

FIELD INVESTIGATIONS OF THREE
REGION 1 SENSITIVE SPECIES
ON THE CLEARWATER NATIONAL FOREST:

ASPLENIUM TRICHOMANES (MAIDENHAIR SPLEENWORT),
THELYPTERIS NEVADENSIS (SIERRA WOODFERN),
AND DODECATHEON HENDERSONII (HENDERSON'S SHOOTING STAR);

PLUS NEW LOCATIONS FOR ADDITIONAL SENSITIVE SPECIES

by

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ABSTRACT

A field investigation of three sensitive plant species, each with highly restricted distributions in Idaho, was conducted on the Clearwater National Forest by the Idaho Department of Fish and Game's Natural Heritage Program. The investigation was a cooperative Challenge Cost-share project between the Department and the Clearwater National Forest.

Asplenium trichomanes (maidenhair spleenwort) has an interruptedly circumboreal distribution with southern extensions into the United States. One such extension is in northern Idaho where a single location is documented from the Clearwater National Forest along a small tributary of the North Fork Clearwater River. This Idaho population of maidenhair spleenwort was not relocated during this investigation and the species is now believed to be extirpated from this site, and perhaps the state of Idaho. However, potentially suitable habitat exists within the same general vicinity and additional populations may occur. I therefore recommend that Asplenium trichomanes be maintained as a Sensitive Species for the Clearwater National Forest.

Thelypteris nevadensis (Sierra wood-fern) is a Pacific coastal disjunct in northern Idaho. Principal populations of this species occur along the west slopes of the Cascade Mountains, extending south through the central Sierra Nevadas. The only population east of the Cascade-Sierra crest is in a low-elevation seepage of the North Fork Clearwater River drainage in northern Idaho. During this investigation, this population of Sierra wood-fern was relocated, but no additional sites were found. Because the species is restricted to a single location in Idaho, I recommend that Thelypteris nevadensis be maintained on the Region 1 Sensitive Species List for the Clearwater National Forest.

Dodecatheon hendersonii (Henderson's shooting star), is a Pacific coastal species, with its principal distribution occurring west of the Cascade summits. Two populations had been documented for northern Idaho, Grasshopper Creek along the North Fork Clearwater River and Cache Creek along the Selway River. These two reported sites of Henderson's shooting star appear to be misidentifications. Although a number of other Pacific coastal species do exhibit disjunction in this region, the species is not presently believed to exist in Idaho. Based on this recent information, I recommend that Dodecatheon hendersonii be dropped from the Region 1 Sensitive Species List.

Within this same geographic vicinity, high concentrations of additional Sensitive Plant Species are found. While conducting field investigations during the 1989 field season, new locations for 38 sensitive species and 6 watch species were found, including two Region 1 Sensitive Species previously unknown from the Clearwater National Forest. Documentation of these species is also included in this report.

Several recommendations are made relative to the long-term viability and conservation of maidenhair spleenwort, Sierra wood-fern, and Henderson's shooting star on these forest lands.

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INTRODUCTION

The National Forest Management Act and Forest Service policy require that Forest Service land be managed to maintain populations of all existing native animal and plant species at or above the minimum viable population level. A minimum viable population consists of the number of individuals, adequately distributed throughout their range, necessary to perpetuate the existence of the species in natural, genetically stable, self-sustaining populations.

The Forest Service, along with other Federal and State agencies, has recognized the need for special planning considerations in order to protect the flora and fauna on the lands in public ownership. Species recognized by the Forest Service as needing such considerations are those that (1) are designated under the Endangered Species Act as endangered or threatened, (2) are under consideration for such designation, or (3) appear on a regional Forest Service sensitive species list.

Asplenium trichomanes (maidenhair spleenwort), Thelypteris nevadensis (Sierra woodfern), and Dodecatheon hendersonii (Henderson's shooting star) have highly restricted distributions in northern Idaho. These species are presently listed as a Region 1 Sensitive Species for the Clearwater National Forest. During the 1989 field season an investigation of these species was conducted by the Idaho Department of Fish and Game's Natural Heritage Program.

The primary objectives of this investigation were to:

- 1) Relocate and survey the documented populations of Asplenium trichomanes, Thelypteris nevadensis, and Dodecatheon hendersonii on the Clearwater National Forest.
- 2) Survey for potential habitats and new populations on National Forest lands.
- 3) Acquire population data and characterize habitat conditions for populations.
- 4) Search for additional listed Sensitive and Watch Plant Species for the Clearwater National Forest.
- 4) Assess population trends and threats to existing populations of these sensitive species and make management recommendations to the forests based on these assessments.

Asplenium trichomanes L.

CURRENT STATUS USFS Region 1 Sensitive Species

TAXONOMY

Family: Polypodiaceae (Fern)

Common Name: maidenhair spleenwort

Citation: Linnaeus, C. 1753. Species Plantarum. 2 vols. Page 1080. Stockholm.

Synonyms: Chamaefilix trichomanes Farw.

Technical Description: see Caicco (1987b) and Cronquist (1969a)

Nontechnical Description: Small, evergreen fern with clustered, spreading leaves, 0.7-3.5 dm long. Leaves are once-pinnate (single set of leaflets) with opposite or offset leaflet pairs that reduce in size towards the leaf tip. Rachis (leaf "stem") is reddish-brown and often remains several years after old leaflets have fallen. Spore clusters (sori) are covered by a conspicuous flap-like cover (indusium) on leaflet undersides.

Distinguishing Features and Similar Species: Maidenhair spleenwort is a rather inconspicuous species that must be searched for diligently. The species inhabits moist rock crevices and talus slopes. Within this habitat, search for a small, evergreen fern with few, roundish, pinnae along a glossy, reddish-brown rachis. The bare rachises persist for several years after the pinnae have been shed and may be even more numerous than the living fronds (Taylor 1970)(see Appendix I).

