
**Final
Non-Environmental Services Cooperative
Agreement Portion of Ranges 43-48
Biological Monitoring Report
Former Fort Ord**

Prepared for
**Department of the Army
U.S. Army Corps of Engineers**

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Submitted to
**Department of the Army
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Acronyms and Abbreviations

ANOVA	Analysis of Variance
ATV	All Terrain Vehicle
BO	Biological Opinion
Burleson	Burleson Consulting, Inc.
cm	Centimeter
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CNPS	California Native Plant Society
ESCA	Environmental Services Cooperative Agreement
FE	Listed as Endangered by the Federal Endangered Species Act
FORA	Fort Ord Reuse Authority
FOSET	Finding of Suitability for Early Transfer
FSC	Listed as a Species of Concern by the U.S. Fish and Wildlife Service
FT	Listed as Threatened by the Federal Endangered Species Act
ft	Feet
GPS	Global Positioning System
HMP	Habitat Management Plan
L	Left side
m	Meter
p-value	Measure of significance
R	Right side
SE	Listed as Endangered under the California Endangered Species Act
ST	Listed as Threatened under the California Endangered Species Act
t-test	Paired-comparison between means
USACE	U. S. Army Corps of Engineers
USFWS	U. S. Fish and Wildlife Service
VMP	Vegetation Monitoring Protocol

SECTION 1

Introduction

Introduction

In April and July 2008, Burleson Consulting, Inc. (Burleson) conducted the third year of annual botanical monitoring for the Non-Environmental Services Cooperative Agreement (ESCA) Ranges 43-48 site. This report presents the results of biological monitoring conducted at non-ESCA portion of Ranges 43-48 at former Fort Ord, California. Monitoring was completed using methodology presented in the Vegetation Monitoring Protocol (VMP) (Burleson 2006).

Burleson was contracted by the U.S. Army Corps of Engineers (USACE) to complete the annual biological monitoring for the non-ESCA portion of Ranges 43-48 in 2008 (Map 1, Appendix A). Munitions removal work began in December 2003 and was completed by September 2005. To adequately characterize developing vegetation requires monitoring prior to treatment and at years 3, 5, 8, and 13 after treatment for shrub transects, and surveys for annual plants at years 1, 2, 5, and 8 (Burleson 2006). The early monitoring is used to confirm that the vegetation is reestablishing rather than being replaced by weeds. Later monitoring is more widely spaced to allow vegetation to develop and the collection of species composition to provide a diversity snapshot. This was the third annual monitoring completed for this site.

This 2008 biological monitoring study was conducted as a requirement of the *Installation-Wide Multispecies Habitat Management Plan for Former Fort Ord* (HMP) [United States Army Corps of Engineers 1997] and biological opinions (BO) issued by the United States Fish and Wildlife Service (USFWS) [1999, 2002, and 2005]. The HMP identifies rare, threatened, or endangered species and habitats designated for protection and future management after completion of munitions removal and other clean-up operations. The HMP also outlines mitigation measures necessary if Army-related munitions cleanup activities have significantly impacted rare species and habitats. The project involved monitoring for HMP annuals, shrubs, and exotic plants. The VMP (Burleson 2006) recommends the monitoring be performed for rare species following completion of the munitions cleanup on each site designated to be managed as future habitat for HMP-listed species over an 8 year period for annuals and a 13 year period for shrubs to evaluate success of habitat recovery. Annual monitoring results may be used for comparison with a site's baseline data to assess whether recovery and regeneration of the habitat and its associated rare plant species are proceeding toward baseline conditions.

In 2005, Parsons completed the annual monitoring for the Ranges 43-48 site. Fort Ord Reuse Authority (FORA) requested the transfer of a portion of Ranges 43-48 at the former Fort Ord, California, pursuant to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 120(h)(3)(C) in a letter dated May 18, 2005. These types of transfers under CERCLA Section 120(h)(3)(C) are typically called "Early Transfers," in which the United States will provide the warranty after property transfer when all the response actions necessary to protect human health and the environment have been taken.

The intent is to facilitate efforts to stimulate the economy through productive reuse of the property while final remediation work is being conducted. The Finding of Suitability for Early Transfer (FOSET) 5 documented the environmental suitability of certain parcels or property at the former Fort Ord, California for early transfer to FORA, consistent with CERCLA Section 120(h) and Department of Defense policy. Therefore, this study only monitored the 273 acres of Ranges 43-48 that were retained by the former Fort Ord, referred to as the non-ESCA portion of Ranges 43-48.

1.1 Site Description

The non-ESCA portion of Ranges 43-48 Munitions Removal Site encompasses approximately 273 acres at the north end of the impact area on former Fort Ord, located about eight miles north of Monterey, California (Maps 1 and 2, Appendix A). The site is designated for future management as habitat for rare, threatened, or endangered species.

The vegetation type in the Ranges 43–48 site is primarily central maritime chaparral with patches of annual grasslands along the site’s west, east, and south boundaries. Central maritime chaparral is a vegetation type protected under the HMP because of its association with significant numbers of rare, threatened, and endangered species. Terrain over most of the site consists of rolling hills with elevations ranging from 375 to 550 feet (ft).

1.2 Species Included in 2005 Habitat and Rare Species Monitoring

The primary habitat of concern on the Ranges 43-48 Munitions Removal Site is central maritime chaparral. Species that were monitored encompassed a variety of central maritime chaparral species including many that are rare, threatened, or endangered and are listed in the HMP. These plant species, listed in Table 1 of Appendix C, include a variety of shrub and annual plants such as sandmat manzanita (*Arctostaphylos pumila*), Monterey ceanothus (*Ceanothus cuneatus* var. *rigidus*), Eastwood’s golden fleece (*Ericameria fasciculata*), sand gilia (*Gilia tenuiflora* ssp. *arenaria*), Monterey spineflower (*Chorizanthe pungens* var. *pungens*), and seaside bird’s-beak (*Cordylanthus rigidus* ssp. *littoralis*). Ranges 43-48 is within designated critical habitat for Monterey spineflower (*Chorizanthe pungens* var. *pungens*). Since there are no wetland areas on the site, wetland species are not considered in this report.

1.3 Previous Surveys Conducted on the Site

- | | |
|---------------|--|
| 1999 and 2000 | Eighty transects were established on the site, including the portion of Ranges 43-48 transferred to FORA, over a two year period (USACE 2000) to capture baseline shrub percent cover and diversity on the site, prior to the prescribed burn or munitions-removal activities. |
| 2000 | Surveys were completed for three rare HMP annuals (sand gilia, Monterey spineflower, and seaside bird’s-beak). |

- 2001 – 2003 No surveys were conducted because Army remedial actions had not occurred.
- 2003 Prescribed burn was conducted in October.
- 2004 MACTEC conducted a survey for rare HMP annuals: sand gilia, Monterey spineflower, and seaside bird's-beak. No vegetation transect data were collected, since it was only a few months following the burn, and there was insufficient regeneration of shrubs to provide adequate assessment of shrub recovery (USACE 2004).
- 2005 Parsons completed the annual biological surveys for the Ranges 43-48 site. The survey focused on rare HMP annuals: sand gilia, seaside bird's-beak, and Monterey spineflower. For Monterey spineflower, only presence/absence data were collected because the plants grow low to the ground in mats and often individuals cannot be distinguished. The first year of transect monitoring for shrubs and perennials was also conducted.
- 2008 This report includes survey results for rare HMP annuals: sand gilia, seaside bird's-beak, and Monterey spineflower within the non-ESCA portion of Ranges 43-48. Although this was the second shrub transect survey, it is the first event at year three per the VMP. The survey results for the ESCA property are included in a separate 2008 monitoring report.

1.4 2008 Annual HMP Species Surveys

Burleson conducted surveys for three rare annual species: sand gilia, seaside bird's-beak, and Monterey spineflower. Monitoring of sand gilia and Monterey spineflower was conducted from April 28 through April 30, 2008 and monitoring of seaside bird's-beak was conducted on July 28, 2008. Density data were collected within a sub-sample of plots that were randomly selected from areas known to have previously contained HMP annuals.

1.5 2008 Central Maritime Chaparral Shrub/Perennial Monitoring

Central maritime chaparral monitoring of shrubs and perennials was conducted from July 28 through July 31, 2008. Data were collected on percent cover of maritime chaparral shrub and perennial species along forty-one 50-meter (m) transects that were established in the two years prior to the prescribed burn. This survey was the second season of shrub monitoring since the site was burned in October 2003.

1.5.1 Effect of Work-Related Disturbances to Maritime Chaparral Species

Part of the goal of monitoring on Fort Ord is to be able to examine trends in recovery of health and diversity of rare habitats, such as maritime chaparral, following cleanup activities. In 2005, Parsons conducted monitoring at the site and compared data between two areas within Ranges 43-48 that received different levels of treatment. The site, including the portion transferred to FORA, was divided into two zones, Zone A and Zone B. Zone A received a complete munitions removal up to 4ft in depth on 256 acres (Map 2, Appendix A).

The remaining 229 acres, Zone B, received only a surface munitions removal. The munitions-removal activities occurring in each zone are described below.

Zone A Munitions Removal Activities:

- a) Burned completely.
- b) Burned plant stems were cut to a height of 6 inches using a large tracked excavator modified with a mowing head.
- c) Surface clearance of munitions and explosives of concern by visual search (walking).
- d) Munitions removal of ferrous items using the Shoenstedt GA-52Cx analog magnetometer, and excavation of all anomalies encountered ranging from depths of a few inches to more than 4ft.
- e) Digital geophysical surveying of all grids to locate remaining non-ferrous and ferrous anomalies encountered. Digital geophysical surveys involved driving over terrain with a “towed array” setup, a two-wheeled cart pulled by either an all terrain vehicle (ATV) or a small tractor. In some areas an EM-61 was pulled by hand.
- f) Global Positioning System (GPS) was used by re-acquisition teams who walked each grid to flag locations for digitally acquired anomalies.
- g) Excavation teams revisited each grid and conducted another dig phase, varying from a few items to 200-plus additional digs per grid and with the depth again ranging from a few inches to 4ft or more.
- h) Backhoe excavations were performed on areas where digs were deeper or more extensive than could be done by hand.

Zone B Treatments:

- a) Burned completely.
- b) Burned plant stems were cut to a height of 6 inches using a large tracked excavator modified with a mowing head.
- c) Surface clearance of munitions and explosives of concern by visual search (walking).

Zone A received many disturbances over a period of 24 months to complete a thorough investigation of all metal items below ground. Each area of the site had multiple periods of disturbance, by trampling, driving with an ATV or tracked vehicle, and a large number of ground excavations. Zone B received few disturbances, and no digging or excavations.

Disturbance levels were different between the two areas, providing “treatment areas” that may indicate trends for whether intensive disturbance by trampling and excavation affects the rare annual plants and chaparral shrub regeneration.

1.5.2 Effect of Vegetation Age on Recovery of Maritime Chaparral Species

The initial 2000 study divided transects into three groups based on estimated age of chaparral stands: disturbed, intermediate, or mature. The transect study results for 2008 were grouped by these three classes to examine trends in species recovery related to chaparral age.

Methods

2.1 Methods for Sand Gilia, Monterey Spineflower, and Seaside Bird's-Beak Monitoring

Burleson monitored for abundance of HMP annuals within a randomly selected sub-sample of grids previously occupied by HMP annuals at the non-ESCA portion of Ranges 43-48 (see Maps 3, 4, and 5). Monitoring was completed using the methodology presented in the VMP (Burleson 2006) and the 2005 Annual Biological Monitoring Report (USACE 2005).

The sand gilia and Monterey spineflower populations were surveyed on April 28, 29, and 30, 2008 during the peak bloom period for these species. The site was subdivided into 100-ft square grids for ease of field orientation. These markers provided the reference point for assessing densities. Twenty percent of the previously occupied 100- by 100-ft grids were randomly selected and surveyed for each of the HMP annuals. The surveys were conducted within a circular plot by scribing a 2.5-m radius around a point within the 100- by 100-ft grid. The center point of a circle plot was placed within a homogeneous concentration of the HMP annuals to determine the density within areas of representative habitat. The density of HMP annuals within the 100- by 100-ft grid was determined by extrapolating density of annuals within the circle plots. Each 100-ft grid was assigned a density class based on the number of individual plants per grid as follows:

- 0 = 0
- 1 = 1 to 50
- 2 = 51 to 100
- 3 = 101 to 500
- 4 = >500

Density of plants per 100- by 100-ft plot were estimates made by multiplying the density of annuals within the circle plots by the amount of suitable habitat present in the plots. The area of suitable habitat for each 100- by 100-ft plot was determined using the average area of bare ground measured during the transect surveys, which was 20.67 percent.

Seaside bird's-beak was surveyed later in the season (July 28) during the peak bloom for this species, using the same protocol as for sand gilia and Monterey spineflower. Areas for seaside bird's-beak were based on the known population boundaries established during 2005. The population size and distribution for each species is listed in Table 2 of Appendix C.

Analysis was conducted by Analysis of Variance (ANOVA) when testing between multiple means and testing between groups with a paired-comparison between means (t-test). The statistical significance (p) of the t-test is illustrated by $p < 0.05$. The p-value of 0.05 (i.e., 1/20) indicates that there is less than 5% probability that the relation between the variables occurred by pure chance.

2.3 Methods for Vegetation Transect Sampling

Vegetation transect sampling was conducted between July 28 and July 31, 2008. The line-intercept method was used to collect percent cover data for the fifth year post-burn as described in the VMP (Burleson 2006). This method differed from the 2005 method because at 22 months after the burn, many shrub and perennial seedlings were still quite small and the abundance of seedlings was determined to better represent the progress of species' regeneration than would percent cover measurements.

The 2000 baseline transect locations were monitored during this 2008 event. A 50m measuring tape was laid between the transect endpoints and the maritime chaparral shrubs and perennial species were measured. Quadrant surveys along transects were conducted when herbaceous vegetation was estimated to be greater than 20 percent. The one-quarter meter square (50x50cm) quadrats were placed at 10m intervals along the tape, alternating left and right sides of the tape, at 0m (L), 10m (R), 20m (L), 30m (R), 40m (L) and 50m (R). Transect BH1 (see Map 2, Appendix A) was extended southeast because the northern end of the transect had been graded during construction activities north of the non-ESCA portion of Ranges 43-48.

