FORA ESCA REMEDIATION PROGRAM

Appendix A.
2014 Habitat Restoration Monitoring Report
Interim Action Ranges Munitons Response Area

Former Fort Ord
Monterey County, California

April 15, 2015

Prepared for:

FORT ORD REUSE AUTHORITY

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WESTON SOLUTIONS

WESTCLIFFE | ENGINEERS

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ACRONYMS AND ABBREVIATIONS

AOC	Administrative Order of Consent
ARCADIS	ARCADIS U.S., Inc.
ARARs	Applicable or Relevant and Appropriate Requirements
Army	United States Department of the Army
bgs	below ground surface
BO	Biological Opinion
BRAC	Base Realignment and Closure
C	Celsius
CDFW	California Department of Fish and Game
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cm	centimeter(s)
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CSUMB	California State University Monterey Bay
CTS	California tiger salamander
dbh	diameter at breast height
DGM	digital geophysical mapping
DTSC	Department of Toxic Substances Control
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESCA	Environmental Services Cooperative Agreement
ESCA RP	Environmental Services Cooperative Agreement Remediation Program
ESCA RP Team	ARCADIS U.S., Inc., Weston Solutions, Inc., Westcliffe Engineers, Inc.
F	Fahrenheit
FFA	Federal Facility Agreement
FORA	Fort Ord Reuse Authority
FEG	Future East Garrison
GIS	Geographic Information System
g	gram(s)
GPS	Global Positioning System
ha	hectare(s)
HMP	Installation-Wide Multispecies Habitat Management Plan for Former Fort Ord, California
HRP	Habitat Restoration Plan
IAR	Interim Action Ranges
kg	kilogram(s)

km	kilometer(s)
l	liter(s)
m	meter(s)
MD	munitions debris
MEC	munitions and explosives of concern
MOUT	Military Operations in Urban Terrain
MRA	Munitions Response Area(s)
MRS	Munitions Response Site
msl	mean sea level
NCA	Non-Completed Area
NRCS	Natural Resources Conservation Service
NRIM	Natural Resource Impact Mitigation
NRMA	Natural Resources Management Area
QB	Qualified Biologist
reporting period	01January 2014 through 31 December 2014
ROD	Record of Decision
RWQCB	Regional Water Quality Control Board
SCA	Special Case Area
SOP	Standard Operating Procedure
SQB	Senior Qualified Biologist
WESTON	Weston Solutions, Inc.
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
UXO	unexploded ordnance

1.0 INTRODUCTION

This Year 2 Habitat Restoration Monitoring Report summarizes the activities conducted by the Fort Ord Reuse Authority (FORA) during the second year of habitat restoration monitoring in the Interim Action Ranges (IAR) Munitions Response Area (MRA) on the former Fort Ord in Monterey County, California, between 1 January 2014 and 31 December 2014; it represents the second mitigation monitoring report documenting maintenance and monitoring restoration activities in the IAR MRA. Restoration implementation activities, including seeding and planting in designated restoration areas, were summarized in the 2013 Habitat Restoration Implementation and Monitoring Report (ESCA RP Team 2014; Appendix A).

All known munitions and explosives of concern (MEC) Design Study and Phase II Interim Actions have been completed in the Range 44 Special Case Area (SCA), Range 47 SCA, and Central Area Non-Completed Areas (NCAs) of the IAR MRA by the Environmental Services Cooperative Agreement (ESCA) Remediation Program (RP) Team ("ESCA RP Team", consisting of ARCADIS U.S., Inc. (ARCADIS), Weston Solutions, Inc., and Westcliffe Engineers, Inc. (Figures A1 and A2). The objective of the Design Study and Phase II Interim Action was to complete the interim remedial action within the IAR MRA consistent with the objectives outlined in the Record of Decision (ROD), Interim Action for Ordnance and Explosives at Ranges 43-48, Range 30A, and Site OE-16, Former Fort Ord, California ("Interim Action ROD"; Army 2002) because the IAR MRA is located within a portion of the United States Department of the Army (Army) Munitions Response Site (MRS) for Ranges 43-48 ("MRS Range 43-48"). The interim remedial action objectives in the Interim Action ROD were to reduce risks to human health and the environment and comply with federal and state Applicable or Relevant and Appropriate Requirements (ARARs). The interim remedial action in the remaining portion of the IAR MRA, outside of the SCAs and NCAs, was completed by the Army in accordance with the objectives outlined in the Interim Action ROD and is referred to as the Phase I Interim Action by FORA. To meet the remedial action objectives and complete the selected remedy for the Interim Action ROD in the SCAs and NCAs, a design study was conducted followed by a remedial action in the Range 47 SCA.

The activities completed during the Design Study and Phase II Interim Action began in February 2011 and were completed in March 2013. Activities were conducted in accordance with the Final Phase II Interim Action Work Plan, IAR MRA ("Interim Action Work Plan"; ESCA RP Team 2011) and associated field variance forms. Activities completed during the Design Study and Phase II Interim Action are discussed in the Interim Remedial Action Completion Report (IRACR; ESCA RP Team 2014b).

In accordance with the Interim Action Work Plan, a Habitat Restoration Plan (HRP) for the IAR MRA (ESCA RP Team 2013b) was prepared to describe the activities to be undertaken to restore the natural resources in habitat parcels that were affected by the ESCA RP Team's MEC remedial activities (Figures A2 and A3). The HRP includes requirements outlined in the Installation-Wide Multispecies Habitat Management Plan (HMP) for Former Fort Ord, California ("the HMP"; USACE 1997) and in Biological Opinions (BOs; USFWS 1999,

2002, 2005, 2007) issued to the Army. The HRP includes mitigation measures to avoid and minimize impacts to rare, threatened, and endangered species and their habitats during pre-disposal activities such as munitions response activities (ESCA RP Team 2013b). The plan was reviewed and approved by the Army and United States Fish and Wildlife Service (USFWS) and was provided as an addendum to the Interim Action Work Plan. The activities outlined in the HRP were designed to establish native vegetation at the site that is progressing on a trajectory toward a self-sustaining native plant community equitable with the species richness and relative cover of species included in the HMP that were present on the site prior to the ESCA RP Team investigation and remedial efforts. This report summarizes the monitoring activities performed by the ESCA RP Team, and its subcontractors in 2014, pursuant to requirements outlined in the HRP. Activities were performed for FORA in coordination with the Army.

1.1 Regulatory History

On 31 March 2007, the Army and FORA entered into an Environmental Services Cooperative Agreement (ESCA) to provide funding for MEC remediation services. In accordance with the ESCA and an Administrative Order on Consent (AOC), FORA is responsible for CERCLA response actions, except for those responsibilities retained by the Army, on approximately 3,300 acres of the former Fort Ord with funding provided by the Army. The AOC was entered into voluntarily by FORA, the United States Environmental Protection Agency (EPA) Region 9, the California Department of Toxic Substances Control, and the United States Department of Justice Environment and Natural Resources Division on December 20, 2006 (EPA Region 9 Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] Docket No. R9-2007-03). The underlying property was transferred to FORA in May 2009. The AOC was issued under the authority vested in the President of the United States by Sections 104, 106, and 122 of CERCLA, as amended, 42 United States Code §§ 9604, 9606, and 9622.

ARCADIS has prepared this document on behalf of FORA in accordance with industry standards and consistent with the requirements of the Remediation Services Agreement dated March 30, 2007 by and between ARCADIS and FORA including any applicable governing documents and applicable laws and regulations. As contractors to FORA under the ESCA Remediation Program (RP), the field activities described in this report were conducted by the ESCA RP Team, and their subcontractors. The information presented in this Habitat Restoration Monitoring Report supports the completion of the Phase II Interim Action under the Interim Action ROD (Army 2002).

1.2 Project Summary

Former Fort Ord served primarily as a training and staging facility for cavalry and infantry troops from 1917 until its closure in 1994. The IAR MRA is located in the north-central portion of the former Fort Ord, within the boundary of the historical impact area (Figure A1). The IAR MRA is approximately 227 acres (92 hectares [ha]) in size and is bordered by the Parker Flats MRA to the north, the Seaside MRA to the northwest, and the historical impact

area to the east, south, and southwest. The IAR MRA is within the jurisdictional boundaries of the City of Seaside and Monterey County. The IAR MRA encompasses approximately 227 acres and contains five United States Army Corp of Engineer (USACE) property transfer parcels, E38, E39, E40, E41, and E42.

The proposed future land use for the IAR MRA Phase II areas is habitat reserve (Figure A3). The future land use presented in this report is primarily based upon the 1997 Fort Ord Base Reuse Plan (FORA 1997). Other sources of future land use information include public benefit conveyance, negotiated sale requests, transfer documents, the HMP (USACE 1997), and the Assessment East Garrison – Parker Flats Land Use Modifications (Zander 2002). The Fort Ord Base Reuse Plan identified approximately 20 land-use categories at the former Fort Ord (FORA 1997) including habitat management, open space/recreation, institutional/public facilities, commercial, industrial/business park, residential, tourism, mixed use, and others.

The former Fort Ord was used to train Army infantry, cavalry, and field artillery units until official closure in 1994. In support of the training of soldiers, military munitions were used at the ranges throughout the former Fort Ord. As a result of the training activities, a wide variety of conventional MEC have been encountered in areas throughout the former Fort Ord. The MEC encountered at the former Fort Ord have been either unexploded ordnance (UXO) or discarded military munitions (DMM).

The IAR MRA is located in the area designated by the Army as MRS Ranges 43-48. The Army previously conducted munitions response actions within MRS Ranges 43-48, which encompasses the IAR MRA (Parsons 2002 and Parsons 2007). The Army determined that the MRS Ranges 43-48 warranted an interim action due to the proximity and increased accessibility to the public, the threat of trespassing, and the MEC on or near the surface of the ranges. An Interim Action ROD was produced by the Army in August 2002 for Interim Action Sites at the former Fort Ord, which included MRS Ranges 43-48 (Army 2002). The interim remedial action selected for the Interim Action Sites included surface and subsurface MEC remediation. The interim action in MRS Ranges 43-48, which was referred to as the Phase I Interim Action by FORA, encompassed the IAR MRA and began in 2002 with site preparation followed by a prescribed burn. Interim remedial actions were conducted from November 2003 to December 2005 (Parsons 2007). The Army designated approximately 235 acres within MRS Ranges 43-48 where the interim remedial action was not completed as SCAs or NCAs. Subsurface removal was not completed within the SCAs due to high concentrations of metallic debris or high density of anomalies (Parsons 2007). Approximately 35 acres of SCAs and approximately 9 acres of NCAs within MRS Ranges 43-48 are located within the boundaries of the IAR MRA. Range 44 SCA (approximately 18.9 acres), Range 47 SCA (approximately 15.2 acres), and Central Area NCAs (approximately 9.2 acres) are the areas monitored and reported within this report. Two additional SCAs (Range 45 Trench SCA [approximately 1.15 acres] and a small portion of the Fenceline SCA [one partial 100-ft by 100-ft grid]) are also located within the IAR MRA; however, these areas are not monitored or included in this report.

1.3 Report Organization

This Year 2 Habitat Restoration Monitoring Report is presented in numbered sections, tables, figures, and a photograph appendix. Tables are numbered to correspond with the section in which they are first referenced. Figures and photographs are numbered sequentially. Introductory information for the project, including site description and background information, is presented in Section 1.0. Section 2.0 presents the requirements for restoration associated with the ESCA RP Design Study and Phase II Interim Action activities. The goals, restoration strategies, and success criteria identified in the HRP are summarized in Section 3.0. Section 4.0 provides the methods for quantitative restoration monitoring, followed by Section 5.0, which summarizes routine restoration maintenance, including weed abatement, irrigation system monitoring, erosion control monitoring, and animal deterrent fence monitoring. Sections 6.0 presents the quantitative monitoring results that document native plant establishment and monitoring results, respectively. Conclusions and recommendations are presented in Section 7.0. References are provided in Section 8.0.

2.0 REGULATORY RESTORATION REQUIREMENTS

Primary requirements for restoration associated with ESCA RP response actions are described in the HMP (USACE 1997) and the United States Fish and Wildlife Service BOs (USFWS 1999, 2002, 2005) issued to the Army. These regulatory documents ensure compliance with the Federal Endangered Species Act (ESA) and provide guidance on avoiding and minimizing, to the extent feasible, take of listed species, as well as protection of other species of concern during remedial activities. Moreover, these documents provide specific objectives and goals for the restoration and monitoring of habitat areas reserved in perpetuity that are impacted by remedial activities.

2.1 Habitat Management Plan

The HMP (USACE 1997) and modifications to the HMP provided in the "Assessment, East Garrison—Parker Flats Land Use Modifications, Fort Ord, California" (Zander 2002) present the boundaries of habitat reserve and development areas and describe land use, conservation, management, and habitat monitoring requirements for target species within the former Fort Ord.

The HMP and BOs establish guidelines for the conservation and management of wildlife and plant species and habitats that largely depend on former Fort Ord land for survival (USACE 1997). Threatened and endangered plant and animal species as well as designated critical habitat occur at the former Fort Ord. Each reuse area has been screened for potential impacts or disturbances to any threatened and endangered species identified in the HMP (USACE 1997). Implementation of the provisions of the HMP and referenced additional measures satisfy the requirements of the ESA. The HMP specifically addresses protection of habitats and certain wildlife and plant species ("HMP species") within the former Fort Ord. HMP species were chosen based on their state and federal ESA listing status and the relative

importance of existing populations and habitats at the former Fort Ord to the continued survival of the species. The HMP species list also incorporates those plant taxa included on rare plant list (now called rare plant ranks) 1B by the California Native Plant Society (CNPS) in 1997 with more than 10 percent of their known range at former Fort Ord.

Restoration objectives and goals required by the HMP and mitigation requirements relevant to the IAR MRA restoration effort are described in the HRP (ESCA RP Team 2013b) and are listed below:

- Survey sites before disturbance to estimate restoration potential and establish success criteria (including information on species presence, soil composition, presence of non-native species, slope, aspect, and microhabitats)
- Develop a restoration plan
- Develop feedback mechanisms that allow restoration results to guide the Army's restoration program
- Collect seed and cuttings from within 0.6 mile (1 kilometer [km]) of the restoration site
- Recontour excavation sites to recreate a natural landscape that grades smoothly into existing topography
- Implement erosion control
- Establish native vegetation and HMP species populations that are equitable with those that were removed
- Monitor re-establishment of vegetation in accordance with the Army's protocol for vegetation monitoring
- Conduct monitoring to evaluate the success of restoration efforts
- Meet success criteria established to evaluate healthy central maritime chaparral using baseline data from undisturbed central maritime chaparral communities
- Meet success criteria related to vegetative cover and species diversity
- Meet success criteria for Monterey gilia, also known as sand gilia (*Gilia tenuiflora* subsp. *arenaria*), Monterey spineflower (*Chorizanthe pungens* var. *pungens*), and seaside bird's-beak (*Cordylanthus rigidus* subsp. *littoralis*) including restoration results after five years consistent with self-sustaining populations (in different age stands) of central maritime chaparral, occupying the same amount of habitat and with population sizes comparable to those recorded during the Army's vegetation survey of the former Fort Ord conducted in 1992 (USACE 1992)

- Prepare annual monitoring reports
- Implement corrective measures if monitoring indicates that success criteria for vegetation or HMP species are not being met, including recontouring, weeding, replanting, reseeding, and improvement of habitat for sand (Monterey) gilia and Monterey spineflower

2.2 Biological Opinions

To ensure compliance with the Federal ESA requirements, the Army consulted with the USFWS on the Army's predisposal actions, including cleanup of MEC. These consultations resulted in three BOs that include incidental take coverage for specific numbers of (or habitat acres for) the following wildlife species: Smith's blue butterfly (*Euphilotes enoptes smithi*), black legless lizard (*Anniella pulchra nigra*), western snowy plover (*Charadrius alexandrines nivosus*), and California tiger salamander (*Ambystoma californiense*). The incidental take statements allow impacts to and incidental take of these listed species during project activities and specify minimization and avoidance measures to be implemented during the project for the protection of special status species and their habitats (USFWS 1999, 2005). In addressing listed plant species, these BOs state that "Sections 7(b)(4) and 7(o)(2) of the Act do not apply to the incidental take of listed plant species. However, protection of listed plants is provided to the extent that the Act requires a Federal permit for the removal or reduction to possession of endangered plants from areas under Federal jurisdiction."

Three BOs include requirements for habitat restoration related to ESCA RP Team's remedial activities. The BO on closure and reuse of Fort Ord (USFWS 1999, p. 21) states that "The Army shall implement all portions of the April 1997 HMP for all predisposal activities undertaken." The BO on critical habitat of Monterey spineflower (USFWS 2002) contains restoration-related measures for excavation of soils. The BO on California tiger salamander and critical habitat for Contra Costa goldfields (*Lasthenia conjugens*; USFWS 2005, pp. 11-12) describes restoration requirements proposed by the Army. It should be noted that Contra Costa goldfields have not been reported to occur within the IAR MRA and there is no designated critical habitat for Contra Costa goldfields within the former Fort Ord site.

The following list summarizes USFWS restoration requirements identified in the relevant BOs (USFWS 1999, 2002, 2005).

- Determine a baseline condition during pre-activity assessment
- Biological surveys for HMP plant species will be conducted using the protocol for conducting vegetation sampling at Fort Ord
- Allow sites to recover naturally or restore sites by planting species consistent with the baseline condition of chaparral plant species present prior to remediation. If recolonization does not appear likely; erosion and weed control will be implemented
- Conduct monitoring of disturbed populations in accordance with HMP protocols

- Identify plant species and population densities to be re-established at each site, including a monitoring plan and corrective measures if goals are not met
- Create goals to establish native vegetation at each site and to establish populations of any HMP species affected to levels equitable to those observed before the disturbance
- Develop a restoration plan with success criteria and a monitoring plan
- Develop measures to enhance natural regeneration and recolonization of the [excavated] site
- After excavation, fill will be added to the excavated areas or they will be recontoured into the natural landscape and smooth transition to surrounding topography
- Provide soil stabilization measures to prevent erosion
- Conduct invasive weed and erosion control
- Monitor, evaluate, and implement corrective actions annually for five years to determine if success criteria are met
- Report monitoring results to the USFWS annually

3.0 HABITAT RESTORATION PLAN

In accordance with goals, objectives and requirements outlined above from the HMP and BOs, the HRP was developed to describe the restoration activities in habitat parcels affected by the ESCA RP Team munition response actions. The following goals established in the HRP reflect those outlined in the HMP:

- Preserve, protect, and enhance populations and habitats of federally listed threatened and endangered wildlife and plant species
- Avoid reducing populations or habitat of federal proposed and candidate wildlife and plant species to levels that may result in one or more of these species becoming listed as threatened or endangered
- Preserve and protect populations and habitat of state-listed threatened and endangered wildlife and plant species
- Avoid reducing populations or habitat of species listed as rare, threatened, and endangered by the CNPS (Rare Plant Rank 1B), or with large portions of their range at former Fort Ord, to levels that may result in one or more of these species becoming listed as threatened or endangered

All activities outlined in the HRP are designed to establish native vegetation in the IAR MRA restoration areas that are progressing on a trajectory toward a self-sustaining native plant

community equitable with the species richness and relative cover of HMP species documented on the site prior to the ESCA RP Team's investigation and remedial efforts.

Restoration implementation, maintenance, and monitoring in the restoration areas are overseen by FORA and its contractors. The following sections summarize the restoration strategies and success criteria for specific activities and locations within the IAR MRA.

3.1 Designated Ground Disturbance Categories Associated with MEC Remedial Activities

The areas within the IAR MRA that are the focus of restoration efforts have been given the following names for the purposes of this report, as identified in the HRP (ESCA RP Team 2013b):

- North Range 44 (referred to as "Range 44 SCA [North]" in IAR MRA IRACR Volume 1; Figure A3)

- South Range 44: Includes South Range 44 SCAs and Central Area NCAs (referred to as "Range 44 SCA [South] and Central Area NCAs" in IAR MRA IRACR Volume 1; Figure A3)

- Range 47 Subarea A: Includes a portion of the Range 47 SCA that was subject to large-scale excavation in which the vegetative cover has historically been low, 10% or less (Figures A4 and A5; ESCA RP Team 2013b). Non-native pampas grass was abundant in places. Historical aerial imagery indicates that the vegetation of the area has changed little since the 1970s, despite an apparent lack of recent disturbance, except for fire that has affected the whole range.

- Range 47 Subarea B: Includes the majority of Range 47, which was subject to large-scale excavation prior to restoration activities (Figures A4 and A5). It should be noted that the boundary of Range 47 Subarea B defined in the HRP has been adjusted slightly in this report and is consistent with the boundary presented in the 2013 Annual Natural Resources Report (ESCA RP Team 2014a).

- Range 47 Subarea C: Includes the portion of Range 47 surrounding the large-scale excavation area in which vegetation cutting took place in 2012 (Figures A4 and A5). Subarea C also includes an escarpment where small-scale excavation was conducted. It should be noted that the boundary of Range 47 Subarea C defined in the HRP has been adjusted slightly in this report and is consistent with the boundary presented in the 2013 Annual Natural Resources Report (ESCA RP Team 2014a).

Four designated categories of MEC remedial activities correlated with ground-disturbing actions are addressed in the HRP (Table 3-1). These designated activity categories include:

- Activity A – Ingress/egress pathways and roads: includes light and heavy traffic ingress/egress pathways on *new* ingress/egress corridors required for access to NCAs and SCAs within the IAR MRA boundaries, which required some limited vegetation clearing. This category originally encompassed a more extensive network of existing pathways and roads before it was recognized that no new widening or other vegetation impacts were necessary for the majority of them. Approximate total area affected: 0.4 acres (0.2 ha).

- Activity B – Above-ground vegetation cutting only, prior to target-specific excavation: vegetation is cut at ground level, and removed material is chipped and left in place. Approximate total area affected: 13.8 acres (5.6 ha).

  Target-specific excavations (i.e., highly localized typically small excavations involving typically hand tools, but occasionally backhoe operation) are conducted in SCA and NCA areas that were not excavated, as described below for Activities C and D.

- Activity C – Small-scale soil excavation: includes above- and below-ground vegetation removal, root removal, and soil excavation in limited areas (less than 1 acre [0.4 ha] or less than 100 feet [30 m] wide). Removed vegetation is stockpiled separately, along with the top 6 to 12 inches (15 to 30 centimeters [cm]) of soil, to preserve the existing seedbank. Stockpiled soils are used to backfill excavated areas within the IAR MRA. Approximate total area affected: 1.2 acres (0.4 ha).

- Activity D – Large-scale soil excavation: includes above-and below-ground vegetation removal, root material removal, and soil excavation in a larger area (more than 1 acre [0.4 ha]). Removed vegetation is stockpiled separately, along with the top 6 to 12 inches (15 to 30 cm) of soil to preserve the existing seedbank. Stockpiled soils are used to backfill excavated areas within the IAR MRA. Approximate total area affected: 13.4 acres (5.4 ha).

Restoration strategies were developed for each activity type, as detailed in the HRP (ESCA RP Team 2013b), and are summarized in the following sections.

3.2 Restoration Strategies

The restoration requirements of the BOs and HMP focus on facilitating re-establishment of native vegetation at the site as well as their associated ecological functions. To address the range of disturbance to native habitats anticipated as a result of the MEC investigation and remedial action work, three strategies focused on plant community recovery were identified within the HRP. This multi-strategy approach was based on the assumption that sites experiencing lesser disturbance will be more easily restored via natural processes, whereas sites experiencing greater disturbance (especially those of larger extent) require more active restoration interventions that facilitate natural recovery processes.

Two principles follow from this assumption:

- The level of restoration effort should be commensurate with the level and/or extent of site disturbance.
- Allocation of restoration resources should be biased toward more disturbed and/or larger sites where prevention of site deterioration and facilitation of natural recovery processes are most needed.

One of the three restoration strategies listed below was applied to each affected site, depending on the type and extent of disturbances:

- Monitoring only
- Passive restoration (seeding only)
- Active restoration (seeding and planting)

Restored sites are also monitored for erosion and invasion by exotic plant species. Each strategy and the associated field activities are discussed in the following sections. Restoration activities in the IAR MRA are shown in Figure A4. Subareas in Range 47 are shown in Figure A5.

3.2.1 Monitoring Only

The monitoring-only strategy involves the least restoration effort, with the primary post-disturbance activity being the monitoring of vegetation regrowth and implementation of weed eradication and/or erosion best management practices (BMPs), as needed. It relies upon vegetation re-establishment from existing root biomass, soil seedbank, and dispersal of plant propagules from adjoining habitat into the sites to re-establish the plant community.

"Monitoring only" was implemented where above-ground vegetation was cut or disturbed, but root systems remain intact; where target-specific excavations that were typically small in size and performed primarily with manual tools; and along ingress/egress pathways that were minimally disturbed during munitions investigation activities (Activities A and B).

The monitoring-only strategy was conducted along ingress/egress routes,and in North Range 44 SCAs, South Range 44 SCAs and Central Area NCAs, and Range 47 SCA Subarea C. The escarpment portion (0.5 acres) of Range 47 SCA within Subarea C was subject to small-scale excavation (Activity C). The escarpment was categorized as an Activity B area and the monitoring-only strategy was implemented in this historically low-recruitment area. The long-term pre-existing condition and baseline vegetation cover of the escarpment was documented in the HRP as being an area of low recruitment with less than 10% shrub cover (ESCA RP Team 2013b).

The primary post-disturbance activity associated with the monitoring-only strategy is monitoring regrowth of vegetation and monitoring for weed infestations and/or erosion issues, as needed.

3.2.2 Passive Restoration: Seeding Only

The passive restoration strategy involves an intermediate level of effort and includes topsoil seedbank replacement (i.e., back-filled topsoil), seeding by restoration personnel, and natural dispersal of plant propagules from adjoining high quality habitat into the sites to re-establish the plant community. Topsoil contains native plant seedbank, nutrients, organic material, microorganisms, beneficial fungi, and other elements that promote ecosystem function. Passive restoration is applied to sites where disturbance activities include small-scale soil excavation or soil disturbance in areas of limited extent (i.e., less than 100 feet [30 m] wide [regardless of acreage] or less than 1 acre [0.4 ha] and in both types), surrounded by undisturbed habitat (Activity C).

The passive restoration strategy was implemented in North Range 44 SCAs, South Range 44 SCAs and Central Area NCAs, and Range 47 SCA Subarea C along one linear scrape (Figure A4).

Restoration activities in IAR MRA North and South Range 44 involved backfilling excavated soil, recontouring as needed to match original topography, and seeding of the site by restoration personnel. A small portion of vegetation-cut areas in Range 47 Subarea C was also seeded. Monitoring methods and results of this activity for Year 2 are described in Sections 4 and 6.

3.2.3 Active Restoration: Seeding and Planting

The active restoration strategy involves the greatest level of effort and a wide range of restoration procedures and materials. This strategy has been implemented only in Range 47, where disturbances included large-scale soil excavation (i.e., greater than 100 feet [30 m] wide and more than 1 acre [0.4 ha], Activity D).

Site preparation involved backfilling excavated soil in the correct sequence, recontouring as needed to match original topography, erosion control prior to installation of an irrigation system, and restoration planting and seeding. Active restoration sites are a primary focus of the adaptive management process, which determines when corrective measures are needed to maintain restoration progress.

Monitoring methods and results of this activity for Year 2 are described in Sections 4 and 6.

3.3 Success Criteria and Performance Targets

Quantitative success criteria for the first seven years following site restoration are shown in Tables 3-2 and 3-3 and Year 2 monitoring results are compared with these success criteria in Section 6 of this report.

Evaluation of and reporting against performance standards is required to support compliance with Applicable or Relevant and Appropriate Requirements (ARARs; ESA Federal requirements) in completion of the Phase II Interim Action under the Interim Action ROD (Army 2002). Habitat restoration and monitoring activities are documented consistent with the Phase II Interim Action Work Plan. These results are the basis for annual meetings with the Army and the USFWS held in the first quarter of each year. Site restoration performance is evaluated and approved by the USFWS based on compliance with the requirements of the BOs and HMP in accordance with the Federal ESA.

Demonstration that the restoration requirements of the BOs (USFWS 1999, 2002, 2005) and the HMP (USACE 1997) have been met will be accomplished by documenting two categories of outcomes as stated below:

- Successful soil and topography remediation in targeted areas (Table 3-2)
- Species and vegetation establishment that meet success criteria (Table 3-3)

Habitat restoration in the IAR MRA is being conducted at the site in a manner consistent with the land use requirements, engineering and institutional controls, and site management restrictions outlined in the HMP (USACE 1997) and HRP (ESCA RP Team 2013b). Quantitative success criteria for plant survival, species richness, and percentage cover have been established for the first seven years following site restoration. Metrics for most criteria are based on the pre-existing baseline values, and progress toward those values is determined on anticipated restoration trajectories. Upon determination that success criteria have been met at each site, monitoring efforts will be considered complete.

Restoration success is evaluated based on the following guidelines as stated in the HRP (ESCA RP Team 2013b):

- The health of the restored community will be determined by successful establishment of the community's component species, most importantly the HMP species (USACE 1997, p. 3-20)
- The self-sustainability of the restored community will be determined by vegetative development (i.e., community species richness and percentage cover) over a minimum of three to five years that is consistent with the generally accepted trajectory of chaparral vegetation development

- The equity of the restored community will be determined by its consistency with the baseline (i.e., pre-disturbance) community. The baseline community represents the community that was removed (USACE 1997, p. 3-6)

- The equity of the restored populations of the HMP species will be determined by their consistency with the baseline (i.e., pre-disturbance) HMP populations. The baseline HMP populations represent the populations that were removed (USACE 1997, p. 3-6)

- The self-sustainability of restored populations of HMP species will be determined by their initial establishment and subsequent colonization of seeded and/or planted areas (i.e., HMP species richness and population estimates) over a minimum of three to five years that is consistent with the HMP baseline populations

- The establishment of a restored habitat that is devoid of or minimally affected by exotic invasive plant populations will be determined by eliminating populations of the target exotic species and/or documenting that their populations are below the quantitative target levels (i.e., total community percentage cover) for a minimum of three to five years

Achievement of these restoration objectives are evaluated via the following parameters and their associated quantitative metrics as stated in the HRP (ESCA RP Team 2013b). Results of first-year monitoring for each objective are presented in tables as noted.

- Community equity will be assessed by comparing the total number of plant species present in the site with the number present prior to disturbance (i.e., the plant palette or baseline, including HMP species; Tables 6-1, 6-2, 6-3, and 6-4)

- Restored community health and HMP equity will be assessed by comparing the total number of HMP species present in the site with the number present prior to disturbance (Tables 6-3 to 6-23)

- Self-sustainability of the community will be assessed by: a) achievement of community equity and b) vegetative development as exhibited by the total percentage live plant cover at the site and in a pattern that is consistent with the anticipated trajectory of chaparral regeneration (Tables 6-25 to 6-36)

- Minimization of habitat degradation via exotic invasion will be assessed by preventing the total area of the site occupied collectively by populations of pampas grass (*Cortaderia jubata*), iceplant (*Carpobrotus edulis*) and French broom (*Genista monspessulana*) from exceeding a target value (Tables 6-25 to 6-36, summarized in Section 6.7)

The values of most of the metrics are not static but reflect the increases associated with growth and maturation of the community to be expected as it progresses along the anticipated

trajectory. The following assumptions were made in selecting quantitative success criteria (Table 3-3 in this Appendix).

- Vegetation cover will start at a low of 0% in most areas in Year 1 and increase through time
- The trajectory for vegetation cover to be equitable with pre-disturbance baseline conditions for each location will generally take 10 years
- Species diversity will increase with time and achievement of equitable diversity to pre-disturbance baseline conditions for each location will take 15 years. This process is assumed to be slower than vegetative growth since long-distance seed dispersal and ideal germination conditions are required for seedling establishment and growth for each new species at a given site
- HMP shrub species presence will increase through time
- Monterey spineflower and sand (Monterey) gilia cover and frequency will decrease through time as the chaparral shrub canopy fills in and microsites are occupied by other species
- Seaside bird's-beak is restricted to one location and requires a host plant for long-term presence. This species will recover more quickly in areas with above-ground vegetation removal where host plants are present but will take time to become established in excavated areas
- Plant establishment in Range 47 Subarea A will be slow initially but will increase slowly to at least a minimum of pre-disturbance conditions within 7 years
- Container plant survival will vary by species and individuals may gradually die, but these may be replaced by recruits of the same species

In order to evaluate progress towards achieving success criteria and performance targets, monitoring results are tabulated at least annually, and the result for each parameter are compared with its expected outcome for Year 7 post-installation (Table 3-3). Results that meet or exceed the target criterion for the monitoring period are considered to have demonstrated a successful outcome and achievement of the restoration objective. Results that are below the expected outcome for Year 7 post-installation are examined by the adaptive management process to determine an appropriate course of action, if any. Review and potential reconsideration of past or proposed adaptive management actions will be conducted jointly with USFWS during annual review meetings.

4.0 HABITAT RESTORATION MONITORING METHODS

Quantitative monitoring was conducted in 2014 in all restoration areas to document native plant establishment and survival during the reporting period. Monitoring methods vary, depending on the investigation activity. The order of presentation of methods and results is based on Table 3-3, the Plant Species Diversity and Vegetation-based Success Criteria.

4.1 Native Plant Species Richness Methods (All Activities)

Documentation of native species presence provides an overview of existing species diversity and the suite of species that recolonize work areas over time, along with the relative abundance of HMP species in the site as a whole. In 2014, all native plant species occurring along a vegetation transect or within a quadrat were recorded to provide total species richness per sample; in addition, all native plant species within one meter of a transect tape measure were also recorded in order to capture a more comprehensive summary of native species in munitions investigation areas. A comprehensive list of species in the IAR MRA is compiled and updated each year (Table 6-2).

Mean species richness per transect or quadrat is calculated for each year and each activity type.

Diversity was determined using the Shannon-Wiener Index (H'), which is a function of the relative abundances of the species present, depending on both the number of species and their evenness (Pielou 1974). The following equation was used to calculate H'.

$$H' = -\sum p_i \ln p_i$$

Where:

H' = Shannon-Wiener Index

p_i = proportion of community that belongs to the *i*th species

Evenness (J') was calculated as the ratio of the observed H' to the maximum possible H' for a community with the same number of species (H'_{max}) (Pielou 1974). The maximum possible value for evenness (i.e., 1) is achieved when H' = H'_{max}, which occurs when all species are present in equal abundance. The following equation was used to calculate J'.

$$J' = \frac{H'}{H'_{max}} = \frac{H'}{\log s}$$

Where:

J' = evenness

H' = Shannon-Wiener Index

H'max = maximum possible H' for a community with s species

s = total number of species present

Field logs and species lists for vascular plants and wildlife are maintained and updated on a routine basis during each monitoring visit. Documentation includes conditions prior to investigation activities and subsequent to activities.

For non-HMP shrub species, the number of expected shrub species after a given activity type when compared with baseline numbers is used as a performance metric in the HRP for Activities B, C and D, based on performance targets in the HRP (Table 3-3).

For HMP shrub species richness metrics, a maximum value of three species was established in the HRP as the baseline. The number of HMP shrub species present in each location for each activity type is compared with this baseline, based on performance targets in the HRP (Table 3-3).

Plant nomenclature follows the *Jepson Manual: Vascular Plants of California,* Second Edition (Baldwin et al. 2012). In addition, pertinent volumes of the *Flora of North America* (Flora of North America Editorial Committee, eds. 1993+) are also utilized for plant identification.

4.2 HMP Shrub Species Frequency Methods (Activities B, C, and D)

HMP shrub species frequency is calculated based on the number of transects in which a given HMP species appears divided by the total transects in a given sampling location.

4.3 HMP Herbaceous Species (Annuals and Herbaceous Perennials) Presence and Density Methods (All Activities)

HMP herbaceous species monitoring surveys document baseline and post-remediation locations and densities of HMP annual or herbaceous perennial species during the peak flowering period for each species. Colonies of HMP herbaceous species found within a grid cell or portion of a grid cell are mapped with a hand-held GPS unit (Trimble GeoHX) to record their distribution and range in the work area; a minimum of twenty percent or thirty-eight (which ever number is larger) 100-ft x 100-ft grid cells per munitions investigation activity type are surveyed sampled when HMP herbaceous species are present.

In 2014, numbers of HMP herbaceous species were either censused, or, in areas with high densities, sampled within circular plots (8.2 feet, or 2.5 meter [m] radius), following Burleson (2009). The plot shape was sometimes adjusted to fit the shape of the disturbance area so that

the sampled area fits within the grid cell, the habitat type, the activity type, and the activity year, such as in portions of Range 44 and along ingress/egress corridors.

Reference colonies of each HMP herbaceous species were mapped and sampled if a given HMP herbaceous species was observed in undisturbed vegetation in or around the IAR MRA during a given year. Identified reference colonies are re-mapped and re-sampled each year, if present, according to the standard protocol described above.

Locations of all grids monitored for HMP annuals in 2014 in the IAR MRAs are shown in Figure A2. Observed locations of HMP herbaceous species in the IAR MRA in 2014 are shown in the main report in Figures 10a, 10b, 10c, and 10d.

Baseline Locations for HMP Herbaceous Species Monitoring:

2010-2011 - Baseline surveys were conducted for all HMP herbaceous species in the IAR MRA as follows:

- North Range 44 SCA, South Range 44 SCA/Central Area NCA central maritime chaparral – Forty-one grids sampled for Monterey spineflower, 30 for sand (Monterey) gilia, and 24 for seaside bird's-beak.
- South Range 44 SCA/Central Area NCA grassland - One grid sampled for Monterey spineflower and one for sand (Monterey) gilia.
- Range 47 SCA Subarea A maritime chaparral – One grid sampled for Monterey spineflower, one for sand (Monterey) gilia, and one for seaside bird's-beak.
- Range 47 SCA Subarea B maritime chaparral – Twenty-four grids sampled for Monterey spineflower, 24 for sand (Monterey) gilia, and five for seaside bird's-beak.
- Range 47 SCA Subarea C maritime chaparral – Three grids sampled for Monterey spineflower, three for sand (Monterey) gilia, and 30 for seaside bird's-beak.
- Ingress/Egress corridors maritime chaparral – All existing ingress and egress corridors sampled for Monterey spineflower, sand (Monterey) gilia, and seaside bird's-beak.

2012 - Safety issues in the IAR MRA from 2010 until 2012 necessitated modifications to the 2009 HMP herbaceous species monitoring protocol. Modified baseline HMP species 25 m^2 plots were sampled in 59 grids for Monterey spineflower, 20 grids for sand (Monterey) gilia, and four grids for seaside-bird's-beak around the perimeter of the SCAs/NCAs in habitat with similar vegetation structure and diversity to that of off-limit areas. In addition to monitoring plots, HMP herbaceous species were counted within entire grids when feasible. The HRP (ESCA RP Team 2013b) describes these baseline locations in more detail; the 2012 data are the reference set for required performance standards related to HMP herbaceous species in the HRP.

Munitions Activities Dates:

2011 - Vegetation cutting and small-scale excavations were completed in linear scrapes in South Range 44. Limited ingress-egress routes were cut for access to work areas.

2011-2012 - Large-scale excavation was conducted in 14.4 acres (5.8 ha) in Range 47 and completed in December 2012. A small amount of vegetation cutting was conducted around the edges of Range 47 in 2012. Limited ingress-egress routes were cut for access to work areas.

2012-2013 - Vegetation cutting of all grids in North Range 44 and small-scale excavations in targeted areas and along scrapes were conducted in 2012 and completed in early 2013.

Post-activity HMP Herbaceous Species Monitoring:

Areas surveyed in 2014 for HMP herbaceous species in the IAR MRA are shown in Figure A2.

North Range 44

2013 HMP Herbaceous Species Monitoring – Year 1 monitoring for all HMP herbaceous species was conducted in North Range 44.

2014 HMP Herbaceous Species Monitoring – Year 2 monitoring for all HMP herbaceous species was conducted in North Range 44 on the following dates: 28 May and 5, 9, 23, and 25-26 June 2014 (Figure A2)

South Range 44

2012 HMP Herbaceous Species Monitoring – Year 1 monitoring of all HMP herbaceous species in South Range 44.

2013 HMP Herbaceous Species Monitoring – Year 2 monitoring for all HMP herbaceous species was conducted in South Range 44.

2014 Grassland Reference Plots - Three Monterey spineflower reference plots were sampled in an undisturbed part of the IAR MRA grassland on 31 July 2014 (Figure A2).

2014 HMP Herbaceous Species Monitoring - Year 3 monitoring was conducted for all HMP herbaceous species in South Range 44 on the following dates: 28 May and 2-3 June 2014.

Range 47

2012 HMP Herbaceous Species Monitoring – Year 1 monitoring of all HMP herbaceous species in Range 47 Subarea C.

2013 HMP Herbaceous Species Monitoring – Year 1 monitoring for all HMP herbaceous species was conducted in Range 47 Subareas A and B.

2013 HMP Herbaceous Species Monitoring – Year 2 monitoring for all HMP herbaceous species was conducted in Range 47 Subarea C.

2014 HMP Herbaceous Species Monitoring – Year 2 monitoring for all HMP herbaceous species was conducted in Range 47 Subareas A and B on the following date: 29-30 May and 9-12 June 2014 (Figure A2). HMP herbaceous species were monitored in seeded and planted HMP plots, as well as in all grids per the 2009 protocol (Burleson 2009).

2014 HMP Herbaceous Species Monitoring - Year 3 monitoring was conducted for all HMP herbaceous species in Range 47 Subarea C on the following date: 3 July 2014.

Outside Range 44 and 47 NCAs and SCAs

2012 Central Maritime Chaparral Reference Monitoring – Seven Monterey spineflower reference plots were sampled in the same locations as prior Army transects that also contained HMP herbaceous species plots. These were scattered around the IAR MRA habitat parcel outside of the ESCA RP NCAs and SCAs.

Five sand (Monterey) gilia reference plots were sampled in the same locations as prior Army transects that also contained HMP herbaceous species plots. These were scattered around the IAR MRA habitat parcel outside of the ESCA RP NCAs and SCAs.

Five seaside bird's-beak reference plots were sampled in the same locations as prior Army transects that also contained HMP herbaceous species plots. These were scattered on the eastern half of the IAR MRA habitat parcel outside of the ESCA RP NCAs and SCAs.

2013 Central Maritime Chaparral Reference Plots – One sand (Monterey) gilia reference location was sampled in northwest IAR MRA habitat reserve on 6 May 2013.

One Monterey spineflower reference location was sampled just east of North Range 44 on 11 June 2013.

One seaside bird's-beak reference plot was sampled just east of South Range 44 on 16 May 2013.

Two coast wallflower reference plots were sampled just outside the North Range 44 SCA.

2014 Central Maritime Chaparral Reference Plots - Two new sand (Monterey) gilia reference colonies were surveyed in northwest IAR MRA on 23 May 2014. One new sand (Monterey) gilia reference colony was surveyed just southeast and outside the IAR MRA on 23 May 2014 (Figure A2).

Two Monterey spineflower reference colonies, containing with five new reference plots, were sampled just east of North Range 44 SCA on 26 June and 3 July 2014.

One seaside bird's-beak reference colony, containing two new reference plots, was surveyed along Tanker Road on the east side of the IAR MRA on 24 June 2014.

4.4 Container Plant Survival Methods (Range 47 Restoration Area – Subarea B, Activity D)

The Year 2 container plant survival census was performed between 7 July and 24 July 2014. All live installed plants and volunteers of planted species were recorded within 100 x 100 foot (30 x 30 m) planting (grid) cells; planting cells were subdivided into 10-foot (3-m) wide transects to facilitate the census process.

4.5 Salvaged Shaggy-barked Manzanita Monitoring Methods (Range 47 Restoration Area – Subarea A and B, Activity D)

Monitoring of salvaged shaggy-barked manzanitas was performed immediately after transplanting to assess the size and health of individual plants and to record the GPS position of each plant. A stake was pounded into the ground near the transplant, and the transplant was flagged and labeled with a unique identification number. Plants were classified as small, medium, or large. Small plants ranged from 6 – 12 inches (15.2 to 30.5 cm) in height; medium plants ranged from 12 – 18 inches (30.5 to 45.7 cm) in height; and large plants were 18 inches (45.7 cm) or taller. Plant health assessment was identified as one of the following: good, fair, poor, bad, and dead. All salvaged manzanitas were assessed on 12 June and 09 September 2014.

4.6 Native Vegetation Cover Methods (Activities B, C, and D)

Line-intercept vegetation transects are used to measure shrub and herbaceous vegetation cover in central maritime chaparral vegetation in the IAR MRA in areas subject to ESCA RP munitions investigation activities, following Burleson (2009); however, pursuant to the HRP, vegetation monitoring occurs every year in the IAR MRA restoration areas. Differences in stand age, plant diversity, or other characteristics are documented in order to stratify transect placement into areas that are likely to have distinct species composition and distribution. A random number generator is used to 1) select a grid cell (total number of grid cells in strata), 2) select the quadrant of the grid cell for transect starting point (1-4), and 3) select which compass direction in which to align the transect from the starting point (0-360 degrees). If a transect location is randomly selected and overlaps another transect, it is discarded and a new transect location is chosen.

During 2014, aerial cover by shrub and tree species was recorded for all individuals that intercept the 50-m monitoring tape; including overlapping shrub layers, so there may be two or more species recorded in the same location. Herbaceous cover was only recorded in the absence of shrub or tree overstory, as per the 2009 protocol (Burleson 2009). Cover by herbaceous plants in areas lacking a shrub canopy were not recorded by species but were combined as "herbaceous cover," also called "vegetated ground." However, beginning in

2013, a list of herbaceous species has been kept for each transect. Bare ground and/or litter was recorded in transect segments devoid of vegetation. Waypoints obtained from a GPS unit were recorded for each end of the transect so that the same transect can be revisited in subsequent years. A photograph was taken from one end.

Herbaceous quadrat monitoring is conducted as a component of the vegetation transect monitoring effort if mean shrub cover is relatively low and herbaceous species cover is proportionately high, as is often observed the spring after remediation activities; methods follow the Army's 2009 sampling protocol (Burleson 2009). These supplementary 2.7 square-foot (0.25 m^2) herbaceous quadrats are placed every 32.8 feet (10 m) on alternating sides of each transect, for a total of six per transect. Percent aerial cover for each plant species in the plot is recorded. If any HMP annuals occur within the quadrat, number of plants are counted and recorded. Comparative baseline data may not be available for quadrats.

Monitoring events for supplemental herbaceous vegetation occurs on the same dates and in the same transect locations, when sampled, as vegetation monitoring described in the prior section.

Supplementary herbaceous quadrats are also sampled in grassland vegetation in the IAR MRA. Three grassland "proxy" baseline quadrats were sampled in the IAR MRA grassland on 29 September 2011; these were placed near to proposed munitions investigation activity areas prior to work.

Baseline Transects:

1999-2000 – Baseline transects established by the Army in the Range 44, Range 45, and Range 47 in 2000, prior to the 2003 prescribed burn (HLA 2001, Parsons 2005).

2008 – Thirty Army transects monitored by the ESCA RP team.

2010-2011 – Twenty-three Army baseline transects in central maritime chaparral selected as "proxy" baseline transects for upcoming munitions activities, excluding the Range 47 SCA large-scale excavation area. An additional nine new "proxy" baseline transects were established near to proposed ESCA RP munitions investigation areas; three of these transects were located immediately west of Range 47 SCA to serve as proxy baseline transects for the large-scale excavation.

As of 2011, no further monitoring of Army transects outside of the IAR MRA NCAs and SCAs was indicated due to vegetation recovery reflecting an appropriate and sustainable trajectory associated with high quality habitat (ESCA RP Team 2012).

Munitions Activities Dates:

2011 - Vegetation cutting and small-scale excavations were completed in linear scrapes in South Range 44. Limited ingress-egress routes were cut for access to work areas.

2011-2012 - Large-scale excavation was conducted in 14.4 acres (5.8 ha) in Range 47 and completed in December 2012. A small amount of vegetation cutting was conducted around the edges of Range 47 in 2012. Limited ingress-egress routes were cut for access to work areas.

2012-2013 - Vegetation cutting of all grids in North Range 44 and small-scale excavations in targeted areas and along scrapes were conducted in 2012 and completed in early 2013.

Post-activity Transects:

2012 - Sixteen Year 1 post-activity transects were established in the South Range 44 SCAs/NCAs, a small portion of North Range 44, and areas outside the large-scale excavation in Range 47 SCA.

2013 - Thirteen Year 1 post-activity transects were established in North Range 44 SCA. Ten new transects were established in the Range 47 large scale excavation. One of these 10 was placed in Subarea A, one was placed in the deer exclusion control area (deer present), and one was placed in the irrigation control area. The remaining seven were in Subarea B.

All 29 transects were monitored in 2013.

2014 - All 29 transects were monitored on 8 and 13-14 May, 26 and 30 June, and 1-3 and 14-15 July 2014.

Locations of all transects in the IAR MRA are shown in Figure A2.

Herbaceous Quadrats

2012 - Six new grassland herbaceous quadrats were monitored in the IAR MRA grassland activity area on 25 June 2012: three in areas subject to vegetation cutting and three in areas subject to small-scale excavation.

2013 – The six grassland herbaceous quadrats were monitored on 22 May 2013.

2014 – The six grassland herbaceous quadrats were monitored on 30 June and 1 July 2014.

4.7 Target Weed Cover Methods (All Activities)

Several weedy species found at the Site are listed by the California Invasive Plant Council as invasive weeds (Cal-IPC 2006). Three target weeds are given priority attention during monitoring events, pampas and/or jubata grass (*Cortaderia selloana, C. jubata*), French broom (*Genista monspessulana*), and iceplant (*Carpobrotus* spp., especially *C. edulis*), as required by the HMP (USACE 1997).

In Range 44 and Range 47, cover by non-native species was recorded during vegetation transects, and also estimated visually during monitoring events. In Range 47 Subarea A and B, however, once non-native species were observed, they were usually immediately removed or targeted for subsequent removal by hand pulling.

5.0 RESTORATION MAINTENANCE AND MONITORING

Restoration implementation in the Range 47 Restoration Area began immediately following replacement and recontouring of salvaged soil, which was completed in December 2012; this process is described in the 2013 Habitat Restoration Implementation and Monitoring Report (ARCADIS 2013). The locations of restoration area fencing, soil moisture monitoring tubes, irrigation system, and irrigation zones are shown in Figure A6. Erosion control BMPs, including hydroseeding, hydromulching, silt fencing, and erosion control blanket placement is summarized in Figure A7. Areas that were seeded in 2013 in Range 44 and Range 47 are shown in Figure A8. Details on the seed mixes, container plantings, and the HMP annual seed, seedbank, and container plantings installed in Range 47 were provided in the 2013 Habitat Restoration Implementation and Monitoring Report (ARCADIS 2013).

Routine restoration maintenance and monitoring in the Range 47 Restoration Area in 2014 included weed monitoring and abatement, irrigation system monitoring, operation and maintenance, erosion control monitoring and maintenance, and animal deterrent fence monitoring and repair. Restoration site maintenance and monitoring are described in the following sections.

5.1 Weed Abatement in Range 47 Restoration Area

Abatement of iceplant, pampas grass, and weedy non-native annuals is routinely performed by ESCA RP biologists during routine monitoring, as required by the HRP. All weeds are removed by hand or using hand tools. Weeds are either left onsite to decompose or disposed of offsite if seeds are present, seeds are likely to mature after the plant is removed, or plants can readily re-root.

During 2014, focused weeding was conducted in the Range 47 HMP herbaceous species polygons to reduce weed competition with sand (Monterey) gilia or Monterey spineflower. Iceplant, filaree, hairy cat's ear and tocalote were some of the most problematic weeds in these locations.

Weed abatement took place on the following dates during 2014 in Range 47:

- January 2, 7-8, 14-16, 20-21, and 27-31
- February 3-5, 11-13, 17-19, and 24-25
- March 5-6, 10-13, 17-20, 24-26, and 31

- April 1-3, and 7-10
- May 29-30
- June 3-5, 9-10, 12, 16-20, 23-24, and 28-29
- October 28-29
- November 3-7, 13-14, and 17
- December1-5 and 8-12

5.2 Irrigation Operation, Maintenance, and Monitoring

Irrigation operation, maintenance, and monitoring has been ongoing since the irrigation system was installed in the Range 47 restoration area in January 2013.

The irrigation system was maintained and operated weekly from January through June 2014 if there was insufficient natural precipitation and associated soil moisture. From July through mid-November 2014, the restoration area was irrigated once every two to four weeks to allow plants to harden-off while still augmenting moisture to the roots of small plants.

Irrigation operation and/or maintenance were conducted on the following dates in 2014:

- January 2, 7-8, 14, 16, 20-21, 27-31
- February 3-5, 11-13, 17-19, 24-25
- March 5-6, 10-13, 17-20, 24-27, 31
- April 1-3, 7-10, 14-17, 21-25, 28-30
- May 1, 14-15, 19-22, 28-30
- June 3-5, 9-12, 16-19, 25-26, 30
- July 1-3, 7-11, 14-17, 21-23, 29-30
- August 4-7, 11-13, 18-21, 27-28
- September 2-5, 10-11, 15-17, 22-25, 29-30
- October 1, 7-9, 13, 15, 20, 27, 29-31
- November 4-7, 13-14

A soil moisture monitoring system was utilized to monitor soil moisture at 15 locations in the restoration area at consistent depths below the ground surface down to three feet (1 m; Figure A6). Soil moisture data were gathered at each location using a hand-held soil moisture logger. Data were analyzed routinely and irrigation timing and duration was adjusted as necessary.

