8.0 VERNAL POOL AND ALKALI PLAYA

8.1 OVERVIEW

Vernal pool and alkali playa vegetation make up 2,244 acres in the MSPA, 877 (39%) of which are conserved (Table V2C.8-1). Vernal pools are seasonal wetlands that contain ponded water from a week to a few months and then are dry in summer and fall (City of San Diego 2015). Vernal pools are located in MUs 2, 3, 4, 5, 6, 7, 8, 9, and 10 (Figure V2C.8-1 or view an online map at https://portal.sdmmp.com/map_vegetation.php?taxaid=SDMMP_vegcom_4). They are most abundant in MUs 3, 10, 6, 4, and 5 (listed in order of decreasing abundance). Vernal pools mapped in MU10 surround Lake Cuyamaca and do not meet the requirements for vernal pools in this plan but are included in the acreages in this section because they are classified as vernal pools in the SANDAG vernal pool spatial layer. Alkali playas comprise 93 acres in the MSPA and 71 (96.3%) are conserved. Alkali playas are also dry lakes or edges of dry lakes that typically undergo periods of temporary inundation during the wet season and have high concentrations of alkali salts (Holland 1986). Alkali playas are most abundant in MUs 6, 3, and 5.

Vernal pool ecosystems are found in the western United States from southern Oregon south into northern Baja California, Mexico (City of San Diego 2015). When rain falls, pools form in depressions that have an underlying impervious soil layer or have poorly drained soils (USFWS 1998). Vernal pools often occur on flat mesa tops or in valleys in lower parts of watersheds (Bauder 1996). Vernal pool systems have differences in the duration and pattern of ponding, water and soil chemistry, and temperature and rainfall regimes (Hanes and Stromberg 1998). In the MSPA, vernal pools are found primarily in the Huerhuero, Stockpen, Redding, and Olivenhain soil series (Bauder 1996, 2000; City of San Diego 2015). Vernal pools can form complexes of interconnected basins with a relatively large shared watershed or can occur as single pools with no watershed that are dependent entirely on rainfall filling the pools directly (City of San Diego 2015). Vernal pools vary in size and depth depending on geomorphology and hydrological conditions. Small rounded hummocks called mima mounds are characteristic of many vernal pools in San Diego County. Vernal pool vegetation is short in stature and consists primarily of annual plants that grow while the pools are inundated or as they are beginning

to dry up. Species associated with vernal pools in central San Diego County include *Crassula connata, C. aquatica, Deschampsia danthonioides, Downingia cuspidata, Elocharis macrostachya, Lilaea scilloides, Pilularia americana, Psilocarphus brevissimus,* and *Psilocarphus tenellus* (Bauder 2000).

Table V2C.8-1. Total acres of vernal pool and alkali playa and acres on Conserved Lands by MSP Management Units.

MU	Vernal Pool Total Acres	Vernal Pool Acres on Conserved Lands	Alkali Playa Total Acres	Alkali Playa Acres on Conserved Lands
1	0	0	14.1	14.1
2	311	4	0.8	0
3	663	386	4.4	1.5
4	158	80	0	0
5	140	52	0	0
6	308	179	38.0	38.0
7	5	1	35.7	17.4
8	2	0	0	0
9	18	16	0	0
10	640	160	0	0
11	0	0	0	0
Grand Total	**2,244**	**877**	**93.0**	**71.0**

Alkali playas undergo periods of inundation followed by rapid evaporation with accumulation of salts and minerals in the poorly drained soil (Bauder et al. 2009). They have high salinity and/or alkalinity (County of San Diego 2005). Alkali playas can be found in dry lakes and in swales in vernal pools where they are hydrologically connected to vernal pools within a shared watershed but the inundation is less. Some species supported in alkali playas in the MSPA include *Atriplex parishii, A. coulteri, Lepidium latipes, Plantago bigelovii, Hordeum depressum* and *Centromadia parryi* ssp. *australis* (Ecological Ventures California 2003; County of San Diego 2005).

For more information on vernal pools and alkali playas, see the vegetation profiles on the MSP Portal: https://portal.sdmmp.com/view_species.php?taxaid=SDMMP_vegcom_4.

