

The Phoenix Park Vernal Pools

A National Natural Landmark

the topography and soil



Vernal Pools Vernal pools are ponds which are formed in winter and spring by accumulating rainfall. The underlying soil (hardpan and clays) does not allow the water to seep down into the ground. Instead, the water is slowly lost by evaporation. Over thousands and thousands of years, the harsh environment of the vernal pools (full of water all winter, baked hard all summer) has allowed the development of a flora (set of plants) and fauna (insects and animals) which are uniquely adapted to the habitat. The vernal pool environment is sufficiently harsh that introduced weedy plants, which have taken over much of the surrounding fields, have made little headway into the pools. Most of the plants found in the vernal pools are native species.

Mima Mounds The small hills interspersed between the vernal pools are called mima mounds. Most of the plants found on the mima mounds are introduced weedy plants not originally found in California. Plants grow readily on the mounds because the soil there is well cultivated by gophers and worms. There are many hypotheses on how mima mounds form. Some scientists believe that gophers are important in the formation of mima mounds; others believe that gophers have adapted to the little hills which formed by other means.

The Soil The nature of the soil is instrumental in determining whether vernal pools will develop. The soil at Phoenix Park belongs to a type called the Redding series, and is formed from the gravels and cobbles materials filling the eastern Sacramento Valley. These materials have washed down from the Sierra Nevada in the American and similar rivers. The surface soil and upper subsoil are reddish, granular, and porous. Underlying the upper subsoil is hardpan, which is clay cemented together by siliceous (silicon-containing) chemicals. Because the subsoils and hardpan are impervious to water, rainwater will stand in depressions in the soil and cannot percolate down to groundwater. Instead, the water evaporates slowly. These water-filled depressions are the vernal pools.

Why Are They Still Here? The somewhat acidic soils of the Redding series are relatively shallow and infertile from the standpoint of agriculture. For this reason, many of the vernal pools formed on Redding soils have not been plowed for crop raising, a practice which has destroyed much of the vernal pool habitat in the Sacramento valley. However, the relatively flat, undulating surface of the Redding soils is ideal for housing and urban development. This use is rapidly diminishing the amount of vernal pool habitat in California, and particularly in Sacramento County. The Phoenix Park site has been set aside so that residents and visitors to Fair Oaks may enjoy the beauty of vernal pools for years to come.

a distinct plant community

phoenix park vernal pools flowers



Checker Bloom (*Sidalcea calycosa*) is the pink flower which rings the vernal pools in April and May. A member of the mallow family, Checker Bloom is probably the showiest of the Phoenix Park natives. (Flowers early March through May)



Goldfields (*Lasthenia fremontii*) are probably among the most commonly found wildflowers in California. The species at Phoenix Park prefers to grow in the bottom of the pools not long after they dry. Elsewhere, similar species carpet broad fields with yellow. (Flowers mid-March through May)



Downingia (*Downingia bicornuta*, *D. ornatisissima*, *D. cuspidata*) are small blue and white (or purple and white) flowers found in the bottom of vernal pools as they dry. The various species of Downingia are found in moist places along the west coast, usually preferring vernal pools. (Flowers April-May)



Spike Rush (*Eleocharis macrostachya*) is the reed-like plant growing in several of the pools in the main drainage of the park. This plant is common in most places throughout California and the United States. (Flowers April-May)



Sticky Orcuttia (*Orcuttia viscida*) is the only plant endemic to Sacramento County; that is, it grows naturally only in Sacramento County and nowhere else in the world. The Phoenix Park population is the northernmost occurrence. This small grass is found flowering in dry pools in June and July, after most annual species are dead.



Vernal Pool Brodiaea (*Brodiaea minor*) is a small lily family member which grows near or in the beds of vernal pools. The pale purple, pinwheel-like flowers are one of the least seven species of Brodiaea found at Phoenix Park. (April and May)



Vernal Pool Buttercup (*Ranunculus bonariensis* var. *triseptalus*) which is a small plant with floating leaves and tiny yellow flowers which is abundantly found in March through May.