Soil moisture monitoring was conducted on the following dates in 2014:

- January 2, 8, 14, 16, 20, 27, 28, 29, 30, 31,
- May 19-22, 30

- June 2
- July 14, 17, 21, 29
- August 4, 7, 11, 14, 21, 25, 28
- September 15, 22
- November 3, 6, 10

5.3 Erosion Control Maintenance

Erosion control monitoring events are routinely conducted before and after significant rain events (> 1/4" in 6 hours or > 1/2" in 24 hours), as well as periodically during rain events using an erosion control checklist. During the monitoring events, all erosion control issues are addressed and documented. During 2014, erosion control maintenance was conducted in the Range 47 restoration area, as well as in the nearby development parcel.

In Range 47, repairs were made to all wattles along the north side of the restoration area, as well as to tears in the erosion control blanket on the escarpment. Additional silt fencing was installed to augment the existing silt fence along the downslope edge of the animal deterrent fencing. Sand bags were replaced as needed throughout the restoration area and new bags were added to address rilling occurring near the western gate. Repairs were made in anticipation of rain events during pre-winter inspections or in response erosion due to post-rain events.

In the development parcel adjacent to Range 47, hydromulch was applied to bare soils covering approximately 2.5 acres (1.01 ha) in this area on 12 November 2014, using a mixture consisting of 2,000 pounds (907 kg) per acre of wood fiber matrix and 5 gallons (19 l) per acre of EarthGuard® tackifier. No seed was added to the hydromulch mixture in the development parcel. The escarpment was hydroseeded with a native seed mix on 11 November 2012 for erosion control purposes.

Since the hydromulching event, regular monitoring has detected no further wind erosion issues in the development parcel. Additionally, new sand bags were installed throughout the development parcel and especially in the southern portion of the development parcel to control rilling and prevent gully formation and soil transport. A formal driving route was marked out within the development parcel to avoid excessive loosening of hard packed soil from vehicles.

Areas targeted for erosion control BMPs in 2013 and 2014 are shown in Figure A7. Erosion control checklists and photo-documentation are included in Appendix E of the main report.

Erosion monitoring and maintenance events in the IAR MRAs were conducted on the following dates in 2014:

- January 30
- February 11, 21
- March 3-6,

- July 31
- August 1, 6-7, 11-14, 18-21, 25-28
- September 2-5, 8-11, 17, 24-25, 29-30
- October 1-2, 6, 13-16, 30-31
- November 3, 10-12
- December 1, 12, 15-19

5.4 Animal Deterrent System Maintenance

Animal deterrent system maintenance has been ongoing since the fencing system was completed in January 2013. ESCA RP biologists routinely inspect the system for potential damage from animal entry. Evidence (bite marks on the deer fencing and scat) of black-tailed jackrabbits (*Lepus californicus*), desert cottontails (*Sylvilagus audubonii*), and western bush rabbits (*S. bachmani*) entering the site have been observed, including gaps in the fencing. Gaps in the fencing are repaired and additional hardware cloth or galvanized metal fencing is added, as needed.

Animal deterrent system monitoring and repairs were conducted on the following dates in 2014:

- January 20
- March 31
- April 1, 3, 7-9
- September 24

5.5 Plant Health Monitoring and Maintenance

In April 2014, ARCADIS biologists noticed that some of the mature bush monkeyflower (*Mimulus aurantiacus*) that were beginning to bloom had paler, larger flowers and pubescence (hairs) on the sepals than those typical of the Fort Ord region; no naturally-occurring bush monkeyflower individuals with these characteristics were observed growing nearby or anywhere in the Fort Ord region. The "pale monkeyflowers" are characteristic of a subspecies found south of Monterey County. It was assumed that some of the nursery plants were of the wrong genotype, despite ARCADIS providing all nurseries with seed and cuttings from the IAR MRA. A total of 759 pale monkeyflower plantings were removed from the restoration area in 2014, beginning in April and continuing as new plants came into bloom through the summer.

In late April 2014, ARCADIS was informed that some of the bush monkeyflower plants grown for the ESCA RP IAR MRA Range 47 restoration project had been infected by a virulent pathogen, *Phytophthora tentaculata*. This pathogen had been discovered and documented in fall 2012 by the California Department of Food and Agriculture (CDFA; S. Rooney-Latham and Blomquist 2014) at one of the nurseries contracted to grow plants for this Range 47 restoration project. The ESCA RP team was informed by CDFA that the pathogen was observed on container specimens of bush monkeyflower being grown to plant

in Range 47 in early January 2013. Infected material was destroyed during fall 2012 by CDFA.

ARCADIS, unaware that the pathogen was discovered at a contracted nursery for the project, took delivery and planted bush monkeyflowers and other container plants in Range 47 during January and early February 2013. In May 2014, an onsite meeting was held with representatives from ARCADIS, the Army, CDFA, and the Monterey County Agricultural Commissioner's office to review pathogen issues. Eleven samples of bush monkeyflower plantings and nearby reference individuals were collected and tested for presence of the pathogen. One of the 11samples was infected with *Phytophthora tentaculata.* This planted specimen was dead at the time of sampling.

To prevent continued infestation or spread of the soil-borne pathogen ARCADIS removed all dead bush monkeyflower plants within the Range 47 restoration site. Additionally, dead plants were bagged before disposal. A total of 1,105 dead monkeyflowers were removed from the Range 47 restoration area between June and October 2014.

In addition, ARCADIS set up a boot and equipment cleaning station at each of the three gates surrounding the restoration area to prevent any inadvertent transfer of pathogens offsite. Cleaning stations include instructional signage, boot scrubbers, and isopropyl alcohol boot dip tubs and or/spray. Additional silt fencing was along the lower perimeter of the restoration area to capture any potential sediments that might be otherwise carried offsite during a large rain event. These pro-active steps were not required by CDFA or the Agricultural Commissioner's office.

Continuous monitoring and additional testing is ongoing to determine the potential presence of the pathogen.

6.0 QUANTITATIVE MONITORING RESULTS

Results of quantitative monitoring for species richness, HMP shrub frequency, HMP herbaceous species presence and density, container plant survival, salvaged manzanita survival, native vegetation cover, and target weed cover are provided in this section. The order of presentation of methods and results is based on Table 3-3, the Plant Species Diversity and Vegetation-based Success Criteria.

6.1 Native Plant Species Richness Results

Summary baseline and post-activity plant species richness data are provided in this section and are shown in Table 6-1. Observed species in the IAR MRA NCAs and SCAs are summarized in Table 6-2. HMP species presence by activity type is presented in Table 6-3, and native shrub species richness by activity type is summarized in Table 6-4.

Comparisons of species richness along baseline and post-activity transects in the IAR for different locations and vegetation types are provided in Tables 6-5, 6-6, 6-7, 6-8, and 6-9). These tables also include number of HMP plant species, species by habit (tree, shrub, herbaceous species, ferns), the Shannon diversity index, as well as cover results for comparison purposes.

6.1.1 Ingress/Egress Routes (Activity A) in IAR MRA

Ingress/egress routes consist of limited access corridors created outside of a grid targeted for munitions investigation activities, primarily in South Range 44.

In the 2013 Annual Natural Resource Report, HMP herbaceous species data were reported from some ingress/egress routes in North Range 44 and elsewhere that are no longer placed in this category. During 2014, ingress/egress routes were more narrowly defined to only encompass access corridors newly created for munitions investigations activities, since no anticipated road widening was necessary on existing corridors.

Fourteen native species were documented along ingress/egress routes prior to munitions investigation activities, and 36 were documented in 2014 subsequent to munitions investigation activities in newly created ingress/egress routes in South Range 44 (Table 6-1). There is no performance standard for overall plant species richness for ingress/egress routes.

6.1.2 Vegetation-Cut Areas (Activity B) in Range 44 and Range 47 Subarea C

A total of 100 native species were documented in Range 44 and Range 47 Subarea C prior to munition investigation activities, including 23 shrub species (Table 6-1 and 6-2). Subsequent to vegetation cutting and target-specific excavation activities in Year 1 (2013), the total number of species in these areas dropped to 79 and the number of shrub and subshrub species dropped to17 in Year 1, primarily as a result of removal of obligate seeding species and species with fleshy fruits.

In 2014, the total native species present after vegetation cutting activities was 92 (>90% of baseline species richness), including 25 shrub and subshrub species, which is higher than the Years 2 through 7 performance target for species richness of 20 species or 30% to 70% of baseline (Tables 3-3 and 6-1).

A total of six HMP species were documented in portions of Range 44 prior to vegetation cutting: sandmat manzanita (*Arctostaphylos pumila*), Eastwood's ericameria (*Ericameria fasciculata),* Monterey ceanothus (*Ceanothus rigidus*), Monterey spineflower, sand (Monterey), gilia and seaside bird's-beak. In 2013 after vegetation cutting, a seventh was added to the list in North Range 44, coast wallflower (*Erysimum ammophilum*). All seven of these species were observed in 2014 (Tables 6-3, 6-5).

Three HMP shrub species were documented in Range 44 and Range 47 Subarea C both before and after vegetation cutting, either due to resprouting or seedling germination:

sandmat manzanita, Eastwood's ericameria, and Monterey ceanothus (seedlings and juveniles).

The presence of all three HMP shrubs in North Range 44, South Range 44, and Range 47 Subarea C in 2014 (3 out of 3 or 100%) is higher than the Years 2 through 7 performance target for HMP shrub species richness (0 to 66%) for areas subject to vegetation cutting (Tables 3-3 and 6-4).

6.1.3 Small-scale Excavation Areas (Activity C) in Range 44 and Range 47 Subarea C

Central Maritime Chaparral: A total of 100 native species were documented in Range 44 and Range 47 Subarea C in central maritime chaparral vegetation prior to munition investigation activities, including 23 shrub species (Table 6-4). Subsequent to small-scale excavation activities (Activity C), the total number of species in these areas dropped to 25 in Year 1 (2013) and the number of shrub and subshrub species dropped to 9. The decrease in species diversity may have resulted from removal of burls and root systems of existing shrubs and perennial species, the mixing and redistribution of topsoil and subsoil layers, and the time it takes for a newly excavated area to be recolonized via seed dispersal from the surrounding area. In 2014, a total of 64 species were observed in Range 44 and Range 47 Subarea C in central maritime chaparral vegetation areas subject to small-scale excavation, with 25 shrub and subshrub species.

The total native species richness of 64 species present after small-scale excavation activities in 2014 (>60% of baseline species richness), including 25 shrub and subshrub species, is higher than the Years 2 through 7 performance target for species richness of 20 species or 20% to 50% of baseline (Tables 3-3 and 6-1).

A total of six HMP species were documented in portions of Range 44 prior to small-scale-excavation: sandmat manzanita, Eastwood's ericameria, Monterey ceanothus, Monterey spineflower, sand (Monterey) gilia, and seaside bird's-beak. In 2014, coast wallflower appeared in small-scale excavation areas, in addition to areas subject to vegetation cutting. All seven of these species were observed in 2014 (Tables 6-3 and 6-5).

Three HMP shrub species were documented in these areas before small-scale excavation activities. Seedlings of all three HMP shrub species, sandmat manzanita, Eastwood's ericameria, and Monterey ceanothus (seedlings and juveniles), have appeared after small-scale excavation activities in both North Range 44 and South Range 44 NCAs and SCAs (Table 6-4).

The presence of all three HMP shrub species 2014 (3 out of 3 or 100%) is higher than the Year 7 performance target for HMP shrub species richness (66%) for areas subject to small-scale excavation (Tables 3-3 and 6-4).

Grassland: A small grassland area in South Range 44 (Figure A2) supported 18 native species prior to munitions investigation activities and 28 species in 2014.

Total species richness (>100% of baseline) is higher than the Years 2 through 7 performance targets (20 to 50% of baseline) for this grassland area. Monterey spineflower was present before and after remedial activities, which is consistent with the Years 2 through 7 performance targets for Monterey spineflower species presence.

6.1.4 Large-scale Excavation Areas (Activity D) in Range 47 Subareas A and B

A total of 25 native species were documented in the Range 47 SCA prior to munition investigation activities, including 22 shrub species. The entire Range 47 area was degraded and supported scattered pampas grass and large mats of iceplant amongst shrubs. A portion of this area had been excavated decades ago at the time of escarpment creation and supported historically low vegetative cover, 10% or less; this area has been designated as Subarea A, while the remainder of the area subject to large-scale excavation is called Subarea B (Figure A5; HRP 2012). Access to Range 47 was limited prior to munitions investigation activities for biological surveys, which may have also contributed to the paucity of species recorded for these areas, which were primarily woody species.

In 2014, 115 native species were recorded in Range 47 Subarea B, and 41 native species were recorded in Subarea A.

Subarea B: Subarea B plant diversity includes six species of trees, including one existing coast live oak tree (*Quercus agrifolia*), and seedlings of Pacific madrone (*Arbutus menziesii*), arroyo willow (*Salix lasiolepis*), black cottonwood (*Populus trichocarpa*), Monterey pine (*Pinus radiata*), and Monterey cypress (*Hesperocyparis macrocarpa*).

Twenty-five shrub and subshrub species currently occur in the Subarea B restoration area, eight more species than the 16 shrub and subshrub species that were planted, which includes three HMP shrub species. A total of 22 shrub and subshrub species were recorded in Range 47 prior to munitions investigation activities, and the 25 shrub species is > 100% of the required shrub species richness performance target for Years 2 (20%) through 7 (70%).

A total of six HMP species are present in Range 47 currently: sandmat manzanita, Eastwood's ericameria, Monterey ceanothus, Monterey spineflower, sand (Monterey) gilia, and seaside bird's-beak. The presence of all three HMP shrubs in Range 47 is higher than the Years 2 through 7 performance target for HMP shrub species richness (0 to 66%) for areas subject to large-scale excavation (Tables 3-3 and 6-4).

Although there is no performance target for herbaceous plant species diversity in the Range 47 Restoration Area, the presence of 84 native herbaceous species mimics the elevated diversity of herbaceous species often recorded after wildfire.

Subarea A: Prior to soil replacement in Range 47 Subarea A, at least two HMP shrubs were documented in this area in small numbers: sandmat manzanita and Monterey ceanothus. Monterey spineflower was also noted.

Although Subarea A vegetative cover and species diversity has been reportedly low for decades (less than 10%), the topsoil from this area was removed during remedial activities and mixed with topsoil from Subarea B and Range 44 before soil replacement. Subsequent germination and plant establishment in this area has been vigorous in the past two years. In 2014, a total of 18 native shrub species were observed in Subarea A, including three HMP shrubs (sandmat manzanita, Monterey ceanothus, and Eastwood's ericameria), along with two HMP annuals (Monterey spineflower and sand [Monterey] gilia).

Shrub species richness and the 18 shrub species present is > 100% of baseline, which is higher than the required shrub species richness performance target for Years 2 (10%) through 7 (30%) (Tables 3-3 and 6-4).

6.2 HMP Shrub Species Frequency Results

HMP shrub species frequency data were gathered during vegetation transect sampling. Frequency is a measure of evenness of a given species distribution, that is, how frequently a given species occurs in a sample across a site. In this case, HMP shrub species is calculated based on the number of transects in which a given HMP species appears divided by the total transects. Performance targets for HMP shrub species frequency are included in the HRP for Activities B and D, with current data shown in Table 6-10.

6.2.1 Vegetation-Cut Areas (Activity B) in Range 44 and Range 47 Subarea C

All three HMP shrub species found in the IAR MRA (sandmat manzanita, Monterey ceanothus, and Eastwood's ericameria) were present after vegetation cutting and associated investigation activities in 2014 (Table 6-10).

In 2014, sandmat manzanita and Monterey ceanothus each had frequencies of 80% in North Range 44 Year 2 transects. Sandmat manzanita also had a frequency of 80% in South Range 44 Year 3 transects, while Monterey ceanothus had a frequency of 90% in South Range 44 Year 3 transects. Eastwood's ericameria was present in fewer transects, 40% in North Range 44 Year 2 transects and 0% in South Range 44 Year 3 transects.

For Activity B, the mean combined frequency of the HMP shrubs as a percentage of the baseline varies between 71.3% and 146.3%, which is higher than the Year 7 performance target of 20% (Tables 3-3 and 6-10).

6.2.2 Large-scale Excavation Areas (Activity D) in Range 47 Subarea B

All three HMP shrub species found in the IAR MRA (sandmat manzanita, Monterey ceanothus, and Eastwood's ericameria) were planted from containers and also produced volunteer recruits.

In 2014, frequencies of HMP shrubs in Range 47 Subarea B transects were: sandmat manzanita (57.1%), Monterey ceanothus (71.4%), and Eastwood's ericameria (42.9%).

For Activity B, the mean combined frequency of the HMP shrubs as a percentage of the baseline was 114.8%, which is higher than the Year 7 performance target of 66%, and all three species are found in Range 47 Subarea B (Tables 3-3 and 6-10).

6.3 HMP Herbaceous Species (HMP Annuals and HMP Herbaceous Perennials) Presence and Density Results

Comparisons of HMP herbaceous plant species density prior to munitions investigation activities and subsequent to activities are provided in this section. Data are presented in Tables 6-11, 6-12, 6-13, 6-14, 6-15, 6-16, 6-17, 6-18, 6-19, 6-20, and 6-21, with separate results for North Range 44, South Range 44, Range 47 Subareas A and B, and Range 47 Subarea C. Because Range 47 Subarea C is small, it was combined with North and South Range 44 in the success criteria table in the HRP (Table 3-3, ESCA RP Team 2013b). Discussion of performance targets in the following sections focuses on North and South Range 44, but data are presented for Range 47 Subarea C separately for reference only.

6.3.1 Ingress/Egress Routes (Activity A) in IAR MRA

In 2014, the mean density/plot of Monterey spineflower in the ingress/egress corridors in South Range 44 was 1,100 individuals; the total Monterey spineflower plants per grid was estimated at 31,388 and the estimated total plants in two grids was 21,235. The 2014 results are much higher than the total 3,349 estimated individuals reported in ingress/egress corridors in 2013 (Table 6-11). The Monterey spineflower density varies by vegetation type, however; mean Monterey spineflower density is 66 individuals/plot in ingress/egress routes cut through central maritime chaparral and 1,034 individuals/plot in open grassland vegetation.

Monterey spineflower was observed growing along ingress/egress routes prior to munitions investigation activities, as well as in 2013 and 2014, which is consistent with the Year 2 through 7 performance targets in Table 3-3.

Sand (Monterey) gilia was not observed in the newly created ingress/egress corridors prior to munitions investigation activities, although it was found growing along regularly used access routes that are no longer classified as "new" ingress/egress routes. In 2013, three sand (Monterey) gilias were observed in one of the new ingress/egress corridors. In 2014, sand (Monterey) gilia was observed near to the ingress/egress routes in two locations, although not actually in them. Because sand (Monterey) gilia was absent in baseline locations for "new" ingress/egress corridors, comparisons of baseline and post-activity data are for information purposes only.

6.3.2 Vegetation-Cut Areas (Activity B) in Range 44 and Range 47 Subarea C

Monterey spineflower: An estimated 27.2 Monterey spineflower individuals/plot were documented in the 2012 baseline sampling in North Range 44 prior to disturbance (Table 6-

12). 2012 baseline Monterey spineflower densities were 40.5 individuals/plot in South Range 44 and 19 individuals/plot in Range 47 Subarea C (Tables 6-11 and 6-13).

North Range 44: In 2014, Monterey spineflower occurred in 35 grids, with a mean density of 35.0 plants/plot in areas subject to vegetation cutting in 2012 (Table 6-12). An estimated total of 35,492 Monterey spineflower individuals were present in post-activity Year 2 areas in 2014, with a mean of 1,014 individuals/grid. Year 2 (2014) Monterey spineflower density was slightly higher than the 2012 baseline density for North Range 44.

Two nearby reference plots supported a mean density of 60 Monterey spineflower individuals/plot.

South Range 44: In 2014 in central maritime chaparral, Monterey spineflower was located in 22 grids with a mean density of 52.1 plants/plot (Table 6-11) and 2,049 individuals per grid in Year 3 post-activity vegetation-cut areas in South Range 44, which exceeds the 2012 baseline. A total of 49,168 Monterey spineflower individuals were estimated to occur in South Range 44 in vegetation-cut areas, which unlike North Range 44, includes grassland vegetation. The grassland occurs in an open area surrounded by maritime chaparral and is dominated by non-native grasses and a mixture of native and non-native forbs. Fewer Monterey spineflower individuals were observed in 2013, 3,601 individuals.

Three nearby reference plots supported a mean density of 290 individuals/plot in 2014.

Range 47 Subarea C: In 2014, average Monterey spineflower density was 122.9 individuals/plot and an estimated 1,484 individuals/grid in Year 3 post-activity vegetation cut areas, encompassing 9 grids for a total estimated 13,353 individuals (Table 6-13). Mean Monterey spineflower density/plot was higher in Year 2 than Year 1 data from the same location, as well as higher than the baseline or nearby North Range 44 reference plots.

Monterey Spineflower Summary for Vegetation-cut Areas in the IAR MRA: In summary, Monterey spineflower was found in 66 grids in vegetation-cut areas in the IAR MRA in 2014 (excluding Range 47 Subareas A and B), with mean densities that ranged from 35 to 122.9 plants /plot in central maritime chaparral. 2014 Monterey spineflower density values are higher than their respective 2012 baseline values and both South Range 44 and Range 47 Subarea C supported more Monterey spineflower at higher densities in Year 3 (2014) than in Year 2 (2013).

In North Range 44, density and total estimated numbers of Monterey spineflower individuals were lower in Year 2 (2014) compared with Year 1 (2013). Lower numbers may be attributed, in part, to competition by vigorous stump-sprouting and recruiting native shrubs and herbs, coupled with three years of subnormal rainfall; persistent masticated vegetation also suppresses annuals in some locations, especially in the chipped vegetation is present in thick layers.

The combined density of Monterey spineflower in all vegetation-cut locations exceeds the 2012 baseline. Monterey spineflower was present in more grids than the 2012 baseline (2

grids) in Year 2 post-activity areas in North Range 44 (35 grids) and combined Year 3 South Range 44 and Range 47 Subarea C grid cells (31 grids). Monterey spineflower presence is higher than performance targets for Years 2 through 7 in vegetation-cut areas (Table 3-3).

Sand (Monterey) gilia: No sand (Monterey) gilia were found in North Range 44 or Range 47 Subarea C in 2012 baseline sampling; an average 2.7 sand (Monterey) gilia/plot were documented in South Range 44.

North Range 44: In 2014, sand (Monterey) gilia was observed in 17 grids in Year 2 post-activity vegetation-cut areas, with a mean density of 4.5 individuals/plot and an estimated 9 individuals/grid and 147 total individuals (Table 6-14). Although Year 2 average sand (Monterey) gilia density values are higher than the 2012 baseline value and nearby reference plot density values, sand (Monterey) gilia plants were extremely diminutive and found in relatively low densities in 2014 compared with previous years. In 2013, an estimated 2,329 sand (Monterey) gilia plants were observed in 29 grids in areas subject to vegetation cutting in 2012, compared with 147 plants in 17 grids in 2014.

An additional 48 sand (Monterey) gilia plants were counted in the Army lead remediation area immediately adjacent to ESCA RP vegetation–cut areas in 2014; it is presumed that seeds and seedbank from sand (Monterey) gilia in North Range 44 have dispersed into adjacent areas.

Three nearby reference plots supported an average of 1.3 sand (Monterey) gilia/plot, 4 individuals/grid, and 12 total individuals.

South Range 44: In 2014, sand (Monterey) gilia was observed in three grids in Year 3 post-activity vegetation-cut areas, with a mean density of 2.0 individuals/plot and a total of 6 individuals (Table 6-15). As in North Range 44, sand (Monterey) gilia plants were tiny and sparsely distributed in 2014. The mean Year 3 density was similar to the nearby reference plots and the 2012 baseline of 2.7 individuals/plot.

Year 3 data are lower than Year 2 results, in which an average density of 3.1 plants were present per plot, with sand (Monterey) gilia present in eight grids, for a total of 33 plants in 2013.

Three nearby reference plots supported a total of 12 sand (Monterey) gilia individuals in 2014, with a mean density of 1.3 individuals/plot.

Range 47 Subarea C: No sand (Monterey) gilias were observed in Range 47 Subarea C in areas subject to vegetation cutting in 2011 (Table 6-16). A total of 66 plants were counted in one location in 2013 Year 1 post-activity sampling, at a mean density of 6.6 plants/plot.

Sand Gilia Summary for Vegetation-cut Areas in the IAR MRA: In summary, numbers and size of sand (Monterey) gilia were much smaller in 2014 compared with 2013; 2014 was the third year in a row of subnormal rainfall, which seemed to effect sand (Monterey) gilia site-wide in areas subject to vegetation cutting, where competition from other sprouting and

recruiting species may have impacted sand (Monterey) gilia germination and establishment. Sand (Monterey) gilia was found in 20 grids in 2014 compared with 37 in 2013 in areas subject to vegetation cutting.

Nonetheless, the combined density of sand (Monterey) gilia in all locations is equivalent or exceeds 2012 baseline density values, and sand (Monterey) gilia was found in 14 grids in 2014 in South Range 44 compared with 13 grids in the 2012 baseline. Sand (Monterey) gilia presence values in vegetation-cut areas are higher than the Years 2 through 7 performance targets for vegetation-cut areas (Table 3-3).

Seaside bird's-beak: 2012 baseline data for seaside bird's-beak indicate an average of 3.3 to 9.3 plants per plot prior to disturbance, depending on the location.

North Range 44: In 2014, seaside bird's-beak exhibited a mean density of 11.2 plants per plot in Year 2 sampling (Table 6-17). An estimated total of 751 seaside bird's-beak plants were found in 11 grids in North Range 44 in vegetation-cut areas, with an average of 68 seaside bird's beak plants/grid. Seaside bird's-beak density and total distribution represented by grid count was higher in Year 2 (2014) results than in the 2012 baseline and also higher than the nearby reference plot, but total estimated numbers of seaside bird's-beak were lower in Year 2 than in Year 1 (2013).

South Range 44: In 2014 in South Range 44, seaside bird's-beak had an estimated average density of 6.3 plants per plot (Table 6-18). Seaside bird's-beak was located in 3 grids in Year 3 post-activity vegetation-cut areas in South Range 44 in 2014, compared with 9 grids in the 2012 baseline and 3 grids in 2013. A total of 19 seaside bird's-beak individuals were counted in South Range 44 in all in vegetation-cut areas. Seaside bird's beak density in 2014 (Year 3) was higher than the 2014 reference plot, but lower than the 2012 baseline and Year 2 density.

Range 47 Subarea C: No seaside bird's-beak plants were observed in Range 47 Subarea C.

Seaside Bird's-beak Summary for Vegetation-cut Areas in the IAR MRA: A total of 770 seaside bird's beak individuals were observed in areas subject to vegetation cutting in the IAR MRA in 2014 sampling. Total individuals and density were higher than the nearby 2014 reference plots but lower than 2013 data. Seaside bird's-beak densities were higher than the 2012 baseline in North Range 44 but lower in South Range 44. As with sand (Monterey) gilia, the prolonged drought coupled with competition from other sprouting and recruiting species may have impacted seaside bird's beak germination and establishment.

Seaside bird's-beak presence values are higher than the Years 2 through 7 performance targets for in vegetation-cut areas (Table 3-3).

Coast wallflower: Prior to 2013, coast wallflower had not been observed in the IAR MRA by ESCA RP biologists, so no reference data from previous years exist. Two 2013 reference grids were established for coast wallflower in North Range 44, the only location in the IAR MRA where this HMP herbaceous perennial has been observed.

In 2014, coast wallflower was observed in three grids in vegetation-cut areas, with an estimated average density of 5.0 individuals/ plot, compared with average density of 4.5 individuals/plot in 2013 (Table 6-19). A total of 33 plants were counted in North Range 44 in Year 2 vegetation-cut areas in 2014. An additional 133 coast wallflower individuals were observed in the Army lead remediation area immediately adjacent to ESCA RP vegetation–cut areas; it is presumed that seeds and seedbank from coast wallflower in North Range 44 have dispersed into adjacent areas, boosting the overall population of this sensitive HMP herbaceous perennial. The total number of coast wallflower observed in the entire area in 2014 was 166, compared with 66 in 2013.

There are no performance targets for coast wallflower presence in the HRP.

6.3.3 Small-scale Excavation Areas (Activity C) in Range 44 and Range 47 Subarea C

Monterey spineflower: An estimated 27.2 Monterey spineflower individuals/plot were documented in the 2012 baseline sampling in North Range 44 prior to disturbance (Table 6-12). 2012 baseline Monterey spineflower densities were 40.5 individuals/plot in South Range 44 and 19 individuals/plot in Range 47 Subarea C (Tables 6-11 and 6-13).

North Range 44: In 2014, Monterey spineflower occurred in 13 grids, with a mean density of 18.4 plants/plot in areas subject to small-scale excavation in 2012 (Table 6-12). An estimated total of 1,528 Monterey spineflower individuals were present in post-activity Year 2 areas, with an estimated mean of 118 individuals/grid. Total Monterey spineflower numbers were higher in 2014 than in 2013, when there were an estimated 1,294 Monterey spineflower plants in 11 grids.

South Range 44: In 2014, Monterey spineflower was observed in 10 grids in South Range 44 in areas subject to small-scale excavations in 2011, with an average estimated density of 154.8 plants/plot in Year 3 and 842 plants/grid (Table 6-11). Approximately 8,422 Monterey spineflower individuals occurred in Year 3 post-activity small-scale excavation areas in 2014, slightly higher than the 7,763 Monterey spineflower plants reported in 2013.

Range 47 Subarea C: In Range 47 Subarea C in areas subject to small-scale excavations in 2011, none of the 3 grids sampled (0%) in 2013 supported Monterey spineflower, but one individual was observed in 2014 (Year 2, Table 6-13).

Monterey Spineflower Summary for Small-scale Excavation Areas in the IAR MRA: In summary, Monterey spineflower was found in 24 grids in small-scale excavation areas in the IAR MRA in 2014 (excluding Range 47 Subareas A and B), expanding from 15 grids in 2013. The mean density of Monterey spineflower individuals/plot varied from 18.4 individuals/plot in North Range 44 in Year 2 (2014) sampling to 154.8 individuals/plot in South Range 44 in Year 3 (2014) sampling; 2014 density values in South Range 44 are higher than the 2012 baseline values three years after small-scale excavation activities, but 2014 mean density values in North Range 44 are lower than the 2012 baseline values two years after small-scale excavation activities, although these numbers are not statistically significant.

The total number of Monterey spineflower in areas subject to small-scale excavation in the IAR MRA are shown for the 2012 baseline and Years 1, 2, and 3 in Figure 31G, indicating an overall increase site-wide.

In 2014, the combined density of Monterey spineflower in all locations subject to small-scale excavation exceeds the 2012 baseline. Monterey spineflower presence values are higher than the Years 2 through 7 performance targets for in small-scale excavation areas (Table 3-3).

Sand (Monterey) gilia: No sand (Monterey) gilia were found in North Range 44 or Range 47 Subarea C in 2012 baseline sampling; an average of 2.7 sand (Monterey) gilia/plot were documented in South Range 44 in the 2012 baseline.

North Range 44: In 2014, sand (Monterey) gilia was observed in 12 grids in Year 2 post-activity small-scale excavation areas, with a mean density of 11.5 individuals/plot, 28 individuals/grid, and an estimated total of 331 individuals (Table 6-14).

Year 2 (2014) mean sand (Monterey) gilia density values in small-scale excavation areas are higher than the reference plots, the 2012 baseline data, and the Year 1 (2013) mean estimated density of 4.4 plants/plot, as are total estimated numbers of sand (Monterey) gilia, 331 in Year 2 (2014) and 108 individuals in Year 1 (2013).

South Range 44: In 2014, sand (Monterey) gilia was observed in 10 grids in Year 3 post-activity small-scale excavation areas, with a mean density of 7.6 individuals/plot, 24 individuals/grid, and an estimated total of 237 sand (Monterey) gilia individuals (Table 6-15). These Year 3 (2014) data show higher mean sand (Monterey) gilia densities than the mean density in Year 2 (2013) of 3.7 plants/plot. Sand (Monterey) gilia was located in 3 grids in small-scale excavation areas in South Range 44 in 2013 and expanded to 10 grids in 2014.

Range 47 Subarea C: In Range 47 Subarea C in areas subject to small-scale excavations in 2011, one sand (Monterey) gilia individual was located in Range 47 Subarea C in small-scale excavation areas in 2013 but no individuals were observed in 2014 (Table 6-16).

Sand (Monterey) Gilia Summary for Small-scale Excavation Areas in the IAR MRA: In summary, sand (Monterey) gilia density was higher in 2014 in both North and South Range 44 than in the 2012 baseline and was also higher in 2014 than in 2013. Sand (Monterey) gilia was found in 22 grids, up from 14 grids in 2013 in areas subject to small-scale excavation the IAR MRA. The total number of sand (Monterey) gilia in areas subject to small-scale excavation in the IAR MRA are shown for the 2012 baseline and Years 1, 2, and 3 in Figure 32G in the main report, indicating an overall increase site-wide.

In 2014, the combined density of sand (Monterey) gilia in all locations subject to small-scale excavation exceeds the 2012 baseline. Sand (Monterey) gilia presence values are higher than the Years 2 through 7 performance targets in small-scale excavation areas (Table 3-3).

Seaside bird's-beak: 2012 baseline data for seaside bird's-beak indicate an average of 3.3 plants/plot in 9 grids in North Range 44 prior to disturbance and 9.3 individuals/plot in 9 grids in South Range 44.

North Range 44: In 2014, seaside bird's beak was observed in 15 grids in Year 2 post-activity small-scale excavation areas, with a mean density of 3.4 individuals/plot, 14 individuals/grid, and an estimated total of 203 seaside bird's-beak individuals (Table 6-17). Seaside bird's beak was only observed in two grids in 2013, with one individual each. Year 2 seaside bird's beak density equals the 2012 baseline and surpasses the Year 1 (2013) density and totals. The total number of seaside bird's beak in areas subject to small-scale excavation in the IAR MRA are shown for the 2012 baseline and Years 1, 2, and 3 in Figure 33G, indicating an overall increase site-wide.

No seaside bird's beak plants were located in South Range 44 or in Range 47 Subarea C in small-scale excavation areas in 2014.

Seaside bird's-beak presence values are higher than the Years 2 through 7 performance targets in small-scale excavation areas (Table 3-3).

Coast wallflower: In 2014, coast wallflower appeared in Year 2 small-scale excavation areas for the first time, with an estimated average density of 5.0 individuals/ plot and 10 plants per grid (Table 6-19).

6.3.4 Large-scale Excavation Areas (Activity D) in Range 47 Subareas A and B

6.3.4.1 HMP Annual Species in Restoration Area

Two HMP annual species were documented in Subarea B prior to soil excavation and replacement: Monterey spineflower and sand (Monterey) gilia. Both species have appeared as seedlings from soil seedbank after soil replacement and have been planted as well (ARCADIS 2014). In addition, seaside bird's-beak, an HMP annual species, not observed in this area prior to investigation activities, germinated from the soil seedbank in spring 2013 and reappeared in 2014.

The initial effort to re-establish Monterey spineflower and sand (Monterey) gilia in Range 47 in 2013 was concentrated in the created HMP annual species polygons in Subareas A and B; these areas were seeded, or spread with HMP annual seedbank, or planted with small container plantings (Figure A8). Seed of HMP annual species also germinated in the replacement topsoil that originated onsite or in nearby Range 44.

In 2014, a total of 1,865 Monterey spineflowers, 109 sand (Monterey) gilias, and two seaside bird's-beak individual germinated, flowered, and set seed in the Range 47 Restoration Area *outside* of the HMP annual polygons (Table 6-20 and 6-21). It is no longer possible to discriminate between HMP annual species germinating from salvaged topsoil or from seed

dispersal from HMP annual plots, although higher densities were often observed near the perimeter of the planting plots.

In 2014, a total of 2,562 Monterey spineflower were censused *inside* HMP annual polygons -- 1,177 individuals in seeded polygons and 1,385 in seedbank polygons, with an average of 203.8 to 235.4 Monterey spineflower individuals/polygon (Table 6-22). Density and total numbers of Monterey spineflower were lower in 2014 compared with 2013, and Monterey spineflower was present in slightly fewer grid cells in 2014 (39) than in 2013 (44).

The 2012 baseline Monterey spineflower plots had an average of 6.0 individuals/plot and 6.0 individuals/grid in 5 grids for a total of 30 Monterey spineflowers. In 2014, in Subarea B there were an average of 5.5 Monterey spineflower individuals/plot and a mean 162 plants/grid for a total of 4,861 individuals. In Subarea A (low recruitment area) in 2014, there were 1.7 Monterey spineflower individuals/plot and a mean 21 plants/grid for a total of 107 individuals.

Monterey spineflower presence is higher than performance targets for Years 2 through 7 in large-scale excavation areas in both Subareas A and B (Table 3-3).

In 2014, a total of 849 sand (Monterey) gilia were tallied inside HMP annual polygons -- 30 sand (Monterey) gilia in seeded polygons, 0 in seedbank polygons, and 819 in sand (Monterey) gilia planting polygons. Sand (Monterey) gilia container planting polygons were the only experimental plot type that supported a higher density of sand (Monterey) gilia in 2014 compared with 2013 (Table 6-22). There was a mean density of 81.9 sand (Monterey) gilia individuals in container planting polygons compared with 15.0 individuals in seeded polygons. The total number of sand (Monterey) gilia individuals in the Range 47 restoration area in 2014 was higher than in 2013; sand (Monterey) gilia was found in more grids in 2013 (14), however, compared with 2014 (9).

The 2012 baseline sand (Monterey) gilia plots had an average of 2.0 individuals/plot and 3.0 individuals/grid in 2 grids for a total of 30 sand (Monterey) gilia. In 2014, in Subarea B there were an average of 2.4 sand (Monterey) gilia individuals/plot and a mean 99 plants/grid for a total of 887 individuals. There were no sand (Monterey) gilia in Subarea A (low recruitment area) in 2014, and only one in 2013.

Sand (Monterey) gilia presence is higher than performance targets for Years 2 through 7 in large-scale excavation areas for Subarea B; there is no sand (Monterey) gilia performance target for Subarea A (Table 3-3).

In 2014, there was one seaside bird's beak in Subarea A and one in Subarea B; this HMP annual was not observed in baseline sampling and there is no performance target for seaside bird's beak in large-scale excavation areas.

6.3.5 HMP Herbaceous Species Monitoring Discussion

Central maritime chaparral is a vegetation type of particular concern in the HMP because it supports a number of rare, threatened, and endangered species populations. Herbaceous species densities vary due to changes in canopy cover, climatic variables, substrate type, presence and persistence in the seedbank, disturbance, competition from invasive species, and other variables. Observed patterns of HMP herbaceous species occurrence the IAR MRA in 2014 are summarized here.

The IAR MRA supports the largest expanse of sandhill central maritime chaparral of the three MRAs monitored in 2014, and it is here that the greatest numbers of Monterey spineflower stands are concentrated, especially in sunny openings in natural chaparral vegetation as well as immediately after disturbance. Density declines in the years following disturbance for a variety of reasons, including weed competition and canopy overgrowth. In addition, density often declines in drier years. The mean annual rainfall in the project region is 13.2 inches (33.5 cm); in 2010, when baseline surveys were conducted, 22.2 inches (56.3 cm) of precipitation was recorded, significantly above the norm (weatherunderground.com). Precipitation between 2012 and 2014 was subnormal, 11.4 inches (29 cm) in 2012, 11.3 inches (28.6 cm) in 2013, and 8.5 inches (21.5 cm) in 2014. Due to three consecutive years of drought, lower numbers and densities of HMP herbaceous species were expected during 2014 HMP herbaceous monitoring. Observed individuals of HMP herbaceous species in 2014 were often smaller and less robust than in previous seasons, especially outside of Range 47 (which was irrigated during 2014).

In 2014, there is a striking distinction between HMP herbaceous species densities and colony numbers between areas that were subject to vegetation cutting and small-scale excavations and those that were subject to small-scale excavations. In 2014, there were higher densities and numbers of all species after small-scale excavations compared with areas subject to vegetation cutting (except for Range 47 Subarea C sand (Monterey) gilia); see Figures 28G – 33G in the main report. In areas subject to vegetation cutting, stump-sprouting shrubs and numerous recruits of trees, shrubs, and herbaceous species have colonized the open areas in the last two (North Range 44, Range 47 Subarea C) to three years (South Range 44); in contrast, Years 2 and 3 small-scale excavation areas in the IAR MRA support relatively low vegetation cover and low shrub densities.

The year 2014 is the driest year of a three-year drought, and competition for space, water, and nutrients may be exerting stronger pressures in vegetation-cut areas than in small-scale excavation areas. In addition, persistent chipped mulch from native shrubs in areas subject to vegetation cutting may retard seedling establishment, especially of small-seeded annuals.

Active restoration of Monterey spineflower and sand (Monterey) gilia was conducted in the Range 47 Restoration Area because of concerns that there might be insufficient seed in the replacement topsoil seedbank for re-establishment of these species. In 2014 a total of 4,427 Monterey spineflowers, 958 sand (Monterey) gilias, and two seaside bird's-beak individual germinated, flowered, and set seed in the Range 47 Restoration Area; individuals of each

species are found in various locations within the Restoration Area and appear to have formed self-sustaining colonies (Table 6-20 to 6-22, Figures 10a, 10b, and 10c in main report). The Range 47 Restoration Area was irrigated in 2014 (Section 5.2).

6.4 Container Plant Survival Results in Range 47 Subarea B

In 2014, it was no longer possible to distinguish container plantings from volunteer recruits, many of which grew rapidly and were the same size as plantings. Therefore, all container plantings and recruits were tallied in a combined census. A total of 120,030 individuals were censused in the Range 47 restoration area, 614% more than the 31,592 total container plantings of 16 species of shrubs and subshrubs in January and early February 2013 (Table 6-23).

Seedlings by all 16 species were observed in both Subarea B and Subarea A, so shrub and subshrub presence in the container planting area could originate from a container planting, from the salvaged soil seedbank, or from contributions of seeds by mature container plantings.

The highest survival/recruitment rates (>500%) were exhibited by rush-rose, coast horkelia, dwarf ceanothus, shaggy-barked manzanita, black sage, and Monterey ceanothus. The three planted HMP shrubs all became successfully established; these include sandmat manzanita (2,001 individuals, 125% survival), Monterey ceanothus (5,139 individuals, 524% survival), and Eastwood's ericameria (2,579 individuals, 69% survival). All species exhibited survival/recruitment totals that exceeded their individual container planting number with the exception of the HMP shrub, Eastwood's ericameria, which was still higher than the performance target for all plantings for all years (Figure A9).

The 613% survival rate is higher than the container planting survival performance target for all years (Table 3-3 and 6-23).

6.5 Salvaged Manzanita Survival Results

One hundred and thirty-seven shaggy-barked manzanita plants were transplanted into the Range 47 Subareas A and B (Table 6-24). Of these plants, 53 were classified as small (6-12 inches [30.5 cm] tall), 64 as medium (12 to18 inches [30.5 to 45.7 cm] tall), and 20 as large (greater than 18 inches [45.7 cm] tall). Due to field implementation logistics, 21 of the 137 plants, one from Subarea A and the remainder from Subarea B, needed to be transplanted at least a second time and in some cases more than two times.

Survival data are presented on Table 6-24 and shown in Figure A10.

A total of 57 salvaged manzanita plants (41.6%) were still alive in 2014. Of the 137 manzanitas initially salvaged, there were 39 surviving small plants (73.6%), 17 surviving medium plants (26.6%), and one surviving large plant (5.0%) in September 2013.

Thirteen manzanitas were transplanted into Subarea A, a small portion of Range 47 that historically supported less than 10% vegetation cover (ESCA RP Team 2013b). Subarea A received replacement subsoil and topsoil similar to Subarea B during large-scale excavation activities. The remaining 124 manzanita transplants were placed in Subarea B. Six manzanitas (42.9%) survived in Subarea A in 2014, and 51 manzanita survivors (41.5%) were counted in Subarea B. The highest mortality rates in Subareas A and B were for medium and large manzanita transplants. Twenty-one manzanitas were transplanted twice, and six of these survived (28.6 %), with small manzanitas comprising the greatest proportion of survivors.

Although large salvaged manzanitas have greater biomass and burl structure that might potentially augment survival after transplanting, a greater proportion of roots may be lost during transplanting in large plants compared with small ones. The data suggest that small plants are the best candidates for salvaging using the methods employed for this effort.

6.6 Native Vegetation Cover Results

Native vegetation in the IAR MRA is comprised primarily of central maritime chaparral, with a small grassland area located in South Range 44 SCA. Baseline and 2014 post-activity sampling data are summarized in this section based on three activity types: vegetation cutting and target-specific investigations, small-scale excavations, and large-scale excavation. During 2014, a total of 28 transects were monitored in the IAR MRA (Figure A2).

6.6.1 Vegetation-Cut Areas (Activity B) in Range 44 and Range 47 Subarea C

Four dominant shrubs formed the majority of shrub cover in 2010-2011 baseline transects in the entire IAR MRA: shaggy-barked manzanita (29.3% average cover), dwarf ceanothus (20.2% cover), Monterey ceanothus (13.5% cover), and chamise (9.0 % average cover), all of which had frequencies of 90% or greater (Tables 6-25 to 6-27); mean total shrub and subshrub cover was 94.5%.

When baseline transect data are segregated by site, different localized patterns emerge. South Range 44 has the lowest combined mean baseline cover of shaggy-barked manzanita and chamise (25.8%), compared with North Range 44 (37.8%) and Range 47 Subarea C (44.8%). Dwarf ceanothus is an important associated species in all three areas: South Range 44 (30.4%), North Range 44 (23.4%), and Range 47 Subarea C (13.7%). Monterey ceanothus has similar cover (16%) in South Range 44 and Range 47 Subarea C, but lower cover in North Range 44 (9.4%).

All post-activity vegetation monitoring transects showed a decline in native shrub cover immediately after vegetation cutting, with a fairly rapid rise in cover two to three years after munitions investigation activities were complete. Mean native shrub cover was 28.4% in Year 3 transects in South Range 44, 38.4% in Year 2 transects in North Range 44, and 62.7% in Year 3 transects in Range 47 Subarea C.

Since the greatest initial cover in post-activity transects is initially provided by stump-sprouting dominants such as shaggy-barked manzanita and chamise, a comparison of baseline and post-activity data for those two species by site points to a pattern of strong vegetation recovery. Combined Year 3 cover of these two species equals 65% of baseline cover in South Range 44; combined Year 3 cover exceeds 100% of baseline cover in Range 47 Subarea C; and combined Year 2 cover in North Range 44 equals 57% of baseline cover.

Obligate seeding species also exhibit high frequencies in post-activity data. In both South Range 44 and North Range 44, sandmat manzanita and Monterey ceanothus both are documented in at least 80% of all transects. In Range 47 Subarea C, dwarf ceanothus was an important baseline associate that was found in 67% of transects, and Monterey ceanothus was found in 100% of transects.

Native plant species richness increased after vegetation cutting in the IAR MRA (Tables 6-5, 6-6 and 6-7). Nineteen native plant species were recorded in baseline transects in dense chaparral vegetation in 2010-2011, 17 of which were shrub species, and one which was an herbaceous species. The total number of native species along transects was highest in Year 1 after vegetation cutting, with 24 native species in North Range 44, 17 in South Range 44, and 7 in Range 47 Subarea C. Mean number of shrub species per transect decreased after vegetation cutting in South Range 44 and Range 47 Subarea C but was similar to baseline data in North Range 44. Herbaceous species richness increased in all areas when data were included within one meter of the transect tape in 2014.

Herbaceous cover was 12.7% in Year 2 transects in North Range 44, but only 1% in Year 3 transects in Range 47 Subarea C (excluding iceplant) and 2.2% in Year 3 transects in South Range 44 (Tables 6-25, 6-26, and 6-27).

There were no observations of target weed species or non-native grass species on transects in vegetation-cut areas in North Range 44 or South Range 44 in 2014. In Range 47 Subarea C, however, where non-native iceplant historically has covered large areas, iceplant cover in Year 3 was 8.6%. Iceplant in this area is being removed from this area as part of the ESCA RP ongoing weed treatment program.

Post-activity native vegetation cover in North Range 44 (Year 2) and Range 47 Subarea C (Year 3) has reached the Year 7 performance cover target (Table 3-3). Post-activity Year 3 native vegetation cover in South Range 44 has reached the Year 6 performance cover target (Table 3-3).

6.6.2 Small-scale Excavation Areas (Activity C) in Range 44

Because all above-ground and below-ground vegetation parts are removed during this process, there are few to no burls or other subterranean stems from which shrubs and herbaceous perennials can resprout. Almost all plant species must colonize these areas by germinating from seed or other propagules.

North Range 44: Year 2 (2014) mean native vegetation cover in newly excavated areas was 4.3%, with 1.9% mean native shrub and tree cover and 2.4% mean native herbaceous cover (Table 6-28). No species had greater than 0.4% cover (rush-rose and coast live oak), and unlike South Range 44, North Range 44 transects show little cover by deerweed and none by chamise. Cover and frequency data indicate germination by several shrubs including three HMP shrubs – Monterey ceanothus, sandmat manzanita, and Eastwood's Ericameria – as well as shaggy-barked manzanita, dwarf ceanothus, Monterey ceanothus, sandmat manzanita, and others.

Cover in herbaceous quadrats in areas subject to small-scale excavations in North Range 44 averaged 1.4% in Year 1, with about 0.9% native cover and 0.5% non-native cover (Table 6-30). Native woody cover averaged 0.5% in Year 1 after small-scale excavations. Small numbers of woody seedlings or sprouts of small pieces are appearing, with sandmat manzanita exhibiting the highest frequency (13.9%) but negligible cover. The cover values are expected to increase quickly through time as the newly recruited seedlings enlarge in size.

The native vegetation cover (4.3%) for small-scaled excavation areas in Year 2 is consistent with the Year 2 performance target of 5%.

South Range 44: Mean cover of both deerweed and chamise was 7.2% each in Year 3 transects in South Range 44, boosting total shrub cover to 16.4% (Table 6-29). Deerweed, a colonizing nitrogen-fixing subshrub, has shown a steady increase in cover during the past three years, but chamise was absent until Year 3. Other shrub species found with low cover (< 1%) in Year 3 include rush-rose, golden-yarrow, black sage, dune-heather, poison-oak, and the HMP shrub, sandmat manzanita. Shrubs that occurred in more than 50% of small-scale excavation transects include chamise, deerweed, sandmat manzanita, rush-rose, black sage, and golden yarrow. Herbaceous cover between shrubs contributed an additional 3.3% cover in Year 3, about one-half of that observed in Year 2.

The native vegetation cover (19.7%) for small-scaled excavation areas in Year 3 after remedial activities in South Range 44 is consistent with the Year 4 performance target (Table 3-3).

Native cover in 30 herbaceous quadrats in South Range 44 averaged 6.2% in Year 3, with mean native herbaceous cover of 4.2% representing 16 herbaceous species (Table 6-31). Six-weeks fescue (*Festuca octoflora*) exhibited the highest mean cover (3.4%), followed by deerweed (1.8%). Four HMP species germinated in small-scale excavation areas in South Range 44 and were present in 2014 sampling with low cover (< 1%), including Monterey ceanothus, sandmat manzanita, Monterey spineflower, and sand (Monterey) gilia; frequency values for these HMP species were 3.3%, 6.7%, 33.3%, and 10% respectively. Species found in at least 20% of quadrats include rush-rose, deerweed, golden yarrow, six-weeks fescue, and Monterey spineflower.

Non-native species cover was 0.1%, with no non-native grass cover.

Grassland: Baseline herbaceous vegetation cover in grassland vegetation in South Range 44 averaged 68% in three herbaceous quadrats, with 33.7% native vegetative cover and 34.3% non-native vegetative cover, especially non-native grasses (Table 6-32). Both the native coast tarplant (*Deinandra increscens* subsp. *increscens*) and non-native rattail fescue were found in all baseline quadrats, with average cover of 17% and 17.7%, respectively. The HMP annual Monterey spineflower averaged 16.7% cover. Nine species were recorded during baseline sampling.

In Year 3 (2014) after munitions investigation activities, total average vegetative cover in six herbaceous quadrats was 15.4%, with 10% native cover and 5.5% non-native cover. Mean native cover in 2014 was comprised primarily of Monterey spineflower (4.3%), common lessingia (*Lessingia pectinata* var. *pectinata.* 1.9%), coast tarplant (1.3%), and California poppy (*Eschscholzia californica, 1%*). For the first time, Eastwood's ericameria was present in these permanent grassland transects, with 0.3% cover. Sand (Monterey) gilia also occurs nearby. Of the 5.5% non-native species cover in Year 3, 3.4% cover consisted of ripgut brome (*Bromus diandrus*) and 1% was smooth cat's ears (*Hypochaeris glabra*).

