

## 3.0 GRASSLAND

### 3.1 OVERVIEW OF THE GRASSLAND VEGETATION COMMUNITY

Grassland is the third most abundant and widespread vegetation community in the MSPA with 135,749 acres in all MUs, 47,731 acres (35%) of which are conserved (Table V2C.3-1; Figure V2C.3-1, or view an online map at: [https://portal.sdmmp.com/map\\_vegetation.php?taxaid=SDMMP\\_vegcom\\_2](https://portal.sdmmp.com/map_vegetation.php?taxaid=SDMMP_vegcom_2)).

Grasslands in order of abundance are most prevalent in MUs 9, 10, 3, 5 and 6.

The grassland vegetation community comprises grasslands dominated by native grasses and grasslands that are dominated primarily by nonnative grasses and, to a lesser extent, nonnative forbs. Nonnative grasslands are most prevalent with only a small fraction of native grasslands occurring in the MSPA. Grasslands in the MSPA are managed for different purposes. Native grasslands are managed to increase native grass and forb cover and diversity, while large, expansive nonnative grasslands are managed to provide the optimal structure to support habitat for MSP species. For example, golden eagle and badger need large, undisturbed grasslands with low grass cover that supports prey species, such as rabbits and California ground squirrels. Western burrowing owls also need similar grasslands with ground squirrels that serve as ecosystem engineers and provide burrows (San Diego Zoo Institute for Conservation Research 2016). Shrublands heavily invaded with nonnative grasses are also managed to reduce cover of these species to promote native grasses, forbs, and shrubs and avoid vegetation type conversion to nonnative grassland.

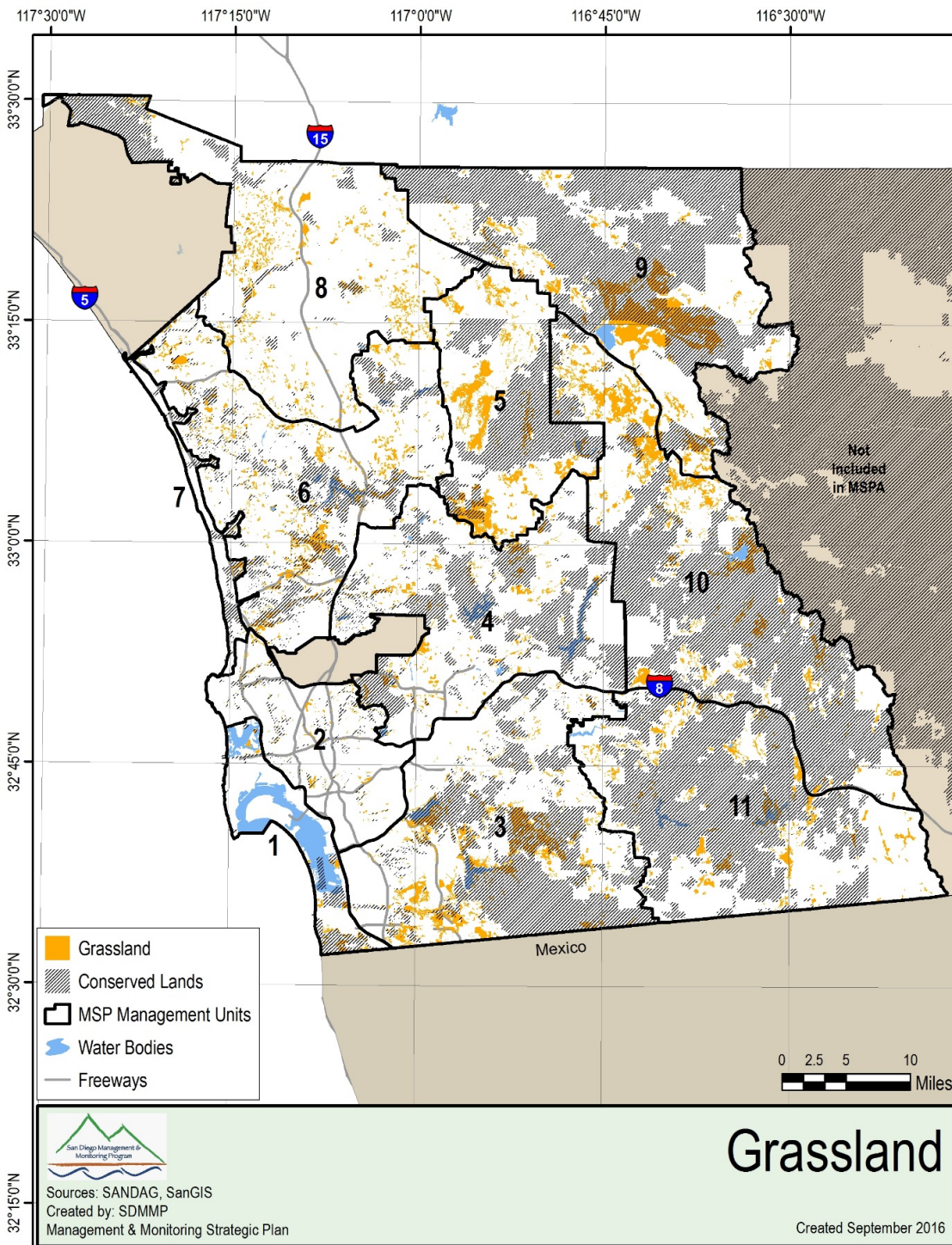
The grassland vegetation community includes 2 native grassland alliances and 5 nonnative semi-natural stands of nonnative grasses and forbs in the western portion of the MSPA that are mapped to the alliance level (SANDAG 2012). A semi-natural stand is a classification similar to an alliance but dominated by nonnative species. The *Nasella pulchra* alliance is mapped on over 1,200 acres (SANDAG 2012) and is dominated by this native bunchgrass or it is present with other native perennial grasses and forbs (Sproul et al. 2011). This alliance occurs from the coast to inland foothills and mountain valleys in heavy soils in valley bottoms that have not been previously tilled and in clay soils on slopes. The *Leymus triticoides* alliance is dominated by this native grass species or codominant with other native and

