Rare Plant Status Review: *Zeltnera namophila*
Proposed Addition to California Rare Plant Rank 1B.1, G2Q / S1
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Background and Taxonomy

Zeltnera namophila (Reveal, C.R. Broome & Beatley) G. Mans. is an annual herb in the Gentianaceae that grows to 60 cm tall with linear to thread-like leaves and pink flowers (Pringle 2012). It was first described under the name *Centaurium namophilum* (Reveal et al. 1973) and is currently Considered But Rejected (CBR) in the CNPS *Inventory* under *C. namophilum* var. *namophilum*, because that name was previously considered a synonym of *C. exaltatum* (now *Zeltnera exaltata*, a common taxon) (Hickman 1993, Pringle 2012). The type locality of *Z. namophila* is in southwestern Nye County, Nevada.

The status of *Zeltnera namophila* in California has been uncertain due to a lack of consensus among authors of recent taxonomic and floristic treatments. The first edition of *The Jepson Manual* (Hickman 1993) did not recognize *Centaurium namophilum* and referred the Californian plants to *C. exaltatum*. More recently, *Zeltnera namophila* was treated in the *Jepson eFlora* with a circumscription that includes plants from both the Mojave Desert (DMoj) and east of Sierra Nevada (SNE) bioregions (Pringle 2012). The treatment of Gentianaceae in the *Flora of North America* (FNA) is still unpublished.

For information on the transfer of *Centaurium namophilum* and other American species to the genus *Zeltnera*, see Mansion and Struwe (2004) and Mansion (2004). Molecular and cytological results indicate that *Z. namophila* belongs to a group of species with chromosome number $n = 17$ that also includes *Z. trichantha*, *Z. nevadensis*, and *Z. venusta* (Mansion and Zeltner 2004). Morphologically, *Z. namophila* most closely resembles *Z. trichantha*, a species found in cismontane California and not in the desert regions (Pringle 2012). Both species have short-pedicellate flowers (pedicels 1–9 mm long on the ultimate branch), relatively large corollas (12–16 mm in diameter), and subcapitate stigma lobes, but they differ by their leaves (ovate to broadly lanceolate in *Z. trichantha* vs. linear to linear-lanceolate in *Z. namophila*), inflorescences (± dense with cymes ± flat-topped vs. paniculate, open and ± elongate), and size of floral parts (corolla-tube 12–22 vs. 7–8 mm long) (Reveal et al. 1973, Mansion 2004, Pringle 2021). *Zeltnera exaltata* and *Z. nevadensis* are both clearly different from *Z. namophila* by having flowers on longer pedicels (10–70 mm) with smaller corollas (8–12 mm in diameter) (Mansion 2004). *Zeltnera namophila* also differs from *Z. exaltata* in chromosome number ($n = 17$ vs. $n = 20$) and in having 5-merous (vs. 4-merous) flowers (Pringle 2012).

The species-name *namophila* means “spring-loving” (Borror 1960, Reveal et al. 1973), in reference to the habitat. In IPNI (2021), the original species-name *namophila* has been corrected to *namatophila*, but Dr. Pringle (2021, pers. comm.) has consulted with nomenclatural experts and reports that either *namophila* or *namatophila* would be acceptable, in which case the original spelling *namophila* should be retained.

Ecology

Zeltnera namophila in California is found in fine-textured, alluvial soil of alkaline meadows and moist, alkaline flats fed by desert springs (a habitat that is also rare). The elevational range is from 1300 to 2100 feet (400–640 m). The blooming period is from July to September (Reveal et

al. 1973, Pringle 2012). Associated plant species include *Almutaster pauciflorus* (CRPR 2B.2), *Atriplex confertifolia, A. lentiformis, Baccharis salicina, Calochortus striatus* (CRPR 1B.2, BLM Sensitive), *Chloropyron tecopense* (CRPR 1B.2, BLM Sensitive), *Cirsium mohavense, Cyperus* sp., *Distichlis spicata, Euphrosyne acerosa, Grindelia fraxinipratensis* (CRPR 1B.2, federally Threatened), *Helianthus annuus, Juncus balticus, Plagiobothrys salsus* (CRPR 2B.2), *Pluchea odorata, Populus fremontii, Prosopis glandulosa* var. *torreyana, P. pubescens,* and *Sporobolus airoides* (CNPS 2021, CCH2 2021; N. Fraga 2021, pers. comm.).

Distribution and Abundance
There are five (possibly six) known occurrences of *Zeltnera namophila* in California, all in the Amargosa River drainage of southeastern Inyo County (DMoj bioregion). Three of these occurrences are historical, apparently on private lands, and presumably extirpated (in "Resting Springs Valley" and near the small towns of Shoshone and Tecopa). Broome (1981) conducted a careful search of these sites in 1978 but could not relocate *Z. namophila,* even though the plants were reportedly common at Tecopa in August 1950 (*J.C. and A.R. Roos 4927,* RSA, US).

