

FLORISTIC INVENTORY OF WETLANDS IN
FREMONT AND TETON COUNTIES, IDAHO

by

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ABSTRACT

During August and September, 1991, ecologists from the Idaho Department of Fish and Game's Conservation Data Center inventoried the flora and vegetation at over 60 wetlands in Fremont and Teton counties, Idaho. Our survey included lands administered by the Targhee National Forest, Yellowstone National Park, Idaho Falls BLM, Idaho Departments of Parks and Recreation, Lands, and Fish and Game, as well as numerous private ownerships. This investigation was a cooperative Challenge Cost-share project between the Department and the Targhee National Forest. Although we surveyed all types of wetlands in the study area, most of our time was spent in peatlands, that is, wetlands with a peat or organic substrate. More rare plants were known to occur in these wetlands than in riparian areas with predominantly mineral substrates.

We encountered 13 rare wetland plants in 13 peatlands of the study area. All species are widespread in boreal regions of the continent, but are disjunct or at the southern edge of their range in Idaho, and are rare here. Several rare species were not previously known to occur in Idaho south of the panhandle, 350 miles to the north. Our discovery of one species, *Eleocharis tenuis*, appears to be the first known occurrence of this plant in Idaho. We discuss the taxonomy and identification, distribution, abundance, habitat relationships, and management suggestions for each species, as well as make recommendations concerning its conservation status in Idaho.

Results of our floristic inventory and associated natural community data suggest that seven peatlands deserve special recognition over and above the fact that they are habitat for rare plants. These relatively undisturbed sites are important to the maintenance of wetland and aquatic diversity in Idaho and the region. The seven wetland sites of high biodiversity value are managed by the U.S. Forest Service, National Park Service, Idaho Department of Parks and Recreation, BLM, and several private landowners.

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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 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.

Four Region 4 Sensitive Plant Species were known to occur in wetlands of the Henrys Lake-Island Park area of the Targhee NF. In addition, we had evidence that at least four other rare plants occurred in wetlands of Fremont and Teton counties, that are not currently Forest Service Sensitive Species. In light of this evidence, the Idaho Department of Fish and Game's Conservation Data Center¹ (CDC) conducted a survey of wetland habitats in Fremont and Teton counties (Figure 1) through the cooperative Challenge Cost-share program with the Targhee NF. The primary objectives of this investigation are as follows:

- 1) Survey wetland habitats in Fremont and Teton counties, Idaho, for rare plant species and wetland communities.
- 2) Determine the distribution, habitat and population levels for rare taxa encountered.
- 3) Assess population trends and threats to existing populations and make management recommendations to the Forest Service, Yellowstone National Park, and Bureau of Land Management based on these assessments.
- 4) Identify high quality sites that have state and regional significance to the maintenance and protection of rare wetland plants and natural communities.

RESULTS

Between early August and mid-September, 1991, ecologists from the CDC surveyed over 60 wetlands in Fremont and Teton counties. Our survey included lands administered by the Targhee National Forest, Yellowstone National Park, Idaho Falls District BLM, Idaho Department of Lands, Idaho Department of Parks and Recreation, and Idaho Department of Fish and Game, as well as numerous private ownerships. Although we surveyed all types of wetlands in the study area, most of our time was spent in peatlands, that is, wetlands with a peat or organic substrate. There are two types of peatlands in the study area: bogs, whose sole source of nutrients is precipitation, and fens, that are fed by groundwater or incoming streams (Rabe and Bursik n.d.). The only bog we found in the study area was at Robinson Lake in Yellowstone NP. Fens, on the other hand, are more common. Shrub-

¹Formerly the Idaho Natural Heritage Program

Figure 1. Study area in Fremont and Teton counties, Idaho.

STUDY AREA

and forb-dominated riparian communities on mineral substrates are common in the study area, but were surveyed less intensively because of the low probability of finding rare plants. A list of wetlands visited during this study appears in Appendix 1.

The results of our survey are discussed in two sections, Rare Vascular Flora and Wetland Sites of High Biodiversity Value. In addition, a section summarizing our results and recommendations appears at the end.

Rare Vascular Flora

Thirteen vascular plants considered rare in Idaho, were discovered at 13 wetland sites in the study area. Later in this section, each of these 13 species is discussed in detail, including information on their taxonomy and identification, range and habitat, conservation status, and recommendations to the various agencies, concerning their status in Idaho.

Prior to 1991, four Region 4 Forest Service Sensitive plants were known to occur in wetlands of the study area: *Claytonia lanceolata* var. *flava*, *Carex aenea*, *Carex buxbaumii*, and *Salix candida*. During our survey, we only found populations of the latter two species, which are discussed later in this section. The former two are discussed below:

Claytonia lanceolata var. *flava* - We found no populations of yellow spring beauty in 1991. Our lack of success was not surprising, however, because it flowers immediately after snow-melt and is probably unidentifiable in late summer. In a thorough survey for this species in 1988, Moseley (1988) found no populations on the Targhee NF.

Carex aenea - It was surprising that we did not find bronze sedge, however, as it would be easily identifiable during our survey. Cronquist (1969a) states that the Idaho distribution of bronze sedge is restricted to Fremont County. We have one collection in our data base from Fremont County, as follows:

Along west edge of North Fork Snake River (presumed to be Henrys Fork), 1 mile above the junction with Warm River. Locally common in moist soil along river edge. L.C. Anderson 277 (NY); June 4, 1966.

We did not relocate this site, as access across private land was difficult. We made a special effort of collect and identify riverbank sedges in the vicinity, but did not find any bronze sedge. This species is not listed in Whitehead (1983).

In addition to the Forest Service Sensitive Species, there were four other species that were either brought to our attention after the field work or we did not find.

Astragalus eucosmus - Elegant milkvetch was once considered to occur in Idaho, only in Fremont County (Barneby 1964). Recent studies by botanists from the University of Idaho and the CDC found that it was also common in riparian zones of Custer County, especially in the Big Lost River drainage (Moseley 1991). Two vague, turn-of-the-century collections were known from the Henrys Lake vicinity and in the western Centennial Mountains. We did not relocate either of these, but much suitable habitat exists, especially in the Centennial Mountains.

Although it was considered rare in Idaho (Moseley and Groves 1990; Idaho Native Plant Society 1991), recent data suggest that it is more widespread than previously thought and not threatened. We will recommend that it be dropped from the state list at the next Idaho Rare Plant Conference in February, 1992.

Juncus hallii - This rare rush is known from two populations in the Island Park area, both of which we were unaware of until after our field work. This species occurs on open hillsides, in meadows, and in clearcuts (Whitehead 1983) and not in permanently wet ground. It is a rare species in Idaho (Moseley and Groves 1990) and Montana, where it is on the Forest Service's Watch list of rare species (Lesica and Shelly 1991; USDA Forest Service 1991).

Populus balsamifera - We were told of the possibility of balsam poplar occurring in the study area by Fred Johnson (Department of Forest Resources, University of Idaho, personnel communication, 1991) after our field work was completed. Fred and Bob Steele, collected a specimen north of Ashton on the Henrys Fork, as follows:

Fremont County: Henry's Fork Snake River at U.S. 20, 2 miles N of Ashton; riparian; 5,200 feet; single large clone of several dozen trees; possibly cultivated; height of largest 60-70 feet; 30 inches dbh. Johnson and Steele s.n. (IDF); June 26, 1984.

Balsam poplar is the eastern and northern vicariad of black cottonwood (*Populus trichocarpa*), which is common in the study area. Balsam poplar differs from black cottonwood by having narrower, glabrous, 2-carpellate ovaries and fruits, and fewer (commonly 20) stamens (Cronquist 1964a). The Johnson and Steele collection was verified by Cronquist as being two carpellate. While the stand of balsam poplar north of Ashton may be planted, the possibility exists that could occur in this part of Idaho naturally. If it was native, it would display a phytogeographic pattern similar to other species discussed in this report, for example *Carex aenea*, *Salix glauca*, and *Picea glauca*, that are eastern and boreal North American disjuncts and peripherals occurring in Island Park. This species is not listed in Whitehead (1983).

Salix glauca - High-elevation populations of gray willow from the eastern end of the Centennial Mountains and in the Henrys Lake Mountains, Fremont County, are the only collections of this species in Idaho. Vague, historical collections from the Henrys Lake area were not relocated by us in 1991. Superficially, it looks similar to Wolf's willow (*S. wolfii*). Steve Brunsfeld (Department of Forest Resources, University of Idaho, personnel communication, 1991) recently told us that George Argus, an expert in this group of willows (Argus 1965), recently reviewed this taxon in Idaho. He concluded that the high-elevation collections from Fremont County mentioned above, were different than any others in the state, but he did not think that they were *Salix glauca*. He was unsure of their exact taxonomic disposition, however. This species is not listed in Whitehead (1983). In light of these findings, the CDC will continue to track gray willow (Moseley and Groves 1990; Idaho Native Plant Society 1991), recognizing that its Idaho distribution is restricted to Fremont County and that its final taxonomic disposition is unclear.

During the course of our survey in August and September, 1991, we made 233 collections of 137 vascular plant species occurring in wetlands of the study area (Appendix 2).

***Carex buxbaumii* Wahl.**

CURRENT STATUS USFS R4 Sensitive Species (ID)
 USFWS - None
 Idaho Native Plant Society - Sensitive
 CDC Rank - G5 S3

TAXONOMY

Family: Cyperaceae (Sedge)

Common Name: Buxbaum's sedge

Citation: Svenska Vet.-Akad. Handl. 24:163. 1803.

Technical Description: Culms arising singly or few together from well-developed creeping rhizomes, mostly 3-10 dm tall, strongly aphyllopodic, not surrounded by old sheaths from previous years; leaves glabrous, elongate, mostly 2-4 mm wide; spikes mostly 2-5, approximate or somewhat remote, erect or closely ascending, sessile or (especially the lower) with more or less well-developed peduncle, the terminal spike gynaeandrous, 1-3 cm long, the lateral ones pistillate, about the same length or somewhat shorter; bract subtending the lowest spike sheathless or nearly so, from distinctly shorter to somewhat longer than the inflorescence; pistillate scales lanceolate to lance-ovate, brown to purplish black with a usually paler midrib, surpassing the perigynia, tapering to an awn-tip 0.5-3 mm long; perigynia 2.7-4.3 mm long, beakless or very shortly beaked, rather narrowly elliptic to sometimes elliptic-obovate or elliptic-ovate, up to barely over half as wide as long, firm-walled, not strongly flattened, light gray-green, densely papillate all over, with prominent marginal nerves and 6-8 inconspicuous or obscure nerves on each face; stigmas 3; achene trigonous, 1.4-1.9 mm long, somewhat narrower and much shorter than the perigynial cavity (Cronquist 1969a).

Nontechnical Description: Stems arising singly or few together from well-developed creeping rhizomes, mostly 1-3 feet in height, lowest leaves strongly reduced to scales; new stems are not surrounded by old sheaths from previous years (though old sheaths can be found separately from the new stems). Leaves are smooth and 2-4 mm in width. Spikes mostly 2-5, borne erect or closely ascending, and loosely sessile on the stem. Terminal spike, pistillate flowers are borne above the staminate flowers; the lateral spikes are entirely pistillate. Bract which subtends the spike is sheathless, and will sometimes exceed the inflorescence (Caicco 1988). See Appendix 3 for a line drawing of Buxbaum's sedge and Appendix 7 for slides of its habit and habitat.

Distinguishing Features and Similar Species: Buxbaum's sedge is a well-marked and distinct species. The light-gray green, densely-papillate perigynia give the inflorescence a distinctive coloration that makes field inventory for flowering stems rather easy. The plants retain this distinctive aspect until the perigynia cure to a pale straw color, which makes them more difficult to spot at a distance. The awned-tipped scales are also quite distinguishing.

DISTRIBUTION

Range: Buxbaum's sedge is distributed throughout the boreal regions of the Northern Hemisphere;

although it is widespread, it is relatively uncommon and infrequently collected. In the western United States it reaches as far south as Colorado, Utah, and central California, but is not recorded for Nevada. In Washington, it is known only from seven recent sightings in widely scattered locations. The Northern Region Forest Service Ecosystem Classification Handbook (USDA Forest Service 1987) lists it as occurring within the Northern Region in Montana, Idaho, and North Dakota.

Buxbaum's sedge is known from four widely disjunct areas of Idaho: 1) Island Park (Fremont Co), discussed below; 2) the Sawtooth Valley (Blaine and Custer counties), where it is found along lake edges and associated wetlands; 3) Tule Lake (Valley Co), where one population is known; and 4) Kaniksu NF (Bonner and Boundary counties) where several populations are known from the Priest River Valley and Selkirk Mountains.

Prior to 1991, Buxbaum's sedge was known in the study area from two locations: the upper Warm River (Whitehead 1983), and near the confluence of the Henrys Lake Outlet and the river from Big Springs. We relocated these two sites and found five new occurrences in the study area. The seven known sites in the study area are listed below (the three digit code refers to the occurrence number of this population in the CDC data base). See Appendices 4 and 5 for the mapped locations of Buxbaum's sedge in the study area and the occurrence records from the CDC data base in Appendix 6 for further location and habitat information on each population.

Targhee NF

Upper Warm River 004
Henrys Fork - Big Springs Confluence 008
Big Springs Boat Launch 014

Yellowstone National Park

"West Boundary Trail Meadows" 011
"Gentian Meadows" 012

State of Idaho, Department of Lands

Toms Creek 013

Private

Woods Creek Fen 015

All populations appeared vigorous and were rather extensive. The exception was the Toms Creek 013 population where only 50 culms were observed, although the population may extend upstream onto private land.

Habitat and Associated Species: Throughout its range Buxbaum's sedge can be found in peat bogs, marshes, wet meadows, and other wet places (Cronquist 1969a). Buxbaum's sedge has been classified as a minor community type in the Sawtooth Valley of Idaho (Tuhy 1981), as well as in Montana (Hansen *et al.* 1988), Utah (Padgett *et al.* 1989), and Wyoming (Mattson 1984). Many times it shares dominance with

one to several other sedges, usually *Carex aquatilis* (water sedge).

Such is the case with Buxbaum's sedge in the study area, where it dominates or codominates sites on peatland substrates, usually in a mosaic with other sedge-dominated communities. Water sedge is the most conspicuous sedge in the Buxbaum's sedge stands, but many other sedges also are associated, including *C. lanuginosa*, *C. rostrata*, *C. lasiocarpa*, *C. muricata*, *C. livida*, *C. nebraskensis*, *C. praeegracilis*, *C. saxitalis*, and *C. simulata*. This community is generally in the wettest portion of the wetland complex of communities; many sites had standing water in August. It can, however, occur on substrates that are saturated to the surface season-long, or even in the slow-moving stretches of the stream channel. The substrate is always high in organic matter. See Appendix 6 for the habitat descriptions of the seven known sites in the study area.

CONSERVATION STATUS

Conservation Status - Idaho: In his evaluation of Buxbaum's sedge for the Idaho rare plant project of the Idaho Natural Areas Council, Henderson (1981a) recommended a State Watch List status, due to its apparent rarity; threats were unknown to him at the time. Buxbaum's sedge was listed as a Watch Species for Idaho on the Northern Region Sensitive Species List (USDA Forest Service 1988), but does not appear on the updated list for some unknown reason (USDA Forest Service 1991). Buxbaum's sedge is a Sensitive Species in the Intermountain Region of the Forest Service (Spahr *et al.* 1991). It is also a BLM Sensitive Species in Idaho (Moseley and Groves 1990).

The Idaho Native Plant Society considers Buxbaum's sedge a Sensitive species (Idaho Native Plant Society 1991). The Sensitive category of the Idaho Native Plant Society list refers to species with small populations or localized distributions within Idaho that presently do not meet the criteria for classification as Priority 1 or 2, but whose populations and habitats may be jeopardized if current land use practices continue.

The Idaho CDC currently ranks Buxbaum's sedge as G5 S3 (G5 = demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery, S3 = Very rare and local in Idaho [Moseley and Groves 1990]).

Conservation Status - Elsewhere:

MONTANA - Considered for listing but rejected (Lesica *et al.* 1984; Lesica and Shelly 1991).

WASHINGTON - Sensitive = Taxon that is vulnerable or declining, and could become endangered or threatened in the state without active management or removal of threats (Washington Natural Heritage Program 1990).

WYOMING - It is on the Wyoming Natural Diversity Database's Plant Species of Special Concern - List 2 (Wyoming Natural Diversity Data Base 1991). List 2 includes species on designated or recommended Watch Lists for Federal lands in Wyoming, or other species that are moderately rare and/or threatened globally or regionally.

Threats: The Toms Creek 013 population is on State land, is small, and is being impacted by bank

erosion caused by cattle grazing. At the Big Springs Boat Launch 014 population on the Targhee NF, nearby disturbances in the wetland, including the parking lot, could be causing disruption of the wetland processes maintaining the sedge population. The Upper Warm River 004 population extends along the Warm River for about three linear miles (not river miles) and its habitat has been disrupted or destroyed in places by roads (2) and railroad crossings, adjacent clearcutting, and a failed attempt to dam the river, among other things. The long-term effects of the disruption of processes that maintain the wetlands inhabited by Buxbaum's sedge are unknown. A road traverses the population in the Woods Creek Fen 015, and may be disrupting hydrologic processes in the fen.

Management Implications: Most of the populations of Buxbaum's sedge in the study area are extensive and appear viable. The Targhee NF and Yellowstone NP should protect the wetlands inhabited by it to the fullest degree, paying special attention to the maintenance of natural processes operating to perpetuate these wetlands.

ASSESSMENT AND RECOMMENDATIONS

Summary: Buxbaum's sedge is known from four widely disjunct areas in Idaho, where it remains uncommon. Seven populations are now known from Fremont and Teton counties, where it occurs on land administered by the Targhee NF, Yellowstone NP, and Idaho Department of Lands, as well as one private ownership. Four of the seven populations have had some habitat destruction take place in the past and the hydrologic processes operating to maintain the wetland communities are vulnerable to disruption.

Recommendations to the Regional Forester: Based on distribution and abundance data, it appears that Buxbaum's sedge has a restricted distribution in Idaho. In addition to Idaho, Washington and Wyoming also consider it to be of conservation concern. Based on information reported here, I recommend that Buxbaum's sedge remain on the Regional Foresters Sensitive Species List for the Intermountain Region in Idaho, for the Boise, Sawtooth and Targhee NFs. Currently it is only listed for the Sawtooth and Targhee NFs (Spahr *et al.* 1991). Status inventories should be conducted on the Sawtooth and Boise NFs as soon as practicable.

Recommendation to the Targhee NF: Seven populations of Buxbaum's sedge are known from Fremont and Teton counties, Idaho, with the Targhee NF managing the largest share (3). Two of the Targhee populations, Upper Warm River 004 and Big Springs Boat Launch 008, have had habitat destroyed or are near ongoing disturbances. Both should be monitored carefully.

