2012 Biological Monitoring Report for Units 2, 3, 6, 10; Units 11, 12, 4, and 23; and Units 14 and 19 Former Fort Ord

Prepared for

Department of the Army
U.S. Army Corps of Engineers

Sacramento District
1325 J Street
Sacramento, CA 95814-2922

January 2013

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SECTION 1

Introduction

1.1. Introduction

This report presents the results of biological monitoring conducted in Units 2, 3, 6, and 10 (baseline pre-burn areas); Units 4, 11, 12, and a portion of Unit 23 (Year 1 monitoring areas); and Units 14 and 19 (Year 3 monitoring areas) (Figure 1-1). Monitoring was completed based on methodology presented in the Vegetation Monitoring Protocol (VMP) (Burleson, 2009a), with modifications as discussed in Sections 2.3, 3.3, and 4.3.

The 2012 biological monitoring study was conducted to satisfy the monitoring requirements 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). This annual monitoring report presents the results of monitoring for HMP annuals, shrubs, grasses, and exotic plants. Before the completion of vegetation clearance, munitions removal, and other related environmental cleanup operations, baseline biological are conducted to establish whether protected species are present prior to work operations, including location and abundance. Monitoring of protected species and habitat after completion of cleanup activities is conducted to determine whether the species and habitat recovery are meeting success criteria as established in the HMP.

Terrain over most of the sites consists of rolling hills with elevations ranging from 375 to 550 feet (ft). The vegetation type is primarily central maritime chaparral with patches of annual grasslands and coast live oak (*Quercus agrifolia*) woodlands. Central maritime chaparral is a vegetation type protected under the HMP because of its association with significant numbers of rare, threatened, and endangered species. Central maritime chaparral is also adapted to periodic fires. These fires remove the dominant shrub species and create open space that can be colonized by annual plants. Establishment of a periodic fire regime is a key factor in establishing a diverse dynamic chaparral community.

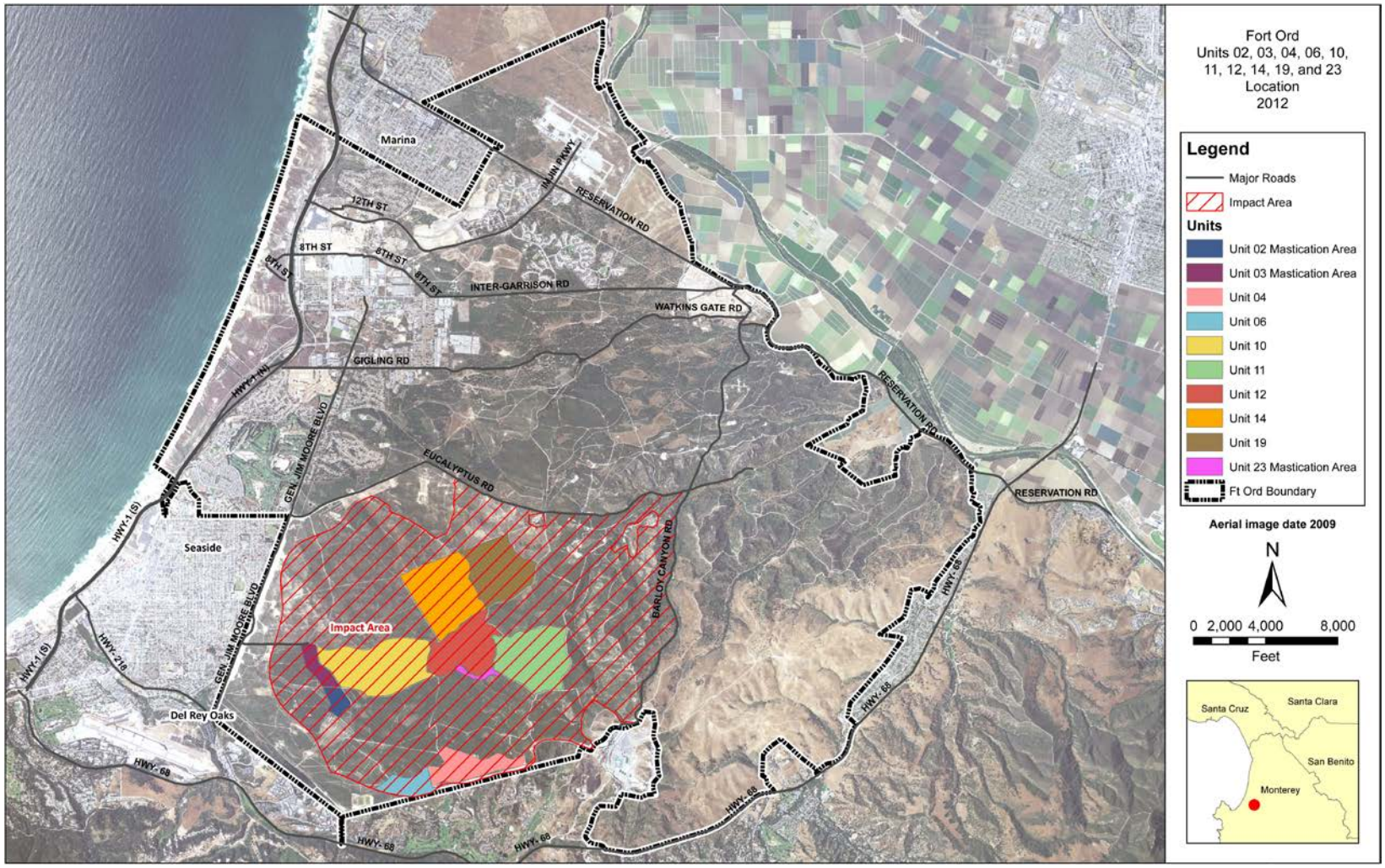

Figure 1-1 Map of former Fort Ord, Monterey California showing locations of Units sampled in 2012.

1.2. Species Included in 2012 Habitat and Rare Species Monitoring

The primary habitat of concern at the former Fort Ord is central maritime chaparral. Plant species within central maritime chaparral include a variety of shrub and herbaceous plants (Table 1-1). These include five shrub species and three annual herbaceous species that are special-status species and, as such, are designated by the HMP as species of concern. The shrub species of concern (HMP shrubs) include sandmat manzanita (*Arctostaphylos pumila*), Monterey manzanita (*Arctostaphylos montereyensis*), Hooker's manzanita (*Arctostaphylos hookeri* ssp. *hookeri*), Monterey ceanothus (*Ceanothus cuneatus var. rigidus*), and Eastwood's goldenbush (*Ericameria fasciculata*). The annual species of concern (HMP annuals) include sand gilia (*Gilia tenuiflora* ssp. *arenaria*), Monterey spineflower (*Chorizanthe pungens* var. *pungens*), and seaside bird's-beak (*Cordylanthus rigidus* ssp. *littoralis*). Some changes in species taxonomy were made to conform to current taxonomic treatments (Baldwin et al. 2012). Specifically, the acronym for the Monterey ceanothus (*Ceanothus cuneatus var. rigidus*) was changed from CERI to CECUR in 2010 to reflect the sub-specific designation of this plant at that time.

1.3. Previous Surveys Conducted on the Sites

The previous surveys conducted at the specific Fort Ord sites monitored in 2012 are provided in Table 1-2. All Year 1 and Year 3 Units sampled in 2012 were sampled either by Burleson (2009b) or by Tetra Tech and EcoSystems West (2011 and 2012).

Data from previous surveys for HMP annuals and shrub line transects were obtained from GIS shapefiles and associated metadata provided by the Fort Ord GIS coordinator, Mr. C. Stiebel (Stiebel 2010, pers. comm.), and from the results of previous surveys in 2010 and 2011 (Tetra Tech and EcoSystems West 2011, 2012).

Data were also transcribed from the electronic versions of previous monitoring reports when available. The 2009 vegetation data for Units 14 and 19 was transcribed from tables in the original report (Burleson 2009b) into the database for analysis. In addition to the incorporation of past line transect data into the database, adjustments were made to the "density" class field in the vegetation monitoring data table to correspond to the density classes defined by Burleson (2009a).

A new data field "treatment" was added in 2011 to the line transect and Vegetation Monitoring data tables. This field was incorporated to enable a comparison to be conducted between treatment classes. Three treatment classes were identified based on treatments applied:

- MasticationOnly – Vegetation was cut and masticated in place;
- Masticate&Burn – Vegetation was cut and then burned in place; and
- Burn – Vegetation was burned in place without being cut first. This method most closely mimics a natural fire.

Treatments were identified based on the activities reported in previous reports. Only those units that were the subject of the 2011 and 2012 surveys were recoded. All 2012 baseline survey locations were classified as "MasticationOnly", as this was the only treatment applied.

Table 1-1
Common and Scientific Names of Plant Species Included in the 2012 Vegetation Surveys

Acronym	Scientific Name	Common Name	Life Form
ADFA	*Adenostoma fasciculatum*	Chamise	shrub
ARHO	*Arctostaphylos hookeri* ssp. *hookeri*	Hooker's manzanita	shrub
ARMO	*Arctostaphylos montereyensis*	Monterey manzanita	shrub
ARPU	*Arctostaphylos pumila*	Sandmat manzanita	shrub
ARTO	*Arctostaphylos tomentosa* ssp. *tomentosa*	Shaggy-barked manzanita	shrub
BAPI	*Baccharis pilularis*	Coyote brush	shrub
CECUR	*Ceanothus rigidus* (=*Ceanothus cuneatus var. rigidus)*	Monterey ceanothus	shrub
CEDE	*Ceanothus dentatus*	Dwarf ceanothus	shrub
CETH	*Ceanothus thyrsiflorus*	Blue blossom	shrub
ERCO	*Eriophyllum confertiflorum*	Golden yarrow	subshrub
ERER	*Ericameria ericoides*	Mock-heather	shrub
ERFA	*Ericameria fasciculata*	Eastwood's goldenbush	shrub
GAEL	*Garrya elliptica*	Coast silk-tassel bush	shrub
HEAR	*Heteromeles arbutifolia*	Toyon	shrub
HESC	*Helianthemum scoparium*	Peak rush-rose	subshrub
LECA	*Lepechinia calycina*	Pitcher sage, woodbalm	shrub
LOSC	*Acmispon glaber* (=*Lotus scoparius)*	Deerweed	subshrub
LUAL	*Lupinus albifrons (*var. *albifrons?)*	Silver bush lupine	shrub
LUAR	*Lupinus arboreus*	Bush lupine	shrub

Table 1-1 (continued)
Common and Scientific Names of Plant Species Included in the 2012 Vegetation Surveys

Acronym	Scientific Name	Common Name	Life Form
MIAU	*Mimulus aurantiacus*	Sticky monkeyflower	shrub
QUAG	*Quercus agrifolia*	Coast live oak	tree or shrub
QUPAS	*Quercus parvula* var. *shrevei*	Shreve oak	tree or shrub
QUWIF	*Quercus wislizenii* var. *frutescens*	Interior live oak	shrub
RHCA	*Frangula californica* *(= Rhamnus californica* ssp. *californica)*	California coffeeberry	shrub
ROGY	*Rosa gymnocarpa*	Wood rose	shrub
RUUR	*Rubus ursinus*	Pacific blackberry	woody vine
SAME	*Salvia mellifera*	Black sage	shrub
SOUM	*Solanum umbelliferum*	Blue witch	shrub
SYMO	*Symphoricarpos mollis*	Creeping snowberry	subshrub
TODI	*Toxicodendron diversilobum*	Poison-oak	shrub
CAED	*Carpobrotus edulis*	Iceplant	perennial succulent herb
COXX	*Cortaderia* sp. *(C. jubata or C. selloana)*	Jubata grass, pampas grass	large, robust perennial grass
BG		Bare ground	
HERB		Herbaceous vegetation	

Nomenclature conforms to *The Jepson Manual, Second Edition* (Baldwin et al. 2012); names used in previous monitoring reports and in the first edition of *The Jepson Manual* (Hickman 1993) are given in parentheses.

Table 1-2
Previous Monitoring Surveys at 2011 Study Sites on Fort Ord

Year	Survey
2009	Burleson (2009) revised the monitoring program approach.
2009	Burleson (2009b) performed baseline monitoring of HMP annual plants and shrubs in Units 14 and 19
2010	Tetra Tech and Ecosystems-West (2011) performed Year 1 HMP annual plants and shrub surveys on Units 14 and 19.
2011	Tetra Tech and Ecosystems-West (2012) performed baseline HMP annual plant and shrub surveys on Units 4, 11, 12, and a portion of Unit 23.

SECTION 2

Baseline Vegetation Surveys—Units 2, 3, 6, and 10

2.1. Units 6 and 10 and Portions of Units 2 and 3 – Introduction

Units 6 and 10 and portions of Units 2 and 3 are scheduled for prescribed burning and/or mechanical clearance of existing shrub cover (mastication) as part of 2012-2013 environmental cleanup operations involving munitions and explosives removal (Figure 2-1). Clearance of existing vegetation in Unit 6 and in the eastern portions of Units 2 and 3 (the areas included in 2012 monitoring) includes only mastication in areas of mature maritime chaparral, with no prescribed burning. In Unit 10, the prescription is for mastication prior to burning within 230-foot-wide primary containment lines (fuel breaks) around the entire perimeter of the unit, followed by prescribed burning of the entire unit including the masticated perimeter. In mastication areas, essentially all shrub cover is mowed to a height of approximately 6 in.

2.2. Units 6 and 10 and Portions of Units 2 and 3 – Setting

Unit 6 encompasses an area of 70 acres, and is located at the south end of former Fort Ord, with the base boundary forming part of the southern boundary of the unit. The topography consists of portions of two parallel east-west-trending ridges along the northern and southern periphery of the unit, with a broad lower-lying area – the upper headwaters of a west-draining canyon – in the central portion. In pre-treatment condition, the vegetation of Unit 6 consisted of a mosaic of mature maritime chaparral and extensive disturbed areas, with limited areas of coast live oak woodland in the southern third of the unit. Mature maritime chaparral occupied much of the eastern half of the unit, and was of lesser extent in the extreme western portion. Shaggy-barked manzanita was the principal dominant in this chaparral. Other dominants included chamise and black sage. Much of Unit 6, especially the central and south-central portions, has a history of extensive heavy disturbance. Vegetation of disturbed areas in pre-treatment condition ranged from areas dominated by non-native annual grasses and associated herb species, also largely non-native, to a sizable area near the center of the unit that was largely bare, with only sparse vegetation. A large area in the south-central portion of the unit was heavily infested with large clumps of the invasive, non-native perennial grass pampas grass (*Cortaderia* sp.), although the density of pampas grass in the area had been considerably reduced in recent years by eradication efforts. The northwestern portion of the unit is vegetated with maritime chaparral that has been subject to considerable past disturbance, and consists of clumps of chaparral shrubs interspersed with open areas vegetated with mostly non-native grasses and herbs.

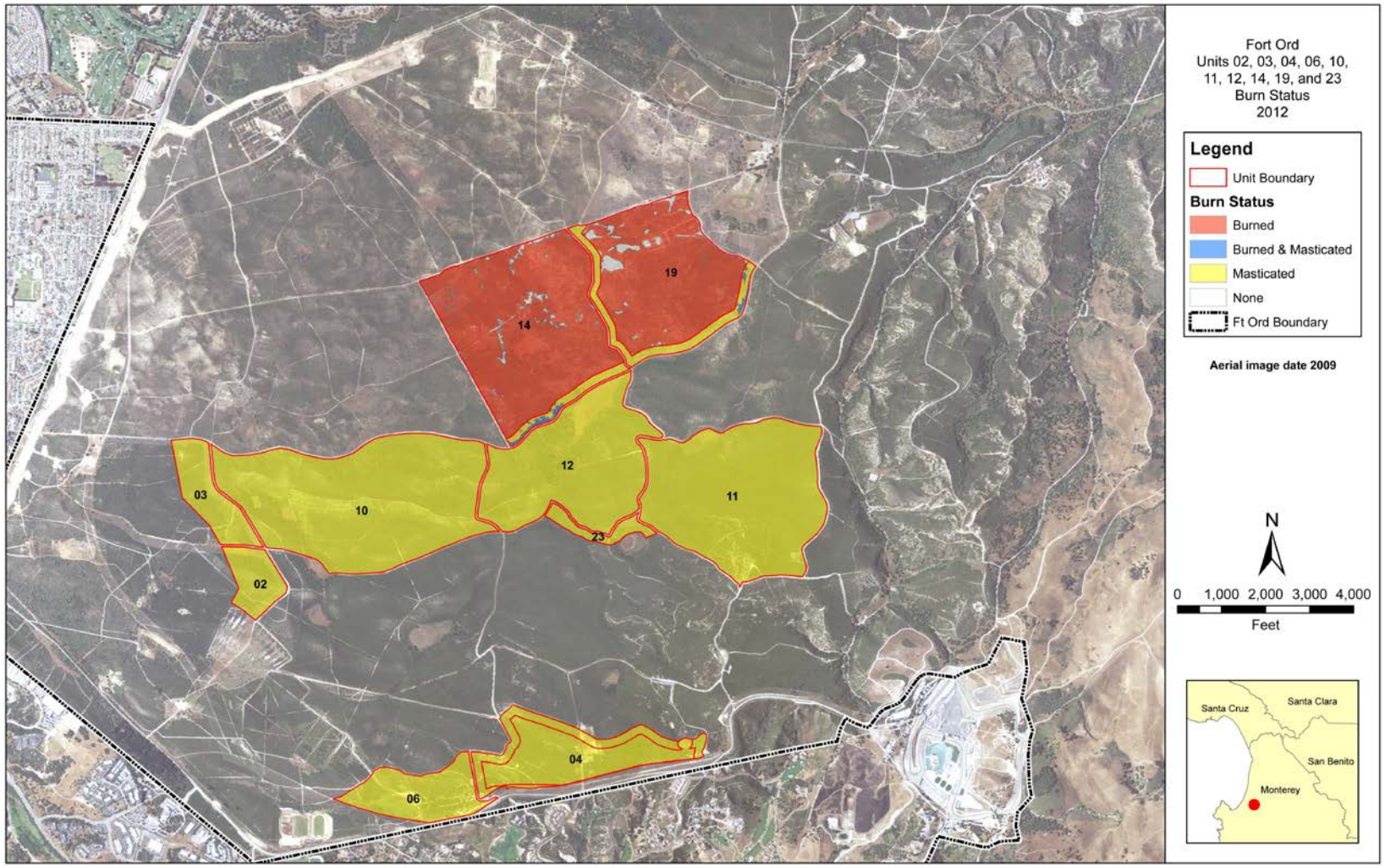

Figure 2-1 Burn units surveyed in 2012 showing burn status for those units.

Unit 10 encompasses a total area of 327 acres, of which 87 acres are within the 239-foot-wide primary containment mastication area and the remaining 239 acres are in the interior of the unit for which prescribed burning only, without mastication, is the vegetation clearing prescription. The unit is located south of Watkins Gate Road in the west-central portion of the area of the base within which munitions and explosives removal are currently being conducted. The unit is dominated by a prominent ridge (presumably a fossil dune ridge) running east-west across approximately the center of the unit. Elsewhere in the unit the terrain is gently rolling.

In pre-treatment condition, Unit 10 was almost entirely vegetated with mature maritime chaparral varying considerably in physiognomy and species composition. The chaparral shrubs range from low (3-4 feet) to tall (12-15 feet), and shrub density ranges from relatively open, with numerous openings of various sizes, to essentially 100 percent areal cover. Relatively open chaparral is most extensive on the upper parts of the main ridge, where chaparral with this physiognomy is continuous almost all the way across the unit. As in maritime chaparral throughout Fort Ord, shaggy-barked manzanita is the most characteristic dominant, and is generally overwhelmingly dominant where the shrub cover is tall and dense. Other characteristic shrubs that are often dominant or co-dominant include chamise, black sage, sandmat manzanita, Monterey ceanothus, and poison-oak. Two sizable areas of meadow habitat, dominated by native and non-native grasses and herbs, occur in the southwestern portion of the unit. One sizable stand of coast live oak woodland occurs in the north-central portion of the unit. Although numerous individual coast live oak trees are scattered throughout the remainder of the unit, and small stands occur in the southwestern portion of the unit, well developed coast live oak woodland does not occur elsewhere in this unit. Disturbed areas are of limited extent in this unit, and mostly occur along old roads and fuel breaks.

The portions of Units 2 and 3 included in 2012 monitoring are adjacent to each other and constitute the easternmost portions of those two units. Unit 3 is directly west of Unit 10, and Unit 2 is south of Unit 3 and southwest of Unit 10. The included portions of Units 2 and 3 encompass 35 acres and 49 acres, respectively. The topography is level to gently rolling. In pre-treatment condition, the included portions of the two units were mostly vegetated with mature maritime chaparral similar to that in Unit 10. This chaparral is mostly dense with few openings in Unit 3 and more variable in physiognomy in Unit 2. In the south portion of the included part of Unit 3, chaparral occurs in a mosaic with patches of coast live oak woodland, with also a disturbed, sparsely vegetated area. A sizable stand of coast live oak woodland occurs in the northern portion of the included part of Unit 2. A sizable meadow is on the border between the two units. A large disturbed soil remediation area is located in the northern portion of the included part of Unit 3.

The U.S. Department of Agriculture (USDA 2012) maps two soil types as occurring in the baseline areas. Arnold-Santa Ynez complex is mapped as occurring in all of Unit 6, all of Unit 10 except the northwest corner, the entire portion of Unit 2 included in the 2012 monitoring, and the southern end of the portion of Unit 3 included in the 2012 monitoring. Characteristics of these soils are presented in Table 2-1.

It is apparent in the field that at least two distinct types of soil occur in the areas where the soil is mapped as Arnold-Santa Ynez complex as well as elsewhere in the portion of the base in which

munitions and explosives removal are currently being conducted. One type of soil consists primarily of relatively coarse, loose sand, generally without gravel. The other soil type consists of finer, harder-packed sand with finer material, and typically contains large numbers of small, reddish, rounded pebbles. The HMP annual species Monterey spineflower, sand gilia, and seaside bird's-beak occur almost exclusively on the former soil type.

Table 2-1
Distribution of Soil Types in the Fort Ord 2011 Baseline Monitoring Areas

Soil Type	Description	Unites Where Found
Arnold-Santa Ynez complex	Arnold: Loamy fine sand; somewhat excessively drained; derived from residuum weathered from sandstone Santa Ynez: Fine sandy loam; moderately well drained; derived from residuum weathered from sandstone	Baseline: Unit 2 (portion included in 2012 monitoring); south end of Unit 3 (portion included in 2012 monitoring); Unit 6; Unit 10 except northwest corner First Year: Throughout except small portion of Unit 11 Year 3: Throughout
Baywood sand, 2 to 15 percent slopes	Sand; somewhat excessively drained; derived from stabilized sandy eolian sands	Baseline: Unit 3 (portion included in 2012 monitoring) except south end; northwest corner of Unit 10
Xerorthents, dissected	Loam, clay loam; well drained; derived from mixed unconsolidated alluvium	First Year: Unit 11, small area in south portion near jct. Orion and Mercury rds.

Source: USDA (2012)

2.3. Units 6 and 10 and Portions of Units 2 and 3 – Methods

In the spring and early summer 2012, prior to any treatments being conducted, baseline vegetation monitoring surveys were conducted in these units. These 2012 baseline monitoring surveys consisted of the following components:

- Meandering transect surveys to locate and map herbaceous HMP species.
- Density monitoring for three HMP annual species: Monterey spineflower, sand gilia, and seaside bird's-beak.
- Line intercept transect sampling to sample shrub species composition in the mature maritime chaparral.
- Mapping of non-native annual grasses within the primary containment areas.

- Mapping of invasive species, including iceplant, pampas grass, and French broom, where encountered.

2.3.1. Meandering Transects

Meandering transect surveying in the baseline areas was conducted between 3 and 9 May 2012. Species surveyed for included five HMP herbaceous species: the biennial to perennial species coast wallflower and the annual species Monterey spineflower, sand gilia, seaside bird's-beak, and Contra Costa goldfields. The timing of this surveying was optimal for locating and identifying coast wallflower, Monterey spineflower, sand gilia, and Contra Costa goldfields, as the surveying was conducted during the flowering period of these species. Seaside bird's-beak had not yet flowered when the meandering transect survey was conducted but the species was readily identifiable by its vegetative characteristics.

When an HMP herbaceous species was observed during meandering transect surveying, a recreational-grade Global Positioning System (GPS) unit (Garmin 72 or 72H) was used to record the location. The HMP species present in the vicinity of each point were also recorded. The base-wide system of 100×100 foot grids was then used for mapping HMP herbaceous species. All GPS coordinates for HMP herbaceous species observed during meandering transect surveying were plotted onto a map of the grids. A list was then compiled of all grids within the baseline areas that contained one or more HMP herbaceous species.

2.3.2. HMP Annuals Density Monitoring

Density monitoring for three HMP annual species, Monterey spineflower, sand gilia, and seaside bird's-beak, was conducted in the baseline areas between 14 and 17 May 2012. This time period was optimal for observing Monterey spineflower and sand gilia, as these species were in flower throughout this period. Seaside bird's-beak was not yet in flower when this density monitoring was conducted, but was readily identifiable by its vegetative characteristics.

The pre-defined 100×100 foot grids were used as sample plots for the density monitoring. In Unit 10 a stratified random sample of 100×100 foot plots consisting of 20 percent of all plots mapped during meandering transect surveying as occupied by one or more HMP annual species were selected for sampling. Sampling was stratified by species, to ensure adequate representation of both Monterey spineflower and sand gilia (the only HMP annual species mapped in the unit), and by mastication area vs. interior. Because relatively few 100×100 foot grids in the portions of Units 2 and 3 included in the 2012 monitoring were occupied by HMP annuals, all occupied grids were monitored. The grids were not marked in any way in the field; we therefore used a resource grade Trimble GeoXH GPS receiver with the grid boundaries loaded as a map layer to determine the boundaries of the grids to be sampled. Grid corners were temporarily marked in the field using pink flagging tape tied to the tallest point of vegetation to assist with navigation during HMP annual species monitoring.

The methods specified in the monitoring protocol (Burleson 2009a) were followed for the density monitoring, with the exception that, in many plots, for one or more HMP annual species, a complete census of the entire plot was conducted rather than a subsampling (below). The

surveyors conducted an initial reconnaissance of each 100×100 foot sample plot to determine which HMP annual species were present and how they were distributed within the plot. When feasible given the numbers and distribution of individuals of HMP annual species in the plot, the entire plot was censused by counting all individuals of a given HMP annual species within the plot using a hand counter. When it was not feasible to conduct a complete census of a given species in a given plot, the plot was subsampled using a 2.5 meter radius circular plot. An area judged by the surveyors to be representative of the density of the species within the entire plot was selected for subsampling, and the circular plot was sampled using a measuring tape. One surveyor held the end of the measuring tape at the point selected as the center point of the circular plot, while another surveyor scribed the circle. All plants of the species being sampled were then counted within the 2.5 meter radius plot.

For all HMP annual species in all 100×100 foot sample plots, the surveyors estimated the percent suitable habitat within the plot for each HMP annual species present. In practice, "suitable habitat" was essentially treated as equivalent to "occupied habitat". Since the percent suitable habitat was used to calculate the estimated number of individuals present within a 100×100 foot sample plot when a circular subsample plot was used, including habitat subjectively judged to be "suitable", but not occupied, in the estimates of suitable habitat would have resulted in upwardly biased estimates of numbers of individuals present in subsampled 100×100 foot plots.

When circular plots were used for subsampling, estimates of the total number of plants present in the 100×100 foot sample plot were calculated. Since the area of a 2.5 meter radius circular plot is approximately 211.34 square feet, and since the area of a 100×100 foot plot is 10,000 square feet, the estimated number of individuals in the 100×100 foot plot was calculated using the following formula:

$$n = \frac{10000\, a \left(\frac{b}{100}\right)}{211.34}$$

where,

n = the estimated number of individuals in the 100×100 foot plot;

a = the number of individuals counted in the circular plot, and

b = the estimated percent suitable habitat in the 100×100 foot plot

For each HMP annual species, each 100×100 foot sample plot was assigned to one of five density classes based on the number of individuals counted or estimated to be present. The density classes are as follows when the entire 100×100 foot sample plot was sampled:

0 = 0 plants

1 = 1 to 50 plants

2 = 51 to 100 plants

3 = 101 to 500 plants

4 = >500 plants

When only a portion of the plot was sampled due to recent disturbance or interception by roads, the density classes were scaled proportional to the percentage of the total plot sampled.

