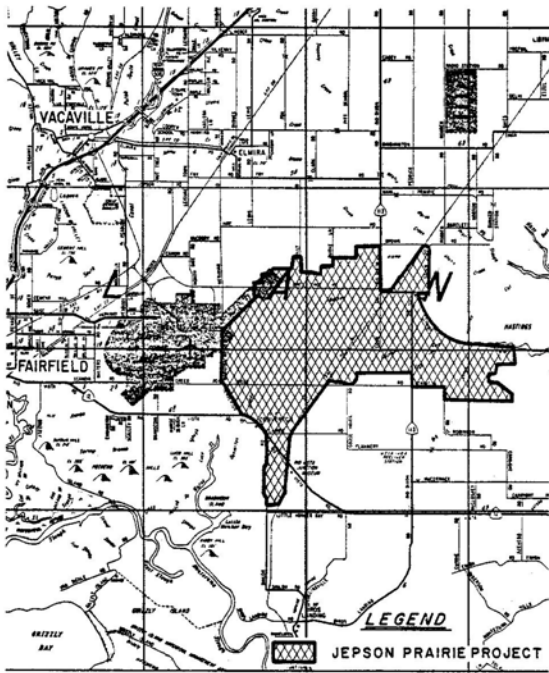

JEPSON PRAIRIE—WILL IT BE PRESERVED?

by W. James Barry

The largest and best preserved example of California grasslands is found in southern Solano County, where there still exists an area of more than 13,000 acres which has never been plowed. This area, known as Jepson Prairie, also includes the best remaining examples of vernal pool communities in California and four rare and endangered species of plants.



Jepson Prairie is located approximately fifteen miles south of Dixon, in the vicinity of Dozier, Denverton, and Travis Air Force Base. It is approximately eighty miles from the San Francisco and Sacramento metropolitan areas via State Highways 12 and 113. There are few access roads within the area.

This Central Valley “island in time” is named for the remarkable botanist, Willis Linn Jepson, who was born in 1867 near Vacaville, a few miles away. Dr. Jepson early became familiar with the flora of Solano County. In 1892 he described a new species from the “alkali spots,” which he termed “vernal pools” and “hogwallows” in later works. His most famous work is his 1,238 page *A Manual of the Flowering Plants of California*, published in 1925. He and his students are largely responsible for the botanical knowledge we have on the unique vernal communities.

Long the object of preservation attempts by a wide number of conservation organizations, including the California Native Plant Society, these vernal pools and areas of nearly pristine grasslands may be on the verge of being saved. Jepson Prairie is on the first-priority list of lands to be acquired under the 1980 State Park Bond Act passed by the voters last November. The funds have been voted. The decision now to be made is what is to be acquired and when. The staff of the Department of Parks and Recreation will make its recommendations to the State Parks Commission on March 13, after this issue of *Fremontia* has gone to press. It is likely that Jepson Prairie will be included; it is possible that the size of the project may be reduced and that acquisition may be spread out over as much as four years.

The first priority for preservation all along has been the Olcutt Lake. This vernal lake has two rare and endangered grasses, *Orcuttia mucronata* (the similarity of names is a coincidence) and *Neostapfia colusana*. On December 31, 1980 the Nature Conservancy purchased 1600 acres from Southern Pacific Railroad which include Olcutt lake, as well as vernal ponds and pools, hogwallows, mima mounds, stipa grassland, and vernal pool plant communities. This, it is hoped, will be the nucleus of a natural reserve and scientific study area. The Nature Conservancy



Neostapfia colusana, a rare annual grass found in vernal pools, was photographed near Denverton, in the Jepson Prairie-Vernal Pools area, by Fraser Muirhead.

paid a total of \$750,000 (\$900,000 was considered the fair market value). \$375,000 was received from one donor. California Native Plant Society contributed \$5000. The rest remains to be raised from corporate gifts and large and small donations from the public.

