

## Plant Species Evaluation Form

### *Pinguicula macroceras* Link

#### HORNED BUTTERWORT

**Family:** Lentibulariaceae  
(CNPS 2018)

**PLANTS Symbol:** PIMA7  
(USDA 2018)

**Calif. Endemic:** No  
(CNPS 2018)

**Synonyms/Other Names:** This taxon was originally described by P.S. von Pallas in 1820 (after an initial invalid description by J.H.F. Link). Other names for this basionym include *Pinguicula vulgaris* var. *macroceras* (Pall. ex Link) Herder, and *Pinguicula vulgaris* subsp. *macroceras* (Pall. ex Link) Calder & Roy L. Taylor (Tropicos 2018).

**Identification Issues:** The genus *Pinguicula* is distinctive for its rosette of sticky, glandular leaves borne on a compressed caudex. It occurs in moist environments, and feeds upon insects that become trapped on its leaves (Müller et al. 2004). As the sole member of this unique group that occurs in California, identification of *P. macroceras* should present no special difficulties.

#### Taxonomy:

Unless otherwise cited, the following description is taken directly from the *Jepson eFlora* and is used with permission from the Jepson Herbarium. Jepson Flora Project (eds.) 2018. *Jepson eFlora*, <http://ucjeps.berkeley.edu/eflora/>, accessed January 2018. Copyright © Regents of the University of California.

Species In Genus: +- 92 species: America, Europe, Mediterranean. Etymology: (Latin: +- fat, from leaf surface)

Leaf: 2--5 cm, elliptic to ovate, green to dark brown. Inflorescence: 1--5 per rosette, 1--2 dm. Flower: corolla (including spur) 13--21 mm, 5-lobed, (pale) blue-violet, center of lower lip white; lobes obovate, throat hairy, spur 6--9 mm. Note: May not be distinct from *Pinguicula vulgaris* L. (also  $2n=64$ ); plants overwinter as dense bud, proliferate by detachment of basal daughter buds (gemmae). eFlora Treatment Author: Barry A. Rice.

#### 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).

State Listing	G-rank	S-rank	CRPR	R5 FSS	NFP SM	CA BLM
CA: Not listed NV: OR:	G4	CA: S2 NV: Not listed OR: Not listed	2B.2	Not listed	Not listed	Not listed

