

4.0 RIPARIAN FOREST AND SCRUB

4.1 OVERVIEW OF THE RIPARIAN FOREST AND SCRUB VEGETATION COMMUNITY

Riparian forest and scrub is the fifth largest vegetation community in the MSPA. There are 38,377 acres of riparian vegetation encompassing all MUs, 14,488 acres (38%) of which are conserved (Table V2C.4-1 and Figure V2C.4-1, or view an online map at: https://portal.sdmmp.com/map_vegetation.php?taxaid=SDMMP_vegcom_7). Riparian vegetation is found throughout California growing along streams, in floodplains, and in canyon bottoms. The hydrologic cycle is very important in determining the composition and structure of riparian communities through surface flows, ground water, nutrient cycling, sedimentation, erosion, and water quality (Stromberg 1993; Stohlgren et al. 1998; White and Greer 2002). Many riparian plant species regenerate from seed following flood events (Griggs 2009; Sproul et al. 2011) and the amount and timing of flows can affect species composition and seed regeneration (Stromberg 1993; White and Greer 2002; Griggs 2009; Sproul et al. 2011). Alluvial soils have a lot of nutrients and are fertile growing areas (Griggs 2009).

Riparian forest is dominated by trees such as *Quercus agrifolia*, *Salix gooddingii*, *Salix lasiolepis*, *Populus fremontii*, and *Platanus racemosa*. Common understory species are *Baccharis salicifolia*, *Toxicodendron diversilobum*, *Sambucus nigra*, *Anemopsis californica*, and *Carex* spp. Riparian scrub is shrub dominated and dense, often with *B. salicifolia* and *Tamarix* species. Invasive species common in riparian areas are *Arundo donax* and *Tamarix* species.

There are 13 riparian forest and scrub alliances mapped by AECOM (SANDAG 2012) in western San Diego County, not including MUs 9, 10, and 11. The most prevalent riparian forest alliance is *Q. agrifolia* (not including upland woodland associations that are mapped in the coast oak woodland category), followed by *P. racemosa*, *S. gooddingii*, *S. lasiolepis*, *S. laevigata*, and *P. fremontii* alliances (Sproul et al. 2011; SANDAG 2012). Riparian scrub is dominated by naturalized warm temperature riparian and wetland semi-natural stands that do not fit into an alliance and in which nonnative species are dominant over native species and do not fit into any

of the alliances dominated by specific nonnative species. *A. donax* and *Tamarix* species dominated alliances are also prevalent in riparian scrub. The only abundant native riparian scrub alliance is the *B. salicifolia* alliance.

For more information on the riparian vegetation community, go to the MSP Portal Riparian Forest and Scrub vegetation summary page:

https://portal.sdmmp.com/view_species.php?taxaid=SDMMP_vegcom_7.

Table V2C.4-1. Total acres of riparian forest and scrub and acres on Conserved Lands by MSP Management Units.

MU	Total Acres	Acres on Conserved Lands
1	1,361	1,098
2	1,014	499
3	3,264	1,611
4	2,986	1,021
5	2,351	954
6	5,478	3,133
7	744	626
8	9,129	2,037
9	8,088	2,317
10	2,828	731
11	1,134	461
Grand Total	38,377	14,488

4.2 MSP SPECIES USING RIPARIAN VEGETATION

Fourteen MSP species are associated with riparian forest and scrub (Table V2C.4-2). Two species are oak woodland VF species, coast newt and yellow-breasted chat, and will be managed through management of riparian forest and scrub vegetation. The remaining 14 SL, SO, SS, VF species from other vegetation types, and VG species will benefit incidentally from oak woodland vegetation management.

