5-YEAR REVIEW
Mariposa Pussypaws (*Calyptridium pulchellum*)

GENERAL INFORMATION:

Species: Mariposa pussypaws (*Calyptridium pulchellum*)
Date listed: September 14, 1998
Federal Register (FR) citation: 63 FR 49022 (Service 1998)
Classification: Threatened

State Listing:
The Mariposa pussypaws is not listed by the State of California.

BACKGROUND:

Species overview:
The Mariposa pussypaws is an annual member of the Portulacaceae (purslane family) that grows in sparsely-vegetated areas such as granitic and gravelly openings within foothill woodland communities (J. Clines, U.S. Forest Service, unpubl. data 2023). Known occurrences of the plant range from 442 meters (1,450 feet) to 1,097 meters (3,600 feet), but most occurrences are between 610 meters (2,000 feet) and 762 meters (2,500 feet; Diversity Database 2023). The plants have fleshy, hairless stems that are spreading rather than upright and can be as small as a penny (2 centimeters [0.8 inches] in diameter), and even the largest individuals reach only 7 centimeters (2.8 inches) in diameter. The plants bloom in April and May and each plant has two or more dense flower clusters.

Figure 1. Two views of Mariposa pussypaws: (1) A landscape view of the small, pink, Mariposa pussypaws in the gravel opening in the center of the photo surrounded by its close associates, the yellow, common goldfields (*Lasthenia gracilis*) and the orange-yellow tufted poppy (*Eschscholzia caespitosa*); and (2) a close-up view of the plant's pink flowers. Photo credit: J. Clines.

Most recent status review:

[Service] U.S. Fish and Wildlife Service. 2008. Mariposa pussypaws (*Calyptridium pulchellum*). 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, Sacramento, California. 15 pp.

We did not recommend a status change in the 2008 status review.

FR notice citation announcing this status review:

U.S. Fish and Wildlife Service. 2021. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status Reviews of 76 Species in California and Nevada. Federal Register 86:27462–27464.

We did not receive information from the public regarding the Mariposa pussypaws in response to the notice.

ASSESSMENT:

Information acquired since the last status review:

This 5-year review was conducted by the U.S. Fish and Wildlife Service's Sacramento Fish and Wildlife Office. Data for this review were solicited from interested parties through a Federal Register notice announcing this review on May 20, 2021. We also contacted species experts from federal agencies, state agencies, tribes, consulting agencies, and non-governmental organizations to request any data or information we should consider in our review. Additionally, we conducted a literature search and a review of information in our files. We also reviewed data in an occurrence search of the California Natural Diversity Database (Diversity Database) maintained by the California Department of Fish and Wildlife and the Natural Resource Information System maintained by the U.S. Forest Service.

Since the last 5-year review, there have been additional survey and monitoring reports from species experts resulting in two new occurrences but other surveys in potential habitat did not detect the species (addressed in **Distribution** and **Abundance**). Minor updates are also addressed in the **Threats** and **Conservation** sections.

Distribution:

At the time of listing, the species was only known from seven locations in Mariposa, Madera, and Fresno Counties (Element Occurrences 1 – 6 and 8; Service 1998, p. 49023). Since listing, five new occurrences have been discovered in 2000, 2003, 2005, and 2022 (Service 2008, p. 11; J. Clines *in litt.* 2023, pp. 1–2). One of these five occurrences was found on private land near the community of Coarsegold (Element Occurrence 9), one on the Sierra National Forest (Element Occurrence 10), and one on Pacific Gas and Electric land bordering the Sierra National Forest (Element Occurrence 11). The two remaining new occurrences consisting of several populations within ¼ mile of each other were recently found in 2022 on private land near the town of Ahwahnee, within the known range of the species, and near another known occurrence (Element Occurrence 3; J. Clines *in litt.* 2023, pp. 1–2; J. Medley, U.S. Forest Service, *in litt.* 2023). These new 2022 locations have not been recorded in the Diversity Database. Three known occurrences may be extirpated since no plants have been observed in many years, and the status of Element Occurrence 3 is uncertain (Element Occurrence 1, 4, and 5; Table 1; J. Clines, *in litt.* 2021a and

