

## 7.0 OAK WOODLAND

### 7.1 OVERVIEW OF THE OAK WOODLAND VEGETATION COMMUNITY

Oak woodland is the fourth largest vegetation community in the MSPA. There are 78,395 acres of oak woodland in MUs 2,3,4,5,6,8,9,10, and 11, of which 23,582 acres (30%) are conserved (Table V2C.7-1 and Figure V2C.7-1, or view an online map at: [https://portal.sdmmp.com/map\\_vegetation.php?taxaid=SDMMP\\_vegcom\\_10](https://portal.sdmmp.com/map_vegetation.php?taxaid=SDMMP_vegcom_10)). The MSP Roadmap focus is on coast live oak (*Quercus agrifolia*) and Engelmann oak (*Q. engelmannii*) woodland and does not include monitoring or management objectives for black oak (*Q. kelloggii*) or canyon oak (*Q. chrysolepis*) woodlands that occur at higher elevations in the mountains.

Engelmann oak woodland is restricted to southern California and is distributed in the foothills of the Peninsular Range in San Diego County and the Santa Ana Mountains of San Diego and Riverside Counties. It often occupies the ecotone between grassland and surrounding shrublands (Oberbauer et al. 2008) and occurs on relatively moist sites with fine-textured soils on gentle slopes and valley bottoms (Sproul et al. 2011). It forms a single alliance, the *Q. engelmannii* alliance, and *Q. engelmannii* is the dominant or codominant species in the tree canopy with *Juglans californica*, *Q. agrifolia*, and *Q. kelloggii* sometimes present as associates. In this alliance, trees are usually less than 18 meters tall, and the canopy is open to closed. The shrub layer is sparse to open and the herbaceous layer is sparse and often dominated by grass species. Alliance level mapping was conducted by AECOM (SANDAG 2012) for the western part of San Diego County but does not include MUs 9, 10, and 11. The *Q. engelmannii* alliance is most prevalent in MU5, followed in order of prevalence by MUs 6, 8, 3, and 4.

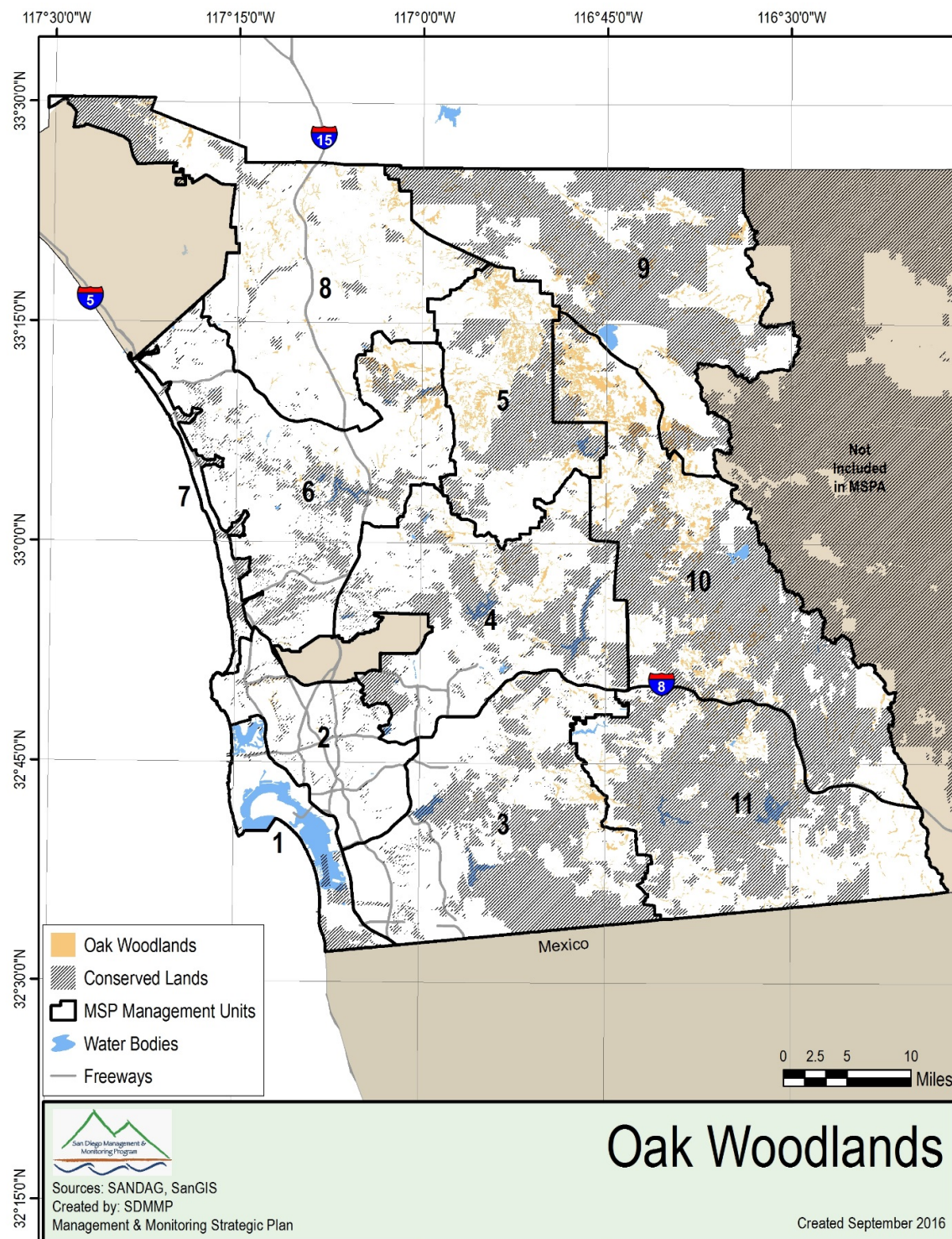
Coast live oak woodlands are distributed west of the Sierra Nevada from Mendocino County, California, south to northwest Baja California, Mexico. In southern California, they are distributed along the South Coast Ranges and coastal slopes of the Transverse and Peninsular Ranges (Oberbauer et al. 2008). These woodlands are typically found on north-facing slopes and shaded ravines in the south (Oberbauer et al. 2008). Stands may be found in mesic uplands or riparian or semi-riparian settings where fluvial processes affect regeneration (Sproul et al. 2011). The coast live oak association *Q. agrifolia*/*Salix lasiolepis* is designated as riparian forest and is included in the riparian forest vegetation category and not in the coast live oak woodland category. Coast live oaks live for more than 200–300

