

San Jacinto Valley Vernal Pools

VEGETATION ASSOCIATION: SAN JACINTO VALLEY VERNAL POOLS
(Sawyer & Keeler-Wolf)

MAPPED SUBASSOCIATIONS: San Jacinto Valley Vernal Pools

OTHER CLASSIFICATIONS: Southern/Perris Basin Vernal Pools (CDFG)
Interior Cismontane Vernal Pools (Cheatham & Haller)
Vernal Pool Ephemeral (Thorne)
Palustrine, non-persistent, seasonally flooded wetland (Cowardin)

DATA CHARACTERIZATION

BIOGEOGRAPHY

The San Jacinto Valley is situated between two arms of the Peninsular Ranges: the Santa Ana Mountains to the west and the San Jacinto/Santa Rosa Mountains to the east. Seismic activity along faults at the valley edges has resulted in the valley floor sinking relative to the adjacent mountains. Alluvial materials have been deposited on the valley floor, and these have developed into saline-alkali clay soils. The vernal pools in this valley are a remnant of a once extensive seasonal wetland landscape that occurred in the valley bottomlands, the majority of which are now in agricultural production. The remaining pools occur in a changing mosaic with a series of alkali-flat plant communities, including alkali (vernal) playas and alkali grassland.

RANGE AND DISTRIBUTION WITHIN WESTERN RIVERSIDE COUNTY

The San Jacinto Valley/Perris Basin.

VEGETATION CHARACTERISTICS

The flora of vernal pools includes species that are restricted to vernal pools, that occur in vernal pools and other types of seasonal wetlands, and/or that are typical of upland Habitats but establish around pool margins or colonize pool basins during the summer or fall (Jones & Stokes 1990). Vegetation cover varies in response to the amount and distribution of rainfall and air temperatures and, consequently, the presence or absence of an individual species and its relative abundance varies from year to year. During drought years, a vernal pool flora may



San Jacinto Valley Vernal Pools

include abundance of upland species and cover not characteristic of vernal pools under normal climatic conditions.

SPECIES COMPOSITION

Vernal pools are well-known for their high level of endemism (Stone 1989) and abundance of rare, threatened, or endangered species (Sawyer and Keeler-Wolf 1995). Many vernal pools are characterized by concentric rings of plants that flower sequentially as the pools dry. Vernal pools are dominated by native annual plants, with low to moderate levels of perennial herbaceous cover. Common vernal pool plant species in the pools in the San Jacinto Valley include woolly marbles (*Psilocarphus brevissimus*), toad rush (*Juncus bufonius*), spike rush (*Eleocharis* sp.), wire-stem popcorn flower (*Plagiobothrys leptocladus*), Mexican speedwell (*Veronica peregrina* ssp. *xalapensis*), annual hairgrass (*Deschampsia danthonioides*), alkali pepper-grass (*Lepidium dictyotum*), and water pygmy weed (*Crassula aquatica*). Sensitive or listed plant species that occur in these vernal pools/alkali playas include: California Orcutt grass (*Orcuttia californica*), little mousetail (*Myosurus minimus* ssp. *apus*), thread-leaved brodiaea (*Brodiaea filifolia*), Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*), little mousetail (*Myosurus minimus* ssp. *apus*), spreading navarretia (*Navarretia fossalis*), Orcutt's brodiaea (*Brodiaea orcuttii*), thread-leaved brodiaea (*Brodiaea filifolia*), Parish brittlescale (*Atriplex parishii*), San Jacinto Valley crownscale (*Atriplex coronatavar. notatior*), and smooth tarplant (*Hemizonia pungens* ssp. *laevis*).

PHYSICAL ENVIRONMENT

Vernal pools are ephemeral wetlands that form in shallow depressions underlain by a substrate near the surface that restricts the downward percolation of water. Depressions in the landscape fill with rainwater and runoff from adjacent areas during the winter and may remain inundated until spring or early summer, sometimes drying more than once during the wet season. Smaller pools can fill, and dry, and larger pools can hold water longer and may in the deeper portions, support species that are more representative of freshwater marshes.

The San Jacinto Valley vernal pools occupy the prehistoric bed of San Jacinto Lake (and its remnant, Mystic Lake) and intergrade with alkali playa and alkali grassland Habitats. Vernal pools and alkali playa occupy approximately 42 acres and 6,081 acres, respectively within the Plan Area (PSBS 1995). Vernal pool basins are few, shallow, and relatively small in size, occurring in both the San Jacinto and Salt Creek drainages within the Perris Basin. Vernal pools, alkali playa, and alkali grasslands also are found southwest of Hemet and scattered along the margins of the San Jacinto River, extending from Mystic Lake to Perris, including portions of the San Jacinto Wildlife Area owned and managed by the California Department of



San Jacinto Valley Vernal Pools

Fish and Game. These pools occupy plains on soils mapped as Domino-Travers-Willows association. This soil association is alkaline and has a subsoil layer of impervious caliche (White 1994). The Willows series is also found in the Sacramento Valley and underlies Northern Claypan pools there, underscoring their similarity to the Riverside pools (CDFG 1998). Hydrology of the Perris Basin pools is variable; some are filled when the San Jacinto River overflows its banks.

