

Alkali Mariposa-Lily (*Calochortus striatus*)

Legal Status

State: S2, Imperiled

California Rare Plant Rank: 1B.2, Rare, threatened, or endangered in California and elsewhere. Fairly endangered in California

Federal: Bureau of Land Management (BLM) Sensitive (Bureau of Land Management 2010)

Critical Habitat: No critical habitat has been designated for this species.

Recovery Planning: No recovery plan for this species.

Notes: No status changes proposed or anticipated during the permit term.

Taxonomy

Alkali mariposa-lily (*Calochortus striatus*) is a perennial bulbiferous herb in the Lily family (Liliaceae). It was first described by S. B. Parish (1902), based on his collections from near Rabbit Springs in the Lucerne Valley, Kern County. Current taxonomic treatments of the genus accept *Calochortus striatus* species rank (Fiedler and Zebell 2002:133; Fiedler 2012:1383).

Descriptions of the species' physical characteristics can be found in Fiedler and Zebell (2002:133) and Fiedler (2012:1383).

Distribution

General

Alkali mariposa-lily occurs in California and Nevada. Its distribution in California has been observed to occur from south Tulare and Inyo Counties south east into Los Angeles and San Bernardino Counties (California Native Plant Society 2012), and 104 total occurrences are known (California Department of Fish and Game 2012).

In Nevada, alkali mariposa-lily has been observed in Clark and Nye Counties but at relatively marginal levels, and no observations of it have been made since 1986 (Nevada Natural Heritage Program 2001).

Distribution and Occurrences within the Study Area

Historical

One occurrence (EO #33) was observed and collected in the study area in 1987 near the junction of Union Road and Coles Levee Road. The number of plants at this occurrence ranged from 6 to 28 individuals, based on counts made between 1987 and 1989. This population is currently assumed to be extant (California Department of Fish and Game 2012).

Recent

A second occurrence in the study area (EO #104) was observed in 2006. It was located roughly 1 mile southeast of the junction of Interstate 5 and Highway 119 south of the Kern River, and comprised roughly 500 individuals. This population is currently assumed to be extant (California Department of Fish and Game 2012).

Natural History

Habitat Requirements

Alkali mariposa-lily grows in alkali and mesic conditions, from 240 to 5,240 feet in elevation (California Native Plant Society 2012). However, surface salts and perennial standing water tend to deter this species. It has typically been most associated with *Atriplex* spp. based scrub lands, low laying grasslands, and Mojave scrub assemblages of plants. Topographically it usually occurs in micro-depressions within the landscape. Associated species include, saltgrass (*Distichlis spicata*), Mexican rush (*Juncus mexicanus*), blue eyed grass (*Sisyrinchium bellum*), honey mesquite (*Prosopis glandulosa*) rabbitbrush (*Ericameria nauseosa*), and winter fat (*Krascheninnikovia lanata*) (Greene and Sanders 2006).

Table 1. Habitat Associations for Alkali Mariposa-Lily

Land Cover Type	Habitat Designation	Habitat Parameters	Supporting Information
Saltbush scrub	Primary	Sandy loam, alkaline soils, seasonally moist, 224 to 5,240 feet elevation	California Department of Fish and Game 2012; Greene and Sanders 2006

Reproduction

Mariposa lilies are herbaceous perennials that survive in a dormant state during the dry season (July–November) as a bulb. Alkali mariposa-lily blooms from April to June (California Native Plant Society 2012). Mariposa lilies are pollinated by flies or beetles (Fiedler 1987); alkali mariposa-lily is reported to be pollinated by bees and flies

(Greene and Sanders 2006). Maturation of the fruits and seeds occurs shortly after blooming. The seeds are large and dispersed by gravity. Mariposa lilies also reproduce vegetatively by production of bulbils and bulblets (Fiedler 1987).

