Species: *Ophioglossum pusillum* Rafinesque, northern adder’s-tongue

**Photo Source:** CalPhotos (2021)

**Photo Credits:** Dean Wm. Taylor (left), Ryan Batten (right)

**Status**

Table 1 summarizes the current status of this species or subspecies/variety by various ranking entities and defines the meaning of the status.

<table>
<thead>
<tr>
<th>Entity</th>
<th>Status</th>
<th>Status Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>NatureServe CA&lt;sup&gt;a&lt;/sup&gt;</td>
<td>G5</td>
<td>G5: Secure — Common; widespread and abundant.</td>
</tr>
<tr>
<td></td>
<td>S1</td>
<td>S1: Critically Imperiled — Critically imperiled in the state because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation.</td>
</tr>
<tr>
<td>California Rare Plant Rank&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2B.2</td>
<td>2B: Plants rare, threatened, or endangered in California, but more common elsewhere. 0.2: Moderately threatened in California (20–80% occurrences threatened / moderate degree and immediacy of threat)</td>
</tr>
</tbody>
</table>
Species Account: *Ophioglossum pusillum*  

This species was added to the *CNPS Inventory* in 1974 and has undergone no subsequent change in status.

<table>
<thead>
<tr>
<th>California State Listing&lt;sup&gt;c&lt;/sup&gt;</th>
<th>Not listed</th>
</tr>
</thead>
<tbody>
<tr>
<td>USDA Forest Service&lt;sup&gt;d&lt;/sup&gt;</td>
<td>S</td>
</tr>
<tr>
<td>USDI FWS&lt;sup&gt;e&lt;/sup&gt;</td>
<td>Not listed</td>
</tr>
<tr>
<td>USDI BLM&lt;sup&gt;f&lt;/sup&gt;</td>
<td>Not listed</td>
</tr>
<tr>
<td>NatureServe OR&lt;sup&gt;g&lt;/sup&gt;</td>
<td>S1</td>
</tr>
<tr>
<td>Oregon State Listing&lt;sup&gt;h&lt;/sup&gt;</td>
<td>Not listed</td>
</tr>
<tr>
<td>NatureServe NV&lt;sup&gt;i&lt;/sup&gt;</td>
<td>Not present</td>
</tr>
<tr>
<td>Nevada State Listing&lt;sup&gt;j&lt;/sup&gt;</td>
<td>Not present</td>
</tr>
</tbody>
</table>

<sup>a</sup> California Natural Diversity Database, California Dept. of Fish & Wildlife [CNDDB 2021, 2021a]  
<sup>b</sup> California Native Plant Society [CNPS 2021]  
<sup>c</sup> California Department of Fish and Wildlife [CDFW 2021]  
<sup>d</sup> US Forest Service Region 5 Forester’s List [USFS 2013] and Pacific NW Survey and Manage [USFS & BLM 2014]  
<sup>e</sup> US Department of Interior Fish and Wildlife Service [USFWS 2021]  
<sup>f</sup> US Department of Interior Bureau of Land Management [BLM 2020]  
<sup>g</sup> Oregon Biodiversity Information Center [ORBIC 2019]  
<sup>h</sup> Oregon Department of Agriculture [ODA 2018]  
<sup>i</sup> Nevada Natural Heritage Program [NNHP 2021]  
<sup>j</sup> Nevada Division of Forestry [NDF 2012]  

Note: Individual State Heritage Programs (CNDDB, ORBIC, NNHP) represent NatureServe and contain more up-to-date ranks for their state than NatureServe Explorer.

**Distribution, abundance, and population trend on the planning unit**<sup>1</sup>

Table 2 summarizes the distribution and frequency of this species or subspecies/variety within National Forest System Lands in California. Table 4 in Appendix 1 lists all known occurrences of this species or subspecies/variety within California. Individual occurrences are defined as sites that contain an individual, population, or groups of populations of the plant that are located more than 1/4 (0.25) of a mile apart from each other as defined by the CNDDB.

