Rare Plant Status Review: *Monardella mojavensis*
Proposed Addition to California Rare Plant Rank 1B.3, G2 / S2

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Background and Taxonomy

Monardella mojavensis Elvin & A.C. Sanders is a subshrub or shrub in Lamiaceae endemic to the mountains of the eastern Mojave Desert in California and possibly extreme southern Nevada (Newberry Mtns.). It was first described by Elvin and Sanders (2009) and is also treated in the *Jepson eFlora* (Sanders et al. 2012). The treatment of Lamiaceae in the *Flora of North America* (FNA) is still unpublished.

This species has grayish green or silvery, strongly aromatic stems and leaves and white flowers with purple markings (appearing lavender) (Elvin and Sanders 2009, Sanders et al. 2012). Plants now referred to *M. mojavensis* were previously treated as *Monardella linoides* A. Gray subsp. *linoides*, a common taxon (Jokerst 1993). They resemble *M. linoides* in their overall habit, leaf width, and dense, uniform pubescence, but differ by their branched inflorescence (vs. flower-cluster mostly 1 per main stem); smaller glomerules (10–20 mm vs. 10–30 mm wide); smaller, narrower bracts (2–5 mm vs. 5–14 mm wide); shorter calyces (5–7 mm vs. 8–9 mm); and presence of glandular trichomes on the calyces (Elvin and Sanders 2009, Sanders et al. 2012). The geographic ranges of *M. mojavensis* and *M. linoides* subsp. *linoides* are also disjunct with respect to each other, with *M. linoides* subsp. *linoides* being found in the Peninsular Ranges, Little San Bernardino Mtns., and southern Mojave Desert (Sanders et al. 2012). Other desert monardellas that are similar to *M. mojavensis* include *M. arizonica* Epling, *M. boydii* A.C. Sanders & Elvin (CRPR 1B.2, G1?Q / S1?), *M. eremicola* A.C. Sanders & Elvin (1B.3, G3Q / S3), and *M. robisonii* Epling ex Munz (1B.3, G3 / S3) (Elvin and Sanders 2009; Sims et al. 2011a, 2011b; CNPS 2022). The differences between *M. mojavensis* and these other taxa are reportedly small but distinct, leading Elvin and Sanders (2009) to recognize it provisionally as a species with the aim of minimizing the need for taxonomic revisions once more information can be obtained. DNA work with *Monardella* species has thus far proven unsuccessful due to the high amount of secondary metabolites in their leaf tissue.

Ecology

Monardella mojavensis in California inhabits desert scrub and pinyon-juniper woodland at elevations from 2600 to 5600 feet (800–1700 m) (CCH2 2021). It is found on rock outcrops and in gravelly to sandy soils of mountain slopes, in washes, and at the upper edge of alluvial fans (bajadas). Most of the known occurrences are on granite, with the remainder on sedimentary or metamorphic substrates; the occurrences in the Providence Mtns. are on limestone (CDC 2015, CCH2 2021). Its blooming period is from May to August (Elvin and Sanders 2009, Sanders et al. 2012). Frequently noted plant associates include trees *Pinus monophylla* and *Juniperus* spp. (*J. osteosperma, J. californica*); shrubs *Ambrosia salsola, Baccharis sergiloides, Brickellia californica, Cylindropuntia acanthocarpa, Ericameria cuneata, E. linearifolia, Eriogonum fasciculatum, Larrea tridentata, Lycium andersonii, Prunus fasciculata, Rhamnus ilicifolia, Rhus aromatica, Salvia mohavensis, Scutellaria mexicana,* and *Senegalia greggii*; and perennial leaf semi-succulent *Yucca schidigera*. Associates in the Providence Mtns. include calciphiles such as

Artemisia bigelovii, *Erigeron utahensis*, *Glossopetalon spinescens* var. *aridum*, *Myriopteris parryi*, and *Selaginella leucobryoides* (CCH2 2021).

Distribution and Abundance
There are 13 known occurrences of *Monardella mojavensis* in California, all in isolated mountain ranges of the eastern Mojave Desert (San Bernardino County; e DMtns bioregion). Six of these occurrences (including the type locality) are in the Granite Mountains. The species has also been found in the Old Woman Mountains (3 occurrences), the Providence Mountains (2 occurrences), the Old Dad Mountains (1 occurrence), and near Old Dad Mountain c. 14 miles northwest of Kelso (1 occurrence). Six of the occurrences are recent (discovered or revisited within the last 20 years), and seven are historical. All but one of the known occurrences are in reserves or other protected lands, including the Mojave National Preserve, the Sweeney Granite Mountains Desert Research Center, the Old Woman Mountains Wilderness, the Native American Land Conservancy, and the Providence Mountains State Recreation Area. The remaining occurrence is on BLM land. In addition, one of the occurrences in the Providence Mountains is partly on private land (near the defunct Bonanza King Mine). (Elvin and Sanders 2009, CCH2 2021).

Plants from the Ord Mountains (San Bernardino County) identified as *Monardella mojavensis* on CCH2 (2021) are now placed in *M. boydii* (Elvin and Sanders 2009; J. André 2022, pers. comm.). Plants on granitic substrate in the New York Mountains (San Bernardino County) have been identified as *M. eremicola* (CCH2 2021), even though that species reportedly occurs mostly on limestone (Elvin and Sanders 2009, Sanders et al. 2012). According to Jim André (2022, pers. comm.), the plants in the New Yorks are closer to *M. mojavensis* but intermediate to *M. eremicola* in some characters. Plants from the Sheep Hole (Sheephole) Mountains (San Bernardino County) are reportedly intermediate to *M. robisonii* (Sanders et al. 2012). Plants from extreme southern Nevada (Newberry Mtns.) were included in the original circumscription of *M. mojavensis* (Elvin and Sanders 2009) but are reportedly closer to a possibly undescribed taxon from Mohave County, Arizona (J. André 2022, pers. comm.). If the Newberry Mtns. plants were to be placed in a different taxon, then *M. mojavensis* would have to be considered as endemic to California and San Bernardino County.

