ALPINE FLORA OF THE UPPER LITTLE WOOD RIVER, PIONEER MOUNTAINS, SAWTOOTH NATIONAL FOREST

by

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ABSTRACT

Comprehensive alpine floristic studies in Idaho, began about 20 years ago. There are still many gaps regarding our knowledge of the distribution of Idaho's alpine flora. One of these is the alpine zone in the Little Wood River drainage, in the southern Pioneer Mountains, Blaine County. To fill this gap I conducted a floristic survey in the area in June and August, 1993. I observed or collected 125 vascular plants from the alpine zone, only three of which are considered rare in Idaho, *Carex straminiformis* (Mt. Shasta sedge), *Saxifraga adscendens* (wedge-leaf saxifrage) and *Saxifraga cernua* (nodding saxifrage). This is considerably less than documented from the Kane Lake Cirque in the northern Pioneers. The difference in the number of rare species probably results from the predominantly south aspects of the cirques in the Little Wood study area. Kane Lake Cirque faces due north and has steep, high headwalls on the west, south, and east, providing an extraordinarily cold, moist environment suitable for uncommon arctic and alpine disjuncts in Idaho. I provide an annotated checklist of the alpine flora of the Little Wood River, and discuss the conservation status of the three rare species.

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INTRODUCTION

The National Forest Management Act and Forest Service policy require that Forest Service land be managed to maintain populations of all existing native animal and plant species at or above the minimum viable population level. A minimum viable population consists of the number of individuals, adequately distributed throughout their range, necessary to perpetuate the existence of the species in natural, genetically stable, self-sustaining populations. The Forest Service, along with other Federal and State agencies, has recognized the need for special planning considerations in order to protect the flora and fauna on the lands in public ownership. Species recognized by the Forest Service as needing such considerations are those that (1) are designated under the Endangered Species Act as endangered or threatened, (2) are under consideration for such designation, or (3) appear on a regional Forest Service sensitive species list.

The only way to gain an complete understanding of species rarity within a geographic area is to conduct a comprehensive inventory of that area. The alpine zone of Idaho has only been explored floristically (Henderson 1978; Henderson et al. 1981; Brunsfeld 1981a; Brunsfeld et al. 1983; Caicco and Henderson 1981; Caicco et al. 1983; Lackshewitz et al. 1983; Hartman and Constance 1985; Moseley and Bernatas 1992a; 1992b) and ecologically (Caicco 1983; Moseley 1985) within the last 20 years. Gaps in our knowledge of the distribution of the states alpine flora still exist, however, and new discoveries are made regularly (e.g., Henderson 1992), including many discoveries in the Pioneer Mountains of species previously not known to occur in Idaho (Moseley and Bernatas 1992b). One such gap is the alpine zone of the Little Wood River drainage at the southern end of the Pioneer Mountains. The Sawtooth National Forest and the Idaho Department of the Fish and Game's Conservation Data Center entered into this cooperative project to fill this gap in our knowledge. The primary objectives of this investigation are as follows:

1) Inventory the vascular flora of the alpine zone of the Little Wood River drainage (Figure 1).

2) If occurrences of rare species are found, characterize population attributes and habitat conditions for each population and make management recommendations to the forest concerning their long-term viability.

Figure 1. Map of the Little Wood River study area. Hatched areas indicate the alpine zone where the inventory took place.

RESULTS

After searching the literature and Conservation Data Center data bases, I found that the following ten rare, alpine species are known from the Pioneer Mountains, on the Sawtooth and/or Challis NFs:

Carex incurviformis
Draba fladnizensis
Erigeron humilis
Lychnis apetala
Parnassia kotzebuei
Potentilla nivea
Ranunculus gelidus
Ranunculus pygmaeus
Saxifraga adscendens
Saxifraga cernua

This formed the target list of rare species for which I would pay 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. The first was on June 27, to look at plants that flowered soon after snowmelt on the ridges. Most of the inventory, however, took place between August 19 and 25. The late August survey is about one month later than normal years for peak flowering in the alpine zone of the Pioneers. 1993 was the coldest summer ever recorded in Idaho, and the snowpack in the high mountains of central Idaho took an abnormally long time to melt.

During my inventory I observed or collected 125 vascular plants from the alpine zone of the Little Wood River drainage. This is comparable to the alpine zone of Kane Lake Cirque at the north end of the Pioneers (Moseley and Bernatas 1992b), however, there is a striking difference between the two areas in the number of rare species; only three, *Carex straminiformis* (Mt. Shasta sedge), *Saxifraga adscendens* (wedge-leaf saxifrage) and *Saxifraga cernua* (nodding saxifrage), from the Little Wood drainage, as compared with nine in the much smaller Kane Lake Cirque. The difference in the number of rare species probably results from the predominantly south aspects of the cirques in the Little Wood study area. Kane Lake Cirque faces due north and has steep, high headwalls on the west, south, and east, making an extraordinarily cold, moist environment suitable for uncommon arctic and alpine disjuncts.

With the completion of this project, there remains just two major portions of the Pioneer Mountains left to conduct inventories of the alpine flora, the Wildhorse Creek drainage (including Fall and Boulder Creeks) of the Challis NF and Hyndman Creek drainage on the Sawtooth NF. Both areas contain extensive areas of potentially suitable habitat for rare alpine species.

CHECKLIST OF THE ALPINE FLORA

Following is an annotated checklist of 125 vascular plant species collected or observed in the alpine zone of the Little Wood River drainage. Sixty-two specimens were collected, processed, and deposited in the University of Idaho Herbarium in Moscow. Those species for which I made voucher collections are indicated by my collection number following each species. The checklist is arranged by division and class (in Magnoliophyta), then alphabetically by family, genus, and species within these major groups. Nomenclature follows Hitchcock and Cronquist (1973) for all species except for the genus *Poa* (the bluegrasses), which follows Arnow (1987). Most of these species have no widely used common name, although some are listed in Duft and Moseley (1989), which also contains photographs of many of the species. The only alien species observed was dandelion (*Taraxacum officinale*).

DIVISION LYCOPHYTA

Selaginellaceae

Selaginella densa Rydb. Common on moist to dry slopes and ledges and stabilized scree.

DIVISION PTEROPHYTA

Pteridaceae

Cryptogramma crispa (L.) R. Br. Common in talus. 2817.