No similar species to maidenhair spleenwort are known to occur within the same habitat and range. The only other spleenwort found in the Pacific Northwest is Asplenium viride, which is documented for a single site in far southeastern Idaho (Bear Lake County). Unlike maidenhair spleenwort, Asplenium viride possesses a green rachis with glandular hairs, is weakly evergreen, and restricted to limestone or other basic rock. Superficially, Pellaea bridgesii also resembles maidenhair spleenwort, however, this species inhabits open, rocky slopes and the naked sori occur in radial rows near the pinnae margins.

DISTRIBUTION

Range: Maidenhair spleenwort has an interruptedly circumboreal distribution with southern extensions into the United States. In the Pacific Northwest the species extends south into Oregon and northern Idaho. A single location is documented for Idaho from a small tributary of the North Fork Clearwater River (see Appendix II). For documentation this location is:

F.D. Johnson (Herb. #7164) 20 November 1971. Idaho, Clearwater Co., Middle June Creek, North Fork Clearwater River, 19 mi North of Headquarters; on mossy rocks near streambottom; 3500 ft elev., very steep slope, NE exposure. Thuja plicata climax. Rare.

Fred Johnson (1989) apparently found the species during a hunting expedition and "stuffed" it in his pocket. Later that night he pressed the plant, but was unable to map the exact locality at the time, and cannot now recollect the exact site with certainty. Apparently, he did try to relocate the species a few years following the original collection, but timber harvesting had occurred at the site during the intervening period and his search was fruitless. Steve Caicco (1987b) was also unable to relocate the species and concluded that the site may have been extirpated.

During the 1989 field season, I conducted yet another search along June Creek, again with no success. Most of my survey encompassed that portion of June Creek bisected by Forest Service Road #246. Many mossy rocks along the creek were located, however, no maidenhair spleenwort was found. I concur with Caicco (1987b) that the species is likely extirpated from this locality, and possibly the state of Idaho.

Habitat and Associated Species: Maidenhair spleenwort occurs in moist, rocky, cliff crevices and talus slopes. Taylor (1970) indicates that maidenhair spleenwort prefers calcareous rocks.

Although the exact location of the single Idaho collection is not known, the community surrounding the vicinity is relatively uniform. The likely habitat is along the boulder bed of a perennial creek in a Thuja plicata/Oplopanax horridum (western redcedar/devil's club) habitat type (Cooper et al. 1987).

Species commonly found growing with maidenhair spleenwort include a number of mosses and Polypodium hesperium. Nearby it is common to find Oplopanax horridum, Asarum caudatum, Athyrium filix-femina, and Disporum hookeri.

STATUS

Ownership: The only documented Idaho location for maidenhair spleenwort occurs on land administered by the North Fork Ranger District of the Clearwater National Forest.

Threats: Timber harvest and other habitat-altering activities such as road building and rock quarries pose the most significant threat to maidenhair spleenwort.

Management Implications: It is possible that the extirpation of the single known Idaho location was directly due to timber harvesting activities. Despite the fact that no other maidenhair spleenwort populations are known for Idaho, what appears to be suitable habitat exists in the same general vicinity. Maidenhair spleenwort may occur in the area, but has been previously overlooked or not yet discovered. The Forest should carefully consider the impacts of its current and future management activities on the conservation status of maidenhair spleenwort.

ASSESSMENT AND RECOMMENDATIONS

Summary: Maidenhair spleenwort is an interruptedly circumboreal fern species. In the Pacific Northwest this species extends south into Oregon and northern Idaho. Prior to this investigation, a single population of maidenhair spleenwort was documented from Idaho, occurring along middle June Creek, a tributary of the North Fork Clearwater River. This population and suitable surrounding habitat occurs on land administered by the Clearwater National Forest.

Two surveys within the past 3 years have failed to relocate this population. It appears that timber harvest activities have extirpated maidenhair spleenwort from this Idaho site, and possibly from the state. However, what seems to be suitable habitat, mossy rocks in a dense western redcedar community, occurs in the same general vicinity. It is conceivable that other populations are present, but have not yet been located.

Recommendations to the Clearwater National Forest: Although no other populations are known for Idaho, suitable habitat occurs within the immediate vicinity. Maidenhair spleenwort is a rather inconspicuous plant that could easily be overlooked. Therefore, I recommend that Asplenium trichomanes be maintained on the Sensitive Species list for the Clearwater National Forest. Since two recent investigations have failed to locate this species, further surveys specifically directed at this species, do not seem warranted at this time. However, clearance surveys should be conducted for any projects in suitable habitat along the North Fork Clearwater River and tributaries that may support maidenhair spleenwort populations.

Thelypteris nevadensis (Baker) Clute

CURRENT STATUS USFS Region 1 Sensitive Species

TAXONOMY

Family: Polypodiaceae (Fern)

Common Name: Sierra wood-fern

Citation: Clute ex Morton. 1958. Am. Fern Journal 48:139.

Synonyms: Aspidium nevadense D.C. Eat.
Nephrodium nevadense Baker
Dryopteris nevadensis Underw.
Dryopteris oregana C. Chr.
Filix oregana Farw.
Thelypteris oregana St. John
Lastrea oregana Copeland

Technical Description: Deciduous perennial from a slender, horizontal rhizome; fronds erect, narrow, few, in a small compact tuft, 3-8 dm tall and 15 cm wide, bipinnate with toothed or entire, often revolute-margined pinnules, villous-puberulent or villous-hirsute along rachis and costae; pinnae linear to linear-lanceolate in 35-40 opposite or offset pairs, the larger upper pinnae are close together, the lower distant and strongly reduced; sori are small, generally borne close to the margins of the pinnules; indusia horseshoe-shaped, inconspicuous, glandular (Cronquist 1969c, Taylor 1970).

