Plant Species Evaluation Form

**Horkelia congesta** Hook. var. *nemorosa* (D.D. Keck) M. Peck

**JOSEPHINE HORKELIA**

**Family:** Rosaceae  
**PLANTS Symbol:** HOCON  
**Calif. Endemic:** No

**(CNPS 2018)**  
**(USDA 2018)**  
**(CNPS 2018)**

**Synonyms/Other Names:** *Horkelia congesta* was described by Hooker (1829) from material collected by David Douglas “at Cape Mendocena, and on the low hills of the Umptqua river upon the North-west coast of America”. In his description, Hooker expressed satisfaction in describing the second species within “This new genus of plants [that] has lately been established by Chamisso and Schlechtendal”. The subspecies *nemorosa* was erected by Keck (1938), but was soon synonymized by Peck (1941a; 1941b), who reduced this subspecies to a variety in his flora of Oregon, creating the only synonym of this taxon. There remains disagreement among authorities about what taxonomic rank “*nemorosa*” deserves, as some accept Peck’s variety (Ertter 2012; Ertter and Reveal 2014; ITIS 2018), others accept Keck’s subspecies but not the variety (Oregon Flora Project 2018; Tropicos 2018), and still others do not accept any infraspecific taxa (The Plant List 2018).

**Identification Issues:** According to Ertter and Reveal (2014), *Horkelia congesta* is comprised of three population clusters that form a latitudinal gradient in Oregon west of the Cascade Range, transitioning to *H. tridentata* in the mountains of California. Populations of *H. congesta* in remnant prairies in the Willamette Valley have relatively tall, erect stems, pectinate stipules, relatively numerous, narrow leaflets, openly branched inflorescences with flowers in corymbiform clusters, and clawed petals 5–6 × 4–5 mm. In contrast, populations centered in rocky serpentine flats within the Illinois River drainage in Josephine County, which were described by Keck as subsp. *nemorosa*, tend to have shorter ascending stems, silvery foliage with less divided stipules, fewer and broader leaflets, more capitate inflorescences, and scarcely clawed petals 3–4 × 2–3 mm. The differences between these two extremes are blurred by populations from the Umpqua Valley in Douglas County (the probable type locality of *H. congesta*), as well as scattered populations in northern Jackson and Josephine counties.

*Horkelia tridentata* (with two varieties), overlaps the two varieties of *H. congesta* in the Klamath/Siskiyou region at the northern edge of its range, extending southwards throughout the North Coast Ranges and Sierra Nevada of California. Populations of *H. tridentata* var. *tridentata* may be found on granite or volcanic soils, and those of *H. tridentata* var. *flavescens* are, like *H. congesta* var. *nemorosa*, often found on serpentine. *Horkelia tridentata* tends to have decumbent stems, that are less glandular those of *H. congesta* (glabrous to sparsely glandular), greener foliage, and narrower petals (linear to oblanceolate) that are 1.5-4 mm long (Ertter 2012; Ertter and Reveal 2014).

**Taxonomy:**

Unless otherwise cited, the following description is used with permission from the Jepson Herbarium. Jepson Flora Project (eds.) 2018. *Jepson eFlora*, [http://ucjeps.berkeley.edu/eflora/](http://ucjeps.berkeley.edu/eflora/), accessed in 2018. Copyright © Regents of the University of California.
Species In Genus: 20 species: western North America. Etymology: (J. Horkel, German plant physiologist, 1769--1846). Note: Many attractive to bees; data apply to basal leaves, pressed hypanths.

Genus Description – Habit: Perennial herb, generally +- glandular, generally resinous-smelling; caudex generally branched. Stem: generally ascending to erect. Leaf: generally basal, odd-1-pinnately compound, generally +- flat; cauline alternate, reduced upward; leaflets 2--15 per side, uppermost lateral generally +- fused with terminal. Inflorescence: cyme; pedicels generally straight, bractlets 0. Flower: hypancthium cup-like, +- flat-bottomed, width +- 2 × length, bractlets 5, generally 2/3 sepals; sepals often reflexed; petals generally +- = sepals, blunt, white; stamens 10, filaments +- flat, often forming a tube; pistils 2--many, ovary superior, style attached below fruit tip, +- thicker at base. Fruit: achene.