Threats to Natural Area

Among the greatest threats to the survival of the vernal communities and the grasslands are proposed projects to bring irrigation water to the area. The hummocky topography would be leveled for irrigated crops, as has been done at the north end of the prairie. A number of water projects are proposed to cross or irrigate the Jepson Prairie: the Solano Irrigation Project, the extension of the U.S. Bureau of Reclamation Tehama-Colusa Canal, The North Bay Aqueduct, the East Bay Municipal Utility District Aqueduct, and the Sacramento Wastewater Aqueduct. Other threats include the Collinsville P.G. & E. Coal Power Plant Waste Dump, and expansion of rail and road service to the Collinsville site. The routes for the proposed BART or HSGT

(High Speed Ground Transportation) corridor and the Canadian gas pipeline are all proposed to go through the Jepson Prairie.

If any major portion of Jepson Prairie were affected by projects such as these it would be an irreplaceable loss to science and the people of California, because there are no other places in the world like this.

Scientific Importance

Vernal communities (vernal pools) are a phenomenon almost entirely limited to California and a few spots in South Africa. They result from the rare coming together of a Mediterranean (winter rain) climate with certain soil conditions. Because of its great scientific interest, the Jepson Prairie is the object of many educational field trips. Classes in biology, botany, ecology, and zoology from neighboring universities, colleges, high schools, and elementary schools every year visit the site. Scientists in many fields from all over the world have conducted research in these vernal communities, and many technical papers are to be found in the literature. From an economic standpoint also, the perpetuation of vernal ecosystems can be important. The vernal flora has potential usefulness to mankind. For example, it has recently been discovered that the oil pressed from the seed of meadow foam (*Limnanthes douglasii*) has qualities that make it a potential substitute for whale oil. This plant may become an agricultural crop in the near future. Because of their efficient use of water and physiological adaptation to highly saline soils, there is a potential for developing vernal pool species for agriculture and similar endeavors in dry and alkaline soils. For example, *Orcuttia* spp. might be developed into a grazing crop through specific breeding programs and genetic research.

Also from the point of view of soils and geologic history, this landscape of hummocks — called mima mounds — and associated vernal habitats is of extraordinary scientific interest. The evolution of this landscape is due to the direct and indirect effects of climatic change. During the last glacial period, between 15,000 and 25,000 years ago, greatly increased rainfall, accompanied by floods from melting icecaps of the Sierra Nevada, converted the Great Central Valley into a vast system of lakes. Sediments were gradually deposited on the lake bottoms, initiating the formation of a thick, claypan layer. The post-glacial period of drought and warmth followed and the Sierran glaciers disappeared completely, leaving the mountains with less annual snowfall than at present. At this time, about 4,000 years ago, lake ecosystems were being converted into isolated vernal ecosystems or were disappearing completely. As the shoreline receded, small mounds of sandy material were deposited by wave action, thus stimulating the formation of mima mounds. These embryonic mima mounds were perhaps first colonized by ants whose tasks gradually built mounds large enough for small rodents to colonize. Rodents such as the pocket gophers colonized the mounds their earth-moving activities were believed to have been largely responsible for the hummocky landscape now present. With the drier climate, vernal pools gradually became isolated and so did associated plants and animals. Evolution had to be quite rapid in order to survive their very restrictive and rapidly changing environments. With the coming of the “Little Ice Age” about 2,000 years ago, small glaciers appeared in the Sierra Nevada and water became more abundant in the Great Valley, allowing some isolated vernal ecosystems to rejoin. During this period, forms of life began competing for the very specialized niches of vernal ecosystems. With the passing of the “Little Ice Age,” vernal ecosystems dwindled and again became isolated. Environmental conditions found in vernal pools have favored extremely rapid evolution. A large number of recent and endemic species are found here.

The Grasses of Jepson Prairie

Besides being the largest and best remaining example of purple needlegrass (*Stipa pulchra*) grassland in California, Jepson Prairie includes many other native grasses—nodding needlegrass (*Stipa cernua*), blue wildrye (*Elymus glaucus*) and squirreltail (*Sitamion histrix*)—which grow in the Denverton area. Interspersed among the bunchgrasses are abundant native perennial wildflowers, such as Johnny-jump-up (*Viola pedunculata*) and mariposa lily (*Calochortus luteus*).