Nontechnical Description: Delicate, pale green, deciduous fern emerging in a small compact clump from a slender rhizome. The leaves are few, erect to arching, 3-8 dm tall and quite narrow (max. ca 15 cm wide). Leaves are twice-pinnate (twice divided leaflets) with 35-40 opposite or off-set leaflet pairs. The upper leaflets are larger and close together, the lower are greatly reduced in size and quite far apart. Spore clusters (sori) are covered by an inconspicuous, horseshoe-shaped cover (indusium) on leaflet undersides.

Distinguishing Features and Similar Species: Sierra wood-fern is difficult to locate due to its tendency to resemble a number of very common northern Idaho ferns. Additionally, the species occurs in typical fern habitats, thus it can easily be overlooked. Once you have located suitable habitat, two key characters can be used to distinguish Sierra wood-fern. The fronds of this species are distinctly narrower and more "delicate" than most of the similar ferns species. Of course, this is a subjective judgement, but a frond averaging 5-8 dm tall and only 10-15 dm wide is not common. The second character for identification is the strongly reduced and distant lower pinnae (see Appendix I for drawing). No other fern in the Clearwater region exhibits this character to such an extent, and once observed, it is quite distinct. Unfortunately, both of these characters are impossible to distinguish from a distance and when in the middle of a dense fern patch identification can prove difficult, even with close observation. The best way to locate this species is by familiarizing yourself with the overall "look" of the taxon. Observations of herbarium specimens, photographs, or live material is essential towards expediting field identification.

The fern species which will cause the most confusion with Sierra wood-fern is Athyrium filix-femina (lady-fern). This species is extremely common in moist habitats. Moreover, lady-fern is quite tall, averaging 1 meter, and has reduced lower pinnae. However, the pinnae are not distantly distributed along the lower leaf stem, and the fronds of lady-fern are much broader (up to 5 dm wide). Even so, these are characters that require close observation.

DISTRIBUTION

Range: Sierra wood-fern is a Pacific coastal disjunct with a restricted distribution in northern Idaho. A disjunction exists when a population segment is separated by some distance from the main, or principal population (Johnson 1983).

In the case of Thelypteris nevadensis, the principal distribution occurs along the west slopes of the Cascade and Sierra Nevada Mountains, from Mt. Rainier, Wash. to Toulumne County in central California (Cronquist 1969c). A single location is documented for Idaho from a small tributary of the North Fork Clearwater River. This specimen was confirmed by Dr. David Wagner in January of 1972. For documentation this location is:

F.D. Johnson and R. Steele (Herb. #7156) 19 September 1971. Idaho, Clearwater Co., Elmer Creek Trail, just below 1st grove of big cedars, 1/4 mile above Isabella Creek; 3300 ft elev., no slope, western exposure, alluvium soils; Thuja/ Dryopteris (seral) community with Equisetum sylvaticum. Rare. Note: 1st record for Idaho.

During the 1989 field season, this site was successfully relocated along a seepage above Elmer Creek (see Appendix II). The population appears vigorous and consists of an estimated 200 to 500 plants. Elmer Creek Trail (# 96) runs right through the population and habitat, which aids in relocation, but simultaneously poses a significant potential threat.

Searching for this species proved to be an extremely time-consuming procedure. During the 1989 field season, I surveyed an overwhelming number of fern patches in the North Fork Clearwater River drainage, with no success. Moreover, no other Sierra wood-fern populations were found in the general vicinity of the known population. I was particularly surprised not to find the species in the nearby Heritage Cedar Grove (1/2 mile further northwest along Elmer Creek Trail). At present it appears that this species is restricted to this single location in Idaho.

Habitat and Associated Species: Sierra wood-fern occurs in moist woods, seepages or springs, damp meadows, and steambanks from foothills to middle altitudes in the mountains (Cronquist 1969c, Taylor 1970). The single Idaho populations occurs within a seepage above Elmer Creek, a tributary of Isabella Creek, which empties into the North Fork Clearwater River (see Appendix VII). It appears that a high water table is essential for Sierra wood-fern. Consequently, other species commonly found growing in the same habitat include moisture-loving taxa such as Equisetum sylvaticum, Senecio triangularis, Boykinia major, Habenaria saccata, and Veratrum viride. The easiest identifiable associate is Equisetum sylvaticum, a dominant species at this site. Also scattered in the same habitat was Athyrium filix-femina, which as mentioned previously, can be confused with Sierra wood-fern. However, Sierra wood-fern far outnumbers lady-fern at this site and once the two species are side-by-side their differences are quite apparent.

The Idaho population of Sierra wood-fern occurs within a cool, moist habitat at a moderately high elevation (approx. 3200 ft.). Many of the species found in association with Sierra wood-fern are indicators of cooler habitat conditions. In this respect Sierra wood-fern is atypical for many of the coastal disjuncts and does not appear grouped with them.

The actual seepage probably keys closest to a Thuja plicata/ Athyrium filix-femina habitat type, however, coverage of lady-fern is quite low and likely replaced by Sierra wood-fern. The surrounding community keys to a Thuja plicata/Gymnocarpium dryopteris (western redcedar/oak fern) habitat type (Cooper et al. 1987).

STATUS

Ownership: The only documented Idaho location for Sierra wood-fern occurs in a portion of roadless land just south of the Mallard-Larkins Pioneer Area. This land is administered by the North Fork District of the Clearwater National Forest.

