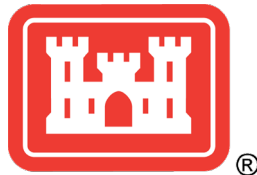


# 2025 ANNUAL REPORT BIOLOGICAL MONITORING

for Unit 5; BLM Area B Units B-2A, B-3 West, B-3 East, A Southern  
Containment Line, B, and C

CONTRACT NO. W91238-23-D-0009  
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**March 2026**

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**2025 ANNUAL REPORT  
BIOLOGICAL MONITORING  
FOR UNIT 5; BLM AREA B UNITS B-2A, B-3 WEST, B-3 EAST, A SOUTHERN CONTAINMENT LINE, B, & C**

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<b>G</b>	NON-NATIVE SPECIES

## ACRONYMS AND ABBREVIATIONS

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ANOVA	Analysis of Variance
Army	United States Army
BRAC	Base Realignment and Closure
BLM	Bureau of Land Management
Burleson	Burleson Consulting Inc., A Terracon Company
CL	Containment Line
CNPS	California Native Plant Society
cm	centimeter (s)
EcoSystems West	EcoSystems West Consulting Group, Inc.
ft	feet
GIS	Geographic Information System
GPS	Global Positioning System
Harris	Harris Environmental Group Inc.
Harris-Terracon	Harris Environmental Group Inc. and Terracon Consultants Inc. Team
HLA	Harding Lawson Associates
HMP	Habitat Management Plan
HMP annuals	Annual Species of Concern
HMP shrub	Shrub Species of Concern
MACTEC	MACTEC Engineering and Consulting, Inc.
MEC	Munitions and Explosives of Concern
m	meter(s)
MRA	Munitions Response Area
NOAA	National Oceanic and Atmospheric Administration
NCEI	National Centers for Environmental Information
NDMC	National Drought Mitigation Center
NPS	Naval Postgraduate School
NMDS	Nonmetric Multidimensional Scaling
PERMANOVA	Permutation-Based Multivariate Analysis of Variance
PBO	Programmatic Biological Opinion
Protocol	Protocol for Conducting Vegetation Monitoring in Compliance with the Installation-Wide Multispecies Habitat Management Plan at Former Fort Ord
RAC	Rank Abundance Curve
Protocol	Revisions of Protocol for Conducting Vegetation Monitoring for Compliance with the Installation-Wide Multispecies Habitat Management Plan, Former Fort Ord
RTK	real-time kinematic
Tetra Tech	Tetra Tech Inc.
Terracon	Terracon Consultants, Inc. (formerly Burleson Consulting, Inc.)
USACE	United States Army Corps of Engineers
USACE-Chenega	United States Army Corps of Engineers and Chenega Reliable Services, LLC Team
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service

## 1 INTRODUCTION

The United States Army Corps of Engineers (USACE) contracted Harris Environmental Group, Inc. (Harris) to conduct biological monitoring at former Fort Ord, Monterey County, California (see Figure 1-1 through Figure 1-3). Harris is supported by Terracon Consultants, Inc. (Terracon) as a subcontractor. Collectively, Harris and Terracon are referred to as the Harris-Terracon team. The biological monitoring is centered on the biological impacts of environmental cleanup activities associated with munitions and explosives of concern (MEC). Biological monitoring includes rare annual plant species density, annual grass density, invasive and rare species locations, and shrub transects.

This report presents results of follow-up biological monitoring conducted in (a) Unit 5 (Year 3 monitoring) and (b) Bureau of Land Management (BLM) Area B Units B-2A, B-3 West, B-3 East, A Southern Containment Line (CL), B, and C (Year 8 monitoring). Monitoring was conducted during spring, summer, and fall of 2025 to satisfy requirements of the *Installation-wide Multispecies Habitat Management Plan for Former Fort Ord* (HMP) and the reinitiated *Programmatic Biological Opinion for Cleanup and Property Transfer Actions Conducted at the Former Fort Ord* (PBO) issued by the United States Fish and Wildlife Service (USFWS) (USACE, 1997; USFWS, 2017). This annual monitoring report presents results of monitoring for annual species of special concern (HMP annuals), shrub communities, non-native annual grasses, and invasive plants. Baseline monitoring is conducted prior to cleanup activities (such as vegetation clearance, MEC removal, and other related operations) to establish the presence, distribution, and abundance of protected species. Vegetation clearance is achieved by burning and/or masticating standing vegetation to allow access to the soil surface for MEC removal and other related operations. Monitoring units are grouped by year class based on time since cleanup activities. Appendices include species acronyms (Appendix A), HMP annuals grid monitoring maps (Appendix B), HMP shrub transect maps (Appendix C), annual grass density maps (Appendix D), invasive and rare species location maps (Appendix E), HMP shrub transect cover data (Appendix F), and non-native species tables (Appendix G).

After completion of cleanup activities, follow-up monitoring of protected species and habitat is conducted to determine whether the species and habitat recovery are meeting success criteria as established in the *Revisions of Protocol for Conducting Vegetation Monitoring for Compliance with the Installation-Wide Multispecies Habitat Management Plan, Former Fort Ord* (Protocol) (Tetra Tech Inc. [Tetra Tech] and EcoSystems West, 2015b). As part of the development of the revised Protocol, a series of three major shrub associations were identified based on the dominant species present in the Baseline surveys and their successional patterns described. These associations included: Association A – shaggy-barked manzanita (*Arctostaphylos tomentosa*) dominated, with chamise (*Adenostoma fasciculatum*) sub-dominant; Association B – chamise dominated with shaggy-barked manzanita and sandmat manzanita (*Arctostaphylos pumila*) subdominant; and Association C/D – sandmat manzanita dominated (Tetra Tech and EcoSystems West, 2015b).

Prior to 2015, densities of annual HMP plants had been monitored at Years 1, 3, 5, and 8 following vegetation clearance; shrub communities had been monitored at Years 3, 5, 8, and 13 following vegetation clearance. With the issuance of the 2015 PBO, the USFWS concurred with the United States Army's (Army) recommendation to reduce the duration of monitoring to a maximum of 5 years for HMP annuals and 8 years for shrub communities (USFWS, 2015). This change was based on an analysis of vegetation data collected from over 5,000 acres over a period of up to 10 years that indicated that recovery could be documented based on a reduced time period (Tetra Tech & EcoSystems West, 2015b).

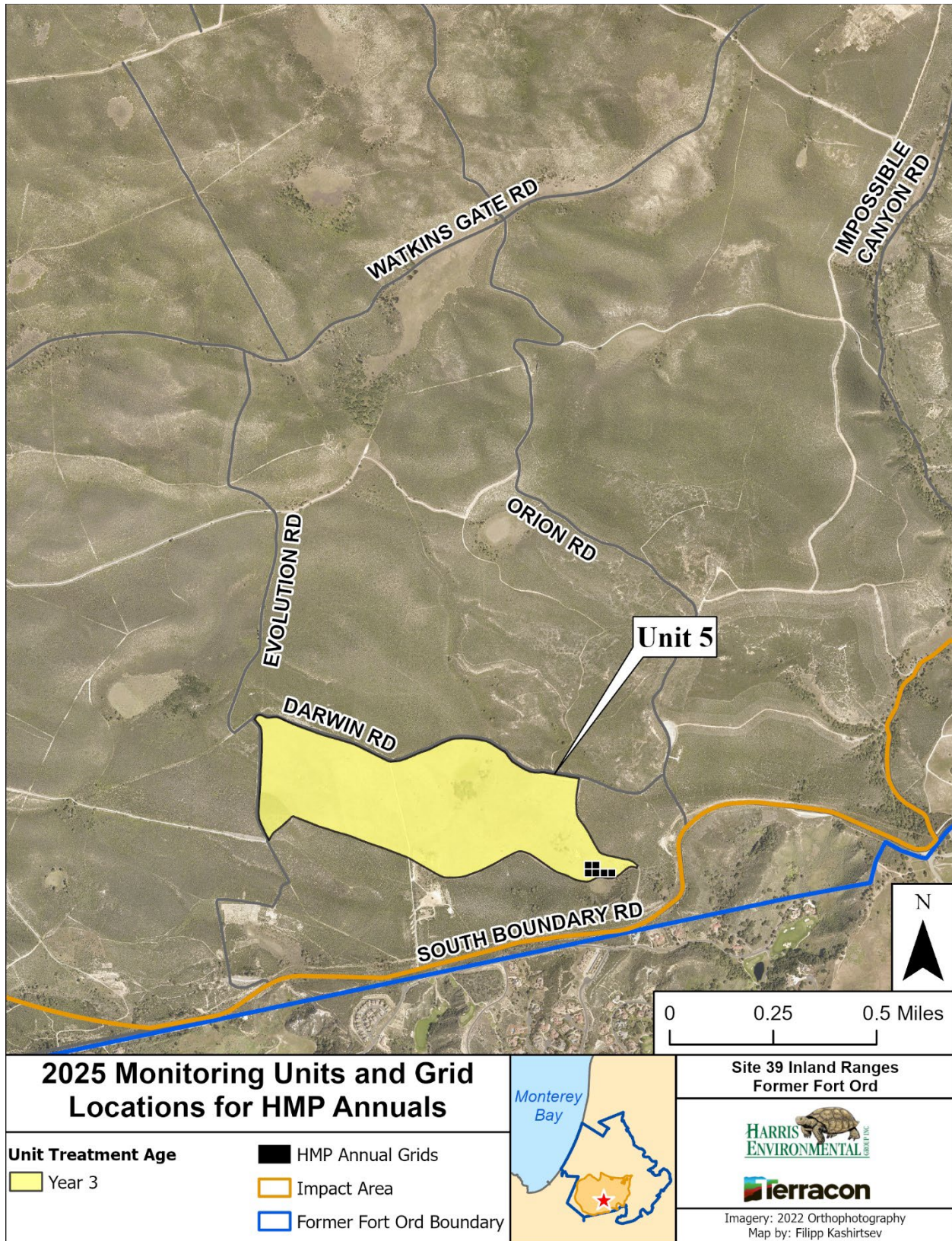


Figure 1-1. Map of Former Fort Ord in Monterey, California, showing location of units and grids sampled for HMP annual species in 2025.

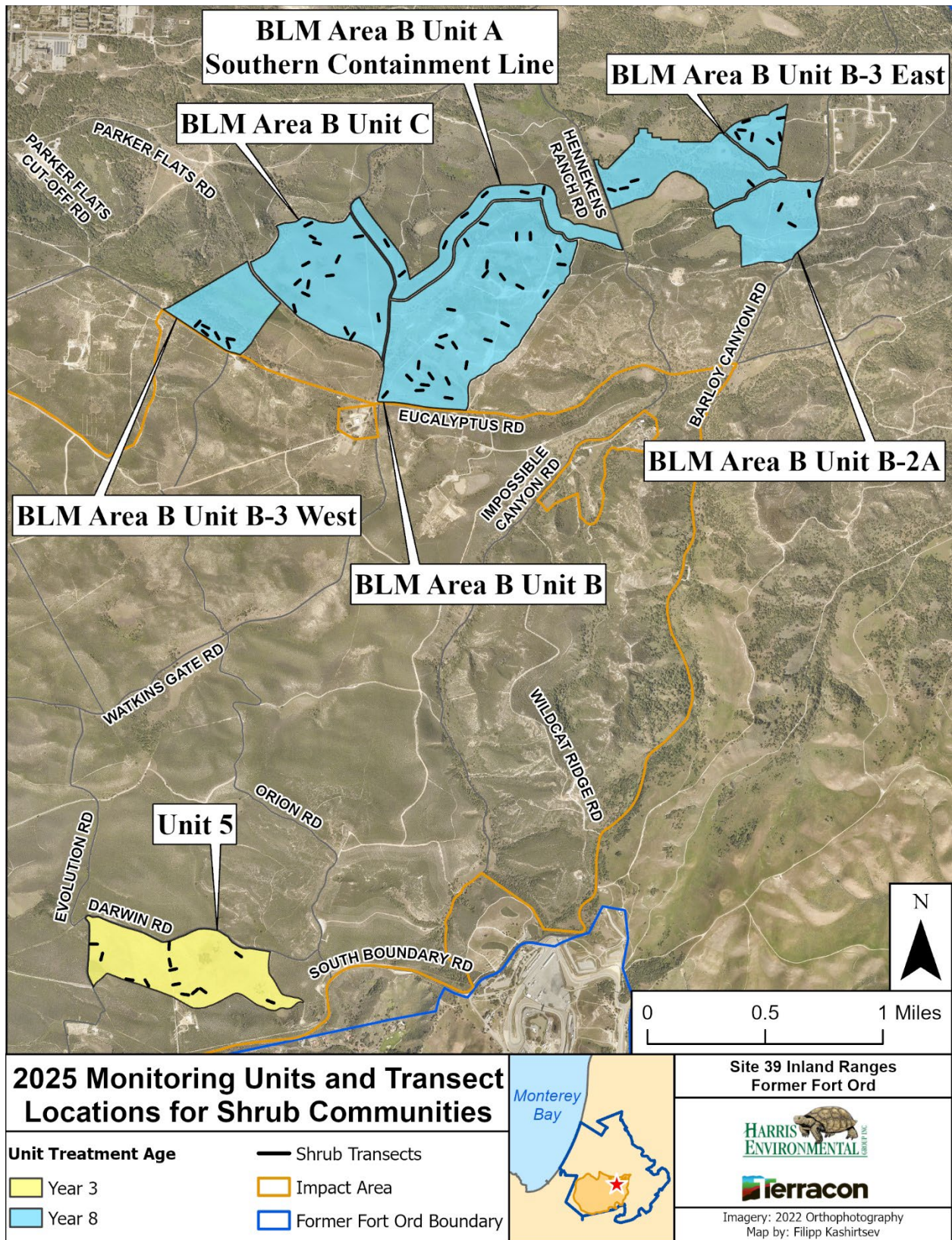


Figure 1-2. Map of Former Fort Ord in Monterey, California, showing locations of units and transects sampled for shrub community in 2025.

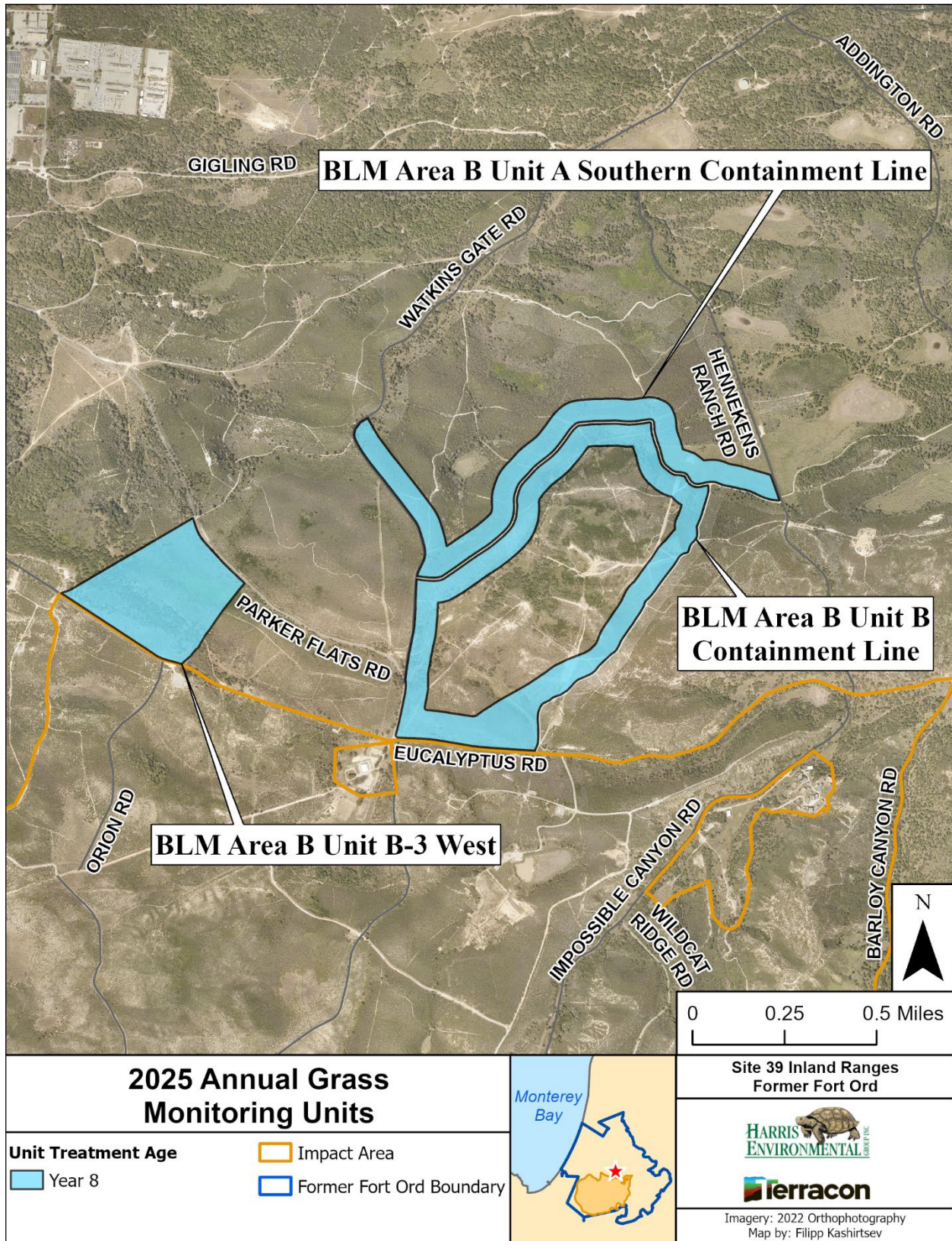
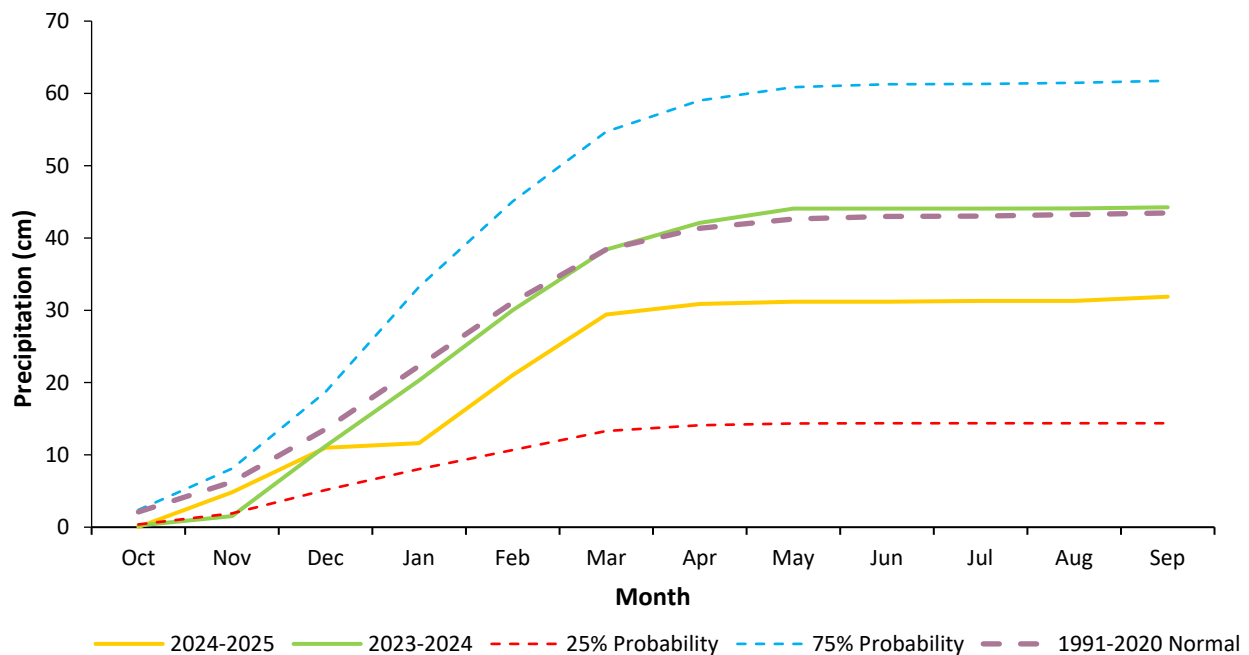


Figure 1-3. Map of Former Fort Ord in Monterey, California, showing locations of units sampled for annual grasses in 2025.

The terrain in the monitoring units 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, vernal pools, wet meadows, and coast live oak (*Quercus agrifolia*) woodlands. Central maritime chaparral is protected under the HMP because of its restricted geographic range and association with significant numbers of rare, threatened, and endangered species. Central maritime chaparral is adapted to periodic fires that remove the dominant shrub species and create open space that can be colonized by annual plants. Van Dyke *et al.* (2001) suggested that prescribed burning, or mechanical disturbance with smoke treatment, may be necessary in central maritime chaparral management. This regime may support the establishment of a more diverse chaparral community by releasing nutrients into the soil through biomass combustion and ash deposition and creating more openings for plants to colonize (Potts *et al.*, 2010).

From 1991 to 2020, the average cumulative precipitation throughout former Fort Ord showed a gradual increase from October through March and generally plateaued at around 40 centimeters (cm) in April. During the 2024-2025 water year, the National Centers for Environmental Information of the National Oceanic and Atmospheric Administration (NCEI NOAA) meteorological tower located at the Monterey Peninsula Regional Airport recorded cumulative precipitation 11.6 centimeters (cm) less than the 30-year normal (NCEI NOAA, 2024-2025; see Figure 1-4). Overall, total cumulative precipitation was 25% less than normal in 2024-2025.



**Figure 1-4. Cumulative monthly precipitation for the 2024-2025 water year compared to the 30-Year normal (mean 1991-2020), the 2023-2024 water year, and the 25%\* and 75%\* probabilities (NCEI NOAA, 2024-2025).**

\* The 25% probability indicates that there is a 25% chance that the actual precipitation will fall below that amount; and the 75% probability indicates that there is a 75% chance that the actual precipitation will fall below that amount.

## 1.1 Species Included in 2025 Habitat and Rare Species Monitoring

Central maritime chaparral habitat is dominated by a variety of shrub and associated herbaceous plants. The focus of the HMP includes five of these shrub species and three annual herbaceous species that are special-status species and, as such, were the focus of the HMP (USACE, 1997). The focus shrub species (HMP shrubs) monitored include:

- California Native Plant Society (CNPS) 1B.2 listed sandmat manzanita,
- CNPS 1B.2 listed Toro manzanita (*Arctostaphylos montereyensis*),
- CNPS 1B.2 listed Hooker's manzanita (*Arctostaphylos hookeri* ssp. *hookeri*),
- CNPS 4.2 listed Monterey ceanothus (*Ceanothus rigidus*),
- and CNPS 1B.1 listed Eastwood's goldenbush (*Ericameria fasciculata*).

The focus annual species (HMP annuals) monitored include:

- state threatened, federally endangered, and CNPS 1B.2 listed Monterey gilia (*Gilia tenuiflora* ssp. *arenaria*),
- federally threatened and CNPS 1B.2 listed Monterey spineflower (*Chorizanthe pungens* var. *pungens*),
- and state endangered and CNPS 1B.1 listed seaside bird's-beak (*Cordylanthus rigidus* ssp. *littoralis*).

Survey teams also report the locations of federally endangered and CNPS 1B.1 listed Yadon's piperia (*Piperia yadonii*) when encountered incidentally during monitoring efforts.

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. However, prior to the 2013 survey, the accepted species designation was changed back to *Ceanothus rigidus* (Baldwin *et al.*, 2012). Therefore, the code has been changed back to CERI to remain consistent with historical data. See Appendix A for a representative list of central maritime chaparral plant species found on Fort Ord, and their associated acronyms.

## 1.2 Previous Surveys Conducted on the Sites

Previous surveys conducted at specific former Fort Ord units monitored in 2025 are referenced in Table 1-1. Data from previous surveys for HMP annuals and shrub transects were obtained from reports of previous surveys and Geographic Information System (GIS) shapefiles and associated metadata provided by the Base Realignment and Closure (BRAC) office (Harding Lawson Associates [HLA], 1999 and 2001; Burleson, 2016 and 2019; Terracon, 2021 and 2023).

When appropriate and available, shrub transect data were transcribed from the electronic versions of previous monitoring reports. In addition to incorporating past shrub transect data into the database, adjustments were made to the “density” class field in the HMP annuals data table to correspond to the density classes defined by Burleson Consulting, Inc. (Burleson), while maintaining the original data (Burleson, 2009). If only count data were provided in previous reports or the database, then an entry was provided in the “density” class field. If the database contained only qualitative estimates of HMP annuals densities (e.g., high, medium, low), then an appropriate density class was determined.

Three treatment classes were identified as follows:

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

In addition, another treatment class was identified for grids and transects which could not be assigned to one of the three primary treatment classes:

- Mixed – A portion of the grid cell or transect was masticated and a portion was burned. These grids or transects are generally located on the border between two treatments.

Treatments were identified based on the activities reported in previous reports and using data from the “flora\_fire\_area” shapefile obtained from USACE (USACE, 2022).

**Table 1-1. Monitoring surveys at 2025 monitoring units on Former Fort Ord.**

Survey Area	Baseline Surveys	Year 1	Year 3	Year 5	Year 8
Unit 5	2015 HMP Annuals, Shrub Transect, & Annual Grass Monitoring (Burleson, 2016)	2023 HMP Annuals (Harris-Terracon, 2024)	2025 HMP Annuals & Shrub Transect Monitoring (Harris-Terracon)	N/A	N/A
Unit B-2A (formerly OE Site 48)	1998 Shrub Transect Monitoring (HLA, 1999)	N/A	2020 Shrub Transect Monitoring (Terracon, 2021)	2022 Shrub Transect Monitoring (Terracon, 2023)	2025 Shrub Transect Monitoring (Harris-Terracon)
Unit B-3 West	2015 HMP Annuals, Shrub Transect, & Annual Grass Monitoring (Burleson, 2016)	2018 HMP Annuals & Annual Grass Monitoring (Burleson, 2019)	2020 HMP Annuals, Shrub Transect & Annual Grass Monitoring (Terracon, 2021)	2022 HMP Annuals, Shrub Transect & Annual Grass Monitoring (Terracon, 2023)	2025 Shrub Transect & Annual Grass Monitoring (Harris-Terracon)
Unit B-3 East	2015 HMP Annuals, Shrub Transect, & Annual Grass Monitoring (Burleson, 2016)	N/A	2020 Shrub Transect Monitoring (Terracon, 2021)	2022 Shrub Transect Monitoring (Terracon, 2023)	2025 Shrub Transect Monitoring (Harris-Terracon)
Unit A Southern CL	2015 HMP Annuals, Shrub Transect, & Annual Grass Monitoring (Burleson, 2016)	2018 HMP Annuals & Annual Grass Monitoring (Burleson, 2019)	2020 Shrub Transect & Annual Grass Monitoring (Terracon, 2021)	2022 Shrub Transect & Annual Grass Monitoring (Terracon, 2023)	2025 Shrub Transect & Annual Grass Monitoring (Harris-Terracon)
Unit B (formerly OE Site 9)	1999 Shrub Transect Monitoring (HLA, 2001); 2015 HMP Annuals, Shrub Transect, & Annual Grass Monitoring (Burleson, 2016)	2018 HMP Annuals & Annual Grass Monitoring (Burleson, 2019)	2020 HMP Annuals, Shrub Transect & Annual Grass Monitoring (Terracon, 2021)	2022 HMP Annuals, Shrub Transect & Annual Grass Monitoring (Terracon, 2023)	2025 Shrub Transect & Annual Grass Monitoring (Harris-Terracon)
Unit C	2015 HMP Annuals, Shrub Transects, Annual Grass Monitoring (Burleson, 2016)	N/A	2020 Shrub Transect Monitoring (Terracon, 2021)	2022 Shrub Transect Monitoring (Terracon, 2023)	2025 Shrub Transect Monitoring (Harris-Terracon)

## 2 METHODS

This section describes the standard monitoring methods used during the 2025 vegetation monitoring program. Monitoring was completed based on methodology presented in the HMP and Protocol (USACE, 1997; Tetra Tech and EcoSystems West, 2015b). Unit-specific modifications to methods are identified in the relevant results sections of the report, as needed.

### 2.1 Soils

The United States Department of Agriculture (USDA) mapped four soil types occurring in units monitored in 2025, shown in Table 2-1 (USDA NRCS, 2025). Antioch very fine sandy loam with 2 to 9 percent slopes occur in BLM Area B Units B, B-2A, B-3 East, and A Southern CL. Arnold-Santa Ynez complex is a large portion of the munitions remediation area (MRA) and occurs in all units surveyed in 2025, and is the only soil type that occurs in Unit C. Oceano loamy sand with 2 to 15 percent slopes occurs in BLM Area B Unit B-3 West. Xerorthents, dissected occurs in BLM Area B Unit B-2A. However, the soils mapped by the USDA (2025) in the MRA may be too coarsely mapped to reflect soil variability at a relatively fine scale.

**Table 2-1. Distribution of soil types in Former Fort Ord biological monitoring areas of 2025 (USDA NRCS, 2025).**

Soil Type	Description	Units Where Found
<b>AeC</b> , Antioch very fine sandy loam, 2 to 9 percent slopes	Very fine loam and sand; moderately well to somewhat poorly drained; derived on level to sloped alluvial fans and terraces	BLM Area B Units B, B-2A, B-3 East, and A Southern CL
<b>Ar</b> , Arnold-Santa Ynez complex	<b>Arnold</b> : Loamy fine sand; somewhat excessively drained; derived from residuum weathered from sandstone <b>Santa Ynez</b> : Fine sandy loam; moderately well drained; derived from residuum weathered from sandstone	Unit 5; BLM Area B Units B, C, B-2A, B-3 West, B-3 East, and A Southern CL
<b>OaD</b> , Oceano loamy sand, 2 to 15 percent slopes	Loamy sand, sand; deep, excessively drained soils that formed in material weathered from sandy aeolian deposits.	BLM Area B Unit B-3 West
<b>Xd</b> , Xerorthents, dissected	Loam, clay loam; well drained; derived from mixed unconsolidated alluvium	BLM Area B Unit B-2A

### 2.2 HMP Annuals Grids Methods

#### 2.2.1 Field Methods

The Harris-Terracon team conducted density monitoring for three HMP annual species (Monterey spineflower, Monterey gilia, and seaside bird's-beak) during the 2025 monitoring season. These surveys occurred in Unit 5. Yadon's piperia was not monitored for density as individual plants are often widely scattered and difficult to locate. Instead, individuals were mapped using ArcGIS Field Maps with a Juniper Systems Geode GNS3S receiver with sub-meter accuracy and RTK (real-time kinematic) corrections; occurrences were noted for comparison with future monitoring efforts. When not in flower, *Piperia* individuals were recorded to genus due to the difficulty of identifying species. If observed,

locations are reported to the BRAC office for possible avoidance during future remediation work and to allow a BRAC biologist to return during the appropriate bloom period to identify the species.

The predefined base-wide 100×100-ft grids were used as sample grids for density monitoring. In the Baseline units, a stratified random sample of 100×100-ft grids were selected for sampling, consisting of grids identified during meandering transect surveys as occupied by one or more herbaceous HMP species. The monitoring protocol indicates that 20% of occupied grids or 38 total grids, whichever is greater, be selected for HMP annual density monitoring (Tetra Tech and EcoSystems West, 2015b). Sampling was stratified by species to ensure adequate representation of Monterey spineflower, Monterey gilia, and seaside bird's-beak, and by containment area versus interior. Boundaries of sampled grids were located in the field using ArcGIS Field Maps with a Juniper Systems Geode GNS3S receiver. 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.

Methods specified in the monitoring protocols were followed for all units monitored in 2025 (Tetra Tech and EcoSystems West, 2015b). Monitoring for HMP annual species density is conducted at Baseline and follow-up monitoring is conducted at 1, 3, and 5-year intervals following treatment and MEC clearance. For all 2025 HMP annuals density surveys, each 100×100-ft sample grid was censused by counting all individuals of a given HMP annual species within the grid using a hand counter. When more than 500 individuals of any species were recorded, surveyors stopped counting individuals since this is the maximum density class.

For each HMP annual species in a 100×100-ft sample grid, surveyors estimated the percent suitable habitat within the grid. In practice, "suitable habitat" is treated as any "occupied habitat" or habitat that is suitable for HMP annuals (e.g., bare ground). Percent suitable habitat was historically used to calculate the estimated number of individuals present within a 100×100-ft sample grid when a circular subsample plot was used. The 2025 monitoring effort was based on the more recent protocols which eliminated the need for circular plots (Tetra Tech and EcoSystems West, 2015b).

For each HMP annual species, the 100×100-ft sample grid was assigned to one of five density classes based on the number of individuals counted or subsampled to be present. The density classes are as follows when the entire 100×100-ft sample grid is 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 grid was sampled due to recent disturbance or interception by roads, the density classes were scaled proportionally to the percentage of the total grid sampled. In some cases, where it was evident that a given sample grid should be assigned to density class 4 (i.e., more than 500 plants), based on experience, the survey team assigned the grid to this density class without attempting to count or estimate the numbers of plants. In some cases, grids were assigned to density class 4 after a partial census indicated that considerably more than 500 plants were present in a 100×100-ft sample grid. Density class 4 was the only class assigned in this manner. The general steps taken by field surveyors when monitoring HMP annual grids were as follows:

- Located grid using ArcGIS Field Maps with a Juniper Systems Geode GNS3S receiver.

- Marked the staked corners with flagging tape, or re-staked if necessary.
- Each grid was monitored by one surveyor, starting at one corner and walking the length of the grid and back, maintaining a 2-3 ft buffer from the last lane surveyed.
- Used hand counters, one for each HMP species, to count the number of individuals.
- Marked areas that had been counted to reduce double counting.
- Stopped counting a species once the entire grid was surveyed, or after 501 individuals were counted.
- Estimated percent occupied habitat.
- Recorded counts of individuals in each grid for Monterey spineflower, seaside bird's-beak, and Monterey gilia and the percent occupied on the field data sheet.

### 2.2.2 Statistical Methods

HMP annual grid density classes were calculated for Monterey spineflower, seaside bird's-beak, and Monterey gilia based on individual plant counts and grid area using ArcGIS Pro (ESRI, 2025). Density classes were assessed by unit by plotting counts of each density class for each HMP annual species. These are visually displayed using bar plots, and trends between Baseline, intervening survey years, and the current monitoring year are evaluated.

When possible, the effects due to treatment type (burned, masticated, or mixed) were evaluated if multiple treatment types occurred in the same unit. Treatment types were allocated by examining shapefiles of the HMP annual monitoring grids against the FODIS shapefiles "flora\_pres\_burn\_area" and "flora\_fire\_area" using ArcGIS Pro (ESRI, 2025; USACE, 2022). Treatment types were allocated based on the following rules:

Mastic

- Masticated – Greater – Greater than 90% of the grid was only masticated.
- Burned – Greater than 90% of the grid was only burned.
- Mixed – A portion of the grid was masticated and burned, and a portion was only burned or a portion was only masticated. Neither treatment was greater than 90%, but the sum was greater than 90%.
- Masticated and Burned – Greater than 90% of the grid was masticated and then subsequently burned.

The only unit surveyed for HMP Annuals in 2025 (Unit 5) was masticated only, so no further analysis was needed.

## 2.3 HMP Shrub Transects Methods

### 2.3.1 Field Methods

The Harris-Terracon team conducted shrub transect monitoring in maritime chaparral in Unit 5; BLM Area B Units B-2A, B-3 West, B-3 East, A Southern CL, B, and C during the 2025 monitoring season. During follow-up monitoring at 3, 5, and 8-years post-treatment, the surveyors used ArcGIS Field Maps with a Juniper Systems Geode GNS3S receiver (sub-foot accuracy) to locate the previously recorded start points for previously sampled transects. In the Baseline year, one transect was allocated for every 11 acres (approximately) within a unit. Transects were allocated separately within the masticated primary

Containment Lines or the interior of the units. This is done to evaluate effects due to treatment type when different treatments are employed between the Containment Lines and the unit interiors.

Shrub transect sampling was conducted using the line intercept method along transects 50 meters (m) in length (Tetra Tech and EcoSystems West, 2015b). The general line intercept methodology included:

- Navigating to the transect start point using ArcGIS Field Maps with a Juniper Systems Geode GNS3S receiver and following line shapefiles of transects from the FODIS database.
- Laying out a 50-m transect tape along the line, repeating direction from previous sampling year.
- Recording plants greater than or equal to 0.1 m contiguous cover directly beneath the transect.
- Identifying shrubs to species and recording start/end points on the transect. Bare ground was also recorded.
- Recording herbaceous cover collectively when its cover was less than 20% of the transect line, and all species present recorded without cover quantification for each.
  - Herbaceous cover only included individuals that appeared to be from this growing season. Herbaceous cover that appeared dead from the previous growing season was considered thatch and not quantified along the transect line.
  - When herbaceous cover was greater than 20%, quadrat sampling was conducted to describe the species composition and abundance (cover) of herbaceous vegetation at that location. These quadrats alternated from right to left on either side of the transect placed every 10 m (6 quadrats total).
- Recording transect direction, clarifying species codes for uncommon species, and noting areas of new mastication or fuel breaks that may have reduced the effective length of a transect since the Baseline sampling year.
- When transects were less than 50 m (i.e., intersected by a road), calculating cover values with the new transect length. The shortened transects were then analyzed as if they were 50 m. This was deemed appropriate since the differences in length occurred on few transects and was a small portion of the total transect length.

### 2.3.2 Statistical Methods

Treatment units were grouped by age at the time of the 2025 shrub transect monitoring (e.g., 5-year-old vs 3-year-old). Within these groups, the Harris-Terracon team conducted either one-way, two-way, or three-way permutational analysis of variance (PERMANOVA) testing to evaluate the differences in community composition associated with *Unit*, *Age*, and *Treatment* (Anderson, 2001; McArdle and Anderson, 2001). PERMANOVAs were run using the *adonis2* function in the *vegan* package, with Bray–Curtis dissimilarity matrices used to quantify community composition (Oksanen, 2021; R Core Team, 2025). Because the three-factor PERMANOVA design was unbalanced, marginal (partial)  $R^2$  values could not be estimated. Therefore,  $R^2$  values for each factor and interaction were obtained from individual PERMANOVA models, reflecting the total variation explained by each term when fitted independently. PERMANOVA is robust compared to non-normal distributions and provides a suitable alternative to traditional multivariate methods when comparing community structure across groups.

Following Legendre and Legendre (1998), the Harris-Terracon team conducted nonmetric multidimensional scaling (NMDS) ordinations. These allowed qualitative visualizations of the differences detected in PERMANOVA testing. NMDS is a reduced-space ordination method that begins with full dimensional space and attempts to represent groups in as few dimensions as possible while retaining

the distance relationships between groups. Vegetation transect data was grouped by *treatment* or *age*. The matrices analyzed were *transect* by *species* and are sometimes longer in the *species* dimension than in the *transect* dimension. Differences between these grouping factors are illustrated by differing locations of ellipsoids that surround grouped transect points in ordination space. These analyses were conducted utilizing the *metaMDS* function in the *vegan* package, using Bray-Curtis dissimilarity distances (Oksanen, 2021).

Four community metrics were calculated and grouped by *treatment* or *age* within units to assess community structure. Community metrics calculated were total cover (%), Shannon-Wiener diversity index, species richness, and species evenness index. All community metrics calculations exclude bare ground and herbaceous cover. Total cover is sometimes greater than 100% due to overlapping growth of some species (e.g., a coast live oak tree growing within a sandmat manzanita individual). Cover (%) is identified as:

$c$  = vegetative cover

Species diversity was measured by the Shannon-Weiner  $H'$  metric (Pielou, 1974). This metric expresses diversity as a combination of the number of species present in the association and their relative abundance (or cover) in the sample. Diversity increases with both increasing number of species and increasing equitability of species abundance. For a given number of species, diversity is highest when all species are present in equal abundance. Diversity index is calculated as:

$$H' = - \sum_{i=1}^S p_i * \ln(p_i)$$

where,

$$p_i = \text{proportion of the } i^{\text{th}} \text{ species} = \frac{n_i}{N}$$

Species richness is the number of species present, including native and non-native species. Evenness is a measure of the equability of the relative contribution of species to the total cover in the association (Pielou, 1974). Evenness is the ratio of the observed diversity to the maximum diversity possible for a sample with the same number of species. Maximum evenness (value = 1) is achieved when all species are present in equal abundance in the sample. Evenness is calculated as:

$$J' = \frac{H'}{\ln(S)}$$

where,

$S$  = species richness

These statistics were calculated using the functions *rowSums*, *diversity*, and *specnumber* in the *vegan* package (Oksanen, 2021). Community metrics data were displayed via scatterplots and the *jitter* function was used to add random noise to better visualize overlapping data points.

One-way, two-way, or mixed-design ANOVA tests were conducted to detect differences of community metrics between *Units* within age classes, and *Treatment* groups within units when more than one treatment was applied to any unit. Bare ground cover and herbaceous cover were evaluated using the same methods that were used for community metrics. These methods are also utilized to evaluate HMP species cover differences between *treatment* types in the Year 8 units.

When conducting two- or three-way ANOVA tests, the  $F$ -statistic and  $p$ -value were used to assess potential differences. The  $F$ -statistic is defined as:

$$F = \frac{\textit{variation between sample means}}{\textit{variation among individuals within the same sample}}$$

The  $F$ -statistic can only be zero or positive in value and is only zero when all sample means are identical (Moore *et al.*, 2013). The  $F$ -statistic gets larger as the sample means move further apart. Large values provide evidence against the null hypothesis that the means are the same.

The  $p$ -value is a means to assess the strength of evidence against a claim (the null hypothesis) (Moore *et al.*, 2013). It follows the reasoning that an outcome that would rarely happen if a claim were true is good evidence against that claim. The  $p$ -value represents the probability of how infrequently an outcome like this would happen if the null hypothesis were true. Small  $p$ -values are evidence against the null hypothesis because they show that the observed result would be unlikely if the null were true.

In former Fort Ord Biomonitoring Annual Reports issued prior to 2020, statistical differences were considered significant when the  $p$ -value was less than a 0.05 significance level and when the  $F$ -statistic was considerably greater than one. Starting with the 2020 Annual Report, less emphasis was placed on the  $p$ -value and  $F$ -statistic in comparison to a significance level. This shift is based on a statement by the American Statistical Association (Wasserstein and Lazar, 2016) that discussed potential misinterpretation of the  $p$ -value and the “bright line” created between significant and not significant when compared against a predetermined significance level (Wasserstein and Lazar, 2016; Wasserstein *et al.*, 2019). Instead, while the  $F$ -statistic and  $p$ -value are reported, no significance level is identified and interpretation of the factors affecting recovery is based on an overall assessment of the data and descriptive statistics. When two- or three-way ANOVAs were conducted,  $F$ -statistic and  $p$ -value were reported for interaction terms. Interaction terms may suggest if unique responses to particular treatment combinations (e.g., *Burned* transects at the *Age* level of Year 8 only) exist (Gotelli and Ellison, 2004).

To evaluate treatment-level effects across Year 8 units, burned and masticated transects were pooled for selected analyses of community metrics. Pooling resulted in a balanced comparison of burned ( $n = 24$ ) and masticated ( $n = 26$ ) transects spanning multiple units. Mixed-design ANOVA models were then conducted on the pooled dataset to examine the effects of treatment (burn vs. mastication), age (Baseline, Year 3, Year 5, Year 8), and their interaction on community metrics. These pooled analyses were intended to assess treatment-level trends across units while recognizing that units may differ in Baseline composition and site characteristics.

When mixed-design ANOVAs indicated a statistically detectable treatment  $\times$  age interaction, post hoc simple-effects comparisons were conducted to evaluate differences between treatments within individual age classes. Estimated marginal means (least-squares means) were calculated from the fitted model using the *emmeans* package in R, and pairwise contrasts between burned and masticated treatments were evaluated within each age class. Adjustments for multiple comparisons were applied where appropriate. Because age was treated as a repeated-measures factor within transects, post hoc comparisons were conducted within the framework of the fitted model to maintain the appropriate error structure. These comparisons were used to identify the specific ages at which treatment differences were most pronounced.

When appropriate, Mauchly's test was utilized to test that the sphericity assumption was met, which evaluates the equal variance among the differences between all possible combinations of groups. When community metrics did not meet parametric assumptions of one-way ANOVA testing, either Greenhouse-Geisser sphericity corrections or nonparametric Kruskal-Wallis tests were used. In cases where community metrics did not meet parametric assumptions of two-way ANOVA testing, we made inferences using the PERMANOVA results, as there is no nonparametric version of a two-way ANOVA. Descriptive statistics were used to examine differences in communities over time and between treatments.

Rank abundance curves (RACs) were generated to illustrate the important community relationships and show species-level responses to differences in *treatment* or *age* (Molles, 2010). RACs were plotted with species rank on the x-axis and the  $\log_{10}$  proportional abundance on the y-axis; species are identified using their species code (see Appendix A for Fort Ord species code list). The distribution of the species in these units can characterize the species composition further than the community metrics such as the Shannon-Wiener diversity index or the species evenness index (Calow, 1999). Rank abundance curves were created using the *rankabundance* function in the BiodiversityR package (Kindt, 2019; R Core Team, 2023).

## 2.4 Non-Native Annual Grasses Methods

### 2.4.1 Field Methods

Non-native annual grasses were mapped within BLM Area B Units B-3 West, B, and the Southern Containment Line of Unit A during the 2025 monitoring season. Areas directly adjacent to the roads were mapped from the vehicle. Areas further than 25-50 ft from the vehicle, or where direct line-of-sight was impeded, were mapped on foot. All maps of annual grass polygons were mapped using ArcGIS Field Maps with a Juniper Systems Geode GNS3S receiver; the acreage occupied was calculated using ArcGIS Pro. Density classes for each polygon were visually estimated and recorded.

### 2.4.2 Reporting Methods

Non-native annual grasses are presented on maps derived in ArcGIS Pro (ESRI, 2025). Additionally, the estimated area occupied by annual grasses was quantified for all areas where surveys occurred and reported by density class. The density classes are as follows:

1 (low)	= 1-5%
2 (medium)	= 6-25%
3 (high)	= >25%

## 2.5 Invasive Species Methods

### 2.5.1 Field Methods

Invasive species were monitored along shrub transects and when encountered incidentally during HMP annuals and annual grass monitoring, or while traversing the units to reach sampling locations. Emphasis was placed on iceplant (*Carpobrotus edulis*), pampas grass (*Cortaderia* spp.), and French broom (*Genista monspessulana*). Iceplant locations were only recorded when the occurrence was larger than about 100 square feet (ft<sup>2</sup>) or in areas clustered with smaller individuals that collectively indicated a recent and/or potentially problematic infestation. Locations were recorded using ArcGIS Field Maps with a Juniper Systems Geode GNS3S receiver.

### **2.5.2 Reporting Methods**

Invasive species are presented on maps developed in ArcGIS Pro (ESRI, 2025). These surveys were not intended to be comprehensive. The intent is to document occurrences to support invasive species management through the Service Agreement with the BLM.

### 3 YEAR 3 VEGETATION SURVEYS: Unit 5

#### 3.1 Introduction

Year 3 surveys were completed at Unit 5 (Figure 3-1) in 2025. Baseline surveys were conducted in 2015 for Unit 5 (Burlleson, 2016). As part of environmental cleanup operations involving MEC removal activities, this area was masticated in 2021 and was therefore considered to be in Year 3 of monitoring in 2025. The Baseline vegetation monitoring surveys (2015) for Unit 5 included meandering transects to map areas of occurrence of HMP herbaceous species; density monitoring for the HMP annual species; shrub transects to sample shrub species composition; annual grass monitoring; and invasive species monitoring. In 2025, density monitoring for HMP annuals, shrub transect monitoring, and invasive species monitoring was conducted in Unit 5.

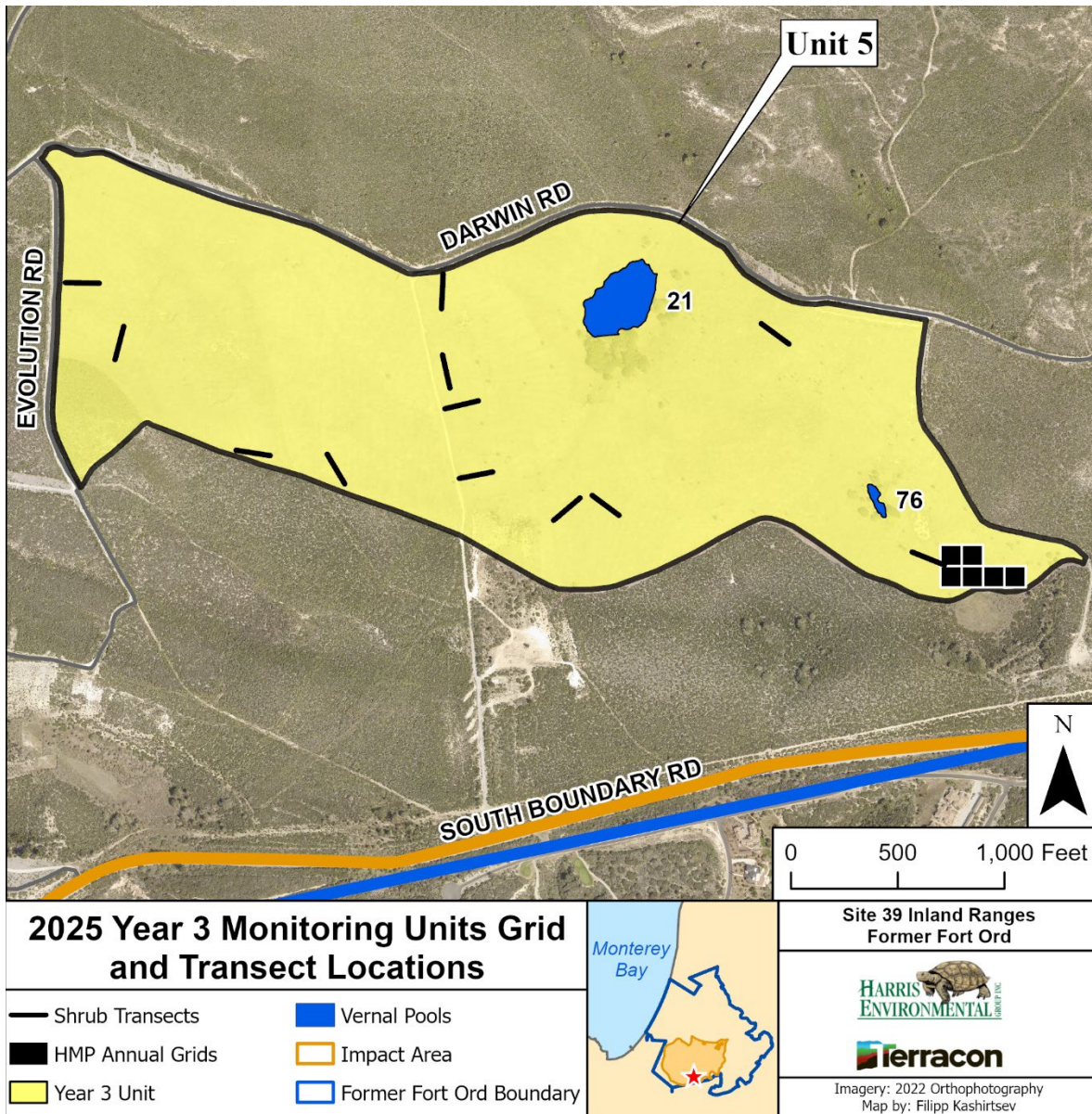


Figure 3-1. Year 3 monitoring units for shrub transect and HMP annuals grid monitoring in 2025.