Year 3 total mean cover (15.4%) in grassland vegetation declined substantially from Year 2, when total mean cover was 83.7. This decline in cover was observed qualitatively in similar undisturbed grassland habitats nearby and may be a result of the prolonged three-year drought. A total of 14 native species occurred in the six herbaceous quadrats, mostly with low cover values. No native grasses occurred in the sampling area.

The 14 native species recorded in the grassland herbaceous quadrats is higher than the six species recorded in baseline quadrats and therefore higher than the Year 7 performance target of 50% of baseline species richness. Monterey spineflower presence is also consistent with the performance target for all years and no target weeds species were observed. Native vegetation cover is just slightly below the 12% cover target for Year 2 (Table 3-3).

6.6.3 Large-scale Excavation Areas (Activity D) in Range 47 Subareas A and B

Prior to munitions investigation activities in Range 47, baseline vegetative cover near Subarea B averaged 72.0% and was dominated by dwarf ceanothus (21.1%), shaggy-barked manzanita (20.8%), with coyote bush (13.9%) and Monterey ceanothus (12.6%) comprising the most common associates (ESCA RP Team 2013a). Non-native pampas grass and iceplant, both HMP target weeds, were also scattered in openings between shrubs.

Average cover in Subarea A was lower than Subarea B prior to remedial activities, 10% or less (ESCA RP Team 2013a). Non-native pampas grass was abundant in places. Historical aerial imagery indicates that the vegetation of the area has changed little since the 1970s, despite an apparent lack of recent disturbance, except for fire that has affected the whole range.

After soil sifting and replacement in 2012, the vegetation cover in the Range 47 Restoration Area was zero prior to planting and seeding in early 2013. Seven new vegetation transects

were established in Subarea B in June 2013 and resampled in July 2014. These transects were placed in areas that were planted with container plantings and received regular irrigation. HMP annual species planting polygons were avoided during vegetation sampling.

Subarea B: Total mean native vegetation cover in Subarea B in July 2014 was 65.4%, an increase from 50.3% native cover in 2013. Total mean shrub and subshrub cover in 2014 was 46.0%, compared with 16.7% in 2013 and mean native herbaceous cover in 2014 was 19.4%, compared with 33.6% in 2013 (Table 6-33).

Mean shrub cover in 2014 was comprised of obligate-seeding large shrubs: dwarf ceanothus (15.3% cover), dune-heather (3.9%), black sage (2.0%), coyote bush (2.0%), and Monterey ceanothus (1.5%) all had greater than 1% cover for a combined cover of 25%. The pre-activity dominant stump-sprouting species, chamise (3.9%) and shaggy-barked manzanita (0.3%), were becoming established and contributed 4.2% to total mean cover. Two subshrubs with high cover were the nitrogen-fixing deerweed (8.7%) as well as rush-rose (6.3%), representing 15% cover overall. All of these species had frequencies greater than 70%, indicating widespread establishment and long-term presence. The shrub species mix reflects that present prior to large-scale excavation activities.

Forty-five herbaceous species provided 19.4% mean native cover along line transects during 2014 sampling. The herbaceous perennial, coast horkelia, had the highest cover (9.4%) and will be an important perennial associate in this recovering chaparral vegetation type long-term. Annuals, biennials, and short-lived perennials that were frequently observed include coast tarplant, several species of everlasting (*Pseudognaphalium*), horseweed (*Erigeron canadensis*), California mustard (*Caulanthus lasiophyllus*), and a rich diversity of other species in smaller numbers. Native herbaceous species found in 70% or more of the transects include coast horkelia, coast tarplant, horseweed, fragrant everlasting, and cottonbatting plant. Red maids, which was fairly common in 2013 in the restoration area, continued to be present in smaller numbers and didn't appear along any of the transects. The relatively high cover provided by smaller herbaceous species and subshrubs is expected to decline in the coming years to a shrub-dominated community, based on the high frequency of healthy shrub seedlings and juveniles that currently exhibit low cover but will increase in size through time.

Coast horkelia and coast tarplant also had the highest cover in herbaceous quadrat data in Range 47 (Table 6-35).

A comparison of HMP shrub frequency between baseline and Year 2 conditions reveals establishment and site-wide distribution for several sensitive HMP species in the Range 47 Restoration Area. Of the two HMP shrubs present in baseline sampling, sandmat manzanita is present in more transects in 2014 (57.1%) than in the 2012 baseline transects (33.3%); Monterey ceanothus was found in all 2012 baseline transects and also present in 71.4% of 2014 transects, indicating widespread establishment. The HMP shrub, Eastwood's ericameria, was absent in the 2012 baseline but is widely scattered in the restoration area, with 42.9% mean frequency in 2014 transects.

In Subarea B, the 2014 results for shrub species richness, native vegetation cover, HMP shrub species richness, HMP shrub species frequency all are higher than performance targets for all years (Years 1-7).

The 65.4% native vegetative cover in Subarea B is higher than the Year 7 performance target of 50%. Monterey spineflower and sand (Monterey) gilia are both present in Subarea B, which is consistent with that performance target. Three out of three HMP shrubs (100%) are widely scattered in Subarea B, which is higher than the 66% HMP shrub species richness target. The mean HMP shrub frequency of 114.8% is also higher than the 66% target. Eighteen native shrub and subshrub species in shrub transects is higher than the nine species in the 2012 baseline of nine and is higher than the shrub richness performance target for all years (Tables 3-3 and 6-10). Target weed cover is less than 5%.

Unirrigated fenced grid: In order to evaluate the effectiveness of irrigation in boosting native plant cover in container planted areas in Subarea B, one transect in an unirrigated fenced grid cell in Subarea B was sampled in July 2014 (Table 6-34). Total mean vegetative cover in this unirrigated fenced transect was about 25% lower than in the irrigated, fenced grid: 48.5% in the unirrigated fenced grid compared with 65.4% in irrigated fenced grids. Shrub and subshrub cover averaged 37.7% in the unirrigated transect, compared with 46.0% in the irrigated transects. Herbaceous cover averaged 10.7%, about 45% lower than the 19.4% herbaceous cover in the irrigated transect. There were fewer native herbaceous species (8 species) in the unirrigated transect compared with the irrigated transects (15 species), a factor that was also observed qualitatively throughout the unirrigated fenced grid cell. Irrigation appears to benefit woody plant establishment and herbaceous species cover and diversity at this restoration site.

Unfenced irrigated grid: An unfenced irrigated grid cell in Subarea B was also created to assess the potential effects of herbivory on native plant establishment (Table 6-34). Total vegetative cover in this unfenced irrigated transect in 2014 was 51.9%, a significant increase over 2013 cover in this grid, 13.6%. Shrub and subshrub cover in one transect established in the unfenced irrigated grid cell was 24.7%, lower than the unirrigated but fenced transect. The unfenced irrigated area supported nine native herbaceous species, compared with 15 native herbaceous species in irrigated and fenced transects and eight in the unirrigated fenced transect. Herbaceous cover increased from 2.7% in 2013 to 27.1% in 2014, primarily due to elevated cover of coast tarplant and horseweed; horseweed is often more common in slightly moister soils and is likely to decrease in cover once irrigation is discontinued in spring 2015. This transect supported the lowest shrub cover of any area, suggesting that herbivory likely plays an important role in limiting native plant growth during the initial phase of habitat restoration in unfenced areas.

Subarea A: Subarea A, an area that historically exhibited low vegetation cover (less than 10%), received the same subsoil and topsoil replacement as Subarea B in December 2012 and was fenced, irrigated, and seeded in January 2013, but did not receive container plantings. Total native vegetative cover in one transect in Subarea A in July 2014 was 74.6%, in comparison with 65.4% average cover in irrigated fenced transects in Subarea B that received container plantings (Tables 6-33 and 6-34); the range of native cover in Subarea B transects

was 51% to 82%. Approximately 59.5% of the vegetative cover in Subarea A was from shrubs and subshrubs established from seed, with the remaining 15.1% cover contributed by a range of native herbaceous species, including 11.2% cover by coast horkelia.

When comparing data from different planting treatments in the Range 47 Restoration Area (fenced/unfenced, irrigated/unirrigated, container planting/seeding), herbaceous species richness was highest in the fenced, irrigated, and planted soil replacement area in Subarea B, followed by Subarea A. The quantity of species that germinated from the replacement seedbank surpassed expectations, with 115 native species observed in Subarea B and 41 native species in Subarea A (Table 6-1); all planted species produced volunteer recruits.

The 74.6% native vegetative cover in Subarea A is higher than the Year 7 performance target of 10%. Monterey spineflower and sand (Monterey) gilia are both present in Subarea A, which is consistent with that performance target. Seventeen native shrub and subshrub species in shrub transects is higher than the nine species in the 2012 baseline and is higher than the shrub richness performance target for all years (Tables 3-3 and 6-10). Target weed cover is less than 5%.

Both large-scale excavation Subareas A and B have achieved all performance targets required in the HRP.

6.6.4 Vegetation Monitoring Discussion

Central maritime chaparral is the dominant vegetation type in the IAR MRA. Mature chaparral vegetation structure consists of a relatively simple canopy layer with a diversity of annual and short-lived herbaceous species in sunny openings between shrubs, including a number of local endemic taxa. Fire plays a major role in chaparral ecosystems, typically occurring every few decades, returning nutrients to the soil that are tied up in dead wood and leaf litter as well as creating openings with ample sunlight and space for seed germination and seedling establishment. A number of chaparral shrubs, such as shaggy-barked manzanita, and chamise, have underground or surface stems (burls) that resprout after fire. Other shrubs, such as dwarf ceanothus, Monterey ceanothus, and sandmat manzanita, are obligate seeders that can only recolonize a burned site from seed after fire; often the seed requires fire-induced cues in order to germinate. Post-fire sites are often carpeted with a mixture of obligate-seeding shrubs and herbaceous species the spring after a wildfire. As shrubs become re-established after fire, herbaceous and smaller species tend to be excluded by expanding canopies of the dominant shrubs; however, even in mature stands of central maritime chaparral, open areas may occur between shrubs that support herbaceous species.

Different types of munitions investigation activities have strikingly different effects on maritime chaparral vegetation. Vegetation cutting leaves the root systems of many stump-sprouting shrubs intact, whereas soil excavation destroys root systems of all species. These differences are consistently reflected in monitoring data. Year 2 and Year 3 post-activity data show a resurgence of dominance by stump-sprouting manzanita and chamise individuals, with 25% or greater cover, and gradual recolonization by obligate-seeding shrubs (Figure

18G and 20G in main report). Subshrubs such as the nitrogen-fixing deerweed are common immediately after vegetation cutting in some areas, along with rush-rose, which also tolerates disturbance of various types. Vegetation cover generally increases rapidly in the first few years following vegetation cutting, and as obligate-seeding shrubs germinate and enlarge, the mix of species becomes more diverse over time.

In contrast, native vegetation recovery after excavation (small-scale or large-scale) is dependent on either the existing seedbank in topsoil, if topsoil has been salvaged and replaced, or on gradual colonization of the bare excavated areas by means of seed dispersal into the excavated area over time and the contributions of any remaining seedbank. Often, small-scale excavation areas exhibit higher cover and diversity at the immediate edge of the excavation and lower diversity in the center. Initial shrub cover is low, usually less than 5%, since it is derived from seed dispersal and seedling growth, with a relatively higher component of herbaceous species and subshrubs providing a sparse scattering of vegetative cover. Although recovery is generally slower than in vegetation-cut areas, the presence and cover of dominant species is expected to increase over time.

Although large-scale excavation resulted in the complete removal of all above and below-ground plant parts in Range 47, active restoration has resulted in a diverse mix of species from a combination of container plantings, seeding, and thousands of recruits of tree, shrub, and herbaceous annuals and perennials that have germinated from the soil seedbank. Fencing to deter herbivory and irrigation of container plantings areas has augmented restoration success, with the entire restoration area achieving all performance standards in 2014. The one unfenced, irrigated grid supported lower cover in 2014 than a fenced but unirrigated grid; although comparative data are limited, herbivory likely plays an important role in limiting native plant establishment and growth after munitions investigation activities.

6.7 Target Weed Cover Results

Ongoing weed removal efforts in the Range 47 Subareas B and A restoration areas have kept the density and cover of target weeds low during the reporting period, at around 1% or less. Iceplant seedlings continue to germinate throughout the Range 47 Restoration Area, along with a range of other weed species including Indian hedge mustard (*Sisymbrium orientale)*, tocalote (*Centaurea melitensis*), red brome (*Bromus madritensis* subsp. *rubens*), filaree (*Erodium* spp.), tropical horseweed (*Erigeron sumatrensis*), and others. Occasional pampas grass are removed as well, as quickly as they are encountered. All are removed on a routine basis, keeping weed cover low in this area.

In Range 47 Subarea C, however, where non-native iceplant historically has covered large areas, iceplant cover in Year 3 was 8.6%. Iceplant in this area is being removed from this area as part of the ESCA RP ongoing weed treatment program and is now below 1%.

Target weed cover for all activity types is at or below 1%, based on vegetation sampling in 2014 (see Tables 6-25 to 6-36). Weed monitoring and removal activities are summarized in Appendix D in the main report.

7.0 CONCLUSIONS AND RECOMMENDATIONS

All known MEC investigation activities in the ESCA RP MRAs were completed in 2013. Biological monitoring in 2014 included completion of 28 vegetation transects, 96 herbaceous species quadrats, and 161 HMP herbaceous species plots, along with surveys on 283 acres for HMP herbaceous species; these monitoring events and associated data provide the ESCA RP Team with valuable information to guide in ongoing site management.

The habitat parcels found in the IAR MRA currently supports four HMP herbaceous species, the most of any MRA. Furthermore, the IAR supports the highest numbers of sand (Monterey) gilia, seaside bird's beak, and coast wallflower HMP individuals of any MRA. In 2014, more than 136,000 Monterey spineflower, 1,620 sand (Monterey) gilia, 1,000 seaside bird's-beak, and 43 coast wallflower individuals were found in all activity types in the IAR MRA.

Vegetation cover and species diversity data indicate recovery of all sensitive vegetation types subject to munitions response actions in the IAR MRA. A combination of committed stewardship, including reductions in acreages potentially subject to vegetation cutting in South Range 44 (saving 13.2 acres [5.4 ha], or 75% of intact central maritime chaparral, along with a diversity of native and HMP species); steady post-activity increases in vegetation cover, species diversity, and number of individual HMP herbaceous species; and ongoing weed and erosion control management activities all combine to promote habitat recovery after munitions investigation activities.

All required soil and topography remediation success criteria were met in 2013.

Both large-scale excavation Subareas A and B have achieved all performance targets required in the HRP in 2014. Restoration plantings are in good health and on a trajectory to continue increasing in size while maintaining populations of HMP annuals.

In Range 44, all areas have reached all performance targets for species richness, HMP shrub species, and HMP herbaceous species presence in all areas. Vegetation cover in North Range 44 and Range 47 Subarea C have reached the Year 7 performance target for areas subject to vegetation-cutting. Areas subject to small-scale excavation show considerable recruitment, based on frequency data, but will require additional years to reach vegetation cover performance targets. In addition, all areas have lower than the maximum required target weed cover, including Range 47 Subarea C, as a result of recent weed removal efforts.

The enhanced native species diversity and cover observed at all sites, along with wildlife usage and other indications of elevated ecological functionality, suggest all areas are on trajectories toward self-sustaining native plant communities equitable with the species richness and relative cover of species that were present on the site prior to the FORA ESCA RP Team investigation and remedial efforts.

Year 3 and 4 quantitative surveys will begin in spring 2015 to satisfy conditions set forth in the HRP. The following tasks will be performed in 2015 to complete mitigation efforts:

Range 47 Restoration Area

- Continue weed control program
- Conduct routine maintenance and monitoring of Range 47 Restoration Area, including irrigation, fence repair, and monitoring for erosion issues and herbivory
- Vegetation transects
- Herbaceous quadrats
- HMP annual surveys
- Species diversity documentation
- Survival censuses and related data in Range 47
- Submit annual monitoring report

North Range 44 and South Range 44 Restoration Areas and Range 47 Subarea C

- Conduct weed control program for target weeds, as needed
- Vegetation transects
- Herbaceous quadrats
- HMP annual surveys
- Species diversity documentation
- Submit annual monitoring report

8.0 REFERENCES

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Table 3-1
Interim Action Ranges MRA Activity Types and Restoration Strategies

2014 Annual Natural Resource Report – Appendix A

Activity Type	Activity Category	Anticipated Investigation Area (acres)	Completed Investigation Area (acres)	Restoration Strategy	Planned Actions
Ingress/egress routes	A	5.5	0.4	Monitoring only	- monitor
Above-ground vegetation cutting prior to target-specific excavation	B	12.3	13.8	Monitoring only	- separate/replace topsoil/subsoil in specified sequence
Small-scale soil excavation - areas of less than 1 acre or no more than 100 feet wide. All vegetation removed above and below ground.	C	2.9	1.2	Passive (seeding)	- separate/replace topsoil/subsoil in specified sequence
					- recontour to match original
					- control erosion as needed
					- seed
					- monitor
Large scale soil excavation - areas of greater than 1 acre or more than 100 feet wide. All vegetation removed above and below ground.	D	13.4	13.4	Active (seeding and container planting)	- separate/replace topsoil/subsoil in specified sequence
					- recontour to match original
					- control erosion as needed
					- seed
					- container plantings
					- monitor
Totals		***34.1***	***28.8***		

Table 3-2
Soil and Topography Remediation Success Criteria

ESCA RP 2014 Annual Natural Resource Report – Appendix A

Restoration Strategy	Success Criteria	Evaluation Method/Procedure	Monitoring Frequency
Soil decompaction on trails and roads	Match soil texture and structure to that of nearby native soils	Linear measurements via GIS of trails and roads requiring restoration	At end of construction activities prior to restoration
		Comparison of samples every 0.25 mile with nearby native soils	After completion of de-compaction efforts
Remove constructed berm in Range 47and restore to pre-existing conditions	Match original topography as closely as possible	Comparison with 1964 aerial image for reference	At end of construction activities prior to remediation
		Ground-level photographic imagery before and after remediation	After completion of re-contouring
Topsoil and subsoil placement in Range 47 Subarea A	6-inch topsoil improvement on 80% of exposed dune hill in Range 47 Subarea A	Comparison with 1964 aerial image for reference	At end of construction activities prior to remediation
		Volume calculations	During re- contouring
		Document soil placement in specified manner	During re- contouring
		Ground-level photographic imagery before and after remediation	After completion of re-contouring

Table 3-3
Plant Species Diversity and Vegetation-Based Success Criteria

ESCA RP 2014 Annual Natural Resource Report – Appendix A

Activity Category	Location	Completed Investigation Area (acres)	Restoration Strategy	Performance Category	Performance Metric	Performance Target for Post-installation by Year							Baseline for Comparison
						1	2	3	4	5	6	7	
Ingress/egress routes (Activity A)	All ingress/egress routes	0.4	Monitoring only	Monterey spineflower presence	% focus species baseline	100	70	60	50	30	20	10	2010-2012 unpublished monitoring data
				Sand (Monterey) Gilia presence	% focus species baseline	100	50	40	30	20	10	0	
				Pampas grass and French broom recruits	% total area	<5	<5	<5	<5	<5	<5	<5	total area
Above-ground vegetation cutting followed by target-specific excavation (Activity B)	North Range 44 SCAs, South Range 44 SCAs and Central Area NCAs, part of Range 47 SCA Subarea C[1]	13.8	Monitoring only	Total native species richness (max. value = 20)	% IAR-wide baseline by area	25	30	35	40	50	60	70	Tables 2 and 3 of this HRP
				Native vegetation cover	% cover by location	0	5	10	20	25	30	50	
				HMP shrub species richness (max. value =3)	% IAR-wide baseline by area	0	0	33	33	33	66	66	
				HMP shrub species frequency	% frequency of HMP shrub species	0	5	5	10	15	20	20	
				Monterey spineflower presence	% focus species baseline	100	70	60	50	30	20	10	2012 baseline monitoring plots
				Sand (Monterey) Gilia presence	% focus species baseline	100	50	40	30	20	10	0	
				Seaside bird's beak presence	% focus species baseline	10	10	5	5	5	5	5	
				Pampas grass and French broom recruits	% total area	<5	<5	<5	<5	<5	<5	<5	total area
Small-scale soil excavation (Activity C)	North Range 44 SCAs, South Range 44 SCAs and Central Area NCAs, linear scrape in Range 47 Subarea C	1.1	Passive (seeding)	Total native species richness (max value = 20)	% of Total Present	15	20	25	30	40	50	50	Tables 2 and 3 of this HRP
				Native vegetation cover	% cover by location	0	5	10	20	25	30	50	
				HMP shrub species richness (max value =3)	% of total present	0	0	33	33	33	66	66	
				Monterey spineflower presence	% focus species baseline	100	30	10	0	0	0	0	2012 baseline monitoring plots
				Sand (Monterey) Gilia presence	% focus species baseline	100	20	10	0	0	0	0	
				Seaside bird's beak presence	% focus species baseline	0	0	0	5	5	5	5	
				Pampas grass, iceplant, and French broom recruits	% total area	<5	<5	<5	<5	<5	<5	<5	total area
	Grassland grid cell in South Range 44 SCA	0.1	Passive (seeding)	Total Species Richness	% baseline	10	20	30	40	45	50	50	Grassland Reference Site - 2010/2011 unpublished monitoring data
				Native vegetation cover	% cover	8	12	20	25	30	35	40	Grassland Reference Site - 2010/2011 unpublished monitoring data
				Monterey spineflower presence	% focus species baseline	100	50	30	10	10	10	10	2012 baseline monitoring plots
				Pampas grass, iceplant, and French broom recruits	% total area	<5	<5	<5	<5	<5	<5	<5	total area

Table 3-3
Plant Species Diversity and Vegetation-Based Success Criteria

ESCA RP 2014 Annual Natural Resource Report – Appendix A

Activity Category	Location	Completed Investigation Area (acres)	Restoration Strategy	Performance Category	Performance Metric	Performance Target for Post-installation by Year							Baseline for Comparison
						1	2	3	4	5	6	7	
Large-scale soil excavation (Activity D)	Range 47 Subarea A (low recruitment area)	1.2	Passive (seeding)	Shrub species richness	% of total present	0	10	10	20	20	20	30	Tables 2 and 3 in this HRP
				Native vegetation cover	% cover by location	0	1	2	4	6	8	10	
				Monterey spineflower presence	% focus species baseline	0	0	30	10	10	10	10	2012 baseline monitoring plots
				Pampas grass, iceplant, and French broom recruits	% total area	<5	<5	<5	<5	<5	<5	<5	total area
	Range 47 Subarea B	12.2	Active (container planting and seeding)	Container plant survival	% total planted	0	60	60	60	50	50	50	Tables 2 and 3 in the HRP[2]
				Shrub species richness	% of total present	0	20	30	40	50	60	70	
				Native vegetation cover	% cover by location	0	5	15	20	25	30	50	
				HMP shrub species richness (max value =3)	% of total present	0	0	33	33	33	66	66	
				HMP shrub species frequency	% frequency of HMP shrub species in IAR-wide baseline	0	0	33	33	33	66	66	
				Monterey spineflower presence	% focus species baseline	100	70	60	50	30	20	10	2012 baseline monitoring plots
				Sand (Monterey) Gilia presence	% focus species baseline	100	50	40	30	20	10	0	
				Pampas grass, iceplant, and French broom recruits	% total area	<5	<5	<5	<5	<5	<5	<5	total area

Notes:

1 = Area includes 0.5-acre escarpment where small-scale excavation was conducted. The escarpment could not be accessed safely to conduct passive or active restoration. For this reason, the escarpment was categorized as an Activity B area and the monitoring-only strategy was implemented in this area.

2= ESCA RP Team 2013. Phase II Interim Action Work Plan Addendum: Habitat Restoration Plan; Interim Action Ranges Munitions Response Area, Former Fort Ord, Monterey County, California. 26 March. Prepared for Fort Ord Reuse Authority. (Fort Ord Administrative Record No. ESCA-0261B)

Table 6-1
Total Native Species Richness by Activity Type

ESCA RP 2014 Annual Natural Resource Report – Appendix A

Activity Category	Location	Restoration Strategy	Total Native Species Present Prior to Activities	Total Native Species Present in 2013 After Activities	Total Native Species Present in 2014 After Activities
Ingress/egress routes (Activity A)	All ingress/egress routes	Monitoring only	14	14	36
Above-ground vegetation cutting followed by target-specific excavation (Activity B)	North Range 44 SCAs and Central Area NCAs, South Range 44 SCAs, Range 47 SCA Subarea C	Monitoring only	100	79	92
Small-scale soil excavation (Activity C)	North Range 44 SCAs and Central Area NCAs, South Range 44 SCAs, Range 47 SCA Subarea C	Passive (seeding) [1]	100	25	64
	Grassland grid cell in South Range 44 SCA		18	20	28
Large-scale soil excavation (Activity D)	Range 47 Subarea A (low recruitment area)	Passive (seeding)	25 [2]	47	41
	Range 47 Subarea B	Active (container planting and seeding)	25 [2]	115	115

[1] Seeding delayed until fall 2013 due to ongoing munitions investigation activities during most of 2013

[2] Only limited field surveys allowed in Range 47 prior to munitions investigations activities

Table 6-2
Observed Plant Species in IAR MRA

ESCA RP 2014 Annual Natural Resource Report – Appendix A

Scientific Name	Common Name	HMP species	CNPS Rare Plant Rank	Cal-IPC Invasiveness Status	IAR MRA Range 44	IAR MRA Range 44 Grassland	IAR MRA Range 47 Subarea A	IAR MRA Range 47 Subarea B	IAR MRA Range 47 Subarea C
Trees									
Arbutus menziesii	**Pacific madrone**							x	
Hesperocyparis macrocarpa	**Monterey cypress**		1B.2					x	
Pinus radiata	**Monterey pine**		1B.1					x	
Populus trichocarpa	**black cottonwood**							x	
Quercus agrifolia	**coast live oak**				x			x	
Salix lasiolepis	**arroyo willow**				x			x	
Shrubs and Subshrubs									
Acmispon glaber	**deerweed**				x		x	x	x
Adenostoma fasciculatum	**chamise**				x		x	x	x
Arctostaphylos pumila	**sandmat manzanita**	HMP	1B.2		x		x	x	x
Arctostaphylos tomentosa* subsp. *tomentosa	**woolyleaf manzanita**				x		x	x	x
Artemisia californica	**California sagebrush**				x				
Baccharis pilularis* subsp. *consanguinea	**coyote bush, coyote brush**				x		x	x	x
Ceanothus dentatus	**dwarf ceanothus**				x		x	x	x
Ceanothus rigidus	**Monterey ceanothus**	HMP	4.2		x		x	x	x
Ericameria ericoides	**dune-heather, mock-heather**				x		x	x	x
Ericameria fasciculata	**Eastwood's ericameria**	HMP	1B.1		x		x	x	x
Eriophyllum confertiflorum	**golden yarrow**				x		x	x	x
Frangula californica* subsp. *californica	**California coffeeberry**				x		x	x	x
Garrya elliptica	**coast silk-tassel**				x			x	x
Crocanthemum scoparium	**rush-rose**				x		x	x	x
Heteromeles arbutifolia	**toyon**				x			x	x
Lepechinia calycina	**pitcher sage**				x			x	x
Lupinus arboreus	**coastal bush lupine**				x		x	x	x
Lupinus chamissonis	**silver bush lupine**				x	x	x	x	x
Mimulus aurantiacus	**bush monkeyflower**				x		x	x	x
Ribes malvaceum	**chaparral currant**				x			x	x
Ribes speciosum	**fuchsia-flowered gooseberry**				x			x	x
Salvia mellifera	**black sage**				x		x	x	x
Solanum umbelliferum	**blue witch nightshade**				x		x	x	x
Symphorocarpus mollis	**creeping snowberry**				x			x	x
Toxicodendron diversilobum	**poison-oak**				x			x	x

Table 6-2
Observed Plant Species in IAR MRA

ESCA RP 2014 Annual Natural Resource Report – Appendix A

Scientific Name	Common Name	HMP species	CNPS Rare Plant Rank	Cal-IPC Invasiveness Status	IAR MRA Range 44	IAR MRA Range 44 Grassland	IAR MRA Range 47 Subarea A	IAR MRA Range 47 Subarea B	IAR MRA Range 47 Subarea C
Herbaceous species (annuals, perennial herbs, grasses, and grass-like species)									
Achillea millefolium	**common yarrow**				**x**			**x**	
Acmispon heermannii* var. *orbicularis	**wooly lotus**				**x**	**x**		**x**	**x**
Acmispon strigosus	**Bishop's lotus**				**x**		**x**	**x**	**x**
Aira caryophyllea	common silver-hair grass				x	x		x	
Amblyopappus pusillus	**amblyopappus**				**x**			**x**	
Amsinckia intermedia	**common fiddleneck**				**x**	**x**		**x**	
Anagallis arvensis	scarlet pimpernel				x			x	
Antirrhinum majus	snapdragon							x	
Apiastrum angustifolium	**wild celery**				**x**			**x**	
Armeria maritima* subsp. *californica	**California sea pink, sea thrift**				**x**				
Artemisia douglasiana	**mugwort**							**x**	
Avena barbata	slender wild oat				x	x		x	
Avena fatua	wild oat								
Briza maxima	rattlensnake grass							x	x
Bromus diandrus	ripgut brome				x	x		x	
Bromus hordeaceus	soft chess				x	x		x	
Bromus madritensis subsp. rubens	red brome			high	x			x	
Calandrinia ciliata	**red maids**				**x**		**x**	**x**	**x**
Calochortus albus* var. *albus	**fairy lanterns, globe lily**				**x**			**x**	
Calyptridium monandrum	**pussy paws**				**x**			**x**	
Calystegia subacaulis	**hill morning-glory**				**x**				
Camissonia contorta	**contorted suncups**				**x**	**x**		**x**	
Camissoniopsis cheiranthifolia* subsp. *cheiranthifolia	**beach primrose**							**x**	**x**
Camissoniopsis micrantha	**small suncups**				**x**			**x**	**x**
Cardionema ramosissimum	**sand mat**				**x**		**x**	**x**	
Camissonia cheiranthifolia* subsp. *cheiranthifolia	**beach evening primrose**							**x**	
Carex globosa	**round-fruited sedge**				**x**			**x**	
Carpobrotus edulis	hottentot fig/ice plant			high	x		x	x	
Castilleja exserta* subsp. *latifolia	**wideleaf purple owl's clover**				**x**	**x**		**x**	
Caulanthus lasiophyllus	**California mustard**				**x**		**x**	**x**	**x**
Centaurea melitensis	tocalote			mod	x	x		x	
Chenopodium californicum	**California goosefoot**							**x**	

Table 6-2
Observed Plant Species in IAR MRA

ESCA RP 2014 Annual Natural Resource Report – Appendix A

Scientific Name	Common Name	HMP species	CNPS Rare Plant Rank	Cal-IPC Invasiveness Status	IAR MRA Range 44	IAR MRA Range 44 Grassland	IAR MRA Range 47 Subarea A	IAR MRA Range 47 Subarea B	IAR MRA Range 47 Subarea C
Herbaceous species (annuals, perennial herbs, grasses, and grass-like species)									
Chorizanthe diffusa	**diffuse chorizanthe**				**x**			**x**	
Chorizanthe pungens **var. *pungens***	**Monterey spineflower**	HMP	1B.2		**x**	**x**	**x**	**x**	**x**
Cirsium occidentale **var. *occidentale***	**cobweb thistle**				**x**	**x**		**x**	
Cirsium vulgare	bull thistle			mod				x	
Clarkia amoena	**farewell-to-spring**							**x**	
Claytonia perfoliata	**miner's lettuce**				**x**			**x**	
Collinsia heterophylla	**Chinese houses**							**x**	
Cordylanthus rigidus **subsp. *littoralis***	**seaside bird's-beak**	HMP	1B.1		**x**			**x**	**x**
Corethrogyne filaginifolia	**California aster**				**x**			**x**	
Cortaderia jubata	pampas grass, jubata grass			high	x			x	x
Crassula connata	**pygmy weed**				**x**		**x**	**x**	
Croton californicus	**California croton**				**x**	**x**		**x**	
Cryptantha clevelandii **var. *florosa***	**coastal cryptantha**				**x**	**x**		**x**	**x**
Cryptantha micromeres	**small-flowered cryptantha**				**x**	**x**	**x**	**x**	**x**
Cryptantha microstachys	**Tejon cryptantha**							**x**	
Daucus pusillus	**rattlesnake weed**				**x**			**x**	
Deinandra increscens **subsp. *increscens***	**coast tarplant**				**x**	**x**	**x**	**x**	**x**
Dichelostemma capitatum	**blue dicks, wild hyacinth**				**x**	**x**		**x**	
Drymocallis glandulosa **var. *glandulosa***	**sticky cinquefoil**				**x**		**x**	**x**	
Elymus glaucus **subsp. *glaucus***	**western wild-rye**				**x**			**x**	
Epilobium brachycarpus	**tall annual willowherb**							**x**	
Epilobium canum	**California-fuchsia**							**x**	
Epilobium ciliatum **var. *ciliatum***	**northern willowherb**							**x**	
Eriastrum virgatum	**wand woollystar**		4.3		**x**	**x**		**x**	
Erigeron bonariensis	flax-leaved fleabane							x	
Erigeron canadensis	**horseweed**				**x**	**x**		**x**	
Erigeron foliosus **var. *foliosus***	**leafy daisy**				**x**				
Erigeron sumatrensis	tropical horseweed							x	
Erodium botrys	long-beaked filaree				x	x		x	
Erodium cicutarium	red-stemmed filaree			lim	x	x		x	
Erysimum ammophilum	**coast wallflower**	**HMP**	**1B.2**		**x**				
Eschscholzia californica	**California poppy**				**x**	**x**		**x**	**x**

Table 6-2
Observed Plant Species in IAR MRA

ESCA RP 2014 Annual Natural Resource Report – Appendix A

Scientific Name	Common Name	HMP species	CNPS Rare Plant Rank	Cal-IPC Invasiveness Status	IAR MRA Range 44	IAR MRA Range 44 Grassland	IAR MRA Range 47 Subarea A	IAR MRA Range 47 Subarea B	IAR MRA Range 47 Subarea C
Herbaceous species (annuals, perennial herbs, grasses, and grass-like species)									
Euphorbia peplus	petty spurge							x	
Festuca microstachya	**small fescue**				x			x	
Festuca myuros	rattail fescue			mod	x	x		x	
Festuca octoflora	**six-weeks fescue**				**x**	**x**	**x**	**x**	
Fritillaria affinis	**checker lily, Mission bells**				**x**				
Galium californicum	**California bedstraw**				**x**			**x**	
Galium porrigens **var. *porrigens***	**climbing bedstraw**				**x**			**x**	
Gamochaeta ustulata	**purple cudweed**				**x**			**x**	
Gilia capitata **subsp. *abrotanifolia***	**ball gilia**							**x**	
Gilia capitata **subsp. *capitata***	**ball gilia**							**x**	
Gilia tenuiflora **subsp. *arenaria***	**sand [Monterey] gilia**	HMP	1B.2		**x**		**x**	**x**	**x**
Gilia tricolor	**bird's eyes gilia**							**x**	
Helminthotheca ixidoides	bristly ox-tongue			lim				x	
Herniaria hirsuta subsp. *cinerea*	hairy rupturewort							x	
Heterotheca grandifolia	**telegraph weed**				**x**	**x**	**x**	**x**	**x**
Hordeum brachyantherum **subsp. *brachyantherum***	**meadow barley**							**x**	
Horkelia cuneata **subsp. *cuneata***	**coast horkelia, wedge-leaved horkelia**				**x**	**x**	**x**	**x**	**x**
Hypochaeris glabra	smooth cat's ears			lim	x	x	x	x	
Hypochaeris radicata	cat's ears			mod	x			x	
Juncus effusus **var. *pacificus***	**bog rush**							**x**	
Koeleria macrantha	**June grass**				**x**				
Layia platyglossa	**tidy tips**				**x**	**x**		**x**	**x**
Lepidium nitidum	**common peppergrass**							**x**	
Leptochloa fusca **subsp. *fascicularis***	**bearded sprangletop**							**x**	
Lessingia pectinata **var. *pectinata***	**common lessingia**				**x**	**x**		**x**	
Leptosiphon parviflorus	**common linanthus**							**x**	
Logfia [Filago] gallica	narrow-leaved filago				x		x	x	
Logfia filaginoides [Filago californica]	**California filago**				**x**		**x**	**x**	
Lomatium parvifolium	**coastal biscuitroot**		4.2		**x**				
Lupinus bicolor	**miniature lupine**					**x**			
Lupinus concinnus	**elegant lupine**							**x**	

Table 6-2
Observed Plant Species in IAR MRA

ESCA RP 2014 Annual Natural Resource Report – Appendix A

Scientific Name	Common Name	HMP species	CNPS Rare Plant Rank	Cal-IPC Invasiveness Status	IAR MRA Range 44	IAR MRA Range 44 Grassland	IAR MRA Range 47 Subarea A	IAR MRA Range 47 Subarea B	IAR MRA Range 47 Subarea C
Herbaceous species (annuals, perennial herbs, grasses, and grass-like species)									
Lupinus nanus	**sky lupine**				**x**	**x**		**x**	
Lupinus truncatus	**blunt-leaved lupine**							**x**	
Madia exigua	**small tarplant**				**x**		**x**	**x**	
Marah fabaceus	**wild cucumber**				**x**				
Melica imperfecta	**Coast Range melic**				**x**			**x**	
Melilotus indicus	yellow sweet-clover							x	
Micropus californicus* var. *californicus	**cottontop**				**x**				
Mimulus cardinalis	**scarlet monkeyflower**							**x**	
Monardella sinuata* subsp. *nigrescens	**northern curly-leaved monardella**		**4.2**		**x**	**x**		**x**	
Navarretia hamata* subsp. *parviloba	**hooked navarretia**				**x**		**x**	**x**	**x**
Navarretia intertexta	**needle-leaved navarretia**					**x**			
Navarretia squarrosa	**skunkweed**				**x**				
Nemophila menziesii	**baby blue-eyes**							**x**	
Nuttallanthus texanus [Linaria canadensis]	**toad-flax**				**x**	**x**	**x**	**x**	
Orobanche bulbosa	**chaparral broomrape**				**x**				
Oxalis pilosa	**hairy wood sorrel**							**x**	
Parapholis incurva	sicklegrass							x	
Pectocarya penicillata	**winged combseed**				**x**			**x**	
Petrorhagia dubia	hairypink				x	x		x	
Phacelia distans	**wild heliotrope**				**x**				
Phacelia douglasii	**Douglas' phacelia**				**x**			**x**	
Piperia michaelii	**Michael's rein-orchid**		**4.2**		**x**				
Plagiobothrys collinus* var. *fulvescens	**rusty-haired popcorn flower**				**x**		**x**	**x**	
Plantago coronopus	cut-leaved plantain				x				
Plantago erecta	**California plantain**				**x**	**x**		**x**	**x**
Poa annua	annual bluegrass							x	
Poa secunda	**one-sided bluegrass, pine bluegrass**				**x**				
Polypogon interruptus	ditch beard grass							x	
Polypogon monspeliensis	rabbitsfoot grass			lim				x	
Polypogon viridis	water beard grass							x	
Pseudognaphalium beneolens	**fragrant everlasting**				**x**			**x**	
Pseudognaphalium californicum	**California everlasting**				**x**	**x**		**x**	

Table 6-2
Observed Plant Species in IAR MRA

ESCA RP 2014 Annual Natural Resource Report – Appendix A

Scientific Name	Common Name	HMP species	CNPS Rare Plant Rank	Cal-IPC Invasiveness Status	IAR MRA Range 44	IAR MRA Range 44 Grassland	IAR MRA Range 47 Subarea A	IAR MRA Range 47 Subarea B	IAR MRA Range 47 Subarea C
Herbaceous species (annuals, perennial herbs, grasses, and grass-like species)									
Pseudognaphalium ramosissimum	**pink everlasting**				**x**		**x**	**x**	
Pseudognaphalium stramineum	**cottonbatting plant**				**x**		**x**	**x**	**x**
Psilocarphus tenellus	**slender woolly marbles**							**x**	
Pterostegia drymarioides	**fairy mist**				**x**			**x**	
Rumex acetosella	sheep sorrel			mod	x			x	x
Sagina apetela	**sticky pearlwort**							**x**	
Senecio c.f. aphanactis	**chaparral ragwort**		2B.2		**x**				
Senecio glomeratus	cut-leaved fireweed			mod				x	
Senecio vulgare	common ragwort							x	
Silene gallica	windmill pink				x			x	
Sisymbrium orientale	Indian hedgemustard							x	
Sisyrinchium bellum	**blue-eyed grass**							**x**	
Solanum americanum **(herbaceous)**	**American nightshade**							**x**	
Sonchus asper subsp. *asper*	prickly sow-thistle				x			x	
Sonchus oleraceus	common sow-thistle				x			x	
Spergula arvensis	corn spurrey							x	
Spergularia rubra	red sand-spurrey							x	
Stachys bullata	**wood mint**				**x**				
Stipa pulchra	**purple needlegrass**				**x**			**x**	
Stylocline gnaphaliodes	**evcerlasting neststraw**				**x**			**x**	
Taraxia [Camissonia] ovata	**suncups**				**x**			**x**	
Toxicoscordion fremontii	**Fremont's star lily**				**x**				
Trifolium ciliolatum	**foothill clover**					**x**			
Trifolium gracilentum	**pinpoint clover**				**x**				
Trifolium hirtum	rose clover			mod				**x**	
Trifolium microcephalum	**hairy clover, small-headed clover**							**x**	
Uropappus lindleyi	**silver puffs**				**x**			**x**	
Viola cultivar	pansy							x	

Table 6-2
Observed Plant Species in IAR MRA

ESCA RP 2014 Annual Natural Resource Report – Appendix A

Scientific Name	Common Name	HMP species	CNPS Rare Plant Rank	Cal-IPC Invasiveness Status	IAR MRA Range 44	IAR MRA Range 44 Grassland	IAR MRA Range 47 Subarea A	IAR MRA Range 47 Subarea B	IAR MRA Range 47 Subarea C
Ferns and Fern-relatives									
Pteridium aquilinum* var. *pubescens	**western bracken fern**				x				

Notes:

Native species in bold
Species and locations noted in this table are for work areas, including monitoring

Status Codes:

California Native Plant Society (CNPS)

Rare Plant Rank (RPR)

RPR 1B: Plants Rare, Threatened, or Endangered in California and Elsewhere

RPR 2A: Plants Presumed Extirpated in California, but More Common Elsewhere

RPR 2B: Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere

RPR 3: Plants About Which More Information is Needed - A Review List

RPR 4: Plants of Limited Distribution - A Watch List

Extensions to List Categories

0.1 - Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)

0.2 – Moderately threatened in California (20-80% occurrences threatened/moderate degree and immediacy of threat)

0.3 – Not very threatened in California (<20% of occurrences threatened/low degree and immediacy of threat or no current threats known)

California Invasive Plant Council (Cal-IPC) ratings:

• high – severe ecological impacts, high rates of dispersal and establishment.
• moderate – substantial and apparent ecological impacts , moderate to high rates of dispersal, establishment dependent upon
• limited – invasive but impacts not widespread statewide, low to moderate rates of dispersal, may be locally persistent and

Table 6-3
Interim Action Ranges MRA HMP Species Presence by Activity Type

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Activity Category	Location	Restoration Strategy	Total HMP Species[1] Present Prior to Activities	Total HMP Species[1] Present in 2013 After Activities	Total HMP Species[1] Present in 2014 After Activities
Ingress/egress routes (Activity A)	All ingress/egress routes	Monitoring only	1	3	4
Above-ground vegetation cutting followed by target-specific excavation (Activity B)	North Range 44 SCAs and Central Area NCAs, South Range 44 SCAs, Range 47 SCA Subarea C	Monitoring only	6	7	7
Small-scale soil excavation (Activity C)	North Range 44 SCAs and Central Area NCAs, South Range 44 SCAs, Range 47 SCA Subarea C	Passive (seeding)[2]	6	4	7
	Grassland grid cell in South Range 44 SCA		1	1	2
Large-scale soil excavation (Activity D)	Range 47 Subarea A (low recruitment area)	Passive (seeding)	1[3]	3	5
	Range 47 Subarea B	Active (container planting and seeding)	5[3]	6	6

[1] Observed HMP species summarized in this table include: sandmat manzanita, Monterey ceanothus, Eastwood's ericameria, Monterey spineflower, seaside bird's-beak, coast wallflower, and sand (Monterey) gilia.

[2] Seeding delayed until fall 2013 due to ongoing munitions investigation activities during early 2013

[3] Only limited field surveys allowed in Range 47 prior to munitions investigations activities

Table 6-4
Native Shrub Species Richness by Activity Type

ESCA RP 2014 Annual Natural Resource Report – Appendix A

Activity Category	Location	Restoration Strategy	Total Non-HMP Native Shrub Species Present Prior to Activities	Total Non-HMP Native Shrub Species Present in 2013 After Activities	Total Non-HMP Native Shrub Species Present in 2014 After Activities	Percent of Non-HMP Shrub Species Compared with Baseline	Baseline Number of Non-HMP Shrub Species Required	Total HMP Native Shrub Species Present Prior to Activities	Total HMP Native Shrub Species Present in 2013 After Activities	Total HMP Native Shrub Species Present in 2014 After Activities	Percent of HMP Shrub Species Compared with Baseline Requirement of 3 HMP Shrubs
Ingress/egress routes (Activity A)	All ingress/egress routes	Monitoring only	0	0	11	no baseline [2]	0	0	0	3	no baseline [2]
Above-ground vegetation cutting followed by target-specific excavation (Activity B)	North Range 44 SCAs and Central Area NCAs, South Range 44 SCAs, Range 47 SCA Subarea C	Monitoring only	20	14	22	110.0%	14	3	3	3	100.0%
Small-scale soil excavation (Activity C)	North Range 44 SCAs and Central Area NCAs, South Range 44 SCAs, Range 47 SCA Subarea C	Passive (seeding) [1]	20	7	22	110.0%	14	3	2	3	100.0%
	Grassland grid cell in South Range 44 SCA		0	0	0	no baseline [2]	0	0	0	1	no baseline [2]
Large-scale soil excavation (Activity D)	Range 47 Subarea A (low recruitment area)	Passive (seeding)	10	14	15	100.0%	8	2	2	3	no baseline [2]
	Range 47 Subarea B	Active (container planting and seeding)	22	22	22	100.0%	8	3	3	3	100.0%

[1] Seeding delayed until fall 2013 due to ongoing munitions investigation activities during early 2013

[2] no baseline = no performance criteria or baseline for this activity type or location

[3] Only limited field surveys allowed in Range 47 prior to munitions investigations activities

Table 6-5
Interim Action Ranges MRA North Range 44 SCA and NCAs
2014 Plant Species Richness and Diversity

2014 Annual Natural Resource Report - Appendix A

Interim Action Ranges MRA in Central Maritime Chaparral							
Location	**IAR MRA Range R44**						
Area	**All**	**North Range NCA and SCAs**					
Activity Type	**Baseline**	**Vegetation Cutting**			**Small-scale Excavation**		
Activity Year	**2010**	**Year 1 (2013)**	**Year 2 (2014)**	**Year 2 with surrounding species included (2014)**	**Year 1 (2013)**	**Year 2 (2014)**	**Year 2 with surrounding species included (2014)**
Number of Transects/Quadrats	**5 Transects**	**Five Transects**			**Eight Transects and 33 Quadrats**		
Total Number of Native Species	**15**	17	28	50	24	41	58
Total Number of HMP Species Present	**3**	3	5	5	3	6	7
Total Number of HMP Herbaceous Species Present	**0**	0	2	2	1	3	4
Total Tree Species in All Transects	**0**	0	0	1	1	1	1
Total Shrub Species in All Transects	**14**	14	13	18	10	15	18
Total Herbaceous Species in All Transects or Related Herbaceous Plots	**1**	3	14	30	12	24	38
Total Fern and Fern Allies Species in All Transects	**0**	0	1	1	1	1	1
Mean Number of Tree Species per Transect	**0.0**	0.0	0.0	0.2	0.1	0.1	0.1
Mean Number of Shrub Species per Transect	**9.8**	9.4	8.6	11.2	2.9	4.9	8.3
Mean Number of Herbaceous Species per Transect[2]	**0.0**	2.0	4.2	11.6	1.9	5.0	11.3
Mean Number of Fern and Fern Allies Species per Transect	**0.0**	0.0	0.2	0.2	0.3	0.1	0.3
Diversity - Shannon Index	**1.8**	1.7	1.7	--	0.8	0.9	--
Evenness	**0.2**	0.2	0.2	--	0.3	0.2	--
Total Percent Mean Native Cover (Transects)	**99.6%**	49.1%	51.2%	--	2.8%	4.4%	--
Percent Mean Shrub Cover	**98.0%**	35.2%	38.4%	--	0.8%	1.9%	--
Percent Mean Herbaceous Cover (Transects)	**1.7%**	14.0%	12.7%	--	0.0%	2.4%	--
Percent Mean Herbaceous Species Cover (Quadrats)	**--**	--	--	--	0.9%	0.7%	--
Total Percent Mean Native Cover (Herbaceous Quadrats)	**--**	--	--	--	0.5%	0.6%	--

Table 6-6
Interim Action Ranges MRA South Range 44 SCA and Central NCAs
2014 Plant Species Richness and Diversity

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Interim Action Ranges MRA in Central Maritime Chaparral									
Location	**IAR MRA Range R44**								
Area	**All**	**South Range NCAs and Central Area SCAs**							
Activity Type	**Baseline**	**Vegetation Cutting**				**Small-scale Excavation**			
Activity Year	**2010**	**Year 1 (2012)**	**Year 2 (2013)**	**Year 3 (2014)**	**Year 3 with surrounding species included (2014)**	**Year 1 (2012)**	**Year 2 (2013)**	**Year 3 (2014)**	**Year 3 with surrounding species included (2014)**
Number of Transects/Quadrats	**7 Transects**	**Seven Transects**				**Five Transects and 30 Quadrats**			
Total Number of Native Species	**15**	24	18	23	41	18	29	26	39
Total Number of HMP Species Present	**3**	4	3	3	3	1	3	5	5
Total Number of HMP Herbaceous Species Present	**0**	1	0	1	1	1	1	3	2
Total Tree Species in All Transects	**0**	0	1	1	1	0	0	0	0
Total Shrub Species in All Transects	**14**	16	16	12	17	7	12	11	14
Total Herbaceous Species in All Transects or Related Herbaceous Plots	**1**	8	1	10	23	11	17	15	25
Total Fern and Fern Allies Species in All Transects	**0**	0	0	0	0	0	0	0	0
Mean Number of Tree Species per Transect	**0.0**	0.0	0.1	0.1	0.3	0.0	0.0	0.0	0.0
Mean Number of Shrub Species per Transect	**9.6**	4.7	8.6	7.1	10.6	4.0	5.8	5.0	9.2
Mean Number of Herbaceous Species per Transect[2]	**0.0**	0.7	0.3	2.1	5.9	4.6	6.6	3.0	11.2
Mean Number of Fern and Fern Allies Species per Transect	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diversity - Shannon Index	**1.8**	1.4	1.5	1.4	--	0.7	0.6	0.8	--
Evenness	**0.2**	0.2	0.2	0.2	--	0.2	0.1	0.2	--
Total Percent Mean Native Cover (Transects)	**108.8%**	24.6%	34.2%	30.6%	--	7.5%	14.4%	19.7%	--
Percent Mean Shrub Cover	**107.6%**	21.1%	31.3%	28.4%	--	2.3%	7.6%	16.4%	--
Percent Mean Herbaceous Cover (Transects)	**1.2%**	3.5%	2.8%	2.2%	--	5.1%	6.8%	3.3%	--
Percent Mean Herbaceous Species Cover (Quadrats)	**--**	--	--	--	--	1.2%	1.6%	4.2%	--
Total Percent Mean Native Cover (Herbaceous Quadrats)	**--**	--	--	--	--	1.3%	3.4%	6.2%	--

Table 6-7
Interim Action Ranges MRA Range 47 Subarea C
2014 Plant Species Richness and Diversity