Threats: Trail maintenance and other habitat altering activities such as road building and timber harvest pose the most significant threats to Sierra wood-fern. The specific site that presently supports this population is bisected by Elmer Creek Trail (#96). Trail improvement and/or maintenance could threaten this populations, especially if the present water flow was somehow disrupted or altered.

Management Implications: Presently, the single known site of Sierra wood-fern in

Idaho does not appear to be in jeopardy. However, no further disruption or altering of the existing water conditions at the site should be allowed. Such action could prove deleterious to the survival of this population and the species' presence in Idaho. Current and future activities should be carefully monitored by the Forest with regard to their impact on the conservation status of Sierra wood-fern.

ASSESSMENT AND RECOMMENDATIONS

Summary: Sierra wood-fern is a Pacific coastal disjunct in northern Idaho. A single documented population of this fern occurs east of the Cascade crest in northern Idaho, along a seepage above Elmer Creek, a small tributary of the North Fork Clearwater River. This Idaho population consists of less than 500 plants and is bisected by Elmer Creek Trail (# 96). Land supporting this population and suitable surrounding habitat is administered by the Clearwater National Forest.

No new populations of Sierra wood-fern were located during the 1989 field season, despite extensive surveys of fern patches in the North Fork Clearwater River drainage. At present it appears that this species is restricted to this single location in Idaho. However, what seems to be suitable habitat occurs in the same general vicinity and it is conceivable that other populations are present, but have not yet been found.

Recommendations to the Clearwater National Forest: A single population of Sierra wood-fern is documented for Idaho along a seepage above Elmer Creek, within the North Fork Clearwater River drainage. Because of its highly restricted distribution in Idaho, I recommend that *Thelypteris nevadensis* be maintained on the Sensitive Species list for the Clearwater National Forest. Although no other Idaho populations are known, what seems to be suitable habitat occurs within other areas of the state, particularly on lands administered by the Clearwater and possibly the Panhandle National Forests.

It appears that Sierra wood-fern requires a narrow set of hydrologic conditions. Trail construction undoubtedly altered the natural water flow. Since we have no record of this population prior to the trail, we cannot substantiate whether such action had a positive or negative effect on the population. Therefore, I would recommend against any further disruption or altering of the present hydrologic conditions, since such actions could have deleterious consequences for this population. To assure protection from damage that may be incurred by trail use and maintenance, I recommend that the Forest seriously consider moving that section of the Elmer Creek Trail completely away from the Sierra wood-fern population. To maintain the existing hydrologic condition, I recommend leaving the wooden planks in place and allowing for natural restoration to occur. This should be relatively easy to accomplish since the actual population is not very extensive.

Clearance surveys should be conducted for any projects in suitable habitat along the North Fork Clearwater River and tributaries that may support Sierra wood-fern populations. Moreover, land managers and field personnel on the Clearwater National Forests should be informed of Sierra wood-fern in their area. Possible sightings of this plant should be documented by specimens (if the size of the populations warrants collecting), and should include fronds, roots and spores, if possible. Specimens should be sent to the University of Idaho Herbarium for verification of their identity. Confirmed sightings of this species should be reported to the Idaho Natural Heritage Program for entry into their permanent data base on sensitive species.

Recommendations to the Panhandle National Forests: Habitat and associated species appears to indicate that this species prefers cooler moist microhabitat within the western redcedar zone. If this is the case, potentially suitable habitat occurs on the Panhandle National Forests.

Land managers and field personnel on the Panhandle National Forests should be informed of the existence of Sierra wood-fern in northern Idaho. Possible sightings of this plant should be documented by specimens and sent to the University of Idaho Herbarium for verification of their identity. Confirmed sightings of this species should be reported to the Idaho Natural Heritage Program for entry into their permanent data base on sensitive species.

Dodecatheon hendersonii Gray

CURRENT STATUS USFS Region 1 Sensitive Species

TAXONOMY

Family: Primulaceae (Primrose)

Common Name: Henderson's shooting star

Citation: Gray, A. 1886. Botanical Gazette. 11:233.

Synonyms: Dodecatheon neadua var. hendersonii Grandg.
Dodecatheon integrifolium var. latifolium Piper
Dodecatheon cruciatum Greene
Dodecatheon atratum Greene

Technical Description: see Caicco (1987b) and Hitchcock (1959)

Nontechnical Description: Perennial herb with a 1-3 dm tall stem from a rosette of basal leaves. The leaves are 3-14 cm long, ovate to deltoid in shape, smooth to remotely toothed, and contracted to an abrupt petiole. Flowers are clustered at the top of the stem and covered with glandular hairs. Flowers are 15-25 mm long and ranging in color from deep magenta to light orchid, with strongly reflexed lobes. Anthers are 4-6 mm long, deep purple, supported by filaments that unite into a tube 2-4 mm long. Numerous, small, rice-like bulblets are found among the roots at flowering time. Fruit is a capsule that opens by an operculum (small cap at the top). Henderson's shooting star is an early spring bloomer, flowering from March through June (see Appendix I for drawing).

Distinguishing Features and Similar Species: Four key characters help distinguish this species of shooting star from other purple-flowered species in the Pacific Northwest. The basal leaves tend to be broadly ovate and are abruptly contracted to a narrow petiole. Additionally, the inflorescence is often covered with glandular hairs. If in flower, the rice-like bulblets found among the roots are quite distinct, and uncommon in this genus. Lastly, the operculate capsules can be used for final verification of Henderson's shooting star.

