

Added to CRPR List 4.3 on 2021-06-24

Rare Plant Status Review: *Silene nelsonii*

Proposed Addition to California Rare Plant Rank 4.3, G3 / S3

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Changes and additions to the original document are in blue.

This species review is being expedited through a challenge cost share agreement between the California Native Plant Society and the USDA Forest Service, Pacific Southwest Region. 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

Silene nelsonii M.R.Mesler, M.S.Mayer, & S.K.Carothers is a perennial herb in the Caryophyllaceae that is known almost entirely from Trinity County, with additional occurrences in adjacent Humboldt and Shasta counties. It is not included in *The Jepson Manual, Vascular Plants of California* (Hartman et al. 2012) or *Flora of North America North of Mexico* (Morton 2005), as it was recently described in 2019 (Mesler et al. 2019). Prior to its publication, the populations included in the name *S. nelsonii* were assigned to the name *S. bolanderi* (or its synonym *S. hookeri* subsp. *bolanderi*); *Silene nelsonii* and *S. bolanderi* are members of the *S. hookeri* complex, which also includes *S. hookeri*, *S. salmonacea*, and *S. serpentinicola* (Mesler et al. 2019). *Silene nelsonii* is included within *S. bolanderi* in *Flora of North America North of Mexico*, *The Jepson Manual: Vascular Plants of California*, and other publications on *Silene*, notably Nelson et al.'s paper on *S. salmonacea* (Morton 2005, Hartman et al. 2012, Nelson et al. 2006, Mesler et al. 2019). Plants described as *S. bolanderi* in the original description of *S. salmonacea* (Nelson et al. 2006, Table 2) and that key to *S. hookeri* subsp. *bolanderi* in *Flora of North America North of Mexico*, Volume 5 (Morton 2005) are actually *S. nelsonii*. The description of *S. bolanderi* in *The Jepson Manual* (Hartman et al. 2012) matches *S. nelsonii* apart from flower color and geographic range. As described in Hartman et al. (2012), *S. bolanderi* has white or pink flowers and occurs in the Outer North Coast Ranges (NCoRO), whereas the flowers of *S. nelsonii* are never pink, and the species occurs in the Klamath Ranges (KR) (Mesler et al. 2019).

Mesler et al. (2019) described *S. nelsonii* based on examination of fresh material collected from most of its known occurrences and from specimens housed at HSC, CAS, DS, JEPS, and UC. They also examined online images of type specimens and fresh material from northwestern California and western Oregon of all representative taxa in the *S. hookeri* complex. They chose 27 populations to represent the geographic range and taxonomic diversity of the *S. hookeri* complex, and using ITS and cpDNA sequence data, they developed a molecular phylogeny of the complex. Mesler et al. (2019) based their decision to recognize *S. nelsonii* on morphological differences, strong support from their molecular analysis, and the fact that the species is almost fully allopatric with its relatives; evidence that when taken together indicates an evolutionarily independent lineage. "Earlier workers likely missed the obvious morphological distinction between *S. nelsonii* and *S. bolanderi* because they did not see *S. nelsonii* in the field owing to its restricted geographical distribution and because of the limited number of herbarium collections available for examination" (Mesler et al. 2019).

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Silene bolanderi, *S. hookeri*, and *S. nelsonii* resemble one another in several morphological characters. All three species have one to several slender, shallowly buried rhizomes that radiate from the crown of a deep tap root, and emerge as a cluster of simple or sparingly branched, decumbent to erect, aerial shoots. Aerial shoots are often short (less than 10 cm) and typically bear less than or equal to three closely spaced pairs of elliptical to narrowly oblanceolate leaves, with one to a few flowers that are borne near ground level in a terminal dichasium. Leaves and stems are sparsely to densely canescent and green to gray-white. (See Mesler et al. 2019 for a suite of additional characters that these species share as well as a floral traits table and dichotomous key that differentiate species in the *S. hookeri* complex of northwestern California and western Oregon.)