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<sup>1</sup> 1909.12 Chapter 10, Section 12.53, components 2, 3, and 4.
Table 2. Known occurrence frequency of northern adder’s-tongue within the planning area (NRIS, CNDDDB, Calflora/CCH databases).

<table>
<thead>
<tr>
<th>National Forest System (NFS) lands in California</th>
<th>Record #s (from Table 4)</th>
<th>CNDDB EOs</th>
<th>Non-CNDDB Records</th>
<th>Recent (seen in past 20 years)</th>
<th>Historical (not seen in past 20 years)</th>
<th>Most Recent Obs. Date</th>
<th>Total Records on NFS lands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eldorado:</td>
<td>3</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>19-Sep-2019</td>
<td>1</td>
</tr>
<tr>
<td>Mendocino:</td>
<td>2, 4, 5</td>
<td>3</td>
<td>-</td>
<td>2</td>
<td>1</td>
<td>7-Jul-2007</td>
<td>3</td>
</tr>
<tr>
<td>Totals:</td>
<td>N/A</td>
<td>4</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>N/A</td>
<td>4</td>
</tr>
</tbody>
</table>
Species Account: *Ophioglossum pusillum* 2021-11-01

**Sources:** Distribution: NRIS (2020), Calflora (2021), CNDDDB (2021), CCH2 (2021).
Baselayers: 2013 National Geographic Society, i-cubed, Esri, Garmin, NOAA, NPS, USGS.
Northern adder’s-tongue was last updated in the CNDDB on 05 April 2018 (CNDDB 2021), and therefore all Calflora, CCH, and/or NRIS records prior to this date are assumed to have already been reviewed and entered into the CNDDB for this plant. Accordingly, only records from Calflora, CCH, and/or NRIS reported after this date have been reviewed for potential new or updated occurrence information and are included in Table 4 in Appendix 1 as applicable.

Northern adder’s-tongue is endemic to North America where it ranges widely from the northern Great Plains and Great Lakes regions across the northeastern U.S. and eastern Canada. In the Pacific Northwest it is found from Alaska southward to British Columbia, Washington state, western Montana, and Oregon, reaching its southern range limit in northern California (Wagner and Wagner 1993, NatureServe 2021).

In California, this species is known from five widely scattered occurrences in the High Cascade Range (CaRH), northern High Sierra Nevada (nSNH), and High North Coast Ranges (NCoRH) bioregions of Siskiyou, El Dorado, Mendocino, and Lake counties. Four of these occurrences are on National Forest lands including three on the Mendocino NF and one on the Eldorado NF (Table 2). Two occurrences are in designated Wilderness Areas including the Yolla Bolly-Middle Eel Wilderness (CNDDB EO # 4) and the Snow Mountain Wilderness (EO # 5). All of the localities on National Forest lands have been documented or revisited within the past 25 years. The Siskiyou County occurrence (EO # 1) is based on a July 1894 collection by W. C. Blasdale from near the town of Sisson (an old name for the place now called the City of Mount Shasta); the collecting locality is not precisely known, but it may have been in the vicinity of the current Mt. Shasta State Fish Hatchery (owned and operated by the California Dept. of Fish and Wildlife) (CNDDB 2021).

Population data have been recorded for three of the five Californian occurrences and suggest generally low numbers of individual plants per site. One site (EO # 3) had 5–6 plants in years 2012–2017, another site (EO # 2) had 25–130 plants in years 1998–1999, and the third site (EO # 4) had 100–1,000 plants in year 2000 and an unknown number of plants in 2004 (CNDDB 2021).

Obtaining accurate population counts for northern adder’s-tongue may be problematic for several reasons. First, Ophioglossum are generally small, inconspicuous, and often overlooked when growing amongst grasses and other dense, herbaceous vegetation (Wagner and Wagner 1993, McMaster 1994). Second, the roots of Ophioglossum including O. pusillum are often proliferous and forming clones (Wagner and Wagner 1993), such that even apparently large colonies of this species may actually consist of only one or very few genets (McMaster 1996). Third, the above-ground plant body of northern adder’s-tongue may not make an appearance in some years, while the dormant root system remains viable below ground (McMaster 1994).

