

Status of Plant Species of Special Concern
In US Forest Service Region 4
In Wyoming

Report prepared for the US Forest Service

By

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INTRODUCTION

The US Forest Service is directed by the Endangered Species Act (ESA) and internal policy (through the Forest Service Manual) to manage for listed and candidate Threatened and Endangered plant species on lands under its jurisdiction. The Intermountain Region of the Forest Service (USFS Region 4) has developed a Sensitive species policy to address the management needs of rare plants that might qualify for listing under the ESA (Joslin 1994). The objective of this policy is to prevent Forest Service actions from contributing to the further endangerment of Sensitive species and their subsequent listing under the ESA. In addition, the Forest Service is required to manage for other rare species and biological diversity under provisions of the National Forest Management Act.

The current Sensitive plant species list for Region 4 (covering Ashley, Bridger-Teton, Caribou, Targhee, and Wasatch-Cache National Forests and Flaming Gorge National Recreation Area in Wyoming) was last revised in 1994 (Joslin 1994). Field studies by botanists with the Forest Service, Rocky Mountain Herbarium, Wyoming Natural Diversity Database (WYNDD), and private consulting firms since 1994 have shown that several currently listed species may no longer warrant Sensitive designation, while some new species should be considered for listing. Region 4 is currently reviewing its Sensitive plant list and criteria for listing. This report has been prepared to provide baseline information on the statewide distribution and abundance of 127 plants listed as “species of special concern” by WYNDD (Table 1) (Fertig and Beauvais 1999). Not all of these species warrant sensitive designation at the regional level, but many may deserve attention at the local Forest level.

WYNDD SPECIES OF SPECIAL CONCERN IN USFS REGION 4

Species of special concern are determined based on their state abundance, geographic distribution pattern, degree of threats, and adequacy of current protection (Fertig and Beauvais 1999). WYNDD uses a standardized ranking system developed by The Nature Conservancy’s Natural Heritage Network to assess the global and state status of each species (Table 2). Species are then assigned a “conservation priority” based on their range and abundance in Wyoming in the context of their global distribution. Species considered a High priority for conservation attention in Wyoming are primarily state or regional endemics ranked G1 or G2, or inadequately protected and highly threatened G3 species. Medium priority plants are state or regional endemics ranked G3 or G4 or disjunct species with moderate threats or poor protection. Low priority is assigned to G4 or G5 species at the periphery of their global range in Wyoming or sparsely distributed species with high habitat specificity and moderate threats. Currently secure state or regional endemics ranked G3 or higher are placed on the WYNDD “Watch List”. These species could become species of concern in the future if subjected to severe habitat loss or disturbance. High priority plants are those that are most vulnerable to extinction and listing under the ESA. Medium and Low priority species are less likely to be extirpated globally, but may still be of significant conservation concern regionally or on individual Forests. Watch list species should be evaluated periodically to identify possible downward trends that may make them higher priority candidates for Sensitive designation.

Insert Table 1

Table 2.

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.

I. HIGH PRIORITY SPECIES

ARABIS CRANDALLII [G4/S1]

Occurrences in Wyoming: Known from 3 occurrences in Wyoming, all discovered since 1968 (most recently in 1995).

Abundance: Not known.

Range: Regional endemic of southwest Colorado and southwest Wyoming. In Wyoming, known only from the Great Divide and Washakie basins and Rock Springs Uplift in Carbon and Sweetwater counties.

Trends: Not known.

Protection Status: All Wyoming populations occur on public lands managed for multiple use or in the BLM/private land checkerboard.

Threats: Not known, although some habitat may occur in areas being actively mined for coal east of Rock Springs.

Managed Areas: Found on lands managed by the BLM Rawlins District and Ashley National Forest (Flaming Gorge NRA). Populations may also occur on BLM Rock Springs Field Office within the checkerboard.

Comments: The rank of this species should be revised to G2 based on its currently known range and abundance in Wyoming and Colorado (Fertig 1999f).

References: Dorn 1992; Fertig 1999f; Fertig et al. 1998; Refsdal 1996; Rollins 1941, 1993.

ASTRAGALUS DIVERSIFOLIUS VAR. *DIVERSIFOLIUS* [G3/SH]

This regional endemic is known from a single vague, historical report from the Green River Basin in western Wyoming (Barneby 1989). Although listed as Sensitive in USFS Region 4, it has not been documented on any of the National Forests in the Wyoming portion of the region (although it is known from USFS lands in Idaho).

ASTRAGALUS PAYSONII [G3/S2]

Occurrences in Wyoming: Known from 36 occurrences in the state, 30 of which have been discovered or observed since 1992.

Abundance: Average occurrences are extremely small and restricted in area, often with fewer than 20 plants in 1/2 acre of habitat. Only 3-4 Wyoming occurrences are notably large, containing over 100 plants.

Range: Regional endemic of east-central Idaho and western Wyoming. In Wyoming, it is known from the Wyoming, Salt River, and Gros Ventre ranges (Lincoln, Sublette, and Teton counties).

Trends: Historically, this species is probably in decline due to fire suppression in western National Forests. Most populations are very small and probably are unable to persist over long periods of time without some form of disturbance. Today, the plants thrive best in human-disturbed sites, such as road cuts and recovering clear-cuts.

Protection Status: No EOs are currently found within a designated special management area. One record is found within the proposed Fall Creek Special Botanical Area (Bridger-Teton NF). All other occurrences are on National Forest lands that receive no special management.

Threats: Threatened primarily by succession which makes habitats unsuitable for long-term persistence. This species requires periodic disturbances to create new habitat or keep competing late-seral species or weeds at bay.

Managed Areas: Known occurrences are restricted to Bridger-Teton NF (Big Piney, Kemmerer, Greys River, and Jackson RDs).

References: Barneby 1944, 1964; Clark et al. 1989; Croft et al. 1997; Dorn and Dorn 1980; Fertig 1996a; Fertig and Jones 1994a; Fertig and Marriott 1993; Fertig et al. 1994; Hartman 1995; Hartman and Nelson 1993, 1994; Hitchcock and Cronquist 1961; Lorain 1990; Markow and Fertig 1993; Rydberg 1927; Shultz and Shultz 1978.

DESCURAINIA TORULOSA [G1/S1]

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 may not represent this species (Dorn 1989b). Rollins (1993) recognizes only the type population (Brooks Lake, Fremont County) as authentic.

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

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 Field Office suggest at least a severe short-term decline (B. Amidon, personal comm.).

Protection Status: Two occurrences in the BLM Rock Springs Field Office are protected within Special Status Plant ACECs (established under the Green River Resource Area Management Plan in 1997). Two populations in the Absaroka Range are in the North Absaroka and Washakie Wilderness Areas. A taxonomically questionable population is found in the BLM's Carter Mountain ACEC. All other occurrences are on public lands managed for multiple use. This species 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 plants rugged habitat.

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

Comments: Genetic studies by Bricker and Brown (1998) suggest that *D. torulosa* should be considered a variety of *D. incana*.

