

**Added to California Rare Plant Rank 1B.2 of the CNPS Inventory on
November 17, 2014**

**Rare Plant Status Review: *Polemonium pulcherrimum* var. *shastense*
Proposed Addition to California Rare Plant Rank 1B.2, G5T2 / S2**

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Changes made to the original document appear in blue text.

Background

Polemonium pulcherrimum var. *shastense* is a perennial herb in the Polemoniaceae that is only known from the high Cascade Ranges of Northern California. Until Stubbs and Patterson (2013) recently made this new combination, these plants were known as *P. pulcherrimum* var. *pilosum*, a name that is now applied only to plants from Washington State. Because the new combination was published so recently, *P. pulcherrimum* var. *shastense* was not included in *The Jepson Manual* (Wilken 1993) or *The Jepson Manual, Second Edition (TJM 2)* (Wilken and Timme 2012). However, *P. pulcherrimum* var. *pilosum* was included in these publications (see http://ucjeps.berkeley.edu/cgi-bin/get_IJM.pl?tid=64082 for *TJM 2* treatment). Variety *shastense* is currently pending inclusion in the *Jepson eFlora* (Jepson Flora Project 2014). The *Flora of North America* treatment for Polemoniaceae is not yet available.

Polemonium pulcherrimum is a highly variable species and, accordingly, has had about 35 infra-taxa described, although currently only five appear to merit taxonomic recognition (Stubbs and Patterson 2013). Not surprisingly, var. *shastense* has undergone many taxonomic changes since its original description. *Polemonium shastense* was first described by Eastwood (1905) from plants collected at Mount Shasta. Since then, its taxonomic status has changed many times, sometimes being treated as a synonym of *P. pulcherrimum* without recognition of infra-taxa (e.g. Jepson 1925, Munz and Keck 1959), as a synonym of *P. pulcherrimum* var. *pilosum* (e.g. Abrams 1951, Wilken 1993, Timme and Wilken 2012), or as a unique entity, but at a lower taxonomic level, such as subvariety or forma (e.g. Brand 1907, Wherry 1942). For a more thorough review of the taxonomic history of vars. *shastense* and *pilosum*, see Stubbs and Patterson (2013).

Morphological data show some support for the recognition of *Polemonium pulcherrimum* var. *shastense* as distinct from the widespread var. *pulcherrimum* and the Washington-endemic var. *pilosum*. In terms of morphology, var. *shastense* is most similar to var. *pilosum*. Both varieties have white flowers with a yellow throat (Stubbs and Patterson 2013; CalPhotos 2014). Flowers of var. *shastense* have either a pink tinge (at Mt. Lassen) or pink veins (at Mt. Shasta and Rainbow Mountain), while flowers of var. *pilosum* never have pink coloration (Stubbs and Patterson 2013). The pink coloration is found in every population, but not every individual, of var. *shastense*. Stubbs and Patterson (2013) also noted that the two taxa differ in several other morphological features, including a larger plant size and greater petiole length in var. *shastense* (with

overlap in both of these features). Stubbs (2012) and Stubbs and Patterson (2013) noted that var. *shastense* has herbage with a densely woolly pubescence, compared to the viscid glandular pubescence of var. *pilosum*. However, Eastwood (1905) noted the glandular pubescent herbage in var. *shastense*, so there is likely some overlap in this character (in both Stubbs 2012 and Stubbs and Patterson 2013, the authors mistakenly reverse this character state between the two varieties in the text, but not tables). The two varieties have a large geographic and altitudinal disjunction, with no white-flowered forms occurring in Oregon, and with var. *shastense* occurring at higher elevations than var. *pilosum*. However, D. Wilken (pers. comm. 2014) noted that review of herbarium specimens could potentially lead to the discovery of white-flowered forms in Oregon. The need for more thorough examination of herbarium specimens in Oregon, coupled with the fact that not every individual of var. *shastense* has pink coloration, makes the recognition of var. *shastense* somewhat controversial (D. Wilken pers. comm. 2014).