The open-prairie plant community is best preserved in the Dozier area. It is distinguished from “prairie” by the density of the bunchgrass canopy. In a prairie this canopy is essentially closed—75% to 100% cover—while in an open prairie there is between 50% and 75% cover. A steppe contains less than 50% bunchgrass cover. The open prairie is found on the top of mima mounds. Here the purple needlegrass is associated with many alien species: soft chess (*Bromus mollis*), ripgut (*B. diandrus*), slender wild oat (*Avena barbata*), and broad-leaf filaree (*Erodium botrys*) and with the native *Viola pedunculata*, owl’s clover (*Orthocarpus erianthus*), mouse-ear chickweed (*Cerastium Glomeratum*), checker bloom (*Sidalcea malvaeflora*), blue-eyed-grass (*Sisyrinchium bellum*), buttercup (*Ranunculus californicus*), and cat’s ear (*Hypochoeris glabra*).

The third grassland community, the purple-needlegrass steppe, occurs on sandy loam soils with nearly level topography. The large areas between the bunchgrasses are seasonally filled with perennial and annual herbs, such as blue dicks (*Dichelostemma pulchella*) = *Brodiaea p.*, *Lupinus nanus*, *Orthocarpus erianthus*, *Sidalcea malvaeflora*, and *Lomatium utriculatum*.

Drawings in this issue, unless otherwise indicated, are from *California Grasslands and Range Forage Grasses*, by A.W. Sampson, A. Chase, and D.W. Hedrick. California Agricultural Experiment Station, Bulletin 724, University of California.

California Brome
Bromus carinatus



Blue Wild Rye
Elymus glaucus



Deergrass
Muhlenbergia rigens



Rare and Endangered Species

Four very rare species occur in the Jepson Prairie: Orcutt's grass (*Orcuttia mucronata*), known only from Olcutt Lake; Colusa grass (*Neostapfia colusana*), and *Fritillaria liliacea*, *Cordylanthus mollis* subsp. *hispidus*, a rare bird's beak, occurs in the southwestern portion of Jepson Prairie and several rare vernal pool and grassland species occur in the west portion. They include *Plagiobothrys histrulus*, *Lasthenia conjugens*, and *Trifolium amoenum*. *Legenere limosa* also occurs within the area to the southeast of Dozsier.

The Delta groundbeetle (*Elaphrus viridis*), a Carabid beetle, was collected in the 1850s, and was not collected again until 1975, when it was found in two vernal lakes in the Jepson Prairie. One of these lakes was plowed in 1976; it is not known whether the plowing will cause the extinction of the beetle population. The Delta groundbeetle is on the Federal list of threatened species. Some of the insects which pollinate vernal community plants restrict their activity to one depression, or a small group of depressions. The Jepson Prairie is also a breeding area for various amphibians, including the California Tiger Salamander.

SAN LUIS ISLAND

San Luis Island contains the only large expanse of unplowed grassland on the floor of the Great Central Valley. In 1969, the Department of Parks and Recreation proposed to acquire 21,000 acres of the 29,000 acres of unplowed grasslands, marshes, and riparian forests. Unfortunately, since that time much of the land has been put under the plow. About 14,000 acres remained in 1972, with more than half (7,600 acres) preserved in the San Luis National Wildlife Refuge. Currently the Department is in the process of acquiring around 2,000 acres at San Luis Island. San Luis Island is located in Merced County.

The alkali lowland portion of San Luis Island contains the very rare *Sporobolus airoides* community. This perennial alkali grassland community occurs both on white and black alkali soils. On these soils, with a high water table, saltgrass (*Distichlis spicata*) occurs in drier alkali areas, while other native grasses such as alkali sacaton (*Sporobolus airoides*) and slender wheatgrass (*Agropyron trachycaulum*) dominate more moist alkaline areas. These native bunchgrasses were once common in the wet and marshy grasslands of the Great Valley. Other native species of the alkali flat community include alkali heath (*Frankenia grandifolia*), alkali mallow (*Sida leprosa* var. *hederacea*), and jackass-clover (*Wislizenia refracta*).

Hemizonia pungens (spikeweed), Lotus spp., and other natives are found in the upper grasslands. Marsh area natives include *Scirpus* spp. (Bulrush or tule), cattail (*Typha latifolia*), Baltic rush (*Juncus balticus*), and spike-rush (*Eleocharis* spp.). Fiddleneck *Amsinckia* sp.) also occurs in grasslands.

The vernal flora includes goldfields, lowland cudweed (*Gnaphalium palustre*), and dwarf pepper grass (*Lepidium latipes*).

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Alkali Sacaton
Sporobolus airoides