**Brief description of natural history and key ecological functions**

Northern adder’s-tongue is a perennial herb from an extensive network of slender, hairless, proliferating roots. Like most other members of the fern family Ophioglossaceae, it produces one

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2 Basis for other 1909.12 Chapter 10, Section 12.53 components.
above-ground leaf per year in mid-spring and persisting until late summer. The leaf is characteristically divided at ground level into a trophophore (sterile segment) that is simple, entire, ± elliptic and 2.5–10 cm long × 1–4 cm wide, and a sporophore (fertile segment) that is 4–23 cm long (overlapping the trophophore) with sporangia closely arranged in two vertical rows 1.5–5 cm long at the tip (Wagner and Wagner 1993; McMaster 1994, 1996). The Ophioglossaceae are one of the most unusual and earliest branching lineages of ferns, having diverged from other monilophytes c. 250–370 million years ago (Rothfels et al. 2015, Testo and Sundue 2016).

This species inhabits a variety of wet or mesic sites such as bogs and fens, marsh edges, pastures, swamplands, grassy shores or swales, damp sands, moist woods, muddy streambanks, and roadside ditches (Wagner and Wagner 1993; McMaster 1994). It is generally associated with early successional habitats, and its occurrence often appears related to recent disturbance reducing cover of woody vegetation, yet it often grows in partial shade (McMaster 1994). In California, it has been found mostly in montane coniferous forest at mid-elevations (from 3,560 to 6,235 feet; CNDDDB 2021). The historical collection by Blasdale (EO # 1) was made in an “open swamp.” Another site (EO # 3) is in a mossy seep on a near-vertical roadcut over granitic bedrock. The other known locations are on meadowy margins of vernal pools, ponds, or shallow lakes. Noted plant associates include trees and shrubs Alnus sp., Fraxinus latifolia, and Salix spp. as well as herbs such as Carex spp., grasses, Hosackia oblongifolia, Myosotis sp., Potamogeton sp., Prunella vulgaris var. lanceolata, and Sceptridium multifidum (NRIS 2020, CNDDDB 2021, CCH2 2021). At EO # 2, it co-occurs with another rare plant species, Howellia aquatilis (CRPR 2B.2; CNPS 2021).

The adder’s-tongue fern genus Ophioglossum has a cosmopolitan distribution mainly in tropical and subtropical regions (Wagner and Wagner 1993). In California there are two native species, O. pusillum and O. californicum (CRPR 4.2; CNPS 2021), the latter being a plant of lower elevations and ranging southward into Baja California and central Mexico (Clausen 1938, JEPS 2021). The plants currently assigned to the northern adder’s-tongue O. pusillum were previously confused with the Eurasian O. vulgatum (Clausen 1938) or treated as a variety of that species (Fernald 1939: 498, 1950: 23), but in molecular phylogenetic analyses O. pusillum and O. vulgatum are distinct from each other (Hauk et al. 2003, Zhang et al. 2020). There is also an unresolved question about whether true O. vulgatum occurs in North America (Wagner and Wagner 1993) or if the plants known as the “southern adder’s-tongue” should be treated as a separate species O. pycnostichum (Lellinger 1985, JEPS 2021). The northern and southern adder’s-tongues not only differ in their respective geographic ranges (± defined by the southern limit of Wisconsin glaciation) but also by their leaf color and shape, basal leaf sheath (ephemeral versus persistent), spore size, and chromosome number (McAlpin 1971, Wagner and Wagner 1993, Rice et al. 2015).