References: Bricker and Brown 1998; Clark et al. 1989; Croft et al. 1997; Dorn 1989b, 1992; Fertig 1992a, 1992b, 1992d, 1995c, 1997a, 1998a; Fertig et al. 1994, 1998; Marriott 1988a, 1988b, 1991a, 1992b; Mills and Fertig 1996a; Rollins 1983, 1993; Rosenthal 1998, 1999; Scott 1997; Snow 1984; USDA Forest Service 1989, 1991.

PHACELIA GLANDULOSA VAR. *DESERTA* [G4T1T2Q/S1?]

Occurrences in Wyoming: Known from approximately 4-8 extant populations discovered between 1987 and 1998 and several vague historical collections.

Abundance: Populations vary in size from very small (fewer than 10 plants) to locally abundant (4000-6000 individuals). Total population probably numbers 20,000-25,000 (Fertig 1999d).

Range: Apparently endemic to Wyoming, although populations may also occur in northeast Utah.

In Wyoming, it is known from the Green River and Washakie basins in Lincoln, Sublette, and Sweetwater counties.

Trends: Not known, but probably stable.

Protection Status: All known occurrences are on public lands managed for multiple use, including water storage, flood control, recreation, livestock grazing, and mineral development.

Threats: Populations may be threatened by surface disturbances associated with mineral exploration or off-road vehicle recreation.

Managed Areas: Occurs on lands managed by the BLM Kemmerer, Pinedale, Rawlins, and Rock Springs Field Offices and Ashley National Forest (Flaming Gorge National Recreation Area).

Comments: This variety is being resurrected by Duane Atwood of Brigham Young University, a long-time student of the genus. Variety *deserta* differs from typical *glandulosa* in having primarily gray, non-glandular pubescence on the upper stems. Intermediates are common throughout the range of the two taxa and glandular hairs can be lost during pressing and drying of specimens, raising some doubts that the two varieties are truly distinct. Fertig (1999d) conducted a range wide status survey in 1998 and concluded that *P. glandulosa* var. *deserta* may only be a genetic variant and not worthy of formal taxonomic recognition.

References: Atwood 1975; Coulter and Nelson 1909; Cramer and Hartman 1996; Fertig 1998 b, 1999d; Fertig et al. 1998; Nelson 1898; Refsdal 1996; Ward et al. 1998.

STEPHANOMERIA FLUMINEA [G2?/S2]

Occurrences in Wyoming: Known from 5-6 occurrences in Wyoming.

Abundance: Population size not known.

Range: State endemic restricted to the Gros Ventre, Snake, and South Fork Shoshone river drainages in Park, Sublette, and Teton counties.

Trends: Not known.

Protection Status: Several occurrences are protected in Grand Teton National Park.

Threats: Some populations could be negatively impacted by gravel quarrying in river bottoms.

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

References: Gottlieb 1999.

THELESPERMA CAESPITOSUM [G1/S1]

Occurrences in Wyoming: Known from 2 occurrences (consisting of 12 subpopulations) in Wyoming. Most recently surveyed in 1998.

Abundance: Total population estimated at 26,500-31,500 in 1997-98 survey (Fertig 1999). Area of occupied habitat probably no more than 22 acres (all within a 2.5 square mile radius).

Range: Regional endemic of SW Wyoming and NE Utah. In Wyoming, it is known only from the Green River Basin in the vicinity of the city of Green River.

Trends: Disturbance from road construction and off-road vehicles has resulted in some habitat loss and mortality at one of the two sites in Wyoming.

Protection Status: All known occurrences are on public or city park lands managed for multiple use and recreation.

Threats: Highly threatened by habitat loss and disturbance from off-road vehicles and road construction. Also threatened by oil and gas development and expansion of residential housing in the city of Green River.

Managed Areas: Occurs on FMC Park (city of Green River) and lands managed by the BLM Rock

Springs Field Office and Ashley National Forest (Flaming Gorge NRA).
References: Delmatier 1998; Dorn 1990, 1992; Fertig 1995e, 1999e; Fertig et al. 1994, 1998;
Hansen 1998; Hartman and Refsdal 1995; Refsdal 1996; USDI Bureau of Land
Management 1997.

THELESPERMA PUBESCENS [G1/S1]

Occurrences in Wyoming: Known from 4 occurrences in Wyoming.

Abundance: Dorn (1989c) estimated the total population at 9200 plants covering 270 acres. This estimate is probably conservative, based on observations by Marriott (1988c) and Fertig.

Range: Regional endemic of southwestern Wyoming and northeast Utah. In Wyoming, known only from the northern foothills of the Uinta Range in Sweetwater and Uinta counties.

Trends: Probably stable at present.

Protection Status: All 4 known populations are within Special Status Plant ACECs established in 1997 by the BLM (USDI Bureau of Land Management 1997). *T. pubescens* was formerly a C2 candidate for listing under the Endangered Species Act and is listed as Sensitive by US Forest Service Region 4.

Threats: Populations are potentially threatened by surface disturbances associated with oil and gas exploration and development. Rim populations could also be adversely impacted by motorized recreational vehicles.

Managed Areas: Occurs on lands managed by the BLM Rock Springs District and Wasatch-Cache National Forest.

References: Dorn 1983, 1989c, 1992; Fertig et al. 1994, 1998; Hartman and Refsdal 1995; IHI Environmental 1995; Marriott 1998b, 1988c; Refsdal 1996.

II. MEDIUM PRIORITY SPECIES

ARABIS SELBYI [G4?Q/S1]

Occurrences in Wyoming: Known from 4 occurrences in Wyoming, all observed since 1981.

Abundance: Not known.

Range: Regional endemic of southwestern Wyoming, western Colorado, eastern Utah, and northwestern New Mexico (Rollins 1993). In Wyoming, known only from the Flaming Gorge area and southern Washakie Basin in Sweetwater County.

Trends: Unknown.

Protection Status: One population is found within the BLM Red Creek ACEC. All other known occurrences are on public lands managed for multiple use.

Threats: Habitat may be threatened by high recreational use.

Managed Areas: Known occurrences are on lands managed by Ashley National Forest (Flaming Gorge NRA), and the BLM Rawlins and Rock Springs Field Offices.

References: Dorn 1992; Fertig et al. 1998; Rollins 1993.

ASTER MOLLIS [G3/S2]

Occurrences in Wyoming: Known from 34 extant and 2 historical in Wyoming, 32 of which have been discovered or relocated since 1990 (most recently in 1999).

Abundance: Many populations are locally abundant, containing several thousand individual plants.

Accurate censuses have been difficult to attain at some sites, however, due to the presence of hybrid individuals and other difficulties in making positive identifications.
Range: Endemic to Wyoming. Restricted to the Bighorn Range in Big Horn, Johnson, Natrona, Sheridan, and Washakie Counties and Hoback Canyon (Gros Ventre Range) in Sublette County.

Trends: Probably stable, although trend data are lacking for most populations.

Protection Status: Three occurrences are protected in The Nature Conservancy's Tensleep Preserve. One population also occurs within the Bull Elk Park Research Natural Area. Ten populations are found within the potential Devil Canyon, Dry Fork, Elephant Head, Pete's Hole, McLain Lake, Poison Creek, Tongue River, and Mann Creek Research Natural Areas. This species is listed as Sensitive in US Forest Service Regions 2 and 4 and was formerly a C2 candidate for listing under the Endangered Species Act.

