1. Species: *Calochortus persistens* Ownbey, Siskiyou mariposa lily

CalPhotos image credits, clockwise from upper left: Norman Jensen, Steve Lowens, Dean Taylor
2. **Status:** Table 1 summarizes the current status of this species or subspecies/variety by various ranking entities and defines the meaning of the status.

<table>
<thead>
<tr>
<th>Entity</th>
<th>Status</th>
<th>Status Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>NatureServe CA(^a)</td>
<td>G1</td>
<td>GLOBAL RANK: Critically Imperiled—At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors. STATE RANK: Critically Imperiled — Critically imperiled in the state because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state.</td>
</tr>
<tr>
<td></td>
<td>S1</td>
<td>Plants rare, threatened, or endangered in California and elsewhere. Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat).</td>
</tr>
<tr>
<td>California Rare Plant Rank(^b)</td>
<td>1B.2</td>
<td>Plants rare, threatened, or endangered in California and elsewhere. Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat).</td>
</tr>
<tr>
<td>California State Listing(^c)</td>
<td>SR</td>
<td>State Listed - Rare</td>
</tr>
<tr>
<td>USDA Forest Service(^d)</td>
<td>S</td>
<td>Sensitive</td>
</tr>
<tr>
<td>USDI FWS(^e)</td>
<td>Not listed</td>
<td>(For further information, see the section “Overview of ecological conditions for recovery, conservation, and viability.”)</td>
</tr>
<tr>
<td>USDI BLM(^f)</td>
<td>S</td>
<td>Sensitive</td>
</tr>
<tr>
<td>NatureServe OR(^g)</td>
<td>I</td>
<td>Critically imperiled because of extreme rarity or because it is somehow especially vulnerable to extinction or extirpation, typically with 5 or fewer occurrences.</td>
</tr>
<tr>
<td>Oregon State Listing(^h)</td>
<td>C</td>
<td>Candidate for listing as Threatened or Endangered</td>
</tr>
<tr>
<td>NatureServe NV(^i)</td>
<td>Not listed</td>
<td></td>
</tr>
<tr>
<td>Nevada State Listing(^j)</td>
<td>Not listed</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) California Natural Diversity Database, California Dept. of Fish & Wildlife [CNDDB]
\(^b\) California Native Plant Society [CNPS]
\(^c\) California Department of Fish and Wildlife [CDFW]
\(^d\) US Forest Service Region 5 Forester’s List [USDA] and Pacific NW Survey and Manage [USDA & BLM]
\(^e\) US Department of Interior Fish and Wildlife Service [USFWS]
\(^f\) US Department of Interior Bureau of Land Management [BLM]
\(^g\) Oregon Biological Information Center [ORBIC]
\(^h\) Oregon Department of Agriculture [ODA]
\(^i\) Nevada Natural Heritage Program [NNHP]
\(^j\) Nevada Division of Forestry [NDF]

Note: Individual State Heritage Programs (CNDDB, ORBIC, NNHP) represent NatureServe and contain more up-to-date ranks for their state than NatureServe Explorer.
Status updates: *Calochortus persistens* was listed in the first edition of the CNPS Inventory of Rare and Endangered Plants, in 1974. There have been no recent changes in the CRPR status of this taxon (CNPS 2020).
3. Taxonomy: Table 2 summarizes this species or subspecies/variety’s name status in key literature.

<table>
<thead>
<tr>
<th>Entity</th>
<th>Name Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNDDB and CNPS</td>
<td><em>Calochortus persistens</em> Ownbey</td>
</tr>
<tr>
<td>Jepson eFlora</td>
<td><em>Calochortus persistens</em> Ownbey</td>
</tr>
<tr>
<td><em>Flora of North America</em></td>
<td><em>Calochortus persistens</em> Ownbey</td>
</tr>
<tr>
<td>USDA NRCSa PLANTS</td>
<td><em>Calochortus persistens</em> Ownbey</td>
</tr>
</tbody>
</table>

*a Natural Resources Conservation Service

Synonymy: This taxon was described by Ownbey (1940); there have been no subsequent revisions, and no synonyms exist (IPNI 2020).


Type locality: Ownbey (1940) described this species from a specimen collected by Greene (#903) on June 30th, 1876. The location is given as “Siskiyou County: Mountains near Yreka.” The holotype specimen is at GH, isotypes at F, MO, PH (Tropicos 2020).

