## SAN JOAQUIN VALLEY ORCUTT GRASS

*Orcuttia inaequalis* USFWS: Threatened CDFG: Endangered CNPS: List 1B

## **Species Account**

**Status and Description.** San Joaquin Valley orcutt grass was federally-listed as threatened on March 26, 1997 (USFWS 1997) and state-listed in September 1979. It is on CNPS' List 1B. Critical habitat was designated on August 6, 2003 (USFWS 2003a) and did not include Solano County. San Joaquin Valley orcutt grass is a small, tufted annual grass in the Orcutt tribe (Orcuttieae) of the grass family (Poaceae). The 5 to 15 cm tall stems are erect to spreading, sometimes forming mats, with grayish foliage with soft, straight hairs. The five lemma teeth are unequal, the central tooth being the longest. At



maturity, the spikelets are aggregated into capitate clusters (Baldwin 2012). *Greg Gallaugher* The foliage is somewhat sticky from glandular secretions and fragrant (USFWS 2003b).

**Range and Distribution.** San Joaquin Valley orcutt grass is the only orcutt grass considered restricted to San Joaquin Valley. Historically, its range included the eastern margin of the valley, from Stanislaus County to Tulare County. Most of the populations have been extirpated, including all of those in Stanislaus County (CNPS 2011). Of the 52 known occurrences of San Joaquin Valley orcutt grass, 31 are presumed to be extant; although only three of these occurrences have been revisited in the past decade (CNDDB 2011, USFWS 2005). Twenty-three (23) populations are presently known in a 36-mile long strip in Fresno, Merced, and Madera counties, on the east side of the Valley (USFWS 2003b), and the remaining occurrences are in Solano and Tulare counties (CNDDB 2011).

In May of 2003 LSA Associates, Inc. found a population of San Joaquin Valley orcutt grass in a playa pool on Muzzy Ranch, located directly east of Travis Air Force Base. A specimen was sent to Dr. John R. Reeder (University of Tucson, Tucson, AZ), the editor of the Orcuttieae tribe in *The Jepson Manual* (Baldwin 2012), for identification confirmation. The identification was further corroborated by DNA analysis conducted by Laura M. Boykin (University of New Mexico, Albuquerque, NM). The population on Muzzy Ranch is the only known occurrence of San Joaquin Valley orcutt grass on the west side of the Central Valley (U&JH/S).

**Habitat and Ecology**. San Joaquin Valley orcutt grass occurs on alluvial fans, high and low stream terraces (Stone *et al.* 1988), and tabletop lava flows (Stebbins *et al.* 1995, CNDDB 2011). It grows in Northern Claypan, Northern Hardpan and Northern Basalt vernal pools (Sawyer and Keeler-Wolf 1995) within rolling grassland (Crampton 1959) at elevations of 30 to 755 meters. Occupied pools

range in area from 0.014 to 4.9 hectares, with a median area of 0.62 hectares (Stone *et al.* 1988). It grows on acidic soils that vary in texture from clay to sandy loam. Occupied soils are in the Hideaway, Raynor or Redding Series, or the Amador, Cometa, Corning, Greenfield, Los Robles, Madera, Peters, or Pollasky-Montpellier complex (USFWS 2005). It blooms May through August, depending on environmental conditions (CNDDB 2011, CNPS 2011). Plant species most commonly associated with San Joaquin Valley orcutt grass are sea holly (*Eryngium* spp.), slender popcorn flower (*Plagiobothrys stipitatus*), Colusa grass (*Neostapfia colusana*), woolly marbles (*Psilocarpus brevissimus*) and doveweed (*Eremocarpus setigerus*) (USFWS 2005).

On Muzzy Ranch, San Joaquin Valley orcutt grass occurs on Solano loam in a playa pool and in an adjacent vernal pool and swale. In 2003, the population was concentrated along the edge in one part of the playa pool, where it provided <5 percent of the vegetative cover. It occurred in dense patches in the adjacent pool and swale, providing about 10 percent of the absolute cover. Associated species observed include alkali heath (*Frankenia salina*), woolly marbles (*Psilocarphus brevissiumus*), slender popcorn flower (*Plagiobothrys stipitatus*), and downingia (*Downingia* spp.). Other playa pools on Solano loam, as well as those occurring on Pescadero loam and Pescadero clay loam on Muzzy Ranch, did not support this orcutt grass in 2003.

Annual plants in general are dependent on ecological factors such as rainfall and temperature, and, with respect to vernal pool plants, length of inundation. In years of optimal growing conditions, this orcutt grass could occur in other pools on Muzzy Ranch and potentially in similar habitat in other parts of Solano County.