years and are usually less than 30 meters tall. In the *Q. agrifolia* alliance, *Q. agrifolia* is the dominant or codominant species and the canopy is open to continuous (Sproul et al. 2011). Associated tree species in the upland *Q. agrifolia* alliance can include *Q. engelmannii*, *Q. berberidifolia* x *acutidens*, and *Q. kelloggii* (Sproul et al. 2011). The shrub layer is poorly developed but may include *Heteromeles arbutifolia*, *Ribes* sp., *Malosma laurina*, or *Sambucus mexicana*. The herb component is continuous and dominated by *Bromus diandrus* and several other introduced taxa (Oberbauer et al. 2008). Alliance level mapping was conducted for the western part of the County by AECOM (SANDAG 2012) and does not include MUs 9, 10, and 11. The *Q. agrifolia* alliance was most widely distributed in MU8, followed in order of prevalence by MUs 4, 5, 3, 6, and 2.

For more information on oak woodlands, go to the MSP Portal Oak Woodland vegetation summary page:  
[https://portal.sdmmp.com/view\\_species.php?taxaid=SDMMP vegcom 10.](https://portal.sdmmp.com/view_species.php?taxaid=SDMMP_vegcom_10)

**Table V2C.7-1. Total acres of oak woodland and acres of oak woodland on Conserved Lands by MSP Management Units.**

MU	Total Acres	Acres on Conserved Lands
1	0	0
2	308	196
3	3,866	831
4	4,482	1,338
5	12,089	1,590
6	4,872	1,416
7	0	0
8	6,618	660
9	12,764	6,522
10	25,399	8,040
11	7,996	2,989
<b>Grand Total</b>	<b>78,394</b>	<b>23,582</b>



**Figure V2C.7-1. Distribution of oak woodland vegetation in the MSPA.**

## **7.2 MSP SPECIES USING OAK WOODLAND VEGETATION**

Sixteen MSP species are associated with oak woodlands (Table V2C.7-2). Two species are oak woodland VF species (Engelmann oak and coast newt) that will be managed through management of oak woodland vegetation. The remaining 14 SL, SO, SS, VF species from other vegetation types, and VG species will benefit incidentally from oak woodland vegetation management.

## **7.3 THREATS TO OAK WOODLAND VEGETATION**

Over the last decade, significant die-offs of oaks have occurred in southern California as a result of several interacting threats. Multiple years of drought have killed trees and made them more vulnerable to other threats such as fire, nonnative pests, and fungal pathogens. Coast live oaks have suffered large-scale mortality as a result of the golden-spotted oak borer and fungal pathogens, and more recently are threatened by the polyphagous shot hole borer/*Fusarium* complex (see Vol. 2B, Sec. 6.3.2.5 and Sec. 6.3.2.6). Fire is the primary natural process affecting upland stands of oak woodlands and short fire return intervals can eliminate coast live oak woodland stands (Sproul et al. 2011). Engelmann oak stands with grassy understories are typically resilient to fire while stands with shrub understories can be top-killed, although trees may recover by resprouting.