Reproduction of northern adder’s-tongue takes place both sexually (by means of spores) and clonally (through sporophytes arising directly from the roots of parent plants) (Wagner and Wagner 1993, McMaster 1994, Goswami 2007). At one site in Massachusetts, an area of 0.5 m² contained 38 sporophytes, including a network of 10 sporophytes connected by a single root
Species Account: *Ophioglossum pusillum* 2021-11-01

The gametophyte is bisexual, non-photosynthetic, and lives entirely below-ground where it is dependent on arbuscular mycorrhizal fungi for its nutrition (Field et al. 2015). Because the soil likely inhibits movement of sperm between gametophytes, there is a high level of intragametophytic selfing. In turn, selfing and clonal reproduction both contribute to the low genetic variability observed at the population level (McMaster 1994). The sporophyte is also subterranean, non-photosynthetic and dependent on symbiotic fungi in its initial developmental stages. Using genetic analysis, the fungal symbiont of *Ophioglossum vulgatum* sporophytes has been identified as *Glomus macrocarpum* (Field et al. 2015). Using radioisotope tracers, the same authors demonstrated the reciprocal exchange of carbon for nutrients (nitrogen and phosphorus) between the photosynthetic sporophyte and the fungus. The association is evidently of benefit to both partners, but it is a “take now, pay later” form of mutualism whereby the fungus may have to wait many years (until the sporophyte matures and becomes photosynthetic) before it is compensated for its investment in the non-photosynthetic, juvenile sporophyte. Fern spores are often carried long distances by air currents (Smith 1972, Meza Torres et al. 2015), and, in homosporous ferns like northern adder’s-tongue, intragametophytic selfing means that a single plant may be the founder of a new population.

**Overview of ecological conditions for recovery, conservation, and viability** including Threats and Risk Factors

Northern adder’s-tongue is endemic to North America, and in the mountains of California it is currently known from five widely scattered localities including three on the Mendocino National Forest. Local populations tend to be small and thus may be inherently vulnerable to extirpation. One of the Californian occurrences (EO # 2) has been ranked as having good habitat quality, and another (EO # 3) has been ranked as fair while the other three remain unranked (CNDDB 2021). The Siskiyou County occurrence (EO # 1) has not been seen since 1894 and may be extirpated. In the U.S., this species is ranked as critically imperiled, imperiled, or vulnerable in 22 of the 32 states where it occurs and possibly extirpated in Alaska, Delaware, and Virginia (NatureServe 2021). It may be generally rare although often overlooked and possibly more common than herbarium collections would indicate (Wagner and Wagner 1993).

Noted threats to northern adder’s-tongue occurrences in California include cattle grazing, fire, competitive exclusion by grasses or other herbaceous species, and encroachment of woody vegetation on its habitat (CNDDB 2021). Any hydrologic alterations to its habitat (including effects of long-term drought and increased evaporation due to anthropogenic climate-change) would also likely be detrimental. The reproductive system in this species, possibly combined with small effective population size and genetic drift, has led to a lack of genetic variation within and between populations. This in turn may limit its ability to adapt to future changes in its habitat (McMaster 1994).

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3 1909.12 Chapter 10, Section 12.53, components 7, 9, 10, 11 and 12, as appropriate.
Species Account: *Ophioglossum pusillum*  
2021-11-01

**Taxonomy**

Table 3 summarizes this species or subspecies/variety’s name status in key literature.

<table>
<thead>
<tr>
<th>Table 3. Name status of northern adder’s-tongue.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Entity</strong></td>
</tr>
<tr>
<td>--------------------------</td>
</tr>
<tr>
<td>CNDDB and CNPS</td>
</tr>
<tr>
<td>Jepson eFlora</td>
</tr>
<tr>
<td>Flora of North America</td>
</tr>
<tr>
<td>USDA NRCS* PLANTS</td>
</tr>
</tbody>
</table>


**Type locality**: U.S.A: Pennsylvania: “[d]ans le bois de la Pensylvanie boréale, à peine élevé de 3 pouces” (Rafinesque 1814). According to TL-2, Rafinesque’s herbarium and types are in P-DU, but it was further noted that the major part of the herbarium was thrown away by Elias Durand. No specimens were cited in the protologue, and whether a lectotype has been designated remains uncertain.

**Key literature**


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* 4 1909.12, Chapter 10, Section 12.53, component 1.

**Literature cited**


Species Account: *Ophioglossum pusillum*  

2021-11-01


[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 February 2021].