Dryopteridaceae

Cystopteris fragilis (L.) Bernh. Common among rocks in moist areas.

DIVISION CONIFEROPHYTA

Cupressaceae

Juniperus communis L. var. *montana* Ait. Rare on dry ledges of lower alpine zone and in krummholz.

Pinaceae

Abies lasiocarpa (Hook.) Nutt. Uncommon at timberline.
Pinus albicaulis Engelm. Common at timberline.

DIVISION ANTHOPHYTA

CLASS DICOTYLEDONES

Apiaceae

Cymopterus glaucus Nutt. Common in dry talus and scree. 2810.

Asteraceae

Achillea millefolium L. ssp. *lanulosa* (Nutt.) Piper var. *alpicola* (Rydb.) Garrett. Common on dry slopes.
Agoseris glauca (Pursh) Raf. var. *dasycephala* (T. & G.) Jeps. Common on unstable substrates.
Antennaria alpina (L.) Gaertn. var. *media* (Greene) Jeps. Common in moist, sandy soil.
Antennaria microphylla Rydb. Common on dry slopes.
Antennaria umbrinella Rydb. Common in dry to moist meadows.
Arnica latifolia Bong. var. *gracilis* (Rydb.) Cronq. Common in many habitats.
Arnica mollis Hook. Common in moist boulder fields. 2795.
Chaenactis alpina (Gray) Jones. Common in dry, sandy scree.
Cirsium tweedyi (Rydb.) Petr. Uncommon in moist meadows and on ledges. 2780.
Erigeron acris L. var. *debilis* Gray. Common in moist sandy soil.
Erigeron asperugineus (Eat.) Gray. Common in dry talus. 2800.
Erigeron compositus Pursh var. *glabratus* Macoun. Common on dry ledges. 2636.
Erigeron peregrinus (Pursh) Greene ssp. *callianthemus* (Greene) Cronq. var. *scaposus* (T. & G.) Cronq. Common in lakeshore meadows.
Erigeron simplex Greene. Common in moist meadows and on slopes.
Eriophyllum lanatum (Pursh) Forbes. Uncommon in scree. 2816.
Haplopappus lanuginosus Gray. Uncommon on dry slopes.
Haplopappus lyallii Gray. Uncommon on dry ledges.
Haplopappus macronema Gray. Uncommon on dry slopes.
Haplopappus suffruticosus (Nutt.) Gray. Uncommon on dry slopes.
Hieracium gracile Hook. Uncommon in dry areas.
Hulsea algida Gray. Common in talus.
Senecio cymbalarioides Buek. Common in moist meadows.
Senecio fremontii T. & G. var. *fremontii*. Common in talus.
Senecio werneriaefolius Gray. Common on dry to moist slopes. 2631.
Solidago multiradiata Ait. var. *scopulorum* Gray. Dry, rocky ledges.
Taraxacum lyratum (Ledeb.) DC. Common in moist meadows and on slopes. 2797.
Taraxacum officinale Weber. Alien; rare.

Brassicaceae

Arabis lemmonii Wats. var. *lemmonii*. Common on dry, unstable slopes. 2629.
Draba crassifolia R. Grah. Common in moist soil.
Draba densifolia Nutt. Common in dry fellfields. 2785.
Draba lonchocarpa Rydb. var. *lonchocarpa*. Common on moist ledges and slopes. 2634
Draba oligosperma Hook. var. *oligosperma*. Common on dry alpine slopes and ledges. 2632, 2803.

Draba oreibata Macbr. & Pays. Rare on exposed ridge near Johnstone Pass. This the only known population of this species on a non-calcareous substrate (limestone or dolomite), in this case granite. 2633.
Erysimum asperum (Nutt.) DC. Rare in dry talus.
Lesquerella occidentalis Wats. var. *diversifolia* (Greene) Hitchc. Locally common on dry, exposed ridges. 2630.
Smelowskia calycina (Steph.) C.A. Mey. var. *americana* (Regel & Herd) Drury & Rollins. Common on dry, exposed slopes. 2635.

Caryophyllaceae

Arenaria aculeata Wats. Common on dry, sandy slopes.
Arenaria nuttallii Pax var. *nuttallii*. Common in loose scree.
Arenaria obtusiloba (Rydb.) Fern. Common on dry, exposed slopes and ledges.
Arenaria rubella (Wahlenb.) J.E. Smith. Uncommon on moist to dry alpine ledges.
Cerastium berringianum Cham. & Schlecht. Common on moist ledges. 2807.
Sagina saginoides (L.) Britt. Uncommon in alpine meadows.
Stellaria longipes Goldie var. *altocaulis* (Hulten) Hitchc. Uncommon in moist, sandy sites and scree.

Crassulaceae

Sedum lanceolatum Torr. var. *lanceolatum*. Common on moist to dry slopes and ledges.

Ericaceae

Kalmia microphylla (Hook.) Heller. Common in lakeside meadow. 2806.
Phyllodoce glandulifera (Hook.) Cov. Common on moist slopes. 2721.
Phyllodoce empetriformis (Sw.) D. Don. Common on moist slopes.

Fabaceae

Astragalus alpinus L. Common in moist meadows. 2798.
Astragalus eucosmus Robins. Uncommon on moist slopes. 2822
Astragalus kentrophyta Gray var. *implexus* (Canby) Barneby. Common on exposed, dry slopes and ledges.
Lupinus argenteus Pursh. Common in moist to dry, exposed areas.

Gentianaceae

Gentiana calycosa Griseb. var. *asepala* (Maguire) Hitchc. Common in moist meadows.

Grossulariaceae

Ribes cernuum Dougl. var. *inebrians* (Lindl.) Hitchc. Uncommon on dry ledges and boulder fields. 2640.
Ribes hendersonii Hitchc. Common on dry ridgeline sites in rocks.

Hydrophyllaceae

Phacelia hastata Dougl. var. *alpina* (Rydb.) Cronq. Uncommon in moist to dry talus.

Onagraceae

Epilobium alpinum L. var. *alpinum*. Common on moist, unstable slopes.

Polemoniaceae

Collomia debilis (S.Wats.) Greene var. *debilis*. Uncommon on scree slopes.
Phlox pulvinata (Wherry) Cronq. Common on dry, exposed, alpine slopes. 2627.
Polemonium viscosum Nutt. Common in talus and unstable sites on ledges. 2639.