**Population Levels and Occurrence in Plan Area.** San Joaquin Valley orcutt grass is found growing within the deeper vernal pools of the Plan Area's Valley Grasslands and Vernal Pools Natural Community. The only population of San Joaquin Valley orcutt grass known from Solano County is the population found on Muzzy Ranch in 2003. In August of 2003, the population was estimated to comprise approximately 1,600 individuals (Eva Buxton, pers. observation). During 2011, LSA estimated the population to approach 5000 plants (See the Species Occurrences map).

**Threats to the Species.** On the east side of the Central Valley, San Joaquin Valley orcutt grass is threatened by habitat loss caused by urban and agricultural development, over-grazing and small population size (USFWS 2005). Because of the rapid growth of human populations in the Central Valley, numerous populations of orcutt grasses, including San Joaquin Valley orcutt grass, have been extirpated and continue to be threatened by development.

In addition, non-native annual and perennial plants have invaded vernal pools of the Central Valley, posing a threat to native vernal pool species. Annual grasses such as Mediterranean barley (*Hordeum marinum* ssp. gussoneanum), hood canary grass (*Phalaris paradoxa*), rabbit's-foot grass (*Polypogon monospeliensis*), and Italian ryegrass (*Lolium multiflorum*). Soil disturbance associated with cattle-grazing have resulted in low vigor and low seed production of two populations of San Joaquin Valley orcutt grass in Merced County. Furthermore, alkali mallow (*Malvella leprosa*), a perennial native forb, appears to threaten another population at a heavily grazed site in Merced County. Intensive livestock-grazing has also affected San Joaquin Valley orcutt grass at some sites in San Joaquin Valley. If the land remains in dry pasture, moderate grazing regimes appear to have little impact on orcutt grasses in general; however, stocking-rates and the timing of grazing are important variables to consider in order to not adversely impact vernal pool plants in general (USFWS 2003b).

The effect of cattle grazing on this species at Muzzy Ranch is unknown. The site has been grazed by cattle for several decades (Pete Craig, pers. comm.). Populations during 2011 appeared much greater that those reported from 2003.

Muzzy Ranch is currently under development as a mitigation bank. San Joaquin Valley orcutt grass habitat will be protected within the mitigation bank, however, grazing may pose a threat to the population.

## Literature Cited

California Native Plant Society (CNPS). 2011. *Electronic Inventory of Rare and Endangered Plants of California*. Sacramento, California.

California Natural Diversity Data Base. 2011. Natural Heritage Division. California Department of Fish and Game, State of California.

Crampton, B. 1959. The grass genera *Orcuttia* and *Neostapfia*: a study in habitat and morphological specialization. Madroño 15:97-110.

Baldwin, B.G., D.H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D.H. Wilken, editors. 2012. *The Jepson Manual: Vascular Plants of California*, second edition. University of California Press. Berkeley, California.

Sawyer, J. O., and T. Keeler-Wolf. 1995. A manual of California vegetation. California Native Plant Society, Sacramento, California. 471 pages.

Stebbins, J. C., W. O. Trayler, and R. Kokx. 1995. Habitat characterization study of San Joaquin Valley vernal pools. Unpublished report to the California Department of Fish and Game and the U.S. Fish and Wildlife Service, Sacramento, California. 35 pages. + appendices.

Stone, R. D., W. B. Davilla, D. W. Taylor, G. L. Clifton, and J. C. Stebbins. 1988. Status survey of the grass tribe Orcuttieae and *Chamaesyce hooveri* (Euphorbiaceae) in the Central Valley of California. 2 volumes. U.S. Fish and Wildlife Service Technical Report, Sacramento, California. 124 pages.

United States Fish and Wildlife Service (USFWS). 1997. Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for Three Plants and Threatened Status for Five Plants from Vernal Pools in the Central Valley of California; Final Rule. Federal Register 62(58):14338-14352.

\_\_\_\_\_. 2003a. Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for Four Vernal Pool Crustaceans and Eleven Vernal Pool Plants in California and Southern Oregon; Final Rule. Federal Register 68(151):46684-46867.

\_\_\_\_\_. 2003b. San Joaquin Orcutt Grass (*Orcuttia inaequalis*). www.sacramento.fws.gov/es/plant\_spp\_accts/san\_joaquin\_valley\_orcutt\_grass . 2005. Recovery plan for vernal pool ecosystems of California and Southern Oregon. Portland, Oregon.

*University and Jepson Herbaria*. SMASCH Project. (U&JH/S). www.mip.berkeley.edu/www\_apps/smasch/smasch\_accession.html

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