

The Status of Rare Plants
on Shoshone National Forest:
1995-97 Survey Results

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Shoshone National Forest

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INTRODUCTION

The US Forest Service (USFS) is directed by the Endangered Species Act and internal policy (through the Forest Service Manual) to manage for listed and candidate Threatened and Endangered plant species on lands under its jurisdiction. In the Rocky Mountain Region (USFS Region 2), Sensitive species lists and policies have been developed to address the management needs of rare plant species that might qualify for listing under the Endangered Species Act (Estill 1993). The objective of these policies is to prevent agency actions from leading to the further endangerment of Sensitive species and the subsequent need for listing them under the Endangered Species Act. In addition, the Forest Service is required to manage for other rare species and biological diversity under provisions of the National Forest Management Act.

In order to meet its management obligations for rare plant species, the Shoshone National Forest (SNF) has been working in cooperation with the Wyoming Natural Diversity Database (WYNDD) to assemble information on the identification, distribution, and management needs of Threatened, Endangered, Sensitive, and other plant species of special concern on SNF lands (Figure 1). In the past decade, WYNDD has produced illustrated field guides to rare plants (Mills and Fertig 1996 a) and willows on the Forest (Fertig and Markow 1998), a report on management needs of Sensitive species (Fertig 1995 c), and conducted field surveys for target species of concern (Fertig 1997 b; Marriott 1988; Mills and Fertig 1996 b). During the last two years, WYNDD has worked in cooperation with SNF and the University of Wyoming's Rocky Mountain Herbarium (RM) to revisit or discover new locations of high priority rare species. This report contains the results of these surveys and summarizes the current protection status of rare plants on the Forest.

METHODS

Field inventories were conducted on the SNF by WYNDD and RM staff in the summers of 1995-1997 (Figure 1). WYNDD surveys in 1997 were directed at sites in the North and South Fork Shoshone River drainages and Pat O'Hara Mountain (Appendix C). Information from these studies has been incorporated into WYNDD's computerized Element Occurrence database and is included in Appendix B.

Surveys during the last three years have focused on 17 SNF species listed as Sensitive by US Forest Service Region 2 and nearly 100 other taxa considered "Species of Special Concern" by WYNDD. Potential species of concern on the SNF were selected according to their state abundance, total geographic range, evidence of decline, and degree of habitat specificity (Table 2). Highest priority was given to state or regional endemics (species with a global distribution limited to Wyoming or 1-2 adjacent states) with low population numbers and fewer than 20 extant occurrences in the state. Plant taxa with wider global distributions, but known from 5 or fewer extant locations in Wyoming were also considered of high concern. Species of limited global distribution, but which are relatively abundant locally in Wyoming were assigned to a lower priority "Watch List" for this analysis.

Data on the distribution, abundance, trends, and management needs of target species were obtained from the published literature, specimens at the Rocky Mountain Herbarium (RM), WYNDD files, and new field work. Unpublished reports from recent floristic surveys of the Shoshone Forest

Figure 1. Shoshone National Forest Study Area and Location of Proposed and Potential Research Natural Areas.

1. Lake Creek Bogs
2. Beartooth Butte
3. Line Creek/Twin Lakes
4. Sawtooth Peatbed
5. Bald Ridge
6. Pat O'Hara Creek/Mountain
7. Grizzly Creek
8. Sheep Mesa
9. Pickett's Knob
10. Arrow Mountain
11. Roaring Fork Mountain

(Evert 1991; Kirkpatrick 1987; Rosenthal 1998; Snow 1992-1994), natural area inventories (Fertig and Bynum 1994 a, 1994 b, 1994 c; Jones 1991 a), and status surveys of specific rare species (Dorn 1989 a, 1989 b, 1989 c, 1989 d; Fertig 1995 a, 1996 a, 1997 b, 1998 a; Marriott 1986, 1988) were also used extensively. Locations of species of concern and existing special management areas (wilderness areas, special botanical areas, research natural areas, etc.) were mapped on 1:24,000 scale USGS topographic maps to determine current land management status for each species. Locations of species of concern were converted to an ArcView theme (part of the SNF's soil and vegetation GIS database, being developed by Kent Houston).

The protection status of each plant species was assessed using a 4-part scale originally developed by the US Geological Survey's National Gap Program for ranking the protection level of different management areas (Merrill *et al.* 1996). The score for each species was based on the highest possible protection score for any individual population. Species were ranked 1 if at least one population occurred on Gap Status 1 lands that are permanently protected and managed to maintain biological processes. Such sites include designated wilderness areas, national parks and monuments, most national wildlife refuges, and Nature Conservancy preserves or easements. A rank of 2 was given to species that occur in designated management areas that still allow some land uses that may reduce the quality of natural communities (Gap Status 2 lands). Category 3 species are those in which the best protected populations occur on public lands managed for multiple use. These Status 3 lands include undesignated BLM, US Forest Service, and state park lands and wilderness study areas. Lastly, species were ranked 4 if they occur only on private, state, or reservation lands with no legally binding protection mandate. Each species was scored on its current status on SNF, its projected status if populations in proposed or potential research natural areas were officially designated, and its current status statewide (including areas outside of the study area).

RESULTS

1995-1997 Surveys

Since 1995, WYNDD and RM surveys have discovered or relocated populations of 65 plant species of special concern on SNF (6 of which are no longer tracked). At least 12 new rare or uncommon species have been documented for the Forest as a result of these studies (*Arnica angustifolia* ssp. *tomentosa*, *Astragalus gilviflorus* var. *purpureus*, *Braya humilis*, *Carex lasiocarpa* [not tracked by WYNDD], *Drosera anglica*, *Epilobium palustre* var. *palustre*, *Equisetum fluviatile*, *Eriophorum gracile*, *Heterotheca depressa*, *Juncus triglumis* var. *albescens*, *Physaria saximontana* var. *saximontana*, and *Utricularia minor*). Two new state records have been found on the SNF (*Arnica angustifolia* ssp. *tomentosa* and *Braya humilis*), and one additional state record on BLM lands just outside the Forest boundary (*Astragalus platytropis*, discovered by Ron Hartman on Rattlesnake Mountain in 1996). 94 new occurrences of plants of special concern have been discovered since 1995, including 26 new locations for USFS Sensitive species. In addition, 78 known occurrences have been resurveyed during this time (Table 1).

Table 1.

Summary of 1995-1997 Survey Results

# of Species Surveyed	USFS Sensitive	WYNDD High Priority	WYNDD Watch List	WYNDD Formerly Tracked	Total
New Occurrences	26	56	5	7	94
Revisited Occurrences	26	48	3	1	78
New Species for SNF	0	10	1	0	11
New State Records	0	2	0	0	2

Plant Species of Special Concern on Shoshone National Forest

Based on WYNDD’s most recent list of species of special concern in Wyoming (Fertig 1997 a), 115 plant taxa were assessed for their rarity on SNF. Recent field surveys in Wyoming have shown that at least 3 of these species are sufficiently widespread and abundant to no longer warrant conservation attention in the state (*Aster borealis*, *Carex buxbaumii*, and *Conimitella williamsii*) and two others (*Agoseris lackschewitzii* and *Heterotheca depressa*) have been placed on the WYNDD “watch list” (Table 3). In all, 28 plant species have been dropped from WYNDD’s list of species of concern from Shoshone Forest since 1993 (6 more have been placed on the watch list), demonstrating the value of floristic and rare plant surveys in determining the abundance and conservation needs of rare species. As a result of this review, two new species were added to the WYNDD list (*Ligusticum canbyi* and *Silene kingii*). The final list of plants of special concern on SNF consists of 106 high ranking and 6 watch list taxa (Table 2).

Information on the current statewide and SNF abundance, distribution, trends, threats, and management status of these species is summarized in Appendix A.

Current and Potential Protective Status of Plant Species of Special Concern

The Shoshone Forest currently contains five designated wilderness areas (Absaroka-Beartooth, Fitzpatrick, North Absaroka, Popo Agie, and Washakie) that cover over 1.3 million acres (56% of the Forest). Due to their remoteness and high level of protection, these lands are considered Status 1 by Gap (Merrill *et al.* 1996). At present, 70 plant species of special concern are known or suspected to occur in wilderness areas on the Forest (Tables 4, 6). An additional 15 species occur on Status 2 lands in the Swamp Lake Special Botanical Area. Status 1 and 2 lands currently protect 75.9% of the Forest’s rare plant species. The remaining 24.1% of the species of concern (27 taxa) occur on Status 3 Forest Service lands managed for multiple use. None of the species of concern on the SNF are restricted to unprotected state or private (Status 4) lands (Table 6).

Five research natural areas (RNAs) were proposed for the SNF in the 1986 Forest Management Plan (USDA Forest Service 1986). To date, these areas have not been formally designated and are

still managed primarily for multiple use. Twenty-four species of concern are known (15) or suspected (9) to occur in the proposed Bald Ridge and Line Creek/Twin Lakes RNAs, eight of which are not already found in designated wilderness areas (Figure 1, Table 5). The three other proposed RNAs were selected primarily for their unusual vegetation or substrate features and do not contain any populations of WYNDD species of special concern.

Eight additional areas on the Forest are currently being evaluated for potential RNA designation (one of these is an expanded version of the proposed Bald Ridge RNA). Forty-two plants of special concern are known or suspected to occur in these areas (Figure 1, Table 5). If all of the current proposed and potential RNAs on the Forest were officially designated, the number of SNF species of special concern found on Status 1 or 2 lands would increase to 84.8% (Table 6). The total number of Status 1 and 2 species on the Forest increases to 87.5% (98 taxa) when populations that are protected elsewhere in the state are considered (Table 6).

DISCUSSION

Recent floristic and rare plant surveys and inventories of proposed or potential research natural areas have provided a clearer picture of the distribution and protection status of rare plant species on Shoshone National Forest. Approximately 75% of the species of concern on the SNF are now known to occur within existing Status 1 or 2 lands (including 15 of the SNF's 17 listed Sensitive plant species). If proposed or potential research natural areas on the Forest are officially designated, the number of protected rare plant species increases to about 85%. The level of protection on the Shoshone Forest is extremely high compared to other National Forests in Wyoming (mainly due to the large area of designated wilderness on the SNF). Only the Grand Teton-Yellowstone National Park area and Bridger-Teton National Forest afford comparable or better protection for plants at present. Non-forested parts of the state are notably less protected than the SNF. Less than 40% of the plant species of special concern in the desert basin country of southwest Wyoming are currently protected in Status 1 or 2 lands (Fertig *et al.* 1998).

Designations alone may be insufficient for the protection of plants of special concern on SNF. A more practical approach is to develop and implement management guidelines for sensitive plants and their habitats. These guidelines need to incorporate the best available knowledge of the biology, distribution, and habitat use of each species. Guidelines should also be developed on a case by case basis, as the response of individual species to different management scenarios is likely to vary. In most cases, potential conflicts between the habitat needs of rare plants and current or potential management uses can be reconciled with proper planning at the onset of a project, as long as managers and resource users recognize that these species may occur in the area.

As a complement to management efforts, monitoring programs should be initiated on the SNF to detect possible changes in habitat quality or population size of sensitive plant species. Qualitative monitoring, involving periodic revisits to known rare plant sites to determine presence/absence, relative abundance, or approximate population size is the least time and labor intensive form of monitoring and may be sufficient for most species of concern on the Forest (Menges and Gordon 1993). More intensive monitoring in which quantitative measurements of individuals or habitat attributes are made over time may be appropriate for species that are especially vulnerable to extirpation, but is more costly to conduct.

Table 2.
Plant Species of Special Concern on Shoshone National Forest

Key: **Heritage Ranks** are explained in Appendix D. **Range Notes:** Periph. = Peripheral (at the edge of the species' continuous range in Wyoming), Reg. Endm. = Regional Endemic (restricted to Wyoming and 1-2 adjacent states), State Endm. = State Endemic (restricted to Wyoming), Disj. = Disjunct (Wyoming populations are widely isolated from the species' main contiguous range), Sparse (widely scattered and uncommon throughout Wyoming). **Federal Status:** USFS R2/R4 Sens. = listed Sensitive by the US Forest Service in Region 2 or 4, USFWS Cand. = Candidate for listing as Threatened or Endangered by the US Fish and Wildlife Service, Rock Sp. SpSt = "Special Status" plant on the BLM Rock Springs District. **County:** Wyoming county distribution, using the first 3 letters of each county name. Yel = Yellowstone National Park (divided between Park and Teton counties). **Managed Area:** BLM = Bureau of Land Management, IR = Indian Reservation, NF = National Forest, NM = National Monument, NP = National Park, NWR = National Wildlife Refuge.

1. High Priority Taxa

Species	Common Name	Heritage Rank	Range Notes	Federal Status	County	Managed Area
<i>Adoxa moschatellina</i>	Moschatel	G5/S1	Sparse		Alb, Cro, Par, She, Was, Yel	Bighorn NF Black Hills NF Medicine Bow NF Shoshone NF Yellowstone NP
<i>Agrostis oregonensis</i>	Oregon bentgrass	G4/S1	Periph.		Par, Tet, Yel	Bridger-Teton NF? Grand Teton NP? Shoshone NF Yellowstone NP
<i>Amerorchis rotundifolia</i> [<i>Orchis rotundifolia</i>]	Round-leaved orchid	G5/S1	Periph.	USFS R2 Sens.	Par	Shoshone NF
<i>Androsace chamaejasme</i> <i>ssp. carinata</i>	Sweet-flowered rock jasmine	G5T4/ S1S2	Periph.	Bridger-Teton & Targhee NF Sens.	Fre, Hot, Par, Yel?	Shoshone NF Worland BLM? Yellowstone NP?
<i>Antennaria flagellaris</i>	Stoloniferous pussytoes	G5?/S1	Disj.		Par, Yel	Shoshone NF Yellowstone NP
<i>Antennaria monocephala</i>	Single-head pussytoes	G4G5/S1	Disj.		Fre, Joh, Par, Sub, Tet	Bighorn NF Bridger-Teton NF Shoshone NF Targhee NF
<i>Aquilegia brevistyla</i>	Small-flower columbine	G5/S1	Disj.		Par?, Wes	Black Hills NF Casper BLM Shoshone NF?
<i>Aquilegia formosa</i> var. <i>formosa</i>	Crimson columbine	G5T5/S1	Periph.		Par	Shoshone NF
<i>Arctostaphylos rubra</i> [<i>Arctous rubra</i>]	Red manzanita	G5/S1	Disj.	USFS R2 Sens	Par	Shoshone NF
<i>Arnica angustifolia</i> ssp. <i>tomentosa</i>	Alpine arnica	G5T5/S1	Periph.		Fre	Shoshone NF
<i>Astragalus gilviflorus</i> var. <i>purpureus</i>	Dubois milkvetch	G5T2/S1	State Endm.		Fre	Rawlins BLM Shoshone NF Wind River IR
<i>Botrychium ascendens</i>	Upward-lobe moonwort	G3/S1	Disj.	USFS R2 Sens USFS R4 Sens	Fre	Shoshone NF
<i>Botrychium lanceolatum</i>	Lance-leaved grapefern	G5/S1	Periph.		Car, Fre	Shoshone NF
<i>Botrychium minganense</i> [<i>Botrychium lunaria</i> var. <i>onondagense</i>]	Mingan Island moonwort	G4/S1	Sparse		Fre, Joh, Par, She	Bighorn NF Shoshone NF
<i>Botrychium virginianum</i>	Rattlesnake fern	G5/S1	Periph.		Cro, Par, She, Tet, Yel?	Bighorn NF Black Hills NF Shoshone NF Targhee NF Yellowstone NP?

Species	Common Name	Heritage Rank	Range Notes	Federal Status	County	Managed Area
<i>Braya humilis</i>	Low braya	G4/S1	Disj.		Fre	Shoshone NF
<i>Carex concinna</i>	Beautiful sedge	G4G5/S1	Periph.		Par, Sub, Yel	Bridger-Teton NF Shoshone NF Yellowstone NP
<i>Carex deweyana</i> var. <i>bolanderi</i> [<i>Carex bolanderi</i>]	Bolander's sedge	G5T5/S1	Periph.		Lin, Par	Bridger-Teton NF Shoshone NF
<i>Carex diandra</i>	Lesser panicled sedge	G5/S1S2	Periph.		Alb, Par, Tet, Yel	Grand Teton NP Medicine Bow NF Shoshone NF Yellowstone NP
<i>Carex incurviformis</i> var. <i>danaensis</i> [<i>Carex maritima</i>]	Seaside sedge	G4G5T3/S2	Periph.	USFS R4 Sens	Fre, Par, Sub	Bridger-Teton NF Shoshone NF
<i>Carex leptalea</i>	Bristly-stalk sedge	G5/S1	Periph.		Par, Tet, Yel	Grand Teton NP Shoshone NF Targhee NF Yellowstone NP
<i>Carex limosa</i>	Mud sedge	G5/S2	Periph.		Big, Car, Par, Sub, Tet, Yel	Bighorn NF Bridger-Teton NF Medicine Bow NF Shoshone NF Targhee NF Yellowstone NP
<i>Carex livida</i>	Livid sedge	G5/S1	Disj.	USFS R2 Sens	Par, Yel,	Shoshone NF Yellowstone NP
<i>Carex luzulina</i> var. <i>atropurpurea</i>	Black and purple sedge	G5T3/S2	Reg. Endm.	USFS R4 Sens	Fre, Sub, Tet	Bridger-Teton NF Shoshone NF
<i>Carex microglochin</i>	False uncinia sedge	G5?/S1	Disj.		Fre, Par, Sub, Yel	Bridger-Teton NF Shoshone NF Yellowstone NP
<i>Carex misandra</i>	Short-leaf sedge	G5/S1	Periph.		Fre, Joh, Par	Bighorn NF Shoshone NF
<i>Carex nelsonii</i>	Nelson's sedge	G3?/S2	Reg. Endm.		Alb, Car, Fre, Par	Medicine Bow NF Shoshone NF
<i>Carex occidentalis</i>	Western sedge	G4/S1	Periph.		Alb, Par	Medicine Bow NF Shoshone NF
<i>Carex scirpoidea</i> var. <i>scirpiformis</i>	Canadian single-spike sedge	G5T4?Q/S1	Periph.		Par, Tet	National Elk Refuge Shoshone NF
<i>Castilleja crista-galli</i>	Cock's-comb paintbrush	G3/S2	Reg. Endm.		Par, Yel	Shoshone NF Worland BLM Yellowstone NP
<i>Crassula aquatica</i> [<i>Tillaea aquatica</i>]	Pygmyweed	G5/S1	Periph.		Fre, Yel	Shoshone NF Yellowstone NP
<i>Cryptogramma stelleri</i>	Fragile rockbrake	G5/S1	Disj.		Fre, She, Tet, Yel	Bighorn NF Bridger-Teton NF Shoshone NF Targhee NF Yellowstone NP
<i>Cymopterus evertii</i>	Evert's wafer-parsnip	G2G3/S2S3	Reg. Endm.		Hot, Par	Shoshone NF Worland BLM
<i>Deschampsia danthonioides</i>	Annual hairgrass	G5/S1	Periph.		Fre, Par, Yel	Shoshone NF Yellowstone NP
<i>Descurainia torulosa</i>	Wyoming tansymustard	G1/S1	State Endm.	USFS R2 Sens USFS R4 Sens Rock Sp. SpSt	Fre, Par, Swe, Tet	Bridger-Teton NF Rock Springs BLM Shoshone NF Worland BLM?

Species	Common Name	Heritage Rank	Range Notes	Federal Status	County	Managed Area
<i>Draba borealis</i>	Boreal draba	G4/S2	Disj.	Bridger-Teton NF Sens.	Lin, Par, Sub, Tet, Yel	Bridger-Teton NF Grand Teton NP Shoshone NF Yellowstone NP
<i>Draba crassa</i>	Thick-leaf whitlow-grass	G3/S2	Reg. Endm.		Fre, Par, Sub, Tet	Bridger-Teton NF Grand Teton NP Shoshone NF
<i>Draba fladnizensis</i> var. <i>pattersonii</i>	White arctic whitlow-grass	G4T3?/S2	Reg. Endm.		Alb?, Fre, Joh, Par, Tet	Bighorn NF Grand Teton NP? Medicine Bow NF? Shoshone NF
<i>Draba glabella</i>	Rock whitlow-grass	G4G5/S1	Disj.		Par	Shoshone NF
<i>Draba globosa</i> [<i>D. apiculata</i> ; <i>D. densifolia</i> var. <i>apiculata</i>]	Rockcress draba	G3/S2	Reg. Endm.	USFS R4 Sens	Alb, Fre, Lin, Par, Sub, Tet	Bridger-Teton NF Grand Teton NP Medicine Bow NF Shoshone NF
<i>Draba paysonii</i> var. <i>paysonii</i>	Payson's draba	G5T3?/S1	Reg. Endm.		Fre, Lin, Par, Sub	Bridger-Teton NF Shoshone NF
<i>Draba paysonii</i> var. <i>treleaseii</i>	Trelease's draba	G5T4?/S1	Periph.		Par, Yel	Shoshone NF Yellowstone NP
<i>Draba pectinipila</i> [<i>D. oligosperma</i> var. <i>pectinipila</i>]	Comb-hair whitlow-grass	G1Q/S1	State Endm.		Par	Shoshone NF
<i>Draba porsildii</i> var. <i>brevicula</i> [<i>D. nivalis</i> var. <i>brevicaule</i>]	Little snow draba	G3G4T1/S1	Reg. Endm.		Par	Shoshone NF
<i>Draba porsildii</i> var. <i>porsildii</i>	Porsild's draba	G3G4T3T4/S1	Periph.		Par, Sub	Bridger-Teton NF Shoshone NF
<i>Drosera anglica</i>	English sundew	G5/S2	Periph.		Par, Tet, Yel	Grand Teton NP JDR Parkway Shoshone NF Yellowstone NP
<i>Dryopteris expansa</i> [<i>D. assimilis</i> ; <i>D. carthusiana</i>]	Spreading woodfern	G5/S1	Periph.		Par, Tet, Yel	Grand Teton NP Shoshone NF Yellowstone NP
<i>Epilobium palustre</i> var. <i>palustre</i>	Swamp willow-herb	G5/S1S2	Sparse		Alb, Fre, Par, Sub, Yel	Bridger-Teton NF Medicine Bow NF Rawlins BLM Shoshone NF Yellowstone NP
<i>Equisetum fluviatile</i>	Water horsetail	G5/S1	Disj.		Par, Tet, Yel	Grand Teton NP Shoshone NF Yellowstone NP
<i>Erigeron humilis</i>	Low fleabane	G4/S2	Periph.		Big, Par, Sub	Bighorn NF Bridger-Teton NF Shoshone NF
<i>Erigeron radicans</i>	Taprooted fleabane	G3/S2	Disj.		Fre, Par, Sub	Bridger-Teton NF Shoshone NF
<i>Eriophorum callitrix</i>	Sheathed cotton-grass	G5/S1	Periph.		Fre, Par	Shoshone NF
<i>Eriophorum chamissonis</i>	Russet cotton-grass	G5/S1S2	Periph.		Par, She, Yel	Bighorn NF Shoshone NF Yellowstone NP
<i>Eriophorum gracile</i>	Sheathed cotton-grass	G5/S1	Periph.		Par, Tet	Bridger-Teton NF? Grand Teton NP Shoshone NF Targhee NF?
<i>Eriophorum scheuchzeri</i>	Scheuchzer cotton-grass	G5/S1	Disj.		Fre, Sub	Bridger-Teton NF Shoshone NF