In some cases where it was evident that a given sample plot should be assigned to density class 4, the surveyors assigned the plot to this density class without attempting to count or estimate numbers of plants. This was done because, for all HMP annual species, it is difficult to get accurate counts, even within a 2.5 meter radius circular plot when plant densities are very high. In some cases, plots were assigned to density class 4 after a partial census indicated that considerably more than 500 plants were present in a 100×100 foot sample plot, or after it became apparent that the number of plants within a circular plot considerably exceeded the minimum number required for an estimate of greater than 500 plants within the 100×100 foot sample plot.

2.3.3. Shrub Transect Monitoring

Shrub transect monitoring in the baseline areas was conducted in areas supporting maritime chaparral without obvious recent or heavy large-scale disturbance, with the exception of one transect in Unit 6 (transect 6-5), which was located in an area that was accidentally burned in 1999. In Unit 10, none of the transects had been sampled in any previous year. One transect in Unit 2 and two transects each in Units 3 and 6 had been previously sampled. In all units, areas supporting habitat types other than maritime chaparral (e.g. coast live oak woodland, grassland), and extensive disturbed areas, were mapped and excluded from transect sampling. Locations for all newly established transects were then selected by randomly selecting 100×100 foot grids within the areas of maritime chaparral vegetation in each baseline unit. For previously sampled transects, the surveyors used a resource grade Trimble GeoXH GPS receiver to locate the previously recorded start and end points of each transect sampled. One transect was allocated for each approximately 11 acres. In Unit 10, transects were allocated separately within the 239-foot-wide primary containment lines (areas to be masticated) and within the interior of the Units beyond the containment lines. This was not necessary in the remaining baseline areas, since those units were to be entirely masticated and not burned. Numbers of transects sampled within each unit were as follows:

Unit 2: 3 (including one sampled previously)

Unit 3: 5 (including two sampled previously)

Unit 6: 6 (including two sampled previously)

Unit 10: 30 (8 containment area, 22 interior)

Transect sampling in Units 2 and 3 was conducted on 11–12 June 2012. Transect sampling in Unit 6 was conducted on 13 June 2012. Transect sampling in the primary containment areas of Unit 10 was conducted on 4–5 June 2012, and in the interior areas of the unit between 6 June and 2 July 2012.

Transect sampling was conducted using the line intercept method along transects 50 meters in length. For transects not sampled in any previous year, the surveyors used a resource grade Trimble GeoXH GPS receiver with the grid boundaries loaded as a map layer to locate the grids selected for sampling. The end point of each transect was located on or near one of the boundaries

of the 100×100 foot grid selected as the basis for transect placement. Exact transect placement was such that the vegetation along the transect was representative of the surrounding area, and such that a substantial portion of the transect was within the grid selected for sampling (it is impossible to include all of a 50-meter transect within a 100×100 foot grid). In Unit 10, containment area transects were placed such that the entire transect was within the containment area, and interior transects were placed such that the entire transect was within the interior area (i.e., did not extend into the containment area). When transects sampled in a previous year were sampled in 2012, the previously recorded start and end points were used for the 2012 sampling.

All transects were established by stretching out a 50-meter measuring tape between the transect start and end points. For transects not sampled in a previous year, the start and end points of each transect were recorded using the resource grade GPS receiver, and the GPS data was post-processing corrected.

Species for which cover data was recorded separately in the transect sampling include all woody species (shrubs and subshrubs) present along the transect length. Iceplant and pampas grass were also recorded separately because they are invasive species. Other herbaceous vegetation was recorded as "herb", with no breakdown by species, although the herbaceous species present along the transect were noted on the datasheets. Bare ground (including dead vegetation) was also recorded.

The continuous lengths along the transect (above, below, or touching the measuring tape) occupied by each woody species, herbaceous vegetation, and bare ground were recorded in 1 decimeter intervals. Lengths less than 1 decimeter were not recorded. Absolute percent cover of each woody species, herbaceous vegetation, and bare ground along each transect were calculated by summing all the individual lengths along the transect and then calculating this length as a percentage of 50 meters.

2.3.4. Annual Grass Monitoring

Non-native annual grass monitoring was conducted within the 239-foot wide primary containment lines surrounding Unit 10 and the portions of Units 2 and 3 included in the 2012 monitoring and in all of Burn Unit 6 on 29 June 2012. This monitoring included the following non-native annual grass species: silvery hair-grass (*Aira caryophyllea*), wild oat (*Avena* spp.), rattlesnake grass (*Briza maxima*), little quaking grass (*Briza minor*), ripgut grass (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), red brome (*Bromus madritensis* ssp. *rubens*), nit grass (*Gastridium ventricosum*), Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), barnyard foxtail (*Hordeum murinum* ssp. *leporinum*), Italian ryegrass (*Lolium multiflorum*, sometimes a biennial), and rattail fescue (*Vulpia myuros*).

The annual grass monitoring was conducted by a combination of driving the perimeter roads surrounding the Units and walking where necessary to obtain a full overview of the containment areas. Areas supporting non-native annual grass species were mapped onto aerial photographs. In each mapped area, non-native annual grass density was visually estimated and mapped in one of three density classes:

1 (low) = 1–5 percent

2 (medium) = 6–25 percent

3 (high) = >25 percent

2.3.5. Invasive Species

Invasive species, including iceplant, pampas grass, and French broom, were encountered incidentally during the meandering transect survey and the HMP annuals density monitoring and shrub transect monitoring. When invasive species were encountered, the locations were mapped using a recreational-grade GPS unit. In portions of Unit 6, iceplant and pampas grass are too abundant and widespread to be mapped as points. A comprehensive survey for invasive species was not conducted.

2.4. Units 6 and 10 and Portions of Units 2 and 3 – Results and Discussion

The estimated areas and percent of the area that was considered occupied by HMP annual species is summarized in Table 2-2. No HMP annuals were observed in Unit 6. In Units 2 and 3, all grids containing HMP annuals and with ≥ 50 percent of the grid within the Unit were sampled; four grids were sampled in Unit 2 and 19 grids were sampled in Unit 3. In Unit 10, a total of 271 grids were mapped as having HMP annuals present. Twenty percent of those grids were selected for density sampling for a total of 55 grids.

Table 2-2
Percentage of Habitat Suitable for HMP Annual Species in Each Unit

Unit	Total Area (acres)	Suitable Area (acres)	Percentage of Unit	Plots Surveyed
Unit 2	35	0.9	2.6	4
Unit 3	49	4.4	8.9	19
Unit 6	70	0	0.0	0
Unit 10	327	62.3	19.1	55

Because only 4 grids in Unit 2 and 19 grids in Unit 3 contained HMPs, all these grids were selected for sampling. No grids in Unit 6 were identified as containing HMPs during the meandering transects; therefore, no grids were sampled. In Unit 10, 20 percent of the 271 occupied grids were randomly selected for sampling, giving a total of 55 grids.

Maps of locations of survey plots are provided in Appendix A1.

2.4.1. Sand Gilia

Seventy-eight (78) plots were surveyed for HMP plants including sand gilia in 2012 on Units 2, 3, and 10 (Table 2-3; Maps A1-1, A1-6, and A1-14). Sand gilia was present in low densities (density class 1) in 21 percent of the sampled plots in Unit 3 and 29 percent of plots in Unit 10.

2.4.2. Seaside Bird's-Beak

None of the 78 baseline plots on Units 2, 3, 6, and 10 that were sampled supported seaside bird's-beak (Table 2-4; Maps A1-2, A1-7, and A1-15).

2.4.3. Monterey Spineflower

Monterey spineflower was the most frequently occurring and most abundant of the HMP species found (Table 2-5; Maps A1-3, A1-8, and A1-16). This species occurred on 100 percent of the 78 plots surveyed. Densities of this species varied widely between plots (Table 2-5). Twenty-one of the 78 plots sampled (27%) supported Monterey spineflower densities of over 500 plants per grid. Fully 53 percent of the plots had densities in excess of 100 plants per plot.

Table 2-3
Sand Gilia – Number of Plots per Density Class

Density	Density Class	Unit 2 Plots	Estimated Acres of Suitable Habitat Occupied	Unit 3 Plots	Estimated Acres of Suitable Habitat Occupied	Unit 10 Plots	Estimated Acres of Suitable Habitat Occupied
0 plants/grid	0	4	0	15	0	39	0
1–50 plants/grid	1	0	0	4	0.9	16	18.1
51–100 plants/grid	2	0	0	0	0	0	0
101–500 plants/grid	3	0	0	0	0	0	0
> 500 plants/grid	4	0	0	0	0	0	0
Total Occupied Plots		**0**		**4**		**16**	
Total Plots Sampled		**4**	**–**	**19**	**–**	**55**	**–**

Each plot is 100- x 100- feet, or 10,000 square feet, or 0.23 acre.

Table 2-4
Seaside Bird's-Beak – Number of Plots per Density Class

Density	Density Class	Unit 2 Plots	Estimated Acres of Suitable Habitat Occupied	Unit 3 Plots	Estimated Acres of Suitable Habitat Occupied	Unit 10 Plots	Estimated Acres of Suitable Habitat Occupied
0 plants/grid	0	4	0	19	0	55	0
1–50 plants/grid	1	0	0	0	0	0	0
51–100 plants/grid	2	0	0	0	0	0	0
101–500 plants/grid	3	0	0	0	0	0	0
>500 plants/grid	4	0	0	0	0	0	0
Total Occupied Plots		**0**		**0**		**0**	
Total Plots Sampled		**4**	**–**	**19**	**–**	**55**	**–**

Each plot is 100- x 100- feet, or 10,000 square feet, or 0.23 acre.

Table 2-5
Monterey Spineflower – Number of Plots per Density Class

Density	Density Class	Unit 2 Plots	Estimated Acres of Suitable Habitat Occupied	Unit 3 Plots	Estimated Acres of Suitable Habitat Occupied	Unit 10 Plots	Estimated Acres of Suitable Habitat Occupied
0 plants/grid	0	0	0	0	0	0	0.0
1–50 plants/grid	1	1	0.23	9	2.1	18	20.4
51–100 plants/grid	2	0	0	1	0.23	8	9.1
101–500 plants/grid	3	0	0	3	0.7	17	19.3
>500 plants/grid	4	3	0.7	6	1.4	12	13.6
Total Occupied Plots		**4**		**19**		**55**	
Total Plots Sampled		**4**	**–**	**19**	**–**	**55**	**–**

Each plot is 100- x 100- feet, or 10,000 square feet, or 0.23 acre.

2.4.4. Piperia

Mature Yadon's piperia (*Piperia yadonii*) plants were observed at two locations on the eastern side of Unit 6 (Map A1-13). In addition, immature plants were observed at three locations in the north eastern proportion of the Unit.

2.4.5. Shrub Transect Monitoring

A total of 44 transects were sampled on the four Units (Maps A1-4, A1-9, A1-11, and A1-17). Average total shrub cover on transects in Units 2, 3, 6, and 10 in 2012 was consistent between Units, averaging 104.3 percent, and ranging from 95.9 percent in Unit 6 to 107.0 percent in Unit 3 (Figure 2-2). Shrub cover often exceeded 100 percent because of overlapping cover between adjacent shrubs. Bare ground averaged 12.8 percent, and herbaceous vegetation occupied 0.21 percent across the four Units. Raw data for the shrub transects sampled in 2012 are provided in Appendix B.

The dominant species in the pre-burn shrub community included shaggy-barked manzanita (*A. tomentosa* ssp. *tomentosa*), which averaged 58 percent cover and occurred on all transects, and chamise (*A. fasciculatum*) which averaged 20 percent cover and occurred on 98% of the transects across all Units. All other species were present at less than 8 percent cover across all transects. Monterey ceoanthus (*C. cuneatus* var. *rigidus*) and black sage (*S. mellifera*) occur frequently on the transects (75 percent and 80 percent of the transects, respectively), but at low percent cover.

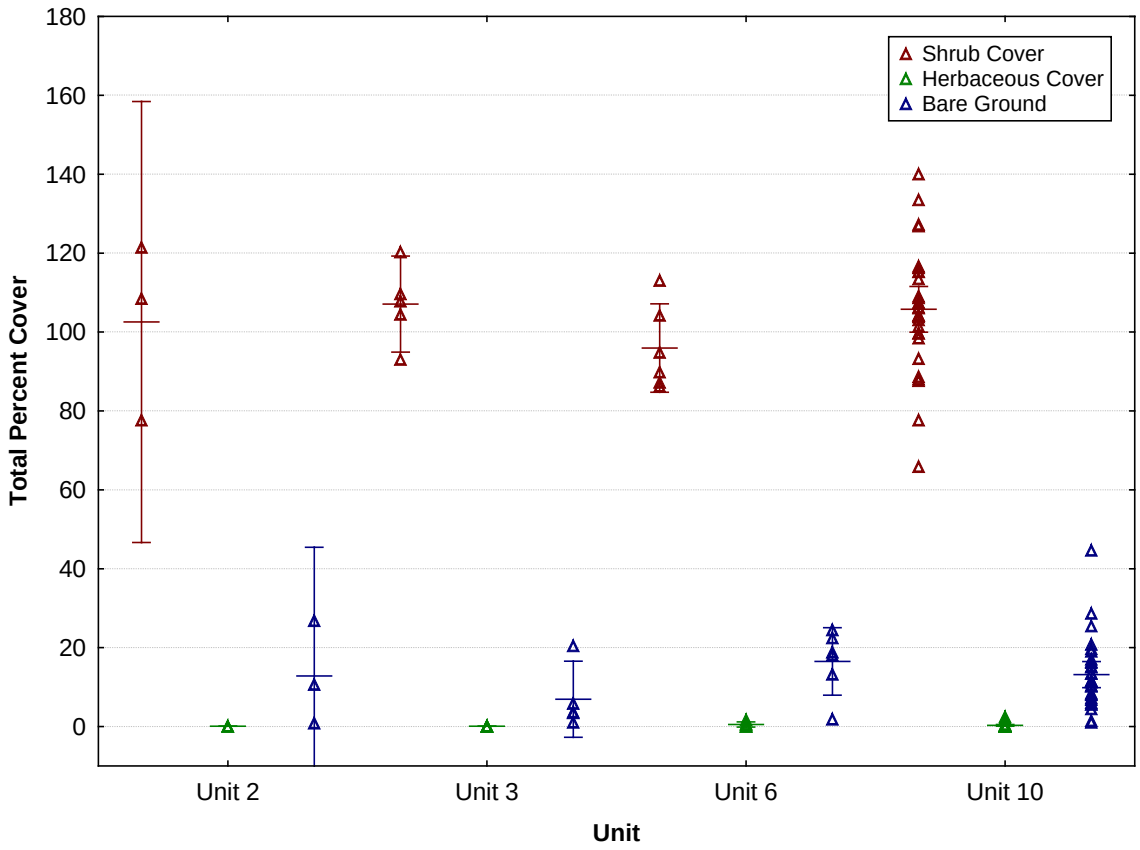

Figure 2-2 **Percent cover of shrubs, bare ground, and herbaceous vegetation for pre-burn conditions in 2012. Points represent individual transects. Lines represent the mean and 95 % confidence interval.**

To assess baseline conditions in community structure, several standard metrics were examined. Species richness (number of species per transect) was variable between transects, with between 3 and 10 species present on each transect (Figure 2-3). Transects sampled in Units 2 and 3 tended, on average, to have lower species richness than transects in Units 6 and 10.

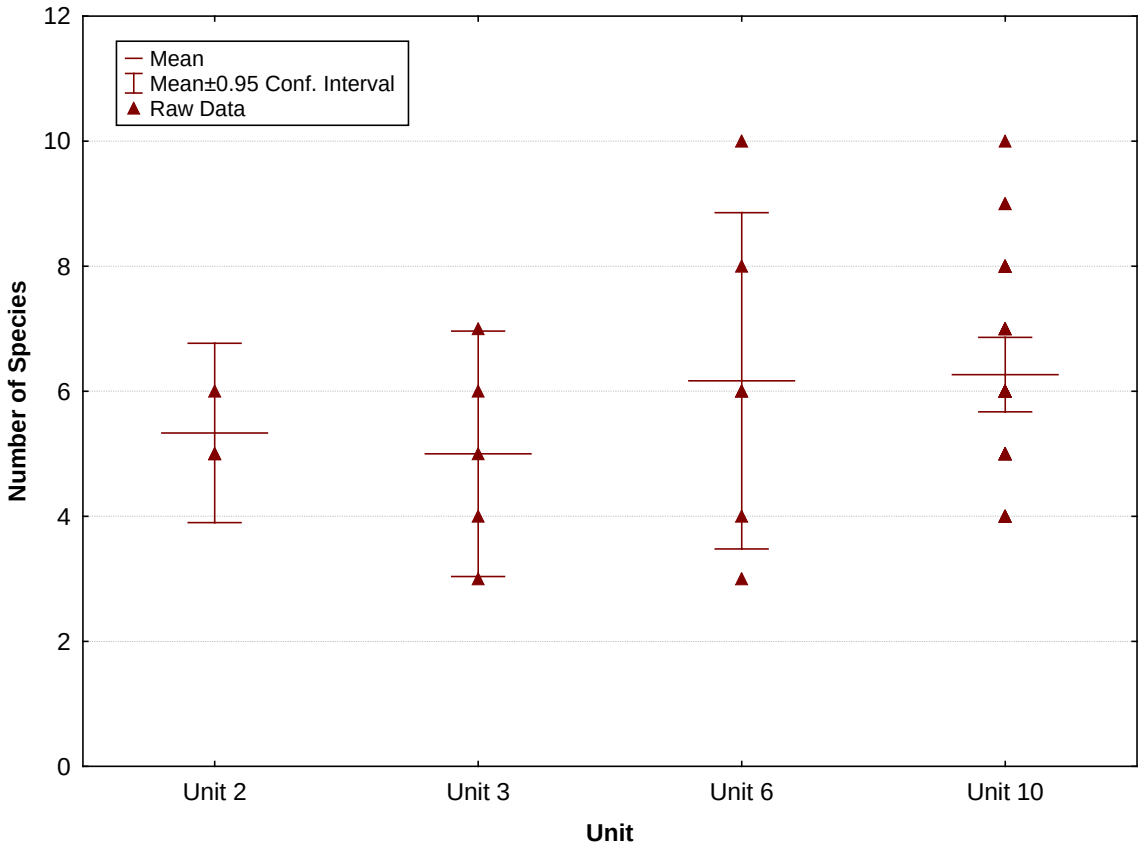

Figure 2-3 Number of shrub species per transect for pre-burn conditions in 2012. Points represent individual transects.

The next metric examined was diversity as measured by the Shannon-Weiner H' metric (Pielou 1974). This metric expresses diversity as a combination of the number of species present in the community and their relative abundance (or cover) in the sample. Average diversity was similar across all Units, ranging from 0.96 in Unit 3 to 1.2 in Unit 10 (Figure 2-4).

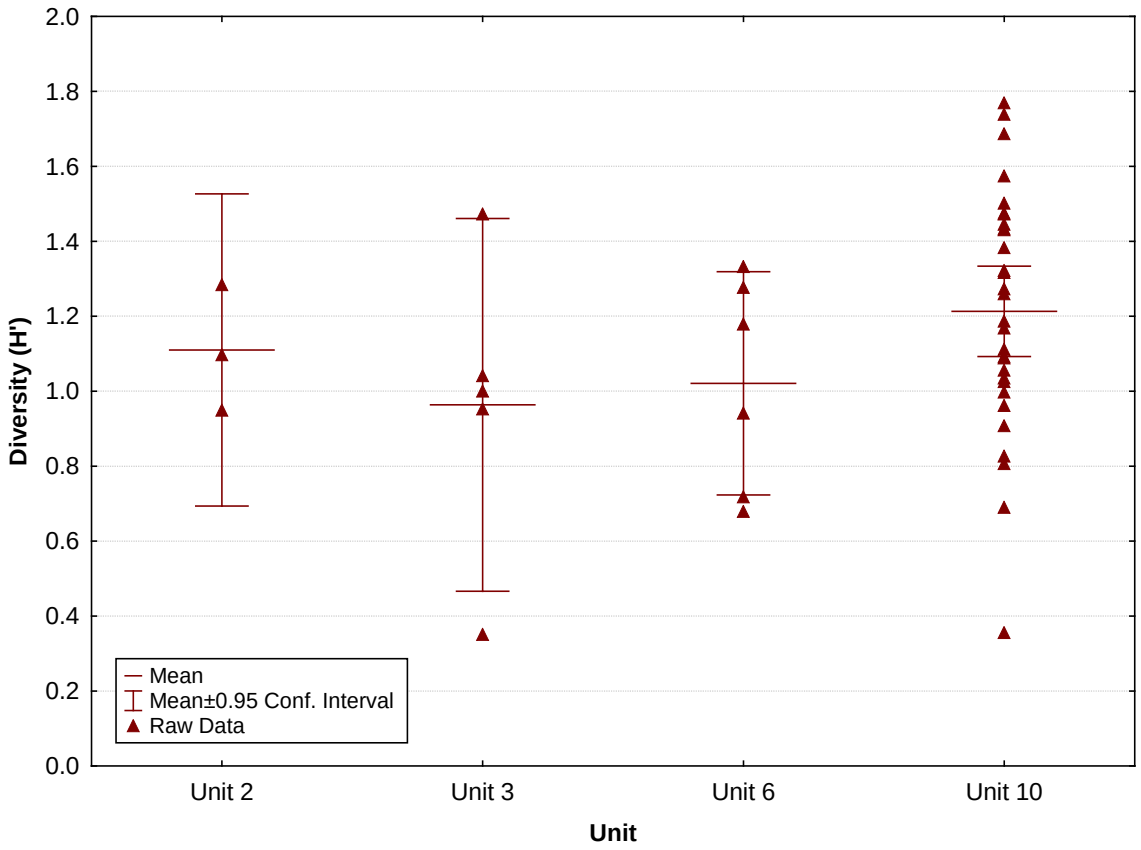

Figure 2-4 Shrub community diversity for pre-burn conditions in 2012. Points represent individual transects.

Evenness is a measure of the equability of the relative contribution of species to the total cover in the community (Pielou 1974). Maximum evenness (value = 1) is achieved when all species are present in equal abundance. Species evenness varied between transects, ranging from 0.59 to 0.67 (Figure 2-5). In the pre-burn community, evenness averaged 0.65 indicating that certain species dominated the community. No differences were seen between Units.

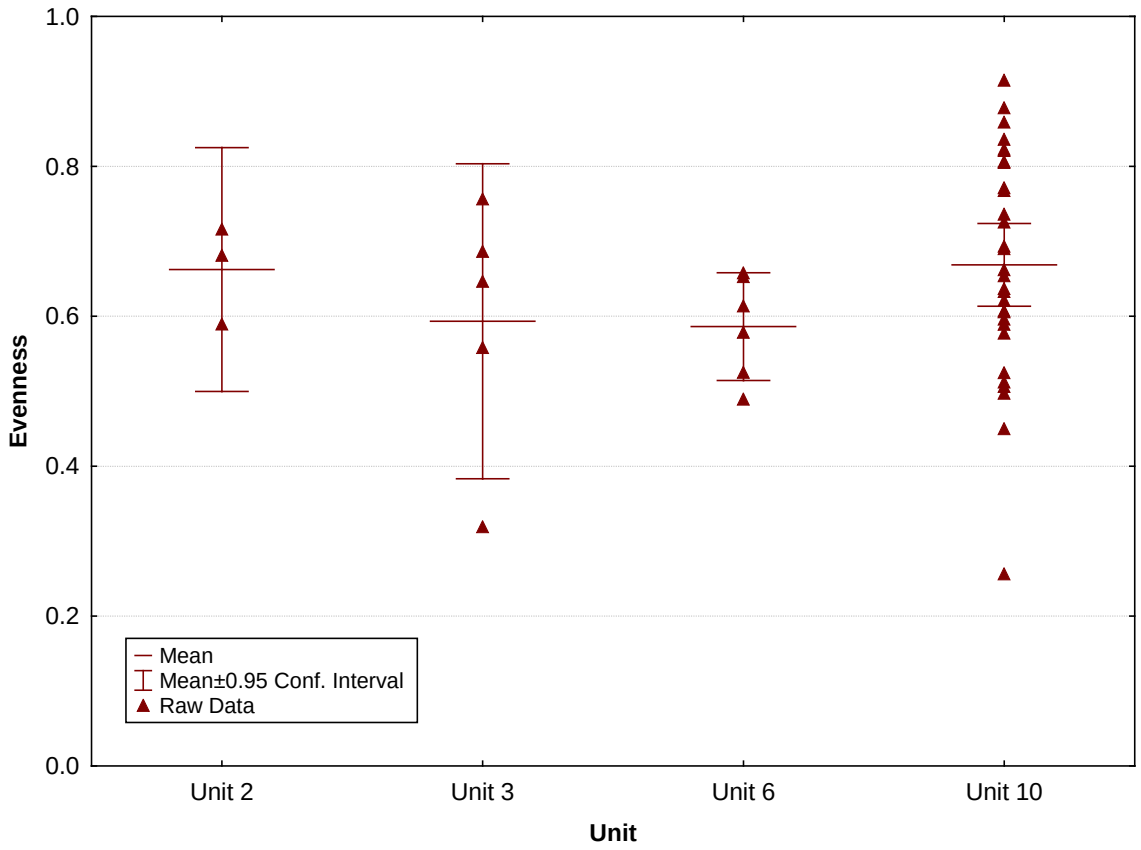

Figure 2-5 Shrub community evenness for pre-burn conditions in 2012. Points represent individual transects.

Multivariate statistics (cluster analysis) was used to assess whether there is a difference in species composition between transects (Jongman et al. 1995). This techniques are based on measures of dissimilarity between samples (transects). This analysis was conducted using the R vegan package, employing function vegdist() to calculate dissimilarity using the Bray-Curtis dissimilarity metric followed by function hclust() to generate the cluster dendogram using the group average method (Oksanen 2011; R Development Core Team 2012). The results of the cluster analysis indicate that there is a biological structure in the shrub communities across the four baseline Units (Figure 2-6). Two groups are clearly evident in the cluster analysis: Group A consists of 20 transects labeled as T10-26 to T10-24 in the center of the cluster dendogram. Group B appears on the right hand side of the dendogram and consists of 14 transects T10-17 to T10-4. A third group of transects (Group C) consists of the remaining 10 transects which show little similarity to each other or to Groups A and B.

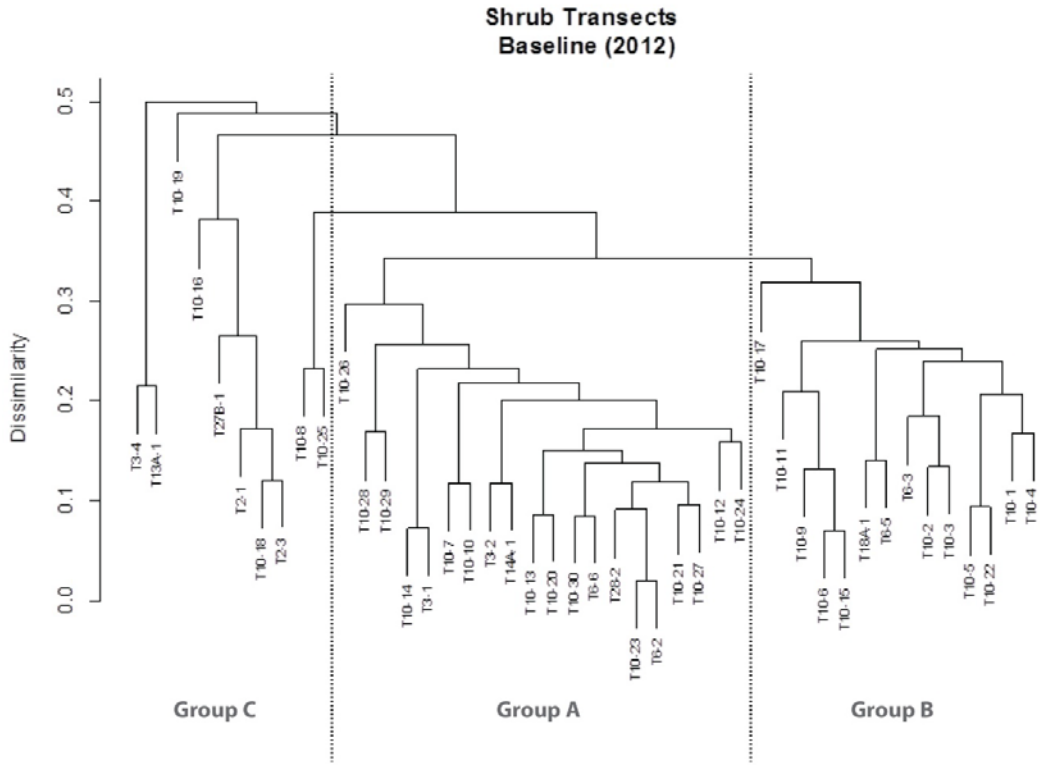

Figure 2-6 Cluster dendrogram of baseline shrub transects in Units 2, 3, 6, and 10. Dashed lines indicate breaks between cluster groupings. Groups A and B are well-defined clusters, whereas Group C is an undefined assemblage of widely varying transects.