Threats: Grazing and trampling have been identified as potential threats, although low levels of herbivory or disturbance do not appear to have a negative impact.

Managed Areas: Found on lands managed by Bighorn and Bridger-Teton National Forests and the BLM Buffalo, Casper, and Worland Field Offices.

References: Bighorn National Forest 1992; Croft et al. 1997; Fertig 1992c, 1999a, 1999b, Fertig et al. 1994; Hartman and Nelson 1993, 1994; Jones 1984; Jones and Fertig 1998; Marriott 1992a; Welp et al. 1998b, 1998c, 1998e, 1998f, 1998g, 1998h, 1998i.

ASTRAGALUS LEPTALEUS [G4/S1]

This species is listed as Sensitive on Targhee National Forest, but has not been documented from the Wyoming portion of the Forest. Only two records are known from the state, both located along the east side of the Sierra Madre in Medicine Bow National Forest.

ASTRAGALUS NELSONIANUS [G2/S2]

Synonym: *Astragalus pectinatus* var. *platyphyllus*

Occurrences in Wyoming: Known from 24 records in Wyoming, 17 of which have been observed since 1980. Four records are historical.

Abundance: Population census data are lacking for nearly all occurrences. One site observed in 1995 was found to consist of relatively few, widely scattered individuals over 20 + acres.

Range: Regional endemic of SW Wyoming, NE Utah, and NW Colorado. In Wyoming, it is known from the Wind River, Green River, Washakie, Southern Powder River, and Great Divide basins, the Owl Creek Mountains, and the Rock Springs Uplift (Fremont, Natrona, and Sweetwater counties).

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

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

Threats: Threats include habitat disturbance associated with oil and gas development and off-road vehicle recreation. At present, these threats are low within much of its habitat.

Managed Areas: Found on public lands managed by the BLM Casper, Lander, Rawlins, and Rock Springs Field Offices and Ashley National Forest (Flaming Gorge National Recreation Area).

References: Barneby 1964, 1989; Dorn 1992; Fertig 1999f; Fertig et al. 1998; Jones and Fertig 1996; Refsdal 1996; Roderick et al. 1999; Spackman et al. 1997; Ward 1998; Ward et al. 1998; Welp 1997; Welp et al. 1996.

ASTRAGALUS TERMINALIS [G3/S1]

Occurrences in Wyoming: Known from 5 extant and 2 historical records in Wyoming, three of which have been relocated or discovered since 1995. Several of the records are in close proximity and may need to be combined with additional study.

Abundance: Population size is not known, although the species appears to be restricted to narrow corridors of river cobblestone habitat. Shaw (1976) refers to Grand Teton NP populations as "common".

Range: Regional endemic of C Idaho, SW Montana, and NW Wyoming. In Wyoming, known only from Jackson Hole and the foothills of the Gros Ventre Range (Teton County).

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

Protection Status: At least 4 occurrences are found in Grand Teton National Park or the National Elk Refuge. Other records are from National Forest lands, but not within special management areas.

Threats: Populations outside of the park may be potentially threatened by gravel quarrying.

Managed Areas: Known from Bridger-Teton NF, Grand Teton NP, and the National Elk Refuge.

References: Barneby 1964, 1989; Clark et al. 1989; Culver and Marriott 1989; Lesica and Shelly 1991; Dorn 1992; Fertig 1998b; Hartman 1996.

BRAYA GLABELLA [G5/S1]

Occurrences in Wyoming: Known from 2 occurrences in Wyoming, both discovered since 1994 (most recently in 1998).

Abundance: Populations are small and highly localized.

Range: Disjunct; in Wyoming known only from the Gros Ventre Range in Sublette and Teton counties.

Trends: Not known.

Protection Status: The entire state range is found within the Gros Ventre Wilderness Area in Bridger-Teton National Forest.

Threats: Population size appears to be very small, making the species vulnerable to chance disturbances. Otherwise, the habitat is highly protected and receives little use.

Managed Areas: Occurs on Bridger-Teton National Forest.

References: Fertig 1998d, 1999b; Rollins 1993; Spackman et al. 1997.

CALAMAGROSTIS KOELERIOIDES [G5/SH]

Occurrences in Wyoming: Known from 2 historical records reported by J.R. Swallen to C.L. Porter in a letter dated 5 January 1950. Both records are believed to date from 1901 or earlier.

Abundance: No census data are available, as the reported Wyoming populations have not been located since at least 1901. This species may be extirpated in the state.

Range: Peripheral; in Wyoming, known only from the Teton Range and Jackson Hole areas in Teton County.

Trends: Not known; may be extirpated in Wyoming (this species has not been located since at least 1901).

Protection Status: Occurs on public lands managed for multiple use.

Threats: May be impacted by grazing, road construction, or recreation activities.

Managed Areas: The reported populations are thought to have come from Bridger-Teton National Forest and possibly from the Targhee NF.

Comments: This species is difficult to identify and all recent collections have proven to be

something else (most often *C. RUBESCENS*). The Wyoming specimens from the US Herbarium should be studied to determine if they are authentic.
References: Clark et al. 1989; Dorn 1992; Hitchcock et al. 1969.

CAREX INCURVIFORMIS [G4G5T3/S2]

Synonyms: *Carex incurviformis* var. *danaensis*, *C. maritima*.

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

Abundance: Population sizes are not known for most occurrences.

Range: Sparse; 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 the Bridger, Fitzpatrick, North Absaroka, and Washakie Wilderness Areas. Two of these populations are also found in proposed or potential research natural areas on Osborn and Arrow mountains (Fertig 1999b). All other populations are on public lands managed for multiple use. This species is listed as Sensitive in USFS Region 4.

Threats: Threats are probably low due to the plant's remote and rugged alpine habitat.

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

References: Dorn 1992; Evert 1982; Fertig 1998a, 1999b; Fertig and Jones 1994c; Fertig et al. 1994; Hermann 1970; Jones and Fertig 1999a; Lesica and Shelly 1991; Mills and Fertig 1996a; Scott 1997.

CAREX LUZULINA VAR. *ATROPURPUREA* [G5T3/S2]

Occurrences in Wyoming: Known from 10 occurrences in Wyoming, 6 of which have been discovered since 1990.

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 wildernesses). 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.

References: Dorn 1988, 1992; Fertig et al. 1991; Fertig 1992a, 1992b, 1998a; Fertig et al. 1994; Hartman 1995; Heidel 1996; Mills and Fertig 1996a; Scott 1997.

CICUTA BULBIFERA [G5/S1]

Occurrences in Wyoming: Known from one location in Wyoming, first observed in 1988.

Abundance: Not known.

Range: Disjunct in NW Wyoming and adjacent Idaho. In WY, known only from Indian Lake, less than 1 mile east of the Idaho state border.

Trends: Trends unknown.

Protection Status: The single known occurrence is on public lands managed for recreation and multiple use.

Threats: May be threatened by loss of wetlands or pollution.
Managed Areas: Occurs in Targhee National Forest.
References: Markow and Fertig 1993; Moseley et al. 1991.