Polygonaceae

Eriogonum caespitosum Nutt. Uncommon on dry ridges.
Eriogonum flavum Nutt. Common on outcrops and stable slopes.
Eriogonum ovalifolium Nutt. var. *depressum* Blank. Common on dry, unstable slopes and ledges.
Oxyria digyna (L.) Hill. Common on moist, rocky slopes.
Polygonum bistortoides Pursh. Common in moist to wet meadows.

Portulacaceae

Claytonia megarhiza (Gray) Parry var. *megarhiza*. Uncommon in talus.
Lewisia pygmaea (Gray) Robins. var. *pygmaea*. Common in dry sites.
Spraguea umbellata Torr. Uncommon in scree.

Primulaceae

Androsace septentrionalis L. Common on moist, sandy slopes.
Dodecatheon pulchellum (Raf.) Merrill var. *watsonii* (Tidestrom) Hitchc. Common in moist meadows.

Ranunculaceae

Anemone drummondii Wats. var. *drummondii*. Common on ledges. 2638, 2799.
Caltha leptosepala DC. var. *leptosepala*. Common in wet meadows along streams and around lakes and ponds.
Ranunculus eschscholtzii Schlecht. var. *eschscholtzii*. Common on moist slopes.
Ranunculus verecundus Robins. Common on moist ledges. 2786.

Rosaceae

Ivesia gordonii (Hook.) T. & G. Community dominant on stable to unstable fellfields.
Potentilla brevifolia Nutt. Common on dry, outcrops and scree slopes. 2781.
Potentilla diversifolia Lehm. var. *diversifolia*. Common in moist meadows.
Potentilla fruticosa L. Common on moist ledges and in boulder fields.
Potentilla glandulosa Lindl. var. *pseudorupestris* (Rydb.) Breit. Local on dry ledges.
Rubus idaeus L. var. *gracilipes* Jones. Rare in scree and talus. 2814.
Sibbaldia procumbens L. Common on moist, sandy slopes and ledges.

Salicaceae

Salix nivalis Hook. var. *nivalis*. Rare on moist slopes.

Saxifragaceae

Heuchera cylindrica Dougl. var. *alpina* Wats. Common on dry ledges and outcrops and moderately stabilized scree.
Parnassia fimbriata Common. var. *fimbriata*. Locally common in moist meadows.
Saxifraga adscendens L. var. *oregonensis* (Raf.) Breit. Rare on moist, sloping meadows and talus and along rivulets in alpine zone. 2825.
Saxifraga arguta D. Don. Uncommon along streams and rivulets.
Saxifraga cernua L. Very rare on moist ledges.
Saxifraga debilis Engelm. Rare on moist and protected alpine ledges and slopes.
Saxifraga occidentalis Wats. var. *occidentalis*. Common in moist areas. 2783.
Saxifraga oppositifolia L. Common on moist cliff faces. 2628.

Scrophulariaceae

Castilleja miniata Dougl. Uncommon in lakeside meadows. 2809.
Pedicularis groenlandica Retz. Common in lakeside meadows. 2796.
Penstemon montanus Greene var. *montanus*. Common in talus and scree.
Veronica wormskjoldii Roem. & Schult. Common in moist to wet meadows.

Violaceae

Viola adunca Sm. var. *bellidifolia* (Greene) Harr. Common on moist meadows and slopes.

CLASS MONOCOTYLEDONES

Cyperaceae

Carex elynoides Holm. Common in exposed fellfields. 2626.
Carex nova Bailey. Uncommon in moist fellfields. 2789, 2792, 2808, 2826.
Carex nigricans C.A. Mey. Common in lakeside meadows. 2805.
Carex phaeocephala Piper. Widely scattered in dry alpine sites. 2791, 2924.
Carex proposita Mack. Common in dry fellfields. 2788, 2793, 2818, 2819.
Carex scirpoidea Michx. var. *pseudoscirpoidea* (Rydb.) Cronq. Common on moist, sandy slopes.
Carex scopulorum Holm. Common in lakeside meadows. 2812.
Carex straminiformis L.H. Bailey. Common in fellfields. 2790.
Carex subnigricans Stacey. Common in moist fellfields. 2794.

Juncaceae

Juncus parryi Engelm. Common in snowbeds. 2784, 2802.
Juncus mertensianus Bong. Uncommon in lakeside meadows. 2802.
Luzula spicata (L.) DC. Common on moist unstable slopes.

Liliaceae

Allium simillimum Hend. Uncommon on dry scree.
Zigadenus elegans Pursh. Common in moist, sloping meadows.

Poaceae

Agropyron scribneri Vasey. Uncommon on dry, unstable slopes.
Agrostis variabilis Rydb. Common on moist ledges. 2820.
Deschampsia cespitosa (L.) Beauv. var. *cespitosa*. Common in moist meadows where it is often dominant.
Festuca ovina L. var. *brevifolia* (R. Br.) Wats. Uncommon in dry fellfields. 2782.
Festuca idahoensis Elmer. Common on lower alpine slopes.
Phleum alpinum L. Common in wet to moist meadows.
Poa alpina L. Common in moist meadows and slopes.
Poa fendleriana (Steudel) Vasey. Common in dry talus. 2801, 2811.
Poa secunda Presl. Common in dry sites. 2787, 2804.
Trisetum spicatum (L.) Richter. Common in moist meadows and on ledges.

Following is the status of our knowledge of Mt. Shasta sedge, wedge-leaf saxifrage, and nodding saxifrage in Idaho, including information on taxonomy, habitat, distribution, conservation status, and management recommendations for each species. Sections containing line drawings, distribution maps, maps of areas searched, and slides of the three species and their habitats are appended to the end of the report.

Carex straminiformis Bailey

TAXONOMY

Full bibliographic citation: L.H. Bailey, 1889, Memoirs of the Torrey Botanical Club 1:24.

Type specimen: Brewer 1375, 1397, 1398, and 1399, Mt. Shasta, California.

Pertinent synonym(s): *C. straminea* var. *congesta*

Common name: Mt. Shasta 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 known collections of Mt. Shasta sedge were made by Monte Lewis and date from the mid-1950's and early 1960's. He collected them in the Deadwood Summit area of the Boise NF and in the Sawtooth Wilderness. In the 1970's, two more collections were made, one from the Copper Basin area and the other from Pinyon Peak, both on the Challis NF. An additional collection was made in the Sawtooth Wilderness by myself in 1985.