### 3.2 Unit 5: Setting

Unit 5 encompasses an area of 130 acres and is located east of Evolution Road and south of Darwin Road in the southern portion of the former Fort Ord. In general, Unit 5 has rolling topography and is divided by a prominent east-to-west trending ridge. Baseline surveys were conducted in 2015, and the unit was masticated in 2021 as a part of the MEC removal activities.

Prior to mastication, Unit 5 was dominated by mature maritime chaparral vegetation which varied considerably in physiognomy and species composition. Most of the chaparral vegetation was very dense, particularly in the south and central portions of the unit with very limited openings. The most dominant maritime chaparral species throughout Fort Ord is shaggy-barked manzanita. Other common dominants or co-dominants include chamise, black sage (*Salvia mellifera*), Monterey ceanothus, and poison oak (*Toxicodendron diversilobum*). Pond 21, a vernal pool dominated by a mix of hydrophytic grasses and forbs and known to support federally threatened California tiger salamander (*Ambystoma californiense*), is located in the north central portion of the unit. Additionally, Pond 76, which was discovered during mastication activities in 2023, lies in the southeast corner of Unit 5. Despite its small size and minimal inundation, California fairy shrimp (*Linderiella occidentalis*) were documented here in 2024 (Harris-Terracon, 2025). A deeply incised and flattened soil remediation and active plant restoration area (Historic Area 29) is located in the south-central portion of the unit. The unit is bisected by Forrestal Road, but otherwise interior portions of the unit were largely inaccessible in Baseline conditions.

### 3.3 Unit 5: Methods

In accordance with methods outlined in the Protocol and Section 2 in this report, the 2025 Year 3 vegetation monitoring surveys in Unit 5 comprised the following components:

- Density monitoring for three HMP annual species: Monterey gilia, seaside bird's-beak, and Monterey spineflower. This survey effort was conducted to evaluate how the density of these species responded to treatment within the monitored grids. Surveys occurred on April 30.
- Repeated sampling of the shrub transects that had Baseline surveys in 2015 surveys (Burlison, 2016). This survey effort was conducted to assess shrub species composition of the sensitive maritime chaparral community after treatment. Surveys occurred on June 23, July 14, 15, and August 21

### 3.4 Unit 5: Results and Discussion

#### 3.4.1 HMP Annual Monitoring

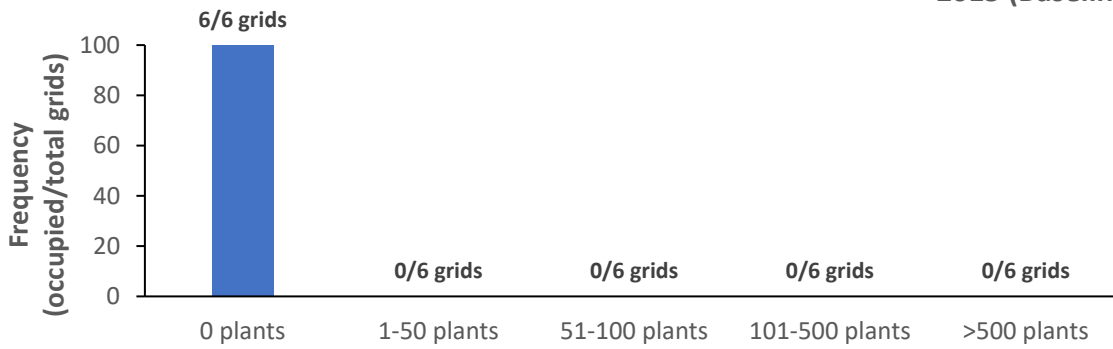
Year 3 HMP annual surveys included 6 HMP monitoring grids in Unit 5 in 2025. Maps of survey grids for the sampled units are provided in Appendix B (Figures B-1 through B-3).

##### 3.4.1.1 Monterey gilia

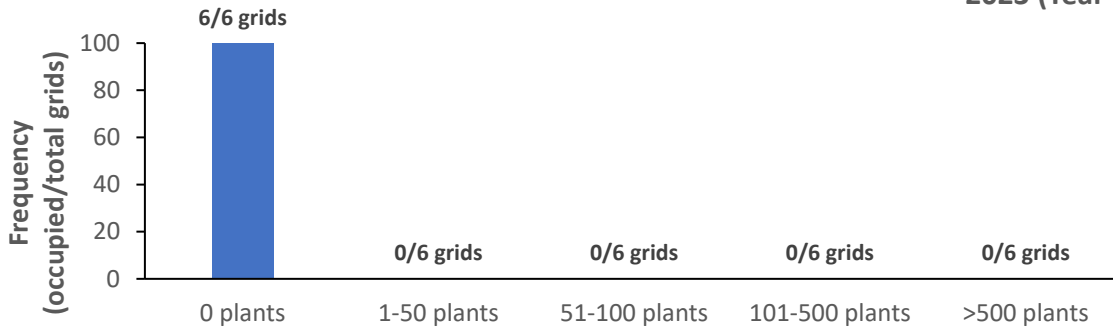
Monterey gilia was not observed in Unit 5 in any survey year. Both Year 1 (2023) and Year 3 (2025) surveys were consistent with Baseline (2015) surveys (Figure 3-2).

**Unit 5: Monterey Gilia Frequency of Occurrence**

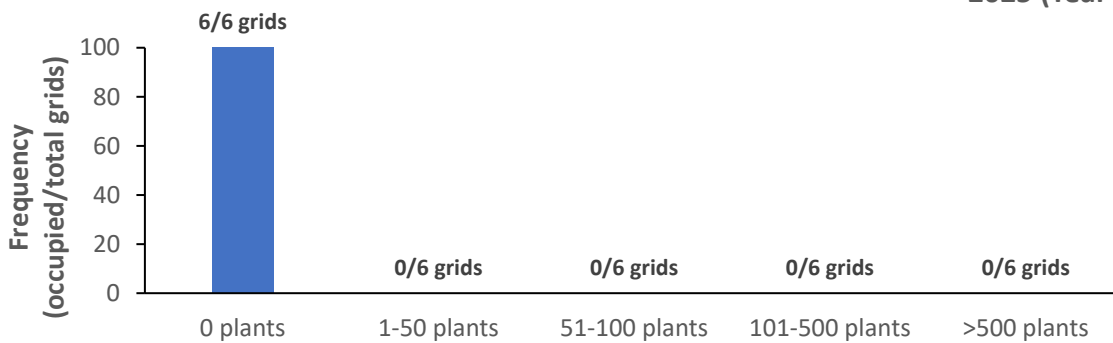
**2015 (Baseline)**



**2023 (Year 1)**



**2025 (Year 3)**



**Figure 3-2. Unit 5 Monterey gilia occurrence in surveyed grids (n=6) for Baseline (2015), Year 1 (2023), and Year 3 (2025).**

3.4.1.2 Seaside Bird's-Beak

No seaside bird's-beak was observed in Unit 5 in any survey year. Both Year 1 (2023) and Year 3 (2025) surveys were consistent with Baseline (2015) surveys (Figure 3-3).

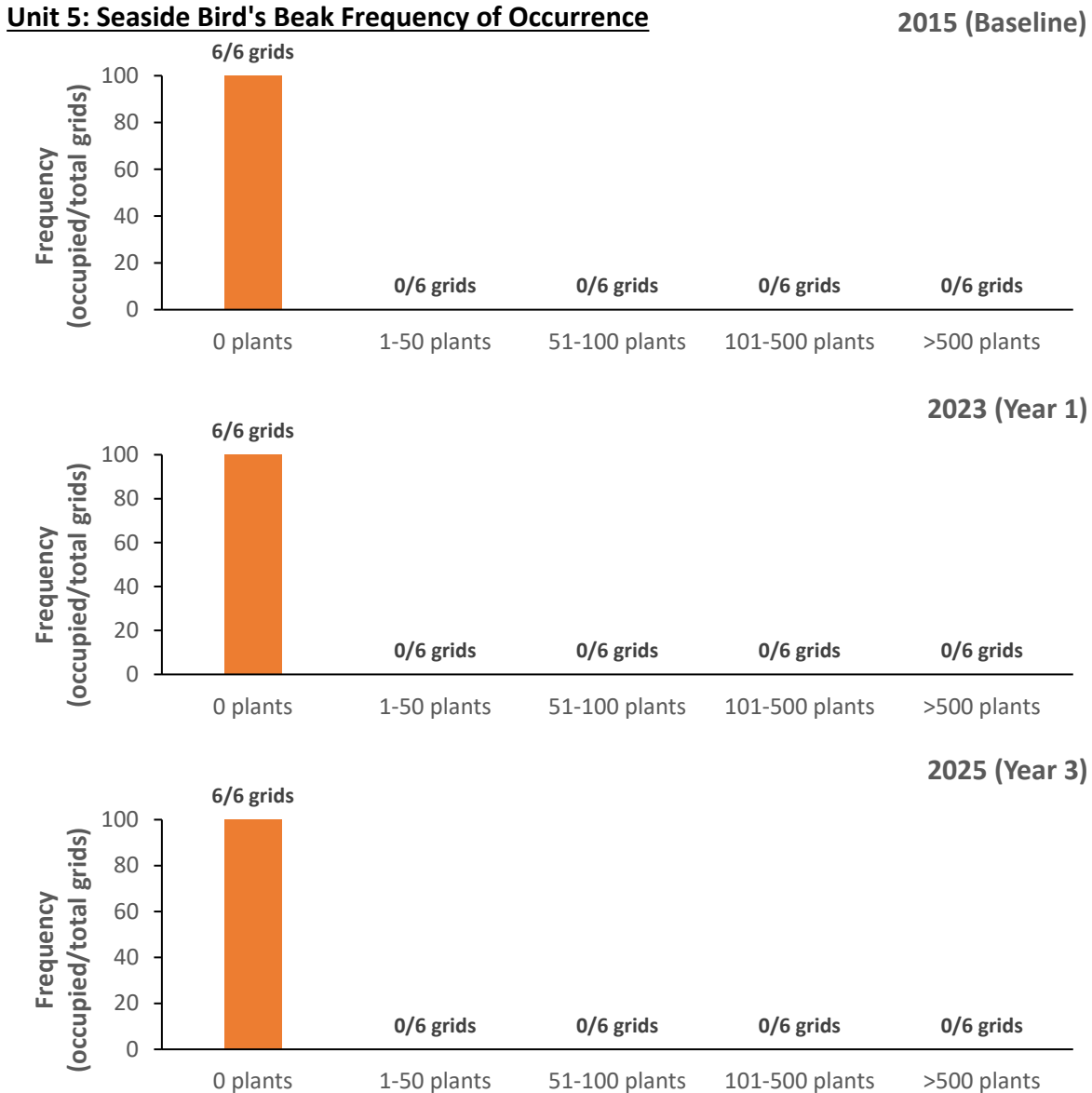


Figure 3-3. Unit 5 seaside bird's beak occurrence in surveyed grids (n=13) for Baseline (2015), Year 1 (2023), and Year 3 (2025).

### 3.4.1.3 Monterey Spineflower

Monterey spineflower was observed in Unit 5 in all survey years and has decreased in density since Baseline (2015) (Figure 3-4). In Baseline, Monterey spineflower was observed with a frequency of occurrence of 100% (6 of 6 grids), with all grids falling within the highest density class (> 500 plants). This remained consistent into Year 1 (2023) but decreased in density by Year 3 (2025) (Figure 3-4; Appendix B, Figure B-3). Frequency of occurrence remained at 100% in Year 3, but densities were scattered, with only 2 of 6 grids containing more than 500 plants, 2 of 6 grids containing 101-500 plants, and 2 of 6 grids containing 1-50 plants (Figure 3-4).

#### Unit 5: Monterey Spineflower Frequency of Occurrence

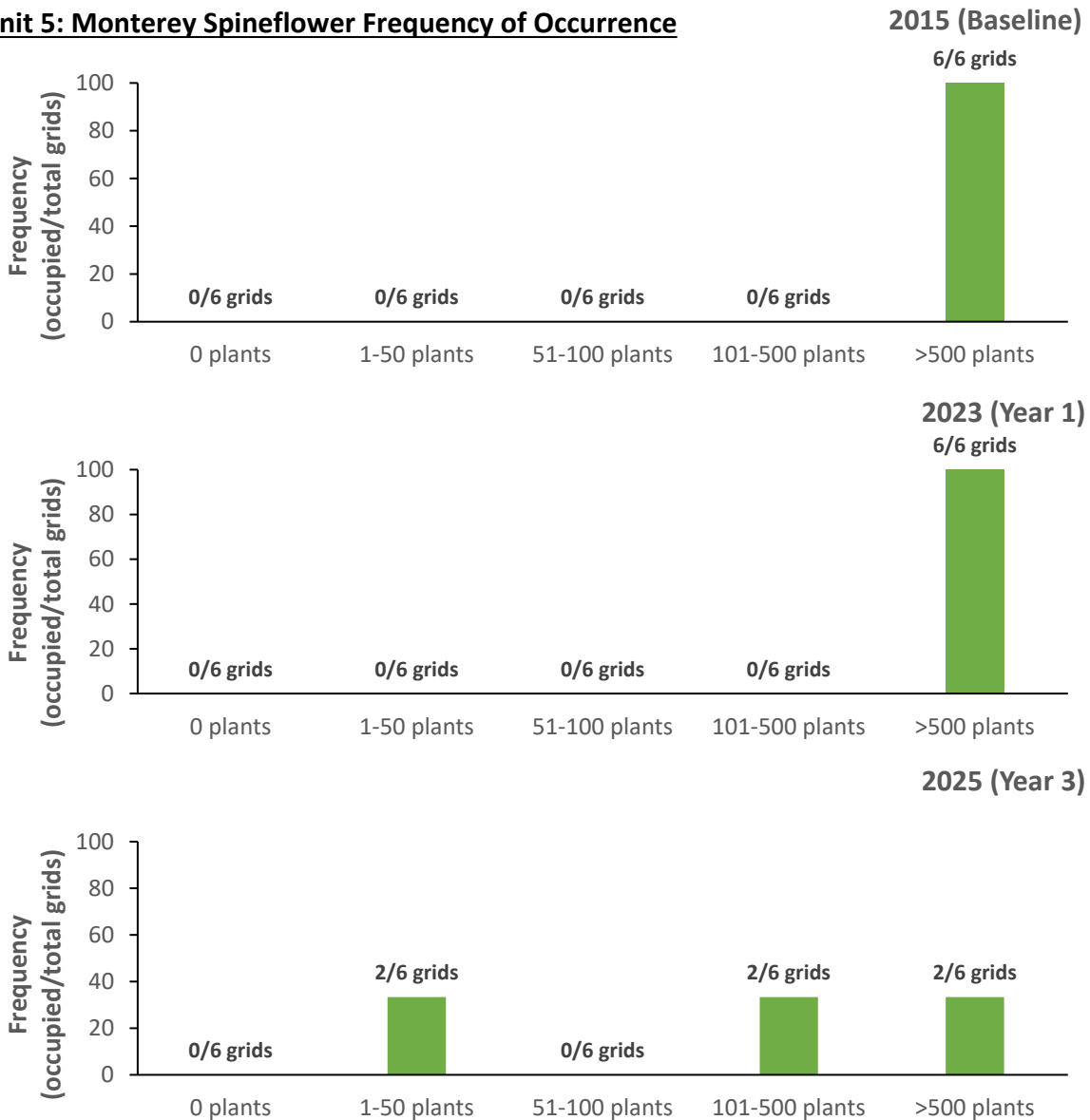


Figure 3-4. Unit 5 Monterey spineflower occurrence in surveyed grids (n=6) for Baseline (2015), Year 1 (2023), and Year 3 (2025).

### 3.4.1.4 Effect of Treatment on HMP Density

The effect of treatment type on HMP annuals density was not evaluated in Unit 5 because only mastication occurred in this unit.

## 3.4.2 Shrub Transect Monitoring

The following section outlines shrub community composition, bare ground and herbaceous cover, rank abundance curves (RACs), HMP shrub species, and NMDS ordinations in Year 3 units. Year 3 shrub transects were conducted in Unit 5 ( $n=12$ ) in 2025. The temporal patterns of broad-scale community response to mastication were generally congruent with past observations of the neighboring units in the MRA (Tetra Tech and EcoSystems West, 2011 through 2015b; Burleson, 2016 – 2022; Harris-Terracon 2024 – 2025).

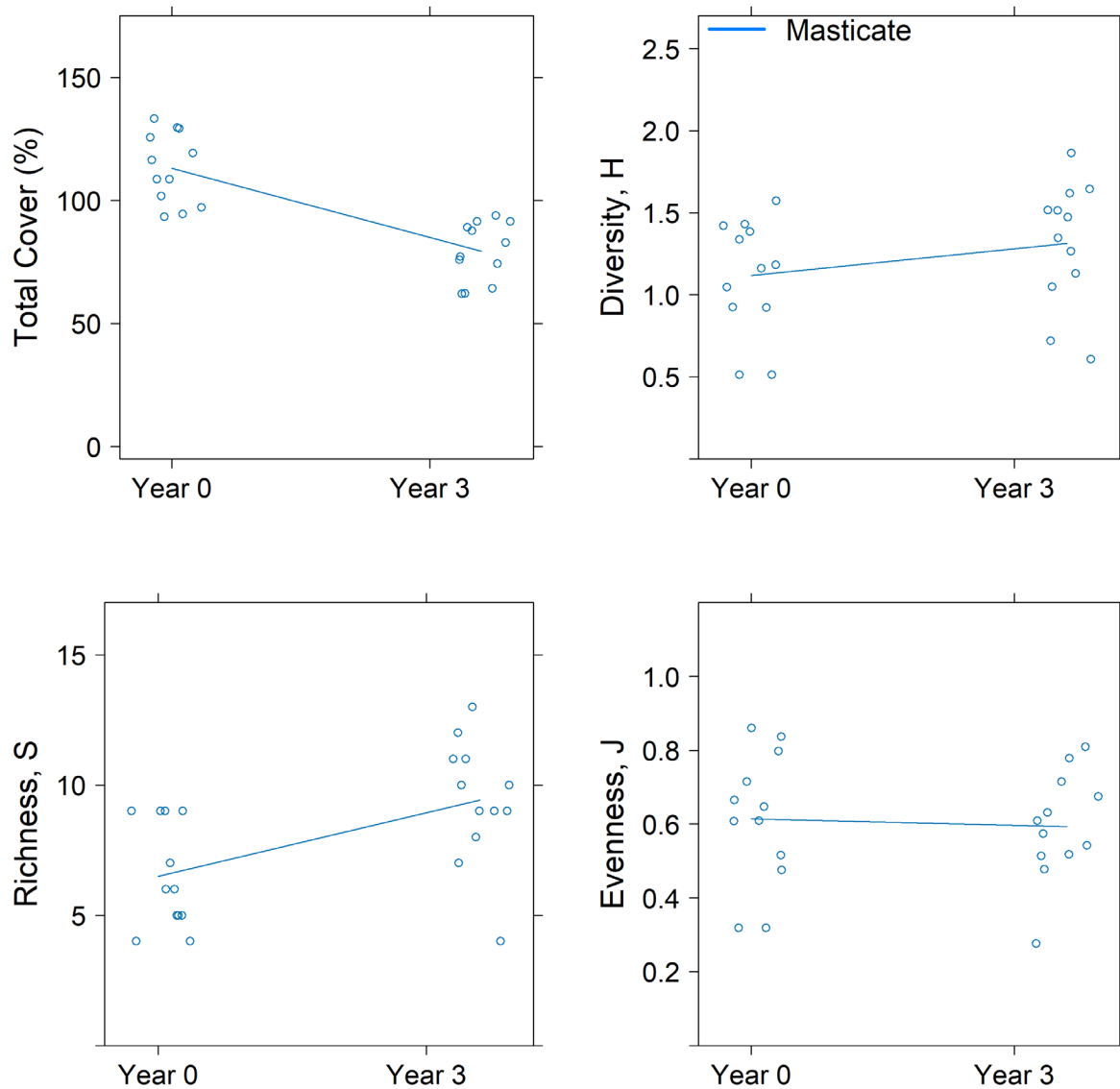
### 3.4.2.1 Community Composition

Mixed-design ANOVAs were conducted to examine the effects of *age* on four key community structure metrics: mean percent cover, species richness, species evenness, and species diversity. There was only one Year 3 unit and therefore the effects of *Unit* and *Unit\*Age* on community structure parameters could not be evaluated. Differences between Baseline and Year 3 surveys were detected for mean percent cover, species richness, and species evenness (Table 3-1). No clear age-related differences were observed for species diversity.

**Table 3-1. Mixed-design ANOVA results for Unit 5 community composition.**

Factor	Total Mean Cover		Species Richness		Species Evenness		Species Diversity	
	<i>F</i>	<i>P</i>	<i>F</i>	<i>P</i>	<i>F</i>	<i>P</i>	<i>F</i>	<i>P</i>
Unit	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Age	135.59	1.58E-07	23.93	4.77E-04	9.55	0.01	0.20	0.67
Unit*Age	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Mean shrub cover decreased from 113% in Baseline (2015) to 79% in Year 3 (2025), while species richness increased from 6.5 to 9.4 species per transect. Species diversity increased slightly (+0.2), and species evenness decreased marginally (−0.02), indicating modest shifts in dominance structure following mastication (Figure 3-5).



**Figure 3-5. Unit 5 community structure from Baseline (2015) to 3 years after mastication (2021). Twelve transects were analyzed in Unit 5.**

A PERMANOVA was conducted to evaluate the effect of *age* (Baseline vs. Year 3) on community composition in Unit 5. Community composition differed between Baseline and Year 3 surveys, indicating a detectable shift in species assemblage following mastication (Table 3-2). The full model explained 18% of the variation in Bray–Curtis dissimilarity, indicating a moderate shift in species composition between Baseline and Year 3. Because only one Year 3 unit was monitored in 2025, effects of *Unit* and *Unit\*Age* interactions could not be evaluated.

**Table 3-2. PERMANOVA results for community composition in Year 3, based on Bray-Curtis distance matrices.**

Factor	R <sup>2</sup>	F	p
Unit	N/A	N/A	N/A
Age	0.18	4.97	1.10E-03
Unit*Age	N/A	N/A	N/A

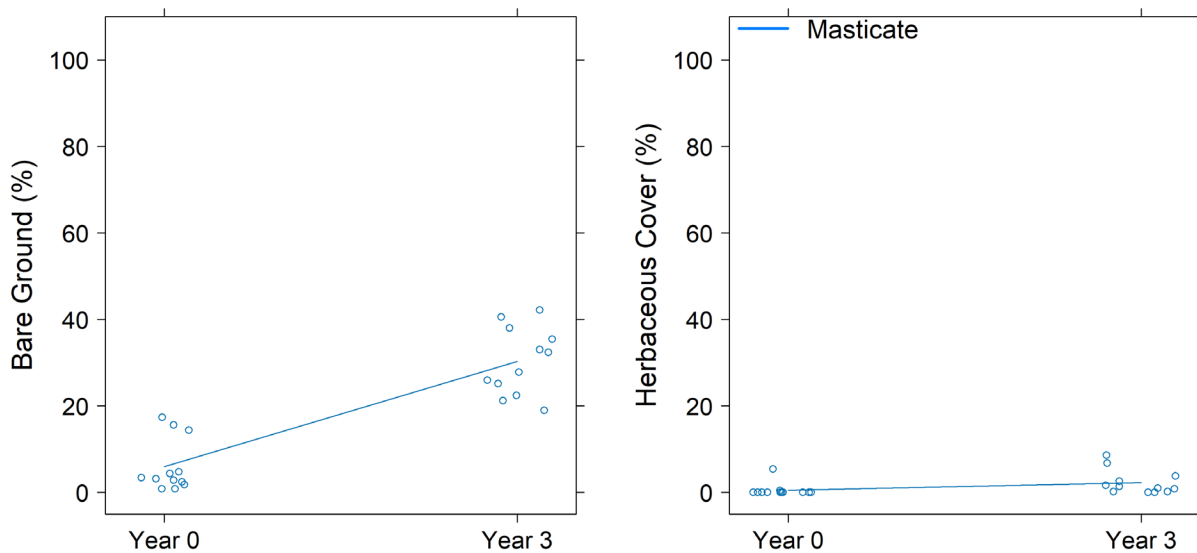
3.4.2.2 Bare Ground and Herbaceous Cover

Mixed-design ANOVAs were conducted to examine the effect of Age on mean percent bare ground and mean percent herbaceous cover (Table 3-3). There was only one Year 3 unit and therefore the effects of Unit and Unit\*Age could not be evaluated. The analyses indicated that Age of the unit (Baseline vs. Year 3) was associated with differences in both bare ground and herbaceous cover (Table 3-3).

**Table 3-3. Mixed-design ANOVA results for Year 3 bare ground and herbaceous cover.**

Factor	Bare Ground		Herbaceous Cover	
	F	P	F	P
Unit	N/A	N/A	N/A	N/A
Age	233.13	9.45E-09	6.96	2.31E-02
Unit*Age	N/A	N/A	N/A	N/A

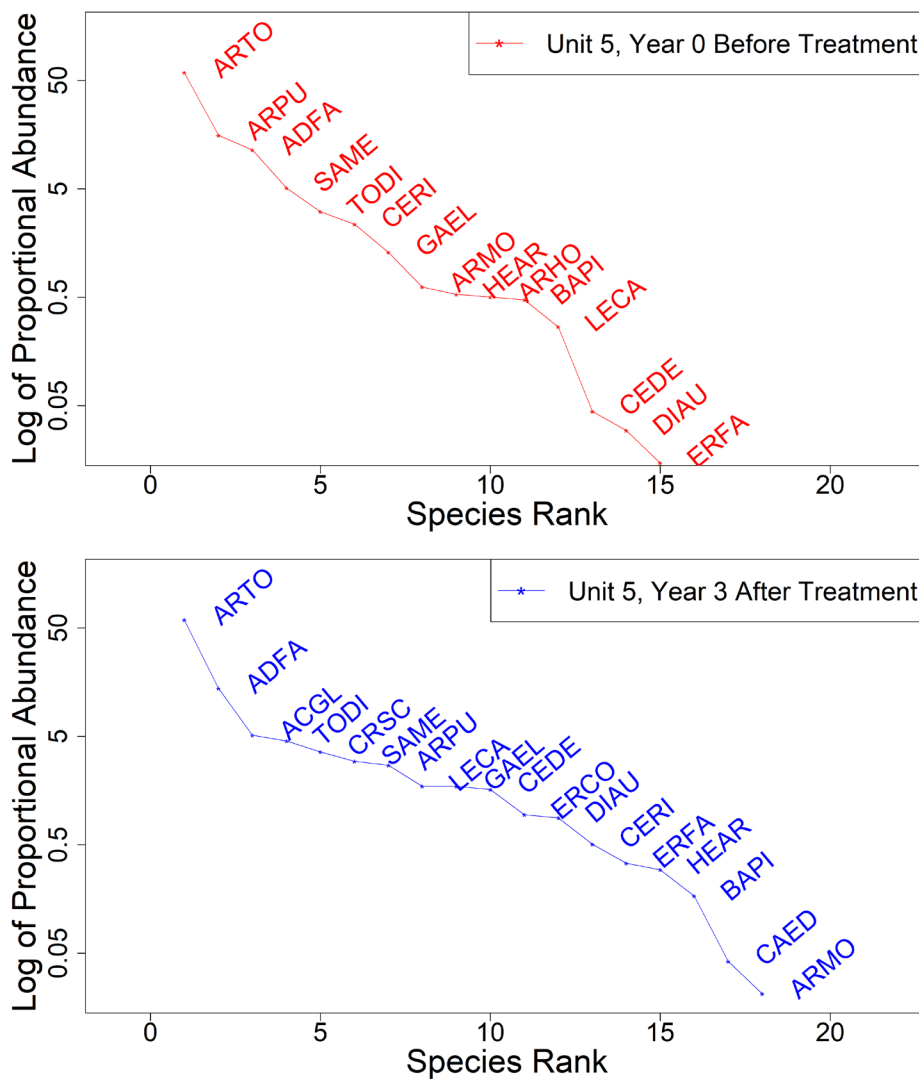
Average bare ground in Unit 5 increased from 6.0% to 30.3% between Baseline (2015) and Year 3 (2025). Herbaceous cover remained relatively stable but increased slightly from 0.5% in Baseline to 2.3% in Year 3 (Figure 3-6). These patterns reflect expected early post-mastication conditions, with initial canopy removal increasing bare ground exposure and herbaceous growth prior to shrub dominance reestablishing.



**Figure 3-6. Unit 5 bare ground and herbaceous cover between Baseline (2015) and Year 3 (2025). Twelve masticated transects were analyzed in Unit 5.**

3.4.2.3 Rank Abundance Curves

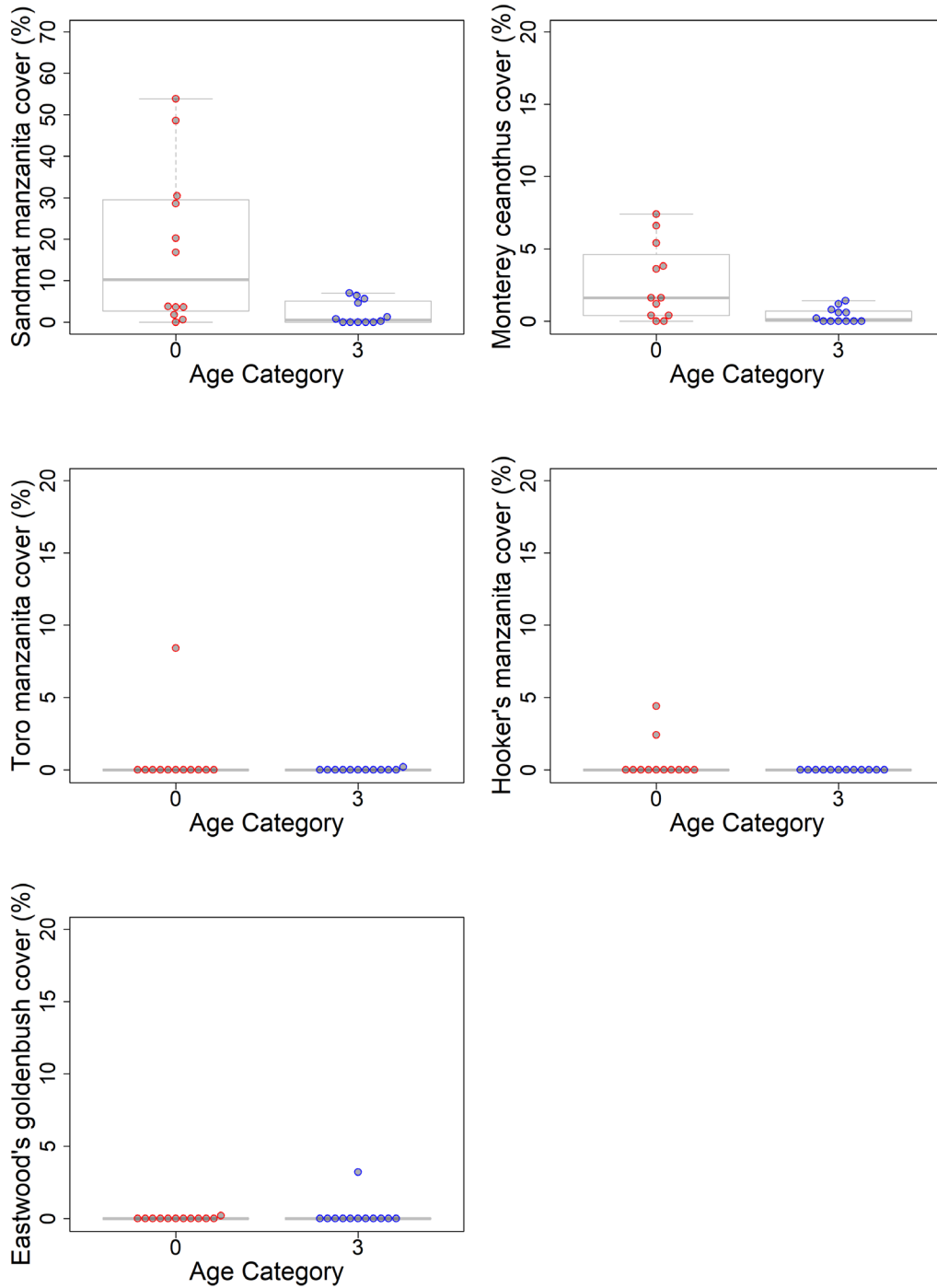
Rank abundance curves (RAC) provide additional context to the PERMANOVA results by illustrating how species' relative abundances shift, even when certain dominant taxa remain present. Unit 5 RACs illustrate a shift toward a more diverse community composition between Baseline (2015) and Year 3 (2025) (Figure 3-7). In Baseline, Unit 5 was dominated by shaggy-barked manzanita ( $C_{Baseline\ ARTO} = 66.4\%$ ), followed by sandmat manzanita ( $C_{Baseline\ ARPU} = 17.7\%$ ) and chamise ( $C_{Baseline\ ADFA} = 12.9\%$ ). All three species decreased in cover in Year 3, but shaggy-barked manzanita and chamise maintained their dominant positions ( $C_{Year\ 3\ ARTO} = 46.8\%$ ,  $C_{Year\ 3\ ADFA} = 11.0\%$ ). The RAC also highlights the colonization of disturbance-adapted species such as deerweed (*Acmispon glaber*) and peak rush-rose (*Crocanthemum scoparium*), as neither species were present in Baseline, but have emerged to moderate-to-high abundance species (Figure 3-7). These changes reflect early successional dynamics, with persistent dominant species and gradual colonization of disturbance-adapted species. All species codes are defined in Appendix A.



**Figure 3-7. Unit 5 rank abundance curves between Baseline (2015) and Year 3 (2025).** New species present in Year 3 surveys included deerweed, iceplant, peak rush-rose, and golden yarrow (*Eriophyllum confertiflorum*). Hooker’s manzanita was the only species present in Baseline and absent in Year 3. Twelve masticated transects were analyzed in Unit 5. Y-axis is on a log<sub>10</sub> scale.

#### 3.4.2.4 HMP Shrub Species

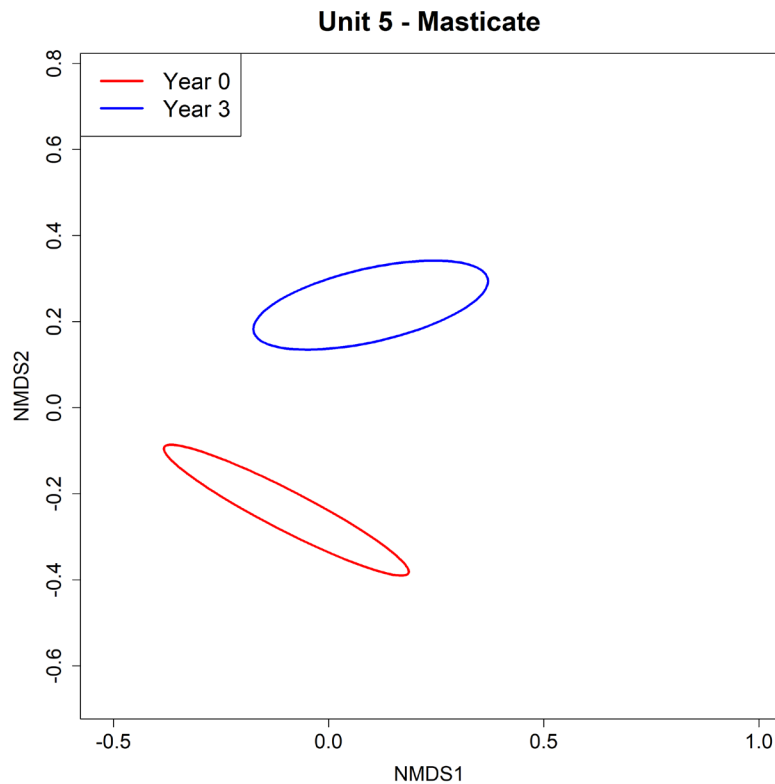
HMP shrub species observed in Unit 5 in Baseline included Monterey ceanothus, Toro manzanita, Hooker's manzanita, sandmat manzanita, and Eastwood's goldenbush (Figure 3-8). The only species that did not persist from Baseline to Year 3 was Hooker's manzanita, which declined from 0.6% mean cover (present on two transects) in Baseline to 0% in Year 3. Monterey ceanothus, Toro manzanita, and sandmat manzanita all declined from Baseline but remained present at lower quantities ( $C_{\text{Year 8 CER1}} = 0.4\%$ ,  $C_{\text{Year 8 ARMO}} = 0.02\%$ ,  $C_{\text{Year 8 ARPU}} = 2.2\%$ ). Eastwood's goldenbush however, increased by over a factor of ten from its Baseline cover of 0.02% to 0.3% in Year 3 (Figure 3-8). Both Toro manzanita and Eastwood's goldenbush were only present on one transect in Baseline and Year 3.



**Figure 3-8. Unit 5 HMP shrub species cover between Baseline (2015) and Year 3 (2025). The colored dots represent the percent cover of the respective species for each transect within an age category. The thick grey line in the box represents the median, the top and bottom edges of the central box represent the upper (3<sup>rd</sup>) and lower (1<sup>st</sup>) quartile, respectively. Twelve masticated transects were analyzed in Unit 5. Scales not equivalent.**

### 3.4.2.5 NMDS Ordinations

NMDS ordination for Unit 5 illustrate that community composition in Year 3 diverged from Baseline composition (Figure 3-9). Community composition is represented by the shape and location of ellipses in the ordination space, where ellipses with similar shape and location imply similar community composition. In Year 3 after treatment, ellipses are typically in a different location on the ordination than the Baseline ellipses since species composition has shifted post treatment. The NMDS ordination below shows a clear distinction between Baseline and Year 3; in Year 5 we would expect composition to shift back toward the Baseline composition.



**Figure 3-9. NMDS ordination plot showing Unit 5 community composition changes between Baseline (2015) and Year 3 (2025). Twelve masticated transects were analyzed in Unit 5.**

### 3.4.3 Invasive and Non-Native Species Monitoring

Invasive species monitoring was conducted along the shrub transects and opportunistically during HMP annual surveys in Unit 5. Minor occurrences of iceplant were incidentally encountered on shrub transects in Unit 5 but were not mapped due to their minimal size. Minor occurrences of non-native herbaceous cover were observed in Unit 5 during transect monitoring (Appendix G, Table G-1).

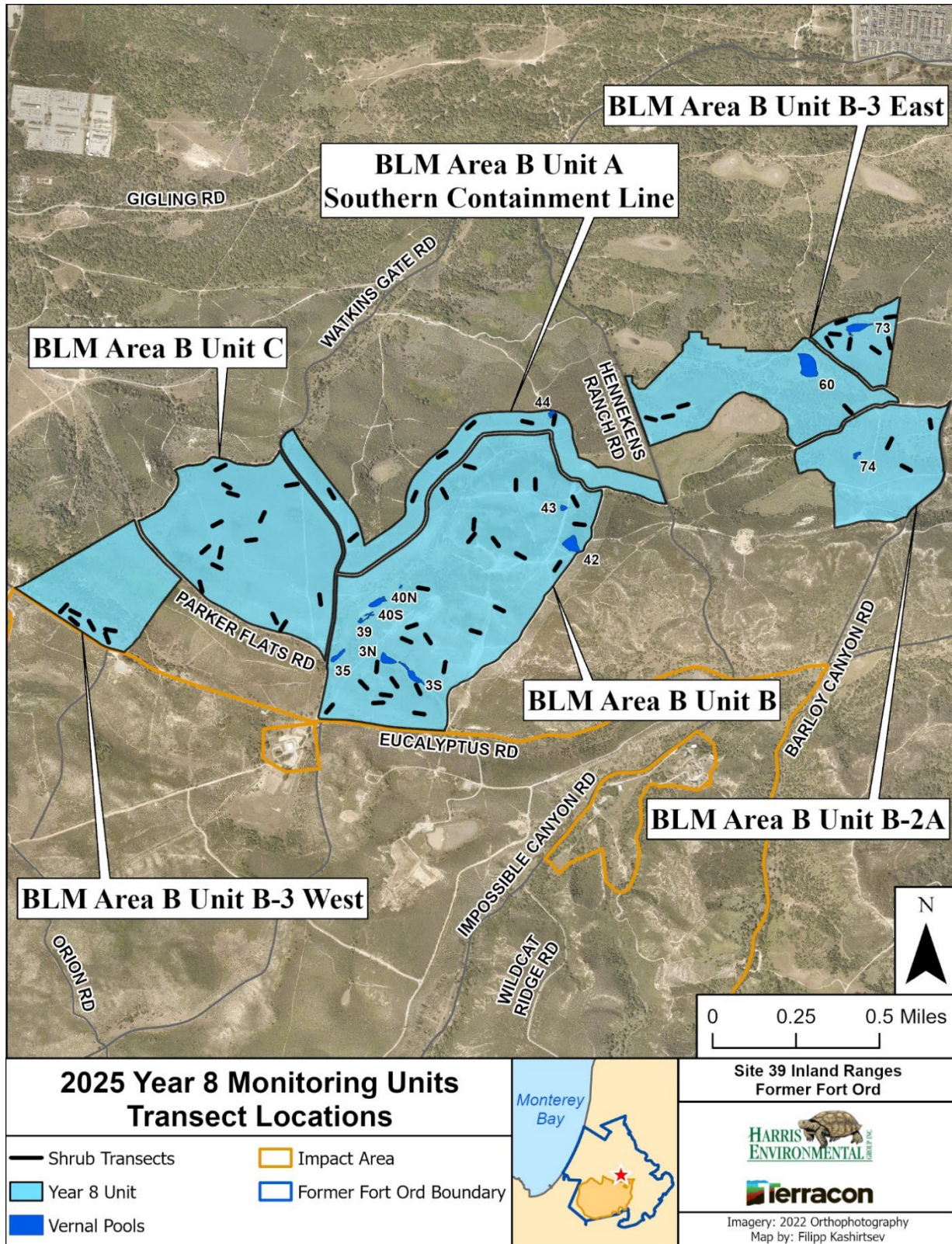
### 3.4.4 Yadon's Piperia

No Yadon's piperia were observed in Unit 5.

## **4 YEAR 8 VEGETATION SURVEYS: BLM AREA B UNITS B-2A, B-3 WEST, B-3 EAST, A SOUTHERN CONTAINMENT LINE (CL), B, AND C**

### **4.1 Introduction**

Year 8 units included BLM Area B Units B-2A, B-3 West, B-3 East, A Southern CL, B, and C (Figure 4-1). Units B-3 West, B-3 East, A Southern CL, and B and C Containment Lines were masticated in 2017. Prescribed burns were conducted at Units B and C after containment line mastication to facilitate environmental cleanup operations involving MEC removal. Subsequently, portions of Unit B and C containment lines were burned. Baseline surveys for Year 8 units were conducted in 2015, except for Unit B-2A (Baseline, 1998) and two Unit B shrub transects (Baseline, 1999). Year 3 (2020) and Year 5 (2022) surveys included density monitoring for HMP annual species; shrub transect monitoring to assess shrub composition in the maritime chaparral; and annual grass monitoring within the planned primary containment lines surrounding these units (Terracon, 2021; Terracon 2023). In 2025, shrub transect monitoring occurred in BLM Area B Units B-2A, B-3 West, B-3 East, A Southern CL, B, and C; and annual grass monitoring occurred in BLM Area B Units B-3 West, A Southern CL, and B.



**Figure 4-1. Year 8 monitoring Units for shrub transect and annual grass monitoring. Shrub transect monitoring occurred in all units; annual grass monitoring occurred in BLM Area B Units B-3 West, A Southern CL, and B Containment Line in 2025.**

## 4.2 BLM Area B Units B-2A, B-3 West, B-3 East, A Southern Containment Line, B, and C: Setting

BLM Area B is a 1,646-acre area and is part of the publicly accessible lands on Fort Ord National Monument. This irregularly configured area is located immediately north and east of the Impact Area units and is divided into eight subareas. BLM Area B is roughly bordered by Watkins Gate Road and Parker Flats Road to the west, Eucalyptus Road to the south, Barloy Canyon Road to the east, and Gigling Road to the north. Portions of this area are currently managed by BLM and contain numerous maintained trails and roads publicly accessible for biking and hiking, providing access to the interior portions of many of these areas. BLM Area B varies greatly in physiognomy, vegetation community composition, and topography.

Unit B-2A primarily supports maritime chaparral with transitional oak woodland areas. The rolling terrain contains erodible roads with underlying compacted soils. Small mesic areas are located in the interior of the unit.

Unit B-3 West is approximately 63 acres, largely dominated by oak woodland and grassland with maritime chaparral limited primarily to the northern and southern boundaries. Chaparral habitat in the southern portion of this area is dominated primarily by sandmat manzanita and other low-growing shrubs, which may indicate an adaptation to the sandy aeolian soils or reflect relatively recent disturbance.

Unit B-3 East is dissimilar from the majority of BLM Area B. The majority of this area is dominated by oak woodland and expansive native grasslands interspersed with vernal pools. Maritime chaparral is limited in this subarea to immediately east of Hennekens Ranch Road and Addington Road. A vernal pool (Pond 60) located in the center of this subarea is known to support federally threatened California tiger salamanders.

Unit A Southern CL is in the northernmost portion of BLM Area B and is bisected by several trails and roads. This area contains a diverse array of maritime chaparral, coast live oak woodland, blueblossom ceanothus-poison oak scrub, native grass prairie, and wet meadow habitats. Unit A Southern CL was the only portion surveyed in 2022 and comprises 64 acres.

Unit B is dominated by a low-lying, hummocky valley comprised of grassland and shallow vernal pools. This valley is bordered by a mosaic of maritime chaparral and coast live oak woodland to the west and a steep, somewhat eroded slope containing oak woodland, chaparral, and disturbed unvegetated, highly eroded openings to the east. This subarea contains many old roads and trails that have been rerouted, restored, or closed by BLM. This subarea also contains several vernal pools, two of which support populations of Contra Costa goldfields (*Lasthenia conjugens*), a federally endangered plant species.

Unit C contains rolling topography and has several prominent east-to-west trending ridges and low-lying valleys. The area comprises nearly ubiquitous, dense maritime chaparral dominated by shaggy-barked manzanita and chamise with areas of locally dense Hooker's manzanita and Monterey ceanothus.

### **4.3 BLM Area B Units B-2A, B-3 West, B-3 East, A Southern Containment Line, B, and C: Methods**

In accordance with methods outlined in the Protocol and Section 2 in this report, the 2025 Year 8 vegetation monitoring surveys in BLM Area B Units B-2A, B-3 West, B-3 East, and A Southern CL consisted of the following components:

- Repeated sampling of transects that were monitored in 1998 (Baseline), 1999 (Baseline), 2015 (Baseline), 2020 (Year 3), and 2022 (Year 5) surveys (Terracon, 2023). These transect surveys were conducted to assess shrub species composition of the sensitive maritime chaparral community after treatment. Surveys occurred on May 27, 29, June 10, 12, 18, 19, 28, July 1, and 9, 2025.
- Mapping of non-native annual grasses within the BLM Area B Units B-3 West, A Southern CL, and B Containment Line. This survey effort was conducted to assess expansion or contraction of these populations over time after disturbance. Surveys occurred on July 7, 8, 11, 12, and 13, 2025.
- Mapping of target invasive species (iceplant, pampas grass, and French broom) where encountered. This survey effort was conducted to support ongoing management.

### **4.4 BLM Area B Unit B-2A, B-3 West, B-3 East, A Southern Containment Line, B, and C: Results and Discussion**

#### **4.4.1 Shrub Transect Monitoring**

The following section outlines shrub community composition, bare ground and herbaceous cover, RACs, HMP shrub species, and NMDS ordinations in Year 8 units. As part of Year 8 monitoring, shrub transects were sampled in BLM Area B Units B-2A ( $n=3$ ), B-3 West ( $n=6$ ), B-3 East ( $n=11$ ), A Southern CL ( $n=7$ ), B ( $n=26$ ), and C ( $n=14$ ) (Appendix C, Figures C-1 through C-7). Baseline monitoring for Year 8 units was conducted in 2015, except for Unit B-2A (1998) and two transects in Unit B (1999) (Burlison, 2016; HLA, 1999). Unit B-2A was not included in the following ANOVA and PERMANOVA analyses to reduce potential influence from differing Baseline data years.

The observed temporal patterns of broad-scale community response to treatment were generally congruent with past observations of the neighboring units in the MRA (Tetra Tech and EcoSystems West, 2011 through 2015b; Burlison, 2016 – 2022; Harris-Terracon 2024 – 2025). Initial post-treatment declines in shrub cover and increase in bare ground and herbaceous cover were followed by recovery of shrub dominance and increases in species richness and diversity by Year 8.

#### 4.4.1.1 Community Composition

Mixed-design ANOVAs were conducted to evaluate the effects of *Unit* and *Age* (Baseline vs. Year 8) on four key community structure metrics: mean percent cover, species richness, species evenness, and species diversity. This analysis included all Year 8 units combined, with the exception of Unit B-2A. Patterns in the data indicated that both *Age* and *Unit* were associated with differences in all community metrics, with the exception of *Unit* not showing a detectable association with species richness (Table 4-1). Interactions between *Unit* and *Age* were also observed for mean percent cover, species evenness, and species diversity, indicating that age-related changes in these metrics differed among units.

**Table 4-1. Mixed-design ANOVA results for BLM Area B Units B-3 West, B-3 East, A Southern CL, B, and C community composition.**

Factor	Total Mean Cover		Species Richness		Species Evenness		Species Diversity	
	F	P	F	P	F	P	F	P
Unit	11.83	4.05E-07	2.01	0.10	7.48	6.04E-05	8.39	2.00E-05
Age	52.74	2.10E-24	65.60	1.44E-28	42.70	8.23E-21	5.88	7.55E-04
Unit*Age	6.20	4.49E-09	1.30	0.22	4.01	1.70E-05	2.97	8.46E-04

Mixed-design ANOVAs were conducted on Units B and C separately to examine the effects of *Treatment* and *Age* on the four community structure metrics. These units were selected as they were the only Year 8 units containing multiple treatment types. In Unit B, no differences associated with *Treatment* were detected for any community metrics, whereas *Age* was associated with differences in mean percent cover, species richness, species evenness, and species diversity (Table 4-2). There was no evidence of an interaction between *Age* and *Treatment* in Unit B. A similar trend was observed in Unit C: no differences associated with *Treatment* were detected, whereas *Age* was associated with differences in all four metrics (Table 4-3). In Unit C, *Treatment\*Age* interactions were observed for species diversity and total mean cover, indicating that age-related changes in these factors varied among treatment types. Overall, *Age* was a more influential driver of community structure than *Treatment* in both units, although it is important to note that Units B and C have unbalanced and small sample sizes across treatment types, limiting confidence in treatment comparisons (Table 4-2 and Table 4-3).

**Table 4-2. Mixed-design ANOVA results for BLM Area B Unit B community composition.**

Factor	Total Mean Cover		Species Richness		Species Evenness		Species Diversity	
	F	P	F	P	F	P	F	P
Treatment	1.33	0.29	0.37	0.69	0.02	0.98	0.04	0.96
Age	8.75	5.39E-05	23.34	1.53E-10	29.84	1.76E-12	9.15	3.55E-05
Treatment*Age	0.65	0.69	0.54	0.77	0.89	0.51	0.58	0.74

**Table 4-3. Mixed-design ANOVA results for BLM Area B Unit C community composition.**

Factor	Total Mean Cover		Species Richness		Species Evenness		Species Diversity	
	F	P	F	P	F	P	F	P
Treatment	3.03	8.93E-02	1.16	0.35	0.69	0.52	2.40	0.14
Age	12.57	1.22E-05	8.50	2.53E-04	5.93	2.37E-03	4.07	0.01
Treatment*Age	2.36	5.26E-02	0.56	0.76	1.61	0.18	3.39	0.01

To increase statistical power for evaluating treatment effects, all burned and masticated transects were pooled for analysis. The combined dataset included 26 masticated transects from BLM Area B Units B-3 West, B-3 East, A Southern CL, and C; and 24 burned transects from BLMB Area B Units B and C. Mixed-design ANOVAs conducted on the pooled dataset indicated that *Age* was associated with variation in all four community metrics. Burn and mastication treatments differed substantially in vegetative cover, with evidence of different temporal trajectories, while treatment effects on evenness and diversity were less pronounced. *Treatment\*Age* interactions were detected for mean percent cover and species diversity, indicating that age-related changes in these metrics differed between burned and masticated transects (Table 4-4).