Table 2. Key Seasonal Periods for Alkali Mariposa-Lily

	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Leaf Emergence	✓	✓										✓
Blooming				✓	✓	✓						
Seed Dispersal					✓	✓	✓					
Dormant							✓	✓	✓	✓	✓	✓

Source: Fiedler (1987).
Notes:

Ecological Relationships

Alkali mariposa-lily is pollinated by flies and bees, although other floral visitors may assist in pollination. Therefore, conservation and management of the pollinator fauna will also need to be part of the conservation strategy for alkali mariposa-lily.

Population Status and Trends

Global: Of 104 known occurrences of alkali mariposa-lily, four have been extirpated, and 23 are known only from historic records (before 1990). Seventy-seven populations have been revisited or discovered since 1990. The population status is good to excellent for 32 occurrences (30.8%) and fair to poor for 13 occurrences (12.5%). The population status of 55 occurrences is unknown. Population trends are unknown for most occurrences, although one occurrence has been reported to be fluctuating and six others to be declining (California Department of Fish and Game 2012).

State: Same as above

Study Area: Occurrences in the study area are ranked fair to good; the population trend for both is unknown.

Population sizes are known to fluctuate greatly. A population known at the Kern River Preserve on The Nature Conservancy property has ranged from 43 to 765 individuals in different years (Greene and Sanders 2006).

Threats and Environmental Stressors

Generally, alkali mariposa-lily is threatened by urbanization (primarily in the Lancaster area [Greene and Sanders 2006]), grazing, trampling, construction, water

diversion, and is possibly threatened by horticultural collections and nonnative plants (California Native Plant Society 2012).

More specifically, the lowering of the water table due to hydrology changes is the most substantial threat due to the precise soil restrictions on this species. This impact is also amplified from urbanization in the Bakersfield area. High intensity grazing has some negative effect on this species, but low intensity grazing has not been shown to negatively affect it (Greene and Sanders 2006). Competition from taller grasses, while somewhat of a problem, is not likely to be an issue within the study area (Greene and Sanders 2006).

Conservation and Management Activities

The proposed Western Mojave Plan HCP would conserve and manage populations of alkali mariposa lily in eastern kern County (BLM 2007). However, no conservation or management plans are known to have been prepared for this species in the study area.

Data Characterization

The location database for alkali mariposa-lily includes 104 records, most of which are based on observations made between 1995 and 2012 (California Department of Fish and Game 2012). Information on the habitat requirements of alkali mariposa-lily appears to be adequate for modeling the species distribution in the study area. As with most plants, almost no specific information exists about the life history of alkali mariposa-lily. However, generalized information about the life history of mariposa lilies is available from studies of other mariposa-lily species and is likely to be adequate to address species management or other conservation measures for alkali mariposa-lily.

Management and Monitoring Considerations

Due to concerns addressed above, this species will require long-term intensive monitoring to assess precise population sizes and trends. Both the historic and recent occurrence should be surveyed and fenced to reduce the threat posed by trampling and over-grazing. A focused control of introduced species in areas of alkali soils could reduce competition and improve recruitment for this species (Greene and Sanders 2006).

Predicted Species Distribution in Study Area

Model Description

Model Assumptions

Primary Habitat: Saltbush scrub, on soils of the Tennco, Kimberlina, and Garces series.

Model Rationale

Alkali mariposa-lily typically occurs in Saltbush (*Atriplex* spp.) scrub on sandy loam soils that often have clay loam horizons (California Department of Fish and Game 2012)¹. The soils are moderately alkaline to very strongly alkaline and often have a horizon within 40 inches of the surface that has high concentrations of sodium salts. Both occurrences of alkali mariposa lily in the study area are found on Tennco soils, which are associated with Kimberlina and Garces soils (U. S. Department of Agriculture, National Conservation Service 2012).