Species	Common Name	Heritage Rank	Range Notes	Federal Status	County	Managed Area
<i>Eriophorum viridicarinatum</i>	Green-keeled cotton-grass	G5/S1	Periph.		Par, Tet, Yel	Grand Teton NP National Elk Refuge Shoshone NF Yellowstone NP
<i>Eritrichium howardii</i>	Howard forget-me-not	G4/S1	Reg. Endm.		Joh, Par, She	Bighorn NF Casper BLM Shoshone NF Worland BLM
<i>Festuca hallii</i> [<i>F. altaica</i> ssp. <i>hallii</i> ; incl. in <i>F. scabrella</i> by some authors]	Hall's fescue	G3G4/S1	Periph.	USFS R2 Sens	Alb, Joh, Par	Bighorn NF ? Medicine Bow NF Shoshone NF Worland BLM
<i>Gayophytum humile</i>	Low groundsmoke	G5/S1	Periph.		Fre, Par, Yel	Shoshone NF Yellowstone NP
<i>Gentianella propinqua</i>	Four-part gentian	G5/S1	Periph.		Par	Shoshone NF
<i>Haplopappus macronema</i> var. <i>linearis</i> [<i>Ericameria discoidea</i> var. <i>linearis</i>]	Narrowleaf goldenweed	G4G5T3/S2	Reg. Endm.	USFS R4 Sens	Fre, Lin, Par, Tet, Yel	Bridger-Teton NF Rock Springs BLM Shoshone NF Wind River IR Yellowstone NP
<i>Ipomopsis spicata</i> ssp. <i>robruthii</i> [<i>I. spicata</i> var. <i>robruthiorum</i>]	Kirkpatrick's ipomopsis	G4?T2/S2	State Endm.	USFS R2 Sens	Par	Shoshone NF
<i>Juncus triglumis</i> var. <i>albescens</i>	Northern white rush	G5T5/S1	Disj.		Alb, Fre, Par, Sub	Bridger-Teton NF Medicine Bow NF Shoshone NF
<i>Juncus triglumis</i> var. <i>triglumis</i>	Three-flower rush	G5T5/S1	Periph.		Joh, Par	Bighorn NF Shoshone NF
<i>Kelloggia galioides</i>	Milk kelloggia	G5/S1	Periph.		Fre?, Lin?, Par, Tet, Yel	Bridger-Teton NF ? Grand Teton NP Shoshone NF Yellowstone NP
<i>Kobresia schoenoides</i> [<i>K. macrocarpa</i> ; <i>K. sibirica</i>]	Siberian kobresia	G5/S1	Disj.		Par	Shoshone NF
<i>Kobresia simpliciuscula</i>	Simple kobresia	G5/S1	Disj.		Par	Shoshone NF
<i>Koenigia islandica</i>	Koenigia	G4/S1	Disj.		Fre, Par	Shoshone NF
<i>Lesquerella fremontii</i>	Fremont bladderpod	G2/S2	State Endm.	USFS R2 Sens	Fre	Rawlins BLM Shoshone NF
<i>Ligusticum canbyi</i>	Canby's lovage	G5/S1	Periph.		Par, Tet, Yel	Bridger-Teton NF JDR Parkway Shoshone NF Yellowstone NP
<i>Lomatium attenuatum</i>	Absaroka biscuitroot	G3/S2	Reg. Endm.		Par	Shoshone NF Worland BLM
<i>Luzula glabrata</i> var. <i>hitchcockii</i> [<i>L. hitchcockii</i>]	Smooth woodrush	G5T4/S1	Periph.		Par, Tet	Grand Teton NP Shoshone NF Targhee NF
<i>Mimulus tilingii</i>	Subalpine monkeyflower	G5/S1	Periph.		Fre, Par	Shoshone NF
<i>Muhlenbergia glomerata</i> [Incl. in <i>M. racemosa</i> by some authors]	Marsh muhly	G4/S1	Periph.	USFS R2 Sens.	Cro, Gos?, Par, Sub, Tet, Yel	Black Hills NF National Elk Refuge Rock Springs BLM Shoshone NF Yellowstone NP

Species	Common Name	Heritage Rank	Range Notes	Federal Status	County	Managed Area
<i>Orobanche corymbosa</i> var. <i>corymbosa</i>	Flat-top broomrape	G4T4/S1	Periph.		Par, Sub, Tet	Bridger-Teton NF Grand Teton NP Shoshone NF
<i>Papaver kluanense</i> [<i>P. lapponicum</i> var. <i>occidentale</i> ; <i>P. radicans</i> ssp. <i>kluanensis</i>]	Alpine poppy	G3?Q/S2	Disj.		Big, Fre?, Joh?, Par, Sub	Bighorn NF Bridger-Teton NF Shoshone NF Worland BLM
<i>Parrya nudicaulis</i>	Naked-stemmed parrya	G5/S2	Disj.	USFS R2 Sens USFS R4 Sens	Fre, Par, Sub, Tet	Bridger-Teton NF Shoshone NF
<i>Pedicularis oederi</i>	Oeder's lousewort	G5/S1	Disj.		Par	Shoshone NF
<i>Pedicularis pulchella</i>	Mountain lousewort	G3/S2	Reg. Endm.		Big, Fre, Hot, Joh, Par, Sub, Tet	Bighorn NF Bridger-Teton NF Shoshone NF
<i>Penstemon absarokensis</i>	Absaroka beardtongue	G2/S2	State Endm.		Fre, Par	Shoshone NF Wind River IR Worland BLM
<i>Phippsia algida</i>	Ice grass	G5/S1	Disj.		Par, Sub	Bridger-Teton NF Shoshone NF
<i>Physaria saximontana</i> var. <i>saximontana</i>	Rocky Mountain twinpod	G3T2/S2	State Endm.		Fre, Hot	Rawlins BLM Shoshone NF Wind River IR Worland BLM
<i>Potamogeton praelongus</i>	White-stem pondweed	G5/S1	Periph.		Alb, Par, Yel	Medicine Bow NF Shoshone NF Yellowstone NP
<i>Potentilla hyparctica</i> [<i>P. nana</i>]	Arctic cinquefoil	G4G5/S1	Disj.		Fre, Sub	Bridger-Teton NF Shoshone NF
<i>Potentilla uniflora</i>	One-flower cinquefoil	G5/S1	Disj.		Fre, Hot?, Par, Sub, Tet	Bridger-Teton NF Shoshone NF
<i>Primula egaliksensis</i>	Greenland primrose	G4/S1	Disj.	USFS R2 Sens Bridger-Teton NF Sens	Par, Sub	Bridger-Teton NF Shoshone NF
<i>Pyrrocoma carthamoides</i> var. <i>subsquarrosa</i> [<i>Haplopappus c.</i> var. <i>subsquarrosus</i>]	Absaroka goldenweed	G4G5 T2T3/S2	Reg. Endm.	USFS R2 Sens	Par	Shoshone NF Worland BLM
<i>Pyrrocoma integrifolia</i> [<i>Haplopappus integrifolius</i>]	Entire-leaved goldenweed	G4/S1	Reg. Endm.		Fre, Was, Yel	Shoshone NF Yellowstone NP
<i>Ranunculus verecundus</i>	Timberline buttercup	G5/S1	Periph.		Par	Shoshone NF
<i>Salix barrattiana</i>	Barratt willow	G5/S1	Disj.		Par	Shoshone NF
<i>Salix candida</i>	Hoary willow	G5/S2	Sparse		Alb, Par, Sub, Tet, Yel	Bridger-Teton NF Medicine Bow NF National Elk Refuge Shoshone NF Yellowstone NP
<i>Salix farriarum</i>	Farr's willow	G4/S1S2	Periph.		Fre, Par, Tet, Yel	Bridger-Teton NF Shoshone NF Yellowstone NP
<i>Salix myrtillofolia</i> var. <i>myrtillofolia</i>	Myrtleleaf willow	G5T5/S1	Disj.	USFS R2 Sens	Par	Shoshone NF
<i>Sanicula graveolens</i>	Sierra sanicle	G4/S1	Periph.		Par, Yel	Shoshone NF Yellowstone NP
<i>Saussurea weberi</i>	Weber's saw-wort	G3Q/S2	Reg. Endm.	USFS R4 Sens	Fre, Sub, Tet	Bridger-Teton NF Shoshone NF
<i>Saxifraga serpyllifolia</i> var. <i>chrysantha</i> [<i>S. chrysantha</i>]	Golden saxifrage	G4/S1	Sparse		Alb, Car, Fre, Par, Sub	Bridger-Teton NF Medicine Bow NF Shoshone NF

Species	Common Name	Heritage Rank	Range Notes	Federal Status	County	Managed Area
<i>Scirpus rollandii</i> [<i>S. pumilus</i>]	Pygmy bulrush	G3Q/S1	Disj.	USFS R2 Sens	Par, Tet	Bridger-Teton NF National Elk Refuge Shoshone NF
<i>Selaginella watsonii</i>	Watson's spike-moss	G4/S1	Periph.		Par	Shoshone NF
<i>Senecio fuscatus</i>	Twice-hairy groundsel	G4/S2	Disj.		Par, Yel	Shoshone NF Worland BLM Yellowstone NP
<i>Senecio indecorus</i>	Plains ragwort	G5/S1	Periph.		Par	Shoshone NF
<i>Shoshonea pulvinata</i>	Shoshonea	G2G3/S2	Reg. Endm.	USFS R2 Sens	Fre, Hot, Par	Shoshone NF Wind River IR Worland BLM
<i>Silene kingii</i>	King's campion	G2G4Q/S1	Disj.		Fre, Par	Shoshone NF
<i>Sparganium minimum</i> [<i>S. nutans</i>]	Small bur-reed	G5/S1	Periph.		Alb, Fre, Par, Tet, Yel	Grand Teton NP Medicine Bow NF Shoshone NF Yellowstone NP
<i>Townsendia condensata</i> var. <i>anomala</i> [<i>T. anomala</i>]	North Fork Easter-daisy	G4T2/S2	State Endm.	USFS R2 Sens	Par	Shoshone NF
<i>Utricularia minor</i>	Lesser bladderwort	G5/S1S2	Sparse		Alb, Par, Tet, Was, Yel	Bighorn NF Grand Teton NP Medicine Bow NF Shoshone NF Yellowstone NP
<i>Viburnum edule</i>	Squashberry	G5/S1	Periph.		Alb, Par, Yel	Medicine Bow NF Shoshone NF Yellowstone NP

2. Watch List

Species	Common Name	Heritage Rank	Range	Federal Status	County	Managed Area
<i>Agoseris lackschewitzii</i>	Pink agoseris	G3/S3	Reg. Endm.	USFS R2 Sens USFS R4 Sens	Big, Fre, Joh, Par, She, Sub, Tet, Was, Yel	Bighorn NF Bridger-Teton NF JDR Parkway Shoshone NF Yellowstone NP
<i>Antennaria aromatica</i>	Aromatic pussytoes	G3G4/S2S3	Reg. Endm.		Big, Fre, Lin, Par, Sub, Tet	Bighorn NF Bridger-Teton NF Grand Teton NP Shoshone NF Worland BLM
<i>Arabis williamsii</i> var. <i>williamsii</i> [<i>A. pendulocarpa</i> var. <i>saximontana</i>]	Williams' rock cress	G3QT3/S3	State Endm.	Rock Sp. SpSt	Fre, Par, Sub	Bridger-Teton NF Rock Springs BLM Shoshone NF
<i>Castilleja nivea</i>	Snow paintbrush	G3/S2	Reg. Endm.		Hot, Par	Shoshone NF Worland BLM
<i>Erigeron flabellifolius</i>	Fan-leaved fleabane	G3G4/S2	Reg. Endm.		Hot, Par	Shoshone NF Worland BLM
<i>Heterotheca depressa</i> [<i>H. villosa</i> var. <i>depressa</i>]	Teton golden-aster	G5T3/S3	Reg. Endm.		Par, Tet, Yel	Bridger-Teton NF Grand Teton NP National Elk Refuge Rock Springs BLM Shoshone NF Yellowstone NP

Table 3.

Plants from Shoshone National Forest Dropped from the High Priority list of
 “Species of Special Concern”, 1993-1998

Species	Old Rank	New Rank	Reason for Change	Year
<i>Agoseris lackschewitzii</i>	G3Q/S2S3	G3/S3	Regional endemic; dropped to Watch List.	1998
<i>Antennaria aromatica</i>	G4/S2	G3G4/S2S3	Regional endemic; dropped to Watch List.	1996
<i>Anemone lithophila</i>	G4/S1	G4/S2	More common and widespread than originally thought.	1993
<i>Aquilegia jonesii</i>	G4/S3	G4/S3	More common than originally thought.	1993
<i>Arabis williamsii</i> var. <i>williamsii</i>	G3QT3/S3	G3QT3?S3	State endemic; dropped to Watch List (may not be a valid taxon).	1996
<i>Aster borealis</i> [<i>Aster junciformis</i>]	G5/S1	G5/S2	More common than originally thought.	1998
<i>Balsamorhiza</i> x <i>tomentosa</i>	HYB/S2	HYB/S2	Hybrid between <i>B. sagittata</i> and <i>B. incana</i> , no longer tracked	1993
<i>Botrychium lunaria</i> var. <i>lunaria</i>	G5T?/S2	G5T?/S2	More widespread than originally thought.	1993
<i>Botrychium simplex</i> var. <i>tenebrosum</i>	G5T3T4/S2	G5T3T4/S2	Taxon no longer recognized at the variety level.	1994
<i>Calamagrostis scopulorum</i>	G5/S1S2	G5/S2	More common than originally thought.	1996
<i>Calochortus eurycarpus</i>	G4/S1	G4/S2	More common than originally thought.	1997
<i>Carex bipartita</i>	G5/S2	G5/S2	More common than originally thought.	1994
<i>Carex buxbaumii</i>	G5/S2	G5/S2	More common and widespread than originally thought.	1998
<i>Castilleja nivea</i>	G3/S2	G3/S2	Regional endemic; dropped to Watch List.	1996
<i>Claytonia lanceolata</i> var. <i>flava</i>	G5T1Q/S1?	G5T?/S3?	Concept of taxon has been broadened to include non-yellow flowered forms; more common than originally thought	1994
<i>Conimitella williamsii</i>	G3/S1S2	G3/S2	More common in Wyoming and more widespread globally than originally thought.	1998
<i>Dicentra uniflora</i>	G5/S1	G5/S2	More common than originally thought.	1993
<i>Erigeron flabellifolius</i>	G3G4/S2	G3G4/S2	Regional endemic; dropped to Watch List.	1997
<i>Heterotheca depressa</i>	G5T3/S2	G5T3/S3	Regional endemic; more common than originally thought and dropped to Watch List.	1998
<i>Lycopodium annotinum</i>	G5/S1	G5/S2	More common than originally thought.	1993
<i>Machaeranthera canescens</i> var. <i>monticola</i>	G3G4	G3G4/S2	More common than originally thought.	1994

<i>Mimulus breweri</i>	G4?/S2	G4?/S2	More common than originally thought.	1994
<i>Minuartia dawsonensis</i> [<i>Arenaria stricta</i> var. <i>dawsonensis</i>]	G5/S1	G5/SRF	Specimens misidentified, no longer thought to occur in Wyoming.	1996
<i>Petasites sagittatus</i>	G4/S1	G4/S2	More widespread than originally thought.	1997
<i>Platanthera hyperborea</i> var. <i>gracilis</i>	G5TU/S1	G5TU/SR	Taxon is probably not valid.	1993
<i>Potentilla palustris</i>	G5/S2	G5/S2	More common than originally thought.	1993
<i>Salix barclayi</i>	G?/S2	G5/S2	More common than originally thought.	1994
<i>Salix monochroma</i>	G4G5/S1	G4G5/SRF	Specimens misidentified, no longer thought to occur in Wyoming.	1996
<i>Senecio werneriiifolius</i> var. <i>alpinus</i>	G5T?/S1	G5T?/S2	More common than originally thought.	1993
<i>Townsendia condensata</i> var. <i>condensata</i>	G4T?/S2	G4T3/S3	More common than originally thought.	1993
<i>Townsendia nuttallii</i>	G3/S3	G3/S3	Regional endemic; more widespread than originally thought.	1994
<i>Townsendia spathulata</i>	G3/S3	G3/S3	Regional endemic; more widespread than originally thought.	1994
<i>Trifolium haydenii</i>	G4/S2	G4/S3	Regional endemic; more widespread than originally thought.	1994
<i>Vaccinium membranaceum</i>	G5/S1	G5/S2	More common than originally thought.	1993

References: Fertig 1993 c, 1994, 1996 c, 1997 a.

Table 4.
Distribution of Plant Species of Special Concern in Existing
Special Management Areas on Shoshone National Forest

Key: X indicates a species is known to occur in a Wilderness or Special Botanical Area; ? indicates a species may occur in a Wilderness or Special Botanical Area. Wilderness Areas are: **Abs.-Btooth** (Absaroka-Beartooth), **Fitzpatrick, N. Absaroka** (North Absaroka), **Popo Agie**, and **Washakie**. Special Botanical Area (SBA) is **Swamp** (Swamp Lake).

1. High Priority Species

Species	Wilderness Areas				Washakie	SBA Swamp
	Abs.-Btooth	Fitzpatrick	N. Absaroka	Popo Agie		
<i>Adoxa moschatellina</i>						
<i>Agrostis oregonensis</i>						
<i>Amerorchis rotundifolia</i>						X
<i>Androsace chamaejasme</i> ssp. <i>carinata</i>		X	X			
<i>Antennaria flagellaris</i>			X			
<i>Antennaria monocephala</i>		X	X			
<i>Aquilegia brevistyla</i>						
<i>Aquilegia formosa</i> var. <i>formosa</i>						
<i>Arctostaphylos rubra</i>						X
<i>Arnica angustifolia</i> ssp. <i>tomentosa</i>		X				
<i>Astragalus gilviflorus</i> var. <i>purpureus</i>						
<i>Botrychium ascendens</i>						
<i>Botrychium lanceolatum</i>						
<i>Botrychium minganense</i>						
<i>Botrychium virginianum</i>						X
<i>Braya humilis</i>		X				
<i>Carex concinna</i>						X
<i>Carex deweyana</i> var. <i>bolanderi</i>						
<i>Carex diandra</i>	X					X
<i>Carex incurviformis</i> var. <i>danaensis</i>		X	X		X	
<i>Carex leptalea</i>	X					X
<i>Carex limosa</i>	X					X
<i>Carex livida</i>						X
<i>Carex luzulina</i> var. <i>atropurpurea</i>				X		
<i>Carex microglochis</i>		X				X
<i>Carex misandra</i>		X				
<i>Carex nelsonii</i>				X		
<i>Carex occidentalis</i>						
<i>Carex scirpoidea</i> var. <i>scirpiformis</i>						X
<i>Castilleja crista-galli</i>			X		X	
<i>Crassula aquatica</i>		?				
<i>Cryptogramma stelleri</i>						
<i>Cymopterus evertii</i>					X	
<i>Deschampsia danthonioides</i>					X	
<i>Descurainia torulosa</i>			X		X	
<i>Draba borealis</i>					X	
<i>Draba crassa</i>			X		X	
<i>Draba fladnizensis</i> var. <i>pattersonii</i>			X			
<i>Draba glabella</i>						

Species	Abs.-Btooth	Fitzpatrick	N Absaroka	Popo Agie	Washakie	Swamp
<i>Draba globosa</i>	X		X	X		
<i>Draba paysonii</i> var. <i>paysonii</i>	X	X				
<i>Draba paysonii</i> var. <i>treleaseii</i>			X		X	
<i>Draba pectinipila</i>	X					
<i>Draba porsildii</i> var. <i>brevicula</i>	X					
<i>Draba porsildii</i> var. <i>porsildii</i>			?		?	
<i>Drosera anglica</i>	X					
<i>Dryopteris expansa</i>			X			
<i>Epilobium palustre</i> var. <i>palustre</i>	X					X
<i>Equisetum fluviatile</i>	X					
<i>Erigeron humilis</i>	X		X		X	
<i>Erigeron radicans</i>	X	X	X			
<i>Eriophorum callitrix</i>		X		X		
<i>Eriophorum chamissonis</i>						
<i>Eriophorum gracile</i>	X					
<i>Eriophorum scheuchzeri</i>		X				
<i>Eriophorum viridicarinatum</i>						X
<i>Eritrichium howardii</i>						
<i>Festuca hallii</i>			X			
<i>Gayophytum humile</i>			X			
<i>Gentianella propinqua</i>					X	
<i>Haplopappus macronema</i> var. <i>linearis</i>					X	
<i>Ipomopsis spicata</i> ssp. <i>robruthii</i>			X		X	
<i>Juncus triglumis</i> var. <i>albescens</i>		X				
<i>Juncus triglumis</i> var. <i>triglumis</i>						
<i>Kelloggia galioides</i>			X		X	
<i>Kobresia schoenoides</i>			X		X	
<i>Kobresia simpliciuscula</i>						X
<i>Koenigia islandica</i>		X				
<i>Lesquerella fremontii</i>		X				
<i>Ligusticum canbyi</i>					X	
<i>Lomatium attenuatum</i>			X			
<i>Luzula glabrata</i> var. <i>hitchcockii</i>						
<i>Mimulus tilingii</i>					X	
<i>Muhlenbergia glomerata</i>						X
<i>Orobanche corymbosa</i> var. <i>corymbosa</i>						
<i>Papaver kluanense</i>					X	
<i>Parrya nudicaulis</i>	X	X		X		
<i>Pedicularis oederi</i>						
<i>Pedicularis pulchella</i>					X	
<i>Penstemon absarokensis</i>			X		X	
<i>Phippsia algida</i>						
<i>Physaria saximontana</i> var. <i>saximontana</i>						
<i>Potamogeton praelongus</i>	?				X	
<i>Potentilla hyparctica</i>		X				
<i>Potentilla uniflora</i>			X		X	
<i>Primula egaliksensis</i>						X
<i>Pyrrocoma carthamoides</i> var. <i>subsquarrosa</i>			X			
<i>Pyrrocoma integrifolia</i>						

Species	Abs.-Btooth	Fitzpatrick	N Absaroka	Popo Agie	Washakie	Swamp
<i>Ranunculus verecundus</i>			X			
<i>Salix barrattiana</i>						
<i>Salix candida</i>						X
<i>Salix farriae</i>			X			
<i>Salix myrtillofolia</i> var. <i>myrtillofolia</i>						X
<i>Sanicula graveolens</i>			X			
<i>Saussurea weberi</i>		X				
<i>Saxifraga serpyllifolia</i> var. <i>chrysantha</i>		?		?		
<i>Scirpus rollandii</i>						X
<i>Selaginella watsonii</i>						
<i>Senecio fuscatus</i>			X			
<i>Senecio indecorus</i>						
<i>Shoshonea pulvinata</i>						
<i>Silene kingii</i>		X		X	X	
<i>Sparganium minimum</i>						X
<i>Townsendia condensata</i> var. <i>anomala</i>			X		X	
<i>Utricularia minor</i>						X
<i>Viburnum edule</i>						

1. High Priority Species

Species	Wilderness Areas				Washakie	SBA Swamp
	Abs.-Btooth	Fitzpatrick	N. Absaroka	Popo Agie		
<i>Agoseris lackschewitzii</i>			X			
<i>Antennaria aromatica</i>	X	X	X			
<i>Arabis williamsii</i> var. <i>williamsii</i>		X	X		X	
<i>Castilleja nivea</i>			X		X	
<i>Erigeron flabellifolius</i>			X		X	
<i>Heterotheca depressa</i>						

Table 5.
Distribution of Plant Species of Special Concern in Proposed or Potential
Special Management Areas on Shoshone National Forest

Key: X indicates a species is known to occur in a proposed or potential RNA; ? indicates a species may occur in a proposed or potential RNA. Proposed RNAs are **BR1** (200 acres on Bald Ridge), **PC** (Pat O’Hara Creek), **PK** (Pickett’s Knob), **SP** (Sawtooth Peatbed), and **LC** (Line Creek/Twin Lakes). Potential RNAs are **AM** (Arrow Mountain), **BR2** (larger area on Bald Ridge), **BB** (Beartooth Butte), **GC** (Grizzly Creek), **LCB** (Lake Creek Bogs), **PM** (Pat O’Hara Mountain), **RF** (Roaring Fork Mountain), **SM** (Sheep Mesa).

