9.0 SALT MARSH

9.1 OVERVIEW OF THE SALT MARSH VEGETATION COMMUNITY

Salt marsh vegetation comprises 2,700 acres in the MSPA, 2,296 acres (85%) of which are conserved (Table V2C.9-1). Salt marsh vegetation community is found along the coast in estuaries, lagoons, and bays in MUs 1, 2, 3, 6, and 7 (Figure V2C.9-1, or view an online map at: https://portal.sdmmp.com/map_vegetation.php?taxaid=SDMMP_vegcom_6). It is most abundant in MU1 followed by MU7.

Southern salt marsh extends from Point Conception south to the Mexican border (Holland 1986). It is a productive vegetation community of herbaceous, salt-tolerant plants less than 1 meter tall (Holland 1986). Some species unique to southern salt marsh include *Atriplex watsonii, Batis maritima*, *Lycium californicum*, *Distichlis littoralis*, *Suaeda californica*, and *Arthrocnemum subterminale* (Oberbauer et al. 2008). Other species commonly found in salt marsh include *Frankenia grandifolia*, *Heliotropium curassavicun*, *Juncus acutus*, *Limonium californicum*, *Salicornia bigelovii*, and *Spartina foliosa*. Soils are subject to tidal inundation by salt water at least part of the year (Holland 1986).

For more information on the salt marsh community, go to the MSP Portal Salt Marsh vegetation summary page: https://portal.sdmmp.com/view_species.php?taxaid=SDMMP_vegcom_6.

9.2 MSP SPECIES USING SALT MARSH VEGETATION

Fifteen MSP species are associated with salt marsh (Table V2C.9-2). Two species are salt marsh VF species (wandering skipper and Belding's savannah sparrow) that will be managed through management of salt marsh vegetation. The remaining 15 SL, SO, SS, VF species from other vegetation types, and VG species will benefit incidentally from salt marsh vegetation management.

Table V2C.9-1. Total acres of salt marsh and acres on Conserved Lands by MSP Management Units.

MU	Total Acres	Acres on Conserved Lands
1	1,558	1,260
2	15	2
3	10	1
4	0	0
5	0	0
6	42	39
7	1,075	994
8	0	0
9	0	0
10	0	0
11	0	0
Grand Total	**2,700**	**2,296**

9.3 THREATS TO SALT MARSH VEGETATION

Threats to southern salt marsh include urbanization; since 1850, 75% of southern California's salt marshes have been lost to development (Stein et al. 2014). Salt marshes have been significantly altered with habitat isolation, fragmentation, increases in subtidal water, and declines in intertidal and vegetated wetlands. Other threats include invasion by nonnative plant species, loss of transitional upland habitats, and changes to sediment and hydrological processes (Callaway and Zedler 2004). Climate change is causing large-scale changes and impacts with rising sea level (Holgate and Woodworth 2004; Kemp et al. 2011); changing precipitation patterns (Hamlet and Lettenmaier 2007; Bengtsson et al. 2009); erosion; and an increasing frequency and intensity of storms (Emanuel 2005; Webster et al. 2005).