The number of transects for which data was collected in each of the three vegetation age groups were as follows: Disturbed chaparral – 8; Intermediate chaparral – 18; Mature chaparral – 15. Age groups were defined according to canopy cover estimated from aerial maps and from field observations when transects were originally established in 1999 and 2000 (USACE 2000).

Twelve transects were completed in Zone A (impacted by the full munitions-removal process), and 29 transects in Zone B. Transects were assigned to a given zone if more than half the transect length occurred in that zone.

The percent cover for each shrub species is listed in Table 3 (Appendix C). Percent cover of live vegetation, dead vegetation, and bare ground was also estimated within each quadrat.

The species listed are shrubs and woody perennial plants that occur in maritime chaparral or in associated grassland areas. These species were evaluated in the baseline surveys and include several special-status species as noted in Table 1 (Appendix C).

SECTION 3

Results

3.1 Results of Sand Gilia Survey

Sand gilia were present in 27 of the 43 plots surveyed on the non-ESCA portion of Ranges 43-48 site. Seventeen plots contained sand gilia in density class 1 (1-50 plants); 5 plots in density class 2 (51-100 plants); 5 plots in density class 3 (101-500 plants); and no plots in density class 4 (>500 plants). Distribution decreased between 2008 and 2005 with 47% of the plots no longer containing sand gilia; however, seed is likely present given past survey results (USACE 2005). Abundance also decreased with 74% of the plots classified in lower density classes; 5% classified in higher density classes, and 21% remaining in the same density class. The distribution and abundance in 2008 are shown on Map 3 (Appendix A).

The estimated 2008 density of sand gilia was significantly lower ($p < 0.05$) than the 2005 survey. The average number of plants in the 43 plots surveyed was 203.6 in 2005 and estimated to be 36.6 in 2008.

Area in acres of sand gilia					
Density Class	2004*	2005*	2005	2008*	2008
0 plants/grid	280	183	26	291	70
1-50 plants/grid	139	119	75	115	74
51-100 plants/grid	21	42	27	34	23
101-500 plants/grid	32	91	66	34	23
>500 plants/grid	2	37	23	0	0

Surveys included the ESCA property. 2008 data is an estimation that was extrapolated to include ESCA property. The 2008 survey results for the ESCA property are included in a separate 2008 monitoring report.

These areas are compared graphically in Figure 1 in Appendix B.

3.2 Results of Seaside Bird's-Beak Survey

Seaside bird's-beak was estimated to be present in 42.6 acres on the non-ESCA portion of Ranges 43-48 site, encompassing about 15% of the site area (Table 2, Appendix C). Seaside bird's-beak was surveyed on the known population boundaries established in 2005. Seaside bird's-beak was observed in each of the plots surveyed; 3 plots were estimated in density class 1 (1-50 plants); 5 plots in density class 2 (51-100 plants); 22 plots in density class 3 (101-500 plants); and 9 plots in density class 4 (>500 plants). Areas not known from previous years to host seaside bird's-beak were not surveyed in detail. These areas were given a cursory inspection during the transect surveys, and no new populations were identified. The distribution and abundance of seaside bird's-beak is shown on Map 4 (Appendix A).

Higher densities of seaside bird's-beak were observed in 2008 with 56% of the grids classified in density class 3 and 23% in density class 4 compared to 37% in density class 3 and 21% in density class 4 in 2005.

Area in acres of seaside bird's-beak					
Density Class	2004*	2005*	2005	2008*	2008
0 plants/grid		11.1	8	11.1	8
1-50 plants/grid	13.3	21.3	12.6	4.8	3.3
51-100 plants/grid	2.3	7.7	4.9	8	5.5
101-500 plants/grid	1	22.8	16.1	35.3	24
>500 plants/grid	0	10.8	9	14.4	9.8

Surveys included the ESCA property. 2008 data is an estimation that was extrapolated to include ESCA property. The 2008 survey results for the ESCA property are included in a separate 2008 monitoring report.

These areas are compared graphically in Map 2 in Appendix B

3.3 Results of Monterey Spineflower Survey

Monterey spineflower was observed in 42 of the 47 plots that were surveyed. The distribution and abundance of Monterey spineflower is shown on Map 5 (Appendix A). Monterey spineflower was estimated to be present on 193.5 acres at the non-ESCA portion of Ranges 43–48 site. The plants were relatively small in size and individuals were distinguishable; therefore, density was recorded within each plot and is presented in Table 2 in Appendix C. In 2008, 5 of the plots did not have Monterey spineflower present; 10 plots were estimated in density class 1 (1-50 plants); 4 plots in density class 2 (51-100 plants); 14 plots in density class 3 (101-500 plants); and 15 plots in density class 4 (>500 plants).

3.4 Results of Shrub Transect Monitoring

Percent cover for each transect are presented in Table 3 in Appendix C. Numbers shown are the percent cover for each plant species observed within each 50-m transect and total percent cover for the entire transect. Percent cover for quadrats along transects that were estimated to have greater than 20 percent herbaceous vegetation are presented in Table 4 in Appendix C.

3.4.1 Shrub and Perennial Percent Cover – All Transects Combined

The species that had the greatest percent cover were (average percent cover in parentheses): shaggy-barked manzanita (18.59%), chamise (17.00%), Monterey ceanothus (14.32%), dwarf ceanothus (12.58%), rush rose (9.22%), sandmat manzanita (4.27%), deerweed (2.53%); black sage (1.48%), golden yarrow (1.21%), and silver beach lupine (1.02%). These species accounted for about 95 percent of the total vegetation cover. Each of the other species observed within the transects averaged less than 1% of the total cover.

3.4.2 Comparison of Transect Sampling Between Zone A and Zone B

There were significant differences ($p < 0.05$) in total percent cover and bare ground between Zone A and Zone B. The average percent cover was 77% in Zone A and 90% in Zone B, and the average percent bare ground was 27% in Zone A and 17% in Zone B (Table 5, Appendix C). The Zone A transects that were classified as disturbed and intermediate had the lowest vegetation cover with 73% and 74%, respectively. Transects that were classified as mature within Zone B had the highest vegetation cover with 93% (Table 6, Appendix C).

Diversity of chaparral species in 2008 was similar between the two zones, with 21 and 22 species appearing in Zone A and B, respectively. The breakdown by species is graphically shown in Map 3 of Appendix B. Of the three HMP-listed shrubs, both Monterey ceanothus and sandmat manzanita occurred in transects within Zones A and B. However, Eastwood's golden fleece was not recorded in transects within Zone A.

3.4.3 Comparison of Transect Sampling Among Vegetation Age Groups

There were no significant differences ($p < 0.05$) between the Mature, Intermediate, and Disturbed age groups. However, the average percent cover was highest in the Mature-aged transect group at 92.10%, compared to 86.9% for the Intermediate age group, and 77.29% for the Disturbed age group (Table 7, Appendix C). The breakdown by species is graphically shown in Map 4 (Appendix B).

Diversity of species was similar throughout the site, the Mature age group had 19 species, the Intermediate age group had 19 species, and the Disturbed group had 18 species. Of the three HMP-listed shrubs, both Monterey ceanothus and sandmat manzanita occurred in all three vegetation age groups. However, Eastwood's golden fleece was only present in the Mature age group transects.

3.5 Percent Cover of Live Vegetation, Dead Vegetation, and Bare Ground

Total percent cover averaged over the entire site are shown in Table 5 of Appendix C. Average percent cover over the 41 transects was as follows:

- % Live Perennial Vegetation: 85.74 (± 23.18)
- % Live Herbaceous Vegetation: 1.19 (± 2.01)
- % Desiccated Vegetation: 10.39 (± 7.26)
- % Bare Ground: 20.17 (± 11.46)

The most commonly encountered perennial shrub species were shaggy-bark manzanita and chamise. Both of these species form underground woody burls, from which new shoots will typically re-sprout quickly following a burn.

Discussion

4.1 Sand Gilia Population

A decrease in sand gilia distribution was observed in 2008 compared to 2005 with 47% of the plots no longer containing sand gilia. Density class also decreased with 74% of the plots classified in a lower density class; 5% classified in a higher density class, and 21% remained in the same density class.

The estimated 2008 density of sand gilia in the plots surveyed was significantly lower ($p < 0.05$) than the 2005 survey. Sand gilia was estimated to be in 119 acres in 2008 compared to 191 acres in 2005. This represents a decrease in distribution of 72 acres between 2005 and 2008. Additionally, a smaller proportion of the population occurred at moderate densities (greater than 50 plants per grid). Annual plant populations can be highly variable between years and several factors may have contributed to the abundance and distribution between years.

One factor contributing to the difference in distribution over the years is the natural succession of plant species in maritime chaparral after fire disturbance. The sequence of vegetation change in chaparral after fire is unusual compared to other habitat types. Shrubs that composed the mature community are typically present in the vegetation the first few years after disturbance; however, the shrubs are small in size and there is low competition for space and nutrients for the annual species. Sand gilia is an early-successional annual plant species that thrives in conditions where there is lowered competition with other plants for resources such as light, water, and nutrients. Prescribed burns provide the right conditions by reducing plant competition to a minimum. The second spring following a burn would be expected to have lower levels of soil nutrients and increased plant competition compared to the first spring, resulting in an expected decline in population density of post-burn annual plants. This is consistent with the results of the 2008 survey when compared to surveys from previous years.

A second factor that may affect annual plant densities is the variable amount of annual rainfall. Through April 2008, rainfall totals for Monterey were 7.37 inches, much less than in previous years when surveys were conducted. January was the wettest month with 4.99 inches of rain. Rainfall totals were 1.92, 0.34, and 0.12 inches in February, March, and April, respectively. This is much less than the 2004/2005 season with about 31 inches of total rainfall and 2003/2004 with about 17 inches. It should also be noted that the majority of individual sand gilia observed in 2008 were very small in size and often only a single flower was present.

A combination of these factors including lack of substantial rainfall, time elapsed since the last prescribed burn, and natural succession of chaparral after a fire are likely the major contributors to the decrease in population density of sand gilia. Past data on Fort Ord have shown much higher germination rates of sand gilia in higher rain years (Fox et al., 2006). Since rainfall was much higher in 2004/ 2005 compared to 2008, rainfall in combination with

the site disturbance that created available habitat likely contributed to the high numbers of sand gilia observed in 2005.

While moderate disturbance levels can increase populations of these rare annuals by decreasing competition from other plants, the amount of open ground is likely a limiting factor since percent bare ground had decreased to 21% in 2008 survey compared to about 41% in 2005.

There was no statistically significant difference in sand gilia density between Zone A and Zone B ($p < 0.05$). The consistency in low density in both the disturbed Zone A and the less-disturbed Zone B suggests that the decrease in population density is influenced by increased plant competition from naturally occurring vegetation re-growth over time associated with succession and from the low amount of rainfall in 2008.

4.2 Seaside Bird's-Beak Survey

A similar distribution of seaside's bird's-beak was observed in 2008 and 2005. In 2008, seaside bird's-beak was estimated to be present in 42.6 acres on the Range 43–48 site, approximately 15% of the total site area (Table 2, Appendix C).

Seaside bird's-beak is similar to sand gilia in its ecological requirements. It is also an early-successional species that often thrives in conditions of moderate disturbance that reduces plant competition. The peak blooming period for seaside bird's-beak is April through October. June through October are typically very dry months. Therefore, the lack of rainfall in 2008 may not have influenced the density of seaside bird's-beak.

The average density of seaside bird's-beak was 494.7 in Zone A and 354.3 in Zone B for 2008. However, there was no statistical difference between Zones A and B ($p < 0.05$). This suggests that the two treatments did not influence the density of seaside bird's-beak five years after the disturbance.

4.3 Monterey Spineflower Survey

Monterey spineflower showed a slight decrease in distribution between 2008 and 2005. Monterey spineflower was observed in 42 of the 47 plots that were surveyed. The distribution and abundance of Monterey spineflower is shown on Map 5 (Appendix A). In 2008, 5 of the plots did not have Monterey spineflower present; 10 plots were estimated in density class 1 (1-50 plants); 4 plots in density class 2 (51-100 plants); 14 plots in density class 3 (101-500 plants); and 15 plots in density class 4 (>500 plants).

The Monterey spineflower surveys completed in 1992, 2004, and 2005 at Range 43-48 indicated a large number of plants and large aerial coverage (USACE 1992; 2004; 2005). The acreage of Monterey spineflower covered approximately 215.5 acres in 2005. In 2008, spineflower was estimated to cover only 193.5 acres. The distribution is similar between years, suggesting that the species may have sufficient germination with low rainfall, unlike sand gilia. This is supported by recent studies on Monterey spineflower on Fort Ord by Dr. Laurel Fox (Fox et al., 2006).

In 2008, the average density per grid for Monterey spineflower was 282.3 in Zone A and 504.1 in Zone B. However, there was no statistical difference between Zones A and B ($p < 0.05$). This suggests that the two treatments did not influence the density of Monterey spineflower five years after the disturbance. The density was higher in 2005 immediately following the disturbances, suggesting that the lower numbers observed in 2008 was not a result of cleanup impacts. The lower density in Zone A, despite having more bare ground than Zone B, suggests that factors other than plant competition associated with succession are influencing spineflower density.

4.4 Vegetation Transect Survey

The results of the transect monitoring are consistent with what would be expected after a fire, with known fire-following species such as shaggy-bark manzanita and chamise occurring throughout the area. Special status species present on the site in the baseline survey for Ranges 43–48 (USACE 2000) were all represented in the current survey. The average percent cover for HMP species in 2008 was as follows: Monterey ceanothus (14.32%), sandmat manzanita (4.27%), and Eastwood's golden fleece (0.15%). 41 transects were monitored. A comparison of zones and age groups is presented below in sections 4.4.1 and 4.4.2. Observed species are presented in Table 4, Appendix C.

Quadrat surveys were conducted along 7 of the 41 transects. Quadrats were surveyed when herbaceous vegetation was visually estimated to be greater than 20 percent of the transect. The species observed in the quadrats were similar to the transect data (Table 5, Appendix C). The most common plants at the site were shaggy-barked manzanita and chamise, which accounted for 35.6 percent of the total percent cover. Desiccated vegetation averaged 25.9 percent of the total cover in the quadrats. Herbaceous vegetation, such as western bracken fern, bunch grass, and brome, composed less than 10 percent. The amount of herbaceous vegetation at the site was expected to be less than in previous surveys because of the increasing cover of the perennials. This survey likely underestimated the amount of herbaceous vegetation because most of the annual herbaceous vegetation had died off by late July when the transect surveys were conducted. The measurement of live herbaceous cover may be low because the transect data were collected in summer after herbaceous cover had died back.