nonnative grasses and forbs (Sproul et al. 2011). It is mapped on only an acre in the area of the MSPA mapped to alliance level (SANDAG 2012). It can tolerate saline to alkaline soils and is found in moist areas at the edges of salt marshes or riparian terraces (Sproul et al. 2011). Most grassland is classified as Mediterranean California naturalized annual and perennial semi-natural grassland in which nonnative grasses and forbs are dominant over native species. Other semi-natural stands include those dominated by *Avena barbata*; *Brassica nigra* and other mustards; *Bromus (diandrus, hordaceus)-Brachypodium distachyon*; *Glebionis coronaria*; *Bromus rubens-Schismus (arabicus, barbatus)*; and *Pennisetum setaceum* (Sproul et al. 2011).

For more information on the grassland vegetation community, go to the MSP Portal Grassland vegetation summary page: [https://portal.sdmmp.com/view\\_species.php?taxaid=SDMMP\\_vegcom\\_2](https://portal.sdmmp.com/view_species.php?taxaid=SDMMP_vegcom_2).

**Table V2C.3-1. Total acres of grassland and acres on Conserved Lands by MSP Management Units.**

MU	Total Acres	Acres on Conserved Lands
1	1,567	909
2	1,578	380
3	20,477	9,722
4	7,672	2,502
5	16,324	2,977
6	15,379	5,171
7	530	307
8	11,924	1,020
9	26,757	15,924
10	23,355	6,516
11	10,186	2,303
<b>Grand Total</b>	<b>135,749</b>	<b>47,731</b>



**Figure V2C.3-1. Distribution of grassland vegetation in the MSPA.**

### **3.2 MSP SPECIES USING GRASSLAND VEGETATION**

There are 29 MSP species that use grassland habitats; some are closely associated only with native grasslands, while others are affiliated with nonnative grasslands (Table V2C.3-2). There are 2 grassland VF species, grasshopper sparrow and San Diego black-tailed jackrabbit. The remaining 27 SL, SO, SS, VF species from other vegetation types, and VG species will benefit incidentally from grassland vegetation management.