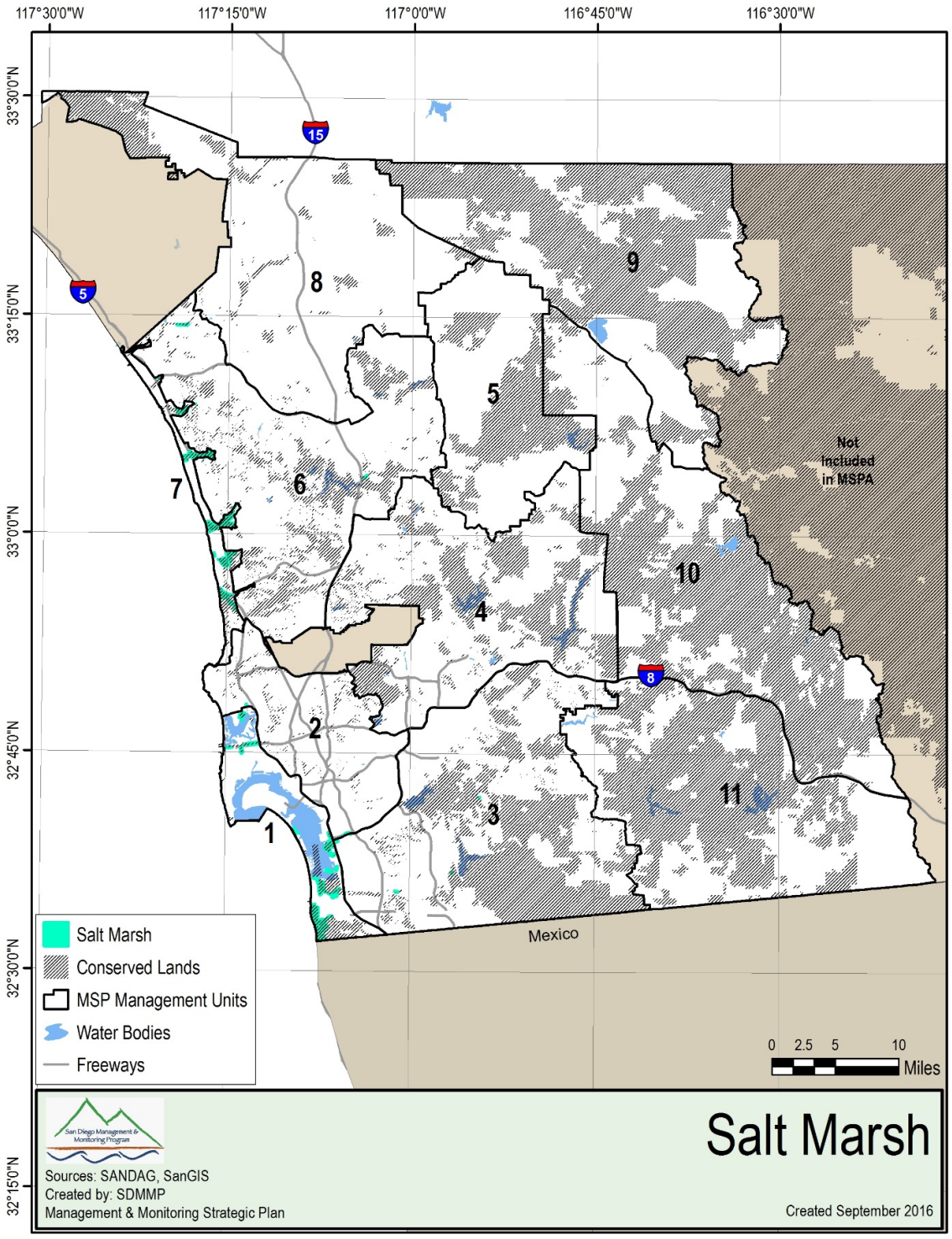

Figure V2C.9-1. Distribution of salt marsh vegetation in the MSPA.

Table V2C.9-2. Salt marsh associated MSP species.

	Scientific Name	Common Name	Management Category	Summary Page Link
Plants				
	Centromadia parryi ssp. australis	Southern tarplant	VF	https://portal.sdmmp.com/view_species.php?taxaid=780715
	Chloropyron maritimum ssp. maritimum	Salt marsh bird's-beak	SL	https://portal.sdmmp.com/view_species.php?taxaid=834234
Invertebrates				
	Panoquina errans	Wandering skipper	VF	https://portal.sdmmp.com/view_species.php?taxaid=706557
Birds				
	Branta canadensis	Canada goose	VG	https://portal.sdmmp.com/view_species.php?taxaid=174999
	Egretta rufescens	Reddish egret	VG	https://portal.sdmmp.com/view_species.php?taxaid=174824
	Falco peregrinus anatum	American peregrine falcon	VG	https://portal.sdmmp.com/view_species.php?taxaid=175605
	Haliaeetus leucocephalus	Bald eagle	VG	https://portal.sdmmp.com/view_species.php?taxaid=175420
	Numenius americanus	Long-billed curlew	VG	https://portal.sdmmp.com/view_species.php?taxaid=176593
	Pandion haliaetus	Osprey	VG	https://portal.sdmmp.com/view_species.php?taxaid=175590
	Passerculus sandwichensis beldingi	Belding's savannah sparrow	VF	https://portal.sdmmp.com/view_species.php?taxaid=179325
	Passerculus sandwichensis rostratus	Large-billed savannah sparrow	VG	https://portal.sdmmp.com/view_species.php?taxaid=179330
	Pelecanus occidentalis californicus	California brown pelican	VG	https://portal.sdmmp.com/view_species.php?taxaid=174688