CIRSIUM OWNBEYI [G3/S2]

Occurrences in Wyoming: Currently known from 7 extant occurrences in the state, 5 of which were discovered in 1998.

Abundance: State population estimated at 56,000-75,000 in 1998 (Fertig 1999c).

Range: Regional endemic of NE Utah, NW Colorado and SW Wyoming. In Wyoming known only from the Flaming Gorge area of the Green River Basin and southern Rock Springs Uplift in Sweetwater County.

Trends: Populations are probably stable, although corroborating long-term trend data are not available.

Protection Status: Most populations are on state or public lands managed for multiple use (primarily grazing and recreation). One population is found in the BLM's Currant Creek ACEC and one other is on a state section inside the Sage Creek ACEC (USDI Bureau of Land Management 1997). *C. ownbeyi* was formerly a C2 candidate for listing under the Endangered Species Act.

Threats: Threats appear low due to the rugged habitat of most populations and the unpalatability of the plant. Some populations may be vulnerable to herbicide spraying, biocontrol insects, or disturbance by recreational vehicles.

Managed Areas: Occurs on lands managed by the BLM Rock Springs Field Office, Flaming Gorge National Recreation Area (Ashley National Forest), and the state of Wyoming.

References: Atwood *et al.* 1991; Colorado Native Plant Society 1989; Dorn 1992; Fertig 1999c; Fertig et al. 1994, 1998; Hartman and Refsdal 1995; O'Kane 1988; Refsdal 1996; Spackman et al. 1997; Welsh 1982; Welsh et al. 1993.

CRYPTANTHA ROLLINSII [G4/S1]

Occurrences in Wyoming: Known from 2 confirmed records (both observed since 1995), one probable record (specimen lacks mature fruit), and one literature report (Dorn 1992 b) in Wyoming.

Abundance: Census information from one population suggests that colonies are localized and small.

Range: Regional endemic of Utah and SW Wyoming. In Wyoming, known from the Green River Basin and northern foothills of the Uinta Range in Sweetwater County.

Trends: Not known.

Protection Status: One occurrence is within Seedskadee National Wildlife Refuge. Other populations in the state are found on public lands managed for multiple use. Formerly considered a C2 candidate for listing under the Endangered Species Act.

Threats: Not known.

Managed Areas: Found on lands managed by the BLM Rock Springs Field Office, Seedskadee National Wildlife Refuge and Flaming Gorge NRA (Ashley National Forest).

References: Cronquist et al. 1984; Dorn 1992; Fertig et al. 1998; Refsdal 1996; Spackman et al. 1997.

CRYPTOGRAMMA STELLERI [G5/S1]

Occurrences in Wyoming: Known from 5 extant occurrences, 3 of which have been located since

1990 (most recently in 1996) and 1 historical record.
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).
Ranges: Disjunct; in Wyoming, known from the Wind River, Teton, Wyoming, and Bighorn ranges and Yellowstone Plateau (Fremont, Sheridan, Park, and Teton counties).
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. 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 National Park.
References: Cronquist et al. 1972; Dorn 1992; Evert (no date); Fertig 1998a, 1999a; Hartman et al. 1991; Hitchcock et al. 1969; Jones and Fertig 1998; Lellinger 1985; Markow and Fertig 1993.

DESCURAINIA PINNATA VAR. *PAYSONII* [G5T3?/S2]

Synonym: *Descurainia incisa* ssp. *paysonii*.

Occurrences in Wyoming: Known from 7 extant occurrences in Wyoming, all of which have been observed since 1973 (the most recent in 1997). and two somewhat vague historical records.
Abundance: Not known, but reported as "common" at 2 sites.
Range: Regional endemic of southwestern Wyoming, eastern Utah, western Colorado, and northern Arizona; in Wyoming, known from the Washakie and Green River basins in Carbon and Sweetwater counties.
Trends: Not known.
Protection Status: Two populations are found in ACECs (Greater Sand Dunes and Sand Hills) managed by the BLM Rawlins and Rock Springs districts. An additional population is found in the Adobe Town Wilderness Study Area. All other occurrences are on public lands managed for multiple use.
Threats: Populations may be impacted by motorized recreation on stabilized sand dunes.
Managed Areas: Found on lands managed by the BLM Rawlins and Rock Springs Field Offices and Flaming Gorge National Recreation Area (Ashley NF).
References: Detling 1939; Dorn 1992; Fertig et al. 1998; Rollins 1993; Ward et al. 1998; Welsh et al. 1993.

DRABA JUNIPERINA [G3Q/S2]

Occurrences in Wyoming: Known from 14 occurrences in Wyoming, all observed since 1977 (4 have been discovered or relocated since 1995).
Abundance: Populations may be extremely abundant locally, although the range of the species is relatively small. The largest known occurrence contains an estimated 800,000-1.5 million plants in an area of at least 360 acres.
Range: Regional endemic of southwest Wyoming and northeast Utah. In Wyoming, known only from the Flaming Gorge-Rock Springs Uplift and Overthrust Belt in Sweetwater and Uinta counties.
Trends: Trend is probably stable.

Protection Status: At least 4 occurrences are found within the BLM Currant Creek, Red Creek, and Sage Creek ACECs (USDI Bureau of Land Management 1997) and one is in the Red Creek Badlands Wilderness Study Area. Most other occurrences are on public lands managed primarily for recreation, livestock grazing, and mineral development.

Threats: Most populations appear to be secure, although some may be negatively impacted by recreational activities (especially off-road vehicles and unregulated camping). Populations at the greatest risk are those near roadsides on erosive soils.

Managed Areas: Occurs on lands managed by the BLM Rock Springs Field Office and Ashley National Forest (Flaming Gorge National Recreation Area).

Comments: Treated as a variety of *D. oligosperma* by Welsh *et al.* (1993). Rollins (1993) considers *juniperina* to be an apomictic morph of *D. oligosperma*. No studies have addressed the breeding system of *D. juniperina* to resolve this taxonomic impasse. Due to its high population size, this species will probably be moved to the WYNDD Watch List in the future.

References: Dorn 1978, 1992; Fertig *et al.* 1998; Lichvar 1983; Refsdal 1996; Rollins 1993; Welsh *et al.* 1993.

DRABA PAYSONII VAR. *PAYSONII* [G5T3?/S2]

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.

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 or SBA 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.

References: Dorn 1992; Fertig 1992a, 1992b, 1997a, 1998a; Fertig and Jones 1994c; Hitchcock 1941; Jones and Fertig 1999b; Rollins 1993; Rosenthal 1998, 1999; Scott 1997.

ERIGERON LANATUS [G3G4/S1]

Occurrences in Wyoming: Known from 2 extant occurrences in Wyoming.

Abundance: Populations are typically small and restricted to a small area of suitable habitat.

Range: Disjunct; in Wyoming, known only from the northwestern Wind River Range in Sublette County.

Trends: Populations appear to be stable based on observations from 1990-94.

Protected Areas: Both known populations are within the Bridger Wilderness area. Listed as Sensitive in USFS Regions 2 and 4.

Threats: Threats are minimal due to the ruggedness and low use of its habitat.

Managed Areas: Wyoming occurrences are all within Bridger-Teton National Forest (Pinedale

Ranger District).