**Table 4-4. Mixed-design ANOVA results for burned and masticated transects community composition.**

Factor	Total Mean Cover		Species Richness		Species Evenness		Species Diversity	
	<i>F</i>	<i>P</i>	<i>F</i>	<i>P</i>	<i>F</i>	<i>P</i>	<i>F</i>	<i>P</i>
Treatment	22.21	2.13E-05	2.20	0.15	3.88	0.05	3.47	0.07
Age	48.45	1.04E-21	55.20	8.22E-24	32.64	3.69E-16	6.23	5.25E-04
Treatment*Age	17.08	1.52E-09	0.38	0.76	1.92	0.13	3.89	0.01

Post hoc comparisons were conducted to identify the ages at which burned and masticated transects differed in total mean cover and species diversity. For total mean cover, no differences between burned and masticated transects were detected at Baseline. From Year 3 onward, burned transects exhibited substantially higher total mean cover than masticated transects (Table 4-5). For species diversity, no differences were detected between burned and masticated transects at Baseline or Year 3; however, burned transects exhibited higher diversity at Year 5 and Year 8 (Table 4-6).

**Table 4-5. Estimated marginal means comparison of burned vs. masticated transects for total mean cover at each age class based on post-hoc pairwise comparisons (Bonferroni-adjusted).** Positive estimates indicate higher total cover in burned transects relative to masticated transects.

Year	Total Mean Cover	
	Estimate	<i>P</i>
Baseline	-2.81	0.60
Year 3	38.61	<1.00E-04
Year 5	18.84	6.00E-04
Year 8	20.52	2.00E-04

**Table 4-6. Estimated marginal means comparison of burned vs. masticated transects for species diversity at each age class based on post-hoc pairwise comparisons (Bonferroni-adjusted).** Positive estimates indicate higher diversity in burned transects relative to masticated transects.

Year	Species Diversity	
	Estimate	<i>P</i>
Baseline	8.81E-03	0.84
Year 3	0.04	0.36
Year 5	0.12	5.30E-03
Year 8	0.10	0.02

Mean shrub cover varied across all Year 8 units, though most units followed a similar trajectory, declining in Year 3 and recovering by Year 8 (Table 4-7). Units B-2A, B-3 West, B-3 East, and A Southern CL all showed relatively sharp declines in cover in Year 3 and approached or exceeded Baseline cover in Year 8 (Figure 4-2 – Figure 4-5). In Unit B, the burned and masticated & burned transects only slightly declined in shrub cover from Baseline (101% cover) to Year 3, continued to decline in Year 5, and exceeded Baseline cover in Year 8 (119%) (Figure 4-6). The mixed transects in Unit B had a sharp decline in Year 3, remained stable in Year 5, and increased in Year 8, though they did not exceed Baseline cover ( $C_{B \text{ Mixed, Baseline}} = 99\%$ ,  $C_{B \text{ Mixed, Year 8}} = 92\%$ ) (Figure 4-6). In contrast to these initial sharp declines in Year 3, the burned and masticated & burned transects in Unit C increased in percent cover from Baseline to Year 3, declined in Year 5, and exceeded Baseline conditions in Year 8 (128%). The masticated transects in Unit C declined in cover in Year 3, continued to decline in Year 5, and returned to Baseline cover in Year 8 (116%) (Figure 4-7).

Treatment influenced the trajectory of shrub cover across Year 8 units. Masticated units, including the masticated transects in Unit C, exhibited a consistent pattern of decline in Year 3 followed by recovery through Year 8. In contrast, burned and masticated & burned transects in Units B and C exhibited more variable trajectories among units. The burn-associated transects in Unit B showed only a slight decline in cover in Year 3, a further decline in Year 5, and recovery in Year 8. While shrub cover in the Unit C transects sharply increased in Year 3, declined in Year 5, and increased in Year 8. This elevated shrub cover observed in Year 3 along burned and masticated & burned transects is consistent with fire-stimulated recruitment of dwarf ceanothus (*Ceanothus dentatus*) and deerweed, both of which are known to germinate in response to heat and chemical cues associated with burning. These species were largely absent or present at minimal levels in Baseline surveys and showed limited recruitment in masticated-only transects, indicating that mastication alone did not generate the same germination response as burn treatments. The subsequent decline in total cover in Year 5 likely reflects typical post-fire thinning of early-successional cohorts as competitive interactions intensify.

**Table 4-7. Percent of total cover between Baseline and Year 8 for BLM Area B Units B-2A, B-3 West, B-3 East, Unit A Southern CL, B, and C.** Green text indicates the value increased and red text indicates the value decreased from the previous monitoring year.

Unit	Treatment	Baseline	Year 3	Year 5	Year 8
Unit B-2A	Masticate	92.9%	73.0%	78.2%	96.6%
Unit B-3 West	Masticate	83.3%	55.6%	53.8%	90.4%
Unit B-3 East	Masticate	114.6%	72.1%	73.4%	101.2%
Unit A - CL	Masticate	111.8%	74.7%	77.7%	107.0%
Unit B	Burn	100.8%	96.8%	88.7%	119.2%
Unit B	Masticate & Burn	100.6%	91.2%	82.6%	119.0%
Unit B	Mixed	99.1%	74.1%	75.2%	91.7%
Unit C	Burn	110.3%	134.1%	92.0%	127.6%
Unit C	Masticate & Burn	104.6%	127.1%	98.2%	128.4%
Unit C	Masticate	116.9%	93.4%	86.1%	116.5%

Species diversity increased across all Year 8 units from Baseline to Year 8 (Table 4-8). Species diversity in Unit B-2A and the masticated transects in Unit C remained relatively stable, decreasing slightly in Year 5 but exceeded Baseline diversity by Year 8 (Figure 4-2 and Figure 4-7). Unit B-3 East remained relatively stable – varying only by 0.3 across all survey years (Figure 4-4). Unit A Southern CL increased slightly each year after an initial decrease in Year 3 (Figure 4-5). Most other units and treatments showed continuous increases in diversity in each survey year (Table 4-8). Unit B-3 West displayed one of the greatest diversity gains, increasing by 0.92 from Baseline to Year 8, and had the highest diversity in Year 8 overall ( $H = 2.07$ ) (Figure 4-3). On average, units with burned, masticated & burned, and mixed transects supported greater diversity gains than mastication alone, with the exception of Unit B-3 West. On average, the mixed transects showed the greatest increase in diversity (0.92), followed by the burned (0.54) and masticate & burn (0.46) treatments, with masticated-only transects (0.33) showing the smallest increase from Baseline to Year 8. However, the fact that Unit B-3 West had the highest species diversity indicates that other factors may be driving diversity gains, including site-specific factors (soil, topography, etc.), pre-existing community structure, or post-treatment implementation differences. It should be noted that these averages have unbalanced data by treatment type and all averages hold the same weight in the above analysis.

**Table 4-8. Species diversity (H) between Baseline and Year 8 for BLM Area B Units B-2A, B-3 West, B-3 East, Unit A Southern CL, B, and C.** Green text indicates the value increased and red text indicates the value decreased from the previous monitoring year.

Unit	Treatment	Baseline	Year 3	Year 5	Year 8
Unit B-2A	Masticate	0.96	1.07	0.99	1.12
Unit B-3 West	Masticate	1.15	1.85	1.98	2.07
Unit B-3 East	Masticate	1.03	1.36	1.26	1.26
Unit A - CL	Masticate	0.98	0.96	1.02	1.22
Unit B	Burn	1.21	1.56	1.67	1.73
Unit B	Masticate & Burn	1.17	1.59	1.63	1.68
Unit B	Mixed	1.00	1.58	1.71	1.92
Unit C	Burn	1.14	1.33	1.63	1.70
Unit C	Masticate & Burn	1.42	1.46	1.59	1.84
Unit C	Masticate	1.43	1.47	1.34	1.55

Species richness increased across all units from Baseline to Year 8 (Table 4-9). Unit B-2A fluctuated in Year 5, but rebounded in Year 8, exceeding Baseline conditions ( $S_{B-2A, Baseline} = 6.0$ ,  $S_{B-2A, Year 8} = 8.0$ ) (Figure 4-2). Unit B-3 West exhibited the greatest increase overall, from 6.0 in Baseline to 11.5 in Year 8, with Unit B mixed transects close behind ( $S_{B Mixed, Baseline} = 6.0$ ,  $S_{B Mixed, Year 8} = 11.3$ ) (Figure 4-3 and Figure 4-6). Unit B-3 East increased from Baseline to Year 5, where it peaked at 9.7, before slightly declining in Year 8 ( $S = 9.1$ ) (Figure 4-4). Unit A Southern CL increased steadily from Baseline to Year 8 ( $S_{A, Baseline} = 6.1$ ,  $S_{A, Year 8} = 10.0$ ) (Figure 4-5). The burned and mixed transects in Unit B displayed large shifts in richness, increasing by 4.0 and 5.3, respectively. The masticated & burned transects in Unit B increased gradually from Baseline ( $S=7.1$ ) to Year 5 ( $S=10.1$ ), and remained stable in Year 8 (Figure 4-6). The burned and masticated & burned transects in Unit C increased in species richness at similar rates between Baseline and Year 8, increasing by 3.6 and 3.5, respectively. The masticated transects in Unit C increased from 9.0 in Baseline to 11.0 in Year 3, peaked at 12.0 in Year 5, and decreased back to 11.0 in Year 8 (Figure 4-7). Across treatments, increases were most pronounced between Baseline and Year 3, with lesser changes thereafter (Table 4-9). On average, mixed and burn treatments supported higher species richness than mastication alone, with the exception of mastication in Unit B-3 West, which exhibited the greatest gain. It should be noted that these averages have unbalanced data by treatment type and all averages hold the same weight in the above analysis.

**Table 4-9. Species richness (S) between Baseline and Year 8 for BLM Area B Units B-2A, B-3 West, B-3 East, Unit A Southern CL, B, and C.** Green text indicates the value increased and red text indicates the value decreased from the previous monitoring year.

Unit	Treatment	Baseline	Year 3	Year 5	Year 8
Unit B-2A	Masticate	6.0	8.0	6.0	8.0
Unit B-3 West	Masticate	6.0	11.2	12.0	11.5
Unit B-3 East	Masticate	6.3	9.3	9.7	9.1
Unit A - CL	Masticate	6.1	8.4	8.6	10.0
Unit B	Burn	7.1	10.6	10.6	11.1
Unit B	Masticate & Burn	7.1	9.4	10.1	10.1
Unit B	Mixed	6.0	10.0	10.7	11.3
Unit C	Burn	7.4	9.4	10.4	11.0
Unit C	Masticate & Burn	6.5	10.3	9.8	10.0
Unit C	Masticate	9.0	11.0	12.0	11.0

Species evenness in Year 8 units responded variably to treatment but remained relatively stable between years (Table 4-10). Units B-2A, B-3 East, and A exhibited minimal changes post-mastication, shifting by 0.01-0.02 from Baseline to Year 8 (Figure 4-2, Figure 4-4, and Figure 4-5). Unit B-3 West showed a consistent increase in evenness and then a pronounced gain in Year 8, from 0.67 in Baseline to 0.85, the highest value recorded in 2025 (Figure 4-3). Burned transects in Units B and C exhibited steady gains, reaching 0.72 in Year 8 in both units (Figure 4-6 and Figure 4-7). In contrast, masticated & burned treatments showed mixed responses, with Unit C increasing by only 0.01 from Baseline to Year 8 ( $J_{C, M\&B, Baseline} = 0.79$ ,  $J_{C, M\&B, Year 8} = 0.80$ ), and Unit B increasing by 0.13 ( $J_{B, M\&B, Baseline} = 0.60$ ,  $J_{B, M\&B, Year 8} = 0.73$ ). Mixed treatment in Unit B achieved the largest gain in evenness across all units, increasing by 0.22 from Baseline to Year 8 ( $J_{B, Mixed, Baseline} = 0.57$ ,  $J_{B, Mixed, Year 8} = 0.79$ ) (Table 4-10). The average change across all treatments was an increase of 0.07 from Baseline to Year 8, indicating stabilization or gradual shifts in dominance structures.

**Table 4-10. Species evenness (J) between Baseline and Year 8 for BLM Area B Units B-2A, B-3 West, B-3 East, Unit A Southern CL, B, and C.** Green text indicates the value increased and red text indicates the value decreased from the previous monitoring year.

Unit	Treatment	Baseline	Year 3	Year 5	Year 8
Unit B-2A	Masticate	0.55	0.52	0.59	0.54
Unit B-3 West	Masticate	0.67	0.77	0.80	0.85
Unit B-3 East	Masticate	0.57	0.61	0.55	0.56
Unit A - CL	Masticate	0.55	0.45	0.47	0.53
Unit B	Burn	0.62	0.67	0.71	0.72
Unit B	Masticate & Burn	0.60	0.71	0.70	0.73
Unit B	Mixed	0.57	0.69	0.72	0.79
Unit C	Burn	0.57	0.59	0.70	0.72
Unit C	Masticate & Burn	0.79	0.63	0.70	0.80
Unit C	Masticate	0.65	0.62	0.54	0.65

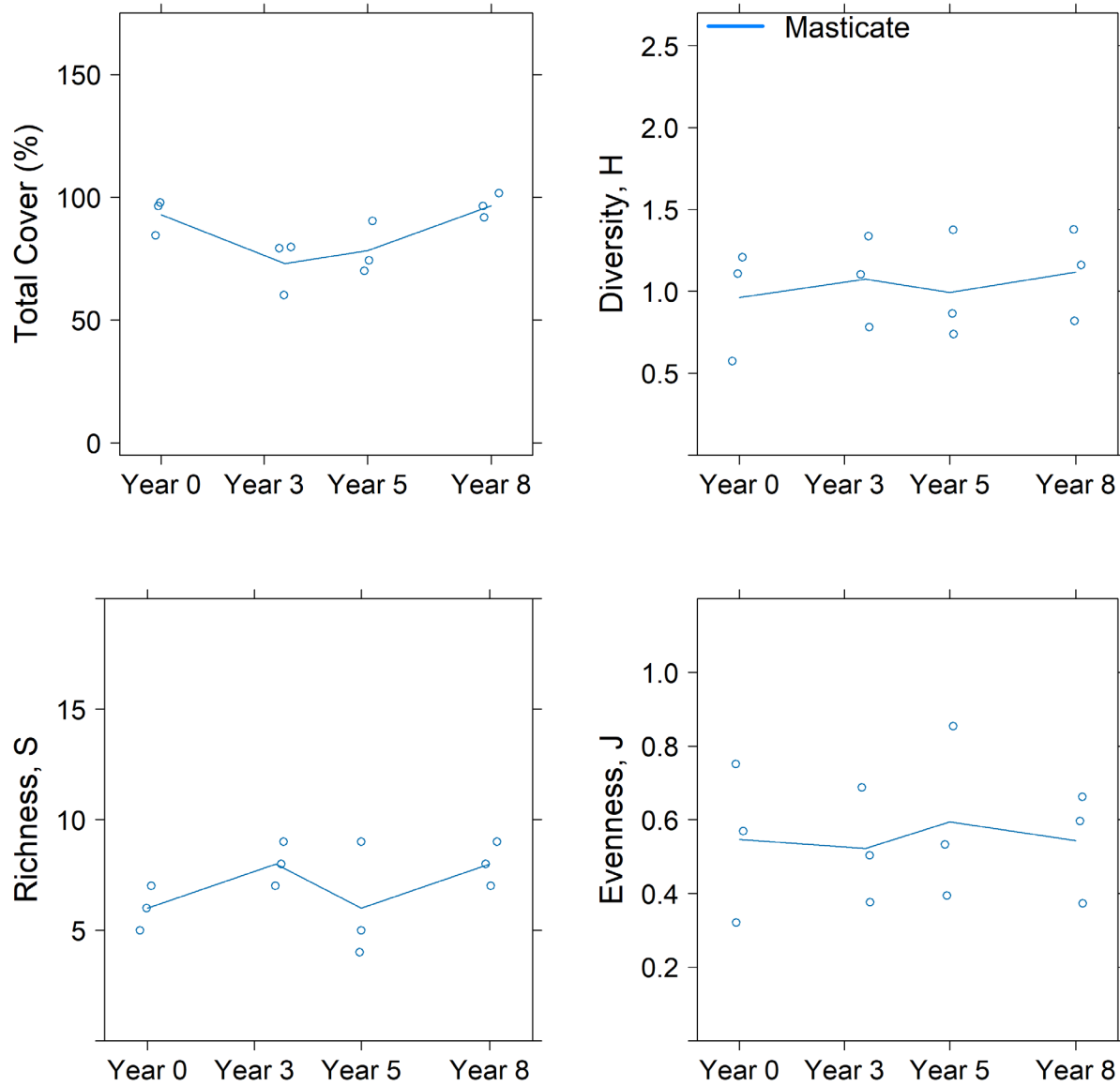


Figure 4-2. BLM Area B Unit B-2A community structure from Baseline (1998) to eight years after mastication (2025). Three masticated transects were analyzed in Unit B-2A.

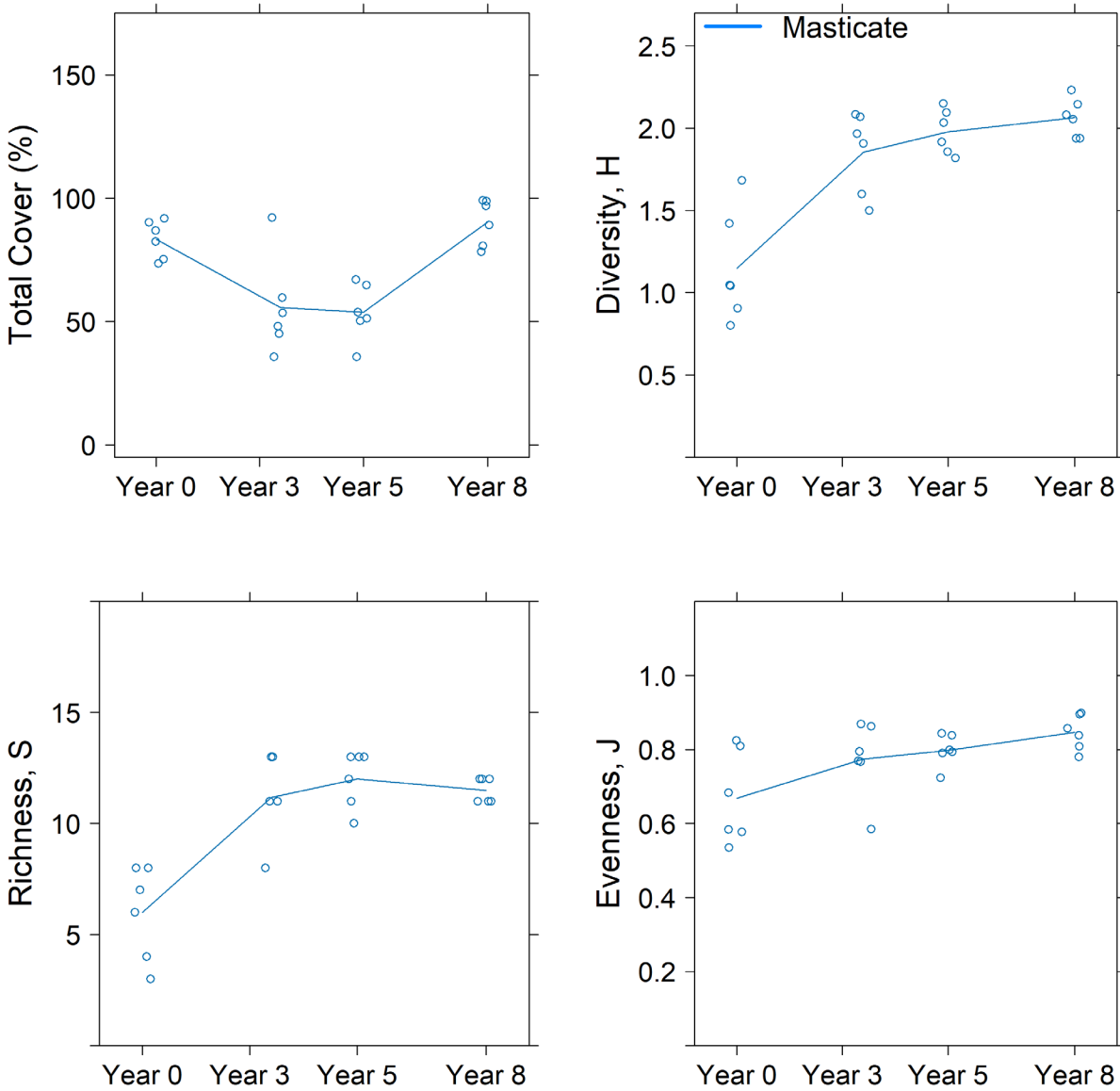


Figure 4-3. BLM Area B Unit B-3 West community structure from Baseline (2015) to eight years after mastication (2025). Six masticated transects were analyzed in Unit B-3 West.

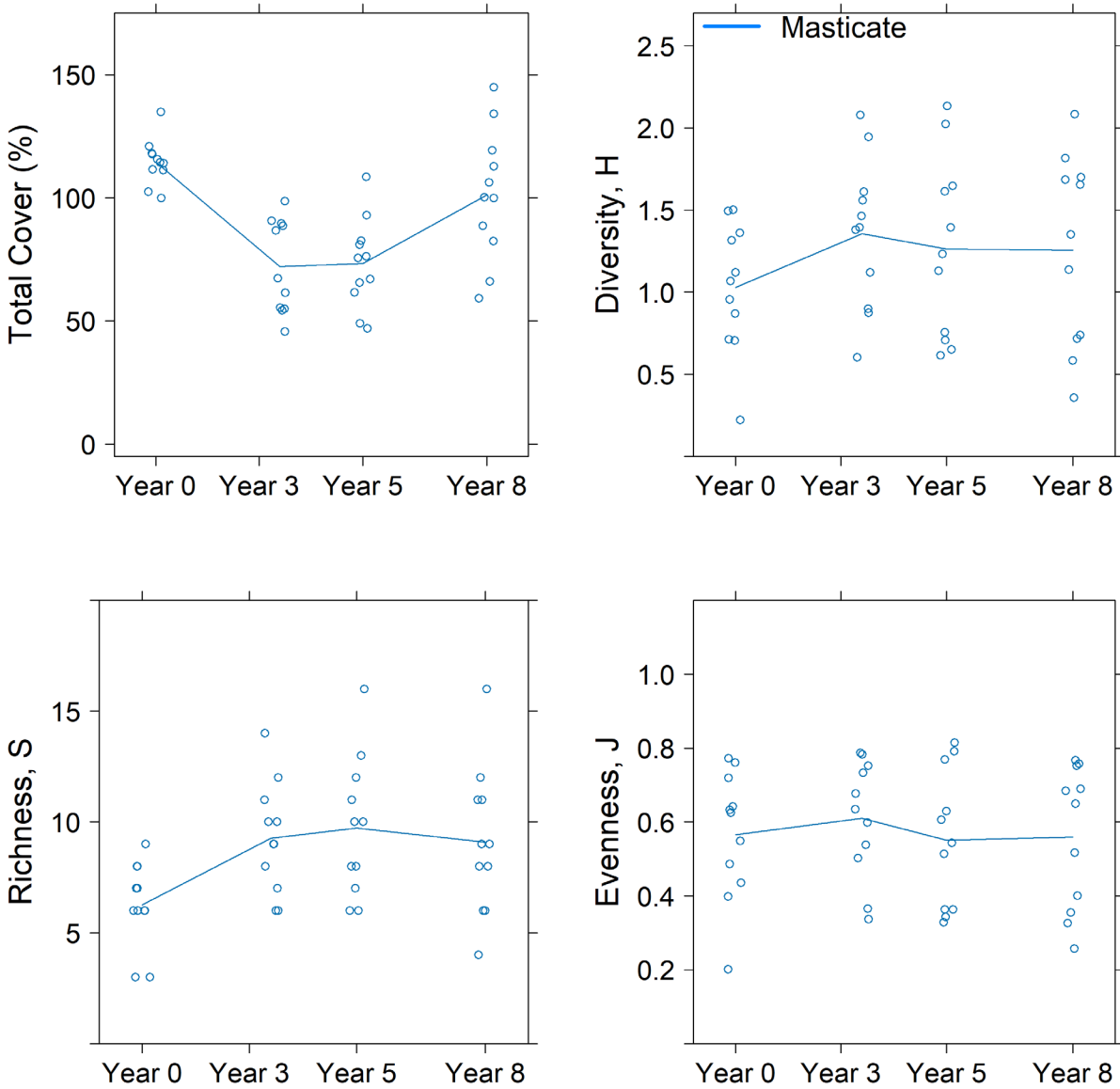
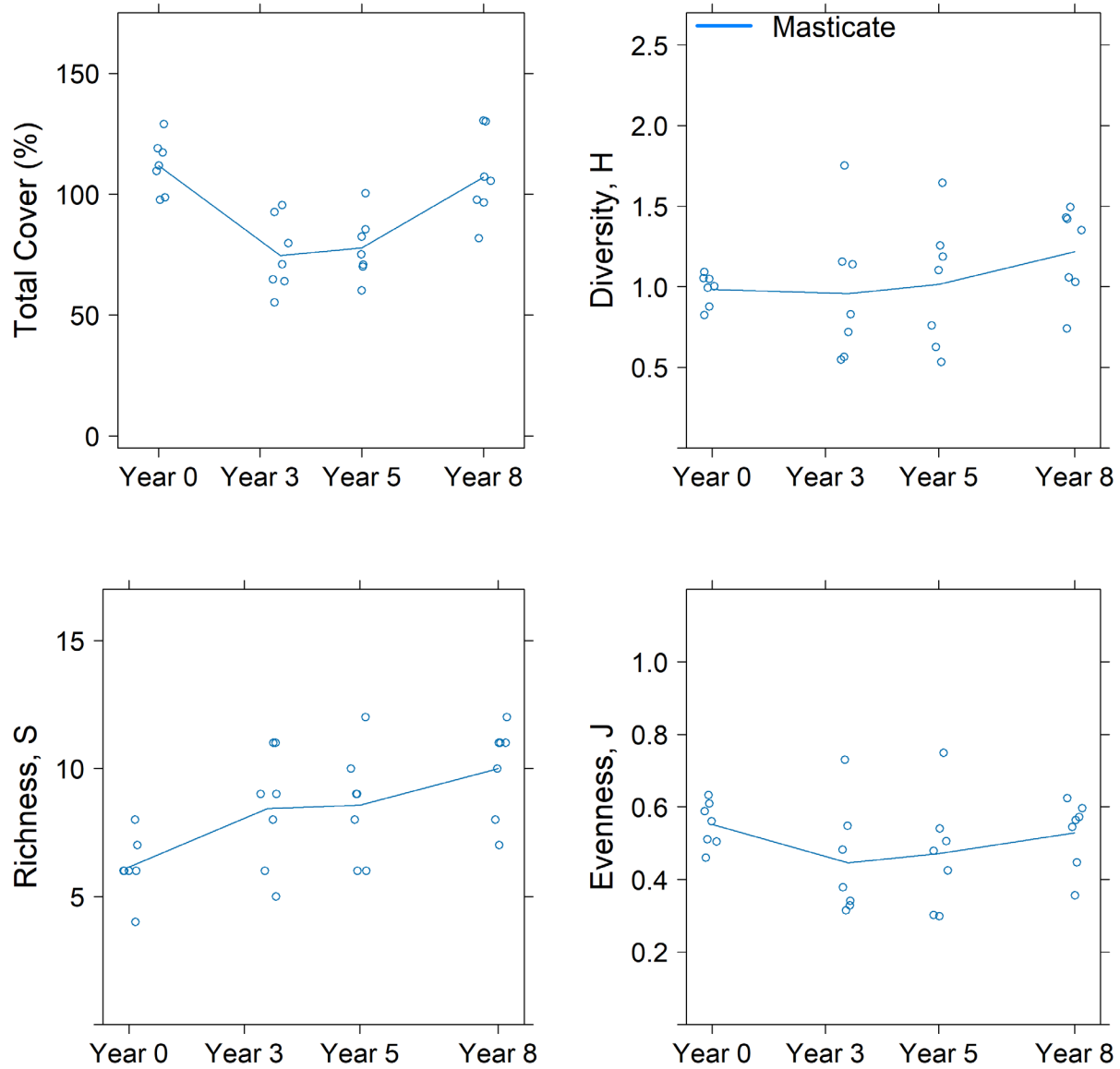
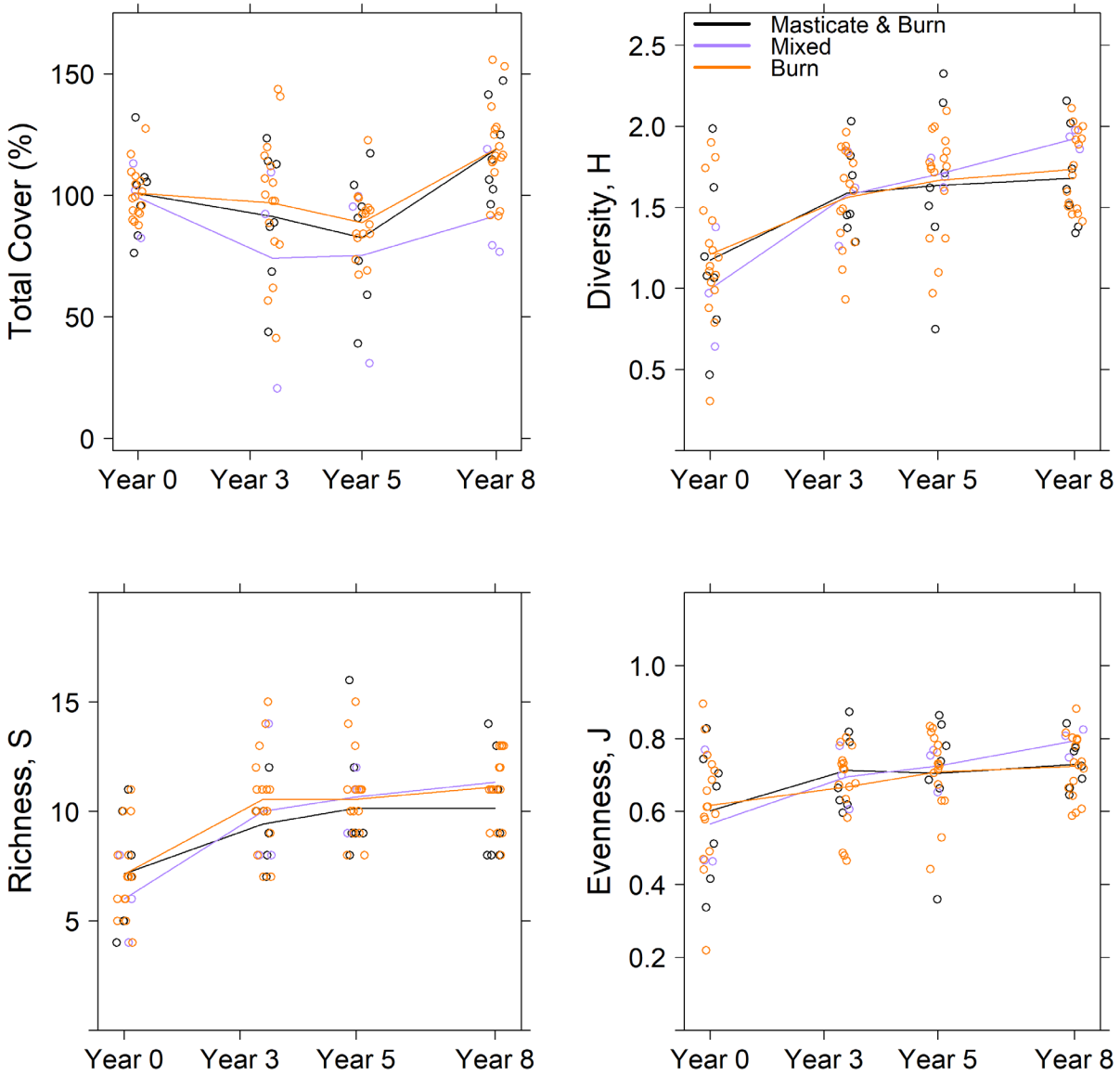


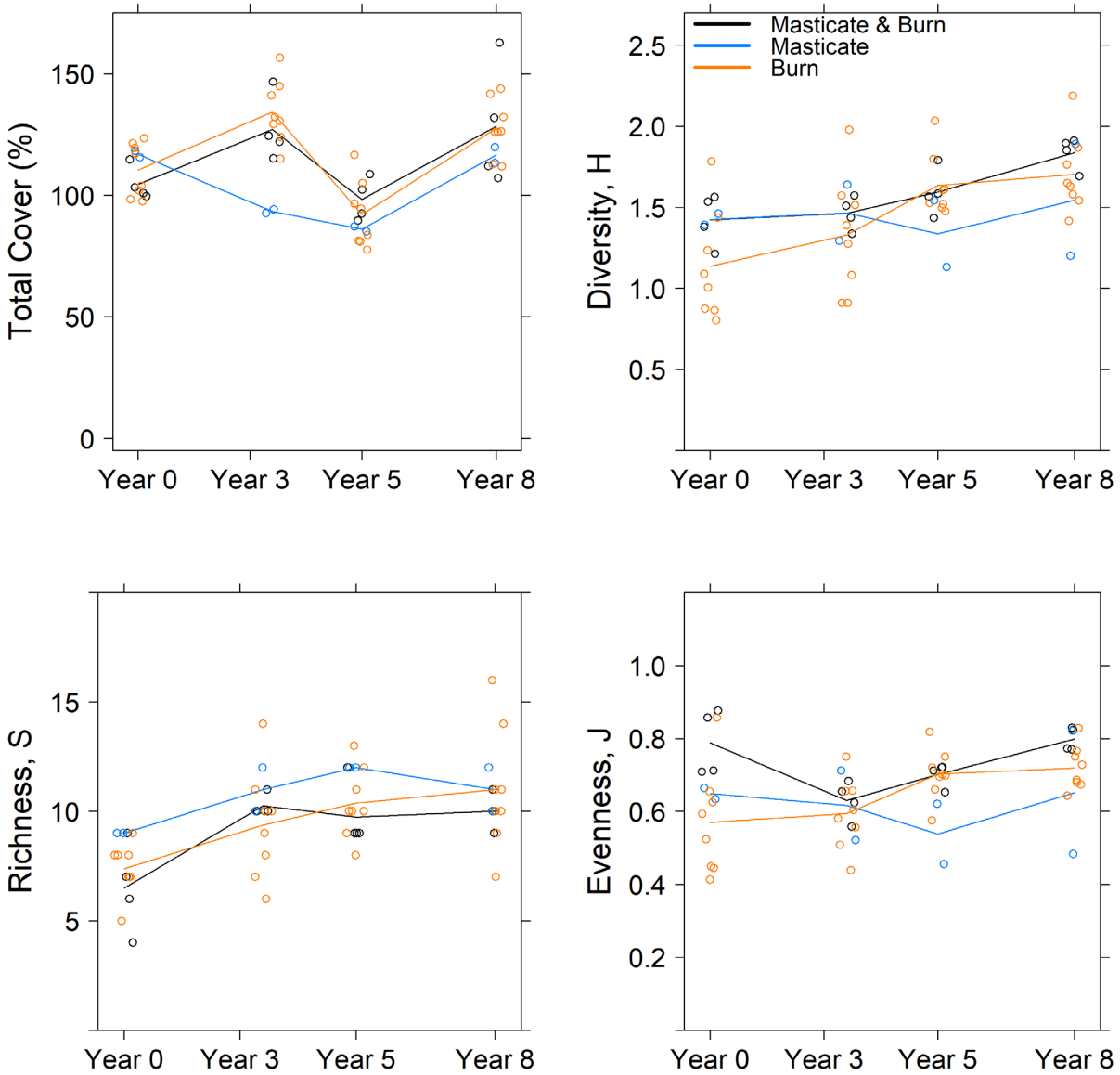
Figure 4-4. BLM Area B Unit B-3 East community structure from Baseline (2015) to eight years after mastication (2025). Eleven masticated transects were analyzed in Unit B-3 East.



**Figure 4-5. BLM Area B Unit A Southern CL community structure from Baseline (2015) to eight years after mastication (2025). Seven masticated transects were analyzed in Unit A Southern CL.**



**Figure 4-6. BLM Area B Unit B community structure from Baseline (2015 and 1999) to eight years after treatment (2025). Sixteen burn transects, seven masticated & burned transects, and three mixed transects were analyzed in Unit B.**



**Figure 4-7. BLM Area B Unit C community structure from Baseline (2015) to eight years after treatment (2025). Eight burned transects, four masticated & burned transects, and two masticated transects were analyzed in Unit C.**

PERMANOVAs were conducted to assess the effects of *Unit*, *Age*, and *Treatment* on community composition in the Year 8 units. *Unit* explained the largest proportion of variation, followed by temporal change and treatment type, indicating that species assemblages vary more across units than through time or between treatment types (Table 4-11). The full model including main effects and all interactions explained 53% of community variation, with interactions contributing additional explanatory power beyond the main effects alone.

**Table 4-11. Three-way PERMANOVA results for BLM Area B Units B-3 West, B-3 East, A Southern CL, B, and C community compositions, based on Bray-Curtis distance matrices.**

Factor	R <sup>2</sup>	F	p
Age	0.13	12.57	<1.00E-04
Unit	0.26	22.19	<1.00E-04
Treatment	0.13	12.02	<1.00E-04
Age*Unit	0.45	10.33	<1.00E-04
Age*Treatment	0.31	7.26	<1.00E-04
Unit*Treatment	0.31	13.80	<1.00E-04
Age*Unit*Treatment	0.53	7.07	<1.00E-04

PERMANOVAs were conducted separately for Units B and C to assess the effects of *Age* and *Treatment* on community composition within each unit. In both units, *Age* and *Treatment* influenced community composition, indicating that species assemblages differed between pre- and post-treatment conditions as well as between treatment types (Table 4-12 and Table 4-13). Each unit also showed an *Age\*Treatment* interaction, demonstrating that the effect of *Age* on community composition differed between treatment types. In Unit B, the full model explained 15% of the variation in Bray–Curtis community dissimilarity. In Unit C, the full model explained 33% of the variation, indicating stronger combined effects of *Age* and *Treatment* on community composition in this unit (Table 4-12 and Table 4-13).

**Table 4-12. Two-way PERMANOVA results for BLM Area B Unit B community composition, based on Bray-Curtis distance matrices.**

Factor	R <sup>2</sup>	F	p
Age	0.09	9.88	<1.00E-04
Treatment	0.05	2.45	4.60E-03
Age*Treatment	0.15	3.42	<1.00E-04

**Table 4-13. Two-way PERMANOVA results for BLM Area B Unit C community composition, based on Bray-Curtis distance matrices.**

Factor	R <sup>2</sup>	F	p
Age	0.12	7.65	3.00E-04
Treatment	0.18	5.97	<1.00E-04
Age*Treatment	0.33	5.01	<1.00E-04

PERMANOVAs were conducted on the pooled set of burned and masticated transects to evaluate the combined effects of *Age* and *Treatment* on community composition. Both factors influenced community structure, indicating that species assemblages changed over time and differed between burned and masticated treatments (Table 4-14). An *Age*\**Treatment* interaction was also detected, demonstrating that the effect of *Age* on community composition was not consistent across treatments (burn vs. masticate). The full model explained 27% of the variation in Bray-Curtis community dissimilarity (Table 4-14).

**Table 4-14. Two-way PERMANOVA results for burned and masticated transects community composition, based on Bray-Curtis distance matrices.**

Factor	R <sup>2</sup>	F	p
Age	0.11	7.87	<1.00E-04
Treatment	0.11	25.58	<1.00E-04
Age*Treatment	0.27	10.11	<1.00E-04

#### 4.4.1.2 Bare Ground and Herbaceous Cover

Mixed-design ANOVAs were conducted to examine the effect of *Unit* and *Age* (Baseline vs. Year 8) on mean percent bare ground and mean percent herbaceous cover. Both *Unit* and *Age* of unit appear to influence bare ground and herbaceous cover independently (Table 4-15). However, an interaction between *Unit* and *Age* indicates that age-related changes in bare ground and herbaceous cover differed among units.

**Table 4-15. Mixed-design ANOVA results for BLM Area B Units B-3 West, B-3 East, A Southern CL, B, and C bare ground and herbaceous cover.**

Factor	Bare Ground		Herbaceous Cover	
	F	P	F	P
Unit	12.94	1.26-E07	7.21	8.51E-05
Age	72.33	3.23E-26	36.86	7.55E-10
Unit*Age	2.52	7.53E-03	7.75	2.38E-06

Mixed-design ANOVAs were conducted on Units B and C separately to evaluate the effects of *Treatment* and *Age* on mean percent bare ground and mean percent herbaceous cover. In Unit B, differences in bare ground were affected by both *Treatment* and *Age*, whereas herbaceous cover was influenced only by *Age* (Table 4-16). There was no evidence of a *Treatment*\**Age* interaction for either metric in Unit B. In Unit C, *Age* was associated with differences seen in both bare ground and herbaceous cover, while *Treatment* did not have an effect on either metric (Table 4-17). However, a *Treatment*\**Age* interaction was observed for both bare ground and herbaceous cover in Unit C, indicating that age-related changes in these cover types differed between treatment types. Overall, *Age* was the dominant factor influencing bare ground and herbaceous vegetation in both units, while treatment effects were more limited and unit-specific.

**Table 4-16. Mixed-design ANOVA results for BLM Area B Unit B bare ground and herbaceous cover.**

Factor	Bare Ground		Herbaceous Cover	
	F	P	F	P
Treatment	4.33	2.53E-02	0.63	0.54
Age	14.12	1.27E-06	8.32	3.80E-03
Treatment*Age	0.87	0.51	0.56	0.63

**Table 4-17. Mixed-design ANOVA results for BLM Area B Unit C bare ground and herbaceous cover.**

Factor	Bare Ground		Herbaceous Cover	
	F	P	F	P
Treatment	0.64	0.54	2.17	0.16
Age	32.27	6.28E-10	6.03	2.20E-03
Treatment*Age	2.21	6.67E-02	2.32	5.58E-02

Mixed-design ANOVAs were also conducted on the pooled set of burned and masticated transects to evaluate the effects of *Treatment* and *Age* on mean percent bare ground and mean percent herbaceous cover. For bare ground, both *Treatment* and *Age* were associated with differences, and a *Treatment\*Age* interaction was detected, indicating that age-related changes in bare ground differed between burned and masticated transects. Herbaceous cover also differed with *Age*, while patterns associated with *Treatment* and the *Treatment\*Age* interaction were less distinct (Table 4-18). Only limited evidence of an interaction effect was observed for herbaceous cover ( $p = 0.07$ ).

**Table 4-18. Mixed-design ANOVA results for burned and masticated transects bare ground and herbaceous cover.**

Factor	Bare Ground		Herbaceous Cover	
	F	P	F	P
Treatment	5.65	2.15E-02	4.75	0.03
Age	66.06	1.04E-19	27.62	5.15E-07
Treatment*Age	4.4	0.01	3.21	0.07

The pattern by which bare ground and herbaceous cover changed over time was relatively similar across Year 8 units (Figure 4-8 – Figure 4-13). Bare ground cover increased sharply in all Year 8 units between Baseline and Year 3, continued to rise in Year 5, and decreased gradually in all units by Year 8 (Table 4-19). The greatest shifts in bare ground cover were seen in Units B-3 East and the mixed transects in Unit B. Unit B-3 East increased from 4.8% bare ground in Baseline to 17.8% bare ground in Year 8 (Figure 4-10); and Unit B mixed transects increased from 12.1% in Baseline to 25.6% in Year 8 (Figure 4-12).

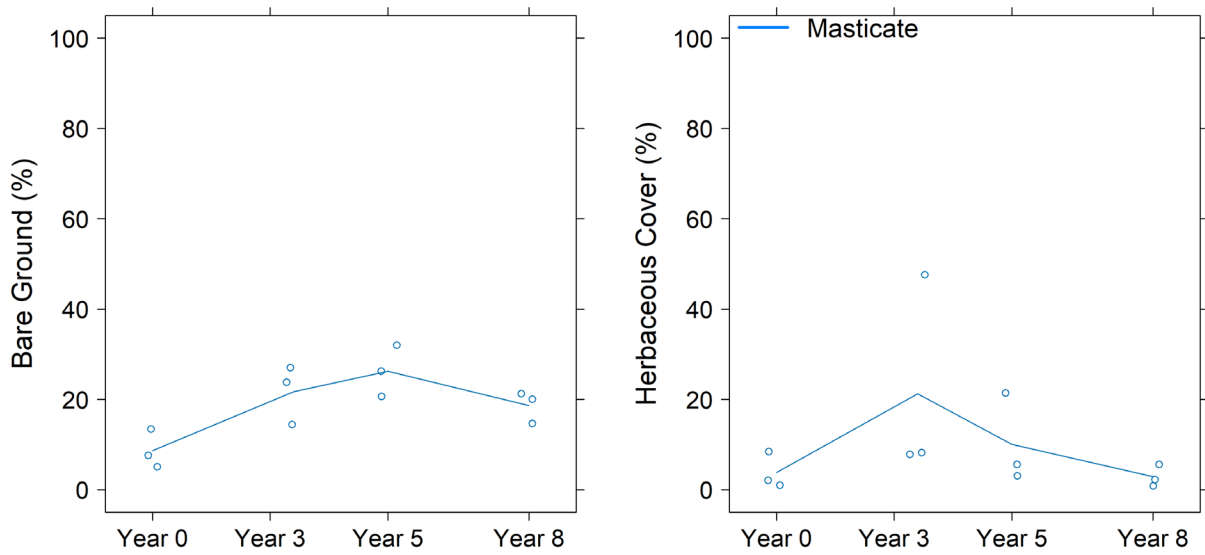
Herbaceous cover followed a similar trajectory across most units, rising substantially in Year 3 and declining in Year 5 (Figure 4-8 – Figure 4-13). There were varied responses across units from Year 5 to Year 8, with Unit B-3 West, the Unit B mixed transects, and the Unit C masticated & burned transects increasing in herbaceous cover; and the remaining transects and units decreasing further in herbaceous cover in Year 8 (Table 4-20). These patterns reflect typical successional dynamics, with initial canopy removal promoting bare ground and herbaceous growth, followed by shrub recovery and reduced bare ground and herbaceous cover by Year 8.

**Table 4-19. Average percent of bare ground cover in BLM Area B Units B-2A, B-3 West, B-3 East, A Southern CL, B and C.** Green text indicates the value increased and red text indicates the value decreased from the previous monitoring year.

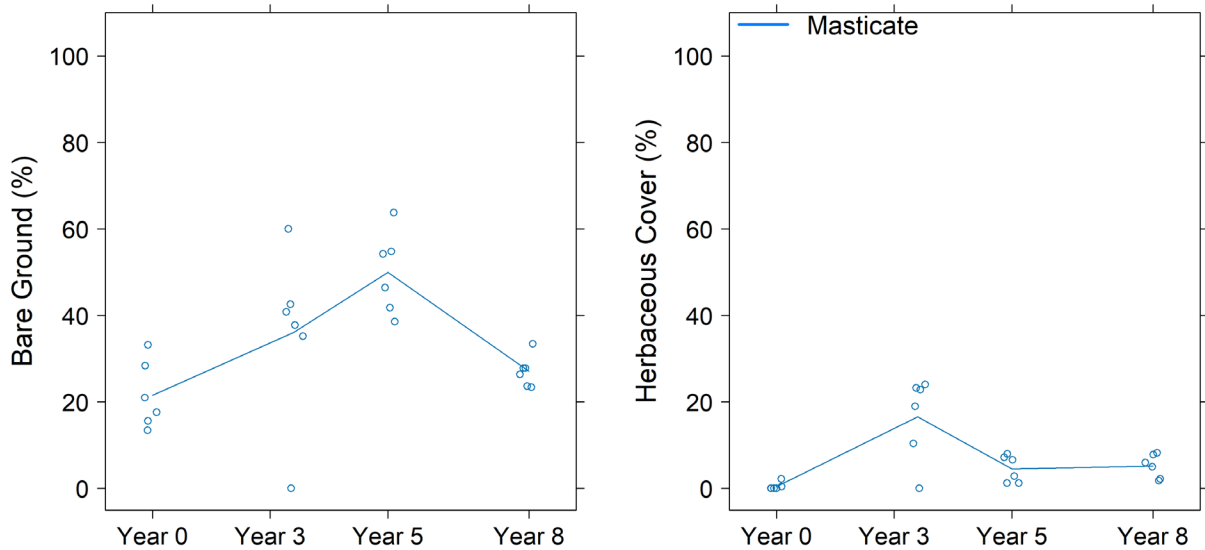
Unit	Treatment	Baseline	Year 3	Year 5	Year 8
Unit B-2A	Masticate	8.7%	21.7%	26.3%	18.6%
Unit B-3 West	Masticate	21.5%	36.1%	49.9%	27.1%
Unit B-3 East	Masticate	4.8%	18.9%	29.6%	17.8%
Unit A - CL	Masticate	5.1%	30.4%	29.8%	13.7%
Unit B	Burn	11.7%	19.9%	26.9%	15.6%
Unit B	Masticate & Burn	12.3%	20.6%	29.3%	12.7%
Unit B	Mixed	12.1%	36.9%	38.0%	25.6%
Unit C	Burn	5.3%	8.8%	27.4%	13.0%
Unit C	Masticate & Burn	9.9%	12.5%	24.2%	14.8%
Unit C	Masticate	1.8%	18.1%	24.4%	9.7%

**Table 4-20. Average percent of herbaceous cover in BLM Area B Units B-2A, B-3 West, B-3 East, A Southern CL, B, and C.** Green text indicates the value increased and red text indicates the value decreased from the previous monitoring year.

