

FLORISTIC INVENTORY OF SUBALPINE PARKS IN THE
COEUR D'ALENE RIVER DRAINAGE, NORTHERN IDAHO

by

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ABSTRACT

Treeless summits and ridges in the otherwise densely forested mountains of northern Idaho, have a relatively unique flora compared with surrounding communities. Although small in area, these subalpine parks add greatly to the biotic diversity of the regional landscape and are habitats for several vascular taxa considered rare in Idaho. I conducted a floristic inventory of 32 parks in the mountains of the Coeur d'Alene River drainage and adjacent portions of the St. Joe drainage. The project is a cooperative one between the Idaho Department of Fish and Game's Conservation Data Center and the Idaho Panhandle National Forest. The subalpine park flora contains 151 taxa representing 97 genera in 34 families. *Carex* are surprisingly depauperate, in terms of both numbers and cover, as is the alien flora, which is comprised of only three species. I discovered populations of five rare species, including *Carex xerantica*, which is here reported for Idaho for the first time. Other rare species include *Astragalus bourgovii*, *Carex californica*, *Ivesia tweedyi*, and *Romanzoffia sitchensis*. Stevens Peak is the highest summit and is phytogeographically unique in the study area. It contains habitat for six taxa occurring nowhere else in the study area, all having high-elevation cordilleran or circumboreal affinities. I provide an annotated checklist of the flora of subalpine parks and provide status reviews of the five rare species.

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SECTION 1
INTRODUCTION AND RESULTS

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.

The only way to gain a complete understanding of species rarity within a geographic area is to conduct a comprehensive inventory of that area. Concerning the flora of subalpine parks in the Coeur d'Alene River drainage and vicinity, early work by John Leiberg in 1895, provided our first glimpse of the subalpine park flora in the vicinity of Stevens Peak and Mount Wiessner, although no list of the plants he collected was ever compiled (Leiberg 1895; 1897). Daubenmire studied the parkland on Grizzly Mountain during the 1950's or 1960's as part of a larger study of subalpine parks in northern Idaho and eastern Washington (Daubenmire 1981). Chuck Wellner collected plants on Pond Peak in 1975, and Wellner and I inventoried the parks on Pond Peak and Ulm Peak in 1986 (Moseley and Wellner 1987; 1988). I also collected plants on Rochat Peak in 1986, and Stevens Peak during July, 1992. Other plants collectors certainly visited subalpine parks in the Coeur d'Alene River area, but only a few of the collections of John Christ, William Baker, Steve Brunsfeld, and W.R. Moore are known to me. Through the floristic explorations of these botanists, several plants having a limited distribution in Idaho were discovered, including Forest Service Sensitive Species. The Idaho Panhandle NFs and the Idaho Department of the Fish and Game's Conservation Data Center entered into this cooperative project to systematically inventory subalpine parks in the area and fill gaps in our knowledge of the distribution and abundance of rare species. The primary objectives of this investigation are as follows:

- 1) Thoroughly inventory the vascular flora of subalpine parks in and around the Coeur d'Alene River drainage.
- 2) When occurrences of rare species are encountered, characterize population attributes and habitat conditions for each population and make management recommendations to the forest concerning their long-term

viability.

The study area included all nonforested parks in the subalpine zone of the Coeur d'Alene River drainage and a few in the upper North Fork St. Joe occurring above 5,800 feet (Figure 1). Summits below this elevation are usually covered by continuous forest or, in a few cases below 4,500, have parks on south-facing slopes that are dominated by *Agropyron spicatum* and *Festuca idahoensis*; the subalpine parks are all dominated by *Festuca viridula*.

Figure 1. Map of the Coeur d'Alene River study area.

RESULTS

After searching the literature and Conservation Data Center data bases, I found that the following seven rare plant species had the potential to occur in subalpine parks of the Coeur d'Alene River drainage and vicinity:

Astragalus bourgovii
Carex californica
Carex tumulicola
Carex straminiformis
Ivesia tweedyi
Romanzoffia sitchensis
Sedum lanceolatum var. *rupicolum*

This formed the target list of rare species for which I paid special attention during my floristic inventory. I was on the lookout, however, for species which may be new discoveries.

Two trips were made to the study area in 1993. The first took place during the period of July 10 through July 20, when I visited a majority of the subalpine parks. A second trip was made on September 17 to the Stevens Peak area. The 32 subalpine parks visited by me between 1986 and 1993 are listed in Appendix 1.

During my inventory I observed or collected 150 vascular species from subalpine parks of the study area. I relocated and discovered new populations of four of the target species, *Astragalus bourgovii*, *Carex californica*, *Ivesia tweedyi*, and *Romanzoffia sitchensis*. In addition, I discovered that a previously documented population of *Carex straminiformis* from Mount Wiessner was misidentified. It turned out that this sedge is actually *Carex xerantica*, which is the first known population in Idaho, and a significant range extension to the west.

With the completion of this project, nearly all subalpine parks in the Coeur d'Alene NF have been inventoried. I only visited a few parks in the upper North Fork St. Joe River drainage of the St. Joe NF during 1993. The remaining parks in the St. Joe drainage should be inventoried as soon as practicable, because many of the rare plant populations I discovered are either on, or south of the St. Joe - Coeur d'Alene divide.

The results of my floristic inventory are reported in the two sections that follow. Section 2 contains status reviews of the five rare species known from subalpine parks of the study area. Section 3 contains a checklist of the vascular flora of subalpine parks in the study area. It is in the form of a manuscript that will be submitted for publication in a scientific journal.

SECTION 2

RARE SPECIES

Following is the status of our knowledge of *Astragalus bourgovii*, *Carex californica*, *Carex xerantica*, *Ivesia tweedyi*, and *Romanzoffia sitchensis* in Idaho, including information on taxonomy, habitat, distribution, conservation status, and management recommendations for each species. Sections containing line drawings, distribution maps, areas searched, and slides of the five species and their habitats are appended to the end of the report.

Astragalus bourgovii Gray

TAXONOMY

Full bibliographic citation: Proc. Amer. Acad. 6:227. 1864.

Type specimen: Rocky Mountains on the British Boundary, Eugene Bourgeau in Palliser's expedition, 1858.

Pertinent synonym(s): None.

Common name: Bourgeau's milkvetch.

Size of genus: A vast genus, rivaled in size only by Carex, Solanum, and Senecio, its numbers variously estimated at 1200, 1600, and 2000 species, most highly developed in arid, continental, and Mediterranean climates, and is widespread in Asia, Europe, North America, and South America (Barneby 1964).

Family name: Fabaceae (Leguminosae).

Common name for family: Pea.

History of knowledge of taxon in Idaho: John Leiberg was the first to collect Bourgeau's milkvetch in Idaho, from the summit of Stevens Peak on August 5, 1895. I discovered the second population from a nearby summit in 1993.

Alternative taxonomic treatments: None.

LEGAL OR OTHER FORMAL STATUS

National:

U.S. Fish and Wildlife Service: Bourgeau's milkvetch is not a federal candidate.

U.S. Forest Service: Bourgeau's milkvetch currently has no Forest Service status.

Other current formal status recommendations: It is given a global rank of 5 by the Biodiversity Information Network - the International Association of Natural Heritage Programs and Conservation Data Centers (Moseley and Groves 1992). The G5 rank (on a scale of 1-5) indicates that Bourgeau's milkvetch is demonstrably secure globally.

State:

Idaho

Idaho Native Plant Society: Bourgeau's milkvetch is in the Idaho Native Plant Society (1993) Priority 1 category, the highest category of their list, indicating that it is extremely rare and vulnerable in Idaho.

Conservation Data Center: The Biodiversity Information Network state ranking for Bourgeau's milkvetch is S1, indicating that it is imperiled because of rarity in Idaho or because of other factors making it vulnerable to extinction (Moseley and Groves 1992).

Review of past status: None.

British Columbia

Straley et al. (1985) place Bourgeau's milkvetch in their highest category, R1, which contains plants that are represented by a single or few known populations, usually with only a few individuals in the populations.

DESCRIPTION

General nontechnical description: Bourgeau's milkvetch is a perennial emanating from a taproot that is branched at or immediately below the soil surface. The foliage, calyx, and fruit are covered with short black hairs. The stems are prostrate, trailing across the ground, and not more than 2 dm tall. The leaves are pinnately compound, with small, elliptic-lanceolate leaflets. The inflorescence is longer than the leafy stems, and has 5-10 small, pea-like flowers that are deep purple. The fruits are lanceolate and generally pendulous.

Technical description: Strigulose perennial from superficially or slightly subterranean caudices with numerous, clustered, prostrate stems 0.3-2.5 dm that are usually unbranched above the base; stems reduced at higher elevations and plant tufted or subcaulescent; leafstalk 2-10 cm, leaflets 11-19, elliptic-oblong or -lanceolate, usually mucronate or acute, 5-15 mm, glabrate above; lower stipules connate; racemes exerted mostly 4-10 cm and longer than the leafy stems, commonly reclinate, with (3) 5-10 soon spreading flowers 8-11 mm; pedicels in fruit 2.5-4 mm; calyx tube 3-5 mm, teeth 1.5-3 mm; corolla purple or bicolored; ovules 2-5; legumes spreading to pendulous, substipitate to stipitate 0.8-1.5 mm, unilocular, persistent, dehiscent, body ellipsoid-lanceolate to oblong, nearly straight, apiculate-tipped, laterally compressed, 10-15 x 3-4 mm, valves papery, black strigulose (Isely 1984).

Local field characters: Bourgeau's milkvetch is a small, prostrate plant, with short black hairs covering the foliage and fruit. It is the only high elevation Astragalus in northern Idaho, and the only one in the study area. It differs from all other legumes in the study area (Section 3) by its prostrate habit and pinnately compound leaves. Hedysarum boreale, the only other legume with pinnate leaves, is tall and erect, larger in every respect than Bourgeau's milkvetch.

Photos and line drawings: A line drawing of Bourgeau's milkvetch by Jeanne Janish appears in Hitchcock (1961a) and is reproduced in Appendix 2. Color slides of Bourgeau's milkvetch and its habitat are in the photographic collection of the Conservation Data Center, some of which appear in Appendix 5.

DISTRIBUTION

Global distribution: Main range of the Rocky Mountains from the sources of the Athabasca River, Alberta, south to the Belt, Bridger, and Anaconda ranges in western Montana, east to the Big Snowy Range in Fergus County, west to the Swan Range in Missoula County, and in the St. Joe Mountains, Shoshone County, Idaho (Barneby 1964).

Idaho distribution: Two populations in the St. Joe Mountains of Shoshone County.

Precise occurrences in Idaho: (the three digit code preceding each population is the Conservation Data Center occurrence number used as a reference number for that population):

Both populations occur on the crest of the St. Joe Mountains. See Appendix 3 for the distribution of Bourgeau's milkvetch in the study area and the occurrence record in Appendix 4 for further information.

Historical sites: None.

Unverified/undocumented reports: None, although a collection reported by Marcus Jones from the Sawtooth Range is probably an error (Barneby 1964).

HABITAT

General habitat description: Throughout most of its range, Bourgeau's milkvetch occurs on rocky crests and summits, talus slides, cliff ledges, and open rocky hillsides, most abundant near and above timberline, but descending along streams and locally persisting on gravel bars and moist grassy banks at middle elevations. It is commonly, but not exclusively on limestone,

4000-8500 feet (Barneby 1964). Both of the Idaho populations occur on rocky, windswept summits and on cliff ledges. Slopes range in declivity from nearly level to very steep, and it occurs on all aspects, although never very far from the ridgeline.

