

Streptanthus albidus ssp. albidus and ssp. peramoenus were kept as California Rare Plant Rank 1B.1 and 1B.2 taxa, respectively, and their names were not changed in the CNPS Inventory on May 9, 2012

**Rare Plant Status Review: *Streptanthus albidus* subspecies
Proposed name change of *S. albidus* ssp. *albidus* to *S. glandulosus* ssp. *albidus*,
and rank change from G2T1 to G4T1**

**Proposed name change of *S. albidus* ssp. *peramoenus* to *S. glandulosus* ssp.
glandulosus, and rank change from 1B.2, G2T2 / S2.2 to 4.2, G4T3Q / S3**

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Background

Streptanthus albidus ssp. *peramoenus* is currently included in the CNPS Inventory as a rank 1B.2 taxon that is endemic to California, known from Contra Costa to San Luis Obispo counties. In *The Jepson Manual, Second Edition (TJM 2)*; available online at: http://ucjeps.berkeley.edu/cgi-bin/get_IJM.pl?tid=53142) and *Flora of North America, Vol. 7 (FNA)*; available online at:

http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=250095240), *S. albidus* ssp. *peramoenus* is treated as a synonym of *S. glandulosus* ssp. *glandulosus*; extending its range north to Tehama, Mendocino, Lake, and Colusa counties, east to Stanislaus County, and south to Santa Barbara County. Similarly, *S. albidus* ssp. *albidus* has been nested as a subspecies of *S. glandulosus* in the new treatments, but the distribution and concept of this taxon has remained the same. The *FNA* and *TJM 2* treatments reflect Al-Shehbaz and Mayer (2008), who reviewed several thousand *Streptanthus* specimens from all of the major herbaria in the United States, as well as evaluated various molecular studies (Mayer and Soltis 1994, 1999; Mayer et al. 1994; Mayer unpublished data) to make their determination. After submitting the work for publication in the *FNA* and *TJM 2*, however, an extensive phylogenetic analysis by Mayer and Beseda (2010) determined that *S. glandulosus* ssp. *glandulosus* forms a distinct southern clade of the *S. glandulosus* species complex, and is known only from Contra Costa County south to San Luis Obispo County. Records of *S. glandulosus* ssp. *glandulosus* that were formerly treated from more northerly counties by Al-Shehbaz and Mayer (2008) were split into two new subspecies of *S. glandulosus*, ssp. *arkii* and ssp. *raichei* (Mayer and Beseda 2010). These two newly described subspecies are still referenced as *S. glandulosus* ssp. *glandulosus* in numerous herbaria (as seen from the Consortium of California Herbaria, 2012), and should be re-annotated. They are also being reviewed (along with 2 additional *S. glandulosus* subspecies recognized in Mayer and Beseda 2010) by CNPS and CNDDDB for possible inclusion in the CNPS Inventory.

Streptanthus albidus ssp. *peramoenus* was originally described by E. L. Greene (1886) as *S. "peramaenus,"* who noted it as having the same pubescence and habit of *S. glandulosus*, but with differences in calyx and sepal morphology. It was later described as a subspecies of *S. albidus* by Kruckeberg (1958), who differentiated *S. albidus* (including subspecies' *albidus* and *peramoenus*) from *S. glandulosus* ssp. *glandulosus* by general robustness (6-10 dm. vs. 3-7 dm. tall), hairiness (glaucus and nearly

glabrous vs. sparsely pubescent to hispid), perianth color (either lilac-lavender (in ssp. *peramoenus*) or white (in ssp. *albidus*) vs. lilac-lavender to purple or purplish-black, rarely pale rose), and distribution (Alameda, Contra Costa, and Santa Clara counties vs. widely distributed from San Luis Obispo County north to Tehama County). It is important to note, however, that Kruckeberg (1958) did not have access to any type material for his treatment (D. Taylor pers. comm. 2011). *Streptanthus albidus* (including subspecies' *albidus* and *peramoenus*) was treated in *The Jepson Manual* (1993), where it was differentiated from *S. glandulosus* ssp. *glandulosus* again by perianth color and hairiness; however, the distribution of ssp. *peramoenus* was extended south, noting that plants from the central Outer South Coast Ranges (c SCoRO) previously treated as *S. glandulosus* ssp. *glandulosus* are indistinct from the lavender flowered plants in the San Francisco Bay Area. This was based on the review of numerous herbarium specimens (R. Buck pers. comm. 2012). The newer concept of the distribution of *S. albidus* ssp. *peramoenus* presented in *The Jepson Manual* (1993) was also later represented in an analysis of allozyme variation (Mayer et al. 1994), and phylogenetic analyses using cpDNA (Mayer and Soltis 1994) and ITS sequences (Mayer and Soltis 1999). The most recent treatment of *S. glandulosus* ssp. *glandulosus* by Mayer and Beseda (2010), however, further increases the known populations of this taxon as it incorporates plants with blackish purple perianths occurring east and south of the San Francisco Bay Area.