It should be noted that John Leiberg collected a sedge from the St. Joe Mountains of Kootenai County in 1895, that was identified as *Carex straminiformis*. I conducted field work in the St. Joe Mountains this year on another project and found that the specimen was a misidentification, and that the population on Latour Pk. was actually *C. xerantica*. The northern Idaho site mentioned by Steele (1981), therefore, is erroneous. (Steele lists it as being in Shoshone County; it is actually just over the border in Kootenai County.)

Alternative taxonomic treatments: None.

LEGAL OR OTHER FORMAL STATUS

National:

U.S. Fish and Wildlife Service: Mt. Shasta sedge in not a federal candidate.

U.S. Forest Service: Mt. Shasta sedge is currently a Forest Service Sensitive Species for the Challis and Salmon NFs in Region 4 (Spahr et al. 1991; U.S. Forest Service no date). The Conservation Data Center has no documentation of populations on the Salmon NF, however, it is known from five sites on the Sawtooth NF and one site on the Boise NF.

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

State:

Idaho

Idaho Native Plant Society: Mt. Shasta 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 Mt. Shasta sedge 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, Steele proposed that it be maintained on the State Watch List (Steele 1981).

DESCRIPTION

General nontechnical description: A member of the sedge family, Mt. Shasta sedge grows in dense tufts up to 4 dm tall. The leaves are crowded near the base and are generally much shorter than the culms. The leaves are rather firm, flat or nearly so, and mostly 2-4 mm wide. The spikes occur 3-10 in the inflorescence, are about 1 cm long or less, and are closely crowded in a compact head. The scales are mostly brownish with translucent margins and a firm green midrib. The perigynia are crowded, thin and flat, commonly greenish, and mostly 4.1-5.0 mm long tapering to a beak with many nerves (Spahr et al. 1991).

Technical description: Plants densely tufted, without creeping rhizomes; culms somewhat aphyllopodic, 1-4 dm tall; leaves crowded near the base, generally much shorter that the culms, rather firm, flat or nearly so and mostly 2-4 mm wide; spikes 3-10, gynaecandrous, sessile, stout, about 1 cm long or less, closely crowded into a compact head (but still readily distinguishable), the first two internodes collectively only

4-7 mm long; bracts sheathless, short and inconspicuous; pistillate scales distinctly shorter and narrower than the perigynia, largely hyaline-scarious except for the firmer green midrib, otherwise mostly brownish, with paler, hyaline margins; perigynia crowded, thin and flat, commonly green or greenish, mostly 4.1-5.0 mm long and 1.5-2.3 mm wide, 1.5-2.3 times as long as wide, finely or rather obscurely many-nerved on both sides or on the dorsal side only, tapering or abruptly contracted to the prominent, obliquely cleft or minutely bidentate beak, which is flattened, margined, and serrulate essentially to the tip, or the distal 0.5 mm sometimes more slender and scarcely margined, though generally still serrulate; stigmas 2; achene lenticular, 1.3-2.0 mm long and 1.0-1.4 mm wide (Cronquist 1969).

Local field characters: I did not realize that I had collected Mt. Shasta sedge until I identified my specimens in November, therefore, I did not observe the distinguishing field characters for this species. Mt. Shasta sedge is a densely tufted plant that is similar in habit to two others collected in the study area, *Carex phaeocephala* and especially *C. proposita*. A technical key is the best way to separate these species, although it appears that the heads of Mt. Shasta sedge are greener in appearance than the predominantly brown heads of *C. proposita*.

Photos and line drawings: Reproductions of a line drawing of Mt. Shasta sedge by Jeanne Janish appears in Cronquist (1969), Spahr et al. (1991), U.S. Forest Service (no date), and Appendix 1. No photos were taken in the Little Wood study area because I did not realize I had collected it until several months after the field work.

DISTRIBUTION

Global distribution: Mt. Shasta sedge is distributed in the Sierra Nevada and White Mountains of California and adjacent Nevada, north irregularly to southern Washington. It is disjunct in the Wasatch Mountains of central Utah (Salt Lake and Utah Counties) and in central Idaho (Cronquist 1969).

Idaho distribution: Nine populations are now known from south-central Idaho, in Custer, Blaine, Boise, and Valley Counties. Five populations occur in the Sawtooth Range, Sawtooth NF, two populations in the Pioneer Mountains, Challis and Sawtooth NFs, one population in the Boulder Mountains, Sawtooth NF, and two populations in the Salmon River Mountains, Boise and Challis NFs.

Precise occurrences in Idaho: The nine populations in Idaho are as follows (the three digit code associated with the site name is the Conservation Data Center occurrence number used as reference number for that population):

001 Thompson Peak cirque, Sawtooth Range, Custer County, Sawtooth NF
002 Star Hope Canyon, Pioneer Mountains, Custer County, Challis NF
003 Pinyon Peak, Salmon River Mountains, Custer County, Challis NF
004 Deadwood Summit, Salmon River Mountains, Valley County, Boise NF
005 Trail Creek - East Fork of the North Fork Big Wood River divide, Boulder Mountains, Blaine County, Sawtooth NF
006 Upper Baron Lake, Sawtooth Range, Boise County, Sawtooth NF
007 Alpine Lake, Sawtooth Range, Custer County, Sawtooth NF
008 Upper Toxaway Basin, Sawtooth Range, Custer County, Sawtooth NF
009 Upper Little Wood River, Pioneer Mountains, Blaine County, Sawtooth NF

I discovered the Upper Little Wood River (009) population during the course of my searches in the study are in 1993. I identified it from a collection made during an excursion through the upper Little Wood River and Laidlaw Creek (see Map 2 of Appendix 4 for route traveled). I'm not sure exactly where I collected it, however, so I have no documentation of the exact location or the size and extent of the population. Data for the upper Little Wood River population are provided in the Occurrence Record that appears in Appendix 3.

Historical sites: None.

Unverified/undocumented reports: None.

HABITAT

General habitat description: As I alluded to above, I'm not sure exactly where I collected Mt. Shasta sedge in the study area. My collections notes indicate that it was common in dry fellfields dominated by *Ivesia gordonii* and *Phlox pulvinata*. The slope probably varied from level to gently sloping to the south.