Geology and Soils: Belt Series metasediments with rocky soil.

Associated species: In Idaho, *Erigeron compositus*, *Ivesia tweedyi*, *Carex geyeri*, *Solidago multiradiata*, *Juniperus communis*, *Calamagrostis purpurascens*, *Saxifraga bronchialis*, *Arnica latifolia*, *Erysimum asperum*, *Trisetum spicatum*, *Selaginella scopulorum*, *Calochortus apiculatus*, *Hedysarum boreale*, *Saxifraga mertensiana*, *Arenaria aculeata*, *Lomatium sandbergii*, *Penstemon fruticosus*.

Other rare species: *Ivesia tweedyi* occurs with Bourgeau's milkvetch on Stevens Peak and is nearby at the other population. *Romanzoffia sitchensis* occurs nearby on Stevens Peak.

POPULATION BIOLOGY

Phenology: I'm unsure when growth begins, but all reproductive plants are in flower by mid-July and fruits begin to develop by late July. Seeds have dispersed by the beginning of September.

Population size and condition: The two populations each consist of several hundred individuals, occurring in locally dense populations. There is a wide distribution of size classes, possibly indicating good age class distribution; both reproductive and nonreproductive plants occur in the populations. The Stevens Peak (001) population is widely scattered over about 10 acres, while the population near Gold Hill (002) is confined to about 0.1 acre.

Reproductive Biology: Bourgeau's milkvetch reproduces by seed.

Biological Interactions: Unknown.

Competition: Unknown.

Herbivory: Unknown.

Land ownership: National Forest land administered by the Idaho Panhandle NFs, Wallace and Avery ranger districts.

Land use: Current land use in the vicinity of the northern Idaho populations is predominantly recreation.

ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

Threats to currently known populations: The two Idaho populations of Bourgeau's milkvetch are small and isolated. The greatest threat to these populations are a natural stochastic event related to environmental variability or genetic bottlenecks. The population is isolated from any obvious anthropogenic threats, although a lightly used hiking trail traverses the Stevens Peak population.

Recommendations:

- o Bourgeau's milkvetch should be added to the Regional Sensitive Species list due to its extreme rarity in Idaho.
- o Current management of the two populations appear compatible with the long-term viability of the species here, although they should be monitored periodically because of their small size.

Carex californica L.H. Bailey

TAXONOMY

Full bibliographic citation: Memoirs of the Torrey Botanical Club 1:9. 1889.

Type specimen: Bolander 4741, Mendocino, CA.

Pertinent synonym(s): C. polymorpha var. californica (Bailey) Keukenth.

Common name: California sedge.

Size of genus: More than 1,000 species occurring in all parts of the world, most abundantly in moist regions of the North Temperate Zone and the Arctic (Cronquist 1969).

Family name: Cyperaceae

Common name for family: Sedge

History of knowledge of taxon in Idaho: The first collection of California sedge that I know of was made by Constance and Pennel from Coolwater Ridge, between the Selway and Lochsa rivers, in 1937. Other collections were made from the Nez Perce, Clearwater, and Coeur d'Alene NFs through the early 1950's. No new populations have been discovered since, although three sites have been revisited in recent years (Caicco 1988; 1989; this report).

Alternative taxonomic treatments: None.

LEGAL OR OTHER FORMAL STATUS

National:

U.S. Fish and Wildlife Service: California sedge is not a federal candidate.

U.S. Forest Service: California sedge is currently a Forest Service Sensitive Species for the Idaho Panhandle, Clearwater, and Nez Perce NFs in Region 1 (U.S. Forest Service 1993).

Other current formal status recommendations: It is given a global rank of 5 by the Biodiversity Information Network - the International Association of Natural Heritage Programs and Conservation Data Centers (Moseley and Groves 1992). The G5 rank (on a scale of 1-5) indicates that California sedge is demonstrably secure globally.

State:

Idaho

Idaho Native Plant Society: California sedge is in the Idaho Native Plant Society (1993) Sensitive category, indicating that it has a small and localized distribution in Idaho that presently does not meet the criteria for classification as Priority 1 or 2, but whose populations and habitats may be jeopardized without active management or removal of threats.

Conservation Data Center: The Biodiversity Information Network state ranking for California sedge is S1, indicating that it is imperiled because of rarity in Idaho or because of other factors making it vulnerable to extinction (Moseley and Groves 1992).

Review of past status: In his review of this taxon for the Rare and Endangered Plants Technical Committee of the Idaho Natural Areas Council, Brunsfeld proposed that it be maintained on the State Watch List (Brunsfeld 1981).

California

California sedge is on the California Native Plant Society List 2, which includes plants that are rare, threatened or endangered in California, but are more common elsewhere (Smith and Berg 1988).

DESCRIPTION

General nontechnical description: Stems arising singly or few together from long, coarse, scaly, creeping rhizomes, 2-7 dm in height, lowest leaves strongly reduced to scales, with purplish or reddish-brown, nearly bladeless basal sheaths. Foliage leaves are flat, 2-5 mm in width, and are borne distinctly on the stem; the upper surface of the leaves is smooth and shiny, but the lower surface is pale and densely covered with minute glands difficult to see with a 10x hand lens, but obvious under a more powerful microscope. The inflorescence is sometimes very loose and open, but more often closely-flowered; several slender spikes are usually borne erectly on relatively short peduncles. The terminal one or two spikes are staminate (male), or may also have pistillate (female) flowers, and are mostly 1.5-3 cm in length. Other spikes range between 1-5 cm in length, and have between 10-35 pistillate flowers. Bract which subtends the lower/lowest spikes with well-developed sheath mostly 1-4 cm in long, shorter than the inflorescence (Caicco 1988).

Technical description: Culms arising singly or in small tufts from long, coarse, scaly, creeping rhizomes, 2-7 dm tall, strongly aphyllopodic, with purplish or reddish-brown, bladeless or short-bladed sheaths, the foliage leaves distinctly cauline, flat, 2-5

mm wide, glabrous and shining on the upper surface, the lower surface pale and densely covered with small, glandular papillae or minute, stipitate glands; spikes several, slender, the terminal one or two staminate or androgynous, mostly 1.5-3 cm long, the others pistillate, mostly (1) 2-5 cm long (10) 15- to 35-flowered, sometimes very loose and open, sometimes more closely flowered, all erect on relatively short peduncles not much exceeding the sheaths, or sometimes some of them basal or nearly so and slenderly long-pedunculate; bracts subtending the lower or lowest of the non-basal spikes with well-developed sheath mostly 1-4 cm long, seldom sheatless, the blade leafy but surpassed by the inflorescence; pistillate scales equaling or somewhat shorter than the perigynia, and often narrower, the pale or greenish midstripe minutely glandular-papillate, often excurrent as a short mucro or awn-tip, the broad, hyaline-scarious margins partly or wholly brownish or purplish; perigynia ascending-appressed, more or less elliptic; 3.3-5.0 mm long, including the stout, cylindrical, truncate or somewhat obliquely cleft-beak, this 0.5-1.0 mm long, the body of the perigynium finely and densely glandular-papillate, strongly 2-nerved, otherwise nerveless or obscurely several-nerved, distended by the achene but not tightly enclosing it, empty just under the beak, not at all flattened; stigmas 3; achene trigonous, 1.8-2.6 mm long, jointed to the style (Cronquist 1969).

Local field characters: The strong reduction of the lowest leaves to scales, the foliage leaves borne distinctly on the stem, and the densely-glandular lower leaf surface serve as useful characters in distinguishing California sedge from other species with similar technical descriptions.

Photos and line drawings: A line drawing of California sedge by Jeanne Janish appears in Cronquist (1969) and is reproduced in U.S. Forest Service (no date) and Appendix 2. Color slides of California sedge and its habitat are in the photographic collection of the Conservation Data Center, some of which appear in Appendix 5.

DISTRIBUTION

Global distribution: The California sedge is a Pacific Coastal species with the majority of its range occurring west of the crest of the Cascade Range from northern Washington to northern California. The disjunct populations in the northern Rocky Mountains of Idaho, were first reported by Mackenzie (Cronquist 1969).

Idaho distribution: It is known from five populations in the mountains of the Coeur d'Alene, Clearwater, and Nez Perce NFs in northern Idaho.

Precise occurrences in Idaho: (the three digit code preceding

each population is the Conservation Data Center occurrence number used as a reference number for that population):

The Striped Peak population lies in the St. Joe Mountains, along the divide between the South Fork Coeur d'Alene River and the St. Joe River, about 100 air miles northwest of the other four known Idaho populations of California sedge. All Idaho populations occur on National Forest land.

First discovered by John Christ in 1951, I relocated the Striped Peak population in 1993. No other populations were discovered in the study area, although considerable potential habitat exists.

See Appendix 3 for the distribution of California sedge in the study area and the occurrence record in Appendix 4 for further information.

Historical sites: None in the study area. Occurrences 001, 002, and 003 have all been visited since 1989, while occurrences 004 and 006 have not been confirmed in recent years.

Unverified/undocumented reports: None, however, until August 1993, California sedge was thought to occur in the Sawtooth Valley of central Idaho (as occurrence 005 in the Conservation Data Center data base). Although the collection documenting this occurrence disappeared recently, I believe this is a misidentification and no California sedge is known from central Idaho (Moseley et al. 1993).

HABITAT

General habitat description: Throughout most of its range, California sedge is known from wet prairies and brushy slopes, from near sea-level to nearly 4,000 feet in altitude (Cronquist 1969). While the habitat of two Idaho populations is not known, the three that have been visited recently all occur in dry, subalpine openings on ridgelines. The Striped Peak population occurs on the summit ridge of the peak in a *Festuca viridula* community in the lee of an *Abies lasiocarpa* tree-island. The slope is nearly flat and the elevation is 6300 feet. The population occurs in a small swale and may be somewhat more moist than surrounding terrain. See Appendix 4 for further information on the habitat of the Striped Peak population of California sedge.

Geology and Soils: The geologic substrate is metamorphosed Precambrian sediments and the soil is gravelly loam in texture.

Associated species: *Xerophyllum tenax*, *Carex geyeri*, *Carex rossii*, and *Luzula hitchcockii*.

Other rare species: None occur with California sedge in the study area.

POPULATION BIOLOGY

Phenology: The plants I collected on July 10, 1993, had well developed fruits (achenes).

Population size and condition: Only one small clonal patch, about 2 m x 2 m in size, was discovered on Striped Peak. About 150 flowering ramets (clonal stems) were seen, which is about one third of the number of non-flowering stems. This population has persisted here since 1951, but the population size at that time is unknown. The Coolwater Ridge population is also very small, while at Fog Mountain it is considerably more abundant.

Reproductive Biology: California sedge reproduces sexually by seed and vegetatively by rhizomes.

Biological Interactions: Unknown.

Competition: Unknown.

Herbivory: Unknown.

Land ownership: U.S Forest Service, Idaho Panhandle NFs, Wallace Ranger District.

Land use: A very old (now overgrown) foot/pack trail traverses the summit of Striped Peak six feet from the California sedge population. The effect of this, and other historical fire lookout activity, on the sedge population is unknown. No current disturbances appear to be taking place on the peak that will affect population viability.

ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

Threats to currently known populations: The Striped Peak population is extremely small and isolated. The greatest threat to this population is a natural stochastic event related to environmental variability or genetic aberrations. The population is isolated from any obvious anthropogenic threats.