### **3.3 THREATS TO GRASSLAND VEGETATION**

A primary threat to native grassland is loss, fragmentation, and degradation due to urban and agricultural development. Agricultural practices such as tilling or overgrazing can lead to the loss of native grasses. Invasive nonnative grasses and forbs are the largest threat to remaining native grasslands. Properly applied grazing, herbicide treatments, and prescribed fire can help to control invasive nonnative annual plants and improve the cover and richness of native grasses and forbs. Nonnative grasslands that provide foraging and burrowing habitat for MSP species can become degraded by tall, dense grasses that dry out and create a thick layer of thatch that becomes unsuitable for ground squirrels (Wisinski et al. 2015). This can decrease suitability of nonnative grasslands for those species that depend on ground squirrels and rabbits for prey.

### **3.4 MANAGEMENT AND MONITORING APPROACH**

This section provides the rationale for management and monitoring objectives for grassland vegetation and associated MSP species. The greatest threat to native grasslands is control of nonnative grasses and forbs. For nonnative grassland management for MSP species, the threat is too dense and tall nonnative grasses. The management and monitoring approach for grasslands is based on an adaptive management framework, in which a science-based, information-gathering process includes monitoring management targets and testing the effectiveness of management actions to provide information to inform the management strategy and the actions necessary to achieve management goals. This iterative process is intended to refine and improve the effectiveness of the management strategy over

**Table V2C.3-2. Grassland associated MSP species.**

Scientific Name	Common Name	Management Category	Summary Page Link
<b>Plants</b>			
<i>Acanthomintha ilicifolia</i>	San Diego thorn-mint	SO	<a href="https://portal.sdmmp.com/view_species.php?taxaid=32426">https://portal.sdmmp.com/view_species.php?taxaid=32426</a>
<i>Adolphia californica</i>	California adolphia (Spineshrub)	VG	<a href="https://portal.sdmmp.com/view_species.php?taxaid=28449">https://portal.sdmmp.com/view_species.php?taxaid=28449</a>
<i>Ambrosia pumila</i>	San Diego ambrosia	SO	<a href="https://portal.sdmmp.com/view_species.php?taxaid=36517">https://portal.sdmmp.com/view_species.php?taxaid=36517</a>
<i>Atriplex coulteri</i>	Coulter's saltbush	VF	<a href="https://portal.sdmmp.com/view_species.php?taxaid=20523">https://portal.sdmmp.com/view_species.php?taxaid=20523</a>
<i>Atriplex parishii</i>	Parish brittle-scale	VF	<a href="https://portal.sdmmp.com/view_species.php?taxaid=20554">https://portal.sdmmp.com/view_species.php?taxaid=20554</a>
<i>Bloomeria clevelandii</i>	San Diego goldenstar	SS	<a href="https://portal.sdmmp.com/view_species.php?taxaid=509575">https://portal.sdmmp.com/view_species.php?taxaid=509575</a>
<i>Brodiaea filifolia</i>	Thread-leaved brodiaea	SS	<a href="https://portal.sdmmp.com/view_species.php?taxaid=42806">https://portal.sdmmp.com/view_species.php?taxaid=42806</a>
<i>Brodiaea santarosae</i>	Santa Rosa brodiaea	SS	<a href="https://portal.sdmmp.com/view_species.php?taxaid=810190">https://portal.sdmmp.com/view_species.php?taxaid=810190</a>
<i>Calochortus dunnii</i>	Dunn's mariposa lily	VG	<a href="https://portal.sdmmp.com/view_species.php?taxaid=42844">https://portal.sdmmp.com/view_species.php?taxaid=42844</a>
<i>Centromadia parryi</i> ssp. <i>Australis</i>	Southern tarplant	VF	<a href="https://portal.sdmmp.com/view_species.php?taxaid=780715">https://portal.sdmmp.com/view_species.php?taxaid=780715</a>
<i>Deinandra conjugens</i>	Otay tarplant	SS	<a href="https://portal.sdmmp.com/view_species.php?taxaid=780273">https://portal.sdmmp.com/view_species.php?taxaid=780273</a>
<i>Dicranostegia orcuttiana</i>	Orcutt's bird's-beak	SL	<a href="https://portal.sdmmp.com/view_species.php?taxaid=834156">https://portal.sdmmp.com/view_species.php?taxaid=834156</a>
<i>Dudleya blochmaniae</i>	Blochman's dudleya	SL	<a href="https://portal.sdmmp.com/view_species.php?taxaid=502165">https://portal.sdmmp.com/view_species.php?taxaid=502165</a>
<i>Ferocactus viridescens</i>	San Diego barrel cactus	VF	<a href="https://portal.sdmmp.com/view_species.php?taxaid=19801">https://portal.sdmmp.com/view_species.php?taxaid=19801</a>
<i>Lepechinia ganderi</i>	Gander's pitcher sage	VG	<a href="https://portal.sdmmp.com/view_species.php?taxaid=32555">https://portal.sdmmp.com/view_species.php?taxaid=32555</a>
<i>Quercus engelmannii</i>	Engelmann Oak	VF	<a href="https://portal.sdmmp.com/view_species.php?taxaid=19329">https://portal.sdmmp.com/view_species.php?taxaid=19329</a>
<b>Invertebrates</b>			
<i>Euphydryas editha quino</i>	Quino checkerspot butterfly	SL	<a href="https://portal.sdmmp.com/view_species.php?taxaid=779299">https://portal.sdmmp.com/view_species.php?taxaid=779299</a>