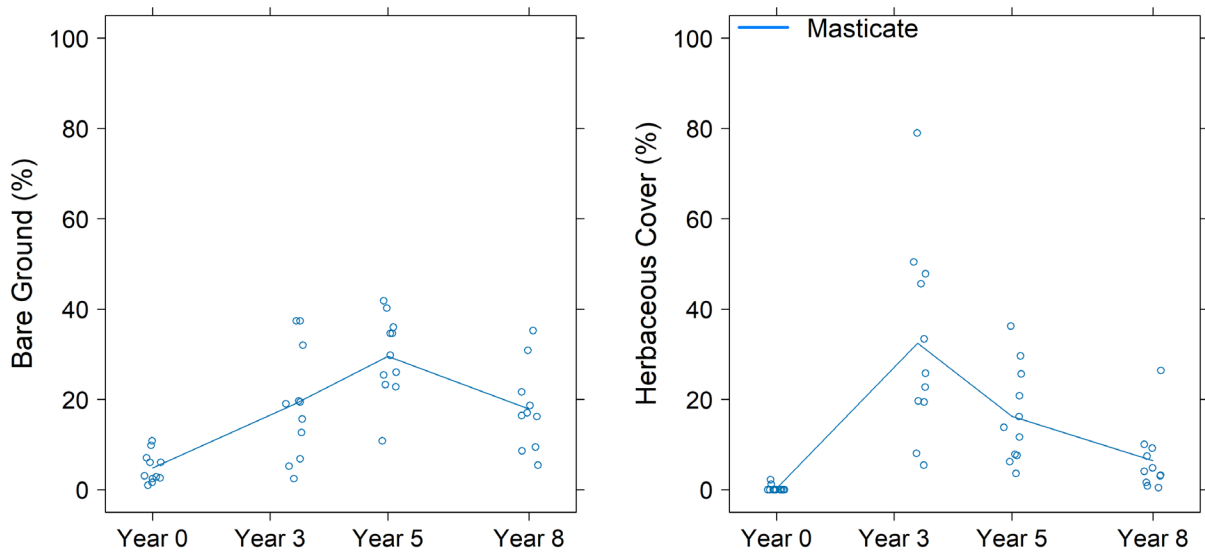
Unit	Treatment	Baseline	Year 3	Year 5	Year 8
Unit B-2A	Masticate	3.8%	21.2%	10.0%	2.9%
Unit B-3 West	Masticate	0.4%	16.6%	4.5%	5.2%
Unit B-3 East	Masticate	0.3%	32.5%	16.3%	6.4%
Unit A - CL	Masticate	0.3%	3.7%	2.0%	1.8%
Unit B	Burn	0.8%	13.8%	5.4%	1.2%
Unit B	Masticate & Burn	1.3%	12.4%	6.0%	3.7%
Unit B	Mixed	4.4%	17.6%	5.6%	12.5%
Unit C	Burn	0.1%	0.6%	3.7%	0.78%
Unit C	Masticate & Burn	0.4%	1.5%	1.2%	1.4%
Unit C	Masticate	0.0%	8.1%	7.2%	2.7%



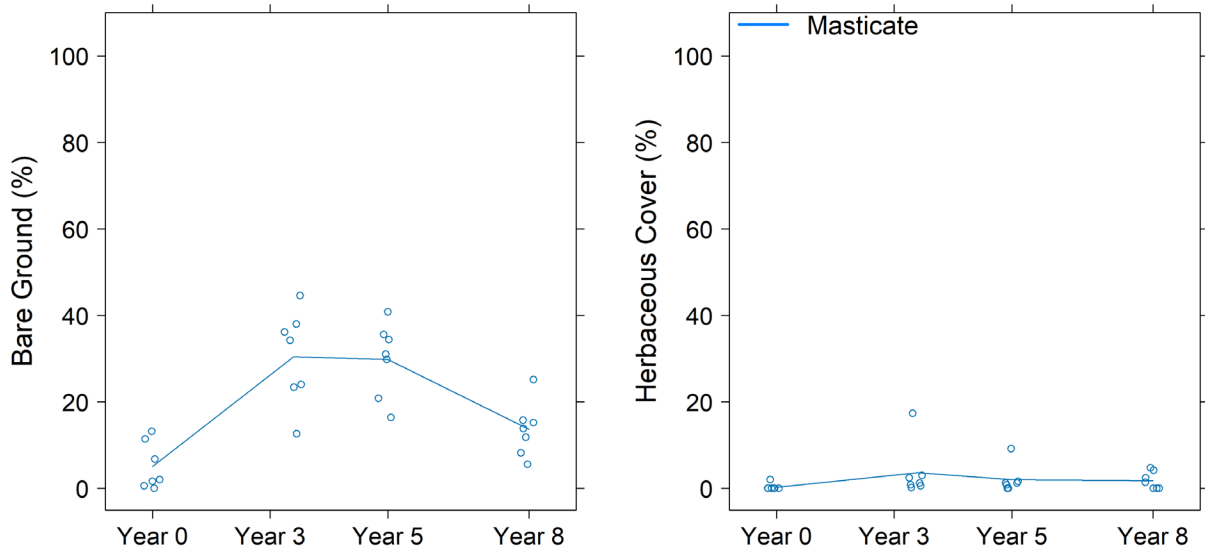
**Figure 4-8. BLM Area B Unit B-2A bare ground and herbaceous cover between Baseline (1998) and Year 8 (2025). Three masticated transects were analyzed in Unit B-2A.**



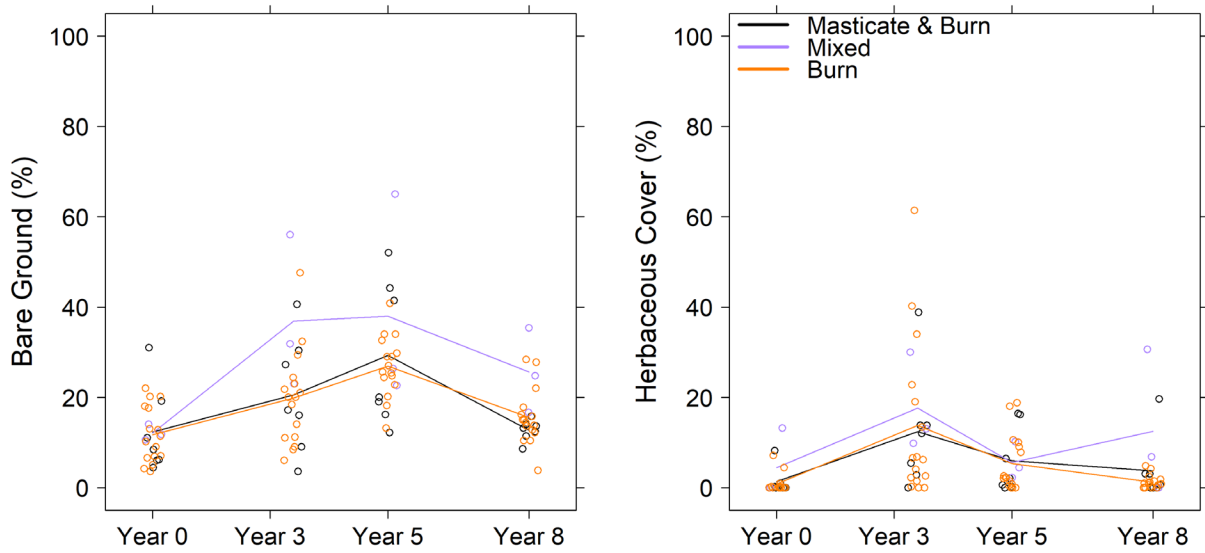
**Figure 4-9. BLM Area B Unit B-3 West bare ground and herbaceous cover between Baseline (2015) and Year 8 (2025). Six masticated transects were analyzed in Unit B-3 West.**



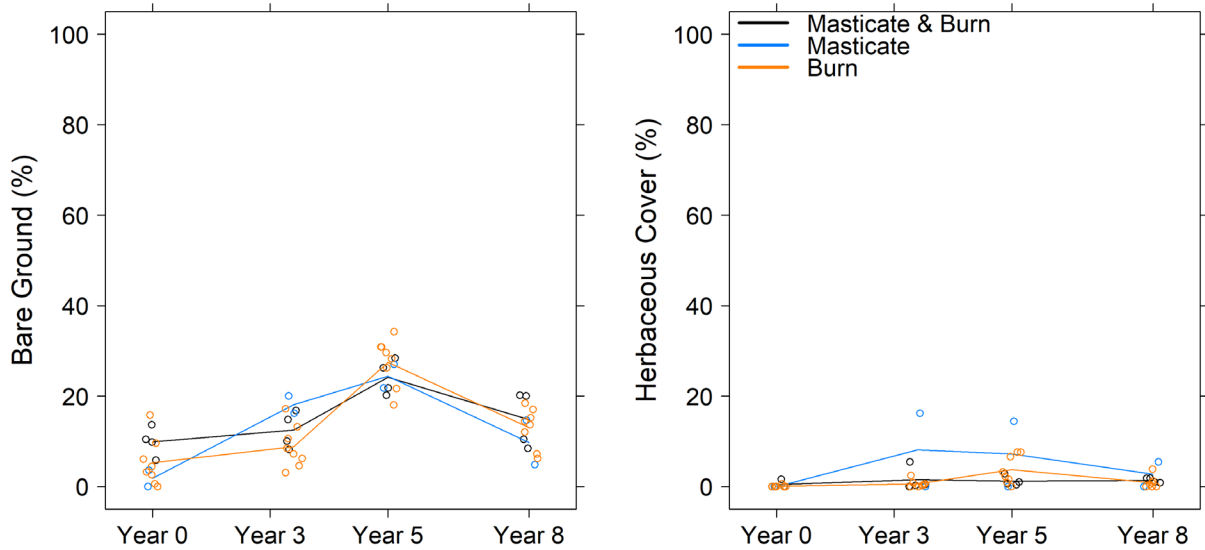
**Figure 4-10. BLM Area B Unit B-3 East bare ground and herbaceous cover between Baseline (2015) and Year 8 (2025). Eleven masticated transects were analyzed in Unit B-3 East.**



**Figure 4-11. BLM Area B Unit A Southern CL bare ground and herbaceous cover between Baseline (2015) and Year 8 (2025). Seven masticated transects were analyzed in Unit A Southern CL.**



**Figure 4-12. BLM Area B Unit B bare ground and herbaceous cover between Baseline (2015 and 1999) and Year 8 (2025). Sixteen burn transects, seven masticated & burned transects, and three mixed transects were analyzed in Unit B.**



**Figure 4-13. BLM Area B Unit C bare ground and herbaceous cover between Baseline (2015) and Year 8 (2025). Eight burned transects, four masticated & burned transects, and two masticated transects were analyzed in Unit C.**

#### 4.4.1.3 Rank Abundance Curves

Rank abundance curves (RAC) provide additional context to the PERMANOVA results by illustrating how species' relative abundances shift across time and treatments, even when certain dominant taxa remain present. The RACs illustrate that community composition of Year 8 units generally responded similarly to treatment over time (Figure 4-14 – Figure 4-21). Across most units, the top three species generally declined in Year 3, reflecting initial post-treatment impacts, then increased by Year 8 – indicating recovery trajectories. Overall, masticated units were consistently dominated by shaggy-barked manzanita and chamise, while burned and masticated & burned transects supported rapid colonization of disturbance-adapted species, such as dwarf ceanothus and peak rush-rose, while initially reducing species such as shaggy-barked manzanita. Across all Year 8 units, deerweed and dwarf ceanothus were among the most consistently observed new species. All species codes are defined in Appendix A.

Unit B-2A was co-dominated by chamise and shaggy-barked manzanita in all survey years, maintaining its primary dominance structure; with coast live oak and black sage as the third and fourth most dominant species in Year 5 and Year 8 ( $C_{B-2A, \text{Year 8}, \text{ARTO}} = 36.7\%$ ,  $C_{B-2A, \text{Year 8}, \text{ADFA}} = 36.6\%$ ,  $C_{B-2A, \text{Year 8}, \text{QUAG}} = 8.3\%$ ,  $C_{B-2A, \text{Year 8}, \text{SAME}} = 4.5\%$ ) (Figure 4-14). Overall, species composition remained close to Baseline, with few additions from year to year.

Unit B-3 West was dominated by sandmat manzanita, shaggy-barked manzanita, and chamise in Baseline and Year 8, with varying species colonizing in Years 3 and 5. (Figure 4-15). Sandmat manzanita was the most dominant species by cover in Year 8 ( $C_{B-3W, \text{ARPU}} = 18.9\%$ ), despite a sharp decline from its Baseline value of 39.7% to 1.6% in Year 3. Both shaggy-barked manzanita and chamise followed similar trends – declining to less than half of their Baseline cover in Year 3 and regaining their sub-dominant position by Year 8 ( $C_{B-3W, \text{Year 8}, \text{ARTO}} = 13.5\%$ ,  $C_{B-3W, \text{Year 8}, \text{ADFA}} = 13.9\%$ ). Notably, peak rush-rose increased from the least abundant in Baseline to the most abundant in Years 3 and 5, and the fourth most dominant species in Year 8 (Figure 4-15).

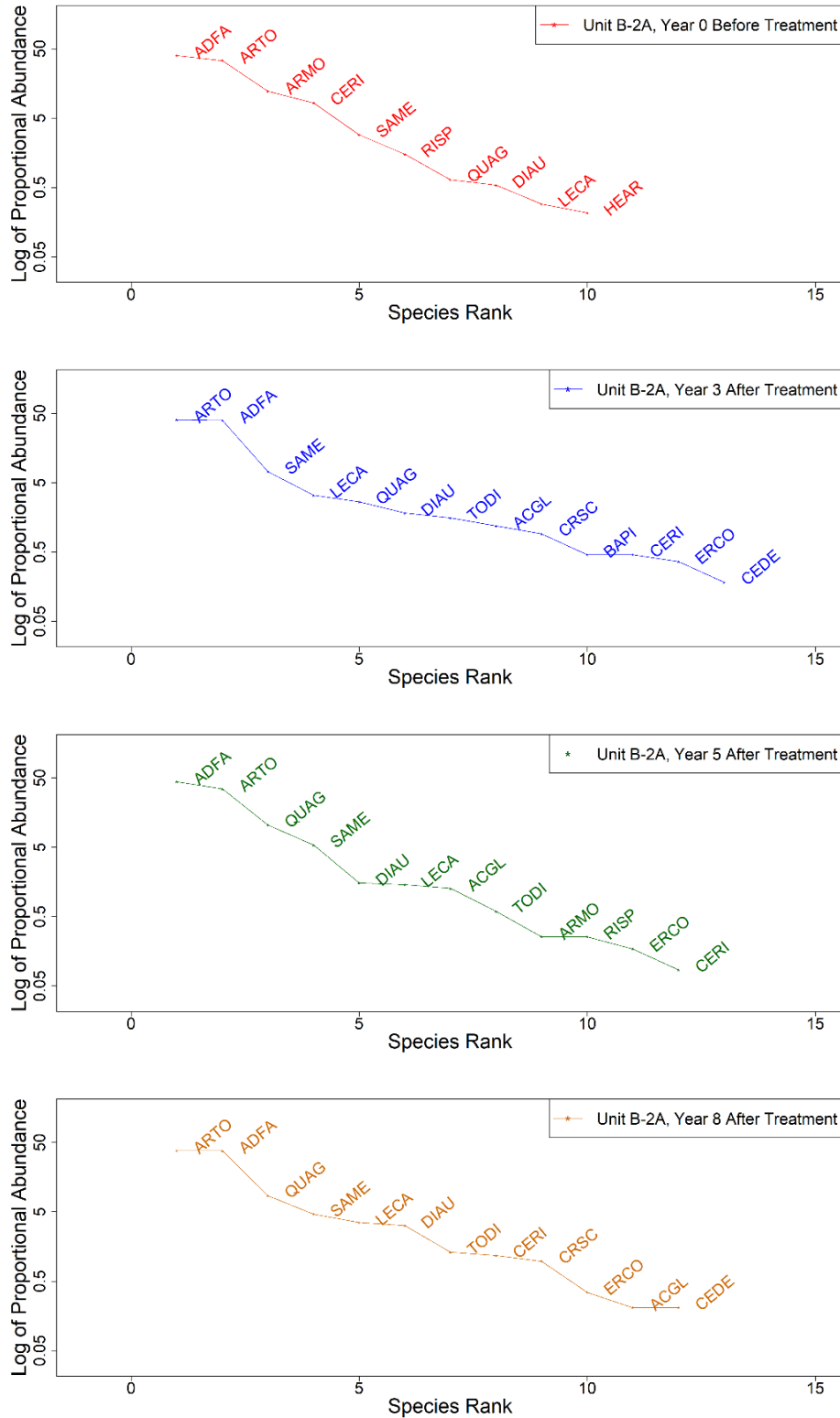
Unit B-3 East was dominated by chamise and shaggy-barked manzanita in all survey years, with Toro manzanita and coyote brush stabilizing as the next two dominant species in Years 5 and 8 (Figure 4-16). Shaggy-barked manzanita, chamise, and Toro manzanita all decreased in cover in Year 3 but have been recovering into Year 8 ( $C_{B-3E, \text{Year 8}, \text{ADFA}} = 44.1\%$ ,  $C_{B-3E, \text{Year 8}, \text{ARTO}} = 24.4\%$ ,  $C_{B-3E, \text{Year 8}, \text{ARMO}} = 6.8\%$ ) (Figure 4-16). Unit B-3 East exhibited the greatest increase in newly observed species by Year 8, with ten additional species present that were not detected in Baseline (Figure 4-16).

Unit A Southern Containment Line RAC shows a steady increase in diversity and richness over time (Figure 4-17). Across all survey years, shaggy-barked manzanita consistently exhibited the highest abundance, substantially exceeding that of all other species. Shaggy-barked manzanita made up 71.4% cover in Year 8, with the next most abundant species (chamise) at 6.7%; resulting in low species evenness in this unit. Also notable in Unit A Southern CL – sticky monkeyflower (*Diplacus aurantiacus*) increased from one of the lowest abundances in Baseline (0.11%) to the third most dominant species in Year 8 (4.17%) (Figure 4-17).

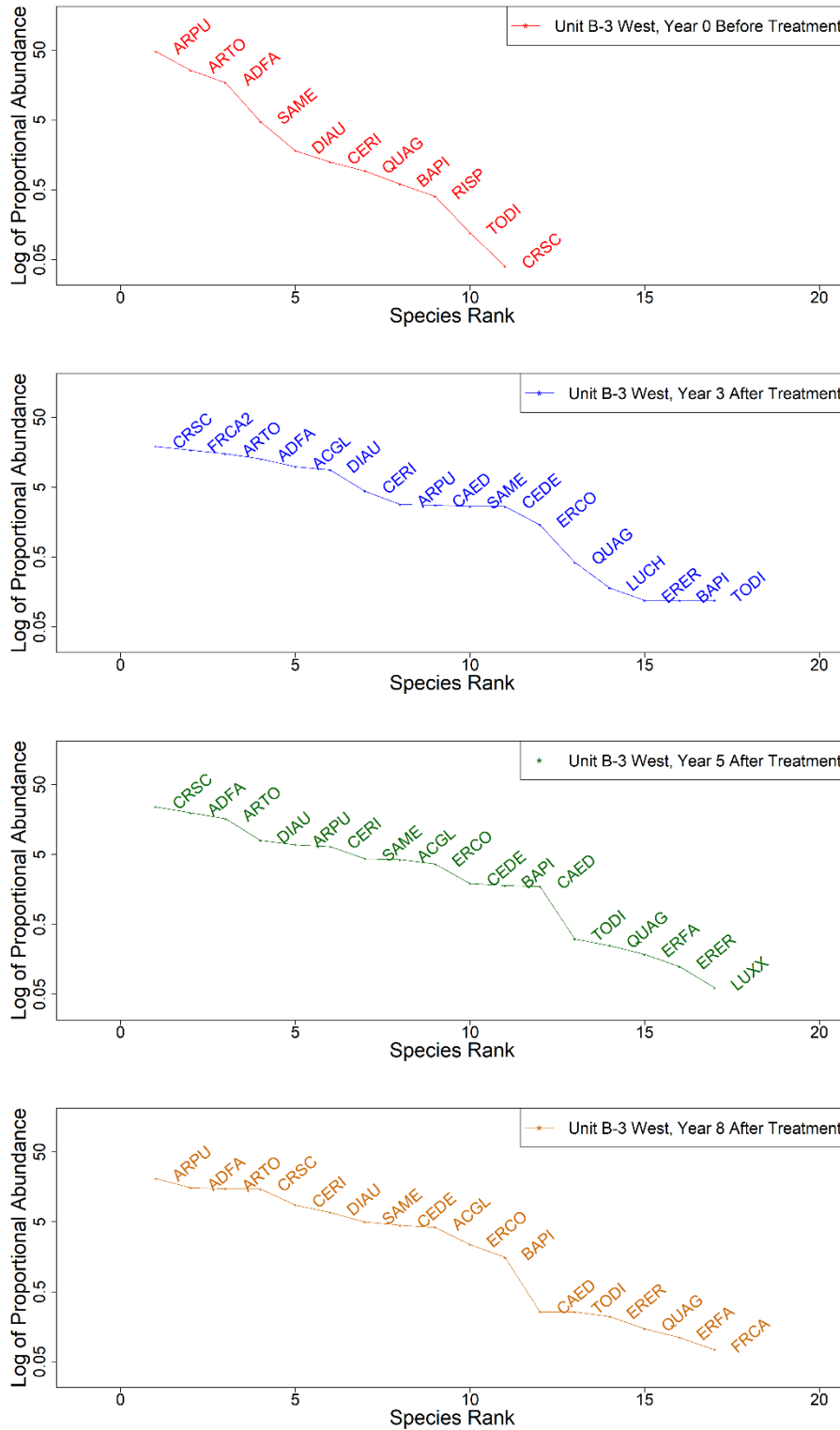
In Unit B, Year 8 community composition along mixed transects differed from compositions seen along burned and masticated & burned transects (Figure 4-18 and Figure 4-19). Dwarf ceanothus was the most dominant species in the burned and masticated & burned transects in Year 8 ( $C_{B, \text{burned CEDE}} = 27.8\%$ ,  $C_{B, \text{M\&B CEDE}} = 26.1\%$ ), followed closely by shaggy-barked manzanita and blue blossom (*Ceanothus thyrsiflorus*). This is especially notable because dwarf ceanothus was absent in Baseline when transects

in both treatment types were dominated by shaggy-barked manzanita; its emergence by Year 8 likely reflects stimulation of an existing seedbank following fire. Species turnover was most pronounced along the burned and masticated & burned transects, with each losing 3-4 species since Baseline, and gaining 5-7 species by Year 8 (Figure 4-18 and Figure 4-19). The mixed treatment transects in Unit B showed the highest retention of Baseline species, with no losses recorded from Baseline to Year 8. Shaggy-barked manzanita was the most dominant in Year 8 ( $C_{B, mixed} ARTO = 23.9\%$ ), followed by peak rush-rose and deerweed, neither of which were present in Baseline (Figure 4-18 and Figure 4-19).

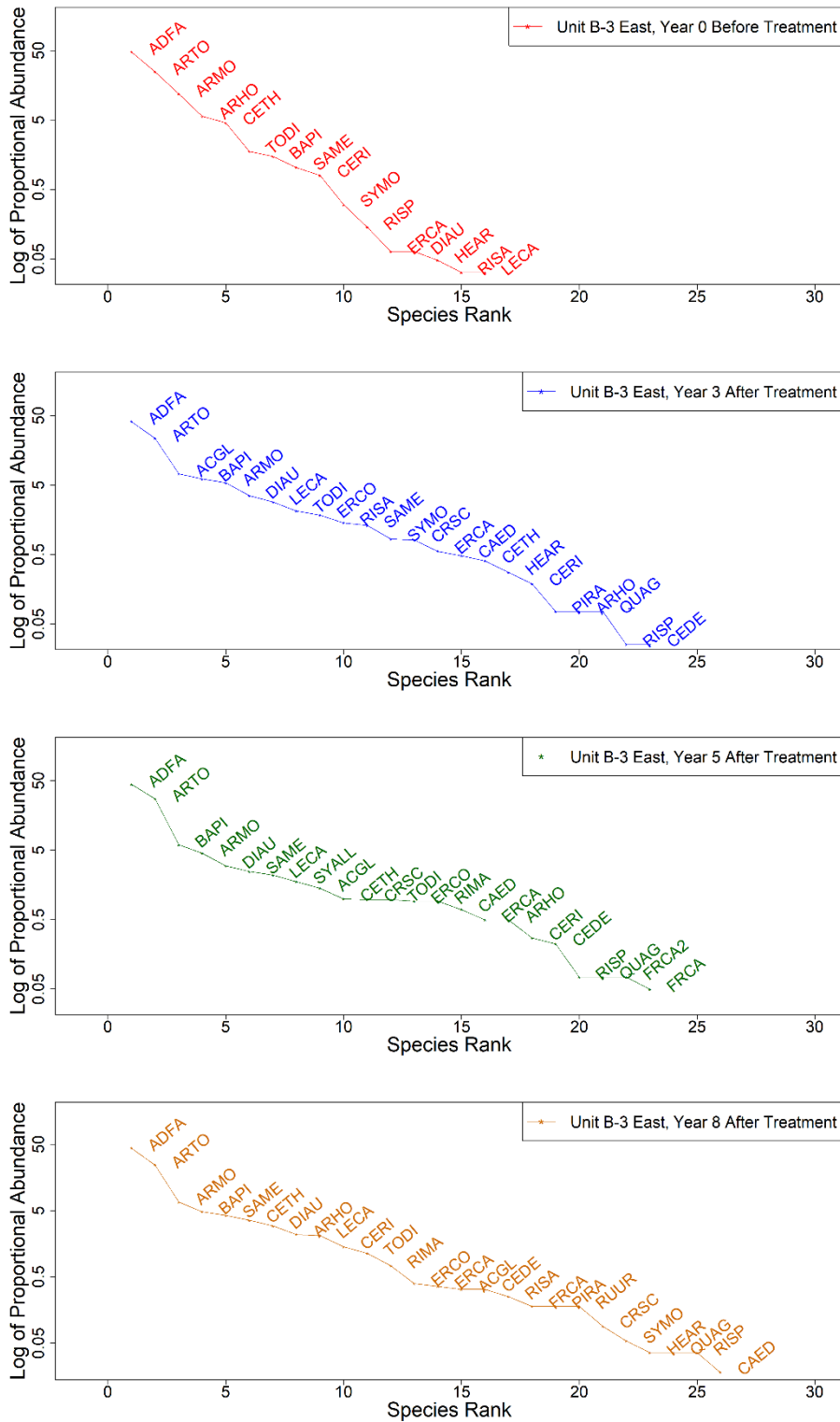
In Unit C, dominance structure and species abundances responded variably to treatment type (Figure 4-20 and Figure 4-21). The burned and masticated & burned transects were dominated by dwarf ceanothus, shaggy-barked manzanita, and peak rush-rose at varying abundances. The burned transects were dominated by dwarf ceanothus ( $C_{C, burned} CEDE = 35.9\%$ ) and shaggy-barked manzanita ( $C_{C, burned} ARTO = 32.3\%$ ) in Year 8. This is a large shift in relative abundances, where shaggy-barked manzanita was the most dominant in Baseline at 69.8% cover, and dwarf ceanothus made up only 0.25% of cover. The burned transects also had no loss of species over the years and had six new species emerge since Baseline, including the appearance of Eastwood's goldenbush in Year 8. The masticated & burned transects were dominated by peak rush-rose ( $C_{C, M\&B} CRSC = 29.2\%$ ) and dwarf ceanothus ( $C_{C, M\&B} CEDE = 24.1\%$ ) in Year 8. This is another large shift in dominance structure, as neither of these species were present in Baseline, when the transects were dominated by shaggy-barked manzanita ( $C_{C, M\&B} ARTO = 45.8\%$ ) and chamise ( $C_{C, M\&B} ADFA = 24.6\%$ ). The masticated transects in Unit C were consistently dominated by shaggy-barked manzanita in all survey years ( $C_{C, masticated, Baseline} ARTO = 58.7\%$ ,  $C_{C, masticated, Year 8} ARTO = 57.1\%$ ), with chamise maintaining its position as the second or third most abundant across the years ( $C_{C, masticated, Baseline} ADFA = 18.9\%$ ,  $C_{C, masticated, Year 8} ADFA = 17.9\%$ ). Creeping snowberry (*Symphoricarpos mollis*) also played a prominent role in community structure as the second and third most abundant species in Year 3 and Year 8, respectively, after being absent in Baseline and Year 5 (Figure 4-20 and Figure 4-21).



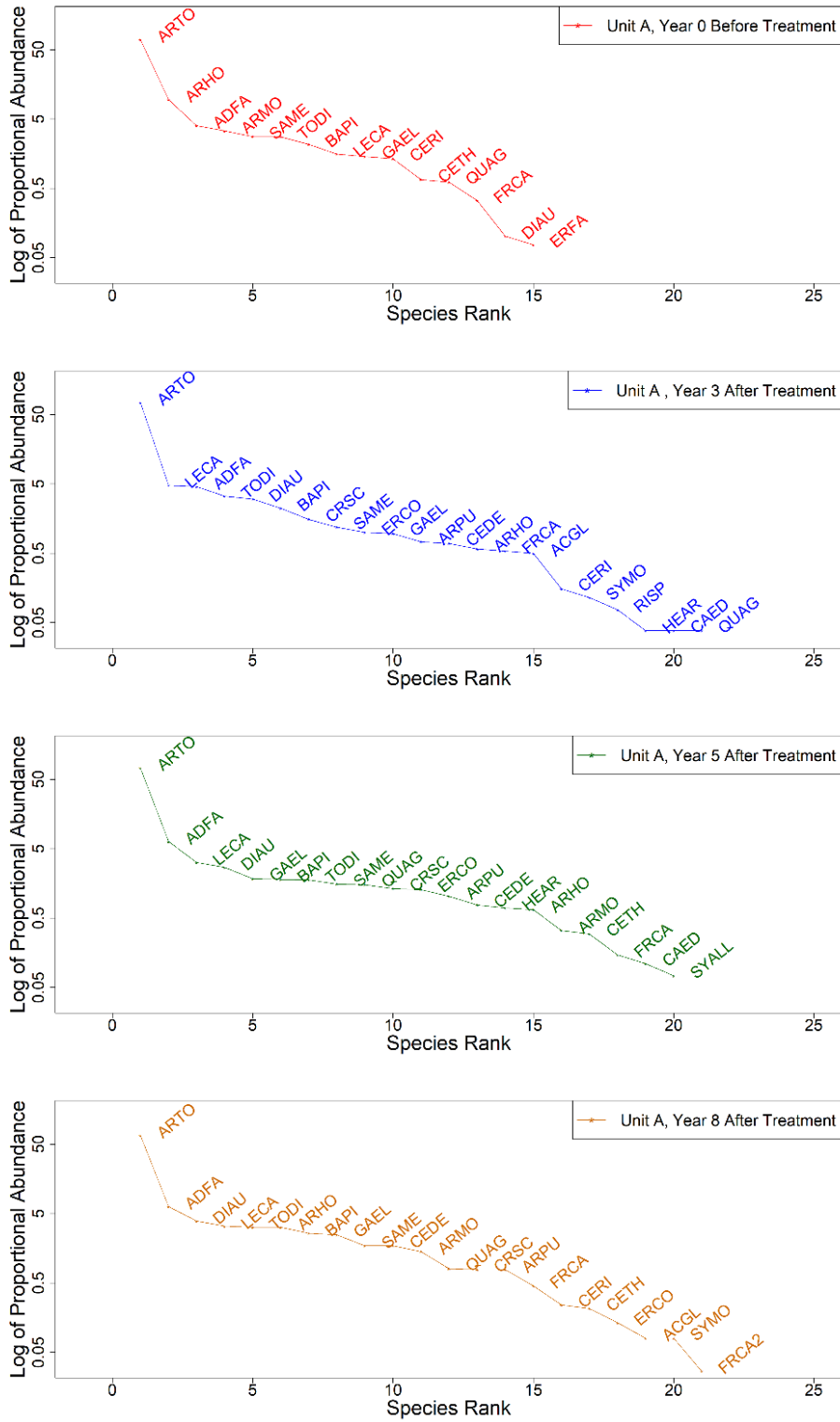
**Figure 4-14. BLM Area B Unit B-2A rank abundance curves between Baseline (1998) and Year 8 (2025). New species present in Year 8 included deerweed, dwarf ceanothus, peak rush-rose, golden yarrow, and poison oak. Species present in Baseline surveys but absent in Year 8 were Toro manzanita, toyon, and fuchsia-flowered gooseberry (*Ribes speciosum*). Three masticated transects were analyzed in Unit B-2A. Y-axis is on a log<sub>10</sub> scale.**



**Figure 4-15. BLM Area B Unit B-3 West rank abundance curves between Baseline (2015) and Year 8 (2025). New species present in Year 8 surveys included deerweed, golden yarrow, iceplant, dwarf ceanothus, mock heather (*Ericameria ericoides*), Eastwood’s goldenbush, and California coffeeberry (*Frangula (Rhamnus) californica*). One species present in Baseline surveys but absent in Year 8 was fuchsia-flowered gooseberry. Six masticated transects were analyzed in Unit B-3 West. Y-axis is on a log<sub>10</sub> scale.**



**Figure 4-16. BLM Area B Unit B-3 East rank abundance curves between Baseline (2015) and Year 8 (2025). New species present in Year 8 surveys included deerweed, iceplant, dwarf ceanothus, peak rush-rose, golden yarrow, California coffeeberry, Monterey pine (*Pinus radiata*), coast live oak, chaparral currant (*Ribes malvaceum*), and California blackberry (*Rubus ursinus*). There were no species observed in Baseline that were absent in Year 8. Eleven masticated transects were analyzed in Unit B-3 East. Y-axis is on a log<sub>10</sub> scale.**



**Figure 4-17. BLM Area B Unit A Southern CL rank abundance curves between Baseline (2015) and Year 8 (2025). New species present in Year 8 surveys included deerweed, sandmat manzanita, dwarf ceanothus, peak rush-rose, golden yarrow, California flannelbush (*Fremontodendron californicum*), and creeping snowberry. Eastwood’s goldenbush was the only species present in Baseline but absent in Year 8. Seven masticated transects were analyzed in Unit A Southern CL. Y-axis is on a log<sub>10</sub> scale.**

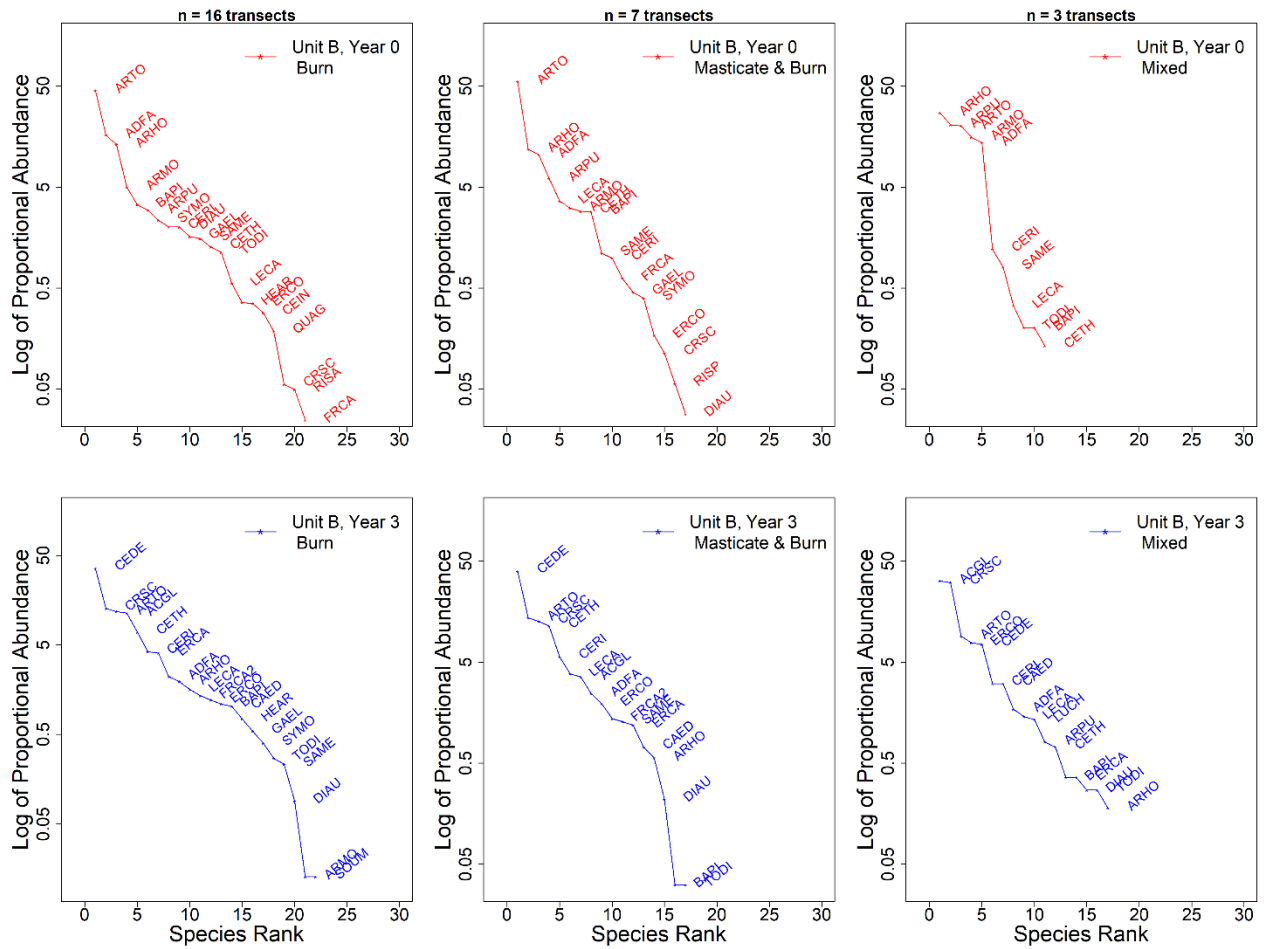
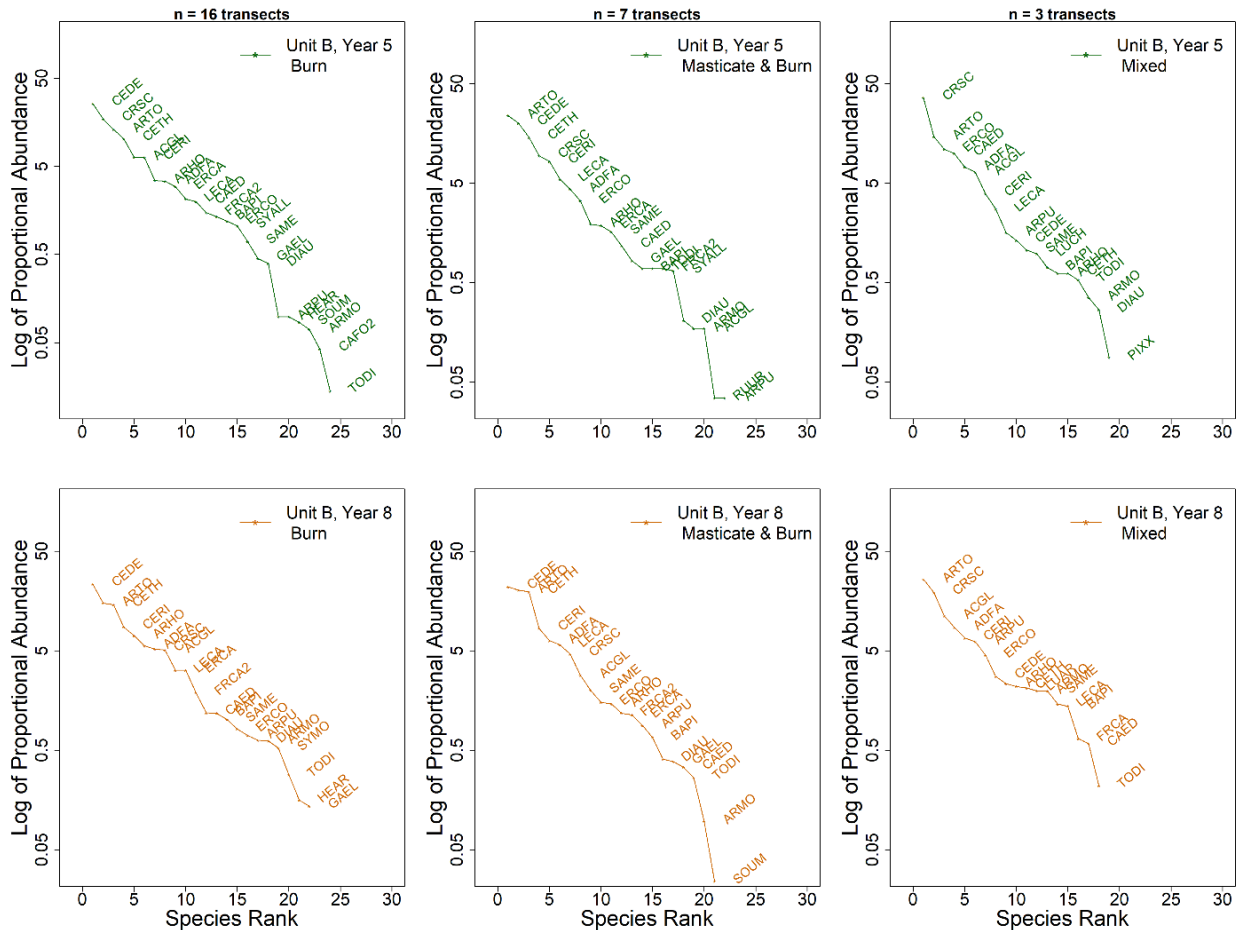
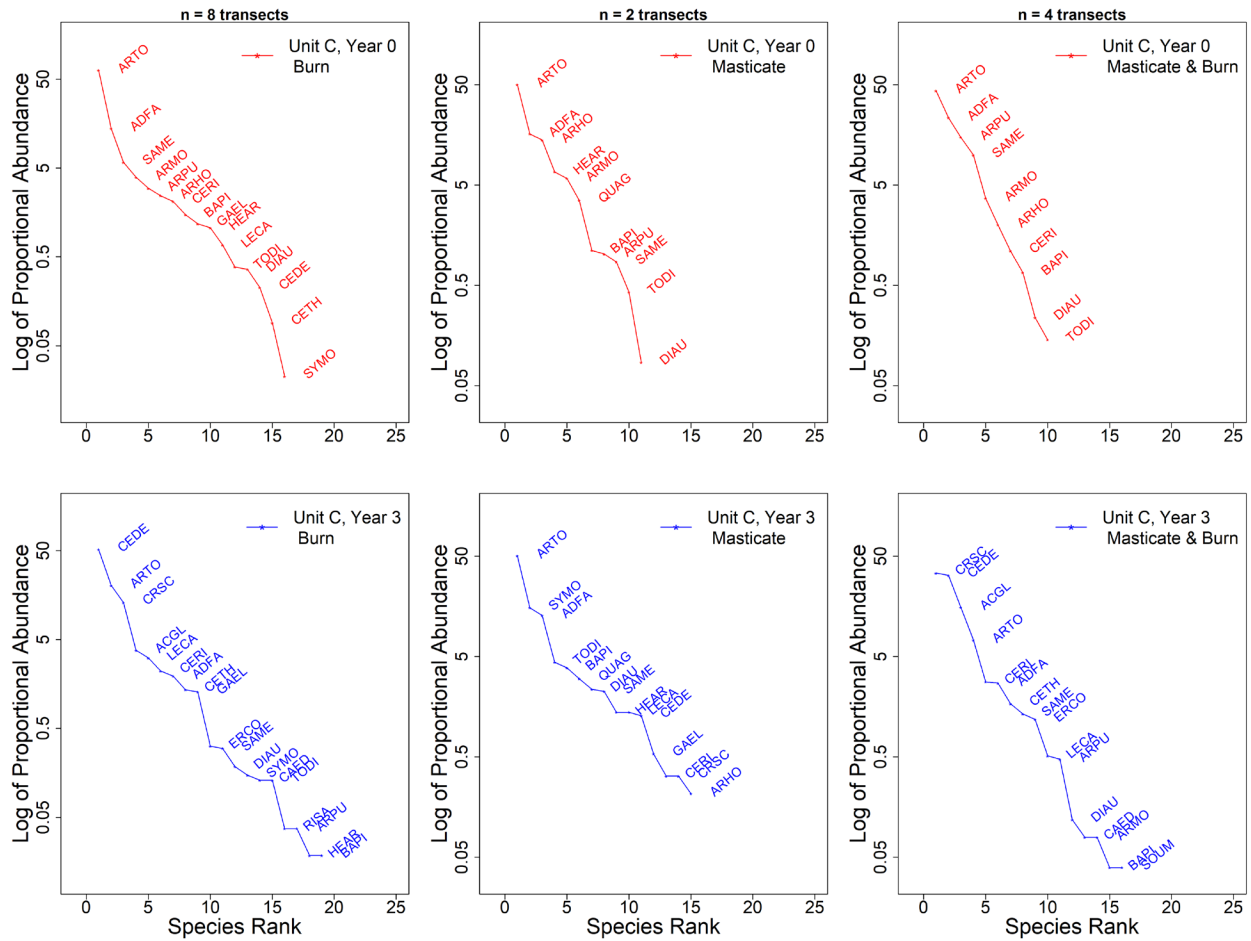


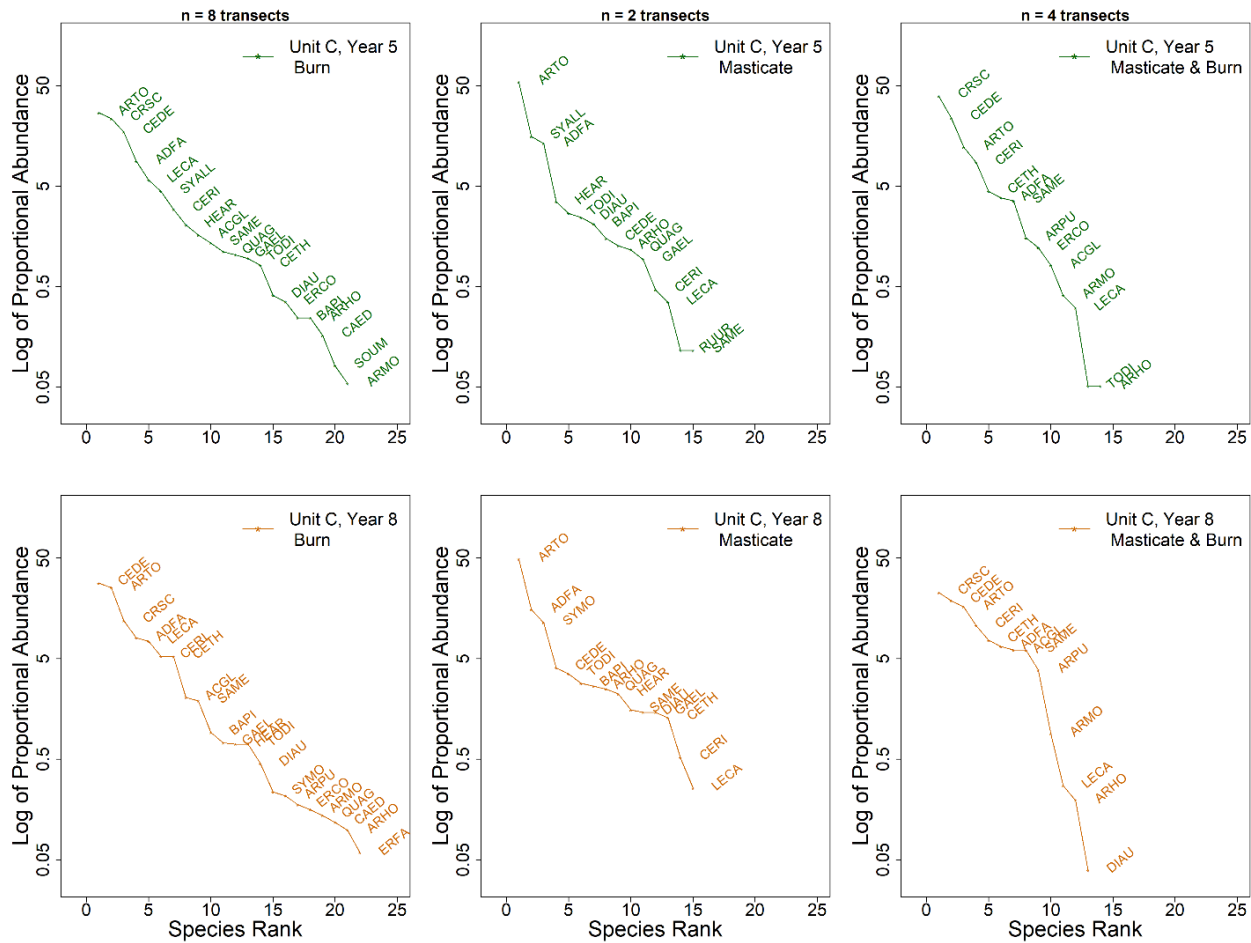
Figure 4-18. BLM Area B Unit B rank abundance curves [Part 1] between Baseline (2015 & 1999 [n=2]) and Year 3 (2020). See Figure 4-19 for Year 5 and Year 8 RACs and Baseline to Year 8 comparisons.



**Figure 4-19. BLM Area B Unit B rank abundance curves [Part 2] between Year 5 (2022) and Year 8 (2025).** The left column represents burned transects (n=16). New species present along Year 8 burned transects compared to Baseline included deerweed, iceplant, dwarf ceanothus, yerba santa (*Eriodictyon californicum*), and California flannelbush. Species that were present in Baseline but absent in Year 8 include coast whitehorn (*Ceanothus incanus*), California coffeeberry, coast live oak, and red flowering currant (*Ribes sanguineum*). The middle column represents masticated & burned transects (n=7). New species present along Year 8 masticated & burned transects compared to Baseline included deerweed, iceplant, dwarf ceanothus, yerba santa, California flannelbush, blue witch (*Solanum umbelliferum*), and poison oak. Species that were present during Baseline but absent in Year 8 include California coffeeberry, fuchsia-flowered gooseberry, and creeping snowberry. The right column represents mixed treatment transects (n=3). New species present along Year 8 mixed treatment transects compared to Baseline included deerweed, iceplant, dwarf ceanothus, peak rush-rose, golden yarrow, California coffeeberry, and yellow bush lupine (*Lupinus arboreus*). There were no species observed in Baseline that were absent in Year 8. Sixteen burned, seven masticated & burned, and three mixed transects were analyzed in Unit B. Y-axis is on a log10 scale.



**Figure 4-20. BLM Area B Unit C rank abundance curves [Part 1] between Baseline (2015) and Year 3 (2020). See Figure 4-21 for Year 5 and Year 8 RACs and Baseline to Year 8 comparisons.**



**Figure 4-21. BLM Area B Unit C rank abundance curves [Part 2] between Year 5 (2022) and Year 8 (2025).** The left column represents burned transects (n=8). New species present along Year 8 burned transects compared to Baseline included deerweed, iceplant, peak rush-rose, golden yarrow, Eastwood’s goldenbush, and coast live oak. There were no species observed in Baseline that were absent in Year 8. The middle column represents masticated transects (n=2). New species present along Year 8 masticated transects compared to Baseline included dwarf ceanothus, Monterey ceanothus, blue blossom, coastal silk tassel (*Garrya elliptica*), pitcher sage (*Lepechinia calycina*), and creeping snowberry. Species that were present during Baseline but absent in Year 8 included Toro manzanita and sandmat manzanita. The right column represents masticated & burned transects (n=4). New species present along Year 8 masticated & burned transects compared to Baseline included deerweed, dwarf ceanothus, blue blossom, peak rush-rose, and pitcher sage. Species present in Baseline but absent Year 8 included coyote brush and poison oak. Eight burned, two masticated, and four masticated & burned transects were analyzed in Unit C. Y-axis is on a log<sub>10</sub> scale.

#### 4.4.1.4 HMP Shrub Species

Generally, HMP shrub species present in Year 8 units varied by unit and treatment, with most persisting from Baseline through Year 8, with a few notable exceptions (Table 4-21). Of the HMP shrub species, only Monterey ceanothus and Toro manzanita were present in Unit B-2A in Baseline (1998) (Figure 4-22). Monterey ceanothus declined sharply from 7.7% cover in Baseline to less than 1% in Years 3 and 5, followed by a partial recovery to 1.13% in Year 8 – approximately 15% of Baseline value. In contrast, Toro manzanita was the third most abundant species in Unit B-2A in Baseline ( $C_{B-2A, \text{Baseline ARMO}} = 11.3\%$ ), which declined to 0% by Year 3, showed minimal presence in Year 5 (0.2%), and was not present in Year 8 (Figure 4-22).