Coyote Thistle (*Eryngium vaseyi*) is a prickly looking green plant in the carrot family found in the beds of many of the vernal pools. Coyote thistle is native to this area (unlike the exotic yellow star-thistle). It flowers after most plants have dried for the summer. (Flowers May-June)



Cat's Ears (*Hypochaeris glabra*) are the abundant little yellow flowers looking like small dandelions. A native of Europe, Cat's Ears have found California much to their liking. (March-May)



Spoke Pod (*Thysanocarpus radians*) are members of the mustard family having tiny white flowers and disc-like seed pods. Those growing at Phoenix Park are unusual in having lovely pink-tinged pods. (March-April)



Filaree (*Erodium botrys*), a native of Europe, is abundant in the grassy areas about the pools. The seed pods of Filaree have led to other common names for the plant, such as "Scissors" or "Clocks". (February-May)



Frying-Pan Poppies (*Eschscholzia lobbi*) are small, flat, beautifully yellow poppies found close to the ground in the areas between vernal pools. (March-May)



Triteleia (*Triteleia* (or *Brodiaea*) *laxa*) are showy spring flowers which are familiar to those who have taken spring walks in the Sacramento area. They are also called "Ithuriel's Spear". (March-May)



Wavy-Leaf Soap Plant (*Chlorogalum pomeridianum*) is noticeable during spring mainly for its leaves, from which a single stalk arises. From mid-May through June, this stalk bears vesperine (opening in the evening) white flowers.



Vetch (*Vicia* sp.) are members of the pea family; those found at Phoenix Park were not originally found in California, but have found the climate here to their liking. They are particularly fond of the tops of mima mounds. (mid-February-May)



Miniture Lupine (*Lupinus bicolor*) is a very small member of this large and showy genus of flowers in the pea family. The little blue and white flowers are worth a close look (March-April).



Johnny Tuck (*Triphysaria*) has odd little yellow flowers with frequently purplish-tinged foliage (stems and leaves). This color combination has led to another common name for this wide-spread California wildflower—Ham and Eggs. (Flowers March-April)

a home for unique animal species...



Vernal Pool Invertebrates There are normally no fishes in vernal pools because they dry out every summer. This absence of competent predators allows several invertebrates and amphibians to exploit vernal pool habitats. Look for the Clam Shrimp (they look like little swimming clams) and fairy shrimp (small, crayfish-like animals that swim upside down) in the water during winter and early spring. These animals are important food sources for the waterfowl that visit the pools each winter.



Vernal Pool Amphibians Several amphibians use vernal pools for reproduction, but spend large parts of their life cycle in the surrounding grassland. It is possible to find the western spadefoot toad (shown above) during late winter and early spring. The tadpole matures as the water recedes each spring. These young amphibians spend much of the dry summer months buried deep within the ground, waiting for moisture to return.



Valley Grassland and Blue Oak Woodland The vernal pools of California's great valley are found for the most part in a natural community called valley grassland. In early California, before settlement by the Spanish Californians in the 1700's and the influx of miners following gold discovery in 1848, the grasses are believed to have been mostly perennial (long-lived). The grasses are now mostly annuals introduced from Europe and other areas. Phoenix Park park is on the border of an area, now largely developed, which was known as the Fair Oaks Bald Spot. The soils here were sufficiently poor that even blue oaks would not grow in great numbers, although the rest of the town was oak covered.



The Blue Oak (*Quercus douglasii*) is found in California's great valley on slopes and plains having relatively poor soils. The blue oak woodland, a variant of the foothill woodland natural community, is found in areas with relatively low rainfall. This open woodland is typical of areas having hot, dry summers. The blue oak, as here at Phoenix Park, is frequently the only type of tree that will grow in large open areas such as the vernal pools.

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