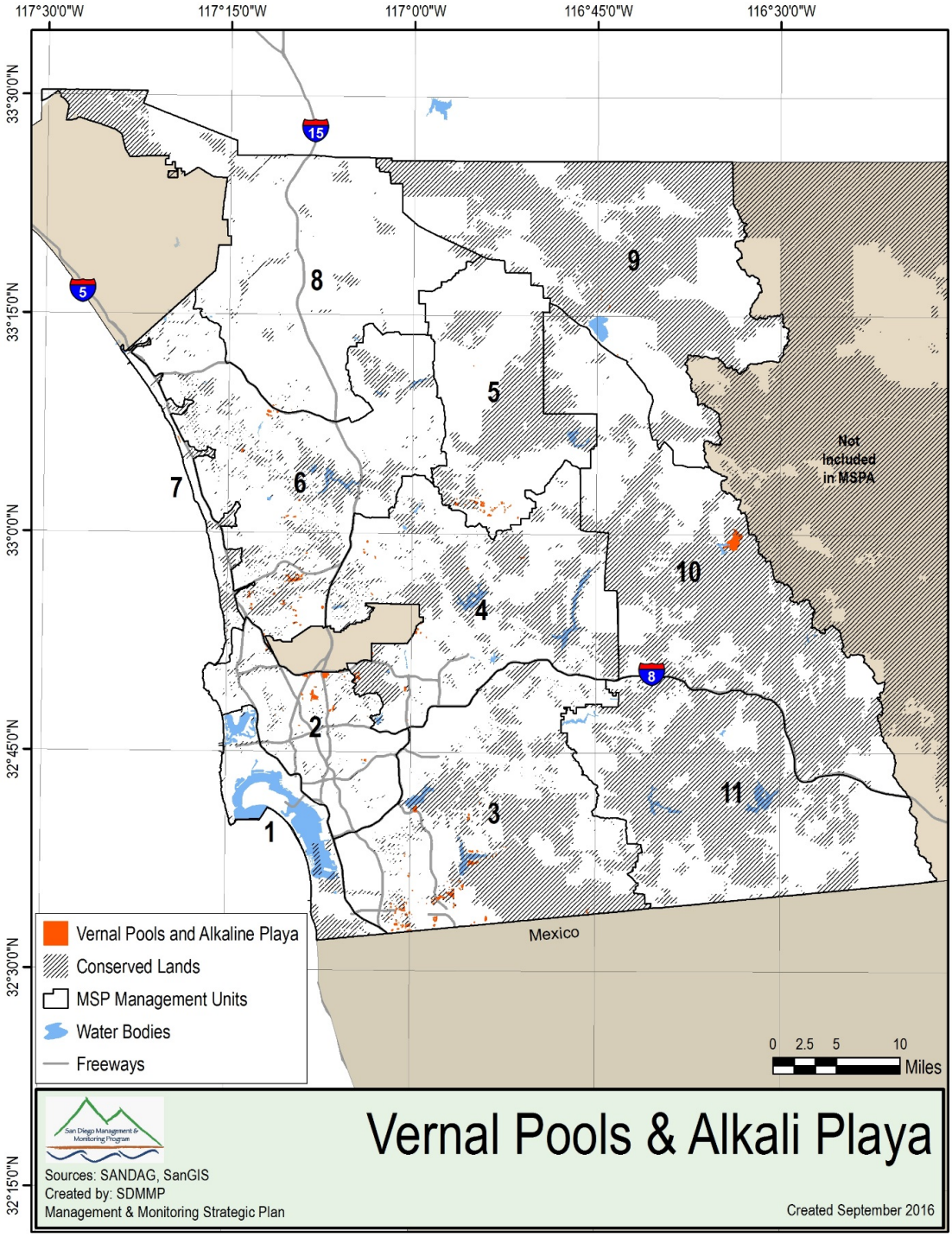

Figure V2C.8-1. Distribution of vernal pool and alkali playa vegetation in the MSPA.

8.2 SPECIES USING VERNAL POOL AND ALKALI PLAYA VEGETATION

Nineteen MSP species are associated with vernal pools and alkali playas. Eleven species are vernal pool and alkali playa VF species that will be managed through management of vernal pools and alkali playas (Table V2C.8-2). Five MSP rare plant, 2 invertebrates and an amphibian are classified as vernal pool VF species. Three MSP rare plant species are categorized as VF species in alkali playa and alkali vernal swale vegetation communities. The remaining 7 SL, SO, and SS species and VF species in other vegetation categories will benefit incidentally from vernal pool and alkali playa vegetation management.