DISTRIBUTION

Range: Henderson's shooting star is principally distributed west of the Cascade summits. It occurs from Vancouver Island, British Columbia, southward along the west slopes of the Cascade Mountains to the coast in Washington and Oregon. In California the species occurs below 4000 feet in the Coast Range to San Benito County and in the Sierra Nevadas to Tulare County. Two disjunct populations have been documented for northern Idaho, one lies along Cache Creek in the Selway River canyon, while the other is near Canyon Work Center in the North Fork Clearwater River canyon (see Appendix II). For documentation these sites are:

R. Steele, s.n. (IDF accession #70165), 23 May 1970. Idaho, Clearwater Co., Grasshopper Creek, N. Fk. Clearwater River, just above Canyon Ranger Station; 1700 ft elev., 60% slope, west exposure, granitic soils; Thuja plicata/Adiantum pedatum habitat type. Occasional.

R. Steele, s.n. (IDF accession #7037), 2 May 1970. Idaho, Idaho Co., Cache Creek, Selway River, about 5 mi W of Selway Guard Station and 14 mi E of Lowell; 1600 ft elev., southwest slope, granitic soils; beneath near-climax Thuja plicata/Adiantum pedatum habitat type with Clintonia uniflora and Polystichum munitum.

The Cache Creek specimen was sent to C.L. Hitchcock who confirmed the identification as Dodecatheon hendersonii in November 1973. He based this identification on the broad sinuate leaf blades, blades narrowed abruptly to petioles, and what appears to be glandular pubescence in the inflorescence.

An investigation of Henderson's shooting star in Idaho conducted in 1987 (Caicco 1987a, 1987b) failed to relocate either of these populations. During the 1989 field

season I was able to locate a Dodecatheon at Cache Creek and found similar populations along the Selway and Lochsa Rivers. The specimens collected at these locations, including Cache Creek, did not fit the description of Dodecatheon hendersonii. This raised serious doubts about the earlier Steele collections and the existence of Henderson's shooting star in Idaho. I therefore reevaluated the collections made in 1970 and created a conspectus of character states using the description of Dodecatheon hendersonii from Cronquist (1959) and Hitchcock and Cronquist (1973) and comparing them to the two specimens collected by Steele (Table 1).

Based on this evidence, it seems clear that C.L. Hitchcock was mistaken in the Cache Creek specimen Dodecatheon hendersonii. Steve Brunsfeld (1989), concurred with my findings. I base my conclusion on the following character differences.

- 1) Glandular inflorescence - questionable at best. Better "developed" on the Cache Creek specimen and altogether absent from the Grasshopper Creek specimen.
- 2) Rice-like bulblets in roots at anthesis - not present on either specimen and both specimens were in flower.
- 3) Blades constricted abruptly to petiole - character is highly variable within populations observed, from very constricted to gradual.
- 4) Capsule opening by operculum - not present on herbarium collections, but 1989 relocation confirmed that the Cache Creek population opens by valves.
- 5) Filament tube - dark maroon for Henderson's shooting star, yet both specimens have yellow filament tubes.

Table 1. Conspectus of character states for *Dodecatheon hendersonii* using the species description from Hitchcock (1959) and Hitchcock and Cronquist (1973) versus the two specimens collected by Steele.

| Character State | Species Description | Cache Creek | Grasshopper Creek |
|----------------------------|--|--|-------------------------------|
| -----SCAPE | | | |
| length pubes | 1-3 dm glabrous to glandular | 1.5-2 dm glabrous to scattered glands | 1.5-2 dm glabrous |
| LEAVES | | | |
| shape | ovate/deltoid | ovate | ovate |
| length | 3-14 cm | 7-14 cm | 6-8 cm |
| width | 2-6 cm | 2-4 cm | 2-3 cm |
| margin | entire to shallowly sinuate or remotely dentate | slightly denticulate | slightly denticulate |
| pubes petiole | glabrous abruptly narrowed | glabrous abruptly narrowed | glabrous abruptly narrowed |
| FLOWERS | | | |
| number | 2-15 | 2-3 | 1-3 |
| length | 15-25 mm | 20-26 mm | 20-23 mm |
| color | deep magenta to light orchid with yellow at base | deep magenta with yellow base | deep magenta with yellow base |
| pubes in inflor. | present/glandular | absent | absent |
| FILAMENT TUBE | | | |
| length | 2-4 mm | 1-2 mm | 2 mm |
| color | deep reddish-purple | yellow | yellow |
| FILAMENTS | | | |
| connectives | cross-rugose to smooth | smooth to lengthwise wrinkled | smooth to lengthwise wrinkled |
| conn. color | maroon | maroon | maroon |
| color | maroon | yellow | yellow |
| CAPSULE | | | |
| length opening | 7-12 mm operculate | 8-14 mm valvate | not present |
| ROOTS | | | |
| rice-like bulblets present | | absent | absent |

It is important to note that the collection sent to C.L. Hitchcock lacked any capsules, which would have eliminated any possibility of Henderson's shooting star. Additionally, these specimens possessed rather poorly developed roots, making the distinct rice-like bulblets questionable.

A reevaluation places these specimens into *Dodecatheon pulchellum* (Raf.) Merrill var. *pulchellum*, a common and widespread species. Hitchcock (1959) does not mention this species, and when using this flora the specimens key to *Dodecatheon pauciflorum* (Durand) Greene var. *alaskanum* (Hulten) C.L. Hitchc. This variety of *D. pauciflorum* has since been synonymized into *D. pulchellum* var. *pulchellum* (Hitchcock and Cronquist 1973).

Habitat and Associated Species: Not applicable because Henderson's shooting star does not occur in Idaho.