Variety Description – Habit: Plant tufted or rosetted, +- gray-green, +- odorless; caudex 0--few-branched. Stem: 15--30 cm, densely glandular above. Leaf: 4--8 cm; stipules entire to forked; leaflets 2--5 per side, separated, 5--12 mm, +- elliptic, < 5-toothed < 1/4 to base, densely hairy. Inflorescence: clusters 1--several, head-like, generally 5--15-flowered; pedicels generally +- 2 mm. Flower: hypanthium width generally 3--4.5 mm, <= 2 × length, bractlets < 0.5 mm wide, linear; sepals 2--4.5 mm; petals generally 2.5--4 mm, generally widely obovate; filaments 0.5--2 mm, base 0.2--0.5 mm wide, anthers +- 0.5 mm; pistils +- 10, style 2--3 mm. Fruit: +- 2 mm. eFlora Treatment Author: Barbara Ertter.

**Status:**

Note: Federally recognized Endangered, Threatened, Proposed, or Candidate species under the Endangered Species Act are omitted as they do not meet the definition of a Species of Conservation Concern (FSH 1909.12 § 12.52).

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<th>G-rank</th>
<th>S-rank</th>
<th>CRPR</th>
<th>R5 FSS</th>
<th>NFP SM</th>
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<td>ORBIC: Not listed</td>
<td>OCS: Not listed</td>
<td>IUCN: Not listed</td>
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</table>

Expanded abbreviations and citations: State Listing=California Endangered Species Act Listing (CDFW 2018b), Nevada Division of Forestry Fully Protected Plant Species (NAC 527) (NDF 2012), Oregon Department of Agriculture Listed Plants (ODA 2014); G-rank=Global Conservation Status (CDFW 2018a; NatureServe 2018); S-rank=Subnational (state or province-level) Conservation Status (CDFW 2018a; NatureServe 2018; NNHP 2017; ORBIC 2016); CRPR=California Rare Plant Rank (CNPS 2018); R5 FSS=USDA Forest Service Region 5 Regional Forester Sensitive Plant Species List (USDA 2013); NFP SM=Forest Service and Bureau of Land Management Northwest Forest Plan Survey and Manage Species (USDA 2001); CA BLM=California Bureau of Land Management Designated Sensitive Species (BLM 2010); SWAP=California State Wildlife Action Plan Status (CDFW 2015); NNHP=Nevada Natural Heritage Program Status (NNHP 2017); NNPS=Nevada Native Plant Society Status (NNHP 2017); ORBIC=Oregon Biological Information Center Status (ORBIC 2016); OCS=Oregon Conservation Strategy Species (ODFW 2016); IUCN=International Union for Conservation of Nature Red List Status (IUCN 2017).

**Horkelia congesta** var. **nemorosa** was added to the equivalent of California Rare Plant Rank (CRPR) 2B in the fourth edition of the CNPS Inventory (as **H. congesta** subsp. **nemorosa**), when it was known in California from only one historic occurrence (Smith and Berg 1988).
**Distribution:** The genus *Horkelia* is endemic to California and northwest Mexico (Ertter and Reveal 2014). The species *Horkelia congesta* belongs to a group of closely related California and Oregon endemics, corresponding to Section Tridentatae in *Flora North America North of Mexico* (Ertter and Reveal 2014). *Horkelia congesta* var. *nemorosa* occupies the Klamath Mountains Ecoregion. It is found in Josephine, Jackson, Curry, Douglas, and Klamath counties in Oregon, and in Del Norte County, California. It has *H. congesta* var. *congesta* as its peripatric sibling taxon on the north side of its range, which occupies remnant prairie habitats in Oregon from Salem southwards, and *H. tridentata* as its peripatric sibling on the south side of its range, occupying montane conifer woodlands in the North Coast and Sierra Nevada ranges of California. *Horkelia congesta* subsp. *nemorosa* itself is primarily found in Oregon, with only two documented locations in Del Norte County 20-30 km south of the nearest recorded population of *H. congesta* var. *nemorosa* in Oregon (CCH 2018; CPNWH 2018).

*Horkelia congesta* var. *nemorosa* is among the least documented rare plants in California. Its range in California consists of two historic specimens. The first was collected in the year 1935 (no date noted) by Ruby VanDeventer in Del Norte County. Her label information (CAS288770; CCH 2018) states “Shelley Creek”, but this description fits a large area that stretches almost 20 miles from highway US 199 (US 199 opened 10 years prior to the VanDeventer collection) to near the Oregon border, roughly paralleling, and east of, the “Old Gasquet Toll Road”, now State Route (SR) 316 (Barker 1978). As a result, the site of her collection has not been relocated (Hoover et al. pers. comm. 2017). Three additional specimens collected by Ruby at HSC are from Oregon (Smith pers. comm. 2018). The second specimen was collected in May of 1968 by D.S. Isil in Del Norte County. Isil’s label information (SOC03261; CPNWH 2018) states “French Hill Road, one mile down from Camp 6. Scattered. Serpentine Soil Meadow. Elevation 1300’.” Camp 6 at the time was a CCC Fire Lookout, built in 1938, at Upper Coon Mountain, near the junction of the current French Hill Road (405), Bear Basin Road (FR17N29) and Big Flat Road (405). It is unclear what “one mile down” would mean, as the roads in all three directions from Camp 6 remain well above 1,300’ elevation. Therefore, we placed the map point approximately 1 mile west, on French Hill Road, with a thousand foot error.
Horkelia congesta Hook. var. nemorosa (D.D. Keck) M. Peck