Model Results

Figure D-12 shows the modeled potential habitat for alkali mariposa lily within the study area. Of the two occurrences in the study area, one (EO #104) falls within the modeled habitat, and the other (EO #33) falls outside the modeled habitat in an area mapped as row crops. This second occurrence may be present in a small patch of remnant habitat. Within the Plan Area, modeled habitat is located primarily along the west side near the junction of Interstate 5 and the Taft Highway. The model also predicts that extensive areas along the west side of the San Joaquin Valley are potential habitat for alkali mariposa lily. However, these areas are outside of the range of alkali mariposa lily and do not provide suitable habitat for the species.

Literature Cited

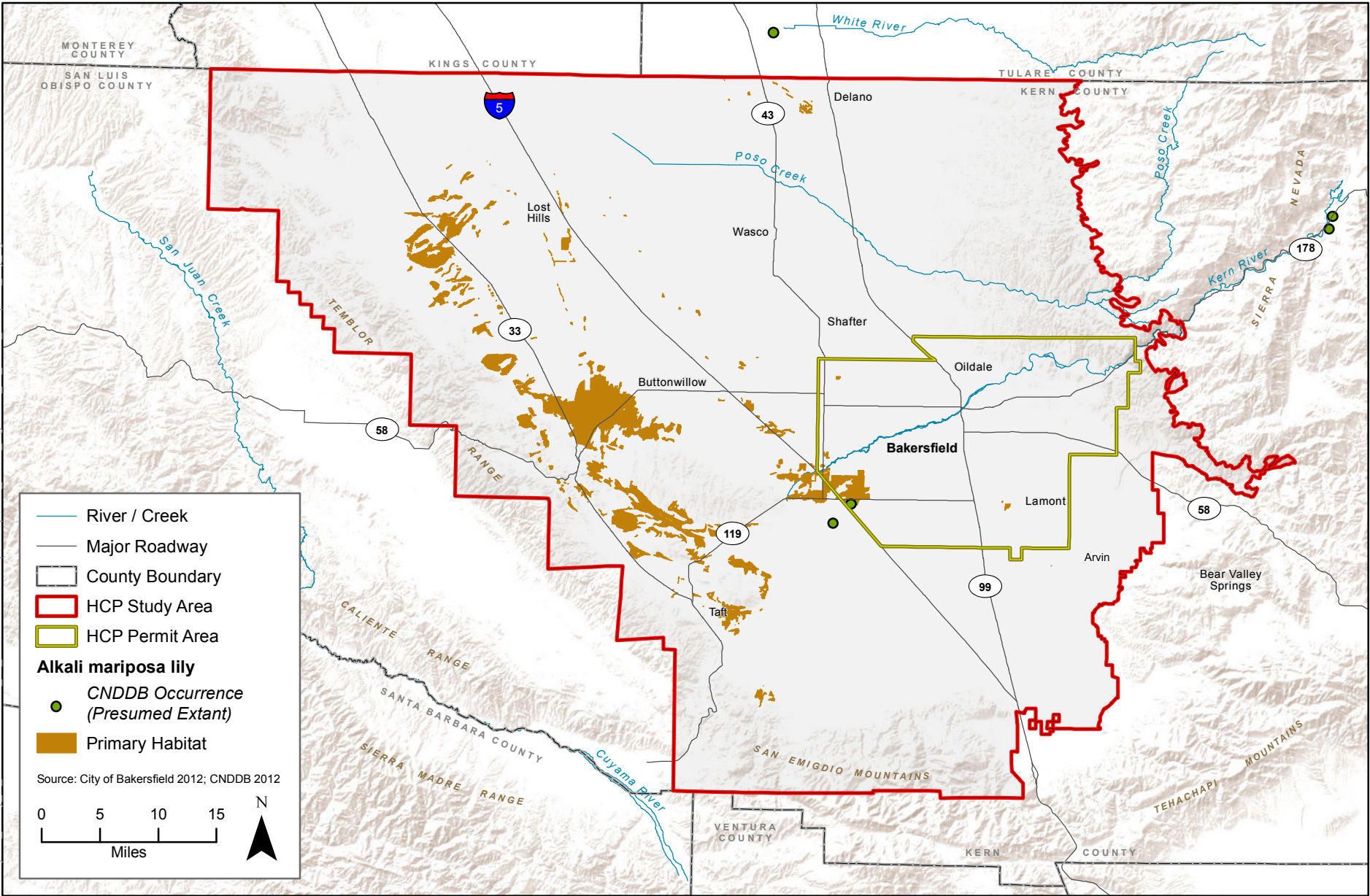
Bureau of Land Management. 2010. *Alkali Mariposa Lily*. Last revised August 5, 2010. Available: <http://www.blm.gov/ca/st/en/prog/ssp/plants/calochortus_striatus.html>. Accessed: August 2012.