All three groups are similar in that shaggy-barked manzanita and chamise comprise a substantial portion of total percent cover and are present on every transect (Table 2-6). However, differences are apparent in terms of the percent cover of the dominant species. Group A transects are clearly dominated by shaggy-barked manzanita, which averages 72% cover on transects within this group. Inclusion of the next two most important species, chamise (13%) and Hooker's manzanita (18%) brings the total percent cover to over 100%. In contrast, the three most dominant species in Group B, shaggy-barked manzanita (48%), chamise (23%) and black sage (15%), comprise a total of only 86%, indicating a less dense community. Bare ground is also significantly greater in the Group B community than in Group A. The Group A community has lower diversity (H') and evenness, consistent with dominance by a single species, whereas percent cover in the Group B community is more equitable.

Table 2-6
Dominant Species (Average Percent Cover) in Each Identified Group

Species	Average Percent Cover		
	Group A	Group B	Group C
Shaggy-barked manzanita	72	48	35
Chamise	13	23	35
Sandmat manzanita	–	–	46
Hooker's manzanita	18	–	–
Black sage	–	15	–
Coast silk-tassel bush	–	–	11
Coast live oak	–	–	12

The percent cover of shaggy-barked manzanita, and chamise on transects within each of the three transect groups are shown in Figure 2-7 and Figure 2-8, respectively. Shaggy-barked manzanita is considered to be the primary climax species in the coastal chaparral community. In contrast, chamise represents an earlier successional stage.

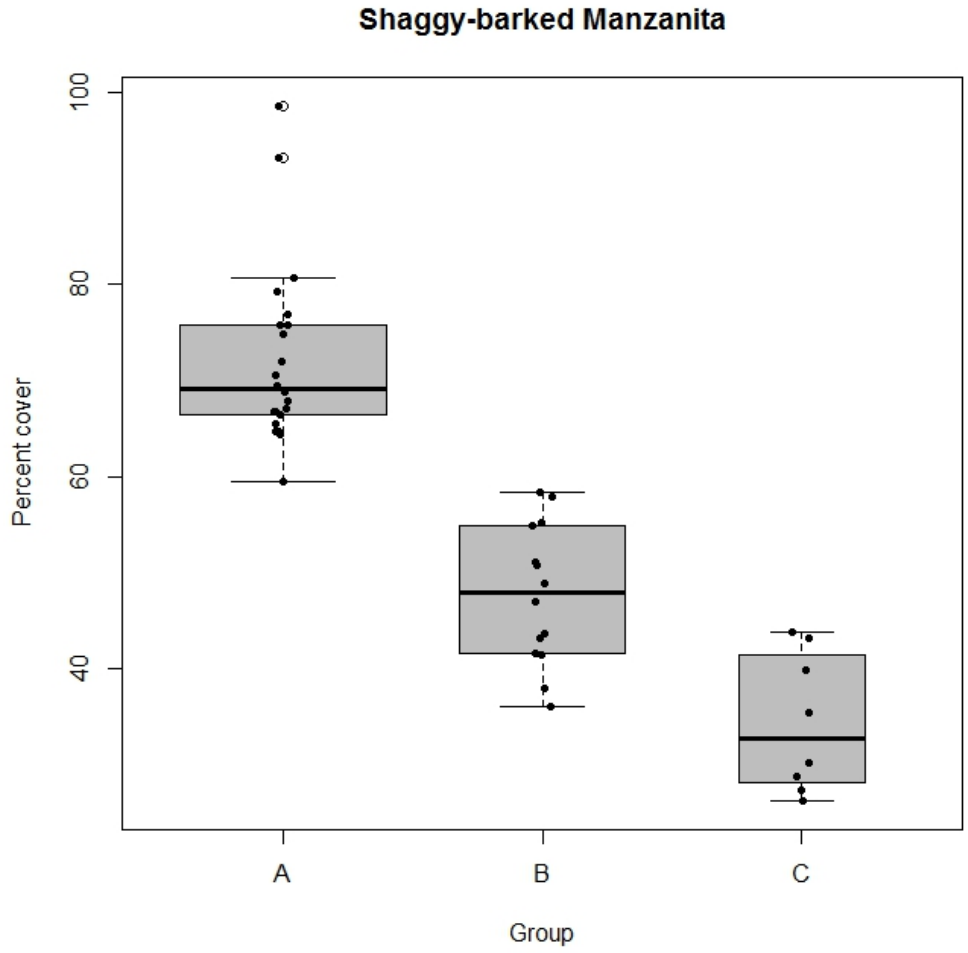

Figure 2-7 **Percent cover of the dominant shaggy-barked manzanita in the three cluster groupings in Units 2, 3, 6, and 10. Boxes represent the 25th through 75th percentile of the data; the thick line within the box represents the median value. Whiskers represent the non-outlier range of the data. Box widths are proportional to the number of transects in each group.**

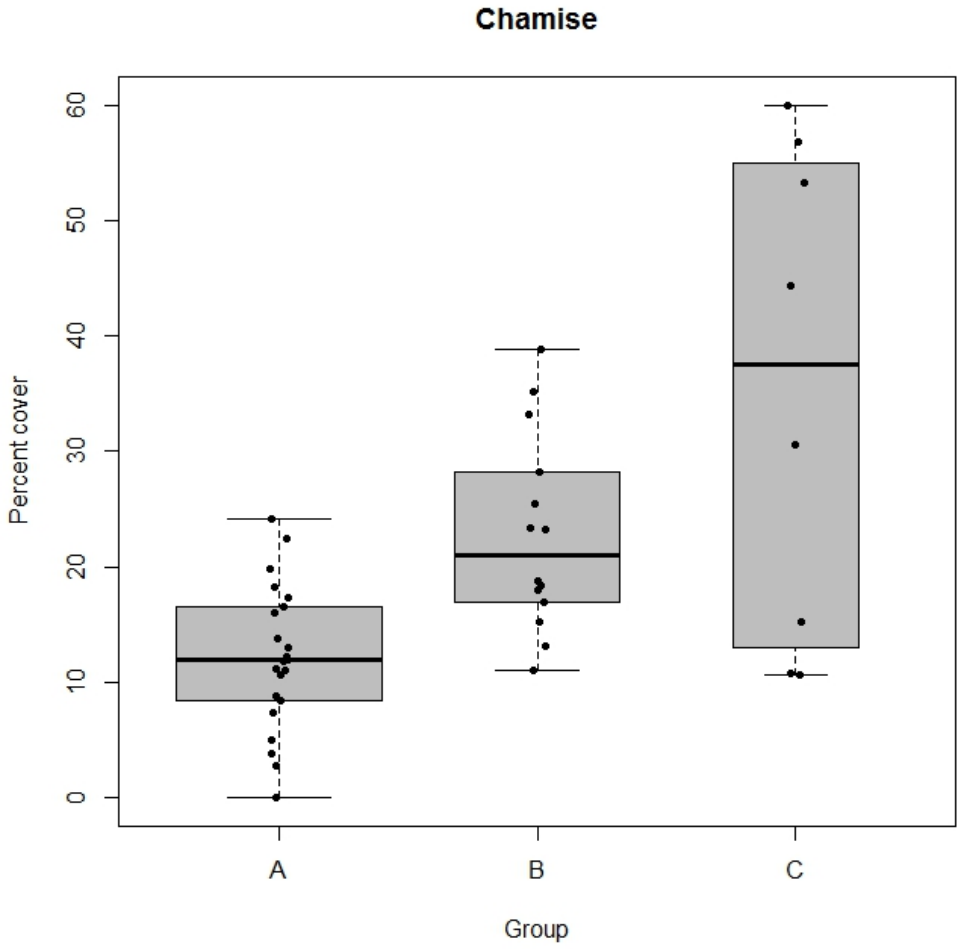

Figure 2-8 **Percent cover of the second most dominant plant species within the three identified plant community clusters in Units 2, 3, 6, and 10. Boxes represent the 25th through 75th percentile of the data; the thick line within the box represents the median value. Whiskers represent the non-outlier range of the data. Box widths are proportional to the number of transects in each group.**

The results of the cluster indicate that there is a pattern to community composition in the baseline Units. The differences are unrelated to the Units, but represent biologically defined groupings, potentially related to environmental conditions. Based on examination of the locations of the transects relative to the Unit boundaries, Group B transects appear to occur more frequently around the periphery of the Units, whereas Group A transects appear to be more centrally located (Figure 2-11). Group C transects are widely dispersed and tend to be in more visibly disturbed areas. Indicator species analysis (Dufrêne and Legendre 1997) indicates that in addition to the dominant late successional species, shaggy-barked manzanita and chamise, Group B transects support the early to mid-successional species Monterey ceanothus and black sage, whereas these species are rare in Group A (Figure 2-9 and Figure 2-10). This supports the viewpoint that Group B transects may be experiencing some degree of disturbance.

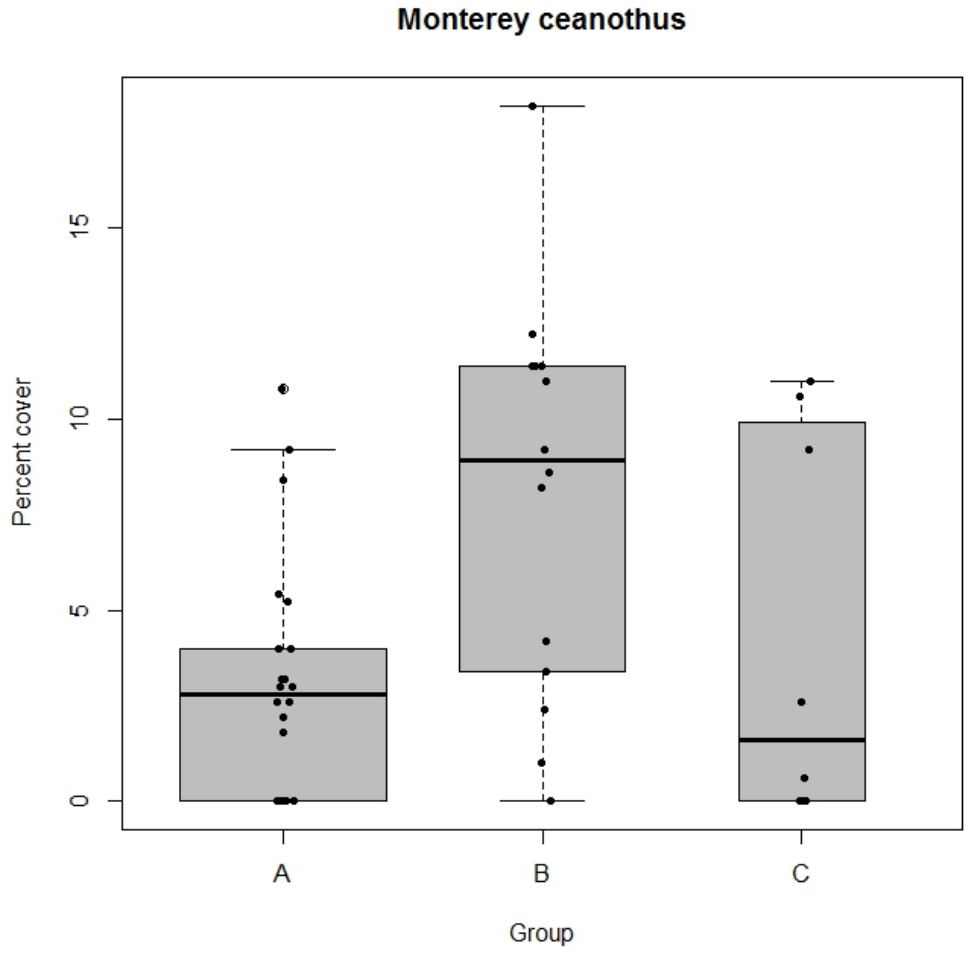

Figure 2-9 **Percent cover of Monterey ceanothus within the three identified plant community clusters in Units 2, 3, 6, and 10. Boxes represent the 25th through 75th percentile of the data; the thick line within the box represents the median value. Whiskers represent the non-outlier range of the data. Box widths are proportional to the number of transects in each group.**

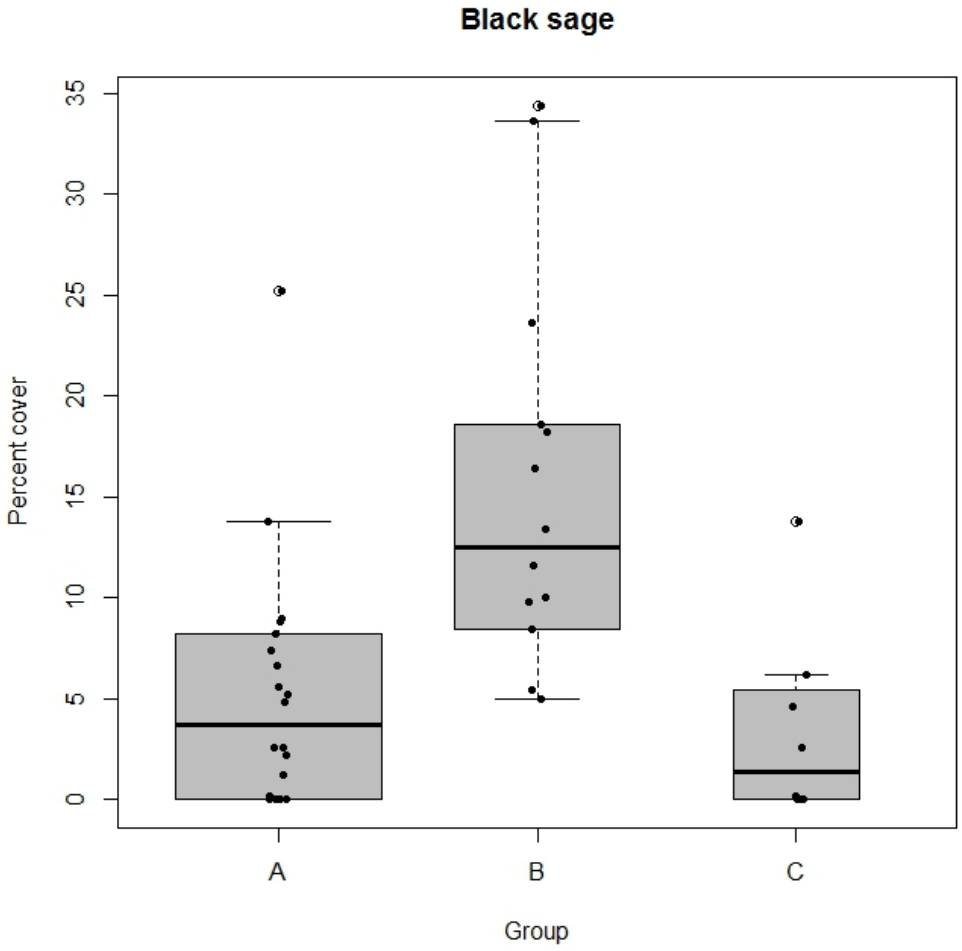

Figure 2-10 Percent cover of black sage within the three identified plant community clusters in Units 2, 3, 6, and 10. Boxes represent the 25th through 75th percentile of the data; the thick line within the box represents the median value. Whiskers represent the non-outlier range of the data. Box widths are proportional to the number of transects in each group.

The position of the transects on the landscape may also be important in influencing the community structure. When the position of the transects belonging to each group are plotted relative to the topographic aspect of the environment, a general pattern relative to aspect appears (Figure 2-11).

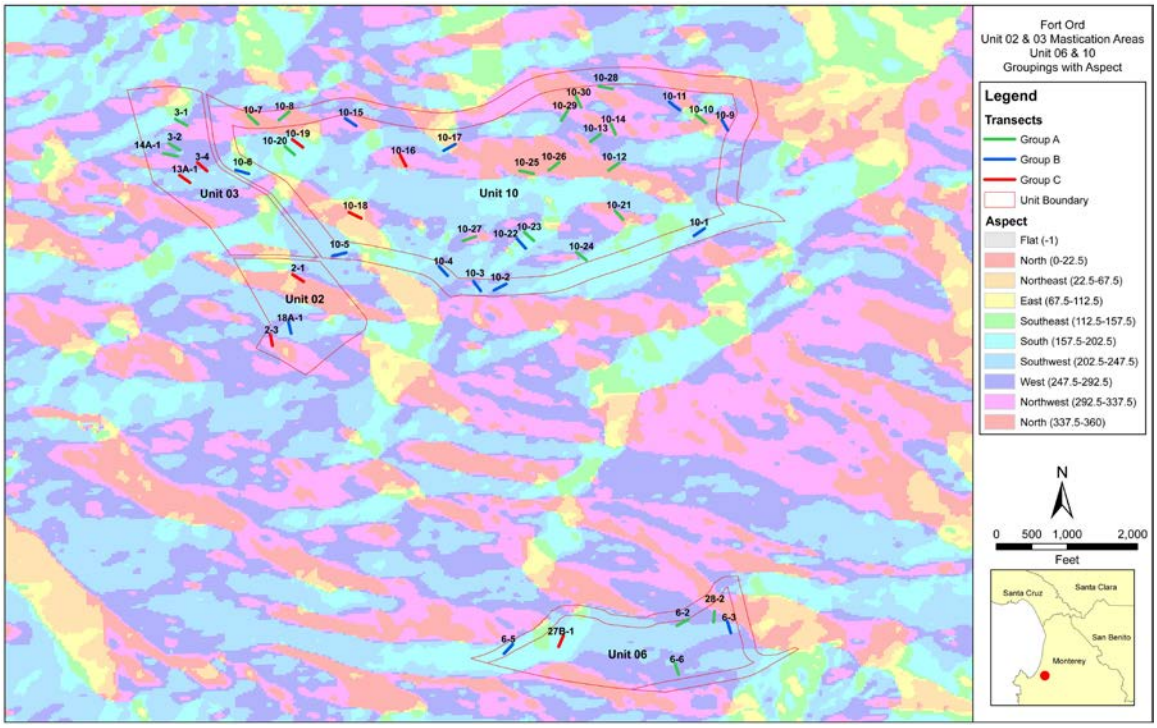

Figure 2-11 Distribution of transect groups relative to topographic aspect. Boundaries of the four baseline units are shown.

Contingency table analysis between Groups A and B indicates that the groups exhibit an association with topographic aspect (χ^2 = 14.7, p=0.005) (Table 2-7). The Group A shrub community is more frequent on west to north facing slopes, whereas Group B transects are most frequent on southwest to south facing slopes. Group C transects do not show any association with topographic aspect.

Table 2-7
Frequency of Occurrence of Transects in Group A and Group B Relative to Topographic Aspect

Aspect	Group	
	A	B
NE	0	1
N	6	0
NW	5	2
W	7	1
SW	2	7
S	2	3

The community structure analyses identified two primary plant communities (Groups A and B) as well as the presence of transects associated with higher levels of disturbance (Group C). Differences between Groups A and B appear to be related to both level of disturbance and topographic position on the landscape.

2.4.6. Annual Grass Monitoring

Annual grass surveys were conducted along roadsides and within the primary containment lines to assess whether cutting of vegetation affects the distribution and density of annual grasses. Annual grasses were limited to the periphery of the Units (Maps A1-5, A1-10, A1-12, and A1-18). Estimated areas occupied by annual grasses are summarized in Table 2-8.

Table 2-8
Estimated Area Occupied (Acres) by Annual Grasses in Baseline Surveys

Cover Class	Unit 2	Unit 3	Unit 6	Unit 10
1 (low) = 1–5 percent	0.2	0.9	5.1	0.6
2 (medium) = 6–25 percent	0.1	0.0	2.3	0.4
3 (high) = >25 percent	2.1	0.9	2.8	1.0
Total Acreage	**2.3**	**1.8**	**10.2**	**2.0**

2.4.7. Invasive Species Monitoring

When invasive species were encountered in Units 3, 6, 10, and the surveyed portion of 23, the locations were mapped using a recreational-grade GPS unit (Maps A4-1 through A4-2). Iceplant was observed at six locations in the surveyed portion of Unit 3. Iceplant was common in the eastern half of Unit 10, and Pampas grass occurred in two isolated patches. Invasive species are pervasive throughout Unit 6 and were not mapped individually.

SECTION 3

Year 1 Vegetation Monitoring—Units 4, 11, 12, and a Portion of Unit 23

3.1. Units 4, 11, 12, and a Portion of Unit 23 – Introduction

In fall 2011, all of Units 4, 11, and 12 and a small portion of Unit 23 located adjacent to the southeastern end of Unit 11 and the southwestern end of Unit 12 were masticated. No controlled burns were conducted on any of these units. Baseline monitoring was conducted in spring and early summer 2011, prior to these treatments within these four units (Tetra Tech and EcoSystems West 2012). This baseline monitoring included meandering transect surveys to map areas of occurrence of HMP herbaceous species; density monitoring for the HMP annual species Monterey spineflower, sand gilia, and seaside bird's-beak; transect surveys to sample shrub composition in the maritime chaparral; and annual grass monitoring in the primary containment areas around the perimeters of Units 11, 12, and the portion of Unit 23 included in the 2011 monitoring.

The first-year follow-up monitoring reported here was conducted in the spring and early summer of 2012 in these four Units in order to assess recovery of the three HMP annual species in the first season after vegetation removal as well as to assess the status of non-native annual grasses in the primary containment areas. Shrub transect monitoring of shrub species composition was not conducted in accordance with the vegetation monitoring protocols and because the monitoring was conducted only a few months after the Units were masticated and the shrub component of the vegetation was only in an early stage of re-establishment.

3.2. Units 4, 11, 12, and a Portion of Unit 23 – Setting

Unit 4 encompasses an area of 145 acres. This unit is located at the south end of former Fort Ord, adjacent to Unit 6 to the east. The terrain is mostly gently rolling to moderately steep. In pre-treatment condition, this unit was vegetated primarily with mature maritime chaparral largely dominated by shaggy-barked manzanita. Other dominants sometimes include such species as sandmat manzanita, Monterey manzanita, chamise, and black sage. Sizable areas of coast live oak woodland and grassland occur in the eastern portion of the unit, and a sizable wetland occurs near the southwest corner of the unit. Scattered individual trees or small clumps of coast live oak occur elsewhere in the unit. Disturbed areas of various sizes occur in the unit, including several areas in the extreme western portion where soil had been removed for lead remediation at some time prior to the 2011 baseline monitoring.

Unit 11 encompasses an area of 273 acres and Unit 12 encompasses an area of 203 acres. These Units are adjacent to each other in the south-central portion of the area of the base within which munitions and explosives removal are currently being conducted. A small portion of Unit 23

adjacent to the southeastern portion of Unit 12, encompassing 15.5 acres, was also included in the 2011 and 2012 monitoring. The terrain is gently rolling to locally steep. In pre-treatment condition, these units were vegetated primarily with mature maritime chaparral. Limited areas of coast live oak woodland occur in Units 11 and 12, more extensively in Unit 12. A large area of meadow habitat occurs in the northeastern portion of Unit 12; a sizable wetland occurs in the north-central portion of Unit 11. Substantial areas of indurated sandstone outcrops occur in the south-central portion of Unit 11. Disturbed areas of various sizes occur on Unit 11 and, less extensively, on Unit 12.

According to the USDA (2012), the soil in all of Units 4 and 12, the portion of Unit 23 included in 2011 and 2012 monitoring, and most of Unit 11 is Arnold-Santa Ynez complex. One small area in the southern portion of Unit 11 is mapped as Xerorthents, dissected soil. Characteristics of these soils are presented in Table 2-1. As in the baseline areas (Section 2.2), it is apparent in the field that two distinct soil types occur in these units, with the HMP annual species almost entirely confined to the soil type characterized by coarser, looser sand mostly without pebbles.

3.3. Units 4, 11, 12, and a Portion of Unit 23 – Methods

The 2012 first-year follow-up monitoring consisted of the following:

- Density monitoring for three HMP annual species: Monterey spineflower, sand gilia, and seaside bird's-beak.

Transect sampling of shrub species composition was not conducted in accordance with vegetation monitoring protocols and because the monitoring was conducted only a few months after the Units were masticated and the shrub component of the vegetation was only in an early stage of re-establishment.

3.3.1. HMP Annuals Density Monitoring

Density monitoring for the three HMP annual species in Units 11 and 12 was conducted on 7 and 8 May 2012. Density monitoring in Unit 4 was conducted on 26 May 2012. This time period was optimal for observing Monterey spineflower and sand gilia. Seaside bird's-beak was not yet in flower when this density monitoring was conducted but was readily identifiable by its vegetative characteristics. In the baseline monitoring conducted in 2011 (Tetra Tech and EcoSystems West 2012), sample plots in Unit 12 were selected by stratified random sampling from among all 100×100 foot grids mapped during meandering transect surveying as containing one or more of the three HMP annual species, with the sampling stratified to ensure adequate representation of both Monterey spineflower and sand gilia (the only HMP annual species mapped in the unit during meandering transect surveying in 2011). A total of 38 grids were sampled in Unit 12 in 2011. Because Unit 4 contained only two grids occupied by HMP annuals, Unit 11 contained only seven occupied grids, and the included portion of Unit 23 contained only three occupied grids, all occupied grids were sampled in 2011 in these units.

All grids in Units 4, 11, 12, and 23 that were sampled in 2011 were resampled in 2012. The methodology for the 2012 density monitoring in Units 4, 11, 12, and 23 was similar to that

described above in Section 2.3.2 for the baseline monitoring. Following treatment, the corners of all grids in these burn units were staked with wooden laths and the grid numbers were marked on the lath at the southwest corner of each grid, facilitating identification of the grids sampled. For some of the Unit 11 plots, only a portion of the plot was sampled because part of the plot extended into a road, a permanently cleared fuel break area, or outside the unit.

Once the plots to be sampled were located, sampling was conducted as described for the baseline monitoring (Section 2.3.2), and the same density classes were used. When only a portion of the plot was sampled, the density classes were scaled proportional to the percentage of the total plot sampled.

3.4. Units 4, 11, 12, and a Portion of Unit 23 – Results and Discussion

3.4.1. Sand Gilia

Sand gilia did not show any change in frequency of occurrence or density on any of the Units between the pre-treatment survey in 2011 and post-mastication survey in 2012 (Table 3-1; Maps A2-1, A2-4, A2-7, and A2-10). This species was present in 11 of 38 sampled plots on Unit 12 in 2011 and 13 of the 38 plots sampled in 2012.

3.4.2. Seaside Bird's-Beak

Seaside bird's-beak was absent from all plots sampled in Units 4, 11, 12, and 23 in the pre-treatment survey in 2011 and post-mastication survey in 2012 (Table 3-2; Maps A2-2, A2-5, A2-8, and A2-11).

Table 3-1
Sand Gilia – Number of Plots per Density Class in Units 4, 11, 12, and 23

Density	Unit 4 Plots		Unit 11 Plots		Unit 12 Plots		Unit 23 Plots	
	2011	**2012**	**2011**	**2012**	**2011**	**2012**	**2011**	**2012**
0 plants/grid (percent of plots)	2 (100%)	2 (100%)	7 (100%)	7 (100%)	27 (71%)	25 (66%)	3 (100%)	3 (100%)
1–50 plants/grid (percent of plots)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	11 (29%)	13 (34%)	0 (0%)	0 (0%)
51–100 plants/grid (percent of plots)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
101–500 plants/grid (percent of plots)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
> 500 plants/grid (percent of plots)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Total Occupied Plots	**0**	**0**	**0**	**0**	**11**	**13**	**0**	**0**
Total Plots Sampled	**2**	**2**	**7**	**7**	**38**	**38**	**3**	**3**

*Each plot is 100- x 100- feet, or 10,000 square feet, or 0.23 acre.