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Interim Action Ranges MRA in Central Maritime Chaparral					
Location	**Range 47**				
Area	**Subarea C**				
Activity Type	**Cut Vegetation**				
Activity Year	**Baseline (2010)**	**Year 1 (2012)**	**Year 2 (2013)**	**Year 3 (2014)**	**Year 3 with surrounding species included (2014)**
Number of Transects/Quadrats	**6 Transects**	**Three Transects**			
Total Number of Native Species	**17**	12	12	17	33
Total Number of HMP Species Present	**3**	2	3	3	3
Total Number of HMP Herbaceous Species Present	**0**	0	0	1	1
Total Tree Species in All Transects	**0**	0	0	0	0
Total Shrub Species in All Transects	**16**	7	7	9	12
Total Herbaceous Species in All Transects or Related Herbaceous Plots	**1**	5	5	8	21
Total Fern and Fern Allies Species in All Transects	**0**	0	0	0	0
Mean Number of Tree Species per Transect	**0.0**	0.0	0.0	0.0	0.0
Mean Number of Shrub Species per Transect	**9.3**	5.3	6.0	7.5	9.0
Mean Number of Herbaceous Species per Transect[2]	**0.0**	2.3	2.6	3.5	9.3
Mean Number of Fern and Fern Allies Species per Transect	**0.0**	0.0	0.0	0.0	0.0
Diversity - Shannon Index	**1.6**	1.0	1.3	1.1	--
Evenness	**0.2**	0.2	0.2	0.2	--
Total Percent Mean Native Cover (Transects)	**92.2%**	46.0%	70.1%	63.7%	--
Percent Mean Shrub Cover	**91.7%**	43.2%	67.2%	62.7%	--
Percent Mean Herbaceous Cover (Transects)	**0.5%**	2.7%	2.9%	1.0%	--
Percent Mean Herbaceous Species Cover (Quadrats)	**--**	--	--	--	--
Total Percent Mean Native Cover (Herbaceous Quadrats)	**--**	--	--	--	--

Table 6-8
Interim Action Ranges MRA South Range 44 Grassland
2014 Plant Species Richness and Diversity

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Interim Action Ranges MRA - Range 44 Grassland				
Activity Year	**Baseline (2010)**	**Year 1 (2012)**	**Year 2 (2013)**	**Year 3 (2014)**
Number of Transects/Quadrats	Three Quadrats	6 Quadrats		
Total Number of Native Species	**9**	9	16	15
Total Number of HMP Species Present	**1**	1	1	2
Total Number of HMP Herbaceous Species Present	**1**	1	1	1
Total Native Tree Species in All Herbaceous Plots	**0**	0	0	0
Total Shrub Species in All Herbaceous Plots	**1**	0	1	1
Total Native Herbaceous Species in All Herbaceous Plots	**8**	9	15	14
Total Native Ferns and Fern Allies in Herbaceous Plots	**0**	0	0	0
Mean Number Tree Species per Herbaceous Plots	**0.0**	0.0	0.0	0.0
Mean Number Shrub Species per Herbaceous Plot	**0.3**	0.0	0.2	0.2
Mean Number of Native Herbaceous Species per Herbaceous Plots	**3.7**	3.2	5.0	5.0
Mean number of Native Ferns and Fern Allies per Herbaceous Plots	**0.0**	0.0	0.0	0.0
Diversity - Shannon Index	**1.61**	1.49	2.14	2.14
Evenness	**0.20**	0.09	0.09	0.09
Total Percent Mean Native Cover (Herbaceous Quadrats)	**23.7%**	4.3%	23.8%	10.0%

[1]No herbaceous plots monitored in 2011, due to low herbaceous cover in project area

[2]Data collected from those transects in which herbaceous plots were monitored

Table 6-9
Interim Action Ranges MRA Range 47 Subarea A and B
2014 Plant Species Richness and Diversity

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Interim Action Ranges MRA in Central Maritime Chaparral							
Location	**IAR MRA Range 47**						
Area	**Subarea A**				**Subarea B***		
Activity Type	**Large-scale Excavation**						
Activity Year	**Baseline (2010)**	**Year 1 (2013)**	**Year 2 (2014)**	**Year 2 with surrounding species included (2014)**	**Year 1 (2013)**	**Year 2 (2014)**	**Year 2 with surrounding species included (2014)**
Number of Transects/Quadrats	**Three Transects**	**One Transect**			**Seven Transects**		
Total Number of Native Species	**10**	41	27	33	54	53	57
Total Number of HMP Species Present	**2**	4	2	3	4	3	4
Total Number of HMP Herbaceous Species Present	**0**	1	0	0	1	0	1
Total Tree Species in All Transects	**0**	0	0	0	1	1	1
Total Shrub Species in All Transects	**9**	18	14	17	16	17	18
Total Herbaceous Species in All Transects or Related Herbaceous Plots	**1**	23	13	16	37	35	38
Total Fern and Fern Allies Species in All Transects	**0**	0	0	0	0	0	0
Mean Number of Tree Species per Transect	**0.0**	--	--	--	0.1	0.1	0.3
Mean Number of Shrub Species per Transect	**6.7**	--	--	--	10.1	10.5	15.8
Mean Number of Herbaceous Species per Transect[2]	**0.7**	--	--	--	14.8	10.8	17.3
Mean Number of Fern and Fern Allies Species per Transect	**0.0**	--	--	--	0.0	0.0	0.0
Diversity - Shannon Index	**1.61**	2.16	1.68	--	1.90	1.87	--
Evenness	**0.20**	0.13	0.14	--	0.16	0.17	--
Total Percent Mean Native Cover (Transects)	**85.0%**	16.3%	74.6%	--	32.3%	66.4%	--
Percent Mean Shrub Cover	**84.1%**	6.9%	59.5%	--	16.7%	46.0%	--
Percent Mean Herbaceous Cover (Transects)	**0.9%**	9.7%	15.2%	--	15.6%	20.5%	--
Percent Mean Herbaceous Species Cover (Quadrats)	**--**	1.9%	19.5%	--	5.0%	13.7%	--
Total Percent Mean Native Cover (Herbaceous Quadrats)	**--**	1.9%	19.4%	--	5.0%	13.4%	--

Table 6-10
HMP Shrub Species Frequency In IAR MRA Following Activity Types B and D

ESCA RP 2014 Annual Natural Resource Report – Appendix A

Activity Type	Location	Restoration Strategy	Years Since Activity	Percent Frequency of HMP Shrub Species - Sandmat Manzanita			Percent of Baseline for 2014	Percent Frequency of HMP Shrub Species - Monterey Ceanothus			Percent of Baseline for 2014	Percent Frequency of HMP Shrub Species - Eastwood's Ericameria			Percent of Baseline for 2014	Mean Frequency for HMP Species Combined (Percent of Baseline)
				2010-2011 Baseline [1]	2013	2014		2010-2011 Baseline [1]	2013	2014		2010-2011 Baseline [1]	2013	2014		
Above-ground vegetation cutting followed by target-specific excavation (Activity B)	North Range 44 SCAs and Central Area NCAs, South Range 44 SCAs, Range 47 Subarea C	Monitoring Only	Year 2 (mean of 5 transects)	66.0%	80.0%	80.0%	121.2%	97.0%	80.0%	80.0%	82%	17.0%	40.0%	40.0%	235.3%	146.3%
			Year 3 (mean of 10 transects)		71.4%	80.0%	121.2%		85.7%	90.0%	93%		14.3%	0.0%	0.0%	71.3%
Large-scale soil excavation (Activity D)	Range 47 Subarea B	Active (container planting and seeding)	Year 1 (mean of 7 transects)	33.0%	71.0%	57.1%	173.0%	100.0%	86.0%	71.4%	71.40%	0.0%	29.0%	42.9%	>100%	114.8%

[1] From Table 2 of HRP

Table 6-11
2014 Total Presence and Density of Monterey Spineflower
After Remedial Activities in IAR South Range 44

ESCA RP 2014 Annual Natural Resource Report - Appendix A

	2013 Total Plants (Occupied Grids)	2014 Total Plants in Occupied Grids	2014 Average Number of Plants per Occupied Grid	2014 Total Number of Plants in Plots	2014 Mean Density per Plot	Standard Deviation	90% Confidence Interval	Number of Occupied Grids	Total Surveyed Grids in 2014	Percentage of Occupied Grid Compared to Baseline
Post-activity Data 2014 (Year 3)										
Activity A - Ingress/Egress Routes										
Post-activity Year 2	3,349 (4)	--	--	--	--	--	--	--	--	--
Post-activity Year 3 - Chaparral	--	465	10,618	66	66.0	--	--	1	21	14%
Post-activity Year 3 - Grassland	--	20,770	20,770	1,034	1034.0	--	--	1	1	7%
Activity B - Vegetation Cut										
Post-activity Year 2	3,601 (3)	--	--	--	--	--	--	--	--	--
Post-activity Year 3 - Chaparral	--	7,375	2,049	1,146	52.1	89.5	32.9	22	77	100%*
Post-activity Year 3 - Grassland	--	41,793	20,896	2,992	1496.0	43.8	195.7	2	2	14%
Activity C - Small-scale Excavation										
Post-activity Year 2	7,763 (4)	--	--	--	--	--	--	--	--	--
Post-activity Year 3	--	8,422	842	1,548	154.8	276.3	160.2	10	26	71%
2014 Sampling Totals		***78,825***	***55,175***	***6,786***	**--**	**--**	**--**	**36**	***127***	**100%***
Reference Plot										
2013 Survey	450 (1)	--	--	--	--	--	--	--	--	--
2014 Survey	--	2,017	672	870	290.0	398.4	671.6	3	3	21%
Baseline Pre-disturbance	**2012 Totals**									
2012	567		41	567	40.5	47.8	22.6	14	--	--

* exceeds number of baseline grid cells sampled

Table 6-12
2014 Total Presence and Density of Monterey Spineflower
After Remedial Activities in IAR North Range 44

ESCA RP 2014 Annual Natural Resource Report - Appendix A

	2013 Total Plants (Occupied Grids)	2014 Total Plants in Occupied Grids	2014 Average Number of Plants per Occupied Grid	2014 Total Number of Plants in Plots	2014 Mean Density per Plot	Standard Deviation	90% Confidence Interval	Number of Occupied Grids	Total Surveyed Grids in 2014	Percentage of Occupied Grid Compared to Baseline
Post-activity Data 2014 (Year 2)										
Activity B - Vegetation Cut										
Post-activity Year 1	64,228 (30)	--	--	--	--	--	--	--	--	--
Post-activity Year 2	--	35,492	1,014	1,226	35.0	45.4	13.0	35	41	100%*
Activity C - Small-scale Excavation										
Post-activity Year 1	1,294 (11)	--	--	--	--	--	--	--	--	--
Post-activity Year 2	--	1,528	118	239	18.4	44.4	22.0	13	19	100%*
2014 Sampling Totals		***37,020***	***1,132***	***1,465***	***--***	***--***	***--***	**48**	***60***	**100%***
Reference Plot										
2013 Survey	450 (1)	--	--	--	--	--	--	--	--	--
2014 Survey	--	1,267	634	120	60.0	5.7	25.3	2	2	33%
Baseline Pre-disturbance	**2012 Totals**									
2012	163		27	163	27.2	32.4	26.7	6	--	--

* exceeds number of baseline grid cells sampled

Table 6-13
2014 Total Presence and Density of Monterey Spineflower
After Remedial Activities in IAR Range 47 Subarea C

ESCA RP 2014 Annual Natural Resource Report - Appendix A

	2013 Total Plants (Occupied Grids)	2014 Total Plants in Occupied Grids	2014 Average Number of Plants per Occupied Grid	2014 Total Number of Plants in Plots	2014 Mean Density per Plot	Standard Deviation	90% Confidence Interval	Number of Occupied Grids	Total Surveyed Grids in 2014	Percentage of Occupied Grid Compared to Baseline
Post-activity Data 2014 (Year 3)										
Activity B - Vegetation Cut/Target-specific Excavation										
Post-activity Year 2	1,716 (7)	--	--	--	--	--	--	--	--	--
Post-activity Year 3	--	13,353	1,484	1,106	122.9	146.2	90.6	9	18	100%*
Activity C - Small-scale Excavation										
Post-activity Year 2	0	--	--	--	--	--	--	--	--	--
Post-activity Year 3	--	1	1	1	1.0	--	--	1	4	100%*
2014 Sampling Totals		***13,354***	***1,485***	***1,107***	**--**	**--**	**--**	**10**	***22***	**100%***
Reference Plot										
2013 Survey	450 (1)	--	--	--	--	--	--	--	--	--
2014 Survey	--	2,017	672	870	290.0	398.4	671.6	3	3	300%
Baseline Pre-disturbance	**2012 Totals**									
2012	30		30	19	19.0	--	--	1	--	--

* exceeds number of baseline grid cells sampled

Table 6-14
2014 Total Presence and Density of Sand (Monterey) Gilia
After Remedial Activities in IAR North Range 44

ESCA RP 2014 Annual Natural Resource Report - Appendix A

	2013 Total Plants (Occupied Grids)	2014 Total Plants in Occupied Grids	2014 Average Number of Plants per Occupied Grid	2014 Total Number of Plants in Plots	2014 Mean Density per Plot	Standard Deviation	90% Confidence Interval	Number of Occupied Grids	Total Surveyed Grids in 2014	Percentage of Occupied Grid Compared to Baseline
Post-activity Data 2014 (Year 2)										
Activity B - Vegetation Cut										
Post-activity Year 1	2,329 (29)	--	--	--	--	--	--	--	--	--
Post-activity Year 2	--	147	9	76	4.5	3.7	1.6	17	41	100%*
Activity C - Small-scale Excavation										
Post-activity Year 1	108 (10)	--	--	--	--	--	--	--	--	--
Post-activity Year 2	--	331	28	138	11.5	11.9	6.2	12	19	100%*
2014 Sampling Totals		***478***	***36***	***214***	***--***	***--***	***--***	**29**	***60***	**100%***
Reference Plot										
2013 Survey	12	--	--	--	--	--	--	--	--	--
2014 Survey	--	12	4	4	1.3	0.6	1.0	3	3	100%*
Baseline Pre-disturbance	**2012 Totals**									
2012	0		0	0	0.0	--	--	0	--	--

* exceeds number of baseline grid cells sampled

Table 6-15
2014 Total Presence and Density of Sand (Monterey) Gilia
After Remedial Activities in IAR South Range 44

ESCA RP 2014 Annual Natural Resource Report - Appendix A

	2013 Total Plants (Occupied Grids)	2014 Total Plants in Occupied Grids	2014 Average Number of Plants per Occupied Grid	2014 Total Number of Plants in Plots	2014 Mean Density per Plot	Standard Deviation	90% Confidence Interval	Number of Occupied Grids	Total Surveyed Grids in 2014	Percentage of Occupied Grid Compared to Baseline
Post-activity Data 2014 (Year 3)										
Activity A - Ingress/Egress Routes										
Post-activity Year 2	3 (1)	--	--	--	--	--	--	--	--	--
Post-activity Year 3	--	0	0	0	0.0	--	--	0	22	0%
Activity B - Vegetation Cut/Target-specific Excavation										
Post-activity Year 2	33 (8)	--	--	--	--	--	--	--	--	--
Post-activity Year 3	--	6	2	6	2.0	1.0	1.7	3	79	21%
Activity C - Small-scale Excavation										
Post-activity Year 2	11 (3)	--	--	--	--	--	--	--	--	--
Post-activity Year 3	--	237	24	76	7.6	6.9	4.0	10	26	71%
2014 Sampling Totals		***243***	***26***	***82***	**--**	**--**	**--**	**13**	***105***	**100%**
Reference Plot										
2013 Survey	12 (1)	--	--	--	--	--	--	--	--	--
2014 Survey	--	12	4	4	1.3	0.6	1.0	3	3	21%

Table 6-16
2014 Total Presence and Density of Sand (Monterey) Gilia
After Remedial Activities in Range 47 Subarea C

ESCA RP 2014 Annual Natural Resource Report - Appendix A

	2013 Total Plants (Occupied Grids)	2014 Total Plants in Occupied Grids	2014 Average Number of Plants per Occupied Grid	2014 Total Number of Plants in Plots	2014 Mean Density per Plot	Standard Deviation	90% Confidence Interval	Number of Occupied Grids	Total Surveyed Grids in 2014	Percentage of Occupied Grid Compared to Baseline
Post-activity Data 2014 (Year 3)										
Activity B - Vegetation Cut/Target-specific Excavation										
Post-activity Year 2	74 (4)	--	--	--	--	--	--	--	--	--
Post-activity Year 3	--	0	0	0	0.0	0.0	0.0	0	4	100%*
Activity C - Small-scale Excavation										
Post-activity Year 2	1 (1)	--	--	--	--	--	--	--	--	--
Post-activity Year 3	--	0	0	0	0.0	0.0	0.0	0	18	100%*
2014 Sampling Totals		***0***	***0***	***0***	***--***	***--***	***--***	**0**	***22***	***100%****
Reference Plot										
2013 Survey	12	--	--	--	--	--	--	--	--	--
2014 Survey	--	12	4	4	1.3	0.6	1.0	3	3	100%*
Baseline Pre-disturbance	**2012 Totals**									
2012	6		0	0	2.0	--	--	2	--	--

* exceeds number of baseline grid cells sampled

Table 6-17
2014 Total Presence and Density of Seaside Bird's-beak
After Remedial Activities in IAR North Range 44

ESCA RP 2014 Annual Natural Resource Report - Appendix A

	2013 Total Plants (Occupied Grids)	2014 Total Plants in Occupied Grids	2014 Average Number of Plants per Occupied Grid	2014 Total Number of Plants in Plots	2014 Mean Density per Plot	Standard Deviation	90% Confidence Interval	Number of Occupied Grids	Total Surveyed Grids in 2014	Percentage of Occupied Grid Compared to Baseline
Post-activity Data 2014 (Year 2)										
Activity B - Vegetation Cut										
Post-activity Year 1	4,549 (10)	--	--	--	--	--	--	--	--	--
Post-activity Year 2	--	751	68	123	11.2	7.1	3.9	11	41	100%*
Activity C - Small-scale Excavation										
Post-activity Year 1	2 (2)	--	--	--	--	--	--	--	--	--
Post-activity Year 2	--	203	14	51	3.4	2.8	1.3	15	19	100%*
2014 Sampling Totals		***954***	***82***	***174***	***--***	***--***	***--***	**26**	***60***	**100%***
Reference Plot										
2013 Survey	108 (1)	--	--	--	--	--	--	--	--	--
2014 Survey	--	31	16	6	3.0	0.0	--	2	2	22%
Baseline Pre-disturbance	**2012 Totals**									
2012	39		4	20	3.3	2.6	2.1	9	--	--

* exceeds number of baseline grid cells sampled

Table 6-18
2014 Total Presence and Density of Seaside Bird's-beak
After Remedial Activities in IAR South Range 44

ESCA RP 2014 Annual Natural Resource Report - Appendix A

	2013 Total Plants (Occupied Grids)	2014 Total Plants in Occupied Grids	2014 Average Number of Plants per Occupied Grid	2014 Total Number of Plants in Plots	2014 Mean Density per Plot	Standard Deviation	90% Confidence Interval	Number of Occupied Grids	Total Surveyed Grids in 2014	Percentage of Occupied Grid Compared to Baseline
Post-activity Data 2014 (Year 3)										
Activity A - Ingress/Egress Routes										
Post-activity Year 2	2 (1)	--	--	--	--	--	--	--	--	--
Post-activity Year 3	--	0	0	0	0.0	--	--	0	22	0%
Activity B - Vegetation Cut/Target-specific Excavation										
Post-activity Year 2	123 (3)	--	--	--	--	--	--	--	--	--
Post-activity Year 3	--	19	6	19	6.3	2.3	3.9	3	79	33%
2014 Sampling Totals		***19***	***6***	***19***	***--***	***--***	***--***	**3**	***101***	***33%***
Reference Plot										
2013 Survey	108 (1)	--	--	--	--	--	--	--	--	--
2014 Survey	--	31	16	6	3.0	0.0	--	2	2	22%
Baseline Pre-disturbance	**2012 Totals**									
2012	84		9	84	9.3	7.8	4.9	9	--	--

* exceeds number of baseline grid cells sampled

Table 6-19
2014 Total Presence and Density of Coast Wallflower
After Remedial Activities in IAR North Range 44

ESCA RP 2014 Annual Natural Resource Report - Appendix A

	2013 Total Plants (Occupied Grids)	2014 Total Plants in Occupied Grids	2014 Average Number of Plants per Occupied Grid	2014 Total Number of Plants in Plots	2014 Mean Density per Plot	Standard Deviation	90% Confidence Interval	Number of Occupied Grids	Total Surveyed Grids in 2014	Percentage of Occupied Grid Compared to Baseline
Post-activity Data 2014 (Year 2)										
Activity B - Vegetation Cut										
Post-activity Year 1	54 (6)	--	--	--	--	--	--	--	--	--
Post-activity Year 2	--	33	11	15	5.0	3.6	6.1	3	41	100%*
Activity C - Small-scale Excavation										
Post-activity Year 1	0	--	--	--	--	--	--	--	--	--
Post-activity Year 2	--	10	10	5	5.0	--	--	1	19	100%*
2014 Sampling Totals		***43***	***21***	***20***	***--***	***--***	***--***	**4**	***60***	**100%***
Reference Plot										
2013 Survey	11 (2)	--	--	--	--	--	--	--	--	--
Baseline Pre-disturbance	**2012 Totals**									
2012	--		--	--	--	--	--	--	--	--

* exceeds number of baseline grid cells sampled

Table 6-20
2014 Total Presence and Density of HMP Herbaceous Species
After Remedial Activity D in IAR Range 47 Subarea B

ESCA RP 2014 Annual Natural Resource Report - Appendix A

	2013 Total Plants (Occupied Grids)	2014 Total Plants in Occupied Grids	2014 Average Number of Plants per Occupied Grid	2014 Total Number of Plants in Plots	2014 Mean Density per Plot	Standard Deviation	90% Confidence Interval	Number of Occupied Grids	Total Surveyed Grids in 2014	Percentage of Occupied Grid Compared to Baseline
Post-activity Data 2014 (Year 2)										
Monterey Spineflower (*Chorizanthe pungens* var. *pungens*)										
Activity D- Large-scale Excavation										
Post-activity Year 1	274 (37)	--	--	--	--	--	--	--	--	--
Post-activity Year 2	--	4,861	162	155	5.5	5.2	1.6	30	56	600%
Baseline Pre-disturbance	**2012 Totals**									
2012	30		6	30	6.0	4.8	4.6	5	--	--
Sand (Monterey) Gilia (*Gilia tenuiflora* subsp. *arenaria*)										
Activity D- Large-scale Excavation										
Post-activity Year 1	172 (11)	--	--	--	--	--	--	--	--	--
Post-activity Year 2	--	887	99	21	2.4	2.3	1.4	9	56	450%
Baseline Pre-disturbance	**2012 Totals**									
2012	6		3	4	2.0	0.0	--	2	--	--
Seaside Bird's-beak (*Cordylanthus rigidus* subsp. *littoralis*)										
Activity D- Large-scale Excavation										
Post-activity Year 1	1 (1)	--	--	--	--	--	--	--	--	--
Post-activity Year 2	--	1	1	1	1.0	--	--	1	56	11%
Baseline Pre-disturbance	**2012 Totals**									
2012	84		9	84	9.3	7.8	4.9	9	--	--

* exceeds number of baseline grid cells sampled

Table 6-21
2014 Presence and Density of HMP Herbaceous Species
After Remedial Activity D in IAR Range 47 Subarea A

ESCA RP 2014 Annual Natural Resource Report - Appendix A

	2013 Total Plants (Occupied Grids)	2014 Total Plants in Occupied Grids	2014 Average Number of Plants per Occupied Grid	2014 Total Number of Plants in Plots	2014 Mean Density per Plot	Standard Deviation	90% Confidence Interval	Number of Occupied Grids	Total Surveyed Grids in 2014	Percentage of Occupied Grid Compared to Baseline
Post-activity Data 2014 (Year 2)										
Monterey Spineflower (*Chorizanthe pungens* var. *pungens*)										
Activity D- Large-scale Excavation										
Post-activity Year 1	274 (37)	--	--	--	--	--	--	--	--	--
Post-activity Year 2	--	107	21	8	1.7	1.5	1.4	5	10	100%
Baseline Pre-disturbance	**2012 Totals**									
2012	30		6	30	6.0	4.8	4.6	5	--	--
Sand (Monterey) Gilia (*Gilia tenuiflora* subsp. *arenaria*)										
Activity D- Large-scale Excavation										
Post-activity Year 1	1 (1)	--	--	--	--	--	--	--	--	--
Post-activity Year 2	--	0	0	0	0.0	--	--	0	10	0%
Baseline Pre-disturbance	**2012 Totals**									
2012	6		3	4	2.0	0.0	--	2	--	--
Seaside Bird's-beak (*Cordylanthus rigidus* subsp. *littoralis*)										
Activity D- Large-scale Excavation										
Post-activity Year 1	2 (2)	--	--	--	--	--	--	--	--	--
Post-activity Year 2	--	1	1	1	1.0	--	--	1	10	11%
Baseline Pre-disturbance	**2012 Totals**									
2012	84		9	84	9.3	7.8	4.9	9	--	--

* exceeds number of baseline grid cells sampled

Table 6-22
HMP Annuals in Range 47 Topsoil, Seeding, and Salvaged Seedbank Polygons in Restoration Area
(Activity D)

ESCA RP 2014 Annual Natural Resources Report - Appendix A

2013				2014 Inside Polygon				2014 Outside Polygon in Topsoil				2014 Grand Totals
Total Plants in all Polygons	**Average Plants per Polygon**	**Standard Deviation**	**90% Confidence Interval**	**Total Plants in all Polygons**	**Average Plants per Polygon**	**Standard Deviation**	**90% Confidence Interval**	**Total Plants outside all Polygons**	**Average Plants**	**Standard Deviation**	**90% Confidence Interval**	**Total 2014 HMP Herbaceous Species**
Monterey Spineflower												
15647	1881.0	616.1	587.4	2562.0	232.9	233.5	127.6	**1865**	62.2	82.6	25.6	**4427**
Sand (Monterey) Gilia												
643	54.7	4.5	7.7	849.0	44.7	67.3	26.8	**109**	5.7	13.5	5.4	**958**
Seaside Bird's Beak												
1	--	--	--	--	--	--	--	**2**	--	--	--	**2**

Table 6-23
Interim Action Ranges MRA Range 47 Subarea B
Container Plant Survival and Volunteer Recruits 2013 -2014

ESCA RP 2014 Annual Natural Resources Report - Appendix A

Scientific Name	Common Name	Total Number of Container Plantings - Baseline March 2013	Container Planting Survival - September 2013	Number of Recruited Individuals* - September 2013	Surviving Container Plantings + Recruited Individuals - September 2013	Surviving Container Plantings + Recruited Individuals - August 2014	Percent Survival - Container Plantings + Recruited Individuals - August 2014
Acmispon glaber	deerweed	3266	2205	7747	9952	9,353	286.4%
Adenostoma fasciculatum	chamise	2581	981	1820	2801	4,186	162.2%
Arctostaphylos pumila	**sandmat manzanita**	**1596**	**758**	**1052**	**1810**	**2,001**	**125.4%**
Arctostaphylos tomentosa subsp. *tomentosa*	woolyleaf manzanita	553	553	2696	3249	5,036	910.7%
Baccharis pilularis subsp. *consanguinea*	coyote brush	2706	1580	1442	3022	7,713	285.0%
Ceanothus dentatus	dwarf ceanothus	789	789	5706	6495	9,226	1169.3%
Ceanothus rigidus	**Monterey ceanothus**	**980**	**980**	**2034**	**3014**	**5,139**	**524.4%**
Ericameria ericoides	mock-heather	1523	1056	1427	2483	4,757	312.3%
Ericameria fasciculata	**Eastwood's ericameria**	**3726**	**1807**	**293**	**2100**	**2,579**	**69.2%**
Eriophyllum confertiflorum	golden yarrow	2578	978	77	1055	2,888	112.0%
Frangula californica subsp. *californica*	California coffeeberry	713	330	47	377	1,079	151.3%
Crocanthemum scoparium	rush-rose	1581	1581	27055	28636	24,317	1538.1%
Horkelia cuneata var. *cuneata*	coast horkelia	1606	1606	17360	18966	22,690	1412.8%
Lupinus chamissonis	silver bush lupine	1021	692	363	1055	1,187	116.3%
Mimulus aurantiacus	bush monkeyflower	4903	2196	1754	3950	5,050	103.0%
Salvia mellifera	black sage	1470	1470	20604	22074	12,829	872.7%
Totals		***31,592***	***19,562***	***91,477***	***111,039***	***120,030***	
Mean Survival							***613.6%***

HMP species in bold

**36% grid cells sampled-numbers are scaled (2.76x)*

Table 6-24
Shaggy-barked Manzanita Salvaging and Transplanting in Range 47 Subareas A and B
(Activity D)

ESCA RP 2014 Annual Natural Resource Report – Appendix A

	All Subareas				Subarea A				Subarea B			
	Small (<20cm*)	Medium (20-30cm*)	Large (>30cm*)	Total	Small (<20cm*)	Medium (20-30cm*)	Large (>30cm*)	Total	Small (<20cm*)	Medium (20-30cm*)	Large (>30cm*)	Total
Number of Salvaged Manzanitas (December 2012)	53	64	20	137	5	5	4	14	48	59	16	123
Total Surviving Salvaged Manzanitas (September 2013)	37	23	1	61	4	1	0	5	33	22	1	56
Total Surviving Salvaged Manzanitas (August 2014)	39	17	1	57	3	2	1	6	36	15	0	51
Percent Survival for Salvaged Manzanitas (September 2013)	69.8%	35.9%	5.0%	44.5%	80.0%	20.0%	0.0%	35.7%	68.8%	37.3%	6.3%	45.5%
Percent Survival for Salvaged Manzanitas (August 2014)	73.6%	26.6%	5.0%	41.6%	60.0%	40.0%	25.0%	42.9%	75.0%	25.4%	0.0%	41.5%
Number of Salvaged Manzanitas Transplanted a Second Time in January 2013	5	11	5	21	1	1	0	2	4	10	5	19
Total Surviving Salvaged Manzanitas that Were Transplanted Twice (September 2013)	3	3	0	6	1	0	0	1	2	3	0	5
Total Surviving Salvaged Manzanitas that Were Transplanted Twice (August 2014)	3	3	0	6	1	0	0	1	2	3	0	5
Percent Survival of Salvaged Manzanitas that Were Transplanted Twice (September 2013)	60.0%	27.3%	0.0%	28.6%	100.0%	0.0%	0.0%	50.0%	50.0%	30.0%	0.0%	26.3%
Percent Survival of Salvaged Manzanitas that Were Transplanted Twice (August 2014)	60.0%	27.3%	0.0%	28.6%	100.0%	0.0%	0.0%	50.0%	50.0%	30.0%	0.0%	26.3%

Table 6-25
Interim Action Ranges MRA North Range 44 SCAs
Vegetation Cover in Areas Subject to Vegetation Cutting Conducted in 2011

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Twenty-nine Baseline Transects				
		Baseline Data 2010 - 2011 (all IAR MRA baseline transects)				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Mean Relative Cover	Frequency
Tree Species						
Quercus agrifolia	coast live oak	0.0%	0.0%	--	0.0%	0.0%
Total Cover by Native Tree Species		***0.0%***			***0%***	
Shrub and Sub-shrub Species						
Arctostaphylos tomentosa subsp. *tomentosa*	shaggy-barked manzanita	29.3%	15.6%	9.0%	31.0%	100%
Ceanothus rigidus	**Monterey ceanothus**	**13.5%**	**9.3%**	**5.4%**	**14.3%**	**96.6%**
Ceanothus dentatus	dwarf ceanothus	20.2%	16.0%	9.2%	21.4%	89.7%
Adenostoma fasciculatum	chamise	9.0%	6.9%	4.0%	9.5%	89.7%
Crocanthemum scoparium	rush-rose	8.1%	9.1%	5.3%	8.6%	86.2%
Salvia mellifera	black sage	5.3%	7.2%	4.1%	5.6%	69.0%
Arctostaphylos pumila	**sandmat manzanita**	**1.6%**	**2.0%**	**1.2%**	**1.7%**	**65.5%**
Eriophyllum confertiflorum	golden yarrow	1.5%	2.2%	1.3%	1.6%	65.5%
Frangula californica subsp. *californica*	California coffeeberry	0.9%	1.9%	0.6%	1.0%	31.0%
Mimulus aurantiacus	bush monkeyflower	0.5%	0.9%	0.5%	0.5%	27.6%
Ericameria ericoides	dune-heather, mock-heather	1.5%	5.6%	3.3%	1.6%	24.1%
Baccharis pilularis subsp. *consanguinea*	coyote brush	0.7%	1.8%	1.1%	0.7%	24.1%
Lepechinia calycina	pitcher sage	0.4%	1.4%	0.8%	0.4%	20.7%
Ericameria fasciculata	**Eastwood's ericameria**	**0.2%**	**0.5%**	**0.3%**	**0.2%**	**17.2%**
Lupinus chamissonis	silver bush lupine	0.4%	1.1%	0.4%	0.4%	13.8%
Acmispon glaber	deerweed	1.4%	0.0%	0.0%	1.5%	0.0%
Garrya elliptica	coast silk-tassel	0.0%	0.0%	--	0.0%	0.0%
Symphoricarpos mollis	creeping snowberry	0.0%	0.0%	--	0.0%	0.0%
Toxicodendron diversilobum	poison-oak	0.0%	0.0%	--	0.0%	0.0%
Total Mean Percent Shrub and Subshrub Cover		**94.5%**			**99%**	
Total Combined Mean Cover Between Shrubs and Subshrubs		***1.3%***	***2.3%***	***1.3%***	***1.4%***	***90.0%***
Target Weed Total (*Carpobrotus edulis*)		***0.0%***	***0.0%***	***--***	***0.0%***	***0.0%***
Total Mean Percent Native Vegetative Cover		***95.8%***				
Total Mean Percent Bare Ground (Including Masticated Vegetation)		***19.3%***				
Total Mean Percent Masticated Vegetation (only calculated in 2014)		***--***				
Total Mean Percent Bare Ground		***19.3%***	***9.3%***	***2.9%***	***--***	***100%***

HMP Species in Bold

Table 6-25
Interim Action Ranges MRA North Range 44 SCAs
Vegetation Cover in Areas Subject to Vegetation Cutting Conducted in 2011

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Five Baseline Transects				
		Baseline Data 2010 -2011 (North Range 44 MRA baseline transects only)				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Mean Relative Cover	Frequency
Tree Species						
Quercus agrifolia	coast live oak	0.0%	0.0%	--	0.0%	0.0%
Total Cover by Native Tree Species		***0%***			***0%***	
Shrub and Sub-shrub Species						
Arctostaphylos tomentosa subsp. *tomentosa*	shaggy-barked manzanita	21.7%	6.3%	6.0%	21.8%	100%
Ceanothus rigidus	**Monterey ceanothus**	**9.4%**	**10.3%**	**9.9%**	**9.4%**	**100.0%**
Ceanothus dentatus	dwarf ceanothus	23.4%	19.3%	18.4%	23.5%	100.0%
Adenostoma fasciculatum	chamise	16.1%	6.1%	5.8%	16.2%	100.0%
Crocanthemum scoparium	rush-rose	11.6%	11.0%	10.5%	11.6%	100.0%
Salvia mellifera	black sage	6.1%	5.8%	5.6%	6.1%	60.0%
Arctostaphylos pumila	**sandmat manzanita**	**2.4%**	**3.3%**	**3.1%**	**2.4%**	**60.0%**
Eriophyllum confertiflorum	golden yarrow	2.8%	3.2%	3.0%	2.8%	100.0%
Frangula californica subsp. *californica*	California coffeeberry	1.8%	2.2%	2.1%	1.8%	60.0%
Mimulus aurantiacus	bush monkeyflower	0.0%	0.1%	0.1%	0.1%	20.0%
Ericameria ericoides	dune-heather, mock-heather	0.8%	1.2%	1.1%	0.8%	40.0%
Baccharis pilularis subsp. *consanguinea*	coyote brush	0.0%	0.0%	--	0.0%	0.0%
Lepechinia calycina	pitcher sage	0.0%	0.0%	--	0.0%	0.0%
Ericameria fasciculata	**Eastwood's ericameria**	**0.6%**	**0.9%**	**0.8%**	**0.6%**	**40.0%**
Lupinus chamissonis	silver bush lupine	0.3%	0.7%	0.7%	0.3%	20.0%
Acmispon glaber	deerweed	0.8%	0.9%	0.8%	0.8%	80.0%
Garrya elliptica	coast silk-tassel	0.0%	0.0%	--	0.0%	0.0%
Symphoricarpos mollis	creeping snowberry	0.0%	0.0%	--	0.0%	0.0%
Toxicodendron diversilobum	poison-oak	0.0%	0.0%	--	0.0%	0.0%
Total Mean Percent Shrub and Subshrub Cover		**98.0%**			**98%**	
Total Combined Mean Cover Between Shrubs and Subshrubs		***1.7%***	***1.4%***	***1.3%***	***1.7%***	***100.0%***
Target Weed Total (*Carpobrotus edulis*)		***0.0%***	***0.0%***	***--***	***0.0%***	***0.0%***
Total Mean Percent Native Vegetative Cover		***99.6%***				
Total Mean Percent Bare Ground (Including Masticated Vegetation)		***20.3%***				
Total Mean Percent Masticated Vegetation (only calculated in 2014)		***--***				
Total Mean Percent Bare Ground		***20.3%***	***10.4%***	***9.9%***	***--***	***100%***

HMP Species in Bold

Table 6-25
Interim Action Ranges MRA North Range 44 SCAs
Vegetation Cover in Areas Subject to Vegetation Cutting Conducted in 2011

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Five Transects areas with Vegetation Cutting Conducted in 2012				
		Post-activity Data 2013 (Year 1)				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Mean Relative Cover	Frequency
Tree Species						
Quercus agrifolia	coast live oak	0.0%	0.0%	--	0.0%	0.0%
Total Cover by Native Tree Species		***0.0%***			***0.0%***	
Shrub and Sub-shrub Species						
Arctostaphylos tomentosa subsp. *tomentosa*	shaggy-barked manzanita	7.6%	6.9%	6.6%	21.5%	100%
Ceanothus rigidus	**Monterey ceanothus**	**0.3%**	**0.3%**	**0.3%**	**0.7%**	**80.0%**
Ceanothus dentatus	dwarf ceanothus	1.4%	1.8%	1.7%	4.0%	60.0%
Adenostoma fasciculatum	chamise	10.2%	7.0%	6.6%	29.1%	100.0%
Crocanthemum scoparium	rush-rose	4.4%	5.4%	5.1%	12.5%	100.0%
Salvia mellifera	black sage	4.5%	4.6%	4.3%	12.9%	60.0%
Arctostaphylos pumila	**sandmat manzanita**	**2.3%**	**1.9%**	**1.8%**	**6.5%**	**80.0%**
Eriophyllum confertiflorum	golden yarrow	1.9%	1.8%	1.8%	5.5%	100.0%
Frangula californica subsp. *californica*	California coffeeberry	0.5%	0.8%	0.8%	1.4%	60.0%
Mimulus aurantiacus	bush monkeyflower	0.0%	0.0%	--	0.0%	0.0%
Ericameria ericoides	dune-heather, mock-heather	0.0%	0.1%	0.1%	0.1%	20.0%
Baccharis pilularis subsp. *consanguinea*	coyote brush	0.0%	0.0%	--	0.0%	0.0%
Lepechinia calycina	pitcher sage	0.0%	0.0%	--	0.0%	0.0%
Ericameria fasciculata	**Eastwood's ericameria**	**1.0%**	**1.4%**	**1.3%**	**2.9%**	**40.0%**
Lupinus chamissonis	silver bush lupine	0.0%	0.0%	--	0.0%	0.0%
Acmispon glaber	deerweed	0.4%	0.6%	0.5%	1.2%	60.0%
Garrya elliptica	coast silk-tassel	0.0%	0.1%	0.1%	0.1%	20.0%
Symphoricarpos mollis	creeping snowberry	0.0%	0.0%	--	0.0%	0.0%
Toxicodendron diversilobum	poison-oak	0.5%	1.2%	1.1%	1.5%	20.0%
Total Mean Percent Shrub and Subshrub Cover		**35.2%**			**72%**	
Total Combined Mean Cover Between Shrubs and Subshrubs		***14.0%***	***9.9%***	***9.4%***	***33.6%***	***100.0%***
Target Weed Total (*Carpobrotus edulis*)		***0.3%***	***0.6%***	***0.5%***	***0.7%***	***40.0%***
Total Mean Percent Native Vegetative Cover		***49.1%***				
Total Mean Percent Bare Ground (Including Masticated Vegetation)		***54.1%***				
Total Mean Percent Masticated Vegetation (only calculated in 2014)		***--***				
Total Mean Percent Bare Ground		***54.1%***	***13.0%***	***12.4%***	***--***	***100%***

HMP Species in Bold

Table 6-25
Interim Action Ranges MRA North Range 44 SCAs
Vegetation Cover in Areas Subject to Vegetation Cutting Conducted in 2011

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Five Transects areas with Vegetation Cutting Conducted in 2012				
		Post-activity Data 2014 (Year 2)				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Mean Relative Cover	Frequency
Tree Species						
Quercus agrifolia	coast live oak	0.0%	--	--	--	0.0%
Total Cover by Native Tree Species		***0.0%***			***0.0%***	
Shrub and Sub-shrub Species						
Arctostaphylos tomentosa subsp. *tomentosa*	shaggy-barked manzanita	9.5%	5.4%	5.2%	18.5%	100%
Ceanothus rigidus	**Monterey ceanothus**	**0.8%**	**0.9%**	**0.9%**	**1.5%**	**80.0%**
Ceanothus dentatus	dwarf ceanothus	1.2%	1.6%	1.6%	2.3%	60.0%
Adenostoma fasciculatum	chamise	12.3%	6.6%	6.3%	24.0%	100.0%
Crocanthemum scoparium	rush-rose	2.7%	2.3%	2.2%	5.2%	100.0%
Salvia mellifera	black sage	3.9%	3.8%	3.6%	7.6%	60.0%
Arctostaphylos pumila	**sandmat manzanita**	**2.9%**	**2.3%**	**2.2%**	**5.7%**	**80.0%**
Eriophyllum confertiflorum	golden yarrow	1.9%	0.8%	0.8%	3.7%	100.0%
Frangula californica subsp. *californica*	California coffeeberry	0.8%	1.6%	1.6%	1.6%	40.0%
Mimulus aurantiacus	bush monkeyflower	0.0%	--	--	--	0.0%
Ericameria ericoides	dune-heather, mock-heather	0.2%	0.4%	0.4%	0.3%	20.0%
Baccharis pilularis subsp. *consanguinea*	coyote brush	0.0%	--	--	--	0.0%
Lepechinia calycina	pitcher sage	0.0%	--	--	--	0.0%
Ericameria fasciculata	**Eastwood's ericameria**	**0.8%**	**1.1%**	**1.1%**	**1.5%**	**40.0%**
Lupinus chamissonis	silver bush lupine	0.0%	--	--	--	0.0%
Acmispon glaber	deerweed	1.2%	1.2%	1.1%	2.4%	60.0%
Garrya elliptica	coast silk-tassel	0.0%	--	--	--	0.0%
Symphoricarpos mollis	creeping snowberry	0.0%	--	--	--	0.0%
Toxicodendron diversilobum	poison-oak	0.4%	0.9%	0.9%	0.8%	20.0%
Total Mean Percent Shrub and Subshrub Cover		**38.4%**			**75%**	
Total Combined Mean Cover Between Shrubs and Subshrubs		***12.7%***	***10.9%***	***10.4%***	***24.9%***	***100.0%***
Target Weed Total (*Carpobrotus edulis*)		***0.0%***	***0.0%***	***0.0%***	***0.0%***	***20.0%***
Total Mean Percent Native Vegetative Cover		***51.2%***				
Total Mean Percent Bare Ground (Including Masticated Vegetation)		***51.5%***				
Total Mean Percent Masticated Vegetation (only calculated in 2014)		***5.3%***	***5.6%***	***5.3%***	*** -- ***	***80.0%***
Total Mean Percent Bare Ground		***46.2%***	***10.9%***	***10.4%***	*** -- ***	***100%***

HMP Species in Bold

Table 6-26
IAR MRA South Range 44 SCA and Central Area NCAs
Vegetation Cover in Areas Subject to Vegetation Cutting Conducted in 2011

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Twenty-nine Baseline Transects				
		Baseline Data 2010 - 2011 (all IAR MRA baseline transects)				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Mean Relative Cover	Frequency
Tree Species						
Quercus agrifolia	coast live oak	0.0%	0.0%	--	0.0%	0.0%
Total Cover by Native Tree Species		***0.0%***			***0%***	
Shrub and Sub-shrub Species						
Arctostaphylos tomentosa subsp. *tomentosa*	shaggy-barked manzanita	29.3%	15.6%	4.9%	31.0%	100%
Ceanothus rigidus	**Monterey ceanothus**	**13.5%**	**9.3%**	**2.9%**	**14.3%**	**96.6%**
Ceanothus dentatus	dwarf ceanothus	20.2%	16.0%	5.0%	21.4%	89.7%
Adenostoma fasciculatum	chamise	9.0%	6.9%	2.2%	9.5%	89.7%
Crocanthemum scoparium	rush-rose	8.1%	9.1%	2.9%	8.6%	86.2%
Salvia mellifera	black sage	5.3%	7.2%	2.3%	5.6%	69.0%
Arctostaphylos pumila	**sandmat manzanita**	**1.6%**	**2.0%**	**0.6%**	**1.7%**	**65.5%**
Eriophyllum confertiflorum	golden yarrow	1.5%	2.2%	0.7%	1.6%	65.5%
Frangula californica subsp. *californica*	California coffeeberry	0.9%	1.9%	0.6%	1.0%	31.0%
Mimulus aurantiacus	bush monkeyflower	0.5%	0.9%	0.3%	0.5%	27.6%
Ericameria ericoides	dune-heather, mock-heather	1.5%	5.6%	1.8%	1.6%	24.1%
Baccharis pilularis subsp. *consanguinea*	coyote brush	0.7%	1.8%	0.6%	0.7%	24.1%
Lepechinia calycina	pitcher sage	0.4%	1.4%	0.5%	0.4%	20.7%
Ericameria fasciculata	**Eastwood's ericameria**	**0.2%**	**0.5%**	**0.2%**	**0.2%**	**17.2%**
Lupinus chamissonis	silver bush lupine	0.4%	1.1%	0.4%	0.4%	13.8%
Acmispon glaber	deerweed	1.4%	0.0%	--	1.5%	0.0%
Garrya elliptica	coast silk-tassel	0.0%	0.0%	--	0.0%	0.0%
Symphoricarpos mollis	creeping snowberry	0.0%	0.0%	--	0.0%	0.0%
Toxicodendron diversilobum	poison-oak	0.0%	0.0%	--	0.0%	0.0%
Total Cover by Native Shrub and Subshrub Species		***94.5%***			***99%***	
Total Combined Mean Cover Between Shrubs and Subshrubs		***1.3%***	***2.3%***	***1.3%***	***1%***	***90%***
Target Weed Total (*Carpobrotus edulis*)		***0.0%***	***0.0%***		***0%***	***0%***
Total Mean Percent Native Vegetative Cover		***95.8%***				
Total Mean Percent Bare Ground (Including Masticated Vegetation)		***19.3%***				
Total Mean Percent Masticated Vegetation (calculated in 2014 only)		***--***	***--***	***--***	***--***	***--***
Total Mean Percent Bare Ground Only		***19.3%***	***9.3%***	***2.9%***	***--***	***100%***

HMP Species in Bold

Note: Not all species observed along transects listed in this table

Table 6-26
IAR MRA South Range 44 SCA and Central Area NCAs
Vegetation Cover in Areas Subject to Vegetation Cutting Conducted in 2011

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Seven Baseline Transects				
		Baseline Data 2010 - 2011 (South Range 44 MRA baseline transects only)				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Mean Relative Cover	Frequency
Tree Species						
Quercus agrifolia	coast live oak	0.0%	0.0%	--	0.0%	0.0%
Total Cover by Native Tree Species		***0%***			***0%***	
Shrub and Sub-shrub Species						
Arctostaphylos tomentosa subsp. *tomentosa*	shaggy-barked manzanita	25.8%	9.5%	6.9%	23.7%	100%
Ceanothus rigidus	**Monterey ceanothus**	**16.3%**	**5.0%**	**3.7%**	14.9%	**100%**
Ceanothus dentatus	dwarf ceanothus	30.4%	14.9%	10.9%	27.9%	100%
Adenostoma fasciculatum	chamise	9.9%	7.1%	5.2%	9.1%	100%
Crocanthemum scoparium	rush-rose	10.0%	8.5%	6.2%	9.2%	100%
Salvia mellifera	black sage	8.7%	9.7%	7.1%	8.0%	100%
Arctostaphylos pumila	**sandmat manzanita**	**0.7%**	**0.6%**	**0.4%**	0.7%	**71.4%**
Eriophyllum confertiflorum	golden yarrow	3.0%	2.7%	2.0%	2.8%	85.7%
Frangula californica subsp. *californica*	California coffeeberry	0.1%	0.2%	0.2%	0.1%	14.3%
Mimulus aurantiacus	bush monkeyflower	0.0%	0.0%	--	0.0%	0.0%
Ericameria ericoides	dune-heather, mock-heather	0.0%	0.0%	--	0.0%	0.0%
Baccharis pilularis subsp. *consanguinea*	coyote brush	0.2%	0.4%	0.3%	0.2%	28.6%
Lepechinia calycina	pitcher sage	0.0%	0.0%	--	0.0%	0.0%
Ericameria fasciculata	**Eastwood's ericameria**	**0.1%**	**0.2%**	**0.2%**	**0.1%**	**14.3%**
Lupinus chamissonis	silver bush lupine	1.2%	2.1%	1.5%	1.1%	28.6%
Acmispon glaber	deerweed	1.2%	1.1%	0.8%	1.1%	85.7%
Garrya elliptica	coast silk-tassel	0.0%	0.0%	--	0.0%	0.0%
Symphoricarpos mollis	creeping snowberry	0.0%	0.0%	--	0.0%	0.0%
Toxicodendron diversilobum	poison-oak	0.0%	0.0%	--	0.0%	0.0%
Total Cover by Native Shrub and Subshrub Species		***108%***			***99%***	
Total Combined Mean Cover Between Shrubs and Subshrubs		***1.2%***	***1.2%***	***0.9%***	***1.1%***	***71%***
Target Weed Total (*Carpobrotus edulis*)		***0%***	***0%***	*--*	***0%***	***0%***
Total Mean Percent Native Vegetative Cover		***108.8%***				
Total Mean Percent Bare Ground (Including Masticated Vegetation)		***16.2%***				
Total Mean Percent Masticated Vegetation (calculated in 2014 only)		*--*	*--*	*--*	*--*	*--*
Total Mean Percent Bare Ground Only		***16.2%***	***7.9%***	***5.8%***	***14.8%***	***100%***

HMP Species in Bold

Note: Not all species observed along transects listed in this t

Table 6-26
IAR MRA South Range 44 SCA and Central Area NCAs
Vegetation Cover in Areas Subject to Vegetation Cutting Conducted in 2011

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Seven Transects in Cut Vegetation Conducted in 2011				
		Post-activity Data 2012 (Year 1)				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Mean Relative Cover	Frequency
Tree Species						
Quercus agrifolia	coast live oak	0.0%	0.0%	--	0.0%	0.0%
Total Cover by Native Tree Species		***0.0%***			***0.0%***	
Shrub and Sub-shrub Species						
Arctostaphylos tomentosa subsp. *tomentosa*	shaggy-barked manzanita	9.4%	4.9%	3.6%	43.7%	100%
Ceanothus rigidus	**Monterey ceanothus**	**0.7%**	**0.7%**	**0.5%**	**3.0%**	**57.1%**
Ceanothus dentatus	dwarf ceanothus	0.0%	0.0%	--	0.0%	0.0%
Adenostoma fasciculatum	chamise	3.3%	1.5%	1.1%	15.5%	100%
Crocanthemum scoparium	rush-rose	2.0%	5.2%	3.8%	9.5%	42.9%
Salvia mellifera	black sage	1.5%	2.2%	1.6%	7.1%	85.7%
Arctostaphylos pumila	**sandmat manzanita**	**1.6%**	**1.3%**	**0.9%**	**7.4%**	**85.7%**
Eriophyllum confertiflorum	golden yarrow	0.1%	0.1%	0.1%	0.4%	42.9%
Frangula californica subsp. *californica*	California coffeeberry	0.0%	0.0%	0.0%	0.0%	0.0%
Mimulus aurantiacus	bush monkeyflower	0.0%	0.1%	0.1%	0.2%	14.3%
Ericameria ericoides	dune-heather, mock-heather	0.5%	1.2%	0.9%	2.1%	14.3%
Baccharis pilularis subsp. *consanguinea*	coyote brush	0.0%	0.0%	--	0.0%	0.0%
Lepechinia calycina	pitcher sage	0.0%	0.0%	--	0.0%	0.0%
Ericameria fasciculata	**Eastwood's ericameria**	**0.1%**	**0.2%**	**0.1%**	**0.3%**	**14.3%**
Lupinus chamissonis	silver bush lupine	0.0%	0.0%	0.0%	0.0%	0.0%
Acmispon glaber	deerweed	1.2%	1.3%	0.9%	5.7%	85.7%
Garrya elliptica	coast silk-tassel	0.4%	1.0%	0.7%	2.1%	28.6%
Symphoricarpos mollis	creeping snowberry	0.1%	0.3%	0.2%	0.6%	14.3%
Toxicodendron diversilobum	poison-oak	0.1%	0.1%	0.1%	0.3%	28.6%
Total Cover by Native Shrub and Subshrub Species		***21.1%***			***85.7%***	
Total Combined Mean Cover Between Shrubs and Subshrubs		***3.5%***	***5.3%***	***4.7%***	***8.0%***	***90.0%***
Target Weed Total (*Carpobrotus edulis*)		***0.5%***	***0.5%***	***0.4%***	***2.2%***	***57.1%***
Total Mean Percent Native Vegetative Cover		***24.6%***				
Total Mean Percent Bare Ground (Including Masticated Vegetation)		***75.2%***				
Total Mean Percent Masticated Vegetation (calculated in 2014 only)		***--***	***--***	***--***	***--***	***--***
Total Mean Percent Bare Ground Only		***75%***	***7.9%***	***5.8%***	***--***	***100%***