## **7.4 MANAGEMENT AND MONITORING APPROACH**

This section provides the rationale for management and monitoring objectives for oak woodland vegetation and associated MSP species. The management and monitoring approach is based on an adaptive management framework intended to refine and improve the effectiveness of the management strategy over time. See Vol. 1, Sec. 2.0 for further details on the overall MSP management and monitoring approach.

The management goal for oak woodland vegetation is to maintain, enhance, and restore oak woodlands on Conserved Lands in the MSPA that support or have the potential to support VF species (i.e., Engelmann oak, coast newt). This management goal should incidentally benefit a diverse array of other MSP species (e.g., Harbison's dun skipper, pallid bat, mountain lion), so that the vegetation

**Table V2C.7-2. Oak woodland associated MSP species.**

	Scientific Name	Common Name	Management Category	Summary Page Link
<b>Plants</b>				
	<i>Arctostaphylos otayensis</i>	Otay manzanita	VF	<a href="https://portal.sdmmp.com/view_species.php?taxaid=23507">https://portal.sdmmp.com/view_species.php?taxaid=23507</a>
	<i>Clinopodium chandleri</i>	San Miguel savory	SL	<a href="https://portal.sdmmp.com/view_species.php?taxaid=565077">https://portal.sdmmp.com/view_species.php?taxaid=565077</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>Lepechinia cardiophylla</i>	Heart-leaved pitcher sage	SL	<a href="https://portal.sdmmp.com/view_species.php?taxaid=32553">https://portal.sdmmp.com/view_species.php?taxaid=32553</a>
	<i>Monardella hypoleuca</i> ssp. <i>lanata</i>	Felt-leaved monardella	VF	<a href="https://portal.sdmmp.com/view_species.php?taxaid=524318">https://portal.sdmmp.com/view_species.php?taxaid=524318</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>Euphyes vestris harbisoni</i>	Harbison's dunn skipper	SL	<a href="https://portal.sdmmp.com/view_species.php?taxaid=707282">https://portal.sdmmp.com/view_species.php?taxaid=707282</a>
<b>Amphibians</b>				
	<i>Taricha torosa torosa</i>	Coast range newt	VF	<a href="https://portal.sdmmp.com/view_species.php?taxaid=208226">https://portal.sdmmp.com/view_species.php?taxaid=208226</a>
<b>Birds</b>				
	<i>Accipiter cooperii</i>	Cooper's hawk	VG	<a href="https://portal.sdmmp.com/view_species.php?taxaid=175309">https://portal.sdmmp.com/view_species.php?taxaid=175309</a>
	<i>Aquila chrysaetos canadensis</i>	Golden eagle	SO	<a href="https://portal.sdmmp.com/view_species.php?taxaid=175408">https://portal.sdmmp.com/view_species.php?taxaid=175408</a>
	<i>Sialia mexicana</i>	Western bluebird	VG	<a href="https://portal.sdmmp.com/view_species.php?taxaid=179806">https://portal.sdmmp.com/view_species.php?taxaid=179806</a>
<b>Mammals</b>				
	<i>Antrozous pallidus</i>	Pallid bat	SL	<a href="https://portal.sdmmp.com/view_species.php?taxaid=180006">https://portal.sdmmp.com/view_species.php?taxaid=180006</a>
	<i>Odocoileus hemionus fuliginata</i>	Southern mule deer	SS	<a href="https://portal.sdmmp.com/view_species.php?taxaid=898459">https://portal.sdmmp.com/view_species.php?taxaid=898459</a>
	<i>Plecotus townsendii pallescens</i>	Townsend's big-eared bat	SO	<a href="https://portal.sdmmp.com/view_species.php?taxaid=203457">https://portal.sdmmp.com/view_species.php?taxaid=203457</a>
	<i>Puma concolor</i>	Mountain lion	SL	<a href="https://portal.sdmmp.com/view_species.php?taxaid=552479">https://portal.sdmmp.com/view_species.php?taxaid=552479</a>

communities have high ecological integrity, and so these species are resilient to invasive pests and disease pathogens; environmental stochasticity; threats; and catastrophic disturbances, such as very large wildfires and intense and prolonged drought. With the achieved management goal, the species are likely to persist over the long term (>100 years).

The management and monitoring approach for oak woodlands is to gather information documenting the status, environmental conditions, threats, and ecological integrity of this vegetation community and associated MSP species over time in order to periodically identify and prioritize management needs, to implement high-priority management actions, and to monitor effectiveness and improve management with time.

The first step in the strategy is to characterize the current extent of tree mortality in coast live oak and Engelmann oak woodlands in the MSPA as a result of drought, pests, fungal pathogens, and fire. There was extensive mapping of oak mortality in southern California based upon aerial imagery in 2014 (UCANR 2017). Since that time, continued die-off has occurred so it is important to update the existing mapping and fill in gaps with an analysis of remote imagery (e.g., high-resolution aerial photos, LIDAR) to map the current extent of dead oak trees across the MSPA.