STATUS

Ownership: Not applicable

Threats: Not applicable

Management Implications: Not applicable

ASSESSMENT AND RECOMMENDATIONS

Summary: Two populations of Henderson's shooting star were thought to occur in northern Idaho. The two reported sites were from the Clearwater National Forest along Grasshopper Creek, just north of Canyon Work Center along the North Fork Clearwater River and near the mouth of Cache Creek along the Selway River in the Nez Perce National Forest. Based on our present knowledge, these reported sites of Henderson's shooting star appear to be misidentifications. Although a number of other Pacific coastal species exhibit disjunction in these regions, Henderson's shooting star is not presently believed to exist in Idaho.

Recommendations to the Regional Forester: Based on our present knowledge, it appears that Henderson's shooting star does not occur in Idaho. I, therefore, recommend that Dodecatheon hendersonii be dropped from the Sensitive Species list for the Clearwater and Nez Perce National Forests. This would consequently result in the removal of this species from the Region 1 Sensitive Species List.

ADDITIONAL SENSITIVE AND WATCH SPECIES

In the process of conducting investigations on selected sensitive plant species (Lorain and Moseley 1989, Lorain 1989) for the Clearwater National Forest during the 1989 field season, new sightings of other sensitive species were discovered. For purposes of providing a better understanding of these taxa and more precisely delineating their distribution, the results of these findings are documented here.

The 1989 field season focused on the low-elevations river canyons of the Clearwater drainage, including the North Fork Clearwater, Lochsa, and Selway Rivers. These narrow river canyons harbor high concentrations of sensitive species, both plant and animal and provide a unique microclimate of high precipitation and relatively moderate temperatures. Western redcedar (Thuja plicata) forest communities dominate these regions and support a unique assemblage of Pacific coastal disjunct species and endemic taxa.

The existence of Pacific coastal disjuncts within northern Idaho, is an unusual phenomenon. Presently, some 40 vascular plants can be classified as Pacific coastal disjuncts. All of these taxa have their major distributions west of the Cascade summits. Due to their limited distribution in the interior Pacific Northwest, many of these species are listed as Sensitive Plant Species for Region 1. A more complete explanation of this phenomenon is presented by Lorain (1988).

Summary of Findings:

Below is a list of the Region 1 Sensitive and Watch taxa found in 1989 and the number of new populations for each (see Appendix IV and VI for distribution maps).

| <u>Sensitive Species</u> | <u>Common Name</u> | <u># pops</u> |
|--------------------------|--------------------------|---------------|
| Blechnum spicant | deerfern | 1 |
| Botrychium minganense* | Mingan moonwort | 5 |
| Cardamine constancei | Constance's bittercress | 3 |
| Calochortus nitidus* | broad-fruit mariposa | 1 |
| Cypripedium fasciculatum | clustered lady's-slipper | 9 |
| Eburophyton austiniae | phantom orchid | 6 |
| Mertensia bella | Oregon bluebell | 1 |
| Trientalis latifolia | western starflower | 6 |
| Viola sempervirens | redwoods violet | 4 |

| <u>Watch Species</u> | <u>Common Name</u> | <u># pops</u> |
|-----------------------------------|--------------------|---------------|
| Carex hendersonii | Henderson's sedge | 1 |
| Corydalis caseana var. hastata | Case's corydalis | 2 |
| Polypodium glycyrrhiza | licorice fern | 4 |

| <u>State Rare Species</u> | <u>Common Name</u> | <u># pops</u> |
|---------------------------|--------------------|---------------|
| Tofieldia glutinosa | short-style | |
| var. brevistyla (?)* | sticky tofieldia | 1 |

*newly documented for the Clearwater National Forest

Five of these taxa have been previously investigated by the Idaho Natural Heritage Program:

| | |
|---------------------------------|---|
| Caicco (1987b) | Eburophyton austiniae Viola sempervirens |
| Caicco (1988a) | Cypripedium fasciculatum |
| Caicco (1987a; 1988a; 1988b) | Calochortus nitidus |
| Caicco (1987a) | Cardamine constancei |

No formal investigations have been conducted for the other taxa, however, most are listed in both the Sensitive Plant Field Guide (USDA Forest Service 1988) and Vascular Plant Species of Concern in Idaho (Rare and Endangered Plants Technical Committee of the Idaho Natural Areas Council 1981).

Two of the most interesting discoveries were the five populations of Botrychium minganense (Mingan moonwort) and one population of Calochortus nitidus (broad-fruit mariposa). Prior to 1989 these species were listed as Region 1 Sensitive Plants, but were not known to occur on the Clearwater National Forest (see Appendix IV and V).

Mingan moonwort was previously known in Idaho from only two sites on the Kaniksu National Forest (USDA Forest Service 1988). Five small populations were found within a 1/4 section near Pollock Creek in the Swamp Ridge Roadless Area, North Fork Ranger District (see Map D and Biological Assessment Report). An estimated total of 300 plants were found scattered throughout the dense, shaded, old-growth western redcedar understory. Some of these stands are quite pristine, with trees measuring 6 or more feet in diameter. Trees of this size have been conservatively estimated to be 500+ years old (Parker 1986). The habitat type keyed to a Thuja plicata/Asarum caudatum (western redcedar/wild ginger) with a sparse understory of Clintonia uniflora, Smilacina stellata, Anemone piperi, and Adenocaulon bicolor (Cooper et al. 1987).