1. High Priority Species

Species	--- Proposed RNAs ---					----- Potential RNAs -----							
	BR1	PC	PK	SP	LC	AM	BR2	BB	GC	LCB	PM	RF	SM
<i>Adoxa moschatellina</i>													
<i>Agrostis oregonensis</i>													
<i>Amerorchis rotundifolia</i>													
<i>Androsace chamaejasme ssp. carinata</i>	X					X	X				X		
<i>Antennaria flagellaris</i>													
<i>Antennaria monocephala</i>													
<i>Aquilegia brevistyla</i>													
<i>Aquilegia formosa var. formosa</i>													
<i>Arctostaphylos rubra</i>													
<i>Arnica angustifolia ssp. tomentosa</i>						X							
<i>Astragalus gilviflorus var. purpureus</i>													
<i>Botrychium ascendens</i>													
<i>Botrychium lanceolatum</i>													
<i>Botrychium minganense</i>								?					
<i>Botrychium virginianum</i>													
<i>Braya humilis</i>						X							
<i>Carex concinna</i>													
<i>Carex deweyana var. bolanderi</i>													
<i>Carex diandra</i>										X			
<i>Carex incurviformis var. danaensis</i>						X							
<i>Carex leptalea</i>										X			
<i>Carex limosa</i>								X		X			
<i>Carex livida</i>													
<i>Carex luzulina var. atropurpurea</i>													
<i>Carex microglochin</i>													
<i>Carex misandra</i>					?								
<i>Carex nelsonii</i>					X								
<i>Carex occidentalis</i>													
<i>Carex scirpoidea var. scirpiformis</i>													
<i>Castilleja crista-galli</i>								X					X
<i>Crassula aquatica</i>													
<i>Cryptogramma stelleri</i>													
<i>Cymopterus evertii</i>													
<i>Deschampsia danthonioides</i>													
<i>Descurainia torulosa</i>													
<i>Draba borealis</i>													
<i>Draba crassa</i>													X

Species	BR 1	PC	PK	SP	LC	AM	BR 2	BB	GC	LC B	PM	RF	SM
<i>Draba fladnizensis</i> var. <i>pattersonii</i>					X								
<i>Draba glabella</i>					?								
<i>Draba globosa</i>								X					
<i>Draba paysonii</i> var. <i>paysonii</i>								X					
<i>Draba paysonii</i> var. <i>treleaseii</i>					X								
<i>Draba pectinipila</i>								X					
<i>Draba porsildii</i> var. <i>brevicula</i>								X					
<i>Draba porsildii</i> var. <i>porsildii</i>											X		
<i>Drosera anglica</i>										X			
<i>Dryopteris expansa</i>													
<i>Epilobium palustre</i> var. <i>palustre</i>										?			
<i>Equisetum fluviatile</i>										?			
<i>Erigeron humilis</i>								X					
<i>Erigeron radicans</i>						X		X					
<i>Eriophorum callitrix</i>					?								
<i>Eriophorum chamissonis</i>													
<i>Eriophorum gracile</i>										X			
<i>Eriophorum scheuchzeri</i>													
<i>Eriophorum viridicarinatum</i>													
<i>Eritrichium howardii</i>	X						X						
<i>Festuca hallii</i>							?				X		
<i>Gayophytum humile</i>													X
<i>Gentianella propinqua</i>													
<i>Haplopappus macronema</i> var. <i>linearis</i>													
<i>Ipomopsis spicata</i> ssp. <i>robruthii</i>									X				
<i>Juncus triglumis</i> var. <i>albescens</i>						X							
<i>Juncus triglumis</i> var. <i>triglumis</i>					?								
<i>Kelloggia galioides</i>													
<i>Kobresia schoenoides</i>					X								
<i>Kobresia simpliciuscula</i>													
<i>Koenigia islandica</i>					X								
<i>Lesquerella fremontii</i>						X							
<i>Ligusticum canbyi</i>													
<i>Lomatium attenuatum</i>									X		?		?
<i>Luzula glabrata</i> var. <i>hitchcockii</i>								?					
<i>Mimulus tilingii</i>													
<i>Muhlenbergia glomerata</i>													
<i>Orobanche corymbosa</i> var. <i>corymbosa</i>													
<i>Papaver kluanense</i>													X
<i>Parrya nudicaulis</i>						X		X					
<i>Pedicularis oederi</i>					X								
<i>Pedicularis pulchella</i>													
<i>Penstemon absarokensis</i>									X				X
<i>Phippsia algida</i>					X								
<i>Physaria saximontana</i> var. <i>saximontana</i>													
<i>Potamogeton praelongus</i>										?			
<i>Potentilla hyparctica</i>													
<i>Potentilla uniflora</i>					X								X
<i>Primula egaliksensis</i>													

Species	BR 1	PC	PK	SP	LC	AM	BR 2	BB	GC	LC B	PM	RF	SM
<i>Pyrocoma carthamoides</i> var. <i>subsquarrosa</i>	?						X				X		
<i>Pyrocoma integrifolia</i>													
<i>Ranunculus verecundus</i>													
<i>Salix barrattiana</i>					?								
<i>Salix candida</i>										?			
<i>Salix farriae</i>								X		?			
<i>Salix myrtilifolia</i> var. <i>myrtilifolia</i>													
<i>Sanicula graveolens</i>													
<i>Saussurea weberi</i>						X							
<i>Saxifraga serpyllifolia</i> var. <i>chrysantha</i>					?								
<i>Scirpus rollandii</i>													
<i>Selaginella watsonii</i>					?								
<i>Senecio fuscatus</i>					X								X
<i>Senecio indecorus</i>													
<i>Shoshonea pulvinata</i>	X						X						
<i>Silene kingii</i>						X							
<i>Sparganium minimum</i>													
<i>Townsendia condensata</i> var. <i>anomala</i>									X				X
<i>Utricularia minor</i>													
<i>Viburnum edule</i>													

2. Watch List Species

Species	--- Proposed RNAs ---						----- Potential RNAs -----						
	BR1	PC	PK	SP	LC	AM	BR2	BB	GC	LCB	PM	RF	SM
<i>Agoseris lackschewitzii</i>					X			X		X			
<i>Antennaria aromatica</i>	X					X	X	X			X		
<i>Arabis williamsii</i> var. <i>williamsii</i>													
<i>Castilleja nivea</i>	X						X				X		X
<i>Erigeron flabellifolius</i>					X								
<i>Heterotheca depressa</i>													

Table 6.
Current and Potential Protection Status of
Plant Species of Special Concern on Shoshone National Forest

Key: **Protection Status** is based on a modified 4-part scale developed for ranking the protection status of different land areas for Gap Analysis (Merrill *et al.* 1996). Species ranked **1** occur on at least one site that is permanently protected from conversion of natural land cover and managed to maintain natural processes [designated Wilderness Areas, National Parks and Monuments, National Wildlife Refuges, and Nature Conservancy preserves]. Species ranked **2** occur on at least one site that is protected from conversion of natural land cover, but which may be subject to some management practices that may reduce the quality of natural communities [BLM ACECs, Forest Service Research Natural Areas and Special Botanical Areas, and National Park Service-managed National Recreation Areas]. Species ranked **3** occur on at least one site that is managed as public land for multiple use. [undesignated BLM, US Forest Service, and state park lands]. Species ranked **4** occur only on lands that lack legally binding mandates for management of natural land cover or species [private, state, and reservation lands]. **Current SNF** status represents the highest possible score for a species in Shoshone National Forest under present management. **Potential SNF** status represents the maximum score possible for a species if populations in potential or proposed Research Natural Areas in Shoshone National Forest are designated. **Current WY** status represents the highest possible score for a species if populations throughout the state are considered. A “?” indicates the rank is uncertain.

1. High priority species

Species	Common Name	Protection Status		
		Current SNF	Potential SNF	Current WY
<i>Adoxa moschatellina</i>	Moschatel	3	3	1
<i>Agrostis oregonensis</i>	Oregon bentgrass	3	3	1
<i>Amerorchis rotundifolia</i>	Round-leaved orchid	2	2	2
<i>Androsace chamaejasme ssp. carinata</i>	Sweet-flowered rock jasmine	1	1	1
<i>Antennaria flagellaris</i>	Stoloniferous pussytoes	1	1	1
<i>Antennaria monocephala</i>	Single-head pussytoes	1	1	1
<i>Aquilegia brevistyla</i>	Small-flower columbine	3	3	3
<i>Aquilegia formosa var. formosa</i>	Crimson columbine	3	3	3
<i>Arctostaphylos rubra</i>	Red manzanita	2	2	2
<i>Arnica angustifolia ssp. tomentosa</i>	Alpine arnica	1	1	1
<i>Astragalus gilviflorus var. purpureus</i>	Dubois milkvetch	3	3	1
<i>Botrychium ascendens</i>	Upward-lobe moonwort	3	3	3
<i>Botrychium lanceolatum</i>	Lance-leaved grapefern	3	3	3
<i>Botrychium minganense</i>	Mingan Island moonwort	3	2?	3
<i>Botrychium virginianum</i>	Rattlesnake fern	2	2	1?
<i>Braya humilis</i>	Low braya	1	1	1
<i>Carex concinna</i>	Beautiful sedge	2	2	1
<i>Carex deweyana var. bolanderi</i>	Bolander's sedge	3	3	3
<i>Carex diandra</i>	Lesser panicled sedge	1	1	1
<i>Carex incurviformis var. danaensis</i>	Seaside sedge	1	1	1
<i>Carex leptalea</i>	Bristly-stalk sedge	1	1	1
<i>Carex limosa</i>	Mud sedge	1	1	1
<i>Carex livida</i>	Livid sedge	2	2	1
<i>Carex luzulina var. atropurpurea</i>	Black and purple sedge	1	1	1
<i>Carex microglochis</i>	False uncinia sedge	1	1	1
<i>Carex misandra</i>	Short-leaf sedge	1	1	1
<i>Carex nelsonii</i>	Nelson's sedge	1	1	1
<i>Carex occidentalis</i>	Western sedge	3	3	3

Species	Common Name	Current SNF	Potential SNF	Current WY
<i>Carex scirpoidea</i> var. <i>scirpiformis</i>	Canadian single-spike sedge	2	2	1
<i>Castilleja crista-galli</i>	Cock's-comb paintbrush	1	1	1
<i>Crassula aquatica</i>	Pygmyweed	1?	1?	1
<i>Cryptogramma stelleri</i>	Fragile rockbrake	3	3	1
<i>Cymopterus evertii</i>	Evert's wafer-parsnip	1	1	1
<i>Deschampsia danthonioides</i>	Annual hairgrass	1	1	1
<i>Descurainia torulosa</i>	Wyoming tansymustard	1	1	1
<i>Draba borealis</i>	Boreal draba	1	1	1
<i>Draba crassa</i>	Thick-leaf whitlow-grass	1	1	1
<i>Draba fladnizensis</i> var. <i>pattersonii</i>	White arctic whitlow-grass	1	1	1
<i>Draba glabella</i>	Rock whitlow-grass	3	2?	3
<i>Draba globosa</i>	Rockcress draba	1	1	1
<i>Draba paysonii</i> var. <i>paysonii</i>	Payson's draba	1	1	1
<i>Draba paysonii</i> var. <i>treleaseii</i>	Trelease's draba	1	1	1
<i>Draba pectinipila</i>	Comb-hair whitlow-grass	1	1	1
<i>Draba porsildii</i> var. <i>brevicula</i>	Little snow draba	1	1	1
<i>Draba porsildii</i> var. <i>porsildii</i>	Porsild's draba	1?	1?	1
<i>Drosera anglica</i>	English sundew	1	1	1
<i>Dryopteris expansa</i>	Spreading woodfern	1	1	1
<i>Epilobium palustre</i> var. <i>palustre</i>	Swamp willow-herb	1	1	1
<i>Equisetum fluviatile</i>	Water horsetail	1	1	1
<i>Erigeron humilis</i>	Low fleabane	1	1	1
<i>Erigeron radicans</i>	Taprooted fleabane	1	1	1
<i>Eriophorum callitrix</i>	Sheathed cotton-grass	1	1	1
<i>Eriophorum chamissonis</i>	Russet cotton-grass	3	3	1
<i>Eriophorum gracile</i>	Sheathed cotton-grass	1	1	1
<i>Eriophorum scheuchzeri</i>	Scheuchzer cotton-grass	1	1	1
<i>Eriophorum viridicarinatum</i>	Green-keeled cotton-grass	2	2	1
<i>Eritrichium howardii</i>	Howard forget-me-not	3	2	3
<i>Festuca hallii</i>	Hall's fescue	1	1	1
<i>Gayophytum humile</i>	Low groundsmoke	1	1	1
<i>Gentianella propinqua</i>	Four-part gentian	1	1	1
<i>Haplopappus macronema</i> var. <i>linearis</i>	Narrowleaf goldenweed	1	1	1
<i>Ipomopsis spicata</i> ssp. <i>robruthii</i>	Kirkpatrick's ipomopsis	1	1	1
<i>Juncus triglumis</i> var. <i>albescens</i>	Northern white rush	1	1	1
<i>Juncus triglumis</i> var. <i>triglumis</i>	Three-flower rush	3	2?	1
<i>Kelloggia galioides</i>	Milk kelloggia	1	1	1
<i>Kobresia schoenoides</i>	Siberian kobresia	1	1	1
<i>Kobresia simpliciuscula</i>	Simple kobresia	2	2	2
<i>Koenigia islandica</i>	Koenigia	1	1	1
<i>Lesquerella fremontii</i>	Fremont bladderpod	1	1	1
<i>Ligusticum canbyi</i>	Canby's lovage	1	1	1
<i>Lomatium attenuatum</i>	Absaroka biscuitroot	1	1	1
<i>Luzula glabrata</i> var. <i>hitchcockii</i>	Smooth woodrush	3	2?	1
<i>Mimulus tilingii</i>	Subalpine monkeyflower	1	1	1
<i>Muhlenbergia glomerata</i>	Marsh muhly	2	2	1
<i>Orobanche corymbosa</i> var. <i>corymbosa</i>	Flat-top broomrape	3	3	1
<i>Papaver kluanense</i>	Alpine poppy	1	1	1
<i>Parrya nudicaulis</i>	Naked-stemmed parrya	1	1	1
<i>Pedicularis oederi</i>	Oeder's lousewort	3	2	3

Species	Common Name	Current SNF	Potential SNF	Current WY
<i>Pedicularis pulchella</i>	Mountain lousewort	1	1	1
<i>Penstemon absarokensis</i>	Absaroka beardtongue	1	1	1
<i>Phippsia algida</i>	Ice grass	3	2	1
<i>Physaria saximontana</i> var. <i>saximontana</i>	Rocky Mountain twinpod	3	3	1
<i>Potamogeton praelongus</i>	White-stem pondweed	1	1	1
<i>Potentilla hyparctica</i>	Arctic cinquefoil	1	1	1
<i>Potentilla uniflora</i>	One-flower cinquefoil	1	1	1
<i>Primula egaliksensis</i>	Greenland primrose	2	2	2
<i>Pyrrocoma carthamoides</i> var. <i>subsquarrosa</i>	Absaroka goldenweed	1	1	1
<i>Pyrrocoma integrifolia</i>	Entire-leaved goldenweed	3	3	1
<i>Ranunculus verecundus</i>	Timberline buttercup	1	1	1
<i>Salix barrattiana</i>	Barratt willow	3	2?	3
<i>Salix candida</i>	Hoary willow	2	2	1
<i>Salix farriae</i>	Farr's willow	1	1	1
<i>Salix myrtillifolia</i> var. <i>myrtillifolia</i>	Myrtleleaf willow	2	2	2
<i>Sanicula graveolens</i>	Sierra sanicle	1	1	1
<i>Saussurea weberi</i>	Weber's saw-wort	1	1	1
<i>Saxifraga serpyllifolia</i> var. <i>chrysantha</i>	Golden saxifrage	1?	1?	1
<i>Scirpus rollandii</i>	Pygmy bulrush	2	2	1
<i>Selaginella watsonii</i>	Watson's spike-moss	3	2?	3
<i>Senecio fuscatus</i>	Twice-hairy groundsel	1	1	1
<i>Senecio indecorus</i>	Plains ragwort	3	3	3
<i>Shoshonea pulvinata</i>	Shoshonea	3	2	3
<i>Silene kingii</i>	King's campion	1	1	1
<i>Sparganium minimum</i>	Small bur-reed	2	2	1
<i>Townsendia condensata</i> var. <i>anomala</i>	North Fork Easter-daisy	1	1	1
<i>Utricularia minor</i>	Lesser bladderwort	2	2	1
<i>Viburnum edule</i>	Squashberry	3	3	1

2. Watch List species

Species	Common Name	Protection Status		
		Current SNF	Potential SNF	Current WY
<i>Agoseris lackschewitzii</i>	Pink agoseris	1	1	1
<i>Antennaria aromatica</i>	Aromatic pussytoes	1	1	1
<i>Arabis williamsii</i> var. <i>williamsii</i>	Williams' rock cress	1	1	1
<i>Castilleja nivea</i>	Snow paintbrush	1	1	1
<i>Erigeron flabellifolius</i>	Fan-leaved fleabane	1	1	1
<i>Heterotheca depressa</i>	Teton golden-aster	3	3	1

3. Protection Summary

A. Current Shoshone National Forest Status

	Status 1	Status 2	Status 3	Status 4
# of High Priority Species	65	15	26	0
# of Watch List Species	5	0	1	0
Total # [High priority & Watch List] and %	70 (62.5%)	15 (13.4%)	27 (24.1%)	0 (0%)

B. Potential Shoshone National Forest Status

	Status 1	Status 2	Status 3	Status 4
# of High Priority Species	65	25	16	0
# of Watch List Species	5	0	1	0
Total # [High priority & Watch List] and %	70 (62.5%)	25 (22.3%)	17 (15.2%)	0 (0%)

C. Current Statewide Wyoming Status

	Status 1	Status 2	Status 3	Status 4
# of High Priority Species	87	5	14	0
# of Watch List Species	6	0	0	0
Total # [High priority & Watch List] and %	93 (83%)	5 (4.5%)	14 (12.5%)	0 (0%)

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Appendix A
Status of Plant Species of Special Concern
on Shoshone National Forest

1. High Priority Species

Adoxa moschatellina

Occurrences in Wyoming: Known from 8 extant occurrences (these have been observed since 1979), and 2-3 historical records (dating from the 1890s) in Wyoming.

Population Abundance: Populations generally are small and restricted to small areas of suitable habitat.

Range: Sparse; In Wyoming, known from the Yellowstone Plateau, Black Hills (Crook Co.), Absaroka Mountains (Park Co.), Bighorn Mountains (Sheridan and Washakie Counties), and the Medicine Bow Range (Albany Co).

Trends: Not known.

Protection Status: One occurrence is protected in TNC's Tensleep Preserve and one extant record is found in Yellowstone National Park. Several other populations are found in potential research natural areas or potential special botanical areas (Sand Creek potential SBA on Black Hills NF and Tensleep Canyon potential RNA in Bighorn NF).

Threats: Small, isolated populations and limited areas of suitable habitat make this species vulnerable to habitat disturbance. Logging may be a threat in some forests.

Managed Areas: Occurs on lands managed by Bighorn, Black Hills, and Shoshone NFs and Yellowstone NP. May also occur on Medicine Bow NF (record is old and vague).

Number of Occurrences on Shoshone NF: 2.

References: Cronquist *et al.* 1984; Dorn 1992; Lesica and Shelly 1991.

Agrostis oregonensis

Occurrences in Wyoming: Confirmed from two historical records in Wyoming, the most recent dating from 1900. Recently reported from one location in Park County by Erwin Evert.

Population Abundance: Reported as "rare" by Evert (1991). Historical populations may not be extant.

Range: Disjunct. Known from the Gros Ventre and Lewis river drainages in Teton County and Yellowstone National Park. Reported from the Absaroka Range in Park County by Evert (1991).

Trends: No trend data available. May be extirpated at historical sites.

Protection Needs: One occurrence is found within Yellowstone National Park.

Threats: Not known.

Managed Areas: Known from Yellowstone National Park. Reported from Bridger-Teton and Shoshone National Forests and Grand Teton National Park.

Number of Occurrences on Shoshone NF: 1.

References: Dorn 1992; Evert 1991.

Amerorchis rotundifolia

Occurrences in Wyoming: Known from a single extant occurrence in the state (formerly treated as 2 records by WYNDD).

Population Abundance: The entire known range of the species in Wyoming is within an area of ca 1-2 square miles. Abundance is relatively small (several hundred individuals were observed in 1996).

Range: Peripheral. In Wyoming, known only from the Clarks Fork Valley in Park County.

Trends: This species may be in decline due to development in the vicinity of its habitat.

Protection Status: One occurrence is protected within the Swamp Lake Special Botanical Area. This species is listed as Sensitive in US Forest Service Region 2.

Threats: Threats include collection by orchid fanciers, removal of white spruce forest habitat, and grazing or trampling by horses or cattle.

Managed Areas: Found on Shoshone NF (Clarks Fork RD).

Number of Occurrences on Shoshone NF: 1.

References: Dorn 1992; Evert 1986; Fertig 1997 b; Fertig and Jones 1992; Fertig *et al.* 1994; Lesica and Shelly 1991; Mills and Fertig 1996 a; Rosenthal 1998; Shelly 1988 a.

Androsace chamaejasme ssp. *carinata*

Occurrences in Wyoming: Known from 5 extant occurrences in Wyoming and 1 historical report from Yellowstone National Park (last observed in 1892). All extant populations have been relocated since 1991.

Population Abundance: Surveyed populations range in size from several hundred to tens of thousands of individuals.

Range: Peripheral; Found in the NE Wind River Range (Fremont Co.), eastern Absaroka Range (Park Co.) and Owl Creek Mountains (Hot Springs Co.) and reported from Yellowstone National Park.

Trends: Trend data are mostly lacking, but populations appear to be stable.

Protection Status: 3 occurrences are found within the Fitzpatrick and North Absaroka wilderness areas and one is within the proposed Bald Ridge Research Natural Area. Two other occurrences are within potential RNAs on Shoshone National Forest (Pat O'Hara Mountain and Arrow Mountain). An historical record may also occur in Yellowstone National Park. This species is listed as Sensitive by Bridger-Teton and Targhee National Forests.

Threats: Most populations are secure due to rugged terrain. Low elevation sites near wet meadows may be impacted by grazing or recreation.

Managed Areas: Extant populations are found in Shoshone National Forest and reported from the BLM Worland District.

Number of Occurrences on Shoshone NF: 4.

References: Dorn 1992; Fertig 1992 a, 1992 c, 1997 b; Fertig and Bynum 1994 b; Fertig *et al.* 1994; Jones 1991 a; Marriott 1991 a; Rosenthal 1988; Scott 1997.

Antennaria flagellaris

Occurrences in Wyoming: Known from 6 extant occurrences in Wyoming, with 3 of these from the same general vicinity along the North Fork Shoshone River drainage. Also known from one historical record (1885) in Yellowstone National Park.

Population Abundance: No population estimates have been made at any of the known sites. Individual populations may be limited in area and restricted to specialized microsites.

Range: Disjunct; in Wyoming, known only from the Yellowstone Plateau and Absaroka Range (Park County).

Trends: Not known.

Protection Status: At least 5 extant occurrences (and 1 historical record) are found in Yellowstone NP and the North Absaroka Wilderness Area (Shoshone NF).

Threats: Not known, although small population size and specialized habitat could make it vulnerable to large scale disturbance.

Managed Areas: Found on lands managed by Yellowstone National Park and Shoshone National Forest.

Number of Occurrences on Shoshone NF: 5.

References: Bayer and Stebbins 1993; Clark *et al.* 1989; Cronquist 1994; Dorn 1992.

Antennaria monocephala

Occurrences in Wyoming: Known from 7 occurrences in Wyoming, all located since 1985 (5 have been discovered since 1991).

Population Abundance: Little population data are available, but known occurrences tend to be limited in area and probably contain very few individuals.

Range: Disjunct; in Wyoming known from the Wind River, northern Absaroka, Bighorn, and Teton ranges in Fremont, Johnson, Park, Sublette, and Teton counties.

Trends: Not known, but probably stable.

Protection Status: At least 5 occurrences are found within established Wilderness Areas (North Absaroka, Bridger, Fitzpatrick, and Cloud Peak areas). Other occurrences are on public lands managed for multiple use.

Threats: Threats low due to rugged, alpine scree habitat.

Managed Areas: Found in Bighorn, Bridger-Teton, Shoshone, and Targhee National Forests.

Number of Occurrences on Shoshone NF: 4.

References: Bayer and Stebbins 1993; Dorn 1992; Fertig 1992 a, 1992 b; Markow 1994, 1996; Markow and Fertig 1993; Rosenthal 1998; Scott 1997; Welsh 1974.

Aquilegia brevistyla

Occurrences in Wyoming: Known from a single confirmed occurrence in Wyoming, last observed in 1982. An older, unconfirmed and possibly erroneous record is known from Park County.

Population Abundance: Not known.

Range: Peripheral; In Wyoming, this species is known from the Black Hills (Weston County). It has also been reported

from the northern Absaroka Range (Park County), but this record may be based on a hybrid individual. Dorn (1992) does not recognize this latter occurrence as legitimate.

Trends: Not known.

Protection Status: All known populations are on public lands managed for multiple use.

Threats: May be threatened by overcollection by wildflower enthusiasts and habitat loss.

Managed Areas: Occurs on lands managed by the BLM Casper District and Black Hills National Forest. May also occur on Shoshone National Forest.

Number of Occurrences on Shoshone NF: 1?

References: Dorn 1992; Lesica and Shelly 1991; Munz 1946.

Aquilegia formosa var. *formosa*

Occurrences in Wyoming: Known from a single occurrence in Wyoming, last observed in 1951.

Population Abundance: Not known, but probably restricted to a small geographic area.

Range: Peripheral; in Wyoming, known only from the northern Absaroka Range in Park County.

Trends: Not known.

Protection Status: The single known occurrence is found on public lands managed by the US Forest Service for multiple use.