In Unit B-3 West, Monterey ceanothus and sandmat manzanita were present in Baseline (2015) and persisted through Year 8 (Figure 4-23). Monterey ceanothus started at relatively low abundance (1.0% cover) in Baseline and increased in each survey year to 7.8% cover in Year 8. Sandmat manzanita was the most abundant species in Baseline, then experienced a sharp decline in Year 3, a minor increase in Year 5, and returned as the third most abundant species in Year 8 ( $C_{B-3W, \text{Baseline ARPU}} = 39.7\%$ ,  $C_{B-3W, \text{Year 3 ARPU}} = 1.6\%$ ,  $C_{B-3W, \text{Year 5 ARPU}} = 3.7\%$ ,  $C_{B-3W, \text{Year 8 ARPU}} = 18.9\%$ ) (Table 4-21). Eastwood's goldenbush was not present in Baseline or Year 3 but emerged at 0.1% cover in both Year 5 and Year 8, suggesting gradual colonization of disturbance-adapted species (Figure 4-23).

In Unit B-3 East, Monterey ceanothus, Toro manzanita, and Hooker's manzanita were present in Baseline (2015) and all persisted into Year 8 (Figure 4-24). Monterey ceanothus was present at 0.9% cover in Baseline, declined in Year 3, and recovered into Year 8 to 1.4% cover. Hooker's manzanita was present at 6.5% cover in Baseline, declined in Years 3 and 5 and recovered to 34% of Baseline conditions ( $C_{B-3E, \text{Year 8 ARHO}} = 2.2\%$ ) (Table 4-21). Toro manzanita was the third most abundant species in Baseline ( $C_{B-3E, \text{ARMO}} = 13.6\%$ ), then declined at a similar rate to other species in Years 3 and 5, and returned to its position as the third most abundant species in Year 8 ( $C_{B-3E, \text{ARMO}} = 6.8\%$ ) (Figure 4-24).

In Unit A Southern CL, Monterey ceanothus, Toro manzanita, Hooker's manzanita, and Eastwood's goldenbush were present in Baseline (2015) at various abundances (Figure 4-25). Monterey ceanothus started at mid- to-low abundance in Baseline ( $C_{A, \text{Baseline CER1}} = 1.5\%$ ), declined to 0% cover in Year 5, and recovered in Year 8 to 20% of Baseline abundance ( $C_{A, \text{Year 8 CER1}} = 0.3\%$ ). Toro manzanita accounted for 3.8% of cover in Baseline, declined to 0% in Year 3, but recovered in Years 5 and 8 ( $C_{A, \text{Year 8 ARMO}} = 1.5\%$ ). Hooker's manzanita was the second most abundant species in Baseline at 10.6% cover, declined to less than 1% in Years 3 and 5, and recovered to 3.4% in Year 8 (32% of Baseline abundance). Eastwood's goldenbush was present at 0.1% cover in Baseline (present on one transect), then declined to 0% in Year 3 and did not recover in the following years (Table 4-21). Sandmat manzanita, which was not present in Baseline, appeared in Year 3 at 0.5% cover and increased to 0.8% cover in Year 8 (Figure 4-25). Overall, Unit A Southern CL experienced pronounced fluctuations in species abundance over the monitoring period, with four of the five species increasing from or declining to 0% cover at least once. Notably, three of these species recovered from these lows, demonstrating resilience and capacity for recovery post-mastication.

Across all treatment types in Unit B, all HMP shrub species that were present in Baseline (1999 & 2015) continued to persist in Year 8; these included Monterey ceanothus, Toro manzanita, Hooker's Manzanita, and sandmat manzanita (Figure 4-26). Monterey ceanothus exhibited moderate relative abundance across all treatment types in Baseline ( $C_{B, \text{burned, Baseline CER1}} = 2.0\%$ ,  $C_{B, \text{M\&B, Baseline CER1}} = 1.0\%$ ,  $C_{B, \text{mixed, Baseline CER1}} = 1.2\%$ ). Notably, Monterey ceanothus was the only species to see an increase in

abundance consistently in Years 3, 5, and 8, reaching 10.3% in burned, 10.0% in masticated & burned, and 6.1% in mixed transects by Year 8. Toro manzanita followed a similar pattern across all treatment types, declining from Baseline in Years 3 and 5, and recovering at low levels in Year 8. Toro manzanita had the sharpest decline in the mixed transects, from 15.4% cover in Baseline to 0% in Year 3, and recovering to 12% of Baseline conditions ( $C_{B, \text{mixed}, \text{Year 8 ARMO}} = 1.8\%$ ) by Year 8. In the burned and masticated & burned transects, Toro manzanita started at 5.1% and 3.1% cover (respectively) in Baseline and recovered to 15% and 4% (respectively) of Baseline abundance by Year 8 (Table 4-21).

Across all treatment types in Unit B, Hooker's manzanita was among the top three most abundant species in Baseline ( $C_{B, \text{burned}, \text{Baseline ARHO}} = 13.3\%$ ,  $C_{B, \text{M\&B}, \text{Baseline ARHO}} = 11.9\%$ ,  $C_{B, \text{mixed}, \text{Baseline ARHO}} = 26.9\%$ ). All transects saw a sharp decline in Year 3, then increased in Years 5 and 8 ( $C_{B, \text{burned}, \text{Year 8 ARHO}} = 8.4\%$ ,  $C_{B, \text{M\&B}, \text{Year 8 ARHO}} = 1.7\%$ ,  $C_{B, \text{mixed}, \text{Year 8 ARHO}} = 2.1\%$ ). Hooker's manzanita had the strongest recovery amongst the burned transects, recovering to 64% of Baseline abundance. Sandmat manzanita had moderate to high abundance in Baseline across all treatment types in Unit B, with the highest abundance occurring in the mixed transects ( $C_{B, \text{burned}, \text{Baseline ARPU}} = 3.0\%$ ,  $C_{B, \text{M\&B}, \text{Baseline ARPU}} = 6.1\%$ ,  $C_{B, \text{mixed}, \text{Baseline ARPU}} = 20.5\%$ ). In the burned and masticated & burned transects, sandmat manzanita declined to 0% cover in Year 3, and returned in Years 5 and 8 ( $C_{B, \text{burned}, \text{Year 8 ARPU}} = 0.8\%$ ,  $C_{B, \text{M\&B}, \text{Year 8 ARPU}} = 1.1\%$ ) (Table 4-21). In the mixed transects, sandmat manzanita decreased to 0.6% in Year 3, and recovered to 28% of Baseline conditions by Year 8 ( $C_{B, \text{mixed}, \text{Year 8 ARPU}} = 5.7\%$ ) (Figure 4-26).

In the burned and masticated & burned transects in Unit C, all HMP shrub species that were present in Baseline (2015) persisted into Year 8 (Figure 4-27). This includes Monterey ceanothus, Toro manzanita, Hooker's manzanita, and sandmat manzanita. In the masticated transects, only Hooker's manzanita persisted into Year 8. Similar to the trends seen in Unit B, Monterey ceanothus increased in abundance in most survey years across all treatment types in Unit C. In the burned transects, Monterey ceanothus increased gradually from 2.3% cover in Baseline to 6.7% in Year 8. In the masticated & burned transects, Monterey ceanothus increased from 1.2% cover in Baseline to 3.6% in Year 3, and continued to increase through Year 8 ( $C_{C, \text{M\&B}, \text{Year 8 CER1}} = 13.6\%$ ). Monterey ceanothus was not present in Baseline in the masticated transects but emerged at 0.3% cover in Year 3 and marginally increased to 0.6% in Year 8. Across all treatment types, Toro manzanita was present at moderate relative abundance in Baseline ( $C_{C, \text{burned}, \text{Baseline ARMO}} = 4.4\%$ ,  $C_{C, \text{M\&B}, \text{Baseline ARMO}} = 3.9\%$ ,  $C_{C, \text{masticate}, \text{Baseline ARMO}} = 6.8\%$ ). In the burned transects, Toro manzanita declined to 0% cover in Year 3 and recovered to 5% of baseline cover by Year 8 ( $C_{C, \text{burned}, \text{Year 8 ARMO}} = 0.2\%$ ). In the masticated & burned transects, Toro manzanita declined to 0.1% cover in Year 3 and increased through Year 8 to 30% of Baseline cover ( $C_{C, \text{M\&B}, \text{Year 8 ARMO}} = 1.2\%$ ) (Table 4-21). In the masticated transects, Toro manzanita declined to 0% in Year 3 and has not reappeared since (Figure 4-27).

In Unit C, Hooker's manzanita was present at similar abundances and followed similar trajectories across the burned and masticated & burned transects (Figure 4-27). Across both treatments, Hooker's manzanita declined from Baseline ( $C_{C, \text{burned}, \text{Baseline ARHO}} = 2.7\%$ ,  $C_{C, \text{M\&B}, \text{Baseline ARHO}} = 2.1\%$ ) to 0% in Year 3 and recovered slightly by Year 8 to 5% (burned) and 12% (masticated & burned) of Baseline conditions ( $C_{C, \text{burned}, \text{Year 8 ARHO}} = 0.1\%$ ,  $C_{C, \text{M\&B}, \text{Year 8 ARHO}} = 0.3\%$ ). In the masticated transects, Hooker's manzanita was present at 16.4% cover, declined sharply in Year 3 to 0.2%, and recovered to 3.1% in Year 8. Sandmat manzanita declined across all treatments, but exhibited the strongest recovery in the masticated & burned transects. In burned transects, sandmat manzanita declined from 3.3% in Baseline to 0.1% and 0% in Years 3 and 5, and increased to 0.3% in Year 8 (9% of Baseline cover). In the masticated & burned transects, sandmat manzanita was the third most abundant species in Baseline ( $C_{C, \text{M\&B}, \text{Baseline ARPU}} = 15.7\%$ ), declined to 0.6% cover in Year 3 and recovered to 32% of Baseline cover by Year 8 ( $C_{C, \text{M\&B}, \text{Year 8}}$

ARPU = 5.0%). In the masticated transects, sandmat manzanita declined from 1.2% cover in Baseline to 0% in Year 3 and did not recover in the following years (Table 4-21). It should be noted that there are only two masticated transects in Unit C – a low sample size for capturing a representative snapshot of community composition. Lastly, Eastwood’s goldenbush was absent in Baseline across all treatment types, but it emerged on one burned transect in Year 8, resulting in an average 0.8% cover (Figure 4-27).

**Table 4-21. HMP shrub cover between Baseline and Year 8 for BLM Area B Units B-2A, B-3 West, B-3 East, Unit A Southern CL, B, and C.** Green text indicates the value increased and red text indicates the value decreased from the previous monitoring year.

Unit	Treatment	Species	Baseline	Year 3	Year 5	Year 8
Unit B-2A	Masticate	CERI	7.7%	0.33%	0.1%	1.1%
		ARMO	11.3%	0.0%	0.2%	0.0%
		ARHO	0.0%	0.0%	0.0%	0.0%
		ARPU	0.0%	0.0%	0.0%	0.0%
		ERFA	0.0%	0.0%	0.0%	0.0%
Unit B-3 West	Masticate	CERI	1.0%	2.4%	3.5%	7.8%
		ARMO	0.0%	0.0%	0.0%	0.0%
		ARHO	0.0%	0.0%	0.0%	0.0%
		ARPU	39.7%	1.6%	3.7%	18.9%
		ERFA	0.0%	0.0%	0.1%	0.1%
Unit B-3 East	Masticate	CERI	0.9%	0.1%	0.2%	1.4%
		ARMO	13.6%	3.9%	3.3%	6.8%
		ARHO	6.5%	0.1%	0.4%	2.2%
		ARPU	0.0%	0.0%	0.0%	0.0%
		ERFA	0.0%	0.0%	0.0%	0.0%
Unit A - CL	Masticate	CERI	1.5%	0.1%	0.0%	0.3%
		ARMO	3.8%	0.0%	0.3%	1.5%
		ARHO	10.6%	0.4%	0.5%	3.4%
		ARPU	0.0%	0.5%	0.8%	0.8%
		ERFA	0.1%	0.0%	0.0%	0.0%
Unit B	Burn	CERI	2.0%	4.1%	5.6%	10.3%
		ARMO	5.1%	0.0%	0.1%	0.7%
		ARHO	13.3%	1.9%	3.1%	8.4%
		ARPU	3.0%	0.0%	0.1%	0.8%
		ERFA	0.0%	0.0%	0.0%	0.0%
Unit B	Masticate & Burn	CERI	1.0%	5.1%	6.8%	10.0%
		ARMO	3.1%	0.0%	0.1%	0.1%
		ARHO	11.9%	0.5%	1.6%	1.7%
		ARPU	6.1%	0.0%	0.0%	1.1%
		ERFA	0.0%	0.0%	0.0%	0.0%

Unit	Treatment	Species	Baseline	Year 3	Year 5	Year 8
Unit B	Mixed	CERI	1.2%	2.3%	2.9%	6.1%
		ARMO	15.4%	0.0%	0.3%	1.8%
		ARHO	26.9%	0.1%	0.5%	2.1%
		ARPU	20.5%	0.6%	1.2%	5.7%
		ERFA	0.0%	0.0%	0.0%	0.0%
Unit C	Burn	CERI	2.3%	3.0%	2.7%	6.7%
		ARMO	4.4%	0.0%	0.1%	0.2%
		ARHO	2.7%	0.0%	0.2%	0.1%
		ARPU	3.3%	0.1%	0.0%	0.3%
		ERFA	0.0%	0.0%	0.0%	0.1%
Unit C	Masticate & Burn	CERI	1.2%	3.6%	8.4%	13.6%
		ARMO	3.9%	0.1%	0.4%	1.2%
		ARHO	2.1%	0.0%	0.1%	0.3%
		ARPU	15.7%	0.6%	1.5%	5.0%
		ERFA	0.0%	0.0%	0.0%	0.0%
Unit C	Masticate	CERI	0.0%	0.3%	0.4%	0.6%
		ARMO	6.8%	0.0%	0.0%	0.0%
		ARHO	16.4%	0.2%	1.1%	3.1%
		ARPU	1.2%	0.0%	0.0%	0.0%
		ERFA	0.0%	0.0%	0.0%	0.0%

Across species, recovery trajectories reflected clear differences in life-history strategies and responses to both fire and climate. Monterey ceanothus showed the most rapid and consistent increases—often exceeding Baseline by Years 5–8—consistent with ceanothus’ well-documented ability to recruit strongly following disturbance and during wet years (Coale et al., 2011; Keeley et al., 2024). These gains also likely benefited from above-normal water years 2022-2023 and 2023-2024, which are known to enhance ceanothus germination and growth (NCEI NOAA, 2025). In contrast, the three manzanitas (Toro, Hooker’s, and sandmat) exhibited sharp initial declines after treatment, which is consistent with the ecology of many manzanita species that function as obligate seeders lacking basal burls, and are therefore top-killed by disturbance and regenerate primarily via post-disturbance seedling recruitment (Keeley et al., 2024). Recovery was strongest in burned or burn-associated treatments where heat, ash, and reduced competition typically create favorable microsites for recruitment in obligate-seeding manzanita species (Odion & Tyler, 2020). Sandmat manzanita showed modest increases by Year 8 in burned-associated units, aligning with its tendency to capitalize on post-fire resource pulses and reduced canopy cover (Coale et al., 2011). Meanwhile, Eastwood’s goldenbush remained scarce, reflecting experimental findings that fire inhibits germination and that the species’ seed viability is extremely low—meaning that neither burning nor mastication promotes meaningful post-treatment recruitment (Detka & Lambrecht, 2010). Overall, the species assemblage shows a consistent pattern: ceanothus responds strongly to disturbance and wet years, manzanitas recover primarily where fire occurs, and goldenbush remains limited due to its non-fire-recruiting strategy.

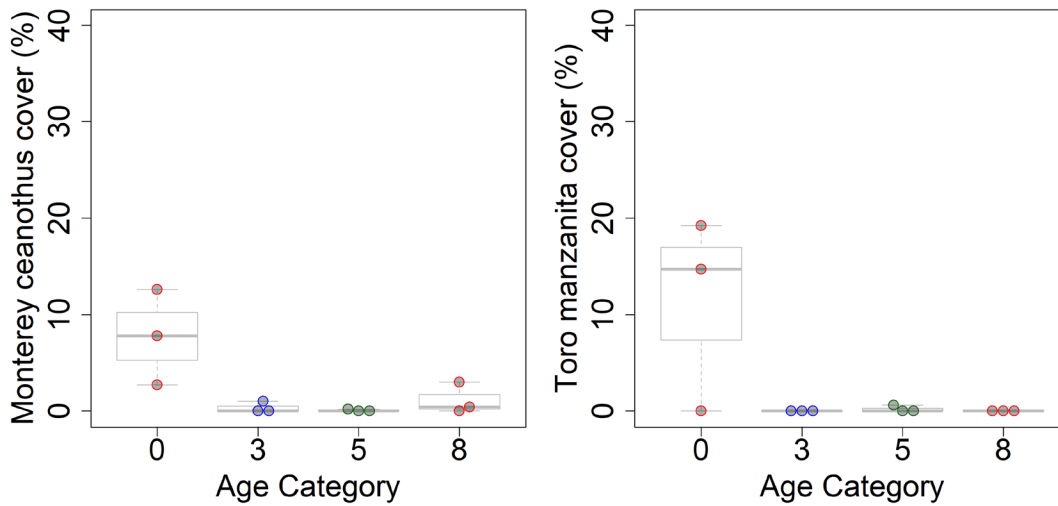


Figure 4-22. Unit B-2A HMP shrub species cover between Baseline (1998) and Year 8 (2025). The colored dots represent the percent cover of the respective species for each transect within an age category. The thick grey line in the box represents the median, the top and bottom edges of the central box represent the upper (3<sup>rd</sup>) and lower (1<sup>st</sup>) quartile, respectively. Three masticated transects were analyzed in Unit B-2A. Scales not equivalent.

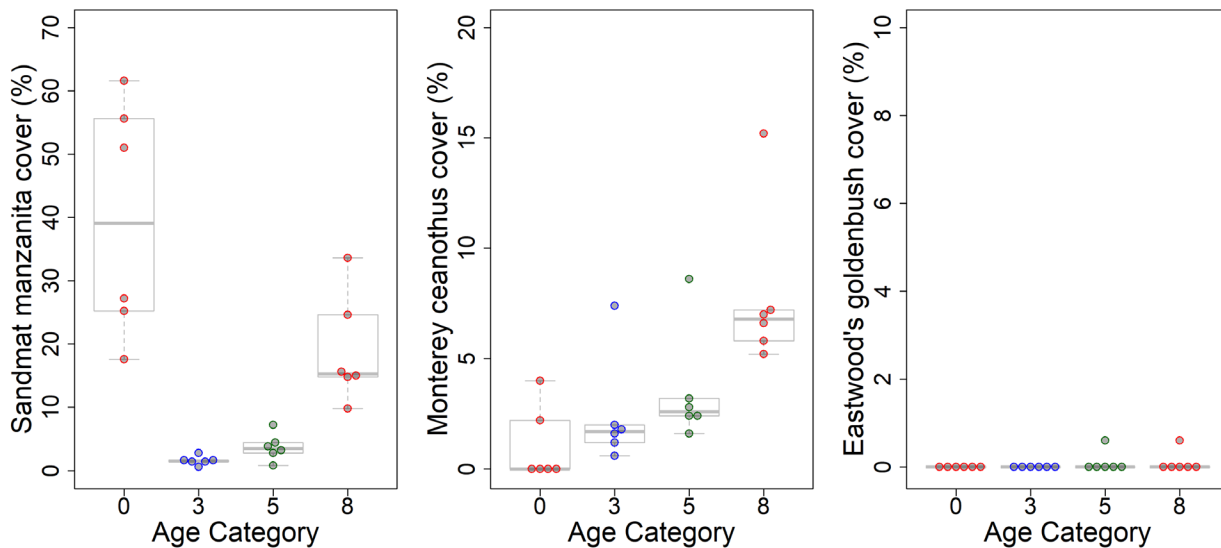
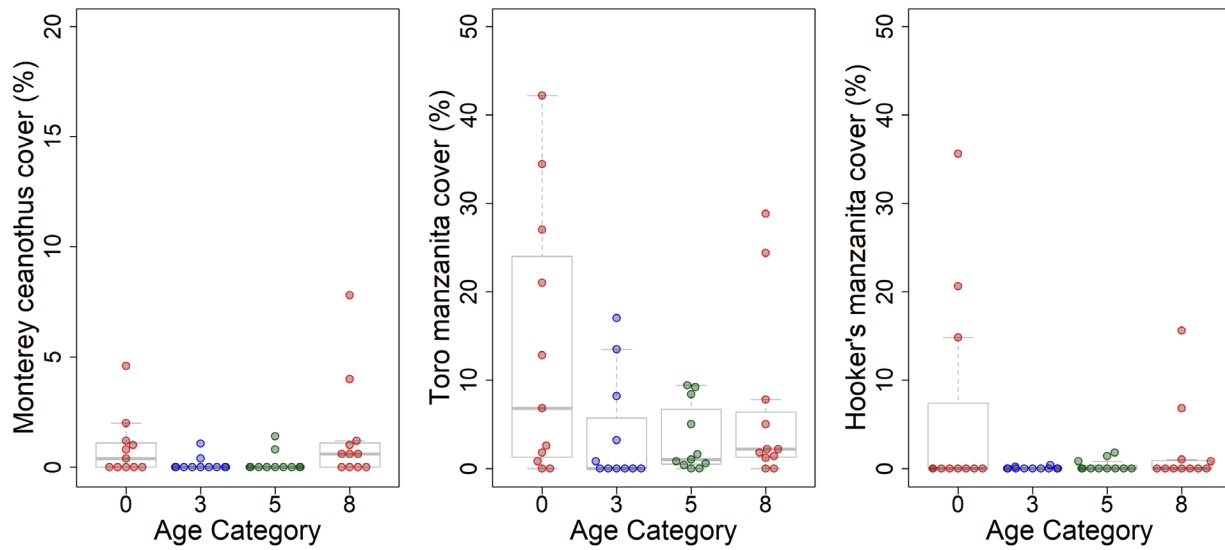
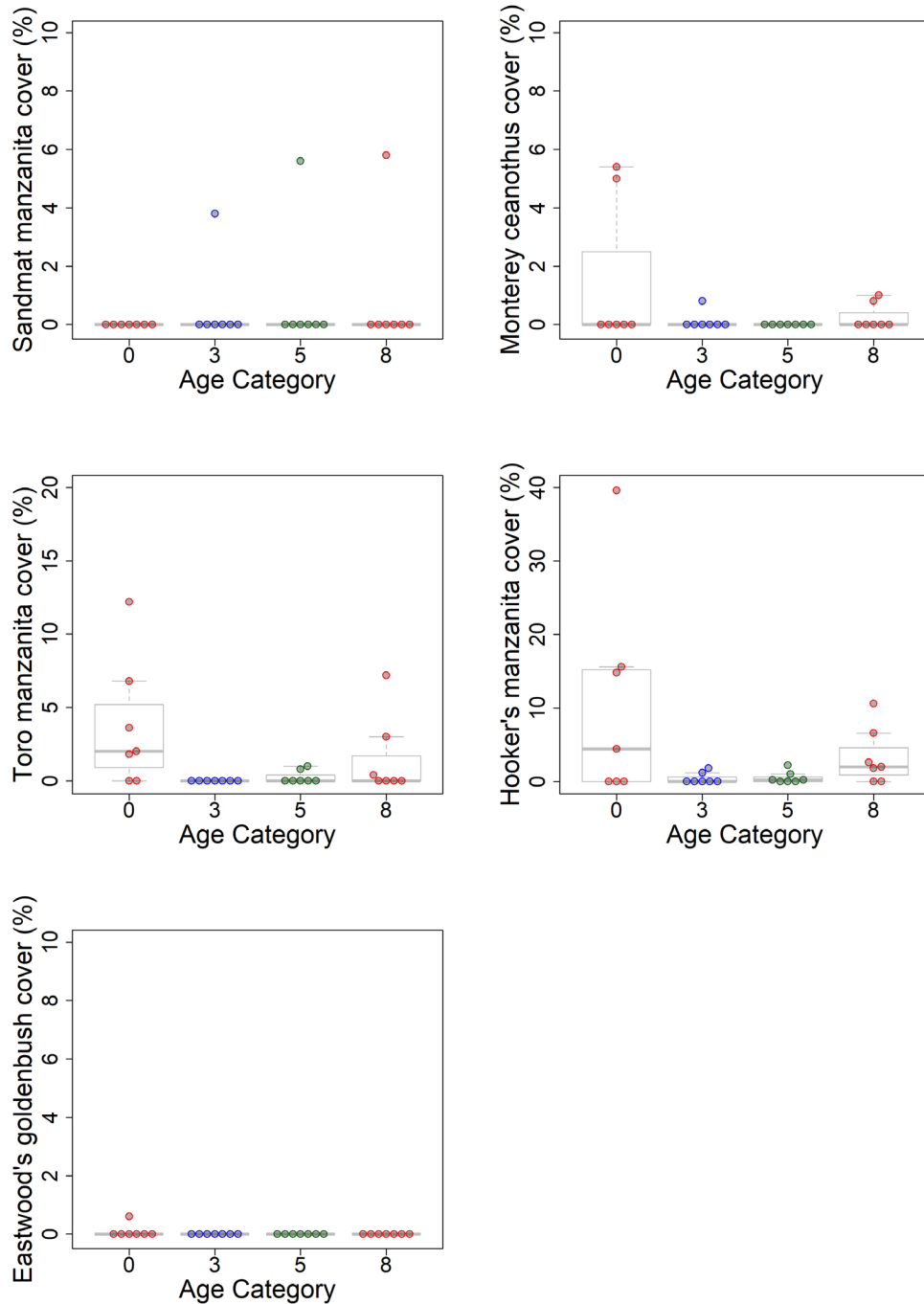


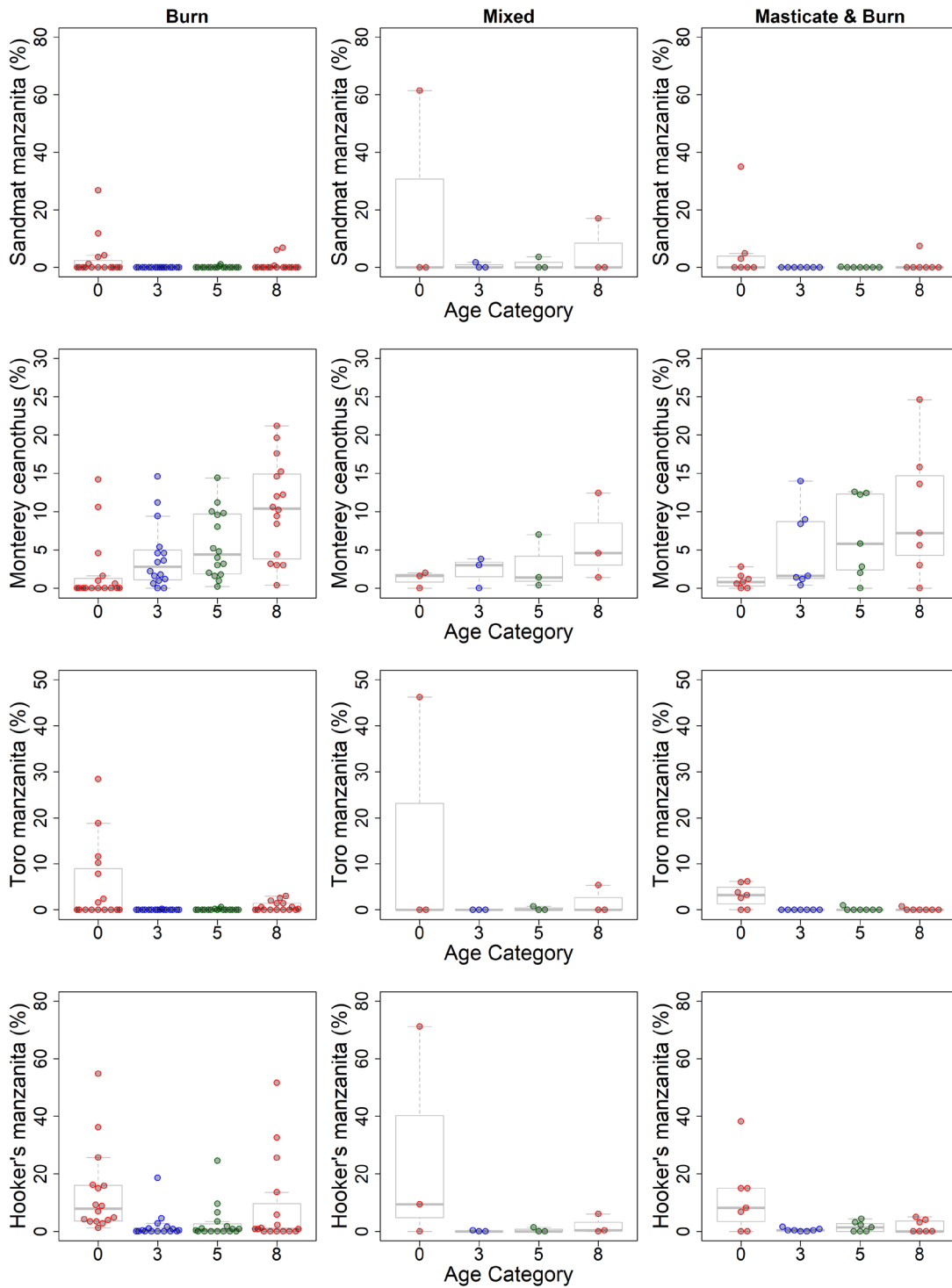
Figure 4-23. Unit B-3 West HMP shrub species cover between Baseline (2015) and Year 8 (2025). The colored dots represent the percent cover of the respective species for each transect within an age category. The thick grey line in the box represents the median, the top and bottom edges of the central box represent the upper (3<sup>rd</sup>) and lower (1<sup>st</sup>) quartile, respectively. Six masticated transects were analyzed in Unit B-3 West. Scales not equivalent.



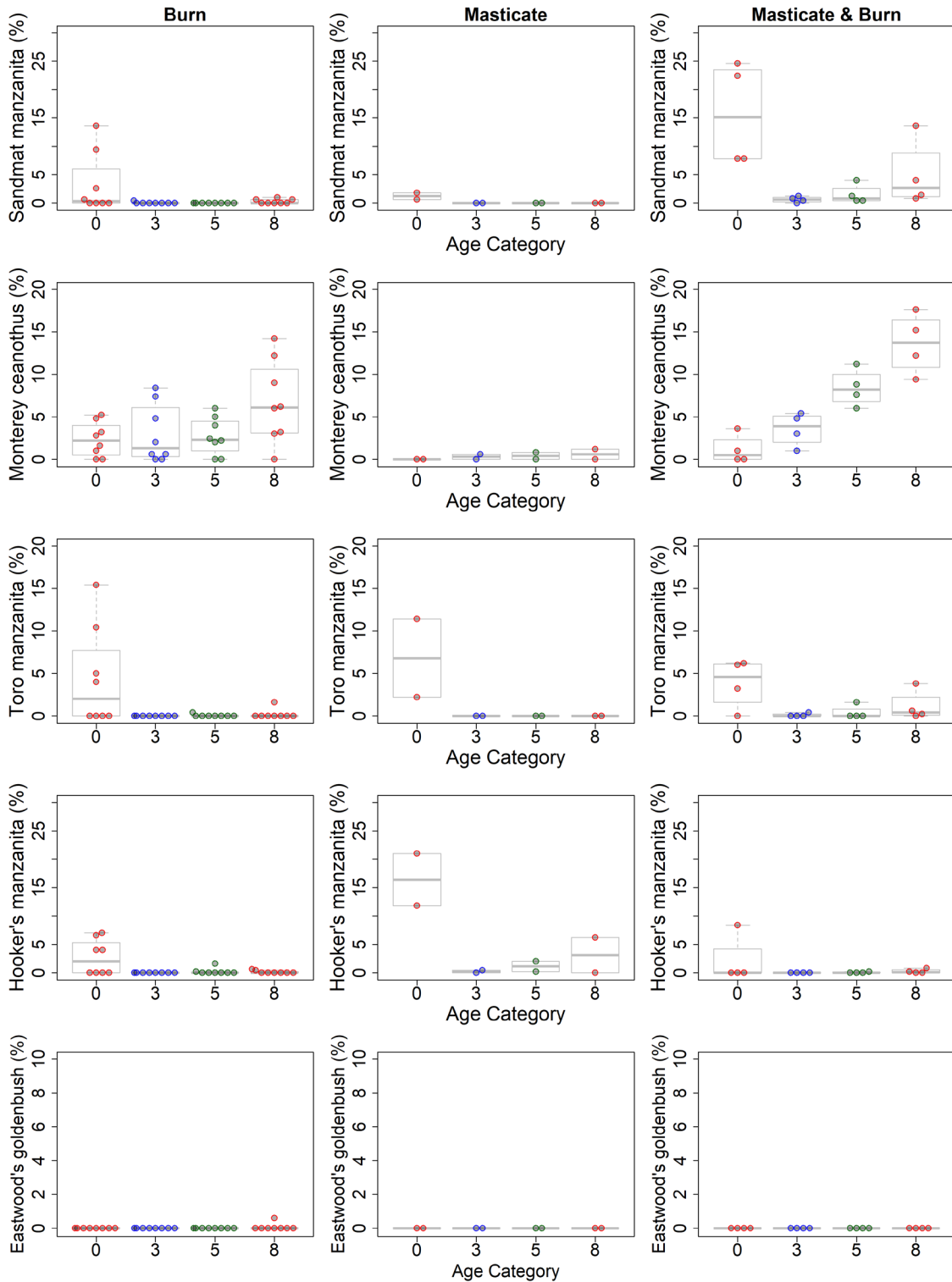
**Figure 4-24. Unit B-3 East HMP shrub species cover between Baseline (2015) and Year 8 (2025).** The colored dots represent the percent cover of the respective species for each transect within an age category. The thick grey line in the box represents the median, the top and bottom edges of the central box represent the upper (3<sup>rd</sup>) and lower (1<sup>st</sup>) quartile, respectively. Eleven masticated transects were analyzed in Unit B-3 East. Scales not equivalent.



**Figure 4-25. Unit A Southern CL HMP shrub species cover between Baseline (2015) and Year 8 (2025).** The colored dots represent the percent cover of the respective species for each transect within an age category. The thick grey line in the box represents the median, the top and bottom edges of the central box represent the upper (3<sup>rd</sup>) and lower (1<sup>st</sup>) quartile, respectively. Seven masticated transects were analyzed in Unit A Southern CL. Scales not equivalent.



**Figure 4-26. Unit B HMP shrub species cover between Baseline (1999 & 2015) and Year 8 (2025).** The colored dots represent the percent cover of the respective species for each transect within an age category. The thick grey line in the box represents the median, the top and bottom edges of the central box represent the upper (3<sup>rd</sup>) and lower (1<sup>st</sup>) quartile, respectively. Twenty-six transects representing burn, masticate & burn, and mixed treatments were analyzed in Unit B. Scales not equivalent.

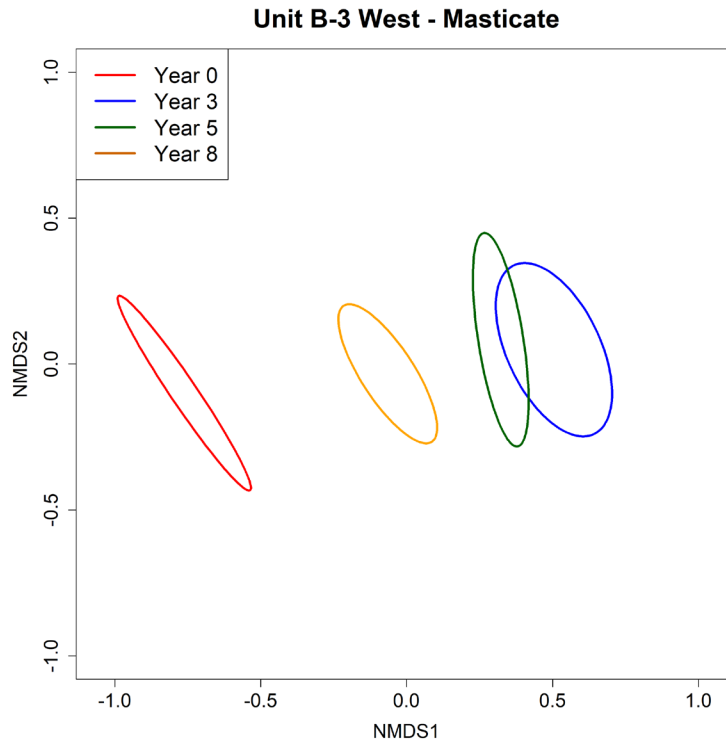


**Figure 4-27. Unit C HMP shrub species cover between Baseline (2015) and Year 8 (2025).** The colored dots represent the percent cover of the respective species for each transect within an age category. The thick grey line in the box represents the median, the top and bottom edges of the central box represent the upper (3<sup>rd</sup>) and lower (1<sup>st</sup>) quartile, respectively. Fourteen transects representing burn, masticate, and masticate & burn treatments were analyzed in Unit C. Scales not equivalent.

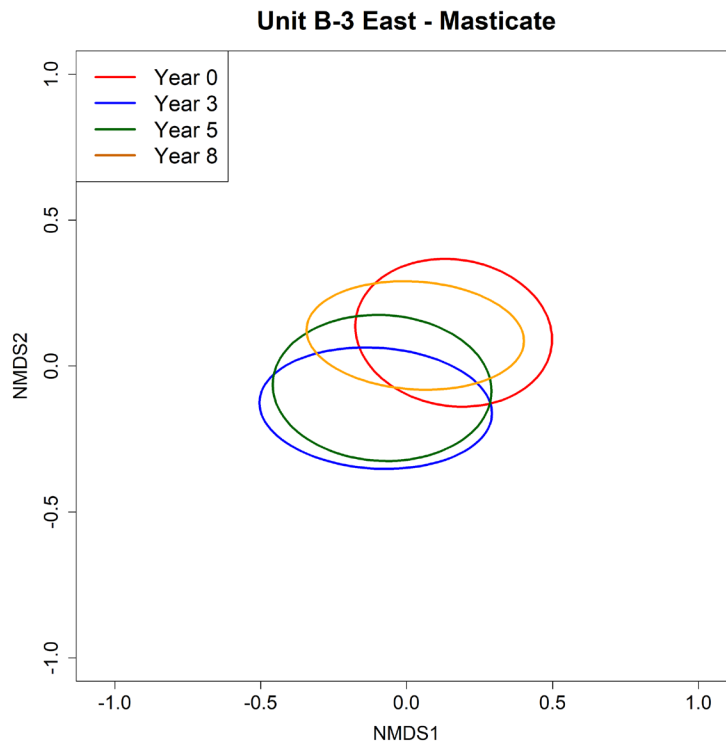
#### 4.4.1.5 NMDS Ordinations

Across all units, nonmetric multidimensional scaling (NMDS) ordinations reveal a consistent temporal pattern in post-treatment community trajectories. In most cases, Year 3 transects were displaced furthest from their Baseline ellipse location, reflecting the strong initial compositional shift immediately following treatment. By Year 5, communities generally moved closer to their Baseline positions, and by Year 8 most units showed substantial overlap or near-overlap between Year 8 and Baseline ellipses, indicating that community composition has returned to a near-Baseline state (Figure 4-28 through Figure 4-32). Masticated transects typically exhibited a quicker return toward Baseline conditions—their Year 5 and Year 8 ellipses generally aligned more closely with Baseline ellipses than did those of burned and masticated & burned transects. In contrast, burned transects often showed larger initial divergence from Baseline, which is consistent with greater species turnover and the larger increases in richness and diversity documented in the ANOVA and post-hoc analyses. These diversity-driven shifts appear to have temporarily pushed burned communities further from their Baseline composition in Years 3 and 5, before trending back toward Baseline by Year 8. Taken together, the NMDS results suggest that while both treatments ultimately move toward recovery, masticated areas tend to stabilize more rapidly, whereas burned areas exhibit larger early-stage compositional changes that resolve more gradually over time.

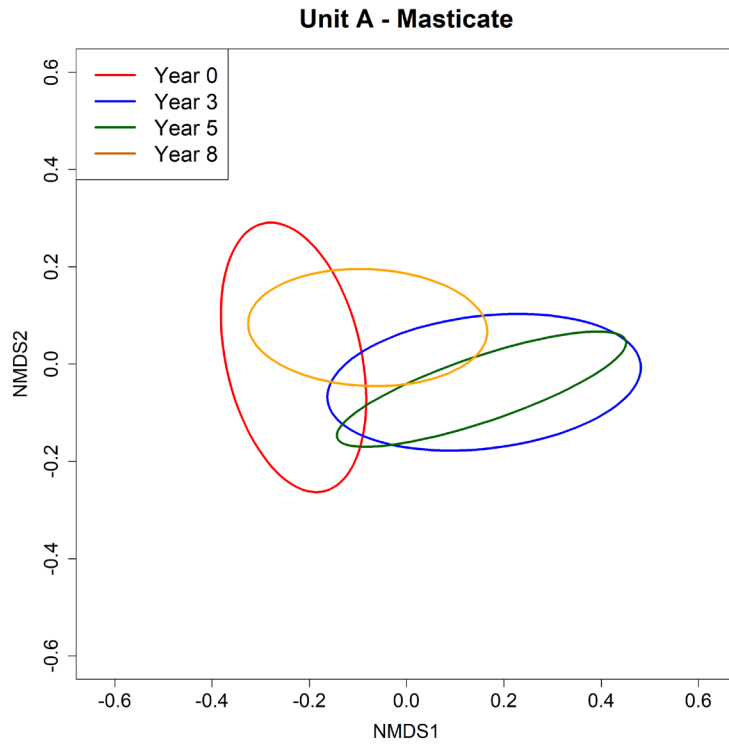
There was an insufficient number of transects in Unit B-2A ( $n=2$ ) to conduct an NMDS ordination or a Wilcoxon signed-rank test, therefore an ordination plot is not provided for this unit. To examine changes in community composition in Unit B-2A, community statistics (total cover, diversity, species richness, and species evenness) were evaluated over time. As shown in Figure 4-2, community composition in Unit B-2A generally exhibited the sharpest divergence from Baseline conditions in Year 3, followed by stabilization or a gradual return to Baseline conditions in Year 5 and Year 8. Total cover in Unit B-2A had a sharp decrease in Year 3 and a steady increase through Year 8; species richness fluctuated in Year 5 but exceeded Baseline richness in Year 8; and species evenness and diversity remained relatively stable throughout the years. Overall, Unit B-2A shows modest recovery toward Baseline conditions post-treatment.



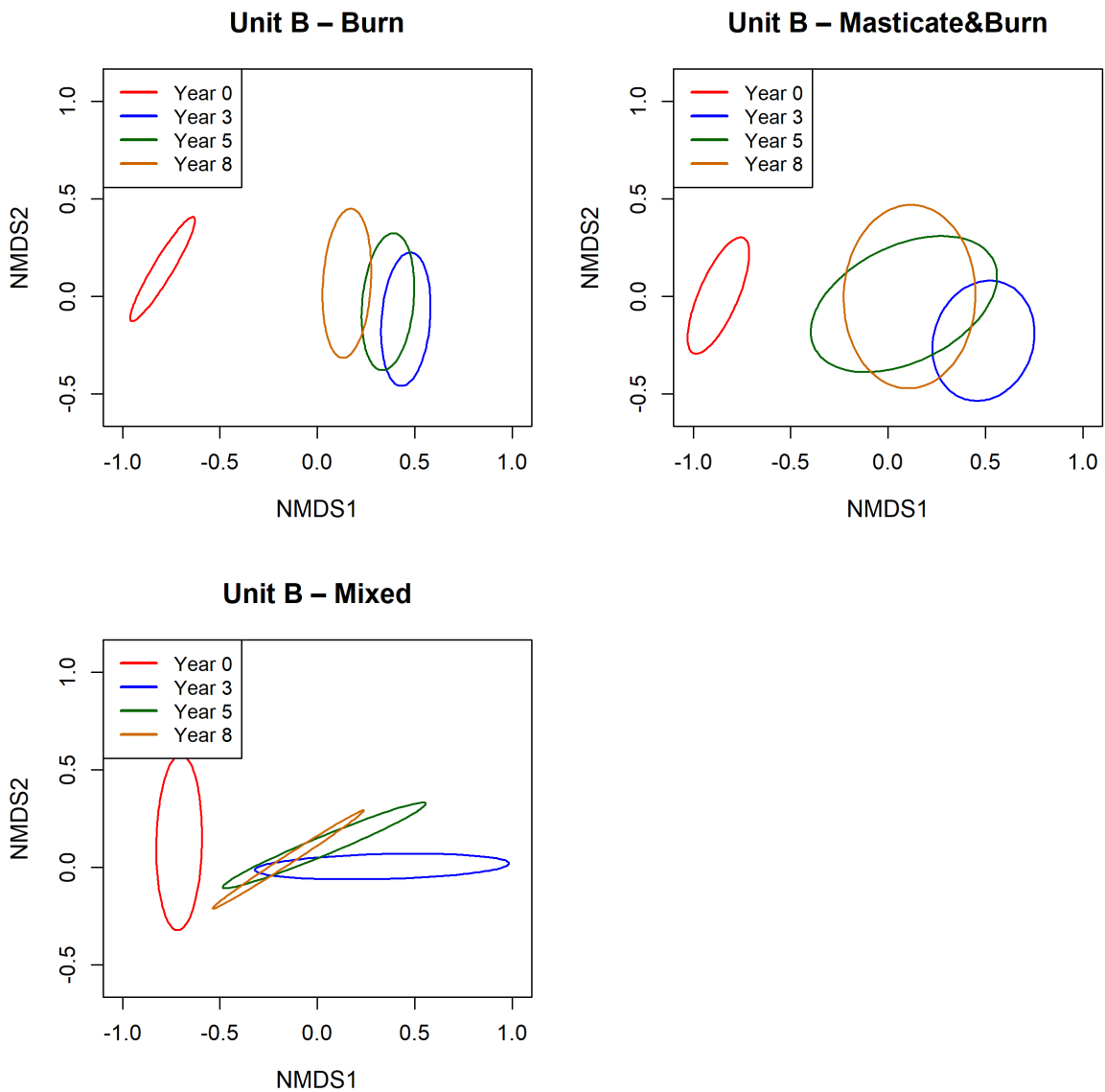
**Figure 4-28. NMDS ordination plot showing Unit B-3 West community composition changes between Baseline (2015), Year 3 (2020), Year 5 (2022), and Year 8 (2025). Six masticated transects were analyzed in Unit B-3 West.**



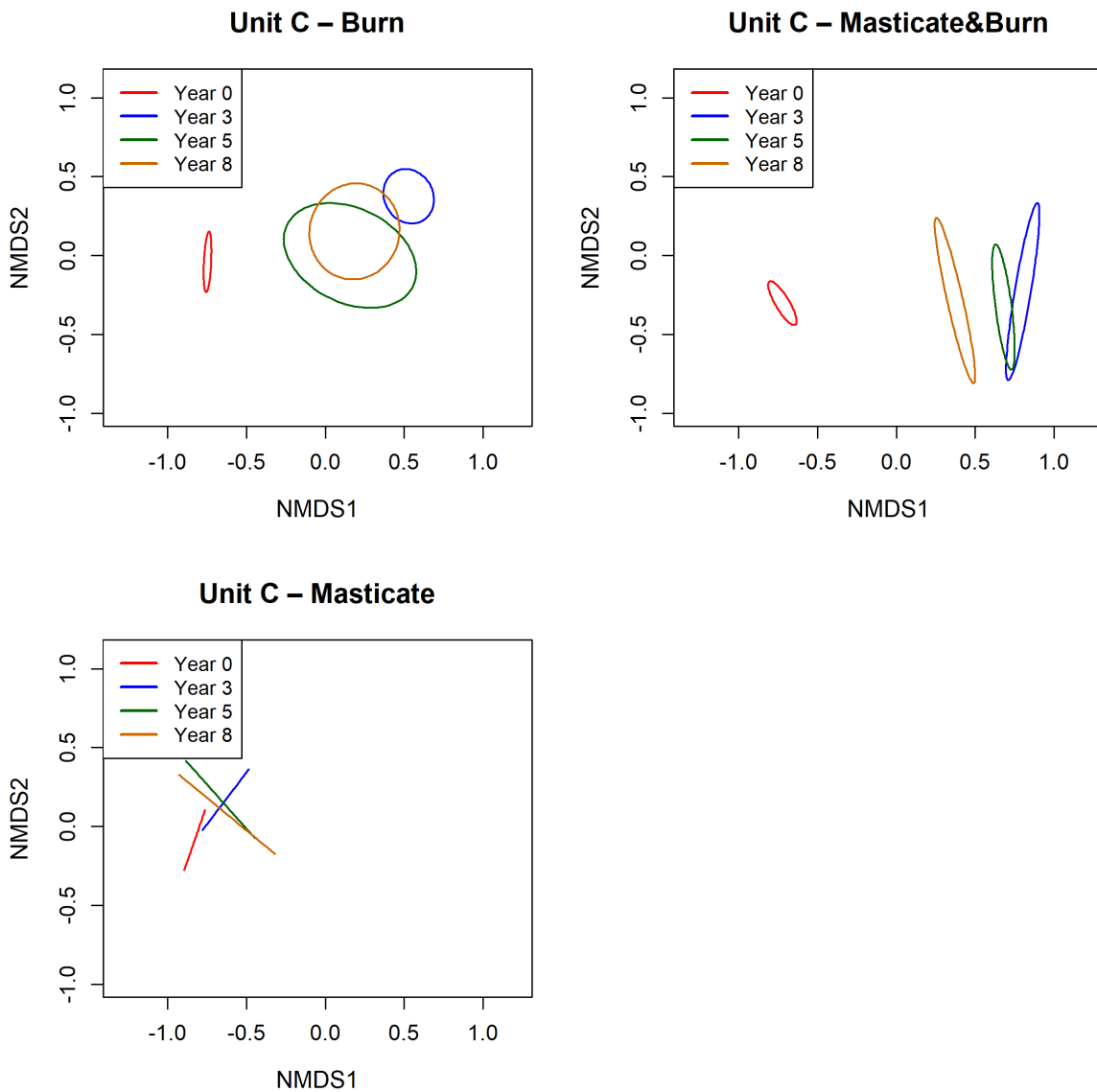
**Figure 4-29. NMDS ordination plot showing Unit B-3 East community composition changes between Baseline (2015), Year 3 (2020), Year 5 (2022), and Year 8 (2025). Eleven masticated transects were analyzed in Unit B-3 East.**



**Figure 4-30. NMDS ordination plot showing Unit A Southern CL community composition changes between Baseline (2015), Year 3 (2020), Year 5 (2022), and Year 8 (2025). Seven masticated transects were analyzed in Unit A Southern CL.**



**Figure 4-31. NMDS ordination plot showing Unit B community composition changes between Baseline (2015 and 1999 [2 transects]), Year 3 (2020), Year 5 (2022), and Year 8 (2025). Twenty-six transects were analyzed in Unit B (sixteen burned transects, seven masticated transects, and three mixed transects).**



**Figure 4-32. NMDS ordination plot showing Unit C community composition changes between Baseline (2015), Year 3 (2020), Year 5 (2022), and Year 8 (2025). Fourteen transects were analyzed in Unit C (eight burned transects, four masticated & burned transects, and two masticated transects).**

#### 4.4.2 Non-Native Annual Grass Monitoring

Non-native annual grassland cover was surveyed and mapped for BLM Area B Units B-3 West, A Southern CL, and B in 2025. Non-native annual grass cover increased sharply between Baseline and Year 3 and substantially decreased in Years 5 and 8 across all units (Appendix D, Figures D-1 through D-3). Estimated areas occupied by each density class in 2025 are summarized in Table 4-22. Density class 3 (>25% cover) accounted for the largest areal extent in Unit A Southern CL and Unit B, while density class 1 (1-5% cover) accounted for the largest areal extent in Unit B-3 West. Although Unit B-3 West exhibited the highest overall area occupied by annual grasses (40.4 acres), its distribution across density classes was relatively uniform, with similar acreages in each class. In contrast, Unit A Southern CL and Unit B had smaller total areas but showed pronounced concentration in density class 3 (>25% cover) (Table 4-22). It should be noted that there is an active eradication program for poison hemlock (*Conium maculatum*) in Unit B-3 West.