4.4.1 Comparison Between Zone A and Zone B

Zone A contained 12 transects and Zone B contained 29 transects. There was significant differences ($p < 0.05$) in total percent cover and bare ground between Zone A and Zone B. The average percent cover of vegetation was 76% in Zone A and 90% in Zone B and the average percent of bare ground was 27% in Zone A and 17% in Zone B. More vegetation cover and less bare ground in Zone B was expected based on less impact during munitions removal compared to the extensive digs required to remove munitions in Zone A. Large numbers of digs conducted during the 18-month project may have incidentally removed plant seedlings. The larger amount of bare ground in Zone A was expected because of the intensity of disturbance the finding of lower seedling abundance in 2005. The percent of bare ground was equal in the two zones in 2005, but most seedlings were small in size and did not contribute much to the percent cover measurements. Diversity of chaparral species in

2008 was similar between the two zones, with 21 and 22 species appearing in Zone A and B, respectively. Of the three HMP-listed shrubs, both Monterey ceanothus and sandmat manzanita occurred in transects within Zones A and B. Eastwood's golden fleece was not recorded in transects within Zone A, but was recorded within Zone B.

The results of the transect study as well as field observations ascertain that, although impacts from munitions removal reduced seedling populations, the diversity was nearly the same after 5 years. Visual observations confirm that abundance of all HMP shrubs was sufficient to ensure likelihood that robust populations will continue. Eastwood's golden fleece, although observed in only a few transects (Table 4, Appendix C), was observed to be present in several healthy populations throughout the site. Monterey ceanothus had one of the highest percent cover in both zones compared to other vegetation. Sandmat manzanita was recorded in 10 of the 12 transects in Zone A and 24 of the 29 transects in Zone B. Similar species diversity between the two zones suggests that the replacement of topsoil following munitions removal allowed retention of the seedbank.

4.4.2 Comparison Between Vegetation Age Groups

There were no significant differences ($p < 0.05$) in percent cover between age groups. The average percent cover was highest in the Mature-aged transect group at 92%, compared to 86% for the Intermediate age group, and 73% for the Disturbed age group (Table 7, Appendix C). Each age group consisted of a relatively high percentage of shrub cover and relatively high species diversity. Shrubs that composed the mature community are typically present in the vegetation two to three years after disturbance. Chaparral succession, thus, is set apart from the usual sequence of change that characterizes secondary succession in most plant communities (Hanes, 1971). Succession in chaparral is more of a gradual elimination of individuals present from the beginning than a replacement of initial shrubs by new species (Hanes, 1971).

Diversity of species was similar throughout the age groups, the Mature age group had 19 species, the Intermediate had 19 species, and the Disturbed had 18 species. Species diversity was slightly higher than in the 2005 survey which recorded 15 species in the Mature age group, 17 in the Intermediate, and 14 in the Disturbed (USACE 2005). In 2000, MACTEC recorded 18 species in the Mature group, 18 in the Intermediate, and 16 in the Disturbed. Of the three HMP-listed shrubs, both Monterey ceanothus and sandmat manzanita occurred in all three vegetation age groups, consistent with the results from the baseline study in 2000. Eastwood's golden fleece was only observed in the Intermediate group in 2005, but was observed in the Mature group in 2008, where it had also been present in 2000 (though at only 0.01% cover).

Conclusions

5.1 Sand Gilia, Seaside Bird's-Beak, and Monterey Spineflower Surveys

A decrease in sand gilia distribution was observed in 2008 compared to 2005. The decrease in sand gilia was expected because of natural succession the maritime chaparral and low amounts of rainfall. The large population of sand gilia in 2005 was likely due to the amount of bare ground created by the prescribed burn in 2003 and the high rainfall occurring in the winter of 2004/2005. Seaside bird's-beak had higher densities in 2008; Zone A had more plots classified in density class 4 than Zone B, which is likely due to the lower shrub cover in that zone. A slight decrease in distribution of Monterey spineflower was observed in 2008; however, dense populations were observed across the site.

Habitat monitoring at the non-ESCA portion of Ranges 43-48 will be conducted in 2011 to monitor species distribution and density. Results of the 2008 botanical monitoring at the non-ESCA portion of Ranges 43-48 will be available in the Administrative Record in early 2009.

5.2 Vegetation Transect Survey

All of the transects within the non-ESCA portion of Ranges 43-48 were monitored. As expected, lower average percent cover of vegetation was observed in Zone A compared to Zone B. More vegetation cover and less bare ground were expected in Zone B because the disturbance from munitions removal was less invasive. Twenty-four different species were observed within the transects. During the monitoring in 2011, species richness may be lower because succession in chaparral is more of a gradual elimination of individuals present from the beginning than a replacement of initial shrubs by new species (Hanes, 1971).

5.3 Percent Cover

There were significant differences ($p < 0.05$) in total percent cover and bare ground between Zone A and Zone B. Shrubs that composed the mature community before a disturbance are typically present in the vegetation the first year after disturbance. The average percent cover of vegetation is proceeding toward baseline conditions with the shrub and perennial cover averaging about 86% over the entire site. The average percent cover is expected to increase by 2011 as the dominant shrubs continue to increase in size.

Recommendations

6.1 Evaluation of Sampling Methods Used in 2008

Burleson monitored for abundance of HMP annuals within a randomly selected sub-sample of grids previously occupied by HMP annuals at the non-ESCA portion of Ranges 43-48. The circular plot method was sufficient for monitoring HMP annuals. Density of HMP annuals was recorded within areas of presence and recorded as absent when not observed within the grid. However, in cases where there are very few individuals within a grid (i.e., 1 individual) or the plants were not normally distributed within the open spaces, this method may have over estimated the number of individuals present within the grid. It is recommended that this methodology be followed in 2011 and the data be compared to other sites to measure consistency.

The line-intercept method was used to collect percent cover data for the fifth year post-burn, which differed from the 2005 method, which was revised because many shrub and perennial seedlings were still small and sparse. The line-intercept method is robust and provided sufficient information about trends in total cover, cover of the dominant species, and cover of the HMP shrubs. It is recommended that this method continue to be used for monitoring of shrubs.

Quadrat sampling was conducted along 7 transects that appeared to contain more than 20% herbaceous vegetation. However, after analyzing the data, none of the transects had more than 20% herbaceous vegetation and only 3 transects had more than 20% desiccated vegetation. It is recommended that the transect surveys be conducted earlier in the season when the herbaceous vegetation is in bloom.

SECTION 7

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APPENDIX A
Maps

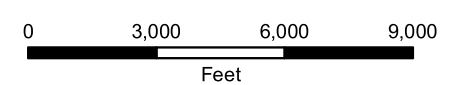
**Map 1
Fort Ord
Non-ESCA Portion of
Ranges 43-48
Location
2008**

Legend

-  Fort Ord Boundary
-  MRS-Ranges 43-48
-  Impact Area
-  Major Roads

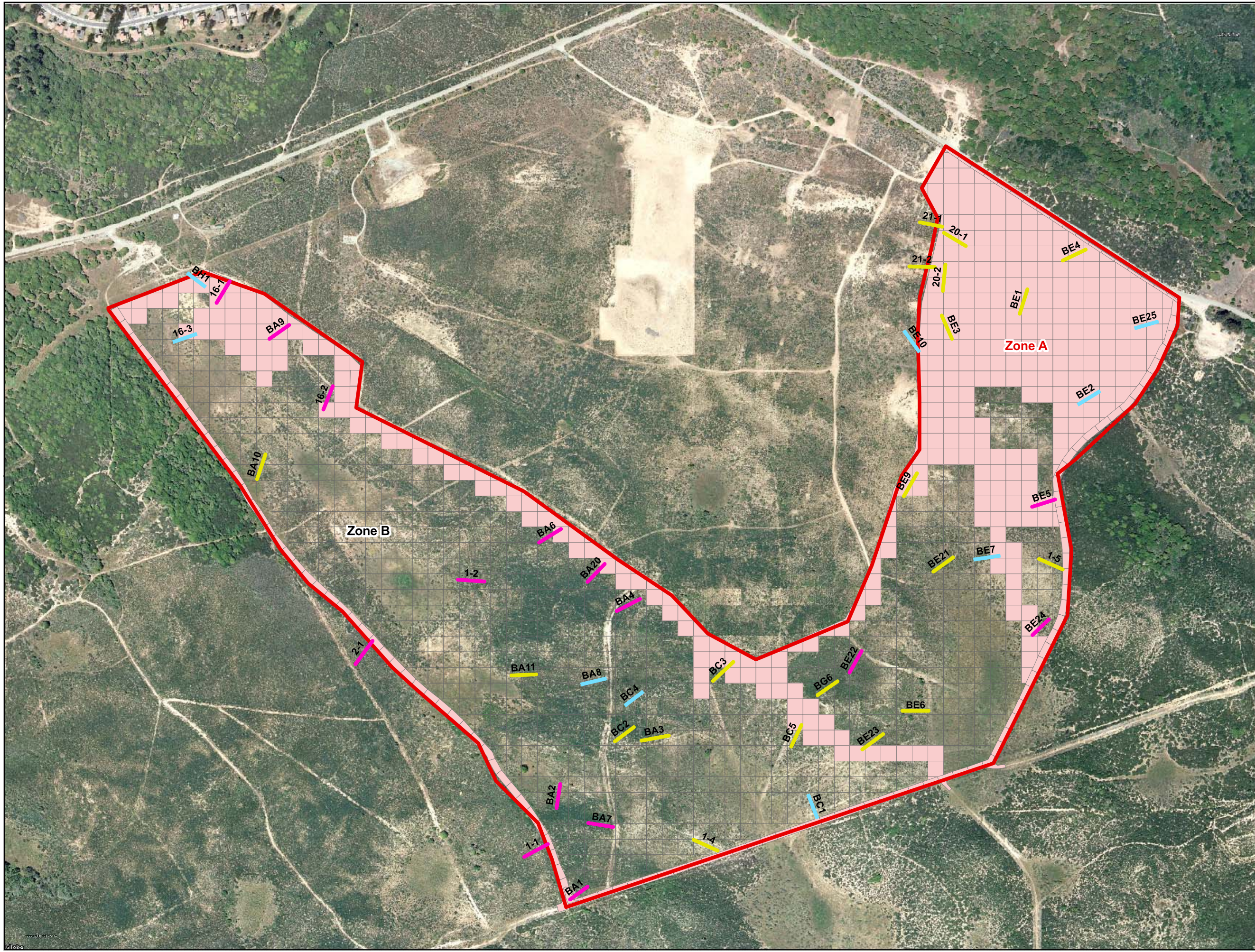


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Data Source: aerial image provided by Digital Globe 1-4-2007
Fort Ord data from Fort Ord MMRP Database

**Map 2
Fort Ord
Non-ESCA Portion of
Ranges 43-48
Vegetation Transect Locations
2008**

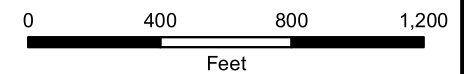


Legend

- MRS Range 43-48
- Mature
- Intermediate
- Disturbed
- Unassigned
- Not Surveyed
- Zone A
- Zone B

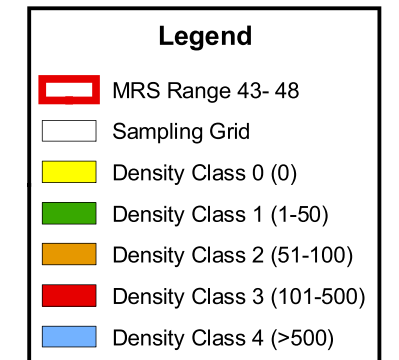


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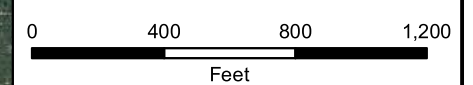


Data Source: aerial image provided by Digital Globe 1-4-2007
Fort Ord data from Fort Ord MMRP Database

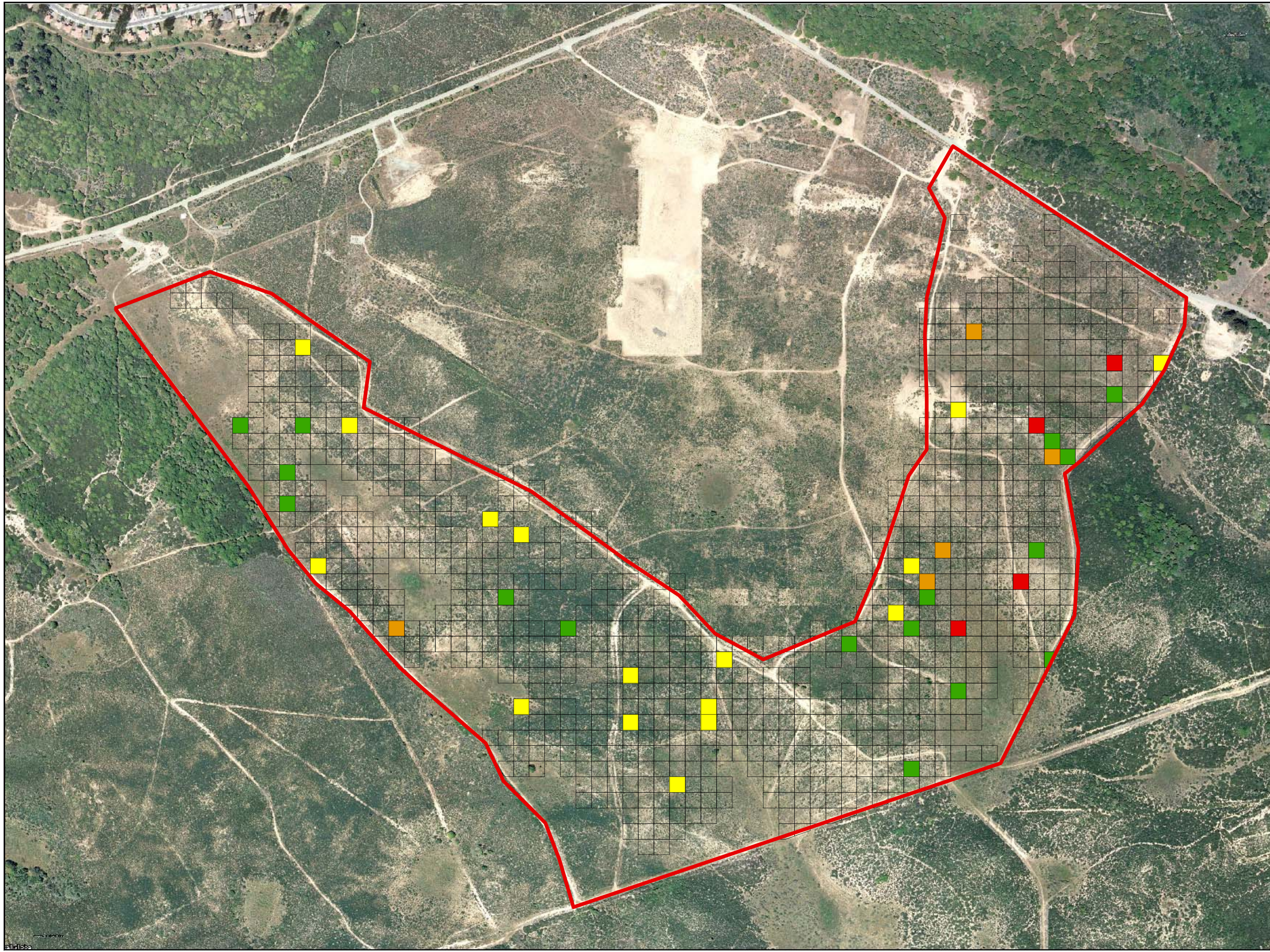
**Map 3
Fort Ord
Non-ESCA Portion of
Ranges 43-48
Sand Gilia Monitoring
Density Classes
2008**