Threats: The showy flowers may make this species vulnerable to over-collection.

Managed Areas: The only known Wyoming occurrence is found in Shoshone National Forest.

Number of Occurrences on Shoshone NF: 1.

Comments: The lone specimen from Shoshone NF may be a hybrid between reddish-flowered *A. formosa* and *A. flavescens*, a yellow flowered species that is relatively abundant in northwest Wyoming.

References: Dorn 1992; Lesica and Shelly 1991; Munz 1946.

Arctostaphylos rubra

Occurrences in Wyoming: A single occurrence is known in Wyoming (and in the contiguous United States).

Population Abundance: Locally common in suitable habitat at Swamp Lake, but restricted to a very small geographic area (less than 1.5 sq miles).

Range: Disjunct; found only at Swamp Lake (a.k.a. Cathedral Cliffs wetland) in the Clarks Fork Valley in northern Park County. Only occurrence in the lower 48 states.

Trends: Population appears stable over last 10 years. Additional monitoring needed to determine longer term trends.

Protection Status: Protected within the Swamp Lake Special Botanical Area in Shoshone National Forest. Listed as Sensitive in USFS Region 2.

Threats: Threats low, primarily threatened if hydrology of the Swamp Lake wetland is severely disturbed.

Managed Areas: Only known from the Shoshone National Forest.

Number of Occurrences on Shoshone NF: 1.

References: Clark *et al.* 1989; Dorn 1992; Evert 1986; Evert *et al.* 1986; Fertig 1995 c; Fertig and Jones 1992; Fertig *et al.* 1994; Mills and Fertig 1996 a; Porsild and Cody 1980; Rosenthal 1998; Welsh 1974.

Arnica angustifolia ssp. *tomentosa*

Occurrences in Wyoming: Known from a single occurrence in Wyoming, first discovered in 1996.

Population Abundance: Population is locally abundant, but restricted to a specialized habitat occupying ca 5 acres.

Range: Peripheral; in Wyoming, known only from the NE Wind River Range in Fremont County.

Trends: Not known.

Protection Needs: The single known occurrence is in the Fitzpatrick Wilderness Area (Shoshone National Forest) and is within the potential Arrow Mountain Research Natural Area.

Threats: Not known.

Managed Areas: All known Wyoming occurrences are found in the Shoshone National Forest.

Number of Occurrences on Shoshone NF: 1.

References: Cronquist 1955; Fertig 1996 b, 1997 b.

Astragalus gilviflorus var. *purpureus*

Occurrences in Wyoming: Known from 11 extant occurrences, 6 of which have been discovered or relocated since 1990. Several specimens of this taxon (labeled as *A. shoshonensis*) are cited by M.L. Roberts in his 1977 thesis, but have never been relocated.

Population Abundance: Population conservatively estimated at 100,000-150,000 in 1996 survey by Fertig (1998 a).

Many occurrences are often quite small, however.

Range: State endemic, known only from the northwestern Wind River Basin and adjacent foothills of the Absaroka and Wind River ranges in northwestern Fremont County, Wyoming.

Trends: No trend data are available, but there is little evidence to suggest a large-scale population decline.

Protection Status: Several occurrences are known from private conservation easements (TNC and Jackson Hole Land Trust). Also found in the Dubois Badlands ACEC and on WY Game and Fish Department wildlife habitat areas.

Threats: May be threatened by dislodgement and soil erosion and compaction from off-road vehicles and by urban expansion in the Dubois area. Mineral development is a potential threat, although current interest in the area is low. Does not appear to be grazed (Fertig 1998 a).

Managed Areas: Known from lands managed by the BLM Rawlins District (Lander Resource Area), Shoshone National Forest, and the Wind River Indian Reservation.

Number of Occurrences on Shoshone National Forest: 1.

References: Dorn 1988, 1992; Fertig 1997 b, 1998 a; Fertig *et al.* 1994; Roberts 1977; Rosenthal 1998.

Botrychium ascendens

Occurrences in Wyoming: Known from 3 occurrences, all of which were discovered or relocated in 1995 during riparian vegetation studies by Jill Walford for Shoshone National Forest.

Population Abundance: Populations appear to be small, with 10-50 individuals. Due to its small size and scattered habitat, however, this species may be more abundant than presently known.

Range: Disjunct; in Wyoming, restricted to drainages in the southern Absaroka Range 15-18 miles north of Dubois (Fremont County).

Trends: Not known.

Protection Status: All known populations are found on public lands managed for multiple use. This species is listed as Sensitive by USFS Regions 2 and 4, and was formerly a C2 candidate for listing under the Endangered

Species

Act.

Threats: Not known. May be vulnerable to changes in hydrologic cycles.

Managed Areas: Occurs on lands managed by Shoshone National Forest.

Number of Occurrences on Shoshone NF: 3.

References: Clark *et al.* 1989; Dorn 1992; Fertig 1995 c; Fertig *et al.* 1994; Lellinger 1985; Mills and Fertig 1996 a, 1996 b; Wagner 1992; Wagner and Wagner 1986, 1993.

Botrychium lanceolatum

Occurrences in Wyoming: Known from 2 records in Wyoming, the most recent observed in 1996.

Population Abundance: Not known.

Range: Peripheral; in Wyoming known from the southeastern Wind River Range (Fremont County) and the northern Medicine Bow Range (Carbon County).

Trends: Not known.

Protection Status: None of the known occurrences are found on lands receiving special management attention. The population on Elk Mountain is on state lands within a large private land conservation easement on the Elk Mountain Ranch (easement being pursued by TNC's Wyoming Field Office).

Threats: Potentially threatened by destruction of habitat associated with logging activities and road construction. May also be threatened by development of springs or grazing.

Managed Areas: Known in Wyoming only from the Shoshone National Forest and state lands (incorrectly reported for Medicine Bow National Forest by Fertig [1997 a]).

Number of Occurrences on Shoshone NF: 1.

References: Clark *et al.* 1989; Cronquist *et al.* 1972; Dorn 1992; Wagner 1992; Wagner and Wagner 1993.

Botrychium minganense

Occurrences in Wyoming: Known from at least 4 locations in Wyoming. In the past, this species has been treated as a synonym of *B. lunaria* or as *B. lunaria* var. *onondagense* (Dorn 1992). Additional specimens may be present in herbaria outside of Wyoming, based on range maps in Wagner and Wagner (1993).

Population Abundance: Population size is not known, although confirmed sites are extremely small.

Range: Sparse; in Wyoming, known from the Bighorn and Absaroka ranges in Fremont, Johnson, Park, and Sheridan counties. Reported from western Wyoming in Wagner and Wagner (1993), but the exact location of these

populations is not provided.

Trends: Not known.

Protection Status: One occurrence is located within the potential Mann Creek Research Natural Area on Bighorn NF. A vague, unconfirmed record is also known from the Beartooth Butte area (possibly within the potential Beartooth Butte RNA on Shoshone NF). All other known populations occur on public lands managed for multiple use.

Threats: Not known. Small habitat size and numbers may make colonies vulnerable to disturbance.

Managed Areas: Occurs on lands managed by Bighorn and Shoshone National Forests.

Number of Occurrences on Shoshone NF: 2-3.

References: Fertig 1995 f; Lellinger 1985; Lesica and Shelly 1991; Wagner 1992; Wagner and Wagner 1993.

Botrychium virginianum

Occurrences in Wyoming: Known from 6-7 occurrences in Wyoming, 4 of which have been observed or discovered since 1982. Reported from Yellowstone National Park by Jennifer Whipple based on a specimen at the Denver Botanical Garden herbarium (confirmation is still needed).

Population Abundance: Most Wyoming populations are small in area and number of individuals.

Range: Peripheral in Wyoming. Known from the Black Hills (Crook Co.), Teton Range (Teton Co.), Bighorn Range (Sheridan Co.), and Clarks Fork Valley (Park Co). Also reported for Yellowstone National Park.

Trends: Trends are not known. Populations in the Black Hills may be vulnerable to habitat loss.

Protection Status: Known from the Swamp Lake Special Botanical Area (Shoshone National Forest). A population in the Black Hills occurs within the proposed Dugout Gulch Special Botanical Area. The Bighorn Range population is within the potential Mann Creek Research Natural Area (Bighorn NF).

Threats: May be threatened by forestry and road construction activities in the Black Hills and recreational development in the Tetons.

Managed Areas: Known occurrences in Wyoming are found on lands managed by Bighorn, Black Hills, Shoshone, and Targhee National Forests.

Number of Occurrences on Shoshone NF: 2.

References: Dorn 1992; Fertig and Jones 1992; Hitchcock *et al.* 1969; Lellinger 1985; Markow and Fertig 1993; Spackman *et al.* 1997; Wagner 1992; Wagner and Wagner 1993.

Braya humilis

Occurrences in Wyoming: Known from a single occurrence in Wyoming, discovered in 1996.

Population Abundance: Known from a single colony of ca 50 individuals in less than 1 acre of habitat. Additional habitat may occur in the vicinity.

Range: Disjunct; in Wyoming, known only from the NE Wind River Range (Fremont County).

Trends: Not known.

Protection Status: The single known occurrence is within the Fitzpatrick Wilderness Area and the Arrow Mountain potential Research Natural Area.

Threats: Threats low, although trampling could be a problem. Recreational use of this plant's habitat is low.

Managed Areas: All known occurrences are on Shoshone National Forest.

Number of Occurrences on Shoshone NF: 1.

References: Fertig 1996 b, 1997 b; Neely and Carpenter 1986; Rollins 1993; Spackman *et al.* 1997.

Carex concinna

Occurrences in Wyoming: 2 extant populations are known in Wyoming. One historical population is also known from Yellowstone National Park (last observed in 1885).

Population Abundance: Known populations typically contain fewer than 20 plants and cover small areas.

Range: Peripheral; known from the west slope of the Wind River Range (Sublette Co), Absaroka Range (Park Co.) and NE Yellowstone National Park.

Trends: Trend data are lacking. The Wind River population is suspected to be stable.

Protection Status: Populations are protected in the Swamp Lake Special Botanical Area, Bridger Wilderness, and Yellowstone National Park.

Threats: Trampling by humans and pack animals (as well as animal grazing) may be a threat to the Wind River Range population. Grazing by horses is a potential threat at Swamp Lake.

Managed Areas: Occurs on lands managed by Bridger-Teton and Shoshone National Forests and Yellowstone National Park.

Number of Occurrences on Shoshone NF: 1.

References: Dorn 1992; Fertig 1992 b; Fertig and Jones 1992; Hermann 1970; Hitchcock *et al.* 1969; Spackman *et al.* 1997.

Carex deweyana var. *bolanderi*

Occurrences in Wyoming: Known from 3 extant occurrences in Wyoming, all observed between 1976-1987. Also recently reported from the Grand Teton area (exact location not yet determined).

Population Abundance: Not known.

Range: Peripheral; in Wyoming confirmed only from the Salt River and Absaroka ranges in Lincoln and Park counties. May also occur in the Teton Range (Teton County).

Trends: Not known.

Protection Status: All known occurrences are on public lands managed for multiple use. One population is found within the proposed Swift Creek Research Natural Area on Bridger-Teton National Forest.

Threats: May be impacted by changes in wetland habitats.

Managed Areas: Occurs on lands managed by Bridger-Teton and Shoshone National Forests.

Number of Occurrences on Shoshone NF: 2.

References: Dorn 1992; Hermann 1970.

Carex diandra

Occurrences in Wyoming: Known from 7-9 recent records (all observed since 1985) and 2 older reports prior to 1963. Several occurrences are in the same general area (although isolated by unsuitable habitat), and perhaps should be considered subpopulations of one larger metapopulation.

Population Abundance: Individual populations are often locally abundant within small areas of suitable habitat.

Range: Peripheral. In Wyoming known from the Absaroka, Beartooth, and Medicine Bow ranges, Yellowstone Plateau, and Jackson Hole Valley in Albany, Park, and Teton counties and Yellowstone National Park.

Trends: Extant populations appear to be stable to partly declining (due to habitat loss).

Protection Status: 3 populations are protected in the Swamp Lake Special Botanical Area, Grand Teton NP, and Yellowstone NP.

Threats: May be threatened by trampling, grazing, and development of wetland habitats.

Managed Areas: Known from lands managed by Medicine Bow and Shoshone National Forests and Grand Teton and Yellowstone National Parks.

Number of Occurrences on Shoshone NF: 6.

References: Dorn 1992; Fertig 1997 b; Fertig and Jones 1992; Hermann 1970; Hitchcock *et al.* 1969; Mills and Fertig 1996 b.

Carex incurviformis var. *danaensis*

Occurrences in Wyoming: Known from 10 records in Wyoming, all of which have been observed or discovered since 1981.

Population Abundance: Population sizes not known for most occurrences.

Range: Peripheral; In Wyoming, known from the Absaroka and Wind River mountains in Fremont, Park, and Sublette counties.

Trends: Presumed to be stable, although hard census and trend data are lacking for all known occurrences.

Protection Status: At least 7 occurrences are found in designated Wilderness Areas (Bridger, Fitzpatrick, North Absaroka, and Washakie) and one is found in the proposed Osborn Mountain Research Natural Area. An additional population is reported from the Arrow Mountain potential RNA. All other populations are on public lands managed for multiple use. This species is listed as Sensitive in USFS Region 4.

Threats: Threats probably low in its remote alpine habitat.

Managed Areas: Known occurrences are found in Bridger-Teton and Shoshone National Forests.

Number of Occurrences on Shoshone NF: 9.

References: Dorn 1992; Evert 1982; Fertig and Jones 1994; Fertig *et al.* 1994; Hermann 1970; Mills and Fertig 1996 a; Scott 1997.

Carex leptalea

Occurrences in Wyoming: Known from at least 12 extant occurrences and 1 historical record in Wyoming, 8 of which have been observed since 1992.

Population Abundance: Census data are lacking for most occurrences. Recently observed colonies in the Beartooth Range consist of widely scattered, but densely clustered tussocks restricted to small areas.
Range: Peripheral; Known from the Absaroka, Beartooth, and Teton ranges, Yellowstone Plateau, and the Jackson Hole Valley in Park and Teton Counties and Yellowstone NP.
Trends: Extant populations appear to be stable at present, but long-term trends may be down due to loss or degradation of wetland forest habitats.
Protection Status: At least 9 occurrences are found in the Absaroka-Beartooth Wilderness Area, Swamp Lake Special Botanical Areas, and Grand Teton and Yellowstone National Parks. Several Grand Teton park records are old, however, and may not be extant. Also occurs in the potential Lake Creek Bogs RNA.
Threats: Populations may be threatened by logging, grazing, or recreational impacts on its wetland habitat.
Managed Areas: Occurs on lands managed by Shoshone and Targhee National Forests and Grand Teton and Yellowstone National Parks.
Number of Occurrences on Shoshone NF: 5.
References: Dorn 1992; Fertig 1997 b; Fertig and Jones 1992; Hermann 1970; Hitchcock *et al.* 1969; Rosenthal 1998; Spackman *et al.* 1997.

Carex limosa

Occurrences in Wyoming: Known from 10-11 occurrences in Wyoming, 9 of which have been observed since 1988.
Population Abundance: Populations may be locally abundant but are restricted to small areas of specialized habitat.
Range: Peripheral; known from the Bighorn, Absaroka, Wind River, Sierra Madre, and Beartooth ranges and Yellowstone Plateau in Big Horn, Carbon, Park, Sublette, and Teton counties and Yellowstone NP.
Trends: Extant populations appear to be stable at present, but the species may have declined in the last century due to loss or degradation of wetland habitats.
Protection Status: At least 5 occurrences are protected in the Absaroka-Beartooth and Bridger Wilderness Areas, Swamp Lake Special Botanical Area, and Yellowstone National Park. At least one population is found in the potential Lake Creek Bogs and Beartooth Butte RNAs.
Threats: May be threatened by degradation of wetland habitats due to trampling, grazing, or recreation activities.
Managed Areas: Found on lands managed by Bighorn, Bridger-Teton, Medicine Bow, Shoshone, and Targhee National Forests and Yellowstone National Park.
Number of Occurrences on Shoshone NF: 5.
References: Dorn 1992; Evert 1986; Fertig 1992 a, 1992 b, 1997 b; Fertig and Jones 1992; Mills and Fertig 1996 b; Rosenthal 1998.

Carex livida

Occurrences in Wyoming: Known from 5 extant occurrences in Wyoming, all of which have been discovered or relocated since 1991.
Population Abundance: Populations can be locally abundant, although suitable habitat is sometimes limited.
Range: Disjunct; in Wyoming, known only from the Yellowstone Plateau (Yellowstone NP) and the Absaroka Range (Park County).
Trends: Probably stable.
Protection Status: All known occurrences are protected within Yellowstone National Park and the Swamp Lake Special Botanical Area. This species is listed as Sensitive in USFS Region 2.
Threats: Some occurrences in Yellowstone NP could be impacted by road construction and expansion.
Managed Areas: Occurs on lands managed by Shoshone National Forest and Yellowstone National Park.
Number of Occurrences on Shoshone NF: 1.
References: Dorn 1992; Fertig 1995 c; Fertig and Jones 1992; Fertig *et al.* 1994; Mills and Fertig 1996 a; Moseley *et al.* 1991; Rosenthal 1998; Sanderson and March 1996; Spackman *et al.* 1997.

Carex luzulina var. *atropurpurea*:

Occurrences in Wyoming: Known from 10 occurrences in Wyoming, 6 of which have been discovered since 1990.
Population Abundance: Size of individual populations is unknown.
Range: Regional endemic of western Wyoming and Montana; in Wyoming known from the Wind River and Gros Ventre ranges in Fremont, Sublette, and Teton counties.
Trends: Not known.
Protection Status: All known occurrences are found in designated Wilderness areas (Bridger, Gros Ventre, and Popo Agie). This species is listed as Sensitive in USFS Region 4.

Threats: Potential threats include grazing (most likely by sheep) and habitat disturbance.

Managed Areas: Occurs on Bridger-Teton and Shoshone National Forests.

Number of Occurrences on Shoshone NF: 1.

References: Dorn 1988, 1992; Fertig 1992 a, 1992 b; Fertig *et al.* 1991, 1994; Hartman 1995; Heidel 1996; Mills and Fertig 1996 a; Scott 1997.

Carex microglochin

Occurrences in Wyoming: Known from 4 extant occurrences in Wyoming, all of which have been discovered since 1985.

Population Abundance: Populations may be locally abundant in limited areas of specialized habitat.

Range: Disjunct; in Wyoming known from the Absaroka and northern Wind River ranges and the Yellowstone Plateau in Fremont, Park, and Sublette counties and Yellowstone National Park.

Trends: Not known.

Protection Status: 3 occurrences are found in special management areas (Yellowstone National Park, Swamp Lake Special Botanical Area, and Fitzpatrick Wilderness Area). One additional population is in the potential Kendall Warm Springs Special Interest Area (Bridger-Teton NF).

Threats: May be impacted by changes in hydrology or heavy grazing.

Managed Areas: Occurs on lands managed by Bridger-Teton and Shoshone National Forests and Yellowstone National Park.

Number of Occurrences on Shoshone NF: 2.

References: Dorn 1992; Fertig 1995 e; Fertig and Jones 1992; Hermann 1970; Mills and Fertig 1996 b; Rosenthal 1998.

Carex misandra

Occurrences in Wyoming: Known from 3 occurrences in Wyoming, all of which have been observed since 1985.

Population Abundance: Not known.

Range: Peripheral; Known only from the Beartooth Plateau (Park Co.), northeast Wind River Range (Fremont Co.), and Bighorn Range (Johnson County).

Trends: Not known.

Protection Status: One occurrence is found in the Fitzpatrick Wilderness area. The Beartooth population is found just outside the boundaries of the proposed Line Creek/Twin Lakes RNA. The Bighorn Range occurrence is within the potential McLain Lakes Research Natural Area. (Welp *et al.* 1998).

Threats: May be vulnerable to high grazing pressure.

Managed Areas: Occurs on Shoshone and Bighorn National Forests.

Number of Occurrences on Shoshone NF: 2.

References: Dorn 1992; Fertig and Bynum 1994 a; Johnson 1962; Lesica and Shelly 1991; Scott 1997; Welp *et al.* 1998.

Carex nelsonii

Occurrences in Wyoming: Known from 7 occurrences in Wyoming, only 2 of which have been observed since 1984.

Population Abundance: Not known for most occurrences. Reported as "infrequent" at sites on the Beartooth Plateau.

Range: Regional endemic of Wyoming, Colorado, and Utah. In Wyoming, this species is known from the Medicine Bow, Sierra Madre, Beartooth, and Wind River ranges in Albany, Carbon, Fremont, and Park counties.

Trends: Trend data are lacking for known occurrences, but populations are assumed to be stable.

Protection Status: One occurrence is known from the Popo Agie Wilderness Area and one is in the proposed Line Creek/Twin Lakes Research Natural Area. All other known occurrences are found on public lands managed for multiple use.

Threats: May be threatened by sheep grazing or impacts from recreational activities.

Managed Areas: Known occurrences are from Medicine Bow and Shoshone National Forests.

Number of Occurrences on Shoshone NF: 2.

References: Dorn 1992; Fertig 1997 b; Fertig and Bynum 1994 a; Hermann 1970; Murray 1969.

Carex occidentalis

Occurrences in Wyoming: Known from 2 extant and 1 historical records in Wyoming (most recently observed in 1997).

Population Abundance: Not known.

Range: Peripheral; in Wyoming, known from the Absaroka, Laramie, and Medicine Bow mountains in Albany and Park counties. Also reported from Cedar Mountain in southern Sweetwater County, but this report is based on an immature specimen and is probably misidentified.

Trends: Not known.

Protection Status: All known populations are found on public lands managed for multiple use. An occurrence on Medicine Bow National Forest is within the potential Ground Moraine Research Natural Area.

Threats: Not known. May be potentially impacted by recreation and grazing.

Managed Areas: Occurs on lands managed Medicine Bow and Shoshone National Forest and the BLM Worland District.

Number of Occurrences on Shoshone NF: 1.

References: Dorn 1992; Hermann 1970; Rosenthal 1998.

Carex scirpoidea var. *scirpiformis*

Occurrences in Wyoming: Known from 2 occurrences in Wyoming, both observed since 1992.

Population Abundance: Census data are lacking, but known populations appear to be restricted to small areas (ca 5-10 acres or less) and specialized microhabitats.

Range: Peripheral; in Wyoming known only from Jackson Hole and the Clarks Fork Valley in Park and Teton counties.

Trends: Not known.

Protection Status: Both known occurrences are within special management areas: Swamp Lake Special Botanical Area and the National Elk Refuge.

Threats: May be impacted by changes in water levels in its wetland habitat.

Managed Areas: Occurs on lands managed by Shoshone National Forest and the National Elk Refuge (US Fish and Wildlife Service).

Number of Occurrences on Shoshone NF: 1.

References: Dorn 1992; Fertig 1998 b; Fertig and Jones 1992; Hermann 1970.

Castilleja crista-galli

Occurrences in Wyoming: Known from 19 extant occurrences and 2 historical populations in Wyoming.

Population Abundance: Population census data are lacking, but this species is thought to be locally common within its small range.

Range: Regional endemic of NW Wyoming and adjacent Montana. In Wyoming, it is known from the Absaroka and Beartooth mountains of Park County and Yellowstone National Park.

Trends: Trend data are lacking, but most populations are thought to be stable.

Protection Needs: At least 8 occurrences are found within Yellowstone NP and designated Wilderness Areas (North Absaroka and Washakie). Two other populations are within potential research natural areas on Shoshone National Forest (Beartooth Butte and Sheep Mesa).

Threats: Threats are thought to be low.

Managed Areas: Known occurrences are found within Shoshone National Forest, Yellowstone NP, and on lands managed by the BLM Worland District.

Number of Occurrences on Shoshone NF: 17.

References: Dorn 1992; Hitchcock *et al.* 1959; Rosenthal 1998.

Crassula aquatica [*Tillaea aquatica*]

Occurrences in Wyoming: Known from 2 occurrences in Wyoming, only 1 of which has been observed since 1960.

Population Abundance: Unknown, but occurrences are suspected to be small in area.

Range: Peripheral; known from the east slope of the Wind River Range (Fremont County) and the Yellowstone Plateau (Yellowstone NP).

Trends: Not known.

Protection Status: Known from Yellowstone National Park and a vague record that is probably in the Fitzpatrick Wilderness Area.

Threats: Not known.

Managed Areas: Occurs on lands managed by Shoshone NF and Yellowstone NP.

Number of Occurrences on Shoshone NF: 1.

References: Cronquist *et al.* 1997; Dorn 1992.