Table 3-2
Seaside Bird's-Beak – Number of Plots per Density Class in Units 4, 11, 12, and 23

Density	Unit 4 Plots		Unit 11 Plots		Unit 12 Plots		Unit 23 Plots	
	2011	2012	2011	2012	2011	2012	2011	2012
0 plants/grid (percent of plots)	2 (100%)	2 (100%)	7 (100%)	7 (100%)	38 (100%)	38 (100%)	3 (100%)	3 (100%)
1–50 plants/grid (percent of plots)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
51–100 plants/grid (percent of plots)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
101–500 plants/grid (percent of plots)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
> 500 plants/grid (percent of plots)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Total Occupied Plots	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total Plots Sampled	**2**	**2**	**7**	**7**	**38**	**38**	**3**	**3**

*Each plot is 100- x 100- feet, or 10,000 square feet, or 0.23 acre.

3.4.3. Monterey Spineflower

Monterey spineflower did not show any change in frequency of occurrence or density on any of the Units between the pre-treatment survey in 2011 and post-mastication survey in 2012 (Table 3-3; Maps A2-3, A2-6, A2-9, and A2-12). Monterey spineflower was present on 94 percent of the plots sampled during the pre-treatment survey in 2011 and the post-treatment survey in 2012.

Because all plots were masticated and no plots were burned on Units 4, 11, 12, or 23 in 2011, the effect of treatment on HMP annual densities was not tested. However, mastication, while reducing the total cover of shrub species, did not appear to stimulate germination of HMP annual species.

3.4.4. Shrub Transect Monitoring

Shrub transect monitoring was not required on Units 4, 11, 12, and 23 according to the vegetation monitoring protocol and because the monitoring was conducted only a few months after mastication the shrub component of the vegetation was only in an early stage of re-establishment.

3.4.5. Invasive Species Monitoring

No invasive species were observed on Units 4, 11, 12, or 23 during the 2012 surveys.

Table 3-3
Monterey Spineflower – Number of Plots per Density Class in Units 4, 11, 12, and 23

Density	Unit 4 Plots		Unit 11 Plots		Unit 12 Plots		Unit 23 Plots	
	2011	**2012**	**2011**	**2012**	**2011**	**2012**	**2011**	**2012**
0 plants/grid (percent of plots)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	3 (8%)	3 (8%)	0 (0%)	0 (0%)
1–50 plants/grid (percent of plots)	1 (50%)	0 (0%)	1 (14%)	0 (0%)	9 (24%)	12 (32%)	0 (0%)	0 (0%)
51–100 plants/grid (percent of plots)	0 (0%)	1 (50%)	0 (0%)	0 (0%)	5 (13%)	5 (13%)	1 (33%)	0 (0%)
101–500 plants/grid (percent of plots)	1 (50%)	0 (0%)	1 (14%)	2 (29%)	8 (21%)	9 (24%)	0 (0%)	1 (33%)
> 500 plants/grid (percent of plots)	0 (0%)	1 (50%)	5 (71%)	5 (71%)	13 (34%)	9 (24%)	2 (67%)	2 (67%)
Total Occupied Plots	**2**	**2**	**7**	**7**	**35**	**35**	**3**	**3**
Total Plots Sampled	**2**	**2**	**7**	**7**	**38**	**38**	**3**	**3**

*Each plot is 100- x 100- feet, or 10,000 square feet, or 0.23 acre.

SECTION 4

Year 3 Vegetation Monitoring—Units 14 and 19

4.1. Units 14 and 19 – Introduction

Baseline sampling of shrubs and HMP annuals in Units 14 and 19 was conducted by Burleson Consulting in spring and early summer 2009 (Burleson 2009b). This baseline monitoring included density monitoring for the HMP annual species Monterey spineflower, sand gilia, and seaside bird's-beak; transect monitoring to sample shrub composition in the maritime chaparral; and annual grass monitoring in the primary containment areas around the perimeters of the two burn units.

A prescribed burn was conducted in Units 14 and 19 in October 2009. EcoSystems West conducted first-year follow-up monitoring of the three HMP annuals and of annual grasses in 2010 (Tetra Tech and EcoSystems West 2011). Shrub transect monitoring was not conducted in 2010 in accordance with vegetation monitoring protocols and because the shrub cover was only beginning to recover from the disturbance.

In the spring and early summer of 2012, EcoSystems West conducted Year 3 follow-up monitoring of shrub transects, HMP annual species, and annual grasses in Units 14 and 19, as described in Section 4.3.

4.2. Units 14 and 19 – Setting

Units 14 and 19 are located north of Watkins Gate Road and north of Units 11 and 12 in the east-central portion of the area of the base within which munitions and explosives removal are currently being conducted. Unit 14 encompasses 295 acres and Unit 19 encompasses 227 acres. The terrain is gently rolling to locally steep. Prior to burning, mature maritime chaparral occupied the bulk of the area within the two burn units, with the principal dominant shrubs being sandmat manzanita and shaggy-barked manzanita (Burleson 2009b). Some areas, principally but not restricted to relatively low-lying "bowls" (extensive topographic depressions surrounded by higher terrain) were (and are, following burning) vegetated primarily with grasses and herbs, with only scattered shrubs of species such as mock-heather (*Ericameria ericoides*), bush lupine (*Lupinus arboreus*), and chamise. The grasses are primarily non-native and include such species as slender wild oat (*Avena barbata*), soft chess, and ripgut grass, with the native perennial bunchgrass purple needlegrass (*Stipa* (= *Nassella*) *pulchra*) also locally important. Herb composition is diverse and includes such native species as sky lupine (*Lupinus nanus*), tidy tips (*Layia platyglossa*), Monterey spineflower, and telegraph weed (*Heterotheca grandiflora*), as well as non-native species such as sheep sorrel (*Rumex acetosella*). A few areas support coast live oak woodland, with scattered coast live oaks and an understory of grasses and herbs.

The USDA (2012) maps the soils throughout Units 14 and 19 as Arnold-Santa Ynez complex. Characteristics of this soil are presented in Table 2-1. As discussed previously for the baseline areas (Section 2.2), it is apparent in the field that two distinct soil types occur in these units, with the HMP annual species almost entirely confined to the soil type characterized by coarser, looser sand mostly without pebbles.

4.3. Units 14 and 19 – Methods

The 2012 monitoring conducted in Units 14 and 19 consisted of the following:

- Density monitoring for three HMP annual species: Monterey spineflower, sand gilia, and seaside bird's-beak.
- Line intercept transect sampling of transects previously sampled in 2009 (Burleson 2009b) to sample shrub species composition in the maritime chaparral that is recovering from past disturbance.
- Mapping of non-native annual grasses within the primary containment areas.
- Mapping of invasive species.

4.3.1. HMP Annuals Monitoring

Density monitoring for three HMP annual species, Monterey spineflower, sand gilia, and seaside bird's-beak, was conducted in Units 14 and 19 between 10 and 31 May 2012. In the 2009 baseline monitoring (Burleson 2009b), 100×100 foot grids were randomly selected from among the grids deemed to contain suitable habitat for the three HMP annual species based on aerial photo interpretation, without regard for whether or not those grids actually contained individuals of any of the three HMP annuals. In the Year 1 monitoring conducted in these units in 2010 (Tetra Tech and EcoSystems West 2011), sampled grids included a randomly selected 20 percent of the plots sampled in 2009, plus a randomly selected 10 percent of all 100×100 foot grids adjacent to the 2009 sample plots.

In 2012, EcoSystems West resampled most of the plots that were sampled in the Year 1 monitoring in 2010. Seven plots in Unit 14 and three plots in Unit 19 were not resampled in 2012 because less than 50 percent of the plot was within the area that was treated in 2009 and/or outside permanently maintained fuel break areas. In addition, for a few grids in both units, only a portion of the grid was sampled; these consisted of grids where more than 50 percent of the grid was within the area that was treated in 2009 and/or outside a permanently maintained fuel break area. In 2012, a total of 86 plots in Unit 14 and 102 plots in Unit 19 were sampled. The corners of these plots were generally but not always staked with lath stakes due to deterioration by weather, or growth of woody vegetation since the stakes were installed in 2010. Where the corners were not staked, we therefore used a resource grade Trimble GeoXH GPS receiver with the grid boundaries loaded as a map layer to determine the boundaries of the grids to be sampled.

Once the plots to be sampled were located, sampling was conducted as described for the baseline monitoring (Section 2.3.2), and the same density classes were used. When only a portion of the

plot was sampled, the density classes were scaled proportional to the percentage of the total plot sampled.

4.3.2. Shrub Transect Monitoring

Burleson Consulting (2009b) conducted baseline shrub transect monitoring in Units 14 and 19 in 2009. In 2012, a total of 22 transects in Unit 14 and 21 transects in Unit 19 that were sampled in 2009 were resampled. Transect sampling in these units was conducted between 14 and 27 June 2012.

All transects sampled in Units 14 and 19 in 2012 were 50 meters in length. The surveyors used a resource grade Trimble GeoXH GPS receiver to locate the previously recorded start and end points of each transect sampled in the 2009 baseline monitoring. Once the start and end points were located, the transects were sampled using the line intercept method following the same methodology as in the baseline monitoring areas (Section 2.3.3).

If the herb cover recorded along a transect exceeded 20 percent, quadrat sampling was used to sample the herb composition along the transect, as specified by the monitoring protocol (Burleson 2009a). A 0.25 m^2 (0.5×0.5 m) quadrat frame was used for the quadrat sampling. The frame was placed next to the transect tape at 0–0.5 m from the start (right side of the transect tape), at 9.75–10.25 m (left side), at 19.75–20.25 m (right side), at 29.75–30.25 m (left side), at 39.75–40.25 m (right side), and at 49.5–50 m (left side). Percent cover of each shrub and herb species in each quadrat was estimated and recorded. For shrubs and HMP annual species, the number of individuals entirely or partly in the quadrat was also recorded. Mean percent cover for each species recorded in one or more quadrats along a transect was calculated for each transect from the data.

4.3.3. Annual Grass Monitoring

Non-native annual grass monitoring was conducted within the 230 foot wide primary containment lines surrounding Units 14 and 19 on 29 June 2012. Annual grass species included in this monitoring were the same species as in the baseline areas annual grass monitoring (Section 2.3.4). Annual grass monitoring was conducted using the same methodology and density classes as those used in the baseline monitoring.

4.3.4. Invasive Species

Invasive species were mapped when encountered incidentally during the HMP annuals density monitoring and shrub transect monitoring. When invasive species were encountered, the locations were mapped using a recreational-grade GPS unit. A comprehensive survey for invasive species was not conducted. This information will be used for targeted eradication efforts of invasive species in subsequent years.

4.4. Units 14 and 19 – Results and Discussion

4.4.1. Sand Gilia

Sand gilia showed a positive response to the effects of the prescribed burn in 2009. Under pre-burn conditions in 2009, only 44 percent of the 259 plots sampled were occupied by sand gilia, whereas 78 percent of the 197 sampled plots were occupied in 2010, and 52 percent of the 185 plots sampled in 2012 were occupied (Table 4-1; Maps A3-1 and A3-6).

Table 4-1
Sand Gilia – Number of Plots per Density Class in Units 14 and 19

Density Class	Unit 14 Plots			Unit 19 Plots		
	2009	**2010**	**2012**	**2009**	**2010**	**2012**
0 plants/grid (percent of plots)	76 (61%)	26 (28%)	54 (63%)	70 (52%)	18 (17%)	35 (35%)
1–50 plants/grid (percent of plots)	22 (18%)	26 (28%)	23 (27%)	27 (20%)	20 (19%)	51 (52%)
51–100 plants/grid (percent of plots)	6 (5%)	6 (7%)	2 (2%)	12 (9%)	11 (10%)	4 (4%)
101–500 plants/grid (percent of plots)	19 (15%)	15 (16%)	5 (6%)	22 (16%)	27 (26%)	7 (7%)
> 500 plants/grid (percent of plots)	2 (2%)	19 (21%)	2 (2%)	3 (2%)	29 (28%)	2 (2%)
Total Occupied Plots	**51**	**66**	**32**	**64**	**87**	**64**
Total Plots Sampled	**125**	**93**	**86**	**133**	**105**	**99**

*Each plot is 100- x 100- feet, or 10,000 square feet, or 0.23 acre.

A contingency analysis was performed on the density classes for each HMP species for each Unit (Table 4-2). With the exception of seaside bird's beak in Unit 19, all tests were highly significant. In both Units 14 and 19, sand gilia exhibited a pronounced change in density over time. The species responded rapidly to the initial burn through increased density, but declined towards baseline conditions by 2012 (Year 3) (Table 4-1).

Table 4-2
χ-Square Analysis of HMP Species Response to Time in Units 14 and 19 in 2012

Unit	Species	χ-Square	p
14	Sand Gilia	53.4	*<0.001*
14	Seaside Bird's-Beak	35.8	*<0.001*
14	Monterey Spineflower	33.6	*<0.001*
19	Sand Gilia	105	*<0.001*
19	Seaside Bird's-Beak	9.24	0.11
19	Monterey Spineflower	24.3	0.002

4.4.2. Seaside Bird's-Beak

Seaside bird's-beak showed a weak response to the effects of the prescribed burn in 2009 in Units 14 and 19. Under pre-burn conditions in 2009 the species was present in 3 percent of the 259 plots sampled in Units 14 and 19 (Table 4-3; Maps A3-2 and A3-7). In comparison, 12 percent of the plots were occupied in 2010 and 20 percent were occupied in 2012. In Unit 14 occupancy and plant density increased in 2010 and 2012. However both the number of occupied plots and plant density showed little change in Unit 19 (Table 4-2).

Table 4-3
Seaside Bird's-Beak – Number of Plots per Density Class in Units 14 and 19

Density Class	Unit 14 Plots			Unit 19 Plots		
	2009	2010	2012	2009	2010	2012
0 plants/grid (percent of plots)	118 (94%)	71 (76%)	55 (64%)	132 (99%)	102 (97%)	93 (94%)
1–50 plants/grid (percent of plots)	2 (2%)	10 (11%)	9 (10%)	1 (1%)	3 (3%)	3 (3%)
51–100 plants/grid (percent of plots)	2 (2%)	5 (5%)	5 (6%)	0 (0%)	0 (0%)	2 (2%)
101–500 plants/grid (percent of plots)	3 (2%)	5 (5%)	13 (15%)	0 (0%)	0 (0%)	1 (1%)
>500 plants/grid (percent of plots)	0 (0%)	2 (2%)	4 (5%)	0 (0%)	0 (0%)	0 (0%)
Total Occupied Plots	**7**	**22**	**31**	**1**	**3**	**6**
Total Plots Sampled	**125**	**93**	**86**	**133**	**105**	**99**

*Each plot is 100- x 100- feet, or 10,000 square feet, or 0.23 acre.

4.4.3. Monterey Spineflower

The Monterey spineflower is the most widespread and frequently occurring of the three HMP species sampled. The Monterey spineflower exhibited a significant response to the effects of the prescribed burn in 2009. In 2009, the species was present in 78 percent of the 259 sampled plots in both Units 14 and 19 (Table 4-4; Maps A3-3 and A3-8). In 2010, the species occupied 88 percent of the 197 plots sampled. In 2012, Monterey spineflower was present in 84 percent of the 185 plots. Whereas occupancy (number of plots occupied) increased over time, density appears to shift towards lower values.

Table 4-4
Monterey Spineflower – Number of Plots per Density Class in Units 14 and 19

Density Class	Unit 14 Plots			Unit 19 Plots		
	2009	2010	2012	2009	2010	2012
0 plants/grid (percent of plots)	31 (25%)	5 (5%)	9 (10%)	26 (20%)	19 (18%)	20 (20%)
1–50 plants/grid (percent of plots)	23 (18%)	30 (32%)	13 (15%)	27 (20%)	38 (36%)	42 (42%)
51–100 plants/grid (percent of plots)	6 (5%)	9 (10%)	5 (6%)	14 (11%)	7 (7%)	11 (11%)
101–500 plants/grid (percent of plots)	21 (17%)	14 (15%)	29 (34%)	30 (23%)	15 (14%)	18 (18%)
>500 plants/grid (percent of plots)	44 (35%)	35 (38%)	30 (35%)	36 (27%)	26 (25%)	8 (8%)
Total Occupied Plots	**94**	**58**	**77**	**107**	**86**	**79**
Total Plots Sampled	**125**	**93**	**86**	**133**	**105**	**99**

*Each plot is 100- x 100- feet, or 10,000 square feet, or 0.23 acre.

4.4.4. Shrub Transect Monitoring

A total of 43 transects were sampled in Units 14 and 19 during 2012 (Maps A3-4 and A3-9). Total shrub cover averaged 82 percent and ranged from 52 to 120 percent on Unit 14 (Figure 4-1). Bare ground averaged 33 percent, and herbaceous vegetation averaged 6.4 percent cover on Unit 14.

Total shrub cover averaged 73 percent and ranged from 41 to 116 percent on Unit 19 (Figure 4-2). Bare ground averaged 39 percent, and herbaceous vegetation averaged 3.9 percent cover on Unit 19.

Raw data for the shrub transects sampled in 2012 are provided in Appendix B.

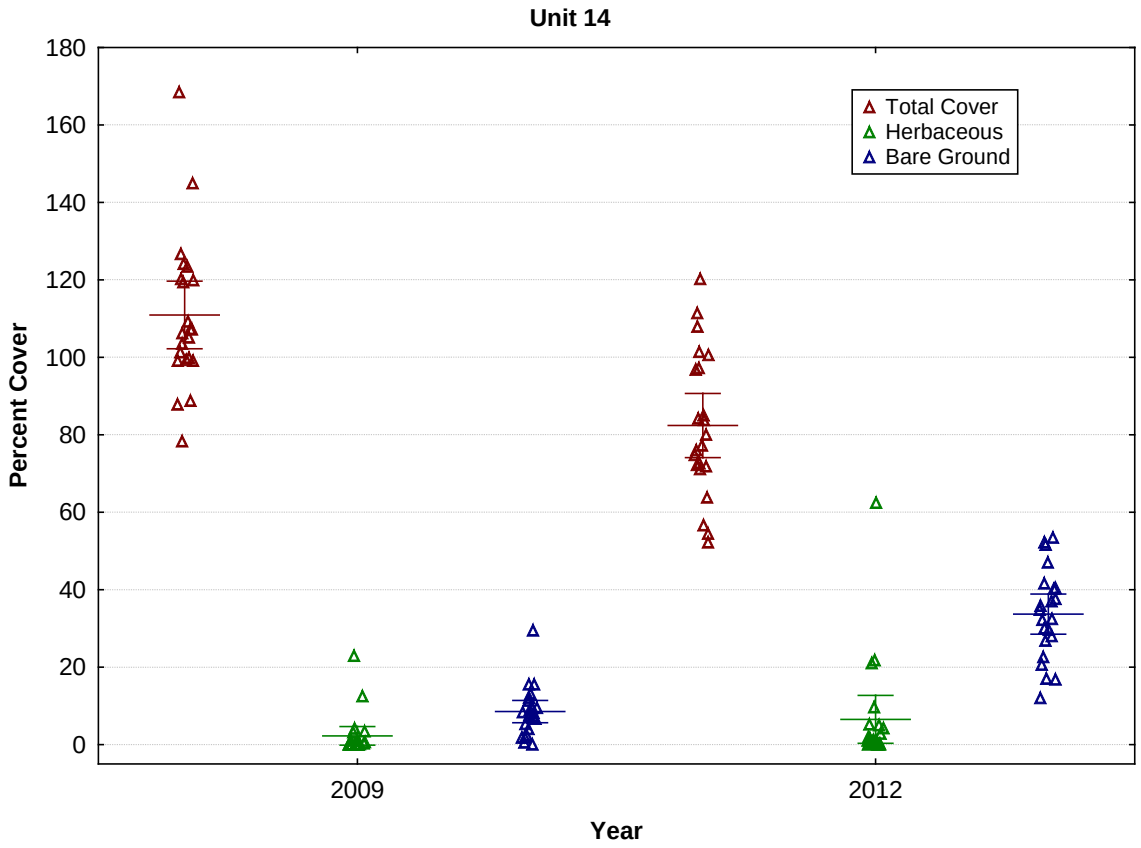

Figure 4-1 **Percent cover of shrubs, herbaceous vegetation, and bare ground on transects in Unit 14 between 2009 and 2012.**

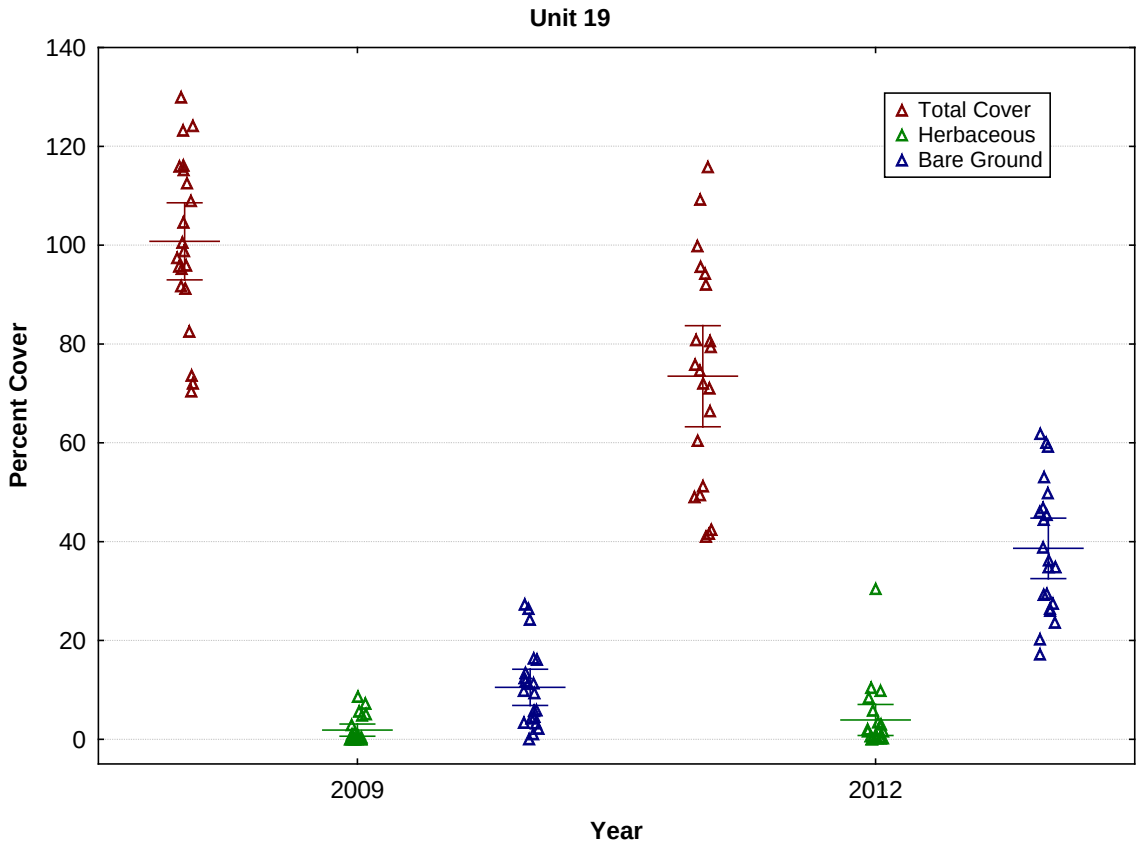

Figure 4-2 Percent cover of shrubs, herbaceous vegetation, and bare ground on transects in Unit 19 between 2009 and 2012.

Units 14 and 19 were burned in 2009. Therefore there has been sufficient time for shrub species to recolonize the area, and successional trends are likely to be observed when comparing data collected between pre-treatment and Year 3 monitoring and between treatments in Units 14 and 19. However, few shrub transects were located in the masticated portions of Units 14 and 19. As a result, it is not possible to test for the effect of treatment on the shrub community. Therefore, the following analysis will concentrate on the analysis of changes between pre-burn (2009) and Year 3 (2012) conditions.

Two-way ANOVA's were performed to test whether there were differences in community metrics between years and between Units (Table 4-5). The only difference observed between Units 14 and 19 was in total shrub cover. Significant differences were observed between 2009 and 2012 in total cover (lower in 2012), bare ground (higher in 2012), diversity (higher in 2012), and species richness (higher in 2012).

Table 4-5
Results of Two-Way ANOVAs for Effects of Unit and Year

Parameter	Unit Effect	Year Effect
Total Cover	p=0.03	p<0.01
Herbaceous Cover	ns	ns
Bare Ground	ns	p<0.01
Diversity	ns	p<0.01
Species Richness	ns	p<0.01
Evenness	ns	ns

To test whether time had an effect on community structure (i.e., species composition), multivariate statistics (ordination) were used. These techniques are based on measures of dissimilarity between samples (transects). This analysis was conducted using non-metric multidimensional scaling (NMDS) as implemented in function "metaMDS" in the "vegan" package in R (Oksanen 2011).

The results of the NMDS ordination show a community level response relative to Year (Figure 4-3). In this plot, the 95th percent confidence interval of the centroid (multivariate average) of each group is indicated as an ellipse. Permutational MANOVA (function adonis(); Oksanen et al. 2011) of the community data indicates that the between Year effect is significant, and explains approximately 41 percent of the variability (Table 4-6).

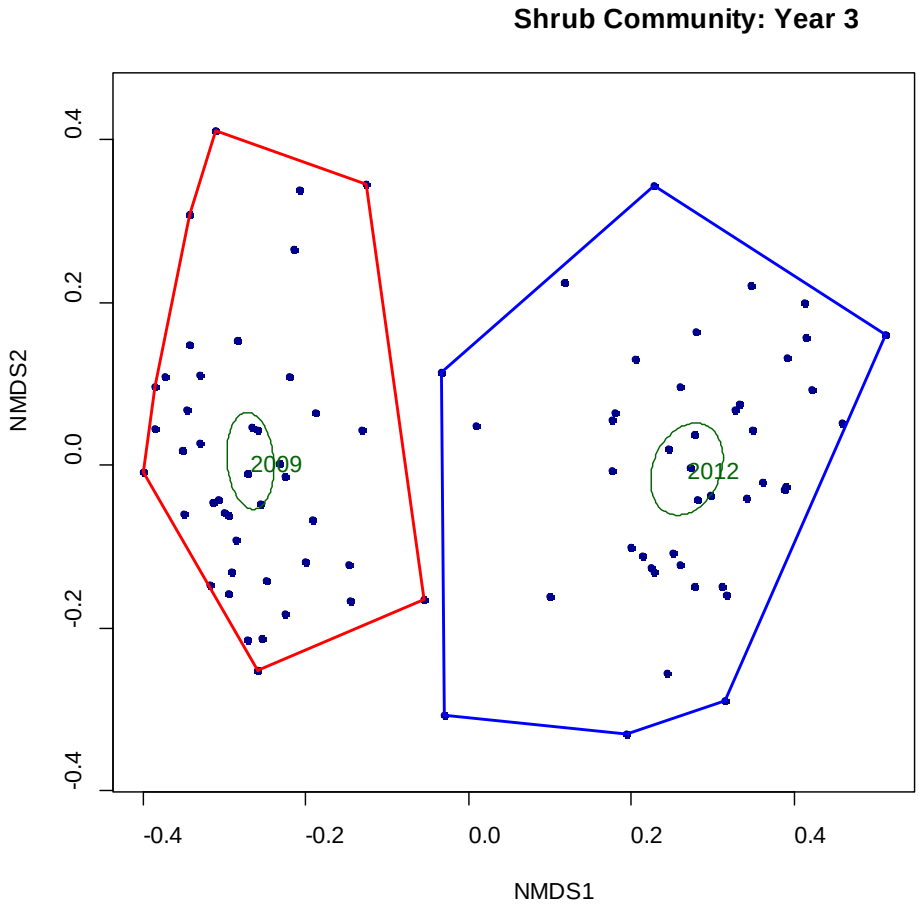

Figure 4-3 **NMDS ordination plot of shrub community structure on Units 14 and 19 over time. Differences in community structure between years is evident in the location of the centroids (ovals). Polygons bound transects from the two years.**

Table 4-6
Results of Permutational MANOVA of Shrub Community Structure on Units 14 and 19

Source	df	Sum Sqs	Mean Sq	F	R^2	p
Year	1	6.93	6.93	57.4	0..41	0.001
Residuals	84	10.15	0.12			
Total	**85**	**17.08**				

To identify which species most effectively discriminated between the pre-burn and Year 3 communities, indicator species analysis (Dufrene and Legendre 1997) was employed. The indicator value varies from 0 (no group indication) to 1 (the species is found in all samples within a single group and not in any other groups). Strong indicator species were identified by this

analysis (Table 4-7). Plants such as the shaggy-barked manzanita and sandmat manzanita which are dominant in the pre-burn climax community are nearly absent from the Year 3 community. In contrast, subshrubs (deerweed, golden yarrow, and peak rush-rose) appear restricted to the post-burn community.