Recommendation to Yellowstone NP: Two extensive populations occur in Yellowstone NP. Neither has been disturbed and present land-use appears compatible with long-term maintenance of the populations.

NOTE: We feel that our survey was rather thorough (see Appendix 1 for a list of wetlands visited during the survey), but additional Buxbaum's sedge populations may be found in the area. Land managers and field personnel working in Fremont and Teton counties, Idaho, should be informed of the possible occurrence of this species in their areas. Possible sightings of this plant should be documented by specimens (if the size of the population warrants collecting), and should include both mature fruits and roots. Specimens should be sent to the University of Idaho Herbarium (Department of Biological Sciences, University of Idaho, Moscow 83843) for verification of their identity. Confirmed sightings of this species should be reported to the Idaho CDC for entry into their permanent data base on sensitive species.

***Carex livida* (Wahl.) Willd.**

CURRENT STATUS USFS R4 - None
 USFS R1 - Sensitive (Idaho and Montana)
 USFWS - None
 Idaho Native Plant Society - Priority 1
 CDC Rank - G5 S2

TAXONOMY

Family: Cyperaceae (Sedge)

Common Name: Pale sedge

Citation: Sp. Pl. 4:285. 1805.

Technical Description: Stems arising singly or few together from slender, creeping rhizomes, 1-4 dm tall, phyllopodic and with some old basal sheaths persistent; leaves mainly basal, firm, narrow, often channeled, 1-3.5 mm wide; terminal spike staminate, 1-2.5 cm long; lateral spikes 1-3, approximate or somewhat remote, slender, pistillate, 1-2.5 cm long, 5- to 15-flowered, erect, the short peduncle not much if at all exceeding the sheath; bract subtending the lowest spike with a fairly well-developed sheath mostly 5-15 mm long and a narrow setaceous but green blade seldom as much as 7 cm long; pistillate scales equaling or somewhat shorter than the perigynia, with a broad, pale green midstripe which seldom reaches the usually rather blunt tip, and with broad, hyaline-scarious, brown or dark brown margins; perigynia elliptic or rather narrowly rhombic, short-stipitate, less than twice as long as wide, tapering to the beakless or very shortly (to 0.2 mm) beaked tip, 3.5-4.5 mm long, distended by the achene but empty distally, scarcely compressed, light green, densely papillate-glaucous, with 2 marginal nerves, otherwise obscurely few-nerved or nerveless; stigmas 3; achene trigonous 2.2-2.5 mm long, jointed to the style (Cronquist 1969a).

Nontechnical Description: Stems arising singly or few together from slender, creeping rhizomes, mostly 1-4 dm in height, with well-developed lower leaves; some new stems may be surrounded by basal sheaths from previous years. Leaves are mainly basal, firm and narrow, channeled, and from 1-3.5 mm in width. Terminal spike has only staminate flowers and is 1-2.5 cm in length; 1-3 lateral spikes are slender and bear 5-15 pistillate (only) flowers. Bract which subtends the lowest spike is narrow and bristle-like, but is green and may be up to 7 cm in length; it also has a well-developed sheath 5-15 mm. See Appendix 3 for a line drawing of pale sedge and Appendix 7 for slides of its habit and habitat.

Distinguishing Features and Similar Species: Pale sedge is quite distinctive with its relatively short, basal leaves that are pale-green in color, falcate in shape, and stiff and channeled. It is somewhat similar to the taller, more robust *Carex aquatilis*. Water sedge, however, has larger, more lax leaves that are folded but do not have a prominent, stiff central groove. The inflorescence is also considerably larger.

DISTRIBUTION

Range: Pale sedge is distributed interruptedly throughout the boreal regions of the Northern Hemisphere. In the western part of the North American continent, it reaches south along the coast to Oregon and California. In the northern Rocky Mountains, it is known from Idaho, Montana, and Wyoming. It is known from four widely disjunct areas in Idaho: 1) the Priest Lake area of Bonner County; 2) Sawtooth Valley - Stanley Basin area of Custer and Blaine counties; 3) upper Lemhi River in Lemhi County; and 4) Yellowstone NP in Fremont County. Currently, there are 11 occurrences known in Idaho.

Within the study area, pale sedge is known from three wetlands in the southwestern corner of Yellowstone NP: Robinson Lake 007, "West Boundary Trail Meadow" 008, and "Gentian Meadow" 009. Rob Bursik first observed it at Robinson Lake in 1987. We found two more populations in 1991. These populations of pale sedge represent an addition to Whitehead's (1983) flora of the Island Park area. All populations are large and undisturbed. We found no pale sedge outside of Yellowstone park. See Appendix 4 for mapped locations of pale sedge in the study area and Appendix 6 for CDC occurrence records for pale sedge, including a detailed description of location, population data, and habitat.

Habitat and Associated Species: The three occurrences of pale sedge in the study all occur in somewhat different habitats. At Robinson Lake 007 it occurs on a floating sphagnum mat where *Carex lasiocarpa* is the dominant species. In the West Boundary Trail Meadow 008, pale sedge occurs on a mineral substrate with high organic matter. It occurs in *Carex buxbaumii*- and *Carex lasiocarpa*-dominated communities, where is locally codominant. In Gentian Meadow 009 it occurs on an organic substrate, although sphagnum is not present. It occurs in two communities here, one dominated by *Carex lasiocarpa* and the other as a codominant with *Eleocharis pauciflora*. This latter community appears to be the *Carex livida* phase of the *Eleocharis pauciflora*-*Carex aquatilis* habitat type described by Mattson (1984). Associated species include *Pedicularis groenlandica*, *Gentiana detonsa*, *Carex muricata*, *Carex rostrata*, *Potentilla palustris*, *Dulichium arundinacea*, *Lycopodium inundatum*, and *Scheuchzeria palustris*. See Appendix 6 for the habitat descriptions of the three known sites in the study area.

CONSERVATION STATUS

Conservation Status - Idaho: The possibility of pale sedge being of conservation concern in Idaho was first brought to our attention in about 1985 by Joel Tuhy. He described a community type dominated by pale sedge in the Sawtooth Valley (Tuhy 1981), which at the time was only "reputedly in northern Idaho" (Cronquist 1969a). It is now known from two sites in northern Idaho. Rob Bursik first noticed pale sedge at Robinson Lake in 1987, while conducting research at the University of Idaho (Bursik 1990). Bob Moseley and Michael Mancuso discovered a large pale sedge population along Texas Creek in the Lemhi River drainage in September 1991.

Pale sedge is listed as a Sensitive Species for Idaho and Montana by the Northern Region of the Forest Service (USDA Forest Service 1991).

The Idaho Native Plant Society considers Pale sedge a Priority 1 species (Idaho Native Plant Society 1991). The Priority 1 category of the Idaho Native Plant Society list refers to species in danger of becoming extinct or extirpated from Idaho in the foreseeable future if identifiable factors contributing to their decline continue to operate.

The Idaho CDC currently ranks Pale sedge as G5 S2 (G5 = demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery, S2 = imperiled in Idaho because of rarity and because of threats to populations in parts of its range in the state [Moseley and Groves 1990]).

Conservation Status - Elsewhere:

CALIFORNIA - On List 1A of the California Native Plant Society's list of rare plants in the state. List 1A contains those plants presumed extinct in California; it was last seen there in 1866 (Smith and Berg 1988).

MONTANA - Pale sedge is sensitive in Montana, where the Montana Natural Heritage Program also gives it a state rank of S2 (Lesica and Shelly 1991).

OREGON - The Oregon Natural Heritage Program places pale sedge on List 2 for Oregon, that is, those species which are threatened, endangered or possibly extirpated in Oregon, but are more common or stable elsewhere (Oregon Natural Heritage Program 1988).

WYOMING - It is on the Wyoming Natural Diversity Database's Plant Species of Special Concern - List 1 (Wyoming Natural Diversity Data Base 1991), a category containing the highest priority species in the state.

Threats: Although several threats exist to populations of pale sedge elsewhere in Idaho, the Yellowstone NP populations are all extensive and no threats are foreseen.

Management Implications: Current management appears compatible with long-term maintenance of these populations.

ASSESSMENT AND RECOMMENDATIONS

Summary: Pale sedge is known from 11 populations in four widely disjunct areas of Idaho. Within the study area, three extensive populations are known from the southwestern corner of Yellowstone NP. Although threats exist to other populations of pale sedge in Idaho, the three in Yellowstone Park are well protected.

Recommendation to the Regional Forester: Pale sedge is currently not on the Regional Forester's Sensitive Species List for Region 4. It is currently known from the Sawtooth NF and within a mile of the Targhee NF. Given the fact that it is rare or extinct in all states that form the southern boundary of its distribution, including, Wyoming, Montana, Idaho, Oregon and California, pale sedge should be added to the Region 4 Sensitive Species List. It is currently on the Region 1 List.

Recommendation to the Targhee NF: No populations are currently known from the Targhee NF, but the three populations in Yellowstone NP come within about a mile of the Forest. We searched most of the possible habitats for it on the Forest and were unsuccessful. The possibility exists that it occurs there, however, and Forest personnel should be on the lookout for it.

Recommendation to Yellowstone NP: Current management appears compatible with long-term maintenance of pale sedge populations in the Park.

Recommendation to the Idaho Native Plant Society: Pale sedge is currently a Priority 1 species on the Idaho Native Plant Society list. We will recommend that it be downgraded to Sensitive to better reflect its currently-known conservation status in the state.

NOTE: We feel that our survey was rather thorough (see Appendix 1 for a list of wetlands visited during the survey), but additional pale sedge populations may be found in the area. Land managers and field personnel working in Fremont and Teton counties, Idaho, should be informed of the possible occurrence of this species in their areas. Possible sightings of this plant should be documented by specimens (if the size of the population warrants collecting), and should include both mature fruits and roots. Specimens should be sent to the University of Idaho Herbarium (Department of Biological Sciences, University of Idaho, Moscow 83843) for verification of their identity. Confirmed sightings of this species should be reported to the Idaho CDC for entry into their permanent data base on sensitive species.

Cicuta bulbifera L.

CURRENT STATUS USFS Region 1 - Sensitive
 USFS Region 4 - None
 USFWS - None
 Idaho Native Plant Society - Priority 2
 CDC Rank - G5 S1

TAXONOMY

Family: Apiaceae or Umbelliferae (Celery)

Common Name: Bulb-bearing waterhemlock

Citation: Sp. Pl. 255. 1753.

Technical Description: Plants generally single-stemmed, 3-10 dm tall, mostly relatively slender, not much thickened at the base and sometimes without thickened roots; leaves all cauline, the middle and lower ones more or less dissected, with narrowly linear, entire or obscurely few-toothed segments mostly 0.5-1.5 mm wide and 0.5-4 cm long, the upper ones more or less reduced, with fewer segments, or undivided, many of them bearing one or more axillary bulbils; umbels frequently wanting, or present but not maturing fruit, the rays mostly 1-2.5 cm long; fruit orbicular, 1.5-2 mm long, constricted at the commissure, the ribs broader than the narrow intervals (Cronquist 1961).

Nontechnical Description: Bulb-bearing waterhemlock has a wispy, easily overlooked habit. Its thin erect stems, to approximately 2 feet tall, have dissected leaves with very narrow segments. In a vegetative state, bulb-bearing waterhemlock blends in with the numerous graminoid species of its habitat, making field inventory before July difficult. The primary mode of propagation is by bulbils found in the axils of the upper, reduced leaves; the entire inflorescence may be lacking. If they are present, the light-colored flowers produce fruits that never mature and produce seeds. See Appendix 3 for a line drawing of bulb-bearing waterhemlock and Appendix 7 for slides of its habit and habitat.

Distinguishing Features and Similar Species: Bulb-bearing waterhemlock is easily distinguished from all other members of the Apiaceae that occur in Idaho bogs. It has narrow leaf segments, the upper ones producing purplish bulbils.

DISTRIBUTION

Range: Bulb-bearing waterhemlock is distributed from Newfoundland to Virginia, west to Saskatchewan, northern Alberta, British Columbia, southern Oregon and Nebraska. In the Northern Region of the Forest Service, the Ecosystem Classification Handbook (USDA Forest Service 1987) lists it as occurring in Idaho, Montana, North Dakota and South Dakota. In Idaho, ten sites are known, nine of which are in the panhandle, in Bonner and Boundary counties. We discovered a population within the study area in Fremont County, that is widely disjunct from the rest in Idaho by over 350 miles. This species represents an addition to Whitehead's (1983) flora of the Island Park area.

The population in the study area occurs on the Targhee NF, in a large wetland near the confluence of the Henrys Lake outlet and the Big Springs outlet. See Appendix 4 for the mapped location of bulb-bearing waterhemlock on the Targhee NF. About 100 plants were seen at this site in 1991. See the CDC occurrence record for bulb-bearing waterhemlock in Appendix 6 for a detailed description of location, population data, and habitat.

Habitat and Associated Species: In the study area, bulb-bearing waterhemlock occurs in a large wetland complex, but is restricted to the narrow margin of a small pond. The substrate was saturated organic muck. It was associated with *Carex rostrata*, *C. aquatilis*, *C. canescens*, *Potentilla palustris*, *Sium suave*, and the rare plant *Epilobium palustre*. This narrow range of habitat conditions is typical of the species in Idaho. See Appendix 6 for the habitat description of the one known site in the study area.

CONSERVATION STATUS

Conservation Status - Idaho: Caicco (1987) first mentioned that bulb-bearing waterhemlock may be of conservation concern in Idaho. Prior to 1991, six populations were known in Idaho (Moseley 1989; 1990). In addition to the one found in the study area, three new occurrences were found in the Priest Lake area in 1991.

Bulb-bearing waterhemlock is on the Northern Region, Forest Service Sensitive Species List for Idaho (USDA Forest Service 1991).

The Idaho Native Plant Society considers bulb-bearing waterhemlock a Priority 2 species (Idaho Native Plant Society 1991). The Priority 2 category of the Idaho Native Plant Society list refers to species likely to be classified as Priority 1 in the foreseeable future in Idaho, if factors contributing to their population decline or habitat degradation or loss continue.

The Idaho CDC currently ranks bulb-bearing waterhemlock as G5 S1 (G5 = demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery, S1 = critically imperiled in Idaho because of extreme rarity or because of some factor of its biology making it especially vulnerable to extinction [Moseley and Groves 1990]).

Conservation Status - Elsewhere:

BRITISH COLUMBIA - R3 = Taxa that have no distinct geographical range or distribution, usually scattered in the province, in isolated populations consisting of small numbers of plants (Straley et al. 1985).

MONTANA - Considered for listing but rejected (Lesica et al. 1984).

OREGON - Apparently extirpated from Oregon (Oregon Natural Heritage Data Base 1991).

WASHINGTON - Sensitive = Taxon that is vulnerable or declining, and could become endangered or threatened in the state without active management or removal of threats (Washington Natural Heritage Program 1990).

Straley et al. (1985) also list bulb-bearing waterhemlock as rare in the Northwest Territories and the Yukon.

Threats: No impending, extrinsic threats to this widely disjunct population on the Targhee NF was apparent in 1991, however, clearcutting of adjacent forests may have long-term, albeit subtle, impacts to the wetland habitat. As with all populations in Idaho, it is small and confined to a narrow habitat and is, therefore, vulnerable to extirpation.

Management Implications: Current management appears compatible with the long-term viability of the bulb-bearing waterhemlock population Targhee NF. Its wetland habitat, and attendant processes operating to maintain this habitat, should be protected.

ASSESSMENT AND RECOMMENDATIONS

Summary: Bulb-bearing waterhemlock is known from one small population within the study area on the Targhee NF. It is disjunct from other known populations in Idaho by over 350 miles. Like other Idaho populations, it is small and restricted to a narrow rare of habitat conditions. No extrinsic threats were apparent in 1991.

Recommendation to the Regional Forester: Bulb-bearing waterhemlock is currently not on the Regional Forester's Sensitive Species List for Region 4. We discovered a small population on the Targhee NF this year. Given the fact that it is rare or extinct in many surrounding states and provinces and the Targhee population is widely disjunct, bulb-bearing waterhemlock should be added to the Region 4 Sensitive Species List. It is currently on the Region 1 List.

Recommendation to the Targhee NF: The one population of bulb-bearing waterhemlock known from the Targhee NF is small. It is also significant because it is disjunct from all others in the state. The habitat is also highly vulnerable to disturbance. Special care should be taken when development projects are undertaken in and around the large wetland containing the population.

NOTE: We feel that our survey was rather thorough (see Appendix 1 for a list of wetlands visited during the survey), but bulb-bearing waterhemlock populations are usually small and easily overlooked, so additional populations may found in the area. Land managers and field personnel working in Fremont and Teton counties, Idaho, should be informed of the possible occurrence of this species in their areas. Possible sightings of this plant should be documented by specimens (if the size of the population warrants collecting), and should include flowers, fruits (bulblets) and roots. Specimens should be sent to the University of Idaho Herbarium (Department of Biological Sciences, University of Idaho, Moscow 83843) for verification of their identity. Confirmed sightings of this species should be reported to the Idaho CDC for entry into their permanent data base on sensitive species.

***Eleocharis tenuis* (Willd.) Schultes**

CURRENT STATUS USFS Region 1 - None
 USFS Region 4 - None
 USFWS - None
 Idaho Native Plant Society - None
 CDC Rank - ?

TAXONOMY

Family: Cyperaceae (Sedge)

Common Name: Slender spike-rush

Citation: Syst. Veg. Mant. 2:89. 1824.

Technical Description: Culms slender, 0.5-4 dm tall, commonly 6- to 8-angled and with many vascular bundles, scattered or loosely clustered on well-developed creeping rhizomes, generally not accumulating as much basal debris as some other spike-rushes; sheaths conspicuously reddish-purple toward the base; spikelets mostly 3-10 mm long and 10- to 30-flowered; outermost scale relatively large and broad, tending to be orbicular, usually with a firm, often greenish area toward the base medially, the other scales narrower, mostly 2-3 mm long, largely or wholly dark (commonly atropurpureous except for the pale, hyaline tip); bristles much reduced or wanting; stigmas 3; achene equally trigonous, with broad inner face and blunt outer angle, obovoid from a broadly and shortly substipitate base, golden yellow, minutely roughened and cellular-reticulate, (0.7) 1-1.5 mm long, including the usually well-defined tubercle, this commonly depressed and with an apiculate center (Cronquist 1969b).

Nontechnical Description: Slender spike-rush is distinguished by its slender, angled, stems that are widely scattered, sometimes in loose clusters, along a well-developed rhizome. The mature achene is golden yellow and has a well-developed tubercle (a small swelling or projection) that is depressed and has an apiculate center. See Appendix 3 for a line drawing of slender spike-rush.