Data on population size, trends over time, and area of occupancy are almost completely lacking for the Californian occurrences of *Monardella mojavensis*. Anecdotal observations by collectors suggest that the plants are infrequent, local, occasional, uncommon, scarce, or rare; one population in the Granite Mountains was noted as consisting of about 20 plants (CCH2 2021). Field work is needed to rediscover historical occurrences, gather population data, assess site quality and threats, and search for additional occurrences.

Distribution addendum: After this Status Review was posted on the CNPS Rare Plant Forum for review, additional location data were submitted by Julie Evens and posted on the Forum. An analysis of these data indicate that there are nine new occurrences (in addition to the 13 that were documented in the Status Review published on the CNPS Forum on 03 February 2022). Of the new localities, five are in the Granite Mountains (mapped on the USGS 7.5' Bighorn Basin quadrangle, quadcode 3411576), and four are in the Providence Mountains (mapped on the USGS 7.5' Bighorn Basin quadrangle, quadcode 3411585). In summary, with these new data, the number of known occurrences for *M. mojavensis* has increased from 13 to 22, but the overall

distribution has not changed, and there are no new USGS quadrangles needing to be reported. These observations from Julie Evens are consistent with Jim André's recent comment on the Forum: "I would be surprised if significant range extensions are made from what is presently known, but additional occurrences are no doubt to be found...".

Please note that four of the locations reported by Julie Evens are records of *Monardella* from the Panamint Mountains (Death Valley region, Inyo County). These localities are well outside the known range of *M. mojavensis*, and, based on the following comment by Elvin and Sanders (2009), the species identification is unclear: "Numerous introgressant specimens between *M. linoides* subsp. *sierrae*, *M. odoratissima*, and *M. eremicola* occur in the mountain ranges of the northern Mojave Desert, particularly in the Panamint and Amargosa mountain ranges of Inyo County. Many of the specimens from this area display a blend of characters intermediate between these three taxa, but do not fit well into any one of them." In short, the records from the Panamint Mountains (Inyo County) do not belong with *M. mojavensis*.

Status and Threats
Monardella mojavensis is a recently described taxon (Elvin and Sanders 2009) and has had no prior conservation status in California or elsewhere. Threats to this species are undocumented, but it should be considered of conservation concern due to its restricted range and few, isolated occurrences together with the seemingly small size of its populations.

Summary
Based on the available information, CNPS and CNDDB recommend adding *Monardella mojavensis* to California Rare Plant Rank 1B.3 of the CNPS Inventory. If knowledge on the distribution, threats, and rarity status of *Monardella mojavensis* changes in the future, we will re-evaluate its status at that time.

Recommended Actions
CNPS: Add *Monardella mojavensis* to CRPR 1B.3
CNDDB: Add *Monardella mojavensis* to G2 / S2

Draft CNPS Inventory Record
Monardella mojavensis Elvin & A.C. Sanders
Granite Mountains monardella
Lamiaceae
USDA Plants Symbol: No results found.
Synonym(s)/Other Name(s): None
CRPR 1B.3
Counties: San Bernardino
States: CA, NV?
Quads name (code): Bighorn Basin (3411576), Budweiser Wash (3411577), Fountain Peak (3411585), Old Dad Mtn. (3511517), Old Woman Statue (3411552), Painted Rock Wash (3411551)
Habitats: Mojavean desert scrub (MDScr), pinyon and juniper woodland (PJWld)
Micro Habitat Notes: rocky slopes, washes and adjacent fans, mostly on granite (rarely on limestone)

Micro Habitat: rocky, gravelly, sandy, washes, bajadas (edges), granite (usually), carbonate (rarely)
Elevation: 800-1700 meters (2600-5600 feet).
Life form: Subshrub or shrub.
Blooms: May to August.
Taxonomy notes: Plants in Ord Mtns. are now placed in *M. boydii*. Taxonomy of plants in New York Mtns. is problematic (closer to *M. eremicola*?), and plants in Sheep Hole Mtns. are intermediate with *M. robisonii*. Plants from s NV (Newberry Mtns.), included in original description, may be undescribed.
Original Description: *Novon* 19(3): 333 (2009)

Literature Cited

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[CCH2] Consortium of California Herbaria Portal 2. 2021. Data provided by the participants of the Consortium of California Herbaria and the California Phenology Thematic Collections Network. Regents of the University of California and Cal Poly, San Luis Obispo. Website http//:www.cch2.org/portal/index.php [accessed December 2021].

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Jokerst, J.D. 1993. *Monardella*. Pp. 718–722 in J.C. Hickman (ed.), *The Jepson Manual: Higher Plants of California*. University of California Press, Berkeley.

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Sims, A.E., N. Jensen, B. Lo, and R. Bittman. 2011a. Rare plant status review: *Monardella boydii*. Report dated 06 December 2011, prepared jointly for the California Native Plant Society, Rare Plant Program and California Department of Fish and Wildlife, Natural Diversity Database.

Sims, A.E., N. Jensen, B. Lo, and R. Bittman. 2011b. Rare plant status review: *Monardella eremicola*. Report dated 06 December 2011, prepared jointly for the California Native Plant Society, Rare Plant Program and California Department of Fish and Wildlife, Natural Diversity Database.

Personal Communications

André, James M. 2022. Director, Sweeney Granite Mountains Desert Research Center. Email correspondence regarding taxonomy of desert *Monardella* populations and the distribution and conservation status of *M. mojavensis*. Pers. comm. 20 January 2022.