The taxonomy of the moonworts (Botrychium) has recently been revised and the species Botrychium minganense is not treated in Cronquist (1969b) or Hitchcock and Cronquist (1973). In both floras this species keys to Botrychium lunaria (L.) Swartz var. onondagense (Underw.) House, which has since been synonymized with B. minganense. Broad-fruit mariposa, a Category 2 candidate for federal listing, was previously documented from a number of sites, principally within the Palouse Prairie grassland (Caicco 1987a, 1987b, 1988b). About 50 individuals were found on the Lochsa Ranger District near the mouth of Canyon Creek, a tributary of the Lochsa River (see Map D). This population is the first documented for the Clearwater National Forest. Plants were found scattered on a dry, grassy slope within an open Pseudotsuga menziesii series forest, with scattered Pinus ponderosa. The habitat type keyed closest to Pseudotsuga menziesii/Agropyron spicatum (Douglas-fir/bluebunch wheatgrass) with scattered Koeleria cristata, Carex geyeri, and Brodiaea douglasii (Cooper et al. 1987).

Four populations of the Watch Species Polypodium glycyrrhiza (licorice fern) were also located during the 1989 field season. Within the North Fork Clearwater River vicinity, one occasionally finds specimens of Polypodium that seem to represent hybrids between the coastally disjunct species (Polypodium glycyrrhiza) and the interior species (P. hesperium). The three populations of Polypodium located on the Clearwater National Forest during this survey seem to be hybrids.

Additionally, I relocated a collection of what is identified tentatively as Tofieldia glutinosa var. brevistyla, first discovered by Steve Brunsfeld at the mouth of Isabella Creek. Three plants were found inhabiting an open, rocky

riverbank and stream mouth, with running water between the rocks. Within this same habitat grows Alnus rubra, Equisetum sylvaticum, and Mentha arvensis. If this identification is confirmed, it represents the first Idaho location for this taxon.

Management Implications and Recommendations:

Botrychium minganense (Mingan moonwort) and Calochortus nitidus (broad-fruit mariposa) will need to be added to the Sensitive Plant Species list for the Clearwater National Forest, due to their recent discovery there. These populations need to be monitored and the forest should carefully assess any actions that could effect these taxa.

Due to the present sensitive status and rarity of Mingan moonwort, I recommend that at least a portion of the old-growth stand in which this species occurs be preserved. These stands are of exceptional quality and undoubtedly well over 500 years in age (Parker 1986). If the objectives of the Forest Service are to maintain some large-diameter trees in old-growth climax condition as they relate to the overall forest integrity and naturalness, then these areas represent exceptional examples of such conditions.

Of additional concern is the single population of Blechnum spicant (deer-fern), first sighted by John Pierce, along Chateau Rock Trail (#144). Information regarding this species in Region 1 is very sketchy. Only six other populations are known at present, five from the Clearwater National Forest and one from the Priest Lake vicinity. All are scattered and consist of very few individuals. This particular population is located directly along a trail that is used predominantly by summer and fall horse traffic. Damage or elimination of this population is quite possible due to its proximity to the trail. I recommend that the present trail be diverted around this population as soon as possible. This would be relatively easy to accomplish since the population is very small (approx 30 individuals) and is restricted to an area less than 3 yards square.

Data gathered during the 1989 field season has aided in delineating the distribution and habitat characteristics of a number of the Clearwater National Forests' Sensitive Plant Species. However, inventory and monitoring needs to be continued. Certain proposed land management activities provide some unique opportunities for monitoring. Those species restricted to older western redcedar habitats would benefit most from this type of study. Presently, we know very little about the autecology of many of these sensitive species and how they react to disturbances. Reaction to timber harvesting is of principal concern, since the Clearwater National Forest produces a high timber output. I, therefore, recommend the establishment of permanent monitoring plots within the Steep Creek proposed timber sale, North Fork District near Aquarius Campground. This site supports populations of Trientalis latifolia, Eburophyton austiniiae, Festuca subuliflora, and Viola sempervirens, which could be monitored and studied. Such action could document the effect of harvesting activities on a number of sensitive species and provide useful information for future management evaluations.

It appears that three genera, Botrychium, Polypodium, and Tofieldia, warrant more than basic inventory studies. Comprehensive taxonomic and/or identification studies, in addition to distributional investigations, are needed for these taxa. Since some of the species or varieties within these genera are listed as sensitive on the Forest and are being considered for federal listing, their exact status should be determined. Further investigations into the distribution and taxonomy of these groups, possibly combined with genetic studies, is warranted.