Geology and Soils: Tertiary granite (Worl et al. 1991), probably weathered into a coarse scree.

Associated species: Not sure.

Other rare species: None.

POPULATION BIOLOGY

Phenology: The plants I collected on August 19, 1993, had well developed fruits (achenes).

Population size and condition: Unknown, although I state in my collection book that Mt. Shasta sedge was common where I collected it.

Reproductive Biology: Mt. Shasta sedge reproduces by seed.

Biological Interactions: Unknown

Competition: Unknown.

Herbivory: Unknown

Land ownership: U.S Forest Service, Sawtooth National Forest, Ketchum Ranger District.

Land use: There appeared to be little (no) human use of the ridges surrounding the upper Little Wood River and Laidlaw Creek. It was probably grazed by sheep in the past, although no recent evidence was observed.

ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

Threats to currently known populations: The upper Little Wood River population of Mt. Shasta sedge is isolated from any obvious anthropogenic threats.

Recommendations:

- Mt. Shasta sedge should remain a Forest Service Sensitive Species due to its relative rarity. Because it is known from five sites on the Sawtooth NF and one on the Boise NF, it should be added to the sensitive list of those two Forests. It is currently listed for the Challis and Salmon NFs, however, the Lemhi County (Salmon NF) site reported by Steele (1981) remains undocumented.

- Current management of the upper Little Wood River population appears compatible with the long-term viability of the species here.

- Additonal floristic inventories should be conducted elsewhere on the Sawtooth NF, especially in the Pioneer and Boulder Mountains and in the Sawtooth Range where known populations occur.

Saxifraga adscendens L. var. *oregonensis* (Raf.) Breit.

TAXONOMY

Full bibliographic citation: Breitung, Canadian Field-Naturalist 71:56. 1957.

Type specimen: Drummond s.n., "alpine rivulets upon the Rocky Mountains" (probably collected in Canada during the 19th century).

Pertinent synonym(s): *Saxifraga oregonensis* A. Nels.; *S. incompta* Peck.

Common name: Wedge-leaf saxifrage

Size of genus: About 300 species, widely distributed but primarily of the temperate and arctic regions of the Northern Hemisphere, many of the species are circumboreal (Hitchcock 1961).

Family name: Saxifragaceae

Common name for family: Saxifrage

History of knowledge of taxon in Idaho: The first Idaho collection of wedge-leaf saxifrage was made by Ray Davis in 1936, in the cirque near Hyndman Peak, Pioneer Mountains. J.W. Thompson again collected it near Hyndman Peak in 1939. The next known collection was made by C.L. Hitchcock in the Rock Creek cirque near Borah Peak, Lost River Range, in 1954. All other populations of this species in Idaho, which now total ten, were discovered between 1979 and 1993.

Alternative taxonomic treatments: None.

LEGAL OR OTHER FORMAL STATUS

National:

U.S. Fish and Wildlife Service: Wedge-leaf saxifrage is not a federal candidate.

U.S. Forest Service: Wedge-leaf saxifrage is currently a Forest Service Sensitive Species for the Challis NF in Region 4 (Spahr et al. 1991; U.S. Forest Service no date). It is also a sensitive species on the Wallowa-Whitman NF, Region 6 (Brooks, et al. 1991.).

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

State:

Idaho

Idaho Native Plant Society: Wedge-leaf saxifrage is in the Idaho Native Plant Society (1993) Monitor category, indicating that it is either common within a limited range in Idaho, or it is uncommon, but has no identifiable threats. The latter case is applicable here.

Conservation Data Center: The Biodiversity Information Network state ranking for wedge-leaf saxifrage is S1, indicating that it is critically imperiled because of extreme rarity in Idaho or because of some factor of its biology making it especially vulnerable to extirpation (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 1981b).

DESCRIPTION

General nontechnical description: This member of the saxifrage family generally has 1 stem growing up from a basal rosette of leaves to a height of 3-10 cm. Both the stem and foliage have red glandular hairs. The leaves are attached directly to the stem, or nearly so, with a petiole. The leaf blades may be entire, 3-toothed, or shallowly lobed at the tip. The sepals are usually reddish-purple and are 2.5-3.5 mm long. The petals are white, 2-3 times as long as the sepals, and narrowed abruptly to a claw about half as long as the sepals. The stamens are inserted with slender filaments (Spahr et al. 1991).

Technical description: Strongly glandular pubescent, short-lived perennial, usually with a simple caudex, the flowering stem from simple to freely branched, (3) 5-10 cm tall; leaves 5-15 mm long, the blades from entire to apically 3 (5)-toothed or shallowly lobed, obovate, gradually narrowed to a broad or narrow petiole-like base, the cauline leaves 3-15; calyx usually reddish-purple, campanulate, 2.5-3.5 mm long at anthesis, the ovate-triangular lobes nearly erect, about equal to the connate portion which in fruit becomes considerably accrescent, turbinate, and up to 4 mm long; petals white, deciduous, 2-3 times as long as the calyx lobes, oblanceolate to (more frequently) obovate or even somewhat flabellate, narrowed abruptly to a claw about half as long as the calyx lobes; stamens inserted at the edge of a narrow disc surrounding the almost completely inferior ovary, the filaments slender, somewhat shorter than the sepals; styles slender, about 1 mm long; stigmas capitate, slightly decurrent; capsule 3.5-5 mm long; seeds obovoid, about 0.5 mm long, dark brownish-black, nearly smooth, with prominent raphe (Hitchcock 1961).

Local field characters: The only likely identification problem may be with young or depauperate specimens of *Saxifraga caespitosa*. Both species are densely glandular pubescent, but wedge-leaf saxifrage has hairs that are tipped with dark purple glands, while *S. caespitosa* has colorless glands. In addition, wedge-leaf saxifrage has a strongly red-tinged calyx, while *S. caespitosa* has a green calyx (Brunsfeld 1981a). Nodding saxifrage, discussed in the next section, occurs with wedge-leaf saxifrage in the study area and differs by having only one flower on the summit of the inflorescence. All other flowers have been modified into red bulbils, which occur in the axil of the lower bracts of the inflorescence.