In 2011, *Z. namophila* was rediscovered in California by Dr. Naomi Fraga and colleagues of the California Botanic Garden, Claremont. The locality is on BLM land along lower Carson Slough (southeastern Inyo County) about 5 miles northeast of Death Valley Junction, north of State Line Road, and close to the Nevada state line. Subsequent field-work in 2018 and 2019 located *Z. namophila* in several additional sites in the same vicinity (Fraga 2019; N. Fraga 2021, pers. comm.) that are currently considered to represent two distinct occurrences separated by more than a mile. These extant occurrences could also be considered an extension of the much larger population in Ash Meadows National Wildlife Refuge in Nye County, Nevada (USFWS 2020). Based on observations made in 2018 and 2019, the population along lower Carson Slough consists of greater than 500 individuals in scattered colonies, but the number might actually be larger since there is more potential habitat in the area (N. Fraga 2021, pers. comm.). Plants tentatively identified as *Z. namophila* have also been found at an isolated spring (also on BLM land) south of State Line Road, although the survey was done out of season and still needs to be confirmed (N. Fraga 2021, pers. comm.).

The original description of *Centaurium namophilum* (Reveal et al. 1973) cited another historical collection from Furnace Creek in Death Valley (*Parish 10035,* UC). However, Broome (1981) placed the Parish collection in *C. namophilum* var. *nevadense* (≡ *Zeltnera nevadensis*). The Furnace Creek population is now seemingly extirpated, but plants from elsewhere in Death Valley have been identified as *Z. exaltata* (D. York 2021, pers. comm.).

There is currently a lack of consensus about the identity of the *Zeltnera* population at Fish Slough in northern Inyo and southern Mono counties (SNE bioregion) (N. Fraga 2022, pers. comm.). Two sources have cited these plants as *Z. namophila* or something close to it (J. Pringle 2021, pers. comm.; J. André 2021, pers. comm.), but they were previously identified as belonging to *Centaurium namophilum* var. *nevadense* (≡ *Z. nevadensis*) (Broome 1981). Further study of the taxonomy of desert *Zeltnera* populations is needed (e.g., using genetic markers), particularly *Z. nevadensis* and the plants from Fish Slough.

Status and Threats
Centaurium namophilum (≡ *Zeltnera namophila*) was previously included on a list of "Very Rare and Rare and Endangered Plants" in the 1st edition of the CNPS *Inventory* (1974). A status report

was also produced (Niehaus 1977). In the 3rd edition (1984), the species was moved to List 1B ("Plants Rare or Endangered in California and Elsewhere"). In the 5th edition (1994), it was dropped from the *Inventory* as a result of Hickman's (1993) treatment for *The Jepson Manual* (see above under Background and Taxonomy).

On May 20, 1985, the U.S. Fish and Wildlife Service listed *Zeltnera namophila* as a Threatened species under the Endangered Species Act (50 FR 20777, as *Centaurium namophilum*). It is also listed by the State of Nevada as critically endangered, threatened with extinction, and fully protected (NDF 2012). The species is not currently listed under the California Endangered Species Act.

The main threat to *Zeltnera namophila* is groundwater pumping, which can cause the desert springs it inhabits to decrease in flow or even dry out (Patten et al. 2008, Parker et al. 2021). Continued pumping in the Ash Meadows basin could result in decreased surface flows at the known sites for *Z. namophila* in southeastern Inyo County, because the two areas are hydrologically connected, and groundwater recharge in the Ash Meadows basin accounts for 40 percent of the discharge from springs in the Alkali Flat-Furnace Creek Ranch basin (Halford and Jackson 2020). Surface water diversions can also adversely affect the habitat of *Z. namophila*, as may have happened at Tecopa where the species was once common but now apparently extirpated. Feral horses and off-highway vehicles (OHVs) are additional threats at the recently documented occurrence along lower Carson Slough (Fraga 2019).

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

Recommended Actions
CNPS: Add *Zeltnera namophila* to CRPR 1B.1
CNDDB: Add *Zeltnera namophila* to G2Q / S1

Draft CNPS Inventory Record
Zeltnera namophila (Reveal, C.R. Broome & Beatley) G. Mans.
spring-loving centaury
Gentianaceae
USDA Symbol: ZENA2
Synonym(s)/Other Name(s): *Centaurium namophilum* Reveal, C.R.Broome & Beatley
CRPR 1B.1
Counties: Inyo
States: CA, NV
Quads: Bole Spring (3611633), Death Valley Junction (3611634), Resting Spring (3511682)*, Shoshone (3511683)*, Tecopa (3511672)*
Habitats: Medws (alkaline) / desert springs; elevation 400-640 meters (1300-2100 feet)
Life form: Annual herb. Blooms July to September.
Threatened by groundwater pumping, feral horses, off-highway vehicles.

Taxonomy: Possibly intergrading with *Z. exaltata* outside of Ash Meadows region; needs further study. Original spelling ‘namophila’ may be correctable to ‘namatophila’ (International Plant Names Index).
Other: Rediscovered in CA in June 2011. Three historical occurrences are presumed extirpated. Plants from Fish Slough (n INY and s MNO cos.) may be referable to *Z. nevadensis*.
References: See *Bulletin of the Torrey Botanical Club* 100(6): 353 (1973) for original description and *Taxon* 53(3): 732 (2004) for revised nomenclature.

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