The recent work by Mayer and Beseda (2010) on the *S. glandulosus* complex is supported by I. Al-Shehbaz and Kruckeberg (M. Mayer pers. comm. 2012); however, it may not represent a complete classification of this complex. Any taxonomy is going to be transitional; there is little gene flow between these populations and these plants will continue diverging over time (M. Mayer pers. comm. 2012), and it is possible that future research may end up supporting ssp. *peramoenus* again at some level (R. Raiche pers. comm. 2011). Within the southern clade "there are plants that match the type of *S. glandulosus* in flower color from two well separated geographic regions: the southeastern Santa Lucia mountains, and from Santa Clara County" (D. Taylor pers. comm. 2011). This phenomenon was also noted by Hoover (1970) in his flora of San Luis Obispo County. Although Hoover (1970) took a more conservative approach and only recognized *S. glandulosus* at the species level, he noted that in San Luis Obispo County, "...at the southern end of the range of the species, all the plants have bright purple flowers, not dark purple as ordinarily in the San Francisco Bay region. Furthermore, the species elsewhere does not generally grow on serpentine, although some of its close relatives do. An occasional specimen from farther north, however, seems to show the lighter flower-color of our plants." The geographic disjunction of lighter-flowered populations is surprising, but perhaps not coincidental; "the combination of serpentine substrate and a strong maritime-influenced climate occurs around San Francisco Bay and in the southern Santa Lucia's, but not in between" (R. Buck pers. comm. 2012). Nevertheless, although one can differentiate *S. albidus* ssp. *peramoenus* from Contra Costa and Alameda counties with those from the Santa Clara County based on perianth color, their morphological differences are inconsistent (R. Raiche pers. comm. 2011), and they are difficult to distinguish based on molecular data (M. Mayer pers. comm. 2011).

Streptanthus albidus ssp. *peramoenus* is currently known from 86 occurrences. The 350 records of *S. glandulosus* ssp. *glandulosus* in the Consortium of California Herbaria (CCH 2012) encompass plants annotated by I. Al-Shehbaz for the *FNA* and *TJM 2* treatments, which again follow the more widespread description of ssp. *glandulosus* by Al-Shehbaz and Mayer (2008) rather than the more restricted taxon treated by Mayer and Beseda in 2010. Therefore, all CCH records of ssp. *glandulosus* north of Contra Costa County need to be re-annotated as other subspecies of *S. glandulosus* (including the newly described ssp. *arkii* and ssp. *raichei*). Without having the CCH records re-annotated to reflect Mayer and Beseda's (2010) work, it is difficult to determine the total number of occurrences of *S. glandulosus* ssp. *glandulosus*. This is further complicated by duplicate records as well as collections made at the same location or at locations within the same area that may constitute a single occurrence. However, with the inclusion of plants with both lilac-lavender and blackish purple perianths, there are over 200 records of *S. glandulosus* ssp. *glandulosus* in the CCH from Contra Costa County south to San Luis Obispo County alone. Therefore, *S. glandulosus* ssp. *glandulosus* is thought to be more common and more widely distributed than what was previously called *S. albidus* ssp. *peramoenus*.

According to M. Mayer (pers. comm. 2011), *S. glandulosus* ssp. *glandulosus* (sensu Mayer and Beseda 2010) is still a rare taxon: the southern populations of ssp. *glandulosus* are very few and far between, so although their addition to ssp. *peramoenus* to make a new ssp. *glandulosus* added to the total number of populations and to the size of its range, we now have a taxon that has even less of a chance of gene flow throughout its range, which ultimately affects its persistence as a cohesive entity. Furthermore, M. Mayer searched for some of the historical populations of *S. glandulosus* ssp. *glandulosus*, but found that the plants were no longer present.

Threats to *S. glandulosus* ssp. *glandulosus* include development, non-native plants, and grazing. It is also possibly threatened by dam maintenance, road construction and maintenance, and recreational activities; however, all of these threats should be re-assessed, especially due to the new treatment and therefore increased range and distribution of this plant.

