Added *L. maculatus* ssp. *emaculatus* to California Rare Plant Rank 1B.1 and Changed *L. maculatus* to *L. maculatus* ssp. *maculatus* in the CNPS Inventory on January 27, 2016

Rare Plant Status Review: *Linanthus maculatus* subsp. *emaculatus* and *Linanthus maculatus*

Proposed Addition of *L. maculatus* subsp. *emaculatus* to CRPR 1B.1, G2T1 / S1
Proposed Name Change of *L. maculatus* to *L. maculatus* subsp. *maculatus*

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Changes made to the original document are in blue text.

Background

Linanthus maculatus (Parish) Milliken subsp. *emaculatus* J.M. Porter, D.S. Bell & R. Patt. is an ephemeral-annual herb in the Polemoniaceae known only from the Colorado/Sonoran Desert of western Imperial and adjacent San Diego Counties, California. It was recently described in Porter and Patterson (2015) and is therefore not included in *The Jepson Manual, Second Edition* (Patterson and Porter 2012).

Linanthus maculatus (Parish) Milliken is a California Rare Plant Rank 1B.2 species (CNPS, Rare Plant Program 2015) that has been included in the CNPS Inventory since the First Edition (Powell 1974), and is also a Bureau of Land Management Sensitive Species. Due to the recent description of *Linanthus maculatus* subsp. *emaculatus*, *L. maculatus* is now known as *L. maculatus* subsp. *maculatus*, and this name should be reflected in the CNPS Inventory and CNDDB.

Linanthus maculatus subsp. *emaculatus* was first collected as *L. maculatus* by Larry Hendrickson and Larry Sward in April, 2010 (*4927*, SD; Porter and Patterson 2015), during botanical surveys for the Ocotillo Wind Energy Facility project (CNDDB 2015; Helix Environmental Planning 2011). It was subsequently collected by Duncan Bell in March, 2012 (*3266* and *3270*, RSA), and by Mark Porter and Sarah De Groot in April, 2012 (*15086* and *15087*, RSA). When *L. maculatus* subsp. *emaculatus* was first observed by D. Bell (pers. comm. 2012), he recognized it could be a new subspecies and sent some photos to *Linanthus* expert, Mark Porter. Mark drove out a few days later to observe the plants and determined that they were indeed unique and worthy of subspecies status. *Linanthus maculatus* subsp. *emaculatus* is most easily differentiated from subsp. *maculatus* in lacking maroon spots at the base of each corolla lobe, which is what the epithet *emaculatus* (Greek = without spots) refers to. It is also differentiated from subsp. *maculatus* in floral morphology, with subsp. *emaculatus* having reverse herkogamy (vs. longer style and stigma lobes adjacent to anthers in subsp. *maculatus*) (Porter and Patterson 2015). They also appear to be allopatric, with *L. maculatus* subsp. *maculatus* occurring in the Little San Bernardino Mountains and southwest Mojave and northwest Sonoran deserts, and subsp. *emaculatus* occurring approximately 128 air km to the south, only in the western Sonoran Desert of California (CCH 2015; Jepson Flora Project 2015; Porter and Patterson 2015).

Linanthus maculatus subsp. *emaculatus* is associated with Colorado Desert riparian vegetation, and “occurs on dune margins, bases of sand ramps, sandy or course, opaque-white, decomposed granite soils of washes and on flats near wash margins” (Porter and Patterson 2015). Although Porter and Patterson (2015) note its elevation range to be 900 to 1,100 meters, a review of the herbarium specimen labels and geographic coordinates in Google Earth (Google Inc. 2015) revealed that it actually occurs at a much lower elevation of approximately 395 to 585 meters. The peak blooming period of *L. maculatus* subsp. *emaculatus* is April, but it has also been observed flowering less commonly in March and May (Porter and Patterson 2015). Dominant shrubs in the habitat where *L. maculatus* subsp. *emaculatus* occurs include *Acacia greggii*, *Ambrosia salsola* var. *salsola*, *Bebbia juncea* var. *aspera*, *Ephedra californica*, *Hyptis emoryi, Justicia californica* and *Stephanomeria pauciflora*; typical associated forbs include *Chaenactis carphoclinia* var. *carphoclinia*, *Chamaesyce polycarpa*, *Logfia filaginoides*, and *Salvia columbariae* (CNDDB 2015; Consortium of California Herbaria 2015).