Alkali grasslands, alkali playas, and vernal pools share much of their floristic composition and are often difficult to differentiate (White 1994). Vernal pools are considered to be those areas which pond reliably year-to-year as evidenced by the presence of standing water durations adequate to support a vegetation characteristic of vernal pool Habitat in most years. In contrast, alkaline vernal playas are physical situations (large, shallow, lakes, some of which are the result of man-made topographic features which impede the natural flow of water) which are subject to seasonal flooding and ponding on a less reliable basis, but which possess characteristic soils and vegetation developed in response to periodic flooding and low soil permeabilities. In the wettest years, large areas of vernal playa Habitat may support plant taxa normally observed primarily in vernal pools. In drier years, these playas may support alkali grassland Habitat (RECON 1995).

The isolated pool at Skunk Hollow near Temecula is relatively large (up to 10 acres), resembling vernal lake. It may remain wet through much of the year and only contain vernal pool species on the drying margins. The Skunk Hollow pool is located on Willows silty clay and is likely to have some similarities with pools in the old Salt Creek drainage west of Hemet. This 33-acre pool provides Habitat for the Riverside fairy shrimp (*Streptocephalus woottoni*) and other sensitive species (e.g., *Ambrosia pumila* in surrounding watershed).

ECOSYSTEM PROCESSES

Vernal pools are seasonally flooded landscape depressions that support a distinctive biota adapted to periodic or continuous inundation during the wet season and the absence of either ponded water or wet soils during the dry season. Vernal pools that meet this definition are circumscribed by a framework of topographic, edaphic, hydrological, and biotic parameters. These parameters also distinguish vernal pools from other types of seasonal and perennial wetlands (Jones & Stokes 1990).

Vernal pools have a unique hydrology primarily because of soil/substrate properties and the Mediterranean climate of lowland California. Pool basins are periodically or continuously flooded during late fall, winter, and spring and are dry and desiccated through summer and



San Jacinto Valley Vernal Pools

early fall, undergoing a sequence of hydrologic phases reflected by the phenology and composition of the dominant biota that characterize each phase. As described in Zedler (1987), vernal pool development during a year can be broken down into four phases: wetting, aquatic, drying, and drought. Fall rains initiate the “wetting” stage and stimulate the germination of dormant seeds and the resprouting of perennials that eventually form an herbaceous turf before and during the transition to the “aquatic” phase. This phase begins after soils reach field capacity (*i.e.*, the soil profile is saturated) and water is either exposed where pool depressions intercept a seasonally perched water table or accumulates from surface runoff. The subsequent “drying” phase begins as water levels recede during spring and is characterized by partially flooded pool basins and/or wet or saturated soil. The final “drought” phase occurs when the pool basin and soils are dry and nearly all of the biota that previously was actively growing dies or becomes dormant. Vernal pools derive water from direct precipitation, overland runoff, and groundwater in seasonal perched water tables. Vernal pool hydrology for pools in the northwestern region seems to differ from other pools because they are filled when the San Jacinto River overflows its banks. Historically, the San Jacinto River drained into Mystic Lake, an expansive playa in the northern region of the valley, and vernal pool hydrology likely was linked to the lake itself (White 1994).

THREATS

The most heavily threatened and most severely reduced vernal pool types in Riverside County are the Perris Basin pools (CDFG 1998). San Jacinto Valley vernal pools are threatened by a variety of factors, including: Habitat destruction and fragmentation from agricultural and urban development; pipeline construction; alterations in wetland hydrology by draining or channelization; clay mining; off-road vehicle activity; cattle and sheep grazing; weed abatement; fire suppression practices; and competition from alien plant species.

The San Jacinto Wildlife Area managed by the CDFG protects a small portion of the San Jacinto Valley vernal pools but the majority of those remaining occur outside its boundaries. Additional protection and study are necessary for these pools and unclassified pools such as Skunk Hollow. Skunk Hollow is conserved as part of a mitigation bank for general wetland impacts which occur within the Plan Area (Western Riverside County). The bank formally is permitted by the Army Corps of Engineers, U.S. Fish and Wildlife Service, and Department of Fish and Game.



San Jacinto Valley Vernal Pools

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