Recommendations:

- o California sedge should remain a Forest Service Sensitive Species due to its relative rarity in Idaho.
- o Current management of the Striped Peak population appears compatible with the long-term viability of the species here,

although it should be monitored periodically because of its small size.

- o Additional floristic inventories should be conducted of subalpine parks in the St. Joe NF; as these sites lie between the Striped Peak population and those known from Idaho County.
- o The historical sites on the Clearwater NF should be relocated and their current status determined. Additional surveys on the Clearwater NF should take place as soon as practicable.

Carex xerantica L.H. Bailey

TAXONOMY

Full bibliographic citation: Botanical Gazette 17:151. 1892.

Type specimen: Macoun, s.n., File Hills, southern Saskatchewan, July 4, 1879.

Pertinent synonym(s): None.

Common name: Dryland sedge.

Size of genus: More than 1,000 species occurring in all parts of the world, most abundantly in moist regions of the North Temperate Zone and the Arctic (Cronquist 1969).

Family name: Cyperaceae

Common name for family: Sedge

History of knowledge of taxon in Idaho: John Leiberg collected a sedge from Mount Wiessner in the St. Joe Mountains of Kootenai County in 1895, that was identified as *Carex straminiformis* [Steele (1981) lists it as being in Shoshone County; it is actually just over the border in Kootenai County]. During the course of this study in mid-July, I found that the sedge there is actually *C. xerantica*. This is apparently the first known population of the species in Idaho. Later in July, I discovered another population in southern Idaho, in the Albion Mountains of Cassia County, about 430 miles south of Mount Wiessner.

Alternative taxonomic treatments: None.

LEGAL OR OTHER FORMAL STATUS

National:

U.S. Fish and Wildlife Service: Dryland sedge is not a federal candidate.

U.S. Forest Service: Dryland sedge currently has no Forest Service status.

Other current formal status recommendations: None.

State:

Idaho Native Plant Society: None yet. I will recommend that it be placed on the Idaho Native Plant Society Review list at the

Idaho Rare Plant Conference in February, 1994.

Conservation Data Center: None yet.

Review of past status: None.

DESCRIPTION

General nontechnical description: Densely tufted plants without a rhizome. The culms are 3-7 dm tall, with olive-green leaves crowded near the base, much shorter than the culm. The leaves are flat and firm, 2-4 mm wide. The inflorescence is comprised of 3-6 spikes, each spike having female flowers on top and a few male flowers below. The spikes are clustered at the top of the culm, with short internodes between spikes. The spikes are medium brown in aspect, and are subtended by a very short bract. The scales of the female flowers range in size from being equal in length and width to the perigynia to being somewhat shorter and narrower. The perigynia are strongly appressed, elliptic to ovate and planoconvex. The body of the perigynia winged margined, tapering to an ill-defined beak.

Technical description: Plants densely tufted, without a creeping rhizome; culms aphyllopodic, 3-7 dm tall; leaves tending to be somewhat crowded toward the base, but not densely tufted, generally shorter than the culms, rather firm, flat or nearly so and mostly 2-4 mm wide; spikes (2) 3-6, gynaeandrous, sessile, 8-17 mm long, borne in a stiff spike mostly 2-4 cm long, the first two internodes collectively mostly (8) 10-18 mm long, the inflorescence pale greenish or stramineous to medium brown in aspect; bracts sheathless, short and inconspicuous, or the lowest one somewhat setaceous-prolonged but still shorter than the inflorescence; pistillate scales varying from fully as long as wide to distinctly narrower and sometimes also shorter than the perigynia, largely hyaline-scarious except for the firmer midrib, light to medium brown with paler, hyaline margins, or largely white-hyaline; perigynia more or less strongly appressed, elliptic or ovate, slightly to strongly planoconvex, (4.2) 4.5-7.0 (7.4) mm long and 1.9-2.8 mm wide, 2.1-2.9 times as long as wide, lightly to evidently multinerved (nerves mostly more than 10) on both sides, or the ventral side with fewer nerves or nearly nerveless, the body wing-margined and distally serrulate, carrying its width well upwards, tapering to the mostly ill-defined, flattened, strongly margined and serrulate, obliquely cleft or minutely bidentate beak, the distal 0.2 mm of which is often abruptly narrower, entire, and hyaline; stigmas 2; achene lenticular, 2.0-3.0 mm long and 1.2-1.6 mm wide (Cronquist 1969).

Local field characters: Dryland sedge is a caespitose graminoid, with an erect culm that is very stiff and nearly twice as tall as the leaves. The culms are distinctive in being thick and stiff

and nearly round in cross-section; the usually three corners (edges) of sedge culms are very indistinct. The two known Idaho populations both have widely spaced plants that are taller than the low-growing vegetation of these exposed ridgeline sites. Otherwise, dryland sedge is in section Ovales, a section having numerous species in Idaho that are separated by minute technical differences.

Photos and line drawings: A line drawing of dryland sedge by Jeanne Janish appears in Cronquist (1969) and is reproduced in Appendix 2. Color slides of dryland sedge and its habitat are in the photographic collection of the Conservation Data Center, some of which appear in Appendix 5.

DISTRIBUTION

Global distribution: Minnesota and Manitoba to Alberta, south to Colorado and reputedly New Mexico, crossing the continental divide in Colorado and extending west to the high plateaus of central and southern Utah and the Kaibab Plateau of Arizona; reported from Durango, Mexico. Rather infrequently collected (Cronquist 1969). Disjunct at two stations in northern and southern Idaho.

Idaho distribution: It is known from two occurrences, one from the St. Joe Mountains of Kootenai County, in northern Idaho, and one in the Albion Mountains, Cassia County, in southern Idaho.

Precise occurrences in Idaho: Neither of the two occurrences in Idaho are in the Conservation Data Center data base yet.

See Appendix 3 for the distribution of dryland sedge in the study area.

Historical sites: None.

Unverified/undocumented reports: None.

HABITAT

General habitat description: Throughout most of its range, dryland sedge occurs in grasslands, open slopes, and mountain parks, from the high plains to the spruce-fir zone in the mountains (Cronquist 1969). The two Idaho populations occur in low, windswept communities of subalpine ridgelines. The Latour Peak and Mount Wiessner populations occur in open portions of the *Festuca viridula* community on a relatively steep, south-facing slope.

The Mount Harrison population occurs in an *Artemisia tridentata* ssp. *vaseyana*/*Festuca idahoensis* habitat type on a gentle slope with relatively low-growing, open vegetation. Associates on Mount Harrison include *Phlox pulvinata*, *Geum triflorum*, *Pedicularis contorta*, *Hesperochloa kingii*, and *Eriogonum heracleoides*.

Geology and Soils: Belt Series metasediments with rocky soil.

Associated species: In the study area, *Calamagrostis purpurascens*, *Phlox diffusa*, *Carex geyeri*, *Sedum lanceolatum*, *Selaginella scopulorum*, *Poa secunda*, *Eriogonum flavum*, *Lupinus polyphyllus*, *Arenaria capitatum*, *Antennaria microphylla*, *Danthonia intermedia*.

Other rare species: None occur with dryland sedge in the study area.

POPULATION BIOLOGY

Phenology: The plants I collected in the St. Joe Mountains on July 20, 1993, had well developed fruits (achenes).

Population size and condition: The two small populations on Mount Wiessner and Latour Peak combined have several hundred plants covering about 10 acres. Vigor appears good, and the population on Mount Wiessner, at least, has persisted for over a century.

Reproductive Biology: Dryland sedge reproduces by seed.

Biological Interactions: Unknown.

Competition: Unknown.

Herbivory: Unknown.

Land ownership: Bureau of Land Management, Coeur d'Alene District, Emerald Empire Resource Area.

Land use: Current land use in the vicinity of the northern Idaho populations is predominantly recreation.

ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

Threats to currently known populations: The Latour Peak - Mount Wiessner populations are small and isolated. The greatest threat to this population is a natural stochastic event related to environmental variability or genetic bottlenecks. The population is isolated from any obvious anthropogenic threats.

Recommendations:

- o Dryland sedge should be added to the Idaho Native Plant Society Review list at the Rare Plant Conference in February 1994.
- o Current management of the Latour Peak and Mount Wiessner populations appears compatible with the long-term viability of the species here, although they should be monitored periodically because of their small size.
- o Additional floristic inventories should be conducted in the Latour Range (the western end of the St. Joe Mountains). Subalpine parks in this area occur on both BLM (mostly) and National Forest land.

Ivesia tweedyi Rydb.

TAXONOMY

Full bibliographic citation: North American Flora 22(3):288.
1908.

Type specimen: F. Tweedy, Yakima Region, Washington, August 1883.

Pertinent synonym(s): Horkelia tweedyi (Rydb.) Nels. & Macbr.

Common name: Tweedy's ivesia.

Size of genus: Twenty-two species of western North America
(Hitchcock 1961b).

Family name: Rosaceae.

Common name for family: Rose.

History of knowledge of taxon in Idaho: The first Idaho collection of which I am aware was made by Daubenmire from the Selkirk Mountains in 1947. John Christ made a collection in the St. Joe Mountains in 1951, and Art Kruckeberg collected Tweedy's ivesia from the Selway Crags in 1957. All others populations in the state have been discovered since 1978.

Alternative taxonomic treatments: None.

LEGAL OR OTHER FORMAL STATUS

National:

U.S. Fish and Wildlife Service: Tweedy's ivesia is not a federal candidate.

U.S. Forest Service: Tweedy's ivesia currently has no Forest Service status.

Other current formal status recommendations: It is given a global rank of 4 by the Biodiversity Information Network - the International Association of Natural Heritage Programs and Conservation Data Centers (Moseley and Groves 1992). The G4 rank (on a scale of 1-5) indicates that Tweedy's ivesia is not rare and apparently secure globally.

State:

Idaho

Idaho Native Plant Society: Tweedy's ivesia is in the Idaho Native Plant Society (1993) Monitor category, indicating that it is either common within a limited range or is uncommon, but has no identifiable threats. The latter case applies here.

Conservation Data Center: The Biodiversity Information Network state ranking for Tweedy's ivesia is S2, indicating that it is imperiled because of rarity in Idaho or because of other factors making it vulnerable to extinction (Moseley and Groves 1992).

Review of past status: In his review of this taxon for the Rare and Endangered Plants Technical Committee of the Idaho Natural Areas Council, Henderson proposed that it be maintained on the State Watch List (Henderson 1981).

DESCRIPTION

General nontechnical description: Strong perennial herb growing from a stout taproot. It has finely-dissected, pinnate, basal leaves which often lie somewhat flat on the ground, thereby appearing to radiate from the central rootcrown. The reddish or purplish stems, which range from 5-20 cm in length, are glandular and usually fine hairy above. Each stem commonly has 1 to 3 small leaves and is topped with a somewhat crowded cluster of several flowers. Each flower has five yellow petals surrounded by a shallow bowl-shaped hypanthium. The fruits are smooth achenes (Caicco 1989).

Technical description: Strong perennial with a large taproot and usually a freely branched caudex, the stems 5-20 cm tall, from nearly glabrous to glandular-puberulent or glandular-pubescent below, becoming more glandular and usually somewhat pilose above, often reddish or purplish; basal leaves numerous, the blades 3-8 cm long; leaflets 19-35, mostly less than 1 cm long, dissected into many filiform to linear segments; cauline leaves commonly 1-3, greatly reduced; calyx yellowish-green, the hypanthium shallowly bowl-shaped, shorter than the deltoid-ovate, ascending, yellowish, 2.5-3 mm lobes; petals yellow, from broadly elliptic to spatulate, slightly longer than the calyx lobes and the stamens; pistils (2) 4-6 (9), the styles about 3 mm long; achenes about 2 mm long (Hitchcock 1961b).