Distinguishing Features and Similar Species: Slender spike-rush has the following features that distinguish it from others in our area: three stigmas and a distinctly trigonous achene; the tubercle forming a distinct apical cap well differentiated from the body of the achene; achene golden yellow; and rhizomes elongate with stems not very densely clustered. *Eleocharis bolanderi* is similar but has very short, freely rooting rhizomes with densely clustered stems.

DISTRIBUTION

Range: Cronquist (1969b) gives the range of slender spike-rush as being chiefly in the eastern U.S. and Canada, but west occasionally to Alberta, Montana, and British Columbia. Our collection of this species from "Gentian Meadow" in Yellowstone National Park in 1991, is apparently the first record of this species from Idaho. This species represents an addition to Whitehead's (1983) and Despain's (1975) floras of the area. It is not treated by Dorn (1988) in his flora of Wyoming.

This species was collected as part of a mass collection of wetland plants from the study area (Appendix 1) and was identified in the herbarium, not in the field. We were, therefore, unaware of the significance of this collection and did not collect detailed data on abundance and habitat characteristics. We recollect that it occurred along the north edge of Gentian Meadow in a very small population. See Appendix 4 for the mapped location of the slender spike-rush population in Gentian Meadow.

Habitat and Associated Species: Our notes indicate that this collection was from a population with few plants that occurred on floating muck and sphagnum with *Carex lasiocarpa* and *C. luzulina*. This needs to be verified, however, by another field visit.

CONSERVATION STATUS

Conservation Status - Idaho: Our collection from Yellowstone NP appears to be the first for this species in Idaho. It does not appear on any rare plant lists from surrounding states and provinces or on any agency sensitive species lists. The CDC is assessing the conservation status of this species in Idaho, largely from herbaria and knowledgeable individuals, and will recommend that it be placed on the Idaho Native Plant Society Review category at the next Idaho Rare Plant Conference in February, 1992.

Threats: No extrinsic threats to this population in Yellowstone NP was apparent in 1991.

Management Implications: Current management appears compatible with the long-term viability of this slender spike-rush population.

ASSESSMENT AND RECOMMENDATIONS

Summary: Our collection of slender spike-rush from Gentian Meadow in Yellowstone NP appears to be the first record for Idaho. The population is small, but well protected. The CDC is assessing the conservation status of this species in Idaho, and will recommend that it be placed in the Idaho Native Plant Society Review category at the next Idaho Rare Plant Conference.

Recommendation to the Regional Forester: Slender spike-rush is not known from National Forest land in Idaho, and no action by the Regional Forester is necessary at this time.

Recommendation to the Targhee NF: The Gentian Meadow population of slender spike-rush is less than two miles from the Targhee NF boundary, and this species could conceivably occur on the Forest. Forest personnel should be made aware of this species and be on the lookout for populations in wetlands on the Forest.

Recommendation to Yellowstone NP: The population of slender spike-rush in Gentian Meadow appears to be the only one known from Idaho. It is well-protected, however, and no special management is necessary.

NOTE: We feel that our survey was rather thorough (see Appendix 1 for a list of wetlands visited during the survey), but slender spike-rush is small and can be easily overlooked in graminoid-dominated peatlands, so additional populations may be found in the area. Land managers and field personnel working in Fremont and Teton counties, Idaho, should be informed of the possible occurrence of this species in their areas. Possible sightings of this plant should be documented by specimens (if the size of the population warrants collecting), and should include fruits and roots. Specimens should be sent to the University of Idaho Herbarium (Department of Biological Sciences, University of Idaho, Moscow 83843) for verification of their identity. Confirmed sightings of this species should be reported to the Idaho CDC for entry into their permanent data base on sensitive species.

***Epilobium palustre* L.**

CURRENT STATUS USFS Region 4 - None
 USFS Region 1 - Sensitive
 USFWS - None
 Idaho Native Plant Society - Priority 2
 CDC Rank - G5 S1

TAXONOMY

Family: Onagraceae (Evening-primrose)

Common Name: Swamp willow-weed

Citation: Sp. Pl. 348. 1753.

Technical Description: Simple to branched perennial 1-4 (8) dm tall, from slender rhizomes which often end in small turions, finely canescent-strigillose throughout or only sparsely so below; leaves mainly opposite, sessile or subsessile, entire to slightly denticulate, obtuse, linear to lanceolate or narrowly oblong, (1) 2-6 cm long, mostly 4 (8) mm broad; inflorescence loosely racemose to paniculate; pedicels slender, 1-4 cm long; free hypanthium 1-1.5 mm long, the sepals about twice as long; petals white to pinkish, notched, 3-5 mm long; styles shorter than the petals; stigma about 1 mm long, 4-lobed, but the lobes usually completely coalescent; capsule linear, 3-6 cm long, usually canescent; seeds minutely papillate, the coma white to tawny (Hitchcock 1961).

Nontechnical Description: Swamp willow-weed has an erect, simple to few-branched stem that is approximately 1 to 1.5 feet tall. Turions (small white bulbs) are present at the lower stem/upper root interface. The flowers are small, generally light pink to white, and are borne on the end of the branches and stem. The leaves are narrow and somewhat revolute (margins rolled downward). The entire plant has a pale appearance due to a fine covering of small, straight, appressed hairs all pointing in the same direction. See Appendix 3 for a line drawing of swamp willow-weed and Appendix 7 for slides of its habit and habitat.

Distinguishing Features and Similar Species: Swamp willow-weed is readily distinguished from other willow-weeds occurring in wetlands of the study area (Appendix 2 and Whitehead 1983) by its grayish-strigillose appearance in combination with the presence of turions.

DISTRIBUTION

Range: Swamp willow-weed is distributed from Alaska to the Cascades of central Washington, east to the Atlantic coast and south in the Rockies to Colorado. In the Northern Region of the Forest Service, the Ecosystem Classification Handbook (USDA Forest Service 1987) lists it as occurring in Idaho, Montana, and South Dakota.

In Idaho, swamp willow-weed is now known from nine occurrences in three, widely disjunct areas: 1) the panhandle in Bonner and Boundary counties; 2) East Fork of the Salmon River in Custer County; and 3)

Island Park - Henrys Lake area in Fremont County. Prior to 1990, it was only known from the panhandle (Moseley 1989). The three Fremont County populations were discovered during our survey in 1991, and represent an addition to Whitehead's (1983) flora of the area. They occur in the following wetlands (see Appendix 4 for mapped locations of these populations and CDC data base occurrence records in Appendix 5 for further information on location and habitat):

Targhee NF

Henrys Fork - Big Springs Confluence 006

Idaho Department of Parks and Recreation, Henrys Lake State Park

Howard Creek Fen 007

Private

Targhee Creek Mouth 008

All three populations are limited in extent and contain very low population numbers, ranging from 10-50 plants.

Habitat and Associated Species: All populations occur in open wetland communities with a saturated organic substrate. The specific wetland associations include the *Carex nebraskensis* community type (Youngblood *et al.* 1985) at Howard Creek Fen 007 and Targhee Creek Mouth 008. At Henrys Fork - Big Springs Confluence 006 it occurs on undescribed mat vegetation dominated by *Sparganium minimum* and *Potentilla palustris*. Other associates include *Triglochin maritimus*, *T. palustris*, *Mentha arvensis*, *Carex aquatilis*, *C. rostrata*, *C. canescens*, *Salix boothii*, *Epilobium watsonii*, *Sium suave* and at the Henrys Fork - Big Springs Confluence 006 with the rare plant *Cicuta bulbifera*. See Appendix 6 for habitat descriptions of the three known sites in the study area.

CONSERVATION STATUS

Conservation Status - Idaho: The rarity of swamp willow-weed in Idaho was recently brought to our attention as a result of floristic studies of Idaho's peatlands by Rob Bursik (1990). Based on his data swamp willow-weed was recommended for inclusion on the rare plant list for the state at the annual Idaho Rare Plant Conference in 1989.

It is currently a Forest Service Sensitive Species in Region 1 for the Idaho Panhandle National Forests (USDA Forest Service 1991).

It is Priority 2 species for Idaho (Idaho Native Plant Society 1991). Priority 2 includes those species that are likely to be classified as Priority 1 within the foreseeable future in Idaho, if factors contributing to their population decline or habitat degradation or loss continue.

The Idaho CDC currently ranks swamp willow-weed as G5 S1 (G5 = Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery; S1 = critically imperiled in Idaho, because of extreme rarity and possibly because of some factor of its biology making it especially

vulnerable to extinction [Moseley and Groves 1990]). Conservation Status - Elsewhere: None in Washington, California, British Columbia, Oregon or Montana.

Threats: No threats were readily apparent to the Henrys Fork - Big Springs Confluence 006 and Howard Creek Fen 007 populations. The Targhee Creek Mouth 008 population is currently grazed and trampled by cattle.

Management Implications: Current management of the two public land populations, Henrys Fork - Big Spring Confluence 006 (Targhee NF) and Howard Creek Fen 007 (Henrys Lake State Park), appears compatible with their long-term viability. Land managers should be aware of these populations, however, and give them special consideration when planning development projects in the vicinity.

ASSESSMENT AND RECOMMENDATIONS

Summary: Swamp willow-weed is known from nine sites in Idaho, occurring in three widely disjunct areas. The three populations found in the study area in 1991, were the first from this part of the state and are disjunct by over 160 miles from the next nearest site in the state. The three populations occur on the Targhee NF, Henrys Lake State Park and private land. All are small, less than 50 individuals occurring in a narrow range of habitat conditions, but the habitat of the two public lands sites is currently not disturbed.

Recommendation to the Regional Forester: Because of its limited distribution in Idaho, it was recently added to the Northern Region Sensitive Species list and should be added to the Intermountain Region list for the Targhee and Sawtooth NFs. The populations are all small and vulnerable.

Recommendation to the Targhee NF: The one population of swamp willow-weed occurring on the Targhee NF is sympatric with another rare plant *Cicuta bulbifera* (see previous section). The Forest should pay special attention to this site to insure that it is not impacted.

Recommendations to Henrys Lake State Park: The population of swamp willow-weed on state park land is currently isolated from most (all?) disturbances associated with park operations. The large wetland at this site appears to be fenced and I saw no evidence that cattle were impacting the site, especially compared with the other side of the fence. There is potential for more willow-weed to be found in this extensive wetland.

NOTE: We feel that our survey was rather thorough (see Appendix 2 for a list of wetlands visited during the survey), but the swamp willow-weed populations are small and can be easily overlooked in graminoid-dominated peatlands, so additional populations may be found in the area. Land managers and field personnel working in Fremont and Teton counties, Idaho, should be informed of the possible occurrence of this species in their areas. Possible sightings of this plant should be documented by specimens (if the size of the population warrants collecting), and should include flowers, fruits and roots. Specimens should be sent to the University of Idaho Herbarium (Department of Biological Sciences, University of Idaho, Moscow 83843) for verification of their identity. Confirmed sightings of this species should be reported to the Idaho CDC for entry into their permanent data base on sensitive species.

***Eriophorum viridicarinatum* (Engelm.) Fern.**

CURRENT STATUS USFS Region 1 - Sensitive (Idaho, Montana, North Dakota)
 USFS Region 4 - None
 USFWS - None
 Idaho Native Plant Society - Review
 CDC Rank - G5 S1

TAXONOMY

Family: Cyperaceae (Sedge)

Common Name: Green keeled cotton-grass

Citation: Rhodora 7:89. 1905.

Technical Description: Extensively colonial from creeping rhizomes; culms subterete, 2-6(9) dm tall; leaves basal and cauline, the blade well developed, more or less elongate (especially that of the lower leaves), 2-6(8) mm wide, flat or nearly so for most of its length, but becoming narrow and triangular or channeled toward the tip; uppermost culm leaf with well-developed blade usually equaling or exceeding the broadened, more chartaceous base, the longest one generally surpassing (or at least equaling) the inflorescence; spikelets 2-8, most or all of them individually pedunculate, in a compact to open, umbelliform cyme, the peduncles more or less strongly compressed, smooth or sometimes minutely scabrous-hirtellous; scales blackish-green, with well-developed, notably paler midrib that tends to be expanded distally and reaches the tip of the scale; anthers mostly 2.5-4 mm long (dry); bristles numerous, white or nearly so; achenes blackish, 2-3 mm long, broadly oblanceolate or obovate, 2-3 times as long as wide (Cronquist 1969c).

Nontechnical Description: Stems are widely spaced along an extensive rhizome. The long, flat, sheathing leaf blades are both basal and cauline. The culm is terminated by 2-8, somewhat nodding spikelets, most of which are hidden by long, very dense, white bristles. The scale is blackish-green, with a well-developed, pale midrib that reaches the tip. See Appendix 3 for a line drawing of green keeled cotton-grass and Appendix 7 for slides of its habit and habitat.

Distinguishing Features and Similar Species: Green keeled cotton-grass very much resembles *Eriophorum polystachion*, but the scales are consistently blackish-green, with a well-developed, notably paler midrib that tends to be expanded distally and reaches the tip of the scale. *Eriophorum polystachion* has scales that are tawny to brownish or blackish-green, which are very thin near the tip, and a slender midrib that is attenuated and not reaching the tip (Cronquist 1969c). *Eriophorum polystachion* was found in several wetlands in the study area.

DISTRIBUTION

Range: Cronquist (1969c) notes that green keeled cotton-grass is endemic to North America, being known from Newfoundland to Alaska, south to New York, Ohio, Michigan, Colorado and northern Idaho, where it is much less common than the circumboreal *Eriophorum polystachion*. In Idaho it is known from just two

populations that are separated from each other by over 350 miles: 1) McArthur Lake, Bonner County and 2) mouth of Targhee Creek, Fremont County. It is, however, listed in Mattson's (1984) treatment of the wetlands of central Yellowstone NP.

The Fremont County population was discovered during our survey in 1991. It is located on private land near the mouth of Targhee Creek on the eastern shore of Henrys Lake. It is a small population of about two dozen stems. This species represents an addition to Whitehead's (1983) flora of the Island Park area. See Appendix 4 for the mapped location of the green keeled cotton-grass population at the mouth of Targhee Creek.

Habitat and Associated Species: At the mouth of Targhee Creek, this species occurs in a subirrigated wetland on organic substrate. The community occupies an old stream channel that is shallowly incised into the alluvial fan. The water table is at the surface of the wetland. It is a graminoid-dominated community with *Carex rostrata*, *Carex muricata*, *Parnassia parviflora*, *Pedicularis groenlandica*, *Salix wolfii*, *Aster junciformis*, and the rare plant *Salix candida* (discussed below). The site is a couple hundred feet north of a swamp willow-weed population discussed previously.

CONSERVATION STATUS

Conservation Status - Idaho: The rarity of green keeled cotton-grass in Idaho was recently brought to our attention as a result of floristic studies of Idaho's peatlands by Rob Bursik (1990). Based on his data it was recommended for inclusion on the rare plant list for the state at the annual Idaho Rare Plant Conference in 1989. Our collection from the study area is only the second known from Idaho.

It is currently a Forest Service Sensitive Species in Region 1 for Forests in Idaho, Montana and North Dakota (USDA Forest Service 1991).

It is on the Idaho Native Plant Society Review list (Idaho Native Plant Society 1991). The Review list includes those species which may be of conservation concern in Idaho, but for which we have insufficient data upon which to base a recommendation regarding their appropriate classification.

The Idaho CDC currently ranks green keeled cotton-grass as G5 S1 (G5 = Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery; S1 = critically imperiled in Idaho because of extreme rarity and possibly because of some factor of its biology making it especially vulnerable to extinction [Moseley and Groves 1990]).

Conservation Status - Elsewhere:

MONTANA - Listed as sensitive in Montana with a state rank of S1 given by the Montana Natural Heritage Program (Lesica and Shelly 1991).

NORTH DAKOTA - Threatened (Lesica and Shelly 1991).

WASHINGTON - Sensitive = a species that is vulnerable or declining, and could become endangered or threatened in the Washington without active management or removal of threats (Washington Natural Heritage Program 1990).

Threats: The population at the mouth of Targhee Creek has been grazed by livestock in the past, but has been rested for a couple of years as a result of an agreement between the landowners and Idaho Fish and Game.

Management Implications: Current management appears compatible with the long-term viability of this green keeled cotton-grass population, but it is small and population levels should be monitored periodically.

ASSESSMENT AND RECOMMENDATIONS

Summary: Our collection of green keeled spike-rush from the study area is only the second in Idaho and represents a disjunction of several hundred miles from the next nearest populations in the panhandle. It is known, however, from Yellowstone NP. The population is small in size and numbers and occurs on private land. Grazing has been withdrawn from the area by the landowners to protect fish and wildlife habitat.

Recommendations to the Regional Forester: Green keeled cotton-grass is not known from National Forest land in Idaho, and no action by the Regional Forester is necessary at this time.

Recommendation to the Targhee NF: The Fremont County population of green keeled cotton-grass is only a few miles from the Targhee NF boundary, and this species could conceivably occur on the Forest. Forest personnel should be made aware of this species and be on the lookout for populations in wetlands on the Forest.

Recommendation to the Idaho Native Plant Society: Our data indicate that green keeled cotton-grass should be moved from the Review category of the Idaho Native Plant Society list, to Priority 1. We will make this recommendation at the annual Idaho Rare Plant Conference in February, 1992.

NOTE: We feel that our survey was rather thorough (see Appendix 2 for a list of wetlands visited during the survey), but green keeled cotton-grass can be easily overlooked, especially early in the year, in graminoid-dominated peatlands, so additional populations may be found in the area. Land managers and field personnel working in Fremont and Teton counties, Idaho, should be informed of the possible occurrence of this species in their areas. Possible sightings of this plant should be documented by specimens (if the size of the population warrants collecting), and should include fruits and roots. Specimens should be sent to the University of Idaho Herbarium (Department of Biological Sciences, University of Idaho, Moscow 83843) for verification of their identity. Confirmed sightings of this species should be reported to the Idaho CDC for entry into their permanent data base on sensitive species.

***Lycopodium inundatum* L.**

CURRENT STATUS USFS R1 - Sensitive (Idaho)
 USFS R4 - None
 USFWS - None
 Idaho Native Plant Society - Priority 1
 CDC Rank - G5 S1

TAXONOMY

Family: Lycopodiaceae (Clubmoss)

Common Name: Northern bog clubmoss

Citation: Sp. Pl. 1102. 1753.

Technical Description: Main stems annual, more or less elongate, prostrate or arching, irregularly rooting, leafy, giving rise to scattered, erect, leafy branches, each of which is up to 1 dm tall and terminates in a cone 1.5-4 cm long; plant perennating by a winter bud; leaves crowded, in 8-10 ranks, thin, narrow, mostly entire, 4-8 mm long and less than 1 mm wide, broadest near the base, tapering gradually to the soft acicular tip, the ones on the lower side of the main stem twisted into a more or less erect position, those of the erect stems loosely ascending; sporophylls numerous, crowded, expanded at the base, otherwise resembling the vegetative leaves, the long, slender, green tips loosely ascending; sporangia ellipsoid-globose, about 1 mm wide; spores 43 microns or more in diameter (Cronquist 1969d).