A brief discussion of the differences between var. *shastense* and *pulcherrimum* is also warranted. Variety *pulcherrimum* is a wide-ranging taxon, occurring from California to Alaska. The most obvious character separating it from var. *shastense* is its blue- to violet corollas. While populations of var. *pulcherrimum* may contain the occasional white-flowered individual, pink coloration has never been observed (Stubbs 2012; Stubbs and Patterson 2013). Although Stubbs and Patterson (2013) did not discuss the differences between these two taxa at length, D Wilken (pers. comm. 2014) noted that they are easily separated based on habit, leaf morphology, and calyx indument in addition to corolla color (Table 1).

TABLE 1. MORPHOLOGICAL AND DISTRIBUTIONAL DIFFERENCES BETWEEN THE THREE SELECTED VARIETIES OF *POLEMONIUM PULCHERRIMUM*. We were unable to obtain information on petiole length of var. *pulcherrimum*. The two other currently-recognized varieties, *delicatum* and *lindleyi*, do not occur in California and have blue/violet flowers. Data were gathered from the CCH (2014), Eastwood (1905), Stubbs and Patterson (2013), and Timme and Wilken (2012).

Variety	<i>pilosum</i>	<i>pulcherrimum</i>	<i>shastense</i>
Corolla color	yellow throat and white lobes	blue to purple; occasional white individual	yellow throat and white lobes with tinge of pink or pink lines in every population, not every individual
Pubescence	viscid glandular	sparsely glandular- hairy	densely woolly or soft shaggy hairy (but some sources say glandular)
Plant size	mostly 6-13 cm	mostly 10-20 cm	mostly 7-18 cm
Petiole length	8-10 mm	-	10-33 mm
Elevation	1525-1830	2400-3700 m	2175-3900 m
Geographic range	Washington	California to Alaska	California

Molecular data also suggest that var. *shastense* should be recognized. Previous phylogenetic work by de Geofroy (1998), Timme (2001), and Worley et al. (2009) did

not consider vars. *pilosum* and *shastense*. In Stubbs (2012) analysis, however, molecular data from the ITS region placed var. *shastense* as a closely related, but distinct sister taxon to var. *pulcherrimum*. This close relationship led Stubbs (2012) and Stubbs and Patterson (2013) to treat the plant as a variety of *P. pulcherrimum*, rather than its own species. Stubbs (2012) did not discuss the phylogenetic relationship of var. *shastense* to var. *pilosum*.

Polemonium pulcherrimum var. *shastense* grows in alpine boulder and rock fields, subalpine coniferous forest, and upper montane coniferous forest. At Mt. Lassen and Mt. Shasta, it grows on volcanic substrates. The geology at several additional occurrences, some of which still need confirmation, is unknown. Stubbs and Patterson (2013) reported var. *shastense* as growing between 2590 and 3900 meters in elevation, but a probable occurrence at Rainbow Mountain extends the plant's distribution to as low as 2175 meters.

We currently estimate a total of about 14 occurrences of *P. pulcherrimum* var. *shastense*. However, some of these occurrences remain unconfirmed, as they were earlier observations of var. *pilosum*, and have not been confirmed as var. *shastense*. Here, we tentatively treat those occurrences as var. *shastense*, as var. *pilosum* is no longer thought to occur in California, and var. *shastense* is the only remaining white-flowered variety in California. Stubbs (pers. comm. 2013) was aware of these specimens and examined most of them, but was unable to verify the identity of any of the populations in the field. She was hesitant to assign any of the specimens to var. *shastense* due to the tendency of purple flowers to fade in herbarium specimens, particularly older ones. These additional specimens are also from the same general region, and could amount to new occurrences of var. *shastense* on Magee Peak (*Taylor 4690*), Mt. Bolivar (*Barbe 325*), Rainbow Mountain (*Preston 1856*), and Davis Creek (*Bruce s.n.*) (Consortium of California Herbaria, CCH 2014). Additionally, there are records of var. *pilosum* on CalPhotos (2014) from the Modoc National Forest and, with a large disjunction, from the Eldorado National Forest in Alpine County. [A specimen of *P. pulcherrimum* from Rainbow Mountain \(*Preston 1856*\) was recently re-collected and confirmed to be var. *shastense* by Klamath National Forest botanists E. Lonergan and J. Beckmann.](#) ~~The population at Rainbow Mountain appears to be assignable to var. *shastense*, as a~~ [A photo of the plants at Rainbow Mountain by R. Preston clearly shows the pink veins on the white flowers \(Preston shared the photo with us, which is of higher quality than the photo available on CalPhotos\), which further confirms this occurrence.](#) While a data gap clearly exists here, we propose to tentatively recognize the northern montane populations as var. *shastense*, so that plants will be searched for during survey efforts in these areas. The occurrences from Modoc County are fairly disjunct and in a different habitat at lower elevation, so we will tentatively *not* recognize them as var. *shastense*. The occurrence from Alpine County is highly disjunct, so we will *not* recognize it as var. *shastense* until confirmed with a specimen. CNPS and CNDDB strongly recommend that surveys be conducted in these areas to better determine the overall distribution of var. *shastense* and confirm that var. *pilosum* actually does not occur in California.