**Table 4-22. Estimated area occupied by annual grasses in BLM Area B Units B-3 West, A Southern Containment Line, and B between Baseline (2015) and Year 8 (2025).**

Cover Class	Baseline (acres)	Year 1 (acres)	Year 3 (acres)	Year 5 (acres)	Year 8 (acres)
<b>BLM Area B Unit B-3 West</b>					
1 (Low) = 1 - 5%	22.1	9.3	20.5	6.9	16.4
2 (Medium) = 6-25%	2.0	4.0	13.7	10.2	10.3
3 (High) = >25%	2.2	14.6	28.9	41.2	13.7
<b>Total Acreage</b>	<b>26.3</b>	<b>27.8</b>	<b>63.0</b>	<b>58.3</b>	<b>40.4</b>
<b>BLM Area B Unit A Southern CL</b>					
1 (Low) = 1 - 5%	13.8	2.4	12.0	5.9	0.9
2 (Medium) = 6-25%	0.5	2.0	5.5	2.0	0.7
3 (High) = >25%	0.5	13.1	22.2	18.1	15.1
<b>Total Acreage</b>	<b>14.8</b>	<b>17.5</b>	<b>39.7</b>	<b>26.0</b>	<b>16.7</b>
<b>BLM Area B Unit B</b>					
1 (Low) = 1 - 5%	3.6	14.6	29.9	27.5	5.4
2 (Medium) = 6-25%	7.3	15.6	13.2	13.4	7.0
3 (High) = >25%	8.9	10.0	54.6	30.1	27.0
<b>Total Acreage</b>	<b>19.8</b>	<b>40.3</b>	<b>97.6</b>	<b>71.0</b>	<b>39.4</b>

#### 4.4.3 Invasive and Non-Native Species Monitoring

Invasive species monitoring was conducted along the shrub transects in Year 8 units. Of the target invasive species, iceplant and pampas grass were observed in Year 8 units. There was one patch of iceplant observed in the central portion of BLM Area B Unit B-3 West; one small patch of iceplant observed in the central portion of BLM Area B Unit C; and one small patch of iceplant observed in the western portion of BLM Area B Unit B-3 East. Minor occurrences of iceplant were also incidentally encountered on shrub transects in Unit B-3 East but were not mapped due to their minimal size. In BLM Area B Unit B, there were two patches of pampas grass in the northern portion of the unit and fifteen patches of iceplant spread throughout the central and southern portions of the unit (Appendix E, Figures E-1 through E-4). Minor occurrences of non-native herbaceous cover were observed in all Year 8 units (Appendix G, Tables G-2 through G-7).

#### **4.4.4 Yadon's Piperia**

No piperia were observed in any Year 8 units.

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## 5 CONCLUSIONS

### 5.1 HMP Annuals

Results of HMP annual species surveys on multiple units over varying amounts of time since treatment have shown that these species tend to persist following vegetation clearance activities. In 2025, comparison to Baseline was conducted for all age classes. Treatment-related effects were not assessed in Unit 5 since only mastication was applied.

Observed densities and frequency of occurrence of HMP annual species were generally consistent with historical Baseline conditions. Monterey gilia and Monterey spineflower seed set, abundance, and survival are highly complex. Both species are generally correlated with rainfall; however, their survival mechanisms differ – Monterey gilia is negatively affected by herbivory and its survival mechanism is a persistent seed bank, while Monterey spineflower is not affected by herbivory and its survival mechanism is its ability to readily germinate under optimal conditions (Fox *et al.*, 2006; Fox, 2007). Considering these life strategies, the densities of these species would be expected to fluctuate between years in response to rainfall, seed bank conditions, or herbivory. Seaside bird’s-beak densities are also variable (Watts *et al.*, 2010). The cause of this variability is highly complex and can be the result of several factors including variable reproduction and germination rates, host availability, herbivory or seed predation, or competition from invasive species.

#### 5.1.1 HMP Annuals Success Criteria

The Protocol identified success criteria for re-establishment of HMP annual species following treatment (Tetra Tech and EcoSystems West, 2015b). Comparisons of survey data to these success criteria are provided in Table 5-1. The HMP annual success criterion requires that frequency of occurrence is at least 90% of the Baseline frequency in any post-treatment year. Monterey gilia and seaside bird’s-beak were not present in Baseline or any survey year; while Monterey spineflower was present in 100% of grids in all survey years. Additionally, bare ground cover in Year 3 (30.3%) exceeded Baseline conditions (6.0%), consistent with the expectations for early post-treatment recovery. Therefore, all HMP annuals success criteria were met for the 2025 survey year (Table 5-1).

**Table 5-1. Evaluation of success criteria for HMP annuals.**

Year Class	Units	Criterion	Baseline	2025	Pass/Fail
Year 3	Unit 5	Frequency of Monterey gilia > 90% of Baseline frequency	$f_{Unit\ 5} = 0.0$	$f_{Unit\ 5} = 0.0$	Pass
		Frequency of seaside bird’s-beak > 90% of Baseline frequency	$f_{Unit\ 5} = 0.0$	$f_{Unit\ 5} = 0.0$	Pass
		Frequency of Monterey spineflower > 90% of Baseline frequency	$f_{Unit\ 5} = 1.0$	$f_{Unit\ 5} = 1.0$	Pass
		Bare ground > Baseline condition	$C_{Unit\ 5} = 6.0\%$	$C_{Unit\ 5} = 30.3\%$	Pass

## 5.2 Shrub Community

Results of the shrub community structure analyses are broadly consistent with previous monitoring efforts, which have documented recurring post-disturbance recovery patterns since 2010 (Tetra Tech and EcoSystems West, 2011–2015a; Burleson, 2016–2020; Terracon, 2021–2024). By Year 8, community structure and composition in the monitored units showed continued progression toward Baseline assemblages, as reflected in NMDS ordinations and field observations. At the same time, treatment-specific differences in recovery pathways were evident. Although both burn and mastication treatments resulted in substantial shrub recovery by Year 8, the pathway of recovery differed between treatments. Burn-associated treatments functioned as stronger demographic resets, whereas mastication-only treatments more often retained pre-treatment dominance structure through resprouting of existing shrubs. Disturbance type therefore influenced not only the rate of recovery but also the competitive structure of recovering chaparral communities. Unit-specific responses further indicate that treatment effects interact with Baseline composition, seedbank structure, and microsite conditions, shaping canopy reassembly during the monitoring period.

Rank abundance curves (RACs) further corroborated differences in recovery pathways among treatment types. Burn treatments were associated with restructuring of canopy dominance, marked by sustained establishment of fire-stimulated taxa, particularly ceanothus species. In contrast, mastication-only transects largely retained pre-treatment dominance and recovered structurally through resprouting, with shaggy-barked manzanita and chamise remaining dominant. In Unit C burn transects, for example, dominance shifted from shaggy-barked manzanita (69.8% at Baseline) to dwarf ceanothus (35.9% by Year 8), reflecting not only increased richness in early post-treatment years but also reorganization of canopy dominance. In contrast, mastication removed aboveground biomass without fully resetting demographic structure. Recovery under mastication occurred with limited compositional reorganization and relatively low recruitment of new canopy-dominant taxa, indicating preservation of pre-treatment competitive hierarchies.

Responses among HMP shrub species varied across treatments and units, reflecting differences in life history strategies, seedbank condition, and post-disturbance competitive environments. Monterey ceanothus exhibited the most consistent recruitment in burn-influenced areas, whereas Toro manzanita and sandmat manzanita showed more variable or limited recovery across treatments, particularly in mastication-only transects. Although most HMP shrubs present at Baseline persisted through Year 8, several species were not detected in specific units, including Toro manzanita in Unit B-2A, Eastwood's goldenbush in Unit A Southern CL, and Toro and sandmat manzanita in the masticated transects of Unit C. These absences may reflect insufficient seedbank reserves, variable germination success, or post-establishment competitive dynamics. However, detectability limitations of line-intercept transects (including slight year-to-year variation in transect alignment) may also contribute to non-detection of low-density or small-stature species. Collectively, these patterns suggest that post-fire recruitment does not benefit all obligate seeders equally, and that species traits, site context, competitive timing, and resource availability influence which taxa ultimately establish and persist during canopy reassembly.

Across Year 8 units, shrub communities exhibited consistent post-disturbance recovery patterns, though via differing ecological pathways. Burn-only and combined burn & mastication treatments functioned as stronger demographic resets, favoring seedbank-driven recruitment and reshuffling of competitive hierarchies, including sustained establishment of disturbance-adapted taxa (e.g., dwarf ceanothus and peak rush-rose) alongside measurable increases in Monterey ceanothus. In contrast, mastication-only treatments supported structural continuity and progression toward Baseline composition through

resprouting of dominant shrubs, but with comparatively weaker recruitment responses among certain obligate-seeding HMP species.

Together, these results indicate that both treatment types contribute to long-term recovery, but through different ecological mechanisms. Burn treatments are associated with greater dominance reconfiguration through recruitment, whereas mastication more often restores similar structural composition through resprouting. These differing responses suggest complementary ecological outcomes that may be aligned with specific management objectives.

### 5.2.1 Shrub Community Success Criteria

The Protocol identified success criteria for recovery of the shrub community in Years 3 and 5, however, no units required Year 5 monitoring in 2025. Comparisons of survey data to these success criteria are provided in Table 5-2. The bare ground and invasive plant cover criteria were met, with bare ground exceeding Baseline conditions and invasive plant cover not exceeding 10% on any one transect. The only criterion not met in Year 3 was the native sub-shrub (peak rush-rose, deerweed, and golden yarrow) cover criterion, which requires native-sub shrub cover to exceed 20% in Year 3 units. Unit 5 contained 7.7% sub-shrub cover by Year 3, failing to meet this criterion. The 20% criterion was derived from observations of previous surveys and generally aligns with the expected successional response to treatment; however, some variation of this response can be expected (Tetra Tech and EcoSystems West, 2015b). While sub-shrub cover in Unit 5 did not comply with established criteria, these values were similar to those in Year 3 masticated units in previous years. Additionally, sub-shrub cover tends to be higher in units exposed to burn treatment or a combination of mastication and burning (Terracon, 2022). Therefore, the sub-shrub cover in Unit 5 aligns with vegetation responses commonly observed following mastication-only treatments.

**Table 5-2. Evaluation of success criteria for shrub communities in Year 3.**

Year	Unit	Criterion	Rationale	Pass/Fail
Year 3	5	Native sub-shrubs > 20% cover	$C_{\text{Unit 5}} = 7.7\%$	Fail
		Bare ground > baseline conditions	Figure 3-6	Pass
		Invasive plants < 10% cover	$C_{\text{Unit 5}} = 0.2\%$ (max)	Pass

The Protocol established more detailed success criteria for recovery of the shrub community in Year 8, based on Baseline shrub associations. A series of three major shrub associations were identified based on dominant species present in Baseline surveys. If a transect was dominated by shaggy-barked manzanita in Baseline, it was considered plant Association A; if dominated by chamise, it was considered plant Association B, and if dominated by sandmat manzanita, it was considered plant Association C/D. The number of transects that fall within each shrub association is indicated in the table below. Recovery was predicted to differ among these associations (Tetra Tech and EcoSystems West, 2015b). Therefore, the Year 8 success criteria are evaluated based on the plant association of the Baseline transects; in addition to assessments of bare ground and invasive species cover. Shrub community success criteria were evaluated for all Year 8 units and results are presented in Table 5-3.

The only criterion not met in 2025 was the frequency of Monterey ceanothus in Unit B-2A, Association B transects. In Unit B-2A, there are two transects in Association B and both contained Monterey

ceanothus in Baseline (100% frequency). By Year 8, Monterey ceanothus was only present on one of the two transects (50% frequency), failing to meet the 70% frequency criterion. Due to the small sample size, the change of occupancy on one transect represents a substantial change in percent cover. Overall, community compositions in Year 8 units continue to move toward Baseline conditions, exhibiting strong trajectories and expected successional patterns following treatments. Per the Protocol, Year 8 is the final year required for monitoring, and given the overall positive response of vegetation to treatments in BLM Area B Units B-2A, B-3 West, B-3 East, A Southern CL, B, and C, these units will be removed from the monitoring schedule.

**Table 5-3. Evaluation of success criteria for dominant chaparral shrub associations on Fort Ord in Year 8 units monitored in 2025 (BLM Area B Units B-2A, B-3 West, B-3 East, A Southern CL, B, and C).**

Plant Association	Criterion	Unit	# of Transects	Baseline value	Year 8 value	Pass/Fail
A – ARTO dominated	Average cover of ARTO > 30% of baseline cover	B-2A	1	81.8%	77.4%	Pass
		B-3W	1	54.8%	19.0%	Pass
		B-3E	2	74.4%	50.6%	Pass
		Unit A - CL	7	77.5%	71.4%	Pass
		Unit B	19	57.3%	24.7%	Pass
		Unit C	14	61.3%	32.6%	Pass
	Frequency of dwarf ceanothus > 70% baseline frequency	B-2A	1	0.0%	100.0%	Pass
		B-3W	1	0.0%	100.0%	Pass
		B-3E	2	0.0%	0.0%	Pass
		Unit A - CL	7	0.0%	40.0%	Pass
		Unit B	19	0.0%	100.0%	Pass
		Unit C	14	100.0%	100.0%	Pass
	Frequency of Monterey ceanothus >70% baseline frequency	B-2A	1	100.0%	100.0%	Pass
		B-3W	1	0.0%	100.0%	Pass
		B-3E	2	50.0%	50.0%	Pass
		Unit A - CL	7	30.0%	30.0%	Pass
		Unit B	19	60.0%	90.0%	Pass
		Unit C	14	60.0%	90.0%	Pass
B – ADFA dominated	Average cover of ADFA > 30% of baseline cover	B-2A	2	54.6%	52.0%	Pass
		B-3W	1	29.6%	23.4%	Pass
		B-3E	9	60.3%	48.5%	Pass
		Unit A - CL	0	N/A	N/A	N/A
		Unit B	6	40.1%	13.0%	Pass
		Unit C	0	N/A	N/A	N/A
	Frequency of dwarf ceanothus > 70% baseline frequency	B-2A	2	0.0%	0.0%	Pass
		B-3W	1	0.0%	100.0%	Pass
		B-3E	9	0.0%	10.0%	Pass
		Unit A - CL	0	N/A	N/A	N/A
		Unit B	6	0.0%	20.0%	Pass
		Unit C	0	N/A	N/A	N/A

Plant Association	Criterion	Unit	# of Transects	Baseline value	Year 8 value	Pass/Fail
	Frequency of Monterey ceanothus >70% baseline frequency	B-2A	2	100.0%	50.0%	Fail
		B-3W	1	100.0%	100.0%	Pass
		B-3E	9	60.0%	70.0%	Pass
		Unit A - CL	0	N/A	N/A	N/A
		Unit B	6	20.0%	100.0%	Pass
		Unit C	0	N/A	N/A	N/A
C/D – ARPU dominated	Frequency of ARPU > 70% of baseline frequency	B-2A	0	N/A	N/A	N/A
		B-3W	4	100.0%	100.0%	Pass
		B-3E	0	N/A	N/A	N/A
		Unit A - CL	0	N/A	N/A	N/A
		Unit B	1	100.0%	100.0%	Pass
		Unit C	0	N/A	N/A	N/A
	Frequency of dwarf ceanothus > 70% baseline frequency	B-2A	0	N/A	N/A	N/A
		B-3W	4	0.0%	100.0%	Pass
		B-3E	0	N/A	N/A	N/A
		Unit A - CL	0	N/A	N/A	N/A
		Unit B	1	0.0%	0.0%	Pass
		Unit C	0	N/A	N/A	N/A
	Frequency of Monterey ceanothus >70% baseline frequency	B-2A	0	N/A	N/A	N/A
		B-3W	4	25.0%	100.0%	Pass
		B-3E	0	N/A	N/A	N/A
		Unit A - CL	0	N/A	N/A	N/A
		Unit B	1	0.0%	100.0%	Pass
		Unit C	0	N/A	N/A	N/A
Bare Ground	Bare ground > 90% of baseline cover	B-2A	3	8.7%	18.6%	Pass
		B-3W	6	21.5%	27.1%	Pass
		B-3E	11	4.8%	17.8%	Pass
		Unit A - CL	7	5.1%	13.7%	Pass
		Unit B	26	11.9%	16.0%	Pass
		Unit C	14	6.1%	13.0%	Pass
Invasive plants	Invasive plants <10% cover per transect	B-2A	3	0.0%	0.0%	Pass
		B-3W	6	0.0%	0.8% (max)	Pass
		B-3E	11	0.0%	0.2% (max)	Pass
		Unit A - CL	7	0.0%	0.0%	Pass
		Unit B	26	0.0%	9.8% (max)	Pass
		Unit C	14	0.0%	1.2% (max)	Pass

### 5.3 Annual Grasses

Annual grasses were present along the edges of roads, masticated areas, other disturbed areas, and occasionally extended into the interior of the units monitored in 2025 (Appendix D). High annual grass density was present in all cleared fuel break areas; however, it does not appear that colonization by annual grasses is a major concern along fuel breaks because annual grasses generally decrease with time as shrubs begin to colonize these areas post-treatment (Table 4-22).

Response of annual grasses varied in density classes across age classes and units, but the overall extent of annual grasses from year to year followed the same pattern across all units. The cover of annual grasses in all Year 8 units (BLM Area B Units B-3W, A Southern CL, and B) increased between Baseline and Year 5, and decreased between Years 5 and 8 (Table 4-22). As shrubs continue to mature in these units, annual grass density is expected to decrease.

## 6 REFERENCES

- Anderson MJ. 2001. A New Method for Non-Parametric Multivariate Analysis of Variance. *Austral Ecology* 26:32-46.
- Baldwin BG, Goldman DH, Keil DJ, Patterson R, Rosatti TJ, Wilken DH (eds.). 2012. *The Jepson Manual – Higher Plants of California*. 2nd ed. University of California Press, Berkeley, CA. pp. 1566.
- [Burluson] Burluson Consulting, Inc. 2009. Protocol for Conducting Vegetation Monitoring in Compliance with the Installation-Wide Multispecies Habitat Management Plan at Former Fort Ord. Prepared for the U.S. Army Corps of Engineers, Sacramento, CA. Administrative Record #BW-2454A.
- [Burluson] Burluson Consulting, Inc. 2016. 2015 Annual Monitoring Report for BLM Area B, Subareas A, B, B-3 East, B-3 West, and C, and Units 05, 13, and 20; Units 01 West, 02 West, and 03 West; Units 02 East and 03 East; Units 15, 21, 32, and 34. Prepared for U.S. Army Corps of Engineers, Sacramento, CA.
- [Burluson] Burluson Consulting, Inc. 2019. 2018 Annual Report: Biological Monitoring for Units 13, 17, and 20; BLM Area B-3 West, and BLM Area B Subareas A and B Containment Lines; Units 5A, 9, 23, and 28; Units 1 East, 6, 7, 10, Watkins Gate Unburned Area, and MOUT Buffer; Units 15, 21, 32, and 34. Prepared for U.S. Army Corps of Engineers, Sacramento, CA. Administrative Record #BW 2870.
- Calow PP. 1999. *Encyclopedia of Ecology and Environmental Management*. Osney Mead, Oxford; Malden, Massachusetts. Blackwell Science.
- Coale TH, Deveny AJ, Fox LR. 2011. Growth, fire history, and browsing recorded in wood rings of shrubs in a mild temperate climate. *Ecology*, 92: 1020-1026. <https://doi.org/10.1890/10-1611.1>
- Detka JR, Lambrecht SC. 2010. *Effects of fire on germination of *Ericameria fasciculata* (Asteraceae), a rare maritime chaparral shrub*. *Madroño*, 57(2), 77–84.
- [ESRI] Environmental Systems Research Institute, Inc. 2025. ArcGIS Pro: Version 3.6.
- Fox LR. 2007. Climatic and Biotic Stochasticity: Disparate Causes of Convergent Demographies in Rare, Sympatric Plants. *Conservation Biology* 23:1556–1561.
- Fox LR, Steel HN, Holl KD, Fusari MH. 2006. Contrasting demographies and persistence of rare annual plants in highly variable environments. *Plant Ecology* 183:157–170.
- Gotelli NJ, Ellison AM. 2004. *A Primer of Ecological Statistics*. Sinauer Associates, Inc. Sunderland, MA.
- [Harris-Terracon] Harris Environmental Group, Inc. and Terracon Consultants, Inc. 2025. 2024 Annual Wetland Vegetation and Wildlife Monitoring Report. Prepared for the Department of the Army, U.S. Army Corps of Engineers, Sacramento, CA.

- [HLA] Harding Lawson Associates. 1999. 1999 Annual Habitat Monitoring Report, Former Fort Ord, Monterey, California. Prepared for U.S. Army Corps of Engineers, Sacramento, CA. Administrative Record #BW-2234.
- [HLA] Harding Lawson Associates. 2001. 2000 Annual Habitat Monitoring Report: Biological Baseline Studies and Follow-up Monitoring, Former Fort Ord, Monterey, CA. Prepared for U.S. Department of the Army, Sacramento, CA. Administrative Record #BW-2235.
- Keeley JE, Parker VT, Zedler PH, Pratt RB. 2024. *Ceanothus: Taxonomic patterns in life history responses to fire*. American Journal of Botany.
- Kindt R. 2019. BiodiversityR: Package for Community Ecology and Suitability Analysis. R Package Version 2.12-2. Available at: <https://cran.r-project.org/web/packages/BiodiversityR/index.html>
- Legendre P, Legendre L. 1998. Numerical Ecology. Second edition. Amsterdam, The Netherlands. Elsevier Science B.V.
- McArdle BH, Anderson MJ. 2001. Fitting Multivariate Models to Community Data: A Comment on Distance-Based Redundancy Analysis. Ecology 82(1):290-297.
- Molles MC. 2010. Ecology: Concepts and Applications - 6<sup>th</sup> ed. McGraw-Hill. New York, NY. pp 352-355.
- Moore D, Notz WI, Fligner MA. 2013. Essential Statistics – 2<sup>nd</sup> ed. W.H. Freeman and Company. New York, NY.
- [NCEI NOAA] National Centers for Environmental Information of the National Oceanic and Atmospheric Administration. 2025. 30-Year Normal Precipitation Data for the Monterey Weather Forecast Office. [Internet]. Available at: <https://www.ncei.noaa.gov/access/services/data/v1?dataset=normals-monthly-1991-2020&startDate=0001-01-01&endDate=9996-12-31&stations=USW00023259&format=pdf>
- [NDMC] National Drought Mitigation Center, USDA, NOAA. 2025. U.S. Drought Monitor – Monthly Precipitation Summaries for the Monterey Region. [Internet]. Available at: <https://droughtmonitor.unl.edu/>
- Oksanen J, Blanchet FG, Friendly M, Kindt R, Legendre P, McGlinn D, Minchin PR, O'Hara RB, Simpson GL, Solymos P, Henry M, Stevens H, Szoecs E, Wagner H. 2022. Vegan: Community Ecology Package. R Package Version 2.6-4. Available at: <http://CRAN.R-project.org/package=vegan>
- Pielou EC. 1974. Population and Community Ecology: Principles and Methods. Gordon and Breach, New York, NY.
- Potts JB, Marino E, Stephens SL. 2010. Chaparral shrub recovery after fuel reduction: a comparison of prescribed fire and mastication techniques. Plant Ecology 210:303-315.

R Core Team. 2025. R: A Language and Environment for Statistical Computing. R Foundation for Statistical Computing, Vienna, Austria. Available at: <https://www.R-project.org/>

Smith RL, Smith TM. 2001. Ecology and Field Biology. 6<sup>th</sup> ed. Benjamin Cummings, USA.

[Terracon] Burleson Consulting Inc., A Terracon Company. 2021. 2020 Annual Report: Biological Monitoring for Range 48; BLM Area B Units B-2A, B-3 West, B-3 East, A Southern Containment Line, B, and C; Units 5A, 9, 23, and 28; Units 2 East and 3 East. Prepared for U.S. Army Corps of Engineers, Sacramento, CA. Administrative Record #BW 2899.

[Terracon] Burleson Consulting Inc., A Terracon Company. 2022. 2021 Annual Report: Biological Monitoring for Units 25, 31, BLM Area B Subunit A Containment Lines; Unit 25 and Units 13, 20, 31 Containment Lines; and Units 6, 7, 10, 1 East, Military Operations Urban Terrain Buffer, and Watkins Gate Burn Area. Prepared for U.S. Army Corps of Engineers, Sacramento, CA. Administrative Record #BW 2922.

[Terracon] Terracon Consultants, Inc. 2023. 2022 Annual Report: Biological Monitoring for Range 48; BLM Area B Units B-2A, B-3 West, B-3 East, A Southern Containment Line, B, and C; Units 1 West, 2 West, and 3 West. Prepared for U.S. Army Corps of Engineers, Sacramento, CA. Administrative Record #BW 2940.

Tetra Tech, Inc., and EcoSystems West Consulting Group. 2011. 2010 Biological Monitoring Report for Burn Units 15, 21, 32, and 34; Burn Units 14 and 19; and Ranges 43-48, Former Fort Ord. Prepared for U.S. Army Corps of Engineers, Sacramento, CA.

Tetra Tech, Inc., and EcoSystems West Consulting Group. 2012. 2011 Biological Monitoring Report for Units 11, 12, MOUT, 28, 9, 4, 5a; a portion of Unit 23 and Watkins Gate Burn Area; Units 15, 21, 32, and 34; South Boundary Road Unit; Units 18 and 22; and MRS 16 Former Fort Ord. Prepared for U.S. Army Corps of Engineers, Sacramento, CA.

Tetra Tech, Inc., and EcoSystems West Consulting Group. 2014. 2013 Biological Monitoring Report for Units 7, 5E and 23E; Units 15, 21, 32, and 34; Units 18 and 22; and Ranges 43–48 Former Fort Ord. Prepared for the U.S. USACE Corps of Engineers, Sacramento, CA.

Tetra Tech, Inc., and EcoSystems West Consulting Group. 2015a. 2014 Biological Monitoring Report for Units 25 and 31; Units 06, 07, 10, 33 WGBA and MOUT; Units 04, 11, 12 and 23N; Units 14 and 19; and MRS-16, Former Fort Ord. Prepared for the U.S. Army Corps of Engineers, Sacramento, CA.

Tetra Tech, Inc., and EcoSystems West Consulting Group. 2015b. Revisions of Protocol for Conducting Vegetation Monitoring for Compliance with the Installation-Wide Multispecies Habitat Management Plan, Former Fort Ord, Monterey, California. Prepared for the U.S. USACE Corps of Engineers, Sacramento, CA.

- Tyler CM, Odion DC. 2020. Seed banks, seed germination, and implications for conservation of the endangered, fire-dependent shrub, *Arctostaphylos morroensis*. *Natural Areas Journal*, 40(2), 155–167. Available at: <https://doi.org/10.3375/043.040.0207>
- [USACE] United States Army Corps of Engineers, Sacramento District. 1997. Installation-Wide Multi-Species Habitat Management Plan for Former Fort Ord, California. April. Sacramento, CA.
- [USACE] United States Army Corps of Engineers. 2022. “flora\_fire\_area” shapefile. Accessed from Fort Ord Data Integration System.
- [USDA NRCS] U.S. Department of Agriculture, Natural Resources Conservation Service. 2025. Soil Survey Spatial and Tabular Data (SSURGO 2.2). Available at: <https://datagateway.nrcs.usda.gov/>
- [USDA NRCS] U.S. Department of Agriculture, Natural Resources Conservation Service. 2025. Plants Database. Available at: <https://plants.usda.gov/>
- [USFWS] U.S. Fish and Wildlife Service. 2015. Programmatic biological opinion for cleanup and property transfer actions conducted at the former Fort Ord, Monterey County, California (8-8-09-F-74).
- [USFWS] U.S. Fish and Wildlife Service. 2017. Reinitiation of Formal Consultation for Cleanup and Property Transfer Actions Conducted at the Former Fort Ord, Monterey County, California (#BW-2747A). (Original Consultation #8-8-09-F-74). Available at: [http://docs.fortordcleanup.com/ar\\_pdfs/AR-BW-2747A/](http://docs.fortordcleanup.com/ar_pdfs/AR-BW-2747A/)
- Van Dyke E, Holl KD, Griffin JR. 2001. Maritime chaparral community transition in the absence of fire. *Madroño* 2001:221-229.
- Wasserstein, R. L. and Lazar, N. A. 2016. The ASA's Statement on p-Values: Context, Process, and Purpose, *The American Statistician*, 70:2, 129-133, DOI: 10.1080/00031305.2016.1154108.
- Wasserstein, R. L., Schirm, A. L., & Lazar, N. A. 2019. Moving to a World Beyond “ $p < 0.05$ ”. *American Statistician*, 73(sup1), 1-19. <https://doi.org/10.1080/00031305.2019.1583913>.
- Watts SM, Uhl MM, Maurano SP, Nuccio EE. 2010. Using Small-Scale Studies to Prioritize Threats and Guide Recovery of a Rare Hemiparasitic Plant: *Cordylanthus rigidus* ssp. *Littoralis*. *PloS one*, 5(1), e8892. <https://doi.org/10.1371/journal.pone.0008892>.

**APPENDIX A**

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**SPECIES ACRONYMS**

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**Table A-1. Species acronyms, Former Fort Ord.**

Acronym	Scientific Name	Common Name	Life Form
ACAMA	<i>Acmispon americanus var. americanus</i>	Spanish clover	annual herb
ACGL	<i>Acmispon glaber (Lotus scoparius)</i>	deerweed	subshrub
ACHEO	<i>Acmispon heermannii var. orbicularis</i>	Heermann's bird's-foot trefoil	perennial herb
ACLO	<i>Acacia longifolia</i>	Sydney golden wattle	tree
ACME	<i>Acacia melanoxylon</i>	blackwood acacia	tree
ACMI	<i>Achillea millefolium</i>	common yarrow	perennial herb
ACPA	<i>Acaena pallida</i>	pale biddy-biddy	perennial herb
ACST	<i>Acmispon strigosus (Lotus strigosus)</i>	strigose lotus	annual herb
ADFA	<i>Adenostoma fasciculatum</i>	chamise	shrub
AGAV	<i>Agrostis avenacea</i>	Pacific hair grass	annual grass
AGPA	<i>Agrostis pallens</i>	leafy bent grass	perennial grass
AGXX	<i>Agoseris sp.</i>		
AICA	<i>Aira caryophylla</i>	silvery hair grass	annual grass
AMME	<i>Amsinckia menziesii</i>	Menzies' fiddleneck	annual herb
ARCA	<i>Artemisia californica</i>	California sagebrush	shrub
ARHO	<i>Arctostaphylos hookeri ssp. hookeri</i>	Hooker's manzanita	shrub
ARMO	<i>Arctostaphylos montereyensis</i>	Toro manzanita	shrub
ARPU	<i>Arctostaphylos pumila</i>	sandmat manzanita	shrub
ARTO	<i>Arctostaphylos tomentosa ssp. tomentosa</i>	shaggy-barked manzanita	shrub
AVBA	<i>Avena barbata</i>	slender wild oat	annual or perennial grass
BAPI	<i>Baccharis pilularis</i>	coyote brush	shrub
BEPI	<i>Berberis pinnata</i>	California barberry	shrub
BRDI	<i>Bromus diandrus</i>	ripgut brome	annual grass
BRHO	<i>Bromus hordeaceus</i>	soft brome	annual grass
BRMA	<i>Briza maxima</i>	rattlesnake grass	annual grass
BRMAR	<i>Bromus madritensis ssp. rubens</i>	red brome	annual grass
BRMI	<i>Briza minor</i>	small quaking grass	annual grass
CAAF	<i>Castilleja affinis</i>	Indian paintbrush	perennial herb
CAAL	<i>Calochortus albus</i>	white globe lily	perennial herb
CABR	<i>Carex brevicaulis</i>	short-stemmed sedge	perennial grass
CACO	<i>Camissonia contorta</i>	contorted suncup	annual herb
CAED	<i>Carpobrotus edulis</i>	iceplant	perennial succulent herb
CAEX	<i>Castilleja exserta</i>	purple owl's-clover	annual herb
CAFO2	<i>Castilleja foliolosa</i>	Texas Indian paintbrush	perennial herb
CAGL	<i>Carex globosa</i>	round fruit sedge	perennial herb
CAKO	<i>Calamagrostis koelerioides</i>	fire reedgrass	perennial grass
CAMA	<i>Calystegia macrostegia</i>	coast morning-glory	Perennial herb
CAMI	<i>Camissoniopsis micrantha</i>	Spencer primrose	annual herb
CAPY	<i>Carduus pycnocephalus</i>	Italian thistle	annual herb
CARA	<i>Cardionema ramosissimum</i>	sand mat	perennial herb

**Table A-1. Species acronyms, Former Fort Ord.**

Acronym	Scientific Name	Common Name	Life Form
CARU	<i>Calamagrostis rubescens</i>	pinegrass	perennial grass
CASU	<i>Calystegia subacaulis</i>	hill morning glory	perennial herb
CATU	<i>Carex tumulicola</i>	Foothill sedge	Perennial herb
CAXX1	<i>Carex</i> sp.	sedge	perennial herb
CAXX2	<i>Castilleja</i> sp.		
CEDE	<i>Ceanothus dentatus</i>	dwarf ceanothus	shrub
CEIN	<i>Ceanothus incanus</i>	coast whitehorn	shrub
CEME	<i>Centaurea melitensis</i>	totalote	annual herb
CERI	<i>Ceanothus rigidus</i> ( <i>Ceanothus cuneatus</i> var. <i>rigidus</i> )	Monterey ceanothus	shrub
CETH	<i>Ceanothus thyrsiflorus</i>	blue blossom	shrub
CHDI	<i>Chorizanthe diffusa</i>	diffuse spineflower	annual herb
CHDO	<i>Chorizanthe douglasii</i>	Douglas' spineflower	annual herb
CHPO	<i>Chlorogalum pomeridianum</i>	wavyleaf soap plant	perennial herb
CHPUP	<i>Chorizanthe pungens</i> var. <i>pungens</i>	Monterey spineflower	HMP annual
CIBR	<i>Cirsium brevistylum</i>	clustered thistle	perennial herb
CIOC	<i>Cirsium occidentale</i>	cobwebby thistle	perennial herb
COFI	<i>Corethrogyne</i> ( <i>Lessingia</i> ) <i>filaginifolia</i>	common sandaster	perennial herb
COJU	<i>Cortaderia jubata</i>	jubata grass	large perennial grass
CORIL	<i>Cordylanthus rigidus</i> ssp. <i>littoralis</i>	seaside bird's beak	HMP annual
COXX	<i>Cortaderia</i> sp. ( <i>C. jubata</i> or <i>C. selloana</i> )	pampas grass	large perennial grass
CRCA	<i>Croton californicus</i>	California croton	perennial herb
CRMUM	<i>Cryptantha muricata</i> var. <i>muricata</i>	showy prickly-nut cryptantha	annual herb
CRSC	<i>Crocotanthemum</i> ( <i>Helianthemum</i> ) <i>scoparium</i>	peak rush-rose	subshrub
CRXX	<i>Cryptantha</i> sp.		annual herb
DACA	<i>Danthonia californica</i>	California oatgrass	Perennial grass
DAPU	<i>Daucus pusillus</i>	American wild carrot	annual herb
DECE	<i>Deschampsia cespitosa</i>	tufted hairgrass	perennial herb
DECO	<i>Deinandra corymbosa</i>	coastal tarweed	annual herb
DIAU	<i>Diplacus aurantiacus</i>	sticky monkeyflower	shrub
DICA	<i>Dichelostemma capitatum</i>	blue dicks	perennial herb
DRGL	<i>Drymocallis</i> ( <i>Potentilla</i> ) <i>glandulosa</i>	sticky cinquefoil	perennial herb
ELGL	<i>Elymus glaucus</i>	blue wild rye	perennial grass
ERBI	<i>Erodium brachycarpum</i>	foothill filaree	annual herb
ERBO	<i>Erodium botrys</i>	long-beaked filaree	annual herb
ERCA20*	<i>Erigeron canadensis</i>	horseweed	annual herb
ERCA	<i>Eriodictyon californicum</i>	yerba santa	shrub
ERCI	<i>Erodium cicutarium</i>	red-stemmed filaree	annual herb
ERCO	<i>Eriophyllum confertiflorum</i>	golden yarrow	subshrub
ERER	<i>Ericameria ericoides</i>	mock heather	shrub

**Table A-1. Species acronyms, Former Fort Ord.**

Acronym	Scientific Name	Common Name	Life Form
ERFA	<i>Ericameria fasciculata</i>	Eastwood's goldenbush	shrub
ERMO	<i>Erodium moschatum</i>	white-stemmed filaree	annual herb
ERNUA	<i>Eriogonum nudum</i> var. <i>auriculatum</i>	ear-shaped wild buckwheat	shrub
ERVI	<i>Eriastrum virgatum</i>	virgate eriastrum	annual herb
EURA	<i>Eurybia radulina</i>	roughleaf aster	perennial herb
FEBR	<i>Festuca (Vulpia) bromoides</i>	brome fescue	annual grass
FEMY	<i>Festuca (Vulpia) myuros</i>	rattail sixweeks grass	annual grass
FEOC	<i>Festuca (Vulpia) octoflora</i>	sixweeks grass	annual grass
FRAF	<i>Fritillaria affinis</i>	checker lily	perennial herb
FRCA	<i>Frangula (Rhamnus) californica</i>	California coffeeberry	shrub
FRCA2	<i>Fremontodendron californicum</i>	California flannelbush	shrub
GAAP	<i>Galium aparine</i>	goose grass	annual herb
GACA	<i>Galium californicum</i>	California bedstraw	perennial herb
GAEL	<i>Garrya elliptica</i>	coast silk tassel	shrub
GAPH	<i>Gastridium phleoides</i>	nit grass	annual grass
GAPO	<i>Galium porrigens</i>	climbing bedstraw	vine
GAUS	<i>Gamochaeta ustulata</i>	purple cudweed	perennial herb
GEDI	<i>Geranium dissectum</i>	cutleaf geranium	annual herb
GEMO	<i>Genista monspessulana</i>	French broom	shrub
GITEA	<i>Gilia tenuiflora</i> ssp. <i>arenaria</i>	sand gilia	HMP annual
HEAR	<i>Heteromeles arbutifolia</i>	toyon	shrub
HEGR	<i>Heterotheca grandiflora</i>	telegraph weed	annual herb
HEXX	<i>Hemizonia</i> sp.		annual herb
HOCU	<i>Horkelia cuneata</i>	wedge-leaved horkelia	perennial herb
HYGL	<i>Hypochaeris glabra</i>	smooth cat's-ear	annual herb
HYRA	<i>Hypochaeris radicata</i>	rough cat's-ear	perennial herb
IRDO	<i>Iris douglasiana</i>	Douglas iris	perennial herb
JUBU	<i>Juncus bufonius</i>	common toad rush	annual herb
JUPH	<i>Juncus phaeocephalus</i>	brown-headed rush	perennial grass
JUXX	<i>Juncus</i> sp.	rush	
KOMA	<i>Koeleria macrantha</i>	June grass	perennial herb
LAPL	<i>Layia platyglossa</i>	coastal tidytips	annual herb
LECA	<i>Lepechinia calycina</i>	pitcher sage	shrub
LEPE	<i>Lessingia pectinata</i> (var. <i>pectinata</i> ?)	valley lessingia	annual herb
LOGA	<i>Logfia (Filago) gallica</i>	daggerleaf cottonrose	annual herb
LOMA	<i>Lomatium</i> sp.		perennial herb
LOPA	<i>Lomatium parvifolium</i>	small-leaved lomatium	perennial herb
LUAL	<i>Lupinus albifrons</i> (var. <i>albifrons</i> ?)	silver bush lupine	shrub
LUAR	<i>Lupinus arboreus</i>	yellow bush lupine	shrub
LUBI	<i>Lupinus bicolor</i>	miniature lupine	annual herb
LUCH	<i>Lupinus chamissonis</i>	silver beach lupine	shrub

**Table A-1. Species acronyms, Former Fort Ord.**

Acronym	Scientific Name	Common Name	Life Form
LUCO	<i>Lupinus concinnus</i>	bajada lupine	annual herb
LUNA	<i>Lupinus nanus</i>	sky lupine	annual herb
LUTR	<i>Lupinus truncatus</i>	Nuttall's annual lupine	annual herb
LUXX	<i>Lupinus</i> sp.	lupine	
LYAR	<i>Lysimachia arvensis</i>	scarlet pimpernel	annual herb
LYHY	<i>Lythrum hyssopifolia</i>	hyssop loosestrife	annual herb
MAEX	<i>Madia exigua</i>	small tarweed	annual herb
MAGR	<i>Madia gracilis</i>	gumweed (slender tarweed)	annual herb
MASA	<i>Madia sativa</i>	coast tarweed	annual herb
METO	<i>Melica torreyana</i>	Torrey's melicgrass	perennial herb
MICA	<i>Micropus californicus</i>	cotton top	annual herb
MOUN	<i>Monardella undulata</i>	curly-leaved monardella	annual herb
MUMA	<i>Muilla maritima</i>	common muilla	perennial herb
NAAT	<i>Navarretia atractyloides</i>	holly leaf navarretia	annual herb
NAHA	<i>Navarretia hamata</i>	hooked navarretia	annual herb
NAXX	<i>Navarretia</i> sp.		annual herb
PEDE	<i>Pedicularis densiflora</i>	Indian warrior	perennial herb
PEDU	<i>Petrorhagia dubia</i>	hairypink	annual herb
PEGA	<i>Perideridia gairdneri</i>	Gairdner's yampah	perennial herb
PEMUM	<i>Pellaea mucronata</i> var. <i>mucronata</i>	bird's foot fern	fern
PETR	<i>Pentagramma triangularis</i> ssp. <i>triangularis</i>	gold back fern	fern
PHDI	<i>Phacelia distans</i>	common phacelia	annual herb
PHRA	<i>Phacelia ramosissima</i>	branching phacelia	perennial herb
PIRA	<i>Pinus radiata</i>	Monterey pine	tree
PIYA	<i>Piperia yadonii</i>	Yadon's piperia	perennial herb
PIXX	<i>Piperia</i> sp.		
PLCO	<i>Plantago coronopus</i>	cut-leaved plantain	annual herb
PLER	<i>Plantago erecta</i>	California plantain	annual herb
PLXX	<i>Plantago</i> sp.	plantain	
POMO	<i>Polypogon monspeliensis</i>	rabbitsfoot grass	annual herb
POSE	<i>Poa secunda</i>	pine bluegrass	perennial grass
POUN	<i>Poa unilateralis</i>	San Francisco bluegrass	perennial grass
POXX	<i>Poa</i> sp.		
PSBE	<i>Pseudognaphalium beneolens</i>	fragrant everlasting	perennial herb
PSCA	<i>Pseudognaphalium californicum</i>	lady's tobacco	annual herb
PSRA	<i>Pseudognaphalium ramosissimum</i>	pink everlasting	biennial herb
PSST	<i>Pseudognaphalium stramineum</i>	cottonbatting plant	perennial herb
PSXX	<i>Pseudognaphalium</i> sp.		
PTAQP	<i>Pteridium aquilinum</i> var. <i>pubescens</i>	western bracken fern	fern
QUAG	<i>Quercus agrifolia</i>	coast live oak	tree
QUPAS	<i>Quercus parvula</i> var. <i>shrevei</i>	Shreve oak	tree

**Table A-1. Species acronyms, Former Fort Ord.**

Acronym	Scientific Name	Common Name	Life Form
QUWIF	<i>Quercus wislizeni</i> var. <i>frutescens</i>	chaparral oak	tree
RHCA	<i>Rhinotropis californica</i>	California milkwort	Perennial herb
RIMA	<i>Ribes malvaceum</i>	chaparral currant	shrub
RISA	<i>Ribes sanguineum</i>	red flowering currant	shrub
RISP	<i>Ribes speciosum</i>	fuchsia-flowered gooseberry	shrub
ROCA	<i>Rosa californica</i>	California wild rose	shrub
ROGY	<i>Rosa gymnocarpa</i>	wood rose	shrub
RUAC	<i>Rumex acetosella</i>	sheep sorrel	perennial herb
RUUR	<i>Rubus ursinus</i>	California blackberry	woody vine
SABI	<i>Sanicula bipinnatifida</i>	purple sanicle	perennial herb
SALA	<i>Salix lasiolepis</i>	arroyo willow	shrub
SAME	<i>Salvia mellifera</i>	black sage	shrub
SEGL	<i>Senecio glomeratus</i>	cutleaf burnweed	annual or perennial herb
SESY	<i>Senecio sylvaticus</i>	woodland ragwort	annual herb
SIBE	<i>Sisyrinchium bellum</i>	western blue-eyed grass	perennial herb
SIGA	<i>Silene gallica</i>	small flower catchfly	annual herb
SOAS	<i>Sonchus asper</i>	prickly sow thistle	annual herb
SOOL	<i>Sonchus oleraceus</i>	common sow thistle	annual herb
SOUM	<i>Solanum umbelliferum</i>	blue witch	shrub
SOXX	<i>Solidago</i> sp.	goldenrod	perennial herb
STPU	<i>Stipa pulchra</i>	purple needle grass	perennial grass
STVI	<i>Stephanomeria virgata</i>	tall stephanomeria	annual herb
SYALL	<i>Symphoricarpos albus</i> var. <i>laevigatus</i>	common snowberry	subshrub
SYMO	<i>Symphoricarpos mollis</i>	creeping snowberry	subshrub
TODI	<i>Toxicodendron diversilobum</i>	poison oak	shrub
TOFR	<i>Toxicoscordion fremontii</i>	Fremont's star lily	perennial herb
TOMI	<i>Toxicoscordion micranthum</i>	small flowered star lily	perennial herb
TRAN	<i>Trifolium angustifolium</i>	narrow-leaved clover	annual herb
TRBI	<i>Trifolium bifidum</i>	notch leaf clover	annual herb
TRFR	<i>Trifolium fragiferum</i>	strawberry clover	perennial herb
TRIX	<i>Triteleia ixioides</i>	coast pretty face	perennial herb
TRMI	<i>Trifolium microcephalum</i>	smallhead clover	annual herb
TROB	<i>Tribolium obliterum</i>	Capetown grass	perennial herb
TRVA	<i>Trifolium variegatum</i>	variegated clover	annual herb
TRWI	<i>Trifolium willdenovii</i>	tomcat clover	annual herb
URLI	<i>Uropappus lindleyi</i>	silver puffs	annual herb
VAOV	<i>Vaccinium ovatum</i>	huckleberry	shrub
VISA	<i>Vicia sativa</i>	garden vetch	annual herb
VIHI	<i>Vicia hirsute</i>	tiny vetch	annual herb
ZEDA	<i>Zeltnera davyi</i>	Davy's centuary	annual herb

**Table A-1. Species acronyms, Former Fort Ord.**

Acronym	Scientific Name	Common Name	Life Form
ZEMU	<i>Zeltnera muehlenbergii</i>	Muehlenberg's centaury	annual herb

\*Numbered codes correspond with the species acronym codes on the USDA PLANTS Database (USDA NRCS, 2024).

**APPENDIX B**

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**MAPS: HMP ANNUALS GRIDS**

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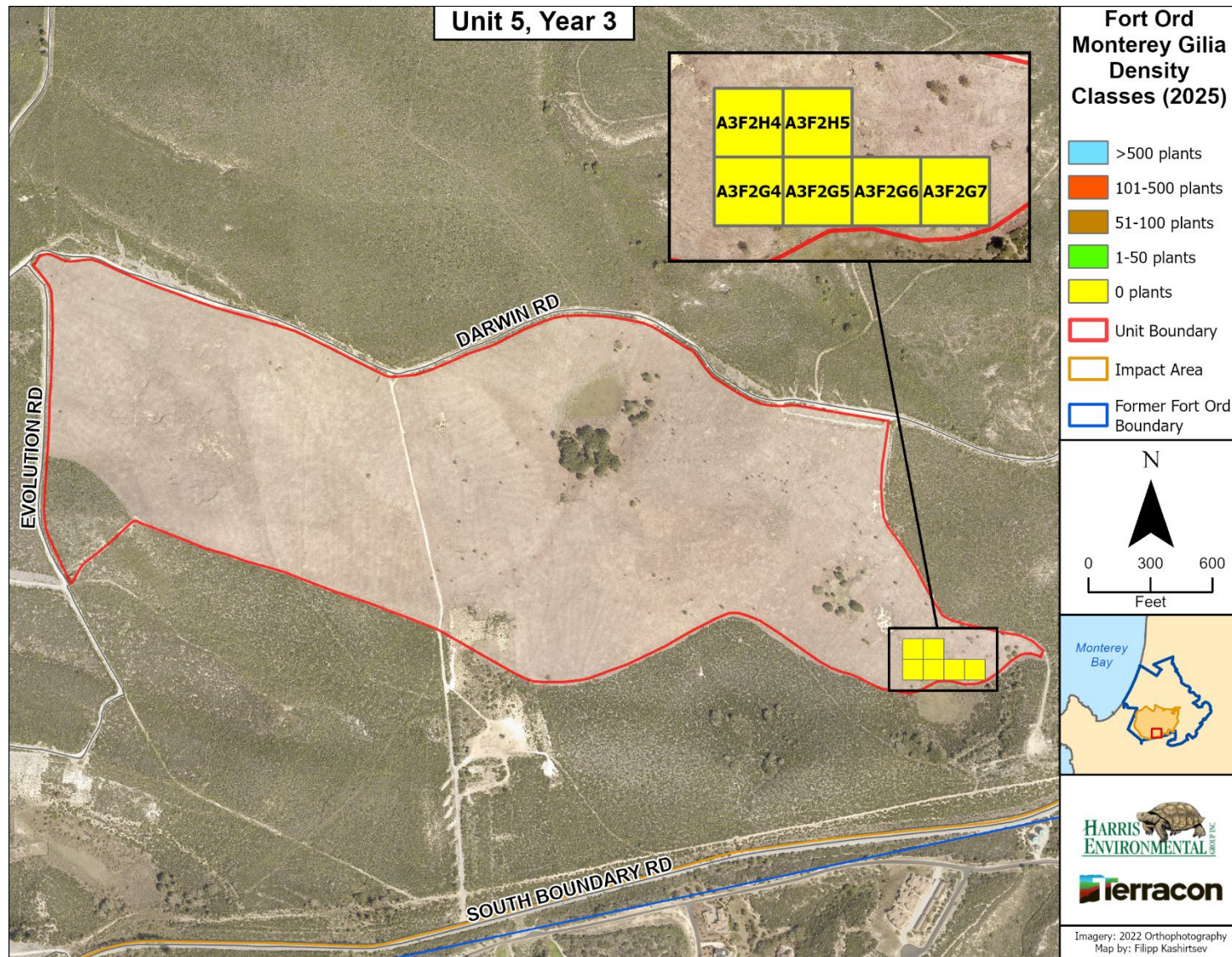


Figure B-1. Map of Monterey gilia density; Unit 5 (Year 3).