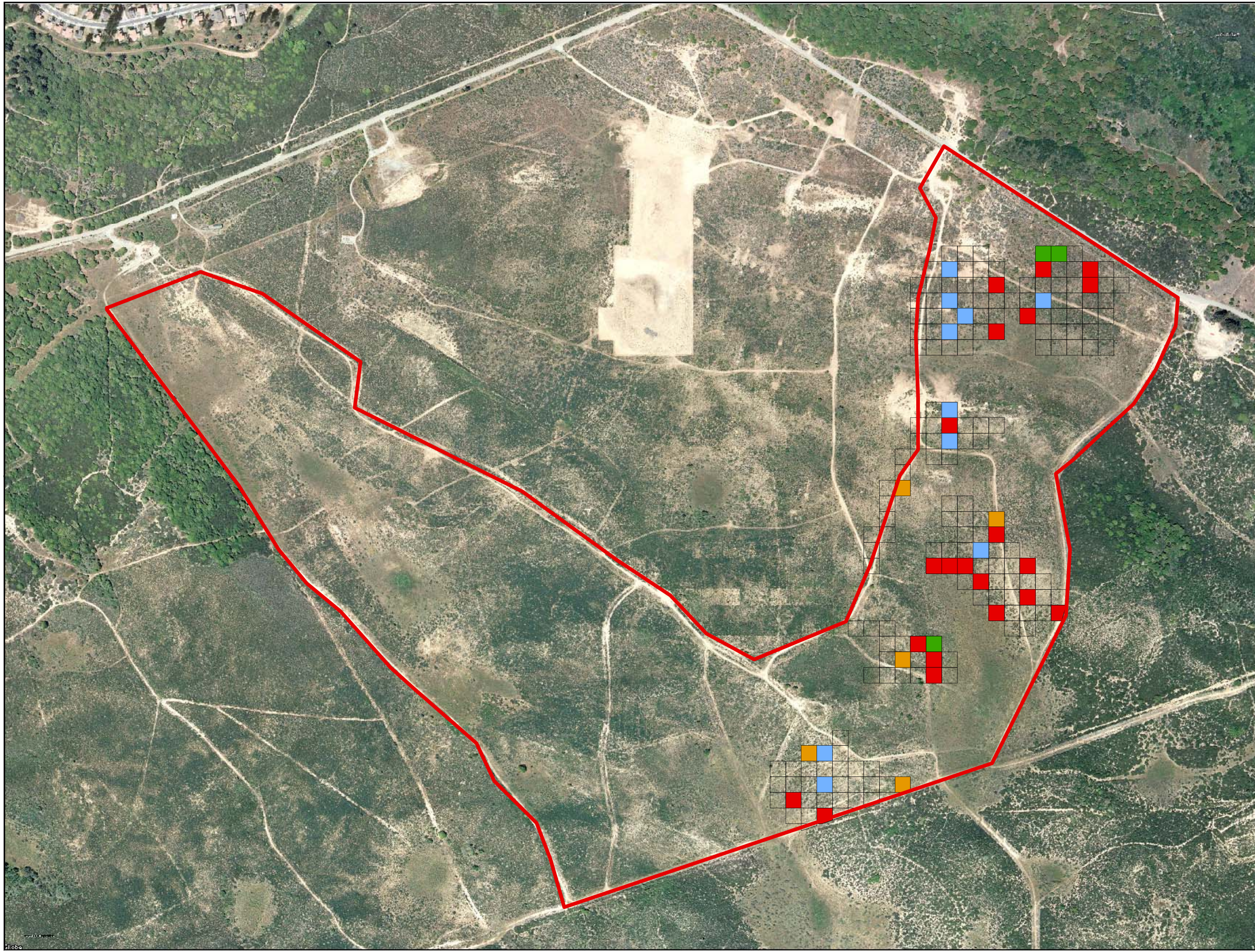
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Data Source: aerial image provided by Digital Globe 1-4-2007
Fort Ord data from Fort Ord MMRP Database



Map 4
Fort Ord
Non-ESCA Portion of
Ranges 43-48
Seaside Bird's-beak Monitoring
Density Classes
2008

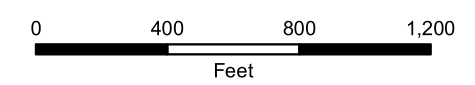


Legend

- MRS Range 43- 48
- Sampling Grid
- Density Class 0 (0)
- Density Class 1 (1-50)
- Density Class 2 (51-100)
- Density Class 3 (101-500)
- Density Class 4 (>500)

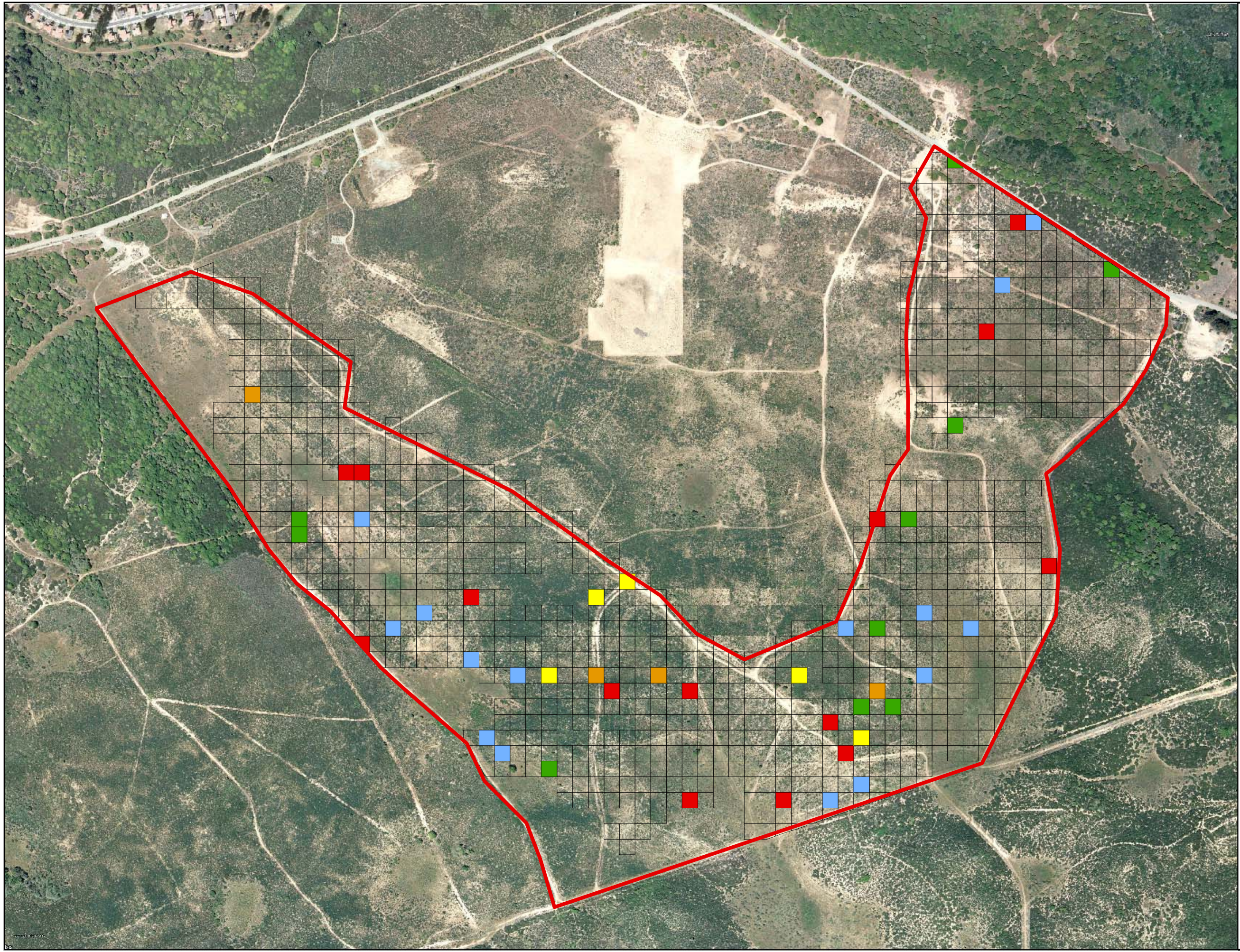


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Data Source: aerial image provided by Digital Globe 1-4-2007
 Fort Ord data from Fort Ord MMRP Database

**Map 5
Fort Ord
Non-ESCA Portion of
Ranges 43-48
Monterey Spineflower Monitoring
Density Classes
2008**

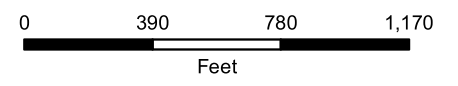


Legend

- MRS Range 43- 48
- Sampling Grid
- Density Class 0 (0)
- Density Class 1 (1-50)
- Density Class 2 (51-100)
- Density Class 3 (101-500)
- Density Class 4 (>500)



1:7,000



Data Source: aerial image provided by Digital Globe 1-4-2007
Fort Ord data from Fort Ord MMRP Database