Linanthus maculatus subsp. *emaculatus* is currently only known from approximately five occurrences. Two of its occurrences are in Imperial County on Bureau of Land Management (BLM) property, and three of its occurrences are in San Diego County in Anza-Borrego Desert State Park. Since *L. maculatus* subsp. *maculatus* is only expected to occur in Riverside and San Bernardino counties, the Consortium of California Herbaria was searched for records of it in Imperial and San Diego counties in attempts to discover any potential additional records that may need to be annotated to subsp. *emaculatus*. Three records of *Gilia maculata* (synonym of *L. maculatus*) from “Agua Caliente” are reported from San Diego County (*W.G. Wright s.n.*, *2123*, and *s.n.*; DS133446, GH78883, and UC444422 respectively), but were actually collected near Palm Springs in Riverside County, at a location then known as Agua Caliente (Consortium of California Herbaria 2015, with comments from Scott Simono in 2011). All of its occurrences are relatively small, with the two Imperial County occurrences known from only 100 to 150 plants (CNDDB 2015), and the three San Diego County occurrences known from a combined total of 700 to 800 plants (D. Bell pers. comm. 2015). As an ephemeral-annual herb, population sizes of *L. maculatus* subsp. *emaculatus* may fluctuate greatly from year to year based on rainfall, and only a few years of surveys could therefore not be suitable for assessing its overall numbers and rarity. Nevertheless, 2013 was considered a good rain year for the area it was discovered in at Anza Borrego-Desert State Park, and dedicated surveys throughout its preferred habitat of the area revealed its occurrence in only a single drainage (D. Bell pers. comm. 2015). Furthermore, since its close look-alike, *L. maculatus*, has been included in the Inventory since 1974, *L. maculatus* subsp. *emaculatus* is expected to have had over 40 years of indirect surveys that could have potentially led to the discovery of new populations.

Threats to *L. maculatus* subsp. *emaculatus* in Imperial County include disturbance and bulldozing from wind energy development, off-highway-vehicle use, and U.S. Border Patrol off-road vehicle traffic (CNDDB 2015). Since *L. maculatus* subsp. *emaculatus* was previously identified as *L. maculatus* in Imperial County, its occurrences there were added to the record of *L. maculatus* in the CNDDB (2015) in 2010 and 2012

(occurrence numbers 33 and 42 respectively), subsequently affording it conservation status as a California Rare Plant Rank 1B.2 taxon since that time. Although some portions of the populations of *L. maculatus* subsp. *emaculatus* in Imperial County could have been bulldozed during the implementation of the Ocotillo Wind Energy Facility project (D. Bell pers. comm. 2013), the Biological Technical Report for the project indicates that there were no foreseeable impacts to *L. maculatus*, and includes a map showing the distribution of all known *L. maculatus* populations from 2010 surveys outside of all permanent and temporary impacts (Helix Environmental Planning 2011). As an ephemeral annual-herb, it is difficult to determine whether any portions of its populations in Imperial County were extirpated by the Ocotillo Wind Energy Facility project based on single-year surveys in 2010, but all populations within the vicinity of the facility should be closely monitored and mitigated against any current and future direct and indirect impacts. Based on their proximity to BLM land, the three occurrences in Anza-Borrego Desert State Park appear to be threatened by off-highway-vehicle use. They occur in a remote area of the park that doesn't seem to be managed as well as the more tourist-attracted area to the north, but the recent discovery of the populations brings hope that park staff will now monitor and keep an eye on these populations (D. Bell pers. comm. 2015).

Based on the available information, CNPS and CNDDB recommend adding *Linanthus maculatus* subsp. *emaculatus* to California Rare Plant Rank 1B.1 of the CNPS Inventory. If knowledge on the distribution, threats, and rarity status of *L. maculatus* subsp. *emaculatus* changes in the future, we will re-evaluate its status at that time. Although *L. maculatus* subsp. *maculatus* is now known from two less occurrences (37 instead of 39), its narrower distribution and lowered number of occurrences and threats do not appear to be significant enough overall to indicate that a change in Threat Rank is warranted, and we therefore recommend maintaining its status in the CNPS Inventory and CNDDB as a California Rare Plant Rank 1B.2 taxon at this time.