Scientific Name	Common Name	Management Category	Summary Page Link
<b>Birds</b>			
Agelaius tricolor	Tricolored blackbird	SL	<a href="https://portal.sdmmp.com/view_species.php?taxaid=179060">https://portal.sdmmp.com/view_species.php?taxaid=179060</a>
Ammodramus savannarum perpallidus	Grasshopper sparrow	VF	<a href="https://portal.sdmmp.com/view_species.php?taxaid=179336">https://portal.sdmmp.com/view_species.php?taxaid=179336</a>
Aquila chrysaetos Canadensis	Golden eagle	SO	<a href="https://portal.sdmmp.com/view_species.php?taxaid=175408">https://portal.sdmmp.com/view_species.php?taxaid=175408</a>
Athene cunicularia hypugaea	Western burrowing owl	SL	<a href="https://portal.sdmmp.com/view_species.php?taxaid=687093">https://portal.sdmmp.com/view_species.php?taxaid=687093</a>
Buteo regalis	Ferruginous hawk	VG	<a href="https://portal.sdmmp.com/view_species.php?taxaid=175377">https://portal.sdmmp.com/view_species.php?taxaid=175377</a>
Buteo swainsoni	Swainson's hawk	VG	<a href="https://portal.sdmmp.com/view_species.php?taxaid=175367">https://portal.sdmmp.com/view_species.php?taxaid=175367</a>
Circus cyaneus	Northern harrier	SO	<a href="https://portal.sdmmp.com/view_species.php?taxaid=175430">https://portal.sdmmp.com/view_species.php?taxaid=175430</a>
<b>Mammals</b>			
Antrozous pallidus	Pallid bat	SL	<a href="https://portal.sdmmp.com/view_species.php?taxaid=180006">https://portal.sdmmp.com/view_species.php?taxaid=180006</a>
Dipodomys stephensi	Stephens' kangaroo rat	SO	<a href="https://portal.sdmmp.com/view_species.php?taxaid=180247">https://portal.sdmmp.com/view_species.php?taxaid=180247</a>
Lepus californicus bennettii	San Diego black-tailed jackrabbit	VF	<a href="https://portal.sdmmp.com/view_species.php?taxaid=900973">https://portal.sdmmp.com/view_species.php?taxaid=900973</a>
Taxidea taxus	American badger	SL	<a href="https://portal.sdmmp.com/view_species.php?taxaid=180565">https://portal.sdmmp.com/view_species.php?taxaid=180565</a>

time and of the management actions to implement that strategy. See Vol. 1, Sec. 2.0 and Vol. 2A for further details on the overall management and monitoring approach.

The management goal for grassland vegetation is to enhance and restore native grasslands and forblands and manage nonnative grasslands on Conserved Lands in the MSPA that support or have the potential to support VF species (i.e., grasshopper sparrow, San Diego black-tailed jackrabbit). This management goal should incidentally benefit a diverse array of other MSP species (e.g., Quino checkerspot butterfly, western burrowing owl, golden eagle, Stephens' kangaroo rat) so that the vegetation communities have high ecological integrity, and so these species are resilient to environmental stochasticity and likely to persist over the long term (>100 years).