References: Cronquist 1955; Dorn 1992; Fertig 1992a, 1992b, 1999b; Fertig et al. 1991, 1994; Lesica and Shelly 1991; Scott 1997; Spackman et al. 1997.

ERIOPHORUM SCHEUCHZERI [G5/S1]

Occurrences in Wyoming: Known from one extant occurrence in Wyoming (last observed in 1997), and two old records dating from 1955-1956.

Abundance: Not known, but presumed to be low.

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

Trends: Unknown.

Protection Status: Two occurrences are found in the Bridger and Fitzpatrick Wilderness Areas. Other known populations are on public lands managed for multiple use.

Threats: Could be impacted by high recreation use or alteration of alpine wetland habitats.

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

References: Cronquist et al. 1977; Dorn 1977, 1992; Fertig 1992b, 1998a; Hulten 1968; Porsild and Cody 1980; Rosenthal 1998, 1999; Scott 1997.

GLOSSOPETALON SPINESCENS VAR. *MEIONANDRUM* [G5T3/S1]

Synonym: *Forsellesia meionandra*.

Occurrences in Wyoming: Known from 3 occurrences in Wyoming, all observed since 1980.

Abundance: May be locally abundant in small areas of suitable habitat.

Range: Regional endemic of eastern Utah, western Colorado, and southwestern Wyoming. In Wyoming, known only from the Flaming Gorge area in Sweetwater County.

Trends: This species may have lost habitat following the creation of Flaming Gorge Reservoir.

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

Threats: May be threatened by loss of habitat due to flooding, or mining activity. Most extant populations, however, occur in rugged or poorly accessible locations that may be naturally protected.

Managed Areas: Found on lands managed by the BLM Rock Springs Field Office and Ashley National Forest (Flaming Gorge NRA).

References: Cronquist et al. 1997; Dorn 1992 b; Fertig et al. 1998; Welsh et al. 1993.

HAPLOPAPPUS MACRONEMA VAR. *LINEARIS* [G4G5T3/S2]

Synonyms: *Ericameria discoidea* var. *linearis*, *Haplopappus macronema* var. *canescens*.

Occurrences in Wyoming: Known from 17 extant occurrences in Wyoming, all of which have been discovered or relocated since 1981 (most recently in 1998). Also known from at least 6 historical records, several of which are too vague to be located.

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 Absaroka and Wind River ranges, Gros Ventre drainage, Yellowstone Plateau, and Overthrust Belt in Fremont, Lincoln, Park, Sublette, 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 at least two populations are 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).

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.

Managed Areas: Found on lands managed by Bridger-Teton and Shoshone NF, Yellowstone NP, Wind River Indian Reservation, and the BLM Kemmerer Field Office.

Comments: Two distinctive pubescence morphs exist (often mixed in the same population): a green-glandular phase and a grey-woolly phase. Additional systematic study is warranted to determine if these morphs warrant varietal recognition (Fertig 1996b).

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

JUNCUS TRIGLUMIS VAR. *ALBESCENS* [G5T5/S1]

Occurrences in Wyoming: Known from 5 extant occurrences, all discovered or relocated since 1990 (most recently in 1998) and one vague, old record (from 1961) in Wyoming.

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. Reports from the Beartooth Range are now known to represent var. *triglumis* (Hermann and Weber 1977).

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.

References: Cronquist et al. 1977; Dorn 1992; Fertig 1992a, 1992b, 1998a; Fertig et al. 1991; Hermann 1970; Hermann and Weber 1977; Johnson 1962; Jones and Fertig 1999a; Lesica and Shelly 1991; Mills and Fertig 1996b; Rosenthal 1998, 1999; Scott 1997.

LEPIDIUM PAYSONII [G3?/SH]

Occurrences in Wyoming: Known from a single historical record in Wyoming, last observed in 1922.

Abundance: Not known. Species may not be extant in Wyoming.

Range: Regional endemic of southwestern Idaho, western Wyoming and western Colorado. In Wyoming, known only from the Wyoming Range (Sublette County).

Trends: Not known.

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

Threats: Not known.

Managed Areas: Only Wyoming occurrence is on lands managed by Bridger-Teton National Forest

(Big Piney RD).

References: Rollins 1993.

LEPTODACTYLON WATSONII [G3?/S1]

Occurrences in Wyoming: Known from 4 occurrences in Wyoming, all of which have been relocated or discovered since 1984 (most recently in 1997).

Abundance: Known populations are all very small (often with fewer than 10 plants) and restricted to specialized microsites.

Range: Peripheral; in Wyoming, known from the Wind River Canyon (Fremont and Hot Springs counties), Flaming Gorge (Sweetwater County), and the west slope of the Bighorn Range (Washakie County).

Trends: Populations may be stable, but trends are not well known.

Protection Status: All known populations are on public or tribal lands managed for multiple use. One occurrence on Bighorn National Forest is within the potential Tensleep Canyon Research Natural Area (Welp et al. 1998).

Threats: Threats appear to be minimal at known sites due to the ruggedness of the plant's habitat.

Managed Areas: Occurs on lands managed by Bighorn National Forest, Flaming Gorge National Recreation Area (Ashley NF), and the Wind River Indian Reservation.

Comments: The G3? Rank of this species seems low, given its broad range. A rank of G4 may be more appropriate (Fertig 1999f).

References: Cronquist et al. 1984; Dorn 1992; Fertig 1999a; Fertig et al. 1998; Hartman et al. 1985; Welp et al. 1998a.

LESQUERELLA CARINATA VAR. *CARINATA* [G3G4T3T4/S1]

Occurrences in Wyoming: Known from 5 extant occurrences in Wyoming, all of which have been relocated or discovered since 1990 (4 were found in 1996 survey by Fertig). Two other historical records are known in the state, one of which is questionable (it may represent the closely related species *L. paysonii*).

Abundance: 1996 surveys estimated the state population at 50,000-60,000 individuals in 445 acres of habitat (Fertig 1997b).

Range: Regional endemic of NW Wyoming and EC Idaho. In Wyoming, known only from Jackson Hole and the adjacent Teton and Gros Ventre ranges in Teton County.

Trends: Trend data are not available for most sites, but the species is thought to be stable at the present time. Some potential habitat has probably been lost as Jackson has expanded, suggesting that the species has experienced an historical decline.

Protection Status: All or part of all 5 extant occurrences are within protected areas managed for wildlife values. Two populations are protected in Grand Teton National Park and 3 occur within the National Elk Refuge. Other populations on Bridger-Teton and Targhee National Forests occur on lands managed for multiple use. Formerly a C2 candidate for listing under the Endangered Species Act.

Threats: May be impacted by recreation, grazing, competition from exotic plants, mineral development, and impacts from wildlife.

Managed Areas: Occurs in Bridger-Teton and Targhee National Forests, Grand Teton National Park, and the National Elk Refuge.

References: Croft et al. 1997; Fertig 1997b, 1998b; Fertig et al. 1994; Greenlee 1994; Markow and Fertig 1993; Marriott 1990; Rollins 1950, 1993; Rollins and Shaw 1973; Schassberger 1991

LESQUERELLA MULTICEPS [G3/S1]

Occurrences in Wyoming: Known from one extant and one historical record in Wyoming (last observed in 1964).