Recommended Actions
CNPS: Add *Linanthus maculatus* subsp. *emaculatus* to CRPR 1B.1;
Change name of *Linanthus maculatus* to *Linanthus maculatus* subsp. *maculatus*
CNDDB: Add *Linanthus maculatus* subsp. *emaculatus* to G2T1 / S1;
Change name of *Linanthus maculatus* to *Linanthus maculatus* subsp. *maculatus*
Change *Linanthus maculatus* subsp. *maculatus* from G2 / S2 to G2T2 / S2

Draft CNPS Inventory Record
Linanthus maculatus (Parish) Milliken subsp. *emaculatus* J.M. Porter, D.S. Bell & R. Patt.
Jacumba Mountains linanthus
Polemoniaceae
CRPR 1B.1
Imperial, San Diego
In-ko-pah Gorge (007A) 3211661, Jacumba (007B~~C~~) 3211662

Sent to: ES/D, B. Patterson, L. Sward on 12/18/2015

Desert dunes (edges), Sonoran desert scrub / sandy or course, opaque-white, decomposed granite soils of washes and on flats near wash margins; elevation 395 - 585 meters.
Ephemeral-annual herb. Blooms (March) April (May)
Discovered in 2010 by L. Hendrickson and L. Sward. Threatened by wind energy development and vehicles. See *L. maculatus* (in part) in *TJM 2*. See *Aliso* 32(2):55-88 (2015) for original description.

Current CNPS Inventory Record
Linanthus maculatus (Parish) Milliken
Little San Bernardino Mtns. linanthus
Polemoniaceae
Synonyms: *Gilia maculata*
CRPR 1B.2
Imperial, Riverside, San Bernardino, San Diego
In-ko-pah Gorge (007A) 32116F1, Toro Peak (065C) 33116E4, Fried Liver Wash (080B) 33115H8, Malapai Hill (081A) 33116H1, Seven Palms Valley (082B) 33116H4, Desert Hot Springs (083A) 33116H5, White Water (083B) 33116H6, Palm Springs (083D) 33116G5, Sunfair (102B) 34116B2, Indian Cove (102C) 34116A2, Joshua Tree North (103A) 34116B3, Yucca Valley North (103B) 34116B4, Yucca Valley South (103C) 34116A4, Joshua Tree South (103D) 34116A3, Morongo Valley (104D) 34116A5, Landers (129C) 34116C4, Rattlesnake Canyon (130C) 34116C6
Desert dunes, Joshua tree woodland, Mojavean desert scrub, Sonoran desert scrub / sandy; elevation 195 - 2075 meters.
Annual herb. Blooms March – May
Threatened by development, vehicles, and dumping. Plants from IMP and SDG cos. lack red spots at the base of their petals and have been proposed to be described as a new taxon, *L. maculatus* ssp. *emaculatus*. A synonym of *Gilia maculata* in *TJM* (1993). See *Bulletin of the Torrey Botanical Club* 19:93 (1892) for original description, and *University of California Publications in Botany* 2:55 (1904) for revised nomenclature.

Revised CNPS Inventory Record
Linanthus maculatus (Parish) Milliken subsp. *maculatus*
Little San Bernardino Mtns. linanthus
Polemoniaceae
Synonyms: *Gilia maculata*
CRPR 1B.2
Riverside, San Bernardino
Toro Peak (065C) 33116E4, Fried Liver Wash (080B) 33115H8, Malapai Hill (081A) 33116H1, Seven Palms Valley (082B) 33116H4, Desert Hot Springs (083A) 33116H5, White Water (083B) 33116H6, Palm Springs (083D) 33116G5, Sunfair (102B) 34116B2, Indian Cove (102C) 34116A2, Joshua Tree North (103A) 34116B3, Yucca Valley North (103B) 34116B4, Yucca Valley South (103C) 34116A4, Joshua Tree South (103D) 34116A3, Morongo Valley (104D) 34116A5, Landers (129C) 34116C4, Rattlesnake Canyon (130C) 34116C6

Desert dunes, Joshua tree woodland, Mojavean desert scrub, Sonoran desert scrub / sandy; elevation 140 - 1220 meters.
Annual herb. Blooms March – May
Threatened by development, vehicles, and dumping. Plants from IMP and SDG cos. lack red spots at the base of their petals and have been described as a new taxon, *L. maculatus* ssp. *emaculatus*. A synonym of *Gilia maculata* in *TJM* (1993). See *Bulletin of the Torrey Botanical Club* 19:93 (1892) for original description, *University of California Publications in Botany* 2:55 (1904) for revised nomenclature, and *Aliso* 32(2):55-88 (2015) for treatment of subspecies.

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