The primary monitoring objective is to establish a long-term vegetation monitoring program to determine the distribution and composition of grassland vegetation plots in a mosaic of chaparral and coastal sage scrub vegetation communities across the MSPA. Nonnative grasses are indicative of reduced ecological integrity in the shrubland mosaic, whereas plots with native grasses are indicative of a healthier grassland vegetative component. Attributes of grassland communities will be tracked over time in response to multiple, potentially interacting threats such as an altered fire regime, changing climate, and nitrogen deposition. The intent is to determine how different, often interacting threats and environmental conditions are associated with changes in vegetation community attributes and how these responses are affected by management. The ecological integrity of native grasslands will be defined by cover, density, and richness of native grasses and forbs and the cover of exotic nonnative grasses and forbs. Other measures of ecological integrity can be added to the vegetation monitoring program to assess the overall integrity of the grassland ecosystem. Potential measures of the ecological integrity of the ecosystem include monitoring the diversity and abundance of other taxonomic groups (e.g., invertebrates, reptiles, birds, small mammals, etc.), evaluating important ecological processes (e.g., pollination services, food webs, soil biogeochemical cycles), and tracking abiotic conditions (e.g., climate, soil temperature, and moisture).

A second monitoring objective is to test and develop BMPs to control invasive nonnative grasses and forbs at a landscape scale that degrade habitat for MSP

species or that threaten the integrity of native grasslands. Large-scale management experiments will be implemented to test the effectiveness of different invasive plant control methods including grazing, prescribed fire, herbicide, and mechanical methods.

A third monitoring objective is to determine the distribution, status, habitat associations, threats and management needs of the 2 grassland VF species. Monitoring plans will be developed and integrated as feasible into the vegetation monitoring. Monitoring will be conducted to gather information that will be used to identify the management needs of VF species in grassland communities in the MSPA.

These 3 types of monitoring data will be analyzed and the results used to develop and implement a management strategy for grassland vegetation. A management plan will be developed that identifies and prioritizes management actions to maintain, enhance, or restore the ecological integrity of native grassland, high biodiversity, and important ecological processes. The second focus of the management plan will be to manage nonnative grassland habitat so that it is suitable for MSP species at prioritized sites. The management plan will include a monitoring component to determine the effectiveness of management actions and the overall management strategy.

#### 2017-2021 Planning Cycle Management and Monitoring Approach

For the 2017–2021 planning cycle, the focus will be to gather information on grassland vegetation in a mosaic of coastal sage scrub and chaparral and to develop BMPs. A monitoring plan will be developed for coastal sage scrub, chaparral, and grassland vegetation. It will be based on a conceptual model that identifies covariates to collect in assessing habitat conditions and threats to identify and prioritize management needs in future planning cycles. The monitoring plan will utilize a sampling design that incorporates ecological integrity classes mapped across the entire MSPA using remote imagery. Permanent sampling plots will be established along north-to-south and east-to-west gradients across the MSPA to capture the full range of environmental conditions and vegetation community characteristics. To further characterize spatial variation, there will also be a subset of sampling plots that are monitored on a rotating basis.



A monitoring plan will be prepared for the San Diego black-tailed jackrabbit, a grassland and coastal sage scrub VF species. The monitoring plan will include both coastal sage scrub and grassland sampling and will be integrated into the vegetation monitoring for these 2 vegetation communities. The monitoring will provide information to determine whether management is needed to restore or enhance sites that support or have potential to support black-tailed jackrabbit. Grasshopper sparrow monitoring will be delayed until future planning cycles. Development and testing of large-scale management BMPs are important in determining management actions to be included in development of a management plan for grasslands. Prioritization and development and implementation of a management plan are planned for the 2022–2026 planning cycle, after all the monitoring components have been implemented and information is available to guide management planning and decision making.