Abundance: Unknown. Has not been relocated since 1964.

Range: Regional endemic of NE Utah, SE Idaho, and SW Wyoming. In Wyoming, found only in the Snake River Range and Bear River Divide in Lincoln County.

Trends: Not known.

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

Threats: Unknown.

Managed Areas: Found in Targhee National Forest (the WY portion managed by Bridger-Teton NF) and possibly in the BLM Kemmerer Field Office.

References: Fertig et al. 1998; Markow and Fertig 1993; Rollins 1993; Rollins and Shaw 1973.

MINUARTIA FILIORUM [G3G4/S1]

Occurrences in Wyoming: Known from 4 occurrences in Wyoming, all dating since 1990.

Abundance: Not known.

Range: Regional endemic of NW Wyoming, NE Utah, and C Colorado. In Wyoming, known from the Gros Ventre and NW Wind River mountains (Sublette and Teton counties).

Trends: Presumed stable.

Protection Status: All known occurrences are found within designated Wilderness areas (Bridger and Gros Ventre Wilderness areas).

Threats: Threats low in alpine scree habitat under current management.

Managed Areas: Occurs on Bridger-Teton National Forest.

Comments: The taxonomy of this species in Wyoming has been confusing. In Dorn (1992), these plants will key to *Arenaria stricta* var. *dawsonensis* [*Minuartia dawsonensis*]. Ron Hartman annotated all Wyoming specimens of this taxon as *Minuartia macrantha* in 1994 (Fertig 1996e; Scott 1997), but has recently re-annotated these specimens as *M. filiorum*.

References: Fertig 1992b, 1996e; Maguire 1946a, 1946b, 1958; Scott 1997.

OPUNTIA POLYACANTHA VAR. *JUNIPERINA* [G5T3?Q/S1]

Occurrences in Wyoming: Known from 4 extant locations, all discovered since 1993. Prior to this, the taxon was only known from reports in Benson (1982).

Abundance: Not known.

Range: Peripheral; known from the Green River Basin in southwest Wyoming (Sublette and Sweetwater counties).

Trends: Not known.

Protection Status: One occurrence is within Seedskafee National Wildlife Refuge. All other populations are on public lands managed for multiple use.

Threats: Probably none.

Managed Areas: Occurs on land managed by the Ashley National Forest (Flaming Gorge National Recreation Area), the BLM Kemmerer Field Office, and Seedskafee National Wildlife Refuge.

References: Benson 1982; Cramer and Hartman 1996; Dorn 1992; Fertig et al. 1998; Refsdal 1996.

PEDICULARIS PULCHELLA [G3/S2]

Occurrences in Wyoming: Known from 14 extant occurrences, 8 of which have been relocated or discovered since 1989.

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 14 known occurrences are found in the 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.

Comments: Recent surveys have found this species to be more widespread in remote alpine areas than once thought. It may warrant downgrading to WYNDD's Watch List in the near future.

References: Bighorn National Forest 1992; Dorn 1992; Evert 1986; Fertig 1998a, 1999a; Hartman 1995, 1996; Hitchcock et al. 1959; Pennell 1942.

PHIPPSIA ALGIDA [G5/S1]

Occurrences in Wyoming: Known from 3 occurrences in Wyoming, all of which have been discovered or relocated since 1984 (most recently in 1999).

Abundance: Populations are typically small and restricted to specialized microhabitats. Several populations surveyed on the Beartooth Plateau in 1996 consisted of colonies of ca 30 plants 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 (also reported for Fremont County by Scott, 1997).

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 has 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 and Line Creek/Twin Lakes RNAs.

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

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

References: Clark et al. 1989; Dorn 1992; Fertig 1997a, 1998a; Fertig and Bynum 1994a; Fertig and Jones 1994c; Hallsten et al. 1987; Johnson 1962; Lesica and Shelly 1991; Scott 1997; Spackman et al. 1997.

POTAMOGETON FRIESII [G4/S1]

Occurrences in Wyoming: Known from 4-5 occurrences in Wyoming, only 2 of which have been observed since 1984. One occurrence is considered historical (from 1947), and the others predate 1960. A report from Teton County cited in Haynes (1974) needs to be confirmed.

Abundance: Not known.

Range: Disjunct; in Wyoming known only from the Absaroka, Wind River, and Medicine Bow mountains and Jackson Hole in Carbon, Park, and Teton counties.

Trends: Not known.

Protection Status: At least one occurrence is found in Grand Teton National Park. Other populations are on public lands managed for multiple use or on private lands (Park County record).

Threats: Not known.

Managed Areas: Occurs in the Bridger-Teton and Medicine Bow National Forests and Grand Teton National Park.

References: Cronquist et al. 1977; Dorn 1992; Evert 1991; Haynes 1974; Hitchcock et al. 1969; Welsh et al. 1993.

POTAMOGETON ROBBINSII [G5/S1]

Occurrences in Wyoming: Known from 4 records in Wyoming, only 1 of which has been observed since 1960. One record from Yellowstone National Park is historical (1878).

Abundance: Current abundance unknown.

Range: Disjunct in Wyoming; Known from the Medicine Bow Range (Carbon Co.), Yellowstone Plateau (Teton Co.), and Wind River Range (Fremont and Sublette Cos.).

Trends: Unknown. Most occurrences are old or historical.

Protection Status: Two populations are protected in Yellowstone National Park and the Bridger Wilderness. One population is also found in the WY Game and Fish Department Whiskey Basin and Little Red Creek Wildlife Habitat Management Area. Other occurrences are on public lands managed for multiple use.

Threats: Threats not known. May be sensitive to changes in water quality.

Managed Areas: Occurs in Bridger-Teton and Medicine Bow National Forests and Yellowstone National Park.

References: Cronquist et al. 1977; Dorn 1992; Gleason and Cronquist 1991; Great Plains Flora Association 1986; Harrington 1954; Welsh et al. 1993.

POTAMOGETON STRICTIFOLIUS [G5/S1]

Occurrences in Wyoming: Known from 3 records in Wyoming, all of which were observed between 1953-1964. A recent (1994) report needs to still be confirmed.

Abundance: Not known.

Range: Disjunct; in Wyoming, known only from the Yellowstone Plateau, NW Wind River Range, and Laramie Basin in Albany, Sublette, and Teton counties. A recent report from Sweetwater County needs to be confirmed (Cramer and Hartman 1996).

Trends: Not known.

Protection Status: The only protected occurrence in Wyoming is in Yellowstone National Park. Other populations are on public lands managed for multiple use.

Threats: Not known, although water pollution and diversion are potential threats.

Managed Areas: Occurs on lands managed by the BLM Rawlins District, Bridger-Teton NF, and Yellowstone NP.

References: Cramer and Hartman 1996; Cronquist et al. 1977; Dorn 1992.

POTENTILLA HYPARCTICA [G4G5/S1]

Occurrences in Wyoming: Known from 2 extant occurrences in Wyoming, all discovered since

1988 (most recently in 1991).
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.
References: Dorn 1992; Fertig 1992a, 1992b, 1998a; Hulten 1968; Scott 1997.