California Department of Fish and Game. 2012. California Natural Diversity Database, RareFind 3, Version 3.1.0. Updated June 1, 2012. Report for *Calochortus striatus*. Sacramento, CA.

¹ Soils information determined by overlaying the occurrence locations over SSURGO soils maps using SoilWeb (California Soil Resources Lab 2012).

- California Native Plant Society. 2012. *Calochortus striatus. Inventory of Rare and Endangered Plants*. Online ed. Version 8-01a. Sacramento, CA: CNPS. Available: <<http://www.cnps.org/inventory>>. Accessed August 2012..
- California Soil Resources Lab. 2012. "SoilWeb: An Online Soil Survey Browser." University of California, Davis. Available: <<http://casoilresource.lawr.ucdavis.edu/drupal/book/export/html/902>>. Accessed October 2012.
- Fiedler, P. L. 1987. Life History and Population Dynamics of Rare and Common Mariposa Lilies (*Calochortus* Pursh: Liliaceae). *Journal of Ecology* 75:977–995.
- . 2012. *Calochortus*. In *The Jepson Manual: Vascular Plants of California, Second Edition*, edited by B. G. Baldwin, D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken, pp. 1378–1384. University of California Press: Berkeley, CA.
- Fiedler, P. L. and R. K. Zebell. 2002. *Calochortus*. In *Flora of North America North of Mexico, Vol. 26: Magnoliophyta: Liliidae: Liliales and Orchidales*, edited by Flora of North America Editorial Committee, pp. 119–141. Oxford University Press: New York and Oxford.
- Greene, J. A. and A. C. Sanders. 2006. *Alkali Mariposa Lily*. West Mojave Plan Species Accounts. U.S. Department of the Interior, Bureau of Land Management. January. Available: http://www.dmg.gov/documents/WMP_Species_Accounts/Species%20Accounts-Plants.pdf >. Accessed: November 20, 2011.
- Nevada Natural Heritage Program. 2001. *Alkali Mariposa Lily*. Last revised June 25, 2001. Available: <<http://heritage.nv.gov/atlas/calocstria.pdf>>. Accessed: August 2012.
- Parish, S. B. 1902. The Southern California Species of *Calochortus*, II. *Bulletin of the Southern California Academy of Sciences* 1(9):122–125.
- United States Bureau of Land Management. 2007. West Mojave Plan, Introduction - BLM California California Desert District. Available: http://www.blm.gov/ca/st/en/fo/cdd/wemo_intro.html. Accessed January 28, 2013.
- United States Department of Agriculture, Natural Resources Conservation Service. 2012. "Official Soil Series Descriptions: Tennco Series". Available: https://soilseries.sc.egov.usda.gov/OSD_Docs/T/TENNCO.html>. Accessed October 2012.

Bakersfield Conservation Plan



K:\Projects\1\City of Bakersfield\00036_12_Bakersfield\HCP\mapdoc\Species_Model_FiguresD_12_Alkali_Mariposa_Lily_figure.mxd, hw, 2/1/2013



Figure D-12
Alkali mariposa lily Modeled Habitat