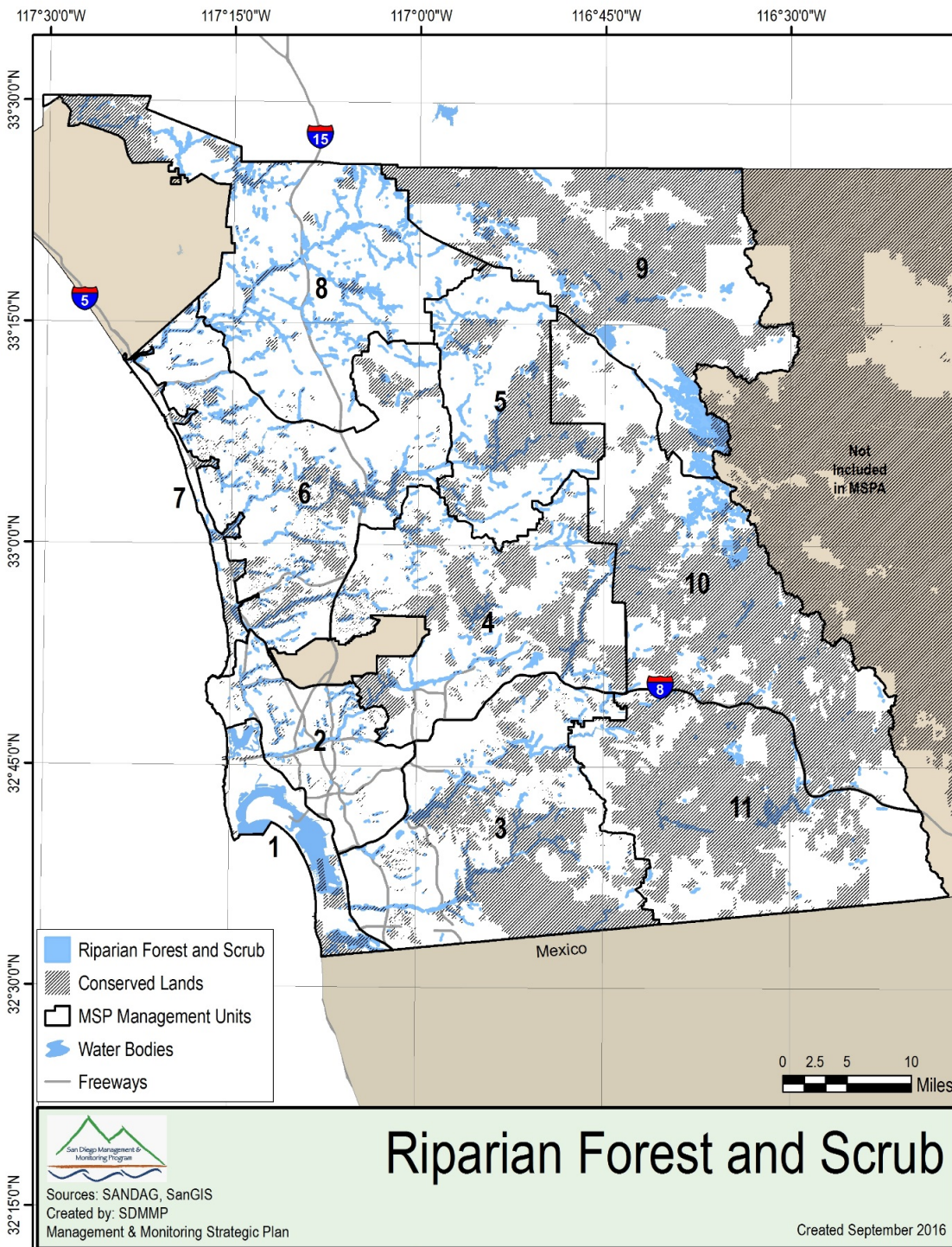


Figure V2C.4-1. Distribution of riparian forest and scrub vegetation in the MSPA.

Table V2C.4-2. Riparian forest and scrub associated MSP species.

Scientific Name	Common Name	Management Category	Summary Page Link
Plants			
<i>Ambrosia pumila</i>	San Diego ambrosia	SO	https://portal.sdmmp.com/view_species.php?taxaid=36517
<i>Iva hayesiana</i>	San Diego marsh-elder	VG	https://portal.sdmmp.com/view_species.php?taxaid=36037
<i>Monardella stoneana</i>	Jennifer's monardella	SL	https://portal.sdmmp.com/view_species.php?taxaid=832834
<i>Monardella viminea</i>	Willow monardella	SL	https://portal.sdmmp.com/view_species.php?taxaid=833060
Fish			
<i>Gila orcuttii</i>	Arroyo chub	SL	https://portal.sdmmp.com/view_species.php?taxaid=553278
Amphibians			
<i>Anaxyrus californicus</i>	Arroyo toad	SO	https://portal.sdmmp.com/view_species.php?taxaid=773514
<i>Taricha torosa torosa</i>	Coast range newt	VF	https://portal.sdmmp.com/view_species.php?taxaid=208226
Reptiles			
<i>Emys pallida</i>	Southwestern pond turtle	SL	https://portal.sdmmp.com/view_species.php?taxaid=668677
<i>Thamnophis hammondi</i>	Two-striped garter snake	VG	https://portal.sdmmp.com/view_species.php?taxaid=209149
Birds			
<i>Accipiter cooperii</i>	Cooper's hawk	VG	https://portal.sdmmp.com/view_species.php?taxaid=175309
<i>Empidonax traillii extimus</i>	Southwestern willow flycatcher	SL	https://portal.sdmmp.com/view_species.php?taxaid=712529
<i>Icteria virens</i>	Yellow-breasted chat	VF	https://portal.sdmmp.com/view_species.php?taxaid=178964
<i>Vireo bellii pusillus</i>	Least Bell's vireo	SO	https://portal.sdmmp.com/view_species.php?taxaid=179007
Mammals			
<i>Plecotus townsendii pallescens</i>	Townsend's big-eared bat	SO	https://portal.sdmmp.com/view_species.php?taxaid=203457
<i>Puma concolor</i>	Mountain lion	SL	https://portal.sdmmp.com/view_species.php?taxaid=552479