Species Account: *Ophioglossum pusillum*


**Author(s) and Date:**
R. Douglas Stone, California Native Plant Society, Associate Rare Plant Botanist, 02 September 2021; finalized 01 November 2021

**Reviewer(s) and Date:**
Aaron E. Sims, California Native Plant Society, Rare Plant Program Director, 29 September 2021; Julie Ann Kierstead, USDA Forest Service Region 5, Ecosystem Planning, 11 October 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 Conservation Concern under the 2012 Planning Rule or a Sensitive Species under the 1982 Planning Rule.
Appendix 1: Known Occurrences

Table 4. Known occurrences of northern adder’s-tongue within California (NRIS, CNDDB, Calflora/CCH databases).

<table>
<thead>
<tr>
<th>Rec. #</th>
<th>Locality</th>
<th>County</th>
<th>Quad</th>
<th>Ref. (Source)</th>
<th>Date Last Obs’d</th>
<th>Population Info</th>
<th>Threats</th>
<th>Land Mgr.</th>
<th>Elev. (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NEAR SISSON, WEST OF THE CITY OF MOUNT SHASTA.</td>
<td>Siskiyou</td>
<td>City of Mount Shasta (4112233)</td>
<td>CNDDB, Jan. 2021 (EO 1)</td>
<td>25-July-1894</td>
<td>OCCURRENCE KNOWN FROM AN 1894 COLLECTION BY BLASDALE.</td>
<td></td>
<td>California Department of Fish &amp; Wildlife, unknown</td>
<td>3560</td>
</tr>
<tr>
<td>1</td>
<td>NEAR SISSON, WEST OF THE CITY OF MT SHASTA.</td>
<td>Siskiyou</td>
<td>City of Mount Shasta (4112233)</td>
<td>NRIS, Nov. 2020 (0514_OPP U3_59_UN K_SURV_1)</td>
<td>1-Jan-1903</td>
<td>9- Jul-1999 25-30 BLADES OBSERVED IN 1998 (POSSIBLY SINGLE CLONE) AND 75 IN 1999 IN THE N-COLONY. 130 BLADES IN 3 PATCHES OBSERVED IN W-COLONY IN 1999. OTHER RARE PLANTS (HOWELLIA AQUATILIS AND BOTRYCHIUM MULTIFIDUM) OBSERVED 30' AWAY. CATTLE GRAZING IS A POSSIBLE THREAT.</td>
<td></td>
<td>California Department of Fish &amp; Wildlife, unknown</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Sisson</td>
<td>Siskiyou</td>
<td>City of Mount Shasta (4112233)</td>
<td>CCH2, Nov. 2020 (UC42573)</td>
<td>25-July-1894</td>
<td></td>
<td></td>
<td>California Department of Fish &amp; Wildlife, unknown</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>SOUTHWEST OF BUCK ROCK, ABOUT 0.2 MILE NORTH OF HOWARD LAKE, MENDOCINO NATIONAL FOREST.</td>
<td>Mendocino</td>
<td>Buck Rock (3912288)</td>
<td>CNDDB, Jan. 2021 (EO 2)</td>
<td>9-Jul-1999</td>
<td></td>
<td></td>
<td>Mendocino NF</td>
<td>3760</td>
</tr>
</tbody>
</table>
Duplicate records from the same site are given the same record number and are included in red. Rows containing questionable records are highlighted in red.