Photos and line drawings: Reproductions of a line drawing of wedge-leaf saxifrage by Jeanne Janish appears in Hitchcock (1961), Spahr et al. (1991), U.S. Forest Service (no date), and Appendix 1. A

photograph appears in Duft and Moseley (1989). Photographs of its habit and habitat appear in U.S. Forest Service (no date). The Conservation Data Center has an extensive collection of slides of wedge-leaf saxifrage, some of which appear in Appendix 5.

DISTRIBUTION

Global distribution: *Saxifraga adscendens* is comprised of two varieties. *S. adscendens* var. *adscendens* occurs exclusively in Europe. *S. adscendens* var. *oregonensis* is the North American representative, occurring from the northern Rocky Mountains of Canada, southward in British Columbia to the northern Cascades of Washington, and in the Rockies to Utah and Colorado, west to central Idaho and the Wallowa Mountains of northeastern Oregon (Hitchcock 1961).

Idaho distribution: Ten populations are now known from south-central Idaho, in Custer and Blaine Counties. Four populations occur in the Pioneer Mountains, Challis and Sawtooth NFs, four populations occur in the Lost River Range, Challis NF, and two occur in the White Clouds, Sawtooth NRA.

Precise occurrences in Idaho: The ten populations in Idaho are as follows (the three digit code associated with the site name is the Conservation Data Center occurrence number used as reference number for that population):

001 Kane Lake Cirque, Pioneer Mountains, Custer County, Challis NF
002 Star Hope Canyon, Pioneer Mountains, Custer County, Challis NF
003 Merriam Lake Basin RNA, Lost River Range, Custer County, Challis NF
004 Rock Creek Cirque, Lost River Range, Custer County, Challis NF
005 Castle Peak, Lost River Range, Custer County, Challis NF
006 O'Calkens Lake, White Cloud Peaks, Custer County, Sawtooth NF
007 Jim Creek (Railroad Ridge) White Cloud Peaks, Custer County, Sawtooth NF
008 Hyndman Peak, Pioneer Mountains, Blaine County, Sawtooth NF
009 Borah Peak, Lost River Range, Custer County, Challis NF
010 Box Canyon, Pioneer Mountains, Blaine County, Sawtooth NF

I discovered the Box Canyon (010) population during the course of my searches in the upper Little Wood River study area in 1993. It is scattered across about 10 acres of the north slope of Pk 10,805, in the Box Canyon drainage (Little Wood River) near the divide with the East Fork of the Big Wood River. I searched all other suitable-appearing habitat in the study area, but found no other populations. It is my experience that wedge-leaf saxifrage occurs on north slopes that are fed by late-lying snow, in other words a combination of wet and cold conditions. These conditions are met by only one other area in the upper Little Wood drainage, at that head of Laidlaw Creek below Pk 11,839. This site was inaccessible to me without technical climbing equipment; it was well protected above and below by cliffbands and steep snowfields on the cirque headwall. It is likely that both rare saxifrages, wedge-leaf saxifrage and nodding saxifrage, occur at this site.

Further data for the Box Canyon population are provided in the Occurrence Record that appears in Appendix 3. See Appendix 2 for a map of the distribution of wedge-leaf and nodding saxifrages in the study area.

Historical sites: None.

Unverified/undocumented reports: None.

HABITAT

General habitat description: As I alluded to above, it is my experience in Idaho that wedge-leaf saxifrage occurs on northerly-facing slopes that remain wet due to their proximity with creeks or alpine rivulets. The Box Canyon population is no different. The dominant species occurring on this 30º-40º, north-facing slope are *Deschampsia cespitosa* and a green moss. Elevations range from approximately 10,200 feet to 10,400 feet.

Geology and Soils: Pk 10,805 appears to be comprised of two geologic units, the Ordovician Clayton Mine Quartzite and undivided metasedimentary rocks of the Middle Proterozoic (Worl et al. 1991). Wedge-leaf saxifrage occurs on ledges and slopes with sandy soil that is kept wet by numerous, small rivulets derived from late-lying snow higher on the slope.

Associated species: *Caltha leptosepala, Zigadenus elegans, Luzula spicata, Saxifraga debile, Saxifraga cernua, Saxifraga oppositifolia, Oxyria digyna, Polemonium viscosum, Arenaria rubella, Potentilla diversifolia, Cerastium beeringianum, Erigeron simplex, Erigeron acris, Poa alpina, Draba lonchocarpa.*

Other rare species: Wedge-leaf saxifrage in Box Canyon occurs with another arctic-alpine disjunct, nodding saxifrage.

POPULATION BIOLOGY

Phenology: It appeared that the wedge-leaf saxifrage population was in early flower in late-August, 1993. When I discovered the site, late in the afternoon of August 25, ice had not yet melted along many of the rivulets from the night before. 1993 was the coldest summer ever recorded in Idaho, and I suspect that in normal years it begins flowering in mid-July.

Population size and condition: The population occupies approximately 10 acres on the north slope of Pk 10,805. It is widely scattered across the slope, with the highest densities occurring as clusters of plants along rivulets and the lower densities as individuals in moist sites on the slope. The habitat is in excellent condition. I estimate the population to contain at least 400 flowering plants. Numerous small, vegetative rosettes are also present, indicating a good age class structure of the population.

Reproductive Biology: Wedge-leaf saxifrage reproduces by seed. Nothing is known about seed dispersal or viability; no pollinators were observed.

Biological Interactions: None observed. I saw no evidence of either small or large mammals using the slope, although mountain goats certainly visit the site.

Competition: Wedge-leaf saxifrage generally occurs in small, bare-soil sites where there is little competition with other vascular species.

Herbivory: None observed.

Land ownership: U.S Forest Service, Sawtooth National Forest, Ketchum Ranger District.

Land use: Little (no) human use takes place on the north slope of Pk 10,805. It is well away from any trails, Pk. 10805 is unnamed and probably not tall enough to attract peak baggers, and I saw no evidence that domestic sheep are trailed to the site.

ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

Threats to currently known populations: The Box Canyon population is small, but isolated from any obvious anthropogenic threats, although mining may be a threat in the future.

Recommendations:

- Wedge-leaf saxifrage should remain a Forest Service Sensitive Species due to its relative rarity. Because it is known from four sites on the Sawtooth NF, it should be added to the Sawooth sensitive list; it is currently listed only for the Challis NF.