SWAP: Not listed	NNHP: Not listed	NNPS: Not listed	ORBIC: Not listed	OCS: Not listed	IUCN: Not listed
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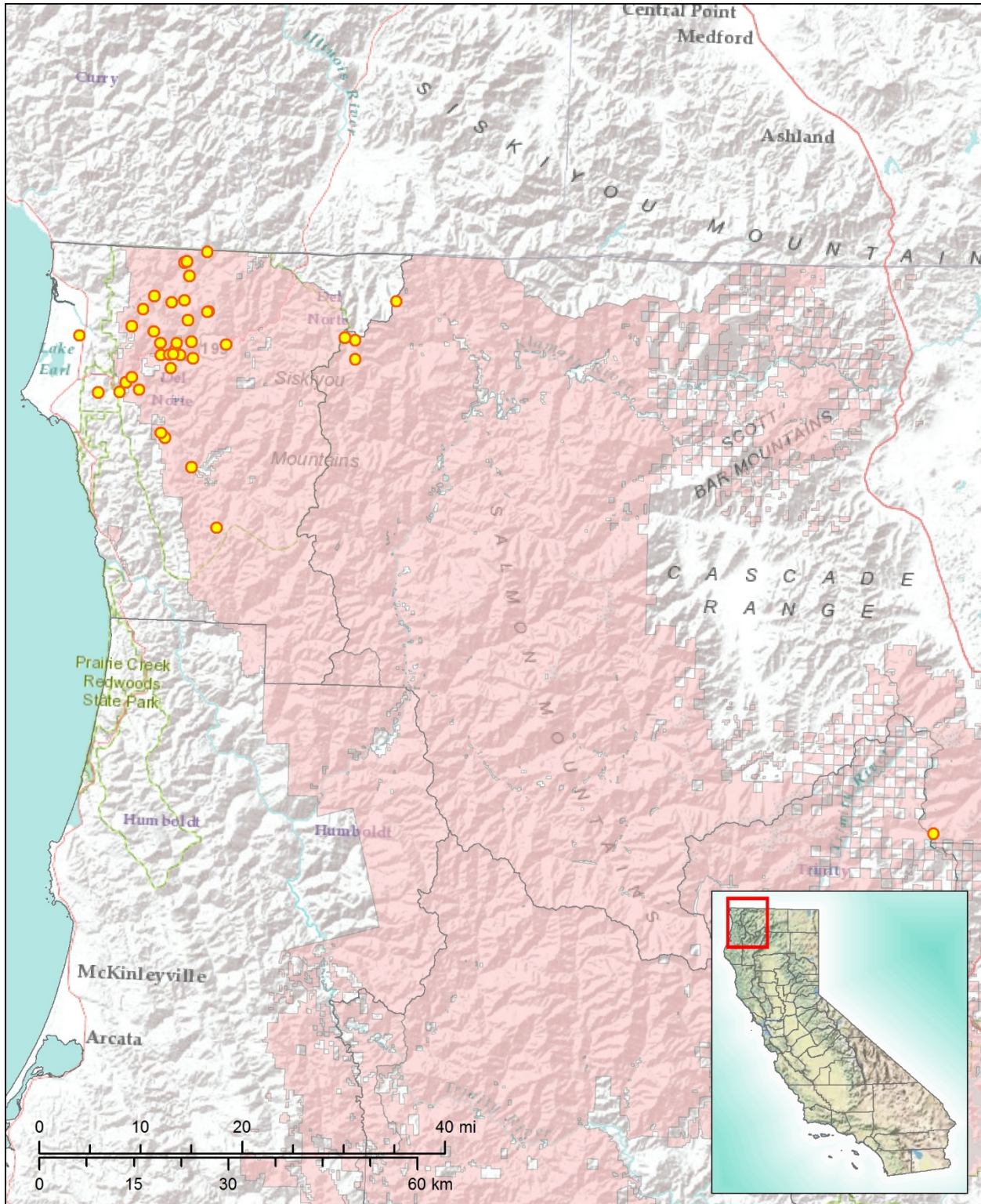
Expanded abbreviations and citations: State Listing=California Endangered Species Act Listing (CDFW 2018b), Nevada Division of Forestry Fully Protected Plant Species (NAC 527) (NDF 2012), Oregon Department of Agriculture Listed Plants (ODA 2014); G-rank=Global Conservation Status (CDFW 2018a; NatureServe 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

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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).

**Distribution:** *Pinguicula macroceras* has an amphipacific distribution, extending from Japan through China and Russia, to Alaska and southward to the Klamath Region of southwestern Oregon and northwestern California (Rice 2018), where it reaches its southern endpoint on the west coast of North America. Additional populations are found to the east, in Idaho and Montana. Within California, it occurs in Del Norte and Siskiyou counties. National Forest Service lands on which *P. macroceras* occurs within California include Klamath NF, Shasta-Trinity NF, and Six Rivers NF (CNDDDB 2018).

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**Sources:** *Distribution:* Calflora 2017, CCH 2017, CNDDDB 2017, NRIS 2017. *Layers:* USDA Forest Service, Pacific Southwest National Forests: CPAD 2016. California counties: CDF 2009. *Basemaps:* California inset map: © 2013 National Geographic Society, i-cubed (Esri 2017a). Main map: Esri, DeLorme, USGS, NPS (Esri 2012) and Esri, USGS, NOAA (Esri 2017b).

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**Locations within California:**

Note: 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 (CNDDDB) definition of Element Occurrences in California). Official Element Occurrence (EO) numbers for plants in California are determined solely by the CNDDDB and are included within the Reference (Source) column for CNDDDB 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 in meters from source were 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 verbatim from the original Reference (Source) unless additional citation is given.