The next step is to develop a long-term MSP Oak Woodland Monitoring Plan to assess coast live oak and Engelmann oak mortality and recruitment over time; to document changes in community composition, structure, and ecological integrity; and to assess environmental conditions and identify threats. The monitoring plan will include a conceptual model; specific monitoring questions; a standardized monitoring protocol; a statistically valid sampling design with sampling locations; a plan for analyzing and managing data; a monitoring schedule; and reporting requirements. The monitoring plan will be based on a conceptual model to identify covariates to collect in assessing environmental conditions and threats to identify and prioritize management needs in future planning cycles. 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 tree mortality characteristics in a statistically valid sampling design. The monitoring plan will incorporate sufficient sampling of Engelmann oaks to determine the status of this VF species and its management needs. The monitoring plan should integrate and

be consistent with the riparian vegetation monitoring plan as feasible, since the threats faced by both vegetation communities are very similar and both communities can be integrated in the larger landscape matrix. Once the Oak Woodland Vegetation Monitoring Plan is completed, then field-based monitoring will be conducted to gather data.

In addition to oak woodland vegetation monitoring, a monitoring plan and schedule will be developed and implemented for coast newt, a VF species in chaparral, oak woodland, and riparian vegetation communities. This monitoring will be integrated with vegetation monitoring as feasible. There will be monitoring to determine the impact of oak die-offs on bird communities, as part of the loss of integrity threat monitoring conducted in riparian and oak woodlands (see Vol. 2B, Sec. 9). Monitoring and developing BMPs for invasive nonnative pests and fungal pathogens, such as the shot hole borer and *Fusarium* complex, will provide information to be integrated into oak woodland monitoring and management (see Vol. 2B, Sec. 6). There is also a species-specific monitoring objective for Harbison's dun skipper to collect data on oak woodland habitats during surveys for this species (see Vol. 2D).

An Oak Woodland Management Plan will be prepared with information obtained from vegetation, ecological integrity, invasive pests, and species-specific monitoring. The management plan will identify and prioritize management needs to maintain, enhance, and restore oak woodlands to ensure recovery from multiple threats, to maintain high ecological integrity, and to support MSP species. The management plan will prioritize the location and type of management actions needed, specify BMPs, develop a management timeline, and provide guidelines for monitoring the effectiveness of management actions. Upon completion of the management plan, high-priority management actions will be completed and monitored for effectiveness according to the timeline prepared for each MSP planning cycle. Long-term vegetation and MSP species monitoring will continue on a scheduled basis and the results, along with management effectiveness monitoring and ecological integrity monitoring, will be used to update and refine the management plan at periodic intervals.



### **7.4.1 General Approach Objectives**

Below is a summary of the management and monitoring objectives for oak woodland 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\\_10&ActionStatus=&ManagementUnit=&ObjectiveType=&Year=&Preserve=&Short=Long&submit=Submit](https://portal.sdmmp.com/tracker.php?Target=veg+community&Species=SDMMP_vegcom_10&ActionStatus=&ManagementUnit=&ObjectiveType=&Year=&Preserve=&Short=Long&submit=Submit).

There are 3 objectives included for oak woodland vegetation monitoring in the MSP Roadmap 2017–2021 planning cycle. The focus will be to gather information to characterize oak woodland vegetation communities, including Engelmann oak, a VF species (see link in Table V2C.7-2).

An existing oak mortality GIS map across the MSPA will be updated and an Oak Woodland Monitoring Plan will be developed and implemented. Development of an Oak Woodland Management Plan and implementation of high-priority management actions is planned for the 2022–2026 planning cycle, after information has been gathered to guide management planning and decision making.

### **7.4.2 Species-Specific Approach Objectives**

The management and monitoring approach; rationale; and goals, objectives, and actions for at-risk MSP species associated with oak woodlands are presented in the corresponding species sections and species profiles accessible on each species' summary page (see links in Table V2C.7-2).

There are 2 oak woodland VF species: Engelmann oak and coast newt. Engelmann oak will be monitored as part of the Oak Woodland Monitoring Plan in the current planning cycle. Development of a monitoring plan for coast newt is delayed until the 2022–2026 planning cycle. Management objectives for both species are also delayed until the development and implementation of an Oak Woodland Management Plan in the next planning cycle.



## 7.5 OAK WOODLAND REFERENCES

- Oberbauer, T. A., M. Kelly, and Jeremy Buegge. 2008. Draft Vegetation Communities of San Diego County. Based on "Preliminary Descriptions of the Terrestrial Natural Communities of California", Robert F. Holland, Ph.D., October 1986. San Diego, CA.
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- 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.
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