- Current management of the Box Canyon population appears compatible with the long-term viability of the species here.

- Additonal floristic inventories should be conducted elsewhere on the Sawtooth NF, especially in the Pioneer Mountains and White Cloud Peaks where known populations occur.

- I will change the Biodiversity Information Network state rank for Idaho, from S1 to S2, to reflect the fact that ten populations are known from the state, and most are isolated and not threatened.

Saxifraga cernua L.

TAXONOMY

Full bibliographic citation: Linnaeus, Species Plantarum, page 403. 1753.

Type specimen: "Habitat in Alpibus Lapponicis frequens."

Pertinent synonym(s): None.

Common name: Nodding saxifrage.

Size of genus: About 300 species, widely distributed but primarily of the temperate and arctic regions of the Northern Hemisphere, many of the species are circumboreal (Hitchcock 1961).

Family name: Saxifragaceae

Common name for family: Saxifrage

History of knowledge of taxon in Idaho: The first Idaho collection of nodding saxifrage was made by C.L. Hitchcock in the Rock Creek cirque near Borah Peak, Lost River Range, in 1954. All other populations of this species in Idaho, which now total nine, were discovered between 1979 and 1993.

Alternative taxonomic treatments: None.

LEGAL OR OTHER FORMAL STATUS

National:

U.S. Fish and Wildlife Service: Nodding saxifrage is not a federal candidate.

U.S. Forest Service: Nodding saxifrage is currently a Forest Service Sensitive Species for the Challis, Salmon, and Targhee NFs in Region 4 (Spahr et al. 1991; U.S. Forest Service no date), although the CDC has no documentation of this species from the Salmon NF.

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

State:

Idaho

Idaho Native Plant Society: Nodding saxifrage 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 nodding saxifrage 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, Brunsfeld proposed that it be maintained on the State Watch List (Brunsfeld 1981c).

DESCRIPTION

General nontechnical description: A member of the saxifrage family, nodding saxifrage has fibrous roots and is single-stemmed. Flowering stems are 8-20 cm tall. There are usually several basal leaves which have rice-like bulblets in their axils. The lowermost flower clusters are replaced by small, red bulbils. The sepals are usually purplish or dotted, 3.0-4.5 mm long. The petals are white with 3 often purplish nerves at the base. The stamens usually exceed the sepal lobes (Spahr et al. 1991).

Technical description: Perennial, single-stemmed to more usually somewhat caespitose with 2-several simple (ours) to branched leafy flowering stems (8) 10-15 (20) cm tall, rather thickly glandular-pubescent to grayish glandular-pilose or rust-lanate below; basal leaves usually several, slender-petiolate, often bearing numerous rice-like bulblets in their axils, the blades mostly reniform, (5) 10-15 (20) mm broad, with 5-7 (9) rather prominent rounded teeth or shallow lobes; cauline leaves usually several, the lower ones like the basal but with much shorter petioles, the upper ones fewer lobed to entire; inflorescence falsely-racemose to paniculate, the lowermost 1 or 2 (sometimes all) flowers replaced by small reddish-purple bulbils; calyx turbinate to broadly campanulate, 3-4.5 mm long at anthesis, usually purplish or purplish-mottled, the ovate to oblong-ovate, erect lobes 2.5-4 times as long as the adnate lower portion, a free hypanthium lacking; petals white, the 3 nerves often purplish near the base; up to 12 mm long, 2-5 times as long as the calyx lobes, obovate to cuneate-obovate, retuse, not clawed, deciduous stamens usually exceeding the calyx lobes, the filaments not clavate; ovary about 1/4 inferior at anthesis, less so at maturity, the calyx not accrescent; styles 1-1.5 mm long; stigmas slightly decurrent (Hitchcock 1961).

Local field characters: Vegetatively, nodding saxifrage is nearly identical to *Saxifraga debilis*. Both form bulbils in the axils of the lower leaves, although this is much more prominent in nodding saxifrage. Leaf shape is nearly undistinguishable, but nodding saxifrage tends to have denser, more tangled, multicellular hairs on the petioles than *S. debilis*, and is soft to the touch. The leaves of nodding saxifrage tend to be dark green instead of the light green color of *S. debilis* leaves. With flowering material, differences are more obvious. Nodding saxifrage has straighter, taller, more leafy and bracted flowering stems with dark red bulbils in the upper leaf and lower bract axils, with few normal, white petaled flowers

above (Brunsfeld 1981a).

Photos and line drawings: Reproductions of a line drawing of nodding saxifrage by Jeanne Janish appears in Hitchcock (1961), Spahr et al. (1991), U.S. Forest Service (no date), and Appendix 1. A photograph appears in Duft and Moseley (1989). The Conservation Data Center has an extensive collection of slides of nodding saxifrage, some of which appear in Appendix 5.

DISTRIBUTION

Global distribution: Nodding saxifrage is circumboreal. In North America is occurs from Alaska to Labrador, southward to the Cascades of northern Washington, and in the Rocky Mountains to New Mexico, west to central Idaho, and Elko County, Nevada, and east to South Dakota (Hitchcock 1961).

Idaho distribution: Nine populations are now known from south-central and east-central Idaho, in Custer, Butte, Fremont, and Blaine Counties. Two populations occur in the Pioneer Mountains, Challis and Sawtooth NFs, four populations occur in the Lost River Range, Challis NF, two occur in the Lemhi Range, Challis NF, and one in the Henrys Lake Mountains, Targhee NF.

Precise occurrences in Idaho: The nine populations in Idaho are as follows (the three digit code associated with the site name is the Conservation Data Center occurrence number used as reference number for that population):

001 Targhee Creek RNA, Henrys Lake Mountains, Fremont County, Targhee NF
002 Pk 11,051 (near Diamond Peak), Lemhi Range, Butte County, Challis NF
003 Pk 10,441 (near Sunset Peak), Lost River Range, Butte County, Challis NF
004 Borah Peak Trail, Lost River Range, Custer County, Challis NF
005 Bunting Canyon, Lemhi Range, Butte County, Challis NF
006 Kane Lake Cirque, Pioneer Mountains, Custer County, Challis NF
007 Rock Creek Cirque, Lost River Range, Custer County, Challis NF
008 Rock Creek Cirque, Lost River Range, Custer County, Challis NF
009 Box Canyon, Pioneer Mountains, Blaine County, Sawtooth NF

I discovered the Box Canyon (009) population at the same time as the wedge-leaf saxifrage population on Pk. 10,805. The habitat is similar to wedge-leaf saxifrage, being both wet and cold, and I observed only one other site in the study are that has this habitat, the steep headwall at the head of Laidlaw Creek, which probably contains both nodding and wedge-leaf saxifrage.