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**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.)

National Forest System (NFS) lands	Record #s (from Locations table above)	CNDDDB EOs	Non-CNDDDB Records	Recent (seen in past 20 yrs.)	Historic (not seen in past 20 yrs.)	Most Recent Obs.	EOs/ Recs. (5 mile buffer)	Total Records on NFS lands
Angeles:	-	-	-	-	-	-	-	0
Cleveland:	-	-	-	-	-	-	-	0
Eldorado:	-	-	-	-	-	-	-	0
Inyo:	-	-	-	-	-	-	-	0
Klamath:	2, 3, 7, 8	4	0	0	3	24-Jul-83	0	4
Lake Tahoe Basin MU:	-	-	-	-	-	-	-	0
Lassen:	-	-	-	-	-	-	-	0
Los Padres:	-	-	-	-	-	-	-	0
Mendocino:	-	-	-	-	-	-	-	0
Modoc:	-	-	-	-	-	-	-	0
Plumas:	-	-	-	-	-	-	-	0
San Bernardino:	-	-	-	-	-	-	-	0
Sequoia:	-	-	-	-	-	-	-	0
Shasta-Trinity:	1	1	0	1	0	22-Jun-02	1	1
Sierra:	-	-	-	-	-	-	-	0
Six Rivers:	4, 6, 9, 10, 11, 12, 13, 14, 16, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 30, 32, 33, 34, 35, 36	17	8	9	15	23-Jul-14	7	25
Stanislaus:	-	-	-	-	-	-	-	0
Tahoe:	-	-	-	-	-	-	-	0
<b>Totals:</b>	N/A	22	8	10	18	N/A	8	30

**Demographic and Population Trends:** *Pinguicula macroceras* is known from approximately 36 occurrences, 26 of which are included in the CNDDDB (2018); the additional

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ten occurrences not included in the CNDDDB are estimated to potentially be new occurrences identified from CCH (2017), Calflora (2017), and NRIS (2017), and should be verified. Of the 26 element occurrences in CNDDDB (2018), 22 are ranked as “unknown” with respect to overall site/occurrence quality/viability. Of the remainder, two are “excellent,” one is “fair,” and one is “poor.” Of the ten occurrences not included in the CNDDDB, nine have abundance data; none of these contain information for multiple years. Five of the nine have fewer than 100 individuals, three have between 100 and 200, and one occurrence has 2,000+ individuals, spread over ten acres. Eleven of 36 total records were observed within the last 20 years, while 25 are older (CNDDDB 2018). From these sparse data, it can be inferred that *P. macroceras* tends to occur in smallish aggregations, with sizable populations appearing where conditions are favorable over a large area.

**Life History:** This species is a perennial carnivorous herb, which uses sticky, glandular leaves to capture small invertebrates (Müller et al. 2004). It flowers from April through June (CNPS 2018), and overwinters as a compact rootless mass that is rich in meristematic tissue. Both sexual and asexual reproduction occur—the latter via shedding of gemmae, produced from axillary buds on the overwintering structure (Worley and Harder 1996). In the case of *Pinguicula*, it is likely that the principal benefit of carnivory comes from enhanced phosphorus uptake (Karlsson and Carlsson 1984).

**Diversity:** There are about 92 species in *Pinguicula*—one of three genera of carnivorous plants comprising the family Lentibulariaceae. Species of *Pinguicula* are found on every continent except Australia and Antarctica; individual species tend to have small ranges, but collectively the genus extends from Europe to the Middle East, the Pacific rim of Asia, into North America, and southward to the highlands of Central and South America. The genus consists of five discrete clades, each corresponding to a geographically-centered radiation; the center of diversity occurs in Central America, where the genus likely originated (Cieslak et al. 2005). Few data exist on the genetic or ecological diversity of *P. macroceras* specifically.