APPENDIX B
Figures

Figure 1 – Sand Gilia Densities Compared

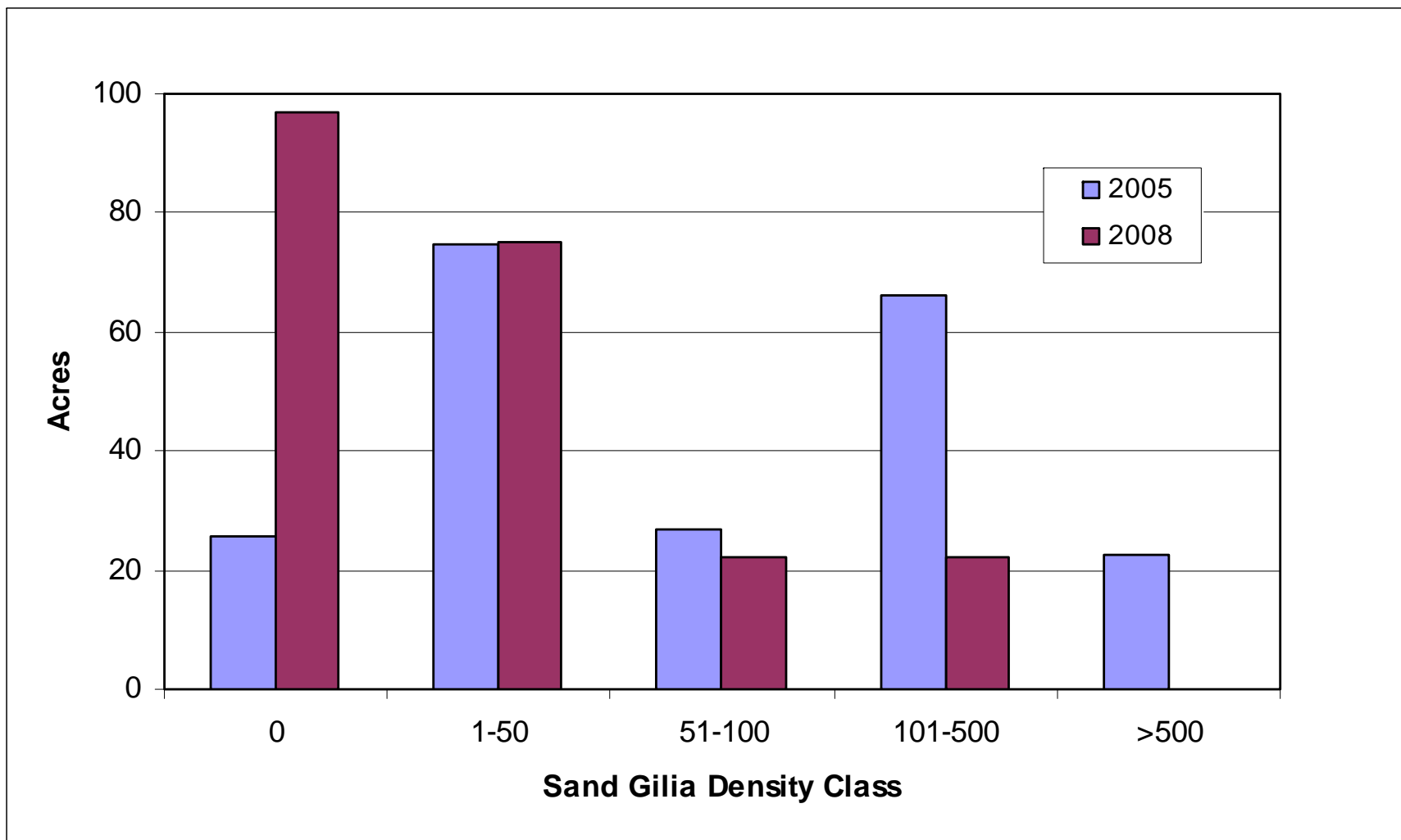


Figure 2 – Seaside Bird's-Beak Densities Compared

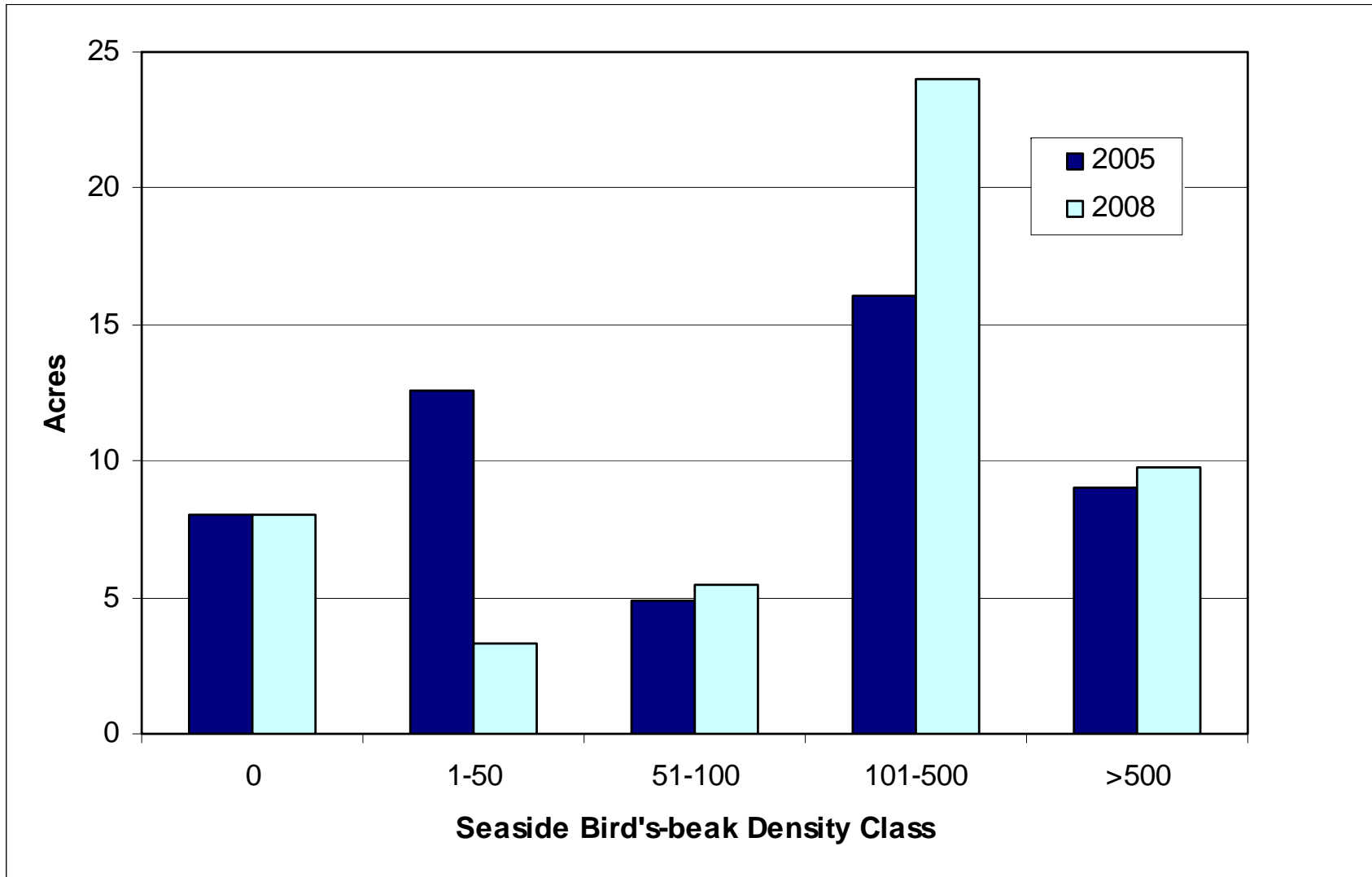


Figure 3 – Average Percent Cover by Species Per Transect in Zone A and Zone B

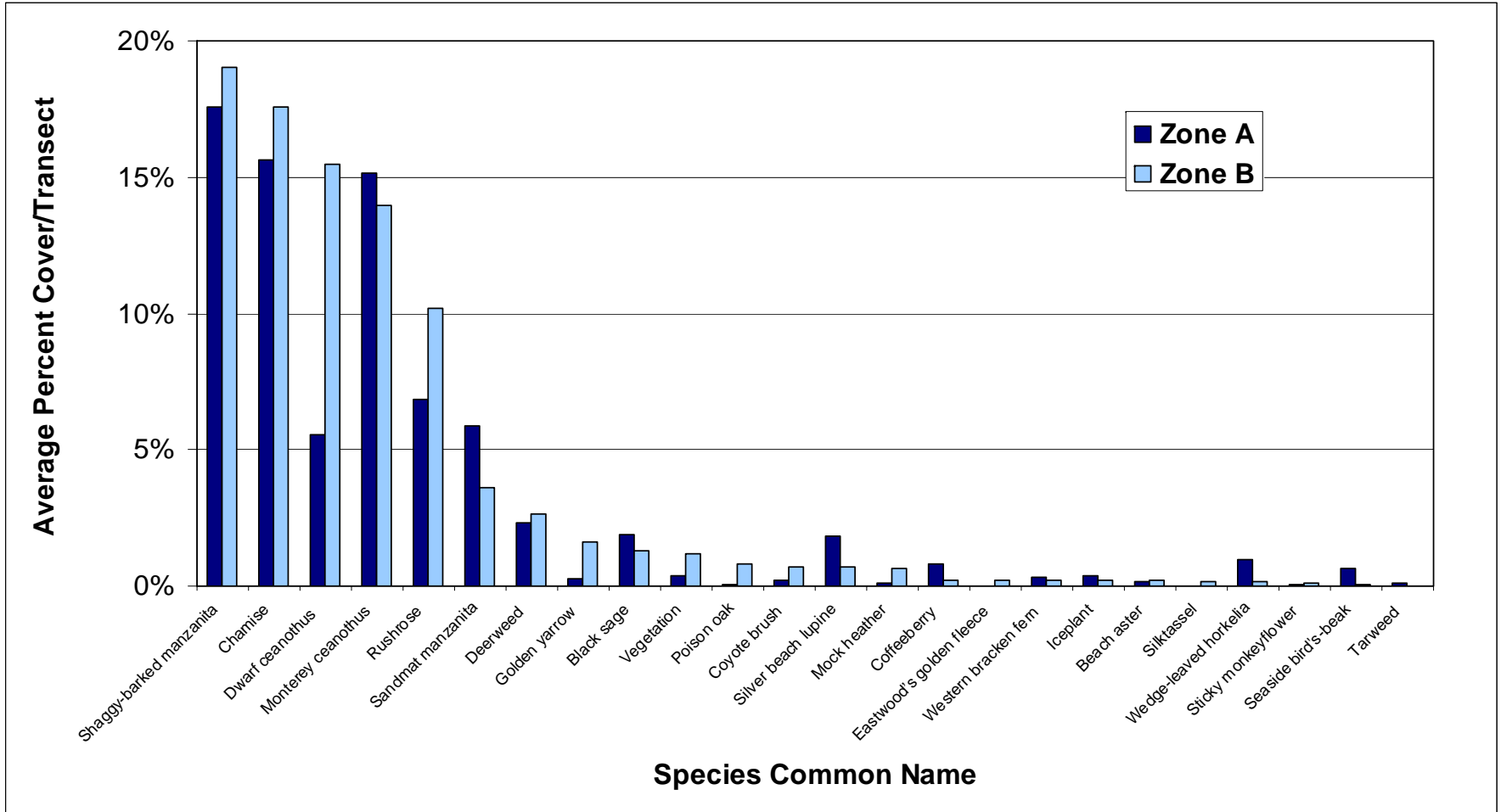
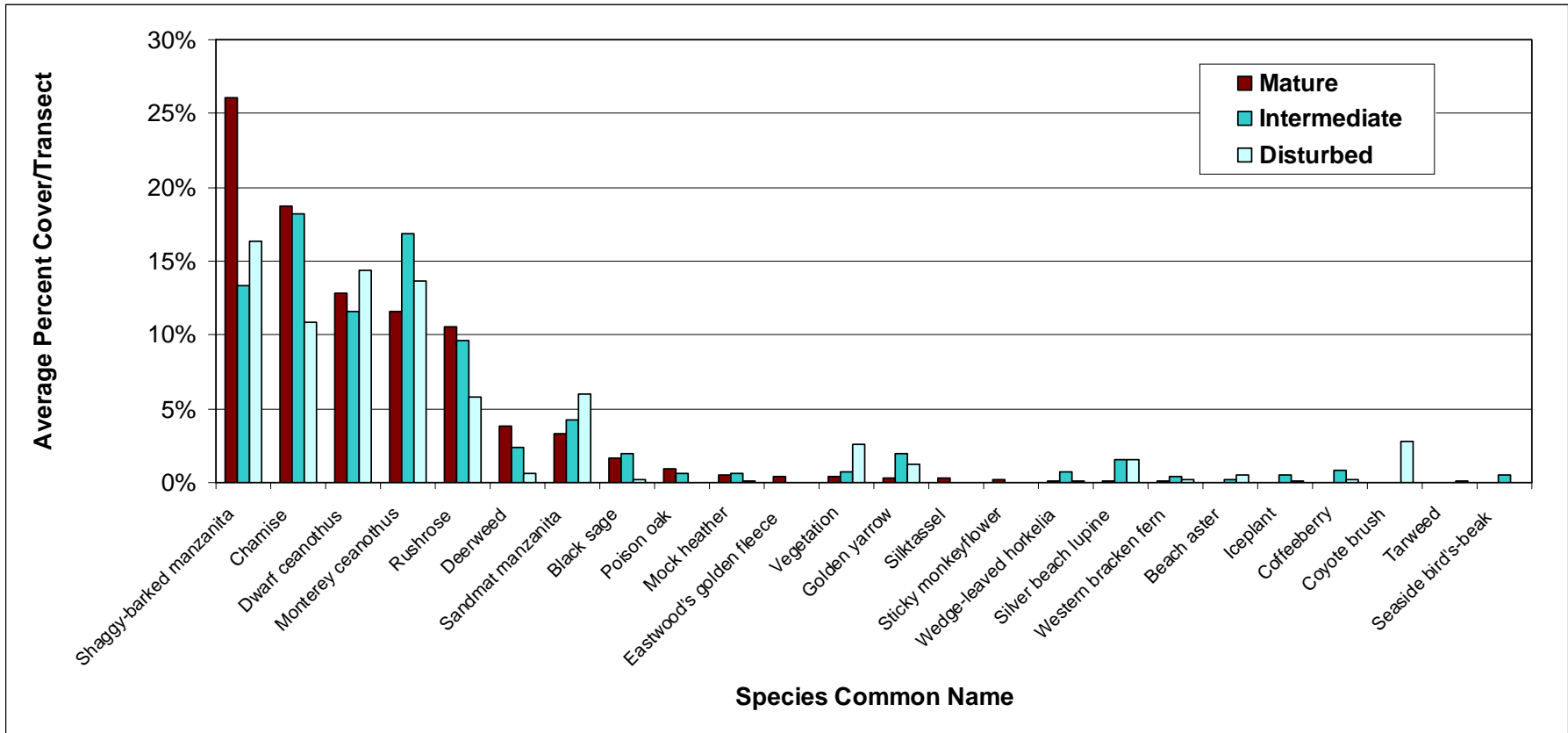


Figure 4 – Average Percent Cover by Species Per Transect for Each Vegetation Age Group (mature, intermediate, and disturbed)



APPENDIX C
Tables

Table 1 – Plant Species Included in the 2008 Annual Monitoring Report

Scientific Name	Common Name	Status
Annuals		
<i>Gilia tenuiflora</i> ssp. <i>arenaria</i>	Sand gilia	FE/ST/1B
<i>Chorizanthe pungens</i> var. <i>pungens</i> (note: var. <i>pungens</i> not recognized in Jepson)	Monterey spineflower	FT/--/1B
<i>Cordylanthus rigidus</i> ssp. <i>littoralis</i>	Seaside bird's-beak	FSC/SE/1B
Maritime Chaparral Shrub and Perennial Species (Counted in transect monitoring)		
<i>Adenostoma fasciculatum</i>	Chamise	
<i>Arctostaphylos pumila</i>	Sandmat manzanita	FSC/--/1B
<i>Arctostaphylos tomentosa</i>	Shaggy-bark manzanita	
<i>Baccharis pilularis</i>	Coyote brush	
<i>Carpobrotus edulis</i>	Iceplant	
<i>Ceanothus cuneatus</i> <i>rigidus</i>	Monterey ceanothus	FSC/--/4
<i>Ceanothus dentatus</i>	Dwarf ceanothus	
<i>Corethrogyne filaginifolia</i>	Beach aster	
<i>Eriophyllum confertiflorum confertiflorum</i>	Golden yarrow	
<i>Ericameria ericoides</i>	Mock heather	
<i>Ericameria fasciculata</i>	Eastwood's golden fleece	FSC/--/1B
<i>Garrya elliptica</i>	Silktassel	
<i>Helianthemum scoparius</i>	Rushrose	
<i>Horkelia cuneata</i>	Wedge-leaved horkelia	
<i>Lotus scoparius</i>	Deerweed	
<i>Lupinus chamissonis</i>	Silver beach lupine	
<i>Mimulus aurantiacus</i>	Sticky monkeyflower	
<i>Pteridium aquilinum pubescens</i>	Western bracken fern	
<i>Rhamnus californica</i>	Coffeeberry	
<i>Salvia mellifera</i>	Black sage	
<i>Toxicodendron diversilobum</i>	Poison oak	
Species Status Codes:		
Federal		
FE Listed as endangered under the Federal Endangered Species Act		
FT Listed as threatened under the Federal Endangered Species Act		
FSC Listed as a species of concern by U.S. Fish and Wildlife Service		
State		
SE Listed as endangered under the California Endangered Species Act		
ST Listed as threatened under the California Endangered Species Act		
CNPS		
1B Plants considered by California Native Plant Society as Rare in California and elsewhere		
4 Plants considered by California Native Plant Society to have limited distributions. A "watch list" species		
Status is included where relevant. Classification and nomenclature follow the Jepson Manual (The Jepson Manual: Higher Plants of California, J.C. Hickman (ed), 1993, University of California Press), except where noted		

