Rare Plant Status Review: *Monardella exilis*
Proposed Addition to California Rare Plant Rank 4.2, G3 / S3

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This status review is being expedited through an agreement between the California Native Plant Society and the Center for Plant Conservation (CPC), with contributions from the state of California, CPC, and the California Plant Rescue initiative. Aside from being advanced as part of this agreement, the process, content, and information provided herein is not altered, modified, or developed differently in any way or form compared to other status reviews developed by CNPS.

Background and Taxonomy

Monardella exilis (A. Gray) Greene is an annual herb in the Lamiaceae known from the western and northern Mojave Desert and adjacent northern Transverse Ranges and southernmost part of the Sierra Nevada. It was first described as *M. candicans* var. *exilis* based on material collected along the Mojave River in San Bernardino County (Gray 1886, Epling 1925). It was later elevated to species rank (Greene 1902) and has been recognized in both *The Jepson Manual* (Jokerst 1993) and the *Jepson eFlora* (Sanders et al. 2012). The treatment of Lamiaceae in the *Flora of North America* is still unpublished.

Monardella exilis is most closely related to two other annual species with floral bracts that are white or partly so: *M. candicans* (of Sierra Nevada foothills and e. San Joaquin V.) and *M. leucocephala* (formerly localized in n. San Joaquin V., now on CRPR 1A) (Sanders et al. 2012, CNPS 2022). It can be distinguished from *M. candicans* by its branching pattern (generally below vs. above the middle), flower-clusters on peduncles 1–3 cm long (vs. peduncles inconspicuous and flower-clusters generally closely subtended by leaves), and floral bracts lacking conspicuous cross-veining (Sanders et al. 2012; see also Epling 1925). The name *exilis* means small or smaller (Gray 1886, Stearn 1983).

Ecology

Monardella exilis is restricted to dry, sandy soils of flats, slopes, ridges, washes, river banks, and stabilized dunes. Its generalized habitats include Mojavean Desert scrub, Great Basin scrub, chenopod scrub, Joshua tree woodland, pinyon and juniper woodland, and lower montane coniferous forest. Associated species include trees: *Yucca brevifolia*, *Pinus monophylla*, and *P. jeffreyi*; shrubs and subshrubs: *Larrea tridentata*, *Artemisia tridentata*, *Atriplex confertifolia*, *A. polycarpa*, *A. canescens*, *Ericameria nauseosa*, *Krascheninnikovia lanata*, *Ephedra*, *Lepidospartum squamatum*, *Grayia spinosa*, and *Lycium cooperi*; and herbs: *Abronia villosa*, *Calyptridium monandrum*, *Cryptantha pterocarya*, *Gilia latiflora* subsp. *davyi*, *Loeseliastrum matthewsii*, *Malacothrix californica*, *Stanleya pinnata*, *Stipa hymenoides*, and *Tiquilia nuttallii*. The elevational range is 600–2050 meters (Sanders et al. 2012, CCH2 2021). The blooming period is April–September (Sanders et al. 2012).

Distribution and Abundance

Monardella exilis is endemic to California in the western and northern Mojave Desert and adjacent northern Transverse Ranges and southernmost Sierra Nevada. Based mainly on herbarium collections, there are an estimated 111 occurrences in Tulare (10 occurrences), Kern (31), Inyo (8), Los Angeles (41), and San Bernardino (21) counties (CCH2 2021, Calflora 2022,

iNaturalist 2022). Eighty-three occurrences are historical (not revisited within the last 20 years), and 28 are recent. Sixty occurrences are on lands of unknown (presumably private) ownership, with the remaining 51 occurrences divided among lands controlled by BLM (18 occurrences), DoD (15), U.S. Forest Service (11), State of California (5), County of Los Angeles (1), and County of San Bernardino (1). Three occurrences in the southern Sierra Nevada (Tulare County) are within the Domeland Wilderness (administered by Sequoia National Forest). Another occurrence may receive protection in the Audubon Kern River Preserve (Kern County), but the latitude / longitude coordinates associated with this record are incorrect and would erroneously place the locality in Fresno County (Jeff Greenhouse observation in Calflora 2022). Using GeoCAT (Bachman et al. 2011), the extent of occurrence (EOO) and area of occupancy (AOO) have been estimated as 21,183 km^2 and 476 km^2, respectively.

Data on population size, trends over time, and area of occupancy are very limited. Anecdotal observations by collectors suggest that *M. exilis* tends to occur in patches or colonies and may be locally frequent, common, or abundant; in other localities, however, the species was noted as being uncommon, occasional, scarce, scattered, or rare (CCH2 2021). Recent field-work by Ryan O'Dell near Lake Isabella (Kern County) and at Kennedy Meadows and Kelso Valley (Kern County) has mapped multiple discrete colonies (2–16 colonies per occurrence) with each colony consisting of up to 1,000 plants (observations in Calflora 2022). Additional field work is needed to rediscover historical occurrences, gather population data, assess site quality and threats, and search for additional occurrences.