**Habitat:** *Pinguicula macroceras* is found in boggy areas, moist slopes and cliffs, as well as hydrated gabbro and serpentine banks (Rice 2018), between approximately 40 and 1,920 meters in elevation (CNPS 2018). It is often associated with *Drosera* and *Darlingtonia*, as well as *Juncus*, *Carex*, and *Equisetum*; woody taxa found in surrounding communities include *Chamaecyparis lawsoniana*, *Rhododendron occidentale*, *Pinus monticola*, *Pseudotsuga menziesii*, *Quercus vaccinifolia*, *Rhamnus californica*, *Vaccinium ovalifolium*, *Umbellularia californica*, *Arbutus menziesii*, and *Pinus contorta* (CNDDDB 2018).

**Habitat Status or Trend:** With its sizable range, *P. macroceras* occupies a diversity of habitats—each with its own history and trajectory. Within California, the species occurs in the Klamath Region. This is one of six globally important temperate forest biodiversity hotspots, having served as a climatic refugium during the Pleistocene. More than a century of land use—including logging, mining, grazing and modification of fire regimes—has significantly altered much of the region. Only 28% of the old-growth forest remains, and ongoing human impacts continue to degrade wild communities, especially in mesic lowland and mid-elevation areas, encompassing the elevation range of *P. macroceras* (Olson et al. 2012).



**Capacity for the Species to Disperse:** In *Pinguicula vulgaris*, which occupies a clade sister to *P. macroceras* (Degtjareva et al. 2006), seeds are small (0.4-1.0 mm), with an ellipsoidal form and fine surface ornamentation. The micropylar end of its seeds have a prominent appendage formed by outgrowth of the seed coat (Degtjareva et al. 2004), which may aid in animal-mediated dispersal. The plant overwinters as a compact rootless mass, and vegetative propagation occurs via discrete axillary buds known as gemmae (Worley and Harder 1996). If the overwintering ability and dual modes of reproduction are conserved in *P. macroceras*, the resulting flexibility in timing and manner of propagation should aid in dispersal between habitat patches.

**Threats:** One of the primary threats to *P. macroceras* populations comes from horticultural collecting (CNPS 2018). Additional impacts arise from road construction and maintenance, trampling, mining effluent, and erosion (CNDDDB 2018). No systematic assessment of these or other conservation concerns has been undertaken.

### Literature Cited

[BLM] Bureau of Land Management. 2010. Special Status Plants in California, Including BLM Designated Sensitive Species. February 8, 2010. Available at: <https://www.blm.gov/ca/dir/pdfs/2010/im/CAIM2010-008ATT2B.pdf> [accessed 25 May 2017].

Calflora. 2017. Information on wild California plants for conservation, education, and appreciation. Website <http://www.calflora.org/> [accessed 14 June 2017].

[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.

[CDFW] California Department of Fish and Wildlife. 2015. California State Wildlife Action Plan, 2015 Update: A Conservation Legacy for Californians; Volume II, Appendix C: Species of Greatest Conservation Need. Gonzales, A. G. and J. Hoshi (eds.). Prepared with assistance from Ascent Environmental, Inc., Sacramento, CA. Available at: <https://www.wildlife.ca.gov/swap/final> [accessed 11 May 2017].

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

\_\_\_\_\_. 2018. RareFind 5 [Internet application] and CNDDDB Maps and Data. Available at: <https://www.wildlife.ca.gov/Data/CNDDDB/Maps-and-Data> [Government Version, January 2018].

[CDFW] California Department of Fish and Wildlife, Natural Diversity Database. 2018a. Special Vascular Plants, Bryophytes, and Lichens List. Quarterly publication, January 2018. 127 pp. Available at <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109383> [accessed 22 January 2018].

\_\_\_\_\_. 2018b. State and Federally Listed Endangered, Threatened, and Rare Plants of California. Last updated January 2018. 6 pp. Available at:

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<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109390&inline> [accessed 22 January 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, California Department of Fish and Game. Berkeley Library Geodata. Available at: <https://geodata.lib.berkeley.edu/catalog/ark28722-s73w23> [10 December 2017].