HMP Species in Bold

Note: Not all species observed along transects listed in this t

Table 6-26
IAR MRA South Range 44 SCA and Central Area NCAs
Vegetation Cover in Areas Subject to Vegetation Cutting Conducted in 2011

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Seven Transects in Cut Vegetation Conducted in 2011				
		Post-activity Data 2013 (Year 2)				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Mean Relative Cover	Frequency
Tree Species						
Quercus agrifolia	coast live oak	0.0%	0.1%	0.1%	0.1%	14.3%
Total Cover by Native Tree Species		***0.0%***			***0.1%***	
Shrub and Sub-shrub Species						
Arctostaphylos tomentosa subsp. *tomentosa*	shaggy-barked manzanita	11.6%	6.7%	4.9%	36.2%	100%
Ceanothus rigidus	**Monterey ceanothus**	**1.1%**	**1.4%**	**1.0%**	**3.3%**	**71.4%**
Ceanothus dentatus	dwarf ceanothus	0.0%	0.1%	0.1%	0.1%	14.3%
Adenostoma fasciculatum	chamise	4.5%	2.4%	1.7%	14.2%	100%
Crocanthemum scoparium	rush-rose	2.0%	4.9%	3.6%	6.4%	85.7%
Salvia mellifera	black sage	3.5%	6.1%	4.5%	10.9%	85.7%
Arctostaphylos pumila	**sandmat manzanita**	**2.7%**	**1.9%**	**1.4%**	**8.5%**	**85.7%**
Eriophyllum confertiflorum	golden yarrow	0.3%	0.4%	0.3%	0.9%	57.1%
Frangula californica subsp. *californica*	California coffeeberry	0.0%	0.0%	0.0%	0.0%	0.0%
Mimulus aurantiacus	bush monkeyflower	0.1%	0.2%	0.1%	0.3%	28.6%
Ericameria ericoides	dune-heather, mock-heather	0.6%	1.5%	1.1%	1.8%	14.3%
Baccharis pilularis subsp. *consanguinea*	coyote brush	0.0%	0.0%	0.0%	0.0%	0.0%
Lepechinia calycina	pitcher sage	0.1%	0.2%	0.1%	0.2%	10.0%
Ericameria fasciculata	**Eastwood's ericameria**	**0.0%**	**0.1%**	**0.1%**	**0.2%**	**14.3%**
Lupinus chamissonis	silver bush lupine	0.0%	0.0%	0.0%	0.0%	0.0%
Acmispon glaber	deerweed	3.8%	3.9%	2.9%	11.8%	85.7%
Garrya elliptica	coast silk-tassel	0.5%	1.4%	1.0%	1.7%	28.6%
Symphoricarpos mollis	creeping snowberry	0.3%	0.8%	0.6%	0.9%	14.3%
Toxicodendron diversilobum	poison-oak	0.1%	0.2%	0.1%	0.2%	14.3%
Total Cover by Native Shrub and Subshrub Species		***31.3%***			***91.7%***	
Total Combined Mean Cover Between Shrubs and Subshrubs		***2.8%***	***4.4%***	***2.6%***	***8.2%***	***80.0%***
Target Weed Total (*Carpobrotus edulis*)		***0.5%***	***0.5%***	***0.3%***	***1.6%***	***71.4%***
Total Mean Percent Native Vegetative Cover		***34.1%***				
Total Mean Percent Bare Ground (Including Masticated Vegetation)		***68.3%***				
Total Mean Percent Masticated Vegetation (calculated in 2014 only)		*--*	*--*	*--*	*--*	*--*
Total Mean Percent Bare Ground Only		***68.3%***	***9.2%***	***6.8%***	*--*	***100%***

HMP Species in Bold

Note: Not all species observed along transects listed in this t

Table 6-26
IAR MRA South Range 44 SCA and Central Area NCAs
Vegetation Cover in Areas Subject to Vegetation Cutting Conducted in 2011

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Seven Transects in Cut Vegetation Conducted in 2011				
		Post-activity Data 2014 (Year 3)				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Mean Relative Cover	Frequency
Tree Species						
Quercus agrifolia	coast live oak	0.0%	0.0%	0.0%	0.0%	14.3%
Total Cover by Native Tree Species		***0.0%***			***0.0%***	
Shrub and Sub-shrub Species						
Arctostaphylos tomentosa subsp. *tomentosa*	shaggy-barked manzanita	11.8%	5.5%	4.0%	38.6%	100%
Ceanothus rigidus	**Monterey ceanothus**	**0.8%**	**0.9%**	**0.6%**	**2.5%**	**85.7%**
Ceanothus dentatus	dwarf ceanothus	0.0%	0.0%	--	0.0%	0.0%
Adenostoma fasciculatum	chamise	5.0%	3.1%	2.3%	16.3%	100%
Crocanthemum scoparium	rush-rose	1.8%	4.2%	3.1%	5.8%	85.7%
Salvia mellifera	black sage	2.6%	3.8%	2.8%	8.6%	71.4%
Arctostaphylos pumila	**sandmat manzanita**	**2.8%**	**2.4%**	**1.8%**	**9.3%**	**85.7%**
Eriophyllum confertiflorum	golden yarrow	0.1%	0.2%	0.1%	0.3%	42.9%
Frangula californica subsp. *californica*	California coffeeberry	0.0%	0.0%	--	0.0%	0.0%
Mimulus aurantiacus	bush monkeyflower	0.1%	0.2%	0.2%	0.3%	14.3%
Ericameria ericoides	dune-heather, mock-heather	0.8%	2.0%	1.5%	2.5%	14.3%
Baccharis pilularis subsp. *consanguinea*	coyote brush	0.0%	0.0%	--	0.0%	0.0%
Lepechinia calycina	pitcher sage	0.0%	0.0%	--	0.0%	0.0%
Ericameria fasciculata	**Eastwood's ericameria**	**0.0%**	**0.0%**	--	**0.0%**	**0.0%**
Lupinus chamissonis	silver bush lupine	0.0%	0.0%	--	0.0%	0.0%
Acmispon glaber	deerweed	2.0%	1.5%	1.1%	6.6%	100%
Garrya elliptica	coast silk-tassel	0.3%	0.8%	0.6%	0.9%	14.3%
Symphoricarpos mollis	creeping snowberry	0.2%	0.6%	0.4%	0.8%	14.3%
Toxicodendron diversilobum	poison-oak	0.1%	0.2%	0.1%	0.2%	14.3%
Total Cover by Native Shrub and Subshrub Species		***28.4%***			***92.7%***	
Total Combined Mean Cover Between Shrubs and Subshrubs		***2.2%***	***4.7%***	***3.4%***	***7.3%***	***85.7%***
Target Weed Total (*Carpobrotus edulis*)		***0.0%***	***0.0%***	***-***	***--***	***0.0%***
Total Mean Percent Native Vegetative Cover		***30.6%***				
Total Mean Percent Bare Ground (Including Masticated Vegetation)		***70.3%***				
Total Mean Percent Masticated Vegetation (calculated in 2014 only)		***19.2%***	***13.5%***	***9.9%***	***--***	***85.7%***
Total Mean Percent Bare Ground Only		***51.1%***	***14.0%***	***10.3%***	***--***	***100%***

HMP Species in Bold

Note: Not all species observed along transects listed in this t

Table 6-27
Interim Action Range MRA - Range 47 Subarea C
Vegetation Cover in Areas Subject to Vegetation Cutting Conducted in 2011

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Twenty-nine Baseline Transects				
		Baseline Data 2010 - 2011 (all IAR MRA baseline transects)				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Mean Relative Cover	Frequency
Tree Species						
Quercus agrifolia	coast live oak	0.0%	0.0%	--	--	0.0%
Total Mean Percent Native Tree Cover		***0.0%***			***0.0%***	
Shrub and Sub-Shrub Species						
Arctostaphylos tomentosa subsp. *tomentosa*	shaggy-barked manzanita	29.3%	15.6%	4.9%	31.0%	100%
Ceanothus rigidus	**Monterey ceanothus**	**13.5%**	**9.3%**	**2.9%**	**14.3%**	**96.6%**
Ceanothus dentatus	dwarf ceanothus	20.2%	16.0%	5.0%	21.4%	89.7%
Adenostoma fasciculatum	chamise	9.0%	6.9%	2.2%	9.5%	89.7%
Crocanthemum scoparium	rush-rose	8.1%	9.1%	2.9%	8.6%	86.2%
Salvia mellifera	black sage	5.3%	7.2%	2.3%	5.6%	69.0%
Arctostaphylos pumila	**sandmat manzanita**	**1.6%**	**2.0%**	**0.6%**	**1.7%**	**65.5%**
Eriophyllum confertiflorum	golden yarrow	1.5%	2.2%	0.7%	1.6%	65.5%
Frangula californica subsp. *californica*	California coffeeberry	0.9%	1.9%	0.6%	1.0%	31.0%
Mimulus aurantiacus	bush monkeyflower	0.5%	0.9%	0.3%	0.5%	27.6%
Ericameria ericoides	dune-heather, mock-heather	1.5%	5.6%	1.8%	1.6%	24.1%
Baccharis pilularis subsp. *consanguinea*	coyote brush	0.7%	1.8%	0.6%	0.7%	24.1%
Lepechinia calycina	pitcher sage	0.4%	1.4%	0.5%	0.4%	20.7%
Ericameria fasciculata	**Eastwood's ericameria**	**0.2%**	**0.5%**	**0.2%**	**0.2%**	**17.2%**
Lupinus chamissonis	silver bush lupine	0.4%	1.1%	0.4%	0.4%	13.8%
Acmispon glaber	deerweed	1.4%	0.0%	--	1.5%	0.0%
Garrya elliptica	coast silk-tassel	0.0%	0.0%	--	--	0.0%
Symphoricarpos mollis	creeping snowberry	0.0%	0.0%	--	--	0.0%
Toxicodendron diversilobum	poison-oak	0.0%	0.0%	--	--	0.0%
Total Mean Percent Shrub and Subshrub Cover		***94.5%***			***98.6%***	
Total Combined Mean Cover Between Shrubs and Subshrubs		***1.3%***	***2.3%***	***1.3%***	***--***	***90.0%***
Target Weed Total (*Carpobrotus edulis*)		***0.0%***	***0.0%***			***0.0%***
Total Mean Percent Native Vegetative Cover		***95.8%***				
Total Mean Percent Bare Ground (Including Masticated Vegetation)		***19.3%***				
Total Mean Percent Masticated Vegetation (calculated in 2014 only)		***--***				
Total Mean Percent Bare Ground		***19.3%***	***9.3%***	***2.9%***	***--***	***100%***

HMP Species in Bold

Note: Not all species observed along the transects listed in this table

Table 6-27
Interim Action Range MRA - Range 47 Subarea C
Vegetation Cover in Areas Subject to Vegetation Cutting Conducted in 2011

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Six Baseline Transects				
		Baseline Data 2010 - 2011 (Range 47 Subarea C baseline transects)				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Mean Relative Cover	Frequency
Tree Species						
Quercus agrifolia	coast live oak	0.0%	0.0%	--	--	0.0%
Total Mean Percent Native Tree Cover		***0.0%***			***0.0%***	
Shrub and Sub-Shrub Species						
Arctostaphylos tomentosa subsp. *tomentosa*	shaggy-barked manzanita	34.4%	15.3%	0.5%	30.2%	100%
Ceanothus rigidus	**Monterey ceanothus**	**16.6%**	**12.3%**	**0.4%**	**14.6%**	**100.0%**
Ceanothus dentatus	dwarf ceanothus	13.7%	15.1%	0.5%	12.1%	83.3%
Adenostoma fasciculatum	chamise	10.5%	6.3%	5.2%	9.2%	83.3%
Crocanthemum scoparium	rush-rose	6.1%	7.6%	0.3%	5.4%	83.3%
Salvia mellifera	black sage	2.3%	2.5%	0.1%	2.1%	66.7%
Arctostaphylos pumila	**sandmat manzanita**	**0.8%**	**1.1%**	**0.0%**	**0.7%**	**50.0%**
Eriophyllum confertiflorum	golden yarrow	0.6%	0.7%	0.0%	0.5%	66.7%
Frangula californica subsp. *californica*	California coffeeberry	0.4%	0.9%	0.0%	0.4%	33.3%
Mimulus aurantiacus	bush monkeyflower	0.7%	1.4%	0.0%	0.6%	33.3%
Ericameria ericoides	dune-heather, mock-heather	1.2%	2.0%	0.1%	1.1%	50.0%
Baccharis pilularis subsp. *consanguinea*	coyote brush	1.2%	2.6%	0.1%	1.1%	33.3%
Lepechinia calycina	pitcher sage	1.3%	3.1%	0.1%	1.1%	16.7%
Ericameria fasciculata	**Eastwood's ericameria**	**0.4%**	**0.7%**	**0.0%**	**0.4%**	**33.3%**
Lupinus chamissonis	silver bush lupine	0.3%	0.7%	0.0%	0.2%	16.7%
Acmispon glaber	deerweed	1.2%	1.3%	0.0%	1.1%	83.3%
Garrya elliptica	coast silk-tassel	0.0%	0.0%	--	0.0%	0.0%
Symphoricarpos mollis	creeping snowberry	0.0%	0.0%	--	0.0%	0.0%
Toxicodendron diversilobum	poison-oak	0.0%	0.0%	--	0.0%	0.0%
Total Mean Percent Shrub and Subshrub Cover		***91.7%***			***99.4%***	
Total Combined Mean Cover Between Shrubs and Subshrubs		***0.5%***	***1.3%***	***0.0%***	***0.5%***	***16.7%***
Target Weed Total (*Carpobrotus edulis*)						
Total Mean Percent Native Vegetative Cover		***92.2%***				
Total Mean Percent Bare Ground (Including Masticated Vegetation)		***21.5%***				
Total Mean Percent Masticated Vegetation (calculated in 2014 only)		***--***				
Total Mean Percent Bare Ground		***21%***	***10%***	***0%***	***19%***	***100%***

HMP Species in Bold

Note: Not all species observed along the transects l

Table 6-27
Interim Action Range MRA - Range 47 Subarea C
Vegetation Cover in Areas Subject to Vegetation Cutting Conducted in 2011

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Three transects with Vegetation Cutting Conducted in 2011				
		Post-activity Data 2012 (Year 1)				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Mean Relative Cover	Frequency
Tree Species						
Quercus agrifolia	coast live oak	0.0%	0.0%	**--**	--	0.0%
Total Mean Percent Native Tree Cover		***0.0%***			***0.0%***	
Shrub and Sub-Shrub Species						
Arctostaphylos tomentosa subsp. *tomentosa*	shaggy-barked manzanita	30.1%	12.1%	20.3%	61.0%	100%
Ceanothus rigidus	**Monterey ceanothus**	**0.1%**	**0.2%**	**0.3%**	**0.2%**	**33.3%**
Ceanothus dentatus	dwarf ceanothus	0.0%	0.0%	--	--	0.0%
Adenostoma fasciculatum	chamise	3.9%	2.8%	4.7%	7.8%	100%
Crocanthemum scoparium	rush-rose	0.1%	0.2%	0.3%	0.2%	33.3%
Salvia mellifera	black sage	1.5%	2.4%	4.0%	3.0%	66.7%
Arctostaphylos pumila	**sandmat manzanita**	**0.6%**	**0.8%**	**1.4%**	**1.2%**	**66.7%**
Eriophyllum confertiflorum	golden yarrow	0.6%	1.0%	1.6%	1.1%	33.3%
Frangula californica subsp. *californica*	California coffeeberry	0.0%	0.0%	--	0.0%	0.0%
Mimulus aurantiacus	bush monkeyflower	0.0%	0.0%	--	--	0.0%
Ericameria ericoides	dune-heather, mock-heather	0.0%	0.0%	--	--	0.0%
Baccharis pilularis subsp. *consanguinea*	coyote brush	0.1%	0.2%	0.4%	0.3%	33.3%
Lepechinia calycina	pitcher sage	0.9%	0.8%	1.4%	1.8%	66.7%
Ericameria fasciculata	**Eastwood's ericameria**	**0.0%**	**0.0%**	**--**	--	**0.0%**
Lupinus chamissonis	silver bush lupine	0.0%	0.0%	0.0%	0.0%	0.0%
Acmispon glaber	deerweed	5.3%	2.5%	4.3%	10.8%	100%
Garrya elliptica	coast silk-tassel	0.0%	0.0%	**--**	--	0.0%
Symphoricarpos mollis	creeping snowberry	0.0%	0.0%	**--**	--	0.0%
Toxicodendron diversilobum	poison-oak	0.1%	0.1%	0.2%	0.1%	33.3%
Total Mean Percent Shrub and Subshrub Cover		***43.2%***			***94.0%***	
Total Combined Mean Cover Between Shrubs and Subshrubs		***2.7%***	***0.6%***	***1.0%***	***--***	***100%***
Target Weed Total (*Carpobrotus edulis*)		***3.3%***	***4.8%***	***8.2%***	***6.7%***	***66.7%***
Total Mean Percent Native Vegetative Cover		***46.0%***				
Total Mean Percent Bare Ground (Including Masticated Vegetation)		***53.1%***				
Total Mean Percent Masticated Vegetation (calculated in 2014 only)		***--***				
Total Mean Percent Bare Ground		***53.1%***	***10.6%***	***17.8%***	***--***	***100%***

HMP Species in Bold

Note: Not all species observed along the transects l

Table 6-27
Interim Action Range MRA - Range 47 Subarea C
Vegetation Cover in Areas Subject to Vegetation Cutting Conducted in 2011

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Three transects with Vegetation Cutting Conducted in 2011				
		Post-activity Data 2013 (Year 2)				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Mean Relative Cover	Frequency
Tree Species						
Quercus agrifolia	coast live oak	0.0%	0.1%	0.1%	0.1%	14.3%
Total Mean Percent Native Tree Cover		***0.0%***			***0.0%***	
Shrub and Sub-Shrub Species						
Arctostaphylos tomentosa subsp. *tomentosa*	shaggy-barked manzanita	36.9%	8.7%	14.7%	34.5%	100%
Ceanothus rigidus	**Monterey ceanothus**	**2.1%**	**1.3%**	**2.3%**	**1.9%**	**100.0%**
Ceanothus dentatus	dwarf ceanothus	0.3%	0.6%	1.0%	0.3%	33.3%
Adenostoma fasciculatum	chamise	10.5%	2.6%	4.4%	9.8%	100%
Crocanthemum scoparium	rush-rose	0.5%	0.4%	0.7%	0.5%	100.0%
Salvia mellifera	black sage	2.9%	5.0%	8.4%	2.7%	33.3%
Arctostaphylos pumila	**sandmat manzanita**	**2.6%**	**3.1%**	**5.2%**	**2.4%**	**66.7%**
Eriophyllum confertiflorum	golden yarrow	0.2%	0.3%	0.4%	0.1%	33.3%
Frangula californica subsp. *californica*	California coffeeberry	0.0%	0.0%	--	--	0.0%
Mimulus aurantiacus	bush monkeyflower	0.0%	0.0%	--	--	0.0%
Ericameria ericoides	dune-heather, mock-heather	0.0%	0.0%	--	--	0.0%
Baccharis pilularis subsp. *consanguinea*	coyote brush	0.0%	0.0%	--	--	0.0%
Lepechinia calycina	pitcher sage	0.2%	0.4%	0.7%	0.2%	33.3%
Ericameria fasciculata	**Eastwood's ericameria**	**0.0%**	**0.0%**	**--**	**--**	**0.0%**
Lupinus chamissonis	silver bush lupine	0.0%	0.0%	--	--	0.0%
Acmispon glaber	deerweed	10.5%	9.0%	15.1%	9.8%	100%
Garrya elliptica	coast silk-tassel	0.0%	0.0%	--	--	0.0%
Symphoricarpos mollis	creeping snowberry	0.0%	0.0%	--	--	0.0%
Toxicodendron diversilobum	poison-oak	0.5%	0.8%	1.3%	0.4%	33.3%
Total Mean Percent Shrub and Subshrub Cover		***67.2%***			***95.9%***	
Total Combined Mean Cover Between Shrubs and Subshrubs		***2.9%***	***5.14%***	***3.8%***	***--***	***71.4%***
Target Weed Total (*Carpobrotus edulis*)		***0.5%***	***0.45%***	***0.3%***	***1.6%***	***71.4%***
Total Mean Percent Native Vegetative Cover		***70.1%***				
Total Mean Percent Bare Ground (Including Masticated Vegetation)		***68.3%***				
Total Mean Percent Masticated Vegetation (calculated in 2014 only)		***--***				
Total Mean Percent Bare Ground		***68.3%***	***9.24%***	***6.8%***	***--***	***100%***

HMP Species in Bold

Note: Not all species observed along the transects l

Table 6-27
Interim Action Range MRA - Range 47 Subarea C
Vegetation Cover in Areas Subject to Vegetation Cutting Conducted in 2011

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Three transects with Vegetation Cutting Conducted in 2011				
		Post-activity Data 2014 (Year 3)				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Mean Relative Cover	Frequency
Tree Species						
Quercus agrifolia	coast live oak	0.0%	0.0%	--	--	0.0%
Total Mean Percent Native Tree Cover		***0.0%***			***0.0%***	
Shrub and Sub-Shrub Species						
Arctostaphylos tomentosa subsp. *tomentosa*	shaggy-barked manzanita	38.9%	12.2%	20.6%	53.8%	100%
Ceanothus rigidus	**Monterey ceanothus**	**1.4%**	**0.2%**	**0.3%**	**1.9%**	**100.0%**
Ceanothus dentatus	dwarf ceanothus	0.4%	0.6%	1.0%	0.5%	66.7%
Adenostoma fasciculatum	chamise	10.2%	4.2%	7.1%	14.1%	100%
Crocanthemum scoparium	rush-rose	0.2%	0.2%	0.4%	0.3%	100.0%
Salvia mellifera	black sage	3.5%	6.1%	10.2%	4.8%	33.3%
Arctostaphylos pumila	**sandmat manzanita**	**2.6%**	**3.9%**	**6.6%**	**3.6%**	**66.7%**
Eriophyllum confertiflorum	golden yarrow	0.0%	0.0%	--	0.0%	0.0%
Frangula californica subsp. *californica*	California coffeeberry	0.0%	0.0%	--	--	0.0%
Mimulus aurantiacus	bush monkeyflower	0.0%	0.0%	0.1%	0.0%	33.3%
Ericameria ericoides	dune-heather, mock-heather	0.0%	--	--	0.0%	0.0%
Baccharis pilularis subsp. *consanguinea*	coyote brush	0.0%	0.0%	--	0.0%	0.0%
Lepechinia calycina	pitcher sage	0.0%	0.0%	--	--	0.0%
Ericameria fasciculata	**Eastwood's ericameria**	**0.0%**	**0.0%**	**--**	**--**	**0.0%**
Lupinus chamissonis	silver bush lupine	0.0%	0.0%	--	--	0.0%
Acmispon glaber	deerweed	5.5%	5.9%	10.0%	7.6%	100%
Garrya elliptica	coast silk-tassel	0.0%	0.0%	--	--	0.0%
Symphoricarpos mollis	creeping snowberry	0.0%	0.0%	--	--	0.0%
Toxicodendron diversilobum	poison-oak	0.0%	0.0%	--	--	0.0%
Total Mean Percent Shrub and Subshrub Cover		***62.7%***			***98.4%***	
Total Combined Mean Cover Between Shrubs and Subshrubs		***1.0%***	***1.69%***	***2.8%***	***1.4%***	***66.7%***
Target Weed Total (*Carpobrotus edulis*)		***8.6%***	***14.90%***	***25.1%***	***11.9%***	***33.3%***
Total Mean Percent Native Vegetative Cover		***63.7%***				
Total Mean Percent Bare Ground (Including Masticated Vegetation)		***31.6%***				
Total Mean Percent Masticated Vegetation (calculated in 2014 only)		***16.0%***	***7.89%***	***13.3%***	***22.1%***	***100%***
Total Mean Percent Bare Ground		***15.6%***	***8.24%***	***13.9%***	***21.5%***	***100%***

HMP Species in Bold

Note: Not all species observed along the transects l

Table 6-28
North Range 44 SCAs
Vegetation Cover in Areas Subject to Small-scale Excavations Conducted in 2011 (Activity C)

ESCA RP 2014 Annual Natural Resources Report - Appendix A

Scientific Name	Common Name	Twenty-nine Baseline Transects				
		Baseline Data 2010 - 2011 (all IAR MRA baseline transects)				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Mean Relative Cover	Frequency
Tree Species						
Quercus agrifolia	coast live oak	0.0%	--	--	0.0%	0.0%
Total Cover by Native Tree Species		***0.0%***			***0%***	
Arctostaphylos tomentosa subsp. *tomentosa*	shaggy-barked manzanita	29.3%	15.6%	4.9%	31.0%	100%
Ceanothus dentatus	dwarf ceanothus	20.2%	16.0%	5.0%	21.4%	89.7%
Ceanothus rigidus	**Monterey ceanothus**	**13.5%**	**9.3%**	**2.9%**	**14.3%**	**96.6%**
Adenostoma fasciculatum	chamise	9.0%	6.9%	2.2%	9.5%	89.7%
Crocanthemum scoparium	rush-rose	8.1%	9.1%	2.9%	8.6%	86.2%
Salvia mellifera	black sage	5.3%	7.2%	2.3%	5.6%	69.0%
Arctostaphylos pumila	**sandmat manzanita**	**1.6%**	**2.0%**	**0.6%**	**1.7%**	**65.5%**
Eriophyllum confertiflorum	golden yarrow	1.5%	2.2%	0.7%	1.6%	65.5%
Ericameria ericoides	dune-heather, mock-heather	1.5%	5.6%	1.8%	1.6%	24.1%
Acmispon glaber	deerweed	1.4%	0.0%	--	1.5%	0.0%
Frangula californica subsp. *californica*	California coffeeberry	0.9%	1.9%	0.6%	1.0%	31.0%
Baccharis pilularis subsp. *consanguinea*	coyote brush	0.7%	1.8%	0.6%	0.7%	24.1%
Mimulus aurantiacus	bush monkeyflower	0.5%	0.9%	0.3%	0.5%	27.6%
Lepechinia calycina	pitcher sage	0.4%	1.4%	0.5%	0.4%	20.7%
Lupinus chamissonis	silver bush lupine	0.4%	1.1%	0.4%	0.4%	13.8%
Ericameria fasciculata	**Eastwood's ericameria**	**0.2%**	**0.5%**	**0.2%**	**0.2%**	**17.2%**
Symphorocarpus mollis	creeping snowberry	0.0%	--	--	0.0%	0.0%
Toxicodendron diversilobum	poison-oak	0.0%	--	--	0.0%	0.0%
Total Mean Percent Shrub and Subshrub Cover		***94.5%***			***100.0%***	
Total Combined Mean Cover Between Shrubs and Subshrubs		***0.0%***	***--***	***--***	***0.0%***	***--***
Target Weed Total *(Carpobrotus edulis)*		***0.0%***				
Total Mean Percent Native Vegetative Cover		***94.5%***				
Total Mean Percent Bare Ground (Including Masticated Vegetation)		***19.3%***				
Total Mean Percent Masticated Vegetation (only calculated in 2014)		***--***				
Total Mean Percent Bare Ground		***19.3%***	***9.3%***	***2.9%***	***--***	***100%***

HMP Species in Bold

Table 6-28
North Range 44 SCAs
Vegetation Cover in Areas Subject to Small-scale Excavations Conducted in 2011 (Activity C)

ESCA RP 2014 Annual Natural Resources Report - Appendix A

Scientific Name	Common Name	Five Baseline Transects				
		Baseline Data 2010 -2011 (North Range 44 MRA baseline transects only)				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Mean Relative Cover	Frequency
Tree Species						
Quercus agrifolia	coast live oak	0.0%	0.0%	--	0.0%	0.0%
Total Cover by Native Tree Species		***0%***			***0%***	
Arctostaphylos tomentosa subsp. *tomentosa*	shaggy-barked manzanita	22%	6%	6%	22%	100%
Ceanothus dentatus	dwarf ceanothus	23.4%	19.3%	18.4%	23.5%	100.0%
Ceanothus rigidus	**Monterey ceanothus**	**9.4%**	**10.3%**	**9.9%**	**9.4%**	**100.0%**
Adenostoma fasciculatum	chamise	16.1%	6.1%	5.8%	16.2%	100.0%
Crocanthemum scoparium	rush-rose	11.6%	11.0%	10.5%	11.6%	100.0%
Salvia mellifera	black sage	6.1%	5.8%	5.6%	6.1%	60.0%
Arctostaphylos pumila	**sandmat manzanita**	**2.4%**	**3.3%**	**3.1%**	**2.4%**	**60.0%**
Eriophyllum confertiflorum	golden yarrow	2.8%	3.2%	3.0%	2.8%	100.0%
Ericameria ericoides	dune-heather, mock-heather	0.8%	1.2%	1.1%	0.8%	40.0%
Acmispon glaber	deerweed	0.8%	0.9%	0.8%	0.8%	80.0%
Frangula californica subsp. *californica*	California coffeeberry	1.8%	2.2%	2.1%	1.8%	60.0%
Baccharis pilularis subsp. *consanguinea*	coyote brush	0.0%	0.0%	--	0.0%	0.0%
Mimulus aurantiacus	bush monkeyflower	0.0%	0.1%	0.1%	0.1%	20.0%
Lepechinia calycina	pitcher sage	0.0%	0.0%	--	0.0%	0.0%
Lupinus chamissonis	silver bush lupine	0.3%	0.7%	0.7%	0.3%	20.0%
Ericameria fasciculata	**Eastwood's ericameria**	**0.6%**	**0.9%**	**0.8%**	**0.6%**	**40.0%**
Symphorocarpus mollis	creeping snowberry	0.0%	0.0%	--	0.0%	0.0%
Toxicodendron diversilobum	poison-oak	0.0%	0.0%	--	0.0%	0.0%
Total Mean Percent Shrub and Subshrub Cover		***98.0%***			***98.3%***	
Total Combined Mean Cover Between Shrubs and Subshrubs		***1.7%***	***1.4%***	***1.3%***	***1.7%***	***100.0%***
Target Weed Total *(Carpobrotus edulis)*		***0.0%***	***0.0%***	***--***	***0.0%***	***0.0%***
Total Mean Percent Native Vegetative Cover		***99.6%***				
Total Mean Percent Bare Ground (Including Masticated Vegetation)		***20.3%***				
Total Mean Percent Masticated Vegetation (only calculated in 2014)		***--***				
Total Mean Percent Bare Ground		***20%***	***10%***	***10%***	***--***	***100%***

HMP Species in Bold

Table 6-28
North Range 44 SCAs
Vegetation Cover in Areas Subject to Small-scale Excavations Conducted in 2011 (Activity C)

ESCA RP 2014 Annual Natural Resources Report - Appendix A

Scientific Name	Common Name	Eight Transects in Small Scale Excavations in North Range 44				
		Post-Activity Data 2013 (Year 1)				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Mean Relative Cover	Frequency
Tree Species						
Quercus agrifolia	coast live oak	0.1%	0.3%	0.2%	1.2%	12.5%
Total Cover by Native Tree Species		***0.1%***			***13.7%***	
Arctostaphylos tomentosa subsp. *tomentosa*	shaggy-barked manzanita	0.2%	0.4%	0.3%	5.2%	25.0%
Ceanothus dentatus	dwarf ceanothus	0.1%	0.2%	0.1%	6.2%	25.0%
Ceanothus rigidus	**Monterey ceanothus**	**0.1%**	**0.2%**	**0.2%**	**6.8%**	**12.5%**
Adenostoma fasciculatum	chamise	0.0%	--	--	--	0.0%
Crocanthemum scoparium	rush-rose	0.1%	0.1%	0.1%	1.9%	37.5%
Salvia mellifera	black sage	0.0%	--	--	0.0%	0.0%
Arctostaphylos pumila	**sandmat manzanita**	**0.1%**	**0.1%**	**0.1%**	**9.5%**	**50.0%**
Eriophyllum confertiflorum	golden yarrow	0.0%	0.0%	0.0%	0.4%	25.0%
Ericameria ericoides	dune-heather, mock-heather	0.0%	--	--	--	0.0%
Acmispon glaber	deerweed	0.0%	0.1%	0.0%	1.5%	12.5%
Frangula californica subsp. *californica*	California coffeeberry	0.0%	--	--	--	0.0%
Baccharis pilularis subsp. *consanguinea*	coyote brush	0.0%	0.0%	--	0.0%	0.0%
Mimulus aurantiacus	bush monkeyflower	0.0%	--	--	--	0.0%
Lepechinia calycina	pitcher sage	0.0%	--	--	--	0.0%
Lupinus chamissonis	silver bush lupine	0.1%	0.1%	0.1%	3.1%	12.5%
Ericameria fasciculata	**Eastwood's ericameria**	**0.0%**	**--**	**--**	**--**	**0.0%**
Symphorocarpus mollis	creeping snowberry	0.0%	0.0%	0.0%	0.4%	12.5%
Toxicodendron diversilobum	poison-oak	0.1%	0.3%	0.2%	5.4%	25.0%
Total Mean Percent Shrub and Subshrub Cover		***0.7%***			***86.3%***	
Total Combined Mean Cover Between Shrubs and Subshrubs		***0.0%***	***--***	***--***	***0.0%***	***0.0%***
Target Weed Total *(Carpobrotus edulis)*		***2.0%***	***2.9%***	***2.0%***	***2.0%***	***100%***
Total Mean Percent Native Vegetative Cover		***0.8%***				
Total Mean Percent Bare Ground (Including Masticated Vegetation)		***97.2%***				
Total Mean Percent Masticated Vegetation (only calculated in 2014)		***--***				
Total Mean Percent Bare Ground		***97.2%***	***3.3%***	***2.2%***	***100%***	***100%***

HMP Species in Bold

Table 6-28
North Range 44 SCAs
Vegetation Cover in Areas Subject to Small-scale Excavations Conducted in 2011 (Activity C)

ESCA RP 2014 Annual Natural Resources Report - Appendix A

Scientific Name	Common Name	Eight Transects in Small Scale Excavations in North Range 44				
		Post-Activity Data 2014 (Year 2)				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Mean Relative Cover	Frequency
Tree Species						
Quercus agrifolia	coast live oak	0.4%	1.2%	0.8%	9.4%	12.5%
Total Cover by Native Tree Species		***0.4%***			***9.5%***	
Arctostaphylos tomentosa subsp. *tomentosa*	shaggy-barked manzanita	0.0%	--	--	--	0.0%
Ceanothus dentatus	dwarf ceanothus	0.1%	0.3%	0.2%	3.3%	62.5%
Ceanothus rigidus	**Monterey ceanothus**	**0.2%**	**0.5%**	**0.3%**	**3.7%**	**12.5%**
Adenostoma fasciculatum	chamise	0.0%	--	--	--	0.0%
Crocanthemum scoparium	rush-rose	0.4%	0.4%	0.3%	8.4%	75.0%
Salvia mellifera	black sage	0.0%	--	--	--	0.0%
Arctostaphylos pumila	**sandmat manzanita**	**0.3%**	**0.5%**	**0.4%**	**6.6%**	**62.5%**
Eriophyllum confertiflorum	golden yarrow	0.0%	0.1%	0.0%	0.7%	25.0%
Ericameria ericoides	dune-heather, mock-heather	0.0%	--	--	--	0.0%
Acmispon glaber	deerweed	0.2%	0.3%	0.2%	3.6%	25.0%
Frangula californica subsp. *californica*	California coffeeberry	0.0%	--	--	--	0.0%
Baccharis pilularis subsp. *consanguinea*	coyote brush	0.0%	--	--	--	0.0%
Mimulus aurantiacus	bush monkeyflower	0.0%	0.0%	0.0%	0.2%	25.0%
Lepechinia calycina	pitcher sage	0.0%	--	--	--	0.0%
Lupinus chamissonis	silver bush lupine	0.0%	0.0%	0.0%	0.2%	12.5%
Ericameria fasciculata	**Eastwood's ericameria**	**0.0%**	**0.1%**	**0.1%**	**0.8%**	**12.5%**
Symphorocarpus mollis	creeping snowberry	0.0%	--	--	--	0.0%
Toxicodendron diversilobum	poison-oak	0.3%	0.6%	0.4%	7.5%	25.0%
Total Mean Percent Shrub and Subshrub Cover		***1.5%***			***35.5%***	
Total Combined Mean Cover Between Shrubs and Subshrubs		***2.4%***	***4.1%***	***2.7%***	***55.0%***	***87.5%***
Target Weed Total *(Carpobrotus edulis)*		***0.1%***	***0.2%***	***0.1%***	***0.1%***	***13%***
Total Mean Percent Native Vegetative Cover		***4.3%***				
Total Mean Percent Bare Ground (Including Masticated Vegetation)		***95.7%***				
Total Mean Percent Masticated Vegetation (only calculated in 2014)		***0.5%***	***1.5%***	***1.0%***	***13%***	***13%***
Total Mean Percent Bare Ground		***95.1%***	***6.4%***	***4.3%***	***--***	***100%***

HMP Species in Bold

Table 6-29
IAR South and Central Range 44 Vegetation Cover in Areas
Subject to Small-scale Excavation Conducted in 2011 (Activity C)

ESCA RP 2014 Annual Natural Resources Report - Appendix A

Scientific Name	Common Name	Twenty-nine Baseline Transects				
		Baseline Data 2010 - 2011				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Mean Relative Cover	Frequency
Arctostaphylos tomentosa subsp. *tomentosa*	shaggy-barked manzanita	29.3%	15.6%	4.9%	31.0%	100%
Ceanothus dentatus	dwarf ceanothus	20.2%	16.0%	5.0%	21.4%	89.7%
Ceanothus rigidus	**Monterey ceanothus**	**13.5%**	**9.3%**	**2.9%**	**14.3%**	**96.6%**
Adenostoma fasciculatum	chamise	9.0%	6.9%	2.2%	9.5%	89.7%
Crocanthemum scoparium	rush-rose	8.1%	9.1%	2.9%	8.6%	86.2%
Salvia mellifera	black sage	5.3%	7.2%	2.3%	5.6%	69.0%
Arctostaphylos pumila	**sandmat manzanita**	**1.6%**	**2.0%**	**0.6%**	**1.7%**	**65.5%**
Ericameria ericoides	dune-heather, mock-heather	1.5%	5.6%	1.8%	1.6%	24.1%
Eriophyllum confertiflorum	golden yarrow	1.5%	2.2%	0.7%	1.6%	65.5%
Acmispon glaber	deerweed	1.4%	0.0%	--	1.5%	0.0%
Frangula californica subsp. californica	California coffeeberry	0.9%	1.9%	0.6%	1.0%	31.0%
Baccharis pilularis subsp. *consanguinea*	coyote brush	0.7%	1.8%	0.6%	0.7%	24.1%
Mimulus aurantiacus	bush monkeyflower	0.5%	0.9%	0.3%	0.5%	27.6%
Lepechinia calycina	pitcher sage	0.4%	1.4%	0.5%	0.4%	20.7%
Lupinus chamissonis	silver bush lupine	0.4%	1.1%	0.4%	0.4%	13.8%
Ericameria fasciculata	**Eastwood's ericameria**	**0.2%**	**0.5%**	**0.2%**	**0.2%**	**17.2%**
Symphoricarpos mollis	creeping snowberry	0.0%	--	--	--	0.0%
Toxicodendron diversilobum	poison-oak	0.0%	--	--	--	0.0%
Total Mean Percent Shrub and Subshrub Cover		***94.5%***			***99%***	
Total Combined Mean Cover Between Shrubs and Subshrubs		***1.3%***	***2.3%***	***1.3%***	***1.4%***	***90.0%***
Target Weed Total (*Carpobrotus edulis*)		***0.0%***	***0.0%***		***0.0%***	***0.0%***
Total Mean Percent Native Vegetative Cover		***95.8%***				
Total Mean Percent Bare Ground (Including Masticated Vegetation)		***19.3%***				
Total Mean Percent Masticated Vegetation (calculated in 2014 only)		***--***				
Total Mean Percent Bare Ground		***19.3%***	***9.3%***	***2.9%***	***--***	***100.0%***

HMP Species in Bold

Table 6-29
IAR South and Central Range 44 Vegetation Cover in Areas
Subject to Small-scale Excavation Conducted in 2011 (Activity C)

ESCA RP 2014 Annual Natural Resources Report - Appendix A

Scientific Name	Common Name	Seven Baseline Transects				
		Baseline Data 2010 - 2011 (South Range 44 MRA baseline transects only)				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Mean Relative Cover	Frequency
Arctostaphylos tomentosa subsp. *tomentosa*	shaggy-barked manzanita	25.8%	9.5%	6.9%	23.7%	100%
Ceanothus dentatus	dwarf ceanothus	30.4%	14.9%	10.9%	27.9%	100%
Ceanothus rigidus	**Monterey ceanothus**	**16.3%**	**5.0%**	**3.7%**	**14.9%**	**100%**
Adenostoma fasciculatum	chamise	9.9%	7.1%	5.2%	9.1%	100%
Crocanthemum scoparium	rush-rose	10.0%	8.5%	6.2%	9.2%	100%
Salvia mellifera	black sage	8.7%	9.7%	7.1%	8.0%	100%
Arctostaphylos pumila	**sandmat manzanita**	**0.7%**	**0.6%**	**0.4%**	**0.7%**	**71.4%**
Ericameria ericoides	dune-heather, mock-heather	0.0%	0.0%	--	0.0%	0.0%
Eriophyllum confertiflorum	golden yarrow	3.0%	2.7%	2.0%	2.8%	85.7%
Acmispon glaber	deerweed	1.2%	1.1%	0.8%	1.1%	85.7%
Frangula californica subsp. californica	California coffeeberry	0.1%	0.2%	0.2%	0.1%	14.3%
Baccharis pilularis subsp. *consanguinea*	coyote brush	0.2%	0.4%	0.3%	0.2%	28.6%
Mimulus aurantiacus	bush monkeyflower	0.0%	0.0%	--	0.0%	0.0%
Lepechinia calycina	pitcher sage	0.0%	0.0%	--	0.0%	0.0%
Lupinus chamissonis	silver bush lupine	1.2%	2.1%	1.5%	1.1%	28.6%
Ericameria fasciculata	**Eastwood's ericameria**	**0.1%**	**0.2%**	**0.2%**	**0.1%**	**14.3%**
Symphoricarpos mollis	creeping snowberry	0.0%	0.0%	--	0.0%	0.0%
Toxicodendron diversilobum	poison-oak	0.0%	0.0%	--	0.0%	0.0%
Total Mean Percent Shrub and Subshrub Cover		***107.6%***			***98.9%***	
Total Combined Mean Cover Between Shrubs and Subshrubs		***1.2%***	***1.2%***	***0.9%***	***1.1%***	***71.4%***
Target Weed Total (*Carpobrotus edulis*)		***0.0%***	***0.0%***	***--***	***0.0%***	***0.0%***
Total Mean Percent Native Vegetative Cover		***108.8%***				
Total Mean Percent Bare Ground (Including Masticated Vegetation)		***16.2%***				
Total Mean Percent Masticated Vegetation (calculated in 2014 only)		***--***				
Total Mean Percent Bare Ground		***16.2%***	***7.9%***	***5.8%***	***14.8%***	***100.0%***

HMP Species in Bold

Table 6-29
IAR South and Central Range 44 Vegetation Cover in Areas
Subject to Small-scale Excavation Conducted in 2011 (Activity C)

ESCA RP 2014 Annual Natural Resources Report - Appendix A

Scientific Name	Common Name	Five Transects in Small-scale Excavations Conducted in 2011				
		Post-activity Data 2012 (Year 1)				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Cover	Frequency
Arctostaphylos tomentosa subsp. *tomentosa*	shaggy-barked manzanita	0.0%	0.0%	0.0%	0.4%	67%
Ceanothus dentatus	dwarf ceanothus	0.0%	0.0%	0.0%	0.1%	16.7%
Ceanothus rigidus	**Monterey ceanothus**	**0.0%**	**0.0%**	**0.0%**	**0.1%**	**16.7%**
Adenostoma fasciculatum	chamise	0.0%	--	--	--	0.0%
Crocanthemum scoparium	rush-rose	0.8%	0.9%	0.9%	11.2%	100%
Salvia mellifera	black sage	0.1%	0.2%	0.2%	1.0%	33.3%
Arctostaphylos pumila	**sandmat manzanita**	**0.0%**	**0.0%**	**NA**	**0.0%**	**0.0%**
Ericameria ericoides	dune-heather, mock-heather	0.0%	--	--	0.0%	0.0%
Eriophyllum confertiflorum	golden yarrow	0.1%	0.1%	0.1%	0.9%	83.3%
Acmispon glaber	deerweed	1.3%	1.0%	1.0%	17.3%	83.3%
Frangula californica subsp. californica	California coffeeberry	0.0%	--	--	0.0%	0.0%
Baccharis pilularis subsp. *consanguinea*	coyote brush	0.0%	0.0%	0.0%	0.0%	16.7%
Mimulus aurantiacus	bush monkeyflower	0.0%	--	--	0.0%	0.0%
Lepechinia calycina	pitcher sage	0.0%	--	--	0.0%	0.0%
Lupinus chamissonis	silver bush lupine	0.0%	--	--	0.0%	0.0%
Ericameria fasciculata	**Eastwood's ericameria**	**0.0%**	**--**	**--**	**0.0%**	**0.0%**
Symphoricarpos mollis	creeping snowberry	0.0%	0.0%	0.0%	0.1%	16.7%
Toxicodendron diversilobum	poison-oak	0.0%	--	--	--	0.0%
Total Mean Percent Shrub and Subshrub Cover		***2.3%***			***31.2%***	
Total Combined Mean Cover Between Shrubs and Subshrubs		***5.1%***	***4.0%***	***3.8%***	***68.8%***	***100.0%***
Target Weed Total (*Carpobrotus edulis*)		***0.0%***	***0.0%***	***--***	***--***	***0.0%***
Total Mean Percent Native Vegetative Cover		***7.5%***				
Total Mean Percent Bare Ground (Including Masticated Vegetation)		***92.5%***				
Total Mean Percent Masticated Vegetation (calculated in 2014 only)		***--***				
Total Mean Percent Bare Ground		***92.5%***	***3.8%***	***3.6%***	***--***	***100.0%***

HMP Species in Bold

Table 6-29
IAR South and Central Range 44 Vegetation Cover in Areas
Subject to Small-scale Excavation Conducted in 2011 (Activity C)

ESCA RP 2014 Annual Natural Resources Report - Appendix A

Scientific Name	Common Name	Five Transects in Small-scale Excavations Conducted in 2011				
		Post-activity Data 2013 (Year 2)				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Cover	Frequency
Arctostaphylos tomentosa subsp. *tomentosa*	shaggy-barked manzanita	0.0%	--	--	0.0%	0.0%
Ceanothus dentatus	dwarf ceanothus	0.0%	0.0%	0.0%	0.2%	40.0%
Ceanothus rigidus	**Monterey ceanothus**	**0.0%**	**0.0%**	**0.0%**	**0.1%**	**40.0%**
Adenostoma fasciculatum	chamise	0.0%	--	--	--	0.0%
Crocanthemum scoparium	rush-rose	1.2%	0.6%	0.6%	15.7%	100%
Salvia mellifera	black sage	0.0%	0.1%	0.0%	0.5%	40.0%
Arctostaphylos pumila	**sandmat manzanita**	**0.0%**	**0.0%**	**0.0%**	**0.2%**	**40.0%**
Ericameria ericoides	dune-heather, mock-heather	0.0%	0.0%	0.0%	0.0%	20.0%
Eriophyllum confertiflorum	golden yarrow	0.1%	0.2%	0.2%	1.3%	60.0%
Acmispon glaber	deerweed	6.1%	9.0%	8.6%	44.7%	100%
Frangula californica subsp. californica	California coffeeberry	0.0%	--	--	0.0%	0.0%
Baccharis pilularis subsp. *consanguinea*	coyote brush	0.0%	--	--	0.0%	0.0%
Mimulus aurantiacus	bush monkeyflower	0.0%	--	--	0.0%	0.0%
Lepechinia calycina	pitcher sage	0.0%	--	--	0.0%	0.0%
Lupinus chamissonis	silver bush lupine	0.0%	--	--	0.0%	0.0%
Ericameria fasciculata	**Eastwood's ericameria**	**0.0%**	**--**	**--**	**0.0%**	**0.0%**
Symphoricarpos mollis	creeping snowberry	0.0%	0.0%	0.0%	0.1%	20.0%
Toxicodendron diversilobum	poison-oak	0.0%	--	--	--	0.0%
Total Mean Percent Shrub and Subshrub Cover		***7.6%***			***52.8%***	
Total Combined Mean Cover Between Shrubs and Subshrubs		***6.8%***	***10.8%***	***10.3%***	***47.2%***	***100%***
Target Weed Total (*Carpobrotus edulis*)		***0.0%***	***0.0%***	***--***	***0.0%***	***0.0%***
Total Mean Percent Native Vegetative Cover		***14.4%***				
Total Mean Percent Bare Ground (Including Masticated Vegetation)		***85.7%***				
Total Mean Percent Masticated Vegetation (calculated in 2014 only)		***--***				
Total Mean Percent Bare Ground		***85.7%***	***11.8%***	***11.2%***	***--***	***100%***

HMP Species in Bold

Table 6-29
IAR South and Central Range 44 Vegetation Cover in Areas
Subject to Small-scale Excavation Conducted in 2011 (Activity C)

ESCA RP 2014 Annual Natural Resources Report - Appendix A

Scientific Name	Common Name	Five Transects in Small-scale Excavations Conducted in 2011				
		Post-activity Data 2014 (Year 3)				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Cover	Frequency
Arctostaphylos tomentosa subsp. *tomentosa*	shaggy-barked manzanita	0.0%	--	--	--	0.0%
Ceanothus dentatus	dwarf ceanothus	0.0%	--	--	--	0.0%
Ceanothus rigidus	**Monterey ceanothus**	**0.0%**	**--**	**--**	**--**	**0.0%**
Adenostoma fasciculatum	chamise	7.2%	7.5%	7.2%	55.9%	80.0%
Crocanthemum scoparium	rush-rose	0.8%	0.8%	0.8%	6.5%	100%
Salvia mellifera	black sage	0.1%	0.1%	0.1%	0.5%	60.0%
Arctostaphylos pumila	**sandmat manzanita**	**0.4%**	**0.4%**	**0.3%**	**3.1%**	**80.0%**
Ericameria ericoides	dune-heather, mock-heather	0.1%	0.1%	0.1%	0.4%	20.0%
Eriophyllum confertiflorum	golden yarrow	0.6%	0.6%	0.5%	4.6%	60.0%
Acmispon glaber	deerweed	7.2%	7.5%	7.2%	55.9%	80%
Frangula californica subsp. californica	California coffeeberry	0.0%	--	--	0.0%	0.0%
Baccharis pilularis subsp. *consanguinea*	coyote brush	0.0%	--	--	--	0.0%
Mimulus aurantiacus	bush monkeyflower	0.0%	--	--	0.0%	0.0%
Lepechinia calycina	pitcher sage	0.0%	--	--	0.0%	0.0%
Lupinus chamissonis	silver bush lupine	0.0%	--	--	0.0%	0.0%
Ericameria fasciculata	**Eastwood's ericameria**	**0.0%**	**--**	**--**	**0.0%**	**0.0%**
Symphoricarpos mollis	creeping snowberry	0.0%	--	--	--	0.0%
Toxicodendron diversilobum	poison-oak	0.1%	0.2%	0.2%	0.6%	20.0%
Total Mean Percent Shrub and Subshrub Cover		***16.4%***			***83.3%***	
Total Combined Mean Cover Between Shrubs and Subshrubs		***3.3%***	***6.1%***	***5.8%***	***16.7%***	***100%***
Target Weed Total (*Carpobrotus edulis*)		***0.0%***	**--**	**--**	**--**	***0.0%***
Total Mean Percent Native Vegetative Cover		***19.7%***				
Total Mean Percent Bare Ground (Including Masticated Vegetation)		***88.0%***				
Total Mean Percent Masticated Vegetation (calculated in 2014 only)		***0.0%***				
Total Mean Percent Bare Ground		***88.0%***	***7.4%***	***7.0%***	**--**	***100%***

HMP Species in Bold

Table 6-30
2013 - 2014 Cover and Frequency of Herbaceous Species
After Small-scale Excavations in North Range 44 (36 quadrats)