4.3 THREATS TO RIPARIAN VEGETATION

Over the last 2 years, significant die-offs of willows have occurred in San Diego County as a result of the polyphagous shot hole borer/*Fusarium* complex (Eskalen 2016; SANDAG 2016; see Vol. 2B, Sec. 6.3.2.6) and more recently from a novel fungal pathogen, *Neofusicoccum parvum* (P. Nolan, pers. comm., 2017). Another large-scale threat to riparian systems is invasive nonnative plants, which is evident in the prevalence of *A. donax* and *Tamarix*-dominated alliances within the MSPA. Riparian vegetation is also threatened by altered hydrology from water management and urbanization. Upstream urbanization increases water flows, even in the dry season, and has resulted in eroded deep cut channels rather than broad, braided channels (Stohlgren et al. 1998; White and Greer 2002; Taniguchi and Biggs 2015). This change in geomorphology can affect species composition and seed regeneration, and allow invasive plants to more easily establish from high water and nutrient levels (Stromberg 1993; White and Greer 2002). Repeated wildfires can degrade riparian communities by opening up the landscape for the expansion of invasive nonnative plants. Prolonged and extended drought can weaken trees to other stressors.

4.4 MANAGEMENT AND MONITORING APPROACH

This section provides the rationale for management and monitoring objectives for riparian forest and scrub 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 riparian vegetation is to maintain, enhance, and restore riparian forest and scrub on Conserved Lands in the MSPA that support or have the potential to support VF species (i.e., coast newt, yellow-breasted chat). This management goal should incidentally benefit a diverse array of other MSP species (e.g., arroyo toad, southwestern pond turtle, least Bell's vireo, southwestern willow flycatcher, Townsend's big-eared bat) so that the vegetation community has 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 riparian forest and scrub 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 management and monitoring approach is to characterize the current extent of tree mortality in riparian forests in the MSPA as a result of drought, pests, and fungal pathogens. This will be done using remote imagery (e.g., high-resolution aerial photos, LIDAR) to map the current extent of dead trees in riparian forest across the MSPA.

The next step is to develop a long-term MSP Riparian Forest and Scrub Monitoring Plan to assess tree 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 should integrate and be consistent with the oak woodland 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 Riparian Forest and Scrub Vegetation Monitoring Plan is completed, then field-based monitoring will be conducted to gather data.

In addition to riparian vegetation monitoring, a monitoring plan and schedule will be developed and implemented for coast range newt, a VF species in chaparral,

oak woodland, and riparian vegetation communities. As feasible, this monitoring will be integrated with riparian vegetation monitoring. Yellow-breasted chat, a second riparian VF species, will be monitored as part of determining the ecological integrity of riparian forest and scrub woodlands. This monitoring will focus on the impact of tree die-offs on bird communities in riparian and oak woodlands (see Vol. 2B, Sec. 9). There will also be monitoring of the impacts of riparian tree die-off on least Bell's vireos and southwestern willow flycatchers, as part of species-specific monitoring strategies (see Vol. 2D). 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 riparian forest monitoring and management (see Vol. 2B, Sec. 6).

A Riparian Forest and Scrub Management Plan will be prepared with information obtained from vegetation, VF species, species-specific, ecological integrity, and invasive pest monitoring. The management plan will identify and prioritize management needs to maintain, enhance, and restore riparian forests and scrub 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.

4.4.1 General Approach Objectives

Below is a summary of the management and monitoring objectives for riparian forest and scrub 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=SDMMPvegcom_7&MonMgtObjType=&ActionStatus=&ManagementUnit=&ObjectiveType=&Year=&Preserve=&Short=Long&submit=Submit.

Three objectives are included for riparian vegetation monitoring in the MSP Roadmap 2017–2021 planning cycle. The focus will be to gather information to characterize riparian forest and scrub vegetation communities. Riparian tree mortality maps across the MSPA will be prepared and a Riparian Forest and Scrub Monitoring Plan will be developed and implemented. Development of a Riparian Forest and Scrub 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.

4.4.2 Species-Specific Approach Objectives

There are 2 riparian VF species: coast newt and yellow-breasted chat (Table V2C.4-2). Yellow-breasted chat will be monitored as part of the loss of ecological integrity monitoring of riparian bird communities 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 a Riparian Forest and Scrub Management Plan in the next planning cycle.

4.5 RIPARIAN REFERENCES

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