Table 4-7
Indicator Species in the 2009 and 2012 Shrub Communities on Units 14 and 19

Species	2009	2012
Shaggy-barked manzanita	0.77	–
Sandmat manzanita	0.91	–
Deerweed	–	0.94
Golden yarrow	–	0.94
Peak rush-rose	–	0.95

4.4.5. Annual Grass Monitoring

Annual grass surveys were limited to the periphery of Units 14 and 19 (Maps A3-5, and A3-10). Estimated areas occupied by annual grasses are summarized in Table 4-8. The extent of annual grasses mapped on Unit 14 in 2012 (18.1 acres) represents a significant decrease in area compared to the Year 1 (2010) surveys when annual grasses covered 30.8 acres (Tetra Tech and EcoSystems West 2011). Annual grasses increased slightly in extent on Unit 19 from 13.8 acres in 2010 to 18.3 acres in 2012.

Table 4-8
Estimated Area Occupied (Acres) by Annual Grasses in Year 3 Surveys in Units 14 and 19

Cover Class	Unit 14	Unit 19
1 (low) = 1–5 percent	0.6	4.4
2 (medium) = 6–25 percent	0.4	4.4
3 (high) = >25 percent	1.0	9.6
Total Acreage	**18.1**	**18.3**

4.4.6. Invasive Species Monitoring

Invasive species were not observed on Units 14 and 19 during the 2012 surveys.

SECTION 5

Conclusions

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

The responses of the HMP annual species to vegetation clearance differed between Year 1 Units (4, 11, 12, and 23) and the Year 3 Units (14 and 19). Units 14 and 19 were burned in 2009, and HMP annual plants subsequently appeared more frequently and at higher densities than in pre-burn conditions. In contrast, Units 4, 11, 12, and 23 were masticated and not burned in 2011. These Units did not exhibit any change in density or frequency of occurrence of HMP annual plants in the 2012 survey. These results suggest that whereas burning tends to stimulate germination of the HMP annual seed bank, mastication does not have a similar effect on the species.

Surveys for HMP annual species in Units 14 and 19, three years after burning, exhibited species-specific responses to fire. These responses are consistent with patterns observed in previous monitoring conducted by Tetra Tech and EcoSystems West (2011, 2012). Sand gilia appears to increase in frequency of occurrence from baseline conditions to Year 1, with either a slight increase or decrease by Year 3. However, by Year 5, this species appears to decline in density and frequency of occurrence.

When present in a Unit, seaside bird's-beak tends to show a continued increase in density and frequency of occurrence through Year 3 surveys. This species has not been observed in any Units that have been sampled in Year 5 by Tetra Tech and EcoSystems West (2011, 2012). Therefore, the trend in this species beyond Year 3 is unknown.

The Monterey spineflower is the most frequently occurring and exhibits the highest densities of the three HMP annual species sampled. Overall, the Monterey spineflower does not show any change in density from the baseline to Year 1 surveys, but increases in density in the Year 3 and Year 5 surveys.

Although it was not possible to directly test the effect of treatment (mastication versus burning) on succession in this community, the differences in the occurrence of HMP annual species and density between the Year 1 Units (4, 11, 12, and a portion of 23) which were masticated, and historic data from the Year 3 Units (14 and 19) which were burned provides a basis for describing the beneficial effects of fire on recruitment of HMP annuals into the community.

5.2. Vegetation Transect Surveys

The shrub community in the baseline Units 2, 3, 6, and 10, exhibited the presence of two discrete communities. Differences in these communities appear due to a combination of level of

disturbance and landscape aspect. The community found on less disturbed, west to north facing slopes (Group A), is dominated by shaggy-barked manzanita (~ 72 percent cover), with low percent cover of chamise (13 %) and Hooker's manzanita (18%). In contrast, the other well-defined community (Group B) tends to be found on south and southwest facing slopes in slightly disturbed areas. This community is characterized by 48 percent cover of shaggy-barked manzanita, 23 percent cover of chamise, and 15 percent cover of the sub-shrub black sage, and a higher amount of bare ground. Both Units 14 and 19 exhibited significant progress towards recovery in year 3. Both Units exhibited similar biotic conditions with the exception that total percent cover on the transects was lower in Unit 19 as compared to Unit 14. On average, total percent cover on the transects was 73 percent of the 2009 baseline cover (Burleson 2009b). However, shrub community structure differed between the baseline (Burleson 2009b) and Year 3 surveys. The baseline community was dominated by shrub species including shaggy-barked manzanita (32.5%), chamise (24%), and sandmat manzanita (28 %); whereas the Year 3 community surveyed in 2012 was dominated by subshrub species including deerweed (21.5%) and peak rush-rose (13.6%). Shaggy-barked manzanita and chamise comprised only 12 % and 10 %, respectively, of the total cover.

Overall, the apparent successional pattern in the post-burn chaparral community progresses from a community characterized by the presence of HMP annual species, with varying rates of colonization, followed by subshrubs (deerweed, peak rush-rose, black sage), through a shrub community with a significant portion of chamise, and ultimately to a shaggy-barked manzanita dominated community. Whereas total shrub cover is lower in post-burn communities as compared to baseline (pre-burn) conditions, both diversity and evenness increase and exceed levels in baseline communities due to the larger number of species, and more equitable distribution of percent cover, in successional stages through at least Year 5. These metrics are expected to decrease over time as species representative of the climax shrub community become dominant. Subsequent data from Units 4, 11, 12, and 23 may provide information on the effects of mastication versus burning on the shrub community when sampled in Year 3 and beyond.

5.3. Annual Grasses

Annual grasses were generally present along the edges of roads, masticated areas, and other disturbed areas, and occasionally extend somewhat into the interior of the study sites. Although there are some localized areas of high annual grass density in cleared fuel break areas, overall it does not appear that colonization by annual grasses is a major problem in these areas. Annual grasses can be controlled in fuel breaks using properly timed mowing, broadcast herbicide spraying or a combination of the two. However, HMP annuals growing in fuel breaks may be harmed by these treatments. Mowing in early spring prior to grasses going to seed, but before the taller growing sand gilia has bolted may prevent further incursions of annual grasses into the interior of the burn units while limiting potential damage to the sand gilia. Mowing to a height several inches above the ground surface is unlikely to adversely affect the more prostrate Monterey spineflower or the later blooming seaside bird's beak. Herbicides should be applied in a targeted manner only after areas have been thoroughly checked for the presence of HMP annuals.

SECTION 6

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APPENDIX A

Maps

Fort Ord
Unit 02 Mastication Area
Sand Gilia
Density Classes
2012
Baseline

Legend

- Unit Boundary
- Density Class 0
- Density Class 1
- Density Class 2
- Density Class 3
- Density Class 4

Aerial image date 2009

N

0 50 100 200 300 400

Feet

Map A1-1

Fort Ord
Unit 02 Mastication Area
Seaside Bird's-beak
Density Classes
2012
Baseline

Legend

- Unit Boundary
- Density Class 0
- Density Class 1
- Density Class 2
- Density Class 3
- Density Class 4

Aerial image date 2009

N

0 50 100 200 300 400

Feet

Map A1-2

Fort Ord
Unit 02 Mastication Area
Monterey Spineflower
Density Classes
2012
Baseline

Legend

- Unit Boundary
- Density Class 0
- Density Class 1
- Density Class 2
- Density Class 3
- Density Class 4

Aerial image date 2009

N

0 50 100 200 300 400

Feet

Map A1-3

Fort Ord
Unit 02 Mastication Area
Vegetation Transect Locations
2012
Baseline

Legend

Vegetation Transect

Unit Boundary

Aerial image date 2009

N

0 50 100 200 300 400

Feet

Map A1-4

Fort Ord
Unit 02 Mastication Area
Annual Grass Distribution
2012
Baseline

Legend

- Unit Boundary
- Low Density (1-5%)
- Medium Density (6-25%)
- High Density (> 25%)

Aerial image date 2009

N

0 50 100 200 300 400

Feet

Map A1-5

Fort Ord
Unit 03 Mastication Area
Sand Gilia
Density Classes
2012
Baseline

Legend

- Unit Boundary
- Density Class 0
- Density Class 1
- Density Class 2
- Density Class 3
- Density Class 4

Aerial image date 2009

N

0 100 200 300 400 500

Feet

Map A1-6

Fort Ord
Unit 03 Mastication Area
Seaside Bird's-beak
Density Classes
2012
Baseline

Legend

- Unit Boundary
- Density Class 0
- Density Class 1
- Density Class 2
- Density Class 3
- Density Class 4

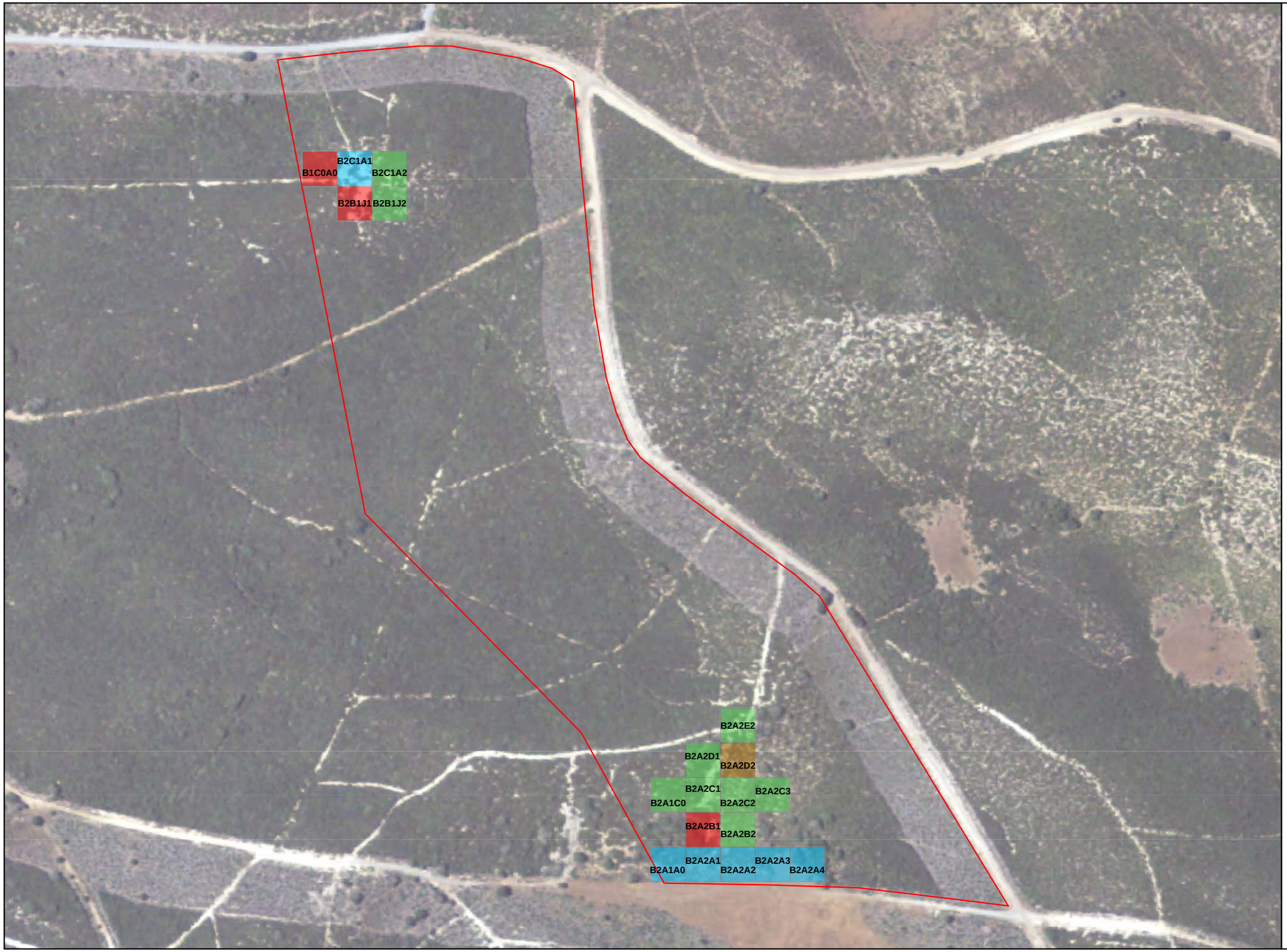
Aerial image date 2009

N

0 100 200 300 400 500

Feet

Map A1-7



Fort Ord
Unit 03 Mastication Area
Monterey Spineflower
Density Classes
2012
Baseline

Legend

- Unit Boundary
- Density Class 0
- Density Class 1
- Density Class 2
- Density Class 3
- Density Class 4

Aerial image date 2009

N

0 100 200 300 400 500

Feet

Map A1-8

Fort Ord
Unit 03 Mastication Area
Vegetation Transect Locations
2012
Baseline

Legend

Vegetation Transect

Unit Boundary

Aerial image date 2009

N

0 100 200 300 400 500

Feet

Map A1-9

Fort Ord
Unit 03 Mastication Area
Annual Grass Distribution
2012
Baseline

Legend

- Unit Boundary
- Low Density (1-5%)
- Medium Density (6-25%)
- High Density (> 25%)

Aerial image date 2009

N

0 100 200 300 400 500

Feet

Map A1-10

Fort Ord
Unit 06
Vegetation Transect Locations
2012
Baseline

Legend

- Vegetation Transect
- Unit Boundary
- South Boundary Rd Unit

Aerial image date 2009

6-5
27B-1
6-2
28-2
6-3
6-6

N

0 100 200 300 400 500
Feet

Map A1-11

Fort Ord
Unit 06
Annual Grass Distribution
2012
Baseline

Legend

- Unit Boundary
- Low Density (1-5%)
- Medium Density (6-25%)
- High Density (> 25%)
- South Boundary Rd Unit

Aerial image date 2009

N

0 100 200 300 400 500

Feet

Map A1-12

Fort Ord
Unit 06
Piperia Locations
2012
Baseline

Legend

LocationID

- Mature Piperia (Previously Known)
- Immature Piperia (Previously Unknown)
- Unit Boundary
- South Boundary Rd Unit

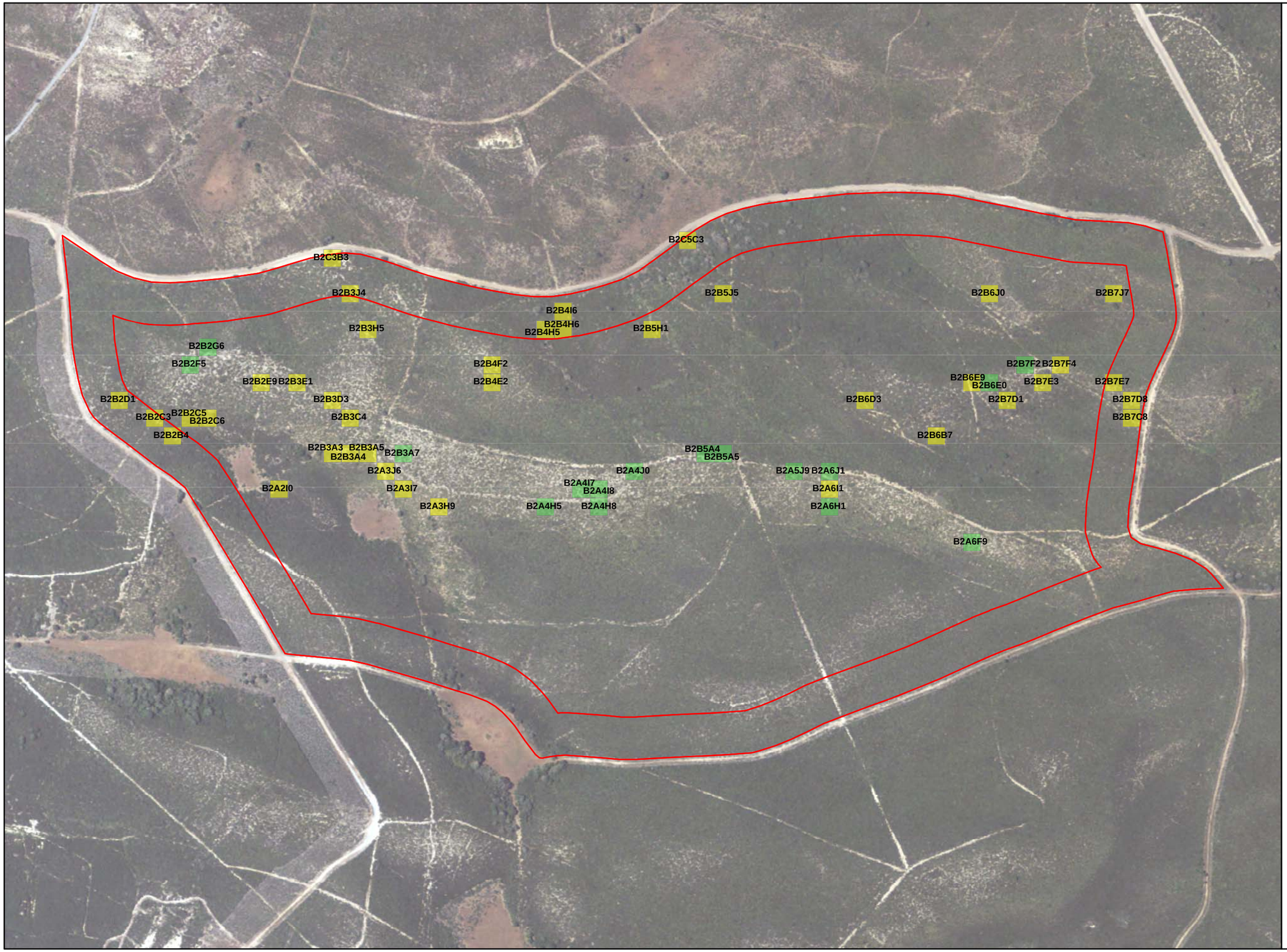
Aerial image date 2009

N

0 50 100 200 300 400 500

Feet

Map A1-13



Fort Ord
Unit 10
Sand Gilia
Density Classes
2012
Baseline

Legend

- Unit Boundary
- Density Class 0
- Density Class 1
- Density Class 2
- Density Class 3
- Density Class 4

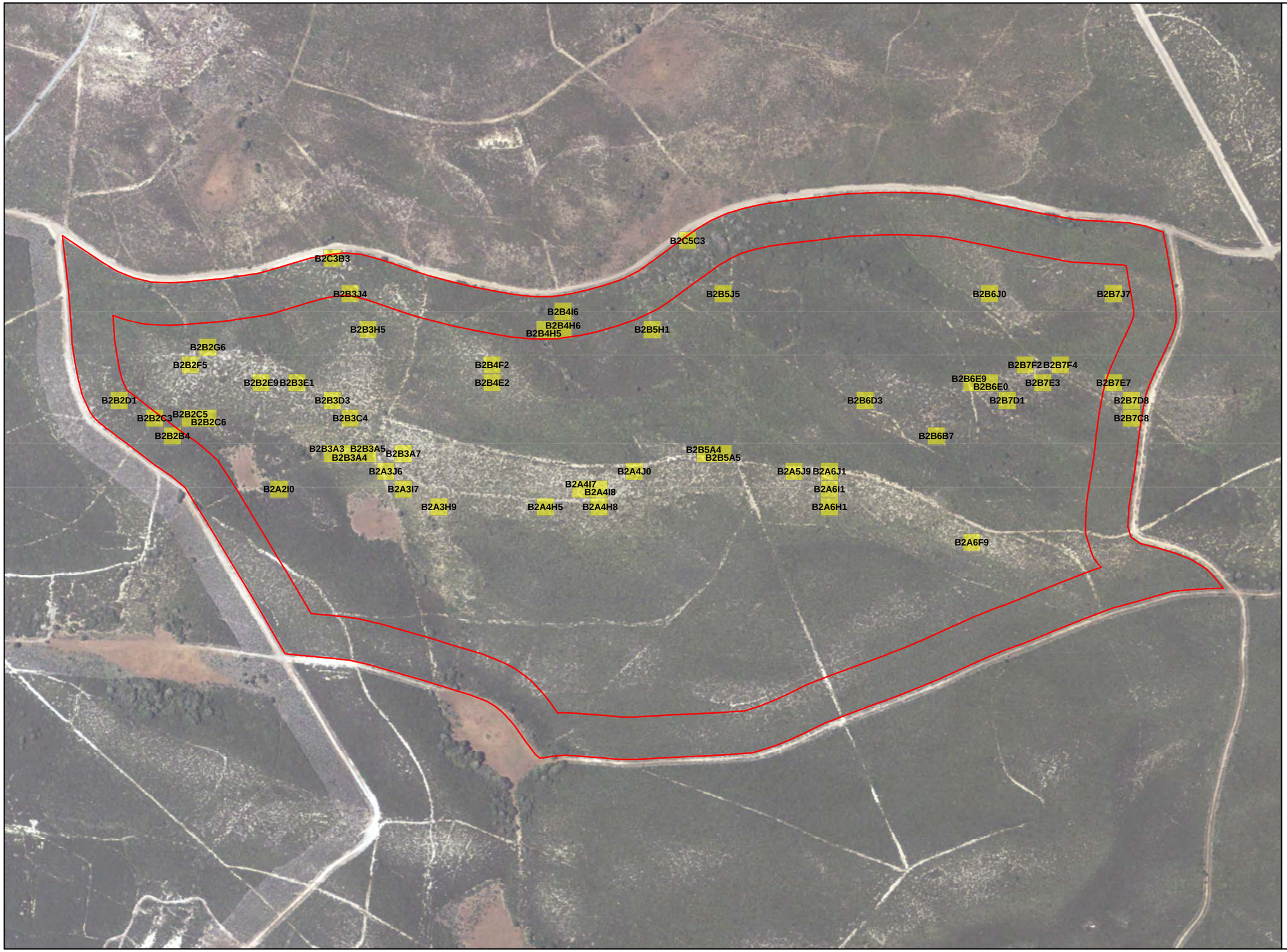
Aerial image date 2009

N

0 200 400 600 800 1,000

Feet

Map A1-14



Fort Ord
Unit 10
Seaside Bird's-beak
Density Classes
2012
Baseline

Legend

- Unit Boundary
- Density Class 0
- Density Class 1
- Density Class 2
- Density Class 3
- Density Class 4

Aerial image date 2009

N

0 200 400 600 800 1,000

Feet

Map A1-15

Fort Ord
Unit 10
Monterey Spineflower
Density Classes
2012
Baseline

Legend

- Unit Boundary
- Density Class 0
- Density Class 1
- Density Class 2
- Density Class 3
- Density Class 4

Aerial image date 2009

N

0 200 400 600 800 1,000

Feet

Map A1-16

Fort Ord
Unit 10
Vegetation Transect Locations
2012
Baseline

Legend

- Vegetation Transect
- Unit Boundary

Aerial image date 2009

N

0 200 400 600 800 1,000

Feet

Map A1-17

Fort Ord
Unit 10
Annual Grass Distribution
2012
Baseline

Legend

- Unit Boundary
- Low Density (1-5%)
- Medium Density (6-25%)
- High Density (> 25%)

Aerial image date 2009

N

0 200 400 600 800 1,000

Feet

Map A1-18

Fort Ord
Unit 04
Sand Gilia
Density Classes
2012
Year 1

Legend

- Unit Boundary
- Density Class 0
- Density Class 1
- Density Class 2
- Density Class 3
- Density Class 4

Aerial image date 2009

N

0 200 400 600 800

Feet

Map A2-1

Fort Ord
Unit 04
Seaside Bird's-beak
Density Classes
2012
Year 1

Legend

- Unit Boundary
- Density Class 0
- Density Class 1
- Density Class 2
- Density Class 3
- Density Class 4

Aerial image date 2009

N

0 200 400 600 800

Feet

Map A2-2

Fort Ord
Unit 04
Monterey Spineflower
Density Classes
2012
Year 1

Legend

- Unit Boundary
- Density Class 0
- Density Class 1
- Density Class 2
- Density Class 3
- Density Class 4

Aerial image date 2009

N

0 200 400 600 800

Feet

Map A2-3

Fort Ord
Unit 11
Sand Gilia
Density Classes
2012
Year 1

Legend

- Unit Boundary
- Density Class 0
- Density Class 1
- Density Class 2
- Density Class 3
- Density Class 4

Aerial image date 2009

N

0 200 400 600 800

Feet

Map A2-4

Fort Ord
Unit 11
Seaside Bird's-beak
Density Classes
2012
Year 1

Legend

- Unit Boundary
- Density Class 0
- Density Class 1
- Density Class 2
- Density Class 3
- Density Class 4

Aerial image date 2009

N

0 200 400 600 800

Feet

Map A2-5

Fort Ord
Unit 11
Monterey Spineflower
Density Classes
2012
Year 1

Legend

- Unit Boundary
- Density Class 0
- Density Class 1
- Density Class 2
- Density Class 3
- Density Class 4

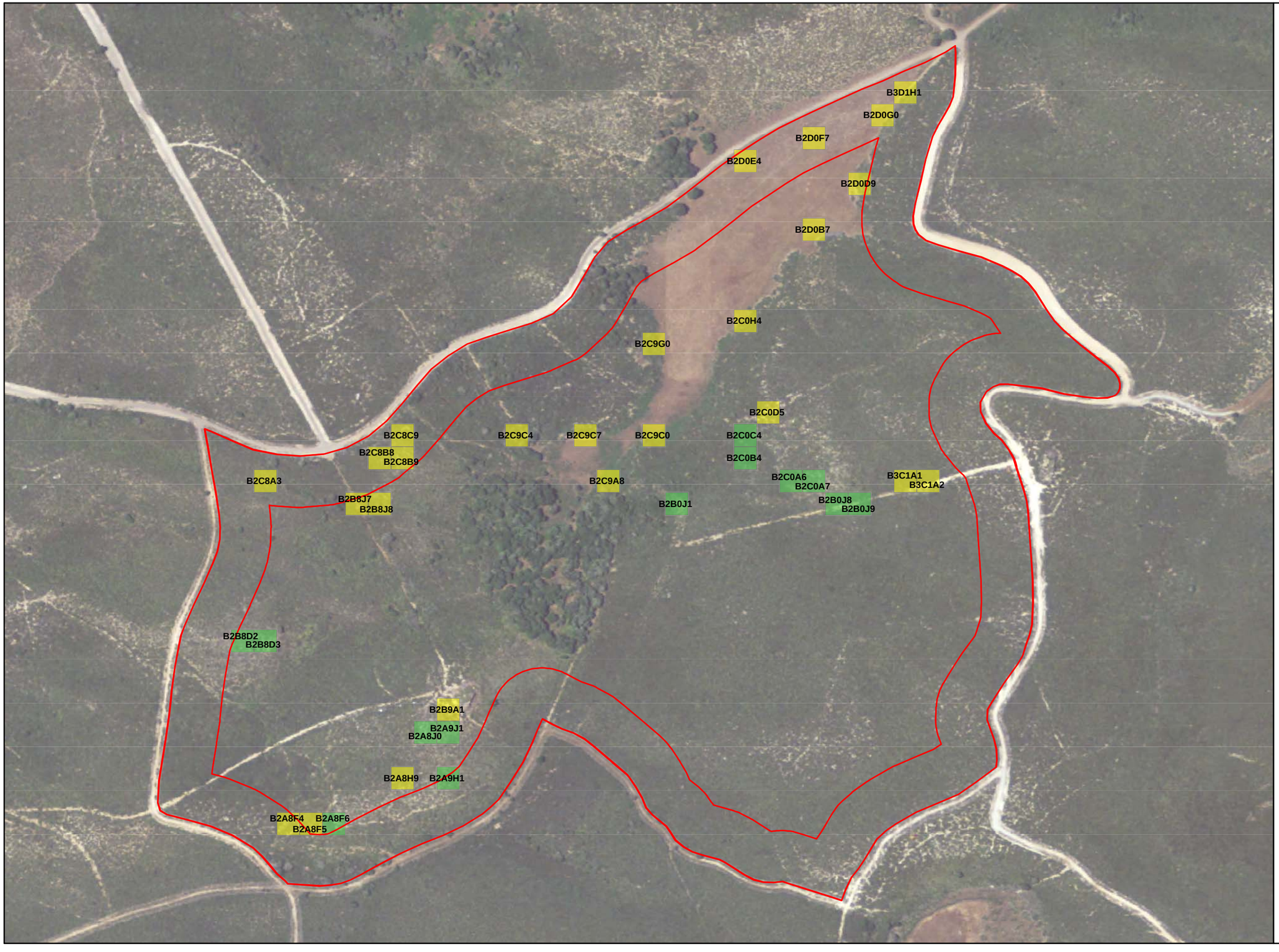
Aerial image date 2009

N

0 200 400 600 800

Feet

Map A2-6



Fort Ord
Unit 12
Sand Gilia
Density Classes
2012
Year 1

Legend

- Unit Boundary
- Density Class 0
- Density Class 1
- Density Class 2
- Density Class 3
- Density Class 4