**Horkelia congesta** Hook. var. *nemorosa* (D.D. Keck) M. Peck

**Locations within California:**

Record numbers indicate sites that contain an individual, population, or groups of populations located within ¼ mile of each other, per the California Natural Diversity Database (CNDDB 2017) definition of Element Occurrences (EOs) in California. Official EO numbers for plants in California are determined solely by the CNDDB and are included within the Reference (Source) column for CNDDB data. Duplicate records from the same site are given the same record number and included in red. The Population Info column includes total number of individuals and total number and size of populations/sub-populations when provided. Elevations provided in meters from source have been converted to feet. If not provided in original source, Land Manager information was obtained using the California Protected Areas Database (CPAD 2016) and Quad information was obtained using 24K Quads, SDE Feature Class (CDFG 2013). All other information is directly from the Reference (Source) unless additional citation is given.

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<th>Locality</th>
<th>County</th>
<th>Quad</th>
<th>Reference (Source)</th>
<th>Date Last Observed</th>
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<th>Threats</th>
<th>Land Manager</th>
<th>Elev. (ft.)</th>
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<td>Del Norte</td>
<td>Shelly Creek Ridge (4112387)</td>
<td>CNDDB, May 2017 (EO 1)</td>
<td>1935</td>
<td>COLLECTION IS ONLY SOURCE OF INFO. MAPPED AS NON-SPECIFIC POLYGON ALONG SHELLY CREEK. ONLY KNOWN CALIFORNIA OCCURRENCE OF OREGON TAXON. NEED BETTER LOCATION INFORMATION.</td>
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**Horkelia congesta** Hook. var. nemorosa (D.D. Keck) M. Peck

### Distribution on National Forest System (NFS) Lands:

(Please see Reference column of Locations table above for references pertaining to Record Numbers indicated on NFS lands.)

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<th>Non-CNDDB Records</th>
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| Totals:                           | N/A                                    | 1         | 1                  | 0                            | 2                                   | N/A             | 0                        | 2                          |

**Demographic and Population Trends:** This variety is usually found on serpentine, so should be sought in meadows and riparian areas on the large band of serpentine substrate that runs from south of US 199 (including French Hill Road) to the Oregon border bounded on the west near the town of Gasquet and on the east near Patrick’s Creek Inn (estimated from Google Earth [Google Inc. 2015]). This area is mostly on Six Rivers National Forest land with a few private inholdings near the Oregon border. The area appears on maps and aerial imagery (Google Inc. 2015) to have little current human activity: there are old mines, a few roads, a few ORV routes and one motorcycle loop (Six Rivers NF 2009), so there are no identifiable pressing concerns about potential negative trends for the unrelocated populations.
**Horkelia congesta** Hook. var. *nemorosa* (D.D. Keck) M. Peck

**Life History:** *Horkelia congesta* var. *nemorosa* is an herbaceous, tap-rooted perennial of unknown longevity. Its caudex may be branched, resulting in multiple rosettes, but it does not spread vegetatively, so all reproduction comes from seed (Gisler 2004). It has a basal rosette of a few silvery leaves, and a few erect flowering stems that are reddish pigmented, each bearing several capitate clusters with multiple flowers open at a time. A population of this species may therefore be a significant local nectar source for pollinators during its flowering period.

Estimates of flowering time vary somewhat. Specimen sheets in flower from southern Oregon mostly were collected in early May with a few in late April and some in early June. Estimates for California flowering time are May through July (CNPS 2018) and April through June (Ertter and Reveal 2014).

Ertter and Reveal (2014) note a recurrent trend in the progressive reduction in size and number of floral parts in evolutionary lineages within *Potentilla* (which includes *Horkelia*). The end product is exemplified by the flower of *Horkelia*, in which the nectariferous, patelliform hypanthium itself becomes the main pollinator attractor. Breeding system studies are not known for *H. congesta*, although field observations reported by Gisler (2004) report solitary bees (*Halictus* sp. and *Andrena* sp.), syrphid flies, and one muscid fly. Keck (1938) suggested that *Horkelia* flowers may be selfing, due to placement of anthers relative to the stigma.