Nontechnical Description: Horizontal stems creeping along the ground surface, the growing tips extending only a few cm beyond the upright fertile stems, rooting at intervals, and sparsely covered with narrow leaves. Erect stems 2-4 inches high, unbranched, and covered with scattered leaves. Erect stems terminated by a cone approximately 2 inches long (Lellinger 1985). See Appendix 3 for a line drawing of northern bog clubmoss and Appendix 7 for slides of its habit and habitat.

Distinguishing Features and Similar Species: The elongate sporophylls are aggregated into sessile, terminal cones, which are mostly several times as long as wide, green and photosynthetic; they are not very different from the vegetative leaves. All but one other clubmoss in the Pacific Northwest have sporophylls that differ obviously from the vegetative leaves. The exception, *Lycopodium selago*, resembles northern bog clubmoss in having sporophylls similar to the vegetative leaves, but the two types of leaves occur in alternating zones on the stem (Caicco 1987). *Lycopodium selago* is not known from the study area.

DISTRIBUTION

Range: Northern bog clubmoss is distributed from Newfoundland to Alaska, south to Maryland, southwestern Virginia, Ohio, Indiana, northern Illinois, Wisconsin, Minnesota, Manitoba, Saskatchewan, Alberta, Montana, Idaho, and northern California (Lellinger 1985). In the Northern Region, the Ecosystem Classification Handbook (USDA Forest Service 1987) lists it as occurring in Idaho and Montana. Two populations (one is historical) are known from northwestern Montana. It is not treated by Dorn (1988) for

Wyoming and is not in Whitehead's (1983) treatment of the Island Park flora.

In Idaho, northern bog clubmoss is known from six sites in Bonner and Boundary counties, and two sites in Yellowstone NP. The Yellowstone NP populations are disjunct by over 300 miles from the next nearest population in Montana. Northern bog clubmoss was first discovered in Yellowstone park in 1987 by Rob Bursik (1990) at Robinson Lake. We discovered a second, very small population in 1991, in "West Boundary Trail Meadow", just a short distance to the southeast. See Appendix 4 for the mapped location of northern bog clubmoss in Yellowstone NP and the occurrence records from the CDC data base in Appendix 6 for a further information on location, abundance and habitat.

Habitat and Associated Species: Both populations occur on a floating sphagnum mat. The population at the West Boundary Trail Meadow is very small with about 20 plants occurring on 1 yd² in a *Carex limosa* community type (Mattson 1984; Padgett *et al.* 1989). At Robinson Lake the population of northern bog clubmoss is quite large, being spread over the large floating sphagnum mat in the center of the lake. The vegetation here is the *Carex lasiocarpa* community type (Padgett *et al.* 1989). Associated species include *Menyanthes trifoliata*, *Drosera anglica*, and the rare species *Carex livida* and *Scheuchzeria palustris*. See Appendix 6 for the habitat descriptions of the two known sites in the study area.

CONSERVATION STATUS

Conservation Status - Idaho: When Johnson (1981a) first evaluated northern bog clubmoss for the Idaho rare plant project of the Idaho Natural Areas Council, he recommended placing it on the State Watch List. He noted that there were only four populations known and the bog habitats are fragile, but that numerous bogs in the area remained unexplored botanically. Caicco (1987) reviewed the status of northern bog clubmoss on the Idaho Panhandle NFs and stated that despite considerable floristic inventory of wetlands in the Priest River drainage, only one new population had come to light in the intervening six years. He concluded that the rarity of northern bog clubmoss is more real than apparent, as suggested by Johnson. In recent studies of Idaho's peatlands by Bursik (1990) and Moseley (1989, 1990), only two new populations were discovered.

Northern bog clubmoss is listed as a Sensitive Species for Idaho and Montana in the Northern Region (USDA Forest Service 1991).

The Idaho Native Plant Society considers northern bog clubmoss a Priority 1 species (Idaho Native Plant Society 1991). The Priority 1 category of the Idaho Native Plant Society list refers to species in danger of becoming extinct or extirpated from Idaho in the foreseeable future if identifiable factors contributing to its decline continue to operate; these are taxa whose populations are present only at critically low levels or whose habitats have been degraded or depleted to a significant degree.

The Idaho CDC currently ranks northern bog clubmoss as G5 S1 (G5 = demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery, S1 = critically imperiled in Idaho because of extreme rarity or because of some other factor of its biology making it especially vulnerable to extinction [Moseley and Groves 1990]).

Conservation Status - Elsewhere:

CALIFORNIA - List 2 = Plants rare, threatened, or endangered in California, but more common elsewhere (Smith and Berg 1988).

MONTANA - Ranked S1 = Taxon critically imperiled in Montana because of extreme rarity or because of some factor of its biology making it especially vulnerable to extinction (Lesica and Shelly 1991).

OREGON - List 2 = species which are threatened, endangered or extirpated in Oregon, but more stable or common elsewhere (Oregon Natural Heritage Program 1991).

WASHINGTON - Sensitive = Taxon that is vulnerable or declining, and could become endangered or threatened in the state without active management or removal of threats (Washington Natural Heritage Program 1990).

Lesica and Shelly (1991) state that northern bog clubmoss is also rare in Alberta and Saskatchewan.

Threats: Although several threats exist to populations of northern bog clubmoss elsewhere in Idaho, the Yellowstone NP populations face no foreseeable threats.

Management Implications: Current management appears compatible with long-term maintenance of these populations.

ASSESSMENT AND RECOMMENDATIONS

Summary: Northern bog clubmoss is known from eight populations in Idaho, with the two Yellowstone NP populations being disjunct by over 300 miles from the next nearest ones in northwestern Montana and northern Idaho. Within the study area, the Robinson Lake population is quite large, while the West Boundary Trail Meadow population is very small. Although threats exist to other populations of northern bog clubmoss in Idaho, the two in Yellowstone park are well protected.

Recommendation to the Regional Forester: Northern bog clubmoss is currently not known from National Forest land in the Intermountain Region and no Regional action is necessary at this time.

Recommendation to the Targhee NF: No populations are currently known from the Targhee NF, but the two populations in Yellowstone NP are within about a mile of the Forest. We searched most of the possible habitats for it on the Forest and were unsuccessful. The possibility exists that it occurs there, however, and Forest personnel should be on the lookout for it.

Recommendation to Yellowstone NP: Current management appears compatible with long-term maintenance of pale sedge populations in the Park.

NOTE: We feel that our survey was rather thorough (see Appendix 2 for a list of wetlands visited during the survey), but additional northern bog clubmoss populations may be found in the area. Land managers and field personnel working in Fremont and Teton counties, Idaho, should be informed of the possible occurrence of this species in their areas. Possible sightings of this plant should be documented by specimens (if the size of the population warrants collecting). Specimens should be sent to the University of Idaho Herbarium (Department of Biological Sciences, University of Idaho, Moscow 83843) for verification of their identity. Confirmed sightings of this species should be reported to the Idaho CDC for entry into their permanent data base on sensitive species.

***Muhlenbergia racemosa* (Michx.) B.S.P.**

CURRENT STATUS USFS Region 1 - None
 USFS Region 4 - None
 USFWS - None
 Idaho Native Plant Society - Review
 CDC Rank - G5 S1?

TAXONOMY

Family: Poaceae or Graminae (Grass)

Common Name: Green muhly

Citation: Preliminary Catalog of New York Plants 67. 1888.

Technical Description: Rhizomatous perennial up to 1 m tall, the culms terete to slightly flattened, hollow, often branching above, puberulent at and adjacent to the nodes; sheaths slightly keeled; ligules truncate, about 1(3) mm long, finely erose-ciliate; blades flat, 2-7 mm broad; panicle 2.5-10(14) cm long, contracted, the branches tightly appressed; glumes narrow, subequal, attenuate to slender awns equalling or longer than the body, (4)5-6.5 mm in overall length; lemma about 3(2.5-3.5) mm long, including the attenuate or shortly awned tip, pilose on the lower half; palea subequal to the lemma; anthers 0.5-1 mm long (Hitchcock 1969a).

Nontechnical Description: Rhizomatous perennial forming loose colonies of stems up to 1 m in height. The cauline leaves have slightly keeled sheaths and the stem is slightly pubescent below the node. The inflorescence is a terminal panicle with tightly appressed branches, 2.5 to 10 cm long. Glumes are attenuate to a slender awn that is equal or longer than the body. See Appendix 3 for a line drawing of green muhly and Appendix 7 for slides of its habit.

Distinguishing Features and Similar Species: Green muhly is sometimes separated from *Muhlenbergia glomerata* and both species were once considered rare in Idaho (Henderson 1981b). Pohl and Mitchell (1965) present evidence for the recognition of the diploid *Muhlenbergia glomerata*, found in wet meadows and bogs, as distinct from the tetraploid *M. racemosa* of mesic to dry habitats. Hitchcock (1969a) could find no way to discern the two so lumped them in his treatment of the Northwest flora, stating that whatever the treatment chosen, it is a rare entity. In their ongoing treatment of the grasses of Idaho, Mike Curto and Doug Henderson, at the University of Idaho Herbarium, have also chosen to lump the two species and call it *Muhlenbergia racemosa*. This is how it will appear when their results are published.

DISTRIBUTION

Range: Hitchcock (1969a) gives the range of green muhly as being from British Columbia, southward on the east side of the Cascades to northeastern Oregon, Nevada, Arizona, and northern Mexico, east to Newfoundland and in the U.S. to Oklahoma, Tennessee, and Maryland. In Idaho it was known from Bonner, Bingham and Fremont counties (Moseley and Groves 1990). In 1991, we discovered two

populations in the study area, both on private land, one in Teton County, approximately one mile east of Driggs at the head of Woods Creek, the other in Fremont County, near the mouth of Ingals Creek, west of Henrys lake. An historical collection from Fremont County with vague location information, simply from "St. Anthony, Idaho" (E.D. Merrill #36; August 11, 1900; at NY), was not relocated in 1991. This species is not treated in Whitehead (1983).

Green muhly was collected as part of a mass collection of wetland plants from the study area (Appendix 1) and was identified in the herbarium, not in the field. We were, therefore, unaware of the significance of this collection and did not collect detailed data on abundance and habitat characteristics. See Appendix 4 for the mapped location of the green muhly population in Woods Creek and Ingals Creek fens.

Habitat and Associated Species: Our notes indicate that this species was rare where it was collected. The areas are dominated by birch, willows and sedges, occurring on both mineral and organic soil, but this needs to be verified by another field visit.

CONSERVATION STATUS

Conservation Status - Idaho: Henderson (1981b) evaluated green muhly, along with *Muhlenbergia glomerata*, as part of the rare plant project of the Idaho Natural Areas Council. He recommended that it be placed on the State Watch List due to its apparent rarity. In his evaluation, he noted that its Idaho distribution included Bingham, Bonner and Fremont counties. The CDC has no records for the Bingham and Bonner county populations.

It is on the Idaho Native Plant Society Review list (Idaho Native Plant Society 1991). The Review list includes those species which may be of conservation concern in Idaho, but for which we have insufficient data upon which to base a recommendation regarding their appropriate classification.

The Idaho CDC currently ranks green muhly as G5 S1? (G5 = Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery; S1? = possibly critically imperiled in Idaho because of extreme rarity or because of some factor of its biology making it especially vulnerable to extinction [Moseley and Groves 1990]).

Conservation Status - Elsewhere:

BRITISH COLUMBIA - As *Muhlenbergia glomerata*, it is on List R3, which includes plants with no distinct geographical range or distribution, usually scattered in the province, in isolated populations consisting of small numbers of plants (Straley *et al.* 1985).

WASHINGTON - Sensitive = Taxon that is vulnerable or declining, and could become endangered or threatened in the state without active management or removal of threats (Washington Natural Heritage Program 1990).

Threats: Considerable disturbance has taken place on the upper (eastern) end of the Woods Creek Fen, in association with ditching, diking, and flooding for the Driggs sewage lagoons. It is unknown what effect this had on the green muhly population, which is about 0.25 mile away. Most of the remaining portion of Woods Creek Fen is in excellent condition. The Ingals Creek Fen populations is in an undisturbed portion

of the wetland.

Management Implications: More abundance and habitat data, along with a more thorough search of the areas, must be gathered before management recommendations can be made.

ASSESSMENT AND RECOMMENDATIONS

Summary: Our collections of green muhly from the study area, are the only recent documentation of this species in the CDC data base. A turn-of-the-century collection was made in Fremont County near/at St. Anthony. Both known sites are on private land. Some habitat alterations have taken place near the green muhly population at Woods Creek Fen. More data needs to be collected on these populations, including abundance and habitat information, along with a more thorough search of the areas.

Recommendation to the Regional Forester: Green muhly is not known from National Forest land in Idaho, and no action by the Regional Forester is necessary at this time.

Recommendation to the Targhee NF: The populations of green muhly from the study area are close to the Targhee NF boundary, and this species could conceivably occur on the Forest. Forest personnel should be made aware of this species and be on the lookout for populations in wetlands on the Forest.

NOTE: Land managers and field personnel working in Fremont and Teton counties, Idaho, should be informed of the possible occurrence of this species in their areas. Possible sightings of this plant should be documented by specimens (if the size of the population warrants collecting), and should include roots, rhizomes, leaves, and flowers. Specimens should be sent to the University of Idaho Herbarium (Department of Biological Sciences, University of Idaho, Moscow 83843) for verification of their identity. Confirmed sightings of this species should be reported to the Idaho CDC for entry into their permanent data base on sensitive species.

***Picea glauca* (Moench) Voss**

CURRENT STATUS USFS Region 1 - None
 USFS Region 4 - None
 USFWS - None
 Idaho Native Plant Society - None
 CDC Rank - G5 S1

TAXONOMY

Family: Pinaceae (Pine)

Common Name: White spruce

Citation: Mitt. Deuts. Dendrol. Ges. 1907:93. 1907

Technical Description: Stunted and deformed to erect tree up to 25 m tall, often with a pointed crown; twigs smooth and shining, yellow-brown, the older bark thin, silvery-brown; needles glaucous-green, mephitic when young, mostly 12-20(25) mm long, 4-sided, tending to project from all sides of the branches, or mostly erect on the upper branches; staminate cones pale red; ovulate cones 2.5-3.5(6) cm long, light brown to somewhat purplish, the scales rounded to blunt at the tip; cotyledons usually 6 (Hitchcock 1969b).

Nontechnical Description: A short tree (in Idaho) with a crown that is narrowly to broadly pyramidal with long, thick branches. The leaves tend to be crowded on the upper side of the branch by twisting of those on the lower side. They are 1-2 cm long, 4-angled, blue-green, occasionally with a whitish tinge and a rigid acute tip. Cones are 2.5-3.5 cm long, light brown to reddish-brown at maturity, oblong-cylindrical, and nearly sessile on the stem. The cone scales are flexible, rounded and smooth at the tip (Preston 1976). See Appendix 3 for a line drawing of green muhly and Appendix 7 for slides of its habit and habitat.

Distinguishing Features and Similar Species: White spruce is distinguished from the more common Engelmann spruce (*Picea engelmannii*) by having glabrous young branches (pubescent in Engelmann spruce) and rounded, smooth cone scales (pointed or more or less rhombic at the tip with an erose edge in Engelmann spruce).

DISTRIBUTION

Range: Hitchcock (1969b) gives the range of white spruce as being from Alaska to Newfoundland, south to British Columbia, northern Montana, Wyoming, South Dakota, Wisconsin, Michigan, New York, and Maine. Although Hitchcock (1969b) mentions that white spruce is reported for Montana, he saw no material which he assigned to the species. Dorn (1988) reports it in his Flora of Wyoming, Despain (1975) from Yellowstone NP, and Johnston (1987) lists it as occurring in the Swamp Lake Botanical Area, Shoshone NF. In Idaho, white spruce is known only from the eastern shore of Henrys Lake, from the center of the northern shore, east and south along the shoreline for about three miles. Whitehead (1983) did not find white spruce in his study area.

Hitchcock (1969b) recognizes that within the Pacific Northwest, especially in northeastern Washington and northern Montana, Engelmann spruce approaches white spruce and shows strong evidence of modification through hybridization with it. Steele *et al.* (1983) state that hybridization of white and Engelmann spruce is widespread across Montana and extends into northeastern Yellowstone Park and southward in the Absaroka Range, Wyoming. Daubenmire (1974) speculated that this white x Engelmann hybridization allowed spruce to extend downslope below the limits of subalpine fir (*Abies lasiocarpa*). Such is the case in our study area.

In his sampling, Fred Johnson (Department of Forest Resources, University of Idaho, personnel communication, 1991) found many trees with intermediate characters and considered most of the trees to be Engelmann spruce - white spruce hybrids. In the stand we surveyed in 1991 (T16N R43E S32 NW4), all trees appeared to be white spruce, having glabrous twigs and smooth, rounded cone scales, among other features. Additional evidence from the presence of host-specific insect herbivores on these trees, suggests that they are mostly if not entirely white spruce. Mal Furness, a retired entomologist from the Intermountain Research Station, sampled insects in the Henrys Lake spruce stands and found a bark beetle that is host-specific to white spruce. Its occurrence in these stands represents a disjunction of several hundred miles, from closest known populations in Alberta. Considering the long coevolutionary history between these two organisms, it would appear that the Henrys Lake spruce stands have considerable genetic influence from white spruce.

See Appendix 4 for the mapped location of the white spruce around Henrys Lake.

Habitat and Associated Species: We only surveyed one stand, along the north shore of the lake where white spruce dominates three swamp communities (Jensen 1990). Two of these, *the Picea glauca/ Equisetum arvense* and *Picea glauca/Carex disperma* habitat types, are similar to the Engelmann spruce habitat types described by Steele *et al.* (1981; 1983). The third, apparently undescribed from the region, is white spruce in association with *Carex rostrata*. Jensen (1990) mistakenly noted *Carex leptalea* as an understory dominant but we believe he was referring to *Carex disperma*. Several shrubs are present in these stand, but have low cover, including *Cornus stolonifera*, *Salix geeyeriana*, *S. boothii*, *S. bebbiana*, and *Alnus incana*. Other species present include *Habenaria orbiculata*, *Trifolium eriocephalum*, *Geum rivale*, *Carex lanuginosa*, *Glyceria striata*, and *Heracleum lanatum*. The soils are organic, ranging in depth from 18 inches to several feet (Jensen 1990).

CONSERVATION STATUS

Conservation Status - Idaho: Our survey is the first to consider white spruce to be of conservation concern in Idaho.