[CNPS] California Native Plant Society, Rare Plant Program. 2018. *Inventory of Rare and Endangered Plants of California* (online edition, v8-03 0.39). Website <http://www.rareplants.cnps.org> [accessed 22 January 2018].

[CPAD] California Protected Areas Database. 2016. Version 2016b1. GreenInfo Network. Available at: <http://www.calands.org/>.

Cieslak, T., J. S. Polepalli, A. White, K. Müller, T. Borsch, W. Barthlott, J. Steiger, A. Marchant, and L. Legendre. 2005. Phylogenetic analysis of *Pinguicula* (Lentibulariaceae): chloroplast DNA sequences and morphology support several geographically distinct radiations. *American Journal of Botany* 92(10): 1723-1736.

[CCH] Consortium of California Herbaria. 2017. 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 16 May 2017].

Degtjareva, G., S. J. Casper, F. H. Hellwig, A. R. Schmidt, J. Steiger, and D. D. Sokoloff. 2006. Morphology and nrITS phylogeny of the genus *Pinguicula* L. (Lentibulariaceae), with special attention to embryo evolution. *Plant Biology* 8: 778-790.

Degtjareva, G., J. Casper, F. Hellwig, and D. Sokoloff. 2004. Seed morphology in the genus *Pinguicula* (Lentibulariaceae) and its relation to taxonomy and phylogeny. *Bot. Jahrb. Syst.* 125(4): 431-452.

Esri. 2012. World Reference Overlay [basemap overlay]. Scale Range: 1:591,657,528 down to 1:72,224. Esri, DeLorme, USGS, NPS. Updated 2 September 2017. Available at: <http://www.arcgis.com/home/item.html?id=9763d83ba63048da8a2e0a71ccea4416> [8 December 2017].

\_\_\_\_\_. 2017a. USA Topo Maps [basemap]. Scale Range: 1:591,657,528 down to 1:18,056. National Geographic Society, i-cubed, 2013. Updated 5 October 2017. Available at: <http://www.arcgis.com/home/item.html?id=99cd5fbd98934028802b4f797c4b1732> [8 December 2017].

\_\_\_\_\_. 2017b. World Terrain Base [basemap]. Scale Range: 1:591,657,528 down to 1:72,224. Esri, USGS, NOAA. Updated 9 February 2017. Available at: <http://www.arcgis.com/home/item.html?id=c61ad8ab017d49e1a82f580ee1298931> [8 December 2017].

[IUCN] International Union for Conservation of Nature. 2017. The IUCN Red List of Threatened Species. Website <http://www.iucnredlist.org/> [accessed 26 May 2017].

Karlsson, P. S. and B. Carlsson. 1984. Why does *Pinguicula vulgaris* L. trap insects? *New Phytologist* 97: 25-30.