4. Distribution, abundance, and population trend on the planning unit [12.53.2,3,4]:
Table 3 summarizes the distribution and frequency of this species or subspecies/variety within National Forest System Lands in California. Table 4 lists all known occurrences of this species or subspecies/variety within California. Individual occurrences are defined as sites that contain an individual, population, or groups of populations of the plant that are located more than 0.25 mile apart from each other as defined by the CNDDB.

<table>
<thead>
<tr>
<th>National Forest System (NFS) lands</th>
<th>Record #s (from Locations table below)</th>
<th>CNDDB EO#s</th>
<th>Non-CNDDB Records</th>
<th>Recent (seen in past 20 years)</th>
<th>Historic (not seen in past 20 years)</th>
<th>Most Recent Observation</th>
<th>Total Records on NFS lands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Klamath</td>
<td>1, 2, 3, 4, 5</td>
<td>5</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>10-Jul-2014</td>
<td>5</td>
</tr>
<tr>
<td>Totals:</td>
<td>N/A</td>
<td>5</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>N/A</td>
<td>5</td>
</tr>
</tbody>
</table>
Table 4. Known Occurrences of Siskiyou mariposa lily within California (NRIS, CNDDDB, Calflora/CCH databases).

<table>
<thead>
<tr>
<th>Location</th>
<th>Occurrence Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Redacted for conservation purposes</td>
<td></td>
</tr>
</tbody>
</table>

REDACTED FOR CONSERVATION PURPOSES
In California, the range of the Siskiyou mariposa lily is narrow, with populations found on three ridge systems within 20 km of each other within the north-eastern Klamath-Siskiyou Mountains of the Klamath Ranges ecoregion (USFWS 2012, CCH 2020). Two occurrences are entirely on Klamath NF and three have a portion on Klamath NF and a portion on private land (CNDDB 2020). None of the occurrences are in Wilderness (Calflora 2020, CCH2020, CNDDB 2020, NRIS 2019). A specimen record indicating an occurrence in the town of Yreka is a database error (CCH 2020). A single disjunct population is known in Oregon, approximately 30 km to the north, on Bald Mountain in Jackson County, also in the Klamath-Siskiyou Mountains and Klamath Ranges ecoregion. An intervening population reported from Observation Peak on the California-Oregon border was found depopulated in 2007, possibly due to rodent herbivory (USFWS 2012). This fairly populated, but highly restricted, distribution is characteristic of neo-endemic plant species in the Klamath Ranges region, which are thought to have adapted to a subset of the patchwork of edaphic islands in this region and diversified due to small size and isolation of the habitat they specialized on (Smith and Sawyer 1988).

In the five California occurrences, repeated counts at most sites report very large swings in population numbers, up to an order of magnitude (CNDDB 2020; USFWS 2012). The swings are attributed to the difficulty of obtaining an accurate plant count. This has several causes: 1) the species is only detectable for a short time after snow-melt, 2) it does not appear above ground every year, especially not in drought years, 3) Insect, rodent or deer herbivory removes above-ground plant parts, and 4) juveniles are easily mistaken for grass or other lily species (USFWS 2012). Consequently, no trends are reliably detected from this data.

5. Brief description of natural history and key ecological functions [basis for other 12.53 components]:

Siskiyou mariposa lily is a perennial herb that emerges from a subterranean bulb; the plant typically reaches a height of ~10 cm. It favors open, rocky areas, specifically ridgetops and shoulders which have thin soils of rocky loam or talus derived from metasedimentary substrate (Diggles 2004; USFWS 2012). Elevations at observed sites range from 1,000 m to 1,860 m (CCH 2020). The population in Oregon occurs in a relatively arid portion of the Eastern Siskiyous, on an upland prairie opening on a south-west exposure near the summit of a mountain-ridge system at 1707m (USFWS 2012).

Blooming typically occurs in June and July (CNPS 2019, Fiedler 2012). The pollination biology for this species is not described, although the genus is reported to host a wide range of pollinators, including twenty-six genera of bees and wasps, seventeen genera of beetles, nine genera of flies, and an assortment of moths and butterflies (CPC 2019). Seeds in this genus tend to be large and unadorned, without obvious adaptations to maximize dispersal. Dispersal typically occurs via gravity and local surface flow, with dispersal distances typically not exceeding 1.4 m (Fiedler 2012, Patterson and Givnish 2003).