Cryptogramma stelleri

Occurrences in Wyoming: Known from 6 occurrences in Wyoming, 3 of which have been located since 1990.

Population Abundance: Little census data are available, but this species appears to be extremely uncommon and restricted to small microsites within a specialized habitat (ledges with thin mossy soil in shady limestone cliffs near water).

Range: Disjunct; in Wyoming, known from the Wind River, Teton, Wyoming, and Bighorn ranges and Yellowstone Plateau (Fremont, Sheridan, and Teton counties and Yellowstone NP).

Trends: Not known.

Protection Status: The only protected occurrence in the state is in Yellowstone National Park. One occurrence is located within the potential Mann Creek Research Natural Area on Bighorn National Forest (Jones and Fertig 1998). All other populations are on public lands managed for multiple use.

Threats: May be threatened by logging activity or road construction in its habitat.

Managed Areas: Occurs on Bighorn, Bridger-Teton, Shoshone, and Targhee National Forests and Yellowstone NP.

Number of Occurrences on Shoshone NF: 1.

References: Cronquist *et al.* 1972; Dorn 1992; Hartman *et al.* 1991; Hitchcock *et al.* 1969; Jones and Fertig 1998; Lellinger 1985; Markow and Fertig 1993.

Cymopterus evertii

Occurrences in Wyoming: Known from 17 occurrences in Wyoming. At least 6 element occurrences formerly recognized by WYNDD have been combined in the past few years due to their close proximity to other known populations.

Population Abundance: Populations number in tens of thousands of individuals (Marriott 1988).

Range: Regional endemic of NW Wyoming and NE Utah (although the Utah populations show some differences, according to Welsh *et al.* 1993). In Wyoming, it is known from the Absaroka and Owl Creek mountains and the western rim of the Bighorn Basin in Hot Springs and Park counties.

Trends: Appears to be stable, although trend data are lacking for nearly all populations.

Protection Status: At least 6 occurrences are in the Washakie Wilderness Area and 2 are within the BLM Carter Mountain ACEC.

Threats: Threats appear low due to the unstable slopes often inhabited by this species.

Managed Areas: Found on lands managed by Shoshone National Forest and the BLM Worland District.

Number of Occurrences on Shoshone NF: 11.

References: Cronquist *et al.* 1997; Dorn 1992; Fertig 1992 c; Hartman and Kirkpatrick 1986; Jones 1991 b; Marriott 1988; Mills and Fertig 1996 a; Rosenthal 1988; Scott 1997; Welsh *et al.* 1993.

Deschampsia danthonioides

Occurrences in Wyoming: Known from 2 extant and 1 historical records in Wyoming. An additional recent report still needs to be confirmed.

Population Abundance: Not known.

Range: Peripheral; in Wyoming, known from the Absaroka Range in Park County and Yellowstone National Park. A report from the Nature Conservancy's Sweetwater Preserve (Fremont County) still needs to be confirmed.

Trends: Not known.

Protection Status: The two extant occurrences are in the Washakie Wilderness Area and Yellowstone National Park. An unconfirmed report comes from TNC's Sweetwater Preserve.

Threats: Not known.

Managed Areas: Occurs in Shoshone National Forest and Yellowstone National Park.

Number of Occurrences on Shoshone NF: 2.

References: Dorn 1992; Hallsten *et al.* 1987.

Descurainia torulosa

Occurrences in Wyoming: Known from 8-11 occurrences in Wyoming, several of which are in the same general area and might be better treated as metapopulations rather than individual occurrences. One population at Carter Mountain (Park County) may not represent this species (Dorn 1989 a). Rollins (1993) recognizes only the type population (Brooks Lake, Fremont County) as authentic.

Population Abundance: The total population of this species probably numbers less than 1500 (Marriott 1991 b, 1992 b, Fertig 1997 b). Most populations average less than 40 individuals and may be restricted to a single ledge.

Numbers may vary from year to year (Dorn 1989 a).

Range: State Endemic; known from the southern Absaroka Range (Fremont, Park, and Teton counties) and Rock Springs Uplift (Sweetwater County).

Trends: Generally considered to have fluctuating population sizes, although overall the species is probably stable. Recent follow-up surveys in the BLM Rock Springs District suggest at least a severe short-term decline (B. Amidon, personal communication).

Protection Status: Two populations on Shoshone National Forest are in the North Absaroka and Washakie Wilderness Areas. A taxonomically questionable population is found in the BLM's Carter Mountain ACEC. Two other populations on BLM lands in Sweetwater County are within Special Status Plant ACECs. All other populations are on National Forest lands managed for multiple use. *D. torulosa* was formerly a C2 candidate for listing under the Endangered Species Act. It is listed as Sensitive by US Forest Service Regions 2 and 4 and is managed as a "Special Status" plant species by the BLM Rock Springs District.

Threats: Anthropogenic threats are minimal due to the plant's rugged habitat.

Managed Areas: Occurs on lands managed by Bridger-Teton National Forest (Buffalo RD), Shoshone NF (Wapiti and Wind River RDs), and the BLM Rock Springs District (Green River RA). Reports from the BLM Worland District (Cody RA), are based on a questionable specimen.

Number of Occurrences on Shoshone NF: 5.

Comments: Bricker and Brown (1998) assessed the genetic structure of populations of this and related species of *Descurainia* and concluded that *D. torulosa* should be recognized as a variety of the more widespread *D. incana*.

References: Bricker and Brown 1998; Clark *et al.* 1989; Dorn 1989 a, 1992; Fertig 1992 a, 1992 c, 1995 c, 1997 b; Fertig *et al.* 1994, 1998; Marriott 1988, 1991 b, 1992 b; Mills and Fertig 1996 a; Rollins 1983, 1993; Rosenthal 1998; Scott 1997; USDA Forest Service 1989, 1991.

Draba borealis

Occurrences in Wyoming: Known from 12 extant and 2 historical records in Wyoming, 9 of which have been discovered or relocated since 1991.

Population Abundance: Populations typically number 100-1000 individuals (Fertig and Marriott 1993). The total population is probably less than 5000 plants.

Range: Disjunct; in Wyoming, known from the Gros Ventre, Wind River, Salt River, Wyoming, and Absaroka ranges, Jackson Hole, and the Yellowstone Plateau (Lincoln, Park, Sublette and Teton counties and Yellowstone NP).

Trends: Not known, but probably stable.

Protection Status: Five occurrences are in special management areas: Grand Teton and Yellowstone National Parks, and Bridger, Gros Ventre, and Washakie Wilderness Areas. At least 2 populations are also found in the proposed Swift Creek and Gros Ventre (Horse Creek) Research Natural Areas on Bridger-Teton NF. This species is listed as Sensitive by Bridger-Teton National Forest.

Threats: Threats low for most populations due to rugged cliff habitat. Plants in more accessible wetland sites are potentially threatened by grazing or loss of habitat to development.

Managed Areas: Occurs in Bridger-Teton and Shoshone National Forests and Grand Teton and Yellowstone National Parks.

Number of Occurrences on Shoshone NF: 1.

References: Fertig 1992 a, 1992 b; Fertig and Marriott 1993; Fertig *et al.* 1991, 1994; Hartman 1995; Hartman *et al.* 1991; Hulten 1968; Marriott 1991 c, 1992 c; Mills and Fertig 1996 a; Spackman *et al.* 1997; USDA Forest Service 1989, 1991; Welsh 1974.

Draba crassa

Occurrences in Wyoming: Known from 13 occurrences in Wyoming, 9 of which have been documented since 1988.

Population Abundance: Populations may be locally abundant, although often restricted to suitable microhabitats.

Range: Regional endemic of the central Rocky Mountains from southern Montana to Colorado and the Uinta Mountains of Utah. In Wyoming, known from the Absaroka, Teton, and Wind River ranges in Fremont, Park, Sublette, and Teton counties.

Trends: Assumed to be stable.

Protection Status: Most occurrences are in designated wilderness areas (Bridger, Gros Ventre, North Absaroka, and Washakie) or Grand Teton National Park.

Threats: Threats low due to rugged habitat.

Managed Areas: Found on lands managed by Bridger-Teton and Shoshone National Forests and Grand Teton National Park.

Number of Occurrences on Shoshone NF: 4.

References: Dorn 1992; Fertig 1992 a, 1992 b; Fertig *et al.* 1991; Hartman 1995; Hitchcock and Cronquist 1964; Rollins 1993; Scott 1997.

Draba fladnizensis var. *pattersonii*

Occurrences in Wyoming: Known from 6-7 occurrences. Four of these have been discovered or revisited since 1983.

Population Abundance: Census data are lacking for all occurrences, but populations are thought to be small.

Range: Regional endemic found in the Absaroka, Beartooth, and Bighorn ranges Park and Johnson counties. Also reported for the Medicine Bow and Teton ranges in Albany and Teton counties.

Trends: Not known.

Protection Status: At least 3 populations occur in the North Absaroka and Cloud Peak Wilderness Areas and another is in the Line Creek/Twin Lakes proposed Research Natural Area. This species may also occur in Grand Teton National Park.

Threats: Threats low due to inaccessible habitat.

Managed Areas: Found on lands managed by Shoshone and Bighorn National Forests. Also reported for the Medicine Bow National Forest and Grand Teton National Park.

Number of Occurrences on Shoshone NF: 3

References: Dorn 1992; Fertig 1992 a; Fertig and Bynum 1994 a; Fertig *et al.* 1991; Lesica and Shelly 1991; Nelson 1984; Rollins 1993; Scott 1997.

Draba glabella

Occurrences in Wyoming: Known from only one occurrence discovered in 1959.

Population Abundance: Census data are lacking, but the population was described as “widely scattered” (Johnson 1962).

Range: Disjunct; in Wyoming, known only from the Beartooth Range.

Trends: Unknown.

Protection Status: This population may occur within the proposed boundaries of the Line Creek/Twin Lakes Research Natural Area. Its exact location is ambiguous.

Threats: Only one occurrence is reported for the state, and it has not been relocated since its discovery in 1959. The population was observed on sheep trails on steep northwest slopes in alpine tundra, which suggests the site is on fragile vegetation, possibly impacted by livestock.

Managed Areas: Occurs on Shoshone NF.

Number of Occurrences on Shoshone NF: 1.

References: Dorn 1992; Fertig and Bynum 1994 a; Johnson 1962; Rollins 1993; Scott 1997.

Draba globosa

Occurrences in Wyoming: Known from 17 occurrences in Wyoming, at least 9 of which have been documented since 1990.

Population Abundance: Few populations have been surveyed, but those which have are often very small and highly restricted to specialized habitats.

Range: Regional endemic of N Utah, W Wyoming, C Idaho, SW Montana, and C Colorado. In Wyoming, known from the Absaroka, Teton, Wind River, Beartooth, Medicine Bow, Gros Ventre, and Salt River ranges in Albany, Fremont, Lincoln, Park, Sublette, and Teton counties.

Trends: Trend data are lacking for most sites, although populations are assumed to be stable due to low threats.

Protection Status: At least 13 occurrences are found in designated Wilderness Areas (Bridger, North Absaroka, Gros Ventre, Absaroka-Beartooth, and Popo Agie) and in Grand Teton National Park. One occurrence is in the proposed Osborn Mountain RNA (Bridger-Teton NF) and one other is in the potential Beartooth Butte RNA (Shoshone NF). All other populations are on public lands managed for multiple use. This species is listed as Sensitive in USFS Region 4, although it was recommended for de-listing by Stone (1995).

Threats: Protected from most human threats by its inaccessible habitat. Past impacts from sheep grazing at high elevations are poorly known.

Managed Areas: Found in Bridger-Teton, Medicine Bow, and Shoshone NFs and Grand Teton NP.

Number of Occurrences on Shoshone NF: 4.

References: Dorn 1992; Fertig 1992 a, 1992 b, 1997 b; Fertig *et al.* 1991, 1994; Hartman 1995; Hartman and Nelson

1993; Hitchcock 1941; Hitchcock and Cronquist 1964; Lesica and Shelly 1991; Markow 1996; Mills and Fertig 1996 a; Rollins 1953, 1993; Scott 1997; Spackman *et al.* 1997; Stone 1995.

Draba paysonii var. *paysonii*

Occurrences in Wyoming: Known from 6 extant populations in Wyoming, all of which have been observed or discovered since 1978 (4 have been observed since 1993). Also known from 2 vague historical reports, one of which may be from a known, extant, occurrence.

Population Abundance: Known colonies are very small (numbering in the low 100s) and restricted to specialized microsites.

Range: Regional endemic of Montana and NW Wyoming (although also reported for Alberta by Mulligan). In Wyoming, known only from the Beartooth, Absaroka, Wyoming, and Wind River ranges in Fremont, Lincoln, Park, and Sublette counties.

Trends: Presumed to be stable due to lack of threats and rugged habitat.

Protection Status: All or parts of 4 populations occur within wilderness areas (Absaroka-Beartooth, Bridger, and Fitzpatrick). Two populations are within areas being considered for RNA status (Beartooth Butte and Osborn Mountain).

Threats: Not known, but assumed to be minor due to the plants rugged and poorly accessible habitat.

Managed Areas: Occurs on lands managed by Bridger-Teton and Shoshone National Forests.

Number of Occurrences on Shoshone NF: 4.

References: Dorn 1992; Fertig 1992 b, 1997 b; Rollins 1993; Rosenthal 1998; Scott 1997.

Draba paysonii var. *treleasii*

Occurrences in Wyoming: Known from 4 extant records and 2 historical reports in Wyoming.

Population Abundance: Not known.

Range: Peripheral; in Wyoming known from the Absaroka Range in Park County and Yellowstone National Park.

Trends: Not known.

Protection Status: At least 2 occurrences are protected within the Washakie and North Absaroka Wilderness Areas and one historical record is known from Yellowstone National Park. One population is also found in the proposed Line Creek/Twin Lakes RNA. All other populations are on public lands managed for multiple use.

Threats: Threats probably very low due to rugged habitat.

Managed Areas: Occurs on lands managed by Shoshone National Forest and Yellowstone National Park.

Number of Occurrences on Shoshone NF: 5.

References: Dorn 1992; Hitchcock 1941; Rollins 1993.

Draba pectinipila

Occurrences in Wyoming: Known from only one occurrence in the world, most recently surveyed in 1996.

Population Abundance: Abundance estimated at 60 plants by Dorn and Dorn (1980). Population found to be more widespread in 1996 survey by Fertig and Mellmann-Brown, who estimated the population size to be 500-750 plants in 10 acres of habitat in 3 main locations (Fertig 1997 b).

Range: State Endemic; restricted to the Clay Butte area of the Beartooth Range in Park County, WY.

Trends: Trends poorly known, but thought to be stable at present. More plants are known today than in the recent past, but this may be due to better sampling. Long-term data are lacking.

Protection Status: This species is found in the Absaroka/Beartooth Wilderness Area and the potential Beartooth Butte Research Natural Area. This species was formerly a C2 candidate for listing under the Endangered Species Act and was formerly designated Sensitive in USFS Region 2.

Threats: Not threatened by normal livestock grazing (Dorn and Dorn 1980). Low population size and small range make it vulnerable to human disturbance and chance natural events.

Managed Areas: Entire range is within Shoshone National Forest.

Number of Occurrences on Shoshone NF: 1.

Comments: Rollins (1993) has reduced this taxon to a synonym of *D. oligosperma*, citing pollen fertility studies by Mulligan and Findlay (1970) that suggest that the *D. oligosperma* complex is agamosperous, with segregate taxa simply representing asexual lines. No pollen fertility studies have been conducted on *D. pectinipila* to confirm if it truly is agamosperous.

References: Clark *et al.* 1989; Dorn 1978, 1992; Dorn and Dorn 1980; Evert 1986; Fertig 1995 c, 1997 b; Fertig *et al.* 1994; Lichvar 1983; Mills and Fertig 1996 a, 1996 b; Mulligan and Findlay 1970; Rollins 1953, 1993; Scott 1997.

Draba porsildii var. *brevicula*

Occurrences in Wyoming: Known from a single occurrence in Wyoming.
Population Abundance: Population estimated at 50 plants in late 1970s. Population estimated in the low thousands in 5 main locations occupying ca 10 acres in survey by Fertig and Mellmann-Brown in 1996 (Fertig 1997 b).
Range: Regional endemic of NW Wyoming and S Montana. In Wyoming, known only from the Beartooth Mountains along the Montana border (Park County).
Trends: Trends are assumed to be stable to slightly increasing (although observed increases may be due to better sampling efficiency in recent years).
Protection Status: The single Wyoming occurrence is within the Absaroka/Beartooth Wilderness Area and the potential Beartooth Butte Research Natural Area.
Threats: Threats minimal due to rugged habitat.
Managed Areas: Known only from Shoshone National Forest.
Number of Occurrences on Shoshone NF: 1.
Comments: Formerly known as *D. nivalis* var. *brevicaule*.
References: Clark and Dorn 1979; Dorn 1992; Dorn and Dorn 1980; Evert 1986; Fertig 1997 b; Mills and Fertig 1996 a, 1996 b; Rollins 1953, 1993; Scott 1997.

Draba porsildii var. *porsildii*

Occurrences in Wyoming: Known from 5 occurrences in Wyoming, three of which have been discovered or revisited since 1983. Formerly reported from several additional sites, but these records have proven to be misidentified.
Population Abundance: Not known.
Range: Peripheral; in Wyoming, known from the Absaroka Range in Park County and the northwestern Wind River and Gros Ventre Mountains in Sublette County.
Trends: Unknown.
Protection Status: Two occurrences may be protected on the Shoshone National Forest. One population occurs in the potential Pat O'Hara Mountain Research Natural Area and may extend into the North Absaroka Wilderness. Another is found in or near the Washakie Wilderness. Two populations are protected within the Bridger-Teton National Forest, one in the Osborn Mountain Research Natural Area and another in the Gros Ventre Wilderness.
Threats: Sites are relatively inaccessible, so threats are probably low.
Managed Areas: Occurs on the Shoshone and Bridger-Teton National Forests
Number of Occurrences on Shoshone NF: 2
References: Dorn 1992; Mills and Fertig 1996 a; Rollins 1993; Scott 1997.

Drosera anglica

Occurrences in Wyoming: Known from 7 extant occurrences in Wyoming, 5 of which have been discovered or relocated since 1991.
Population Abundance: Populations are often reported to be locally abundant, at least within small areas of suitable habitat. Densities as high as 15-19 plants per square foot have been observed in favorable sites.
Range: Peripheral; in Wyoming known from the Yellowstone Plateau (Yellowstone NP), Jackson Hole valley (Teton County), and Beartooth Mountains (Park County).
Trends: Presumed to be stable, although trend data are not available. Some areas of suitable habitat have probably been lost in the past century.
Protection Status: At least 6 of the 7 known occurrences in Wyoming are within Grand Teton and Yellowstone National Parks, the JDR Parkway, or the Absaroka-Beartooth Wilderness Area. At least one colony is found within the potential Lake Creek Bogs Research Natural Area.
Threats: The floating mat habitat of this species is extremely sensitive to trampling by people or livestock. Overcollection of this carnivorous plant for cultivation could be a potential problem.
Managed Areas: Known occurrences in Wyoming are found in Grand Teton and Yellowstone National Parks, the John D. Rockefeller Parkway, and Shoshone National Forest.
Number of Occurrences on Shoshone NF: 2.
References: Clark and Dorn 1979; Dorn 1992; Fertig 1997 b; Lesica and Shelly 1991; Marriott 1991 c; Mills and Fertig 1996 b; Schnell 1995.

Dryopteris expansa

Occurrences in Wyoming: Known from 3 occurrences in Wyoming, the most recent observed in 1997.

Population Abundance: Populations typically reported as "rare". One colony in Yellowstone National Park had fewer than 100 plants in 1997.

Range: Peripheral; in Wyoming, known from the Yellowstone Plateau, and Absaroka and Teton ranges in Park and Teton counties.

Trends: Not known.

Protection Status: All known occurrences are found in protected areas (North Absaroka Wilderness and Yellowstone and Grand Teton National Parks).

Threats: Not known.

Managed Areas: Occurs on Shoshone National Forest and Grand Teton and Yellowstone National Parks.

Number of Occurrences on Shoshone NF: 1.

References: Dorn 1992; Lellinger 1985.

Epilobium palustre var. *palustre*

Occurrences in Wyoming: Known from 9 extant occurrences in Wyoming (dating since 1964). Five of these have been discovered or relocated since 1994. Three additional historical populations are known from 1899-1925.

Population Abundance: Some populations may be very small, numbering from 10-50 plants and restricted to small areas of suitable habitat. Most populations have not been adequately censused.

Range: Sparse; in Wyoming, known from the Laramie Range (Albany Co.), Sweetwater River Valley (Fremont Co.), Wind River Range (Sublette Co.), Absaroka and Beartooth ranges (Park Co.) and the Yellowstone Plateau (Yellowstone NP). Dorn (1992) reports var. *palustre* from Laramie County, but all specimens from the county appear to be var. *gracile*.

Trends: Unknown. This species may be a glacial relict that is slowly declining as bog-like habitats are replaced by succession.

Protection Status: 2 occurrences are protected within the Swamp Lake Special Botanical Area and the proposed Kendall Warm Springs Special Interest Area. At least 4 occurrences are found within the Absaroka-Beartooth Wilderness Area or Yellowstone National Park. A population may also occur within the potential Lake Creek Bogs RNA on Shoshone National Forest.

Threats: Primarily threatened by disturbances to its wetland habitat from grazing, trampling, or recreational activity.

Managed Areas: Known occurrences are on lands managed by Bridger-Teton NF (Pinedale RD), Shoshone NF (Clarks Fork RD), Medicine Bow NF (Laramie RD), Yellowstone NP, and the BLM Rawlins District.

Number of Occurrences on Shoshone NF: 4.

Comments: Many populations of var. *palustre* in northwest Wyoming have moderately pubescent leaves and intergrade with var. *gracile* (synonym = *Epilobium leptophyllum*). These two varieties may not be worthy of taxonomic recognition where their ranges overlap broadly in Wyoming. Recent surveys suggest that this species may be more widespread in the state than originally suspected (Fertig 1998 b).

References: Cronquist *et al.* 1997; Dorn 1992; Fertig 1995e, 1997 b, 1998 b; Moseley *et al.* 1991; Welp 1997.

Equisetum fluviatile

Occurrences in Wyoming: Known from 2 extant occurrences in Wyoming, most recently observed in 1996. One historical record (1899) from Jackson Lake may be extirpated.

Population Abundance: Found to be locally abundant at one recently discovered site in Park County, but restricted to less than 5 acres of habitat. Yellowstone National Park population is also small according to Dorn.

Range: Disjunct; extant populations are known from the Yellowstone Plateau (Yellowstone NP) and Beartooth Mountains (Park County). An historical population is also known from Jackson Hole (Teton County).

Trends: Not known.

Protection Needs: All known Wyoming occurrences are found within areas receiving some form of land protection. Two populations are in National Parks and the third is within the Absaroka-Beartooth Wilderness Area on Shoshone National Forest. This latter population may be within the potential Lake Creek Bogs RNA.

Threats: One population is thought to be extirpated due to dam construction on Jackson Lake.

Managed Areas: Known Wyoming populations are found in Yellowstone and Grand Teton National Parks and Shoshone National Forest (Clarks Fork RD).

Number of Occurrences on Shoshone NF: 1.

References: Dorn 1992; Dorn and Dorn 1972; Fertig 1997 b; Hitchcock *et al.* 1969; Lellinger 1985.

Erigeron humilis

Occurrences in Wyoming: Known from 9 records in Wyoming, 8 of which are recent and presumed extant (the oldest

known record dates from 1955). Three sites have been located since 1990.
Population Abundance: Known populations are small in number and occupied area. Surveys in 1996 in the Beartooth Mountains reported colonies of 10-25 plants.
Range: Peripheral; in Wyoming known from the Wind River, Beartooth, Bighorn, Gros Ventre, and Absaroka ranges in Big Horn, Park, and Sublette counties.
Trends: Presumed to be stable at present, although no trend data are available.
Protection Status: 8 of the 9 known occurrences are protected within designated wilderness areas (Bridger, Gros Ventre, Absaroka-Beartooth, North Absaroka, Cloud Peak, and Washakie).
Threats: Not known, but presumed to be low.
Managed Areas: Known from the Bighorn, Bridger-Teton, and Shoshone National Forests.
Number of Occurrences on Shoshone NF: 6.
References: Dorn 1992; Evert 1986; Fertig 1997 b; Mills and Fertig 1996 b; Moseley 1989; Scott 1997.