	Scientific Name	Common Name	Management Category	Summary Page Link
	Rallus obsoletus levipes	Light-footed Ridgway's rail	SO	https://portal.sdmmp.com/view_species.php?taxaid=176211
	Sternula antillarum browni	California least tern	SO	https://portal.sdmmp.com/view_species.php?taxaid=825084
	Thalesseus elegans	Elegant tern	VG	https://portal.sdmmp.com/view_species.php?taxaid=176931

9.4 MANAGEMENT AND MONITORING APPROACH

This section provides the rationale for management and monitoring objectives for salt marsh 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 is to maintain, enhance, and restore salt marsh vegetation on Conserved Lands in the MSPA that supports or has the potential to support VF species (i.e., wandering skipper, Belding's savannah sparrow). This management goal should incidentally benefit other MSP species (e.g., salt marsh bird's-beak, Ridgway's light-footed rail) so that the vegetation community has high ecological integrity, and so these species are resilient to environmental stochasticity and threats such as climate change. With the achieved management goal, the species are likely to persist over the long term (>100 years).

The management and monitoring approach for salt marsh vegetation is to gather information documenting the status, environmental conditions, threats, and ecological integrity of this vegetation community and associated VF 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. It is also important to use models of future potential conditions as a result of climate change to plan for the long-term management of this vegetation community.

The first step in the strategy is to evaluate existing salt marsh monitoring programs with land managers, scientists, wildlife agencies, and other stakeholders to determine if there are gaps in existing monitoring programs or information needs. If needed, a long-term MSP Salt Marsh Monitoring Plan will be developed 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 in coastal estuaries, lagoons, and bays on Conserved Lands. The sampling design and protocols will take into account rising sea levels and models projecting future conditions to provide information important for managing under climate change. The monitoring plan will be implemented according to the recommended schedule, data analyzed, and the results incorporated into existing management programs. As high-priority management actions are implemented, monitoring will be employed to determine the effectiveness of management actions and whether changes or adjustments are needed to improve management.

In addition to the salt marsh vegetation monitoring, a monitoring plan and schedule will be developed and implemented for the wandering skipper. This monitoring will be integrated with salt marsh vegetation monitoring as feasible. Belding's savannah sparrow populations are being monitored as part of a program conducted by CDFW. The objective is to develop a standardized protocol to integrate habitat assessments and threat monitoring into the existing sparrow monitoring program and as feasible with the salt marsh vegetation monitoring. Data collected on the VF species and habitat assessments and threat evaluations will be used to develop management recommendations to incorporate into existing management programs.

If there are preserves without vegetation management plans or that need to update existing plans, then a Salt Marsh Vegetation Management Plan can be developed to fill the gaps for the benefit of salt marsh vegetation and VF species.

9.4.1 General Approach Objectives

Below is a summary of the management and monitoring objectives for salt marsh 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_6&MonMgtObjType=&ActionStatus=&ManagementUnit=&ObjectiveType=&Year=&Preserve=&Short=Long&submit=Submit.

There is 1 objective for salt marsh vegetation monitoring in the MSP Roadmap 2017–2021 planning cycle. The focus is to evaluate existing monitoring programs and develop a Salt Marsh Vegetation Monitoring Plan if gaps are present in existing efforts.

If there is a need to develop a Salt Marsh Vegetation Monitoring Plan in the 2017–2021 planning cycle, then it will be implemented in the 2022–2026 planning cycle. Data collected from monitoring will be available to develop management recommendations to incorporate into existing programs. A Salt Marsh Vegetation Management Plan can be developed in future planning cycles if such a plan is needed to cover gaps in existing efforts.

9.4.2 Species-Specific Approach Objectives

The management and monitoring approach; rationale; and goals, objectives, and actions for at-risk MSP species associated with salt marsh are presented in the corresponding species sections and species profiles accessible on each species' summary page (see links in Table V2C.9-2).

There are 2 salt marsh VF species: wandering skipper and Belding's savannah sparrow. A Wandering Skipper Monitoring Plan will be developed in the current planning cycle and integrated into salt marsh vegetation monitoring as feasible. A habitat and threat assessment plan will be developed for Belding's savannah sparrow and integrated as practical into existing population monitoring and the salt marsh vegetation monitoring. Habitat and threats monitoring will be conducted in the 2017–2021 planning cycle; the monitoring year will depend on the timing of CDFW's Belding's savannah sparrow monitoring.

9.5 SALT MARSH REFERENCES

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