b). Further, no information has been recorded from Element Occurrence 8 since 2008 when no plants were observed (Diversity Database 2023). Most plants occur on private land with two occurrences on federal land. Although there are now a total of 12 occurrences, when the extirpation at three occurrences is considered (potentially four if Element Occurrence 3 is also included), the overall known occurrences have not substantially increased since the time of listing, nor has the species range. The plant is rare, and its range is well understood and established by species experts (C. Winchell, consultant, pers. comm. 2022). The occurrences are spread over a range of approximately 64 kilometers (40 miles) but are not evenly spaced within that range. Several surveys occurred in suitable habitat within the range of the species near the towns of Mariposa and Ahwahnee in Mariposa and Madera Counties with no plants observed (Service 2018; S. Cordier, California Department of Forestry and Fire Protection, *in litt.* 2021 and 2023). Extensive surveys have also occurred on the Sierra National Forest since the 1980s with no new observations (Clines, *in litt*. 2022a).

Abundance:
Species abundance numbers are recorded in association with an Element Occurrence in the Diversity Database. An Element Occurrence is the location record for a site which contains an individual or population. Populations or individuals located within ¼ mile of each other generally constitute a single occurrence (Diversity Database 2023). Information on abundance over the years at each Element Occurrence has been gathered sporadically making it challenging to determine whether populations are declining, increasing, or stable. Further, species abundance patterns are driven by climate, which makes comparing years challenging as plants do poorly during dry years and can be more abundant and larger in size during wet years. The previous 5-year review provided very few abundance numbers, and all were prior to 1998 (Service 2008, p. 4). Periodic abundance surveys have occurred since 2008 at most occurrences of the species. Abundance numbers from the 1990s through present appear to similarly fluctuate with few to hundreds of plants, and it appears there are a few key populations that harbor the highest numbers (Table 1; Element Occurrence 9 and 11).

Table 1. Species abundance numbers for occurrences in Diversity Database from previous and current 5-year review contributed by species experts (Clines, unpublished data 2009a, b, c; Clines, *in litt.* 2021a and b; Clines, *in litt.* 2022b; A. Colwell, California Plant Rescue, *in litt.* 2021, p. 1; Diversity Database 2023; J. Stebbins, Consultant, *in litt.* 2021 and 2022; C. Winchell, pers. comm. 2022).

County	Population	Element Occurrence	Notes on abundance from 2008 5-year review	Notes on abundance since 2008 5-year review
Mariposa	Pea Ridge	1	No information	Population has not been observed in years with the last Diversity Database occurrence recorded in 1994.
Mariposa	Jack Kirk Ranch	2	No information	2021: 3 plants; In 2021, property owner stated that thousands of plants have been observed other years but did not report observations to Diversity Database. 1992 was last year

				reported to Diversity Database with a large number of plants (900).
Madera	Windy Gap	3	1996: hundreds of plants; 1998: 3 plants	No plants have been found during several visits since 2015.
Madera	Indian Lake Estates	4	May be extirpated	No plants found in 20 years.
Madera	Indian Lake Estates	5	May be extirpated	No plants found in 20 years.
Fresno	Sierra National Forest, Jose Basin	6	1991: 58 plants; 1992: 770 plants; 1995: 59 plants; 1998: 607 plants	2011: 513 plants; 2012: 82 plants; 2020: 0 plants; 2021: 0 plants
Madera	Coarsegold	8	No information	No information
Madera	Coarsegold Mobile Home Park	9	No information	2009: 1000+ plants; 2021: hundreds of plants; 2023: thousands of plants
Fresno	Sugarloaf Hill/Shaver Lake	10	No information*	2009: 100 plants; 2012: 1 plant; 2015: 7 plants; 2017: 18 plants; 2019: 13 plants; 2020: 0 plants; 2021: 0 plants
Madera	Northfork	11	No information*	2009: 700+ plants; 2019: hundreds of plants; 2020: 460 plants; 2021: 40 – 50 plants; 2022: approx. 100 very stressed plants; 2023: a few plants
Madera	Unnamed	New occurrence	Not applicable	2022: 125 plants
Madera	Unnamed	New occurrence	Not applicable	Observed in 2022 but no information on abundance.

*Little information to report on these populations in the previous 5-year review since they were found in 2003 and 2005, respectively.