Several records are out of range and presumably misidentified or mislabeled: Badger, Tulare County (*T. S. Brandegee* on 24 July 1892, UC104628), the San Emigdio Mountains, Kern County (*Boyd 9584*, RSA 600594), and near Deep Canyon, Riverside County (*Jaeger 960*, GH 00400556). Plants from Kennedy Meadows and elsewhere on the Kern Plateau (Tulare County) may be more-or-less intermediate between this species and *M. candicans*; in CCH2 (2021) there are six collections that have been identified as "hybrids" (*Griesel s.n.* in 1961, CAS; *Twisselmann 7861* & *13493*, CAS; *J.T. Howell 43910* & *43570*, CAS; *Ertter 4992*, OBI). In elevating *M. exilis* to species rank, Greene (1902) noted that it is amply distinct from *M. candicans*, and neither Abrams (1912) nor Epling (1925) mentioned any difficulty in separating these two taxa. The identification of "hybrids" from the Kern Plateau seems to be an idea that originated with recent investigators (M. Elvin and A. Sanders), and we would question whether they are really hybrids or better regarded as possible introgressants between two closely related species occurring at the limits of their respective geographic ranges. For this status review, the eight known occurrences from the Kern Plateau are included under *M. exilis*, but further study of these populations is warranted.

Status and Threats

Monardella exilis is currently listed as globally Vulnerable with uncertainty (G3?) and is not ranked (SNR) in California (NatureServe 2022). The occurrences in northern Los Angeles County (in and around Lancaster and Palmdale) have been urbanized, as have those in southwestern San Bernardino County (in and round Victorville, Apple Valley and Hesperia). Less than 20% of the species' habitat remains in these areas. In other parts of its range, *M. exilis* is threatened by solar and wind energy development, suburban sprawl, ORVs, cattle grazing, fire management (fuel reduction treatments), and invasive species e.g. *Bromus tectorum* (J. André 2022, pers. comm.; M. Elvin 2022, pers. comm.). Based on our own analysis of the

georeferenced localities, eleven of the estimated 111 occurrences are extirpated or possibly extirpated, and the remaining 100 occurrences are presumed extant. Recent observations on iNaturalist (2022) show that the species is still present on undeveloped land on the outskirts of Lancaster and Palmdale. Because of its restricted range and apparent population declines, the occurrences of *M. exilis* should be regularly monitored. Mojave Desert annuals are well known to undergo extreme interannual fluctuations in abundance depending on winter precipitation. Observations from multiple years might thus be needed to determine if *M. exilis* has truly disappeared from areas it formerly occupied.

Summary
Based on the available information, CNPS and CNDDB recommend adding *Monardella exilis* to California Rare Plant Rank 4.2 of the CNPS Inventory. If knowledge on the distribution, threats, and rarity status of *M. exilis* changes in the future, we will re-evaluate its status at that time.

Recommended Actions
CNPS: Add *Monardella exilis* to CRPR 4.2
CNDDB: Add *Monardella exilis* to G3 / S3

Draft CNPS Inventory Record
Monardella exilis (A. Gray) Greene
Mojave monardella
Lamiaceae
USDA Plants Symbol: MOEX
Synonym(s)/Other Name(s):
CRPR 4.2
Counties: Inyo, Kern, Los Angeles, San Bernardino, Tulare
Quad name (code): Adelanto (3411754), Adobe Mountain (3411766), Alpine Butte (3411768), Apple Valley South (3411742), Cactus Peak (3611717), Camp Nelson (3611825), Cane Canyon (3511852), Cantil (3511738), Cinco (3511831), Cougar Buttes (3411647), Crag Peak (3611812), Cross Mountain (3511832), Democrat Hot Springs (3511856), Devore (3411724), El Mirage (3411756), Fifteenmile Valley (3411741), Haiwee Reservoirs (3611722), Hi Vista (3411767), Jackrabbit Hill (3411776), Kernville (3511874), Kramer Junction (3411785), Lake Arrowhead (3411732), Lake Isabella North (3511864), Lake Isabella South (3511854), Lamont Peak (3511871), Lancaster East (3411861), Lancaster West (3411862), Leuhman Ridge (3411786), Little Buttes (3411873), Little Lake (3511788), Littlerock (3411758), Long Canyon (3611811), Lovejoy Buttes (3411757), Lucerne Valley (3411648), Mescal Creek (3411746), Miracle Hot Springs (3511855), Mojave (3511812), Onyx (3511862), Pacifico Mountain (3411841), Palmdale (3411851), Phelan (3411745), Pinyon Mtn. (3511842), Red Buttes (3411775), Redman (3411778), Ritter Ridge (3411852), Rockhouse Basin (3511882), Rogers Lake North (3411787), Rosamond (3411872), Rosamond Lake (3411871), Sacatar Canyon (3511881), Shadow Mountains SE (3411755), Silverwood Lake (3411733), Sleepy Valley (3411853), Soledad Mtn. (3411882), Victorville (3411753), Walker Pass (3511861), Weldon (3511863)
General Habitat: Desert dunes, Mojavean Desert scrub, Great Basin scrub, Chenopod scrub, Pinyon and juniper woodlandd, Joshua tree woodlandd, Lower montane coniferous forest
Micro Habitat: Sandy
Elevation: 600-2050 meters
Life form: annual herb

Blooms: April to September
- Notes:
- Threats: Urbanization, habitat loss, energy development, vehicles, grazing
- Taxonomy: Intergrades with *M. candicans* in sSN.

Selected References:
- Original Description: *Synoptical Flora of North America*, 2nd ed., 2(1): 358 (1886)
- Revised Nomenclature: *Pittonia* 5: 86 (1902)
- Taxonomic Treatment: *Annals of the Missouri Botanical Garden* 12: 88 (1925)

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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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Personal Communications

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Elvin, Mark A. 2022. Senior Fish and Wildlife Biologist, U.S. Fish and Wildlife Service, Ventura, CA and Research Associate, University of California, Los Angeles. Email correspondence regarding information needs for *M. australis* subsp. *gabrielensis* and three other *Monardella* taxa nominated for CRPR 1B. Personal communication 13 February 2022.