Further data for the Box Canyon population are provided in the Occurrence Record that appears in Appendix 3. See Appendix 2 for a map of the distribution of wedge-leaf and nodding saxifrages in the study area.

Historical sites: None.

Unverified/undocumented reports: None.

HABITAT

General habitat description: The habitat of nodding saxifrage in Idaho is similar to that of wedge-leaf saxifrage, that is, high elevation, north-facing slopes that are continuously moist to wet. It is surprising, however, that the two saxifrages only overlap at a few sites, such as in the Kane Lake Cirque (Moseley and Bernatas 1992b) and Box Canyon in the Pioneer Mountains. The habitat is that described for wedge-leaf saxifrage in the previous section, except much more limited in extent. It occurs on ledges of a steep, north-facing rock outcrop with *Deschampsia cespitosa* and a green moss as the community dominants. The elevation is approximately 10,300 feet.

Geology and Soils: Pk 10,805 appears to be comprised of two geologic units, the Ordovician Clayton Mine Quartzite and undivided metasedimentary rocks of the Middle Proterozoic (Worl et al. 1991). Nodding saxifrage occurs on ledges and slopes with sandy soil that is kept wet by numerous, small rivulets derived from late-lying snow higher on the slope.

Associated species: *Caltha leptosepala, Zigadenus elegans, Luzula spicata, Saxifraga debilis, Saxifraga adscendens, Saxifraga oppositifolia, Oxyria digyna, Polemonium viscosum, Arenaria rubella, Potentilla diversifolia, Cerastium beeringianum, Erigeron simplex, Erigeron acris, Poa alpina, Draba lonchocarpa.*

Other rare species: Nodding saxifrage in Box Canyon occurs with another arctic-alpine disjunct, wedge-leaf saxifrage.

POPULATION BIOLOGY

Phenology: When I discovered the Box Canyon population of nodding saxifrage, late in the afternoon of August 25, it was not yet in flower and ice had not yet melted along the rivulet from the night before. Bulbils were developing, however, in three or four of the lowest bracts of the inflorescence. So, although sexual reproduction will probably not be successful this year, vegetative propagation of new individuals probably will be.

Population size and condition: The population consists of about 40 individuals occupying just a few square feet. More individuals may occur in the chutes below the ledge system containing the known population. The habitat is in excellent condition. Some vegetative rosettes were present, possibly indicating a good age class structure of the population.

Reproductive Biology: Nodding saxifrage reproduces sexually by seed and by vegetative propagation with bulbils. Nothing is known about seed dispersal or viability; no pollinators were observed.

Biological Interactions: None observed. I saw no evidence of either small or large mammals using the slope, although mountain goats certainly visit the site.

Competition: Nodding saxifrage generally occurs in small, bare-soil sites where there is little competition with other vascular species.

Herbivory: None observed.

Land ownership: U.S Forest Service, Sawtooth National Forest, Ketchum Ranger District.

Land use: Little (no) human use takes place on the north slope of Pk 10,805. It is well away from any trails, Pk. 10805 is unnamed and probably not tall enough to attract peak baggers, and I saw no evidence that domestic sheep are trailed to the site.

ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

Threats to currently known populations: The Box Canyon population is small, but isolated from any obvious anthropogenic threats, although mining may be a threat in the future.

Recommendations:

- Nodding saxifrage should remain a Forest Service Sensitive Species due to its relative rarity. It is currently listed as occurring on the Challis, Targhee, and Salmon NFs (Brunsfeld 1981c; Spahr et al. 1991; U.S. Forest Service no date). The population found this year in the study area is on the Sawtooth NF, which should be added to the list. I have seen no evidence, however, that nodding saxifrage occurs on the Salmon NF.

- Current management of the Box Canyon population appears compatible with the long-term viability of the species here.

- Additonal floristic inventories should be conducted to search out new populations elsewhere on the Sawtooth NF, especially in the Pioneer Mountains.

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Appendix 1

Line drawings of *Carex straminiformis* (from Cronquist 1969),
Saxifraga adscendens and *Saxifraga cernua* (from Hitchcock 1961).

Appendix 2

Distribution of *Saxifraga adscendens* and *Saxifraga cernua* in the Little Wood River study area
(portion of the 1967 Grays Peak 7.5' USGS quadrangle).

Appendix 3

Occurrence records from the Conservation Data Center for
Carex straminiformis (009), *Saxifraga adscendens* (010) and *Saxifraga cernua* (009).

Appendix 4

Routes traveled through the Little Wood River study area in 1993.

Map 1. Box Canyon - Brocky Canyon area (portion of the 1967 Grays Peak 7.5' USGS quadrangle). This map adjoins Map 2.

Map 2. Laidlaw Creek - upper Little Wood River area (portion of the 1967 Standhope Peak 7.5' USGS quadrangle). This map adjoins Map 1.

Map 3. Upper Muldoon Creek - Scorpion Mountain area (portion of the 1991 provisional edition Star Hope Mine 7.5' USGS quadrangle). This map adjoins Map 4.

Map 4. Upper Muldoon Creek - Scorpion Mountain area (portion of the 1991 provisional edition Muldoon 7.5' USGS quadrangle). This map adjoins Map 3.

Appendix 5

Slides of rare plants in the Little Wood River study area.

Slide 1. Close-up of *Saxifraga adscendens* (wedge-leaf saxifrage). Note pencil for scale.

Slide 2. Habitat of *Saxifraga adscendens* (wedge-leaf saxifrage) on the north slope of Pk. 10,805 in the Box Canyon area.

Slide 3. Close-up of *Saxifraga cernua* (nodding saxifrage). Note pencil for scale. This photo was taken in the Kane Lake Cirque; the plants in Box Canyon were not in flower when I visited them.

Slide 4. Habitat of *Saxifraga cernua* (nodding saxifrage) on the north slope of Pk. 10,805 in the Box Canyon area.