Threats:

Threats described in the final listing rule include urbanization, small population size, and small number of populations (Service 1998, p. 49031). The previous 5-year review documented the same threats but also included competition from nonnative plants and native live oak (Service 2008, p. 10). Encroachment from species besides native live oak, like other native shrubs and conifers, is also a threat to the species. Natural disturbance events, such as wildfire, regularly keep encroaching conifers and shrubs from suitable habitat for Mariposa pussypaws. Thus, wildfire is considered a benefit to the species (J. Stebbins, *in litt.* 2022). Since 2008, 17 wildfires

of varying size (2 – 380,000 acres) burned in suitable habitat for the species[1]. Two known occurrences burned in one fire in 2020 (Element Occurrences 6 and 10), and a fence was burned that surrounded one of the populations. The fence was installed to protect this occurrence from active cattle grazing and was repaired in 2022, though there is little evidence cattle grazing is a threat to the species (Service 2008, p. 8; J. Clines *in litt.* 2022c). Though fire can help maintain the openings Mariposa pussypaws need, it can also facilitate the invasion of nonnative annual grasses. Currently, at Element Occurrence 6, dense rattail fescue, *Festuca myuros*, appears to be dominant two years postfire and may require a grass-specific herbicide to ensure it does not spread (J. Clines *in litt.* 2022c).

Though increased susceptibility of populations to extirpation from random demographic or environmental events due to small population sizes was discussed in the final listing rule, effects from drought have become more prominent in recent years. Species experts confirm observing fewer individuals or no individuals at some known occurrences, and overall, the plants appear smaller, depauperate, and stressed, resulting in reduced future seed production (Figure 2; J. Stebbins, *in litt*. 2021 and 2022). Effects from urbanization, such as development and human activities (e.g., off-road recreation) continue to be a problem for the species (C. Winchell, pers. comm. 2022). Thus, the threats identified at the time of listing and the 2008 5-year review continue to act on the species.

Figure 2. Stressed Mariposa pussypaws plant observed during drought year. Photo credit: J. Stebbins.

Conservation:
Despite the lack of a recovery plan, various conservation actions have occurred or are planned for the species. In 2018, Pacific Gas and Electric Company completed a restoration project associated with the Crane Valley Project (Federal Energy Regulatory Commission No. 1354). Woody vegetation was cleared from around the known plant occurrences (Element Occurrence 11) to reduce competition from encroaching shrubs (Stebbins 2019, entire). In addition, Sierra

[1] Some of these wildfires reburned the same areas in subsequent years and also burned in locations outside the range of the Mariposa pussypaws. Suitable habitat was approximated using elevation and known occurrences, so the number of fires is an approximation since there is no mapped range for the species.

Foothill Conservancy, a local land trust, is engaging partners and landowners to preserve and protect a known occurrence (Element Occurrence 2) near the town of Mariposa (L. Miller, Sierra Foothill Conservancy, pers. comm. 2022). Sierra Foothill Conservancy also actively works with private landowners to conserve land throughout Mariposa, Madera, and Fresno Counties. Other efforts for preservation and research including seed and leaf collection are also funded and expected to occur in 2023 (A. Colwell, California Plant Rescue, *in litt.* 2023; J. Clines, *in litt.* 2023, p. 1).

Recovery criteria:
There is currently no published recovery plan for Mariposa pussypaws.

Conclusion:
After reviewing the best available scientific information, we conclude that Mariposa pussypaws remains a threatened species. The evaluation of threats affecting the species under the factors in 4(a)(1) of the Endangered Species Act and analysis of the status of the species in our 2008 status review (Service 2008) and this current 2023 review remains an accurate reflection of the species' current status.

RECOMMENDATIONS FOR FUTURE ACTIONS:

Here we propose several habitat conservation and ecological research recommendations which will aid in the recovery and conservation of the Mariposa pussypaws. Some of these recommendations have already been discussed in our previous status review (Service 2008, pp. 11–12) and remain valid.

1. Increase research in breeding system genetics and pollinator studies to better understand gene flow given populations are separated by considerable distances.
2. Finalize a recovery plan or work with other agencies to finalize a conservation assessment for the species.
3. Map potential habitat and conduct more surveys for additional populations within potential habitat on private land and scattered federal land parcels throughout the range of the species.
4. Implement more fuels reduction treatments near known occurrences and in potential habitat that include prescribed fire to prevent encroachment from other plant species and create openings the plant requires.
5. Monitor population abundance more regularly at all known occurrences and ensure surveys include both drought and non-drought years.
6. Protect and preserve more suitable habitat for the species in Mariposa, Madera, and Fresno Counties through mechanisms such as conservation easements.
7. Ensure any field observations are entered into the Diversity Database to track population status more effectively.

Field Supervisor, Sacramento Fish and Wildlife Office

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Date: 2023.08.09 09:00:26 -07'00'

Approve _____ **Date** _____

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