Aerial image date 2009

N

0 200 400 600 800

Feet

Map A2-7

Fort Ord
Unit 12
Seaside Bird's-beak
Density Classes
2012
Year 1

Legend

- Unit Boundary
- Density Class 0
- Density Class 1
- Density Class 2
- Density Class 3
- Density Class 4

Aerial image date 2009

B3D1H1
B2D0G0
B2D0F7
B2D0E4
B2D0D9
B2D0B7
B2C0H4
B2C9G0
B2C0D5
B2C8C9
B2C9C4
B2C9C7
B2C9C0
B2C0C4
B2C8B8
B2C8B9
B2C0B4
B2C8A3
B2C9A8
B2C0A6
B2C0A7
B3C1A1
B3C1A2
B2B8J7
B2B8J8
B2B0J1
B2B0J8
B2B0J9
B2B8D2
B2B8D3
B2B9A1
B2A9J1
B2A8J0
B2A8H9
B2A9H1
B2A8F4
B2A8F6
B2A8F5

N

0 200 400 600 800

Feet

Map A2-8

Fort Ord
Unit 12
Monterey Spineflower
Density Classes
2012
Year 1

Legend

- Unit Boundary
- Density Class 0
- Density Class 1
- Density Class 2
- Density Class 3
- Density Class 4

Aerial image date 2009

B3D1H1
B2D0G0
B2D0F7
B2D0E4
B2D0D9
B2D0B7
B2C0H4
B2C9G0
B2C0D5
B2C8C9
B2C9C4
B2C9C7
B2C9C0
B2C0C4
B2C8B8
B2C8B9
B2C0B4
B2C8A3
B2C9A8
B2C0A6
B2C0A7
B3C1A1
B3C1A2
B2B8J7
B2B8J8
B2B0J1
B2B0J8
B2B0J9
B2B8D2
B2B8D3
B2B9A1
B2A9J1
B2A8J0
B2A8H9
B2A9H1
B2A8F4
B2A8F6
B2A8F5

N

0 200 400 600 800

Feet

Map A2-9

Fort Ord
Unit 23 Mastication Area
Sand Gilia
Density Classes
2012
Year 1

Legend

- Unit Boundary
- Density Class 0
- Density Class 1
- Density Class 2
- Density Class 3
- Density Class 4

Aerial image date 2009

N

0 50 100 200 300 400

Feet

Map A2-10

Fort Ord
Unit 23 Mastication Area
Seaside Bird's-beak
Density Classes
2012
Year 1

Legend

- Unit Boundary
- Density Class 0
- Density Class 1
- Density Class 2
- Density Class 3
- Density Class 4

Aerial image date 2009

N

0 50 100 200 300 400

Feet

Map A2-11

Fort Ord
Unit 23 Mastication Area
Monterey Spineflower
Density Classes
2012
Year 1

Legend

- Unit Boundary
- Density Class 0
- Density Class 1
- Density Class 2
- Density Class 3
- Density Class 4

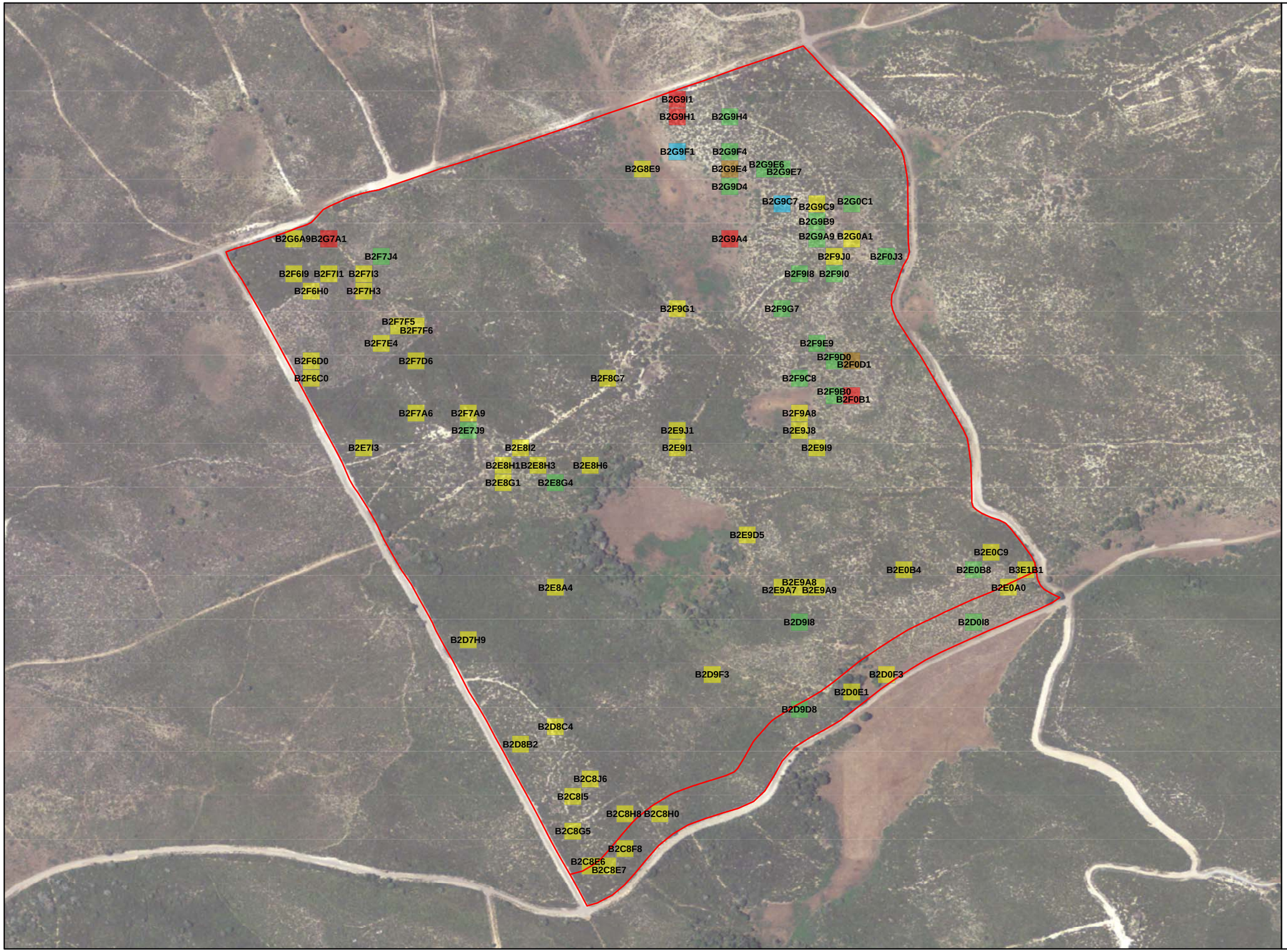
Aerial image date 2009

N

0 50 100 200 300 400

Feet

Map A2-12



Fort Ord
Unit 14
Sand Gilia
Density Classes
2012
Year 3

Legend

- Unit Boundary
- Density Class 0
- Density Class 1
- Density Class 2
- Density Class 3
- Density Class 4

Aerial image date 2009

N

0 200 400 600 800 1,000

Feet

Map A3-1

Fort Ord
Unit 14
Seaside Bird's-beak
Density Classes
2012
Year 3

Legend

- Unit Boundary
- Density Class 0
- Density Class 1
- Density Class 2
- Density Class 3
- Density Class 4

Aerial image date 2009

N

0 200 400 600 800 1,000
Feet

Map A3-2

Fort Ord
Unit 14
Monterey Spineflower
Density Classes
2012
Year 3

Legend

- Unit Boundary
- Density Class 0
- Density Class 1
- Density Class 2
- Density Class 3
- Density Class 4

Aerial image date 2009

N

0 200 400 600 800 1,000
Feet

Map A3-3

Fort Ord
Unit 14
Vegetation Transect Locations
2012
Year 3

Legend

- Vegetation Transect
- Unit Boundary

Aerial image date 2009

N

0 200 400 600 800 1,000

Feet

Map A3-4

Fort Ord
Unit 14
Annual Grass Distribution
2012
Year 3

Legend

- Unit Boundary
- Low Density (1-5%)
- Medium Density (6-25%)
- High Density (> 25%)

Aerial image date 2009

N

0 200 400 600 800 1,000

Feet

Map A3-5

Fort Ord
Unit 19
Sand Gilia
Density Classes
2012
Year 3

Legend

- Unit Boundary
- Density Class 0
- Density Class 1
- Density Class 2
- Density Class 3
- Density Class 4

Aerial image date 2009

N

0 200 400 600 800 1,000

Feet

Map A3-6

Fort Ord
Unit 19
Seaside Bird's-beak
Density Classes
2012
Year 3

Legend

- Unit Boundary
- Density Class 0
- Density Class 1
- Density Class 2
- Density Class 3
- Density Class 4

Aerial image date 2009

N

0 200 400 600 800 1,000

Feet

Map A3-7

Fort Ord
Unit 19
Monterey Spineflower
Density Classes
2012
Year 3

Legend

- Unit Boundary
- Density Class 0
- Density Class 1
- Density Class 2
- Density Class 3
- Density Class 4

Aerial image date 2009

N

0 200 400 600 800 1,000

Feet

Map A3-8

Fort Ord
Unit 19
Vegetation Transect Locations
2012
Year 3

Legend

- Vegetation Transect
- Unit Boundary

Aerial image date 2009

N

0 200 400 600 800 1,000

Feet

Map A3-9

Fort Ord
Unit 19
Annual Grass Distribution
2012
Year 3

Legend

- Unit Boundary
- Low Density (1-5%)
- Medium Density (6-25%)
- High Density (> 25%)

Aerial image date 2009

N

0 200 400 600 800 1,000

Feet

Map A3-10

Fort Ord
Unit 03 Mastication Area
Invasive Weeds
2012
Baseline

Legend

- Unit Boundary
- Pampas Grass
- Ice Plant
- French Broom

Aerial image date 2009

N

0 100 200 300 400 500

Feet

Map A4-1

Fort Ord
Unit 10
Invasive Weeds
2012
Baseline

Legend

- Unit Boundary
- Pampas Grass
- Ice Plant
- French Broom

Aerial image date 2009

N

0 200 400 600 800 1,000

Feet

Map A4-2

APPENDIX B

Shrub Transect Data

Appendix B-1

Baseline Transects, Units 2, 3, and 6

		Unit 2			Unit 3		
Code	Species	2-1	2-3	18A-1	3-1	3-2	3-4
ADFA	*Adenostoma fasciculatum*	56.80	53.20	18.40	11.00	22.40	10.60
ARMO	*Arctostaphylos montereyensis*	0.00	0.00	0.00	0.00	0.00	0.00
ARPU	*Arctostaphylos pumila*	0.00	0.00	0.00	0.00	16.40	39.80
ARTO	*Arctostaphylos tomentosa* ssp. *tomentosa*	43.20	30.20	51.00	93.20	75.80	27.40
CAED	*Carpobrotus edulis*	0.00	0.00	0.00	0.00	0.00	0.00
CECUR	*Ceanothus rigidus (=Ceanothus cuneatus var. rigidus)*	0.00	10.60	2.40	0.00	0.00	2.60
CEDE	*Ceanothus dentatus*	0.00	0.00	0.80	0.00	0.00	0.00
COXX	*Cortaderia* sp. *(C. jubata or C. selloana)*	0.00	0.00	0.00	0.00	0.00	0.00
ERCO	*Eriophyllum confertiflorum*	0.00	0.00	0.00	0.00	0.00	0.00
ERFA	*Ericameria fasciculata*	0.00	0.00	0.00	0.00	0.00	0.00
GAEL	*Garrya elliptica*	19.20	11.60	0.00	0.00	4.60	0.00
HEAR	*Heteromeles arbutifolia*	0.00	0.00	0.00	0.00	0.00	0.00
HESC	*Helianthemum scoparium*	0.00	0.00	0.00	0.00	0.00	0.00
LECA	*Lepechinia calycina*	0.00	1.00	0.00	0.00	0.00	0.00
LOSC	*Acmispon glaber* (*=Lotus scoparius)*	0.00	0.00	0.00	0.00	0.00	0.00
MIAU	*Mimulus aurantiacus*	0.00	0.00	0.00	0.00	0.00	1.40
QUAG	*Quercus agrifolia*	0.00	0.00	0.00	0.00	0.00	0.00
SAME	*Salvia mellifera*	0.00	0.00	5.00	0.20	0.00	6.20
SYMO	*Symphoricarpos mollis*	0.40	0.00	0.00	0.00	0.00	0.00
TODI	*Toxicodendron diversilobum*	1.80	1.80	0.00	0.00	1.00	5.00
BG	Bare ground	0.80	10.60	26.80	1.00	3.60	20.40
HERB	Herbaceous vegetation	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Baseline Transects, Units 2, 3, and 6

		Unit 3		Unit 6			
Code	Species	13A-1	14A-1	6-2	6-3	6-5	6-6
ADFA	*Adenostoma fasciculatum*	10.80	16.00	12.00	28.20	17.00	18.20
ARMO	*Arctostaphylos montereyensis*	0.00	0.00	0.00	2.00	0.00	0.60
ARPU	*Arctostaphylos pumila*	52.20	6.00	0.00	1.20	0.80	0.00
ARTO	*Arctostaphylos tomentosa* ssp. *tomentosa*	43.80	74.80	65.40	43.60	48.80	80.60
CAED	*Carpobrotus edulis*	0.00	0.00	0.00	0.00	0.00	0.00
CECUR	*Ceanothus rigidus (=Ceanothus cuneatus var. rigidus)*	0.60	0.00	0.00	1.00	0.00	5.20
CEDE	*Ceanothus dentatus*	0.00	0.00	0.00	0.40	0.00	0.00
COXX	*Cortaderia* sp. *(C. jubata or C. selloana)*	0.00	0.00	0.00	0.00	0.00	6.20
ERCO	*Eriophyllum confertiflorum*	0.00	0.00	0.00	0.00	0.80	0.00
ERFA	*Ericameria fasciculata*	0.00	0.00	0.00	0.00	0.60	0.00
GAEL	*Garrya elliptica*	0.00	12.80	0.00	1.20	0.00	0.00
HEAR	*Heteromeles arbutifolia*	0.00	0.00	0.00	2.00	0.00	0.00
HESC	*Helianthemum scoparium*	0.00	0.00	0.00	0.20	12.80	0.00
LECA	*Lepechinia calycina*	0.00	0.00	0.00	0.00	0.00	0.00
LOSC	*Acmispon glaber* (*=Lotus scoparius)*	0.00	0.00	0.00	0.00	1.40	0.00
MIAU	*Mimulus aurantiacus*	0.20	0.00	0.00	0.00	0.00	0.00
QUAG	*Quercus agrifolia*	0.00	0.00	0.00	0.00	0.00	0.00
SAME	*Salvia mellifera*	0.20	0.00	8.80	10.00	5.00	2.20
SYMO	*Symphoricarpos mollis*	0.00	0.00	0.00	0.00	0.00	0.00
TODI	*Toxicodendron diversilobum*	0.00	0.00	0.00	0.00	0.00	0.00
BG	Bare ground	3.40	5.80	18.80	22.40	24.40	1.80
HERB	Herbaceous vegetation	0.00	0.00	0.00	0.40	0.60	0.00

Appendix B-1
Baseline Transects, Units 2, 3, and 6

		Unit 6	
Code	Species	27B-1	28-2
ADFA	*Adenostoma fasciculatum*	44.40	8.80
ARMO	*Arctostaphylos montereyensis*	0.00	0.00
ARPU	*Arctostaphylos pumila*	0.00	0.00
ARTO	*Arctostaphylos tomentosa* ssp. *tomentosa*	39.80	75.80
CAED	*Carpobrotus edulis*	0.80	0.00
CECUR	*Ceanothus rigidus (=Ceanothus cuneatus var. rigidus)*	0.00	0.00
CEDE	*Ceanothus dentatus*	0.00	0.00
COXX	*Cortaderia* sp. *(C. jubata or C. selloana)*	0.00	0.00
ERCO	*Eriophyllum confertiflorum*	0.00	0.00
ERFA	*Ericameria fasciculata*	0.00	0.00
GAEL	*Garrya elliptica*	0.00	0.00
HEAR	*Heteromeles arbutifolia*	0.00	1.20
HESC	*Helianthemum scoparium*	0.00	0.00
LECA	*Lepechinia calycina*	0.00	0.00
LOSC	*Acmispon glaber* (*=Lotus scoparius)*	0.00	0.00
MIAU	*Mimulus aurantiacus*	0.60	0.00
QUAG	*Quercus agrifolia*	16.00	0.00
SAME	*Salvia mellifera*	2.60	9.00
SYMO	*Symphoricarpos mollis*	0.00	0.00
TODI	*Toxicodendron diversilobum*	0.00	0.00
BG	Bare ground	13.20	18.00
HERB	Herbaceous vegetation	0.00	1.60

Appendix B-2
Baseline Transects, Unit 10

		Unit 10						
Code	Species	10-1	10-2	10-3	10-4	10-5	10-6	10-7
ADFA	*Adenostoma fasciculatum*	38.80	33.20	25.40	35.20	11.00	23.20	2.80
ARHO	*Arctostaphylos hookeri* ssp. *hookeri*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ARPU	*Arctostaphylos pumila*	0.00	0.00	0.00	0.00	0.00	10.40	8.20
ARTO	*Arctostaphylos tomentosa* ssp. *tomentosa*	54.80	50.80	47.00	58.40	55.20	43.20	69.40
BAPI	*Baccharis pilularis*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CAED	*Carpobrotus edulis*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CECUR	*Ceanothus rigidus (=Ceanothus cuneatus var. rigidus)*	11.00	11.40	8.60	8.20	3.40	12.20	3.00
CEDE	*Ceanothus dentatus*	0.00	0.00	0.00	1.80	0.20	0.00	0.00
ERCO	*Eriophyllum confertiflorum*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ERER	*Ericameria ericoides*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ERFA	*Ericameria fasciculata*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GAEL	*Garrya elliptica*	1.80	0.00	9.60	0.00	0.20	0.00	0.00
HEAR	*Heteromeles arbutifolia*	0.00	9.60	14.80	0.00	0.00	0.00	0.00
HESC	*Helianthemum scoparium*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LECA	*Lepechinia calycina*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOSC	*Acmispon glaber* (*=Lotus scoparius)*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MIAU	*Mimulus aurantiacus*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
QUAG	*Quercus agrifolia*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAME	*Salvia mellifera*	33.60	11.60	9.80	5.40	18.60	18.20	1.20
SYMO	*Symphoricarpos mollis*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TODI	*Toxicodendron diversilobum*	0.00	0.00	0.00	0.00	0.00	0.00	3.00
BG	Bare ground	7.20	5.60	11.60	10.40	20.80	16.20	13.40
HERB	Herbaceous vegetation	0.00	0.00	0.00	0.00	0.00	0.40	0.00

Appendix B-2
Baseline Transects, Unit 10

		Unit 10						
Code	Species	10-8	10-9	10-10	10-11	10-12	10-13	10-14
ADFA	*Adenostoma fasciculatum*	0.00	18.00	3.80	18.80	11.20	24.20	5.00
ARHO	*Arctostaphylos hookeri* ssp. *hookeri*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ARPU	*Arctostaphylos pumila*	4.40	10.60	13.80	7.20	5.00	0.00	0.00
ARTO	*Arctostaphylos tomentosa* ssp. *tomentosa*	59.40	41.60	72.00	36.00	64.60	66.40	98.60
BAPI	*Baccharis pilularis*	6.40	0.00	0.00	0.00	0.00	0.00	0.00
CAED	*Carpobrotus edulis*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CECUR	*Ceanothus rigidus (=Ceanothus cuneatus var. rigidus)*	5.40	11.40	8.40	4.20	9.20	1.80	3.20
CEDE	*Ceanothus dentatus*	0.00	0.00	0.00	0.00	1.00	0.00	0.00
ERCO	*Eriophyllum confertiflorum*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ERER	*Ericameria ericoides*	0.00	0.00	0.00	0.00	0.00	3.00	0.00
ERFA	*Ericameria fasciculata*	0.00	0.00	0.00	0.00	0.00	0.60	0.00
GAEL	*Garrya elliptica*	6.00	0.00	0.00	0.00	0.00	0.00	0.00
HEAR	*Heteromeles arbutifolia*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HESC	*Helianthemum scoparium*	0.00	0.00	0.00	3.00	0.00	0.00	0.00
LECA	*Lepechinia calycina*	0.80	0.00	0.00	0.00	5.40	0.00	0.00
LOSC	*Acmispon glaber* (*=Lotus scoparius)*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MIAU	*Mimulus aurantiacus*	0.40	0.00	0.00	0.00	0.00	0.00	0.00
QUAG	*Quercus agrifolia*	1.40	0.00	0.00	0.00	0.00	2.00	0.00
SAME	*Salvia mellifera*	0.00	34.40	2.60	8.40	6.60	4.80	0.00
SYMO	*Symphoricarpos mollis*	1.20	0.00	3.60	0.00	0.00	0.00	0.00
TODI	*Toxicodendron diversilobum*	28.00	0.20	0.00	0.00	0.00	1.00	0.60
BG	Bare ground	19.60	11.20	8.40	28.60	15.00	11.60	1.00
HERB	Herbaceous vegetation	0.00	0.00	0.00	2.00	0.00	0.00	0.00

Appendix B-2
Baseline Transects, Unit 10

		Unit 10						
Code	Species	10-15	10-16	10-17	10-18	10-19	10-20	10-21
ADFA	*Adenostoma fasciculatum*	23.40	30.60	13.20	60.00	15.20	19.80	16.60
ARHO	*Arctostaphylos hookeri* ssp. *hookeri*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ARPU	*Arctostaphylos pumila*	3.80	0.00	0.80	0.00	0.00	0.00	0.00
ARTO	*Arctostaphylos tomentosa* ssp. *tomentosa*	41.40	28.80	38.00	35.40	26.20	64.40	76.80
BAPI	*Baccharis pilularis*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CAED	*Carpobrotus edulis*	0.00	0.00	0.00	0.00	4.80	0.00	0.00
CECUR	*Ceanothus rigidus (=Ceanothus cuneatus var. rigidus)*	11.40	9.20	18.20	11.00	0.00	0.00	2.60
CEDE	*Ceanothus dentatus*	0.00	0.60	1.60	0.00	0.00	0.00	0.00
ERCO	*Eriophyllum confertiflorum*	0.00	0.00	0.00	0.00	0.00	0.60	0.00
ERER	*Ericameria ericoides*	0.00	0.00	3.20	0.00	0.00	0.00	0.00
ERFA	*Ericameria fasciculata*	0.60	0.00	0.00	0.00	3.40	0.00	0.00
GAEL	*Garrya elliptica*	0.00	0.00	0.00	0.80	0.00	0.00	5.20
HEAR	*Heteromeles arbutifolia*	0.00	0.00	0.00	0.00	0.00	0.00	1.40
HESC	*Helianthemum scoparium*	0.00	0.00	0.00	0.00	2.80	0.00	0.00
LECA	*Lepechinia calycina*	0.00	14.40	0.00	0.00	0.00	0.00	0.40
LOSC	*Acmispon glaber* (*=Lotus scoparius)*	0.00	0.00	0.00	0.00	0.20	0.40	0.00
MIAU	*Mimulus aurantiacus*	0.00	1.80	0.00	0.00	0.60	0.00	0.00
QUAG	*Quercus agrifolia*	0.00	7.00	0.00	0.00	0.00	0.00	0.00
SAME	*Salvia mellifera*	16.40	13.80	13.40	0.00	4.60	5.20	5.60
SYMO	*Symphoricarpos mollis*	0.00	0.00	4.60	0.00	0.00	0.00	0.00
TODI	*Toxicodendron diversilobum*	2.60	0.00	8.40	0.00	8.00	2.80	0.00
BG	Bare ground	17.00	15.20	25.40	8.20	44.60	16.40	5.60
HERB	Herbaceous vegetation	0.40	0.00	0.00	0.00	2.40	0.00	0.00

Appendix B-2
Baseline Transects, Unit 10

		Unit 10						
Code	Species	10-22	10-23	10-24	10-25	10-26	10-27	10-28
ADFA	*Adenostoma fasciculatum*	15.20	12.20	17.40	8.40	7.40	13.80	10.60
ARHO	*Arctostaphylos hookeri* ssp. *hookeri*	0.00	0.00	0.00	0.00	0.00	0.00	10.80
ARPU	*Arctostaphylos pumila*	0.20	0.00	9.40	2.00	18.00	0.00	0.00
ARTO	*Arctostaphylos tomentosa* ssp. *tomentosa*	57.80	64.60	68.80	66.80	66.80	70.60	67.80
BAPI	*Baccharis pilularis*	0.00	0.00	0.00	0.00	0.40	0.00	0.00
CAED	*Carpobrotus edulis*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CECUR	*Ceanothus rigidus (=Ceanothus cuneatus var. rigidus)*	9.20	2.20	3.20	2.60	10.80	3.00	4.00
CEDE	*Ceanothus dentatus*	0.00	0.00	0.40	0.00	0.00	0.00	0.00
ERCO	*Eriophyllum confertiflorum*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ERER	*Ericameria ericoides*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ERFA	*Ericameria fasciculata*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GAEL	*Garrya elliptica*	0.00	0.00	1.40	0.00	0.00	2.20	0.00
HEAR	*Heteromeles arbutifolia*	0.00	0.00	0.00	2.00	0.00	7.20	0.00
HESC	*Helianthemum scoparium*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LECA	*Lepechinia calycina*	0.00	0.00	0.80	0.00	0.00	0.00	0.00
LOSC	*Acmispon glaber* (*=Lotus scoparius)*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MIAU	*Mimulus aurantiacus*	0.00	0.00	0.00	1.60	4.80	0.00	0.00
QUAG	*Quercus agrifolia*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAME	*Salvia mellifera*	23.60	9.00	13.80	8.20	25.20	7.40	0.00
SYMO	*Symphoricarpos mollis*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TODI	*Toxicodendron diversilobum*	0.00	0.00	0.00	35.60	0.00	0.00	5.20
BG	Bare ground	13.40	19.00	8.00	10.20	6.80	10.20	4.40
HERB	Herbaceous vegetation	0.00	0.00	0.00	0.00	0.00	0.00	1.40

Appendix B-2
Baseline Transects, Unit 10

		Unit 10	
Code	Species	10-29	10-30
ADFA	*Adenostoma fasciculatum*	11.80	13.00
ARHO	*Arctostaphylos hookeri* ssp. *hookeri*	38.60	4.80
ARPU	*Arctostaphylos pumila*	0.00	0.00
ARTO	*Arctostaphylos tomentosa* ssp. *tomentosa*	67.00	79.20
BAPI	*Baccharis pilularis*	0.00	0.00
CAED	*Carpobrotus edulis*	0.00	0.00
CECUR	*Ceanothus rigidus (=Ceanothus cuneatus var. rigidus)*	4.00	0.00
CEDE	*Ceanothus dentatus*	0.00	0.00
ERCO	*Eriophyllum confertiflorum*	0.00	0.00
ERER	*Ericameria ericoides*	0.00	0.00
ERFA	*Ericameria fasciculata*	0.00	0.00
GAEL	*Garrya elliptica*	4.20	0.00
HEAR	*Heteromeles arbutifolia*	0.00	0.00
HESC	*Helianthemum scoparium*	0.00	0.00
LECA	*Lepechinia calycina*	0.00	0.00
LOSC	*Acmispon glaber* (*=Lotus scoparius)*	0.00	0.00
MIAU	*Mimulus aurantiacus*	0.00	0.00
QUAG	*Quercus agrifolia*	0.00	0.00
SAME	*Salvia mellifera*	0.00	2.60
SYMO	*Symphoricarpos mollis*	0.00	0.00
TODI	*Toxicodendron diversilobum*	1.20	0.00
BG	Bare ground	1.40	6.00
HERB	Herbaceous vegetation	0.00	0.00

