

## **JEPSON PRAIRIE**

### **Self Guided Nature Trail**

*Jepson Prairie, one of the last remaining intact vernal pool and grassland habitats, is preserved and managed by the Solano Land Trust and University of California Natural Reserve System for public education, research and grazing. To protect the Prairie's inhabitants and visitors, please remain on the trail, and leave your pets. No smoking is allowed. The trail is approximately 1/2 mile long and begins at the entrance across the road.*

1. Imagine yourself flying low over Jepson Prairie like a hawk, the Northern Harrier. Your wings dip and rise with the currents of air that flow over the gently rounded landscape. Soaring higher, you view a patchwork pattern of terrain and vegetation. Shrubs and tree-lined sloughs mark the northern and southern boundaries; tules and cattails fill the quiet waters. Playa pools and smaller vernal pools dot the grassland, ringed with flowers and busy with wading birds. Swales fill with rainwater and converge into streams that ultimately empty into the Delta. Mounds emerge from the prairie like islands with their tops fringed with grasses that sway and rustle in the Delta breeze.

2. Jepson Prairie was spared from the plow and the land speculator by the nature of its soils. These soils originated 15 miles to the northwest from the wreckage of sedimentary rock called the Vaca Mountains, which were uplifted from the sea floor as a result of the collision of two of the earth's plates. Over tens of thousands of years, the weathered remains of their sandstones - the sands, silts, and clays - were sorted and deposited onto this landscape by ancient watercourses. You are now standing near the end of this vast, sloping alluvial fan.

Time and rainfall have further moved and sorted the particles of soil downward to create a dense clay zone beneath its surface. It is this water impermeable "claypan" and infertile soils to which Jepson Prairie owes its vernal pools, playa lakes and ultimately its preservation.

3. At this site, almost all of the 20 inches of annual rainfall is received between the months of October and March. The cool moist winter and spring are followed by summer heat and

drought. This is typical of the Mediterranean climate, which California shares with only four other regions on earth. Germination of the plants begins after the first fall rains. Growth is slowed by lower temperatures of winter but quickly accelerates with the longer, warmer days of early spring. The drying of the depressions permits the plants to flower and ripen their seed before the heat and drought of summer.

The animal residents also adjust their activities to this seasonal regime of moisture and temperature. Pocket gophers, whose highly visible tunneling activities lace the grassland, forage for their favorite food plants in the vernal pools and swales during the summer and must evacuate to higher ground of the mounds in winter. While awaiting the fall rains, the tiger salamanders escape desiccation from the summer drought by resting in the cool moist burrows of the gophers.

4. The curious looking bumps on this landscape are one of the mysteries of Jepson Prairie. Called "mima-mounds" (pronounced my-ma), this type of landform occurs elsewhere in western North America, from Alaska to Mexico. Explanations for the origins of these mounds include alternate freezing and thawing of the ground during past glacial periods, erosion and deposition of soil by the wind, the activities of burrowing animals such as the gopher, and disturbance by earthquakes. Which explanation applies to the specific conditions at Jepson Prairie?

This type of landscape feature was once more common, before the leveling and deep ripping of grasslands for row crops, orchards and urban development. The pasture just north of Jepson Prairie, across Highway 113, was planed of its mounds and its depressions filled. Compare the floral displays as you depart from the preserve.

5. You have just passed through a swale or "hogwallow". This depression is lined by a layer of clay, which prevents the downward movement of water and dissolved salts through the soil. Instead, water must move sideways through the saturated soil. It collects in low places, creating closed vernal pools and slowly flowing, interconnected swales. As you proceed on the higher ground of the mima-mounds, compare the kinds and abundance of blooms with the swale vegetation.

6. Few non-native plants can tolerate the flooded conditions of the vernal pools and swales. As a result, the native flora can thrive there, presenting the diversity and profusion of blooms that you can observe.

In stark contrast, the cover of vegetation on the mounds is mostly comprised of species not native to California, North America, or even the Western Hemisphere! It is this higher, drier ground that the introduced pink flowering filaree, the tall wild oats and the prickly thistles can out-compete the native clovers, yellow violets and bunchgrasses for light, moisture, and nutrients. Their seeds arrived here by hitching rides in the ballast of sailing ships or in the feed and coats of introduced livestock, or by being intentionally planted by the early Spaniards and other Europeans who followed them.

7. The wildness of Jepson Prairie has faced many challenges since the arrival of the Europeans, represented by the structures that you can observe from this trail. The fences confine herds of domesticated grazing animals, which have replaced the free-roaming deer, pronghorn antelope and tule elk. The railroad was associated in the early 1900's with land speculation involving the planting and harvest of eucalyptus, cattle grazing and housing. The powerlines crackle above with hydroelectricity from dams of Central Valley water projects which ended annual flooding of the region. In California as a whole, 90% of the original vernal pools and 95% of the original grassland, riparian and marsh habitats have been destroyed. Jepson Prairie Preserve protects a portion of what remains.

You may proceed toward Olcott Lake at trail marker #12, or take a longer walk by turning right, past this marker.