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Post-activity Data Year 1 (2013)				
		Thirty-three Quadrats in Small-scale Excavations in North Range 44				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Percent Cover	Frequency
Shrub and Subshrub Species						
Arctostaphylos pumila	**sandmat manzanita**	**0.0%**	**0.4%**	**0.1%**	**2.8%**	**13.9%**
Toxicodendron diversilobum	poison-oak	0.3%	5.7%	1.4%	23.7%	5.6%
Crocanthemum scoparium	rush-rose	0.0%	0.0%	--	0.4%	5.6%
Ceanothus dentatus	dwarf ceanothus	0.1%	1.3%	0.3%	4.2%	5.6%
Eriophyllum confertiflorum	golden yarrow	0.0%	0.0%	--	0.4%	5.6%
Arctostaphylus tomentosa subsp. *tomentosa*	shaggy-barked manzanita	0.1%	--	--	4.0%	2.8%
Ceanothus rigidus	**Monterey ceanothus**	0.0%	--	--	0.2%	2.8%
Adenostemma fasciculata	chamise	0.0%	--	--	--	0.0%
Quercus agrifolia var. agrifolia	coast live oak	0.0%	--	--	--	0.0%
Lupinus chamissonis	silver bush lupine	0.0%	--	--	--	0.0%
Baccharis pilularis subsp. consanguinea	coyote brush	0.0%	--	--	--	0.0%
Salvia mellifera	black sage	0.0%	--	--	--	0.0%
Mimulus aurantiacus	bush monkeyflower	0.0%	--	--	--	0.0%
Ericameria fasciculata	Eastwood's ericameria	0.0%	--	--	--	0.0%
Acmispon glaber	deerweed	0.0%	--	--	--	0.0%
Total Cover by Shrub and Subshrub Species		***0.5%***			***35.6%***	
Herbaceous Species						
Achillea millefolium	common yarrow	0.0%	--	--	--	0.0%
Apiastrum angustifolium	wild parsley	0.0%	NA	NA	0.2%	2.8%
Calandrinia ciliata	red maids	0.0%	--	--	--	0.0%
Camissonia contorta	contorted suncups	0.0%	--	--	--	0.0%
Camissoniopsis micrantha	small suncups	0.0%	--	--	--	0.0%
Carex globosa	round-fruited sedge	0.0%	--	--	--	0.0%
Carpobrotus edulis	hottentot fig/iceplant	0.0%	--	--	--	0.0%
Caulanthus sp		0.0%	--	--	--	0.0%
Chorizanthe diffusa	diffuse spineflower	0.0%	NA	NA	2.0%	2.8%
Chorizanthe pungens* var *pungens	**Monterey Spineflower**	0.1%	0.5%	0.1%	4.2%	8.3%
Chrozanthe species (non-flowering)	spineflower	0.0%	0.0%	NA	0.4%	5.6%
Cordylanthus rigidus subsp. littoralis	**seaside bird's-beak**	0.0%	--	--	--	0.0%
Corethrogyne filaginifolia	California aster	0.0%	NA	NA	0.2%	2.8%
Crassula connata	pygmy weed	0.0%	--	--	--	0.0%
Croton californicus	California croton	0.0%	NA	NA	2.0%	2.8%
Cryptantha microstachys	Tejon cryptantha	0.0%	--	--	--	0.0%
Daucus pusillus	rattlesnake weed	0.1%	NA	NA	7.1%	2.8%
Erigeron canadensis	horseweed	0.0%	--	--	--	0.0%
Festuca octoflora	six-weeks fescue	0.0%	0.3%	0.1%	1.2%	5.6%
Gilia tenuiflora* subsp. *arenaria	**sand (Monterey) gilia**	0.0%	--	--	--	0.0%
Horkelia cuneata var. *cuneata*	coast horkelia	0.0%	0.1%	0.0%	0.7%	5.6%
Logfia filaginoides	California filago	0.0%	--	--	--	0.0%
Lomatium parvifolium	coastal biscuitroot	0.0%	--	--	--	0.0%
Marah fabaceus	wild cucumber	0.0%	NA	NA	2.0%	2.8%
Nuttallanthus texanus	blue toad-flax	0.0%	NA	NA	1.0%	2.8%
Navarretia hamata	hooked navarretia	0.0%	0.0%	NA	0.4%	5.6%
Navarretia intertexta	needle-leaved navarretia	0.0%	--	--	--	0.0%
Plantago erecta	California plantain	0.0%	NA	NA	0.2%	2.8%
Pteridium aquilinum var. *pubescens*	western bracken fern	0.1%	0.7%	0.2%	5.9%	5.6%

Table 6-30
2013 - 2014 Cover and Frequency of Herbaceous Species
After Small-scale Excavations in North Range 44 (36 quadrats)

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Post-activity Data Year 1 (2013)				
		Thirty-three Quadrats in Small-scale Excavations in North Range 44				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Percent Cover	Frequency
Total Cover by Native Herbaceous Species		***0.4%***			***27.4%***	
*Aira caryophyllea**	silver hairgrass	0.0%	NA	NA	1.0%	2.8%
*Avena barbata**	slender wild oat	0.1%	NA	NA	4.0%	2.8%
Bromus madritensis subsp. *rubens**	red brome	0.1%	NA	NA	4.0%	2.8%
*Centaurea melitensis**	tocalote	0.1%	NA	NA	7.9%	2.8%
*Erodium cicutarium**	red-stemmed filaree	0.1%	1.4%	0.3%	7.9%	5.6%
*Festuca myuros**	rattail fescue	0.1%	0.3%	0.1%	5.0%	19.4%
*Hypochaeris glabra**	smooth cat's ear	0.1%	0.7%	0.2%	5.9%	5.6%
*Logfia gallica**	narrowleaf cottonrose	0.0%	0.3%	0.1%	1.2%	5.6%
*Sonchus asper**	prickly sow-thistle	0.0%	NA	NA	0.2%	2.8%
Total Cover by Non-native Herbaceous Species		***0.5%***			***37.1%***	
Total Cover by Non-native Grass Cover		***0.2%***				
Total Cover by All Herbaceous Species		***0.9%***			***64.4%***	
Total Mean Percent All Vegetative Cover		***1.4%***				
Total Mean Percent Native Vegetative Cover		***0.9%***			***62.9%***	
Total Mean Percent Bare ground		***98.6%***				

*non-native species

Bold is HMP species

Note: Not all species observed along the transects listed in this table

Table 6-30
2013 - 2014 Cover and Frequency of Herbaceous Species
After Small-scale Excavations in North Range 44 (36 quadrats)

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Post-activity Data Year 2 (2014)				
		Thirty-three Quadrats in Small-scale Excavations in North Range 44				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Percent Cover	Frequency
Shrub and Subshrub Species						
Arctostaphylos pumila	**sandmat manzanita**	**0.1%**	**0.7%**	**0.2%**	**5.6%**	**3.0%**
Toxicodendron diversilobum	poison-oak	0.7%	3.0%	0.9%	33.6%	6.1%
Crocanthemum scoparium	rush-rose	0.2%	0.9%	0.3%	10.8%	30.3%
Ceanothus dentatus	dwarf ceanothus	0.1%	0.3%	0.1%	3.9%	12.1%
Eriophyllum confertiflorum	golden yarrow	0.0%	0.1%	0.0%	1.4%	9.1%
Arctostaphylus tomentosa subsp. *tomentosa*	shaggy-barked manzanita	0.1%	0.7%	0.2%	5.8%	6.1%
Ceanothus rigidus	**Monterey ceanothus**	0.0%	--	--	--	0.0%
Adenostemma fasciculata	chamise	0.0%	0.2%	0.1%	1.9%	3.0%
Quercus agrifolia var. agrifolia	coast live oak	0.0%	0.1%	0.0%	1.1%	3.0%
Lupinus chamissonis	silver bush lupine	0.0%	0.0%	0.0%	0.2%	3.0%
Baccharis pilularis subsp. consanguinea	coyote brush	0.0%	0.0%	0.0%	0.1%	3.0%
Salvia mellifera	black sage	0.0%	0.0%	0.0%	0.1%	3.0%
Mimulus aurantiacus	bush monkeyflower	0.0%	0.0%	0.0%	0.1%	3.0%
Ericameria fasciculata	Eastwood's ericameria	0.0%	0.0%	0.0%	0.1%	3.0%
Acmispon glaber	deerweed	0.0%	0.0%	0.0%	0.1%	3.0%
Total Cover by Shrub and Subshrub Species		***1.3%***			***66.1%***	
Herbaceous Species						
Achillea millefolium	common yarrow	0.0%	0.0%	0.0%	0.1%	3.0%
Apiastrum angustifolium	wild parsley	0.0%	0.0%	0.0%	0.3%	6.1%
Calandrinia ciliata	red maids	0.0%	0.0%	0.0%	0.1%	3.0%
Camissonia contorta	contorted suncups	0.0%	0.0%	0.0%	0.1%	3.0%
Camissoniopsis micrantha	small suncups	0.0%	0.0%	0.0%	0.1%	3.0%
Carex globosa	round-fruited sedge	0.0%	0.0%	0.0%	0.1%	3.0%
Carpobrotus edulis	hottentot fig/iceplant	0.0%	0.0%	0.0%	0.1%	3.0%
Caulanthus sp		0.1%	0.4%	0.1%	3.7%	3.0%
Chorizanthe diffusa	diffuse spineflower	0.0%	0.0%	0.0%	0.3%	6.1%
Chorizanthe pungens* var *pungens	**Monterey Spineflower**	0.1%	0.2%	0.1%	3.5%	24.2%
Chrozanthe species (non-flowering)	spineflower	0.0%	0.0%	0.0%	0.6%	12.1%
Cordylanthus rigidus subsp. littoralis	**seaside bird's-beak**	0.0%	0.2%	0.1%	1.9%	3.0%
Corethrogyne filaginifolia	California aster	0.0%	--	--	--	0.0%
Crassula connata	pygmy weed	0.0%	0.0%	0.0%	0.1%	3.0%
Croton californicus	California croton	0.1%	0.7%	0.2%	5.6%	3.0%
Cryptantha microstachys	Tejon cryptantha	0.0%	0.0%	0.0%	0.1%	3.0%
Daucus pusillus	rattlesnake weed	0.0%	0.0%	0.0%	0.1%	3.0%
Erigeron canadensis	horseweed	0.0%	0.0%	0.0%	0.3%	6.1%
Festuca octoflora	six-weeks fescue	0.1%	0.1%	0.0%	2.5%	33.3%
Gilia tenuiflora* subsp. *arenaria	**sand (Monterey) gilia**	0.0%	0.0%	0.0%	0.7%	9.1%
Horkelia cuneata var. *cuneata*	coast horkelia	0.0%	0.1%	0.0%	1.7%	15.2%
Logfia filaginoides	California filago	0.0%	0.0%	0.0%	0.7%	15.2%
Lomatium parvifolium	coastal biscuitroot	0.0%	0.0%	0.0%	0.1%	3.0%
Marah fabaceus	wild cucumber	0.0%	--	--	--	0.0%
Nuttallanthus texanus	blue toad-flax	0.0%	0.0%	0.0%	0.1%	3.0%
Navarretia hamata	hooked navarretia	0.0%	--	--	--	0.0%
Navarretia intertexta	needle-leaved navarretia	0.0%	0.0%	0.0%	0.1%	3.0%
Plantago erecta	California plantain	0.0%	0.0%	0.0%	0.1%	3.0%
Pteridium aquilinum var. *pubescens*	western bracken fern	0.0%	0.2%	0.1%	1.5%	3.0%

Table 6-30
2013 - 2014 Cover and Frequency of Herbaceous Species
After Small-scale Excavations in North Range 44 (36 quadrats)

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Post-activity Data Year 2 (2014)				
		Thirty-three Quadrats in Small-scale Excavations in North Range 44				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Percent Cover	Frequency
Total Cover by Native Herbaceous Species		***0.5%***			***25.8%***	
*Aira caryophyllea**	silver hairgrass	0.0%	0.0%	0.0%	0.1%	3.0%
*Avena barbata**	slender wild oat	0.0%	--	--	--	0.0%
Bromus madritensis subsp. *rubens**	red brome	0.0%	0.0%	0.0%	0.4%	3.0%
*Centaurea melitensis**	tocalote	0.0%	0.2%	0.1%	1.9%	3.0%
*Erodium cicutarium**	red-stemmed filaree	0.0%	0.2%	0.1%	2.1%	15.2%
*Festuca myuros**	rattail fescue	0.0%	0.1%	0.0%	1.6%	27.3%
*Hypochaeris glabra**	smooth cat's ear	0.0%	0.1%	0.0%	0.9%	9.1%
*Logfia gallica**	narrowleaf cottonrose	0.0%	0.1%	0.0%	1.0%	15.2%
*Sonchus asper**	prickly sow-thistle	0.0%	--	--	--	0.0%
Total Cover by Non-native Herbaceous Species		***0.2%***			***8.1%***	
Total Cover by Non-native Grass Cover		***0.04%***				
Total Cover by All Herbaceous Species		***0.7%***			***33.9%***	
Total Mean Percent All Vegetative Cover		***2.0%***				
Total Mean Percent Native Vegetative Cover		***1.8%***			***91.9%***	
Total Mean Percent Bare ground		***98.0%***				

*non-native species
Bold is HMP species
Note: Not all species observed along the transects listed in this table

Table 6-31
2012 - 2014 Cover and Frequency of Herbaceous Species
After Small-scale Excavations in Central and South Range 44 (30 Quadrats)

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Post-activity Data 2012 (Year 1)				
		Thirty Quadrats in Small-scale Excavations in South Range 44				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Percent Cover	Frequency
Shrub and Subshrubs						
Crocanthemum scoparium	rush-rose	0.1%	0.3%	0.1%	0.1%	41.7%
Acmispon glaber	deerweed	0.1%	0.2%	0.1%	0.1%	33.3%
Arctostaphylus tomentosa subsp. *tomentosa*	shaggy-barked manzanita	0.0%	0.1%	0.0%	0.0%	13.9%
Salvia mellifera	black sage	0.0%	0.2%	0.1%	0.0%	8.3%
Eriophyllum confertiflorum	golden yarrow	0.0%	0.1%	0.0%	0.0%	5.6%
Ceanothus rigidus	**Monterey ceanothus**	**0.0%**	**0.3%**	**0.1%**	**0.0%**	**2.8%**
Arctostaphylos pumila	**sandmat manzanita**	**0.0%**	**--**	**--**	**0.0%**	**0.0%**
Baccharis pilularis subsp. *consanguinea*	coyote brush	0.0%	--	--	0.0%	0.0%
Ceanothus dentatus	dwarf ceanothus	0.0%	--	--	0.0%	0.0%
Total Cover by Native Shrub and Subshrub Species		***0.3%***			***18.6%***	
Herbaceous Species						
Horkelia cuneata var. *cuneata*	coast horkelia	0.6%	0.0%	NA	0.4%	5.6%
Festuca octoflora	six-weeks fescue	0.1%	0.0%	0.0%	0.1%	47.2%
Cryptantha micormeres	small flowered cryptantha	0.1%	0.0%	0.0%	0.0%	25.0%
Navarretia hamata subsp. *parviloba*	hooked navarretia	0.1%	0.0%	0.0%	0.0%	16.7%
Acmispon strigosus	strigose lotus	0.0%	0.0%	0.0%	0.0%	22.2%
Chorizanthe diffusa	diffuse spineflower	0.0%	0.0%	0.0%	0.0%	25.0%
Camissoniopsis micrantha	miniature suncup	0.0%	0.0%	0.0%	0.0%	5.6%
Chorizanthe pungens* var. *pungens	**Monterey spineflower**	**0.0%**	**0.0%**	**--**	**0.0%**	**5.6%**
Crassula connata	pygmy weed	0.0%	0.0%	0.0%	0.0%	8.3%
Cryptantha species	cryptantha	0.0%	0.0%	0.0%	0.0%	8.3%
Calandrinia ciliata	red maids	0.0%	0.0%	0.0%	0.0%	5.6%
Monardella undulata	curly-leaved monardella	0.0%	NA	NA	0.0%	2.8%
Carex globosa	round-fruited sedge	0.0%	--	--	0.0%	5.6%
Cirsium occidentale	cobweb thistle	0.0%	--	--	0.0%	0.0%
Cryptantha clevelandii	Cleveland's cryptantha	0.0%	--	--	0.0%	0.0%
Cryptantha microstachys	Tejon cryptantha	0.0%	--	--	0.0%	0.0%
Erigeron canadensis	horseweed	0.0%	--	--	0.0%	0.0%
Gilia tenuiflora* subsp. *arenaria	**sand (Monterey) gilia**	**0.0%**	**--**	**--**	**0.0%**	**0.0%**
Lessingia pectinata var. *pectinata*	common lessingia	0.0%	NA	NA	0.0%	0.0%
Logfia californica	California cottonrose	0.0%	NA	NA	0.0%	0.0%
Logfia filaginoides	California filago	0.0%	--	--	0.0%	0.0%
Lupinus bicolor	miniature lupine	0.0%	NA	NA	0.0%	0.0%
Navarretia intertexta	needle-leaved navarretia	0.0%	--	--	0.0%	0.0%
Plantago erecta	California plantain	0.0%	NA	NA	0.0%	0.0%
Pseudognaphalium californicum	California everlasting	0.0%	--	--	0.0%	0.0%
Pseudognaphalium ramosissimum	pink everlasting	0.0%	0.0%	0.0%	0.0%	5.6%

Table 6-31
2012 - 2014 Cover and Frequency of Herbaceous Species
After Small-scale Excavations in Central and South Range 44 (30 Quadrats)

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Post-activity Data 2012 (Year 1)				
		Thirty Quadrats in Small-scale Excavations in South Range 44				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Percent Cover	Frequency
Sagina apetala	sticky pearlwort	0.0%	NA	NA	0.0%	0.0%
Total Cover by Native Herbaceous Species		***1.0%***			***64.6%***	
*Festuca myuros**	rattail six-weeks grass	0.0%	--	--	0.0%	0.0%
*Portulaca oleracea**	common purslane	0.0%	NA	NA	0.0%	2.8%
*Hypochaeris radicata**	hairy cat's ear	0.0%	NA	NA	0.0%	2.8%
*Centaurea melitensis**	tocalote	0.0%	0.0%	0.0%	0.0%	5.6%
*Erodium cicutarium**	red-stemmed filaree	0.1%	0.0%	0.0%	0.1%	22.2%
*Hypochaeris glabra**	smooth cat's ear	0.1%	0.0%	0.0%	0.0%	22.2%
*Logfia gallica**	narrowleaf cottonrose	0.0%	0.0%	0.0%	0.0%	16.7%
*Aira caryophyllea**	silver hairgrass	0.0%	--	--	0.0%	0.0%
Sonchus asper subsp. *asper**	prickly sow-thistle	0.0%	--	--	0.0%	0.0%
Total Cover by Non-Native Herbaceous Species		***0.3%***			***16.8%***	
Total Mean Percent Non-native Grass Cover		***0.0%***				
Total Mean Cover by All Herbaceous Species		***1.2%***			***81.4%***	
Total Mean Percent All Vegetative Cover		***1.5%***				
Total Mean Percent Native Vegetative Cover		***1.3%***			***83.2%***	
Total Mean Percent Bare ground		***98.5%***				

*non-native species
HMP species in bold
Note: Not all species observed along the transects listed in this table

Table 6-31
2012 - 2014 Cover and Frequency of Herbaceous Species
After Small-scale Excavations in Central and South Range 44 (30 Quadrats)

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Post-activity Data 2013 (Year 2)				
		Thirty Quadrats in Small-scale Excavations in South Range 44				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Percent Cover	Frequency
Shrub and Subshrubs						
Crocanthemum scoparium	rush-rose	0.6%	2.3%	0.7%	16.2%	36.7%
Acmispon glaber	deerweed	1.6%	5.8%	1.8%	41.7%	46.7%
Arctostaphylus tomentosa subsp. *tomentosa*	shaggy-barked manzanita	0.0%	--	--	0.1%	3.3%
Salvia mellifera	black sage	0.0%	--	--	0.4%	3.3%
Eriophyllum confertiflorum	golden yarrow	0.0%	0.2%	0.1%	0.6%	10.0%
Ceanothus rigidus	**Monterey ceanothus**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
Arctostaphylos pumila	**sandmat manzanita**	**0.0%**	**0.3%**	**0.1%**	**0.5%**	**6.7%**
Baccharis pilularis subsp. *consanguinea*	coyote brush	0.0%	--	--	0.1%	3.3%
Ceanothus dentatus	dwarf ceanothus	0.0%	--	--	0.0%	0.0%
Total Cover by Native Shrub and Subshrub Species		***2.3%***			***59.6%***	
Herbaceous Species						
Horkelia cuneata var. *cuneata*	coast horkelia	0.0%	0.5%	0.1%	1.11%	13.3%
Festuca octoflora	six-weeks fescue	0.2%	0.3%	0.1%	4.02%	53.3%
Cryptantha micormeres	small flowered cryptantha	0.2%	0.6%	0.2%	4.02%	20.0%
Navarretia hamata subsp. *parviloba*	hooked navarretia	0.2%	0.6%	0.2%	4.45%	30.0%
Acmispon strigosus	strigose lotus	0.0%	0.2%	0.1%	0.09%	16.7%
Chorizanthe diffusa	diffuse spineflower	0.1%	0.2%	0.1%	1.71%	20.0%
Camissoniopsis micrantha	miniature suncup	0.0%	0.0%	--	0.17%	6.7%
Chorizanthe pungens* var. *pungens	**Monterey spineflower**	**0.3%**	**1.8%**	**0.6%**	**8.73%**	**16.7%**
Crassula connata	pygmy weed	0.0%	0.0%	0.0%	0.00%	0.0%
Cryptantha species	cryptantha	0.0%	0.0%	0.0%	0.00%	0.0%
Calandrinia ciliata	red maids	0.0%	0.0%	0.0%	0.00%	0.0%
Monardella undulata	curly-leaved monardella	0.0%	0.0%	0.0%	0.00%	0.0%
Carex globosa	round-fruited sedge	0.0%	0.2%	0.1%	0.60%	10.0%
Cirsium occidentale	cobweb thistle	0.0%	NA	NA	0.09%	3.3%
Cryptantha clevelandii	Cleveland's cryptantha	0.1%	0.4%	0.1%	1.54%	16.7%
Cryptantha microstachys	Tejon cryptantha	0.0%	--	--	0.00%	0.0%
Erigeron canadensis	horseweed	0.0%	0.3%	0.1%	0.51%	6.7%
Gilia tenuiflora* subsp. *arenaria	**sand (Monterey) gilia**	**0.0%**	**--**	**--**	**0.00%**	**0.0%**
Lessingia pectinata var. *pectinata*	common lessingia	0.1%	1.3%	0.4%	1.80%	6.7%
Logfia californica	California cottonrose	0.0%	NA	NA	0.09%	13.3%
Logfia filaginoides	California filago	0.0%	--	--	0.00%	0.0%
Lupinus bicolor	miniature lupine	0.0%	NA	NA	0.09%	3.3%
Navarretia intertexta	needle-leaved navarretia	0.0%	--	--	0.00%	0.0%
Plantago erecta	California plantain	0.0%	NA	NA	0.09%	3.3%
Pseudognaphalium californicum	California everlasting	0.0%	--	--	0.00%	0.0%
Pseudognaphalium ramosissimum	pink everlasting	0.0%	NA	NA	0.09%	3.3%

Table 6-31
2012 - 2014 Cover and Frequency of Herbaceous Species
After Small-scale Excavations in Central and South Range 44 (30 Quadrats)

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Post-activity Data 2013 (Year 2)				
		Thirty Quadrats in Small-scale Excavations in South Range 44				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Percent Cover	Frequency
Sagina apetala	sticky pearlwort	0.0%	NA	NA	0.09%	3.3%
Total Cover by Native Herbaceous Species		***1.1%***			***29.3%***	
*Festuca myuros**	rattail six-weeks grass	0.3%	0.0%	0.1%	7.71%	6.7%
*Portulaca oleracea**	common purslane	0.0%	0.0%	0.0%	0.00%	0.0%
*Hypochaeris radicata**	hairy cat's ear	0.0%	NA	NA	0.00%	0.0%
*Centaurea melitensis**	tocalote	0.0%	0.5%	0.1%	1.11%	13.3%
*Erodium cicutarium**	red-stemmed filaree	0.0%	0.0%	--	0.17%	6.7%
*Hypochaeris glabra**	smooth cat's ear	0.0%	0.5%	0.2%	1.03%	10.0%
*Logfia gallica**	narrowleaf cottonrose	0.0%	0.2%	0.1%	1.03%	13.3%
*Aira caryophyllea**	silver hairgrass	0.0%	NA	NA	0.09%	3.3%
Sonchus asper subsp. *asper**	prickly sow-thistle	0.0%	--	--	0.00%	0.0%
Total Cover by Non-Native Herbaceous Species		***0.4%***			***11.1%***	
Total Mean Percent Non-native Grass Cover		***0.3%***				
Total Mean Cover by All Herbaceous Species		***1.6%***			***40.4%***	
Total Mean Percent All Vegetative Cover		***3.9%***				
Total Mean Percent Native Vegetative Cover		***3.5%***			***88.9%***	
Total Mean Percent Bare ground		***96.1%***				

*non-native species
HMP species in bold
Note: Not all species observed along the transects listed in this table

Table 6-31
2012 - 2014 Cover and Frequency of Herbaceous Species
After Small-scale Excavations in Central and South Range 44 (30 Quadrats)

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Post-activity Data 2014 (Year 3)				
		Thirty Quadrats in Small-scale Excavations in South Range 44				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Percent Cover	Frequency
Shrub and Subshrubs						
Crocanthemum scoparium	rush-rose	0.2%	0.5%	0.2%	3.2%	33.3%
Acmispon glaber	deerweed	1.8%	4.2%	1.3%	28.0%	30.0%
Arctostaphylus tomentosa subsp. *tomentosa*	shaggy-barked manzanita	0.0%	--	--	0.0%	0.0%
Salvia mellifera	black sage	0.0%	0.1%	0.0%	0.2%	10.0%
Eriophyllum confertiflorum	golden yarrow	0.1%	0.2%	0.1%	0.9%	20.0%
Ceanothus rigidus	**Monterey ceanothus**	**0.0%**	**0.0%**	**0.0%**	**0.1%**	**3.3%**
Arctostaphylos pumila	**sandmat manzanita**	**0.0%**	**0.2%**	**0.1%**	**0.7%**	**6.7%**
Baccharis pilularis subsp. *consanguinea*	coyote brush	0.0%	0.0%	0.0%	0.1%	3.3%
Ceanothus dentatus	dwarf ceanothus	0.0%	0.2%	0.1%	0.7%	6.7%
Total Cover by Native Shrub and Subshrub Species		***2.2%***			***33.9%***	
Herbaceous Species						
Horkelia cuneata var. *cuneata*	coast horkelia	0.0%	0.0%	0.0%	0.16%	10.0%
Festuca octoflora	six-weeks fescue	3.4%	18.2%	5.7%	53.32%	56.7%
Cryptantha micormeres	small flowered cryptantha	0.0%	--	--	0.00%	0.0%
Navarretia hamata subsp. *parviloba*	hooked navarretia	0.0%	0.0%	0.0%	0.05%	3.3%
Acmispon strigosus	strigose lotus	0.0%	0.0%	0.0%	0.05%	3.3%
Chorizanthe diffusa	diffuse spineflower	0.0%	0.0%	0.0%	0.21%	13.3%
Camissoniopsis micrantha	miniature suncup	0.0%	0.0%	0.0%	0.16%	10.0%
Chorizanthe pungens* var. *pungens	**Monterey spineflower**	**0.2%**	**0.6%**	**0.2%**	**2.38%**	**33.3%**
Crassula connata	pygmy weed	0.0%	--	--	0.00%	0.0%
Cryptantha species	cryptantha	0.0%	0.0%	0.0%	0.05%	3.3%
Calandrinia ciliata	red maids	0.0%	--	--	0.00%	0.0%
Monardella undulata	curly-leaved monardella	0.0%	--	--	0.00%	0.0%
Carex globosa	round-fruited sedge	0.0%	0.1%	0.0%	0.31%	6.7%
Cirsium occidentale	cobweb thistle	0.0%	--	--	0.00%	0.0%
Cryptantha clevelandii	Cleveland's cryptantha	0.0%	--	--	0.00%	0.0%
Cryptantha microstachys	Tejon cryptantha	0.0%	0.0%	0.0%	0.21%	13.3%
Erigeron canadensis	horseweed	0.0%	0.0%	0.0%	0.05%	3.3%
Gilia tenuiflora* subsp. *arenaria	**sand (Monterey) gilia**	**0.0%**	**0.0%**	**0.0%**	**0.16%**	**10.0%**
Lessingia pectinata var. *pectinata*	common lessingia	0.5%	2.1%	0.7%	7.85%	6.7%
Logfia californica	California cottonrose	0.0%	--	--	0.00%	0.0%
Logfia filaginoides	California filago	0.0%	0.0%	0.0%	0.05%	3.3%
Lupinus bicolor	miniature lupine	0.0%	--	--	0.00%	0.0%
Navarretia intertexta	needle-leaved navarretia	0.0%	0.0%	0.0%	0.21%	13.3%
Plantago erecta	California plantain	0.0%	--	--	0.00%	0.0%
Pseudognaphalium californicum	California everlasting	0.0%	0.0%	0.0%	0.05%	3.3%
Pseudognaphalium ramosissimum	pink everlasting	0.0%	--	--	0.00%	0.0%

Table 6-31
2012 - 2014 Cover and Frequency of Herbaceous Species
After Small-scale Excavations in Central and South Range 44 (30 Quadrats)

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Post-activity Data 2014 (Year 3)				
		Thirty Quadrats in Small-scale Excavations in South Range 44				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Percent Cover	Frequency
Sagina apetala	sticky pearlwort	0.0%	--	--	0.00%	0.0%
Total Cover by Native Herbaceous Species		***4.2%***			***65.3%***	
*Festuca myuros**	rattail six-weeks grass	0.0%	0.0%	0.0%	0.05%	3.3%
*Portulaca oleracea**	common purslane	0.0%	--	--	0.00%	0.0%
*Hypochaeris radicata**	hairy cat's ear	0.0%	--	--	0.00%	0.0%
*Centaurea melitensis**	tocalote	0.0%	0.0%	0.0%	0.26%	16.7%
*Erodium cicutarium**	red-stemmed filaree	0.0%	0.0%	0.0%	0.21%	13.3%
*Hypochaeris glabra**	smooth cat's ear	0.0%	--	--	0.00%	0.0%
*Logfia gallica**	narrowleaf cottonrose	0.0%	0.0%	0.0%	0.21%	13.3%
*Aira caryophyllea**	silver hairgrass	0.0%	0.0%	0.0%	0.05%	3.3%
Sonchus asper subsp. *asper**	prickly sow-thistle	0.0%	0.0%	0.0%	0.05%	3.3%
Total Cover by Non-Native Herbaceous Species		***0.1%***			***0.8%***	
Total Mean Percent Non-native Grass Cover		***0.0%***				
Total Mean Cover by All Herbaceous Species		***4.2%***			***66.1%***	
Total Mean Percent All Vegetative Cover		***6.4%***				
Total Mean Percent Native Vegetative Cover		***6.3%***			***99.2%***	
Total Mean Percent Bare ground		***93.6%***				

*non-native species
HMP species in bold
Note: Not all species observed along the transects listed in this table

Table 6-32
2010 - 2014 South Range 44 Grassland Herbaceous Cover after Small-scale Excavation

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	2010 Baseline				
		Six Quadrats in South Range 44 Grassland				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Percent Cover	Frequency
Shrub and Subshrub Species						
Ericameria fasciculata	**Eastwood's ericameria**	0.0%	--	--	0.0%	0.0%
Frangula californica subsp. *californica*	California coffee berry	0.7%	1.6%	1.3%	1.5%	16.7%
Total Cover by Native Shrub and Subshrub Species		***0.7%***			***1.4%***	
Herbaceous Species						
Erigeron canadensis	horseweed	10.0%	--	--	14.7%	33.3%
Deinandra increscens subsp. *increscens*	grassland tarweed	5.7%	0.5%	0.4%	10.9%	83.3%
Chorizanthe pungens* var. *pungens	**Monterey spineflower**	**4.7%**	**6.4%**	**5.3%**	**10.2%**	**50.0%**
Croton californicus	California croton	2.0%	3.3%	2.8%	4.4%	33.3%
Galium californicum	California bedstraw	0.7%	1.6%	1.3%	1.5%	16.7%
Callendrinia ciliata	red maids	0.0%	--	--	0.0%	0.0%
Camissonia contorta	contorted suncups	0.0%	--	--	0.0%	0.0%
Castilleja exserta subsp. *latifolia*	wideleaf purple owl's clover	0.0%	--	--	0.0%	0.0%
Chorizanthe diffusa	diffuse chorizanthe	0.0%	--	--	0.0%	0.0%
Cirsium occidentale	cobweb thistle	0.0%	--	--	0.0%	0.0%
Cryptantha micromeres	small-flowered cryptantha	0.0%	--	--	0.0%	0.0%
Cryptantha microstachys	Tejon cryptantha	0.0%	--	--	0.0%	0.0%
Dichelostemma capitatum subsp. *capitatum*	bluedicks	0.0%	--	--	0.0%	0.0%
Eschscholzia californica	California poppy	0.0%	--	--	0.0%	0.0%
Heterotheca grandifolia	telegraph weed	0.0%	--	--	0.0%	0.0%
Layia platyglossa	tidytips	0.0%	--	--	0.0%	0.0%
Lessingia pectinata var. *pectinata*	common lessingia	0.0%	--	--	0.0%	0.0%
Lupinus bicolor	miniature lupine	0.0%	--	--	0.0%	0.0%
Lupinus chamissonis	silver bush lupine	0.0%	--	--	0.0%	0.0%
Lupinus nanus	sky lupine	0.0%	--	--	0.0%	0.0%
Navarretia intertexta	needle-leaved navarretia	0.0%	--	--	0.0%	0.0%
Nuttallanthus texanus	blue toad-flax	0.0%	--	--	0.0%	0.0%
Plantago erecta	California plantain	0.0%	--	--	0.0%	0.0%
Stephanomeria virgata subsp. *virgata*	tall milk aster	0.0%	--	--	0.0%	0.0%
Trifolium ciliolatum	foothill clover	0.0%	--	--	0.0%	0.0%

Table 6-32
2010 - 2014 South Range 44 Grassland Herbaceous Cover after Small-scale Excavation

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	2010 Baseline				
		Six Quadrats in South Range 44 Grassland				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Percent Cover	Frequency
Total Cover by Native Herbaceous Species		***23.0%***			***47.0%***	
*Sisymbrium orientale**	Indian hedgemustard	0.0%	--	--	0.0%	0.0%
*Silene gallica**	windmill pink	0.0%	--	--	0.0%	0.0%
*Petrorhagia dubia**	hairy pink	0.0%	--	--	0.0%	0.0%
*Hypochaeris glabra**	smooth cat's-ear	0.0%	--	--	0.0%	0.0%
*Erodium cicutarium**	red-stemmed filaree	0.0%	--	--	0.0%	0.0%
*Centaurea melitensis**	tocalote	0.0%	--	--	0.0%	0.0%
*Bromus hordeaceus**	soft chess	0.0%	--	--	0.0%	0.0%
*Avena barbata**	slender oat	0.0%	--	--	0.0%	0.0%
*Bromus diandrus**	ripgut brome	0.0%	--	--	0.0%	0.0%
*Rumex acetosella**	sheep sorrel	6.0%	12.8%	10.6%	13.1%	33.3%
*Festuca myuros**	rattail fescue	19.3%	23.4%	19.2%	47.9%	66.7%
Total Cover by Non-native Herbaceous Species		***25.3%***			***51.7%***	
Total Mean Non-native Grass Species Cover		***19.3%***				
Total Cover by All Herbaceous Species		***48.3%***				
Total Mean All Vegetative Cover		***49.0%***				
Total Mean Native Vegetative Cover		***23.7%***			***48.3%***	
Total Mean Bare ground		***51.0%***				

*non-native species
HMP species in bold
Note: Not all species observed along transects listed in this table

Table 6-32
2010 - 2014 South Range 44 Grassland Herbaceous Cover after Small-scale Excavation

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Post-activity Data 2012 (Year 1)				
		Six Quadrats in South Range 44 Grassland				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Percent Cover	Frequency
Shrub and Subshrub Species						
Ericameria fasciculata	**Eastwood's ericameria**	0.0%	--	--	0.0%	0.0%
Frangula californica subsp. *californica*	California coffee berry	0.0%	--	--	0.0%	0.0%
Total Cover by Native Shrub and Subshrub Species		***0.0%***			***0.0%***	
Herbaceous Species						
Erigeron canadensis	horseweed	0.3%	0.7%	0.6%	0.0%	50.0%
Deinandra increscens subsp. *increscens*	grassland tarweed	1.8%	2.2%	1.8%	0.2%	83.3%
Chorizanthe pungens* var. *pungens	**Monterey spineflower**	**1.2%**	**2.0%**	**1.7%**	**0.1%**	**50.0%**
Croton californicus	California croton	0.0%	--	--	0.0%	0.0%
Galium californicum	California bedstraw	0.0%	--	--	0.0%	0.0%
Callendrinia ciliata	red maids	0.0%	--	--	0.0%	0.0%
Camissonia contorta	contorted suncups	0.0%	--	--	0.0%	0.0%
Castilleja exserta subsp. *latifolia*	wideleaf purple owl's clover	0.0%	--	--	0.0%	0.0%
Chorizanthe diffusa	diffuse chorizanthe	0.0%	--	--	0.0%	0.0%
Cirsium occidentale	cobweb thistle	0.0%	--	--	0.0%	0.0%
Cryptantha micromeres	small-flowered cryptantha	0.2%	0.2%	0.2%	1.6%	33.3%
Cryptantha microstachys	Tejon cryptantha	0.0%	--	--	0.0%	0.0%
Dichelostemma capitatum subsp. *capitatum*	bluedicks	0.3%	0.7%	0.6%	0.0%	33.3%
Eschscholzia californica	California poppy	0.0%	0.1%	0.0%	0.0%	16.7%
Heterotheca grandifolia	telegraph weed	0.0%	--	--	0.0%	0.0%
Layia platyglossa	tidytips	0.2%	0.6%	0.5%	0.0%	16.7%
Lessingia pectinata var. *pectinata*	common lessingia	0.0%	--	--	0.0%	0.0%
Lupinus bicolor	miniature lupine	0.0%	--	--	0.0%	0.0%
Lupinus chamissonis	silver bush lupine	0.0%	--	--	0.0%	0.0%
Lupinus nanus	sky lupine	0.3%	0.7%	0.6%	0.0%	33.3%
Navarretia intertexta	needle-leaved navarretia	0.0%	0.0%	0.0%	0.0%	16.7%
Nuttallanthus texanus	blue toad-flax	0.0%	--	--	0.0%	0.0%
Plantago erecta	California plantain	0.0%	--	--	0.0%	0.0%
Stephanomeria virgata subsp. *virgata*	tall milk aster	0.0%	--	--	0.0%	0.0%
Trifolium ciliolatum	foothill clover	0.0%	--	--	0.0%	0.0%

Table 6-32
2010 - 2014 South Range 44 Grassland Herbaceous Cover after Small-scale Excavation

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Post-activity Data 2012 (Year 1)				
		Six Quadrats in South Range 44 Grassland				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Percent Cover	Frequency
Total Cover by Native Herbaceous Species		***4.3%***			***46.8%***	
*Sisymbrium orientale**	Indian hedgemustard	0.0%	--	--	0.0%	0.0%
*Silene gallica**	windmill pink	0.0%	--	--	0.0%	0.0%
*Petrorhagia dubia**	hairy pink	0.0%	--	--	0.0%	0.0%
*Hypochaeris glabra**	smooth cat's-ear	1.5%	2.8%	2.3%	0.2%	83.3%
*Erodium cicutarium**	red-stemmed filaree	0.1%	0.1%	0.1%	0.0%	16.7%
*Centaurea melitensis**	tocalote	0.5%	0.8%	0.6%	0.1%	66.7%
*Bromus hordeaceus**	soft chess	0.4%	0.6%	0.5%	0.0%	33.3%
*Avena barbata**	slender oat	0.8%	0.7%	0.6%	0.1%	66.7%
*Bromus diandrus**	ripgut brome	0.0%	0.1%	0.0%	0.0%	33.3%
*Rumex acetosella**	sheep sorrel	0.0%	--	--	0.0%	0.0%
*Festuca myuros**	rattail fescue	1.6%	2.8%	2.3%	0.2%	100.0%
Total Cover by Non-native Herbaceous Species		***4.9%***			***53.2%***	
Total Mean Non-native Grass Species Cover		***2.8%***				
Total Cover by All Herbaceous Species		***9.2%***				
Total Mean All Vegetative Cover		***9.2%***				
Total Mean Native Vegetative Cover		***4.3%***			***46.8%***	
Total Mean Bare ground		***90.8%***				

*non-native species
HMP species in bold
Note: Not all species observed along transects listed in this table

Table 6-32
2010 - 2014 South Range 44 Grassland Herbaceous Cover after Small-scale Excavation

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Post-activity Data 2013 (Year 2)				
		Six Quadrats in South Range 44 Grassland				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Percent Cover	Frequency
Shrub and Subshrub Species						
Ericameria fasciculata	**Eastwood's ericameria**	0.0%	--	--	0.0%	0.0%
Frangula californica subsp. *californica*	California coffee berry	0.0%	--	--	0.0%	0.0%
Total Cover by Native Shrub and Subshrub Species		***0.0%***			***0.0%***	
Herbaceous Species						
Erigeron canadensis	horseweed	0.3%	0.3%	0.2%	0.4%	50.0%
Deinandra increscens subsp. *increscens*	grassland tarweed	0.4%	0.3%	0.2%	0.5%	50.0%
Chorizanthe pungens* var. *pungens	**Monterey spineflower**	**7.2%**	**4.3%**	**3.5%**	**8.6%**	**66.7%**
Croton californicus	California croton	0.0%	--	--	0.0%	0.0%
Galium californicum	California bedstraw	0.0%	--	--	0.0%	0.0%
Callendrinia ciliata	red maids	0.0%	--	--	0.0%	0.0%
Camissonia contorta	contorted suncups	0.5%	--	--	0.6%	16.7%
Castilleja exserta subsp. *latifolia*	wideleaf purple owl's clover	0.8%	2.5%	2.0%	0.9%	33.3%
Chorizanthe diffusa	diffuse chorizanthe	0.0%	--	--	0.0%	0.0%
Cirsium occidentale	cobweb thistle	0.1%	--	--	0.1%	16.7%
Cryptantha micromeres	small-flowered cryptantha	0.0%	--	--	0.0%	0.0%
Cryptantha microstachys	Tejon cryptantha	0.0%	--	--	0.0%	0.0%
Dichelostemma capitatum subsp. *capitatum*	bluedicks	0.0%	--	--	0.0%	0.0%
Eschscholzia californica	California poppy	3.4%	13.8%	11.3%	4.1%	33.3%
Heterotheca grandifolia	telegraph weed	0.0%	--	--	0.0%	0.0%
Layia platyglossa	tidytips	5.5%	3.6%	3.0%	6.6%	50.0%
Lessingia pectinata var. *pectinata*	common lessingia	1.3%	2.8%	2.3%	1.6%	33.3%
Lupinus bicolor	miniature lupine	0.1%	--	--	0.1%	16.7%
Lupinus chamissonis	silver bush lupine	0.1%	0.1%	0.1%	0.1%	0.1%
Lupinus nanus	sky lupine	3.5%	13.4%	11.1%	4.2%	33.3%
Navarretia intertexta	needle-leaved navarretia	0.0%	--	--	0.0%	0.0%
Nuttallanthus texanus	blue toad-flax	0.1%	--	--	0.1%	16.7%
Plantago erecta	California plantain	0.3%	0.4%	0.3%	0.3%	33.3%
Stephanomeria virgata subsp. *virgata*	tall milk aster	0.0%	--	--	0.0%	0.0%
Trifolium ciliolatum	foothill clover	0.3%	--	--	0.4%	16.7%

Table 6-32
2010 - 2014 South Range 44 Grassland Herbaceous Cover after Small-scale Excavation

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Post-activity Data 2013 (Year 2)				
		Six Quadrats in South Range 44 Grassland				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Percent Cover	Frequency
Total Cover by Native Herbaceous Species		***23.8%***			***28.5%***	
*Sisymbrium orientale**	Indian hedgemustard	0.0%	--	--	0.0%	0.0%
*Silene gallica**	windmill pink	0.0%	--	--	0.0%	0.0%
*Petrorhagia dubia**	hairy pink	1.6%	4.2%	3.4%	1.9%	50.0%
*Hypochaeris glabra**	smooth cat's-ear	1.7%	1.7%	1.4%	2.0%	83.3%
*Erodium cicutarium**	red-stemmed filaree	0.6%	0.8%	0.6%	0.7%	50.0%
*Centaurea melitensis**	tocalote	0.8%	2.0%	1.7%	1.0%	50.0%
*Bromus hordeaceus**	soft chess	1.5%	0.7%	0.6%	1.8%	33.3%
*Avena barbata**	slender oat	7.3%	13.6%	11.2%	8.8%	50.0%
*Bromus diandrus**	ripgut brome	21.1%	32.5%	26.7%	25.2%	83.3%
*Rumex acetosella**	sheep sorrel	0.0%	--	--	0.0%	0.0%
*Festuca myuros**	rattail fescue	25.1%	28.5%	23.5%	30.0%	100.0%
Total Cover by Non-native Herbaceous Species		***59.7%***			***71.5%***	
Total Mean Non-native Grass Species Cover		***55.0%***				
Total Cover by All Herbaceous Species		***83.5%***				
Total Mean All Vegetative Cover		***83.5%***				
Total Mean Native Vegetative Cover		***23.8%***			***28.5%***	
Total Mean Bare ground		***16.5%***				

*non-native species
HMP species in bold
Note: Not all species observed along transects listed in this table

Table 6-32
2010 - 2014 South Range 44 Grassland Herbaceous Cover after Small-scale Excavation

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Post-activity Data 2014 (Year 3)				
		Six Quadrats in South Range 44 Grassland				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Percent Cover	Frequency
Shrub and Subshrub Species						
Ericameria fasciculata	**Eastwood's ericameria**	0.3%	0.8%	0.7%	2.2%	16.7%
Frangula californica subsp. *californica*	California coffee berry	0.0%	--	--	0.0%	0.0%
Total Cover by Native Shrub and Subshrub Species		***0.3%***			***2.2%***	
Herbaceous Species						
Erigeron canadensis	horseweed	0.0%	0.0%	0.0%	0.0%	16.7%
Deinandra increscens subsp. *increscens*	grassland tarweed	1.3%	1.8%	1.5%	8.6%	83.3%
Chorizanthe pungens* var. *pungens	**Monterey spineflower**	**4.3%**	**6.7%**	**5.5%**	**27.8%**	**83.3%**
Croton californicus	California croton	0.0%	--	--	0.0%	0.0%
Galium californicum	California bedstraw	0.0%	--	--	0.0%	0.0%
Callendrinia ciliata	red maids	0.0%	0.1%	0.1%	0.3%	16.7%
Camissonia contorta	contorted suncups	0.0%	--	--	0.0%	0.0%
Castilleja exserta subsp. *latifolia*	wideleaf purple owl's clover	0.0%	--	--	0.0%	0.0%
Chorizanthe diffusa	diffuse chorizanthe	0.0%	0.1%	0.1%	0.3%	16.7%
Cirsium occidentale	cobweb thistle	0.0%	--	--	0.0%	0.0%
Cryptantha micromeres	small-flowered cryptantha	0.0%	--	--	0.0%	0.0%
Cryptantha microstachys	Tejon cryptantha	0.2%	0.5%	0.4%	1.4%	33.3%
Dichelostemma capitatum subsp. *capitatum*	bluedicks	0.0%	0.1%	0.1%	0.3%	16.7%
Eschscholzia californica	California poppy	1.0%	0.7%	0.6%	6.2%	83.3%
Heterotheca grandifolia	telegraph weed	0.6%	1.5%	1.3%	4.1%	16.7%
Layia platyglossa	tidytips	0.1%	0.2%	0.2%	0.5%	16.7%
Lessingia pectinata var. *pectinata*	common lessingia	1.9%	2.9%	2.4%	12.2%	50.0%
Lupinus bicolor	miniature lupine	0.1%	0.2%	0.2%	0.8%	33.3%
Lupinus chamissonis	silver bush lupine	0.0%	--	--	0.0%	0.0%
Lupinus nanus	sky lupine	0.0%	--	--	0.0%	0.0%
Navarretia intertexta	needle-leaved navarretia	0.0%	--	--	0.0%	0.0%
Nuttallanthus texanus	blue toad-flax	0.0%	--	--	0.0%	0.0%
Plantago erecta	California plantain	0.0%	0.0%	0.0%	0.0%	16.7%
Stephanomeria virgata subsp. *virgata*	tall milk aster	0.0%	0.0%	0.0%	0.0%	16.7%
Trifolium ciliolatum	foothill clover	0.0%	--	--	0.0%	0.0%

Table 6-32
2010 - 2014 South Range 44 Grassland Herbaceous Cover after Small-scale Excavation

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Post-activity Data 2014 (Year 3)				
		Six Quadrats in South Range 44 Grassland				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Percent Cover	Frequency
Total Cover by Native Herbaceous Species		***9.6%***			***62.5%***	
*Sisymbrium orientale**	Indian hedgemustard	0.0%	0.0%	0.0%	0.0%	16.7%
*Silene gallica**	windmill pink	0.0%	0.0%	0.0%	0.0%	16.7%
*Petrorhagia dubia**	hairy pink	0.0%	--	--	0.0%	0.0%
*Hypochaeris glabra**	smooth cat's-ear	1.0%	1.2%	1.0%	6.5%	66.7%
*Erodium cicutarium**	red-stemmed filaree	0.4%	0.5%	0.4%	2.4%	50.0%
*Centaurea melitensis**	tocalote	0.3%	0.6%	0.5%	1.9%	66.7%
*Bromus hordeaceus**	soft chess	0.0%	0.0%	0.0%	0.0%	16.7%
*Avena barbata**	slender oat	0.1%	0.3%	0.3%	0.8%	33.3%
*Bromus diandrus**	ripgut brome	3.6%	7.1%	5.8%	23.3%	50.0%
*Rumex acetosella**	sheep sorrel	0.0%	--	--	0.0%	0.0%
*Festuca myuros**	rattail fescue	0.0%	0.1%	0.1%	0.3%	33.3%
Total Cover by Non-native Herbaceous Species		***5.5%***			***35.3%***	
Total Mean Non-native Grass Species Cover		***3.8%***				
Total Cover by All Herbaceous Species		***15.1%***				
Total Mean All Vegetative Cover		***15.4%***				
Total Mean Native Vegetative Cover		***10.0%***			***64.7%***	
Total Mean Bare ground		***84.6%***				

*non-native species
HMP species in bold
Note: Not all species observed along transects listed in this table

Table 6-33
Range 47 Subarea B
Vegetation Cover in Subarea B (Activity D)

ESCA RP 2014 Annual Natural Resource Report – Appendix A

Scientific Name	Common Name	2010-2011 Baseline - 3 Transects				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Cover	Frequency
Shrubs and Subshrubs						
Ceanothus dentatus	dwarf ceanothus	21.1%	12.0%	20.1%	18.6%	100%
Acmispon glaber	deerweed	2.3%	2.0%	3.3%	2.0%	66.7%
Crocanthemum scoparium	rush-rose	3.0%	2.0%	3.3%	2.7%	100%
Ericameria ericoides	dune-heather, mock-heather	0.0%	0.0%	--	0.0%	0.0%
Adenostoma fasciculatum	chamise	4.8%	8.3%	14.0%	4.2%	33.3%
Salvia mellifera	black sage	5.3%	5.0%	8.5%	4.7%	66.7%
Baccharis pilularis subsp. *consanguinea*	coyote bush, coyote brush	13.9%	17.9%	30.2%	12.3%	100%
Ceanothus rigidus	**Monterey ceanothus**	**12.6%**	**5.8%**	**9.7%**	**11.2%**	**100%**
Mimulus aurantiacus	bush monkeyflower	0.0%	0.0%	--	0.0%	0.0%
Ericameria fasciculata	**Eastwood's ericameria**	**0.0%**	**0.0%**	**--**	**0.0%**	**0.0%**
Arctostaphylos pumila	**sandmat manzanita**	**0.3%**	**0.6%**	**1.0%**	**0.3%**	**33.3%**
Lupinus chamissonis	silver bush lupine	0.0%	0.0%	--	0.0%	0.0%
Eriophyllum confertiflorum	golden yarrow	0.0%	0.0%	--	0.0%	0.0%
Arctostaphylos tomentosa subsp. *tomentosa*	shaggy-barked manzanita	20.8%	18.0%	30.4%	18.4%	66.7%
Solanum umbelliferum	blue-witch nightshade	0.0%	--	--	0.0%	0.0%
Lepechinia calycina	pitcher sage	0.0%	0.0%	--	0.0%	0.0%
Frangula californica subsp. *californica*	California coffeeberry	0.0%	0.0%	--	0.0%	0.0%
Salix lasiolepis	arroyo willow	0.0%	--	--	0.0%	0.0%
Total Cover by Shrub and Subshrub Species		***84.1%***			***98.9%***	
Herbaceous Species						
Acmispon heermannii	wooly lotus	0.0%	--	--	0.0%	0.0%
Acmispon strigosus	strigose lotus	0.0%	--	--	0.0%	0.0%
Agrostis stolonifera	creeping bentgrass	0.0%	--	--	0.0%	0.0%
Calandrinia ciliata	red maids	0.0%	--	--	0.0%	0.0%
Calyptridium monandrum	pussy paws	0.0%	--	--	0.0%	0.0%
Camissonia contorta	contorted suncups	0.0%	--	--	0.0%	0.0%
Camissoniopsis cheiranthifolia	beach-primrose	0.0%	--	--	0.0%	0.0%
Camissoniopsis micrantha	small suncups	0.0%	--	--	0.0%	0.0%
Cardionema ramosissimum	sand mat	0.0%	--	--	0.0%	0.0%
Carex globosa	round-fruited sedge	0.0%	--	--	0.0%	0.0%
Castilleja exserta	purple owl's clover	0.0%	--	--	0.0%	0.0%
Caulanthus lasiophyllus	California mustard	0.0%	--	--	0.0%	0.0%
Chorizanthe diffusa	diffuse spineflower	0.0%	--	--	0.0%	0.0%
Chorizanthe pungens* var. *pungens	**Monterey spineflower**	**0.0%**	**--**	**--**	**0.0%**	**0.0%**
Cirsium occidentale	cobweb thistle	0.0%	--	--	0.0%	0.0%
Crassula connata	pygmy weed	0.0%	--	--	0.0%	0.0%
Cryptantha clevelandii	coastal cryptantha	0.0%	--	--	0.0%	0.0%
Cryptantha micromeres	small-flowered cryptantha	0.0%	--	--	0.0%	0.0%
Daucus pusillus	rattlesnake weed	0.0%	--	--	0.0%	0.0%
Deinandra increscens subsp. *increscens*	coast tarplant	0.0%	--	--	0.0%	0.0%
Deschampsia danthonioides	annual hairgrass	0.0%	--	--	0.0%	0.0%
Drymocallis glandulosa var. *glandulosa*	sticky cinquefoil	0.0%	--	--	0.0%	0.0%