REFERENCES CITED

- Brunsfeld, S.J. 1989. Personal communication. Herbarium Curator, Coll. Forestry, Wildlife and Range Sciences, University of Idaho, Moscow.
- Caicco, S.L. 1987a. Field investigations of selected sensitive plant species on the Nez Perce National Forest. Idaho Natural Heritage Program, Idaho Department of Fish and Game, Boise, ID. 42 p. plus appendixes.
- Caicco, S.L. 1987b. Field investigations of selected sensitive plant species on the Clearwater National Forest. Idaho Natural Heritage Program, Idaho Department of Fish and Game, Boise, ID. 21 p. plus appendixes.
- Caicco, S.L. 1988a. Field investigations of selected sensitive plant species on the Clearwater National Forest. Idaho Natural Heritage Program, Idaho Department of Fish and Game, Boise, ID. 15 p. plus appendixes.
- Caicco, S.L. 1988b. Status report for Calochorus nitidus. Idaho Natural Heritage Program, Idaho Department of Fish and Game, Boise, ID. 54 p. plus appendixes.
- Cooper, S.V., K.E. Neiman, R. Steele, and D.W. Roberts. 1987. Forest habitat types of Northern Idaho: a second approximation. USDA Forest Service, Intermountain Research Station General Technical Report INT-236. Ogden, UT. 135 p.
- Cronquist A. 1969a. Asplenium. Pages 59-62 In: Vascular Plants of the Pacific Northwest, Part 1, by C.L. Hitchcock, A. Cronquist, M. Ownbey and J.W. Thompson. University of Washington Press, Seattle. 914 p.
- Cronquist A. 1969b. Botrychium. Pages 49-56 In: Vascular Plants of the Pacific Northwest, Part 1, by C.L. Hitchcock, A. Cronquist, M. Ownbey and J.W. Thompson. University of Washington Press, Seattle. 914 p.
- Cronquist A. 1969c. Thelypteris. Pages 93-97 In: Vascular Plants of the Pacific Northwest, Part 1, by C.L. Hitchcock, A. Cronquist, M. Ownbey and J.W. Thompson. University of Washington Press, Seattle. 914 p.
- Hitchcock, C.L. 1959. Dodecatheon. Pages 40-46 In: Vascular Plants of the Pacific Northwest, Part 4, by C.L. Hitchcock, A. Cronquist, M. Ownbey and J.W. Thompson. University of Washington Press, Seattle. 510 p.
- Hitchcock, C.L. and A. Cronquist. 1973. Flora of the Pacific Northwest. University of Washington Press, Seattle, WA. 730 p.
- Johnson, F.D. 1983. Glossary of ecological terms. Coll. Forestry, Wildlife and Range Sci. Exp. Sta., Univ. of Idaho, Moscow. 14 p.
- Johnson, F.D. 1989. Personal communication. Dept. of Forest Resources, University of Idaho, Moscow, ID.
- Linnaeus, C. 1753. Species Plantarum. 2 vols. Page 1080. Stockholm.
- Lorain, C.C. 1988. Floristic history and distribution of coastal disjunct plants of the northern Rocky Mountains. M.S. Thesis. University of Idaho, Moscow, ID. 221 p.
- Lorain, C.C. 1989. Field investigation of Festuca subuliflora (crinkle-awn fescue), a Region 1 sensitive species on the Nez Perce National Forest. Idaho Natural Heritage Program, Idaho Department of Fish and Game, Boise, ID. 8 p. plus appendixes.
- Lorain, C.C. and R.K. Moseley. 1989. Field investigation of Mimulus clivicola (bank monkeyflower), a Region 1 sensitive species on the Clearwater and Nez Perce National Forests. Idaho Natural Heritage Program, Idaho Department of Fish and Game, Boise, ID. 15 p. plus appendixes.

Parker, T. 1986. Ecology of western redcedar groves. PhD Dissertation. University of Idaho, Moscow, ID. 187p.

Rare and Endangered Plants Technical Committee of Idaho Natural Areas Council. 1981. Vascular plant species of concern in Idaho. Forest, Wildlife, and Range Experiment Station Bull. No. 34. University of Idaho, Moscow. 161p.

Taylor, T.M.C. 1970. Pacific Northwest ferns and fern-allies. University of Toronto Press, Toronto. 247 p.

USDA Forest Service. 1988. Sensitive plant field guide - Idaho. Northern Region, Missoula, MT.

APPENDIX I

Line drawings of Asplenium trichomanes,
Thelypteris nevadensis, and Dodecatheon hendersonii.
(taken from Cronquist 1969a, 1969c
Hitchcock 1959, and Taylor 1970)

APPENDIX II

Map of precise occurrence of Thelypteris nevadensis
and historical site of Asplenium trichomanes
in northern Idaho

Map A. Portion of Sheep Mountain 7.5' quadrangle
Map B. Portion of Mallard Peak 7.5' quadrangle

APPENDIX III

Demographic data for Asplenium trichomanes
and Thelypteris nevadensis
sites in northern Idaho

Asplenium trichomanes (Map A)

1. June Creek
 - a. Location:
 - b. Area: 1-10 yds²
 - c. Number of plants: <5 plants in 1971
 - d. Density: Low
 - e. Evidence of expansion/contraction: Unable to locate 1987 or 1989, believed extirpated

Thelypteris nevadensis (Map B)

2. Elmer Creek
 - a. Location:
 - b. Area: 10-100 yds²
 - c. Number of plants: 200-500 plants in 1989
 - d. Density: High
 - e. Evidence of expansion/contraction: Trail has obviously destroyed some of the population since it bisects it

APPENDIX IV

Map of precise occurrence of Sensitive Species
new to the Clearwater National Forest

Calochortus nitidus
Botrychium minganense

Map C. Lowell 7.5' quadrangle
Map D. Straight Peak 7.5' quadrangle

APPENDIX V

Demographic data for Sensitive Species new
to the Clearwater National Forest*

Botrychium minganense
Calochortus nitidus

* see also Festuca subuliflora report (Lorain 1989)

Botrychium minganense (Map D)

5. Pollock Creek
 - a. Location:
 - b. Area: 1/4 section - sparsely scattered throughout
 - c. Number of plants: ca 300 plants in 1989
 - d. Density: Low

Calochortus nitidus (Map C)

6. Lost Irishman Mine
 - a. Location:
 - b. Area: 10-100 yds²
 - c. Number of plants: 50 plants in 1989
 - d. Density: Low

APPENDIX VI

Mapped overview of distribution for Sensitive Species
on the Clearwater National Forest

Blechnum spicant
Cardamine constancei
Cypripedium fasciculatum
Eburophyton austiniae
Mertensia bella
Trientalis latifolia
Viola sempervirens

Watch Plant Species

Carex hendersonii
Corydalis caseana var. hastata
Polypodium glycyrrhiza

State Rare Species

Tofieldia glutinosa var. brevistyla

APPENDIX VII

Slides of rare plants on the Clearwater National Forest.

Carex hendersonii
Corydalis caseana var. hastata
Eburophyton austiniae
Mertensia bella
Polypodium glycyrrhiza X hesperium
Thelypteris nevadensis
Viola sempervirens