Erigeron radicans

Occurrences in Wyoming: Known from 8 occurrences in the state, 6 of which have been discovered or relocated since 1992.
Population Abundance: May be locally common within small patches of suitable habitat
Range: Disjunct; in Wyoming, known from the Wind River, Gros Ventre, Beartooth, and Absaroka ranges in Fremont, Park, and Sublette counties.
Trends: Most populations are presumed to be stable at present.
Protection Status: Six populations are found in designated wilderness areas (Absaroka-Beartooth, Bridger, Fitzpatrick, Gros Ventre, and North Absaroka). Populations also occur in the proposed Osborn Mountain RNA and the potential Arrow Mountain and Beartooth Butte RNAs. This species was formerly listed as Sensitive in US Forest Service Region 4.
Threats: Presumed low due to the plant's rugged, alpine habitat.
Managed Areas: Occurs in Bridger-Teton and Shoshone National Forests.
Number of Occurrences on Shoshone NF: 4.
References: Cronquist 1955; Dorn 1992; Fertig 1992 a, 1992 b, 1997 b; Fertig et al. 1991; Mills and Fertig 1996 a, 1996 b; Moseley 1989; Scott 1997; USDA Forest Service 1989.

Eriophorum callitrix

Occurrences in Wyoming: Known from 5 occurrences in Wyoming, 3 of which have been discovered or relocated since 1991 (the other two were located between 1959-1965).
Population Abundance: Census data are lacking for nearly all populations. Based on observations of the Beartooth Plateau occurrence in 1996, individual colonies may number in the low thousands and be locally abundant.
Range: Peripheral; in Wyoming, known from the Beartooth and Wind River ranges in Fremont and Park counties.
Trends: Trend data are lacking, but populations are assumed to be stable (at least at present).
Protection Status: 3 occurrences are protected within designated wilderness areas (Fitzpatrick and Popo Agie wilderness areas). One population may occur in the proposed Line Creek/Twin Lakes RNA.
Threats: Individual colonies may be impacted by grazing, trampling, and recreational activity.
Managed Areas: All known occurrences in the state are on Shoshone National Forest.
Number of Occurrences on Shoshone NF: 5.
References: Dorn 1992; Fertig 1997 b; Fertig and Bynum 1994 a; Johnson 1962; Mills and Fertig 1996 a; Scott 1997.

Eriophorum chamissonis

Occurrences in Wyoming: Known from 6 extant occurrences and 4 historical records in Wyoming.
Population Abundance: Population size not known. Reported as "rare and scarce" at one location in the southeast Absarokas.
Range: Peripheral; In Wyoming, known from the Yellowstone Plateau, Absaroka Range, and Bighorn Range in Park and Sheridan counties.
Trends: Not known, but at least 4 historical sites have not been relocated in recent years, suggesting a possible downward trend.
Protection Status: At least 7 occurrences (4 of which are historical) occur in Yellowstone National Park. Other populations are found on public lands managed for multiple use.
Threats: May be sensitive to degradation of wetland habitats.
Managed Areas: Occurs on lands managed by Bighorn and Shoshone National Forests and Yellowstone National Park.

Number of Occurrences on Shoshone NF: 2.
References: Dorn 1992; Raymond 1954.

Eriophorum gracile

Occurrences in Wyoming: Known from 4-5 extant and 1 historical records in Wyoming. All of the extant populations have been located since 1991.

Population Abundance: The known populations in Wyoming range from 30 to nearly 1000 stems in a total area of ca 12 acres (Marriott 1991 c; Mills and Fertig 1996 b; Fertig 1997 b).

Range: Peripheral; in Wyoming, known only from the Beartooth Range (Park Co.) and Jackson Hole (Grand Teton NP).

Trends: Trend data are lacking. Populations may be relatively stable at present, although they may be in decline in the past century due to loss or degradation of its wetland habitat.

Protection Status: 2-3 populations are protected in national parks and wilderness areas (Grand Teton NP and the Absaroka-Beartooth Wilderness Area). One occurrence is located within the potential Lake Creek Bogs Research Natural Area. All other populations are on public lands managed for multiple use.

Threats: May be threatened by livestock grazing, trampling, and recreational use of its habitat.

Managed Areas: Found on lands managed by Grand Teton National Park and Shoshone National Forest. May also occur on Targhee and Bridger-Teton National Forests.

Number of Occurrences on Shoshone NF: 3.

References: Dorn 1992; Fertig 1997 b; Hitchcock *et al.* 1969; Marriott 1991 c; Mills and Fertig 1996 b; Sanderson and March 1996; Spackman *et al.* 1997.

Eriophorum scheuchzeri

Occurrences in Wyoming: Known from 2 occurrences in Wyoming, the most recent of which was observed in 1997.

Population Abundance: Not known, but presumed to be low.

Range: Disjunct; known only from the Wind River Range in Fremont and Sublette counties.

Trends: Not known.

Protection Status: Both known occurrences are found in the Bridger and Fitzpatrick wilderness areas.

Threats: Poorly known.

Managed Areas: Found in Bridger-Teton NF (Pinedale RD) and Shoshone NF (Wind River RD).

Number of Occurrences on Shoshone NF: 1.

References: Dorn 1992; Fertig 1992 a; Rosenthal 1998; Scott 1997.

Eriophorum viridicarinatum

Occurrences in Wyoming: Known from 4 occurrences in Wyoming, 2 of which have been discovered or relocated since 1992.

Population Abundance: Populations may be locally abundant, but are typically limited to small microsites.

Range: Peripheral; in Wyoming known only from the Yellowstone Plateau, Teton Range, Jackson Hole, and Clarks Fork Valley in Park and Teton counties and Yellowstone NP.

Trends: Not known.

Protection Status: Four populations are protected in the Swamp Lake Special Botanical Area, Grand Teton and Yellowstone National Parks, and the National Elk Refuge.

Threats: Threatened primarily by changes in water availability (flooding or draining of its wetland habitat).

Managed Areas: Occurs on lands managed by Shoshone National Forest, Grand Teton and Yellowstone NPs and the National Elk Refuge.

Occurrences on Shoshone NF: 1.

References: Dorn 1992; Fertig 1998 b; Fertig and Jones 1992; Hitchcock *et al.* 1969; Lesica and Shelly 1991; Moseley *et al.* 1991; Rosenthal 1998.

Eritrichium howardii

Occurrences in Wyoming: Known from 6 extant occurrences and one vague, unmappable historical record. Three occurrences have been discovered or relocated since 1989.

Population Abundance: Not known. Most populations appear to be small and restricted to specialized microsites.

Range: Regional endemic of N Wyoming, Montana, and Idaho. In Wyoming, known from the eastern Absaroka and Bighorn Ranges and Heart Mountain area of the Bighorn Basin in Johnson, Park, and Sheridan counties.

Trends: Not known.

Protection Status: Two populations are found within proposed or potential Research Natural Areas on Bald Ridge (Shoshone NF) and Mann Creek (Bighorn NF). All other known occurrences are on public lands managed for multiple use.

Threats: Not known, but small population size and specialized habitat requirements may make this species vulnerable to large scale disturbances.

Managed Areas: Known populations are found on lands managed by Bighorn and Shoshone National Forests and the BLM Casper and Worland districts.

Number of Occurrences on Shoshone NF: 2.

References: Dorn 1992; Fertig 1997 b; Fertig and Bynum 1994 a; Hitchcock *et al.* 1959; Jones 1991 a; Jones and Fertig 1998.

Festuca hallii

Occurrences in Wyoming: Known from 8 confirmed records in Wyoming and one vague, historical record. Four populations have been discovered or relocated since 1994.

Population Abundance: Surveyed occurrences contain 500-1000 plants. Most populations, however, have not been censused. Populations may be restricted to specialized habitats.

Range: Peripheral; in Wyoming, known from the Medicine Bow and eastern Absaroka ranges (Albany and Park counties). A single historical record is known from the east slope of the Bighorn Range (Johnson County).

Trends: This species may be a decreaser under heavy grazing, although observations in 1995 suggest that it is not a preferred forage species for livestock (Fertig 1995 c; Mills and Fertig 1996 b).

Protection Status: Two occurrences are within the North Absaroka Wilderness Area. Populations also occur in the potential Pat O'Hara Mountain RNA and just outside the proposed Bald Ridge RNA. An occurrence is also present in the Cinnabar Park Special Management Area on Medicine Bow National Forest. All other populations are on state or public lands managed for multiple use. This species is listed as Sensitive in US Forest Service Region 2.

Threats: May be threatened by grazing, competition from exotics, and habitat disturbance.

Managed Areas: Found on lands managed by Shoshone and Medicine Bow National Forests and the BLM Worland District. An historical record may be from Bighorn National Forest.

Number of Occurrences on Shoshone NF: 4.

References: Dorn 1992; Fertig 1995 c, 1997 b; Fertig *et al.* 1994; Harms 1985; Mills and Fertig 1996 a, 1996 b; Pavlick and Looman 1984; Spackman *et al.* 1997; Tweit and Houston 1980.

Gayophytum humile

Occurrences in Wyoming: Known from 5 extant occurrences and 1 historical record (last observed in 1899). The extant populations have all been located since 1989.

Population Abundance: Populations in Wyoming may be locally abundant, but are typically restricted to very small areas and specialized microhabitats.

Range: Peripheral; in Wyoming known only from the Absaroka Range and Yellowstone Plateau in Park and Fremont counties and Yellowstone National Park.

Trends: Not known.

Protection Status: At least 3 occurrences are found within special management areas (Yellowstone National Park and the North Absaroka Wilderness Area). One population is also within the potential Sheep Mesa Research Natural Area.

Threats: Habitats for this species are typically in extremely rugged areas that receive some natural protection.

Managed Areas: Occurs on Shoshone National Forest and in Yellowstone National Park.

Number of Occurrences on Shoshone NF: 4.

References: Cronquist *et al.* 1997; Dorn 1992; Fertig 1997 b.

Gentianella propinqua

Occurrences in Wyoming: Known from one occurrence in Wyoming, last observed in 1980.

Population Abundance: Not known.

Range: Peripheral; In Wyoming, known only from the Absaroka Range in Park County.

Trends: Not known.

Protection Status: The single Wyoming occurrence is located within the Washakie Wilderness.

Threats: Not known.

Managed Areas: Found in Shoshone National Forest (Wapiti Ranger District).

Number of Occurrences on Shoshone NF: 1.
References: Dorn 1992; Evert 1982, 1991.

Haplopappus macronema var. *linearis*

Occurrences in Wyoming: Known from 16 extant occurrences in Wyoming, all of which have been discovered or relocated since 1981. Also known from at least 6 historical records, several of which are too vague to be located.

Population Abundance: Census data are lacking for most occurrences, but those populations that have been surveyed are usually very small in number and area. Populations in the Gros Ventre River drainage typically contain 12-2000 individuals in areas of 0.5-10 acres.

Range: Regional endemic of western Wyoming and southwestern Montana. In Wyoming, known only from the southern Absaroka Range, northern Wind River Range (Gros Ventre River drainage), Yellowstone Plateau, and Overthrust Belt in Fremont, Lincoln, Park, and Teton counties.

Trends: Apparently stable, although trend data are lacking for most occurrences.

Protection Status: At least 5 occurrences are known from the Washakie and Teton Wilderness areas and one population is also protected in Yellowstone National Park. All other populations are on public lands managed for multiple use. Listed as Sensitive by US Forest Service Region 4 (although recommended for downlisting by Fertig (1996 a)).

Threats: Threats are probably low at sites on Bridger-Teton National Forest. The species is not preferred browse and may benefit from low level disturbance associated with recreational activities. Some populations could be impacted by mineral exploration and development on erosive soils (Fertig 1996 a).

Managed Areas: Found on lands managed by Bridger-Teton and Shoshone NF, Yellowstone NP, Wind River Indian Reservation, and BLM Rock Springs District (Kemmerer RA).

Number of Occurrences on Shoshone NF: 7.

References: Anderson 1995; Cronquist 1955, 1994; Dorn 1992; Fertig 1996 a; Fertig *et al.* 1991, 1994, 1998; Hall 1928; Hartman *et al.* 1991; Mills and Fertig 1996; Nesom 1990; Scott 1997; Winkler and Wambolt 1991.

Ipomopsis spicata var. *robruthiorum*

Occurrences in Wyoming: Known from 16 occurrences in Wyoming, all of which have been discovered or relocated since 1981.

Population Abundance: Census data are lacking for nearly all known occurrences. One population surveyed in 1996 contained 500-650 plants in an area of 10 acres.

Range: State Endemic; known only from the Absaroka Range in Park County.

Trends: Although no trend data are available, this species is presumed to be stable due to the low threats in its rugged, inaccessible habitat.

Protection Status: At least 14 of the 16 known populations are wholly or partially protected within the Washakie and North Absaroka wildernesses. At least one occurrence is also within the Grizzly Creek potential Research Natural Area. This species is listed as Sensitive in USFS Region 2 and was formerly a C2 candidate for listing under the Endangered Species Act.

Threats: Threats minimal due to its rugged habitat. Some populations could be impacted by sheep grazing or trampling.

Managed Areas: All known occurrences are on Shoshone National Forest.

Number of Occurrences on Shoshone NF: 16.

Comments: Originally named *Ipomopsis spicata* ssp. *robruthii* in honor of Rob and Ruth Kirkpatrick (Wilken and Hartman 1991), but renamed var. *robruthiorum* by Dorn (1992)

References: Dorn 1992; Fertig 1995 c, 1997 b; Fertig *et al.* 1994; Mills and Fertig 1996 a; Rosenthal 1998; Wilken and Hartman 1991.

Juncus triglumis var. *albescens*

Occurrences in Wyoming: Known from 5 extant occurrences (all observed since 1990) and one older record in Wyoming (1961).

Population Abundance: Few data exist on population size, although at least two populations have been reported as locally abundant.

Range: Disjunct; in Wyoming, known only from the Wind River, Absaroka, and Medicine Bow ranges in Albany, Fremont, Park, and Sublette counties.

Trends: Not known.

Protection Status: Two occurrences are protected within designated wilderness areas (Bridger and Fitzpatrick). One wilderness population is also within the potential Arrow Mountain Research Natural Area. All other known sites are on public lands managed for multiple use.

Threats: May be impacted by recreational and grazing activities in its wetland habitats.

Managed Areas: Occurs on lands managed by Bridger-Teton, Medicine Bow, and Shoshone National Forests.

Number of Occurrences on Shoshone NF: 3.

References: Fertig 1992 a, 1992 b; Fertig *et al.* 1991; Hermann and Weber 1977; Johnston 1962; Mills and Fertig 1996 b; Rosenthal 1998; Scott 1997.

Juncus triglumis var. *triglumis*

Occurrences in Wyoming: Known from 2 extant occurrences in Wyoming, both located since 1983.

Population Abundance: Not known.

Range: Peripheral; in Wyoming known from the Bighorn and Beartooth ranges in Johnson and Park counties.

Trends: Not known.

Protection Status: One occurrence is protected in the Cloud Peak Wilderness Area. Another population is located just outside the proposed Line Creek/Twin Lakes Research Natural Area.

Threats: Not known.

Managed Areas: Occurs on Bighorn and Shoshone National Forests.

Number of Occurrences on Shoshone NF: 1.

References: Dorn 1992; Fertig and Bynum 1994 a; Hermann and Weber 1977.

Kelloggia galioides

Occurrences in Wyoming: Confirmed from 2 extant populations, 1 older occurrence, and 1 historical record in Wyoming. The range map in Scott (1997) indicates that there may be 5-8 locations in the state.

Population Abundance: Not known.

Range: Peripheral; known from the Absaroka and Teton ranges and Yellowstone Plateau in Park and Teton counties. Also reported for Lincoln and Fremont counties in the Salt River and Wind River ranges by Scott (1997).

Trends: Not known.

Protection Status: At least 4 populations are protected within Grand Teton and Yellowstone National Parks and the North Absaroka and Washakie wilderness areas.

Threats: Not known.

Managed Areas: Occurs on lands managed by Grand Teton and Yellowstone National Parks and Shoshone National Forest. May also occur on lands managed by Bridger-Teton NF (based on distribution map in Scott 1997).

Number of Occurrences on Shoshone NF: 2-4.

References: Dorn 1992; Lesica and Shelly 1991; Scott 1997.

Kobresia schoenoides [*K. macrocarpa*]

Occurrences in Wyoming: Known from 4 occurrences in Wyoming, all of which have been observed since 1981 (2 were seen as recently as 1996).

Population Abundance: Census data are lacking for most sites. Surveys in 1996 on the Beartooth Plateau found this species to be locally abundant, but restricted to small areas of suitable microhabitat.

Range: Disjunct. In Wyoming, known only from the Beartooth and Absaroka ranges in Park County.

Trends: Not known. May currently be stable, although no data are available to predict past abundance and distribution.

Protection Status: 2 of the 4 occurrences are found within the North Absaroka and Washakie wilderness areas. Part of one occurrence is within the boundaries of the proposed Line Creek/Twin Lakes Research Natural Area.

Threats: Most colonies are probably not threatened at present, although they may have been impacted in the past by sheep grazing.

Managed Areas: Found on the Shoshone National Forest (Clarks Fork and Wapiti RDs).

Number of Occurrences on Shoshone NF: 4.

References: Dorn 1992; Fertig 1997 b; Fertig and Bynum 1994 a; Johnson 1962; Lesica and Shelly 1991; Rosenthal 1998; Scott 1997.

Kobresia simpliciuscula

Occurrences in Wyoming: Known from a single occurrence in Wyoming, discovered in 1984 and last observed in 1992.

Population Abundance: Entire state population restricted to a wetland covering ca 1.5 square miles. The actual area of

occupied or suitable habitat may be limited to 20 acres.

Range: Disjunct; in Wyoming, known only from the Clarks Fork Valley of the northern Absaroka Range in Park County.

Trends: Not known.

Protection Status: The only known occurrence in the state is protected within the Swamp Lake Special Botanical Area.

Threats: May be potentially impacted by changes in hydrology of the Swamp Lake wetland.

Managed Areas: Found in Shoshone National Forest (Clarks Fork Ranger District).

Number of Occurrences on Shoshone NF: 1.

References: Dorn 1992; Evert *et al.* 1986; Fertig and Jones 1992; Hitchcock *et al.* 1969; Sanderson and March 1996.

Koenigia islandica

Occurrences in Wyoming: Known from 2 occurrences in Wyoming, only one of which has been located since 1963 (last observed in 1996). Reported from at least 4 locations in the state by Scott (1997).

Population Abundance: Locally abundant within its specialized habitat. Surveys of 6 small colonies (all within Occurrence # 002) in 1996 suggested that the total population in the Beartooth Range may number over 15,000 individuals in a total area of 6 acres.

Range: Disjunct; in Wyoming, known from the Wind River and Beartooth ranges in Fremont and Park counties.

Trends: Trend data are not available. Given the annual nature of this species, large fluctuations may occur in population size from year to year. Overall, the trend is probably stable to possibly increasing. Sheep and horse grazing activity on the Beartooth does not appear to be having an adverse impact at present.

Protection Status: One occurrence is protected within the Fitzpatrick Wilderness Area. At least one of the Beartooth Plateau colonies lies within the boundaries of the proposed Line Creek/Twin Lakes Research Natural Area.

Threats: May be impacted by recreational activity and trampling. Grazing does not appear to be having a negative impact on Beartooth Plateau colonies.

Managed Areas: Occurs on the Shoshone National Forest.

Number of Occurrences on Shoshone NF: 2.

References: Dorn 1992; Fertig 1997 b; Fertig and Bynum 1994 a; Johnson 1962; Lesica and Shelly 1991; Scott 1997.

Lesquerella fremontii

Occurrences in Wyoming: Known from 8-9 extant occurrences, 6 of which have been discovered or relocated since 1993. In the past, several additional records were recognized, but many of these were combined following surveys in 1994 that found them to be essentially confluent (Fertig 1995 a). One historical (but vague) record is also recognized.

Population Abundance: The total known range of the species is just over 200 acres. Total population size was estimated at 40,000-50,000 individuals by Fertig in 1994. Three additional, medium to large populations have since been discovered, suggesting that the total population size may be closer to 50,000-60,000.

Range: Endemic to west central Wyoming. Known only from the eastern Wind River Range and Beaver Rim area in Fremont County.

Trends: Probably stable. Some colonies have been lost due to road expansion and possibly due to limestone quarrying.

Protection Status: Part of the large Limestone Mountain occurrence is found within Wyoming TNC's Red Canyon Ranch preserve. One other colony is protected in the Fitzpatrick Wilderness Area (within the potential Arrow Mountain RNA). This species is listed as Sensitive in USFS Region 2.

Threats: Potentially threatened by limestone quarrying and road construction.

Managed Areas: Occurs on lands managed by the BLM Rawlins District and Shoshone National Forest.

Number of Occurrences on Shoshone NF: 4.

References: Clark and Dorn 1979; Dorn 1992; Fertig 1995 a, 1995 c, 1995 d, 1997 b; Fertig *et al.* 1994; Mills and Fertig 1996 a, 1996 b; Rollins 1993; Rollins and Shaw 1973; Welp 1997; Welp *et al.* 1996.

Ligusticum canbyi

Occurrences in Wyoming: Known from 3 extant occurrences and 3 historical records in Wyoming.

Population Abundance: Not known.

Range: Peripheral; in Wyoming, known from the Yellowstone Plateau and Absaroka Range in Park and Teton counties and Yellowstone NP.

Trends: Not known.

Protection Status: All known occurrences are protected with Yellowstone National Park, the JDR Parkway, and the Teton and Washakie wilderness areas.

Threats: May be threatened by over-collection for medicinal use.

Managed Areas: Occurs on Bridger-Teton and Shoshone National Forests, Yellowstone NP, and JDR Parkway.

Number of Occurrences on Shoshone NF: 1.

Comments: Added to WYNDD's list of Species of Special Concern in 1998.

References: Cronquist *et al.* 1997; Dorn 1992.

Lomatium attenuatum

Occurrences in Wyoming: Known from 13 occurrences, all of which have been discovered or relocated since 1987.

Prior to 1995, 28 records were recognized, many of which have since been combined due to their proximity.

Population Abundance: Dorn (1989 b) estimated the entire population in the North Fork Shoshone River drainage to be ca 4000 plants in 185 acres of habitat. Surveys of 4 colonies by Fertig in 1996 suggest that Dorn's figures are probably conservative. Total numbers are probably closer to 10,000 plants.

Range: Regional endemic of northwest Wyoming (Park Co.) and adjacent Montana.

Trends: Trend data are mostly lacking, but the rugged nature of the plant's habitat and low threats suggest that it is probably stable at present.

Protection Status: Parts of four occurrences are protected within the North Absaroka Wilderness Area. Populations also occur in the potential Grizzly Creek RNA and just outside the potential Pat O'Hara Mountain and Sheep Mesa RNAs. Other populations are found on public lands managed for multiple use.

Threats: Threats are lacking or minimal due to the rugged nature of its habitat. Grazing is probably not a threat due to the lack of forage at most sites occupied by this species. Some low elevation sites may be impacted by road and trail development.

Managed Areas: Occurs in Shoshone National Forest and the BLM Worland District.

Number of Occurrences on Shoshone NF: 9.

Comments: Fertig (1997 b) reported a new occurrence (EO # 011) for the Forest from the Mummy Cave area based on fragmentary field material. A revisit to this site earlier in the growing season in 1997 revealed that the population was actually *Lomatium cous*, a close relative of *L. attenuatum*. This record has been deleted from the WYNDD database.

References: Clark *et al.* 1989; Dorn 1989 b, 1992; Evert 1983; Fertig 1997 b; Marriott 1988; Mills and Fertig 1996 a; Rosenthal 1998; Vanderhorst and Heidel 1998; Vanderhorst and Lesica 1994.

Luzula glabrata var. *hitchcockii*

Occurrences in Wyoming: Known from 4 occurrences in Wyoming, (most recently observed in 1995).

Population Abundance: Not known, although reported as "common" at Holly Cirque by R. Shaw (1976).

Range: Peripheral; in Wyoming, known from the Beartooth Range (Park County) and Teton/Snake River ranges (Teton County).

Trends: Not known.

Protection Status: 2 of the 3 known occurrences are protected in Grand Teton NP. The Beartooth Mountains population is probably located within the potential Beartooth Butte Research Natural Area.

Threats: Not known.

Managed Areas: Occurs in Shoshone and Targhee National Forests and Grand Teton National Park.

Number of Occurrences on Shoshone NF: 1.

References: Dorn 1992; Shaw 1976, 1992.

Mimulus tilingii

Occurrences in Wyoming: Known from only 2 extant populations in Wyoming.

Population Abundance: Not known.

Range: Peripheral; known only from the Absaroka Mountains in northwestern Wyoming (Fremont and Park counties).

Trends: Not known.

Protection Status: One occurrence is protected within the Washakie Wilderness.