Seed production has been estimated for *H. congesta* var. *congesta* (Gisler 2004) as follows: “Based on a random sample of 25 flowers from 25 individuals at the Greenhill population west of Eugene, *Horkelia congesta* ssp. *congesta* produced a mean of 12.92 ovules per flower (range 7-19, SD +/- 3.17) and a mean of 1.84 achenes per flower (range 0-4, SD +/- 1.31) (Gisler, unpublished data). Flower production in pressed specimens of *Horkelia congesta* ssp. *congesta* in the herbarium at Oregon State University varies substantially between few and many stemmed individuals, but ranges from 100-400 flowers in typical plants producing 4-5 primary flowering stems. Therefore, if we assume an average 1-3 seeds per flower, then seed production would be expected to range from 100-1200 per plant per year.”

Gisler (2014) also studied seed germination and found 21% germination for seed placed outdoors for the winter, with mean 50% germination time 65-80 days.

**Diversity:** The resinously aromatic ivesioid genera *Horkelia* and *Ivesia* have been confirmed by molecular analyses to be evolved from within a clade of western North American *Potentilla* between 7.2 and 12.7 million years ago (Dobeš and Paule 2010; Töpel et al. 2012), and form a monophyletic near-polytomy, indicating rapid morphologic radiation not matched by molecular divergence. On the basis of morphology and biogeography, *Horkelia* itself is likely nested within *Ivesia* as the branch that has radiated primarily within the California Floristic Province (Ertter and Reveal 2014). Although retention of both *Horkelia* and *Ivesia* results in a paraphyletic *Potentilla*, Ertter does not find this “sufficient to dictate generic circumscriptions”, and both *Horkelia* and *Ivesia* remain in the *Flora of North America North of Mexico* (Ertter and Reveal 2014) and *The Jepson Manual* (Ertter 2012). This concept is followed by CNPS (2018). The conceptual support for retention is the ivesioid genera represent a threshold-crossing radiation in response to the late Tertiary development of xeric conditions in western North America, with
adaptations that allow drought-avoidance or minimize water loss (Ertter and Reveal 2014; Topel et al. 2012). Much of this evolutionary radiation has occurred in the various island-like habitats that characterize the arid West, with the result that the ivesioid genera include a high percentage of narrowly endemic species. That these narrow endemics show less sharp definition than species in the related Ivesia and Potentilla (Ertter and Reveal 2014) has contributed to a century and a half of a taxonomic frenzy of varieties and subspecies of known species being named, which were subsequently split off as distinct species (see Synonym section above for details).

As described in Identification Issues and Distribution Sections above, there is some debate about intermediate morphologies between the two varieties of *H. congesta*, but the cause of this remains unknown as no population genetic studies have been done on this species. Variation within var. *nemorosa* has not been noted in print.

**Habitat:** The probable habitat of this species in California would be: openings in conifer woodland and chaparral that are vernally moist, with a substrate of rocky, generally serpentine-derived, clay soil at elevations of 300 to 800 meters (CNPS 2018; Ertter 2012). In Oregon, variety *nemorosa* occurs primarily in open ultramafic flats in the Illinois River Valley of southern Josephine County (Ertter and Reveal 2014). Specimen label information (CPNWH 2018) gives a more detailed picture of the several types of habitats in which it has been found in Oregon. The substrate, when mentioned, is usually a serpentine-derived soil, often described as red or clay, as well as dry, rocky and flat, but in a couple of instances, the substrate is stated to be basaltic. In one instance, the habitat was described as a xeric south-facing slope, rather than a “flat”. When exposure is mentioned, the plant was found in full sun, or “open fields”. In two instances, it was found in gravelly roadsides. Several plant community types are mentioned on specimen labels, most of which are typical of ultramafic soils. Most frequently mentioned is mixed conifer woodland with *Arbutus menziesii, Pseudotsuga menziesii,* or *Calocedrus decurrens* mentioned as part of the canopy cover (NatureServe 2018: Klamath-Siskyou Lower Montane Serpentine Mixed Conifer Woodland), but in one case the more mesic streamside Douglas-fir forest was mentioned. Two other community types are frequently mentioned (corresponding to NatureServe 2018 Klamath-Siskiyou Xeromorphic Serpentine): *Pinus jeffreyii* or *P. ponderosa* woodland over low shrubs/forbs and grasses; chaparral, especially *Arctostaphylos* and *Ceanothus*-dominated, are another frequently mentioned habitat type. In a few cases, oak woodland is mentioned, specifically *Ceanothus cuneatus/Quercus garryana/Quercus kelloggii* over grassland, which is not typical of serpentine substrate because, for the most part, oaks do not tolerate it. So this latter category may indicate an occurrence on metavolcanic or metasedimentary soil. For herbaceous layer species, lilies and onions, as well as grasses, are often mentioned. The forbs mentioned by name include: *Antennaria* sp., *Penstemon azureus,* *Eriogonum* spp., *Eschscholzia* sp., *Lomatium* spp., *Dichelostemma congestum,* *Allium falcifolium,* *Plectritis congesta,* and *Senecio* sp.