The plant community associated with Siskiyou Mariposa lily is montane shrub community within a lower montane coniferous forest and North Coast coniferous forest context. Shrub species co-occurring with Siskiyou mariposa lily include: *Cercocarpus ledifolius*, *C. betuloides*, *Amelanchier alnifolia*, *Prunus emarginata*, *Quercus garryana* var. breweri, *Chrysothamnus nauseosus*, *Garrya* sp., and *Berberis aquifolium*. Adjacent forest canopy species are likely to be:
Abies concolor, Calocedrus decurrens, Juniperus occidentalis, and Pseudotsuga menziesii. Herbaceous associates reported are: Allium falcifolium, Arabis holboellii, Cheilanthes gracillima, Eriogonum umbellatum, E. ursinum var. erubescens, Festuca idahoensis, Fritillaria pudica, Pellaea brachyptera, Phacelia linearis, Phlox diffusa, and Sedum obtusatum (CNDDB 2019, USFWS 2020).

6. Overview of ecological conditions for recovery, conservation, and viability [12,53 7, 9?, 10, 11, 12] including Threats and Risk Factors:
Siskiyou mariposa lily was formally petitioned for listing under the federal Endangered Species Act, but the U.S. Fish and Wildlife Service instead developed a conservation agreement for this species (USFWS 2012). It faces a number of anthropogenic threats under the umbrella of habitat disturbance: disturbance from activities at telecommunications infrastructure and access routes, unauthorized hiking trails and off-highway vehicle use, timber harvest, fire suppression activity and competition from invasive species (CNPS 2020). Two of the five element occurrences in CNDDB (2020) are heavily invaded by dyer’s woad (Isatis tinctoria), which may prevent recruitment (USFWS 2012). In addition to favoring invasive species, fire suppression has led to shrub encroachment and a buildup of fuels; the former reduces the available habitat, and the latter increases the risk of high-severity wildfire, which may kill plants outright, or provide an opportunity for invasives to compete (Diggles 2004, USFWS 2012). Timber harvest operations have disturbed EO 5 (CNDDB 2020). In the future, the BLM Bear Grub Vegetation Management Project (DOI-BLM-ORWA-M060-2020-001-EA), which includes a proposed timber sale on land adjacent to the Oregon population, may have direct (disturbance) or indirect (introduction of invasive plants) impacts on that population.

Siskiyou mariposa lily was the subject of horticultural collection historically, notably by the prolific bulb collector Carl Purdy (Ownbey 1940) and poaching of seed or bulbs possibly continues, as instructions for growing this species from seed appear on the web (pacificbulbsociety.org/pbswiki/index.php/HowToGrowCalochortus). Horticultural collection is mentioned as a threat for EO 1, where evidence of this occurring in the past was detected, but is considered a minor threat at this time (CNDDB 2020, USFWS 2012).

There are significant natural threats to this species: First, deer and rodent herbivory is significant in some populations and is frequently noted. It is thought to be a cause of extirpation of one population (USFWS 2012). Gopher predation (a native rodent that is not naturally in the species’ range) is mentioned as negatively impacting EO 5 and 6 (CNDDB 2020). A high rate of insect predation on developing fruits has been noted at all sites, leading to poor seed production (USFWS 2012). Second, limited distribution makes C. persistens vulnerable to even small-scale impacts, and this is especially true for locations with few individuals. Two occurrences (EO 2 and 3) have not been evaluated since 1980, so their size and status is unknown (CNDDB 2020). The Oregon population occurs within 5 square meters. It has been intensively monitored, with five or fewer individuals having been observed since 1998 (USFWS 2012). In contrast, the three most recently discovered sites (EO 1,5,6), have large subpopulation population numbers in the hundreds to thousands (CNDDB 2020). Third, the scale and speed of anthropogenic climate change in the Klamath region could disrupt the patchwork of refugia that support its array of endemic taxa; this is especially true for taxa of low mobility and strict ecological requirements, like C. persistens. Careful management may partially mitigate this risk (Olson et al. 2012), but
the task is substantial. Klamath National Forest has adopted species management guidelines for Siskiyou mariposa lily, but no successful recruitment to adult stage has been observed since 1997 (CNPS 2019, USFWS 2012). Low reproductive output and seedling survivorship, together with high adult survivorship and longevity, is typical of many rare *Calochortus* taxa (Fiedler et al. 1988); that establishment has not been detected in a species with such a restricted range is cause for concern (USFWS 2012).

7. **Key literature:**


8. **Literature cited:**


[CNDDB] California Department of Fish and Wildlife, Natural Diversity Database. 2020. RareFind 5 [Internet application] and CNDDB Maps and Data. Available at:


Persons Contacted: None

Author(s) and Date: Alison Colwell, CNPS, 15 January 2020

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Julie A. Kierstead, USFS R5, 26 August 2020