The Idaho CDC currently ranks white spruce as G5 S1 (G5 = Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery; S1 = critically imperiled in Idaho because of extreme rarity or because of some factor of its biology making it especially vulnerable to extinction [Moseley and Groves 1990]).

Conservation Status - Elsewhere:

WYOMING - Johnston (1987) notes that white spruce is of rare occurrence in Wyoming.

Threats: Most of the white spruce stands along Henrys Lake have been disturbed to some degree. The shoreline along the northeastern shore of Henrys Lake, along State Highway 27 has been developed, and spruce stands there are much degraded. We were unable to visit the BLM isolated tract in Sections 3 and 4 T15N R43E, which contains the southern extent of these stands around the lake. From the highway the stand appeared to be intact, although it may be grazed by livestock. The northern extent of the spruce is described above and is in excellent condition, although the owner has applied for an application to alter the entire wetland in that area (Jensen 1990).

Management Implications: The remaining stands should be protected to the greatest degree possible. The BLM should assess the quality of their stand. Grazing has considerable impact on the organic soils of these stands, and many similar spruce stands have already been impacted in the region (Steele *et al.* 1983).

ASSESSMENT AND RECOMMENDATIONS

Summary: White spruce occurs in Idaho only along the northern and eastern shore of Henrys Lake, although it may be an introgressive hybrid with Engelmann spruce. The communities in which it occurs as an overstory dominant are unique in the state. Most of the white spruce stands along the lake have been altered by shoreline development, although two, relatively intact stands remain, one on private land and one on BLM land. Both should be protected.

Recommendation to the Regional Forester: White spruce is not known from National Forest land in Idaho, and no action by the Regional Forester is necessary at this time.

Recommendation to the Targhee NF: The Henrys Lake population of white spruce is within a mile of the Targhee NF boundary. It could conceivably occur on the Forest, although we did not see any potential habitat there. Forest personnel should be made aware of this species, however, and be on the look out for populations in wetlands on the Forest.

Recommendation to the Idaho Falls District BLM: One of the two remaining intact stands of white spruce in Idaho is on an isolated BLM tract along the eastern shore of Henrys Lake. White spruce should be added to the Idaho BLM sensitive species list. The ecological condition of the stand along Henrys Lake should be assessed and should be protected if it is of high quality.

Recommendation to the Idaho Native Plant Society: White spruce should be placed in the Priority 2 category of the Idaho Native Plant Society's list of rare plants in the state. We will make that recommendation at the next Idaho Rare Plant Conference in February, 1992.

NOTE: Land managers and field personnel working in Fremont and Teton counties, Idaho, should be informed of the possible occurrence of this species in their areas. Possible sightings of this plant should be documented by specimens (if the size of the population warrants collecting), and should include twigs, needles, and cones, preferable attached to the branch. Specimens should be sent to the University of Idaho Herbarium (Department of Biological Sciences, University of Idaho, Moscow 83843) for verification of their identity. Confirmed sightings of this species should be reported to the Idaho CDC for entry into their permanent data base on sensitive species.

***Primula incana* Jones**

CURRENT STATUS USFS Region 1 - None
 USFS Region 4 - None
 USFWS - None
 Idaho Native Plant Society - Priority 1
 CDC Rank - G4 S1

TAXONOMY

Family: Primulaceae (Primrose)

Common Name: Jones' primrose

Citation: Proceedings of the California Academy of Science 5:706. 1895.

Technical Description: Plants slender and heavily farinose, occasionally efarinose. Scape to 46 cm tall. Leaves elliptic or oblanceolate, including the petioles to 6 cm long, blade 0.3-1.6 cm wide, margins denticulate, blade gradually narrowing into a broadly winged petiole. Involucral bracts oblong, densely covered with white farina, flat above, saccate or gibbous at the base, 0.5-1 cm long. Umbels capitate, (4)7-19-flowered, pedicels 0.3-0.9 cm long. Flowers homostylous. Calyx green, heavily farinose, cylindrical, obscurely ribbed, 0.4-0.7(1) cm long, divided up to one third its length by lanceolate teeth covered with capitate glands. Corolla lavender with yellow throat; limb 0.4-0.8 cm wide, tube equal to or slightly longer than calyx, limb emarginate. Stamens ca 1 mm long, located in upper portion of corolla tube. Pollen 4-syncolpate. Stigma capitate, located adjacent to the anthers. Capsule cylindrical to slightly elliptical, 0.8-1.8 cm long, 0.2-0.3 cm in diameter. Seeds brown, reticulate, ca 0.2 mm long (Kelso 1987; 1991).

Nontechnical Description: Tall slender plants with a basal rosette of elliptic leaves, the blade gradually narrowing to a broadly winged petiole. The scape is naked and terminated by a capitate cluster of from 7-19 lavender flowers. The plant is heavily farinose (covered with a meal-like powder), especially in the young leaves and on the calyx and upper stem. See Appendix 3 for a line drawing of Jones' primrose and Appendix 7 for slides of its habit.

Distinguishing Features and Similar Species: Jones' primrose is a distinctive species with heavily farinose leaves, tall scape, and flat-tipped bracts subtending tight umbels of small, lavender flowers. Elongation of the scape continues throughout anthesis and pedicels lengthen as seeds ripen. Thus, the characteristic tight umbels do not persist beyond anthesis, and individuals in fruiting stage may be many times taller than those in early flowering stage (Kelso 1991).

The only other lowland, wet-site primrose in the area is *Primula alcalina*, endemic to three meadows in the Birch Creek, Little Lost River, and Lemhi valleys. The habitats of the two species are similar, but they are easily distinguished as follows (from Cholewa and Henderson 1984; Kelso 1991):

Primula incana - Flowers homostylous (anthers at one level in the corolla tube); calyx 5-8 mm long; corolla 5.8-8.2 mm long, lavender; leaves strongly farinose on lower surface, denticulate.

Primula alcalina - Flowers distylous (anthers at two levels in the corolla tube); calyx 4-5.7 mm

long; corolla 4.3-6.2 mm long, white; leaves not farinose or farinose only on the lower surface when young, entire or denticulate.

DISTRIBUTION

Range: The distribution of Jones' primrose includes Utah and Colorado, north to Alaska in western North America. It is rare throughout the southern portion of its range in the United States, including, Colorado, Idaho, Montana, Utah, and Wyoming (Kelso 1987). In Idaho it is known from only two, widely disjunct areas: the upper East Fork of the Salmon River, on the Sawtooth NF in Custer County, and on private land in the Woods Creek Fen, Teton Basin, Teton County. Whitehead (1983) did not find it in his study area. A population occurs near Monida, Montana, very close to the Idaho border in the Centennial Mountains. It is to be expected in nearby meadows in Idaho.

The Woods Creek Fen population occurs in two subpopulations, approximately 1.6 miles west of downtown Driggs. Only two plants were observed in one subpopulation and 28 in the other. It was first collected there by R.J. Davis in 1938 (Davis 258, IDS), and rediscovered by us in September 1991. Further searching of this extensive wetland may reveal the presence of additional plants. See Appendix 4 for the mapped location of the Jones' primrose population in Woods Creek Fen and the occurrence record from the CDC data base in Appendix 5 for additional information on location, abundance, and habitat in the study area.

Habitat and Associated Species: Throughout its range, Jones' primrose occurs in alkaline clay soil (Kelso 1987). Such is the case in the study area, where it occurs on bare-soil microsites on the sides of hummocks. The soil is grayish-white and fine in texture, and subirrigated with water that probably originates in the calcareous geology of the Teton Range to the east. *Potentilla fruticosa* dominates the top of the hummocks along with *Parnassia parviflora*, *Thalictrum alpinum*, and *Galium boreale*. The intervening swales contain *Carex oederi* and *Eriophorum polystachion*. The soil is saturated to the surface throughout the year.

CONSERVATION STATUS

Conservation Status - Idaho: Henderson (1981c) evaluated Jones' primrose as part of the rare plant project of the Idaho Natural Areas Council, listing it from five counties. His 1981 evaluation, however, was prior the publication of *Primula alcalina* as a new species (Cholewa and Henderson 1984), leaving only the Teton County site as Jones' primrose. The Teton County record is probably based on the Davis collection cited above, which was relocated in 1991. Steve Brunfeld discovered a second population on the Sawtooth NF in the East Fork Salmon River drainage in 1983. Moseley and Mancuso discovered another population nearby in 1990.

Jones' primrose is a Priority 1 species on the Idaho Native Plant Society's list of rare plants in Idaho (Idaho Native Plant Society 1991). Priority 1 species are in danger of becoming extinct or extirpated from Idaho in the foreseeable future if identifiable factors contributing to its decline continue to operate; these are species whose populations are present only at critically low levels or whose habitats have been degraded or depleted to a significant degree.

The Idaho CDC currently ranks Jones' primrose as G4 S1 (G4 = Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery; S1 = critically imperiled in Idaho because of extreme rarity or because of some factor of its biology making it especially vulnerable to extinction [Moseley and Groves 1990]).

Conservation Status - Elsewhere:

UTAH - Jones' primrose is ranked S1 by the Utah Natural Heritage Program (Utah Natural Heritage Program 1990).

Threats: The Teton County population is small, occurring in two small subpopulations. One, where only two plants were seen in 1991, is in an area near the Driggs sewage lagoons where much habitat destruction has taken place. Both of the Sawtooth NF populations occur in a riparian zone that is heavily grazed.

Management Implications: All three populations are small and occur in unique wetland communities. They should be protected from habitat disturbances.

ASSESSMENT AND RECOMMENDATIONS

Summary: We relocated an historical collection of Jones' primrose in the study area in Woods Creek Fen in Teton County. It is a small population of about thirty plants occurring on private land. Additional searches in this extensive wetland may reveal more plants. The habitat at Woods Creek appears limited, however, as it occurs on bare-soil microsites in hummocky ground that is saturated to the surface the entire season. Most of the substrate in the fen is organic and at many other sites in the Teton Basin the soil surface dries in late summer.

Recommendation to the Regional Forester: Jones' primrose is currently not on the Regional Forester's Sensitive Species List for the Intermountain Region. It is currently known from the Sawtooth NF and within three miles of the Targhee NF. All populations in Idaho, are small and potentially vulnerable, with some degree of past and present disturbance to its habitat. Jones' primrose should be added to the Region 4 Sensitive Species List.

Recommendation to the Targhee NF: No populations are currently known from the Targhee NF, but the Woods Creek Fen population is three (east) to five (west) miles from the Targhee NF boundary, and this species could conceivably occur on the Forest. Forest personnel should be made aware of this species and be on the lookout for populations in wetlands on the Forest.

NOTE: We feel that our survey was rather thorough (see Appendix 1 for a list of wetlands visited during the survey), but additional Jones' primrose populations may be found in the area. Land managers and field personnel working in Fremont and Teton counties, Idaho, should be informed of the possible occurrence of this species in their areas. Possible sightings of this plant should be documented by specimens (if the size of the population warrants collecting). Specimens should be sent to the University of Idaho Herbarium (Department of Biological Sciences, University of Idaho, Moscow 83843) for verification of their identity. Confirmed sightings of this species should be reported to the Idaho CDC for entry into their permanent data base on sensitive species.

***Salix candida* Fluegge**

CURRENT STATUS USFS R1 - None
 USFS R4 - Sensitive
 USFWS - None
 Idaho Native Plant Society - Priority 2
 CDC Rank - G5 S2

TAXONOMY

Family: Salicaceae (Willow)

Common Name: Hoary willow

Citation: Sp. Pl. 4:708. 1806.

Technical Description: Freely branched low shrub (0.6) 5-12 (15) dm tall; twigs densely and closely white-tomentose when young, some of the tomentum generally persistent into the second year; stipules usually small and caducous, or larger and more persistent on vigorous young shoots; petioles mostly 5-10 mm long; leaves narrow, mostly oblanceolate to narrowly oblong or less often lanceolate, the better-developed ones mostly 4.5-8.5 (15) cm long and 0.7-1.5 (2.3) cm wide, 3.5-10 times as long as wide, the margins revolute and entire, the lower surface densely and usually permanently white-tomentose with very fine, tangled hairs, the upper surface rugose and glabrate or only thinly tomentose, dark green under the tomentum; aments coetaneous, nearly sessile, but the short peduncle generally with some leafy-textured bracts 5-15 mm long; scales brown, persistent, woolly-villous; staminate catkins (1) 1.5-2.5 cm long, about 1 cm thick or a little less; stamens 2, with purple anthers and glabrous, free filaments; pistillate catkins (2) 3-5 (6) cm long at maturity, the fruits often rather loosely arranged, though the pedicel is very short (up to about 1 mm long); ovaries and capsules tomentose, the capsule 5-7.5 mm long; style and stigmas red or reddish, the style 0.8-1.7 mm long, sometimes divided; stigmas bifid, 0.2-0.5 mm long (Cronquist 1964b).

Nontechnical Description: Hoary willow is a low- to medium-sized willow, generally to 4 feet tall. The lower surfaces of the leaves are covered with a dense, white, felt-like tomentum, comprised of fine, tangled hairs. The catkins are nearly sessile, but may have several, small leafy bracts. See Appendix 3 for a line drawing of hoary willow and Appendix 7 for slides of its habit and habitat.

Distinguishing Features and Similar Species: Hoary willow is one of most distinctive willows, due largely to leaf characteristics. In their study area, Brunsfeld and Johnson (1985) report that the thinly tomentose early leaves are evidently glaucous beneath, and so, early in the season these plants somewhat resemble *Salix brachycarpa*, which is similar in its habitat, stature and floral morphology. Hoary willow, however, has notably longer and narrower leaves. *Salix brachycarpa* occurs in our study area and the two are sympatric at Woods Creek Fen, but we did not have difficulty identifying either species.

DISTRIBUTION

Range: Hoary willow is distributed from Labrador to Alaska, south to New Jersey, Iowa, South Dakota, and in the Rocky Mountains to Colorado, Idaho, and southern British Columbia. Cronquist (1964b) notes that it is seldom collected in our range. In the Northern Region of the Forest Service, the Ecosystem Classification Handbook (USDA Forest Service 1987) lists it as occurring in Idaho, Montana, North Dakota, and South Dakota.

Until 1983, the only known populations of hoary willow in Idaho were in Lemhi and Fremont counties. Johnson and Brunsfeld (1983) reported the discovery of two populations in Boundary County. Hoary willow is now known from eleven, widely scattered populations in Idaho, in Boundary, Caribou, Lemhi, Bonner, Teton, Fremont, and Custer counties. This species is not treated in Whitehead (1983). Four populations are known from the study area in Fremont and Teton counties:

Idaho Department of Parks and Recreation, Henrys Lake State Park

Howard Creek Fen 009 - several thousand plants

Private

Woods Creek Fen 007 - 50-100 plants

Targhee Creek Mouth 008 - 15 plants

Ingals Creek Fen 010 - 200 plants

Three of the sites are around Henrys Lake in Fremont County, Howard Creek Fen 009, Targhee Creek Mouth 008, and Ingals Creek Fen 010, with the Howard Creek population being one of the largest in the state. Woods Creek Fen 007 is in the Teton Basin, approximately 1.5 miles west of Driggs. See Appendix 4 for the mapped locations of hoary willow in the study area and occurrences records from the CDC data base in Appendix 6 for detailed information on the location and habitat of hoary willow in the study area.

Habitat and Associated Species: Throughout its range, hoary willow occurs in bogs and swampy places (Cronquist 1964b). In the study area, hoary willow occurs in subirrigated wetland communities that are largely on organic substrates. All sites appear to be alkaline. At Ingals Creek Fen 010 and Woods Creek Fen 007, it is in two *Betula glandulosa* (bog birch) communities, that has either a *Carex rostrata*-dominated understory (Ingals Creek Fen) or *Carex simulata*-dominated understory (Woods Creek Fen). At the Targhee Creek Mouth 008 population it occurs in a *Carex rostrata* community type (Youngblood *et al.* 1985) as it does at Howard Creek Fen 009, where this extensive population also occurs in *Salix wolfii*/*Carex rostrata* (Youngblood *et al.* 1985) and *Typha latifolia*/*Carex rostrata* communities. Associated species include several willows, including *Salix brachycarpa*, *S. boothii*, *S. geeyeriana*, *S. eastwoodiae*, *S. bebbiana* and *S. planifolia*. Other associates include *Carex nebraskensis*, *C. aquatilis*, *C. aurea*, *C. muricata*, *Potentilla fruticosa*, *Zizia aptera*, *Triglochin maritimum*, *Parnassia parviflora*, *Thalictrum alpinum*, *Juncus balticus*, *Swertia perennis*, *Aster eatonii*, and *Galium boreale*. See Appendix 6 for the habitat descriptions of the three known sites in the study area.

CONSERVATION STATUS

Conservation Status - Idaho: The rarity of hoary willow in Idaho was recently reviewed by Brunfeldt (1983) as part of the Idaho rare plant project of the Idaho Natural Areas Council. He recommended that it be placed on the State Watch List, noting that only four populations were known (then), but that no threats were apparent.

Hoary willow is a Sensitive Species in the Intermountain Region of the Forest Service, where it is known from the Targhee NF (Spahr *et al.* 1985).

The Idaho Native Plant Society considers hoary willow a Priority 2 species (Idaho Native Plant Society 1991). The Priority 2 category of the Idaho Native Plant Society list refers to species likely to be classified as Priority 1 within the foreseeable future in Idaho, if factors contributing to their population decline or habitat degradation or loss continue.

The Idaho CDC currently ranks hoary willow as G5 S2 (G5 = demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery, S2 = imperiled in Idaho because of extreme rarity or because of some factor of its biology making it vulnerable to extinction [Moseley and Groves 1990]).

Conservation Status - Elsewhere:

WASHINGTON - Sensitive = Taxon that is vulnerable or declining, and could become endangered or threatened in the state without active management or removal of threats (Washington Natural Heritage Program 1990).

Threats: The Howard Creek Fen 009 and the Targhee Creek Mouth 008 populations are no longer grazed and little disturbance is currently taking place at those sites. A narrow nature trail winds through the Howard Creek population at Henrys Lake State Park. Although the Woods Creek Fen 007 and the Ingals Creek Fen 010 populations appear open to grazing, the vegetation is of little interest to grazing livestock due probably to its unpalatable nature. These sites are generally in excellent condition.

Management Implications: The only population in the study area on public land is at Henrys Lake State Park, where a nature trail winds through the population. The trail appears to impact the population little. Although we didn't see any, if interpretive material or signs are available for park visitors, the identification of this rare boreal disjunct species could be noted. A small population of *Epilobium palustre* also occurs in this wetland, and while the presence of another boreal disjunct could be noted, its habitat could be easily disturbed by trampling. Currently it is well out of the way.