**Habitat Status or Trend:** No information on habitat status specifically for this species was discovered. In general, Klamath-Siskiyou Xeromorphic Serpentine plant communities are at risk from non-native plant encroachment, especially non-native grasses. In addition, fire suppression leading to brush encroachment may reduce the suitable habitat for existing populations. Third,
this species appears to frequent flat, open areas that are particularly vulnerable to vehicle or other human uses (CPNWH 2018).

**Capacity for the Species to Disperse:** The seed of *H. congesta* var. *nemorosa* is a dry achene approximately two millimeters in length, lacking elaborations for wind or animal dispersal (Ertter 2012; Ertter and Reveal 2014), and thus is presumably primarily dispersed over very short distances by gravity or wind shaking them loose from their dried carpels and flinging them by the waving action of the dried inflorescence scapes in the wind. This species would therefore depend on the maintenance of open areas between shrubs, and connectivity between them to disperse.

**Threats:** No threats are known for the California occurrence of this species (CNDDB 2018).

**Literature Cited**


[CDFG] California Department of Fish and Game. 2013. 24K Quads, SDE Feature Class. Index for 1:24,000-scale (24K), 7.5-minute by 7.5-minute, paper U.S. Geological Survey maps in California.


[CNDDB] California Department of Fish and Wildlife, Natural Diversity Database. 2017. RareFind 5 [Internet application] and CNDDB Maps and Data. Available at: https://www.wildlife.ca.gov/Data/CNDDB/Maps-and-Data [Government Version, May 2017].

________. 2018. RareFind 5 [Internet application] and CNDDB Maps and Data. Available at: https://www.wildlife.ca.gov/Data/CNDDB/Maps-and-Data [Government Version, March 2018].


[CDF] California Department of Forestry and Fire Protection. 2009. 1:24,000 County Boundaries (cnty24k09_1_poly) [shapefile]. California Department of Forestry and Fire Protection,
Horkelia congesta Hook. var. nemorosa (D.D. Keck) M. Peck

California Department of Fish and Game. Berkeley Library Geodata. Available at: https://geodata.lib.berkeley.edu/catalog/ark28722-s73w23 [10 December 2017].


Horkelia congesta Hook. var. nemorosa (D.D. Keck) M. Peck


Horkelia congesta Hook. var. nemorosa (D.D. Keck) M. Peck


Persons Contacted:


Kaye, Thomas. 2018. Director, Institute for Applied Ecology, 227 SW 6th St., Corvallis, Oregon, 97333, (541) 753-3099, kayet@peak.org. Contacted by email; request for BLM study he authored that is not available on the web, and any information he might have about var. nemorosa. Contacted 18 April 2018.


Smith, James P., Jr. 2018. Professor Emeritus of Botany, Department of Biological Sciences, Humboldt State University, Arcata, California 95521. Email on information about VanDeventer HSC specimen of Horkelia congesta subsp. nemorosa not in CCH and whether field notes or additional information available for VanDeventer collections. Personal communication 30 April 2018.


Author(s) and Date:
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Aaron E. Sims, Rare Plant Botanist, California Native Plant Society, (916) 324-3816, asims@cnps.org. June 27, 2018.

Reviewer(s) and Date:
David Magney, Rare Plant Program Manager, California Native Plant Society, (916) 447-2677 ext. 205, dmagney@cnps.org. June 27, 2018.

Formatting: Form is set up as 508 compliant. Please use the “styles” if further formatting is necessary.

Purpose: This is to maintain the best available science on a species that could be used by the Forest Service in a variety of functions. Specifically, there would be additional steps and evaluations to determine whether or not this species would be considered a Species of Conservation Concern under the 2012 Planning Rule or a Sensitive Species under the 1982 Planning Rule.

Additional Considerations at the Forest Level: Habitat amount and juxtaposition of both the species and habitat locations.