Table 2 – Comparison of Population Size and Distribution for Sand Gilia, Seaside Bird’s-Beak, and Monterey Spineflower

Sand gilia						
Year	Zone A	Zone B	Total in Zones A/B	Population Area (acres)	Density/acre in Zone A	Density/acre in Zone B
2005	2791	5674	8,465	190	1,213	749
2008	576	998	1,574	120	251	132
Seaside bird's-beak						
Year	Zone A	Zone B	Total in Zones A/B	Population Area (acres)	Density/acre in Zone A	Density/acre in Zone B
2005	3,283	7,490	10,773	43	753	1,632
2008	9,400	7,086	16,486	43	2155	1,544
Monterey spineflower						
Year	Zone A	Zone B	Total in Zones A/B	Population Area (acres)	Density/acre in Zone A	Density/acre in Zone B
2005				216		
2008	2,822	19,155	21,977	194	1,227	2,197
*Data for 2005 are raw numbers from the grids which were sampled in 2008 and not the entire site or zone						

Table 3 – Total Percent Cover for Transects

* indicates an HMP-listed species		ZONE A							
		TRANSECT ID							
Scientific Name	Common Name	16-1	20-1	20-2	BA-9	BE-1	BE-2	BE-3	BE-4
<i>Adenostoma fasciculatum</i>	Chamise	3.81%	0.00%	3.29%	1.93%	10.27%	12.65%	59.98%	47.64%
* <i>Arctostaphylos pumila</i>	Sandmat manzanita	4.57%	17.04%	10.36%	0.00%	4.63%	5.49%	2.87%	8.29%
<i>Arctostaphylos tomentosa</i>	Shaggy-bark manzanita	42.93%	3.29%	7.01%	50.29%	12.56%	13.44%	6.46%	14.26%
<i>Baccharis pilularis</i>	Coyote brush	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Carpobrotus edulis</i>	Iceplant	0.00%	0.00%	3.29%	0.00%	0.00%	0.00%	0.00%	0.00%
* <i>Ceanothus cuneatus rigidus</i>	Monterey ceanothus	13.77%	13.14%	60.32%	9.40%	7.71%	18.68%	7.35%	16.09%
<i>Ceanothus dentatus</i>	Dwarf ceanothus	28.60%	0.00%	0.00%	2.64%	0.00%	0.00%	0.00%	0.00%
<i>Corethrogyne filaginifolia</i>	Beach aster	0.00%	0.06%	0.00%	0.00%	0.00%	1.46%	0.00%	0.00%
<i>Eriophyllum confertiflorum confertiflorum</i>	Golden yarrow	2.44%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Ericameria ericoides</i>	Mock heather	0.00%	0.00%	0.00%	0.00%	0.00%	1.04%	0.00%	0.00%
* <i>Ericameria fasciculata</i>	Eastwood's golden fleece	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Garrya elliptica</i>	Silktassel	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Helianthemum scoparium</i>	Rushrose	0.86%	1.58%	0.79%	17.12%	0.00%	0.49%	2.38%	1.40%
<i>Horkelia cuneata</i>	Wedge-leaved horkelia	0.00%	7.89%	2.26%	0.00%	0.00%	0.27%	0.79%	0.24%
<i>Lotus scoparius</i>	Deerweed	1.12%	0.00%	0.55%	2.64%	0.00%	0.00%	0.00%	0.00%
<i>Lupinus chamissonis</i>	Silver beach lupine	0.00%	14.97%	0.00%	0.00%	1.43%	2.10%	0.00%	1.22%
<i>Mimulus aurantiacus</i>	Sticky monkeyflower	0.00%	0.00%	0.00%	0.66%	0.00%	0.00%	0.00%	0.00%
<i>Pteridium aquilinum pubescens</i>	Western bracken fern	0.00%	0.00%	0.00%	0.00%	2.29%	0.00%	0.00%	0.00%
<i>Rhamnus californica</i>	Coffeeberry	0.00%	0.00%	0.67%	0.00%	5.88%	1.46%	1.77%	0.00%
<i>Salvia mellifera</i>	Black sage	0.36%	4.21%	3.17%	3.71%	0.00%	0.00%	4.57%	0.79%
<i>Toxicodendron diversilobum</i>	Poison oak	0.00%	0.00%	0.00%	0.00%	0.18%	0.00%	0.00%	0.00%
Grand Total		98.45%	62.18%	91.71%	88.39%	44.96%	57.09%	86.17%	89.95%
	Total % Cover								
	Bare ground	9.55%	32.58%	11.89%	17.73%	54.86%	35.54%	27.74%	25.45%
	Desiccated Vegetation	8.89%	10.18%	10.42%	11.53%	5.91%	10.27%	7.19%	15.79%
	Herbaceous Vegetation	0.20%	0.00%	0.00%	0.10%	0.00%	0.00%	0.00%	0.43%

Total percent cover of shrub and perennial vegetation; and bare ground, desiccated vegetation, and herbaceous vegetation for all transects.

Table 3 - Total Percent Cover for Transects

* indicates an HMP-listed species		ZONE A							
		TRANSECT ID							
Scientific Name	Common Name	BE-5	BE-9	BE-25	BH-1				
<i>Adenostoma fasciculatum</i>	Chamise	20.67%	4.11%	22.92%	0.20%				
* <i>Arctostaphylos pumila</i>	Sandmat manzanita	0.43%	0.00%	4.94%	11.89%				
<i>Arctostaphylos tomentosa</i>	Shaggy-bark manzanita	18.56%	7.62%	13.93%	20.22%				
<i>Baccharis pilularis</i>	Coyote brush	0.00%	0.00%	2.32%	0.00%				
<i>Carpobrotus edulis</i>	Iceplant	0.00%	0.00%	1.07%	0.00%				
* <i>Ceanothus cuneatus rigidus</i>	Monterey ceanothus	5.33%	14.83%	1.31%	13.92%				
<i>Ceanothus dentatus</i>	Dwarf ceanothus	0.00%	11.89%	0.00%	23.47%				
<i>Corethrogyne filaginifolia</i>	Beach aster	0.00%	0.00%	0.49%	0.00%				
<i>Eriophyllum confertiflorum confertiflorum</i>	Golden yarrow	0.00%	0.86%	0.00%	0.00%				
<i>Ericameria ericoides</i>	Mock heather	0.00%	0.00%	0.00%	0.00%				
* <i>Ericameria fasciculata</i>	Eastwood's golden fleece	0.00%	0.00%	0.00%	0.00%				
<i>Garrya elliptica</i>	Silktassel	0.00%	0.00%	0.00%	0.00%				
<i>Helianthemum scoparium</i>	Rushrose	7.32%	13.56%	31.79%	4.67%				
<i>Horkelia cuneata</i>	Wedge-leaved horkelia	0.00%	0.00%	0.30%	0.00%				
<i>Lotus scoparius</i>	Deerweed	17.86%	0.46%	0.00%	4.93%				
<i>Lupinus chamissonis</i>	Silver beach lupine	0.00%	2.54%	0.00%	0.00%				
<i>Mimulus aurantiacus</i>	Sticky monkeyflower	0.00%	0.00%	0.00%	0.00%				
<i>Pteridium aquilinum pubescens</i>	Western bracken fern	0.00%	0.00%	1.40%	0.00%				
<i>Rhamnus californica</i>	Coffeeberry	0.00%	0.00%	0.00%	0.00%				
<i>Salvia mellifera</i>	Black sage	0.49%	3.76%	1.65%	0.00%				
<i>Toxicodendron diversilobum</i>	Poison oak	0.00%	0.00%	0.18%	0.00%				
Grand Total		70.65%	59.64%	82.30%	79.30%				
Total % Cover									
Bare ground		34.66%	37.44%	17.47%	17.78%				
Desiccated Vegetation		5.94%	5.03%	11.70%	18.24%				
Herbaceous Vegetation		0.00%	1.83%	0.43%	1.57%				

Total percent cover of shrub and perennial vegetation; and bare ground, desiccated vegetation, and herbaceous vegetation for all transects.

Table 3 - Total Percent Cover for Transects

* indicates an HMP-listed species		ZONE B							
		TRANSECT ID							
Scientific Name	Common Name	1-1	1-2	1-4	1-5	2-1	16-2	16-3	BA-1
<i>Adenostoma fasciculatum</i>	Chamise	24.38%	28.38%	23.32%	24.84%	15.33%	3.35%	0.00%	9.30%
* <i>Arctostaphylos pumila</i>	Sandmat manzanita	4.42%	1.46%	0.00%	0.12%	0.00%	1.02%	3.71%	0.36%
<i>Arctostaphylos tomentosa</i>	Shaggy-bark manzanita	14.83%	11.77%	6.96%	15.54%	49.68%	32.26%	4.57%	26.72%
<i>Baccharis pilularis</i>	Coyote brush	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Carpobrotus edulis</i>	Iceplant	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.36%
* <i>Ceanothus cuneatus rigidus</i>	Monterey ceanothus	5.89%	29.54%	0.30%	1.98%	6.89%	9.55%	19.15%	13.26%
<i>Ceanothus dentatus</i>	Dwarf ceanothus	9.70%	22.68%	0.86%	0.00%	4.66%	15.80%	19.10%	11.13%
<i>Corethrogyne filaginifolia</i>	Beach aster	0.00%	0.00%	1.63%	0.73%	0.00%	0.00%	0.00%	0.00%
<i>Eriophyllum confertiflorum confertiflorum</i>	Golden yarrow	0.00%	0.00%	10.21%	0.00%	0.00%	0.91%	3.81%	0.00%
<i>Ericameria ericoides</i>	Mock heather	0.41%	2.71%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
* <i>Ericameria fasciculata</i>	Eastwood's golden fleece	1.63%	0.00%	0.00%	0.00%	0.91%	0.00%	0.00%	0.00%
<i>Garrya elliptica</i>	Silktassel	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Helianthemum scoparium</i>	Rushrose	28.45%	1.74%	15.44%	5.73%	3.72%	7.82%	3.30%	6.05%
<i>Horkelia cuneata</i>	Wedge-leaved horkelia	0.05%	1.28%	0.36%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Lotus scoparius</i>	Deerweed	14.88%	0.00%	2.13%	1.52%	8.14%	1.42%	0.00%	0.61%
<i>Lupinus chamissonis</i>	Silver beach lupine	0.00%	1.52%	0.00%	0.00%	0.00%	0.00%	8.43%	0.00%
<i>Mimulus aurantiacus</i>	Sticky monkeyflower	2.79%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Pteridium aquilinum pubescens</i>	Western bracken fern	0.00%	0.00%	0.56%	4.33%	0.00%	0.00%	0.00%	0.36%
<i>Rhamnus californica</i>	Coffeeberry	0.00%	0.24%	0.00%	0.37%	0.00%	0.00%	0.00%	0.00%
<i>Salvia mellifera</i>	Black sage	2.29%	0.00%	0.00%	0.00%	3.23%	3.15%	0.00%	3.30%
<i>Toxicodendron diversilobum</i>	Poison oak	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.83%
Grand Total		107.44%	101.32%	61.77%	55.17%	92.57%	75.29%	62.08%	73.25%
Total % Cover									
Bare ground		4.72%	16.06%	34.34%	33.80%	24.01%	12.75%	17.17%	18.54%
Desiccated Vegetation		12.55%	4.60%	6.60%	20.12%	0.67%	19.46%	32.05%	16.05%
Herbaceous Vegetation		0.00%	0.37%	2.13%	0.00%	0.00%	0.00%	4.93%	2.59%

Total percent cover of shrub and perennial vegetation; and bare ground, desiccated vegetation, and herbaceous vegetation for all transects.

Table 3 - Total Percent Cover for Transects

* indicates an HMP-listed species		ZONE B							
		TRANSECT ID							
Scientific Name	Common Name	BA-2	BA-3	BA-4	BA-6	BA-7	BA-8	BA-10	BA-11
<i>Adenostoma fasciculatum</i>	Chamise	20.22%	9.54%	3.84%	49.93%	2.49%	13.29%	28.14%	16.73%
* <i>Arctostaphylos pumila</i>	Sandmat manzanita	1.17%	2.71%	0.00%	0.49%	0.00%	9.11%	0.51%	2.44%
<i>Arctostaphylos tomentosa</i>	Shaggy-bark manzanita	26.21%	23.10%	15.21%	30.54%	33.38%	17.56%	5.28%	12.89%
<i>Baccharis pilularis</i>	Coyote brush	0.00%	0.61%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Carpobrotus edulis</i>	Iceplant	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
* <i>Ceanothus cuneatus rigidus</i>	Monterey ceanothus	20.22%	27.10%	0.67%	9.20%	20.32%	31.03%	24.33%	43.19%
<i>Ceanothus dentatus</i>	Dwarf ceanothus	12.19%	36.24%	43.53%	0.00%	41.50%	30.42%	11.63%	22.74%
<i>Corethrogyne filaginifolia</i>	Beach aster	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Eriophyllum confertiflorum confertiflorum</i>	Golden yarrow	0.61%	0.00%	0.00%	0.00%	0.00%	0.00%	10.21%	0.00%
<i>Ericameria ericoides</i>	Mock heather	4.62%	2.74%	0.00%	0.00%	0.00%	0.00%	0.00%	5.24%
* <i>Ericameria fasciculata</i>	Eastwood's golden fleece	0.00%	0.00%	0.00%	3.66%	0.00%	0.00%	0.00%	0.00%
<i>Garrya elliptica</i>	Silktassel	0.00%	0.00%	1.77%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Helianthemum scoparium</i>	Rushrose	1.17%	10.67%	15.00%	25.60%	19.20%	0.00%	7.52%	3.66%
<i>Horkelia cuneata</i>	Wedge-leaved horkelia	0.15%	0.00%	0.24%	0.00%	0.00%	0.00%	1.93%	0.00%
<i>Lotus scoparius</i>	Deerweed	0.41%	3.23%	0.91%	0.00%	2.24%	0.00%	0.00%	0.00%
<i>Lupinus chamissonis</i>	Silver beach lupine	0.00%	0.00%	0.00%	0.00%	0.00%	1.52%	1.47%	3.66%
<i>Mimulus aurantiacus</i>	Sticky monkeyflower	0.00%	0.00%	0.21%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Pteridium aquilinum pubescens</i>	Western bracken fern	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Rhamnus californica</i>	Coffeeberry	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Salvia mellifera</i>	Black sage	0.00%	5.03%	0.70%	2.99%	2.03%	0.00%	0.00%	0.00%
<i>Toxicodendron diversilobum</i>	Poison oak	0.41%	2.13%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Grand Total		87.38%	123.11%	82.08%	122.41%	121.16%	102.93%	91.03%	110.55%
	Total % Cover								
	Bare ground	9.70%	10.58%	12.25%	6.55%	5.99%	17.53%	20.68%	17.40%
	Desiccated Vegetation	19.86%	2.93%	7.56%	0.98%	8.13%	0.30%	8.64%	5.06%
	Herbaceous Vegetation	0.25%	0.00%	0.00%	0.00%	0.00%	0.00%	0.51%	0.00%

Total percent cover of shrub and perennial vegetation; and bare ground, desiccated vegetation, and herbaceous vegetation for all transects.