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- Müller, K., T. Borsch, L. Legendre, S. Porembski, I. Theisen, and W. Barthlott. 2004. Evolution of carnivory in Lentibulariaceae and the Lamiales. *Plant Biology* 6: 477-490.
- NatureServe. 2018. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Website <http://explorer.natureserve.org> [accessed 22 January 2018].
- [NDF] Nevada Division of Forestry. 2012. NAC 527.010 List of fully protected species of native flora. April 2012. Available at: <https://www.leg.state.nv.us/NAC/NAC-527.html#NAC527Sec010> [accessed 12 May 2017].
- [NNHP] Nevada Natural Heritage Program. 2017. Species Lists. Department of Conservation and Natural Resources. Available at: <http://heritage.nv.gov/species/lists.php> [accessed 25 May 2017].
- Olson, D., D. A. DellaSala, R. F. Noss, J. R. Strittholt, J. Kass, M. E. Koopman, and T. F. Allnutt. 2012. Climate change refugia for biodiversity in the Klamath-Siskiyou ecoregion. *Natural Areas Journal* 32(1): 65-74.
- [ODA] Oregon Department of Agriculture. 2014. Oregon listed and candidate plants - complete list. Native Plant Conservation Program. August 13, 2014. Available at: <https://data.oregon.gov/Natural-Resources/Oregon-listed-and-candidate-plants-complete-list/8s3k-ygh2> [accessed 25 May 2017].
- [ODFW] Oregon Department of Fish and Wildlife. 2016. Oregon Conservation Strategy, Chapter 6: Strategy Species. Oregon Department of Fish and Wildlife, Salem, Oregon. PDF content last updated December 30, 2016. Available at: <http://oregonconservationstrategy.org/> [accessed 25 May 2017].
- [ORBIC] Oregon Biodiversity Information Center. 2016. Rare, Threatened and Endangered Species of Oregon. Institute for Natural Resources, Portland State University, Portland, OR. 130 pp. Available at: <http://inr.oregonstate.edu/sites/inr.oregonstate.edu/files/2016-rte-book.pdf> [accessed 25 May 2017].
- Rice, B. A. 2018. *Pinguicula macroceras*. In: Jepson Flora Project (eds.), *Jepson eFlora*. Website <http://ucjeps.berkeley.edu/eflora/> [accessed 28 February 2018].
- Tropicos. 2018. Missouri Botanical Garden. Website <http://www.tropicos.org> [accessed 22 January 2018].
- [NRIS] U.S. Department of Agriculture Forest Service, Natural Resource Information System. 2017. Natural Resource Information System; Threatened, Endangered and Sensitive Plants—Invasive Plants [accessed December 2016 and February 2017].
- [USDA] U.S. Department of Agriculture Forest Service, Pacific Southwest Region. 2013. Regional Forester Sensitive Species List. Available at: <http://www.fs.usda.gov/main/r5/plants-animals/plants> [accessed 9 May 2017].
- [USDA] U.S. Department of Agriculture Forest Service and U.S. Department of Interior Bureau of Land Management. 2001. List of Survey and Manage Species in Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures; as amended by Annual Species Reviews 2001-2003. Available at:

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<https://www.blm.gov/or/plans/surveyandmanage/files/sm-fs-enc3-table1-1-dec2003wrtv.pdf> [accessed 12 September 2017].

[USDA] U.S. Department of Agriculture, Natural Resources Conservation Service. 2018. PLANTS Database. Website <http://plants.usda.gov/> [accessed 22 January 2018].

Worley, A. C. and L. D. Harder. 1996. Size-dependent resource allocation and costs of reproduction in *Pinguicula vulgaris* (Lentibulariaceae). *Journal of Ecology* 84: 195-206.

**Persons Contacted:**

Carlberg, T. 2017. USDA Forest Service, Six-Rivers National Forest; President, California Lichen Society. Information submitted at Mendocino/Six Rivers FS-SCC and IPA Workshop, Loleta, CA. Contacted 16-18 November 2017.

Goldsworthy, E. 2017. Botanist, Green Diamond Resource Company, Arcata, CA. Information submitted at Mendocino/Six Rivers FS-SCC and IPA Workshop, Eureka, CA. Contacted 16-18 November 2017.

Hoover, L., J. McRae, and S. Carothers. 2017. Hoover and McRae: Forest Botanists, Six Rivers NF, Eureka, CA; Carothers: Botanical Contractor, Arcata, CA. Information submitted at Mendocino/Six Rivers FS-SCC and IPA Workshop, Loleta, CA. Contacted 16-18 November 2017.

O'Connell, G., G. Lester, D. York, B. Clare, G. Laural, P. Clint. 2017. California North Coast botanists. Information submitted at Mendocino/Six Rivers FS-SCC and IPA Workshop, Loleta, CA. Contacted 16-18 November 2017.

Taylor, D. Wm. 2017. Environmental contractor, Aptos, CA. Information submitted at Mendocino/Six Rivers FS-SCC and IPA Workshop, Eureka, CA. Contacted 16-18 November 2017.

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Julie Ann Kierstead, USDA Forest Service Region 5 Ecosystem Planning; 7 December 2021.

**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

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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.