8.3 THREATS TO VERNAL POOL AND ALKALI PLAYA VEGETATION

Threats to vernal pools and alkali playa in the MSPA include the loss, degradation, and fragmentation of habitat; off-road vehicles; altered hydrology; modified watersheds; soil compaction; erosion; invasive nonnative plant and animal species; and human disturbance (USFWS 1998; Bauder 2005). Disruptions to hydrological cycles and impacts to watersheds can create barriers to dispersal so that reproduction and pollination of species can be inhibited (Bauder 1996). Other threats include indirect effects of pesticides, water and air pollution, and fire suppression (USFWS 1998). Drought may also depress native plant populations and provide openings for nonnative plant species to invade pools and adjacent watersheds (MSP-MOM 2016). Future climate is projected to have more frequent, intensive, and prolonged droughts, which could affect vernal pool species (see Vol. 2B, Sec. 3).

8.4 MANAGEMENT AND MONITORING APPROACH

This section provides the rationale for management and monitoring objectives for vernal pool and alkali playa vegetation and MSP VF species assigned to this group. 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.

Table V2C.8-2. MSP plant and animal species with vernal pool and alkali playa vegetation communities.

	Scientific Name	Common Name	Management Category	Summary Page Link
Plants				
	Atriplex coulteri	Coulter's saltbush	VF	https://portal.sdmmp.com/view_species.php?taxaid=20523
	Atriplex parishii	Parish brittlescale	VF	https://portal.sdmmp.com/view_species.php?taxaid=20554
	Bloomeria clevelandii	San Diego goldenstar	SS	https://portal.sdmmp.com/view_species.php?taxaid=509575
	Brodiaea filifolia	Thread-leaved brodiaea	SS	https://portal.sdmmp.com/view_species.php?taxaid=42806
	Brodiaea santarosae	Santa Rosa brodiaea	SS	https://portal.sdmmp.com/view_species.php?taxaid=810190
	Centromadia parryi ssp. Australis	Southern tarplant	VF	https://portal.sdmmp.com/view_species.php?taxaid=780715
	Dicranostegia orcuttiana	Orcutt's bird's-beak	SL	https://portal.sdmmp.com/view_species.php?taxaid=834156
	Dudleya variegata	Variegated dudleya	SS	https://portal.sdmmp.com/view_species.php?taxaid=502182
	Eryngium aristulatum var. parishii	San Diego button-celery	VF	https://portal.sdmmp.com/view_species.php?taxaid=528066
	Ferocactus viridescens	San Diego barrel cactus	VF	https://portal.sdmmp.com/view_species.php?taxaid=19801
	Navarretia fossalis	Spreading navarretia	VF	https://portal.sdmmp.com/view_species.php?taxaid=31328
	Orcuttia californica	California orcutt grass	SL	https://portal.sdmmp.com/view_species.php?taxaid=41970
	Pogogyne abramsii	San Diego mesa mint	VF	https://portal.sdmmp.com/view_species.php?taxaid=32639
	Pogogyne nudiuscula	Otay mesa mint	SL	https://portal.sdmmp.com/view_species.php?taxaid=32643
Invertebrates				
	Branchinecta sandiegonensis	San Diego fairy shrimp	SL	https://portal.sdmmp.com/view_species.php?taxaid=624043
	Euphydryas editha quino	Quino checkerspot butterfly	SL	https://portal.sdmmp.com/view_species.php?taxaid=779299
	Streptocephalus wootoni	Riverside fairy shrimp	SL	https://portal.sdmmp.com/view_species.php?taxaid=624020

	Scientific Name	Common Name	Management Category	Summary Page Link
Amphibians				
	Spea hammondii	Western spadefoot toad	VF	https://portal.sdmmp.com/view_species.php?taxaid=206990
Birds				
	Athene cunicularia hypugaea	Western burrowing owl	SL	https://portal.sdmmp.com/view_species.php?taxaid=687093

The overall goal is to protect, enhance. and restore vernal pool and alkali playa habitat on Conserved Lands in the MSPA that supports or has the potential to support VF and SL species (i.e., California Orcutt grass, Coulter's saltbush, Otay mesa mint, Parish brittlescale, San Diego button-celery, San Diego mesa mint, southern tarplant, spreading navarretia, Riverside fairy shrimp, San Diego fairy shrimp, and western spadefoot) so that the vegetation community has high ecological integrity, and these species are resilient to environmental stochasticity and threats such as altered hydrology, climate change, and invasive plants, and will likely persist over the long term (>100 years).