Local field characters: Tweedy's ivesia is in a small genus of perennial herbs in the rose family (Rosaceae). Only two members of the genus occur in the Pacific Northwest; both of these occur in Idaho. *Ivesia gordonii* is common in subalpine and alpine habitats south of the main canyon of the Salmon River. The southernmost known population of Tweedy's ivesia is near Elk Mountain on the Nez Perce National Forest (see below).

The finely-dissected basal leaves are a primary distinguishing

character of Tweedy's ivesia. Although they resemble those of Achillea millefolium, with which ivesia may occur, they are not aromatic as in yarrow. The flowers of Tweedy's ivesia superficially resemble those of certain other genera in the rose family, e.g., the genus Potentilla. Ivesia, however, has only 5 stamens, as compared with the ten or more present in other similar genera.

Photos and line drawings: A line drawing of Tweedy's ivesia by Jeanne Janish appears in Hitchcock (1961b) and is reproduced in Appendix 2. Color slides of Tweedy's ivesia and its habitat are in the photographic collection of the Conservation Data Center, some of which appear in Appendix 5.

DISTRIBUTION

Global distribution: East side of the Cascade Mountains from southern Chelan and northern Yakima counties, Washington, and disjunct in mountains of northern Idaho (Hitchcock 1961b).

Idaho distribution: Eleven occurrences are known from Idaho, with six of them from Shoshone County. Three populations are known from Idaho County and a single site is known from the Selkirk Mountains of Boundary County.

Precise occurrences in Idaho: (the three digit code preceding each population is the Conservation Data Center occurrence number used as a reference number for that population)

Five of the known populations in Idaho (002, 003, 004, 009, and 010) occur in the study area. See Appendix 3 for the distribution of Tweedy's ivesia in the study area, and the occurrence records in Appendix 4 for additional location information.

Historical sites: None.

Unverified/undocumented reports: None.

HABITAT

General habitat description: Throughout its range Tweedy's ivesia occurs on dry, open to wooded, usually rocky slopes and alpine ridges, often on serpentine (Hitchcock 1961b). In Idaho, it occurs on exposed, windswept ridgcrests or steep, dry slopes in the subalpine zone. Slopes can range from nearly level to very steep. Slope aspects are generally southerly, but Tweedy's ivesia can occur on easterly and northerly slopes as well. See the occurrence records in Appendix 4 for further information on the habitat of Tweedy's ivesia in the study area.

Geology and Soils: The geologic substrate is metamorphosed

Precambrian sediments and the soils are shallow and very rocky.

Associated species: *Vaccinium membranaceum*, *Hieracium albertinum*, *Phlox diffusa*, *Spiraea densiflora*, *Penstemon attenuatus*, *Carex geyeri*, *Xerophyllum tenax*, *Antennaria microphylla*, *Senecio integerrimus*, *Hedysarum boreale*, and *Calochortus apiculatus*.

Other rare species: Tweedy's ivesia is sympatric with *Astragalus bourgovii* on Stevens Peak.

POPULATION BIOLOGY

Phenology: The plants are in flower throughout July, and set seed in August. By early September, seeds have dispersed.

Population size and condition: The five populations of Tweedy's ivesia in the study area range in size from 800 to about 8000 individuals and from 0.1 to 30+ acres in size. The Stevens Peak population is the largest in terms of both number of individuals and area. All populations are relatively dense, and they appear vigorous, having a good distribution of size (age?) classes present. See Appendix 4 for further population data.

Reproductive Biology: Tweedy's ivesia reproduces by seed.

Biological Interactions: Unknown.

Competition: Unknown.

Herbivory: Unknown.

Land ownership: In the study area, all populations are on public land administered by the Idaho Panhandle NFs. Occurrence 010 is wholly on the Wallace Ranger District, while 002, 003, and 004 are wholly on the Avery Ranger District. The two districts share administration of occurrence 009.

Land use: Current land use in the vicinity of populations in the study area is predominantly recreation.

ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

Threats to currently known populations: All populations in the study area are generally small and isolated. The greatest threat to this population is a natural stochastic event related to environmental variability or genetic bottlenecks. The populations are isolated from any obvious anthropogenic threats.

Recommendations:

- o Current management of populations in the study area appears compatible with the long-term viability of the species here, although they should be monitored periodically because of their small size.

- o Additional floristic inventories of subalpine parks should be conducted in the St. Joe drainage and in the Selkirk Mountains to determine the full extent of its distribution on the Idaho Panhandle NF and Coeur d'Alene BLM District. Surveys should also be conducted in the Selway Crags of the Nez Perce and Clearwater NFs to determine its distribution and abundance in that part of its range.

Romanzoffia sitchensis Bong.

TAXONOMY

Full bibliographic citation: Mem. Acad. St. Petersburg. VI 2:158. 1833.

Type specimen: Eschscholtz, Sitka, AK.

Pertinent synonym(s): There are many synonyms, including *Romanzoffia leibergii* Greene (*Pittonia* 5:37, 1902). The type specimen for *R. leibergii* was collected by John Leiberg from Stevens Peak on August 4-5, 1895.

Common name: Sitka mistmaiden.

Size of genus: Four closely allied species of western North America (Hitchcock 1959).

Family name: Hydrophyllaceae

Common name for family: Waterleaf

History of knowledge of taxon in Idaho: John Leiberg first collected Sitka mistmaiden in Idaho on Steven Peak in August 1895. John Christ collected it at the Continental Mine in the Selkirks sometime during the 1940's or 1950's. I discovered all other Idaho populations between 1986 and 1989.

Alternative taxonomic treatments: None.

LEGAL OR OTHER FORMAL STATUS

National:

U.S. Fish and Wildlife Service: Sitka mistmaiden is not a federal candidate.

U.S. Forest Service: Sitka mistmaiden is currently a Forest Service Sensitive Species for the Idaho Panhandle NFs in Region 1 (U.S. Forest Service 1993).

Other current formal status recommendations: It is given a global rank of 4 by the Biodiversity Information Network - the International Association of Natural Heritage Programs and Conservation Data Centers (Moseley and Groves 1992). The G4 rank (on a scale of 1-5) indicates that Sitka mistmaiden is not rare and apparently secure globally.

Other current formal status recommendations: None.

State:

Idaho

Idaho Native Plant Society: Sitka mistmaiden is in the Idaho Native Plant Society (1993) Sensitive category, indicating that it has a small and localized distribution in Idaho that presently does not meet the criteria for classification as Priority 1 or 2, but whose populations and habitats may be jeopardized without active management or removal of threats.

Conservation Data Center: The Biodiversity Information Network state ranking for Sitka mistmaiden is S1, indicating that it is critically imperiled because of rarity in Idaho or because of other factors making it vulnerable to extinction (Moseley and Groves 1992).

Review of past status: None.

Montana

Considered for sensitive status, but rejected; common (Lesica and Shelly 1991).

DESCRIPTION

General nontechnical description: Plants slender, somewhat trailing, 0.5-3 dm tall; basal leaf blades kidney-shaped, 0.5-4 cm wide, palmately veined to shallowly lobed, or coarsely toothed, petioles long (up to 15 cm), bases overlapping and expanded, often thickened and hairy; plants otherwise mostly not hairy or finely glandular in the inflorescence to somewhat glandular-short-hairy; stem leaves few, mostly arising from the base, or none; inflorescence loose and elongate, well-surpassing the leaves, pedicels mostly 1-4 cm in fruit; calyx shorter than corolla; corolla 6-11 mm long and wide, styles 2-5 mm long (Bursik 1992).

Technical description: Plants slender, lax, (0.5)1-2(3) dm tall; basal leaves with reniform-orbicular blade (0.5)1-4 cm wide, palmately veined and rather shallowly lobed or coarsely toothed, the petioles well-developed (up to 15 cm long), their bases overlapping, conspicuously expanded, often thickened and commonly villous-ciliate; plants otherwise generally subglabrous, or finely stipitate-glandular in the inflorescence, rarely somewhat glandular-villous; cauline leaves few and mostly borne near the base, or none; inflorescence loose and elongate, well-surpassing the leaves, pedicels mostly 1-4 cm long in fruit; calyx seldom reaching the sinuses of the corolla; corolla 6-11 mm long and wide; style 2-5 mm long (Hitchcock 1959).

Local field characters: Sitka mistmaiden can be confused with a *Saxifraga*, several species of which share its high-elevation,

seepy habitat. Its long-petiolate, toothed to slightly lobed, kidney-shaped leaves, which mostly arise from the base of the plant are distinctive. A showy corolla with fused petals that are notched at the sutures is also characteristic of this species, being quite different than any saxifrage.

Photos and line drawings: A line drawing of Sitka mistmaiden by Jeanne Janish appears in Hitchcock (1959) and is reproduced in Bursik (1992) and Appendix 2. Color slides of Sitka mistmaiden and its habitat are in the photographic collection of the Conservation Data Center, some of which appear in Appendix 5.

DISTRIBUTION

Global distribution: Sitka mistmaiden is a cordilleran species ranging from southern Alaska to northern Oregon and northern California along the coast, and inland to Alberta, northwestern Montana, and northern Idaho (Hitchcock 1959).

Idaho distribution: Sitka mistmaiden is known from four sites in the Selkirk Mountains, Boundary County, and one population on Stevens Peak, in the St. Joe Mountains, Shoshone County. The Stevens Peak population is disjunct from the Selkirk populations by nearly 100 miles.

Precise occurrences in Idaho: (the three digit code preceding each population is the Conservation Data Center occurrence number used as a reference number for that population)

Only occurrence 005, Stevens Peak, occurs in the study area. See Appendix 3 for the distribution of Sitka mistmaiden in the study area, and the occurrence records in Appendix 4 for additional location information.

Historical sites: None.

Unverified/undocumented reports: John Christ collected Sitka mistmaiden from the vicinity of Continental Mine in the Selkirk Mountains, sometime during the 1940's or 1950's. The Conservation Data Center does not have this record in its data base at present; the herbarium label information needs to be relocated.

HABITAT

General habitat description: Throughout its range, Sitka mistmaiden occurs on wet cliffs and ledges in the mountains,

sometimes above timberline, descending to sea level in the northern portion of its range (Hitchcock 1959). This holds true in Idaho, where it occurs on wet, generally moss-covered cliffs and ledges on ridges and peaks of the subalpine and alpine (on Snowy Top) zone. On Stevens Peak, it occurs in a couloir that is incised into the north face. It rarely receives direct sunlight (if ever) and snow lies late, creating a very moist habitat, unlike anywhere else I visited in the study area.

Geology and Soils: The Selkirk populations appear to all occur on granitic substrates, while the Stevens Peak population occurs on Belt Series metasediments. It can grow directly on moss mats lying on bedrock or in small pockets of soil on ledges or in cracks in the cliff.

Associated species: At Stevens Peak, Sitka mistmaiden occurs with *Saxifraga mertensiana*, *Arabis nuttallii*, *Smelowskia calycina*, *Sedum rosea*, *Stenanthium occidentale*, and *Draba lonchocarpa*.

Other rare species: None are sympatric with Sitka mistmaiden on Stevens Peak, but *Astragalus bourgovii* and *Ivesia tweedyi* occur nearby.

POPULATION BIOLOGY

Phenology: The plants I collected on Stevens Peak in mid-July were in full flower. The timing of fruit development and seed dispersal is unknown.