Table 3 - Total Percent Cover for Transects

* indicates an HMP-listed species		ZONE B							
		TRANSECT ID							
Scientific Name	Common Name	BA-20	BC-1	BC-2	BC-3	BC-4	BC-5	BE-6	BE-7
<i>Adenostoma fasciculatum</i>	Chamise	48.83%	0.81%	9.88%	1.32%	24.04%	2.49%	23.88%	12.80%
* <i>Arctostaphylos pumila</i>	Sandmat manzanita	0.18%	6.40%	21.37%	1.07%	3.99%	1.63%	0.71%	2.29%
<i>Arctostaphylos tomentosa</i>	Shaggy-bark manzanita	30.39%	23.42%	0.00%	3.40%	21.14%	35.41%	33.83%	16.15%
<i>Baccharis pilularis</i>	Coyote brush	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	20.22%
<i>Carpobrotus edulis</i>	Iceplant	0.00%	0.00%	5.43%	0.00%	0.00%	0.00%	0.00%	0.00%
* <i>Ceanothus cuneatus rigidus</i>	Monterey ceanothus	5.79%	5.28%	25.88%	7.21%	19.72%	8.84%	0.00%	0.00%
<i>Ceanothus dentatus</i>	Dwarf ceanothus	0.00%	0.61%	43.89%	32.46%	36.48%	6.25%	0.00%	5.33%
<i>Corethrogyne filaginifolia</i>	Beach aster	0.00%	0.00%	0.55%	0.00%	0.00%	0.00%	0.00%	2.34%
<i>Eriophyllum confertiflorum confertiflorum</i>	Golden yarrow	0.00%	3.25%	0.00%	2.79%	0.00%	3.00%	1.37%	2.49%
<i>Ericameria ericoides</i>	Mock heather	0.00%	0.00%	3.32%	0.00%	0.00%	0.00%	0.00%	0.00%
* <i>Ericameria fasciculata</i>	Eastwood's golden fleece	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Garrya elliptica</i>	Silktassel	0.00%	0.00%	0.18%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Helianthemum scoparium</i>	Rushrose	18.32%	0.00%	17.16%	55.63%	6.19%	6.60%	1.63%	0.30%
<i>Horkelia cuneata</i>	Wedge-leaved horkelia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Lotus scoparius</i>	Deerweed	3.17%	0.00%	13.11%	1.83%	0.00%	7.92%	5.74%	0.00%
<i>Lupinus chamissonis</i>	Silver beach lupine	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Mimulus aurantiacus</i>	Sticky monkeyflower	0.00%	0.00%	0.82%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Pteridium aquilinum pubescens</i>	Western bracken fern	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Rhamnus californica</i>	Coffeeberry	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Salvia mellifera</i>	Black sage	1.43%	0.00%	1.04%	0.05%	0.00%	4.72%	0.00%	0.00%
<i>Toxicodendron diversilobum</i>	Poison oak	0.00%	0.00%	3.44%	0.00%	0.00%	0.00%	0.00%	0.00%
Grand Total		108.11%	39.78%	146.06%	105.77%	111.57%	76.86%	67.16%	61.93%
Total % Cover									
Bare ground		12.89%	25.04%	6.61%	11.28%	12.86%	18.08%	15.24%	38.86%
Desiccated Vegetation		2.87%	26.62%	1.28%	7.06%	2.74%	17.12%	16.92%	4.42%
Herbaceous Vegetation		0.00%	9.86%	0.00%	2.18%	0.00%	2.13%	1.88%	3.71%

Total percent cover of shrub and perennial vegetation; and bare ground, desiccated vegetation, and herbaceous vegetation for all transects.

Table 3 - Total Percent Cover for Transects

* indicates an HMP-listed species		ZONE B				
		TRANSECT ID				
Scientific Name	Common Name	BE-21	BE-22	BE-23	BE-24	BG-6
<i>Adenostoma fasciculatum</i>	Chamise	36.53%	31.65%	6.86%	17.47%	19.76%
* <i>Arctostaphylos pumila</i>	Sandmat manzanita	3.05%	2.74%	0.00%	0.00%	0.41%
<i>Arctostaphylos tomentosa</i>	Shaggy-bark manzanita	5.28%	17.22%	34.44%	24.78%	13.16%
<i>Baccharis pilularis</i>	Coyote brush	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Carpobrotus edulis</i>	Iceplant	0.00%	0.00%	0.00%	0.00%	0.00%
* <i>Ceanothus cuneatus rigidus</i>	Monterey ceanothus	32.66%	12.55%	2.13%	12.10%	10.52%
<i>Ceanothus dentatus</i>	Dwarf ceanothus	0.00%	0.00%	17.12%	0.00%	24.84%
<i>Corethrogyne filaginifolia</i>	Beach aster	0.00%	0.00%	0.00%	0.49%	0.00%
<i>Eriophyllum confertiflorum confertiflorum</i>	Golden yarrow	0.76%	1.42%	3.76%	0.00%	1.57%
<i>Ericameria ericoides</i>	Mock heather	0.00%	0.00%	0.00%	0.00%	0.00%
* <i>Ericameria fasciculata</i>	Eastwood's golden fleece	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Garrya elliptica</i>	Silktassel	0.00%	0.00%	0.00%	3.47%	0.00%
<i>Helianthemum scoparium</i>	Rushrose	0.00%	3.40%	12.40%	1.89%	17.37%
<i>Horkelia cuneata</i>	Wedge-leaved horkelia	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Lotus scoparius</i>	Deerweed	0.00%	2.29%	1.07%	1.01%	4.72%
<i>Lupinus chamissonis</i>	Silver beach lupine	3.00%	0.00%	0.00%	0.00%	0.00%
<i>Mimulus aurantiacus</i>	Sticky monkeyflower	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Pteridium aquilinum pubescens</i>	Western bracken fern	0.00%	0.00%	0.00%	0.79%	0.00%
<i>Rhamnus californica</i>	Coffeeberry	6.05%	0.00%	0.00%	0.00%	0.30%
<i>Salvia mellifera</i>	Black sage	0.00%	0.86%	1.98%	0.00%	5.28%
<i>Toxicodendron diversilobum</i>	Poison oak	0.00%	10.97%	2.64%	0.00%	2.69%
Grand Total		87.33%	83.11%	82.40%	62.00%	100.63%
Total % Cover						
Bare ground		23.52%	13.21%	14.07%	41.94%	8.43%
Desiccated Vegetation		6.96%	19.30%	16.51%	8.41%	9.14%
Herbaceous Vegetation		0.00%	2.08%	0.25%	0.00%	1.47%

Total percent cover of shrub and perennial vegetation; and bare ground, desiccated vegetation, and herbaceous vegetation for all transects.

Table 4 - Total Percent Cover for Quadrats

* indicates an HMP-listed species		QUADRAT MONITORING							
		TRANSECT ID							
Scientific Name	Common Name	1-5	20-2	21-1	21-2	BC-1	BE-10	BE-25	Average Percent Cover
<i>Adenostoma fasciculatum</i>	Chamise	17.17%	8.17%	4.17%	6.50%	3.00%	5.50%	4.00%	6.93%
* <i>Arctostaphylos pumila</i>	Sandmat manzanita	0.00%	8.17%	0.33%	2.83%	1.50%	0.00%	3.33%	3.23%
<i>Arctostaphylos tomentosa</i>	Shaggy-bark manzanita	32.00%	8.33%	15.33%	29.67%	18.17%	0.00%	7.00%	18.42%
<i>Baccharis pilularis</i>	Coyote brush	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.17%	0.17%
<i>Bromus madritensis ssp. rubens</i>	Red brome	0.00%	0.00%	0.00%	0.00%	0.33%	0.00%	0.00%	0.33%
* <i>Ceanothus cuneatus rigidus</i>	Iceplant	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.50%	4.50%
<i>Ceanothus dentatus</i>	Monterey ceanothus	0.00%	16.17%	0.00%	1.67%	0.00%	5.00%	5.00%	6.96%
<i>Corethrogyne filaginifolia</i>	Beach aster	0.50%	0.00%	1.17%	0.17%	2.00%	0.00%	0.00%	0.96%
<i>Eriophyllum confertiflorum confertiflorum</i>	Seaside bird's-beak	0.00%	0.00%	0.00%	0.00%	0.00%	3.33%	0.00%	3.33%
<i>Ericameria ericoides</i>	Tarweed	0.00%	0.00%	0.00%	0.00%	0.33%	0.33%	0.00%	0.33%
* <i>Ericameria fasciculata</i>	Golden yarrow	0.00%	0.00%	0.00%	0.00%	0.33%	3.33%	0.00%	1.83%
<i>Heterotheca grandiflora</i>	Telegraph weed	0.00%	0.00%	0.67%	0.00%	0.00%	0.00%	0.00%	0.67%
<i>Helianthemum scoparius</i>	Rushrose	6.67%	0.00%	8.83%	5.67%	0.00%	0.83%	40.83%	12.57%
<i>Horkelia cuneata</i>	Wedge-leaved horkelia	0.00%	1.67%	0.17%	2.83%	0.00%	0.00%	2.33%	1.75%
<i>Lotus scoparius</i>	Deerweed	0.00%	0.00%	0.17%	12.00%	0.00%	0.00%	0.00%	6.08%
<i>Lupinus chamissonis</i>	Silver beach lupine	0.00%	0.00%	0.00%	0.00%	0.00%	7.33%	0.00%	7.33%
<i>Mimulus aurantiacus</i>	Bunch Grass sp.	0.00%	0.00%	0.00%	0.00%	0.50%	0.00%	0.00%	0.50%
<i>Pteridium aquilinum pubescens</i>	Western bracken fern	3.33%	0.00%	0.00%	0.00%	1.00%	0.00%	5.17%	3.17%
<i>Rhamnus californica</i>	Coffeeberry	0.00%	8.33%	12.50%	0.00%	0.00%	0.00%	0.00%	10.42%
<i>Salvia mellifera</i>	Black sage	0.00%	1.67%	0.00%	0.00%	0.00%	0.00%	2.50%	2.08%
Total Percent Cover		59.67%	52.50%	43.33%	61.33%	27.17%	25.67%	74.83%	49.21%
	Total % Cover								
	Bare ground	34.67%	33.50%	23.83%	10.83%	38.67%	24.83%	28.67%	27.86%
	Desiccated Vegetation	5.67%	14.00%	32.83%	27.83%	34.17%	57.00%	10.00%	25.93%

Total percent cover of live vegetation, bare ground, and desiccated vegetation for all quadrats along transects.

Table 5 - Average Percent Cover for Shrub and Perennial Vegetation by Zone

* indicates an HMP-listed species		Zone A		Zone B		All Transects	
Scientific Name	Common Name	Average	sd	Average	sd	Average	sd
<i>Adenostoma fasciculatum</i>	Chamise	15.62%	19.55%	17.57%	13.48%	17.00%	15.27%
* <i>Arctostaphylos pumila</i>	Sandmat manzanita	5.88%	5.21%	3.61%	7.10%	4.27%	6.62%
<i>Arctostaphylos tomentosa</i>	Shaggy-bark manzanita	17.55%	14.54%	19.03%	12.20%	18.59%	12.76%
<i>Baccharis pilularis</i>	Coyote brush	0.19%	0.67%	0.72%	3.75%	0.56%	3.17%
<i>Carpobrotus edulis</i>	Iceplant	0.36%	0.97%	0.20%	1.01%	0.25%	0.99%
* <i>Ceanothus cuneatus rigidus</i>	Monterey ceanothus	15.15%	15.07%	13.98%	11.53%	14.32%	12.49%
<i>Ceanothus dentatus</i>	Dwarf ceanothus	5.55%	10.21%	15.49%	15.07%	12.58%	14.44%
<i>Corethrogyne filaginifolia</i>	Beach aster	0.17%	0.43%	0.20%	0.54%	0.19%	0.50%
<i>Eriophyllum confertiflorum confertiflorum</i>	Golden yarrow	0.28%	0.73%	1.59%	2.71%	1.21%	2.38%
<i>Ericameria ericoides</i>	Mock heather	0.09%	0.30%	0.66%	1.49%	0.49%	1.29%
* <i>Ericameria fasciculata</i>	Eastwood's golden fleece	0.00%	0.00%	0.21%	0.74%	0.15%	0.63%
<i>Garrya elliptica</i>	Silktassel	0.00%	0.00%	0.19%	0.71%	0.13%	0.60%
<i>Helianthemum scoparium</i>	Rushrose	6.83%	9.61%	10.21%	11.80%	9.22%	11.19%
<i>Horkelia cuneata</i>	Wedge-leaved horkelia	0.98%	2.27%	0.14%	0.42%	0.38%	1.30%
<i>Lotus scoparius</i>	Deerweed	2.30%	5.12%	2.63%	3.89%	2.53%	4.22%
<i>Lupinus chamissonis</i>	Silver beach lupine	1.86%	4.23%	0.68%	1.76%	1.02%	2.72%
<i>Mimulus aurantiacus</i>	Sticky monkeyflower	0.06%	0.19%	0.13%	0.54%	0.11%	0.46%
<i>Pteridium aquilinum pubescens</i>	Western bracken fern	0.31%	0.74%	0.21%	0.81%	0.24%	0.79%
<i>Rhamnus californica</i>	Coffeeberry	0.82%	1.71%	0.24%	1.12%	0.41%	1.33%
<i>Salvia mellifera</i>	Black sage	1.89%	1.84%	1.31%	1.73%	1.48%	1.76%
<i>Toxicodendron diversilobum</i>	Poison oak	0.03%	0.07%	0.83%	2.19%	0.60%	1.87%
Grand Total		75.90%	16.68%	89.81%	24.48%	85.74%	23.18%
Total % Cover							
Bare ground		26.89%	12.95%	17.38%	9.72%	20.17%	11.46%
Desiccated Vegetation		10.09%	3.97%	10.51%	8.31%	10.39%	7.26%
Herbaceous Vegetation		1.10%	1.73%	1.22%	2.15%	1.19%	2.01%

sd: standard deviation

Summary of average percent cover of shrub and perennial vegetation; and bare ground, desiccated vegetation, and herbaceous vegetation for Zone A and Zone B.