<table>
<thead>
<tr>
<th>Rec. #</th>
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<th>Ref. (Source)</th>
<th>Date Last Obs'd</th>
<th>Population Info</th>
<th>Threats</th>
<th>Land Mgr.</th>
<th>Elev. (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Mendocino National Forest, 0.35 mi from Howard Lake on a heading of 344 degrees. T24N R10W S32 SW1/4 of SW1/4 of SE1/4 USGS Quadrangle: Buck Rock 1:24,000</td>
<td>Mendocino</td>
<td>Buck Rock (3912288)</td>
<td>CCH2, Nov. 2020 (CHSC072 256)</td>
<td>10-Sep-1998</td>
<td></td>
<td></td>
<td>Mendocino NF</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>ca. 1 mi SW of Loon Lake</td>
<td>El Dorado</td>
<td>Loon Lake (3812083)</td>
<td>CCH2, Nov. 2020 (UC149587 8)</td>
<td>23-Aug-1983</td>
<td></td>
<td></td>
<td>Eldorado NF</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>ca. 1 mi SW of Loon Lake</td>
<td>El Dorado</td>
<td>Loon Lake (3812083)</td>
<td>NRIS, Nov. 2020 (OPPU3_0 01-01)</td>
<td>23-Aug-1983</td>
<td></td>
<td></td>
<td>Eldorado NF</td>
<td></td>
</tr>
</tbody>
</table>
## Duplicate records from the same site are given the same record number and are included in red. Rows containing questionable records are highlighted in red.

<table>
<thead>
<tr>
<th>Rec. #</th>
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<th>Threats</th>
<th>Land Mgr.</th>
<th>Elev. (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Loon Lake Road, Chipmunk Butte, 0.75 miles east of Schlein Ranger Station</td>
<td>El Dorado</td>
<td>Loon Lake (3812083)</td>
<td>Califlora, Jan. 2021 (xr168023)</td>
<td>9-Jul-2004</td>
<td>1+ individuals</td>
<td>Eldorado NF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Loon Lake Road, Chipmunk Butte, 0.75 miles east of Schlein Ranger Station</td>
<td>El Dorado</td>
<td>Loon Lake (3812083)</td>
<td>CCH2, Nov. 2020 (JEPS1098 40)</td>
<td>9-Jul-2004</td>
<td></td>
<td>Eldorado NF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Loon Lake Road, Chipmunk Butte, 0.75 miles east of Schlein Ranger Station</td>
<td>El Dorado</td>
<td>Loon Lake (3812083)</td>
<td>NRIS, Nov. 2020 (OPPU3_0 01-01)</td>
<td>9-Jul-2004</td>
<td></td>
<td>Eldorado NF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>FR3 MP 27.02, 3.1 mi E of FR33 -- SW of Loon L, El Dorado NF</td>
<td>El Dorado</td>
<td>Loon Lake (3812083)</td>
<td>Califlora, Jan. 2021 (wb1194-2410)</td>
<td>10-Jun-2012</td>
<td>1+ individuals</td>
<td>Eldorado NF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>El Dorado</td>
<td>Loon Lake (3812083)</td>
<td>NRIS, Nov. 2020 (OPPU3_0 01-01)</td>
<td>28-Jun-2016</td>
<td></td>
<td>Eldorado NF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Loon Lake Road, Chipmunk Butte, 0.75 miles east of Schlein Ranger Station</td>
<td>El Dorado</td>
<td>Loon Lake (3812083)</td>
<td>NRIS, Nov. 2020 (OPPU3_0 01-01)</td>
<td>3-Aug-2016</td>
<td></td>
<td>Eldorado NF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>El Dorado</td>
<td>Loon Lake (3812083)</td>
<td>NRIS, Nov. 2020 (OPPU3_0 01-01)</td>
<td>14-Aug-2018</td>
<td>6 individuals</td>
<td>Eldorado NF</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Duplicate records from the same site are given the same record number and are included in red. Rows containing questionable records are highlighted in red.

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<th>Land Mgr.</th>
<th>Elev. (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>El Dorado</td>
<td>El Dorado</td>
<td>Loon Lake (3812083)</td>
<td>NRIS, Nov. 2020 (OPPU3_0 01-01)</td>
<td>30-May-2019</td>
<td></td>
<td></td>
<td>Eldorado NF</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>El Dorado</td>
<td>El Dorado</td>
<td>Loon Lake (3812083)</td>
<td>Calflora, Jan. 2021 (gp19034)</td>
<td>19-Sep-2019</td>
<td>1+ individuals</td>
<td></td>
<td>Eldorado NF</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>El Dorado</td>
<td>El Dorado</td>
<td>Loon Lake (3812083)</td>
<td>NRIS, Nov. 2020 (OPPU3_0 01-01)</td>
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<td>Leech Lake Mtn. (3912381)</td>
<td>CCH2, Nov. 2020 (CHSC101 615)</td>
<td>5-Jul-2000</td>
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<td>Mendocino NF</td>
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<td>1-Aug-2000</td>
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<td>1-Aug-2000</td>
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Species Account: *Ophioglossum pusillum*  

Duplicate records from the same site are given the same record number and are included in red. Rows containing questionable records are highlighted in red.