Population size and condition: All populations in Idaho are very small consisting of from one individual to over 100. I observed about 100 on Stevens Peak, occupying a small area of the couloir. I assume this is where John Leiberg collected the species on Stevens Peak, therefore, this small population has persisted for nearly a century. See Appendix 4 for further population data.

Reproductive Biology: Sitka mistmaiden reproduces by seed.

Biological Interactions: Unknown.

Competition: Unknown.

Herbivory: Unknown.

Land ownership: In the study area, Idaho Panhandle NFs, Wallace Ranger District.

Land use: Current land use in the vicinity of Stevens Peak is predominantly recreation.

ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

Threats to currently known populations: The Stevens Peak population is extremely small and isolated. The greatest threat to this population is a natural stochastic event related to environmental variability or genetic aberrations. The population is isolated from any obvious anthropogenic threats.

Recommendations:

- o Current management of the Stevens Peak population appear compatible with the long-term viability of the species there, although it should be monitored periodically because of its small size.
- o Sitka mistmaiden should be maintained on the Regional Sensitive Species list for the Idaho Panhandle National Forest, due to its rarity.

LITERATURE CITED IN SECTIONS 1 AND 2

- Barneby, R.C. 1964. Atlas of North American Astragalus. Memoirs of the New York Botanical Garden Vol. 13. 1188 p.
- Brunsfeld, S.J. 1981. *Carex californica*. Page 97 in: Vascular Plant Species of Concern in Idaho, by the Rare and Endangered Plants Technical Committee of the Idaho Natural Areas Council. Bulletin No. 34. University of Idaho, Forest, Wildlife, and Range Experiment Station, Moscow, ID.
- Bursik, R.J. 1992. Field investigations of sensitive plant taxa occurring on the Priest Lake Ranger District, Kaniksu National Forest, Idaho Panhandle National Forests. Unpublished report on file at: Idaho Department of Fish and Game, Conservation Data Center, Boise. 141 p., plus appendices.
- Caicco, S.L. 1988. Studies in the genus *Carex* on the Idaho Panhandle National Forest. Unpublished report on file at: Idaho Department of Fish and Game, Conservation Data Center, Boise. 26 p., plus appendices.
- Caicco, S.L. 1989. Field investigations of selected plant species on the Nez Perce National Forest: *Carex californica*, *Ivesia tweedyi*, *Synthyris platycarpa*, *Dasynotus daubenmirei*, *Astragalus paysonii*. Unpublished report on file at: Idaho Department of Fish and Game, Conservation Data Center, Boise. 12 p., plus appendices.
- Cronquist, A. 1969. *Carex*. Pages 220-345 in: Vascular plants of the Pacific Northwest, Part 6, by C.L. Hitchcock, A. Cronquist, M. Ownbey, and J.W. Thompson, University of Washington Press, Seattle, WA.
- Daubenmire, R. 1981. Subalpine parks associated with snow transfer in the mountains of northern Idaho and eastern Washington. Northwest Science 55:124-135.
- Henderson, D.L. 1981. *Ivesia tweedyi*. Page 115 in: Vascular Plant Species of Concern in Idaho, by the Rare and Endangered Plants Technical Committee of the Idaho Natural Areas Council. Bulletin No. 34. University of Idaho, Forest, Wildlife, and Range Experiment Station, Moscow, ID.
- Hitchcock, C.L. 1959. *Romanzoffia*. Pages 173-175 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, WA.
- Hitchcock, C.L. 1961a. *Astragalus*. Pages 197-272 in: Vascular plants of the Pacific Northwest, Part 3, by C.L. Hitchcock,

- A. Cronquist, M. Ownbey, and J.W. Thompson, University of Washington Press, Seattle, WA.
- Hitchcock, C.L. 1961b. *Ivesia*. Pages 120-121 in: *Vascular plants of the Pacific Northwest, Part 3*, by C.L. Hitchcock, A. Cronquist, M. Ownbey, and J.W. Thompson, University of Washington Press, Seattle, WA.
- Idaho Native Plant Society. 1993. Results of the ninth annual Idaho Rare Plant Conference. Unpublished manuscript on file at the Conservation Data Center, Idaho Department of Fish and Game, Boise, ID. 5 p.
- Isely, D. 1984. *Astragalus* L. (Leguminosae: Papilionoideae) II. Species summary A-E. *Iowa State Journal of Research* 59:99-209.
- Leiberg, J.B. 1895. Department of Agriculture of the United States, itinerary of John B. Leiberg, northern Idaho, June-October, 1895. Handwritten field journal deposited at the Smithsonian Institution, Washington, DC. [Copy on file at: Idaho Department of Fish and Game, Conservation Data Center, Boise, ID.]
- Leiberg, J.B. 1897. General report on a botanical survey of the Coeur d'Alene Mountains in Idaho during the summer of 1895. *Contributions from the U.S. National Herbarium* Volume 10:1-85.
- Lesica, P., and J.S. Shelly. 1991. Sensitive, threatened and endangered vascular plants of Montana. Occasional Publication No. 1. Montana Natural Heritage Program, Helena, MT. 88 p.
- Moseley, R., and C. Groves, compilers. 1992. Rare, threatened and endangered plants and animals of Idaho. Idaho Department of Fish and Game, Conservation Data Center, Boise, ID. 38 p.
- Moseley, R.K., and C.A. Wellner. 1987. Establishment record for Pond Peak Research Natural Area within Coeur d'Alene National Forest, Shoshone County, Idaho. Unpublished report on file at: USDA Forest Service, Idaho Panhandle National Forests, Coeur d'Alene, ID. 19 p., plus maps and appendices.
- Moseley, R.K., and C.A. Wellner. 1988. Establishment record for Upper Shoshone Creek Research Natural Area within Coeur d'Alene National Forest, Shoshone County, Idaho. Unpublished report on file at: USDA Forest Service, Idaho Panhandle National Forests, Coeur d'Alene, ID. 23 p., plus maps and appendices.
- Moseley, R.K., R.J. Bursik, and F.W. Rabe. 1994. Peatlands of

the Sawtooth Valley, Custer and Blaine counties, Idaho.
Unpublished report on file at: Idaho Department of Fish and
Game, Conservation Data Center, Boise, ID.

Smith, J.P., and K. Berg. 1988. Inventory of rare and
endangered plants of California. California Native Plant
Society, Sacramento, CA. 168 p.

Steele, R. 1981. *Carex straminiformis*. Page 100 in: Vascular
Plant Species of Concern in Idaho, by the Rare and Endangered
Plants Technical Committee of the Idaho Natural Areas
Council. Bulletin No. 34. University of Idaho, Forest,
Wildlife, and Range Experiment Station, Moscow, ID.

Straley, G.B, R.L. Taylor, and G.W. Douglas. 1985. The rare
vascular plants of British Columbia. Syllogeus No. 59.
National Museums of Canada, National Museum of Natural
Science, Ottawa, Ontario. 165 p.

U.S. Forest Service. 1993. Threatened, Endangered, and
Sensitive species list for Region 1. Northern Region,
Missoula, MT.

U.S. Forest Service. No date. Sensitive plant field guide -
Region 1. Northern Region, Missoula, MT.

SECTION 3

VASCULAR FLORA OF SUBALPINE PARKS IN THE COEUR D'ALENE RIVER DRAINAGE

This section is in the form of a manuscript that will be submitted for publication to *Madrono*, a peer-reviewed journal of west American botany published by the California Botanical Society. The style of this section is somewhat different than the rest of the report in order to conform with the editorial guidelines of the journal.

VASCULAR FLORA OF SUBALPINE PARKS IN THE
COEUR D'ALENE RIVER DRAINAGE, NORTHERN IDAHO

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ABSTRACT

Treeless summits and ridges in the otherwise densely forested mountains of northern Idaho, have a relatively unique flora compared with surrounding communities. Although small in area, these subalpine parks add greatly to the biotic diversity of the regional landscape and are habitats for several plant species considered rare in Idaho. I conducted a floristic inventory of 32 parks in the mountains of the Coeur d'Alene River drainage and adjacent portions of the St. Joe drainage. The subalpine park flora contains 151 taxa representing 97 genera in 34 families. *Carex* are surprisingly depauperate, in terms of both numbers and cover, as is the alien flora, which is comprised of only three species. I discovered populations of five rare species, including *Carex xerantica*, which is here reported for Idaho for the first time. Other state-rare species include *Astragalus bourgovii*, *Carex californica*, *Ivesia tweedyi*, and *Romanzoffia sitchensis*. Stevens Peak is the highest summit and is phytogeographically unique in the study area. It contains habitat for six species occurring nowhere else in the study area, all having high-elevation cordilleran or circumboreal affinities.

INTRODUCTION

Treeless summits and ridges in the otherwise densely forested mountains of northern Idaho, have a relatively unique flora compared with surrounding communities. Although small in area, these subalpine parks or balds add greatly to the biotic diversity of the regional landscape. The origin of subalpine parks was originally hypothesized to be a result of repeated fires (Leiberg 1897, Larson 1926), but was later shown to result from a combination of low soil moisture on slopes exposed to the wind and heavy snow accumulation on leeward slopes (Daubenmire 1944; 1968; 1981; Root and Habeck 1972). Conditions created by this interplay of topography and snow transfer are too extreme for tree seedlings to survive (Daubenmire 1981).

Floristic studies of subalpine parks in northern Idaho, in general, and the Coeur d'Alene River drainage, in particular, are sparse. The early explorations of John Leiberg (1897) were the first to elucidate the floristic and ecologic composition of subalpine parks in the Coeur d'Alene drainage, as did the collections of John Christ from several parks in the region during the middle of this century. Daubenmire (1981) listed the flora he

observed in five subalpine parks between the Canadian border and the Salmon River, including one in the Coeur d'Alene drainage. These and other collectors elucidated the phytogeographic significance of subalpine parks in the area and discovered several plants that have a limited distribution in Idaho. Because of increasing recreational use of the northern Idaho mountains, the sensitivity of the habitat, and the preliminary nature of the floristic inventory, I undertook this study in cooperation with the Idaho Panhandle National Forests to provide them with adequate data on floristic composition and the distribution and abundance of rare plants in subalpine parks for future management.

STUDY AREA

The study area includes treeless parks above 1768 m within the Coeur d'Alene River drainage and the northern fringe of the St. Joe River drainage, Benewah, Kootenai, and Shoshone counties. The center of the study area lies at 47° 45' N latitude and 116° W longitude. Stevens Peak, at 2084 m, is the highest summit in the area. The mountains of central and northern Idaho form a nearly continuous massif. Mountains north of the Salmon River have generally been called the Bitterroot Range, with indistinct subranges named after major river drainages. In the study area, the high divide between the St. Joe and Coeur d'Alene rivers is called the St. Joe Mountains by the U.S. Geological Survey. The name Coeur d'Alene Mountains has been broadly used in the past in reference to highlands of northern Idaho that drain into Coeur d'Alene Lake (Leiberg 1897; Dort 1962), although it now appears to be more narrowly applied to mountains of the Coeur d'Alene River drainage north of its South Fork. Latour Range and Shoshone Range are names applied to prominent mountain crests within the St. Joe and Coeur d'Alene mountains, respectively.

The study area is underlain by metasedimentary rocks of the Belt Supergroup of Precambrian age. The thickness of the Belt Supergroup in this area is estimated to be at least 6400 m thick and is comprised predominantly of quartzite and argillite, with minor amounts of limestone and dolomite (Bennett et al. 1989). Ridgecrests of the study area do not greatly exceed the minimum elevation necessary for formation of alpine glaciers during the Pleistocene (Dort 1962). The glaciers that did develop were relatively small, confined to the north sides of ridges and summits, resulting in relatively gentle slopes on south aspects and steep headwalls on the north.