Table 6-33
Range 47 Subarea B
Vegetation Cover in Subarea B (Activity D)

ESCA RP 2014 Annual Natural Resource Report – Appendix A

Scientific Name	Common Name	2010-2011 Baseline - 3 Transects				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Cover	Frequency
Herbaceous Species						
Erigeron canadensis	horseweed	0.0%	--	--	0.0%	0.0%
Eschscholzia californica	California poppy	0.0%	--	--	0.0%	0.0%
Festuca octoflora	six-weeks fescue	0.0%	--	--	0.0%	0.0%
Gamochaeta ustulata	purple cudweed	0.0%	--	--	0.0%	0.0%
Heterotheca grandifolia	telegraph weed	0.0%	--	--	0.0%	0.0%
Horkelia cuneata var. *cuneata*	coast horkelia	0.9%	1.1%	1.9%	0.8%	66.7%
Lessingia pectinata var. pectinata	common lessingia	0.0%	--	--	0.0%	0.0%
Logfia filaginoides	California filago	0.0%	--	--	0.0%	0.0%
Madia exigua	small tarweed	0.0%	--	--	0.0%	0.0%
Madia sativa	coast tarweed	0.0%	--	--	0.0%	0.0%
Navarretia hamata	hooked navarretia	0.0%	--	--	0.0%	0.0%
Nuttallanthus texanus	blue toad-flax	0.0%	--	--	0.0%	0.0%
Polypogon sp.		0.0%	--	--	0.0%	0.0%
Potentilla sp.		0.0%	--	--	0.0%	0.0%
Plagiobothrys collinus var. *fulvescens*	rusty-haired popcorn flower	0.0%	--	--	0.0%	0.0%
Pseudognaphalium beneolens	fragrant everlasting	0.0%	--	--	0.0%	0.0%
Pseudognaphalium californicum	California everlasting	0.0%	--	--	0.0%	0.0%
Pseudognaphalium canescens	white everlasting	0.0%	--	--	0.0%	0.0%
Pseudognaphalium ramosisumum	pink everlasting	0.0%	--	--	0.0%	0.0%
Pseudognaphalium stramineum	cottonbatting plant	0.0%	--	--	0.0%	0.0%
Stylocline gnaphaliodes	everlasting neststraw	0.0%	--	--	0.0%	0.0%
Total Cover by Native Herbaceous Species		***0.9%***			***1.1%***	
*Aira caryophyllea**	common silver-hair grass	0.0%	--	--	0.0%	0.0%
*Avena barbata**	slender wild oat	0.0%	--	--	0.0%	0.0%
*Carpobrotus edulis**	hottentot fig/ice plant	0.0%	--	--	0.0%	0.0%
*Erigeron sumatrensis**	tropical horseweed	0.0%	--	--	0.0%	0.0%
*Erodium cicutarium**	red-stemmed filaree	0.0%	--	--	0.0%	0.0%
*Festuca myuros**	rattail fescue	0.0%	--	--	0.0%	0.0%
*Hypochaeris glabra**	smooth cat's ears	0.0%	--	--	0.0%	0.0%
*Logfia gallica**	narrow-leaved filago	0.0%	--	--	0.0%	0.0%
*Polypogon monspeliensis**	rabbitsfoot grass	0.0%	--	--	0.0%	0.0%
*Pseudognaphalium luteospermum**	cudweed everlasting	0.0%	--	--	0.0%	0.0%
*Rumex acetosella**	sheep sorrel	0.0%	--	--	0.0%	0.0%
Sonchus asper subsp. *asper**	prickly sow-thistle	0.0%	--	--	0.0%	0.0%
*Sonchus oleraceous**	common sow-thistle	0.0%	--	--	0.0%	0.0%
*Spergularia rubra**	red sand-spurrey	0.0%	--	--	0.0%	0.0%
*Silene gallica**	windmill pink	0.0%	--	--	0.0%	0.0%
Total Cover by Non-native Herbaceous Species		***0.0%***			***0.0%***	
Total Cover by All Herbaceous Species		***0.9%***			***1.1%***	
Total Mean Vegetative Cover		***85.0%***				
Total Mean Native Vegetative Cover		***85.0%***				
Total Mean Bare ground		***28.0%***	***15.3%***	***25.7%***	***--***	***100%***

*non-native species
HMP species in bold

Table 6-33
Range 47 Subarea B
Vegetation Cover in Subarea B (Activity D)

ESCA RP 2014 Annual Natural Resource Report – Appendix A

Scientific Name	Common Name	Post-activity Data 2013 (Year 1)				
		7 Transects in Newly Planted Restoration Area				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Cover	Frequency
Shrubs and Subshrubs						
Ceanothus dentatus	dwarf ceanothus	0.9%	0.4%	0.3%	0.9%	100%
Acmispon glaber	deerweed	7.1%	7.4%	5.5%	6.9%	100%
Crocanthemum scoparium	rush-rose	2.1%	1.4%	1.0%	2.0%	100%
Ericameria ericoides	dune-heather, mock-heather	1.3%	0.8%	0.6%	1.3%	100%
Adenostoma fasciculatum	chamise	1.0%	0.8%	0.6%	1.0%	85.7%
Salvia mellifera	black sage	1.2%	0.8%	0.6%	1.1%	100%
Baccharis pilularis subsp. *consanguinea*	coyote bush, coyote brush	0.5%	0.4%	0.3%	0.4%	85.7%
Ceanothus rigidus	**Monterey ceanothus**	**0.3%**	**0.2%**	**0.1%**	**0.3%**	**85.7%**
Mimulus aurantiacus	bush monkeyflower	1.4%	0.9%	0.6%	1.4%	100%
Ericameria fasciculata	**Eastwood's ericameria**	**0.2%**	**0.3%**	**0.2%**	**0.2%**	**28.6%**
Arctostaphylos pumila	**sandmat manzanita**	**0.3%**	**0.3%**	**0.2%**	**0.3%**	**71.4%**
Lupinus chamissonis	silver bush lupine	0.1%	0.2%	0.1%	0.1%	28.6%
Eriophyllum confertiflorum	golden yarrow	0.1%	0.1%	0.1%	0.1%	57.1%
Arctostaphylos tomentosa subsp. *tomentosa*	shaggy-barked manzanita	0.1%	0.3%	0.2%	0.1%	57.1%
Solanum umbelliferum	blue-witch nightshade	0.2%	0.2%	0.1%	0.2%	57.1%
Lepechinia calycina	pitcher sage	0.0%	0.1%	0.1%	0.0%	14.3%
Frangula californica subsp. *californica*	California coffeeberry	0.0%	--	--	0.0%	0.0%
Salix lasiolepis	arroyo willow	0.0%	0.0%	0.0%	0.0%	14.3%
Total Cover by Shrub and Subshrub Species		***16.7%***			***51.6%***	
Herbaceous Species						
Acmispon heermannii	wooly lotus	0.1%	0.1%	0.1%	0.1%	28.6%
Acmispon strigosus	strigose lotus	0.3%	0.5%	0.4%	0.3%	42.9%
Agrostis stolonifera	creeping bentgrass	0.0%	--	--	0.0%	0.0%
Calandrinia ciliata	red maids	2.6%	1.3%	0.9%	2.6%	100%
Calyptridium monandrum	pussy paws	0.0%	0.0%	0.0%	0.0%	14.3%
Camissonia contorta	contorted suncups	0.0%	0.1%	0.0%	0.0%	14.3%
Camissoniopsis cheiranthifolia	beach-primrose	0.1%	0.1%	0.1%	0.1%	57.1%
Camissoniopsis micrantha	small suncups	0.6%	0.6%	0.4%	0.6%	100%
Cardionema ramosissimum	sand mat	0.0%	0.0%	0.0%	0.0%	14.3%
Carex globosa	round-fruited sedge	0.1%	0.1%	0.1%	0.1%	28.6%
Castilleja exserta	purple owl's clover	0.0%	--	--	0.0%	0.0%
Caulanthus lasiophyllus	California mustard	0.3%	0.4%	0.3%	0.3%	57.1%
Chorizanthe diffusa	diffuse spineflower	0.8%	0.8%	0.6%	0.8%	71.4%
Chorizanthe pungens* var. *pungens	**Monterey spineflower**	**0.3%**	**0.4%**	**0.3%**	**0.3%**	**71.4%**
Cirsium occidentale	cobweb thistle	0.0%	0.1%	0.1%	0.0%	14.3%
Crassula connata	pygmy weed	0.0%	0.0%	0.0%	0.0%	14.3%
Cryptantha clevelandii	coastal cryptantha	0.1%	0.3%	0.2%	0.1%	14.3%
Cryptantha micromeres	small-flowered cryptantha	0.5%	0.5%	0.4%	0.5%	71.4%
Daucus pusillus	rattlesnake weed	0.1%	0.1%	0.1%	0.1%	42.9%
Deinandra increscens subsp. *increscens*	coast tarplant	3.5%	4.1%	3.0%	3.4%	100%
Deschampsia danthonioides	annual hairgrass	0.1%	0.1%	0.1%	0.1%	28.6%
Drymocallis glandulosa var. *glandulosa*	sticky cinquefoil	0.0%	0.1%	0.1%	0.0%	28.6%

Table 6-33
Range 47 Subarea B
Vegetation Cover in Subarea B (Activity D)

ESCA RP 2014 Annual Natural Resource Report – Appendix A

Scientific Name	Common Name	Post-activity Data 2013 (Year 1)				
		7 Transects in Newly Planted Restoration Area				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Cover	Frequency
Herbaceous Species						
Erigeron canadensis	horseweed	0.3%	0.2%	0.2%	0.3%	100%
Eschscholzia californica	California poppy	0.1%	0.3%	0.2%	0.1%	14.3%
Festuca octoflora	six-weeks fescue	0.0%	0.0%	0.0%	0.0%	14.3%
Gamochaeta ustulata	purple cudweed	0.2%	0.3%	0.2%	0.2%	28.6%
Heterotheca grandifolia	telegraph weed	0.0%	0.0%	--	0.0%	0.0%
Horkelia cuneata var. *cuneata*	coast horkelia	1.5%	0.7%	0.5%	1.5%	100%
Lessingia pectinata var. pectinata	common lessingia	0.0%	--	--	0.0%	0%
Logfia filaginoides	California filago	0.1%	0.2%	0.1%	0.1%	57.1%
Madia exigua	small tarweed	0.1%	0.1%	0.1%	0.1%	14.3%
Madia sativa	coast tarweed					
Navarretia hamata	hooked navarretia	1.6%	0.9%	0.7%	1.6%	100%
Nuttallanthus texanus	blue toad-flax	0.6%	0.3%	0.2%	0.6%	100%
Polypogon sp.		0.0%	--	--	0.0%	0%
Potentilla sp.		0.0%	--	--	0.0%	0%
Plagiobothrys collinus var. *fulvescens*	rusty-haired popcorn flower	0.3%	0.6%	0.4%	0.3%	42.9%
Pseudognaphalium beneolens	fragrant everlasting	0.0%	0.1%	0.1%	0.0%	14.3%
Pseudognaphalium californicum	California everlasting	0.0%	--	--	0.0%	0.0%
Pseudognaphalium canescens	white everlasting	0.0%	--	--	0.0%	0.0%
Pseudognaphalium ramosisumum	pink everlasting	0.1%	0.1%	0.1%	0.1%	42.9%
Pseudognaphalium stramineum	cottonbatting plant	0.1%	0.2%	0.1%	0.1%	42.9%
Stylocline gnaphaliodes	everlasting neststraw	0.0%	0.0%	0.0%	0.0%	14.3%
Total Cover by Native Herbaceous Species		***14.7%***			***45.4%***	
*Aira caryophyllea**	common silver-hair grass	0.0%	--	--	0.0%	0.0%
*Avena barbata**	slender wild oat	0.0%	--	--	0.0%	0.0%
*Carpobrotus edulis**	hottentot fig/ice plant	0.0%	--	--	0.0%	0.0%
*Erigeron sumatrensis**	tropical horseweed	0.0%	--	--	0.0%	0%
*Erodium cicutarium**	red-stemmed filaree	0.0%	--	--	0.0%	0%
*Festuca myuros**	rattail fescue	0.0%	--	--	0.0%	0.0%
*Hypochaeris glabra**	smooth cat's ears	0.0%	--	--	0.0%	0%
*Logfia gallica**	narrow-leaved filago	0.9%	1.0%	0.7%	0.9%	71.4%
*Polypogon monspeliensis**	rabbitsfoot grass	0.0%	--	--	0.0%	0%
*Pseudognaphalium luteospermum**	cudweed everlasting	0.0%	--	--	0.0%	0.0%
*Rumex acetosella**	sheep sorrel	0.0%	--	--	0.0%	0.0%
Sonchus asper subsp. *asper**	prickly sow-thistle	0.0%	--	--	0.0%	0.0%
*Sonchus oleraceous**	common sow-thistle	0.0%	--	--	0.0%	0.0%
*Spergularia rubra**	red sand-spurrey	0.0%	--	--	0.0%	0.0%
*Silene gallica**	windmill pink	0.0%	0.0%	0.0%	0.0%	14.3%
Total Cover by Non-native Herbaceous Species		***1.0%***			***3.0%***	
Total Cover by All Herbaceous Species		***15.6%***			***48.4%***	
Total Mean Vegetative Cover		***32.3%***				
Total Mean Native Vegetative Cover		***31.4%***				
Total Mean Bare ground		***69.6%***	***9.8%***	***7.2%***	***--***	***24.1%***

*non-native species
HMP species in bold

Table 6-33
Range 47 Subarea B
Vegetation Cover in Subarea B (Activity D)

ESCA RP 2014 Annual Natural Resource Report – Appendix A

Scientific Name	Common Name	Post-activity Data 2014 (Year 2)				
		7 Transects in Newly Planted Restoration Area				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Cover	Frequency
Shrubs and Subshrubs						
Ceanothus dentatus	dwarf ceanothus	15.3%	5.2%	3.8%	23.1%	100%
Acmispon glaber	deerweed	8.9%	7.5%	5.5%	13.4%	100%
Crocanthemum scoparium	rush-rose	6.3%	2.3%	1.7%	9.5%	100%
Ericameria ericoides	dune-heather, mock-heather	3.9%	3.5%	2.6%	5.9%	100%
Adenostoma fasciculatum	chamise	3.4%	2.2%	1.6%	5.1%	85.7%
Salvia mellifera	black sage	2.0%	1.3%	1.0%	3.0%	86%
Baccharis pilularis subsp. *consanguinea*	coyote bush, coyote brush	2.0%	1.5%	1.1%	2.9%	85.7%
Ceanothus rigidus	**Monterey ceanothus**	**1.5%**	**1.6%**	**1.2%**	**2.2%**	**71.4%**
Mimulus aurantiacus	bush monkeyflower	0.5%	0.6%	0.4%	0.8%	57%
Ericameria fasciculata	**Eastwood's ericameria**	**0.5%**	**0.6%**	**0.4%**	**0.7%**	**42.9%**
Arctostaphylos pumila	**sandmat manzanita**	**0.4%**	**0.6%**	**0.4%**	**0.6%**	**57.1%**
Lupinus chamissonis	silver bush lupine	0.4%	0.8%	0.6%	0.5%	42.9%
Eriophyllum confertiflorum	golden yarrow	0.3%	0.2%	0.2%	0.5%	85.7%
Arctostaphylos tomentosa subsp. *tomentosa*	shaggy-barked manzanita	0.3%	0.3%	0.2%	0.5%	71.4%
Solanum umbelliferum	blue-witch nightshade	0.1%	0.2%	0.1%	0.2%	42.9%
Lepechinia calycina	pitcher sage	0.1%	0.3%	0.2%	0.1%	14.3%
Frangula californica subsp. *californica*	California coffeeberry	0.1%	0.1%	0.1%	0.1%	14.3%
Salix lasiolepis	arroyo willow	0.0%	0.0%	0.0%	0.0%	14.3%
Total Cover by Shrub and Subshrub Species		***46.0%***			***69.2%***	
Herbaceous Species						
Acmispon heermannii	wooly lotus	0.0%	0.1%	0.0%	0.0%	14.3%
Acmispon strigosus	strigose lotus	0.0%	0.0%	0.0%	0.0%	14.3%
Agrostis stolonifera	creeping bentgrass	0.0%	0.0%	0.0%	0.0%	14.3%
Calandrinia ciliata	red maids	0.0%	--	--	0.0%	0%
Calyptridium monandrum	pussy paws	0.0%	--	--	0.0%	0.0%
Camissonia contorta	contorted suncups	0.0%	--	--	0.0%	0.0%
Camissoniopsis cheiranthifolia	beach-primrose	0.1%	0.2%	0.1%	0.2%	42.9%
Camissoniopsis micrantha	small suncups	0.0%	0.0%	0.0%	0.0%	14%
Cardionema ramosissimum	sand mat	0.0%	0.1%	0.1%	0.1%	14.3%
Carex globosa	round-fruited sedge	0.0%	0.0%	0.0%	0.0%	14.3%
Castilleja exserta	purple owl's clover	0.1%	0.1%	0.1%	0.1%	28.6%
Caulanthus lasiophyllus	California mustard	0.1%	0.4%	0.3%	0.2%	28.6%
Chorizanthe diffusa	diffuse spineflower	0.1%	0.1%	0.1%	0.1%	28.6%
Chorizanthe pungens* var. *pungens	**Monterey spineflower**	**0.0%**	**--**	**--**	**0.0%**	**0.0%**
Cirsium occidentale	cobweb thistle	0.0%	--	--	0.0%	0.0%
Crassula connata	pygmy weed	0.0%	--	--	0.0%	0.0%
Cryptantha clevelandii	coastal cryptantha	0.0%	--	--	0.0%	0.0%
Cryptantha micromeres	small-flowered cryptantha	0.0%	--	--	0.0%	0.0%
Daucus pusillus	rattlesnake weed	0.0%	--	--	0.0%	0.0%
Deinandra increscens subsp. *increscens*	coast tarplant	3.2%	1.2%	0.9%	4.8%	100.0%
Deschampsia danthonioides	annual hairgrass	0.0%	--	--	0.0%	0.0%
Drymocallis glandulosa var. *glandulosa*	sticky cinquefoil	0.0%	--	--	0.0%	0.0%

Table 6-33
Range 47 Subarea B
Vegetation Cover in Subarea B (Activity D)

ESCA RP 2014 Annual Natural Resource Report – Appendix A

Scientific Name	Common Name	Post-activity Data 2014 (Year 2)				
		7 Transects in Newly Planted Restoration Area				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Cover	Frequency
Herbaceous Species						
Erigeron canadensis	horseweed	2.4%	1.5%	1.1%	3.6%	100%
Eschscholzia californica	California poppy	0.0%	--	--	0.0%	0.0%
Festuca octoflora	six-weeks fescue	0.0%	0.0%	0.0%	0.0%	14.3%
Gamochaeta ustulata	purple cudweed	0.0%	--	--	0.0%	0.0%
Heterotheca grandifolia	telegraph weed	0.0%	0.1%	0.1%	0.1%	14.3%
Horkelia cuneata var. *cuneata*	coast horkelia	9.4%	4.0%	2.9%	14.2%	100%
Lessingia pectinata var. pectinata	common lessingia	0.1%	0.3%	0.2%	0.2%	14%
Logfia filaginoides	California filago	0.0%	--	--	0.0%	0.0%
Madia exigua	small tarweed	0.0%	--	--	0.0%	0.0%
Madia sativa	coast tarweed	0.1%	0.2%	0.1%	0.1%	14.3%
Navarretia hamata	hooked navarretia	0.1%	0.1%	0.1%	0.2%	43%
Nuttallanthus texanus	blue toad-flax					
Polypogon sp.		0.0%	0.1%	0.0%	0.0%	14%
Potentilla sp.		0.0%	0.1%	0.1%	0.0%	14%
Plagiobothrys collinus var. *fulvescens*	rusty-haired popcorn flower	0.0%	--	--	0.0%	0.0%
Pseudognaphalium beneolens	fragrant everlasting	2.2%	2.0%	1.5%	3.4%	85.7%
Pseudognaphalium californicum	California everlasting	0.2%	0.5%	0.3%	0.3%	14.3%
Pseudognaphalium canescens	white everlasting	0.1%	0.2%	0.2%	0.2%	28.6%
Pseudognaphalium ramosisumum	pink everlasting	0.7%	0.9%	0.6%	1.1%	57.1%
Pseudognaphalium stramineum	cottonbatting plant	0.2%	0.2%	0.2%	0.3%	71.4%
Stylocline gnaphaliodes	everlasting neststraw	0.0%	--	--	0.0%	0.0%
Total Cover by Native Herbaceous Species		***19.4%***			***29.1%***	
*Aira caryophyllea**	common silver-hair grass	0.4%	0.4%	0.3%	0.6%	71.4%
*Avena barbata**	slender wild oat	0.0%	0.0%	0.0%	0.0%	14.3%
*Carpobrotus edulis**	hottentot fig/ice plant	0.0%	0.0%	0.0%	0.0%	14.3%
*Erigeron sumatrensis**	tropical horseweed	0.0%	0.0%	0.0%	0.0%	14%
*Erodium cicutarium**	red-stemmed filaree	0.0%	0.0%	0.0%	0.0%	14%
*Festuca myuros**	rattail fescue	0.2%	0.3%	0.2%	0.3%	42.9%
*Hypochaeris glabra**	smooth cat's ears	0.0%	0.1%	0.1%	0.1%	14%
*Logfia gallica**	narrow-leaved filago	0.1%	0.1%	0.1%	0.2%	57.1%
*Polypogon monspeliensis**	rabbitsfoot grass	0.0%	0.0%	0.0%	0.0%	14%
*Pseudognaphalium luteospermum**	cudweed everlasting	0.0%	0.0%	0.0%	0.0%	14.3%
*Rumex acetosella**	sheep sorrel	0.2%	0.2%	0.2%	0.3%	71.4%
Sonchus asper subsp. *asper**	prickly sow-thistle	0.0%	0.0%	0.0%	0.0%	14.3%
*Sonchus oleraceous**	common sow-thistle	0.0%	--	--	0.0%	0.0%
*Spergularia rubra**	red sand-spurrey	0.0%	0.0%	0.0%	0.0%	14.3%
*Silene gallica**	windmill pink	0.1%	0.2%	0.1%	0.1%	42.9%
Total Cover by Non-native Herbaceous Species		***1.1%***			***1.6%***	
Total Cover by All Herbaceous Species		***20.4%***			***30.8%***	
Total Mean Vegetative Cover		***66.4%***				
Total Mean Native Vegetative Cover		***65.3%***				
Total Mean Bare ground		***42.2%***	***10.1%***	***7.4%***		***100.0%***

*non-native species
HMP species in bold

Table 6-34
Vegetation Cover in Range 47 with Four Different Treatments
(Activity D)

ESCA RP 2014 Annual Natural Resources Report - Appendix A

Scientific Name	Common Name	Percent Cover Post-Activity 2013 - 2014							
		Subarea B (Fenced, Irrigated, Container Plantings) 7 Transects				Subarea B (Fenced, No Irrigation, Container Plantings) 1 Transect			
		Post-activity Year 1 (2013)		Post-activity Year 2 (2014)		Post-activity Year 1 (2013)		Post-activity Year 2 (2014)	
		Mean Cover	Relative Cover	Mean Cover	Relative Cover	Mean Cover	Relative Cover	Mean Cover	Relative Cover
Shrubs and Subshrubs									
Acmispon glaber	deerweed	7.1%	21.9%	8.9%	13.4%	2.3%	9.3%	6.4%	12.8%
Adenostoma fasciculatum	chamise	1.0%	3.2%	3.4%	5.1%	0.1%	0.6%	3.9%	7.9%
Arctostaphylos pumila	**sandmat manzanita**	**0.3%**	**0.9%**	**0.4%**	**0.6%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
Arctostaphylos tomentosa subsp. *tomentosa*	shaggy-barked manzanita	0.1%	0.4%	0.3%	0.5%	0.1%	0.2%	0.2%	0.4%
Baccharis pilularis subsp. *consanguinea*	coyote brush	0.5%	1.4%	2.0%	2.9%	0.0%	0.0%	0.0%	0.0%
Ceanothus dentatus	dwarf ceanothus	0.9%	2.7%	15.3%	23.1%	1.3%	5.2%	7.6%	15.3%
Ceanothus rigidus	**Monterey ceanothus**	**0.3%**	**0.8%**	**1.5%**	**2.2%**	**0.6%**	**2.4%**	**2.3%**	**4.7%**
Ericameria ericoides	dune-heather, mock-heather	1.3%	4.2%	3.9%	5.9%	1.3%	5.2%	5.0%	10.0%
Ericameria fasciculata	**Eastwood's ericameria**	**0.2%**	**0.6%**	**0.5%**	**0.7%**	**0.6%**	**2.3%**	**0.9%**	**1.9%**
Eriophyllum confertiflorum	golden yarrow	0.1%	0.3%	0.3%	0.5%	2.9%	11.8%	1.8%	3.6%
Frangula californica subsp. *californica*	California coffeeberry	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%
Crocoanthemum scoparium	rush-rose	2.1%	6.4%	6.3%	9.5%	2.3%	9.4%	5.4%	10.8%
Lepechinia calycina	pitcher sage	0.0%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%
Lupinus arboreus			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Lupinus chamissonis	silver bush lupine	0.1%	0.3%	0.4%	0.5%	0.0%	0.2%	0.6%	1.2%
Mimulus aurantiacus	bush monkeyflower	1.4%	4.3%	0.5%	0.8%	1.4%	5.6%	0.0%	0.0%
Salix lasiolepis	arroyo willow	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Salvia mellifera	black sage	1.2%	3.6%	2.0%	3.0%	1.6%	6.6%	3.7%	7.5%
Solanum umbelliferum	blue-witch nightshade	0.2%	0.5%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%
Total Cover by Shrub and Subshrub Species		***16.7%***	***51.7%***	***46.0%***	***69.6%***	***14.5%***	***58.7%***	***37.7%***	***76.1%***
Herbaceous Species									
Acmispon heermannii	woolly lotus	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Acmispon strigosus	Bishop's lotus	0.3%	1.0%	0.0%	0.0%	0.2%	0.7%	0.0%	0.0%
Agrostis stolonifera	creeping bentgrass	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
*Avena barbata**	slender wild oat	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
*Bromus madritensis subsp. rubens**	red brome	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
Calandrinia ciliata	red maids	2.6%	8.1%	0.0%	0.0%	1.1%	4.3%	0.0%	0.0%
Calyptridium monandrum	pussy paws	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Camissonia contorta	contorted suncups	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Camissoniopsis cheiranthifolia	beach-primrose	0.1%	0.3%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%
Camissoniopsis micrantha	small suncups	0.6%	1.9%	0.0%	0.0%	0.3%	1.2%	0.0%	0.0%
Cardionema ramosissimum	sand mat	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
Carex globosa	round-fruited sedge	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Castilleja exserta subsp. latifolia	purple owl's clover	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%
Caulanthus lasiophyllus	California mustard	0.3%	1.0%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%
Chorizanthe diffusa	diffuse chorizanthe	0.8%	2.6%	0.1%	0.1%	0.1%	0.2%	0.2%	0.4%
Chorizanthe pungens* var. *pungens	**Monterey spineflower**	**0.3%**	0.9%	**0.0%**	**0.0%**	**2.6%**	**10.6%**	**2.8%**	**5.7%**
Cirsium occidentale	cobweb thistle	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Crassula connata	pygmy weed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Croton californicus	California croton	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.6%
Cryptantha clevelandii	coastal cryptantha	0.1%	0.4%	0.0%	0.0%	0.2%	1.0%	0.0%	0.0%
Cryptantha micromeres	small-flowered cryptantha	0.5%	1.6%	0.0%	0.0%	0.1%	0.6%	0.0%	0.0%
Daucus pusillus	rattlesnake weed	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Deinandra corymbosa subsp. *corymbosa*	coast tarplant	3.5%	10.8%	0.0%	0.0%	4.1%	16.6%	0.0%	0.0%
Deinandra increscens	coast tarweed	0.0%	0.0%	3.2%	4.8%	0.0%	0.0%	3.1%	6.3%
Deschampsia danthonioides	annual hairgrass	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Table 6-34
Vegetation Cover in Range 47 with Four Different Treatments
(Activity D)

ESCA RP 2014 Annual Natural Resources Report - Appendix A

Scientific Name	Common Name	Percent Cover Post-Activity 2013 - 2014							
		Subarea B (Fenced, Irrigated, Container Plantings) 7 Transects				Subarea B (Fenced, No Irrigation, Container Plantings) 1 Transect			
		Post-activity Year 1 (2013)		Post-activity Year 2 (2014)		Post-activity Year 1 (2013)		Post-activity Year 2 (2014)	
		Mean Cover	Relative Cover	Mean Cover	Relative Cover	Mean Cover	Relative Cover	Mean Cover	Relative Cover
Herbaceous Species									
Drymocallis glandulosa var. *glandulosa*	sticky cinquefoil	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Erigeron canadensis	horseweed	0.3%	1.0%	2.4%	3.6%	0.0%	0.0%	0.6%	1.2%
Erigeron sumatrensis	tropical horseweed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Eschscholzia californica	California poppy	0.1%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Festuca octoflora	six-weeks fescue	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Gamochaeta ustulata	purple cudweed	0.2%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Heterotheca grandiflora	telegraph weed	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%	0.1%
Horkelia cuneata var. *cuneata*	coast horkelia	1.5%	4.7%	9.4%	14.2%	1.1%	4.3%	3.3%	6.7%
Lessingia pectinata var. pectinata	common lessingia	0.0%	0.0%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%
Logfia filaginoides	California filago	0.1%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Madia exigua	small tarweed	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Madia sativa	coast tarweed	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%
Navarretia hamata	hooked navarretia	1.6%	5.0%	0.1%	0.2%	0.4%	1.7%	0.0%	0.0%
Nuttallanthus texanus	toad-flax	0.6%	1.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Plagiobothrys collinus var. *fulvescens*	rusty-haired popcorn flower	0.3%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Plantago erecta	California plantain	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.5%
Potentilla sp.		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pseudognaphalium beneolens	fragrant everlasting	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pseudognaphalium sp. (seedlings)		0.0%	0.0%	2.2%	3.4%	0.0%	0.0%	0.0%	0.0%
Pseudognaphalium californicum	California everlasting	0.0%	0.0%	0.2%	0.3%	0.0%	0.0%	0.0%	0.0%
Pseudognaphalium canescens	white everlasting	0.0%	0.0%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%
Pseudognaphalium ramosisumum	pink everlasting	0.1%	0.3%	0.7%	1.1%	0.0%	0.0%	0.0%	0.0%
Pseudognaphalium stramineum	cottonbatting plant	0.1%	0.4%	0.2%	0.3%	0.0%	0.0%	0.0%	0.0%
Stylocline gnaphaliodes	everlasting neststraw	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total Cover by Native Herbaceous Species		***14.6%***	***45.3%***	***19.4%***	***29.2%***	***10.2%***	***41.3%***	***10.7%***	***21.6%***
*Aira caryophyllea**	common silver-hair grass	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.7%
*Carpobrotus edulis**	hottentot fig/ice plant	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
*Centaurea melitensis**	tocalote	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
*Erodium cicutarium**	red-stemmed filaree	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	1.0%
*Festuca myuros**	rattail fescue	0.0%	0.0%	0.2%	0.3%	0.0%	0.0%	0.0%	0.0%
*Hypochaeris glabra**	smooth cat's ears	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%	0.2%
*Logfia gallica**	narrow-leaved filago	0.9%	2.9%	0.1%	0.2%	0.0%	0.0%	0.1%	0.2%
*Medicago polymorpha**	bur-clover	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
*Polypogon monspeliensis**	rabbitsfoot grass	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Polypogon sp.		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
*Rumex acetosella**	sheep sorrel	0.0%	0.0%	0.2%	0.3%	0.0%	0.0%	0.0%	0.0%
*Silene gallica**	windmill pink	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%
Sonchus asper subsp. *asper**	prickly sow-thistle	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
*Sonchus oleraceus**	common sow-thistle	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
*Spergularia rubra**	red sand-spurrey	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
*Pseudognaphalium luteoalbum**	cudweed everlasting	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total Cover by Non-native Herbaceous Species		***0.9%***	***2.9%***	***0.7%***	***1.1%***	***0.0%***	***0.0%***	***1.2%***	***2.3%***
Total Cover by Herbaceous Species		***15.6%***	***48.3%***	***20.1%***	***30.2%***	***10.2%***	***41.3%***	***11.9%***	***23.9%***
Total Mean Vegetative Cover		**32.3%**		**66.1%**		**24.6%**		**49.6%**	
Total Mean Native Cover		**31.3%**		**65.4%**		**24.6%**		**48.5%**	
Total Mean Bare ground		**69.6%**		**42.2%**		**76.4%**		**52.4%**	

*non-native species

HMP species in bold

Table 6-34
Vegetation Cover in Range 47 with Four Different Treatments
(Activity D)

ESCA RP 2014 Annual Natural Resources Report - Appendix A

Scientific Name	Common Name	Percent Cover Post-Activity 2013 - 2014							
		Subarea B (No Fence, Irrigated, Container Plantings) 1 Transect				Subarea A (Fenced, Irrigated, Seeded, No Container Plantings) 1 Transect			
		Post-activity Year 1 (2013)		Post-activity Year 2 (2014)		Post-activity Year 1 (2013)		Post-activity Year 2 (2014)	
		Mean Cover	Relative Cover	Mean Cover	Relative Cover	Mean Cover	Relative Cover	Mean Cover	Relative Cover
Shrubs and Subshrubs									
Acmispon glaber	deerweed	6.3%	46.1%	7.2%	13.4%	1.9%	11.0%	15.9%	21.2%
Adenostoma fasciculatum	chamise	0.0%	0.0%	0.7%	1.3%	0.4%	2.2%	2.0%	2.6%
Arctostaphylos pumila	**sandmat manzanita**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.1%**	**0.7%**	**0.0%**	**0.0%**
Arctostaphylos tomentosa subsp. *tomentosa*	shaggy-barked manzanita	0.0%	0.0%	0.4%	0.8%	0.1%	0.8%	0.8%	1.0%
Baccharis pilularis subsp. *consanguinea*	coyote brush	2.0%	14.4%	6.3%	11.6%	0.1%	0.6%	0.6%	0.7%
Ceanothus dentatus	dwarf ceanothus	0.0%	0.0%	0.0%	0.0%	1.0%	5.8%	22.8%	30.3%
Ceanothus rigidus	**Monterey ceanothus**	**0.1%**	**0.9%**	**0.3%**	**0.5%**	**0.0%**	**0.1%**	**1.8%**	**2.4%**
Ericameria ericoides	dune-heather, mock-heather	0.3%	2.1%	3.7%	6.8%	0.2%	0.9%	0.7%	0.9%
Ericameria fasciculata	**Eastwood's ericameria**	**1.7%**	**12.6%**	**1.4%**	**2.5%**	**0.0%**	**0.2%**	**0.7%**	**0.9%**
Eriophyllum confertiflorum	golden yarrow	0.1%	0.4%	0.0%	0.0%	0.7%	4.1%	1.9%	2.5%
Frangula californica subsp. *californica*	California coffeeberry	0.2%	1.3%	0.1%	0.2%	0.0%	0.2%	0.0%	0.0%
Crocoanthemum scoparium	rush-rose	0.3%	2.5%	1.5%	2.7%	1.6%	9.2%	10.4%	13.8%
Lepechinia calycina	pitcher sage	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Lupinus arboreus		0.0%	0.0%	0.0%	0.0%	0.1%	0.6%	0.0%	0.0%
Lupinus chamissonis	silver bush lupine	0.0%	0.0%	0.0%	0.0%	0.1%	0.4%	0.0%	0.0%
Mimulus aurantiacus	bush monkeyflower	0.0%	0.0%	1.5%	2.7%	0.2%	1.3%	0.2%	0.3%
Salix lasiolepis	arroyo willow	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Salvia mellifera	black sage	0.0%	0.0%	1.8%	3.2%	0.3%	1.8%	1.9%	2.5%
Solanum umbelliferum	blue-witch nightshade	0.0%	0.0%	0.0%	0.0%	0.2%	0.9%	0.0%	0.0%
Total Cover by Shrub and Subshrub Species		***10.9%***	***80.3%***	***24.7%***	***45.6%***	***6.9%***	***41.8%***	***59.5%***	***79.2%***
Herbaceous Species									
Acmispon heermannii	woolly lotus	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Acmispon strigosus	Bishop's lotus	0.0%	0.0%	0.0%	0.0%	0.4%	2.6%	0.0%	0.0%
Agrostis stolonifera	creeping bentgrass	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
*Avena barbata**	slender wild oat	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
*Bromus madritensis subsp. rubens**	red brome	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Calandrinia ciliata	red maids	0.0%	0.0%	0.0%	0.0%	1.6%	9.5%	0.0%	0.0%
Calyptridium monandrum	pussy paws	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Camissonia contorta	contorted suncups	0.0%	0.0%	0.0%	0.0%	0.4%	2.1%	0.0%	0.0%
Camissoniopsis cheiranthifolia	beach-primrose	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Camissoniopsis micrantha	small suncups	0.1%	0.7%	0.0%	0.0%	0.2%	1.4%	0.0%	0.0%
Cardionema ramosissimum	sand mat	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
Carex globosa	round-fruited sedge	0.1%	0.4%	0.0%	0.0%	0.1%	0.6%	0.0%	0.1%
Castilleja exserta subsp. latifolia	purple owl's clover	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Caulanthus lasiophyllus	California mustard	0.0%	0.1%	0.0%	0.0%	0.3%	1.5%	0.0%	0.0%
Chorizanthe diffusa	diffuse chorizanthe	0.1%	0.6%	0.7%	1.3%	0.0%	0.0%	0.0%	0.0%
Chorizanthe pungens* var. *pungens	**Monterey spineflower**	**0.0%**	**0.0%**	**0.6%**	**1.2%**	**0.5%**	**2.7%**	0.0%	0.0%
Cirsium occidentale	cobweb thistle	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Crassula connata	pygmy weed	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
Croton californicus	California croton	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
Cryptantha clevelandii	coastal cryptantha	0.1%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Cryptantha micromeres	small-flowered cryptantha	0.0%	0.3%	0.5%	0.8%	1.3%	7.6%	0.0%	0.0%
Daucus pusillus	rattlesnake weed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Deinandra corymbosa subsp. *corymbosa*	coast tarplant	0.6%	4.3%	0.0%	0.0%	0.7%	4.0%	0.0%	0.0%
Deinandra increscens	coast tarweed	0.0%	0.0%	10.0%	18.4%	0.0%	0.0%	1.5%	2.0%
Deschampsia danthonioides	annual hairgrass	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Table 6-34
Vegetation Cover in Range 47 with Four Different Treatments
(Activity D)

ESCA RP 2014 Annual Natural Resources Report - Appendix A

Scientific Name	Common Name	Percent Cover Post-Activity 2013 - 2014							
		Subarea B (No Fence, Irrigated, Container Plantings) 1 Transect				Subarea A (Fenced, Irrigated, Seeded, No Container Plantings) 1 Transect			
		Post-activity Year 1 (2013)		Post-activity Year 2 (2014)		Post-activity Year 1 (2013)		Post-activity Year 2 (2014)	
		Mean Cover	Relative Cover	Mean Cover	Relative Cover	Mean Cover	Relative Cover	Mean Cover	Relative Cover
Herbaceous Species									
Drymocallis glandulosa var. *glandulosa*	sticky cinquefoil	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Erigeron canadensis	horseweed	0.0%	0.0%	12.2%	22.4%	0.0%	0.0%	0.4%	0.6%
Erigeron sumatrensis	tropical horseweed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Eschscholzia californica	California poppy	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Festuca octoflora	six-weeks fescue	0.0%	0.0%	0.0%	0.0%	0.1%	0.7%	0.0%	0.0%
Gamochaeta ustulata	purple cudweed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Heterotheca grandiflora	telegraph weed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	0.6%
Horkelia cuneata var. *cuneata*	coast horkelia	0.7%	4.8%	1.8%	3.4%	1.4%	8.4%	11.2%	15.0%
Lessingia pectinata var. pectinata	common lessingia	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Logfia filaginoides	California filago	0.0%	0.0%	0.0%	0.0%	0.1%	0.5%	0.0%	0.0%
Madia exigua	small tarweed	0.0%	0.0%	0.0%	0.0%	0.4%	2.5%	0.0%	0.0%
Madia sativa	coast tarweed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Navarretia hamata	hooked navarretia	1.0%	7.6%	0.2%	0.4%	0.4%	2.5%	0.0%	0.0%
Nuttallanthus texanus	toad-flax	0.0%	0.0%	0.0%	0.0%	0.5%	2.8%	0.0%	0.0%
Plagiobothrys collinus var. *fulvescens*	rusty-haired popcorn flower	0.0%	0.0%	0.0%	0.0%	0.2%	1.2%	0.0%	0.0%
Plantago erecta	California plantain	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Potentilla sp.		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pseudognaphalium beneolens	fragrant everlasting	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pseudognaphalium sp. (seedlings)		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pseudognaphalium californicum	California everlasting	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pseudognaphalium canescens	white everlasting	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pseudognaphalium ramosisumum	pink everlasting	0.0%	0.0%	0.8%	1.5%	0.5%	3.0%	1.0%	1.3%
Pseudognaphalium stramineum	cottonbatting plant	0.0%	0.0%	0.3%	0.5%	0.3%	1.7%	0.4%	0.6%
Stylocline gnaphaliodes	everlasting neststraw	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total Cover by Native Herbaceous Species		***2.7%***	***19.7%***	***27.1%***	***50.0%***	***9.4%***	***55.6%***	***15.1%***	***20.1%***
*Aira caryophyllea**	common silver-hair grass	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
*Carpobrotus edulis**	hottentot fig/ice plant	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
*Centaurea melitensis**	tocalote	0.0%	0.0%	1.8%	3.2%	0.0%	0.0%	0.0%	0.0%
*Erodium cicutarium**	red-stemmed filaree	0.0%	0.0%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%
*Festuca myuros**	rattail fescue	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
*Hypochaeris glabra**	smooth cat's ears	0.0%	0.0%	0.5%	0.8%	0.0%	0.0%	0.0%	0.0%
*Logfia gallica**	narrow-leaved filago	0.0%	0.0%	0.0%	0.0%	0.3%	1.7%	0.0%	0.0%
*Medicago polymorpha**	bur-clover	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
*Polypogon monspeliensis**	rabbitsfoot grass	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Polypogon sp.		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
*Rumex acetosella**	sheep sorrel	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
*Silene gallica**	windmill pink	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Sonchus asper subsp. *asper**	prickly sow-thistle	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
*Sonchus oleraceus**	common sow-thistle	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
*Spergularia rubra**	red sand-spurrey	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
*Pseudognaphalium luteoalbum**	cudweed everlasting	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total Cover by Non-native Herbaceous Species		***0.0%***	***0.0%***	***2.3%***	***4.3%***	***0.3%***	***1.7%***	***0.1%***	***0.2%***
Total Cover by Herbaceous Species		***2.7%***	***19.7%***	***29.5%***	***54.4%***	***9.7%***	***57.3%***	***15.2%***	***20.2%***
Total Mean Vegetative Cover		**13.6%**		**54.2%**		**16.6%**		**74.7%**	
Total Mean Native Cover		**13.6%**		**51.9%**		**16.3%**		**74.6%**	
Total Mean Bare ground		**87.1%**		**46.3%**		**83.4%**		**35.2%**	

*non-native species

HMP species in bold

Table 6-35
2013 - 2014 Range 47 Subarea B Cover and Frequency of Plant Species
after Large-scale Excavation (No controls)

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Post-activity Data 2013 (Year 1)				
		42 Quadrats in Range 47 Subarea B (no controls)				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Percent Cover	Frequency
Shrub and Subshrub Species						
Acmispon glaber	deerweed	1.4%	5.0%	1.3%	28.6%	21.4%
Adenostoma fasciculatum	chamise	0.5%	2.4%	0.6%	10.5%	7.1%
Arctostaphylos pumila	**sandmat manzanita**	0.0%	0.2%	0.0%	0.8%	7.1%
Arctostaphylos tomentosa	shaggy-barked manzanita	0.1%	0.2%	0.1%	1.2%	14.3%
Baccharis pilularis	coyote brush	0.0%	0.1%	0.0%	0.3%	4.8%
Ceanothus dentatus	dwarf ceanothus	0.0%	0.2%	0.0%	0.5%	2.4%
Ceanothus rigidus	**Monterey ceanothus**	0.1%	0.3%	0.1%	1.2%	4.8%
Crocanthemum scoparium	rush-rose	0.3%	0.8%	0.2%	5.5%	33.3%
Ericameria ericoides	mock heather, dune heather	0.1%	0.6%	0.2%	2.9%	9.5%
Ericameria fasciculata	**Eastwood's ericameria**	0.0%	0.0%	0.0%	0.1%	2.4%
Eriophyllum confertiflorum	golden yarrow	0.0%	--	--	0.0%	0.0%
Frangula californica subsp. *californica*	California coffee berry	0.0%	0.2%	0.0%	0.8%	4.8%
Lepechinia calycina	pitcher sage	0.0%	0.0%	0.0%	0.1%	2.4%
Lupinus chamissonis	silver bush lupine	0.0%	0.0%	0.0%	0.1%	2.4%
Mimulus aurantiacus	bush monkeyflower	0.3%	0.9%	0.2%	5.2%	23.8%
Salvia mellifera	black sage	0.1%	0.3%	0.1%	1.3%	38.1%
Solanum umbelliferum	blue witch nightshade	0.0%	0.1%	0.0%	0.3%	23.8%
Total Cover by Native Shrub and Subshrub Species		***3.0%***			***59.5%***	
Herbaceous Species						
Acmispon heermannii var. orbicularis	wooly lotus	0.0%	--	--	--	0.0%
Acmispon strigosus	Bishop's lotus	0.0%	0.1%	0.0%	0.2%	2.4%
Amsinckia intermedia	common fiddleneck	0.0%	0.1%	0.0%	0.2%	2.4%
Calandrinia ciliata	red maids	0.8%	1.9%	0.5%	15.3%	40.5%
Camissoniopsis cheiranthifolia	beach-primrose	0.0%	0.2%	0.1%	0.8%	4.8%
Camissoniopsis micrantha	small suncups	**0.1%**	**0.3%**	**0.1%**	**2.5%**	**19.0%**
Cardionema ramosissimum	sand mat	0.0%	--	--	--	0.0%
Carex globosa	round-fruited sedge	0.0%	--	--	--	0.0%
Caulanthus lasiophyllus	California mustard	0.1%	0.2%	0.1%	1.1%	7.1%
Chorizanthe diffusa	diffuse chorizanthe	0.0%	0.0%	0.0%	0.1%	2.4%
Crassula connata	pygmy weed	0.0%	0.0%	0.0%	0.1%	7.1%
Cryptantha micromeres	small-flowered cryptantha	0.0%	0.1%	0.0%	0.2%	2.4%
Cryptantha sp.	cryptantha	0.0%	0.0%	0.0%	0.0%	2.4%
Daucus pusillus	rattlesnake weed	0.0%	--	--	--	0.0%
Deinandra increscens subsp. increscens	coast tarweed	0.1%	0.4%	0.1%	2.7%	14.3%
Deschampsia danthonioides	annual hairgrass	0.0%	0.1%	0.0%	0.4%	4.8%
Descurainia pinnata	western tansymustard	0.0%	0.0%	0.0%	0.0%	2.4%
Epilobium ciliatum subsp. ciliatum	willow-herb	0.0%	--	--	--	0.0%
Erigeron canadensis	horseweed	0.0%	0.1%	0.0%	0.2%	4.8%
Eschscholzia californica	California poppy	0.0%	0.0%	0.0%	0.0%	2.4%
Festuca octoflora	six-weeks fescue	0.0%	0.0%	0.0%	0.1%	9.5%
Gamochaeta ustulata	purple cudweed	0.0%	0.2%	0.0%	0.5%	2.4%
Horkelia cuneata var *cuneata*	coast horkelia, wedge-leaved horkelia	0.2%	0.5%	0.1%	3.4%	21.4%
Navarretia hamata subsp. *parviloba*	hooked navarretia	0.3%	0.8%	0.2%	5.1%	26.2%
Navarretia intertexta	needle-leaved navarretia	0.0%	--	--	--	0.0%
Pectocarya penicillata	winged combseed	0.0%	0.0%	0.0%	0.0%	2.4%

Table 6-35
2013 - 2014 Range 47 Subarea B Cover and Frequency of Plant Species
after Large-scale Excavation (No controls)

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Post-activity Data 2013 (Year 1)				
		42 Quadrats in Range 47 Subarea B (no controls)				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Percent Cover	Frequency
Herbaceous Species						
Plagiobothrys collinus var. fulvescens	rusty-haired popcorn flower	0.1%	0.3%	0.1%	1.4%	4.8%
Plantago erecta	California plantain	0.0%	0.2%	0.0%	0.7%	57.1%
Potentilla glandulosa	sticky cinquefoil	0.0%	0.2%	0.1%	0.7%	52.4%
Potentilla sp	cinqefoil	0.0%	--	--	--	0.0%
Pseudognaphalium beneolens	fragrant everlasting	0.0%	0.2%	0.1%	0.8%	50.0%
Pseudognaphalium canescens	white everlasting	0.0%	0.2%	0.1%	0.9%	47.6%
Pseudognaphalium ramosissimum	pink everlasting	0.0%	--	--	--	0.0%
Pseudognaphalium stramineum	cottonbatting plant	0.1%	0.2%	0.1%	1.0%	40.5%
Sagina apetela	sticky pearlwort	0.0%	--	--	--	0.0%
Sagina decumbens subsp. *occidentalis*	western pearlwort	0.0%	--	--	--	0.0%
Stylocline gnaphaliodes	everlasting neststraw	0.0%	0.0%	0.0%	0.2%	7.1%
Nuttallanthus texanus	toad-flax	0.1%	0.2%	0.0%	1.3%	26.2%
Total Cover by Native Herbaceous Species		***2.0%***			***40.2%***	
*Aira caryophyllea**	common silver-hair grass	0.0%	--	--	--	0.0%
*Agrostis stolonifera**	creeping bentgrass	0.0%	--	--	--	0.0%
*Bromus madritensis subsp. rubens**	red brome	0.0%	--	--	--	0.0%
*Carpobrotus edulis**	hottentot fig/ice plant	0.0%	--	--	--	0.0%
*Centaurea melitensis**	tocalote	0.0%	--	--	--	0.0%
*Cerastium glomeratum**	mouse-eared chickweed	0.0%	--	--	--	0.0%
*Erigeron sumatrensis**	tropical horseweed	0.0%	--	--	--	0.0%
*Erodium cicutarium**	red-stemmed filaree	0.0%	--	--	--	0.0%
*Euphorbia peplus**	petty spurge	0.0%	--	--	--	0.0%
*Logfia gallica**	narrow-leaved filago	0.0%	0.0%	0.0%	0.3%	11.9%
*Polypogon interruptus**	ditch beard grass	0.0%	--	--	--	0.0%
*Polypogon monspeliensis**	rabbitsfoot grass	0.0%	--	--	--	0.0%
*Rumex acetosella**	sheep sorrel	0.0%	--	--	--	0.0%
*Silene gallica**	windmill pink	0.0%	--	--	--	0.0%
Sonchus asper subsp. *asper**	prickly sow-thistle	0.0%	--	--	--	0.0%
*Sonchus oleraceus **	common sow-thistle	0.0%	--	--	--	0.0%
*Spurgilaria rubra**	red sand-spurrey	0.0%	--	--	--	0.0%
Total Cover by Non-native Herbaceous Species		***0.0%***			***0.3%***	
Total Mean Non-native Grass Species Cover		***0.0%***				
Total Cover by All Herbaceous Species		***2.0%***				
Total Mean All Vegetative Cover		***5.0%***				
Total Mean Native Vegetative Cover		***5.0%***			***99.7%***	
Total Mean Bare ground		***95.0%***				