### **3.4.1 General Approach Objectives**

Below is a summary of the management and monitoring objectives for grassland vegetation. For the most up-to-date goals, objectives, and actions, go to the MSP Portal:

[https://portal.sdmmp.com/tracker.php?Target=veg+community&Species=SDMMP\\_vegcom\\_2&MonMgtObjType=&ActionStatus=&ManagementUnit=&ObjectiveType=&Year=&Preserve=&Short=Long&submit=Submit](https://portal.sdmmp.com/tracker.php?Target=veg+community&Species=SDMMP_vegcom_2&MonMgtObjType=&ActionStatus=&ManagementUnit=&ObjectiveType=&Year=&Preserve=&Short=Long&submit=Submit).

There are 5 objectives currently included for grassland vegetation monitoring in the MSP Roadmap 2017–2021 planning cycle. Three objectives involve establishing and implementing the long-term monitoring program. The first objective includes developing a monitoring plan that includes permanent sampling plots with a rotating panel of plots to expand spatial sampling. The sampling design will be informed by the second objective of mapping integrity classes at the landscape scale based upon remote imagery (satellite imagery, high resolution aerial photographs and LIDAR). The third objective is to implement the monitoring. In the first year, pilot monitoring will be conducted to test the ecological integrity classifications and evaluate the monitoring protocols and sampling design. Data from the pilot monitoring will be used to finalize the vegetation monitoring plan. After the plan is finalized, there will be 3 years of monitoring to gather information on annual variability in grassland vegetation community attributes

and to increase the spatial distribution with the rotating panel of sample plots. Monitoring data will then be analyzed to identify management needs for coastal sage scrub communities across the MSPA and to determine the frequency of future monitoring.

The other 2 vegetation monitoring objectives are to develop and implement a plan to test grazing, prescribed fire, and other methods of landscape-scale control of invasive annual grasses and forbs in grassland vegetation. This plan will test the effectiveness of management methods and their effects on the vegetation community, MSP species, measures of ecological integrity and other monitoring targets to determine beneficial and adverse effects of the different management methods. After testing the methods detailed in the grazing management plan and analyzing the results, BMPs will be developed to guide large-scale management of invasive annual grasses in a mosaic of native shrubland and grassland vegetation to promote native grasses and forbs.

### **3.4.2 Species-Specific Approach Objectives**

The management and monitoring approach; rationale; and goals, objectives, and actions for at-risk MSP species associated with grasslands are presented in the corresponding species sections and species profiles accessible on each species' summary page (see links in Table V2C.3-2).

There are 2 grassland VF species: grasshopper sparrow and San Diego black-tailed jackrabbit. For the black-tailed jackrabbit, there are objectives to prepare and implement a monitoring plan to track their distribution and status and to assess habitat and threat risks. This plan is intended to integrate to the extent feasible into the vegetation monitoring program and results will be used to develop the grassland management plan in the next planning cycle.

Grasshopper sparrow monitoring objectives are delayed until the 2022–2026 planning cycle. At that time, a monitoring plan will be developed and implemented that will integrate as feasible into the coastal sage scrub, chaparral, and grassland vegetation monitoring program. After data have been collected and management recommendations will be developed and included in the Grassland Management Plan in the 2022–2026 planning cycle.

### **3.5 GRASSLAND REFERENCES**

- SANDAG. 2012. ECO\_VEGETATION\_WSD\_2012. Principal authors: (AECOM) Oberbauer, T., F. Sproul, J. Dunn, and L. Woolley. [www.sangis.org](http://www.sangis.org). Accessed September 2016.
- San Diego Zoo Institute for Conservation Research. 2016. Burrowing Owl Conservation and Management Plan for San Diego County. San Diego, CA. 39 pp.
- Sproul, F., T. Keeler-Wolf, P. Gordon-Reedy, J. Dunn, A. Klein, and K. Harper. 2011. *Vegetation Classification Manual for Western San Diego County* (First). San Diego, CA.
- Wisinski, C., J. P. Montagne, S. Marczak, D. M. Shier, L. A. Nordstrom, and R. R. Swaisgood. 2015. Project Report: An Adaptive Management Approach to Recovering Burrowing Owl Populations and Restoring a Grassland Ecosystem in San Diego County. San Diego Zoo Global Institute for Conservation Research, Escondido, CA.