Climate of the Coeur d'Alene River drainage is influenced primarily by prevailing westerlies which carry maritime air masses from the Pacific Ocean across the Northern Rockies during the winter and spring. This inland maritime regime extends from the Selkirk Range in British Columbia to the Clearwater River drainage in north-central Idaho. During winter and spring the inland maritime regime is characterized by gentle rains, deep snow

accumulations at higher elevations, and abundant fog, cloudiness, and high humidity. Winter temperatures are 8 to 14°C warmer than continental locations at similar latitudes. Summers are relatively dry due to subtropical high pressure systems shifting northward in late June, causing the prevailing westerlies to carry dry air across northern Idaho (Ross and Savage 1967; Cooper et al. 1991).

The climate of the study area is not expressed well by any climatic records, however, the records from Deception Creek HQ (Finklin and Fischer 1987), located at the western edge of the study area and approximately 850 m below the subalpine parks, gives an indication of climatic trends (Table 1). Temperatures in the subalpine parks are lower and precipitation is approximately 10% higher than at Deception Creek HQ. Snowpack average at 1469 m on April 1 is 183 cm (Finklin and Fischer 1987).

Dense, mixed coniferous forests cover much of the mountains in the Coeur d'Alene River drainage. *Pinus ponderosa* and *Pseudotsuga menziesii* dominate the dryer, lower elevation slopes, while *Thuja plicata*, *Tsuga heterophylla*, *Larix occidentalis*, *Pinus monticola*, and *Abies grandis* comprise much of the forest cover at middle elevations. Upper elevation forests surrounding subalpine parks are comprised of communities dominated by *Tsuga mertensiana*, *Abies biflora*, and *Pinus albicaulis*. *Pinus albicaulis* is represented largely by standing dead trees, as few individuals have survived the invasion of white pine blister rust (Arno and Hoff 1989). Forests at all elevations are in various stages of successional development following large wildfires of the late 1800's and early 1900's, and over a century of large-scale mining and smelting activity (Rabe and Flaherty 1974). Livestock grazing does not currently take place in and around subalpine parks of the Coeur d'Alene drainage and, at least according to Leiberg (1897), was largely absent in the past.

PLANT COMMUNITIES OF SUBALPINE PARKS

Although Daubenmire was able to classify forest and steppe vegetation of the region (Daubenmire and Daubenmire 1968; Daubenmire 1970), he discontinued phytosociologic studies in subalpine parks due largely to the small-scale patterns of plant composition and dominance (Daubenmire 1981). He did, however, partition subalpine parks into two broad types, xerophytic parks on the windward slopes of ridges and summits, and snowbank parks on the lee sides. Using this classification as a basis, I recognize three types of plant habitats or communities in the study area.

Graminoid. This corresponds to Daubenmire's (1981) xerophytic park. It is dominated by graminoids, largely *Festuca viridula*, but also with high cover of *Xerophyllum tenax* and *Carex geyeri* in some areas. Unlike xerophytic parks described by Daubenmire (1981), *Festuca idahoensis* and *Agropyron spicatum* are rare in my study area. There is a high diversity, albeit low cover of forbs.

Shrub cover is low and trees generally occur as scattered clumps or islands. Graminoid parks occur on southerly slopes and are exposed to prevailing winds, making them zones of snow deflation. In contrast, treeless parks occurring on south slopes in the montane zone, below about 1370 m, are dominated by *Festuca idahoensis* and *Agropyron spicatum* and lack *Festuca viridula*.

Cliffs and Ledges. This habitat roughly corresponds to Daubenmire's (1981) snowbank park, because it occurs on the lee sides of summits and ridges. Unlike his study areas, which had relatively gentle slopes, these northerly-facing habitats occur on glaciated cirque headwalls. Cliffs and ledges are generally zones of snow deposition, although in a few places they are exposed to winds year-long and are relatively xeric. *Penstemon fruticosus* and *Saxifraga* spp. are characteristic species of this habitat.

Talus. Talus slopes occupy only a small portion of the study area, but have a distinctive flora. Talus can occur within both the graminoid community on south slopes and at the base of cliffs and ledges on north slopes (Daubenmire 1943). This habitat is comprised of stabilized blocks of argillite or quartzite, up to 4 dm in diameter, with little soil development between the blocks. *Calamagrostis purpurascens* and *Penstemon fruticosus* are characteristic species here.

METHODS

The checklist is based largely on the 189 collections that I made in 32 subalpine parks in the study area between 1986 and 1993. All specimens are deposited at the University of Idaho Herbarium (ID). Other collectors, with whose collections I became partially familiar during herbarium searches, include John Leiberg, John Christ, W.R. Moore, Steven Brunsfeld and Charles Wellner. Identification of questionable *Carex* were made by J. Mastrogiuseppe and M. Hurd. Range-extension data for the species new to Idaho were determined from herbarium records. The Idaho Conservation Data Center data base was consulted concerning the current distribution of rare species in Idaho.

RESULTS AND DISCUSSION

The vascular flora of subalpine parks in the Coeur d'Alene River drainage consists of 151 taxa representing 97 genera in 34 families of pteridophytes, gymnosperms, and angiosperms. Four alien species, comprising 3% of the flora, were found in the study area, including *Centaurea maculosa*, *Rumex acetosella*, *Taraxacum officinale*, and *Trifolium repens*. All are rare, occurring only along roads and near electronic sites. *Carex* are surprisingly depauperate in the study area, in terms of both numbers and cover. Of the ten sedges encountered, only *Carex geyeri* is common. Their scarcity can be attributed to the lack of late-lying snowbanks in the study area, the usual habitat for ridgeline sedges in northern

Idaho. Because of the relatively low elevation of the study area, few snowbanks last through an ordinary summer and fall, except in the couloirs on Stevens Peak.

My collection of *Carex xerantica* represents the first documented occurrence of this species in Idaho. Four additional species have a limited distribution in Idaho and are considered rare in the state, including *Astragalus bourgovii*, *Carex californica*, *Ivesia tweedyi*, *Romanzoffia sitchensis* (Moseley and Groves 1992). All five rare species have either low population levels or occupy very localized habitats in the study area, but none appear to be imminently threatened by anthropogenic disturbances. Management for their viability should be emphasized, however, and they should be periodically monitored by forest managers to assure their continued existence.

Carex xerantica. This species is distributed across the northern and central Great Plains and the high plateaus of central and southern Utah and northern Arizona (Hermann 1970). I collected it in two areas of Idaho during 1993. Two small populations were discovered in the study area on Latour Peak and nearby Mount Wiessner, Kootenai County. I discovered a second site on Mount Harrison, Cassia County, ca. 700 km south of the study area (Moseley 2847 BOIS). The Kootenai County sites are perhaps 200 km west of the nearest known populations in Montana and the Cassia County population is ca. 350 km northwest of those in Utah.

Astragalus bourgovii. Endemic to the Rocky Mountains of western Montana and adjacent areas of British Columbia and Alberta, *Astragalus bourgovii* is at the western edge of its range in Idaho (Barneby 1964), where it is represented by two populations in the study area. John Leiberg discovered the first population on Stevens Peak in 1895, and I located only one additional population on an unnamed summit 3.2 km to the east. In the study area, it occurs in windswept areas of the graminoid community and on dry, ridgeline ledges.

Carex californica. Idaho populations of *Carex californica*, represent disjunct locations for this otherwise Cascadian species (Hermann 1970). Five Idaho populations are known, one from the study area on the summit of Striped Peak, Shoshone County, and four from Idaho County, ca. 110 km to the south (unpublished data on file at the Idaho Conservation Data Center). The small clone on Striped Peak occurs in a graminoid community dominated by *Festuca viridula*.

Ivesia tweedyi. Another disjunct species in the mountains of northern Idaho, *Ivesia tweedyi* is also mainly a Cascadian species from Chelan and Yakima counties, central Washington. It is known from eleven populations in Idaho, with five occurring in the southeastern portion of the study area (unpublished data on file

at the Idaho Conservation Data Center). It occurs on exposed, rocky ridgcrests and steep, dry slopes in the study area.

Romanzoffia sitchensis. This delicate member of the Hydrophyllaceae is a cordilleran species ranging from southern Alaska to northern California, and inland to Alberta (Hitchcock and Cronquist 1973). Six small populations are known from Idaho (unpublished data on file at the Idaho Conservation Data Center), five of them from the Selkirk Mountains near the Canadian border, Boundary County, and one in the study area in Shoshone County. The study area population on Stevens Peak is disjunct ca. 160 km south of the Selkirk populations.

Results of my floristic inventory indicate that Stevens Peak occupies a unique phytogeographic position in the study area. I found that six species occur only on this summit, including *Astragalus bourgovii*, *Draba lonchocarpa*, *Oxyria digyna*, *Romanzoffia sitchensis*, *Sedum roseum*, and *Smelowskia calycina*. All are high-elevation cordilleran species, some having circumboreal distributions. In addition, a large population of *Ivesia tweedyi* occurs on the peak. Stevens Peak is the highest summit in the study area and is one of the most heavily glaciated. The large headwall on the north face is incised by several couloirs, where all but *A. bourgovii* and *I. tweedyi* occur.

ANNOTATED CHECKLIST OF VASCULAR PLANTS

The checklist is arranged by division and class (in Anthophyta), then alphabetically by family, genus, and species within these major groups. Nomenclature generally follows Hitchcock and Cronquist (1973). Exceptions include Lycophyta, Pterophyta, and Coniferophyta (Flora of North America Editorial Committee 1993) and *Poa* (Arnou 1987). Unless otherwise noted, the collection numbers are the author's, which are deposited at ID.

DIVISION LYCOPHYTA

Selaginellaceae

Selaginella scopulorum Maxon. Common on dry ledges and cliffs in graminoid community; 2715.

DIVISION PTEROPHYTA

Pteridaceae

Cheilanthes gracillima D.C. Eaton. Common on dry cliffs and ledges; 2689.

Cryptogramma acrostichoides R. Br. Common in talus and on cliffs and ledges; 2693.

Dryopteridaceae

Athyrium alpestre (Hoope) Clairville var. *americanum* Butters.
Rare in talus; 2776.
Cystopteris fragilis (L.) Bernh. Common on cliffs and ledges;
2694.
Polystichum lonchitis (L.) Roth. Uncommon on moist cliffs and
ledges; 2716.
Woodsia scopulina D.C. Eaton. Uncommon on cliffs and ledges;
2731.

DIVISION CONIFEROPHYTA

Cupressaceae

Juniperus communis L. var. *depressa* Pursh. Uncommon on ledges and
in talus; 2662.

Pinaceae

Abies bifolia A. Murray. Common treeline species. No voucher.
Pinus albicaulis Engelm. Common treeline species along eastern
edge of study area. Largely absent from peaks in western
portion. No voucher.
Pinus contorta Dougl. var. *latifolia* Engelm. Rare in graminoid
community. No voucher.
Pinus monticola Dougl. Rare in graminoid community. No voucher.
Pseudotsuga menziesii (Mirbel) Franco var. *glauca* (Mayr) Franco.
Rare in south-facing graminoid community. No voucher.
Tsuga mertensiana (Bong.) Carr. Common treeline species. No
voucher.