*non-native species
HMP species in bold

Table 6-35
2013 - 2014 Range 47 Subarea B Cover and Frequency of Plant Species
after Large-scale Excavation (No controls)

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Post-activity Data 2014 (Year 2)				
		42 Quadrats in Range 47 Subarea B (no controls)				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Percent Cover	Frequency
Shrub and Subshrub Species						
Acmispon glaber	deerweed	2.8%	5.4%	1.4%	20.2%	47.6%
Adenostoma fasciculatum	chamise	1.1%	3.9%	1.0%	7.8%	19.0%
Arctostaphylos pumila	**sandmat manzanita**	0.1%	0.4%	0.1%	0.6%	4.8%
Arctostaphylos tomentosa	shaggy-barked manzanita	0.3%	1.0%	0.3%	2.0%	21.4%
Baccharis pilularis	coyote brush	0.4%	1.0%	0.3%	2.7%	19.0%
Ceanothus dentatus	dwarf ceanothus	1.3%	3.6%	0.9%	9.7%	40.5%
Ceanothus rigidus	**Monterey ceanothus**	0.6%	1.5%	0.4%	4.1%	26.2%
Crocanthemum scoparium	rush-rose	0.0%	--	--	0.0%	0.0%
Ericameria ericoides	mock heather, dune heather	0.4%	1.4%	0.4%	3.2%	19.0%
Ericameria fasciculata	**Eastwood's ericameria**	0.1%	0.5%	0.1%	0.5%	4.8%
Eriophyllum confertiflorum	golden yarrow	0.0%	--	--	0.0%	0.0%
Frangula californica subsp. *californica*	California coffee berry	0.0%	--	--	0.0%	0.0%
Lepechinia calycina	pitcher sage	0.0%	--	--	0.0%	0.0%
Lupinus chamissonis	silver bush lupine	0.0%	--	--	0.0%	0.0%
Mimulus aurantiacus	bush monkeyflower	0.0%	--	--	0.0%	0.0%
Salvia mellifera	black sage	1.1%	2.2%	0.6%	7.6%	38.1%
Solanum umbelliferum	blue witch nightshade	0.0%	0.1%	0.0%	0.2%	9.5%
Total Cover by Native Shrub and Subshrub Species		***8.1%***			***59.2%***	
Herbaceous Species						
Acmispon heermannii var. orbicularis	wooly lotus	0.0%	0.2%	0.1%	0.2%	2.4%
Acmispon strigosus	Bishop's lotus	0.0%	0.0%	0.0%	0.0%	2.4%
Amsinckia intermedia	common fiddleneck	0.0%	--	--	--	0.0%
Calandrinia ciliata	red maids	0.0%	--	--	--	0.0%
Camissoniopsis cheiranthifolia	beach-primrose	0.0%	0.0%	0.0%	0.1%	14.3%
Camissoniopsis micrantha	small suncups	**0.0%**	**--**	**--**	**--**	**0.0%**
Cardionema ramosissimum	sand mat	0.0%	0.0%	0.0%	0.0%	2.4%
Carex globosa	round-fruited sedge	0.0%	0.1%	0.0%	0.1%	4.8%
Caulanthus lasiophyllus	California mustard	0.0%	0.0%	0.0%	0.0%	2.4%
Chorizanthe diffusa	diffuse chorizanthe	0.0%	0.0%	0.0%	0.0%	4.8%
Crassula connata	pygmy weed	0.0%	--	--	--	0.0%
Cryptantha micromeres	small-flowered cryptantha	0.0%	0.0%	0.0%	0.1%	7.1%
Cryptantha sp.	cryptantha	0.0%	--	--	--	0.0%
Daucus pusillus	rattlesnake weed	0.0%	0.0%	0.0%	0.0%	4.8%
Deinandra increscens subsp. increscens	coast tarweed	0.3%	0.8%	0.2%	2.1%	52.4%
Deschampsia danthonioides	annual hairgrass	0.0%	--	--	--	0.0%
Descurainia pinnata	western tansymustard	0.0%	--	--	--	0.0%
Epilobium ciliatum subsp. ciliatum	willow-herb	0.0%	0.0%	0.0%	0.0%	4.8%
Erigeron canadensis	horseweed	0.6%	0.7%	0.2%	4.0%	97.6%
Eschscholzia californica	California poppy	0.0%	0.0%	0.0%	0.0%	2.4%
Festuca octoflora	six-weeks fescue	0.0%	--	--	--	0.0%
Gamochaeta ustulata	purple cudweed	0.0%	--	--	--	0.0%
Horkelia cuneata var *cuneata*	coast horkelia, wedge-leaved horkelia	0.0%	--	--	--	0.0%
Navarretia hamata subsp. *parviloba*	hooked navarretia	0.0%	0.1%	0.0%	0.3%	42.9%
Navarretia intertexta	needle-leaved navarretia	0.0%	0.0%	0.0%	0.0%	4.8%
Pectocarya penicillata	winged combseed	0.0%	--	--	--	0.0%

Table 6-35
2013 - 2014 Range 47 Subarea B Cover and Frequency of Plant Species
after Large-scale Excavation (No controls)

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Post-activity Data 2014 (Year 2)				
		42 Quadrats in Range 47 Subarea B (no controls)				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Percent Cover	Frequency
Herbaceous Species						
Plagiobothrys collinus var. fulvescens	rusty-haired popcorn flower	0.0%	--	--	--	0.0%
Plantago erecta	California plantain	0.0%	0.0%	0.0%	0.1%	9.5%
Potentilla glandulosa	sticky cinquefoil	0.0%	--	--	--	0.0%
Potentilla sp	cinqefoil	0.0%	0.1%	0.0%	0.1%	2.4%
Pseudognaphalium beneolens	fragrant everlasting	0.5%	0.8%	0.2%	3.5%	71.4%
Pseudognaphalium canescens	white everlasting	0.0%	0.1%	0.0%	0.1%	4.8%
Pseudognaphalium ramosissimum	pink everlasting	0.2%	1.2%	0.3%	1.8%	7.1%
Pseudognaphalium stramineum	cottonbatting plant	3.6%	16.2%	4.2%	25.8%	11.9%
Sagina apetela	sticky pearlwort	0.0%	0.0%	0.0%	0.0%	2.4%
Sagina decumbens subsp. *occidentalis*	western pearlwort	0.0%	0.0%	0.0%	0.0%	2.4%
Stylocline gnaphaliodes	everlasting neststraw	0.0%	--	--	--	0.0%
Nuttallanthus texanus	toad-flax	0.0%	0.0%	0.0%	0.0%	4.8%
Total Cover by Native Herbaceous Species		***5.3%***			***38.9%***	
*Aira caryophyllea**	common silver-hair grass	0.1%	0.3%	0.1%	1.0%	54.8%
*Agrostis stolonifera**	creeping bentgrass	0.0%	0.0%	0.0%	0.0%	4.8%
*Bromus madritensis subsp. rubens**	red brome	0.0%	0.0%	0.0%	0.0%	2.4%
*Carpobrotus edulis**	hottentot fig/ice plant	0.0%	0.0%	0.0%	0.1%	16.7%
*Centaurea melitensis**	tocalote	0.0%	0.0%	0.0%	0.0%	4.8%
*Cerastium glomeratum**	mouse-eared chickweed	0.0%	0.0%	0.0%	0.1%	7.1%
*Erigeron sumatrensis**	tropical horseweed	0.0%	0.1%	0.0%	0.1%	9.5%
*Erodium cicutarium**	red-stemmed filaree	0.0%	0.0%	0.0%	0.1%	7.1%
*Euphorbia peplus**	petty spurge	0.0%	0.0%	0.0%	0.0%	2.4%
*Logfia gallica**	narrow-leaved filago	0.0%	--	--	--	0.0%
*Polypogon interruptus**	ditch beard grass	0.0%	0.0%	0.0%	0.0%	4.8%
*Polypogon monspeliensis**	rabbitsfoot grass	0.0%	0.0%	0.0%	0.1%	9.5%
*Rumex acetosella**	sheep sorrel	0.0%	0.1%	0.0%	0.1%	7.1%
*Silene gallica**	windmill pink	0.0%	0.0%	0.0%	0.0%	4.8%
Sonchus asper subsp. *asper**	prickly sow-thistle	0.0%	0.0%	0.0%	0.1%	9.5%
*Sonchus oleraceus **	common sow-thistle	0.0%	0.0%	0.0%	0.1%	4.8%
*Spurgilaria rubra**	red sand-spurrey	0.0%	0.0%	0.0%	0.0%	2.4%
Total Cover by Non-native Herbaceous Species		***0.3%***			***1.9%***	
Total Mean Non-native Grass Species Cover		***0.2%***				
Total Cover by All Herbaceous Species		***5.6%***				
Total Mean All Vegetative Cover		***13.7%***				
Total Mean Native Vegetative Cover		***13.4%***			***98.1%***	
Total Mean Bare ground		***86.3%***				

*non-native species
HMP species in bold

Table 6-36
Range 47 Subarea A Cover and Frequency of Plant Species
after Large-scale Excavation

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Post-activity Data 2013 (Year 1)				
		6 Quadrats in Range 47 Subarea A				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Percent Cover	Frequency
Shrub and Subshrub Species						
Acmispon glaber	deerweed	0.0%	0.0%	0.0%	0.7%	90.5%
Adenostoma fasciculatum	chamise	0.2%	0.4%	0.1%	8.8%	83.3%
Arctostaphylos tomentosa	shaggy-barked manzanita	0.0%	--	--	0.0%	0.0%
Baccharis pilularis	coyote brush	0.0%	--	--	0.0%	0.0%
Ceanothus dentatus	dwarf ceanothus	0.4%	0.5%	0.1%	22.0%	73.8%
Ceanothus rigidus	**Monterey ceanothus**	0.0%	0.0%	0.0%	0.7%	64.3%
Crocanthemum scoparium	rush-rose	0.1%	0.1%	0.0%	4.2%	42.9%
Ericameria ericoides	mock heather, dune heather	0.0%	0.0%	0.0%	1.3%	59.5%
Ericameria fasciculata	**Eastwood's ericameria**	0.0%	0.0%	0.0%	0.7%	50.0%
Eriophyllum confertiflorum	golden yarrow	0.1%	0.2%	0.1%	5.7%	52.4%
Frangula californica subsp. *californica*	California coffee berry	0.0%	0.0%	0.0%	0.7%	45.2%
Lupinus chamissonis	silver bush lupine	0.0%	--	--	0.0%	0.0%
Mimulus aurantiacus	bush monkeyflower	0.1%	0.1%	0.0%	2.9%	21.4%
Salvia mellifera	black sage	0.1%	0.1%	0.0%	2.9%	4.8%
Total Cover by Native Shrub and Subshrub Species		***1.0%***			***50.4%***	
Herbaceous Species						
Acmispon strigosus	Bishop's lotus	0.1%	0.2%	0.1%	5.1%	88.1%
Amsinckia intermedia	common fiddleneck	0.1%	0.1%	0.0%	6.6%	81.0%
Cardionema ramosissimum	sand mat	0.0%	--	--	0.0%	0.0%
Deinandra increscens subsp. increscens	grassland tarweed	0.0%	0.0%	0.0%	0.7%	61.9%
Erigeron canadensis	horseweed	0.0%	--	--	0.0%	0.0%
Heterotheca grandifolia	telegraph weed	0.2%	0.3%	0.1%	8.8%	33.3%
Horkelia cuneata var *cuneata*	coast horkelia, wedge-leaved horkelia	0.3%	0.4%	0.1%	17.6%	28.6%
Navarretia hamata subsp. *parviloba*	hooked navarretia	0.1%	0.2%	0.1%	5.7%	16.7%
Navarretia intertexta	needle-leaved navarretia	0.0%	--	--	0.0%	0.0%
Potentilla glandulosa	sticky cinquefoil	0.1%	0.2%	0.1%	4.4%	9.5%
Potentilla sp	cinqefoil	0.0%	--	--	0.0%	0.0%
Pseudognaphalium beneolens	fragrant everlasting	0.0%	--	--	0.0%	0.0%
Pseudognaphalium sp	everlasting	0.0%	--	--	0.0%	0.0%
Pseudognaphalium stramineum	cottonbatting plant	0.0%	0.0%	0.0%	0.7%	7.1%
Total Cover by Native Herbaceous Species		***0.9%***			***49.6%***	
*Aira caryophyllea**	common silver-hair grass	0.0%	--	--	0.0%	0.0%
*Euphorbia peplus**	petty spurge	0.0%	--	--	0.0%	0.0%
Sonchus asper subsp. *asper**	prickly sow-thistle	0.0%	--	--	0.0%	0.0%
Total Cover by Non-native Herbaceous Species		***0.0%***			***0.0%***	
Total Mean Non-native Grass Species Cover		***0.0%***				
Total Cover by All Herbaceous Species		***0.9%***				
Total Mean All Vegetative Cover		***1.9%***				
Total Mean Native Vegetative Cover		***1.9%***			***100.0%***	
Total Mean Bare ground		***98.1%***				

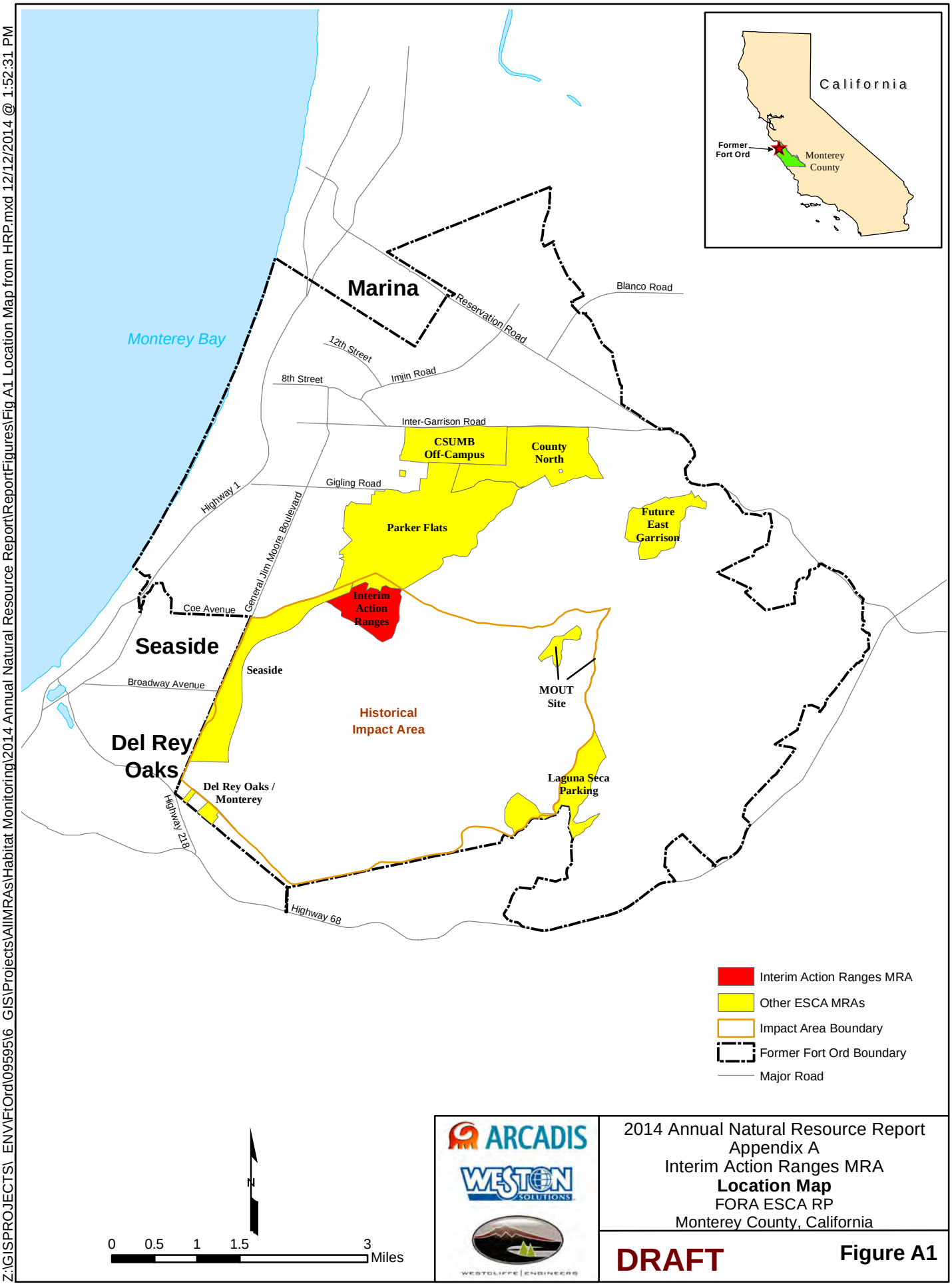
*non-native species
HMP species in bold

Table 6-36
Range 47 Subarea A Cover and Frequency of Plant Species
after Large-scale Excavation

ESCA RP 2014 Annual Natural Resource Report - Appendix A

Scientific Name	Common Name	Post-activity Data 2014 (Year 2)				
		6 Quadrats in Range 47 Subarea A				
		Mean Percent Cover	Standard Deviation	90% Confidence Interval	Relative Percent Cover	Frequency
Shrub and Subshrub Species						
Acmispon glaber	deerweed	1.4%	2.5%	2.0%	7.0%	50.0%
Adenostoma fasciculatum	chamise	0.3%	0.8%	0.7%	1.7%	16.7%
Arctostaphylos tomentosa	shaggy-barked manzanita	0.2%	0.3%	0.2%	0.9%	33.3%
Baccharis pilularis	coyote brush	0.0%	0.0%	0.0%	0.1%	16.7%
Ceanothus dentatus	dwarf ceanothus	8.0%	7.7%	6.3%	41.2%	66.7%
Ceanothus rigidus	**Monterey ceanothus**	0.5%	0.7%	0.6%	2.3%	33.3%
Crocanthemum scoparium	rush-rose	0.9%	1.1%	0.9%	4.7%	50.0%
Ericameria ericoides	mock heather, dune heather	0.2%	0.5%	0.4%	1.1%	16.7%
Ericameria fasciculata	**Eastwood's ericameria**	0.3%	0.5%	0.4%	1.3%	33.3%
Eriophyllum confertiflorum	golden yarrow	0.5%	0.8%	0.6%	2.6%	50.0%
Frangula californica subsp. *californica*	California coffee berry	0.0%	0.0%	0.0%	0.1%	16.7%
Lupinus chamissonis	silver bush lupine	0.3%	0.6%	0.5%	1.3%	16.7%
Mimulus aurantiacus	bush monkeyflower	0.1%	0.2%	0.2%	0.5%	33.3%
Salvia mellifera	black sage	0.3%	0.7%	0.6%	1.7%	50.0%
Total Cover by Native Shrub and Subshrub Species		***13.0%***			***66.4%***	
Herbaceous Species						
Acmispon strigosus	Bishop's lotus	0.0%	--	--	0.0%	0.0%
Amsinckia intermedia	common fiddleneck	0.0%	--	--	0.0%	0.0%
Cardionema ramosissimum	sand mat	0.0%	0.0%	0.0%	0.1%	16.7%
Deinandra increscens subsp. increscens	grassland tarweed	2.1%	5.1%	4.2%	10.7%	33.3%
Erigeron canadensis	horseweed	0.1%	0.1%	0.0%	0.3%	66.7%
Heterotheca grandifolia	telegraph weed	0.2%	0.2%	0.2%	0.8%	66.7%
Horkelia cuneata var *cuneata*	coast horkelia, wedge-leaved horkelia	3.1%	4.2%	3.4%	15.8%	50.0%
Navarretia hamata subsp. *parviloba*	hooked navarretia	0.0%	0.0%	0.0%	0.1%	16.7%
Navarretia intertexta	needle-leaved navarretia	0.0%	0.0%	0.0%	0.1%	16.7%
Potentilla glandulosa	sticky cinquefoil	0.0%	--	--	0.0%	0.0%
Potentilla sp	cinqefoil	0.6%	1.5%	1.3%	3.2%	16.7%
Pseudognaphalium beneolens	fragrant everlasting	0.2%	0.5%	0.4%	1.1%	16.7%
Pseudognaphalium sp	everlasting	0.2%	0.3%	0.2%	0.8%	50.0%
Pseudognaphalium stramineum	cottonbatting plant	0.0%	--	--	0.0%	0.0%
Total Cover by Native Herbaceous Species		***6.5%***			***33.0%***	
*Aira caryophyllea**	common silver-hair grass	0.0%	0.1%	0.0%	0.2%	33.3%
*Euphorbia peplus**	petty spurge	0.1%	0.1%	0.0%	0.3%	66.7%
Sonchus asper subsp. *asper**	prickly sow-thistle	0.0%	0.0%	0.0%	0.1%	16.7%
Total Cover by Non-native Herbaceous Species		***0.1%***			***0.6%***	
Total Mean Non-native Grass Species Cover		***0.0%***				
Total Cover by All Herbaceous Species		***6.6%***				
Total Mean All Vegetative Cover		***19.5%***				
Total Mean Native Vegetative Cover		***19.4%***			***99.4%***	
Total Mean Bare ground		***80.5%***				

*non-native species
HMP species in bold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California
Former Fort Ord
Monterey County
Monterey Bay
Marina
Seaside
Del Rey Oaks
Blanco Road
Reservation Road
12th Street
8th Street
Imjin Road
Inter-Garrison Road
Gigling Road
Highway 1
General Jim Moore Boulevard
Coe Avenue
Broadway Avenue
Highway 218
Highway 68
CSUMB Off-Campus
County North
Parker Flats
Future East Garrison
Interim Action Ranges
Seaside
Historical Impact Area
MOUT Site
Laguna Seca Parking
Del Rey Oaks / Monterey
Interim Action Ranges MRA
Other ESCA MRAs
Impact Area Boundary
Former Fort Ord Boundary
Major Road
N
0 0.5 1 1.5 3
Miles
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2014 Annual Natural Resource Report
Appendix A
Interim Action Ranges MRA
Location Map
FORA ESCA RP
Monterey County, California
DRAFT
Figure A1

EUCALYPTUS ROAD

EUCALYPTUS ROAD

BD3+
192SSW+
BD2+
BD7+
BD6+
NWR47Ref2+
17-2+
BD5+
NWR47Ref1+
SCA47-2+
T14
T15
R47-03
SCA47-1+
R47-04
R47-02
R47-06
R47-01
R47-10
R47-05
T12
18-1+
R47-09
BD1+
BF1+
R47-07
SCA47-3+
R47-08
BA5+
BF4+
BF3+
T16
BG3+
NCA44-2+
NCA44-1+
BG-4+
T11
T2
T1
T6
T3
T9
T8
T14
BG-20+
BG1+
BE11+
BF6+
T113
SCA44-1+
SCA44-2+
T10
BE20+
T5
T7
T105
T106
T110
T107
T109
T102
T111
T101
T108
T103
T112
T104
21-1+
21-2+
BE10+

2 km California Tiger Salamander Buffer

Document Path: Z:\GISPROJECTS_ENV\FtOrd\095956_GIS\Projects\AllMRAs\Habitat Monitoring\2014 Annual Natural Resource Report\ReportFigures\Fig A2 IAR Monitoring Locations and Veg Comm.mxd

Legend

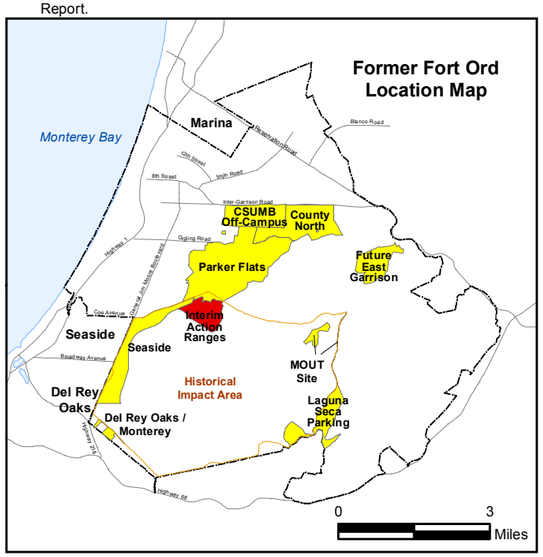
- Munitions Response Area
- Major Road
- Development Parcel
- Improved Ingress/Egress Established by ESCA RP Team
- Site 39 (HA44) US Army Action
- North Range 44 SCA
- South Range 44 SCA/Central Area NCA
- Range 47 SCA
- 2014 Vegetation Transects (Monitored Annually per HRP)
- Baseline Transects
- Borderland Interface
- 100-Foot Buffer from Borderland Interface
- 2014 HMP Herbaceous Species Survey Areas
- 2014 Reference Populations

Note: + = baseline transect

Vegetation Types*

- Grassland
- Central Maritime Chaparral

*Source: Flora and Fauna Baseline Study of Fort Ord, California, Jones and Stokes Association Inc., December 1992. Vegetation mapping modified from 2011 Annual Natural Resource Report.



Aerial Source: Google Earth Pro, Accessed 4/17/2014 - Image Date: 8/25/2013

N

0 400 800 Feet

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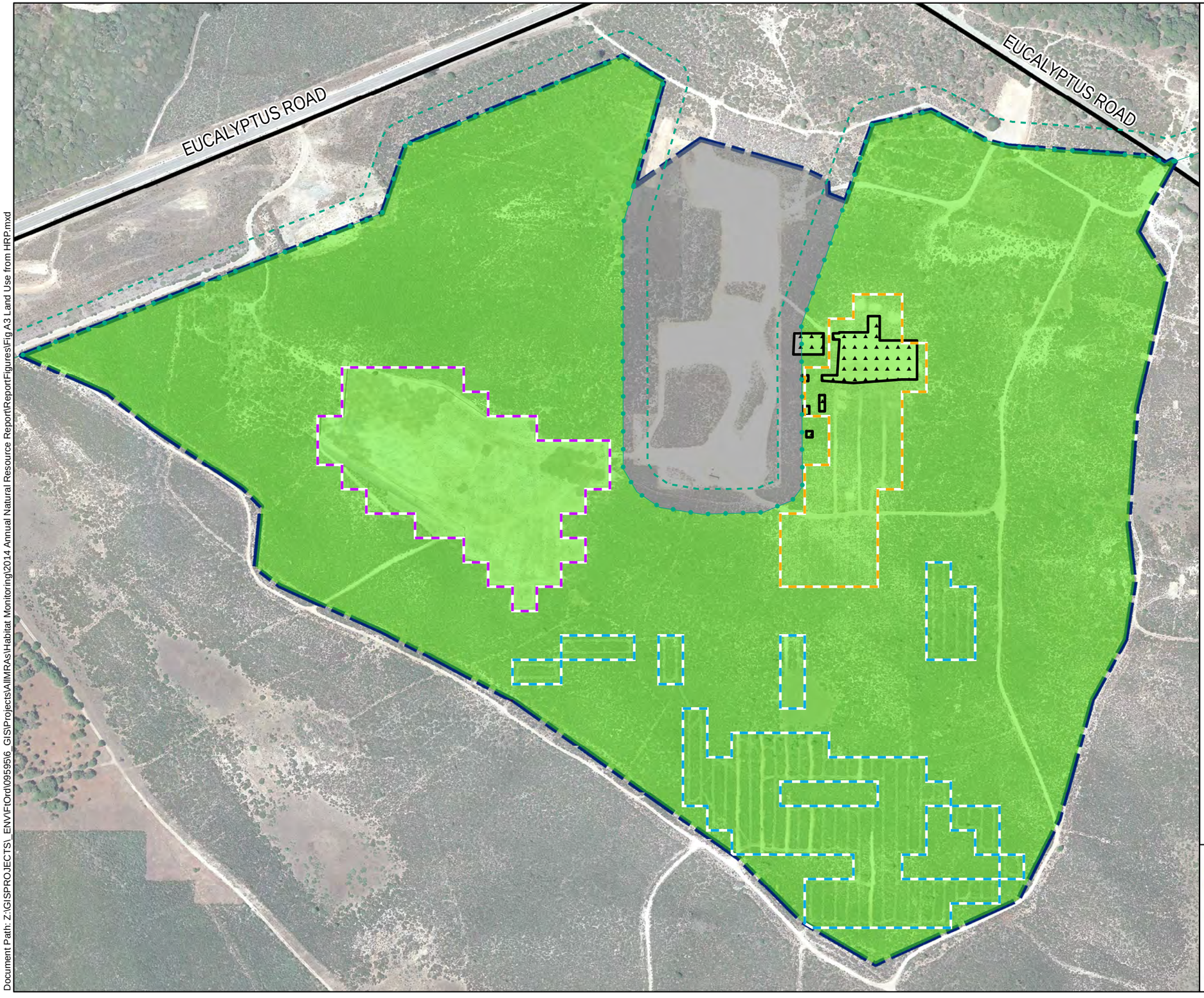
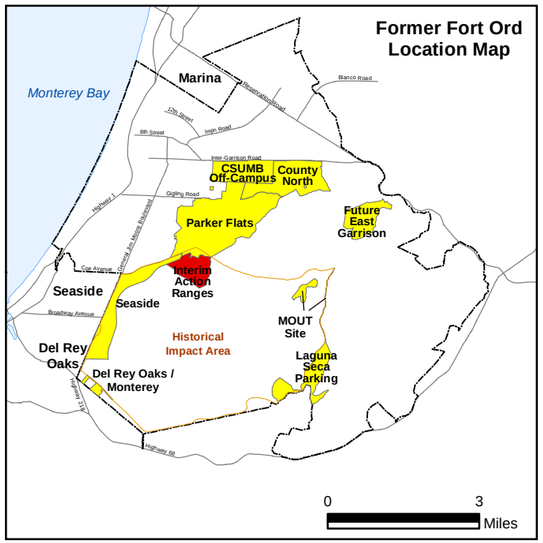
Appendix A
Interim Action Ranges MRA
Vegetation Monitoring and HMP Herbaceous Survey Locations
FORA ESCA RP
Monterey County, California

Figure A2



Legend

- Munitions Response Area
- Major Road
- Site 39 (HA44) US Army Action
- North Range 44 SCA
- South Range 44 SCA/Central Area NCAs
- Range 47 SCA
- Borderland Interface
- 100-Foot Buffer from Borderland Interface
- Habitat Reserve
- Development Parcel



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Accessed 11/21/2014 - Image Date: 8/25/2013

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Appendix A
Interim Action Ranges MRA

Proposed Future Land Use

FORA ESCA RP
Monterey County, California

Figure A3

Document Path: Z:\GIS\PROJECTS_ENV\FTOrd\0095956_GIS\Projects\AllMRAs\Habitat Monitoring\2014 Annual Natural Resource Report\ReportFigures\Fig A3 Land Use from HRP.mxd

EUCALYPTUS ROAD

EUCALYPTUS ROAD

Escarpment

Legend

- Major Road
- Munitions Response Area
- Site 39 (HA44) US Army Action

Monitoring Only

- Monitoring of Improved Ingress/Egress Areas Established by ESCA RP Team
- Monitoring of Vegetation Cutting and Target-specific Areas
- Monitoring of Low-recruitment Escarpment Subject to Small-scale and Target-specific Excavation Areas

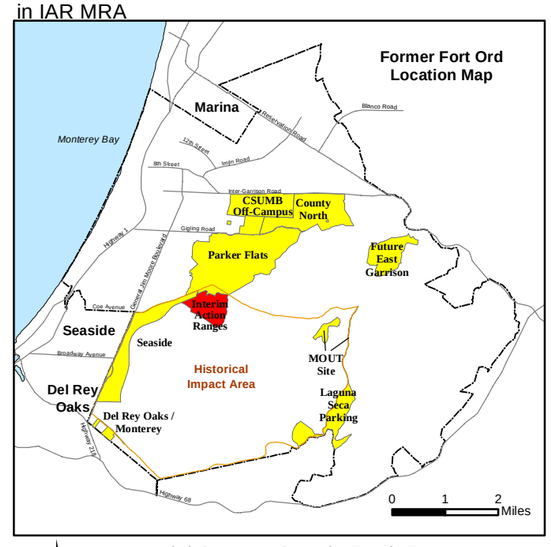
Passive Restoration

- Seeding of Small-scale Excavation Areas
- Topsoil Replacement and Seeding of Large-scale Soil Excavation Area

Active Restoration

- Topsoil Replacement, Seeding, and Container Planting of Large-scale Excavation Area

NOTE: Schematic representation of restoration activities in IAR MRA



Aerial Source: Google Earth Pro,
Accessed 11/21/2014 - Image Date: 8/25/2013

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Appendix A
Interim Action Ranges MRA

Restoration Activities

FORA ESCA RP
Monterey County, California

Figure A4

Document Path: Z:\GIS\PROJECTS_ENV\FtOrd\0959S6_GIS\Projects\AllMRAs\Habitat Monitoring\2014 Annual Natural Resource Report\ReportFigures\Fig A4 IAR Restoration Strategies.mxd

Subarea C

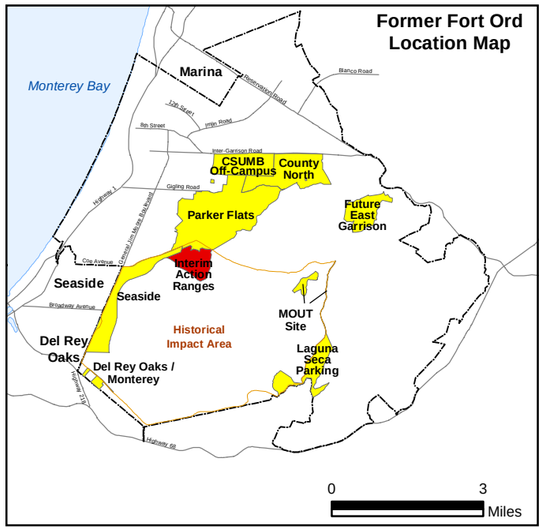
Subarea A

Subarea B

Escarpment

Legend

- Munitions Response Area
- Range 47 SCA
- Subarea A - Topsoil Replacement and Seeding of Large-scale Soil Excavation Area
- Subarea B - Topsoil Replacement, Seeding, and Container Planting of Large-scale Soil Excavation Area
- Subarea C - Vegetation Cutting and Target-specific Areas, and Seeding of Small-scale Excavation Areas
- Subarea C - Low-recruitment Escarpment Subject to Small-scale and Target-specific Excavation Areas



Aerial Source: Google Earth Pro,
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Appendix A
Interim Action Ranges MRA

Range 47 SCA Subareas

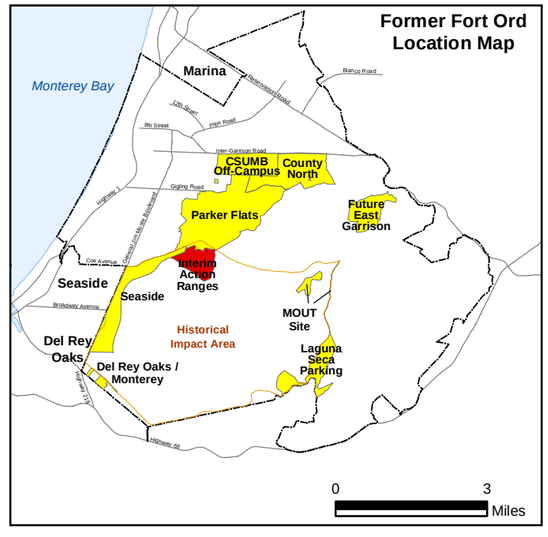
FORA ESCA RP
Monterey County, California

Figure A5

Document Path: Z:\GIS\PROJECTS_ENV\FtOrd\095956_GIS\Projects\AIMRAs\Habitat Monitoring\2014 Annual Natural Resource Report\ReportFigures\Fig A5 IAR_R47_Detail_and_Subareas.mxd

Legend

- Munitions Response Area
- Range 47 Special Case Area
- Soil Moisture Monitoring Locations
- Irrigation Zones
- Sprinkler Head
- Irrigation Valve
- Irrigation piping
- Fence Alignment



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0 125 250 Feet

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Appendix A
Interim Action Ranges MRA

Range 47 Infrastructure

FORA ESCA RP
Monterey County, California

Figure A6

Document Path: Z:\GIS\PROJECTS_ENV\FtOrd\095956_GIS\Projects\AIIMRAs\Habitat Monitoring\2014 Annual Natural Resource Report\ReportFigures\Fig A6 R47 Irrigation System.mxd

Eucalyptus Road (West)

Remove (WEST)

Add 'Eucalyptus Road' label as on A2, A3, A4

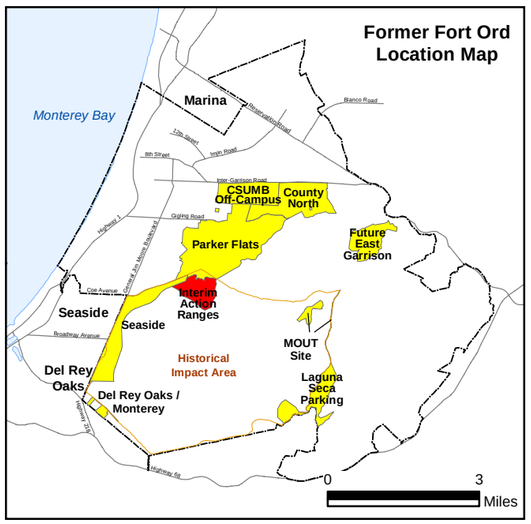
change colors to be able to distinguish between BMP types

Legend

- ajor Road
- unitions Response Area
- orderland Interface
- 100-Foot Buffer from Borderland Interface

Erosion Control Measures

- 2013 Sand Bags/Straw Bales/ Erosion Control Blanket
- 2014 Sand Bags/Straw Bales/ Erosion Control Blanket
- 2013 Silt Fencing
- 2013 Wind Screen
- 2013 Straw Wattles/Water Bars
- 2014 Silt Fencing
- 2014 Straw Wattles/Water Bars
- 2013 Hydromulch Areas
- 2013 Erosion Control Blanket
- 2014 Hydromulch Areas
- 2014 Hydroseed Areas



Aerial Source: Google Earth Pro,
Accessed 11/21/2014 - Image Date: 8/25/2013

0 400 800 Feet

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2014 Annual Natural Resource Report
Appendix A
Interim Action Ranges MRA

Erosion Control BMPs in IAR MRA 2013-2014

FORA ESCA RP
Monterey County, California

Figure A7

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Legend

- Munitions Response Area
- Development Parcel Boundary
- North Range 44 SCA
- South Range 44 SCA/Central Area NCA
- Range 47 SCA

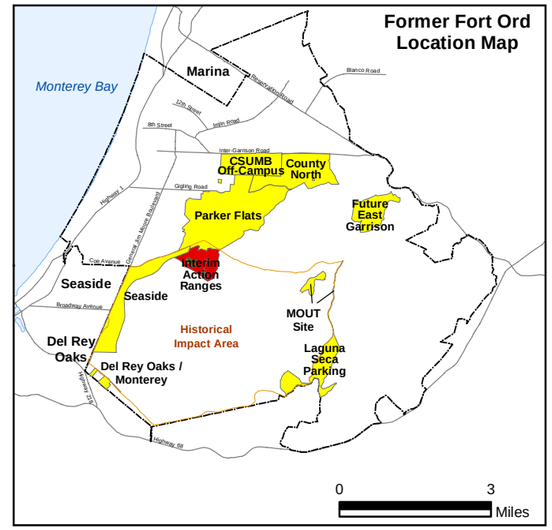
Range 44 Seeding Activities

- Central Maritime Chaparral Seed Mix, with additional Monterey Gilia and Monterey Spineflower Seed
- Same seed mix as above with further addition of Ceanothus Seed Mix and Seaside Bird's-beak Seed

Range 47 Seeding Activities

- Central Maritime Chaparral Seed Mix and Ceanothus Seed Mix and Range 47 Soil Seedbank
- Range 47 Soil Seedbank
- Central Maritime Chaparral Seed Mix and Ceanothus Seed Mix
- Monterey spineflower seedbank
- Monterey spineflower seed
- Monterey gilia container plants
- Monterey gilia seedbank
- Monterey gilia seed

This color needs to match the color on the map



Aerial Source: Google Earth Pro,
Accessed 11/21/2014 - Image Date: 8/25/2013

N

0 200 400
Feet

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2014 Annual Natural Resource Report
Appendix A
Interim Action Ranges MRA
Range 44 and Range 47
2013 Seeding
FORA ESCA RP
Monterey County, California

Figure A8

Document Path: Z:\GISPROJECTS_ENV\FtOrd\0959S6_GIS\Projects\AllMRAs\Habitat Monitoring\2014 Annual Natural Resource Report\ReportFigures\Fig A8 IAR Seeding.mxd

Figure A9
Percent Survival of 16 Planted Species in Range 47 Subarea B.

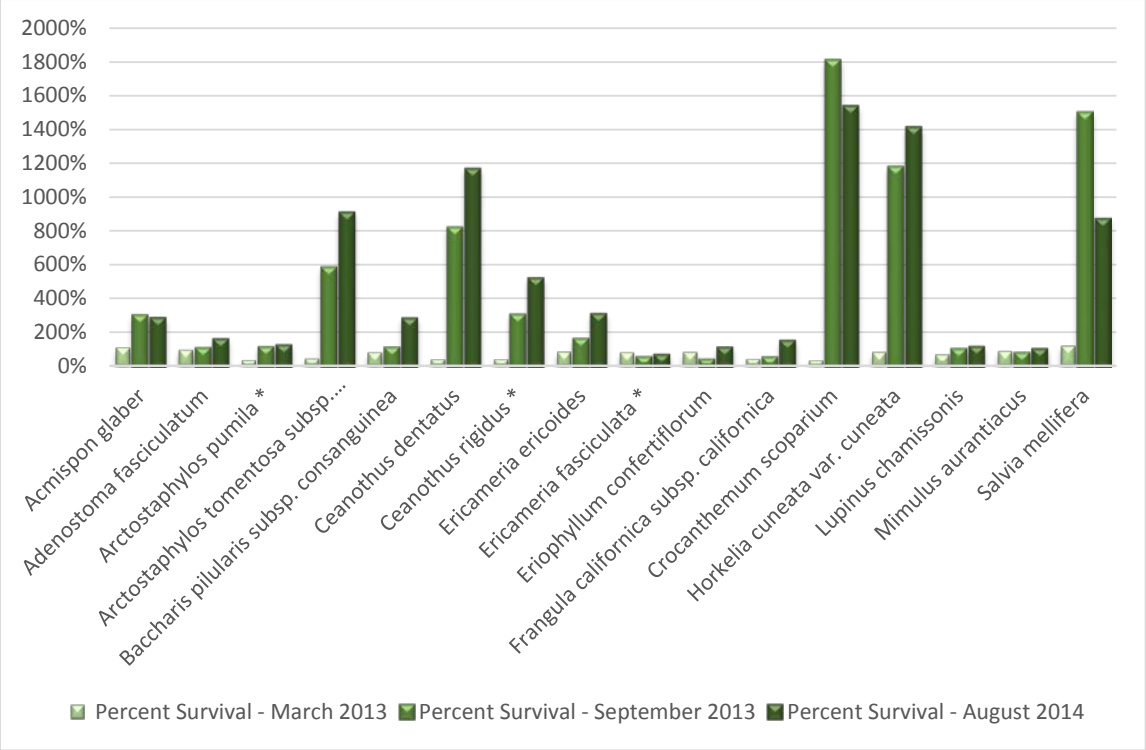
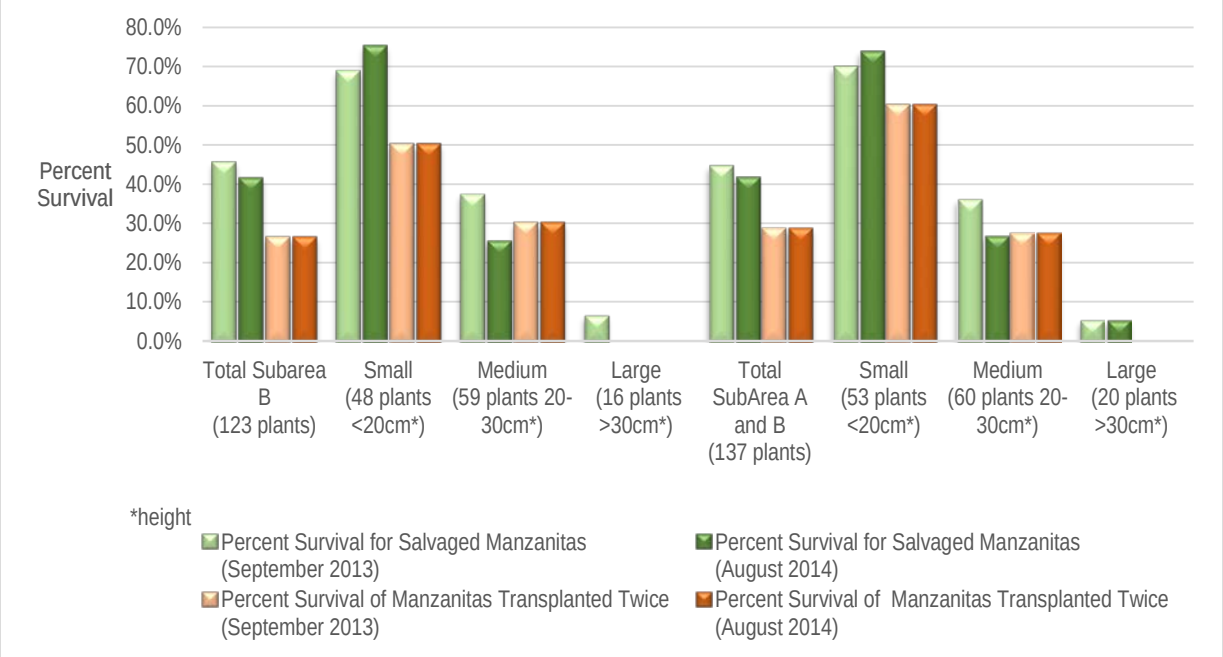


Figure A10
Percent Survival of Shaggy-barked Manzanita Plants Nine Months after Transplanting



Appendix A - IAR MRA Habitat Restoration Photo-documentation

Photograph 1

Interim Action Ranges MRA Range 47 Restoration Area

Restoration area after soil backfilling; looking west.

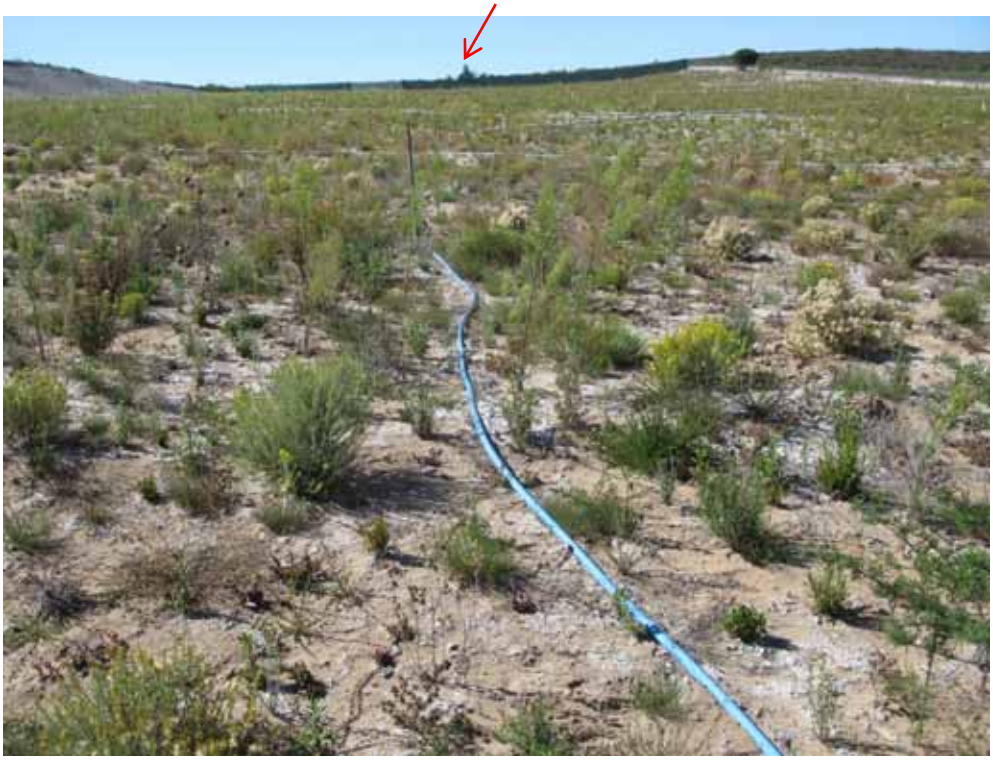
7 January 2013

Photograph 2

Interim Action Ranges MRA Range 47 Restoration Area

After installation of container plants, fencing, irrigation system and erosion control; looking west.

11 April 2013



Photograph 3

Interim Action Ranges MRA Range 47 Restoration Area

First year early fall vegetation; looking west.

25 September 2013

Photograph 4

Interim Action Ranges MRA Range 47 Restoration Area

Winter conditions; looking west.

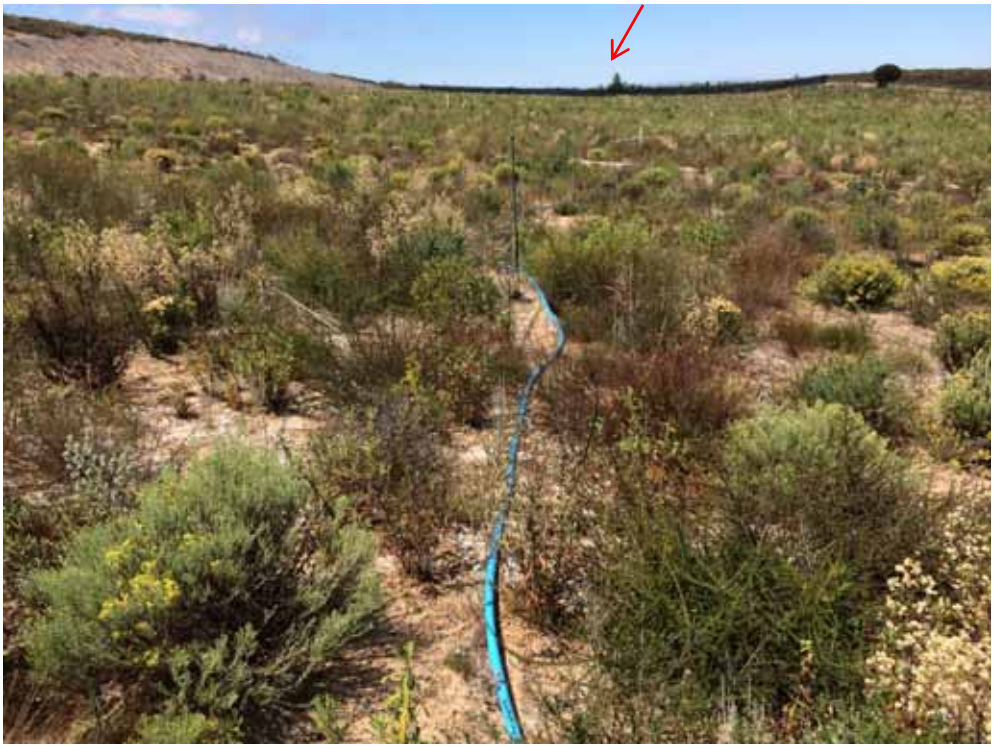
12 February 2014

Photograph 5

Interim Action Ranges MRA Range 47 Restoration Area

Late spring vegetation; looking west.

13 June 2014



Photograph 6

Interim Action Ranges MRA Range 47 Restoration Area

Late summer vegetation; looking west.

25 August 2014

Photograph 7

Interim Action Ranges MRA Range 47 Restoration Area

Undisturbed chaparral in foreground and Range 47 restoration area inside fence, with recently hydroseeded escarpment in background; looking southwest

12 November 2014

Photograph 8

Interim Action Ranges MRA

North Range 44

Three HMP species along a vegetation monitoring transect within a small-scale excavation area. HMP species include seaside bird's-beak (center), sandmat manzanita (center), and sand (Monterey) gilia (right of ¼ m quadrat).

8 May 2014

Photograph 9

Interim Action Ranges MRA North Range 44

Recruits of HMP shrub Eastwood's goldenbush in area subject to vegetation cutting and target-specific investigation.

9 June 2014

Photograph 10

Interim Action Ranges MRA South Range 44

Diminutive sand (Monterey) gilia plants during 2014 monitoring in area subject to small-scale excavation.

8 May 2014