POTENTILLA UNIFLORA [G5/S2]

Occurrences in Wyoming: Known from at least 6 extant occurrences in Wyoming, although reported from 8-10 sites by Scott (1997).
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 3 occurrences are found in the North Absaroka, Washakie, and Gros Ventre wilderness areas. Populations are also found in the proposed Line Creek/Twin Lakes Research Natural Area and potential Sheep Mesa RNA.
Threats: Not known.
Managed Areas: Occurs on lands managed by Bridger-Teton and Shoshone National Forests.
References: Fertig 1998a; Fertig and Bynum 1994a; Hartman 1995; Jones and Fertig 1999e; Lesica and Shelly 1991; Scott 1997.

PRIMULA EGALIKSENSIS [G4/S1]

Occurrences in Wyoming: Known from only 2 occurrences in Wyoming, each observed since 1992 (most recently observed in 1999).
Abundance: The total state population is estimated at 10,000-14,000 plants and is restricted and is restricted to about 105 acres of habitat.
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 Comments: 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 NF.
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).
References: Evert 1986; Fertig 1992a, 1992b, 1995c, 1996d, 1998a; Fertig and Jones 1992; Fertig et al. 1991, 1994; Hulten 1968; Kelso 1991; Mills and Fertig 1996a; Sanderson and March 1996; Rosenthal 1998, 1999; Spackman et al. 1997.

RORIPPA CALYCINA [G3/S2S3]

Occurrences in Wyoming: Known from 23 occurrences in Wyoming, all of which have been observed since 1977. Total population consists of more than 70 subpopulations, some of which were formerly recognized as separate occurrences.

Abundance: Fertig and Welp (1998) conservatively estimated the total state population at 15,000-25,000 plants based on surveys of 27 subpopulations in 1997.

Range: Regional endemic of Wyoming, North Dakota, and Montana with one disjunct population in the Northwest Territories of Canada. In Wyoming, it is known from the North Platte River drainage, and Bighorn, Green River, Laramie, Great Divide, and Wind River basins (Albany, Big Horn, Carbon, Fremont, Park, Sweetwater, and Washakie counties).

Trends: Long-term trend data are not available for most populations. Individual colonies appear to vary in size and area from year to year in response to flooding levels.

Protection Status: Eleven populations are on protected lands managed by The Nature Conservancy (Red Canyon Ranch), US Fish and Wildlife Service (Pathfinder National Wildlife Refuge), BLM Red Canyon ACEC (Rawlins District), and Wyoming state parks (Boysen, Buffalo Bill, and Seminoe). All other known populations are on public or private lands managed for multiple use. This species was formerly a C2 candidate for listing under the Endangered Species Act.

Threats: The primary threat comes from changes in water management that reduce the periodicity of flooding. Other threats include competition from exotic plants, herbicide spraying, trampling by livestock, recreational activities, and pollution associated with coal mining.

Managed Areas: Occurs on lands managed by Ashley National Forest (Flaming Gorge National Recreation Area), Bighorn Canyon National Recreation Area, Pathfinder National Wildlife Refuge, and the BLM Cody, Lander, Rawlins, and Worland Field Offices. Also present on Wyoming state park lands at Boysen, Buffalo Bill, and Seminoe Reservoirs.

References: Clark and Dorn 1981; Dorn 1992; Dorn and Dorn 1980; Fertig 1995d, 1999a; Fertig and Welp 1998; Fertig et al. 1994, 1998; Hitchcock and Cronquist 1964; Lesica and Shelly 1991; Lichvar 1981; Refsdal 1996; Roderick et al. 1999; Stuckey 1972; Rollins 1993; Welp 1997; Welp et al. 1995, 1996.

SAUSSUREA WEBERI [G3Q/S2]

Synonym: Included in *Saussurea densa* by some authors.

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

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 Cos.) 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 2.

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

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

References: Dorn 1992; Fertig 1992a, 1992b, 1997a, 1998a; Fertig and Jones 1994c; Fertig et al. 1991, 1994; Hartman 1995; Hulten 1959; Jones and Fertig 1999a; Lesica and Shelly 1991; Marriott 1988a, 1991a; Mills and Fertig 1996a; O’Kane 1988; Rosenthal 1998, 1999; Scott 1997; Soreng 1984; Spackman et al. 1997.

SCIRPUS ROLLANDII [G3Q/S1]

Occurrences in Wyoming: Known from 3 extant occurrences in Wyoming, all discovered or last observed since 1992 (most recently in 1999).

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 area of Teton County and the Clarks Fork Valley in Park County.

Trends: Presumed to be stable.

Protection Status: 2 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 are minor.

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

References: Beetle 1941; Dorn 1992; Evert et al. 1986; Fertig 1995c, 1998a, 1998b; Fertig and Jones 1992; Fertig et al. 1994; Lesica and Shelly 1991; Mills and Fertig 1996a; Sanderson and March 1996; Spackman et al. 1997.

SILENE REPENS VAR. *AUSTRALIS* [G5T?/S1]

Occurrences in Wyoming: Known from one extant record (last observed in 1990) and one historical record in Wyoming.

Abundance: Not known.

Range: Regional endemic of NW Wyoming, EC Idaho, and SW Montana. In Wyoming known only from the Hoback Canyon area of Sublette and Teton counties.

Trends: Not known.

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

Threats: Not known.

Managed Areas: Occurs on Bridger-Teton National Forest.

References: Dorn 1992; Hitchcock and Maguire 1947.

VIOLA RENIFOLIA VAR. *BRAINERDII* [G5T5/S1]

Occurrences in Wyoming: Known from 4 extant occurrences in Wyoming (all of which have been discovered or relocated since 1984) and one vague historical record (Murie 366) which may be misidentified.

Abundance: Not known.

Range: Disjunct; in Wyoming known from the Black Hills (Crook County) and Teton Range (Teton County). A report from the southwestern Absarokas (Teton County) may be based on a misidentified specimen.

Trends: Not known.

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

Threats: Populations could be impacted by high recreation use or timber harvesting.

Managed Areas: Occurs on Black Hills and Targhee National Forests. A population has also been reported from Bridger-Teton NF.

References: Dorn 1992; Lesica and Shelly 1991; Markow 1994; Markow and Fertig 1993; Ode and Marriott 1990.

III. LOW PRIORITY SPECIES

ABIES CONCOLOR [G5/S1]

Occurrences in Wyoming: Known from one extant population and two historical, but unconfirmed reports (Cary 1917). Jerry Morris, an amateur botanist from Denver, has reported observing *A. concolor*/*A. lasiocarpa* hybrids south of Encampment (Carbon County). Other hybrid swarms between these two taxa have been observed by R. Dorn and W. Fertig in the mountainous areas of southern Sweetwater County.

Abundance: Dorn reported 100-300 individuals from the Little Mountain population in 1977. This area was resurveyed by W. Fertig in 1998 who observed a large stand of putative hybrid trees.

Range: Peripheral; in Wyoming, known only from Little Mountain area in southern Sweetwater County.

Trends: Population reported as stable by Dorn in 1977.