Based on the available information, CNPS and CNDDDB recommend re-naming *Streptanthus albidus* ssp. *peramoenus* to *S. glandulosus* ssp. *glandulosus* and re-ranking it from 1B.2 to 4.2. An alternate approach could be to re-rank it to 3.2 until more research is done. We also recommend that *S. albidus* ssp. *albidus* be re-named to *S. glandulosus* ssp. *albidus*, without a change in California Rare Plant Rank. If further research indicates that the mid-range plants with blackish purple perianths are distinct from other populations of *S. glandulosus* ssp. *glandulosus* (and/or former *S. albidus* ssp. *peramoenus*), we will re-evaluate its status at that time.

Recommended Actions

CNPS: Change name of *S. albidus* ssp. *peramoenus* to *S. glandulosus* ssp. *glandulosus*, and re-rank from 1B.2 to 4.2; change name of *S. albidus* ssp. *albidus* to *S. glandulosus* ssp. *albidus*

CNDDDB: Change name of *S. albidus* ssp. *peramoenus* to *S. glandulosus* ssp. *glandulosus*, and re-rank from G2T2 / S2.2 to G4T3Q / S3; change name of *S. albidus* ssp. *albidus* to *S. glandulosus* ssp. *albidus*

Please review the draft CNPS Inventory record below, respond Yes or No on the proposal to add this species to the Inventory and CNDDDB, and provide any edits/comments. If responding No, please provide supporting information.

Revised CNPS Inventory Records

Streptanthus glandulosus Hook. ssp. *albidus* (Greene) Al-Shehbaz, M.S. Mayer & D.W. Taylor

Metcalf Canyon jewel-flower

Brassicaceae

Synonym: *Streptanthus albidus* ssp. *albidus*

Rank 1B.1

Santa Clara

Mt. Sizer (406A)* 37121B5, Morgan Hill (406B) 37121B6, Gilroy (406D) 37121A5, Santa Teresa Hills (407A)* 37121B7, Los Gatos (407B) 37121B8, Lick Observatory (426C) 37121C6, San Jose East (427D) 37121C7

Valley and foothill grassland (serpentinite); elevation 45-800 meters.

Annual herb. Blooms April-July.

Threatened by residential development, road construction, and vehicles. See *Pittonia* 1:62 (1887) for original description, *Madroño* 14(7):217-227 (1958) for taxonomic treatment, and *Annals of the Missouri Botanical Garden* 97(1):106-116 (2010) for revised nomenclature.

Streptanthus glandulosus Hook. ssp. *glandulosus*

most beautiful jewel-flower

Brassicaceae

Synonym: *Streptanthus albidus* ssp. *peramoenus*

Rank 4.2

Alameda, Contra Costa, Monterey, San Benito, Santa Clara, Santa Cruz, San Luis Obispo

Port San Luis (222A) 35120B7, Atascadero (246B) 35120D6, San Luis Obispo (246C)

35120C6, Morro Bay South (247D) 35120C7, Cypress Mountain (270C)

35120E8, Pebble stone Shut-in (271A) 35121F1, San Simeon (271B)

35121F2, Cambria (271D) 35121E1, Pederast Blancas (272A) 35121F3, Burnett Peak

(295C) 35121G2, Alder Peak (296A) 35121H3, Burro Mountain (296D) 35121G3, Cone

Peak (319C) 36121A4, Chittenden (386A) 36121H5, Mt. Sizer (406A) 37121B5, Morgan

Hill (406B) 37121B6, Mt. Madonna (406C) 37121A6, Gilroy (406D) 37121A5, Santa

Teresa Hills (407A) 37121B7, Los Gatos (407B) 37121B8, Calaveras Reservoir (427A)

37121D7, Niles (446C) 37121E8, La Costa Valley (446D) 37121E7, Hayward (447A)

37122F1, San Leandro (447B) 37122F2, Clayton (464B) 37121H8, Briones Valley (465B) 37122H2, Oakland East (465C) 37122G2, Las Trampas Ridge (465D) 37122G1, Richmond (466A) 37122H3 [Note: this only represents the previous mapped occurrences of *S. albidus* ssp. *peramoenus*. Additional occurrences are too difficult to determine and map at this juncture due to the need of many herbarium annotations] Chaparral, cismontane woodland, valley and foothill grassland / usually serpentinite Known only from Coast Ranges from CCA to SLO counties. Threatened by development, non-native plants, and grazing. Possibly threatened by dam maintenance, road construction and maintenance, and recreational activities. Includes plants with lilac-lavender to blackish purple perianths. See *S. albidus* ssp. *peramoenus* in *The Jepson Manual* (1993). Treated differently here than *TJM 2*, which includes synonyms of plants that occur north of CCA County. See *Bulletin of the Torrey Botanical Club* 13(1):142 (1886) for original description, and *Madroño* 14(7):217-227 (1958) and *Annals of the Missouri Botanical Garden* 97(1):106-116 (2010) for taxonomic treatments.

Literature Cited:

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