DIVISION ANTHOPHYTA

CLASS DICOTYLEDONES

Apiaceae

Angelica dawsonii Wats. Rare on moist ledges; 2740, 2754.
Angelica genuflexa? Nutt. Rare on moist ledge only on Quarles
Peak; 2741.
Lomatium dissectum (Nutt.) Math. & Const. var. *multifidum* (Nutt.)
Math. & Const. Rare in
graminoid community; 2674.
Lomatium sandbergii Coult. & Rose. Common in graminoid community
and on ledges; 1265, 2673.
Lomatium triternatum (Pursh) Coult. & Rose var. *triternatum*.
Rare, found only in graminoid community on Kellogg Peak;
2761.

Asteraceae

Achillea millefolium L. ssp. *lanulosa* (Nutt.) Piper var. *lanulosa*.
Common in all habitats; 2648, Wellner 674 (ID).

Agoseris aurantiaca (Hook.) Greene var. *aurantiaca*. Common in graminoid community; 2679, Wellner 672 (ID).
Anaphalis margaritacea (L.) Benth. & Hook. Rare in graminoid community; 2681.
Antennaria alpina (L.) Gaertner var. *media* (Greene) Jepson. Uncommon on moist ledges; 2764.
Antennaria microphylla Rydb. Common in graminoid community; 1273, 2653.
Antennaria racemosa Hook. Uncommon in moist graminoid community and on ledges; 2706.
Antennaria umbrinella Rydb. Common in graminoid community and on ledges; 2530, 2685.
Arnica latifolia Bong. var. *gracilis* (Rydb.) Cronq. Common in talus and on ledges; 1266, 2645, 2721.
Arnica rydbergii Greene. Rare in graminoid community; found only on an unnamed summit along eastern edge of study area; 2718.
Aster foliaceus Lindl. var. *lyallii* (Gray) Cronq. Common in graminoid community; 2845.
Centaurea maculosa Lam. Rare in graminoid community; only one vegetative rosette was observed on a mining road. No voucher.
Erigeron acris L. var. *debilis* Gray. Uncommon on cliffs and ledges; 2649.
Erigeron compositus Pursh var. *glabratus* Macoun. Common on dry ledges; 2711, 2752.
Erigeron peregrinus (Pursh) Greene ssp. *callianthemus* (Greene) Cronq. var. *eucallianthemus* (Greene) Cronq. Uncommon on moist ledges; 2668, 2833.
Hieracium albertinum Farr. Common in graminoid community; 2768, 2836, Wellner 678 (ID).
Hieracium gracile Hook. Common in graminoid community and on ledges; 2684.
Microseris nigrescens Henderson. Rare in graminoid community; 2646.
Microseris nutans (Geyer) Schultz-Bip. Rare, found only on Rochat Peak; 1272.
Senecio integerrimus Nutt. var. *exaltatus* (Nutt.) Cronq. Uncommon in graminoid community; 2725.
Senecio megacephalus Nutt. Common in graminoid community; 2536, 2660, 2765.
Senecio triangularis Hook. var. *triangularis*. Rare on moist ledges. No voucher.
Solidago multiradiata Ait. var. *scopulorum* Gray. Uncommon in graminoid community; 2831.
Taraxacum officinale Weber. Alien. Rare in graminoid community; 2739.

Boraginaceae

Mertensia paniculata (Ait.) G. Don. var. *borealis* (Macbr.) L.O. Williams. Uncommon on moist ledges; 2743.

Brassicaceae

- Arabis holboellii* Hornem. Common in graminoid community; 2691.
Arabis nuttallii Robins. Common in all habitats; 699, 1270, 2531, 2643.
Draba lonchocarpa Rydb. var. *lonchocarpa*. Rare, found only on the north face of Stevens Peak; 2534.
Draba oligosperma Hook. var. *oligosperma*. Rare on dry cliffs and ledges; 2842.
Draba stenoloba Ledeb. Rare, found only in graminoid community on Pond Peak; Wellner 541 (ID).
Erysimum asperum (Nutt.) DC. Common in talus and on dry ledges; 2729.
Smelowskia calycina C.A. Mey. var. *americana* (Regel & Herder) Drury & Rollins. Rare, found only on the north face of Stevens Peak; 2529, 2832.
Thlaspi fendleri Gray var. *glaucum* (A.Nels.) C.L.Hitchc. Common in graminoid community; 2641.

Campanulaceae

- Campanula rotundifolia* L. Common in moist graminoid community; 2841.

Caprifoliaceae

- Lonicera utahensis* Wats. Uncommon in graminoid community; 2647.

Caryophyllaceae

- Anemone multifida* Poir. var. *multifida*. Uncommon in graminoid community; 2846.
Arenaria aculeata Wats. Common in graminoid community; 2651, 2770.
Arenaria capillaris Poir. Uncommon in graminoid community; 704, 1271, Wellner 673 (ID).
Arenaria congesta Nutt. var. *congesta*. Uncommon in graminoid community; 2830.
Cerastium arvense L. Uncommon on moist cliffs and ledges; 2537, 2838.
Silene douglasii Hook. var. *douglasii*. Common on dry ledges; 2775.
Silene scouleri Hook. var. *scouleri*. Uncommon in graminoid community; 710, 2676, 2837, Wellner 680 (ID).

Crassulaceae

- Sedum lanceolatum* Torr. var. *lanceolatum*. Common in all habitats; 2692.
Sedum roseum (L.) Scop. Rare, found only on the north face of Stevens Peak; 2527.

Ericaceae

- Phyllodoce empetrifomis* (Sweet) D. Don. Uncommon in graminoid community and on ledges; 2657.
Vaccinium membranaceum Dougl. Common in graminoid community; 2699.
Vaccinium scoparium Leiberg. Uncommon in graminoid community; 2658.

Fabaceae

- Astragalus bourgovii* Gray. Rare, found only in graminoid community and on dry ledges in the vicinity of Stevens Peak; 2525, 2757, Leiberg 1470 (NY).
Hedysarum boreale Dougl. var. *boreale*. Common in all habitats; 2702, 2719.
Lupinus polyphyllus Lindl. var. *burkei* (Wats.) C.L. Hitchc. Uncommon in graminoid community; 2682.
Trifolium repens L. Alien. Rare along roads in graminoid community; 2771.

Gentianaceae

- Gentiana affinis* Griseb. Common in graminoid community; 2844.
Gentiana calycosa Griseb. Uncommon on moist ledges; 2755.

Grossulariaceae

- Ribes lacustre* (Pers.) Poir. Uncommon on moist cliffs and ledges; 2717.

Hydrophyllaceae

- Phacelia heterophylla* Pursh var. *heterophylla*. Rare in talus; 2760.
Romanzoffia sitchensis Bong. Rare, found only on the north face of Stevens Peak; 2528; Leiberg 1461 (NY). Leiberg's collection is the type for *R. leibergii* Greene.

Hypericaceae

- Hypericum formosum* H.B.K. var. *nortoniae* (Jones) C.L. Hitchc. Common in graminoid community and on cliffs and ledges; 2762.

Onagraceae

- Epilobium angustifolium* L. Uncommon in talus; 2703.

Polemoniaceae

- Phlox diffusa* Benth. Common in graminoid community only along southern periphery of study area; 2726.

Phlox speciosa Pursh. Rare, found only in continuous graminoid community on Sunset and Goose peaks; 2769, Christ 51-357 (ID). This is an odd high-elevation population of an otherwise low-elevation steppe and woodland species.
Polemonium pulcherrimum Hook. var. *calycinum* (Eastw.) Brandegee. Common on cliffs and ledges; 2675.

Polygonaceae

Eriogonum flavum Nutt. var. *piperi* (Greene) Jones. Common in talus and uncommon in graminoid community; 2654, Wellner 675 (ID).
Eriogonum heracleoides Nutt. var. *minus* Benth. Uncommon in talus and graminoid community; 2655.
Eriogonum ovalifolium Nutt. var. *nivale* (Canby) Jones. Rare on dry ledges; 2744, 2839.
Eriogonum umbellatum Torr. Uncommon in graminoid community. No voucher.
Oxyria digyna (L.) Hill. Rare, found only on the north face of Stevens Peak; 2538.
Polygonum bistortoides Pursh. Common in moist graminoid community; 2736, Wellner 538 (ID).
Polygonum phytolaccaefolium Meisn. Common in graminoid community; 2700.
Rumex acetosella L. Alien. Rare along mining roads in graminoid community; 2680.

Portulacaceae

Claytonia lanceolata Pursh var. *lanceolata*. Common in graminoid community and on ledges; 2687.
Montia parvifolia (Moc.) Greene. var. *parvifolia*. Common on moist cliffs and ledges; 2535, 2690, 2706.

Primulaceae

Dodecatheon pulchellum (Raf.) Merr. var. *watsonii* (Tidestr.) C.L.Hitchc. Uncommon in graminoid community and on ledges; 2686.

Ranunculaceae

Aquilegia flavescens Wats. Uncommon in moist graminoid community; 2738.
Clematis columbiana (Nutt.) T. & G. var. *columbiana*. Rare on moist ledges; 2756.
Ranunculus eschscholtzii Schlecht. var. *suksdorfii* (Gray) L.Benson. Uncommon on ledges; 2710.

Rosaceae

Amelanchier alnifolia Nutt. var. *alnifolia*. Rare in graminoid

community; 2774.
Ivesia tweedyi Rydb. Rare in graminoid community and on dry ledges only in southeastern portion of study area; 2526, 2720, 2751, Christ 51-479 (ID), Moore 486 (WS).
Potentilla diversifolia Lehm. var. *diversifolia*. Uncommon in moist graminoid community; 2835.
Potentilla glandulosa Lindl. var. *pseudorupestris* (Rydb.) Breitung. Common on dry ledges; 705, 2714.
Rubus idaeus L. var. *gracilipes* Jones. Rare in talus; 2704.
Sorbus scopulina Greene var. *scopulina*. Rare in graminoid community; 2773.
Spiraea densiflora Nutt. Uncommon in talus; 2667.

Saxifragaceae

Heuchera cylindrica Dougl. var. *glabella* (T. & G.) Wheelock. Common on cliffs and ledges, uncommon in graminoid community and talus; 1274, 2656.
Heuchera grossulariifolia Rydb. Rare, found only on cliffs and ledges on Ulm Peak; 706.
Lithophragma bulbifera Rydb. Rare in dry graminoid community; 2695.
Mitella breweri Gray. Uncommon on moist cliffs and ledges; 2777.
Saxifraga bronchialis L. var. *austromontana* (Wieg.) Jones. Common on cliffs and ledges; 2688.
Saxifraga ferruginea Grah. var. *macounii* Engl. & Irm. Common on cliffs and ledges; 2697, 2733.
Saxifraga mertensiana Bong. Common on ledges; 2532, 2696, 2732.
Saxifraga occidentalis Wats. var. *occidentalis*. Common in graminoid community; 2698, 2734.

Scrophulariaceae

Castilleja longispica A.Nels. Rare, found only on Shefoot Mountain at southern edge of study area; 2724.
Castilleja miniata Dougl. var. *miniata*. Common in graminoid community and on ledges; 702, 2701.
Pedicularis bracteosa Benth. var. *latifolia* (Pennel) Cronq. Rare on moist ledges; 2735.
Pedicularis contorta Benth. var. *contorta*. Common in graminoid community and on ledges; 2670, Wellner 679 (ID).
Penstemon attenuatus Dougl. var. *attenuatus*. Common in talus; 708, 2642, 2759.
Penstemon fruticosus (Pursh) Greene var. *fruticosus*. Common in all habitats; 701, 1267, 2663, Wellner 539 (ID).
Penstemon lyallii Gray. Uncommon on dry ledges; 707, 2727.
Synthyris missurica (Raf.) Pennell. Rare, found only on Kellogg Peak in graminoid community; 2758.
Veronica cusickii Gray. Uncommon on moist ledges. 2779.