8. The native American Indians of this area, the Southern Patwin, visited the prairie seasonally to hunt its waterfowl and larger game. The grasslands also provided harvests of seeds, greens, bulbs and medicinal herbs. The nearby marsh and riparian habitats of the Delta yielded fish as well as plants such as the tule that were utilized for fiber, shelter and food. Evidence from artifacts found near here suggest that the manufacture and trade of goods took place in this area. How might the first inhabitants have altered this landscape?

9. Fire was used to increase the seed crop of their preferred grasses and annual forbs, and prevent the encroachment of trees and shrubs onto the grassland. The Patwin's harvesting and replanting activities may have increased the number and distribution of bulb plants such as the late spring blooming Golden Nuggets.

The native purple needle grass seen here, a perennial bunchgrass whose flowering stalks emerge among last year's seed stalks, benefits from fire. Controlled burns in late spring reduce the seed crop of the annual non-native grasses and help reduce thatch buildup. This section was last burned in the spring of 2000. The preserve is also managed to maintain its high diversity and abundance of native plants by permitting grazing. Sheep help remove the competing cover of the annual grasses and lightly break the litter with their hooves, aiding native species.

10. On most days, Mt. Diablo, less than 30 miles to the south as the Prairie Falcon flies, is visible from Jepson Prairie. Its slopes also host an impressive springtime flowering display of native plants. Some of its soils are derived from serpentine rock, which due to its chemical content is inhospitable to many non-native plant species. With less competition from introduced species, the native grasses and forbs flourish. It is the special environments such as the vernal pool- dotted grasslands of Jepson Prairie and the serpentine soils of Mt. Diablo that contribute to and help preserve the diverse and unique flora of California.

11. The receding waters of Olcott Lake expose the pool's bottom in successive intervals, permitting the plants, which germinated in the fall, to resume their growth, flower, and set seed. This process contributes to the formation of the "bathtub ring" pattern of plant distribution and color around the playa lake's shoreline. The whites of meadow foam and popcorn flower, the pale yellow of yellow carpet, the deep yellows of goldfields and the sky blue of downingia are some of the pigments contributed by the vernal pool plants.

12. Here near the shore of Olcott Lake, the principal species of rare plants and animals that prompted the protection of Jepson Prairie lie mostly hidden from view. Olcott Lake, often called a

playa pool, is a very large vernal pool with alkaline waters clouded by dissolved clays. In 1980, The Nature Conservancy purchased this land primarily to protect the small and elusive Delta Green Ground Beetle that inhabits its shoreline. The water obscures the locally abundant but regionally endangered fairy and tadpole shrimps. When the lakebed dries by midsummer, revealing its cracked clay surface, the rare Solano Grass may be found here, one of only three remaining known populations in the world.

Because of the rarity of these organisms and the fragility of the shoreline environment, please remain on the trail and do not approach the lake's edge.

13. The upland grassland and playa pool are linked, not only by the valuable nutrients washed from the grassland by the rains, but also by the animals that occupy both environments. The wading Avocet uses scythe-like sweeps of its bill to capture its prey and incubates its eggs in the prairie vegetation. Small, solitary bees pollinate flowers that bloom along the receding edges of pools, as they collect pollen and nectar to provision eggs laid in excavated tunnels in the higher, drier soil of the mounds. The tiger salamander spends the first months of its life feeding and growing as a larva in Olcott Lake. After emerging from the drying pool as an adult, it will spend the rest of its life in the grassland, returning to Olcott Lake during dark, rainy nights in late winter to breed.

14. Olcott Lake is home to several species of crustaceans, most of which are threatened with extinction due to the loss of their unique habitat. The ancestors of the fairy and tadpole shrimps in the lake preceded the dinosaurs. These organisms left the marine environments of their past and survive today in temporary, freshwater habitats that usually lack fish predators, like Olcott Lake. However, fish will occasionally make their way from the nearby Delta, across the flooded grassland, and into the lake.

Although Olcott Lake dries completely by midsummer, the playa pool crustaceans repopulate the pool next year by laying heat- and drought resistant cysts before dying. These cysts will hatch when the playa pool refills by the next winter or several years later. Other playa pool inhabitants, such as dragonfly nymphs, chorus frog tadpoles, and tiger salamander larvae, will

develop into their adult forms in time to fly, hop, or crawl their way from the warming and disappearing waters.

15. Great numbers of shorebirds, ducks and geese rest and replenish their energy stores here, between their breeding and overwintering destinations, which may be as far apart as the arctic tundra and South America. In winter, Rough Legged and Ferruginous Hawks hunt the rodents and jackrabbits of the prairie, far from their nesting grounds. Their movements demonstrate the global importance of preserving Jepson Prairie and the surrounding "Dixon Vernal Pools" mentioned on the plaque. The National Natural Landmark designation in 1987 acknowledged the importance of Jepson Prairie's contribution to the richness of life on earth and the need to preserve the last remaining vernal pool habitats and historic grasslands of California.

Notes:

**For additional general information or information regarding public tours contact the Solano Land Trust at 707-432-0150 extension 121 or visit our website at: <http://www.solantolandtrust.org>**

**For information regarding university or college access and research opportunities please contact the University of California Natural Reserve System at 530-752-6949 or visit our website at: <http://nrs.ucdavis.edu>**