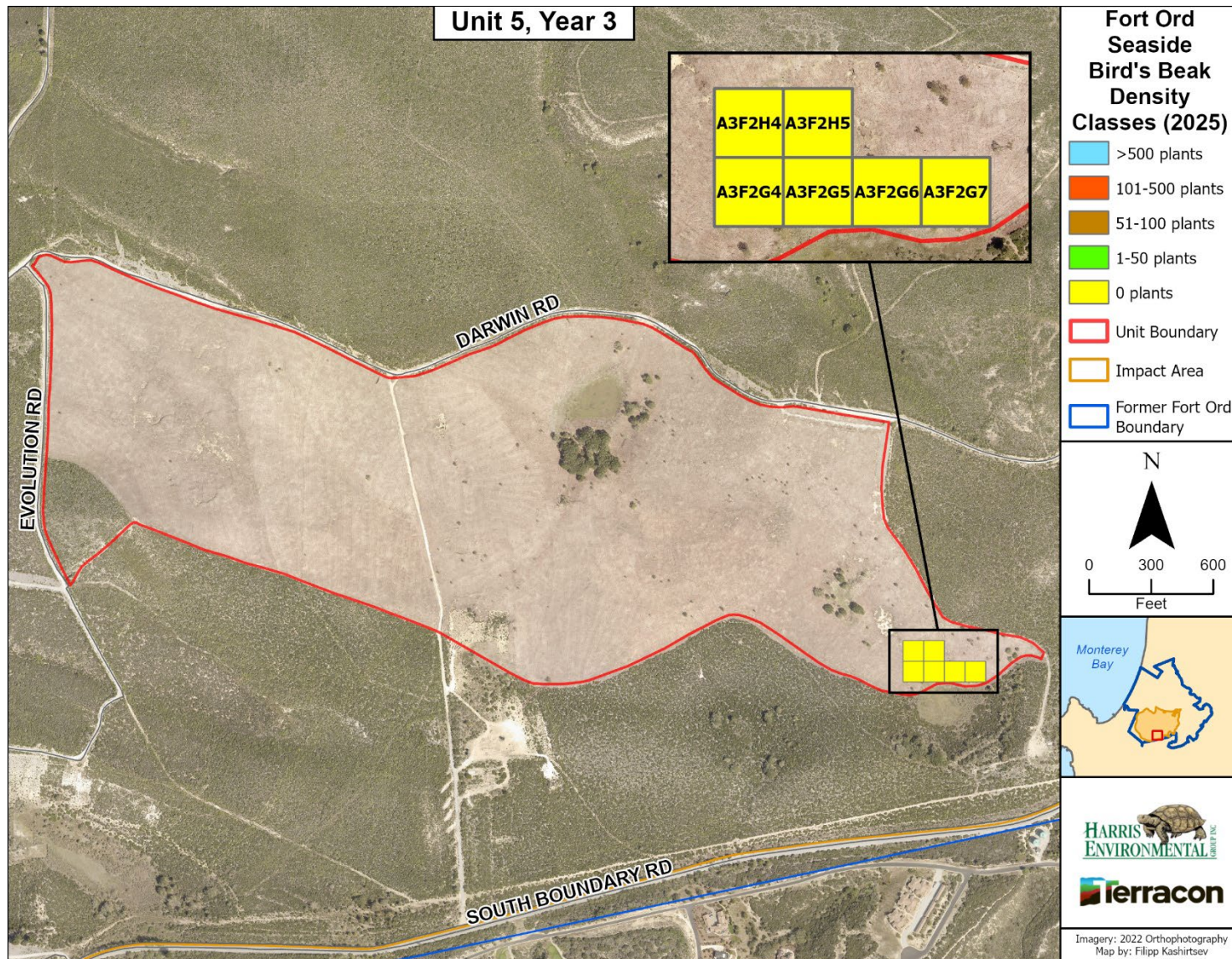


Figure B-2. Map of seaside bird's beak density; Unit 5 (Year 3).

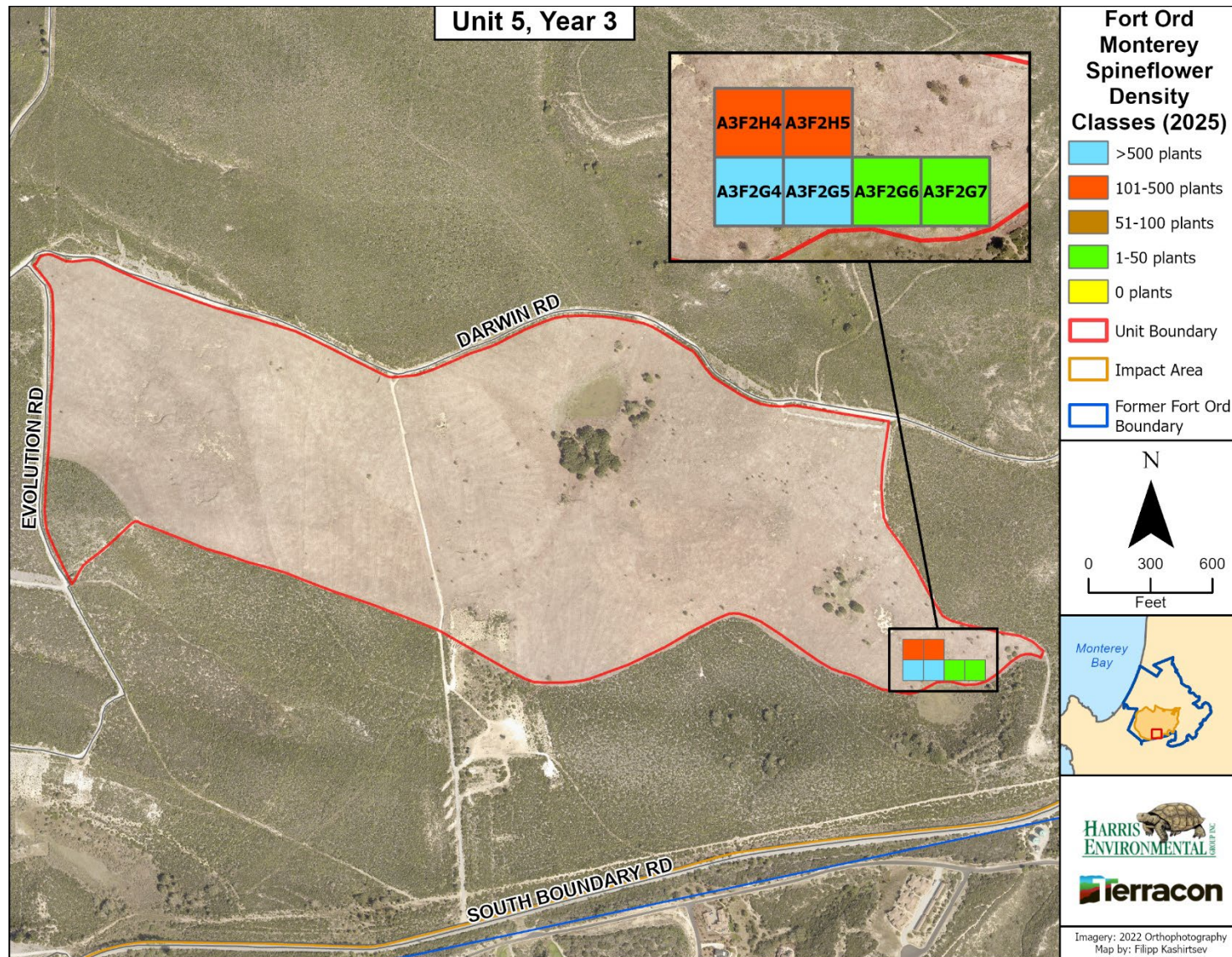


Figure B-3. Map of Monterey spineflower density; Unit 5 (Year 3).

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**APPENDIX C**

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**MAPS: HMP SHRUB TRANSECTS**

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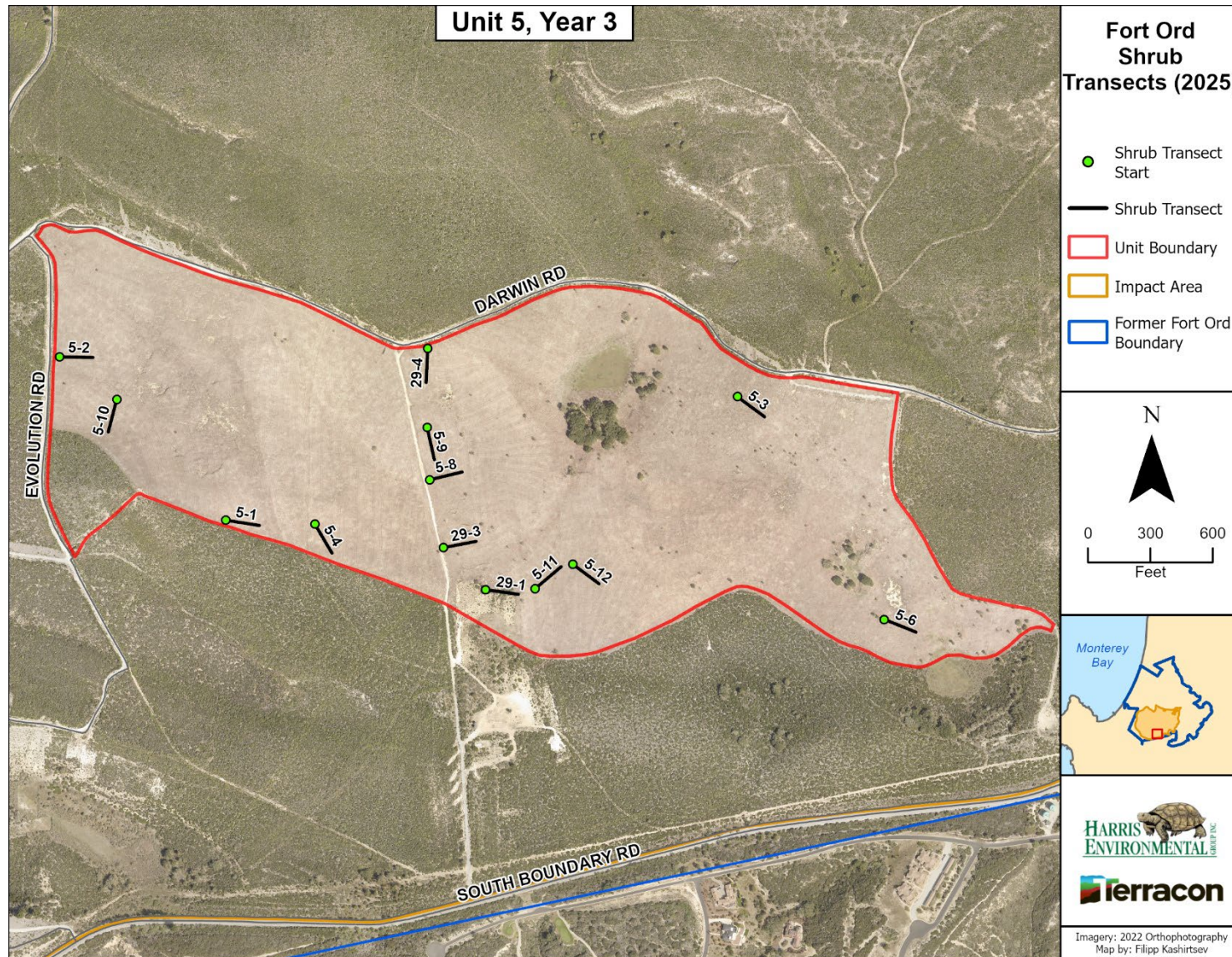


Figure C-1. Map of shrub transects; Unit 5 (Year 3).

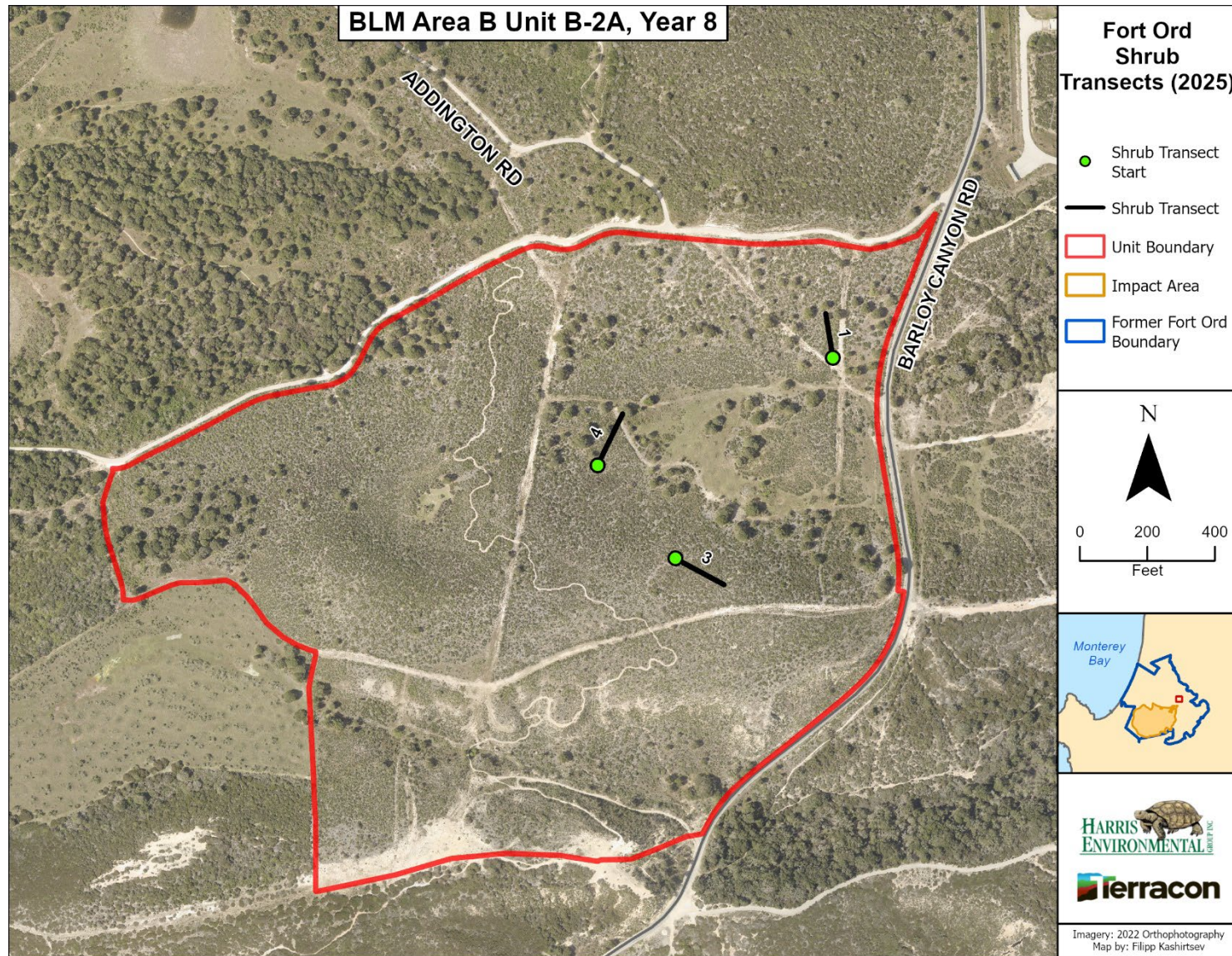


Figure C-2. Map of shrub transects; Unit B-2A (Year 8).

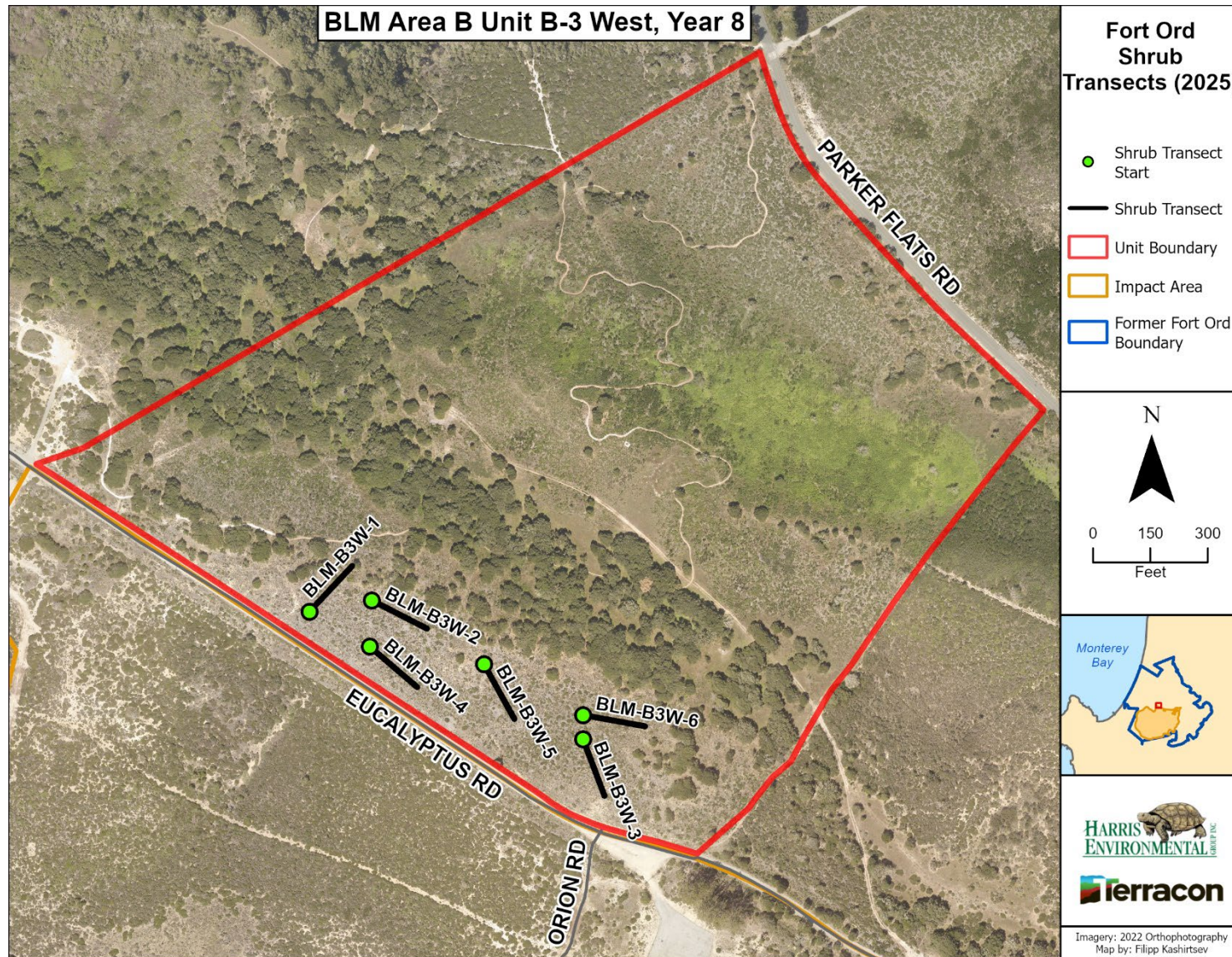
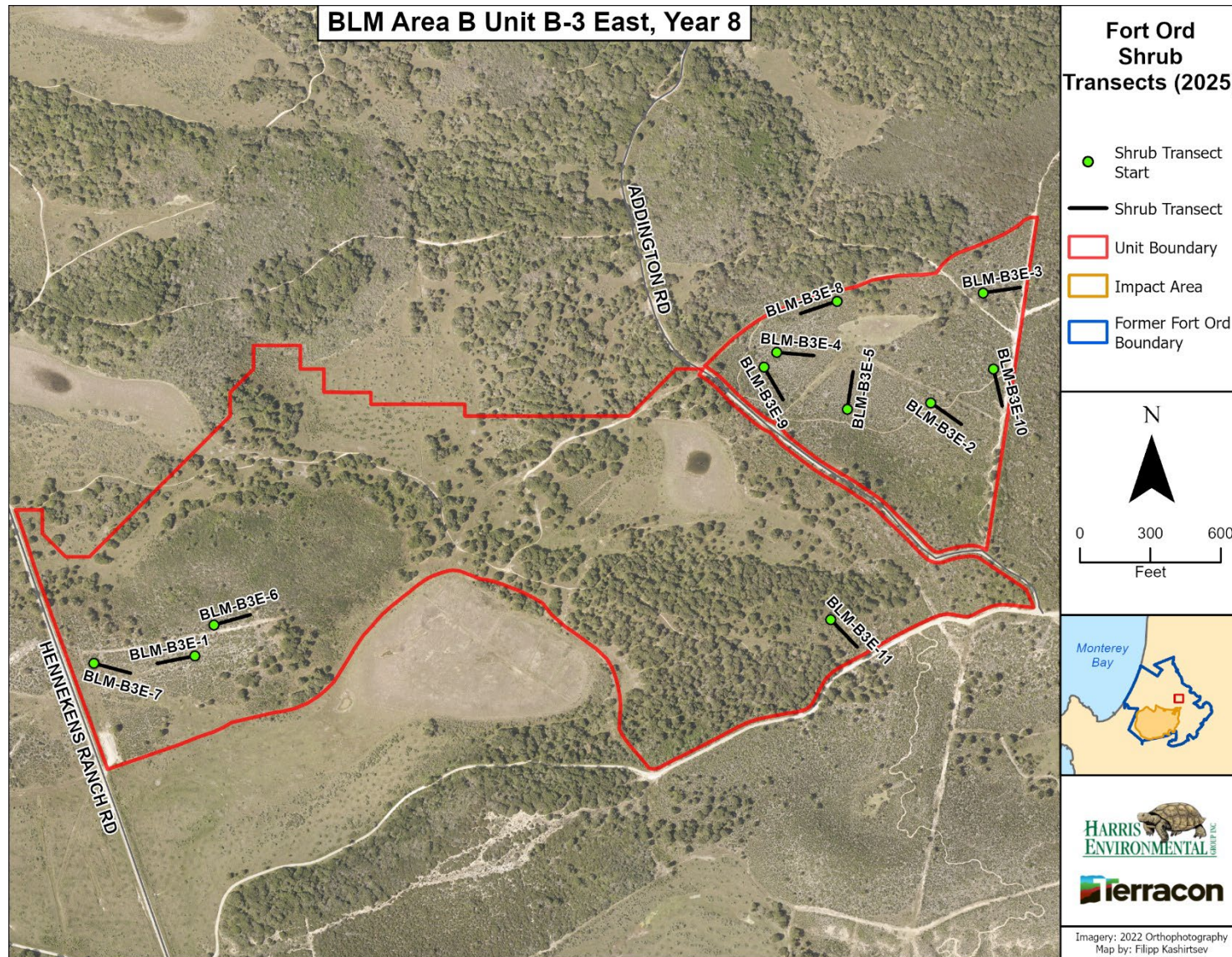


Figure C-3. Map of shrub transects; BLM Area B Unit B-3 West (Year 8).



**Figure C-4.** Map of shrub transects; BLM Area B Unit B-3 East (Year 8).

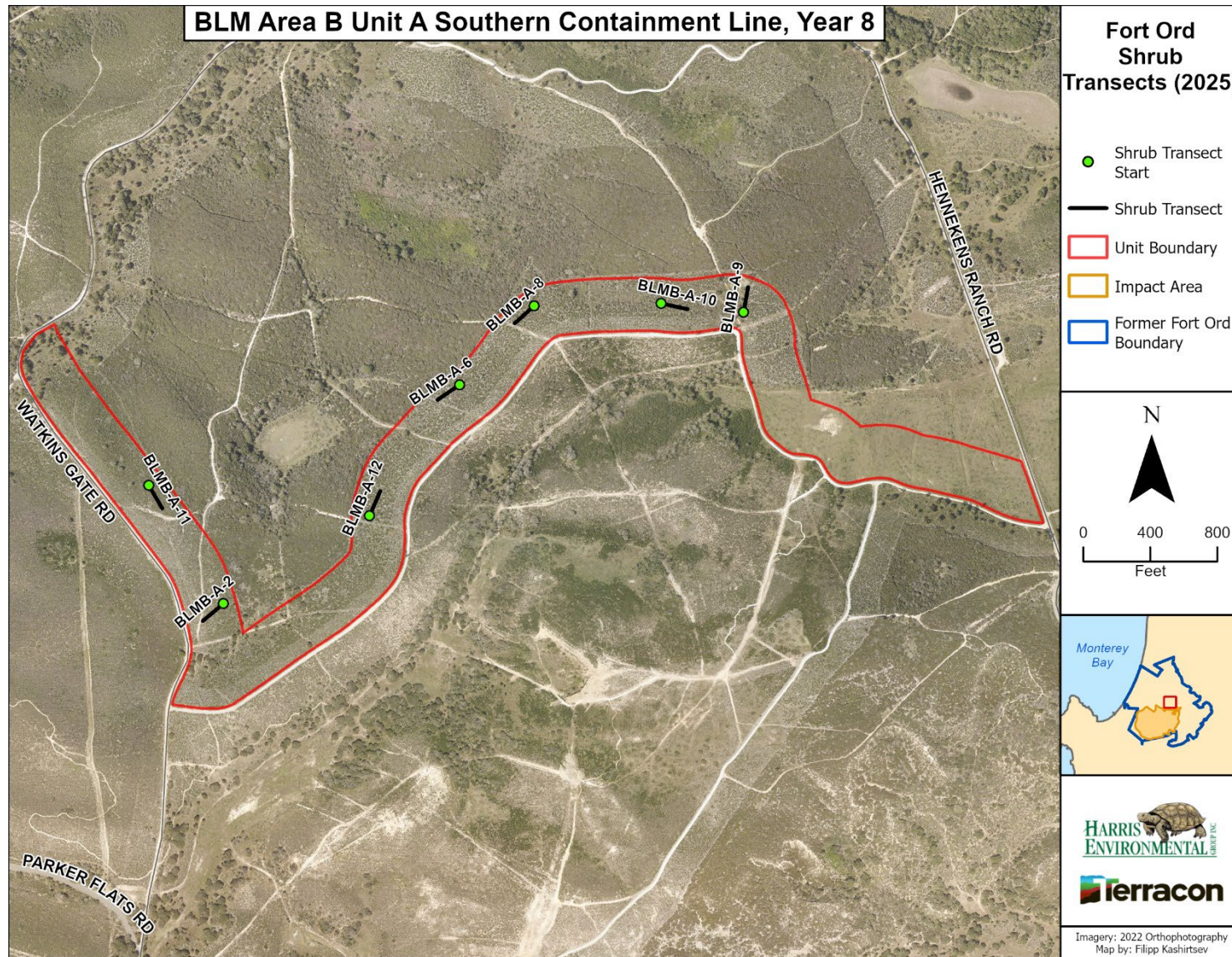


Figure C-5. Map of shrub transects; BLM Area B Unit A Southern Containment Line (Year 8).

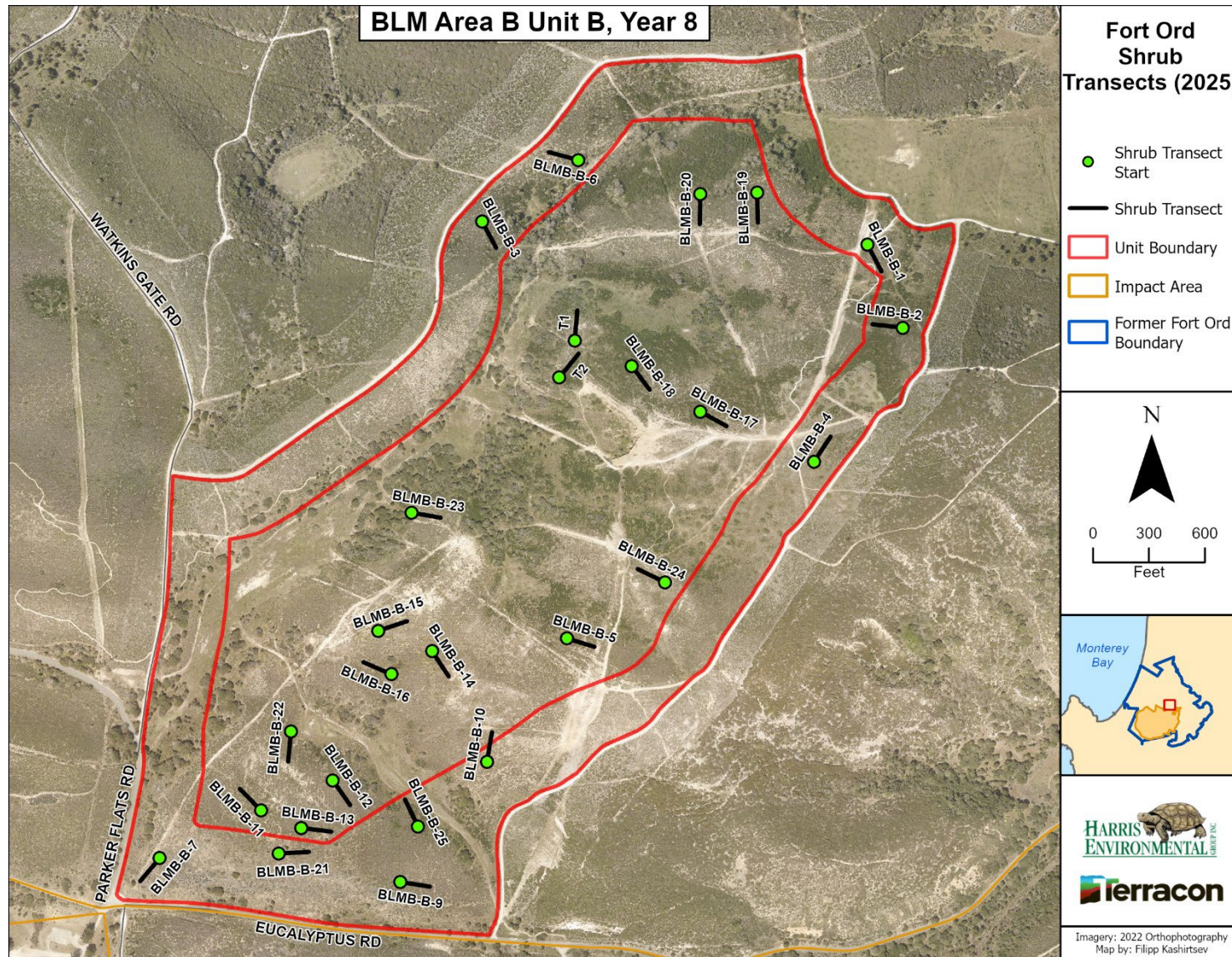


Figure C-6. Map of shrub transects; BLM Area B Unit B (Year 8).

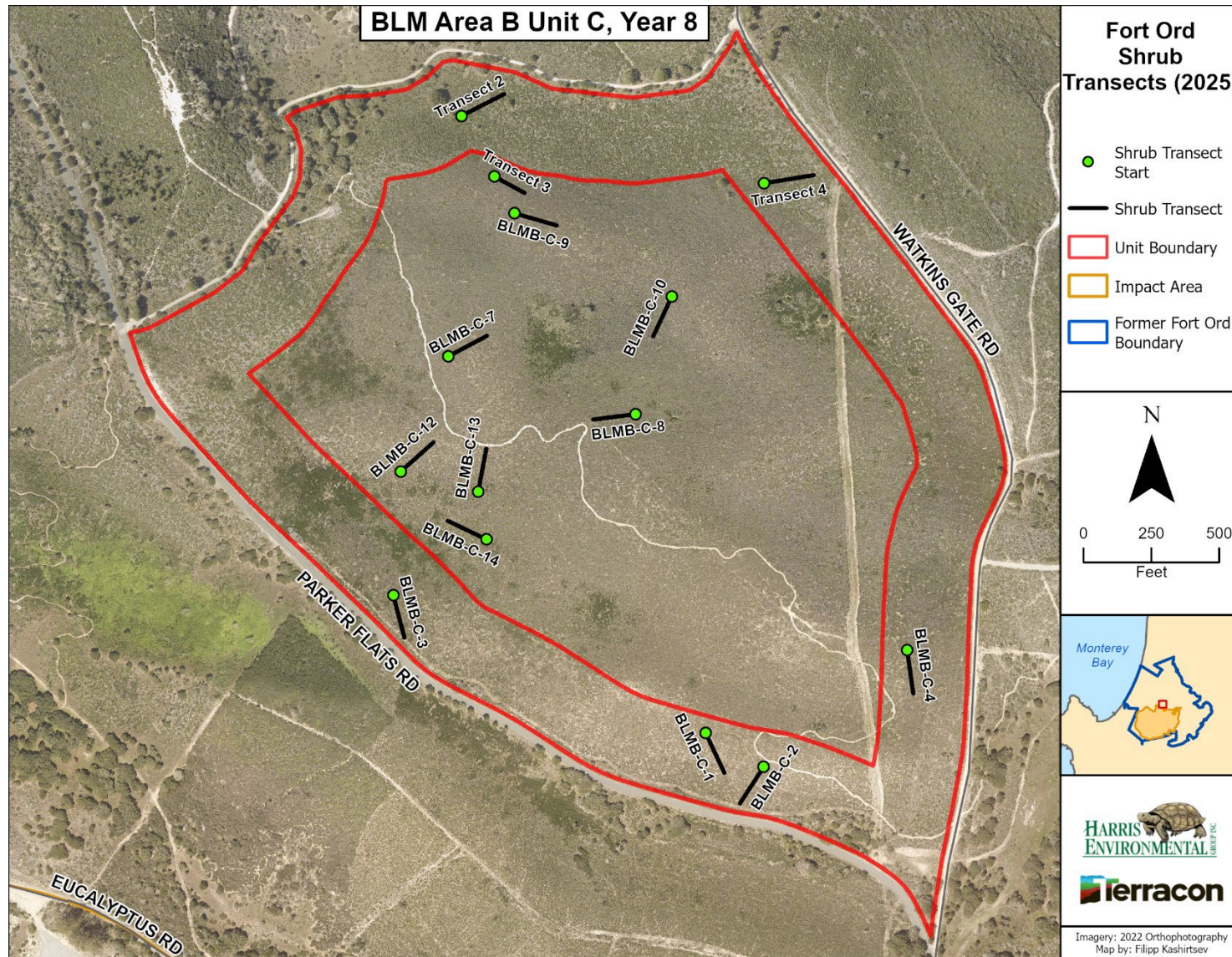


Figure C-7. Map of shrub transects; BLM Area B Unit C (Year 8).

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**APPENDIX D**

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**MAPS: ANNUAL GRASS DENSITY**

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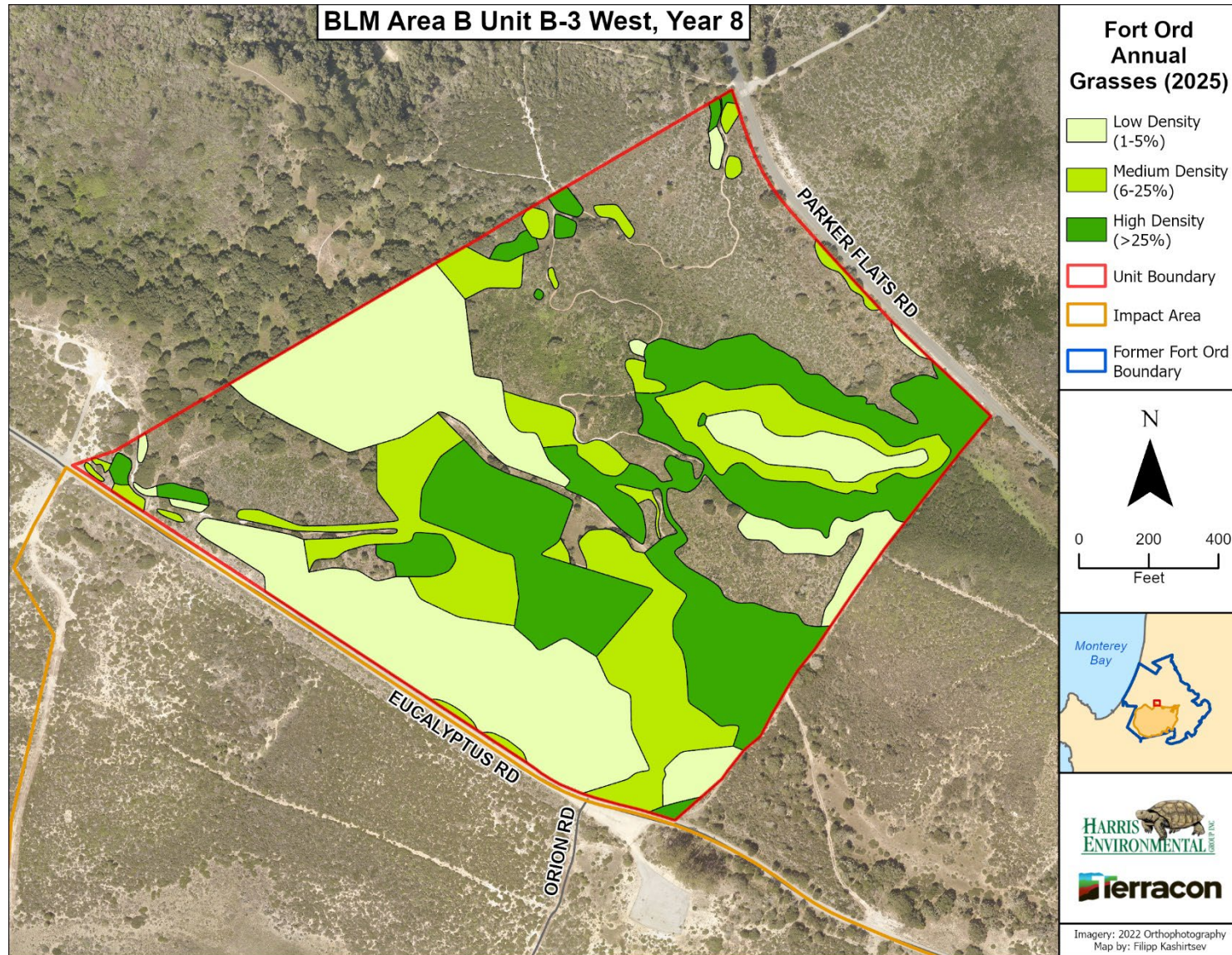


Figure D-1. Map of non-native annual grass density; BLM Area B Unit B-3 West (Year 8).

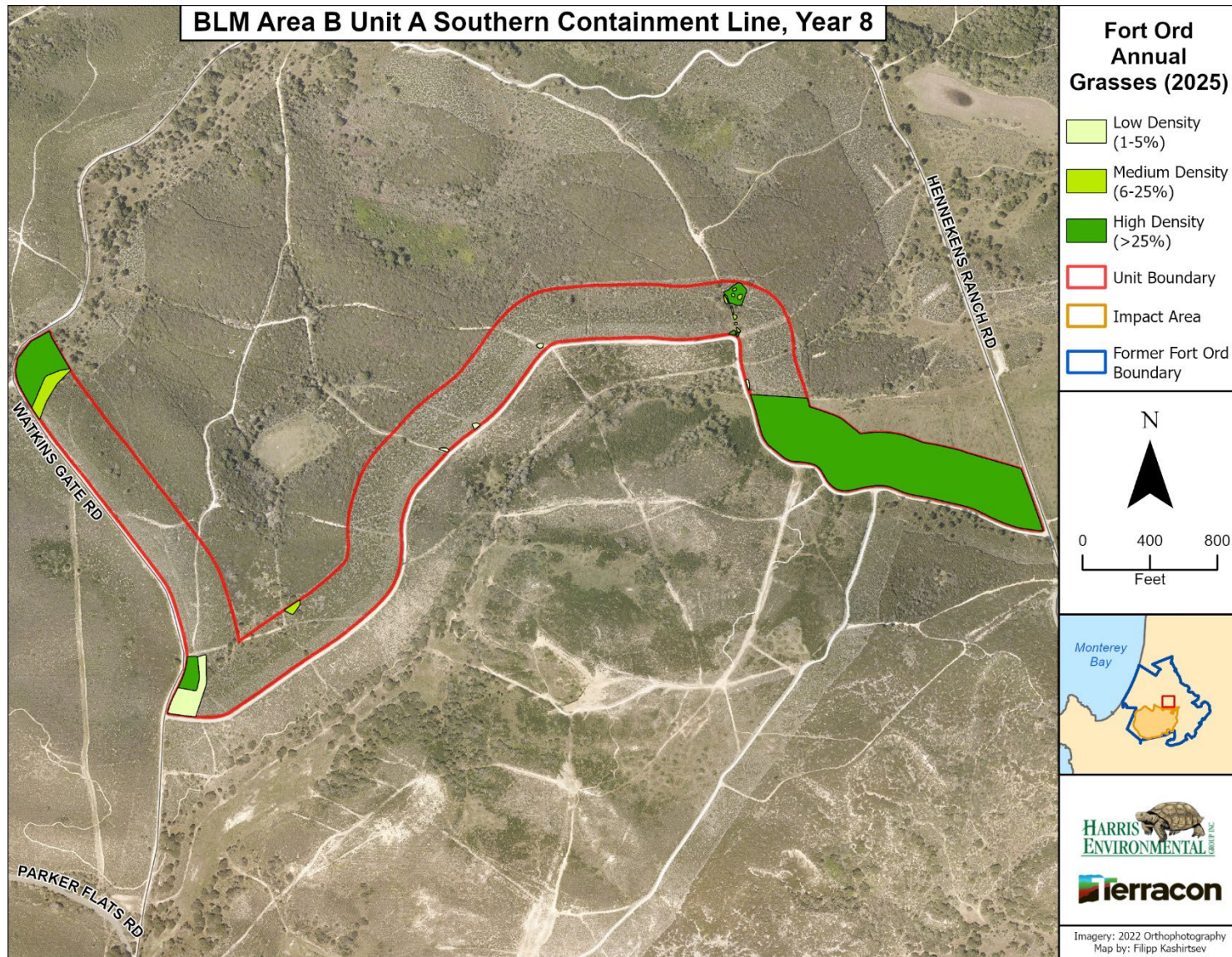


Figure D-2. Map of non-native annual grass density; BLM Area B Unit A Southern Containment Line (Year 8).

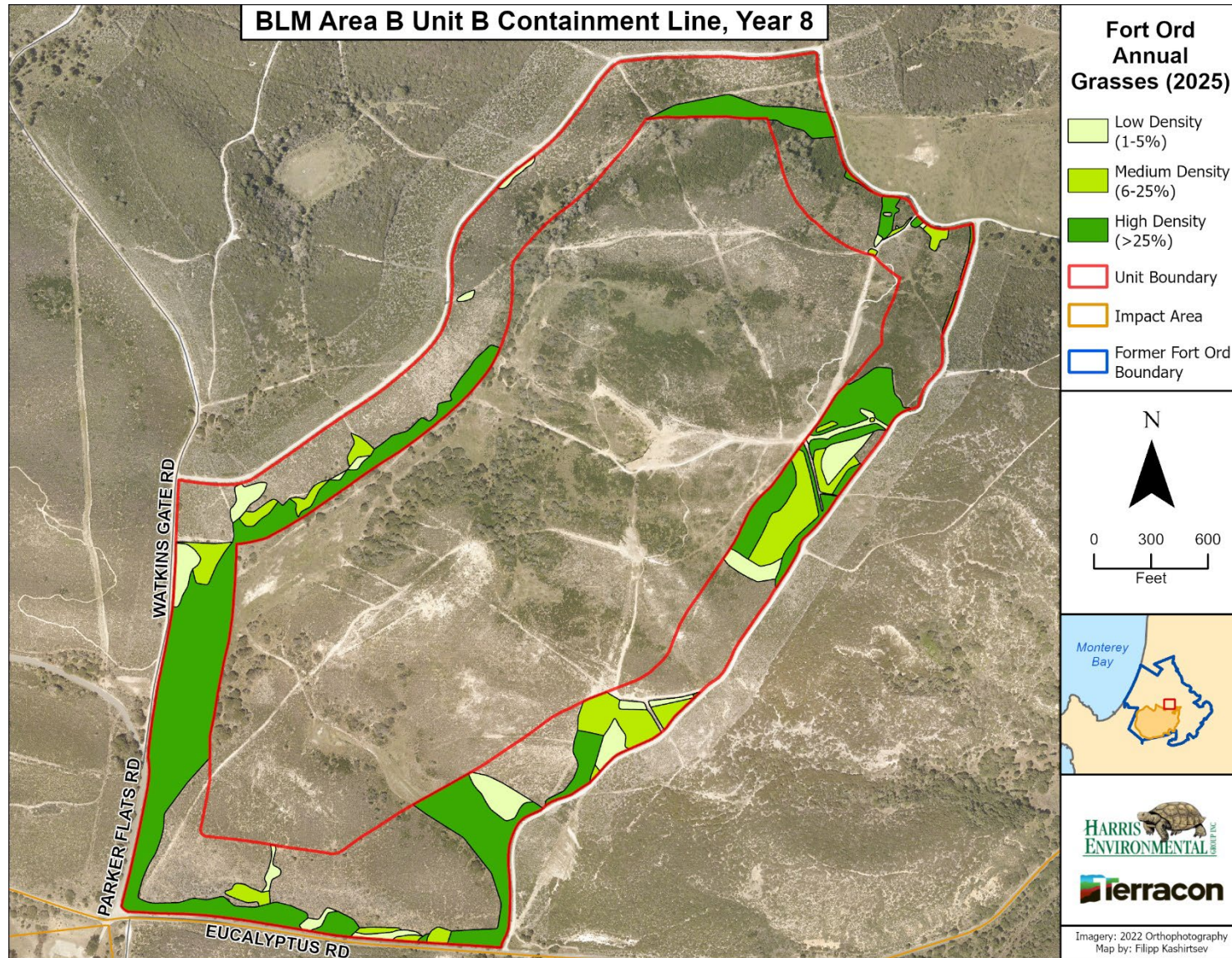


Figure D-3. Map of non-native annual grass density; BLM Area B Unit B Containment Line (Year 8).

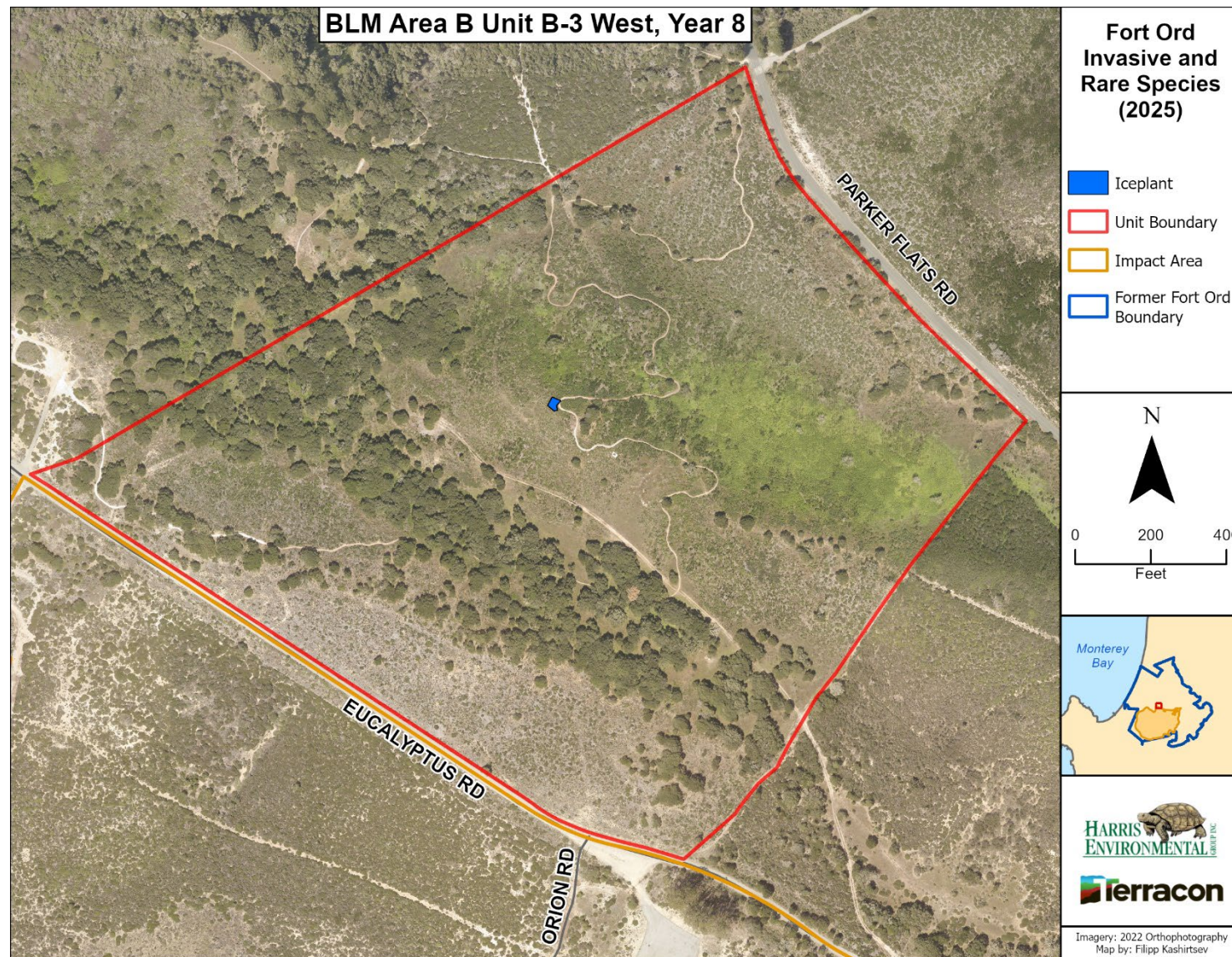
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**APPENDIX E**

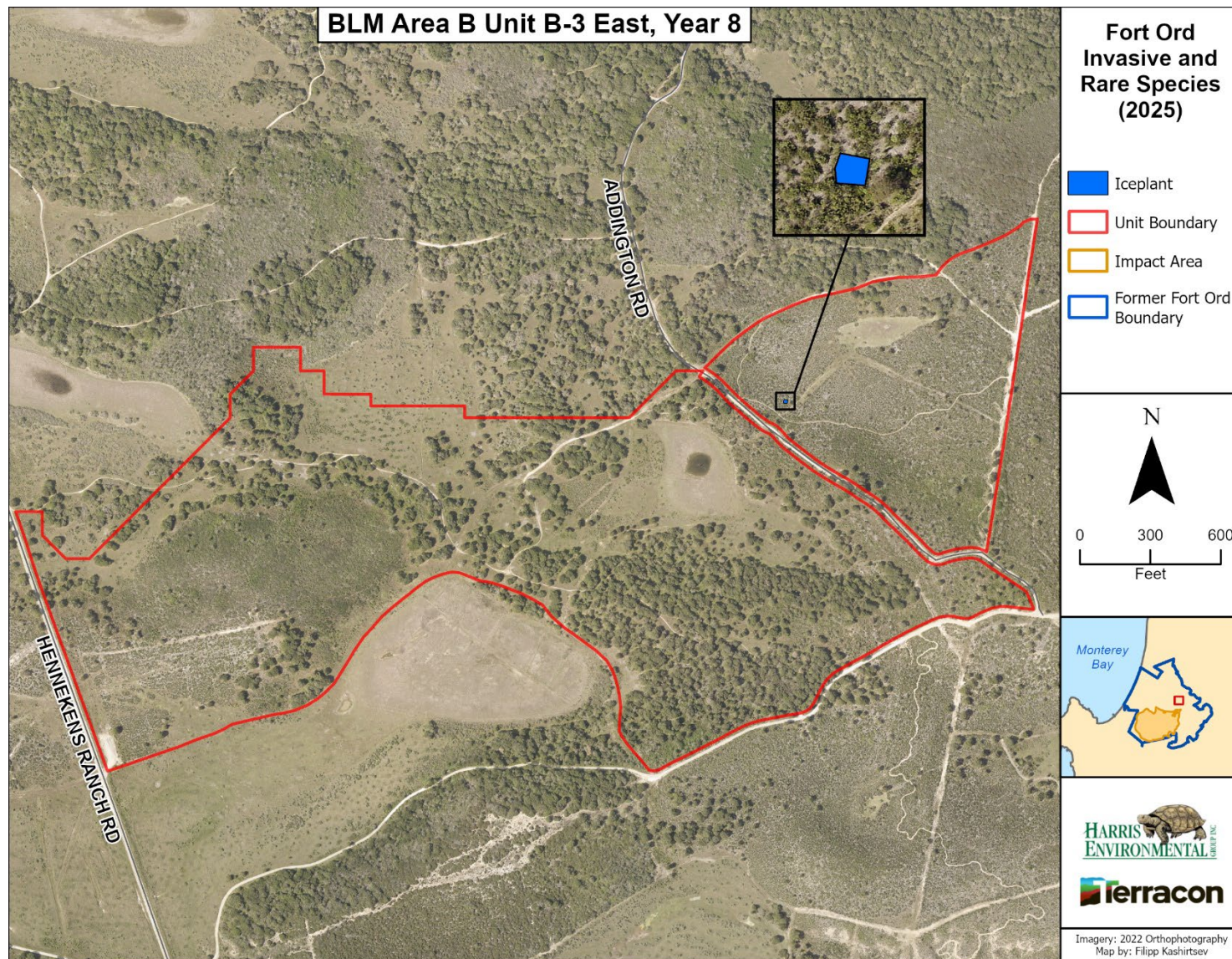
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**MAPS: INVASIVE AND RARE SPECIES**

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**Figure E-1.** Map of invasive species; BLM Area B Unit B-3 West (Year 8).