Appendix B-3

Year 3 Transects, Units 14 and 19

		Unit 14					
		14-1		14-10	14-11	14-12	14-13
	Treatment	Burn		Burn	Burn	Burn	Burn
	Method	transect	quadrat	transect	transect	transect	transect
Code	**Species**[1]						
ADFA	*Adenostoma fasciculatum*	3.00	0.0	5.00	14.80	10.00	4.60
ACMI	*Achillea millefolium*	0.00	1.3	0.00	0.00	0.00	0.00
AICA	Aira caryophylla	0.00	13.8	0.00	0.00	0.00	0.00
ARPU	*Arctostaphylos pumila*	0.20	0.3	0.20	0.80	0.00	0.40
ARTO	*Arctostaphylos tomentosa ssp. tomentosa*	6.80	0.0	6.20	4.60	7.40	12.40
AVBA	*Avena barbata*	0.00	0.0	0.00	0.00	0.00	0.00
BAPI	*Baccharis pilularis*	0.00	0.0	0.00	0.00	0.00	0.20
BRDI	*Bromus diandrus*	0.00	0.0	0.00	0.00	0.00	0.00
BRHO	*Bromus hordeaceus*	0.00	0.0	0.00	0.00	0.00	0.00
BRMAR	*Bromus madritensis ssp. rubens*	0.00	1.5	0.00	0.00	0.00	0.00
CAED	*Carpobrotus edulis*	0.00	0.0	1.00	0.80	3.00	1.40
CAEX	*Castilleja exserta*	0.00	0.3	0.00	0.00	0.00	0.00
CASU	*Castilleja subinclusa*	0.00	0.0	0.00	0.00	0.00	0.00
CECUR	*Ceanothus rigidus (=Ceanothus cuneatus var. rigidus)*	5.80	2.5	0.20	5.20	0.00	2.60
CEDE	*Ceanothus dentatus*	1.00	0.0	0.40	10.40	0.00	2.00
CHDI	*Chorizanthe diffusa*	0.00	0.0	0.00	0.00	0.00	0.00
CHPUP	*Chorizanthe pungens var. pungens*	0.00	3.0	0.00	0.00	0.00	0.00
CORIL	*Cordylanthus rigidus ssp. littoralis*	0.00	0.0	0.00	0.00	0.00	0.00
COXX	*Cortaderia sp. (C. jubata or C. selloana)*	0.00	1.0	0.00	0.00	0.00	0.00
CRXX	*Cryptantha sp.*	0.00	0.0	0.00	0.00	0.00	0.00
DAPU	*Daucus pusillus*	0.00	0.5	0.00	0.00	0.00	0.00
ELGL	*Elymus glaucus*	0.00	0.0	0.00	0.00	0.00	0.00
ERCO	*Eriophyllum confertiflorum*	3.00	3.8	9.00	2.80	2.80	3.80
ERER	*Ericameria ericoides*	12.00	0.8	0.00	0.00	0.00	0.00
ERFA	*Ericameria fasciculata*	0.00	0.0	0.00	0.40	0.00	0.00
ERVI	*Eriastrum virgatum*	0.00	0.5	0.00	0.00	0.00	0.00

Appendix B-3

Year 3 Transects, Units 14 and 19

		Unit 14					
		14-1		14-10	14-11	14-12	14-13
	Treatment	Burn		Burn	Burn	Burn	Burn
	Method	transect	quadrat	transect	transect	transect	transect
Code	**Species**[1]						
GAEL	*Garrya elliptica*	0.00	0.0	0.00	0.20	1.80	0.00
GNCA	*Pseudognaphalium californicum*	0.00	0.0	0.00	0.00	0.00	0.00
HEAR	*Heteromeles arbutifolia*	0.00	0.0	0.00	0.00	0.00	1.40
HECO	*Deinandra (Hemizonia) corymbosa*	0.00	0.5	0.00	0.00	0.00	0.00
HEGR	*Heterotheca grandiflora*	0.00	0.0	0.00	0.00	0.00	0.00
HESC	*Helianthemum scoparium*	1.40	4.2	20.20	21.60	13.60	11.60
HOCU	*Horkelia cuneata*	0.00	0.0	0.00	0.00	0.00	0.00
HYGL	*Hypocharis glabra*	0.00	1.8	0.00	0.00	0.00	0.00
LECA	*Lepechinia calycina*	0.00	0.0	0.00	0.00	0.00	0.00
LEPE	*Lessingia pectinata (var. pectinata?)*	0.00	3.5	0.00	0.00	0.00	0.00
LOSC	*Acmispon glaber (=Lotus scoparius)*	1.00	0.0	31.40	2.00	66.80	7.80
LOST	*Acmispon (Lotus) strigosus*	0.00	1.7	0.00	0.00	0.00	0.00
LUAL	*Lupinus albifrons (var. albifrons?)*	0.00	0.0	0.00	0.00	0.00	0.00
LUAR	*Lupinus arboreus*	0.00	0.0	0.00	0.00	0.00	0.00
LUBI	*Lupinus bicolor*	0.00	0.0	0.00	0.00	0.00	0.00
MIAU	*Mimulus aurantiacus*	0.00	0.0	0.00	0.00	0.00	0.00
MOUN	*Monardella undulata*	0.00	1.8	0.00	0.00	0.00	0.00
NAXX	*Navarretia sp.*	0.00	0.0	0.00	0.00	0.00	0.00
PHDI	*Phacelia distans*	0.00	0.0	0.00	0.00	0.00	0.00
POGL	*Drymocallis glandulosa var. wrangelliana*	0.00	0.0	0.00	0.00	0.00	0.00
PTAQP	*Pteridium aquilinum var. pubescens*	0.00	0.0	0.00	0.00	0.00	0.00
QUAG	*Quercus agrifolia*	0.00	0.2	0.00	0.00	0.00	0.00
QUPAS	*Quercus parvula var. shrevei*	0.00	0.0	0.00	0.00	0.00	0.00
QUWIF	*Quercus wislizenii var. frutescens*	0.00	0.0	0.00	0.00	0.00	3.20
RHCA	*Frangula californica (= Rhamnus californica ssp. californica)*	0.00	0.0	0.00	0.00	0.00	0.00
SAME	*Salvia mellifera*	0.00	0.0	1.20	0.20	3.20	0.00
STVI	*Stephanomeria virgata*	0.00	0.2	0.00	0.00	0.00	0.00
SYMO	*Symphoricarpos mollis*	0.00	0.0	0.00	0.00	0.00	0.00

Appendix B-3
Year 3 Transects, Units 14 and 19

		Unit 14					
		14-1		14-10	14-11	14-12	14-13
	Treatment	Burn		Burn	Burn	Burn	Burn
	Method	transect	quadrat	transect	transect	transect	transect
Code	**Species**[1]						
TODI	*Toxicodendron diversilobum*	0.00	0.2	0.00	0.00	2.80	0.80
TRBI	*Trifolium bifidum*	0.00	0.2	0.00	0.00	0.00	0.00
VUBR	*Vulpia bromoides*	0.00	0.0	0.00	0.00	0.00	0.00
VUMY	*Festuca (Vulpia) myuros*	0.00	6.0	0.00	0.00	0.00	0.00
BG	Bare ground	16.80	55.8	37.00	40.20	12.00	52.20
HERB	Herbaceous vegetation	62.40	0	2.00	1.00	0.00	1.20

Notes: [1] Includes herbaceous species detected in quadrats

Appendix B-3
Year 3 Transects, Units 14 and 19

		Unit 14					
		14-14	14-15	14-16		14-17	14-18
	Treatment	Burn	Burn	Burn		Burn	Burn
	Method	transect	transect	transect	quadrat	transect	transect
Code	**Species**[1]						
ADFA	*Adenostoma fasciculatum*	0.60	8.20	9.20	0.7	6.00	7.60
ACMI	*Achillea millefolium*	0.00	0.00	0.00	0.0	0.00	0.00
AICA	Aira caryophylla	0.00	0.00	0.00	0.3	0.00	0.00
ARPU	*Arctostaphylos pumila*	0.00	1.00	0.40	0.2	0.40	0.20
ARTO	*Arctostaphylos tomentosa ssp. tomentosa*	19.60	16.80	9.40	6.5	11.60	28.00
AVBA	*Avena barbata*	0.00	0.00	0.00	0.0	0.00	0.00
BAPI	*Baccharis pilularis*	0.00	0.00	0.00	0.0	0.00	0.00
BRDI	*Bromus diandrus*	0.00	0.00	0.00	0.0	0.00	0.00
BRHO	*Bromus hordeaceus*	0.00	0.00	0.00	0.0	0.00	0.00
BRMAR	*Bromus madritensis ssp. rubens*	0.00	0.00	0.00	0.0	0.00	0.00
CAED	*Carpobrotus edulis*	0.80	0.20	0.20	0.0	0.00	0.60
CAEX	*Castilleja exserta*	0.00	0.00	0.00	0.0	0.00	0.00
CASU	*Castilleja subinclusa*	0.00	0.00	0.00	0.0	0.00	0.00
CECUR	*Ceanothus rigidus (=Ceanothus cuneatus var. rigidus)*	4.20	16.60	0.40	0.5	2.40	3.60
CEDE	*Ceanothus dentatus*	2.00	4.00	2.60	4.7	10.00	39.80
CHDI	*Chorizanthe diffusa*	0.00	0.00	0.00	0.0	0.00	0.00
CHPUP	*Chorizanthe pungens var. pungens*	0.00	0.00	0.00	0.0	0.00	0.00
CORIL	*Cordylanthus rigidus ssp. littoralis*	0.00	0.00	0.00	1.0	0.00	0.00
COXX	*Cortaderia sp. (C. jubata or C. selloana)*	0.00	0.00	0.00	0.0	0.00	0.00
CRXX	*Cryptantha sp.*	0.00	0.00	0.00	0.0	0.00	0.00
DAPU	*Daucus pusillus*	0.00	0.00	0.00	0.0	0.00	0.00
ELGL	*Elymus glaucus*	0.00	0.00	0.00	0.0	0.00	0.00
ERCO	*Eriophyllum confertiflorum*	1.20	2.20	6.40	2.0	7.40	1.80
ERER	*Ericameria ericoides*	0.00	0.00	0.00	0.0	0.00	0.00
ERFA	*Ericameria fasciculata*	0.00	0.00	0.00	0.0	0.00	0.00
ERVI	*Eriastrum virgatum*	0.00	0.00	0.00	0.0	0.00	0.00

Appendix B-3
Year 3 Transects, Units 14 and 19

		Unit 14					
	Treatment	14-14 Burn	14-15 Burn	14-16 Burn		14-17 Burn	14-18 Burn
	Method	transect	transect	transect	quadrat	transect	transect
Code	**Species**[1]						
GAEL	*Garrya elliptica*	0.00	0.00	0.00	0.0	0.00	0.00
GNCA	*Pseudognaphalium californicum*	0.00	0.00	0.00	0.0	0.00	0.00
HEAR	*Heteromeles arbutifolia*	0.00	3.20	0.00	0.0	0.00	0.00
HECO	*Deinandra (Hemizonia) corymbosa*	0.00	0.00	0.00	0.0	0.00	0.00
HEGR	*Heterotheca grandiflora*	0.00	0.00	0.00	0.0	0.00	0.00
HESC	*Helianthemum scoparium*	22.00	1.20	5.40	3.8	14.40	13.40
HOCU	*Horkelia cuneata*	0.00	0.00	0.00	0.7	0.00	0.00
HYGL	*Hypocharis glabra*	0.00	0.00	0.00	0.0	0.00	0.00
LECA	*Lepechinia calycina*	0.00	0.00	0.00	0.0	0.00	0.00
LEPE	*Lessingia pectinata (var. pectinata?)*	0.00	0.00	0.00	0.0	0.00	0.00
LOSC	*Acmispon glaber (=Lotus scoparius)*	45.00	0.80	28.60	9.7	18.00	4.60
LOST	*Acmispon (Lotus) strigosus*	0.00	0.00	0.00	0.0	0.00	0.00
LUAL	*Lupinus albifrons (var. albifrons?)*	1.60	1.80	1.20	0.0	0.00	0.00
LUAR	*Lupinus arboreus*	0.20	0.00	0.00	0.0	0.00	0.00
LUBI	*Lupinus bicolor*	0.00	0.00	0.00	0.0	0.00	0.00
MIAU	*Mimulus aurantiacus*	0.00	0.20	0.00	0.8	0.20	0.80
MOUN	*Monardella undulata*	0.00	0.00	0.00	0.0	0.00	0.00
NAXX	*Navarretia sp.*	0.00	0.00	0.00	0.0	0.00	0.00
PHDI	*Phacelia distans*	0.00	0.00	0.00	0.0	0.00	0.00
POGL	*Drymocallis glandulosa var. wrangelliana*	0.00	0.00	0.00	0.0	0.00	0.00
PTAQP	*Pteridium aquilinum var. pubescens*	0.00	0.00	0.00	11.7	0.00	0.00
QUAG	*Quercus agrifolia*	0.00	0.00	0.00	0.0	0.00	0.00
QUPAS	*Quercus parvula var. shrevei*	0.00	0.00	0.00	0.0	0.00	0.00
QUWIF	*Quercus wislizenii var. frutescens*	0.00	0.00	0.00	0.0	0.00	0.00
RHCA	*Frangula californica (= Rhamnus californica ssp. californica)*	0.00	0.00	0.00	0.0	0.00	0.00
SAME	*Salvia mellifera*	0.00	0.00	0.00	1.3	2.20	0.00
STVI	*Stephanomeria virgata*	0.00	0.00	0.00	0.0	0.00	0.00
SYMO	*Symphoricarpos mollis*	0.00	0.40	0.00	0.0	0.00	0.20

Appendix B-3
Year 3 Transects, Units 14 and 19

		Unit 14					
	Treatment	14-14 Burn	14-15 Burn	14-16 Burn		14-17 Burn	14-18 Burn
	Method	transect	transect	transect	quadrat	transect	transect
Code	**Species**[1]						
TODI	*Toxicodendron diversilobum*	0.00	0.00	0.20	0.0	0.00	0.00
TRBI	*Trifolium bifidum*	0.00	0.00	0.00	0.0	0.00	0.00
VUBR	*Vulpia bromoides*	0.00	0.00	0.00	0.0	0.00	0.00
VUMY	*Festuca (Vulpia) myuros*	0.00	0.00	0.00	0.0	0.00	0.00
BG	Bare ground	28.00	41.60	30.00	64.2	35.80	20.60
HERB	Herbaceous vegetation	1.60	9.60	21.00	0	5.00	0.00

Notes: [1] Includes herbaceous species detected in quadrats

Appendix B-3
Year 3 Transects, Units 14 and 19

		Unit 14					
		14-19	14-2		14-20	14-21	14-22
	Treatment	Burn	Burn		Burn	Burn	Masticate
	Method	transect	transect	quadrat	transect	transect	transect
Code	**Species**[1]						
ADFA	*Adenostoma fasciculatum*	20.60	11.20	20.0	5.60	14.60	20.20
ACMI	*Achillea millefolium*	0.00	0.00	0.0	0.00	0.00	0.00
AICA	Aira caryophylla	0.00	0.00	0.0	0.00	0.00	0.00
ARPU	*Arctostaphylos pumila*	3.00	0.80	0.3	0.00	0.20	0.20
ARTO	*Arctostaphylos tomentosa ssp. tomentosa*	4.80	5.20	0.0	13.20	13.20	5.00
AVBA	*Avena barbata*	0.00	0.00	0.0	0.00	0.00	0.00
BAPI	*Baccharis pilularis*	0.00	0.00	0.0	0.00	0.00	0.00
BRDI	*Bromus diandrus*	0.00	0.00	0.2	0.00	0.00	0.00
BRHO	*Bromus hordeaceus*	0.00	0.00	0.0	0.00	0.00	0.00
BRMAR	*Bromus madritensis ssp. rubens*	0.00	0.00	3.5	0.00	0.00	0.00
CAED	*Carpobrotus edulis*	0.00	0.00	0.0	0.00	0.00	0.00
CAEX	*Castilleja exserta*	0.00	0.00	0.0	0.00	0.00	0.00
CASU	*Castilleja subinclusa*	0.00	0.00	0.2	0.00	0.00	0.00
CECUR	*Ceanothus rigidus (=Ceanothus cuneatus var. rigidus)*	14.60	1.80	3.7	1.40	11.80	6.60
CEDE	*Ceanothus dentatus*	0.60	0.00	0.0	10.00	0.00	9.40
CHDI	*Chorizanthe diffusa*	0.00	0.00	0.2	0.00	0.00	0.00
CHPUP	*Chorizanthe pungens var. pungens*	0.00	0.00	1.7	0.00	0.00	0.00
CORIL	*Cordylanthus rigidus ssp. littoralis*	0.00	0.00	0.0	0.00	0.00	0.00
COXX	*Cortaderia sp. (C. jubata or C. selloana)*	0.00	0.00	0.3	0.00	0.00	0.00
CRXX	*Cryptantha sp.*	0.00	0.00	1.2	0.00	0.00	0.00
DAPU	*Daucus pusillus*	0.00	0.00	0.0	0.00	0.00	0.00
ELGL	*Elymus glaucus*	0.00	0.00	0.2	0.00	0.00	0.00
ERCO	*Eriophyllum confertiflorum*	3.40	2.00	0.3	6.00	0.80	3.20
ERER	*Ericameria ericoides*	0.00	0.00	0.0	0.00	0.00	0.00
ERFA	*Ericameria fasciculata*	0.00	0.00	0.0	0.00	0.00	0.00
ERVI	*Eriastrum virgatum*	0.00	0.00	0.0	0.00	0.00	0.00

Appendix B-3
Year 3 Transects, Units 14 and 19

		Unit 14					
		14-19	14-2		14-20	14-21	14-22
	Treatment	Burn	Burn		Burn	Burn	Masticate
	Method	transect	transect	quadrat	transect	transect	transect
Code	**Species**[1]						
GAEL	*Garrya elliptica*	0.00	0.00	0.0	0.00	0.00	0.00
GNCA	*Pseudognaphalium californicum*	0.00	0.00	0.2	0.00	0.00	0.00
HEAR	*Heteromeles arbutifolia*	0.00	0.00	0.0	0.00	0.00	0.00
HECO	*Deinandra (Hemizonia) corymbosa*	0.00	0.00	0.0	0.00	0.00	0.00
HEGR	*Heterotheca grandiflora*	0.00	0.00	0.0	0.00	0.00	0.00
HESC	*Helianthemum scoparium*	4.60	0.00	0.0	21.20	22.00	7.80
HOCU	*Horkelia cuneata*	0.00	0.00	0.0	0.00	0.00	0.00
HYGL	*Hypocharis glabra*	0.00	0.00	4.0	0.00	0.00	0.00
LECA	*Lepechinia calycina*	0.00	0.00	0.0	0.00	0.00	3.00
LEPE	*Lessingia pectinata (var. pectinata?)*	0.00	0.00	0.0	0.00	0.00	0.00
LOSC	*Acmispon glaber (=Lotus scoparius)*	36.80	0.00	0.0	14.00	51.40	17.20
LOST	*Acmispon (Lotus) strigosus*	0.00	0.00	0.7	0.00	0.00	0.00
LUAL	*Lupinus albifrons (var. albifrons?)*	0.00	0.00	0.0	0.00	0.00	0.00
LUAR	*Lupinus arboreus*	0.00	0.00	0.0	0.00	3.60	0.00
LUBI	*Lupinus bicolor*	0.00	0.00	0.0	0.00	0.00	0.00
MIAU	*Mimulus aurantiacus*	1.20	0.00	0.0	0.00	0.20	0.00
MOUN	*Monardella undulata*	0.00	0.00	0.2	0.00	0.00	0.00
NAXX	*Navarretia sp.*	0.00	0.00	0.2	0.00	0.00	0.00
PHDI	*Phacelia distans*	0.00	0.00	0.0	0.00	0.00	0.00
POGL	*Drymocallis glandulosa var. wrangelliana*	0.00	0.00	0.5	0.00	0.00	0.00
PTAQP	*Pteridium aquilinum var. pubescens*	0.00	0.00	1.3	0.00	0.00	0.00
QUAG	*Quercus agrifolia*	0.00	0.00	0.0	0.00	0.00	3.80
QUPAS	*Quercus parvula var. shrevei*	0.00	0.00	0.0	0.00	0.00	0.00
QUWIF	*Quercus wislizenii var. frutescens*	0.00	0.00	0.0	0.00	0.00	0.00
RHCA	*Frangula californica (= Rhamnus californica ssp. californica)*	0.00	0.00	0.0	0.00	0.00	0.00
SAME	*Salvia mellifera*	4.80	0.00	0.0	0.80	2.20	0.00
STVI	*Stephanomeria virgata*	0.00	0.00	0.5	0.00	0.00	0.00
SYMO	*Symphoricarpos mollis*	0.00	0.00	0.2	0.00	0.00	2.40

Appendix B-3
Year 3 Transects, Units 14 and 19

		Unit 14					
	Treatment	14-19 Burn	14-2 Burn		14-20 Burn	14-21 Burn	14-22 Masticate
	Method	transect	transect	quadrat	transect	transect	transect
Code	**Species**[1]						
TODI	*Toxicodendron diversilobum*	7.00	8.20	2.0	0.00	0.20	1.20
TRBI	*Trifolium bifidum*	0.00	0.00	0.0	0.00	0.00	0.00
VUBR	*Vulpia bromoides*	0.00	0.00	0.3	0.00	0.00	0.00
VUMY	*Festuca (Vulpia) myuros*	0.00	0.00	0.0	0.00	0.00	0.00
BG	Bare ground	32.20	53.40	63.7	40.40	22.60	47.00
HERB	Herbaceous vegetation	0.60	21.80	0	0.20	0.00	0.60

Notes: [1] Includes herbaceous species detected in quadrats

Appendix B-3

Year 3 Transects, Units 14 and 19

		Unit 14					
	Treatment	14-3 Burn	14-4 Burn	14-5 Burn	14-6 Burn	14-7 Burn	14-8 Burn
	Method	transect	transect	transect	transect	transect	transect
Code	**Species**[1]						
ADFA	*Adenostoma fasciculatum*	4.20	12.40	12.20	23.40	0.00	2.00
ACMI	*Achillea millefolium*	0.00	0.00	0.00	0.00	0.00	0.00
AICA	Aira caryophylla	0.00	0.00	0.00	0.00	0.00	0.00
ARPU	*Arctostaphylos pumila*	0.00	0.00	0.20	0.00	0.00	0.40
ARTO	*Arctostaphylos tomentosa ssp. tomentosa*	10.20	8.60	5.20	9.40	12.20	4.60
AVBA	*Avena barbata*	0.00	0.00	0.00	0.00	0.00	0.00
BAPI	*Baccharis pilularis*	0.00	0.00	0.00	0.00	0.00	0.00
BRDI	*Bromus diandrus*	0.00	0.00	0.00	0.00	0.00	0.00
BRHO	*Bromus hordeaceus*	0.00	0.00	0.00	0.00	0.00	0.00
BRMAR	*Bromus madritensis ssp. rubens*	0.00	0.00	0.00	0.00	0.00	0.00
CAED	*Carpobrotus edulis*	0.60	0.00	0.20	0.40	0.00	0.00
CAEX	*Castilleja exserta*	0.00	0.00	0.00	0.00	0.00	0.00
CASU	*Castilleja subinclusa*	0.00	0.00	0.00	0.00	0.00	0.00
CECUR	*Ceanothus rigidus (=Ceanothus cuneatus var. rigidus)*	0.00	0.80	0.60	0.20	5.60	2.40
CEDE	*Ceanothus dentatus*	0.60	0.60	2.40	0.20	7.60	16.40
CHDI	*Chorizanthe diffusa*	0.00	0.00	0.00	0.00	0.00	0.00
CHPUP	*Chorizanthe pungens var. pungens*	0.00	0.00	0.00	0.00	0.00	0.00
CORIL	*Cordylanthus rigidus ssp. littoralis*	0.00	0.00	0.00	0.00	0.00	0.00
COXX	*Cortaderia sp. (C. jubata or C. selloana)*	0.00	0.00	0.00	0.00	0.00	0.00
CRXX	*Cryptantha sp.*	0.00	0.00	0.00	0.00	0.00	0.00
DAPU	*Daucus pusillus*	0.00	0.00	0.00	0.00	0.00	0.00
ELGL	*Elymus glaucus*	0.00	0.00	0.00	0.00	0.00	0.00
ERCO	*Eriophyllum confertiflorum*	3.20	14.20	7.80	2.00	2.00	0.60
ERER	*Ericameria ericoides*	0.80	0.00	0.00	0.00	0.00	0.00
ERFA	*Ericameria fasciculata*	0.40	0.60	1.20	0.00	0.00	0.00
ERVI	*Eriastrum virgatum*	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-3

Year 3 Transects, Units 14 and 19

		Unit 14					
	Treatment Method	14-3 Burn transect	14-4 Burn transect	14-5 Burn transect	14-6 Burn transect	14-7 Burn transect	14-8 Burn transect
Code	**Species**[1]						
GAEL	*Garrya elliptica*	0.00	0.00	1.40	1.80	0.00	0.00
GNCA	*Pseudognaphalium californicum*	0.00	0.00	0.00	0.00	0.00	0.00
HEAR	*Heteromeles arbutifolia*	0.00	0.00	0.00	0.00	0.00	0.00
HECO	*Deinandra (Hemizonia) corymbosa*	0.00	0.00	0.00	0.00	0.00	0.00
HEGR	*Heterotheca grandiflora*	0.00	0.00	0.00	0.00	0.00	0.00
HESC	*Helianthemum scoparium*	24.00	14.00	23.20	7.40	21.80	14.60
HOCU	*Horkelia cuneata*	0.00	0.00	0.00	0.00	0.00	0.00
HYGL	*Hypocharis glabra*	0.00	0.00	0.00	0.00	0.00	0.00
LECA	*Lepechinia calycina*	0.00	0.00	0.00	0.00	0.00	0.00
LEPE	*Lessingia pectinata (var. pectinata?)*	0.00	0.00	0.00	0.00	0.00	0.00
LOSC	*Acmispon glaber (=Lotus scoparius)*	29.60	3.00	21.00	47.80	35.80	43.20
LOST	*Acmispon (Lotus) strigosus*	0.00	0.00	0.00	0.00	0.00	0.00
LUAL	*Lupinus albifrons (var. albifrons?)*	0.00	0.00	0.00	0.00	0.00	0.00
LUAR	*Lupinus arboreus*	0.00	0.00	0.00	0.00	0.00	0.00
LUBI	*Lupinus bicolor*	0.00	0.00	0.00	0.00	0.00	0.00
MIAU	*Mimulus aurantiacus*	1.20	0.00	0.00	0.40	0.00	0.00
MOUN	*Monardella undulata*	0.00	0.00	0.00	0.00	0.00	0.00
NAXX	*Navarretia sp.*	0.00	0.00	0.00	0.00	0.00	0.00
PHDI	*Phacelia distans*	0.00	0.00	0.00	0.00	0.00	0.00
POGL	*Drymocallis glandulosa var. wrangelliana*	0.00	0.00	0.00	0.00	0.00	0.00
PTAQP	*Pteridium aquilinum var. pubescens*	0.00	0.00	0.00	0.00	0.00	0.00
QUAG	*Quercus agrifolia*	0.00	0.00	0.00	0.00	0.00	0.00
QUPAS	*Quercus parvula var. shrevei*	0.00	0.00	0.00	0.00	0.00	0.00
QUWIF	*Quercus wislizenii var. frutescens*	0.00	0.00	0.00	0.00	0.00	0.00
RHCA	*Frangula californica (= Rhamnus californica ssp. californica)*	0.00	0.00	0.20	0.00	0.00	0.00
SAME	*Salvia mellifera*	2.40	0.00	0.40	0.20	0.00	0.00
STVI	*Stephanomeria virgata*	0.00	0.00	0.00	0.00	0.00	0.00
SYMO	*Symphoricarpos mollis*	0.00	0.20	0.00	0.00	0.00	0.00

Appendix B-3
Year 3 Transects, Units 14 and 19

		Unit 14					
	Treatment	14-3 Burn	14-4 Burn	14-5 Burn	14-6 Burn	14-7 Burn	14-8 Burn
	Method	transect	transect	transect	transect	transect	transect
Code	**Species**[1]						
TODI	*Toxicodendron diversilobum*	0.00	0.00	0.00	3.60	0.00	0.00
TRBI	*Trifolium bifidum*	0.00	0.00	0.00	0.00	0.00	0.00
VUBR	*Vulpia bromoides*	0.00	0.00	0.00	0.00	0.00	0.00
VUMY	*Festuca (Vulpia) myuros*	0.00	0.00	0.00	0.00	0.00	0.00
BG	Bare ground	29.60	51.60	34.80	17.00	32.40	26.80
HERB	Herbaceous vegetation	2.80	0.60	5.20	4.20	1.20	0.00