The single best trait to identify *S. nelsonii* is the pubescence at the base of the petals which is densely ciliate, often obscuring the filaments. Even this trait, however, can sometimes overlap with other species in the *S. hookeri* complex, and unfortunately cannot be discerned with certainty on herbarium specimens. *Silene nelsonii* is most similar to *S. bolanderi*, and both share several floral features that set them apart from *S. hookeri*. *Silene nelsonii* is differentiated from *S. bolanderi* in petal color (white vs. pale pink [rarely white] in *S. bolanderi*), depth of petal lobing (inner lobe 8-32 mm and outer lobe 6-26 mm, vs. inner lobe 9-17 mm and outer lobe 8-15 mm), expression of petal appendages (absent or inconspicuous short teeth that are generally less than 1 mm vs. linear and greater than 1 mm), and vestiture at the base of petals (sparsely to densely ciliate with filaments at least partially obscured by hairs in *S. nelsonii*, vs. glabrous with filaments clearly visible in *S. bolanderi*).

Silene nelsonii is named in honor of the late Thomas W. Nelson (1928-2006), who first drew the attention of Mesler et al. to the plants near Burnt Ranch. Nelson was an avid student of the flora of northwestern California and the author of two species in the *S. hookeri* complex, *S. salmonacea* and *S. serpentinicola* (Mesler et al. 2019).

Ecology

Silene nelsonii generally grows in deep, well-drained soils of ultramafic or metasedimentary substrates in grassy openings near ephemeral drainages, along roads, or on exposed dry rocky slopes in cismontane and lower coniferous forests, from an approximate elevation of 85 to 1,400 meters. It flowers from mid-April to June, and its fruits begin to mature by late June. Species that are commonly associated with *S. nelsonii* are *Ceanothus cuneatus*, *Festuca californica*, *Pinus jeffreyi*, *P. ponderosa*, *Pseudotsuga menziesii*, *Quercus garryana*, and *Q. kelloggii* (Mesler et al. 2019).

Distribution and Abundance

Silene nelsonii is a narrow endemic, almost entirely restricted to an area bounded by the Main Stem and South Fork of the Trinity River in Trinity County. Exceptions include three areas due west of the Main Stem and another area between the South and Stuart Forks of Trinity River. Its entire distribution is estimated to be restricted to an area of 1600 km². *Silene nelsonii* is known from approximately 67 occurrences, which vary in size from fewer than 10 to over 100 plants. Total number of occurrences of *Silene nelsonii* were estimated using GIS tools and methods described by Green and Sims (2018) with data obtained from Calflora (2021), CalPhotos (2021), Consortium of California Herbaria (CCH 2021), iNaturalist (2021), and a spreadsheet of records

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provided by Michael Mesler (pers. comm. 2020) based on field surveys and herbarium records. Thirty-two records do not have geographic coordinates (mostly from the CCH) and were primarily attributed to other records with coordinates based on their location descriptions. Records without coordinates that were only identified at the county level were attributed to other, more detailed, records as being too vague to map individually.

Approximately 24 (36%) of the estimated 67 occurrences of *S. nelsonii* are considered recent, with 15 occurrences being historical (not documented in over 20 years), and the remaining 28 having no reporting date. Thirty-eight occurrences of *S. nelsonii* are in Shasta-Trinity National Forest and 12 are in Six Rivers National Forest; the remaining 17 occurrences are on land of unknown ownership.

According to M. Mesler (pers. comm. 2020), the current number of occurrences of *S. nelsonii* should be considered quite conservative. He keeps finding new records as he travels around Trinity County and estimates that the true number of occurrences easily exceeds 100. However, he emphasized that all occurrences are in the same, very restricted, geographical area. Mesler also noted that there are online records identified as *S. bolanderi* on iNaturalist that are north of the Trinity River that should be reidentified as *S. nelsonii*; he believes these records are not accurately mapped (with some having accuracy estimates greater than 20 km), because he has never seen the species north of the river.

Status and Threats

Potential threats to *S. nelsonii* include road construction and maintenance, trampling by grazing cattle, and severe fires which kill taproots. It appears that *S. nelsonii* may benefit from canopy removal and moderate soil disturbance caused by logging, possibly by creating bare soil for recruitment (Linstrand III 2021 pers. comm.). However, forest thinning near populations, including the creation of slash piles (which may be burned) could be a significant threat (Kierstead pers. comm. 2021, York pers. comm 2021).

Mesler et al. (2019) recommend a California Rare Plant Rank of 4.3 based on many populations that are large and apparently healthy, and with the majority of its occurrences on relatively remote public lands managed by the Shasta-Trinity National Forest.

Summary

Based on the available information, CNPS and CNDDDB recommend adding *Silene nelsonii* to California Rare Plant Rank 4.3 of the CNPS Inventory. If knowledge on the distribution, threats, and rarity status of *Silene nelsonii* changes in the future, we will re-evaluate its status at that time.