Table 6 - Average Percent Cover of Disturbed, Intermediate, and Mature Vegetation by Zone

* indicates an HMP-listed species		Disturbed				Intermediate			
		Zone A		Zone B		Zone A		Zone B	
Scientific Name	Common Name	Average	sd	Average	sd	Average	sd	Average	sd
<i>Adenostoma fasciculatum</i>	Chamise	11.92%	11.38%	10.19%	10.00%	20.88%	26.02%	16.94%	10.99%
* <i>Arctostaphylos pumila</i>	Sandmat manzanita	7.44%	3.86%	1.96%	2.74%	7.20%	6.09%	12.82%	14.69%
<i>Arctostaphylos tomentosa</i>	Shaggy-bark manzanita	15.86%	3.78%	16.57%	7.30%	8.53%	4.10%	15.78%	12.89%
<i>Baccharis pilularis</i>	Coyote brush	0.77%	1.34%	0.00%	0.00%	0.00%	0.00%	0.41%	1.25%
<i>Carpobrotus edulis</i>	Iceplant	0.36%	0.62%	0.00%	0.00%	0.55%	1.34%	0.94%	1.79%
* <i>Ceanothus cuneatus rigidus</i>	Monterey ceanothus	11.30%	8.98%	18.39%	15.49%	19.91%	20.13%	16.34%	15.65%
<i>Ceanothus dentatus</i>	Dwarf ceanothus	7.82%	13.55%	5.10%	2.69%	1.98%	4.85%	2.83%	5.94%
<i>Corethrogyne filaginifolia</i>	Beach aster	0.65%	0.74%	0.00%	0.00%	0.01%	0.02%	0.45%	1.57%
<i>Eriophyllum confertiflorum confertiflorum</i>	Golden yarrow	0.00%	0.00%	0.00%	0.00%	0.14%	0.35%	0.00%	0.00%
<i>Ericameria ericoides</i>	Mock heather	0.35%	0.60%	0.00%	0.00%	0.00%	0.00%	0.02%	0.05%
* <i>Ericameria fasciculata</i>	Eastwood's golden fleece	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.09%	0.32%
<i>Garrya elliptica</i>	Silktassel	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Helianthemum scoparium</i>	Rushrose	12.32%	16.99%	15.04%	12.41%	3.29%	5.10%	15.35%	14.62%
<i>Horkelia cuneata</i>	Wedge-leaved horkelia	0.19%	0.17%	3.70%	4.09%	1.86%	3.07%	0.88%	0.98%
<i>Lotus scoparius</i>	Deerweed	1.64%	2.84%	0.00%	0.00%	0.17%	0.26%	3.44%	3.93%
<i>Lupinus chamissonis</i>	Silver beach lupine	0.70%	1.21%	0.00%	0.00%	3.36%	5.77%	1.51%	2.20%
<i>Mimulus aurantiacus</i>	Sticky monkeyflower	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.19%	0.56%
<i>Pteridium aquilinum pubescens</i>	Western bracken fern	0.47%	0.81%	0.00%	0.00%	0.38%	0.93%	0.56%	1.73%
<i>Rhamnus californica</i>	Coffeeberry	0.49%	0.84%	0.00%	0.00%	1.39%	2.31%	0.91%	1.37%
<i>Salvia mellifera</i>	Black sage	0.55%	0.95%	1.91%	1.81%	2.75%	1.90%	2.81%	3.69%
<i>Toxicodendron diversilobum</i>	Poison oak	0.06%	0.11%	0.00%	0.00%	0.03%	0.07%	0.07%	0.24%
Grand Total		72.89%	13.77%	72.85%	31.40%	72.43%	19.45%	92.32%	26.02%
	Total % Cover								
	Bare ground	23.59%	10.35%	22.29%	10.25%	31.66%	14.27%	17.84%	9.04%
	Desiccated Vegetation	13.40%	4.25%	13.23%	14.90%	9.09%	3.95%	9.86%	6.22%
	Herbaceous Vegetation	0.95%	0.58%	6.50%	9.63%	1.68%	2.33%	0.97%	1.25%

sd: standard deviation

Summary of average percent cover of shrub and perennial vegetation; and bare ground, desiccated vegetation, and herbaceous vegetation by vegetation age group (disturbed, intermediate, mature) and Zone.

Table 6 - Average Percent Cover of Disturbed, Intermediate, and Mature Vegetation by Zone

* indicates an HMP-listed species		Mature			
		Zone A		Zone B	
Scientific Name	Common Name	Average	sd	Average	sd
<i>Adenostoma fasciculatum</i>	Chamise	8.80%	10.32%	21.26%	16.29%
* <i>Arctostaphylos pumila</i>	Sandmat manzanita	1.67%	2.53%	11.03%	9.84%
<i>Arctostaphylos tomentosa</i>	Shaggy-bark manzanita	37.26%	16.61%	23.30%	12.62%
<i>Baccharis pilularis</i>	Coyote brush	0.00%	0.00%	0.10%	0.24%
<i>Carpobrotus edulis</i>	Iceplant	0.00%	0.00%	0.65%	1.47%
* <i>Ceanothus cuneatus rigidus</i>	Monterey ceanothus	9.50%	4.22%	13.43%	15.39%
<i>Ceanothus dentatus</i>	Dwarf ceanothus	10.41%	15.81%	3.77%	9.42%
<i>Corethrogyne filaginifolia</i>	Beach aster	0.00%	0.00%	0.03%	0.10%
<i>Eriophyllum confertiflorum confertiflorum</i>	Golden yarrow	0.81%	1.41%	0.52%	1.11%
<i>Ericameria ericoides</i>	Mock heather	0.00%	0.00%	0.44%	1.08%
* <i>Ericameria fasciculata</i>	Eastwood's golden fleece	0.00%	0.00%	0.00%	0.00%
<i>Garrya elliptica</i>	Silktassel	0.00%	0.00%	0.00%	0.00%
<i>Helianthemum scoparium</i>	Rushrose	8.43%	8.19%	12.16%	7.92%
<i>Horkelia cuneata</i>	Wedge-leaved horkelia	0.00%	0.00%	0.44%	0.90%
<i>Lotus scoparius</i>	Deerweed	7.21%	9.26%	2.92%	4.37%
<i>Lupinus chamissonis</i>	Silver beach lupine	0.00%	0.00%	1.67%	1.33%
<i>Mimulus aurantiacus</i>	Sticky monkeyflower	0.22%	0.38%	0.14%	0.37%
<i>Pteridium aquilinum pubescens</i>	Western bracken fern	0.00%	0.00%	0.02%	0.07%
<i>Rhamnus californica</i>	Coffeeberry	0.00%	0.00%	1.10%	3.15%
<i>Salvia mellifera</i>	Black sage	1.52%	1.90%	0.25%	0.48%
<i>Toxicodendron diversilobum</i>	Poison oak	0.00%	0.00%	0.25%	0.80%
Grand Total		85.83%	14.07%	93.47%	19.13%
Total % Cover					
Bare ground		20.65%	12.80%	14.89%	10.12%
Desiccated Vegetation		8.79%	2.80%	10.04%	7.24%
Herbaceous Vegetation		0.10%	0.10%	0.13%	0.44%

sd: standard deviation

Summary of average percent cover of shrub and perennial vegetation; and bare ground, desiccated vegetation, and herbaceous vegetation by vegetation age group (disturbed, intermediate, mature) and Zone.

Table 7 - Average Percent Cover of Vegetation by Age Group



* indicates an HMP-listed species		Disturbed		Intermediate		Mature	
Scientific Name	Common Name	Average	sd	Average	sd	Average	sd
<i>Adenostoma fasciculatum</i>	Chamise	10.84%	9.74%	18.25%	16.76%	18.77%	15.82%
* <i>Arctostaphylos pumila</i>	Sandmat manzanita	4.01%	4.07%	10.94%	12.57%	9.16%	9.59%
<i>Arctostaphylos tomentos</i>	Shaggy-bark manzanita	16.30%	5.88%	13.36%	11.17%	26.09%	14.07%
<i>Baccharis pilularis</i>	Coyote brush	0.29%	0.82%	0.27%	1.02%	0.08%	0.22%
<i>Carpobrotus edulis</i>	Iceplant	0.13%	0.38%	0.81%	1.63%	0.52%	1.33%
* <i>Ceanothus cuneatus rigidus</i>	Monterey ceanothus	15.73%	13.17%	17.53%	16.75%	12.65%	13.83%
<i>Ceanothus dentatus</i>	Dwarf ceanothus	6.12%	7.65%	2.55%	5.47%	5.10%	10.63%
<i>Corethrogyne filaginifolia</i>	Beach aster	0.24%	0.52%	0.30%	1.28%	0.02%	0.09%
<i>Eriophyllum confertiflorum confertiflorum</i>	Golden yarrow	0.00%	0.00%	0.05%	0.20%	0.58%	1.13%
<i>Ericameria ericoides</i>	Mock heather	0.13%	0.37%	0.01%	0.04%	0.35%	0.98%
* <i>Ericameria fasciculata</i>	Eastwood's golden fleece	0.00%	0.00%	0.06%	0.26%	0.00%	0.00%
<i>Garrya elliptica</i>	Silktassel	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Helianthemum scoparium</i>	Rushrose	14.02%	13.13%	11.33%	13.42%	11.42%	7.83%
<i>Horkelia cuneata</i>	Wedge-leaved horkelia	2.38%	3.58%	1.21%	1.91%	0.35%	0.82%
<i>Lotus scoparius</i>	Deerweed	0.62%	1.74%	2.35%	3.54%	3.78%	5.51%
<i>Lupinus chamissonis</i>	Silver beach lupine	0.26%	0.74%	2.13%	3.70%	1.33%	1.37%
<i>Mimulus aurantiacus</i>	Sticky monkeyflower	0.00%	0.00%	0.13%	0.46%	0.16%	0.36%
<i>Pteridium aquilinum pubescens</i>	Western bracken fern	0.18%	0.50%	0.50%	1.49%	0.02%	0.06%
<i>Rhamnus californica</i>	Coffeeberry	0.18%	0.52%	1.07%	1.69%	0.88%	2.83%
<i>Salvia mellifera</i>	Black sage	1.40%	1.62%	2.79%	3.14%	0.50%	0.99%
<i>Toxicodendron diversilobum</i>	Poison oak	0.02%	0.06%	0.06%	0.20%	0.20%	0.72%
Grand Total		72.87%	24.85%	85.69%	25.34%	91.94%	18.05%
	Total % Cover						
	Bare ground	22.78%	9.54%	22.44%	12.56%	16.04%	10.47%
	Desiccated Vegetation	13.29%	11.49%	9.60%	5.46%	9.79%	6.53%
	Herbaceous Vegetation	4.42%	7.83%	1.21%	1.65%	0.12%	0.39%



sd: standard deviation



Summary of average percent cover of shrub and perennial vegetation; and bare ground, desiccated vegetation, and herbaceous vegetation by vegetation age group (disturbed, intermediate, mature).



APPENDIX D



Photographs





Viewing Direction	Photo Description	Photo
<p style="text-align: center;">↓</p>	<p>Typical circle plot, showing bare ground within shaggy-bark manzanita, chamise, and rush rose</p>	
<p style="text-align: center;">↓</p>	<p>North facing slope showing predominance of shaggy-bark manzanita, chamise, dwarf ceanothus, and Monterey ceanothus</p>	




Viewing Direction	Photo Description	Photo
<p style="text-align: center;">←</p>	<p>Typical circle plot, showing bare ground with desiccated vegetation, shaggy-bark manzanita, chamise, and mock heather</p>	
	<p>Sand gilia</p>	

Viewing Direction	Photo Description	Photo
	Monterey spineflower	
	Seaside bird's-beak	

Viewing Direction	Photo Description	Photo
<p style="text-align: center;">↓</p>	<p>Typical circle plot, showing gaps of bare ground with chamise, mock heather, and shaggy-bark manzanita</p>	
<p style="text-align: center;">↑</p>	<p>Typical circle plot, showing gaps of bare ground with desiccated vegetation, shaggy-bark manzanita, and chamise</p>	

Viewing Direction	Photo Description	Photo
<p style="text-align: center;">↑</p>	<p>Typical circle plot, showing gaps of bare ground with desiccated vegetation, seaside bird's-beak, and shaggy-bark manzanita</p>	
<p style="text-align: center;">→</p>	<p>Area south of transect BA3 with bare ground, desiccated vegetation, shaggy-bark manzanita, sandmat manzanita, and mock heather</p>	

Viewing Direction	Photo Description	Photo
	<p>Typical transect lines, BE-5 showing about 71% absolute cover predominated by chamise, shaggy-bark manzanita, and deerweed</p>	
	<p>Typical transect lines, BA-7 showing predominance of shaggy-bark manzanita, rush rose, dwarf ceanothus, and Monterey ceanothus</p>	

Viewing Direction	Photo Description	Photo
	<p>Typical transect line, 16-1 showing predominance of shaggy-bark manzanita, dwarf ceanothus, and Monterey ceanothus</p>	
	<p>South facing slope showing predominance of shaggy-bark manzanita, chamise, dwarf ceanothus, and Monterey ceanothus, and valley containing annual grasses</p>	