Threats: Not known.

Managed Areas: Occurs on Shoshone National Forest.

Number of Occurrences on Shoshone NF: 2.

References: Dorn 1992.

Muhlenbergia glomerata

Occurrences in Wyoming: Known from 5 extant records (most recent is from 1997) and one historical report in

Wyoming.

Population Abundance: Census data are lacking for most sites, but populations appear to be highly restricted to specialized habitats. The late summer/early fall flowering period for this plant may help explain why it is infrequently collected (Jennifer Whipple, personal communication).

Range: Peripheral; in Wyoming, known from the Black Hills, Yellowstone Plateau, Southeastern Plains, Green River Basin, Clarks Fork Valley, and Jackson Hole (Crook, Goshen [?], Park, Sublette, and Teton counties, and Yellowstone National Park).

Trends: Not known.

Protection Status: Occurrences are protected in the Swamp Lake Special Botanical Area, National Elk Refuge, and Yellowstone National Park. This species is listed as Sensitive in USFS Region 2.

Threats: May be threatened by changes in hydrology, grazing, or exotics.

Managed Areas: Occurs on lands managed by Black Hills and Shoshone National Forests, National Elk Refuge, Yellowstone National Park, and the BLM Rock Springs District.

Number of Occurrences on Shoshone NF: 1.

Comments: *Muhlenbergia glomerata* is synonymized under *M. racemosa* by some authors, although Wyoming populations of the two taxa appear to be readily distinguishable.

References: Dorn 1992; Fertig 1993 a, 1995 c, 1998 b; Fertig and Jones 1992; Fertig *et al.* 1994, 1998; Hallsten *et al.* 1987; Hitchcock *et al.* 1969; Markow and Fertig 1993; Mills and Fertig 1996 a; Moseley *et al.* 1991; Pohl and Mitchell 1965.

Orobanche corymbosa var. *corymbosa*

Occurrences in Wyoming: Known from 3-4 locations in Wyoming, at least 2 of which have been documented since 1990. Two populations are historical.

Population Abundance: Not known.

Range: Peripheral; in Wyoming, known from the Absaroka Range, Hoback Canyon, and Jackson Hole in Park, Sublette, and Teton counties.

Trends: Not known.

Protection Status: 1-2 populations are found in Grand Teton National Park. Other known populations occur on public lands managed for multiple use.

Threats: Not known.

Managed Areas: Occurs on lands managed by Bridger-Teton and Shoshone National Forest and Grand Teton National Park.

Number of Occurrences on Shoshone NF: 1.

References: Cronquist *et al.* 1984; Dorn 1992; Hartman and Nelson 1993, 1994.

Papaver kluanense

Occurrences in Wyoming: Known from at least 9 extant occurrences in Wyoming and 1 historical record. Four populations have been observed since 1990. Additional populations have been reported for Fremont and Johnson counties by Scott (1997).

Population Abundance: Census data are lacking for nearly all known populations. Occurrences studied by Fertig (1990-97) have all been small and highly localized.

Range: Disjunct; in Wyoming, known only from the Bighorn, Wind River, and Absaroka ranges in Big Horn, Fremont, Johnson, Park, and Sublette counties.

Trends: Not known.

Protection Status: At least 4 occurrences are protected within National Forest Wilderness Areas (Cloud Peak, Bridger, and Washakie). An additional population is also protected within the BLM Carter Mountain ACEC. One population is found within the potential Sheep Mesa Research Natural Area. This species is listed as Sensitive on the Idaho National Forests within USFS Region 4.

Threats: Probably unthreatened in rugged alpine habitat.

Managed Areas: Occurs on lands managed by Bighorn, Bridger-Teton, and Shoshone National Forests and the BLM Worland District.

Number of Occurrences on Shoshone NF: 6.

References: Fertig 1992 a; Jones 1991 b; Kiger 1975; Lesica and Shelly 1991; Love 1969; Moseley 1989; Rosenthal 1998; Scott 1997; Spackman *et al.* 1997; USDA Forest Service 1991.

Parrya nudicaulis

Occurrences in Wyoming: Currently known from 8 extant occurrences (all observed or discovered since 1990), and one older occurrence (from 1965).

Population Abundance: Population data are available from only 4 occurrences, but these figures suggest that the species numbers at least 100,000 individuals in Wyoming in over 450 acres of habitat.

Range: Disjunct; in Wyoming, known from the Wind River (Sublette and Fremont counties), Gros Ventre (Teton and Sublette counties), and Beartooth ranges (Park Co.).

Trends: Until recently, this species was thought to be much less common than surveys in 1994 indicated. These higher numbers are probably due to better sampling rather than a recent population increase.

Protection Status: All known occurrences are found within designated Wilderness Areas (Bridger, Absaroka-Beartooth, Popo Agie, Gros Ventre, and Fitzpatrick wilderness areas). One population also occurs within the proposed Osborn Mountain Research Natural Area, and two others occur in the potential Beartooth Butte and Arrow Mountain RNAs. This species is listed as Sensitive in USFS Regions 2 and 4.

Threats: Habitat is adequately protected by management policy and rough terrain.

Managed Areas: Known occurrences are found on lands managed by Bridger-Teton National Forest (Pinedale and Jackson RDs) and Shoshone National Forest (Clarks Fork, Washakie and Wind River RDs).

Number of Occurrences on Shoshone NF: 4.

References: Dorn 1992; Fertig 1992 a, 1992 b, 1995 b, 1995 c, 1997 b; Fertig *et al.* 1991, 1994; Mills and Fertig 1996 a, 1996 b; Rollins 1993; Rosenthal 1998; Scott 1997.

Pedicularis oederi

Occurrences in Wyoming: Known from a single large occurrence along the Wyoming-Montana border, last observed in 1996.

Population Abundance: Population consists of 13 essentially confluent colonies covering an area of over 150 acres. Total population estimated in the low thousands.

Range: Disjunct; In Wyoming, known only from the Beartooth Plateau in Park County.

Trends: This colony has been known since 1938 and is thought to be stable.

Protection Status: Some colonies within this population occur within the proposed Line Creek/Twin Lakes Research Natural Area.

Threats: Individual sites are potentially threatened by trampling, recreational use of its habitat, and damage from sheep grazing.

Managed Areas: The entire range of the species in Wyoming is within Shoshone National Forest (Clarks Fork RD).

Number of Occurrences on Shoshone NF: 1.

References: Dorn 1992; Evert 1986; Fertig 1997 b; Fertig and Bynum 1994 a; Hulten 1968; Lesica and Shelly 1991; Scott 1997.

Pedicularis pulchella

Occurrences in Wyoming: Known from 13 extant occurrences, 6 of which have been relocated or discovered since 1989.

Population Abundance: Population data are lacking for most occurrences, but the total range of the species is small.

Range: Regional endemic of Montana and Wyoming; in Wyoming known from the Bighorn, Absaroka, and Gros Ventre ranges in Big Horn, Fremont, Hot Springs, Johnson, Park, Sublette, and Teton counties.

Trends: Not known, but thought to be stable.

Protection Status: Twelve of the 13 known occurrences are found in designated wilderness areas (Gros Ventre, Washakie, and Cloud Peak Wilderness Areas).

Threats: Not known.

Managed Areas: Found on lands managed by the Bighorn, Bridger-Teton, and Shoshone National Forests.

Number of Occurrences on Shoshone NF: 6.

References: Bighorn National Forest 1992; Dorn 1992; Evert 1986; Hartman 1995, 1996.

Penstemon absarokensis

Occurrences in Wyoming: 20 occurrences are currently recognized, all of which have been observed since 1984 (12 have been surveyed since 1996). Dorn recognized only 2 extensive populations in his 1989 status survey for the US Fish and Wildlife Service. The single Fremont County occurrence may represent a different taxon (Dorn 1989 c).

Population Abundance: Dorn estimated the population at over 2000 for his 2 extensive occurrences in the Absarokas.

More recent field work by Fertig suggests that this species may be more abundant, numbering in the range of 8000-15000. Individual populations are often exceedingly small and restricted to areas of suitable micro-habitat.

Range: Endemic to the Absaroka Range of northwest Wyoming in Park County. An isolated population from the northeast Wind River Range in Fremont County may represent a different, undescribed taxon according to Dorn (1989 c).

Trends: Thought to be stable at present due to the isolation and ruggedness of its habitat. Population size may vary from year to year based on moisture availability, but long-term trends have not been studied.

Protection Status: At least 9 occurrences are protected within the Washakie and Northern Absaroka Wilderness areas. Populations are also found in the potential Grizzly Creek and Sheep Mesa Research Natural Areas.

Threats: Most populations are unthreatened due to the ruggedness of their habitat. Populations near trails may be impacted by recreational activities and competition from weeds. It remains to be determined whether this species can persist in such sites or is actually able to colonize disturbed areas.

Managed Areas: Occurs on lands managed by the Shoshone National Forest, BLM Worland District, and the Wind River Indian Reservation.

Number of Occurrences on Shoshone NF: 18.

References: Clark *et al.* 1989; Dorn 1989 c; Evert 1984 a, 1986; Fertig 1997 b; Marriott 1988; Mills and Fertig 1996 a; Rosenthal 1998.

Phippsia algida

Occurrences in Wyoming: Known from 3 occurrences in Wyoming, all of which have been discovered or relocated since 1984.

Population Abundance: Populations are typically small and restricted to specialized microhabitats. Several colonies surveyed on the Beartooth Plateau in 1996 consisted of ca 30 plants each in areas less than 0.1 acre.

Range: Disjunct; in Wyoming, known only from the Beartooth and Wind River range in Park and Sublette counties.

Trends: No trend data area available. This species may benefit from moderate grazing activity (particularly from the increase in nitrogen from animal wastes), but it is not known what impacts long-term sheep grazing have had in the Beartooth Range.

Protection Status: 2 occurrences are protected within the North Absaroka and Washakie Wilderness Areas.

Populations are also found in the proposed Osborn Mountain RNA and potential Line Creek/Twin Lakes RNA.

Threats: May be threatened by grazing, trampling, and habitat loss.

Managed Areas: Occurs in Bridger-Teton and Shoshone National Forest.

Number of Occurrences on Shoshone NF: 2.

References: Clark *et al.* 1989; Dorn 1992; Fertig 1997 b; Fertig and Bynum 1994 a; Johnson 1962; Lesica and Shelly 1991; Scott 1997; Spackman *et al.* 1997.

Physaria saximontana var. *saximontana*

Occurrences in Wyoming: Known from 18 extant occurrences in Wyoming, 9 of which have been relocated or discovered since 1990. An additional occurrence reported for Shoshone NF by Rosenthal (1998) is based on a misidentified specimen.

Population Abundance: Populations may be small and sparse to locally abundant, depending on the suitability of habitat.

Range: State Endemic; Known only from the Wind River and southern Bighorn basins and the SE foothills of the Wind River Range in Fremont and Hot Springs counties.

Trends: Apparently stable.

Protection Status: 2 occurrences are protected within TNC's Red Canyon Preserve and in the Beaver Rim ACEC.

Other populations are found on public lands managed for multiple use.

Threats: Threats low.

Managed Areas Found on lands managed by the BLM Rawlins and Worland Districts, Wind River Indian Reservation, and Shoshone National Forest.

Number of Occurrences on Shoshone NF: 2.

References: Dorn 1992; Fertig 1992 c, 1995 d, 1997 b; Fertig *et al.* 1994; Mills and Fertig 1996 a, 1996 b; Rollins 1984, 1993; Welp 1997; Welp *et al.* 1996.

Potamogeton praelongus

Occurrences in Wyoming: Known from 5 records in Wyoming, 2 of which have been observed since 1996 (2 records are historical).

Population Abundance: Populations may be locally abundant in suitable habitat, but habitat is widely scattered and small in extent.

Range: Peripheral; in Wyoming, known from the Medicine Bow Range (Albany Co.), Yellowstone Plateau (Yellowstone NP), and Absaroka and Beartooth ranges (Park Co.).

Trends: Trend data are lacking, but extant populations are thought to be stable at present.

Protection Status: At least 2 occurrences are found in special management areas: Yellowstone NP and the Washakie Wilderness (Shoshone NF). The Lily Lake population is found near the Absaroka-Beartooth Wilderness Area boundary and may occur in the potential Lake Creek Bogs RNA. Other populations occur on National Forest lands managed for multiple use (mostly with an emphasis on recreation or livestock grazing).

Threats: Threatened by alteration of ponds and loss of water quality.

Managed Areas: Occurs on lands managed by Yellowstone National Park and Medicine Bow and Shoshone National Forests.

Number of Occurrences on Shoshone NF: 3.

References: Dorn 1992; Evert 1991; Fertig 1997 b; Hitchcock *et al.* 1969.

Potentilla hyparctica

Occurrences in Wyoming: Known from 3-4 locations in Wyoming, all located since 1988.

Population Abundance: Not known.

Range: Disjunct; in Wyoming known only from the northern Wind River Range in Fremont and Sublette counties.

Trends: Not known.

Protection Status: All known occurrences are within the Fitzpatrick and Bridger wilderness areas.

Threats: Largely unthreatened due to rugged habitat.

Managed Areas: Occurs on lands managed by Bridger-Teton and Shoshone National Forests.

Number of Occurrences on Shoshone NF: 3.

References: Dorn 1992; Fertig 1992 a, 1992 b; Scott 1997.

Potentilla uniflora

Occurrences in Wyoming: Known from at least 5 extant occurrences in Wyoming, although reported from 8-11 sites by Scott (1997).

Population Abundance: Not known.

Range: Disjunct; in Wyoming, known from the Absaroka, Beartooth, and Gros Ventre ranges in Fremont, Park and Sublette counties. Also reported from Teton and Hot Springs counties by Scott (1997).

Trends: Not known.

Protection Status: At least 2 occurrences are found in the North Absaroka and Washakie wilderness areas. Populations are also found in the proposed Line Creek/Twin Lakes and potential Sheep Mesa RNAs.

Threats: Not known.

Managed Areas: Occurs on lands managed by Bridger-Teton and Shoshone National Forests.

Number of Occurrences on Shoshone NF: 5.

References: Dorn 1992; Fertig and Bynum 1994 a; Hartman 1995; Scott 1997.

Primula egaliksensis

Occurrences in Wyoming: Known from only 2 occurrences in Wyoming, each observed since 1992.

Population Abundance: The total state population is estimated at 10,000-14,000 plants and is restricted to about 105 acres of habitat (Fertig 1996 d).

Range: Disjunct; in Wyoming, known only from the Clarks Fork Valley in the northern Absaroka Range and the upper Green River Valley in the northwest Wind River Range (Park and Sublette counties).

Trends: Populations are thought to be stable at present. Low population numbers may be due to the very limited area of suitable habitat, and not the result of a population decline.

Protection Status: The population on Shoshone National Forest is protected within the Swamp Lake Special Botanical Area. The Bridger-Teton NF population has no formal protection. This species is listed as Sensitive in USFS Region 2 and on Bridger-Teton National Forest.

Threats: Threatened by loss or despoliation of wetland habitats by livestock or recreational users.

Managed Areas: Populations occur in Bridger-Teton NF (Pinedale RD) and Shoshone NF (Clarks Fork RD).

Number of Occurrences on Shoshone NF: 1.

References: Dorn 1992; Evert *et al.* 1986; Fertig 1992 a, 1992 b, 1995 c, 1996 d; Fertig and Jones 1992; Fertig *et al.* 1991, 1994; Hulten 1968; Kelso 1991; Mills and Fertig 1996 a; Rosenthal 1998; Sanderson and March 1996; Spackman *et al.* 1997.

Pyrrocoma carthamoides var. *subsquarrosa*

Occurrences in Wyoming: Known from 13 occurrences in Wyoming, all of which have been discovered or relocated since 1975 (6 sites have been observed since 1994).

Population Abundance: Colonies are often locally abundant, numbering in the low hundreds to thousands. The entire Wyoming population may number as high as 100,000 individuals (based on an extrapolation of known, censused populations). Similar population estimates have been derived for Montana populations (Lesica 1995).

Range: Regional endemic of NW Wyoming and SW Montana. In Wyoming, this taxon is restricted to the Absaroka Range in Park County.

Trends: Long-term trend data are mostly lacking, but this species is presumed to be stable at the present time.

Protection Status: All or part of 3 occurrences are protected within the North Absaroka Wilderness Area. Additional occurrences are found within the proposed Bald Ridge RNA and potential Pat O'Hara Mountain RNA. 1-3 other populations may partially occur within TNC Conservation easements in the Clarks Fork and North Fork Shoshone River valley areas. This species is listed as Sensitive in USFS Region 2 and was formerly a C2 candidate for listing under the Endangered Species Act.

Threats: Some areas of habitat are disturbed by highway construction and competition with weeds. Grazing does not appear to be a significant threat in most areas (the plant is not favored forage). Loss of habitat for residential development could be a threat on private land sites.

Managed Areas: Found on lands managed by the BLM Worland District and Shoshone National Forest.

Number of Occurrences on Shoshone NF: 11.

References: Brown and Keil 1992; Fertig 1995 c, 1997 b; Fertig and Bynum 1994 b; Fertig *et al.* 1994; Jones 1991 a; Lesica 1995; Mills and Fertig 1996 a, 1996 b; Rosenthal 1998.

Pyrrocoma integrifolia

Occurrences in Wyoming: Known from four occurrences in the state, three of which are historical. The one extant occurrence is from 1995.

Population Abundance: No census information is provided in reports.

Range: Regional endemic; found in the Bighorn Mountains (Washakie County), the southern Wind River Range (Fremont County), and Yellowstone National Park.

Trends: Not known.

Protection Status: Two occurrences, including the extant one, are protected in Yellowstone National Park, and another population may be on public lands within The Nature Conservancy's Red Canyon Preserve.

Threats: Not known.

Managed Areas: Occurs on lands managed by Shoshone National Forest and Yellowstone National Park.

Number of Occurrences on Shoshone NF: 1.

References: Dorn 1992.

Ranunculus verecundus

Occurrences in Wyoming: Known from 5 occurrences in Wyoming, all observed since 1979.

Population Abundance: Not known.

Range: Peripheral; in Wyoming, found only in the Absaroka Range in Park County.

Trends: Not known.

Protection Status: At least 3 occurrences are found in the North Absaroka Wilderness areas. Other known populations are on public lands managed for multiple use.

Threats: Not known.

Managed Areas: Occurs on lands managed by Shoshone National Forest.

Number of Occurrences on Shoshone NF: 5.

References: Dorn 1992; Scott 1997.

Salix barrattiana

Occurrences in Wyoming: Known from a single occurrence along the Wyoming-Montana border.

Population Abundance: Population is restricted to a single clump in a limited geographic area.
Range: Disjunct; restricted to the Beartooth Plateau along the Montana-Wyoming border in northern Park County.
Trends: This clone consists entirely of staminate plants. Without pistillate plants, sexual reproduction is not possible and long term survival of the clone is in doubt. Currently, the clone reproduces entirely by vegetative means.
Protection Status: The single Wyoming occurrence is on public land, but is not currently within a special management area. Across the border in Montana, this same population is on lands proposed for the Line Creek Research Natural Area.
Threats: The habitat of this species is fragile and easily disturbed.
Managed Areas: Occurs on the Shoshone National Forest.
Number of Occurrences on Shoshone NF: 1.
References: Dorn 1992, 1997; Fertig and Bynum 1994 a; Fertig and Markow 1998; Lesica 1993; Mills and Fertig 1996 a; Scott 1997.

Salix candida

Occurrences in Wyoming: Known from 9 extant occurrences and 1 historical record in Wyoming. Eight of these populations have been discovered or relocated since 1985.
Population Abundance: Known populations are mostly very small and restricted to specialized wetland habitats that are themselves very uncommon.
Range: Sparse; in Wyoming, known from widely scattered locations in the upper Green River Basin, Yellowstone Plateau, and Laramie, Medicine Bow, Absaroka, Beartooth, and Wind River ranges in Albany, Park, Sublette and Teton counties (and Yellowstone NP).
Trends: Not known. Some habitat may have been lost in the Laramie Valley since European settlement.
Protection Status: At least 4 occurrences are found in national parks, national wildlife refuges, or designated special interest areas (Yellowstone NP, National Elk Refuge, Swamp Lake SBA). Three other occurrences are within potential Research Natural Areas or Special Interest Areas on National Forest lands (Lake Creek Bogs, Sheep Mountain, and Kendall Warms Springs).
Threats: Populations may be threatened by grazing pressure on the National Elk Refuge. Occurrences on private lands may be threatened by water development or diversion.
Managed Areas: Occurs on lands managed by Bridger-Teton, Medicine Bow, and Shoshone National Forests, Yellowstone National Park, and the National Elk Refuge.
Number of Occurrences on Shoshone NF: 2.
References: Brunfeld and Johnson 1985; Dorn 1992, 1997; Fertig 1995 e, 1998 b; Fertig and Jones 1992; Fertig and Markow 1998; Mills and Fertig 1996 b; Mills and Neighbours 1995; Moseley *et al.* 1991; Rosenthal 1998; Sanderson and March 1996; Spackman *et al.* 1997; Walford *et al.* 1997.

Salix farriae

Occurrences in Wyoming: Known from 8-9 extant occurrences in Wyoming, 7 of which have been relocated or discovered since 1995. Also known from an historical population in Yellowstone NP (last observed in 1899).
Population Abundance: Census data are lacking for most occurrences, but at some sites this species may be locally abundant (even dominant) in the understory of willow thickets. Most populations are small in area and restricted to specialized microsites.
Range: Peripheral; in Wyoming known from the Wind River, northern Absaroka, Beartooth, and Gros Ventre ranges, Jackson Hole, and the Yellowstone Plateau in Fremont, Park, and Teton counties and Yellowstone National Park.
Trends: Trend data are not available for most occurrences, but populations are thought to be stable.
Protection Status: 1-2 occurrences are known from the North Absaroka Wilderness Area. One historical occurrence is also known from Yellowstone NP. A population is found in the potential Beartooth Butte RNA and the species is to be expected in the Lake Creek Bogs potential RNA. All other populations occur on public lands managed for multiple use.
Threats: Threats overall are probably low, although individual populations could be impacted by grazing activities, recreational development, or other disturbances in wetland habitats.
Managed Areas: Known populations in Wyoming are found on Bridger-Teton and Shoshone National Forests and Yellowstone National Park. Potential habitat may also exist in Grand Teton National Park.
Number of Occurrences on Shoshone NF: 6.
References: Brunfeld and Johnson 1985; Dorn 1992, 1997; Fertig 1997 b; Fertig and Markow 1998; Hartman 1996.

Salix myrtilifolia var. *myrtilifolia*

Occurrences in Wyoming: Known from a single population in Wyoming, last surveyed in 1992.

Population Abundance: The single population is extremely small and limited to an area of less than 5 acres. Only pistillate individuals have been found in the Wyoming site, indicating that the colony may not be capable of sexual reproduction (without pollen-producing staminate plants in the colony, no fruits or seeds can be produced).

Range: Disjunct; in Wyoming known only from the Clarks Fork Valley (Northern Absaroka Range) in Park County.

Trends: Trend data are not available, but in the absence of evidence of sexual reproduction, the long-term trends for the species in Wyoming are probably poor. The colony may be able to maintain itself in the short term, however, through asexual reproduction. It is not known how long this colony has been present (it could potentially be a glacial relict).

Protection Status: The single Wyoming occurrence is protected within the Swamp Lake Special Botanical Area. This species is listed as Sensitive in USFS Region 2.

Threats: May be threatened by browsing from native species and trespass cows and horses. The apparent lack of staminate individuals may prevent sexual reproduction and further spread into new microsites.

Managed Areas: Occurs only in Shoshone National Forest in Wyoming.

Number of Occurrences on Shoshone NF: 1.

References: Dorn 1992, 1997; Evert *et al.* 1986; Fertig 1995 c; Fertig and Jones 1992; Fertig and Markow 1998; Fertig *et al.* 1994; Mills and Fertig 1996 a; Porsild and Cody 1980; Sanderson and March 1996; Spackman *et al.* 1997.

Sanicula graveolens

Occurrences in Wyoming: Known from 3-4 extant populations (observed since 1981) and one historical record (1899). Jennifer Whipple (Yellowstone NP botanist) reports that several additional occurrences may be known from the Park.

Population Abundance: Not known.

Range: Peripheral; in Wyoming, known only from the northern Absaroka Range (Park County) and Yellowstone Plateau (Yellowstone NP).

Trends: Not known.

Protection Status: All known occurrences are found within Yellowstone National Park or the North Absaroka Wilderness.

Threats: Not known.

Managed Areas: Occurs on lands managed by Shoshone National Forest and Yellowstone National Park.