Valerianaceae

Valeriana sitchensis Bong. Uncommon in moist graminoid community;
2737, Wellner 540 (ID).

Violaceae

Viola adunca J.E.Sm. ex Rees var. *bellidifolia* (Greene)
Harrington. Uncommon in moist graminoid community; 1268.

CLASS MONOCOTYLEDONES

Cyperaceae

Carex californica Bailey. Rare, found in graminoid community only
on Striped Peak; 2669, Christ 51-419, 51-393 (WTU).

Carex geyeri F.Boott. Common in graminoid community, 2661, 2730.

Carex hoodii F.Boott in Hook. Uncommon in moist graminoid
community; 2742.

Carex microptera Mack. Rare in graminoid community; 2728.

Carex nigricans C.A. Mey. Uncommon in moist graminoid community;
2772.

Carex pachystachya Cham. ex Steudel. Uncommon in moist graminoid
community; 2840.

Carex paysonis Clokey. Uncommon in graminoid community; 2763.

Carex phaeocephala Piper. Uncommon in graminoid community; 2707,
2766.

Carex rossii F.Boott. Uncommon in graminoid community; 2671.

Carex xerantica Bailey. Rare, found in graminoid community only
on Latour Peak and nearby Mount Wiessner; 2778.

Juncaceae

Juncus drummondii E. Mey. Common in moist graminoid community.
No voucher.

Luzula hitchcockii Hamet-Ahti. Uncommon in graminoid community;
2658.

Luzula spicata (L.) DC. Uncommon on ledges; 2709.

Liliaceae

Allium fibrillum Jones. Rare in graminoid community; 2683.

Calochortus apiculatus Baker. Common in graminoid community; 703,
1269, 2644.

Erythronium grandiflorum Pursh var. *grandiflorum*. Common in
graminoid community and on ledges; 2652.

Stenanthium occidentale Gray. Common on moist cliffs and ledges;
2713.

Xerophyllum tenax (Pursh) Nutt. Common in graminoid community;
2705.

Poaceae

Agropyron caninum (L.) Beauv. ssp. *majus* (Vasey) C.L.Hitchc. var. *andinum* (Scribn. & Sm.) C.L.Hitchc. Uncommon in moist graminoid community; 2745.
Agropyron caninum (L.) Beauv. ssp. *majus* (Vasey) C.L.Hitchc. var. *latiglume* (Scribn. & Sm.) C.L.Hitchc. Uncommon in graminoid community; 2234.
Agropyron spicatum (Pursh) Scribn. & Sm. Rare in graminoid community; 2677.
Bromus carinatus H. & A. Uncommon in moist graminoid community; 2743.
Calamagrostis purpurascens R.Br. in Richards. Uncommon in graminoid community and common in talus; 709, 2650.
Danthonia intermedia Vasey. Uncommon in graminoid community; 2722.
Festuca idahoensis Elmer. Rare in graminoid community. No voucher.
Festuca viridula Vasey. Common in graminoid community; 2665, 2723, Wellner 537, 677 (ID).
Oryzopsis exigua Thurber in Torr. Uncommon on dry ledges; 2712.
Poa alpina L. Rare on moist ledges; 2843.
Poa fendleriana (Steudel) Vasey. Uncommon in graminoid community; 2666, 2767.
Poa glauca Vahl var. *glauca*. Uncommon in talus and on ledges; 2672.
Poa secunda Presl. Uncommon in graminoid community; 2664.
Trisetum spicatum (L.) Richter. Common on ledges and in talus; 2678.

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LITERATURE CITED

- Arno, S.F., and R.J. Hoff. 1989. Silvics of whitebark pine (*Pinus albicaulis*). USDA Forest Service, Intermountain Research Station, General Technical Report INT-253.
- Arnow, L.O. 1987. Poaceae. Pp. 684-788 in S.L. Welsh, N.D. Atwood, S. Goodrich, and L.C. Higgins, A Utah Flora. Great Basin Naturalist Memoirs No. 9.
- Barneby, R.C. 1964. Atlas of North America Astragalus. Memoirs of the New York Botanical Garden Vol. 13.
- Bennett, E.H., P.L. Siems, and J.T. Constantopoulos. 1989. The

- geology and history of the Coeur d'Alene Mining District, Idaho. Pp. 137-156 in V.E. Chamberlain, R.M. Breckenridge, and B. Bonnicksen (eds.), Guidebook to the geology of northern and western Idaho and surrounding area. Idaho Geological Survey, Bulletin 28.
- Cooper, S.V., K.E. Neiman, and D.W. Roberts. 1991. Forest habitat types of northern Idaho: A second approximation. USDA Forest Service, Intermountain Research Station, General Technical Report INT-236.
- Daubenmire, R.F. 1944. Mountain parks in north Idaho. Idaho Forester 12:16.
- Daubenmire, R. 1968. Soil moisture in relation to vegetation distribution in the mountains of northern Idaho. Ecology 49:431-438.
- Daubenmire, R. 1970. Steppe vegetation of Washington. Washington Agricultural Experiment Station, Technical Bulletin 60.
- Daubenmire, R. 1981. Subalpine parks associated with snow transfer in the mountains of northern Idaho and eastern Washington. Northwest Science 55:124-135.
- Daubenmire, R.F., and A.W. Skipp. 1943. Plant succession on talus in northern Idaho as influenced by slope exposure. Bulletin of the Torrey Botanical Club 70:473-480
- Daubenmire, R., and J.B. Daubenmire. 1968. Forest vegetation of eastern Washington and northern Idaho. Washington Agricultural Experiment Station, Technical Bulletin 62.
- Dort, W. 1962. Glaciation of the Coeur d'Alene District. Geological Society of America Bulletin 73:889-906.
- Finklin, A.I., and W.C. Fischer. 1987. Climate of the Deception Creek Experimental Forest, northern Idaho. USDA Forest Service, Intermountain Research Station, General Technical Report INT-226.
- Flora of North America Editorial Committee, eds. 1993. Flora of North America north of Mexico, Volume 2. Oxford University Press, New York.
- Hermann, F.J. 1970. Manual of the Carices of the Rocky Mountains and Colorado Basin. USDA Forest Service, Agricultural Handbook No. 374.
- Hitchcock, C.L., and A. Cronquist. 1973. Flora of the Pacific Northwest. University of Washington Press, Seattle, WA.

- Larson, J.A. 1926. Fires and forest succession in the Bitterroot Mountains of northern Idaho. *Ecology* 10:67-76.
- Leiberg, J.B. 1897. General report on a botanical survey of the Coeur d'Alene Mountains in Idaho during the summer of 1895. *Contributions from the U.S. National Herbarium* 10:1-85.
- Moseley, R., and C. Groves, compilers. 1992. Rare, threatened and endangered plants and animals of Idaho. Idaho Department of Fish and Game, Conservation Data Center, Boise, ID.
- Rabe, F.W., and D.C. Flaherty. 1974. The river of green and gold. Idaho Research Foundation, Natural Resource Series No. 4.
- Root, R.A., and J.R. Habeck. 1972. A study of high elevation grassland communities in western Montana. *American Midland Naturalist* 87:109-121.
- Ross, S.H., and C.N. Savage. 1967. Idaho earth science. Idaho Bureau of Mines and Geology, Earth Science Series No. 1.

Table 1. Climatic records for Deception Creek HQ, Idaho, elevation 933 m, 1931-1980.

	Temperature (°C)	Precipitation (mm)
Mean Annual	5.5 1418	
Mean October-May	1.0 1217	
Mean June-September	14.9 201	

Appendix 1

Subalpine parks inventoried between 1986 and 1993.

Coeur d'Alene Mountains (subrange of the Bitterroot Range, north of the South Fork Coeur d'Alene River and west of the main Bitterroot crest)

- Ulm Peak
- 80 Peak
- Idaho Point
- Sunset Peak
- Goose Peak
- Tiger Peak
- Custer Peak
- Granite Peak
- Ridge east of Granite Peak (two 6200' summits)
- Peak 6554 (between Copper Pass and Glidden Pass)
- Burke Summit
- Peak above Glidden Lakes
- Snowstorm Peak
- Cliffs at head of Military Gulch

Shoshone Range (subrange of the Coeur d'Alene Mountains between the North Fork Coeur d'Alene River and Shoshone Creek)

Pond Peak

St. Joe Mountains (subrange of the Bitterroot Range, between the South Fork Coeur d'Alene River and North Fork St. Joe River, west of the main Bitterroot crest)

- Ridge east of Upper and Lower Stevens Lakes
- Stevens Peak
- West Willow Peak
- Peak 6443 (between Stevens Peak and Gold Hill)
- Peak 6279 (between Stevens Peak and Gold Hill)
- Gold Hill
- Moon Peak
- Gibson Point
- Kellogg Peak
- Wardner Peak
- Striped Peak
- Ridge above Elsie Lake

Latour Range (subrange of the St. Joe Mountains at their western end; oriented north-south)

- Mount Wiessner
- Twin Crags
- Latour Peak
- Rochat Peak
- Peak 6136 (southeast of Rochat Peak)

Bitterroot Mountains (subsidiary of the Bitterroot Range, in this case including peaks in the upper St. Joe River drainage)

Crittenden Peak
Shefoot Mountain
Quarles Peak

Appendix 2

Line drawings of *Astragalus bourgovii*, *Carex californica*,
Carex xerantica, *Ivesia tweedyi*, and *Romanzoffia sitchensis*
(from Cronquist 1969; Hitchcock 1959, 1961a, 1961b)

Appendix 3

Distribution of *Astragalus bourgovii*, *Carex californica*, *Carex xerantica*, *Ivesia tweedyi*, and *Romanzoffia sitchensis* in the study area.

- Map 1. Stevens Peak area:
- Map 2. Moon Peak area:
- Map 3. Shefoot Mountain area:
- Map 4. Striped Peak:
- Map 5. Mount Wiessner - Latour Peak area:

Appendix 4

Occurrence records from the Conservation Data Center for
Astragalus bourgovii, *Carex californica*, *Ivesia tweedyi*, and
Romanzoffia sitchensis.

Appendix 5

Slides of rare plants from subalpine parks
in the Coeur d'Alene River study area.

- Slide 1. *Astragalus bourgovii* - close-up of flowers.
- Slide 2. *Astragalus bourgovii* - close-up of fruits.
- Slide 3. *Astragalus bourgovii* - close-up of plant.
- Slide 4. *Astragalus bourgovii* - ridgeline habitat at 002.
- Slide 5. *Carex californica* - close-up of inflorescence.
- Slide 6. *Carex californica* - close-up of plant.
- Slide 7. *Carex californica* - habitat on Striped Peak, between two logs in middle.
- Slide 8. *Carex xerantica* - close-up of inflorescence.
- Slide 9. *Carex xerantica* - close-up of plant.
- Slide 10. *Carex xerantica* - habitat on Latour Peak, near pack in middle.
- Slide 11. *Ivesia tweedyi* - close-up of plant.
- Slide 12. *Ivesia tweedyi* - close-up of leaves.
- Slide 13. *Romanzoffia sitchensis* - close-up of plant.
- Slide 14. *Romanzoffia sitchensis* - habitat in seepy couloir in Selkirk Mountains.