The management and monitoring approach for vernal pool and alkali playa vegetation is based upon the City of San Diego Vernal Pool Habitat Conservation Plan (VPHCP); City of San Diego 2015). A conceptual model was developed to document understanding of vernal pool systems and to identify monitoring components and management triggers. In the VPHCP, management standards were identified and, if not met, then more intensive management and monitoring are required to achieve these standards under the Vernal Pool Monitoring and Management Plan (VPMMP; City of San Diego 2015). The standards include "preventing an average decline of 1 cover class for conserved (MSP) plant species over 3 years; preventing a 20% decline in shrimp species presence over 3 years; preventing an average of at least 1 cover class of total nonnative cover over 3 years in complexes with at least 10% total nonnative cover; and maintaining vernal pool hydrological network and water storage functions" (City of San Diego 2015).

Under the VPMMP (City of San Diego 2015), Level 1 is classified as stewardship and is the lowest tier of monitoring and management to maintain existing conditions and conserved species populations (including MSP species) within conserved vernal pool complexes. Level 2 requires more rigorous monitoring and an intermediate level of management to stabilize conserved species through habitat enhancement to achieve habitat and species objectives. The highest intensity of management is Level 3, in which habitat is restored to increase declining conserved species (including MSP species) populations as identified in the species objectives and standards.

8.4.1 General Approach Objectives

Below is a summary of the management and monitoring objectives for vernal pool and alkali playa 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_4&MonMgtObjType=&ActionStatus=&ManagementUnit=&ObjectiveType=&Year=&Preserve=&Short=Long&submit=Submit.

There are 3 general monitoring and 3 general management objectives for vernal pools during the 2017–2021 planning cycle that follow the City of San Diego's VPMMP (City of San Diego 2015). The first monitoring objective is to conduct annual qualitative monitoring to document threats such as trampling, dumping, topographic and hydrological disturbance, and invasive plants and to determine management needs. The second monitoring objective is to conduct baseline quantitative hydrological surveys to characterize the hydrology of each basin within a vernal pool complex. The third objective is to conduct a topographic disturbance assessment as needed and indicated by the qualitative monitoring and to compare the results with the baseline hydrological assessment. These results will inform management recommendations, and the monitoring will be repeated as management is implemented to determine if hydrological functions are met.

The first management objective is to conduct annual routine stewardship to maintain vernal pool habitat and existing MSP species populations. This Level 1 management includes routine access patrols, trash removal, edge effects maintenance, maintaining fencing and signage, and low intensity control of invasive nonnative plants. The second management objective is to implement Level 2 management as needed to enhance and stabilize vernal pool habitat and MSP species populations. Level 2 management includes implementing Level 1 management actions plus additional actions to repair moderate topographic disturbance, dethatching pools with MSP species and surrounding 20-foot buffers, seed collection, bulking and redistribution to enhance declining MSP plant species populations, and actions to collect and redistribute cysts of MSP shrimp species for population enhancement. This latter action stipulates no collection of shrimp cysts from pools containing Lindahl's fairy shrimp. The final management objective is to implement Level 3 management as needed to restore vernal pool habitat and MSP species that are in decline or poor condition based upon management triggers.

Level 3 management includes all Level 1 actions, in addition to restoring existing pools to increase MSP species, mechanized and hand repair of extensive topographic disturbances, dethatching pools with MSP species and 35-foot surrounding watershed, invasive plant control, reestablishing or enhancing MSP plant species populations through seed collection, bulking and redistribution and container plantings, and collecting MSP fairy shrimp cysts to enhance existing populations or establish new populations.

Additional monitoring objectives for VF vernal pool and alkali playa species are included in the species-specific approach.

8.4.2 Species Specific Approach Objectives

There are 11 vernal pool and alkali playa VF species (Table V2C.8-2). The 5 vernal pool VF plant species have annual surveys in occupied, historically occupied, and potentially suitable habitat to determine cover classes in each basin and of nonnative species to determine if Level 1, 2, or 3 management is required. There are qualitative surveys to determine the presence of 2 MSP fairy shrimp species to determine whether Level 1, 2, or 3 management actions are needed. There is an objective to conduct annual surveys of western spadefoot in vernal pools to determine distribution and status, and to assess habitat and threats to determine management needs. The 3 MSP rare plant species classified as VF species in alkali playa will have "inspect and manage" monitoring in 2018 to determine occurrence status and distribution, and to assess habitat and threats to inform management needs.

8.5 VERNAL POOL AND ALKALI PLAYA REFERENCES

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