Notes: [1] Includes herbaceous species detected in quadrats

Appendix B-3

Year 3 Transects, Units 14 and 19

		Unit 14	Unit 19				
		14-9	19-1	19-10	19-11	19-12	19-13
	Treatment	Burn	Burn	Burn	Burn	Burn	Burn
	Method	transect	transect	transect	transect	transect	transect
Code	**Species**[1]						
ADFA	*Adenostoma fasciculatum*	10.00	0.60	18.00	10.40	11.40	8.80
ACMI	*Achillea millefolium*	0.00	0.00	0.00	0.00	0.00	0.00
AICA	Aira caryophylla	0.00	0.00	0.00	0.00	0.00	0.00
ARPU	*Arctostaphylos pumila*	0.00	0.80	0.00	0.00	0.40	2.40
ARTO	*Arctostaphylos tomentosa ssp. tomentosa*	12.80	22.20	9.40	8.60	8.40	4.20
AVBA	*Avena barbata*	0.00	0.00	0.00	0.00	0.00	0.00
BAPI	*Baccharis pilularis*	0.00	0.00	0.00	0.00	0.00	0.00
BRDI	*Bromus diandrus*	0.00	0.00	0.00	0.00	0.00	0.00
BRHO	*Bromus hordeaceus*	0.00	0.00	0.00	0.00	0.00	0.00
BRMAR	*Bromus madritensis ssp. rubens*	0.00	0.00	0.00	0.00	0.00	0.00
CAED	*Carpobrotus edulis*	11.00	0.00	0.20	3.60	1.80	1.20
CAEX	*Castilleja exserta*	0.00	0.00	0.00	0.00	0.00	0.00
CASU	*Castilleja subinclusa*	0.00	0.00	0.00	0.00	0.00	0.00
CECUR	*Ceanothus rigidus (=Ceanothus cuneatus var. rigidus)*	3.60	2.20	5.00	5.80	11.60	7.40
CEDE	*Ceanothus dentatus*	17.40	4.20	6.40	9.00	0.00	0.00
CHDI	*Chorizanthe diffusa*	0.00	0.00	0.00	0.00	0.00	0.00
CHPUP	*Chorizanthe pungens var. pungens*	0.00	0.00	0.00	0.00	0.00	0.00
CORIL	*Cordylanthus rigidus ssp. littoralis*	0.00	0.00	0.00	0.00	0.00	0.00
COXX	*Cortaderia sp. (C. jubata or C. selloana)*	0.00	0.00	0.00	0.00	0.00	0.00
CRXX	*Cryptantha sp.*	0.00	0.00	0.00	0.00	0.00	0.00
DAPU	*Daucus pusillus*	0.00	0.00	0.00	0.00	0.00	0.00
ELGL	*Elymus glaucus*	0.00	0.00	0.00	0.00	0.00	0.00
ERCO	*Eriophyllum confertiflorum*	1.20	21.80	5.40	4.60	2.40	2.20
ERER	*Ericameria ericoides*	0.00	0.00	0.00	0.00	0.00	0.00
ERFA	*Ericameria fasciculata*	0.00	0.00	0.00	0.00	0.00	0.00
ERVI	*Eriastrum virgatum*	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-3

Year 3 Transects, Units 14 and 19

		Unit 14	Unit 19				
		14-9	19-1	19-10	19-11	19-12	19-13
	Treatment	Burn	Burn	Burn	Burn	Burn	Burn
	Method	transect	transect	transect	transect	transect	transect
Code	**Species**[1]						
GAEL	*Garrya elliptica*	0.00	2.40	2.40	2.20	0.00	0.00
GNCA	*Pseudognaphalium californicum*	0.00	0.00	0.00	0.00	0.00	0.00
HEAR	*Heteromeles arbutifolia*	0.00	0.00	0.00	0.00	0.00	0.00
HECO	*Deinandra (Hemizonia) corymbosa*	0.00	0.00	0.00	0.00	0.00	0.00
HEGR	*Heterotheca grandiflora*	0.00	0.00	0.00	0.00	0.00	0.00
HESC	*Helianthemum scoparium*	7.80	6.20	29.80	21.40	14.40	5.80
HOCU	*Horkelia cuneata*	0.00	0.00	0.00	0.00	0.00	0.00
HYGL	*Hypocharis glabra*	0.00	0.00	0.00	0.00	0.00	0.00
LECA	*Lepechinia calycina*	0.00	0.00	0.00	0.00	0.00	0.00
LEPE	*Lessingia pectinata (var. pectinata?)*	0.00	0.00	0.00	0.00	0.00	0.00
LOSC	*Acmispon glaber (=Lotus scoparius)*	1.80	25.80	3.60	28.20	21.20	24.00
LOST	*Acmispon (Lotus) strigosus*	0.00	0.00	0.00	0.00	0.00	0.00
LUAL	*Lupinus albifrons (var. albifrons?)*	0.00	0.00	0.00	0.00	0.00	17.80
LUAR	*Lupinus arboreus*	1.20	0.00	0.00	0.00	0.00	0.00
LUBI	*Lupinus bicolor*	0.00	0.00	0.00	0.00	0.00	0.00
MIAU	*Mimulus aurantiacus*	0.20	1.60	0.00	0.00	0.00	0.00
MOUN	*Monardella undulata*	0.00	0.00	0.00	0.00	0.00	0.00
NAXX	*Navarretia sp.*	0.00	0.00	0.00	0.00	0.00	0.00
PHDI	*Phacelia distans*	0.00	0.00	0.00	0.00	0.00	0.00
POGL	*Drymocallis glandulosa var. wrangelliana*	0.00	0.00	0.00	0.00	0.00	0.00
PTAQP	*Pteridium aquilinum var. pubescens*	0.00	0.00	0.00	0.00	0.00	0.00
QUAG	*Quercus agrifolia*	0.00	0.00	0.00	0.00	0.00	0.00
QUPAS	*Quercus parvula var. shrevei*	0.00	4.60	0.00	0.00	0.00	0.00
QUWIF	*Quercus wislizenii var. frutescens*	0.00	0.00	0.00	0.00	0.00	0.00
RHCA	*Frangula californica (= Rhamnus californica ssp. californica)*	0.00	1.80	0.00	0.00	0.00	0.00
SAME	*Salvia mellifera*	0.00	0.00	0.40	0.40	0.00	0.20
STVI	*Stephanomeria virgata*	0.00	0.00	0.00	0.00	0.00	0.00
SYMO	*Symphoricarpos mollis*	4.80	2.80	0.00	0.00	0.00	0.00

Appendix B-3
Year 3 Transects, Units 14 and 19

		Unit 14	Unit 19				
		14-9	19-1	19-10	19-11	19-12	19-13
	Treatment	Burn	Burn	Burn	Burn	Burn	Burn
	Method	transect	transect	transect	transect	transect	transect
Code	**Species**[1]						
TODI	*Toxicodendron diversilobum*	0.00	18.80	0.00	0.00	0.40	0.60
TRBI	*Trifolium bifidum*	0.00	0.00	0.00	0.00	0.00	0.00
VUBR	*Vulpia bromoides*	0.00	0.00	0.00	0.00	0.00	0.00
VUMY	*Festuca (Vulpia) myuros*	0.00	0.00	0.00	0.00	0.00	0.00
BG	Bare ground	37.60	20.20	29.40	29.20	44.40	36.20
HERB	Herbaceous vegetation	0.60	1.60	0.20	0.00	0.20	0.40

Notes: [1] Includes herbaceous species detected in quadrats

Appendix B-3

Year 3 Transects, Units 14 and 19

		Unit 19					
		19-14	19-15	19-16	19-17	19-19	19-2
	Treatment	Burn	Burn	Burn	Masticate	Burn	Burn
	Method	transect	transect	transect	transect	transect	transect
Code	**Species**[1]						
ADFA	*Adenostoma fasciculatum*	15.00	24.20	21.20	17.80	7.40	10.20
ACMI	*Achillea millefolium*	0.00	0.00	0.00	0.00	0.00	0.00
AICA	Aira caryophylla	0.00	0.00	0.00	0.00	0.00	0.00
ARPU	*Arctostaphylos pumila*	0.20	0.00	0.00	0.40	0.00	1.80
ARTO	*Arctostaphylos tomentosa ssp. tomentosa*	19.00	6.40	6.80	9.20	7.00	3.60
AVBA	*Avena barbata*	0.00	0.00	0.00	0.00	0.00	0.00
BAPI	*Baccharis pilularis*	0.00	0.00	0.00	0.00	0.00	0.00
BRDI	*Bromus diandrus*	0.00	0.00	0.00	0.00	0.00	0.00
BRHO	*Bromus hordeaceus*	0.00	0.00	0.00	0.00	0.00	0.00
BRMAR	*Bromus madritensis ssp. rubens*	0.00	0.00	0.00	0.00	0.00	0.00
CAED	*Carpobrotus edulis*	0.00	0.00	1.00	0.00	0.00	1.80
CAEX	*Castilleja exserta*	0.00	0.00	0.00	0.00	0.00	0.00
CASU	*Castilleja subinclusa*	0.00	0.00	0.00	0.00	0.00	0.00
CECUR	*Ceanothus rigidus (=Ceanothus cuneatus var. rigidus)*	0.00	2.60	0.80	0.20	2.40	3.80
CEDE	*Ceanothus dentatus*	0.00	0.00	3.00	0.00	3.40	0.00
CHDI	*Chorizanthe diffusa*	0.00	0.00	0.00	0.00	0.00	0.00
CHPUP	*Chorizanthe pungens var. pungens*	0.00	0.00	0.00	0.00	0.00	0.00
CORIL	*Cordylanthus rigidus ssp. littoralis*	0.00	0.00	0.00	0.00	0.00	0.00
COXX	*Cortaderia sp. (C. jubata or C. selloana)*	0.00	0.00	0.00	0.00	0.00	0.00
CRXX	*Cryptantha sp.*	0.00	0.00	0.00	0.00	0.00	0.00
DAPU	*Daucus pusillus*	0.00	0.00	0.00	0.00	0.00	0.00
ELGL	*Elymus glaucus*	0.00	0.00	0.00	0.00	0.00	0.00
ERCO	*Eriophyllum confertiflorum*	0.40	7.20	0.40	3.60	4.00	0.00
ERER	*Ericameria ericoides*	0.00	0.00	0.00	0.00	0.00	0.00
ERFA	*Ericameria fasciculata*	0.00	0.00	0.00	0.20	0.00	0.00
ERVI	*Eriastrum virgatum*	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-3
Year 3 Transects, Units 14 and 19

		Unit 19					
		19-14	19-15	19-16	19-17	19-19	19-2
	Treatment	Burn	Burn	Burn	Masticate	Burn	Burn
	Method	transect	transect	transect	transect	transect	transect
Code	**Species**[1]						
GAEL	*Garrya elliptica*	0.00	0.00	0.00	0.00	0.00	0.00
GNCA	*Pseudognaphalium californicum*	0.00	0.00	0.00	0.00	0.00	0.00
HEAR	*Heteromeles arbutifolia*	0.00	0.00	0.20	0.00	0.00	0.00
HECO	*Deinandra (Hemizonia) corymbosa*	0.00	0.00	0.00	0.00	0.00	0.00
HEGR	*Heterotheca grandiflora*	0.00	0.00	0.00	0.00	0.00	0.00
HESC	*Helianthemum scoparium*	9.00	22.00	17.40	3.20	25.80	13.60
HOCU	*Horkelia cuneata*	0.00	0.00	0.00	0.00	0.00	0.00
HYGL	*Hypocharis glabra*	0.00	0.00	0.00	0.00	0.00	0.00
LECA	*Lepechinia calycina*	0.00	0.00	0.00	0.00	0.00	0.00
LEPE	*Lessingia pectinata (var. pectinata?)*	0.00	0.00	0.00	0.00	0.00	0.00
LOSC	*Acmispon glaber (=Lotus scoparius)*	40.60	33.20	23.20	16.20	10.40	6.80
LOST	*Acmispon (Lotus) strigosus*	0.00	0.00	0.00	0.00	0.00	0.00
LUAL	*Lupinus albifrons (var. albifrons?)*	4.80	0.00	0.00	0.00	0.00	0.00
LUAR	*Lupinus arboreus*	0.00	0.00	0.00	0.00	0.00	0.00
LUBI	*Lupinus bicolor*	0.00	0.00	0.00	0.00	0.00	0.00
MIAU	*Mimulus aurantiacus*	0.00	2.80	0.20	0.00	0.00	0.00
MOUN	*Monardella undulata*	0.00	0.00	0.00	0.00	0.00	0.00
NAXX	*Navarretia sp.*	0.00	0.00	0.00	0.00	0.00	0.00
PHDI	*Phacelia distans*	0.00	0.00	0.00	0.00	0.00	0.00
POGL	*Drymocallis glandulosa var. wrangelliana*	0.00	0.00	0.00	0.00	0.00	0.00
PTAQP	*Pteridium aquilinum var. pubescens*	0.00	0.00	0.00	0.00	0.00	0.00
QUAG	*Quercus agrifolia*	0.00	0.00	0.00	0.00	0.00	0.00
QUPAS	*Quercus parvula var. shrevei*	1.20	0.00	0.00	0.00	0.00	0.00
QUWIF	*Quercus wislizenii var. frutescens*	0.00	0.00	0.00	0.00	0.00	0.00
RHCA	*Frangula californica (= Rhamnus californica ssp. californica)*	0.00	0.00	0.00	0.00	0.00	0.00
SAME	*Salvia mellifera*	0.00	1.40	1.60	0.40	0.00	0.00
STVI	*Stephanomeria virgata*	0.00	0.00	0.00	0.00	0.00	0.00
SYMO	*Symphoricarpos mollis*	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-3
Year 3 Transects, Units 14 and 19

		Unit 19					
	Treatment	19-14 Burn	19-15 Burn	19-16 Burn	19-17 Masticate	19-19 Burn	19-2 Burn
	Method	transect	transect	transect	transect	transect	transect
Code	**Species**[1]						
TODI	*Toxicodendron diversilobum*	1.80	0.00	0.00	0.00	0.00	0.00
TRBI	*Trifolium bifidum*	0.00	0.00	0.00	0.00	0.00	0.00
VUBR	*Vulpia bromoides*	0.00	0.00	0.00	0.00	0.00	0.00
VUMY	*Festuca (Vulpia) myuros*	0.00	0.00	0.00	0.00	0.00	0.00
BG	Bare ground	26.00	23.60	27.40	45.40	46.80	61.80
HERB	Herbaceous vegetation	0.20	1.60	5.80	10.40	0.40	0.20

Notes: [1] Includes herbaceous species detected in quadrats

Appendix B-3
Year 3 Transects, Units 14 and 19

		Unit 19					
		19-20	19-23	19-25		19-3	19-4
	Treatment	Burn	Burn	Masticate		Burn	Burn
	Method	transect	transect	transect	quadrat	transect	transect
Code	**Species**[1]						
ADFA	*Adenostoma fasciculatum*	14.80	12.60	9.80	14.5	17.60	12.60
ACMI	*Achillea millefolium*	0.00	0.00	0.00	0.0	0.00	0.00
AICA	Aira caryophylla	0.00	0.00	0.00	0.2	0.00	0.00
ARPU	*Arctostaphylos pumila*	0.60	1.00	0.00	0.0	0.00	0.40
ARTO	*Arctostaphylos tomentosa ssp. tomentosa*	4.40	37.40	0.00	0.0	0.00	10.20
AVBA	*Avena barbata*	0.00	0.00	0.00	1.0	0.00	0.00
BAPI	*Baccharis pilularis*	0.00	0.00	0.00	0.0	0.00	0.00
BRDI	*Bromus diandrus*	0.00	0.00	0.00	0.0	0.00	0.00
BRHO	*Bromus hordeaceus*	0.00	0.00	0.00	0.2	0.00	0.00
BRMAR	*Bromus madritensis ssp. rubens*	0.00	0.00	0.00	1.3	0.00	0.00
CAED	*Carpobrotus edulis*	0.40	0.00	0.00	0.0	0.40	2.80
CAEX	*Castilleja exserta*	0.00	0.00	0.00	0.0	0.00	0.00
CASU	*Castilleja subinclusa*	0.00	0.00	0.00	0.0	0.00	0.00
CECUR	*Ceanothus rigidus (=Ceanothus cuneatus var. rigidus)*	5.80	8.20	0.00	0.0	0.20	0.80
CEDE	*Ceanothus dentatus*	0.00	0.00	0.00	0.0	0.60	0.20
CHDI	*Chorizanthe diffusa*	0.00	0.00	0.00	0.0	0.00	0.00
CHPUP	*Chorizanthe pungens var. pungens*	0.00	0.00	0.00	0.0	0.00	0.00
CORIL	*Cordylanthus rigidus ssp. littoralis*	0.00	0.00	0.00	0.0	0.00	0.00
COXX	*Cortaderia sp. (C. jubata or C. selloana)*	0.00	0.00	0.00	0.0	0.00	0.00
CRXX	*Cryptantha sp.*	0.00	0.00	0.00	0.0	0.00	0.00
DAPU	*Daucus pusillus*	0.00	0.00	0.00	0.7	0.00	0.00
ELGL	*Elymus glaucus*	0.00	0.00	0.00	0.0	0.00	0.00
ERCO	*Eriophyllum confertiflorum*	2.00	4.20	3.00	1.7	4.60	5.60
ERER	*Ericameria ericoides*	0.00	0.00	2.60	1.7	0.00	0.80
ERFA	*Ericameria fasciculata*	0.00	0.00	0.00	0.0	0.00	0.00
ERVI	*Eriastrum virgatum*	0.00	0.00	0.00	0.0	0.00	0.00

Appendix B-3
Year 3 Transects, Units 14 and 19

		Unit 19					
		19-20	19-23	19-25		19-3	19-4
	Treatment	Burn	Burn	Masticate		Burn	Burn
	Method	transect	transect	transect	quadrat	transect	transect
Code	**Species**[1]						
GAEL	*Garrya elliptica*	0.00	0.00	0.00	0.0	0.20	0.00
GNCA	*Pseudognaphalium californicum*	0.00	0.00	0.00	0.0	0.00	0.00
HEAR	*Heteromeles arbutifolia*	0.00	0.00	0.00	0.0	0.00	0.00
HECO	*Deinandra (Hemizonia) corymbosa*	0.00	0.00	0.00	0.2	0.00	0.00
HEGR	*Heterotheca grandiflora*	0.00	0.00	0.00	0.2	0.00	0.00
HESC	*Helianthemum scoparium*	29.40	2.00	0.00	0.0	14.60	12.60
HOCU	*Horkelia cuneata*	0.00	0.00	0.00	12.5	0.00	0.00
HYGL	*Hypocharis glabra*	0.00	0.00	0.00	5.3	0.00	0.00
LECA	*Lepechinia calycina*	0.00	0.00	0.00	0.0	0.00	0.00
LEPE	*Lessingia pectinata (var. pectinata?)*	0.00	0.00	0.00	1.7	0.00	0.00
LOSC	*Acmispon glaber (=Lotus scoparius)*	9.00	5.60	10.40	8.0	2.20	2.00
LOST	*Acmispon (Lotus) strigosus*	0.00	0.00	0.00	1.2	0.00	0.00
LUAL	*Lupinus albifrons (var. albifrons?)*	0.00	0.00	2.00	0.0	0.60	1.40
LUAR	*Lupinus arboreus*	0.00	0.00	0.00	0.0	0.00	0.00
LUBI	*Lupinus bicolor*	0.00	0.00	0.00	0.2	0.00	0.00
MIAU	*Mimulus aurantiacus*	0.00	0.00	0.00	0.0	0.00	0.00
MOUN	*Monardella undulata*	0.00	0.00	0.00	0.0	0.00	0.00
NAXX	*Navarretia sp.*	0.00	0.00	0.00	0.0	0.00	0.00
PHDI	*Phacelia distans*	0.00	0.00	0.00	0.5	0.00	0.00
POGL	*Drymocallis glandulosa var. wrangelliana*	0.00	0.00	0.00	0.0	0.00	0.00
PTAQP	*Pteridium aquilinum var. pubescens*	0.00	0.00	0.00	0.0	0.00	0.00
QUAG	*Quercus agrifolia*	0.00	0.00	0.00	0.0	0.00	0.00
QUPAS	*Quercus parvula var. shrevei*	0.00	0.00	0.00	0.0	0.00	0.00
QUWIF	*Quercus wislizenii var. frutescens*	0.00	0.00	0.00	0.0	0.00	0.00
RHCA	*Frangula californica (= Rhamnus californica ssp. californica)*	0.00	0.00	0.00	0.0	0.00	0.00
SAME	*Salvia mellifera*	0.00	0.00	0.00	0.0	0.00	0.00
STVI	*Stephanomeria virgata*	0.00	0.00	0.00	0.2	0.00	0.00
SYMO	*Symphoricarpos mollis*	0.00	0.00	0.00	0.0	0.00	0.00

Appendix B-3
Year 3 Transects, Units 14 and 19

		Unit 19					
		19-20	19-23	19-25		19-3	19-4
	Treatment	Burn	Burn	Masticate		Burn	Burn
	Method	transect	transect	transect	quadrat	transect	transect
Code	**Species**[1]						
TODI	*Toxicodendron diversilobum*	0.00	0.00	0.00	0.0	0.00	0.00
TRBI	*Trifolium bifidum*	0.00	0.00	0.00	1.7	0.00	0.00
VUBR	*Vulpia bromoides*	0.00	0.00	0.00	0.0	0.00	0.00
VUMY	*Festuca (Vulpia) myuros*	0.00	0.00	0.00	0.0	0.00	0.00
BG	Bare ground	38.80	34.80	46.00	53.3	59.20	53.00
HERB	Herbaceous vegetation	0.40	0.00	30.40	0	2.00	2.00

Notes: [1] Includes herbaceous species detected in quadrats

Appendix B-3

Year 3 Transects, Units 14 and 19

		Unit 19				
		19-5	19-6	19-7	19-8	19-9
	Treatment	Burn	Burn	Burn	Masticate	Burn
	Method	transect	transect	transect	transect	transect
Code	**Species**[1]					
ADFA	*Adenostoma fasciculatum*	22.80	7.80	3.00	23.80	16.80
ACMI	*Achillea millefolium*	0.00	0.00	0.00	0.00	0.00
AICA	Aira caryophylla	0.00	0.00	0.00	0.00	0.00
ARPU	*Arctostaphylos pumila*	0.00	0.00	5.20	0.00	0.80
ARTO	*Arctostaphylos tomentosa ssp. tomentosa*	0.00	4.40	6.40	13.60	14.40
AVBA	*Avena barbata*	0.00	0.00	0.00	0.00	0.00
BAPI	*Baccharis pilularis*	0.00	0.00	0.00	0.00	0.00
BRDI	*Bromus diandrus*	0.00	0.00	0.00	0.00	0.00
BRHO	*Bromus hordeaceus*	0.00	0.00	0.00	0.00	0.00
BRMAR	*Bromus madritensis ssp. rubens*	0.00	0.00	0.00	0.00	0.00
CAED	*Carpobrotus edulis*	0.00	0.00	0.80	0.20	3.00
CAEX	*Castilleja exserta*	0.00	0.00	0.00	0.00	0.00
CASU	*Castilleja subinclusa*	0.00	0.00	0.00	0.00	0.00
CECUR	*Ceanothus rigidus (=Ceanothus cuneatus var. rigidus)*	4.60	0.00	1.40	1.00	12.60
CEDE	*Ceanothus dentatus*	0.00	0.60	0.00	0.20	6.80
CHDI	*Chorizanthe diffusa*	0.00	0.00	0.00	0.00	0.00
CHPUP	*Chorizanthe pungens var. pungens*	0.00	0.00	0.00	0.00	0.00
CORIL	*Cordylanthus rigidus ssp. littoralis*	0.00	0.00	0.00	0.00	0.00
COXX	*Cortaderia sp. (C. jubata or C. selloana)*	0.00	0.00	0.00	0.00	0.00
CRXX	*Cryptantha sp.*	0.00	0.00	0.00	0.00	0.00
DAPU	*Daucus pusillus*	0.00	0.00	0.00	0.00	0.00
ELGL	*Elymus glaucus*	0.00	0.00	0.00	0.00	0.00
ERCO	*Eriophyllum confertiflorum*	6.40	0.40	9.20	18.60	4.80
ERER	*Ericameria ericoides*	0.00	0.00	0.00	0.00	0.00
ERFA	*Ericameria fasciculata*	0.00	0.00	0.00	0.00	0.00
ERVI	*Eriastrum virgatum*	0.00	0.00	0.00	0.00	0.00

Appendix B-3

Year 3 Transects, Units 14 and 19

		Unit 19				
	Treatment	19-5 Burn	19-6 Burn	19-7 Burn	19-8 Masticate	19-9 Burn
	Method	transect	transect	transect	transect	transect
Code	**Species**[1]					
GAEL	*Garrya elliptica*	0.00	1.40	0.00	0.00	0.60
GNCA	*Pseudognaphalium californicum*	0.00	0.00	0.00	0.00	0.00
HEAR	*Heteromeles arbutifolia*	0.00	0.00	0.20	0.00	0.00
HECO	*Deinandra (Hemizonia) corymbosa*	0.00	0.00	0.00	0.00	0.00
HEGR	*Heterotheca grandiflora*	0.00	0.00	0.00	0.00	0.00
HESC	*Helianthemum scoparium*	7.60	4.60	6.00	5.40	6.60
HOCU	*Horkelia cuneata*	0.00	0.00	0.00	0.00	0.00
HYGL	*Hypocharis glabra*	0.00	0.00	0.00	0.00	0.00
LECA	*Lepechinia calycina*	0.00	0.00	0.00	0.00	0.00
LEPE	*Lessingia pectinata (var. pectinata?)*	0.00	0.00	0.00	0.00	0.00
LOSC	*Acmispon glaber (=Lotus scoparius)*	2.60	70.00	10.20	6.20	27.60
LOST	*Acmispon (Lotus) strigosus*	0.00	0.00	0.00	0.00	0.00
LUAL	*Lupinus albifrons (var. albifrons?)*	0.00	0.00	0.00	1.20	5.60
LUAR	*Lupinus arboreus*	0.00	0.00	0.00	0.00	0.00
LUBI	*Lupinus bicolor*	0.00	0.00	0.00	0.00	0.00
MIAU	*Mimulus aurantiacus*	0.00	4.60	0.00	0.00	0.00
MOUN	*Monardella undulata*	0.00	0.00	0.00	0.00	0.00
NAXX	*Navarretia sp.*	0.00	0.00	0.00	0.00	0.00
PHDI	*Phacelia distans*	0.00	0.00	0.00	0.00	0.00
POGL	*Drymocallis glandulosa var. wrangelliana*	0.00	0.00	0.00	0.00	0.00
PTAQP	*Pteridium aquilinum var. pubescens*	0.00	0.00	0.00	0.00	0.00
QUAG	*Quercus agrifolia*	5.00	0.00	0.00	0.00	0.00
QUPAS	*Quercus parvula var. shrevei*	0.00	0.00	0.00	0.00	0.00
QUWIF	*Quercus wislizenii var. frutescens*	0.00	0.00	0.00	0.00	0.00
RHCA	*Frangula californica (= Rhamnus californica ssp. californica)*	0.00	0.00	0.00	0.20	0.00
SAME	*Salvia mellifera*	0.00	0.00	0.00	0.00	0.00
STVI	*Stephanomeria virgata*	0.00	0.00	0.00	0.00	0.00
SYMO	*Symphoricarpos mollis*	0.00	0.00	0.00	0.00	3.00

Appendix B-3
Year 3 Transects, Units 14 and 19

		Unit 19				
	Treatment	19-5 Burn	19-6 Burn	19-7 Burn	19-8 Masticate	19-9 Burn
	Method	transect	transect	transect	transect	transect
Code	**Species**[1]					
TODI	*Toxicodendron diversilobum*	0.00	1.80	0.00	9.00	6.60
TRBI	*Trifolium bifidum*	0.00	0.00	0.00	0.00	0.00
VUBR	*Vulpia bromoides*	0.00	0.00	0.00	0.00	0.00
VUMY	*Festuca (Vulpia) myuros*	0.00	0.00	0.00	0.00	0.00
BG	Bare ground	49.80	17.20	60.00	34.80	26.40
HERB	Herbaceous vegetation	8.40	9.80	3.00	3.40	0.60

Notes: [1] Includes herbaceous species detected in quadrats