Number of Occurrences on Shoshone NF: 2.

References: Cronquist *et al.* 1997; Dorn 1992.

Saussurea weberi

Occurrences in Wyoming: Known from 6 locations in Wyoming, all of which have been located since 1981.

Population Abundance: Populations often have thousands to tens of thousands of individuals, but are restricted to small areas of suitable habitat in the alpine.

Range: Regional endemic of SW Montana, NW Wyoming, and C Colorado. In Wyoming, known only from the northern Wind River Range (Fremont and Sublette counties) and the Gros Ventre Range (Teton County).

Trends: Populations are assumed to be stable.

Protection Status: All known occurrences are found within designated wilderness areas (Bridger, Fitzpatrick, and Gros Ventre Wilderness Areas). One population is also in the potential Arrow Mountain RNA. This species is listed as Sensitive in USFS Region 4.

Threats: Occurs in relatively inaccessible alpine areas with no obvious disturbances aside from hikers.

Managed Areas: Found in Bridger-Teton and Shoshone National Forests.

Number of Occurrences on Shoshone NF: 2.

References: Dorn 1992; Fertig 1992 a, 1992 b; Fertig 1997 b; Fertig *et al.* 1991, 1994; Hartman 1995; Hulten 1959; Marriott 1988, 1991 a; Mills and Fertig 1996 a; Rosenthal 1998; Scott 1997; Soreng 1984; Spackman *et al.* 1997.

Saxifraga chrysantha

Occurrences in Wyoming: Known from 5 records, but these may represent only 3-4 distinct populations.

Population Abundance: Locally abundant at one site in the Snowy Range. No population data are available from other

sites.

Range: Sparse; in Wyoming, known from the Beartooth, Medicine Bow, and Wind River ranges in Albany, Carbon, Park, Fremont, and Sublette counties.

Trends: Not known.

Protection Status: One population is within the Medicine Bow Peak Special Botanical Area. Several reported occurrences on Shoshone National Forest may occur within the Fitzpatrick or Popo Agie wilderness areas (Scott 1997). An additional population may be found within the proposed Line Creek/Twin Lakes Research Natural Area (Fertig and Bynum 1994 a).

Threats: Most populations are probably secure due to their rugged habitat. The Medicine Bow Peak population occurs in an area that receives relatively high recreational use.

Managed Areas: Occurs on lands managed by the Bridger-Teton, Medicine Bow and Shoshone National Forests.

Number of Occurrences on Shoshone NF: 3-4.

References: Dorn 1992; Fertig 1993 d; Fertig and Bynum 1994 a; Hitchcock and Cronquist 1961; Lesica and Shelly 1991; Scott 1997.

Scirpus rollandii [*Scirpus pumilus*]

Occurrences in Wyoming: Known from 3 extant occurrences in Wyoming, all discovered or relocated since 1992.

Population Abundance: Populations may be locally abundant but are limited to highly specialized and restricted habitats.

Range: Disjunct; known from the Jackson Hole and Gros Ventre River Valley areas of Teton County and the Clarks Fork Valley in Park County.

Trends: Presumed to be stable.

Protection Status: Populations are protected in the National Elk Refuge and Swamp Lake Special Botanical Area. The third occurrence is found on Bridger-Teton NF lands managed for multiple use. This species is listed as Sensitive in USFS Region 2.

Threats: May be impacted by water diversion or heavy trampling, but threats at present appear low.

Managed Areas: Occurs on lands managed by the National Elk Refuge and the Shoshone and Bridger-Teton National Forests.

Number of Occurrences on Shoshone NF: 1.

References: Beetle 1941; Dorn 1992; Evert *et al.* 1986; Fertig 1995 c, 1998 b; Fertig and Jones 1992; Fertig *et al.* 1994; Mills and Fertig 1996 a; Sanderson and March 1996; Spackman *et al.* 1997.

Selaginella watsonii

Occurrences in Wyoming: Known from a single occurrence in Wyoming, last observed in 1985. Until 1994, this population was thought to represent *Selaginella densa*. This species is not included in Dorn's 1992 flora of Wyoming.

Population Abundance: Census data are not available, but the single known occurrence occupies a small area.

Range: Peripheral; in Wyoming, known only from the Beartooth Mountains in Park County.

Trends: Not known, but presumed to be stable at the present time.

Protection Status: Found just outside the proposed Line Creek/Twin Lakes RNA on public lands managed for multiple use.

Threats: Threats probably low due to the plants rugged habitat. The area where it occurs does receive a high degree of recreational use, however.

Managed Areas: Found on Shoshone National Forest.

Number of Occurrences on Shoshone NF: 1.

References: Fertig 1995 f; Valdespino 1993.

Senecio fuscatus

Occurrences in Wyoming: Known from 17 locations in Wyoming, all of which have been relocated or discovered since 1982.

Population Abundance: Population data are lacking for nearly all of the known occurrences, but anecdotal information suggests that populations are at least locally abundant.

Range: Disjunct from Alaska and the Yukon Territory. In Wyoming, known from the Beartooth and Absaroka Mountains in Park County and Yellowstone National Park.

Trends: Not known, but presumed to be stable at present.

Protection Status: Nine occurrences are protected in the North Absaroka Wilderness Area and Yellowstone National

Park. Other populations are found within the Carter Mountain ACEC, proposed Line Creek/Twin Lakes RNA, and potential Sheep Mesa RNA.

Threats: Individual populations may be impacted by recreational activity or high elevation grazing, but in general this species is probably not greatly threatened.

Managed Areas: Occurs on lands managed by Shoshone National Forest, BLM Worland District, and Yellowstone National Park.

Number of Occurrences on Shoshone NF: 16.

Comments: The Beartooth Plateau population was originally described as a separate species (*S. bivestitus*) by Cronquist (1950), but was later found to be synonymous with *S. fuscatus*, a Eurasian taxon (Cronquist 1953).

References: Barkley 1981; Cronquist 1950, 1953; Dorn 1992; Evert 1986; Fertig 1997 b; Fertig and Bynum 1994 a; Scott 1997; Snow *et al.* 1990.

Senecio indecorus:

Occurrences in Wyoming: Known only from 1-2 locations (separated by ca 2-3 miles) in Wyoming, last observed in 1980.

Population Abundance: Population estimates are not available for these populations, but the total area of occupied habitat appears to be small.

Range: Peripheral; In Wyoming known only from the Clarks Fork Valley in the northern Absaroka Range (Park County). Also reported from north of Dubois, but this record has not been confirmed.

Trends: Not known.

Protection Status: All known populations in the state occur on public lands managed for multiple use.

Threats: May be threatened by impacts to its wetland habitat.

Managed Areas: Occurs on Shoshone National Forest.

Number of Occurrences on Shoshone NF: 1-2.

References: Dorn 1992.

Shoshonea pulvinata

Occurrences in Wyoming: Known from 8 occurrences in Wyoming, all of which have been discovered or relocated since 1982 (7 of these were intensively studied between 1989-1996).

Population Abundance: Individual populations often number in the tens of thousands of mats. Dorn (1989 d) estimated the total number of plants in Wyoming at ca 210,000. Approximately 12,000 plants were reported in Montana in the late 1980s (Shelly 1988 b).

Range: Regional endemic of northwest Wyoming and south-central Montana. In Wyoming, known only from the eastern Absaroka and Owl Creek mountains in Fremont, Hot Springs, and Park counties.

Trends: Trends appear to be stable at present.

Protection Status: One occurrence is located within the proposed Bald Ridge RNA on Shoshone National Forest. All other known populations are on public lands managed for multiple use. Listed as Sensitive in USFS Region 2 and formerly listed as a C2 candidate under the Endangered Species Act.

Threats: Habitat relatively inaccessible and little threatened.

Managed Areas: Occurs on lands managed by the Shoshone National Forest, Worland BLM, and Wind River Indian Reservation.

Number of Occurrences on Shoshone NF: 3.

References: Clark *et al.* 1989; Dorn 1989 d, 1992; Evert 1986; Evert and Constance 1982; Fertig 1992 c, 1995 c, 1997 b; Fertig and Bynum 1994 b; Fertig *et al.* 1994; Lesica 1992; Marriott 1988, 1992 a; Mills and Fertig 1996 a; Rosenthal 1988; Shelly 1988 b.

Silene kingii

Occurrences in Wyoming: Known from 7 extant occurrences in Wyoming, 3 of which have been observed since 1996.

Population Abundance: Not known.

Range: Disjunct; in Wyoming known from the Absaroka and eastern Wind River ranges in Fremont and Park counties.

Trends: Not known.

Protection Status: 5-6 populations are found in designated wilderness areas (Popo Agie, Fitzpatrick, and Washakie). One occurrence is also in the Carter Mountain ACEC and another is within the potential Arrow Mountain Research Natural Area.

Threats: Threats are probably low given the rugged, high elevation habitat of this plant. Possible impacts from sheep grazing or recreation activity have not been studied.

Managed Areas: Occurs on Shoshone National Forest and the BLM Worland District.

Number of Occurrences on Shoshone NF: 6.

Comments: Ron Hartman is studying this species and believes that it consists of two varieties in Wyoming. The typical variety ("var. *kingii*") is characterized by downward-pointing non-glandular hairs on the lower leaves, while an undescribed variety ("var. *novum*") is recognized by spreading, glandular hairs on the lower leaves (Dorn 1992). The new variety may be endemic to the Absaroka and Wind River ranges of Wyoming. A mixed population on Arrow Mountain should be investigated further to determine if the two entities occupy different niches. Scott (1997) lumps this species with *Silene hitchguirei* under the name *Lychnis apetala*. This species was added to WYNDD's high priority species of concern list in 1998.

References: Dorn 1992; Scott 1997.

Sparganium minimum

Occurrences in Wyoming: Known from 6 extant and 1 historic occurrences in Wyoming. Three populations have been observed since 1992.

Population Abundance: Not known.

Range: Peripheral; in Wyoming, known from the Absaroka, Medicine Bow, and Wind River ranges, Jackson Hole, and Yellowstone Plateau (Albany, Fremont, Park, and Teton counties and Yellowstone NP).

Trends: Not known.

Protection Status: Populations are protected in Yellowstone and Grand Teton National Park and the Swamp Lake Special Botanical Area. Other occurrences are on public lands managed for multiple use.

Threats: May be threatened by water pollution or diversion.

Managed Areas: Occurs on lands managed by Yellowstone and Grand Teton National Parks and Medicine Bow and Shoshone National Forests.

Number of Occurrences on Shoshone NF: 2.

References: Cronquist *et al.* 1977; Dorn 1992; Fertig and Jones 1992.

Townsendia condensata var. *anomala*

Occurrences in Wyoming: Known from 21 occurrences in Wyoming, all of which have been relocated or discovered since 1983 (13 occurrences have been relocated or discovered since 1996).

Population Abundance: Censused populations are typically very small, often with fewer than 50-100 individuals. The total range of the species appears to be very limited, but the full extent of its habitat has not been thoroughly investigated. Fertig (1997 b) estimated the total population at 20,000-30,000 individuals.

Range: State endemic. Restricted to the Absaroka Range in Park County, Wyoming.

Trends: Not known, but suspected to be stable due to the ruggedness of most habitat.

Protection Status: At least 12 occurrences are found within designated Wilderness areas (Washakie and North Absaroka Wilderness areas). Three occurrences are within the potential Grizzly Creek and Sheep Mesa RNAs. All other known occurrences are on public or state lands managed for multiple use. This species is listed as Sensitive in USFS Region 2.

Threats: Threats are mostly low due to the ruggedness of most of its habitat. Some streamside habitats may be impacted by changes in hydrology, competition from exotics, trampling, or other human-induced activities. The species is probably not grazed due to its low stature.

Managed Areas: Occurs on Shoshone National Forest (Clarks Fork, Greybull, and Wapiti RDs) and state lands.

Number of Occurrences on Shoshone NF: 20.

Comments: Populations of var. *anomala* and the more widespread var. *condensata* appear to overlap in the upper Greybull River drainage. Var. *anomala* typically has numerous small heads and is a sexually reproducing diploid, while var. *condensata* can be recognized by its 1-2 enormous flowering heads and is an apomictic tetraploid.

References: Beaman 1957; Dorn 1988, 1992; Fertig 1995 c, 1997 b; Fertig *et al.* 1994; Heiser 1948; Mills and Fertig 1996 a; Rosenthal 1998; Scott 1997.

Utricularia minor

Occurrences in Wyoming: Known from at least 6 records in Wyoming (one of which is historical, dating from 1900). Two records have been relocated since 1996.

Population Abundance: Known populations are all very small and restricted to specialized microsites.

Range: Sparse; in Wyoming known from scattered locations in the Big Horn, Laramie, and Absaroka ranges, Yellowstone Plateau, and the Laramie and Jackson Hole basins (Albany, Teton, Park, and Washakie counties,

and Yellowstone National Park).

Trends: Not known.

Protection Status: One occurrence is protected within the Swamp Lake Special Botanical Area (Shoshone NF) and at least 2 others are found within Grand Teton and Yellowstone National Parks. All other known populations are on unprotected private lands or public lands managed for multiple use.

Threats: May be threatened by loss or deterioration of wetland habitat.

Managed Areas: Found on lands managed by Bighorn, Shoshone and Medicine Bow National Forests and Grand Teton and Yellowstone National Parks.

Number of Occurrences on Shoshone NF: 1.

Comments: This species may be more widespread and abundant than currently known, especially in Yellowstone National Park (Jennifer Whipple, Yellowstone NP botanist, personal communication). The plant can be extremely difficult to locate and identify when it is not in flower.

References: Ceska and Bell 1973; Dorn 1992; Fertig 1997 b; Rossbach 1939; Taylor 1989.

Viburnum edule

Occurrences in Wyoming: Known from 3 extant and 3 historical records in Wyoming. Only one population has been observed since 1992.

Population Abundance: Not known.

Range: Peripheral; in Wyoming, known from the Medicine Bow and Absaroka ranges in Albany and Park counties and the Yellowstone Plateau (Yellowstone NP).

Trends: Not known.

Protection Status: One extant population occurs in Yellowstone National Park. All other known occurrences are on public lands managed for multiple use.

Threats: Not known.

Managed Areas: Occurs on lands managed by Medicine Bow and Shoshone National Forests and Yellowstone National Park.

Number of Occurrences on Shoshone NF: 3.

References: Dorn 1992.

2. Watch List Species

Agoseris lackschewitzii

Occurrences in Wyoming: Known from at least 39 extant occurrences (36 of which have been discovered or relocated since 1991) and one historical record. This species was not known to occur in WY until 1993, when herbarium material was determined to be *A. lackschewitzii* by the late Dr. Doug Henderson of the University of Idaho. The species was first collected in the state in 1951 by C.L. Porter.

Population Abundance: Population estimates are lacking for many occurrences, but those which have been sampled typically average 25-50 individuals in small areas of sufficiently wet habitat. The largest known populations have 300-500 plants.

Range: Regional endemic of EC Idaho, SW Montana, and NW Wyoming. In Wyoming, it is known from the Beartooth, Wind River, Gros Ventre, and Bighorn ranges and the Yellowstone Plateau in Big Horn, Fremont, Johnson, Park, Sheridan, Sublette, Teton and Washakie counties (and Yellowstone NP).

Trends: Trend data are lacking for nearly all occurrences, but are probably stable at the present time. Long-range trends, however, may be downward given the degree of historical loss of riparian habitats.

Protection Status: 10 occurrences are protected within designated Wilderness Areas (North Absaroka, Cloud Peak, Gros Ventre, and Bridger) or in Yellowstone National Park. This species is designated Sensitive in Forest Service Regions 2 and 4.

Threats: Threats are probably low. Some Wind River and Bighorn Range populations are found near trails where trampling by hikers and horses is a potential threat. Populations in the Bighorns have been observed to persist in disturbed areas. Grazing by livestock is a potential threat in some areas.

Managed Areas: Occurs on Bridger-Teton, Bighorn, and Shoshone National Forests, the JDR Parkway, and Grand Teton and Yellowstone National Parks.

Number of Occurrences on Shoshone NF: 10.

Comments: Since first being reported for the state (Fertig 1993 b), the number of collections and reports of this taxon

has climbed to nearly 40. Identifications can be tricky, however, especially without diagnostic fruit characters (the beak of *A. lackschewitzii* is intermediate in length between the long-beaked *A. aurantiaca* and beakless *A. glauca*). The seemingly distinctive pink ligulate flowers of *A. lackschewitzii* are also not always diagnostic, as individuals may also have whitish flowers and dried specimens of other *Agoseris* species may turn pinkish. Populations on the Beartooth Plateau can be especially difficult to identify. Some researchers have concluded that *A. lackschewitzii* may not warrant taxonomic status, but definitive breeding and genetic studies have not yet been completed.

References: Clark *et al.* 1989; Fertig 1993 b, 1997 b; Fertig *et al.* 1994; Hartman 1996; Henderson *et al.* 1990; Lesica and Shelly 1991; Markow and Fertig 1993; Mills and Fertig 1996 a, 1996 b; Rosenthal 1998; USDA Forest Service 1989, 1991.

Antennaria aromatica

Occurrences in Wyoming: Known from over 27 occurrences in Wyoming, 21 of which have been observed since 1988.

Population Abundance: May be locally abundant when found, although sometimes colonies can be mixed with other *Antennaria* taxa and censusing can be difficult.

Range: Regional endemic of SW Montana and NW Wyoming. Reports from elsewhere in NW North America have largely proven to be false. In Wyoming, the species is known from the Absaroka, Beartooth, Bighorn, Wind River, Gros Ventre, and Wyoming/Salt River ranges (Big Horn, Fremont, Lincoln, Park, Sublette, and Teton counties).

Trends: Although trend data are lacking for most occurrences, there appears to be little evidence of decline in numbers or range.

Protection Status: At least 10 populations are known to occur in designated Wilderness areas (Gros Ventre, Fitzpatrick, Absaroka-Beartooth, North Absaroka, and Bridger) and Grand Teton National Park. Populations are also found in the proposed Bald Ridge and potential Beartooth Butte, Arrow Mountain, and Pat O'Hara Mountain Research Natural Areas.

Threats: Threats minimal due to the ruggedness and inaccessibility of the species' alpine habitat.

Managed Areas: Known occurrences are found on lands managed by Bighorn, Bridger-Teton, and Shoshone National Forests, Grand Teton NP, and the Worland District, BLM.

Number of Occurrences on Shoshone NF: 13.

References: Bayer 1989; Chmielewski, 1993; Clark and Dorn 1989; Evert 1984 b, 1986; Fertig 1992 a, 1992 b, 1997 b; Fertig and Bynum 1994 b; Hartman 1995; Hartman and Nelson 1993, 1994; Jones 1991 a; Marriott 1988; Mills and Fertig 1996 b; Scott 1997.

Arabis williamsii var. *williamsii*

Occurrences in Wyoming: Reported from 25 locations in Fremont, Park, and Sublette counties.

Population Abundance: Population estimates are only available for fifteen of the populations. Colonies tend to be large, ranging from ca 100 to several hundred individuals. Total population size may be from 2000-5000.

Range: State endemic primarily of the Wind River and Absaroka ranges, but one population occurs on the east flank of the Wyoming Range.

Trends: Probably stable.

Protection Status: At least four occurrences are protected in the Fitzpatrick, North Absaroka, and Washakie Wilderness Areas on the Shoshone National Forest.

Threats: Not known.

Managed Areas: Occurs on lands managed by the Shoshone and Bridger-Teton National Forests and the Rock Springs District of the Bureau of Land Management.

Number of Occurrences on Shoshone NF: 23.

Comments: This taxon is considered a synonym of *A. pendulocarpa* var. *saximontana* by Dorn (1992). Most populations consist of hybrid swarms with other related taxa, suggesting that the species may not be valid. Surveys by Marriott (1986, 1988) found this species to be more widespread than originally suspected.

References: Dorn 1988; Fertig *et al.* 1998; Marriott 1986, 1988; Rollins 1993; Scott 1997.

Castilleja nivea

Occurrences in Wyoming: Known from ca 20 occurrences in Wyoming, most of which have been observed since 1980.

Population Abundance: Not known. Census data are lacking for nearly all known sites. Recently observed populations in the eastern Absarokas have been found to be locally common, although often widely scattered.

Range: Regional endemic of Montana and NW Wyoming. In Wyoming, known from Absaroka Mountains in Hot Springs and Park counties.

Trends: Presumed to be stable.

Protection Status: At least 8 populations occur in designated wilderness areas (Washakie and North Absaroka). Three additional populations are found in the proposed Bald Ridge RNA and potential Pat O'Hara Mountain and Sheep Mesa RNAs. One population is also found in the BLM's Carter Mountain ACEC. All other known populations occur on public lands managed for multiple use.

Threats: Not known.

Managed Areas: Occurs on lands managed by Shoshone National Forest and the BLM Worland District.

Number of Occurrences on Shoshone NF: 18.

References: Dorn 1992; Evert 1986; Fertig 1997 b; Fertig and Bynum 1994 b; Hitchcock *et al.* 1959; Scott 1997.

Erigeron flabellifolius

Occurrences in Wyoming: Known from approximately 18-20 occurrences in Wyoming.

Population Abundance: Populations may be locally abundant within suitable habitat.

Range: Regional endemic of SW Montana and NW Wyoming. In Wyoming, known from the Absaroka and Beartooth mountains in Hot Springs and Park counties.

Trends: Probably stable.

Protection Status: At least 9 populations occur within the North Absaroka and Washakie wilderness areas. One population is also within the proposed Line Creek/Twin Lakes Research Natural Area. All other known occurrences are on public lands managed for multiple use.

Threats: Not known, but probably low.

Managed Areas: Found on lands managed by Shoshone National Forest and the Worland District, BLM.

Number of Occurrences on Shoshone NF: ca 18.

References: Cronquist 1955; Dorn 1992; Evert 1986; Fertig and Bynum 1994 a; Lesica and Shelly 1991.

Heterotheca depressa

Occurrences in Wyoming: Known from at least 20 extant occurrences in Wyoming and at least 3-5 historical records.

Population Abundance: Populations may be locally abundant along gravel stream terraces in the Snake River/Gros Ventre River drainage or around thermal areas in Yellowstone National Park.

Range: Regional endemic of NW Wyoming and adjacent Montana. In Wyoming, known from the Snake River and Gros Ventre river drainages in Teton County, the Absaroka Range in Park County, and the Yellowstone Plateau in Yellowstone National Park.

Trends: Trend data are lacking for nearly all occurrences. Those in the Gros Ventre River valley have been found to be persistent, at least in the short term. Some habitat loss has probably taken place since white settlement.

Protection Status: Most occurrences are protected within Yellowstone or Grand Teton National Parks. At least one population is also found on the National Elk Refuge. Other known sites are on public lands managed for multiple use.

Threats: Some occurrences may be threatened by quarrying of river gravel deposits.

Managed Areas: Known from Bridger-Teton and Shoshone National Forests, Yellowstone and Grand Teton National Parks, the BLM Rock Springs District, and the National Elk Refuge.

Number of Occurrences on Shoshone NF: 1.

References: Coulter and Nelson 1909; Cronquist 1955; Dorn 1992; Fertig 1998 b; Mills and Fertig 1996 a, 1996 b; Semple 1996.

Appendix B.

Element Occurrence Records and Maps from 1997 surveys

Appendix C.
1997 Survey Routes

Appendix D.

Natural Heritage Ranking System

WYNDD uses The Nature Conservancy's standardized ranking system to assess the global and state rarity of all plant and animal species, subspecies, and varieties. Each taxon is ranked on a scale of 1-5 (rarest to most common) based on population size, geographic range, habitat specificity, and downward trend at the state and global levels. Codes are as follows:

- G Global rank: based on the rangewide status of a species.
- T Trinomial rank: based on the rangewide status of a subspecies or variety.
- S State rank: based on the status of a taxon in Wyoming (state ranks may differ in other states).
- 1 Critically imperiled because of extreme rarity (5 or fewer extant occurrences, or very few remaining individuals), or because of some factor of a species' life history that makes it vulnerable to extinction.
- 2 Imperiled because of rarity (6-20 occurrences) or because of factors demonstrably making a species vulnerable to extinction.
- 3 Rare or local throughout its range or found locally in a restricted range (21-100 occurrences).
- 4 Apparently secure, although the species may be quite rare in parts of its range, especially at the periphery.
- 5 Demonstrably secure, although the species may be quite rare in parts of its range, especially at the periphery.
- H Known only from historical records (last observed prior to 1950).
- U Status uncertain, more information is needed.
- Q Questions exist regarding the taxonomic validity of a species, subspecies, or variety.
- ? Questions exist regarding the assigned G, T, or S rank of a taxon.