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<th>Rec. #</th>
<th>Locality</th>
<th>County</th>
<th>Quad</th>
<th>Ref. (Source)</th>
<th>Date Last Obs'd</th>
<th>Population Info</th>
<th>Threats</th>
<th>Land Mgr.</th>
<th>Elev. (ft.)</th>
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<td>WATERS RECREATION SITE- MENDOCINO NATIONAL FOREST.</td>
<td>Lake</td>
<td>Crockett Peak (3912247)</td>
<td>CNDDDB, Jan. 2021 (EO 5)</td>
<td>7-Jul-2007</td>
<td>ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 2007 GREENHOUSE OBSERVATION. NEEDS FIELDWORK.</td>
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<td>Mendocino NF</td>
<td>5200</td>
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<td>Mendocino National Forest; Waters Camp W of Upper Nye Meadow N of Snow Mountain Wilderness</td>
<td>Lake</td>
<td>Crockett Peak (3912247)</td>
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<td>Lake</td>
<td>Crockett Peak (3912247)</td>
<td>Calflora, Jan. 2021 (jgr25319)</td>
<td>7-Jul-2007</td>
<td>1+ individuals</td>
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</tbody>
</table>
Appendix 2: Additional Considerations at the Forest Level

<This section, including the next 5 subheadings, would be filled out by Forest Service botanists.>

<Forest Name>

Geographic distribution within the Forest

A. Scarce or isolated
B. Patchy or gaps
C. Contiguous

<Select a geographic distribution rank and provide references or cite ‘specialist expertise, <name>’ where appropriate.>

Abundance of the species on the Forest

A. Rare – current abundance is low enough that stochastic and other factors could lead to potential imperilment.
B. Uncommon – current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.
C. Common – current abundance is large enough that species persistence is not threatened by demographic stochasticity in combination with environmental variation.
D. Insufficient information to draw inferences about criterion.

<Select a species abundance rank and provide references or cite ‘specialist expertise, <name>’ where appropriate.>

Population trend on the Forest

A. Significant downward or suspected downward population trend.
B. Stable population.
C. Upward population trend.
D. Insufficient information to draw inferences about criterion.

<Select a population trend rank and provide references or cite ‘specialist expertise, <name>’ where appropriate.>

Habitat trend on the Forest

A. Decline in habitat quality or quantity.
B. Stable amounts of suitable or potential habitat, relatively unchanged habitat quality.
C. Improving habitat quality or increasing amounts of suitable or potential habitat.
D. Insufficient information to draw inferences about criterion.

<Select a habitat trend rank and provide references or cite ‘specialist expertise, <name>’ where appropriate.>
Vulnerability of habitat on the Forest

A. Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on NRV, and/or habitat is impacted by modern stressors such as drought, climate change, high intensity wildfire and wildfire suppression disturbances, loss of natural openings due to historical wildfire suppression, nonnative invasive species, water impoundments and diversions, and recreation, etc.

B. Habitat modification is likely to result in ecological patterns similar to the range of historical conditions, but is being impacted by modern stressors.

C. Habitat resilient, changes are similar in frequency and intensity to those expected from NRV, and modern stressors not significant.

D. Insufficient information to draw inferences about criterion.

<Select a habitat vulnerability rank and provide references or cite ‘specialist expertise, <name>’ where appropriate.>

Additional Forest specific information related to the SCC determination

<This section is provided for Forest botanists to add additional Forest specific information that is not captured in the section above, if necessary. Provide a narrative description here of the additional relevant information. State “No additional information” if this section is not used.>