**Figure E-2.** Map of invasive species; BLM Area B Unit B-3 East (Year 8).

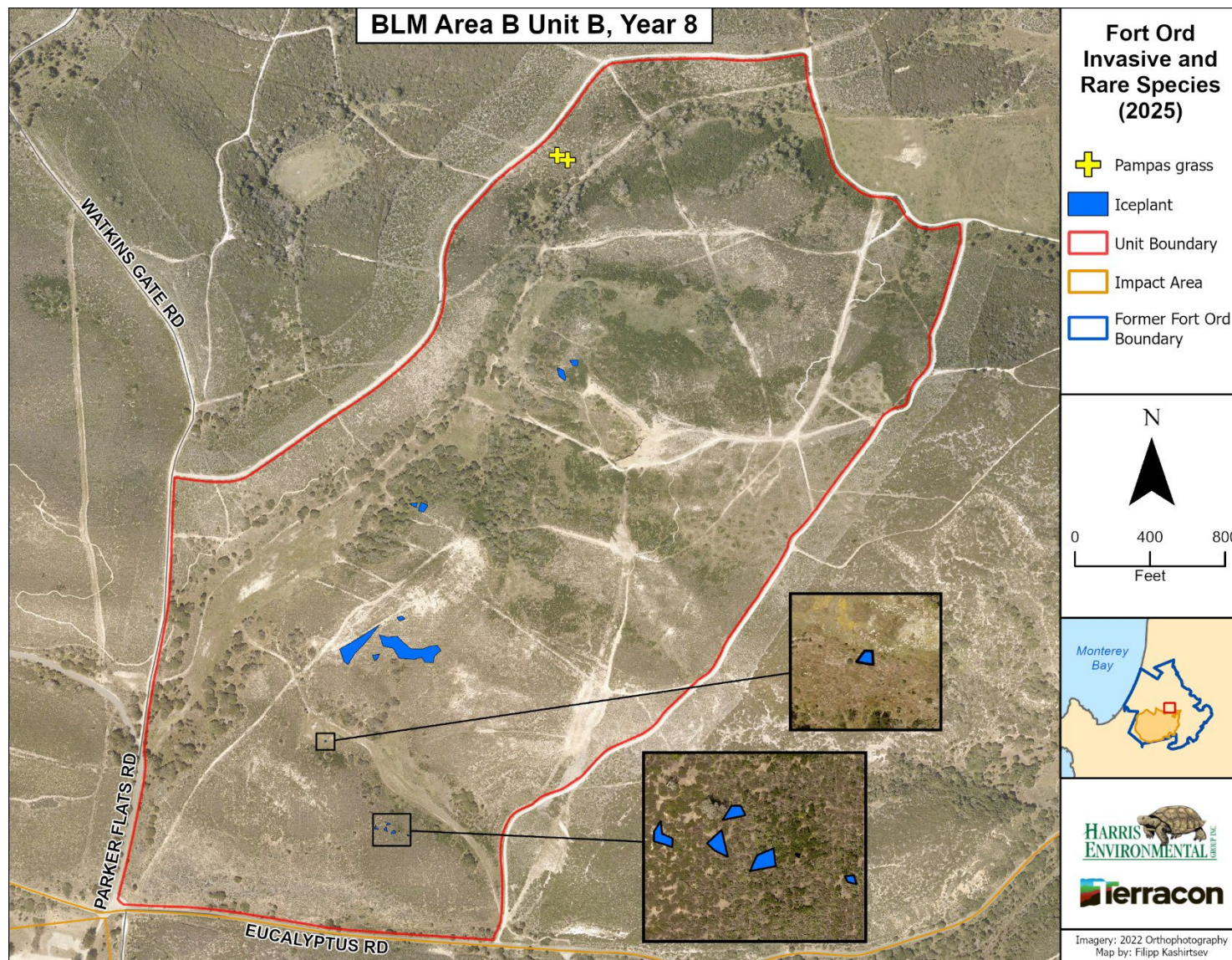


Figure E-3. Map of invasive species; BLM Area B Unit B (Year 8).



Figure E-4. Map of invasive species; BLM Area B Unit C (Year 8).

**APPENDIX F**

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**SHRUB TRANSECT COVER DATA**

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Table F-1. Year 3 shrub transects, Unit 5.

Code	Species	Unit 5											
		29-3	29-4	5-1	5-10	5-11	5-12	5-2	5-3	5-4	5-6	5-8	5-9
ACGL	<i>Acmispon glaber (Lotus scoparius)</i>	1.4	4.8	1.2	12	-	0.6	7.8	6.2	8.6	6	-	0.2
ADFA	<i>Adenostoma fasciculatum</i>	11.2	-	10.4	9.6	17	5.4	6.2	16.4	19	16.6	18.2	1.6
ARHO	<i>Arctostaphylos hookeri ssp. hookeri</i>	-	-	-	-	-	-	-	-	-	-	-	-
ARMO	<i>Arctostaphylos montereyensis</i>	0.2	-	-	-	-	-	-	-	-	-	-	-
ARPU	<i>Arctostaphylos pumila</i>	0.8	6.4	0.2	-	-	-	-	7	-	4.6	1.2	5.6
ARTO	<i>Arctostaphylos tomentosa ssp. tomentosa</i>	44.8	13.6	57.6	48.8	68.4	71.6	52	26.4	57.4	33.8	47.8	39.4
BAPI	<i>Baccharis pilularis</i>	0.6	0.6	-	-	-	-	-	-	-	0.4	-	-
CAED	<i>Carpobrotus edulis</i>	-	-	-	-	-	0.2	-	-	0.2	-	-	-
CEDE	<i>Ceanothus dentatus</i>	0.6	3.4	1	0.6	-	-	1.2	-	2.2	2.8	0.8	2.8
CERI	<i>Ceanothus rigidus</i>	-	-	1.2	1.4	-	-	0.8	-	0.6	0.6	0.2	-
CETH	<i>Ceanothus thyrsiflorus</i>	-	-	-	-	-	-	-	-	-	-	-	-
CRSC	<i>Crocianthemum scoparium</i>	2.4	6.4	1.4	1.4	-	2.4	3	1.2	0.2	7.8	1.6	6.4
DIAU	<i>Diplacus aurantiacus</i>	2.2	-	0.6	-	-	0.8	4.8	-	-	-	-	-
ERCA	<i>Eriodictyon californicum</i>	-	-	-	-	-	-	-	-	-	-	-	-
ERCO	<i>Eriophyllum confertiflorum</i>	4	1.4	-	-	-	-	-	1.6	-	1	0.8	0.2
ERER	<i>Ericameria ericoides</i>	-	-	-	-	-	-	-	-	-	-	-	-
ERFA	<i>Ericameria fasciculata</i>	-	3.2	-	-	-	-	-	-	-	-	-	-
FRCA	<i>Frangula (Rhamnus) californica</i>	-	-	-	-	-	-	-	-	-	-	-	-
FRCA2	<i>Fremontodendron californicum</i>	-	-	-	-	-	-	-	-	-	-	-	-
Gael	<i>Garrya elliptica</i>	0.2	-	3	0.2	5.8	0.4	6.6	-	-	-	0.2	-
HEAR	<i>Heteromeles arbutifolia</i>	-	-	-	2.8	-	-	-	-	-	-	-	-
LECA	<i>Lepechinia calycina</i>	-	-	5.6	5.6	0.2	0.4	2.4	-	2.2	-	-	-
LUAR	<i>Lupinus arboreus</i>	-	-	-	-	-	-	-	-	-	-	-	-
PIRA	<i>Pinus radiata</i>	-	-	-	-	-	-	-	-	-	-	-	-
QUAG	<i>Quercus agrifolia</i>	-	-	-	-	-	-	-	-	-	-	-	-
RIMA	<i>Ribes malvaceum</i>	-	-	-	-	-	-	-	-	-	-	-	-
RISA	<i>Ribes sanguineum</i>	-	-	-	-	-	-	-	-	-	-	-	-
RISP	<i>Ribes speciosum</i>	-	-	-	-	-	-	-	-	-	-	-	-
RUUR	<i>Rubus ursinus</i>	-	-	-	-	-	-	-	-	-	-	-	-
SAME	<i>Salvia mellifera</i>	1	0.8	2.4	4.4	-	-	1.6	3.2	1	2.2	3.4	8
SOUM	<i>Solanum umbelliferum</i>	-	-	-	-	-	-	-	-	-	-	-	-
SYMO	<i>Symphoricarpos mollis</i>	-	-	-	-	-	-	-	-	-	-	-	-
TODI	<i>Toxicodendron diversilobum</i>	7.8	21.6	4.4	7	-	1	1.2	-	-	-	-	-
BG	Bare ground	35.4	42.2	26	27.8	19	22.4	25.2	40.6	21.2	33	32.4	38
HERB	Herbaceous cover	0.2	8.6	0.2	6.8	-	-	1	3.8	1.6	2.6	0.8	1.4

Table F-2. Year 8 shrub transects, Unit B-2A.

Code	Species	Unit B-2A		
		Transect 1	Transect 3	Transect 4
ACGL	<i>Acmispon glaber (Lotus scoparius)</i>	0.6	-	-
ADFA	<i>Adenostoma fasciculatum</i>	44	5.8	60
ARHO	<i>Arctostaphylos hookeri ssp. hookeri</i>	-	-	-
ARMO	<i>Arctostaphylos montereyensis</i>	-	-	-
ARPU	<i>Arctostaphylos pumila</i>	-	-	-
ARTO	<i>Arctostaphylos tomentosa ssp. tomentosa</i>	19.2	77.4	13.6
BAPI	<i>Baccharis pilularis</i>	-	-	-
CAED	<i>Carpobrotus edulis</i>	-	-	-
CEDE	<i>Ceanothus dentatus</i>	-	0.6	-
CERI	<i>Ceanothus rigidus</i>	-	0.4	3
CETH	<i>Ceanothus thyrsiflorus</i>	-	-	-
CRSC	<i>Crocانthemum scoparium</i>	0.6	2.2	-
DIAU	<i>Diplacus aurantiacus</i>	0.4	1.2	7.6
ERCA	<i>Eriodictyon californicum</i>	-	-	-
ERCO	<i>Eriophyllum confertiflorum</i>	-	0.4	0.6
ERER	<i>Ericameria ericoides</i>	-	-	-
ERFA	<i>Ericameria fasciculata</i>	-	-	-
FRCA	<i>Frangula (Rhamnus) californica</i>	-	-	-
FRCA2	<i>Fremontodendron californicum</i>	-	-	-
GAEL	<i>Garrya elliptica</i>	-	-	-
HEAR	<i>Heteromeles arbutifolia</i>	-	-	-
LECA	<i>Lepechinia calycina</i>	-	6.8	3.4
LUAR	<i>Lupinus arboreus</i>	-	-	-
PIRA	<i>Pinus radiata</i>	-	-	-
QUAG	<i>Quercus agrifolia</i>	23.2	1.6	-
RIMA	<i>Ribes malvaceum</i>	-	-	-
RISA	<i>Ribes sanguineum</i>	-	-	-
RISP	<i>Ribes speciosum</i>	-	-	-
RUUR	<i>Rubus ursinus</i>	-	-	-
SAME	<i>Salvia mellifera</i>	13.4	-	-
SOUM	<i>Solanum umbelliferum</i>	-	-	-
SYMO	<i>Symphoricarpos mollis</i>	-	-	-
TODI	<i>Toxicodendron diversilobum</i>	0.2	-	3.6
BG	Bare ground	20	14.6	21.2
HERB	Herbaceous cover	0.8	2.2	5.6

Table F-3. Year 8 shrub transects, BLM Area B Unit B-3 West.

Code	Species	BLM Area B Unit B-3 West					
		BLM-B3W-1	BLM-B3W-2	BLM-B3W-3	BLM-B3W-4	BLM-B3W-5	BLM-B3W-6
ACGL	<i>Acmispon glaber (Lotus scoparius)</i>	8	2.4	0.6	2.6	3.4	5.6
ADFA	<i>Adenostoma fasciculatum</i>	17.4	15.6	6.4	3	17.8	23.4
ARHO	<i>Arctostaphylos hookeri ssp. hookeri</i>	-	-	-	-	-	-
ARMO	<i>Arctostaphylos montereyensis</i>	-	-	-	-	-	-
ARPU	<i>Arctostaphylos pumila</i>	14.8	9.8	24.6	33.6	15.6	15
ARTO	<i>Arctostaphylos tomentosa ssp. tomentosa</i>	9.6	26.8	19	6.8	12.2	6.4
BAPI	<i>Baccharis pilularis</i>	-	-	-	-	-	8.4
CAED	<i>Carpobrotus edulis</i>	-	0.6	-	0.8	-	-
CEDE	<i>Ceanothus dentatus</i>	3.8	3.2	2	8	3.8	3.4
CERI	<i>Ceanothus rigidus</i>	6.6	7.2	5.2	15.2	7	5.8
CETH	<i>Ceanothus thyrsiflorus</i>	-	-	-	-	-	-
CRSC	<i>Crocانthemum scoparium</i>	11.8	17.4	11.8	18.6	8.4	11.8
DIAU	<i>Diplacus aurantiacus</i>	7.4	8	3.6	2.4	2.6	13
ERCA	<i>Eriodictyon californicum</i>	-	-	-	-	-	-
ERCO	<i>Eriophyllum confertiflorum</i>	4.2	5	0.8	2.4	-	0.4
ERER	<i>Ericameria ericoides</i>	-	-	1	-	0.2	-
ERFA	<i>Ericameria fasciculata</i>	-	-	0.6	-	-	-
FRCA	<i>Frangula (Rhamnus) californica</i>	-	-	-	-	0.4	-
FRCA2	<i>Fremontodendron californicum</i>	-	-	-	-	-	-
GAEL	<i>Garrya elliptica</i>	-	-	-	-	-	-
HEAR	<i>Heteromeles arbutifolia</i>	-	-	-	-	-	-
LECA	<i>Lepechinia calycina</i>	-	-	-	-	-	-
LUAR	<i>Lupinus arboreus</i>	-	-	-	-	-	-
PIRA	<i>Pinus radiata</i>	-	-	-	-	-	-
QUAG	<i>Quercus agrifolia</i>	0.8	-	-	-	-	-
RIMA	<i>Ribes malvaceum</i>	-	-	-	-	-	-
RISA	<i>Ribes sanguineum</i>	-	-	-	-	-	-
RISP	<i>Ribes speciosum</i>	-	-	-	-	-	-
RUUR	<i>Rubus ursinus</i>	-	-	-	-	-	-
SAME	<i>Salvia mellifera</i>	4.2	2	5	5.4	6.8	3.6
SOUM	<i>Solanum umbelliferum</i>	-	-	-	-	-	-
SYMO	<i>Symphoricarpos mollis</i>	-	-	-	-	-	-
TODI	<i>Toxicodendron diversilobum</i>	0.4	1	-	-	-	-
BG	Bare ground	27.8	23.4	27.8	26.4	33.4	23.6
HERB	Herbaceous cover	8.2	1.8	6	2.2	7.8	5

Table F-4. Year 8 shrub transects, BLM Area B Unit B-3 East.

Code	Species	BLM Area B Unit B-3 East					
		BLM-B3E-1	BLM-B3E-10	BLM-B3E-11	BLM-B3E-2	BLM-B3E-3	BLM-B3E-4
ACGL	<i>Acmispon glaber (Lotus scoparius)</i>	2.2	-	1	-	-	-
ADFA	<i>Adenostoma fasciculatum</i>	17.2	37.2	45.4	37.6	37.6	54.4
ARHO	<i>Arctostaphylos hookeri ssp. hookeri</i>	15.6	-	-	-	-	-
ARMO	<i>Arctostaphylos montereyensis</i>	24.4	2.2	7.8	1.8	28.8	2.2
ARPU	<i>Arctostaphylos pumila</i>	-	-	-	-	-	-
ARTO	<i>Arctostaphylos tomentosa ssp. tomentosa</i>	33	47.6	29.2	24.8	25	2.2
BAPI	<i>Baccharis pilularis</i>	-	2.8	2.8	26.6	19.2	-
CAED	<i>Carpobrotus edulis</i>	0.2	-	-	-	-	-
CEDE	<i>Ceanothus dentatus</i>	-	-	3.6	-	-	-
CERI	<i>Ceanothus rigidus</i>	0.6	4	1	7.8	0.6	-
CETH	<i>Ceanothus thyrsiflorus</i>	-	5	8	8.4	13	-
CRSC	<i>Crocانthemum scoparium</i>	0.4	0.6	-	-	-	-
DIAU	<i>Diplacus aurantiacus</i>	2	1.4	21.4	-	4	-
ERCA	<i>Eriodictyon californicum</i>	-	-	-	-	-	-
ERCO	<i>Eriophyllum confertiflorum</i>	1.8	-	-	-	-	-
ERER	<i>Ericameria ericoides</i>	-	-	-	-	-	-
ERFA	<i>Ericameria fasciculata</i>	-	-	-	-	-	-
FRCA	<i>Frangula (Rhamnus) californica</i>	-	-	-	2	-	-
FRCA2	<i>Fremontodendron californicum</i>	-	-	-	-	-	-
GAEL	<i>Garrya elliptica</i>	-	-	-	-	-	-
HEAR	<i>Heteromeles arbutifolia</i>	-	-	-	-	0.4	-
LECA	<i>Lepechinia calycina</i>	0.2	7	6	-	-	-
LUAR	<i>Lupinus arboreus</i>	-	-	-	-	-	-
PIRA	<i>Pinus radiata</i>	-	2	-	-	-	-
QUAG	<i>Quercus agrifolia</i>	-	-	0.4	-	-	-
RIMA	<i>Ribes malvaceum</i>	-	-	0.8	3.2	1.4	-
RISA	<i>Ribes sanguineum</i>	-	-	-	0.6	-	-
RISP	<i>Ribes speciosum</i>	-	-	-	-	-	0.4
RUUR	<i>Rubus ursinus</i>	-	-	2	-	-	-
SAME	<i>Salvia mellifera</i>	2.2	9.4	6	-	0.6	-
SOUM	<i>Solanum umbelliferum</i>	-	-	-	-	-	-
SYMO	<i>Symphoricarpos mollis</i>	-	-	0.6	-	-	-
TODI	<i>Toxicodendron diversilobum</i>	-	-	8.8	-	3.4	-
BG	Bare ground	17	9.4	5.4	17	21.6	35.2
HERB	Herbaceous cover	4	3	1.6	7.4	0.8	9.2

Table F-4. Year 8 shrub transects, BLM Area B Unit B-3 East (cont'd).

Code	Species	BLM Area B Unit B-3 East				
		BLM-B3E-5	BLM-B3E-6	BLM-B3E-7	BLM-B3E-8	BLM-B3E-9
ACGL	<i>Acmispon glaber (Lotus scoparius)</i>	-	-	-	0.4	-
ADFA	<i>Adenostoma fasciculatum</i>	57.4	11.8	66.2	73.8	46.6
ARHO	<i>Arctostaphylos hookeri ssp. hookeri</i>	-	0.8	6.8	-	1
ARMO	<i>Arctostaphylos montereyensis</i>	1.4	-	-	5	1.2
ARPU	<i>Arctostaphylos pumila</i>	-	-	-	-	-
ARTO	<i>Arctostaphylos tomentosa ssp. tomentosa</i>	2.8	53.6	7.2	-	43.2
BAPI	<i>Baccharis pilularis</i>	2.2	-	-	-	-
CAED	<i>Carpobrotus edulis</i>	-	-	-	-	-
CEDE	<i>Ceanothus dentatus</i>	-	-	-	-	-
CERI	<i>Ceanothus rigidus</i>	0.6	-	1.2	-	-
CETH	<i>Ceanothus thyrsiflorus</i>	-	2	-	3	0.2
CRSC	<i>Crocانthemum scoparium</i>	-	-	-	-	-
DIAU	<i>Diplacus aurantiacus</i>	-	-	-	1.8	2
ERCA	<i>Eriodictyon californicum</i>	-	4	-	-	-
ERCO	<i>Eriophyllum confertiflorum</i>	-	0.6	0.6	-	1.4
ERER	<i>Ericameria ericoides</i>	-	-	-	-	-
ERFA	<i>Ericameria fasciculata</i>	-	-	-	-	-
FRCA	<i>Frangula (Rhamnus) californica</i>	-	-	-	-	-
FRCA2	<i>Fremontodendron californicum</i>	-	-	-	-	-
GAEL	<i>Garrya elliptica</i>	-	-	-	-	-
HEAR	<i>Heteromeles arbutifolia</i>	-	-	-	-	-
LECA	<i>Lepechinia calycina</i>	-	5	-	1.8	3.4
LUAR	<i>Lupinus arboreus</i>	-	-	-	-	-
PIRA	<i>Pinus radiata</i>	-	-	-	-	-
QUAG	<i>Quercus agrifolia</i>	-	-	-	-	-
RIMA	<i>Ribes malvaceum</i>	1.6	-	-	-	1.2
RISA	<i>Ribes sanguineum</i>	-	-	-	2.2	-
RISP	<i>Ribes speciosum</i>	-	-	-	-	-
RUUR	<i>Rubus ursinus</i>	-	-	-	-	-
SAME	<i>Salvia mellifera</i>	-	28.4	-	0.6	-
SOUM	<i>Solanum umbelliferum</i>	-	-	-	-	-
SYMO	<i>Symphoricarpos mollis</i>	-	-	-	-	-
TODI	<i>Toxicodendron diversilobum</i>	-	-	0.4	-	-
BG	Bare ground	30.8	16.2	8.6	18.6	16.4
HERB	Herbaceous cover	10	0.4	26.4	4.8	3.2

Table F-5. Year 8 shrub transects, BLM Area B Unit A Southern Containment Line.

Code	Species	BLM Area B Unit A Southern Containment Line						
		BLMB_A-10	BLMB_A-11	BLMB_A-12	BLMB_A-2	BLMB_A-6	BLMB_A-8	BLMB_A-9
ACGL	<i>Acemispom glaber (Lotus scoparius)</i>	-	-	-	0.6	-	-	-
ADFA	<i>Adenostoma fasciculatum</i>	2.2	6.8	4.8	15.2	10.8	3.6	3.8
ARHO	<i>Arctostaphylos hookeri ssp. hookeri</i>	2.6	-	2	-	1.8	6.6	10.6
ARMO	<i>Arctostaphylos montereyensis</i>	7.2	-	-	-	-	0.4	3
ARPU	<i>Arctostaphylos pumila</i>	-	-	-	5.8	-	-	-
ARTO	<i>Arctostaphylos tomentosa ssp. tomentosa</i>	77	79.8	79	57	57.2	79.6	70.4
BAPI	<i>Baccharis pilularis</i>	10.2	1.2	1	-	4.4	0.4	2.2
CAED	<i>Carpobrotus edulis</i>	-	-	-	-	-	-	-
CEDE	<i>Ceanothus dentatus</i>	-	8.8	-	0.6	-	-	3.4
CERI	<i>Ceanothus rigidus</i>	-	-	-	1	-	-	0.8
CETH	<i>Ceanothus thyrsiflorus</i>	-	-	-	-	-	-	1.6
CRSC	<i>Crocانthemum scoparium</i>	-	0.4	1	4.4	-	-	-
DIAU	<i>Diplacus aurantiacus</i>	7.6	4.2	4.4	5.2	0.4	3.8	3.6
ERCA	<i>Eriodictyon californicum</i>	-	-	-	-	-	-	-
ERCO	<i>Eriophyllum confertiflorum</i>	-	-	-	1	-	-	-
ERER	<i>Ericameria ericoides</i>	-	-	-	-	-	-	-
ERFA	<i>Ericameria fasciculata</i>	-	-	-	-	-	-	-
FRCA	<i>Frangula (Rhamnus) californica</i>	0.4	2.4	-	0.6	-	-	-
FRCA2	<i>Fremontodendron californicum</i>	0.2	-	-	-	-	-	-
GAEL	<i>Garrya elliptica</i>	5.2	0.8	7.2	-	4	1.2	-
HEAR	<i>Heteromeles arbutifolia</i>	-	-	-	-	-	-	-
LECA	<i>Lepechinia calycina</i>	-	17.2	5	-	-	1	1.4
LUAR	<i>Lupinus arboreus</i>	-	-	-	-	-	-	-
PIRA	<i>Pinus radiata</i>	-	-	-	-	-	-	-
QUAG	<i>Quercus agrifolia</i>	6	-	-	-	-	-	-
RIMA	<i>Ribes malvaceum</i>	-	-	-	-	-	-	-
RISA	<i>Ribes sanguineum</i>	-	-	-	-	-	-	-
RISP	<i>Ribes speciosum</i>	-	-	-	-	-	-	-
RUUR	<i>Rubus ursinus</i>	-	-	-	-	-	-	-
SAME	<i>Salvia mellifera</i>	-	3.2	0.2	6.2	3.2	-	-
SOUM	<i>Solanum umbelliferum</i>	-	-	-	-	-	-	-
SYMO	<i>Symphoricarpos mollis</i>	-	0.6	-	-	-	-	-
TODI	<i>Toxicodendron diversilobum</i>	11.4	5	0.8	-	-	-	6.4
BG	Bare ground	5.6	8.2	13.8	15.2	25.2	15.8	11.8
HERB	Herbaceous cover	-	-	1.4	4.2	2.4	-	4.8

Table F-6. Year 8 shrub transects, BLM Area B Unit B.

Code	Species	BLM Area B Unit B						
		BLMB_B-1	BLMB_B-10	BLMB_B-11	BLMB_B-12	BLMB_B-13	BLMB_B-14	BLMB_B-15
ACGL	<i>Acemispom glaber (Lotus scoparius)</i>	-	4.2	17.4	-	7.2	-	11.6
ADFA	<i>Adenostoma fasciculatum</i>	-	8.8	12.6	1.4	1.2	-	6.8
ARHO	<i>Arctostaphylos hookeri ssp. hookeri</i>	-	6	0.4	13.6	0.8	-	32.6
ARMO	<i>Arctostaphylos montereyensis</i>	-	-	5.4	-	2	-	1.4
ARPU	<i>Arctostaphylos pumila</i>	-	-	-	6.8	-	6	-
ARTO	<i>Arctostaphylos tomentosa ssp. tomentosa</i>	11	32.6	10.8	14	44.4	27	7.2
BAPI	<i>Baccharis pilularis</i>	1.6	3.2	0.2	3.6	-	2.2	0.6
CAED	<i>Carpobrotus edulis</i>	-	-	0.8	-	1	0.4	2.4
CEDE	<i>Ceanothus dentatus</i>	58.8	7.6	-	67.8	32.6	34.2	14.2
CERI	<i>Ceanothus rigidus</i>	13.6	1.4	12.4	9.4	4.4	19.6	10.6
CETH	<i>Ceanothus thrysiflorus</i>	15.4	6	-	-	13.6	-	-
CRSC	<i>Crocانthemum scoparium</i>	3.8	38.4	13.4	1.8	3	3.6	3
DIAU	<i>Diplacus aurantiacus</i>	-	-	-	1.6	-	0.4	-
ERCA	<i>Eriodictyon californicum</i>	-	-	-	-	-	-	-
ERCO	<i>Eriophyllum confertiflorum</i>	-	6.8	0.6	-	-	-	1
ERER	<i>Ericameria ericoides</i>	-	-	-	-	-	-	-
ERFA	<i>Ericameria fasciculata</i>	-	-	-	-	-	-	-
FRCA	<i>Frangula (Rhamnus) californica</i>	-	-	-	-	-	-	-
FRCA2	<i>Fremontodendron californicum</i>	-	-	-	-	-	-	-
GAEL	<i>Garrya elliptica</i>	-	-	-	-	-	-	-
HEAR	<i>Heteromeles arbutifolia</i>	-	-	-	-	-	-	-
LECA	<i>Lepechinia calycina</i>	0.8	4	-	-	1.4	-	-
LUAR	<i>Lupinus arboreus</i>	-	-	-	-	-	-	-
PIRA	<i>Pinus radiata</i>	-	-	-	-	-	-	-
QUAG	<i>Quercus agrifolia</i>	-	-	-	-	-	-	-
RIMA	<i>Ribes malvaceum</i>	-	-	-	-	-	-	-
RISA	<i>Ribes sanguineum</i>	-	-	-	-	-	-	-
RISP	<i>Ribes speciosum</i>	-	-	-	-	-	-	-
RUUR	<i>Rubus ursinus</i>	-	-	-	-	-	-	-
SAME	<i>Salvia mellifera</i>	-	-	5.4	-	2	-	-
SOUM	<i>Solanum umbelliferum</i>	-	-	-	-	-	-	-
SYMO	<i>Symphoricarpos mollis</i>	-	-	-	-	-	-	-
TODI	<i>Toxicodendron diversilobum</i>	1.4	-	-	-	-	-	-
BG	Bare ground	13.6	16.6	35.4	12.8	16.2	27.8	22
HERB	Herbaceous cover	-	-	6.8	-	-	1.2	4.2

Table F-6. Year 8 shrub transects, BLM Area B Unit B (cont'd).

Code	Species	BLM Area B Unit B						
		BLMB_B-16	BLMB_B-17	BLMB_B-18	BLMB_B-19	BLMB_B-2	BLMB_B-20	BLMB_B-21
ACGL	<i>Acmispon glaber (Lotus scoparius)</i>	12	-	3	2	-	2.4	-
ADFA	<i>Adenostoma fasciculatum</i>	2.8	22	2.6	2.2	8.6	2.6	6.6
ARHO	<i>Arctostaphylos hookeri ssp. hookeri</i>	2.2	51.6	25.6	0.8	5	-	3.2
ARMO	<i>Arctostaphylos montereyensis</i>	3	-	-	-	0.8	0.6	-
ARPU	<i>Arctostaphylos pumila</i>	-	-	-	-	-	-	-
ARTO	<i>Arctostaphylos tomentosa ssp. tomentosa</i>	42	-	-	-	11.6	36	21.6
BAPI	<i>Baccharis pilularis</i>	-	6	-	1.8	-	-	0.8
CAED	<i>Carpobrotus edulis</i>	3	3.4	-	-	-	-	-
CEDE	<i>Ceanothus dentatus</i>	16.4	-	2.2	-	15.4	63.6	10.2
CERI	<i>Ceanothus rigidus</i>	14.6	8.4	15.2	0.4	24.6	3	-
CETH	<i>Ceanothus thyrsoiflorus</i>	-	11.2	52	78.6	26.6	4.4	54.8
CRSC	<i>Crocانthemum scoparium</i>	21.4	0.2	5.2	3.4	17.4	5.6	1.2
DIAU	<i>Diplacus aurantiacus</i>	2.2	3.2	0.6	-	1.4	-	2
ERCA	<i>Eriodictyon californicum</i>	-	-	15.2	26.4	1	-	8.4
ERCO	<i>Eriophyllum confertiflorum</i>	0.2	-	1	0.6	7	-	5.6
ERER	<i>Ericameria ericoides</i>	-	-	-	-	-	-	-
ERFA	<i>Ericameria fasciculata</i>	-	-	-	-	-	-	-
FRCA	<i>Frangula (Rhamnus) californica</i>	-	-	-	-	-	-	-
FRCA2	<i>Fremontodendron californicum</i>	-	-	8.2	15.6	-	0.8	4.6
GAEL	<i>Garrya elliptica</i>	-	-	-	-	-	0.4	3.2
HEAR	<i>Heteromeles arbutifolia</i>	-	-	-	-	-	-	-
LECA	<i>Lepechinia calycina</i>	-	-	5.4	20	4.4	8.6	16.8
LUAR	<i>Lupinus arboreus</i>	-	-	-	-	-	-	-
PIRA	<i>Pinus radiata</i>	-	-	-	-	-	-	-
QUAG	<i>Quercus agrifolia</i>	-	-	-	-	-	-	-
RIMA	<i>Ribes malvaceum</i>	-	-	-	-	-	-	-
RISA	<i>Ribes sanguineum</i>	-	-	-	-	-	-	-
RISP	<i>Ribes speciosum</i>	-	-	-	-	-	-	-
RUUR	<i>Rubus ursinus</i>	-	-	-	-	-	-	-
SAME	<i>Salvia mellifera</i>	7.2	-	0.2	-	1	-	2.4
SOUM	<i>Solanum umbelliferum</i>	-	-	-	-	-	-	-
SYMO	<i>Symphoricarpos mollis</i>	-	-	-	0.4	-	-	-
TODI	<i>Toxicodendron diversilobum</i>	-	3.4	-	0.8	-	-	-
BG	Bare ground	14.4	15.8	10.4	3.8	12.4	13.8	8.6
HERB	Herbaceous cover	2.4	1.8	-	-	3	1	-

Table F-6. Year 8 shrub transects, BLM Area B Unit B (cont'd).

Code	Species	BLM Area B Unit B						
		BLMB_B-22	BLMB_B-23	BLMB_B-24	BLMB_B-25	BLMB_B-3	BLMB_B-4	BLMB_B-5
ACGL	<i>Acmispon glaber (Lotus scoparius)</i>	3	20.4	8.4	1.6	-	-	9.2
ADFA	<i>Adenostoma fasciculatum</i>	1.8	0.4	2.2	5.8	-	-	2.2
ARHO	<i>Arctostaphylos hookeri ssp. hookeri</i>	1.2	-	0.8	-	5.8	-	-
ARMO	<i>Arctostaphylos montereyensis</i>	-	-	-	0.6	1.4	-	-
ARPU	<i>Arctostaphylos pumila</i>	-	7.4	-	-	-	-	17
ARTO	<i>Arctostaphylos tomentosa ssp. tomentosa</i>	14.8	31.4	36.4	26.4	10.2	17.8	28.2
BAPI	<i>Baccharis pilularis</i>	-	2	0.8	-	-	1.2	0.4
CAED	<i>Carpobrotus edulis</i>	-	0.2	-	-	-	2.6	0.8
CEDE	<i>Ceanothus dentatus</i>	66.4	15.4	18	46.4	70.8	63	-
CERI	<i>Ceanothus rigidus</i>	12.2	15.8	21.2	3.2	10.2	7.2	4.6
CETH	<i>Ceanothus thyrsiflorus</i>	3.8	-	-	17.6	8.4	5.4	-
CRSC	<i>Crocانthemum scoparium</i>	2.8	2.2	3.6	16.8	2.6	8.4	1
DIAU	<i>Diplacus aurantiacus</i>	-	-	-	-	-	-	-
ERCA	<i>Eriodictyon californicum</i>	2.4	-	-	-	-	-	-
ERCO	<i>Eriophyllum confertiflorum</i>	1	-	-	3.6	-	-	5
ERER	<i>Ericameria ericoides</i>	-	-	-	-	-	-	-
ERFA	<i>Ericameria fasciculata</i>	-	-	-	-	-	-	-
FRCA	<i>Fragula (Rhamnus) californica</i>	-	-	-	-	-	-	1.8
FRCA2	<i>Fremontodendron californicum</i>	1.6	-	-	-	-	5.2	-
GAEL	<i>Garrya elliptica</i>	0.6	-	-	-	-	-	-
HEAR	<i>Heteromeles arbutifolia</i>	-	-	-	-	3	-	-
LECA	<i>Lepechinia calycina</i>	2.6	-	14.4	2.2	3.8	-	-
LUAR	<i>Lupinus arboreus</i>	-	-	-	-	-	-	5.8
PIRA	<i>Pinus radiata</i>	-	-	-	-	-	-	-
QUAG	<i>Quercus agrifolia</i>	-	-	-	-	-	-	-
RIMA	<i>Ribes malvaceum</i>	-	-	-	-	-	-	-
RISA	<i>Ribes sanguineum</i>	-	-	-	-	-	-	-
RISP	<i>Ribes speciosum</i>	-	-	-	-	-	-	-
RUUR	<i>Rubus ursinus</i>	-	-	-	-	-	-	-
SAME	<i>Salvia mellifera</i>	-	-	1.8	-	-	3.8	-
SOUM	<i>Solanum umbelliferum</i>	-	0.2	-	-	-	-	-
SYMO	<i>Symphoricarpos mollis</i>	-	0	9	0.6	-	-	-
TODI	<i>Toxicodendron diversilobum</i>	-	0.8	-	-	-	-	0.6
BG	Bare ground	12.2	13.2	17.8	13.6	15	11.4	24.8
HERB	Herbaceous cover	0.6	19.6	1	0.8	0.2	-	30.6

Table F-6. Year 8 shrub transects, BLM Area B Unit B (cont'd).

Code	Species	BLM Area B Unit B				
		BLMB_B-6	BLMB_B-7	BLMB_B-9	T1	T2
ACGL	<i>Acmispon glaber (Lotus scoparius)</i>	3.2	21.8	17.8	6.4	-
ADFA	<i>Adenostoma fasciculatum</i>	3.2	14.6	24.2	16.4	33.8
ARHO	<i>Arctostaphylos hookeri ssp. hookeri</i>	-	-	-	-	4
ARMO	<i>Arctostaphylos montereyensis</i>	-	0.2	-	2.6	-
ARPU	<i>Arctostaphylos pumila</i>	-	0.6	-	-	-
ARTO	<i>Arctostaphylos tomentosa ssp. tomentosa</i>	64.4	14.8	5.2	8.6	11.4
BAPI	<i>Baccharis pilularis</i>	-	-	6	1.4	-
CAED	<i>Carpobrotus edulis</i>	-	2.6	9.8	-	-
CEDE	<i>Ceanothus dentatus</i>	9.4	-	-	12.4	10.2
CERI	<i>Ceanothus rigidus</i>	5.6	12	3	17.6	3
CETH	<i>Ceanothus thyrsiflorus</i>	-	30.2	56.4	0.6	60.6
CRSC	<i>Crocانthemum scoparium</i>	3.2	9.6	1	15	2.2
DIAU	<i>Diplacus aurantiacus</i>	-	1.8	2.2	-	-
ERCA	<i>Eriodictyon californicum</i>	-	-	16.6	-	-
ERCO	<i>Eriophyllum confertiflorum</i>	-	5.6	-	2.6	-
ERER	<i>Ericameria ericoides</i>	-	-	-	-	-
ERFA	<i>Ericameria fasciculata</i>	-	-	-	-	-
FRCA	<i>Frangula (Rhamnus) californica</i>	-	-	-	-	-
FRCA2	<i>Fremontodendron californicum</i>	-	-	10	-	-
GAEL	<i>Garrya elliptica</i>	-	1.6	-	-	-
HEAR	<i>Heteromeles arbutifolia</i>	-	-	-	-	-
LECA	<i>Lepechinia calycina</i>	4	-	2.2	-	21.8
LUAR	<i>Lupinus arboreus</i>	-	-	-	-	-
PIRA	<i>Pinus radiata</i>	-	-	-	-	-
QUAG	<i>Quercus agrifolia</i>	-	-	-	-	-
RIMA	<i>Ribes malvaceum</i>	-	-	-	-	-
RISA	<i>Ribes sanguineum</i>	-	-	-	-	-
RISP	<i>Ribes speciosum</i>	-	-	-	-	-
RUUR	<i>Rubus ursinus</i>	-	-	-	-	-
SAME	<i>Salvia mellifera</i>	9.4	-	-	8.2	-
SOUM	<i>Solanum umbelliferum</i>	-	-	-	-	-
SYMO	<i>Symphoricarpos mollis</i>	-	-	-	-	-
TODI	<i>Toxicodendron diversilobum</i>	-	-	1.2	-	-
BG	Bare ground	15.8	15	10.4	28.4	14
HERB	Herbaceous cover	0.6	4.8	1.4	-	3

Table F-7. Year 8 shrub transects, BLM Area B Unit C.

Code	Species	BLM Area B Unit C						
		BLMB_C-1	BLMB_C-10	BLMB_C-12	BLMB_C-13	BLMB_C-14	BLMB_C-2	BLMB_C-3
ACGL	<i>Acmispon glaber (Lotus scoparius)</i>	14.8	-	17.4	1.4	-	15.4	-
ADFA	<i>Adenostoma fasciculatum</i>	8.6	-	8	28.8	4.8	14.8	3.4
ARHO	<i>Arctostaphylos hookeri ssp. hookeri</i>	0.2	-	-	-	0.6	-	0.8
ARMO	<i>Arctostaphylos montereyensis</i>	0.2	-	-	1.6	-	0.6	3.8
ARPU	<i>Arctostaphylos pumila</i>	4	-	-	0.6	-	13.6	0.8
ARTO	<i>Arctostaphylos tomentosa ssp. tomentosa</i>	19.8	41.4	45.6	17.4	51.6	7.8	25.8
BAPI	<i>Baccharis pilularis</i>	-	3.4	-	-	-	-	-
CAED	<i>Carpobrotus edulis</i>	-	-	-	-	-	-	-
CEDE	<i>Ceanothus dentatus</i>	14	45	21.2	11.4	7.2	17.2	28.6
CERI	<i>Ceanothus rigidus</i>	15.2	6	6.2	12.2	3	17.6	12.2
CETH	<i>Ceanothus thyrsiflorus</i>	-	-	1	11.2	37.6	-	39
CRSC	<i>Crocانthemum scoparium</i>	31.6	5.4	28	4	-	59.8	12.6
DIAU	<i>Diplacus aurantiacus</i>	-	-	-	0.6	0.2	0.2	-
ERCA	<i>Eriodictyon californicum</i>	-	-	-	-	-	-	-
ERCO	<i>Eriophyllum confertiflorum</i>	-	-	-	-	-	-	-
ERER	<i>Ericameria ericoides</i>	-	-	-	-	-	-	-
ERFA	<i>Ericameria fasciculata</i>	-	-	-	-	-	-	-
FRCA	<i>Frangula (Rhamnus) californica</i>	-	-	-	-	-	-	-
FRCA2	<i>Fremontodendron californicum</i>	-	-	-	-	-	-	-
GAEL	<i>Garrya elliptica</i>	-	-	0.6	2.8	4	-	-
HEAR	<i>Heteromeles arbutifolia</i>	-	-	-	3.2	1	-	-
LECA	<i>Lepechinia calycina</i>	-	10	2	3.4	31.4	-	0.8
LUAR	<i>Lupinus arboreus</i>	-	-	-	-	-	-	-
PIRA	<i>Pinus radiata</i>	-	-	-	-	-	-	-
QUAG	<i>Quercus agrifolia</i>	-	-	-	-	-	-	-
RIMA	<i>Ribes malvaceum</i>	-	-	-	-	-	-	-
RISA	<i>Ribes sanguineum</i>	-	-	-	-	-	-	-
RISP	<i>Ribes speciosum</i>	-	-	-	-	-	-	-
RUUR	<i>Rubus ursinus</i>	-	-	-	-	-	-	-
SAME	<i>Salvia mellifera</i>	3.6	-	2.2	13.2	-	15.6	4
SOUM	<i>Solanum umbelliferum</i>	-	-	-	-	-	-	-
SYMO	<i>Symphoricarpos mollis</i>	-	-	-	-	2.4	-	-
TODI	<i>Toxicodendron diversilobum</i>	-	1.6	-	-	-	-	-
BG	Bare ground	20.2	17	15.2	18.4	7.2	8.4	10.4
HERB	Herbaceous cover	1.8	-	0.4	-	1.2	1	0.8

Table F-7. Year 8 shrub transects, BLM Area B Unit C (cont'd).

Code	Species	BLM Area B Unit C						
		BLMB_C-4	BLMB_C-7	BLMB_C-8	BLMB_C-9	Transect 2	Transect 3	Transect 4
ACGL	<i>Acemispom glaber (Lotus scoparius)</i>	1	-	-	0.4	-	1.8	-
ADFA	<i>Adenostoma fasciculatum</i>	7	15	0.6	10.6	25	14	10.8
ARHO	<i>Arctostaphylos hookeri ssp. hookeri</i>	-	-	0.4	-	6.2	-	-
ARMO	<i>Arctostaphylos montereyensis</i>	-	-	-	-	-	-	-
ARPU	<i>Arctostaphylos pumila</i>	1.4	0.6	-	1	-	-	-
ARTO	<i>Arctostaphylos tomentosa ssp. tomentosa</i>	30.6	35.8	18.8	17.6	34.4	30	79.8
BAPI	<i>Baccharis pilularis</i>	-	-	1	1.2	5.2	3.8	1.4
CAED	<i>Carpobrotus edulis</i>	-	-	-	1.2	-	-	-
CEDE	<i>Ceanothus dentatus</i>	36.4	43.4	66.8	39.8	9	52.4	0.4
CERI	<i>Ceanothus rigidus</i>	9.4	3.2	-	14.2	-	9	1.2
CETH	<i>Ceanothus thrysiflorus</i>	-	-	3.6	-	-	-	3
CRSC	<i>Crocانthemum scoparium</i>	12.6	37.6	10	32	-	4.8	-
DIAU	<i>Diplacus aurantiacus</i>	-	0.2	2.6	0.6	1	0.4	2.4
ERCA	<i>Eriodictyon californicum</i>	-	-	-	-	-	-	-
ERCO	<i>Eriophyllum confertiflorum</i>	-	1	-	0.8	-	-	-
ERER	<i>Ericameria ericoides</i>	-	-	-	-	-	-	-
ERFA	<i>Ericameria fasciculata</i>	-	-	-	0.6	-	-	-
FRCA	<i>Frangula (Rhamnus) californica</i>	-	-	-	-	-	-	-
FRCA2	<i>Fremontodendron californicum</i>	-	-	-	-	-	-	-
GAEL	<i>Garrya elliptica</i>	-	-	-	-	2.8	-	0.6
HEAR	<i>Heteromeles arbutifolia</i>	-	-	2.2	0.8	-	-	5.2
LECA	<i>Lepechinia calycina</i>	0.6	4.2	14.4	0.4	-	10	0.6
LUAR	<i>Lupinus arboreus</i>	-	-	-	-	-	-	-
PIRA	<i>Pinus radiata</i>	-	-	-	-	-	-	-
QUAG	<i>Quercus agrifolia</i>	-	-	-	1.4	5.8	-	-
RIMA	<i>Ribes malvaceum</i>	-	-	-	-	-	-	-
RISA	<i>Ribes sanguineum</i>	-	-	-	-	-	-	-
RISP	<i>Ribes speciosum</i>	-	-	-	-	-	-	-
RUUR	<i>Rubus ursinus</i>	-	-	-	-	-	-	-
SAME	<i>Salvia mellifera</i>	8	0.6	-	3.4	-	-	3.6
SOUM	<i>Solanum umbelliferum</i>	-	-	-	-	-	-	-
SYMO	<i>Symphoricarpos mollis</i>	-	-	-	-	26.4	-	-
TODI	<i>Toxicodendron diversilobum</i>	-	-	5.6	-	4	-	4.2
BG	Bare ground	20	6.2	12	13.6	14.6	14.4	4.8
HERB	Herbaceous cover	1.8	-	0.8	3.8	5.4	-	-

**APPENDIX G**

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**NON-NATIVE SPECIES**

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**Table G-1. Non-native species observed during line intercept transect monitoring in Unit 5.**

Non-Native Herbaceous Species Name	Common Name	Species Code
<i>Aira caryophylla</i>	silvery hair grass	AICA
<i>Bromus hordeaceus</i>	soft brome	BRHO
<i>Festuca (Vulpia) myuros</i>	rattail sixweeks grass	FEMY
<i>Gastridium phleoides</i>	nit grass	GAPH
<i>Hypochaeris glabra</i>	smooth cat's ear	HYGL
<i>Logfia (Filago) gallica</i>	daggerleaf cottonrose	LOGA

**Table G-2. Non-native species observed during line intercept transect monitoring in Unit B-2A.**

Non-Native Herbaceous Species Name	Common Name	Species Code
<i>Aira caryophylla</i>	silvery hair grass	AICA
<i>Briza maxima</i>	rattlesnake grass	BRMA
<i>Festuca (Vulpia) myuros</i>	rattail sixweeks grass	FEMY
<i>Hypochaeris glabra</i>	smooth cat's ear	HYGL
<i>Logfia (Filago) gallica</i>	daggerleaf cottonrose	LOGA
<i>Lysimachia arvensis</i>	scarlet pimpernel	LYAR

**Table G-3. Non-native species observed during line intercept transect monitoring in BLM Area B Unit B-3 West.**

Non-Native Herbaceous Species Name	Common Name	Species Code
<i>Aira caryophylla</i>	silvery hair grass	AICA
<i>Festuca (Vulpia) myuros</i>	rattail sixweeks grass	FEMY
<i>Hypochaeris glabra</i>	smooth cat's ear	HYGL
<i>Logfia (Filago) gallica</i>	daggerleaf cottonrose	LOGA

**Table G-4. Non-native species observed during line intercept transect monitoring in BLM Area B Unit B-3 East.**

Non-Native Herbaceous Species Name	Common Name	Species Code
<i>Aira caryophylla</i>	silvery hair grass	AICA
<i>Agrostis avenacea</i>	Pacific hair grass	AGAV
<i>Avena barbata</i>	slender wild oat	AVBA
<i>Festuca (Vulpia) bromoides</i>	brome fescue	FEBR
<i>Festuca (Vulpia) myuros</i>	rattail sixweeks grass	FEMY
<i>Hypochaeris glabra</i>	smooth cat's ear	HYGL
<i>Logfia (Filago) gallica</i>	daggerleaf cottonrose	LOGA
<i>Lysimachia arvensis</i>	scarlet pimpernel	LYAR
<i>Polypogon monspeliensis</i>	rabbitsfoot grass	POMO
<i>Silene gallica</i>	small flower catchfly	SIGA

**Table G-5. Non-native species observed during line intercept transect monitoring in BLM Area B Unit A Southern Containment Line.**

Non-Native Herbaceous Species Name	Common Name	Species Code
<i>Aira caryophyllea</i>	silvery hair grass	AICA
<i>Lysimachia arvensis</i>	scarlet pimpernel	LYAR
<i>Silene gallica</i>	small flower catchfly	SIGA

**Table G-6. Non-native species observed during line intercept transect monitoring in BLM Area B Unit B.**

Non-Native Herbaceous Species Name	Common Name	Species Code
<i>Aira caryophyllea</i>	silvery hair grass	AICA
<i>Avena barbata</i>	slender wild oat	AVBA
<i>Briza maxima</i>	rattlesnake grass	BRMA
<i>Festuca (Vulpia) myuros</i>	rattail sixweeks grass	FEMY
<i>Hypochaeris glabra</i>	smooth cat's ear	HYGL
<i>Logfia (Filago) gallica</i>	daggerleaf cottonrose	LOGA
<i>Rumex acetosella</i>	sheep sorrel	RUAC
<i>Silene gallica</i>	small flower catchfly	SIGA
<i>Tribolium oblitterum</i>	Capetown grass	TROB
<i>Vicia sativa</i>	garden vetch	VISA

**Table G-7. Non-native species observed during line intercept transect monitoring in BLM Area B Unit C.**

Non-Native Herbaceous Species Name	Common Name	Species Code
<i>Aira caryophyllea</i>	silvery hair grass	AICA
<i>Briza minor</i>	small quaking grass	BRMI