ASSESSMENT AND RECOMMENDATIONS

Summary: Hoary willow is now known from four sites in the study area, one at Henrys Lake State Park and the rest on private land. The three private-land populations are small, while the state park population is one of the largest known in Idaho. The habitats in which they occur in the study area are in excellent ecological condition.

Recommendation to the Regional Forester: While no populations of hoary willow were found on National Forest land in the study area, it does occur on the Targhee NF in Birch Creek. That is the only National Forest population in Idaho. Because it remains rare in Idaho, it should remain an Intermountain Region Sensitive Species.

Recommendation to the Targhee NF: No populations were found on the Targhee NF in the study area, however, one population is known from the Forest in Birch Creek. All sites found in 1991 from the study area are within a couple of miles of the Forest boundary, and this species could conceivably occur on the Forest. Forest personnel should be made aware of this species and be on the lookout for populations in wetlands on the Forest.

Recommendation to Henrys Lake State Park: As noted above, the only population in the study area on public land is at Henrys Lake State Park, where a nature trail winds through the population. The trail appears to impact the population little. The identification of this rare, boreal-disjunct species could be noted in any interpretive material available to park visitors. A small population of *Epilobium palustre* also occurs in this wetland, and while the presence of another boreal disjunct could be noted, its habitat could be easily disturbed by trampling. Currently it is well out of the way.

NOTE: We feel that our survey was rather thorough (see Appendix 1 for a list of wetlands visited during the survey), but additional hoary willow populations may occur in the area. Land managers and field personnel working in Fremont and Teton counties, Idaho, should be informed of the possible occurrence of this species in their areas. Possible sightings of this plant should be documented by specimens (if the size of the population warrants collecting). Specimens should be sent to the University of Idaho Herbarium (Department of Biological Sciences, University of Idaho, Moscow 83843) for verification of their identity. Confirmed sightings of this species should be reported to the Idaho CDC for entry into their permanent data base on sensitive species.

***Scheuchzeria palustris* L.**

CURRENT STATUS USFS R1 - None
 USFS R4 - None
 USFWS - None
 Idaho Native Plant Society - Monitor
 CDC Rank - G5 S3

TAXONOMY

Family: Scheuchzeriaceae (Pod grass)

Common Name: Pod grass

Citation: Sp. Pl. 338. 1753.

Technical Description: Flowering stems (1) 2-4 dm tall, covered with marcescent leaves at base; basal leaves 1-4 dm long, the cauline gradually reduced upward, the ligule (1) 2-10 mm long, the blade erect, 1-3 mm broad; racemes 3- to 12-flowered; pedicels up to 25 mm long in fruit, axillary to well-developed bracts; perianth greenish-white, the segments oblong, 1-nerved, about 3 mm long; follicles 5-8 (10) mm long, compressed, divergent, light greenish-brown, connate only at the base, the stylar beak 0.5-1 mm long; seeds 4-5 mm long (Hitchcock 1969c).

Nontechnical Description: Pod grass is a trailing, strongly rhizomatous graminoid, with each erect stem having three or four stiff, alternate leaves arranged on opposite sides of the stem (two-ranked). Stems are about one foot tall. The obscure flowers produce three, compressed fruits arranged in a spreading, triangular cluster. The entire plant has a greenish-brown appearance. See Appendix 3 for a line drawing of pod grass and Appendix 7 for slides of its habit and habitat.

Distinguishing Features and Similar Species: Pod grass is very distinctive, but could be confused with a sedge (*Carex*) or rush (*Juncus*), however, upon close examination many differences can be seen, most notably in the fruits. It may be confused with an arrow-grass (*Triglochin*), which has mostly basal leaves and very different fruits.

DISTRIBUTION

Range: Pod grass is circumboreal, being distributed in North America from southern Alaska to Labrador and Newfoundland, south in British Columbia and Washington to northern California, and to Idaho, Wisconsin, Iowa, Indiana, and New Jersey (Hitchcock 1969c). In the Northern Region, Forest Service, the Ecosystem Classification Handbook (USDA Forest Service 1987) lists it as occurring in Idaho, Montana, and North Dakota.

Pod grass is currently known from 11 sites in three widely disjunct areas of Idaho: 1) eight populations in the Priest River and Kootenai River valleys of the panhandle, Bonner and Boundary counties; 2) one population at Tule Lake, east of Cascade on the Boise NF, Valley County; and 3) two populations in the southwestern corner of Yellowstone NP, Fremont County. Whitehead (1983) did not find it in his Island

Park study area, but it is reported from Yellowstone NP (Mattson 1984).

The two Yellowstone NP populations occur at Robinson Lake 010, which had over 1000 stems in 1991, and West Boundary Trail Meadow 011, where we observed several hundred individuals. See Appendix 4 for mapped locations of pod grass in Yellowstone NP and the occurrence records from the CDC data base in Appendix 6 for additional information on location and habitat.

Habitat and Associated Species: Throughout its range, pod grass can be found in bogs, where it usually occurs with sphagnum, or on lake margins, where it is often with *Carex* (Hitchcock 1969c). In Idaho, both of these statements hold true, although within the study area, the substrate at both populations is sphagnum. It occurs in a *Carex limosa* community type (Mattson 1984; Padgett *et al.* 1989) at the West Boundary Trail Meadow 011 population. At Robinson Lake, pod grass is widely scattered over the large floating sphagnum mat in the center of the lake. The vegetation here is the *Carex lasiocarpa* community type (Padgett *et al.* 1989). Associated species include *Menyanthes trifoliata*, *Drosera anglica*, *Eleocharis pauciflora*, and the rare species *Carex livida* and *Lycopodium inundatum*. See Appendix 6 for the habitat descriptions of the two known sites in the study area.

CONSERVATION STATUS

Conservation Status - Idaho: Johnson (1981b) reviewed pod grass for the Idaho rare plant project of the Idaho Natural Areas Council. He placed it on the State Watch List explaining that at that time only two sites were known, but many bogs in the region remained to be searched. Now that many bogs and peatlands in the state have been inventoried (Tuhy 1981; Caicco 1987; Moseley 1989; 1990; Bursik 1990; Rabe *et al.* 1990), pod grass still appears to be a rare species in Idaho, with just 11 populations known.

The Idaho Native Plant Society places pod grass on the Monitor list (Idaho Native Plant Society 1991). The Monitor category of the Idaho Native Plant Society list refers to species that are common within a limited range as well as those taxa which are uncommon, but have no identifiable threats.

The Idaho CDC currently ranks pod grass as G5 S2 (G5 = demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery, S2 = imperiled in Idaho, because of rarity or because of other factors demonstrably making it vulnerable to extirpation [Moseley and Groves 1990]).

Conservation Status - Elsewhere:

CALIFORNIA - List 1A - plants considered extinct in California (Smith and Berg 1988).

OREGON - List 2 - A taxon threatened in Oregon but more common or stable elsewhere (Oregon Natural Heritage Data Base 1991).

Threats: The habitats of the two populations in Yellowstone NP are undisturbed and no threats are foreseen.

Management Implications: Present management appears to be compatible with the long-term maintenance of these populations.

ASSESSMENT AND RECOMMENDATIONS

Summary: Pod grass is known from 11 populations in three widely disjunct areas of Idaho. Within the study area, two populations are known from the southwestern corner of Yellowstone NP. Although threats exist to other populations of pod grass in Idaho, the two in Yellowstone park are well protected.

Recommendations to the Regional Forester: Pod grass is currently not on the Regional Forester's Sensitive Species List for Region 4. It is currently known from the Boise NF and within a mile of the Targhee NF. Given its rarity in Idaho, and at least two other states in the west, and the impacts that fisherman may be having on its habitat on the Boise NF, pod grass should be added to the Region 4 Sensitive Species List. We will also make a similar recommendation to Region 1.

Recommendation to the Targhee NF: No populations are currently known from the Targhee NF, but the three populations in Yellowstone NP are within about a mile of the Forest. We searched most of the possible habitats for it on the Forest and were unsuccessful. The possibility exists that it occurs there, however, and Forest personnel should be on the lookout for it.

Recommendation to Yellowstone NP: Current management appears compatible with long-term maintenance of pod grass populations in the Park.

Recommendation to the Idaho Native Plant Society: Pod grass is currently a Monitor species on the Idaho Native Plant Society list. We will recommend that it be upgraded to Sensitive to better reflect its currently-known conservation status in the state.

NOTE: We feel that our survey was rather thorough (see Appendix 1 for a list of wetlands visited during the survey), but additional pod grass populations may found in the area. Land managers and field personnel working in Fremont and Teton counties, Idaho, should be informed of the possible occurrence of this species in their areas. Possible sightings of this plant should be documented by specimens (if the size of the population warrants collecting), and should include both fruits and roots. Specimens should be sent to the University of Idaho Herbarium (Department of Biological Sciences, University of Idaho, Moscow 83843) for verification of their identity. Confirmed sightings of this species should be reported to the Idaho CDC for entry into their permanent data base on sensitive species.

***Scirpus subterminalis* Torr.**

CURRENT STATUS USFS R1 - Sensitive
 USFS R4 - None
 USFWS - None
 Idaho Native Plant Society - Monitor
 CDC Rank - G4G5 S1

TAXONOMY

Family: Cyperaceae (Sedge)

Common Name: Water clubrush

Citation: Fl. N. & Mid. U.S. 47. 1824.

Technical Description: Rhizomatous, aquatic perennial with slender, subterete, flaccid stems 20-80 cm long, and elongate, slender, flaccid leaves from near the base, the leaves and stems usually floating distally rather than emergent, or the plant seldom more or less terrestrial with erect or emergent stems and leaves (not seen in Idaho); spikelet solitary, light brown, 7-12 mm long, subtended by a prominent bract (1)1.5-6 cm long which appears like a continuation of the stem; scales 4-6 mm long, very thin and almost hyaline except for the somewhat firmer midrib, which may be minutely exerted; hypogynous bristles retroely barbellate, shorter than to occasionally equalling or slightly exceeding the achene; achene trigonous, 2.5-3.8 mm long, including the prominent (0.5 mm), slender beak-apiculus (Cronquist 1969e).

Nontechnical Description: Rhizomatous aquatic perennial with flaccid stems and leaves, the leaves floating on the surface of the water. The stems are slightly erect above the surface of the water 4-7 cm (unlike the drawing in Cronquist 1969e), and are terminated by a small, solitary spikelet, which is subtended by a prominent bract. See Appendix 3 for a line drawing of pod grass and Appendix 7 for slides of its habit and habitat.

Distinguishing Features and Similar Species: The flaccid stems and leaves and aquatic habit distinguish this species from all other *Scirpus* in our area.

DISTRIBUTION

Range: According to Cronquist (1969e), water clubrush is distributed in western North America, from southern Alaska to southern Oregon, chiefly west of the Cascade summits, but also extending inland to northern Idaho and northwestern Montana. In eastern North America it occurs from Newfoundland to Ontario, south to South Carolina, Georgia, and Missouri. Cronquist (1969e; 1977) states that there is apparently an isolated station in Utah, although it is not treated in Welsh *et al.* (1987).

Ten populations have been recorded from two widely disjunct regions in Idaho. Eight occur in the panhandle, where only six have been seen in recent years. The other two were only recently discovered in the southwestern corner of Yellowstone NP, Fremont County. Whitehead (1983) did not find it in his Island Park study area, nor is it treated in (Dorn 1988). These populations are several hundred miles

disjunct from the next nearest populations in northern Idaho and northwestern Montana.

The two Yellowstone NP populations occur at Robinson Lake 004, which had over 1000 stems in 1991, and "Border Meadow" 005, where we observed about 30 stems. See Appendix 4 for mapped locations of water clubrush in Yellowstone NP and the occurrence records from the CDC data base in Appendix 5 for additional information on location and habitat.

Habitat and Associated Species: Water clubrush occurs in quiet, shallow water 2-8 dm deep. At Robinson Lake 004 this habitat occurs in the moat around the central, floating sphagnum mat. At Border Meadow 005 water clubrush occurs in a small channel that traverses an extensive *Carex lasiocarpa* peatland. At both sites water clubrush occurs in a *Nuphar polysepalum* community type. Associated species include *Sparganium minimum*, *Sagittaria latifolia*, *Utricularia vulgaris*, and *Potamogeton gramineus*. See Appendix 6 for the habitat descriptions of the two known sites in the study area.

CONSERVATION STATUS

Conservation Status - Idaho: Water clubrush has only recently been recognized as being of conservation concern in Idaho, as a result of the extensive peatland floristic studies conducted by Rob Bursik (1990). It is a Sensitive Species in the Northern Region of the Forest Service for Montana and Idaho (USDA Forest Service 1991).

The Idaho Native Plant Society places water clubrush in their Sensitive category (Idaho Native Plant Society 1991). The Sensitive category of the Idaho Native Plant Society list refers to species with small populations or localized distributions within Idaho that presently do 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.

The Idaho CDC currently ranks water clubmoss as G5 S1 (G5 = demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery, S1 = critically imperiled in Idaho, because of rarity or because of some factor of its biology making it especially vulnerable to extinction [Moseley and Groves 1990]).

Conservation Status - Elsewhere:

CALIFORNIA - List 2 = plants rare, threatened, or endangered in California, but more common elsewhere.

MONTANA - Sensitive = Known from a limited number of populations in Montana, or it occurs principally in restricted habitat considered vulnerable to man-caused disturbances (Lesica and Shelly 1991).

Lesica and Shelly (1991) also list water clubrush as rare in Wyoming.

Threats: The habitat of the two populations in Yellowstone NP are undisturbed and no threats are foreseen.

Management Implications: Present management appears to be compatible with the long-term maintenance of these populations.

ASSESSMENT AND RECOMMENDATIONS

Summary: Water clubrush is known from 10 populations in two widely disjunct areas of Idaho. Within the study area, two populations are known from the southwestern corner of Yellowstone NP. Although threats exist to other populations of water clubrush in Idaho, the two in Yellowstone park are well protected.

Recommendation to the Regional Forester: Water clubrush is currently not on the Regional Forester's Sensitive Species List for the Region, and no action is recommended at this time.

Recommendation to the Targhee NF: No populations are currently known from the Targhee NF, but the two populations in Yellowstone NP are within about a mile of the Forest. We searched most of the possible habitats for it on the Forest and were unsuccessful. The possibility exists that it occurs there, however, and Forest personnel should be on the lookout for it.

Recommendation to Yellowstone NP: Current management appears compatible with long-term maintenance of water clubrush populations in the Park.

NOTE: We feel that our survey was rather thorough (see Appendix 1 for a list of wetlands visited during the survey), but additional water clubrush populations may be found in the area. Land managers and field personnel working in Fremont and Teton counties, Idaho, should be informed of the possible occurrence of this species in their areas. Possible sightings of this plant should be documented by specimens (if the size of the population warrants collecting), and should include both flowers and roots. Specimens should be sent to the University of Idaho Herbarium (Department of Biological Sciences, University of Idaho, Moscow 83843) for verification of their identity. Confirmed sightings of this species should be reported to the Idaho CDC for entry into their permanent data base on sensitive species.

Wetland Sites of High Biodiversity Value

The results of our floristic inventory and associated natural community data suggest that seven wetland sites deserve special consideration over and above the fact that they are the habitats of rare plants (Appendix 4). These relatively undisturbed sites are important to the maintenance of wetland and aquatic diversity in Idaho, in particular, and in the region as a whole.

These seven wetlands are all peatlands -- wetlands with an organic or peat substrate. These are low productivity wetlands, where photosynthetic production exceeds the microbial decomposition of plants, resulting in a net accumulation over time of undecomposed organic material known as peat (Rabe and Bursik n.d.). We found two types of peatlands in the study area, bogs and fens. The sole source of nutrients in bogs is from precipitation. The only bog we found in the study area was Robinson Lake, which had no conspicuous inlet and has a large central mat of sphagnum moss surrounded by a moat. The remaining peatlands are fens, which are fed by groundwater or incoming streams. These sites generally have conspicuous sources of incoming water, such as springs or traversing streams.

Recent floristic research by Bursik (1990) found that peatlands can be divided into two groups based on relative elevation:

High Elevation - Those peatlands that occur in the subalpine zone of the mountains, generally in cirques created by alpine glaciation, and are characterized by a high percentage of plants that are endemic to the Rocky Mountains. Most of these plants are widespread in Idaho, so these types of peatlands generally do not contain many rare species. This peatland type is widespread in Idaho and is relatively isolated from major disturbances.

Low Elevation - Peatlands occurring at low elevations are characterized by a high percentage of plants with boreal affinities, many of which are at the southern limit of their range or are disjunct from their main range. Many of Idaho's rare plants occur in this type of peatland. The landscape setting of these peatlands are generally large, intermontane valleys that are formed by a variety of processes, including continental icesheets (Priest River valley and Purcell Trench), piedmont or valley glaciers (Sawtooth Valley and Warm Lake area), faulting (Birch Creek and Teton Basin), or vulcanism (Robinson Lake complex). Most of these low elevation peatlands in Idaho have been disturbed to some degree.

All of the seven peatlands of high biodiversity value in the study area fall into the low-elevation group.

Following is a brief summary of the significant attributes of each of the wetlands, including ownership, location, rare plant species, wetland communities, and special comments concerning significance, management, and/or protection. Four of the sites are totally or partially on private land and agencies and organizations working to protect biological diversity on private lands may find this information useful. The three digit code following the species refers to the occurrence number of this population in the CDC data base. See also Appendix 6 for occurrences records for these populations. No occurrence number indicates that it has not been entered into the data base yet. The global (G) and state (S) ranks are given for each community, and Moseley and Groves (1990) should be consulted for definitions of these ranks.

WOODS CREEK FEN

Ownership: Private (several)

Location: Teton County, ca. 1-2 miles east of Driggs.

Rare Plants: *Carex buxbaumii* 015
 Muhlenbergia racemosa
 Primula incana 003
 Salix candida 007

Wetland Community: *Betula glandulosa*/*Carex simulata* (G2? S1)

Comments: Extensive area that has been little grazed, probably due to relative unpalatability of the dominant graminoids. Complex mosaic of wetland communities that have been lumped into the above type. Further study may revise this. Habitat for one of three populations of *Primula incana* in Idaho.

INGALS CREEK FEN

Ownership: Private

Location: Fremont County, at confluence of Ingals and Duck creeks, ca. 2 miles west of Henrys Lake.

Rare Plants: *Muhlenbergia racemosa*
 Salix candida 010

Wetland Communities: *Betula glandulosa*/*Carex rostrata* (G3? S1?)
 Salix geeyeriana/*Poa pratensis* (G4G5 S4)

Comments: Extensive wetland; large interior has not been grazed very much due probably to the unstable nature of the peat substrate and the generally unpalatability of the dominant species.

HOWARD CREEK FEN

Ownership: State of Idaho, Department of Parks and Recreation

Location: Fremont County, on east shore of Henrys Lake at mouth of Howard Creek.