Recommended Actions

CNPS: Add *Silene nelsonii* to CRPR 4.3

CNDDDB: Add *Silene nelsonii* to G3 / S3

Draft CNPS Inventory Record

Silene nelsonii M.R.Mesler, M.S.Mayer, & S.K. Carothers

Nelson's stringflower

Caryophyllaceae

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CRPR 4.3

Humboldt, Shasta, Trinity

Beegum W (4012238), Chanchelulla Peak (4012248), Weaverville (4012268), Rush Creek Lakes (4012278), Pony Buck Peak (4012331), Wildwood (4012341), Dubakella Mtn. (4012342), Naufus Creek (4012343), Hayfork Summit (4012351), Hayfork (4012352), Halfway Ridge (4012353), Hyampom (4012354), Big Bar (4012363) Hyampom Mtn. (4012364), Sims Mountain (4012365), Ironside Mtn. (4012374), Hennessy Peak (4012375), Salyer (4012385), Willow Creek (4012386)

Cismontane woodland, lower montane coniferous forest / grassy openings; ephemeral drainages, roadsides, or dry rocky slopes; elevation 85-1400 meters.

Perennial herb. Blooms April to June.

Potentially threatened by road construction and maintenance, trampling, and severe wildfires.

See *Madroño* 66(4): 176-193 (2019) for original description.

Literature Cited

Calflora. 2021. Information on wild California plants for conservation, education, and appreciation. Website <http://www.calflora.org/> [accessed February 2021].

CalPhotos. 2021. CalPhotos: Plants. Regents of the University of California, Berkeley. Website <http://calphotos.berkeley.edu/flora/> [accessed February 2021].

Consortium of California Herbaria (CCH). 2021. Data provided by the participants of the Consortium of California Herbaria. Regents of the University of California, Berkeley. Website <http://ucjeps.berkeley.edu/consortium/> [accessed February 2021].

Green, K. and A. E. Sims. 2018. Assessing rarity status of the newly described Shasta County endemic, *Adiantum shastense* (Pteridaceae), by employing innovative tools in geographic information systems. Rare Plant Program, California Native Plant Society. Presented in Scientific Poster session of CNPS 2018 Conservation Conference, Los Angeles, CA, 1-3 February 2018.

Hartman, R. L., R. K. Rabeler, and D. H. Wilken. 2012. *Silene*. Pp. 616–622 in B. G. Baldwin, D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken (eds.), *The Jepson Manual: vascular plants of California*, 2nd ed. University of California Press, Berkeley, CA.

iNaturalist. 2021. Website <https://www.inaturalist.org>. Accessed [accessed February 2021].

Mesler, M. R., M. S. Mayer, and S. K. Carothers. 2019. *Silene nelsonii*, a new large-flowered species from the Trinity River area of northwestern California, USA, and a re-evaluation of *S. bolanderi* Gray. *Madroño* 66(4): 176-193.

Morton, J. K. 2005. *Silene*. Pp. 166–214 in Flora of North America Editorial Committee, *Flora of North America north of Mexico*, Vol. 5. Magnoliophyta: Caryophyllidae, pt 2. Oxford University Press, New York, NY.

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Nelson, T. W., J. P. Nelson, and S. A. Erwin. 2006. A new species in the *Silene hookeri* complex (Caryophyllaceae) from the Klamath Mountains of Shasta-Trinity National Forest, Trinity County, California. *Madroño* 53(1): 72–76.

Personal Communications

Mesler, Michael. 2017-2020. Professor Emeritus – Botany, Department of Biological Sciences, Humboldt State University. Email correspondences regarding information about status and distribution of *Silene bolanderi*, *S. nelsonii*, and *S. hookeri*. December 2017 to June 2020.

Carothers, Sydney. 2017. Department of Biological Sciences, Humboldt State University. Email correspondences regarding information about status and distribution of *Silene bolanderi*, *S. nelsonii*, and *S. hookeri*. December 2017.

Linstrand III, Len. 2021. Botanist, Sierra Pacific Lumber. Comments on *Silene nelsonii* in the CNPS Forum made 26 May 2021.

Kierstead, Julie. 2021. US Forest Service Botanist (retired). Comments on *Silene nelsonii* in the CNPS Forum made 15 June 2021.

York, Dana. 2021. Field Botanist. Comments on *Silene nelsonii* in the CNPS Forum made 20 May 2021.