The majority of occurrences of var. *shastense* have recent documentation, as eleven of the fourteen have been seen in the past 20 years (occurrences not seen in over 20 years are considered historical by the CNDDDB). The occurrence on Mt. Lassen is the only occurrence on National Park Service Lands. Most of the remaining occurrences are on the Shasta-Trinity National Forest. The possible occurrence at Rainbow Mountain ~~could be~~ is in the Shasta-Trinity **Klamath** National Forest or in a private ~~in~~holding. The possible occurrences at Mt. Bolivar and Magee Peak are on the Klamath and Lassen National Forests, respectively. At Mt. Shasta, the plant is considered locally common (Cooke 11646; CCH 2014), and it has been observed on all aspects of the mountain, with some populations having three to five thousand individuals or more (E. White pers. comm. 2013; Shasta-Trinity NF Rare Plant Surveys 2013). The general area of occurrence of *P. pulcherrimum* var. *shastense* is very remote. It may occur on peaks other than Mt. Lassen and Mt. Shasta, and is possibly more widespread than indicated by our current records.

The main threat to *P. pulcherrimum* var. *shastense* is trampling from hikers, as many plants occur directly adjacent to trails, and both Mt. Lassen and Mt. Shasta are heavily used (Stubbs and Patterson 2013; R. Stubbs pers. comm. 2013). However, the rugged terrain of these peaks should provide protection for plants that are not located directly adjacent to trails. Climate change could also pose a long-term threat to this predominantly alpine plant, but its occurrence on the lower slopes of Mt. Shasta suggest that this potential threat is not imminent.

Based on the available information, CNPS and CNDDDB recommend adding *Polemonium pulcherrimum* var. *shastense* to California Rare Plant Rank (CRPR) 1B.2 of the CNPS Inventory. Although the recognition of this plant as a distinct taxon is somewhat controversial, it would probably still qualify for inclusion in the Inventory under CRBR 2B if it were re-assigned to var. *pilosum* in the future. If more information regarding the taxonomy, abundance, or distribution of this plant becomes available, CNPS and CNDDDB will re-evaluate its status at that time.

Recommended Actions

CNPS: Add to CRPR 1B.2

CNDDDB: Add to G5T2 / S2

Draft CNPS Inventory Record

Polemonium pulcherrimum Hook. var. *shastense* (Eastw.) Stubbs

Mt. Shasta sky pilot

Polemoniaceae

CRPR 1B.2

Alpine? ~~Medec?~~ Shasta, Siskiyou

Reading Peak (625B) 4012144, Lassen Peak (626A) 4012145, Thousand Lakes Valley (644A) 4012165, Jacks Backbone (644B) 4012166, Rainbow Mountain (697B) 4112148, McCloud (698C) 4112232, Mt. Shasta (698B) 4112242, Callahan (701D),

~~4112237, Lauer Reservoir (708B)? 4112064, Davis Creek (708A)? 4112063, Sugar Hill (725D)? 4112073.~~

Alpine boulder and rock fields, subalpine coniferous forest, upper montane coniferous forest / sometimes volcanic; elevation 2175 – 3900 meters.

Perennial herb. Blooms June to September.

Threatened by foot traffic. See *Bulletin of the Torrey Botanical Club* 32(4):205-206 (1905) for original description and *Madroño* 60(3):243-248 (2013) for taxonomic treatment.

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