Rare Plants: *Epilobium palustre* 007
 Salix candida 009

Wetland Communities: *Carex rostrata* (G5 S5)
 Carex nebraskensis (G5 S5)
 Salix wolfii/Carex rostrata (G4 S3?)
 Typha latifolia/Carex rostrata (G? S1?)
 Salix geyeriana/Poa pratensis (G4G5 S4)

Comments: Very large and diverse wetland, apparently all on State Park land. Small nature trail winds through the southern part of the wetland, including the *Salix candida* population. Interpretive material can be developed to highlight the significance of the plants and communities. Trail is having little impact on *Salix candida* and is well away from the *Epilobium palustre* population.

TARGHEE CREEK MOUTH

Ownership: Private

Location: Fremont County, on east shore of Henrys Lake at mouth of Targhee Creek.

Rare Plants: *Epilobium palustre* 008
 Eriophorum viridicarinatum
 Salix candida 008

Wetland Communities: *Carex rostrata* (G5 S5)
 Carex nebraskensis (G5 S5)

Comments: Additional willow and aquatic communities present also. It is one of two known sites of *Eriophorum viridicarinatum* in Idaho, the other being over 350 miles to the north.

HENRYS LAKE WHITE SPRUCE

Ownership: Private and BLM, Idaho Falls District

Location: Fremont County, north and east shore of Henrys Lake.

Rare Plant: *Picea glauca*

Wetland Communities: *Picea glauca/Carex rostrata* (G? S1)
Picea glauca/Equisetum arvense (G? S1)
Picea glauca/Carex disperma (G? S1)

Comments: Two parcels; north shore site is private and east shore site is a BLM isolated tract. The BLM tract has not been inventoried. Remaining white spruce stands in Idaho have been altered.

BIG SPRINGS-HENRYS FORK CONFLUENCE

Ownership: U.S. Forest Service, Targhee NF

Location: Fremont County, north and south sides of the Henrys Fork, downstream from confluence of Henrys Lake outlet and Big Springs outlet.

Rare Plants: *Carex buxbaumii* 008
Cicuta bulbifera 004
Epilobium palustre 006

Wetland Communities: *Carex praegracilis* (G4 S2?)
Carex buxbaumii (G4? S1)
Carex nebraskensis (G5 S5)

Comments: Extensive wetland with a large population of *Carex buxbaumii*, possibly largest in state. *Cicuta bulbifera* population is the only one in southern Idaho, disjunct by over 350 miles from next nearest Idaho populations. This site should be considered for Special Interest "Botanical" Area designation (FSM 2360) by the Targhee NF.

ROBINSON LAKE WETLAND COMPLEX

Ownership: National Park Service, Yellowstone National Park

Location: Fremont County, a complex of (at least four) wetlands in the southwestern corner of park, beginning ca. 1 mile northwest of Bechler River Ranger Station.

Rare Plants:

<i>Robinson Lake</i>	<i>Carex livida</i> 007 <i>Lycopodium inundatum</i> 007 <i>Scheuchzeria palustris</i> 010 <i>Scirpus subterminalis</i> 004
"Border Meadow"	<i>Scirpus subterminalis</i> 005
"West Boundary Trail Meadow"	<i>Carex buxbaumii</i> 011 <i>Carex livida</i> 008 <i>Lycopodium inundatum</i> 008 <i>Scheuchzeria palustris</i> 011
"Gentian Meadow"	<i>Carex buxbaumii</i> 012 <i>Carex livida</i> 009 <i>Eleocharis tenuis</i>

Wetland Communities: *Carex lasiocarpa* (G5 S4)
Carex buxbaumii (G4? S1)
Carex rostrata (G5 S5)
Eleocharis pauciflora - *Carex aquatilis* (*Carex livida* phase) (G4? S1)
Carex limosa (G4? S2)
Nuphar polysepalum (G5 S4)

Comments: The most floristically significant of all wetlands surveyed in this study. Five of the six rare species found in these meadows, *Lycopodium inundatum*, *Scheuchzeria palustris*, *Scirpus subterminalis*, *Carex livida*, and *Eleocharis tenuis*, were found nowhere else in the study area, despite a thorough search. For the former four species these populations represent significant range extensions from previously known sites in Idaho, some by as much as 350 miles. It is the only known site of *Eleocharis tenuis* in the state. The sites are in excellent condition and are well protected. Further searches north of this complex in Idaho, at the headwaters of Bartlett Slough, may reveal the presence of more populations of these rare species.

SUMMARY AND CONCLUSIONS

Results of our 1991 floristic survey have provided a relatively complete picture of the distribution, abundance, and habitat relationships of rare plants in wetlands of Fremont and Teton counties. Additional populations of some species will certainly be discovered, but existing data provide the basis for, what we believe are informed recommendations on the status and management of the species and their habitats. Our data also suggest that seven peatlands of the study area are especially important to the maintenance of regional community diversity and deserve special consideration over and above being rare plant habitats. While none of the thirteen rare plant species are globally rare or endangered, all are rare in Idaho, being either at the edge of their range or disjunct here from the main part of their range to the north.

Summary of Conservation Status Recommendations for Rare Species

1. Currently Intermountain Region Sensitive - No Change.
 - a. *Carex buxbaumii*
 - b. *Salix candida*
2. Recommended additions to the Intermountain Region Sensitive List.
 - a. *Carex livida* (known from Sawtooth NF; within 1 mile of Targhee NF)
 - b. *Cicuta bulbifera* (known from Targhee NF)
 - c. *Epilobium palustre* (known from Sawtooth and Targhee NFs)
3. Recommended addition to the Idaho BLM Sensitive List
 - a. *Picea glauca*
4. Recommended category changes or additions for the Idaho Native Plant Society listing.
 - a. *Eleocharis tenuis* (add to list as Review species)
 - b. *Eriophorum viridicarinatum* (change from Review to Priority 1)
 - c. *Picea glauca* (add to list as Priority 2)
 - d. *Scheuchzeria palustris* (change from Monitor to Sensitive)
5. No recommended status changes:
 - a. *Lycopodium inundatum*
 - b. *Muhlenbergia racemosa*
 - c. *Primula incana*
 - d. *Scirpus subterminalis*

Summary of Protection Status of Wetlands of High Biodiversity Value

Woods Creek Fen - Private; unprotected.

Ingals Creek fen - Private; unprotected.

Howard Creek Fen - Henrys Lake State Park; fenced and appears to be well protected.

Targhee Creek Mouth - Private; livestock grazing unilaterally withdrawn from area to protect wildlife habitat in an agreement with Idaho Fish and Game.

Henrys Lake White Spruce - Private; currently unprotected and threatened.
Idaho Falls BLM; unprotected.

Henrys Fork - Big Springs Confluence - Targhee NF; recommend Special Interest Area designation (FSM 2360).

Robinson Lake Wetland Complex - Yellowstone NP; well protected.

REFERENCES

- Argus, G.W. 1965. The taxonomy of the *Salix glauca* complex in North America. Contributions to the Gray Herbarium 196:1-142.
- Barneby, R.C. 1964. Atlas of North American *Astragalus*. Memoirs of the New York Botanical Garden Vol. 13. New York Botanical Garden, Bronx. 1188 pp.
- Bursik, R.J. 1990. Floristic and phytogeographic analysis of northwestern Rocky Mountain peatlands, U.S.A. Unpublished M.S. Thesis. University of Idaho, Moscow. 37 pp.
- Brunsfeld, S.J. 1983. *Salix candida*. Page 18 In: 1983 status changes and additions to: Vascular plant species of concern in Idaho, by the Rare and Endangered Plants Technical Committee of the Idaho Natural Areas Council, Bull. No. 34, Forest, Wildlife and Range Experiment Station, University of Idaho, Moscow.
- Brunsfeld, S.J., and F.D. Johnson. 1985. Field guide to willows of east-central Idaho. Bull. No. 39. Forest, Wildlife and Range Experiment Station, University of Idaho, Moscow. 95 pp.
- Caicco, S.L. 1987. Field investigations of selected sensitive plant species on the Idaho Panhandle National Forest. Unpublished report prepared for the Idaho Panhandle National Forests; on file at Idaho Department of Fish and Game, Conservation Data Center, Boise, ID. 44 pp., plus appendices.
- Caicco, S.L. 1988. Studies in the genus *Carex* on the Idaho Panhandle National Forests. Unpublished report for the Idaho Panhandle National Forests; on file at Idaho Department of Fish and Game, Conservation Data Center, Boise, ID. 44 pp., plus appendices.
- Cholewa, A.F., and D.M. Henderson. 1984. *Primula alcalina* (Primulaceae): A new species from Idaho. Brittonia 36:59-62.
- Cronquist, A. 1961. *Cicuta*. Pages 522-523 In: Hitchcock, C.L., A. Cronquist, M. Ownbey, and J.W. Thompson; Vascular Plants of the Pacific Northwest, Part 3; University of Washington Press, Seattle.
- Cronquist, A. 1964a. *Populus*. Pages 32-37 In: Hitchcock, C.L., A. Cronquist, M. Ownbey, and J.W. Thompson; Vascular Plants of the Pacific Northwest, Part 2; University of Washington Press, Seattle.
- Cronquist, A. 1964b. *Salix*. Pages 37-70 In: Hitchcock, C.L., A. Cronquist, M. Ownbey, and J.W. Thompson; Vascular Plants of the Pacific Northwest, Part 2; University of Washington Press, Seattle.
- Cronquist, A. 1969a. *Carex*. Pages 220-345 In: Hitchcock, C.L., A. Cronquist, M. Ownbey, and J.W. Thompson; Vascular Plants of the Pacific Northwest, Part 1; University of Washington Press, Seattle.

- Cronquist, A. 1969b. *Eleocharis*. Pages 352-359 *In*: Hitchcock, C.L., A. Cronquist, M. Ownbey, and J.W. Thompson; Vascular Plants of the Pacific Northwest, Part 1; University of Washington Press, Seattle.
- Cronquist, A. 1969c. *Eriophorum*. Pages 359-364 *In*: Hitchcock, C.L., A. Cronquist, M. Ownbey, and J.W. Thompson; Vascular Plants of the Pacific Northwest, Part 1; University of Washington Press, Seattle.
- Cronquist, A. 1969d. *Lycopodium*. Pages 23-28 *In*: Hitchcock, C.L., A. Cronquist, M. Ownbey, and J.W. Thompson; Vascular Plants of the Pacific Northwest, Part 1; University of Washington Press, Seattle.
- Cronquist, A. 1969e. *Scirpus*. Pages 369-383 *In*: Hitchcock, C.L., A. Cronquist, M. Ownbey, and J.W. Thompson; Vascular Plants of the Pacific Northwest, Part 1; University of Washington Press, Seattle.
- Cronquist, A. 1977. *Scirpus*. Pages 68-80 *In*: A. Cronquist, A.H. Holmgren, N.H. Holmgren, J.L. Reveal, and P.K. Holmgren; Intermountain Flora. Vascular plants of the intermountain west, U.S.A. Vol.6; Columbia University Press, New York.
- Daubenmire, R. 1974. Taxonomic and ecological relationships between *Picea glauca* and *Picea engelmannii*. Canadian Journal of Botany 52:1545-1560.
- Despain, D.G. 1975. Field key to the flora of Yellowstone National Park. Yellowstone Library and Museum Association, Yellowstone National Park, Wyoming. 257 pp.
- Dorn, R.D. 1988. Vascular plants of Wyoming. Mountain West Publishing, Cheyenne, WY. 340 pp.
- Hansen, P.L., S.W. Chadde, and R.D. Pfister. 1988. Riparian dominance types of Montana. Miscellaneous Publication No. 49, Montana Forest and Conservation Experiment Station, School of Forestry, University of Montana, Missoula, MT. 411 pp.
- Henderson, D.M. 1981a. *Carex buxbaumii*. Page 96 *In*: Vascular plant species of concern in Idaho, by the Rare and Endangered Plants Technical Committee of the Idaho Natural Areas Council, Bull. No. 34, Forest, Wildlife and Range Experiment Station, University of Idaho, Moscow.
- Henderson, D.M. 1981b. *Muhlenbergia glomerata* and *Muhlenbergia racemosa*. Page 121 *In*: Vascular plant species of concern in Idaho, by the Rare and Endangered Plants Technical Committee of the Idaho Natural Areas Council, Bull. No. 34, Forest, Wildlife and Range Experiment Station, University of Idaho, Moscow.
- Henderson, D.M. 1981c. *Primula incana*. Page 83 *In*: Vascular plant species of concern in Idaho, by the Rare and Endangered Plants Technical Committee of the Idaho Natural Areas Council, Bull. No. 34, Forest, Wildlife and Range Experiment Station, University of Idaho, Moscow.

- Hitchcock, C.L. 1961. *Epilobium*. Pages 473-485 In: Hitchcock, C.L., A. Cronquist, M. Ownbey, and J.W. Thompson; Vascular Plants of the Pacific Northwest, Part 3; University of Washington Press, Seattle.
- Hitchcock, C.L. 1969a. *Muhlenbergia*. Pages 623-629 In: Hitchcock, C.L., A. Cronquist, M. Ownbey, and J.W. Thompson; Vascular Plants of the Pacific Northwest, Part 1; University of Washington Press, Seattle.
- Hitchcock, C.L. 1969b. *Picea*. Pages 121-123 In: Hitchcock, C.L., A. Cronquist, M. Ownbey, and J.W. Thompson; Vascular Plants of the Pacific Northwest, Part 1; University of Washington Press, Seattle.
- Hitchcock, C.L. 1969c. *Scheuchzeria*. Page 153 In: Hitchcock, C.L., A. Cronquist, M. Ownbey, and J.W. Thompson; Vascular Plants of the Pacific Northwest, Part 1; University of Washington Press, Seattle.
- Hitchcock, C.L., and A. Cronquist. 1973. Flora of the Pacific Northwest. University of Washington Press, Seattle. 730 pp.
- Idaho Native Plant Society. 1991. Results of seventh annual Idaho Rare Plant Conference. Unpublished manuscript; on file at Idaho Department of Fish and Game, Conservation Data Center, Boise.
- Jensen, S. 1990. Wetlands delineation, Moose Meadow Ranch, Franklin (sic) County, Idaho. Unpublished report prepared by White Horse Associated, Smithfield, Utah; on file at Idaho Department of Fish and Game, Conservation Data Center, Boise. 17 pp.
- Johnson, F.D. 1981a. *Lycopodium inundatum*. Page 119 In: Vascular plant species of concern in Idaho, by the Rare and Endangered Plants Technical Committee of the Idaho Natural Areas Council, Bull. No. 34, Forest, Wildlife and Range Experiment Station, University of Idaho, Moscow.
- Johnson, F.D. 1981b. *Scheuchzeria palustris*. Page 134 In: Vascular plant species of concern in Idaho, by the Rare and Endangered Plants Technical Committee of the Idaho Natural Areas Council, Bull. No. 34, Forest, Wildlife and Range Experiment Station, University of Idaho, Moscow.
- Johnston, B.C. 1987. Designation of the Swamp Lake Botanical Area, Shoshone National Forest. Unpublished report by the U.S. Forest Service; on file at Idaho Department of Fish and Game, Conservation Data Center, Boise. 9 pp.
- Johnson, F.D., and S.J. Brunsfeld. 1983. Noteworthy collections: Idaho. Madrono 33:259.
- Kelso, S. 1987. Systematics and biogeography of the arctic and boreal species of *Primula*. Unpublished Ph.D. Dissertation. University of Alaska, Fairbanks. 213 pp.
- Kelso, S. 1991. Taxonomy of *Primula* sects. *Aleuritia* and *Armerina* in North America. Rhodora 93:67-99.

- Lellinger, D.B. 1985. A field manual of the ferns and fern-allies of the United States and Canada. Smithsonian Institution Press, Washington, D.C. 389 pp.
- Lesica, P., G. Moore, K.M. Peterson, and J.H. Rumley. 1984. Vascular plants of limited distribution in Montana. Monograph No. 2, Montana Academy of Sciences, Supplement to the Proceedings, Vol 43. 61 pp.
- Lesica, P., and J.S. Shelly. 1991. Sensitive, threatened and endangered plants of Montana. Montana Natural Heritage Program, Occasional Publication No. 1. Helena, MT. 88 pp.
- Mattson, D.J. 1984. Classification and environmental relationships of wetland vegetation in central Yellowstone National Park, Wyoming. Unpublished M.S. thesis, University of Idaho, Moscow, ID. 326 pp.
- Moseley, R.K. 1988. Report on the conservation status of *Claytonia lanceolata* var. *flava* in Idaho. Unpublished report prepared for the U.S. Fish and Wildlife Service; on file at the Idaho Department of Fish and Game, Conservation Data Center, Boise. 20 pp., plus appendices.
- Moseley, R.K. 1989. Field investigations of 16 rare plant taxa occurring in wetlands on the Bonners Ferry Ranger District, Idaho Panhandle National Forests. Unpublished report prepared for the Idaho Panhandle National Forest; on file at Idaho Department of Fish and Game, Conservation Data Center, Boise. 75 pp., plus appendices.
- Moseley, R.K. 1990. Field investigations of eight rare plant taxa occurring in wetlands on the Sandpoint Ranger District, Idaho Panhandle National Forests. Unpublished report prepared for the Idaho Panhandle National Forest; on file at Idaho Department of Fish and Game, Conservation Data Center, Boise. 42 pp., plus appendices.
- Moseley, R.K. 1991. A field investigation of park milkvetch (*Astragalus leptaleus*) in Idaho. Unpublished report prepared for the Challis National Forest and Salmon District BLM; on file at Idaho Department of Fish and Game, Conservation Data Center, Boise. 12 pp., plus appendices.
- Moseley, R.K., and C.G. Groves. 1990. Rare, threatened and endangered plants and animals of Idaho. Idaho Department of Fish and Game, Natural Heritage Section, Boise. 33 pp.
- Oregon Natural Heritage Program. 1991. Rare, threatened and endangered plants and animals of Oregon. Oregon Natural Heritage Program, Portland, OR. 64 pp.
- Padgett, W.G., A.P. Youngblood, and A.W. Winward. 1989. Riparian community classification of Utah and southeastern Idaho. R4-Ecol-89-01. USDA, Forest Service, Intermountain Region, Ogden, UT. 191 pp.
- Pohl, R.W., and W.W. Mitchell. 1965. Cyto geography of the rhizomatous American species of *Muhlenbergia*. *Brittonia* 17:107-112.
- Preston, R.J. 1976. North American Trees. The Iowa State University Press, Ames. 399 pp.

- Rabe, F.W., R.J. Bursik, and E.B. Cantor. 1990. Classification and monitoring of wetlands in established and proposed Natural Areas. Unpublished report prepared by the University of Idaho; on file at Idaho Department of Fish and Game, Conservation Data Center, Boise. 209 pp.
- Rabe, F., and R. Bursik. No date. Natural wetland diversity in Idaho. University of Idaho, Idaho Water Resources Research Institute, Moscow. 13 pp.
- Smith, J.P., and K. Berg, eds. 1988. Inventory of rare and endangered vascular plants of California. California Native Plant Society, Sacramento, CA. 168 pp.
- Spahr, R., L. Armstrong, D. Atwood, and M. Rath. 1991. Threatened, endangered, and sensitive species of the Intermountain Region. USDA Forest Service, Intermountain Region, Ogden, UT.
- Steele, R., R.D. Pfister, R.A. Ryker, and J.A. Kittams. 1981. Forest habitat types of central Idaho. General Technical Report INT-114. USDA Forest Service, Intermountain Research Station, Ogden, UT. 138 pp.
- Steele, R., S.V. Cooper, D.M. Ondov, D.W. Roberts, and R.D. Pfister. 1983. Forest habitat types of eastern Idaho - western Wyoming. General Technical Report INT-144. USDA Forest Service, Intermountain Research Station, Ogden, UT. 122 pp.
- Straley, G.B., R.L. Taylor, G.W. Douglas. 1985. The rare vascular plants of British Columbia. Syllogeus No. 59. National Museums of Canada, Ottawa, Ontario. 165 pp.
- Tuhy, J.S. 1981. Stream bottom community classification for the Sawtooth Valley, Idaho. Unpublished M.S. Thesis. University of Idaho, Moscow. 230 pp.
- USDA Forest Service. 1987. Ecosystem Classification Handbook; Appendix K. FSH 12/87 R-1 Suppl. Northern Region, Missoula, MT.
- USDA Forest Service. 1988. Sensitive Plant Field Guide: R-1 (Idaho). Northern Region, Missoula, MT.
USDA Forest Service. 1991. Updated Northern Region sensitive species list. Northern Region, Missoula, MT.
- Utah Natural Heritage Program. 1990. Special plant list. Unpublished list; on file at Idaho Department of Fish and Game, Conservation Data Center, Boise. 49 pp.
- Washington Natural Heritage Program. 1990. Endangered, threatened and sensitive vascular plants of Washington. Department of Natural Resources, Olympia, WA.
- Welsh, S.L., N.D. Atwood, L.C. Higgins, and S. Goodrich. 1987. A Utah flora. Great Basin Naturalist Memoir No. 9. 894 pp.
- Whitehead, G.S. 1983. Flora of the Island Park Geothermal Area. Unpublished M.S. Thesis. Idaho State University, Pocatello. 187 pp.

Wyoming Natural Diversity Data Base. 1991. Plant species of special concern. Unpublished manuscript; on file at Idaho Department of Fish and Game, Conservation Data Center, Boise.

Youngblood, A.P., W.G. Padgett, and A.W. Winward. 1985. Riparian community type classification of eastern Idaho - western Wyoming. R4-Ecol-85-01. USDA Forest Service, Intermountain Region, Ogden, UT. 78 pp.

Appendix 1

List of wetlands inventoried in Fremont and Teton counties, Idaho,
during August and September, 1991.

TETON COUNTY

Woods Creek (1 to 2 miles west of Driggs)

Wetlands along the upper Teton River: lower portions of Fox Creek, Trail Creek, Foster Slough,
Darby Creek, Teton Creek, and several other areas.

FREMONT COUNTY

Warm River drainage

Several unnamed lakes in the Rock Creek drainage, ca. seven miles east of Porcupine Guard
Station

Horseshoe Lake

Eccles area; upper Warm River

Upper Warm River around Boy Scout Camp

Lily Lake

Preston Spring and creek

Wetlands and lake in the Gerit area

Falls River drainage

Lakes in the Sheep Falls area, east of Porcupine Guard Station

Paddy Lake

Indian Lake

Yellowstone National Park

Wetlands around Robinson Lake, northwest of Bechler Ranger Station

Lake southwest of Bechler Ranger Station, west of road to ranger station

Henry's Lake area

Duck Creek

Ingals Creek

Gillan Creek - Kelly Creek

Lake shore at north end, east of Timber Creek

Mouth of Targhee Creek

Middle Targhee Creek on Targhee NF

Upper Howard Creek

Lower Howard Creek (Howard Creek Fen)

Buffalo River drainage

Ponds Lodge area

Toms Creek

Lower Elk Creek

Springs at source/Chick Creek

Middle Henrys Fork area

Lakes along the Hatchery Butte Road
Blue Springs Creek

Big Springs area

Boat Launch
Confluence with Henrys Lake outlet.
West of confluence of Moose Creek

Shotgun Valley

Hotel Creek
Icehouse Creek

Appendix 2

List of vascular plants collected in wetlands of Fremont and Teton counties, Idaho,
during August and September, 1991.

PLEASE NOTE:

1. Species are arranged alphabetically by family, genus and species. Nomenclature follows Hitchcock and Cronquist (1973).
2. Numbers following each species refer to collection numbers of Rob Bursik (numbering sequence 1884-2075) or Bob Moseley (2437-2470) collected in the following locations in the study area:

Along the Henry's Fork near Warm River mouth (8/5/91)

Bursik 1884-1898; 1918-1919

Porcupine Creek (8/5/91)

Bursik 1899-1904

Peatland/Ponds above (south of) Rock Creek (8/5/91)

Bursik 1905-1917

Unnamed lake near Thompson Hole (8/5/91)

Bursik 1920-1925

Small pothole ca 1 mile S of Horseshoe Lake (8/5/91)

Bursik 1926-1928

Horseshoe Lake (8/5/91)

Bursik 1929-1930

Upper Warm River (8/5/91)

Bursik 1931-1938, 2075

"West Boundary Trail Meadow" (8/6/91)

Bursik 1939-1964

Robinson Lake (8/6/91)

Bursik 1965-1991

"Gentian Meadow" (8/6/91)

Bursik 1992-2008

Unnamed lake SW of Bechler Ranger Station (8/6/91)

Bursik 2009

Ingals Creek Fen (8/7/91)

Bursik 2010-2024

Mouth of Targhee Creek (8/7/91)

Bursik 2025-2038

White Spruce Swamp N shore Henrys Lake (8/8/91)

Bursik 2039-2042

Upper Howard Creek (8/7/91)

Bursik 2043

Henrys Fork, Macks Inn, Flat Rock Campground (8/7/91)

Bursik 2044-2051

Boat Launch along Big Springs outlet (8/8/91)

Bursik 2052-2057

Confluence of Henrys Fork and Big Springs Outlet, N and S of river (8/8/91)

Bursik 2058-2069

Toms Creek (8/8/91)

Bursik 2070-2074

Woods Creek Fen, 1-2 miles E of Driggs (9/12/91)

Moseley 2437-2470

These collections are deposited in the University of Idaho Herbarium (ID), with duplicates to be distributed.

ALISMATACEAE

Alisma plantago-aquatica - 1911, 1979

Sagittaria cuneata - 1884, 1922

S. latifolia - 1905, 1978, 1986

APIACEAE

Berula erecta - 2074

Cicuta bulbifera - 2065

Zizia aptera - 2034

ASTERACEAE

Antennaria anaphiloides - 2016, 2028A

A. microphylla - 2059

Aster eatonii - 1888, 2454

A. foliaceus - 1902, 1960, 2023, 2446

A. junciformis - 2028B, 2464

Bidens cernua - 1889, 1908, 1969, 2453

Erigeron lonchophyllus - 2451

Haplopappus integrifolius - 2043

Helianthella uniflora - 1997

Senecio foetidus - 1923

S. hydrophilus - 2064

BETULACEAE

Betula glandulosa - 2462

BORAGINACEAE

Myosotis laxa - 2061

BRASSICACEAE

Rorippa nasturtium-aquaticum - 2467

R. obtusa - 1885

CARYOPHYLLACEAE

Arenaria lateriflora - 2018A

CYPERACEAE

Carex aquatilis - 1948, 2053
C. aperta - 1887B, 1949, 1962, 2066B
C. artherodes - 2009
C. athrostachya - 1925
C. aurea - 2000, 2029A, 2452
C. bebbii - 1886
C. buxbaumii - 1932, 1939, 2006, 2052, 2058, 2069, 2071, 2459
C. canescens - 1910C, 2056
C. cusickii - 1893, 2057
C. diandra - 1910A, 2035
C. disperma - 2039
C. lasiocarpa - 1910B, 1984
C. limosa - 1945, 1989
C. livida - 1942, 1991, 1994
C. luzulina - 1996B
C. muricata - 1961
C. praegracilis - 1954, 1996A, 2012, 2063, 2072, 2470
C. nebrascensis - 1887A, 2054
C. oederi - 2060, 2068, 2070, 2075, 2460
C. rostrata - 1990, 2463
C. saxitalis - 2457
C. simulata - 1934, 2444, 2469
C. vesicaria - 1970
Dulichium arundinaceum - 1983
Eleocharis acicularis - 1906, 1924, 2062
E. pauciflora - 1946, 2461
E. palustris - 1890, 1987
E. rostellata - 2437
E. tenuis - 2003
Eriophorum gracile - 1909, 1956, 1993
E. polystachion - 1958, 1992, 2468
E. viridicarinatum - 2029B
Scirpus subterminalis - 1988

DROSERACEAE

Drosera anglica - 1951, 1966

FABACEAE

Trifolium eriocephalum - 2040B

GENTIANACEAE

Gentiana affinis - 2022, 2443
G. detonsa - 1931
G. simplex - 1964, 1999
Swertia perennis - 2020, 2021

HALOGORACEAE

Myriophyllum spicatum - 1896, 2047

HIPPURIDACEAE

Hippuris montana - 2036

HYDROCHARITACEAE

Elodea canadensis - 1895 2044

HYPERICACEAE

Hypericum formosum - 2073

ISOETACEAE

Isoetes bolanderi - 1930

JUNCACEAE

Juncus balticus - 2015
J. ensifolius - 1904, 2007, 2445
J. filiformis - 1917
J. longistylis - 1933
J. nevadensis - 2440
J. nodosus - 2456
J. tweedyi - 2004

JUNCAGINACEAE

Triglochin maritimum - 1950, 1995

LAMIACEAE

Lycopus uniflorus - 1974

Mentha arvensis - 1972
Scutellaria galericulata - 1927

LILIACEAE

Allium schoenoparsum - 2032

LENTIBULARIACEAE

Utricularia gibba - 1938
U. minor - 1944, 2008
U. vulgaris - 1912, 1955, 1980, 2030

LYCOPODIACEAE

Lycopodium inundatum - 1965

MENYANTHACEAE

Menyanthes trifoliata - 1968

NYMPHAEACEAE

Nuphar polysepalum - 1967

ONAGRACEAE

Epilobium alpinum - 2067
E. palustre - 2037, 2066A
E. watsonii - 1892, 1973, 2455

ORCHIDACEAE

Habenaria dilatata - 2002
H. orbiculata - 2040A
Spiranthes romanzoffiana - 1963, 1977

PINACEAE

Picea glauca - 2041

POACEAE

Agrostis thurberiana - 1957
Alopecurus aequalis - 1920
Bromus ciliatus - 2019
Calamagrostis stricta - 2055
Glyceria borealis - 1907
Muhlenbergia racemosa - 2017, 2465
M. richardsonis - 1941, 2439

POLEMONIACEAE

Polemonium palustre - 2024

POLYGONACEAE

Polygonum amphibium - 1899
Rumex crispus - 1891

POTAMOGETONACEAE

Potamogeton alpinus - 1936, 2048
P. berchtoldii - 1898
P. epihydrus - 1903
P. filiformis - 1897B, 2049, 2466
P. gramineus - 1943, 1975
P. natans - 1915, 1952
P. nodosus - 1921
P. richardsonii - 1894

PRIMULACEAE

Androsace filiformis - 1916
Primula incana - 2442

RANUNCULACEAE

Ranunculus aquatilis - 2045
R. flamula - 1929
R. subrigidus - 1900
R. ? (submerged aquatic) - 2046
Thalictrum venulosum - 2033

ROSACEAE

Geum rivale - 2042

Potentilla fruticosa - 2449

P. palustris - 1976

RUBIACEAE

Galium boreale - 2011, 2438

G. trifidum - 1973

SALICACEAE

Salix bebbiana - 1926

S. brachycarpa - 2447

S. candida - 2010, 2026, 2448

S. commutata - 1959

S. eastwoodiae - 2013

S. geeyeriana - 2027

S. planifolia - 1935, 1937, 1940, 2005, 201, 2025A

S. wolfii - 2025B

SAXIFRAGACEAE

Parnassia parviflora - 2018B, 2450

SCHEUCHZERIAEAE

Scheuchzeria palustris - 1947, 1982

SCROPHULARIACEAE

Mimulus guttatus - 1998

Veronica americana - 2038, 2051

V. scutellata - 1928, 1981

SPARGANIACEAE

Sparganium emersum - 1901, 1914, 2031

S. minimum - 1913, 1985, 2001, 2441

ZANNICHELLIACEAE

Zannichellia palustris - 1884, 2050

Appendix 3

Line drawings of rare plants found in wetlands
of Fremont and Teton counties, Idaho.*

1. *Carex buxbaumii*
2. *Carex livida*
3. *Cicuta bulbifera*
4. *Eleocharis tenuis*
5. *Epilobium palustre*
6. *Eriophorum viridicarinatum*
7. *Lycopodium inundatum*
8. *Muhlenbergia racemosa*
9. *Picea glauca*
10. *Primula incana*
11. *Salix candida*
12. *Scheuchzeria palustris*
13. *Scirpus subterminalis*

*All drawings from: C.L. Hitchcock, A. Cronquist, M. Ownbey, and J.W. Thompson. 1959-1969. Vascular Plants of the Pacific Northwest: Parts 1-4. University of Washington Press, Seattle.

Appendix 4

Mapped locations of bogs and fens of high biodiversity value in Fremont and Teton counties, Idaho.

Map 1. **WOODS CREEK FEN** (Portion of the 1979 Bates 7.5' quadrangle)

Carex buxbaumii 015*
Muhlenbergia racemosa
Primula incana 003
Salix candida 007

Map 2. **INGALS CREEK FEN** (Portion of the 1964 Sawtell Peak 7.5' quadrangle)

Muhlenbergia racemosa
Salix candida 010

Map 3. **HOWARD CREEK FEN** (Portions of the 1964 Big Springs, Targhee Peak, and Targhee Pass 7.5' quadrangles)

Epilobium palustre 007
Salix candida 009

TARGHEE CREEK MOUTH

Epilobium palustre 008
Eriophorum viridicarinatum
Salix candida 008

HENRYS LAKE WHITE SPRUCE (Private and BLM)

Picea glauca

Map 4. **BIG SPRINGS-HENRYS FORK CONFLUENCE** (Portion of the 1964 Island Park 7.5' quad)

Carex buxbaumii 008
Cicuta bulbifera 004
Epilobium palustre 006

*Three digit code refers to the occurrence number of this population in the CDC data base. See also Appendix 6 for occurrences records for these populations. No occurrence number indicates that it has not been entered into the data base yet.

Map 5. **ROBINSON LAKE WETLAND COMPLEX** (Portion of the 1989 Bechler Falls 7.5' quadrangle, provisional edition.

Robinson Lake	<i>Carex livida</i> 007 <i>Lycopodium inundatum</i> 007 <i>Scheuchzeria palustris</i> 010 <i>Scirpus subterminalis</i> 004
"Border Meadow"	<i>Scirpus subterminalis</i> 005
"West Boundary Trail Meadow"	<i>Carex buxbaumii</i> 011 <i>Carex livida</i> 008 <i>Lycopodium inundatum</i> 008 <i>Scheuchzeria palustris</i> 011
"Gentian Meadow"	<i>Carex buxbaumii</i> 012 <i>Carex livida</i> 009 <i>Eleocharis tenuis</i>

APPENDIX 5

Mapped locations of additional *Carex buxbaumii* populations in Island Park.

Map 1. Big Springs Boat Launch - *Carex buxbaumii* 014
(Portion of the 1964 Island Park 7.5' quadrangle)

Map 2. Toms Creek - *Carex buxbaumii* 013
(Portion of the 1964 Island Park 7.5' quadrangle)

Map 3. Upper Warm River - *Carex buxbaumii* 004
(Portion of the 1964 Hatchery Butte 7.5' quadrangle)

APPENDIX 6

Occurrence records for rare plants occurring in wetlands in
Fremont and Teton counties, Idaho.

(Arranged alphabetically by genus and species and occurrence number for each species.)

APPENDIX 7

Slides of rare plants and their habitats.

1. *Carex buxbaumii* - close-up of inflorescence.
2. *Carex buxbaumii* - close-up of whole plant.
3. *Carex buxbaumii* - habitat at Upper Warm River 004 population; *Salix geyeriana*/*Carex rostrata* community type.
4. *Carex livida* - close-up of inflorescence.
5. *Carex livida* - close-up of whole plant.
6. *Carex livida* - habitat at Robinson Lake 007 population; short, grayish-green sward in foreground is *Carex livida*.
7. *Cicuta bulbifera* - plant and habitat; note inflorescence with regular flowers in center and bulblets on outer branches.
8. *Cicuta bulbifera* - close-up of leaf.
9. *Epilobium palustre* - close-up of inflorescence.
10. *Epilobium palustre* - habitat in *Carex nebraskensis*.
11. *Eriophorum viridicarinatum* - close-up of an inflorescence.
12. *Eriophorum viridicarinatum* - close-up of several inflorescences.
13. *Lycopodium inundatum* - close-up of cone.
14. *Lycopodium inundatum* - close-up of whole plant with *Drosera anglica*.
15. *Lycopodium inundatum* - habitat at Robinson Lake 007 population.
16. *Muhlenbergia racemosa* - close-up of inflorescence.
17. *Muhlenbergia racemosa* - close-up of whole plant.
18. *Picea glauca* - close-up of cone; note round tip of scale.
19. *Picea glauca* - close-up of branch tip; stem is glabrous.
20. *Primula incana* - close-up of flower.
21. *Primula incana* - close-up of basal rosette; note farinose leaves and young stem.
22. *Primula incana* - close-up of whole plant.
23. *Salix candida* - close-up of leaves; note contrasting dark green on top and white beneath.
24. *Salix candida* - habitat; low, silvery shrubs in foreground are *Salix candida*.
25. *Scheuchzeria palustris* - close-up of plant; see slide 15 for habitat at Robinson Lake 010 population.
26. *Scirpus subterminalis* - close-up of above-water stem with terminal spikelet..
27. *Scirpus subterminalis* - close-up of cluster of stems; note stems with spikelets sticking above water surface and linear leaves floating on surface.
28. *Scirpus subterminalis* - habitat at Robinson Lake 004 population; *Nuphar polysepalum* community type, with *Scirpus subterminalis* leaves and stems in foreground.