Protection Status: One population is found within the BLM Sage Creek ACEC. Other occurrences are found on public lands managed for multiple use.

Threats: Threats considered low by Dorn. Hybridization with *A. lasiocarpa* may be preventing this species from becoming more widely established in southern Wyoming.

Managed Areas: Occurs on lands managed by the BLM Rock Springs Field Office. Historical Reports may have occurred on Wasatch-Cache National Forest.

References: Cary 1917; Clark et al. 1989; Cronquist et al. 1972; Dorn 1992; Fertig et al. 1998; Hartman et al. 1980.

AGROSTIS OREGONENSIS [G4/S1]

Occurrences in Wyoming: Confirmed from 2 historical records in Wyoming, the most recent dating from 1900. Recently reported from one location in Park County by Erwin Evert.

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 Co. 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 Status: One occurrence is protected 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.

References: Dorn 1992; Evert 1991; Fertig 1998a; Harvey 1993; Hitchcock 1950; Hitchcock et al. 1969.

ANDROSACE CHAMAEJASME VAR. *CARINATA* [G5T4/S1S2]

Listed as Sensitive in the Bridger-Teton National Forest, although it has never been documented there despite the close proximity of known sites on Shoshone National Forest and the presence of some potential habitat in the northwestern Wind River Range and Teton Range.

References: Fertig 1992a; Fertig et al. 1994; Marriott 1991b.

ANTENNARIA MONOCEPHALA [G4G5/S1]

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

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.

References: Bayer and Stebbins 1993; Dorn 1992; Fertig 1992a, 1992b, 1998a, 1999a; Markow 1994, 1996; Markow and Fertig 1993; Rosenthal 1998, 1999; Scott 1997; Welsh 1974.

ARCEUTHOBIUM DOUGLASII [G5/S1]

Occurrences in Wyoming: Known from only 2 occurrences in Wyoming, both dating from 1962.

Abundance: Unknown.

Range: Peripheral; Known only from the Teton Range and Snake River Canyon in Wyoming (Lincoln and Teton Cos.).

Trends: No trend data are available.

Protection Status: No occurrences are found within special management areas. Both populations are found on National Forest lands.

Threats: May be threatened by efforts to control mistletoe. One occurrence is from a campground and may be threatened by fuel wood cutting or logging to enlarge facilities.

Managed Areas: Known Wyoming occurrences are found on Targhee National Forest lands managed by Bridger-Teton National Forest.

References: Cronquist et al. 1997; Dorn 1992; Hawksworth and Wiens 1972.

ASCLEPIAS CRYPTOCERAS SSP. *DAVISII* [G4T?/SH]

Occurrences in Wyoming: Known from a single historical record in Wyoming, last observed in the 1890s.

Abundance: Not known, may be extirpated in Wyoming.

Range: Peripheral; in Wyoming known only from the Snake River area in Lincoln County.

Trends: Not known.

Protection Status: Presumed to occur on public lands managed for multiple use.

Threats: Not known.

Managed Areas: May occur on lands managed by Bridger-Teton National Forest.

References: Cronquist et al. 1984; Woodson 1954.

ASPLENIUM TRICHOMANES-RAMOSUM [G4/S2]

Synonym: *Asplenium viride*.

Occurrences in Wyoming: Known from 9 extant and 2 historical records in Wyoming. Seven occurrences have been discovered or relocated since 1985.

Abundance: Individual populations are often small and highly localized, with fewer than 50 clusters of plants. Evert (no date), however, reports that this can be "the most frequently encountered fern of mesic limestone crevices in the Teton-Darby Canyon area".

Range: Disjunct; in Wyoming known from the Medicine Bow, Teton, Bighorn, and Gros Ventre ranges in Carbon, Sheridan, Sublette, Teton, and Washakie counties.

Trends: Not known.

Protection Status: Three occurrences are protected within the Gros Ventre Wilderness Area and one is within the potential Tensleep Canyon Research Natural Area on Bighorn NF. All other known populations occur on public lands managed for multiple use.

Threats: May be impacted by logging, trampling, or over-collection.

Managed Areas: Occurs on Bighorn, Bridger-Teton, Medicine Bow, and Targhee National Forests.

References: Cronquist et al. 1972; Dorn 1992; Evert (no date); Fertig 1999a; Hartman 1995; Lellinger 1985; Scott 1997; Welp et al. 1998a.

ASTRAGALUS ROBBINSII VAR. *MINOR* [G5T5/S1]

Occurrences in Wyoming: Known from 3 extant occurrences in Wyoming (all observed since 1987) and 1 historical record from 1926.

Abundance: 2 of the known occurrences are small and apparently restricted in area.

Range: Peripheral; In Wyoming, known from the Wyoming Range (Lincoln and Sublette Cos.) and the Gros Ventre Range (Teton Co.).

Trends: Not known.

Protection Status: One occurrence is found within the proposed Gros Ventre Research Natural Area (formerly named Horse Creek RNA).

Threats: May be moderately threatened by development of streamside habitats and possibly by gravel quarrying. At present, these threats are low.

Managed Areas: Found on lands managed by Bridger-Teton NF (Big Piney, Greys River, and Jackson RDs).

References: Barneby 1989; Dorn 1992; Fertig and Jones 1994b.

ATHYRIUM DISTENTIFOLIUM VAR. *AMERICANUM* [G4G5T4T5/S1]

Synonym: *Athyrium alpestre* var. *americanum*.

Occurrences in Wyoming: Known from 5 locations, all of which have been discovered or relocated since 1991.

Abundance: Populations relatively small in Grand Teton NP, although not all of the potential habitat has been surveyed (Marriott 1993). Previously thought to be extirpated in Medicine Bow NF (Fertig 1993b), but a small population was relocated there in 1996 (62 years after being last observed).

Range: Peripheral in Wyoming. Known from the Teton Range (Teton County) and the Medicine Bow Mountains (Albany County).

Trends: Trends not known.

Protection Status: 3 occurrences are protected in Grand Teton National Park and one is protected in the Medicine Bow Peak Special Botanical Area (Medicine Bow NF). Previous reports

from Yellowstone National Park are based on a misidentified specimen (Jennifer Whipple, personal communication).

Threats: Threats are low due to plant's rugged habitat. Potentially threatened by trampling if trails are routed through its habitat. Overcollection for specimens may have reduced the Medicine Bow Peak population

Managed Areas: Known from Grand Teton National Park and Medicine Bow and Targhee National Forests.

References: Cronquist et al. 1972; Dorn 1992; Dorn and Dorn 1972; Fertig 1993b; Harrington 1954; Markow and Fertig 1993; Marriott 1993; Scott 1997.

BOTRYCHIUM VIRGINIANUM [G5/S1]

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).

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 Absaroka Range (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) and Dugout Gulch Botanical Management Area (Black Hills National Forest). The Bighorn Range population is within the potential Mann Creek Research Natural Area. The species is reported to occur in Yellowstone National Park.

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

Managed Areas: Occurs on lands managed by Bighorn, Black Hills, Shoshone, and Targhee National Forests. Also reported from Yellowstone National Park.

References: Dorn 1992; Evert (no date); Fertig 1998a, 1999a; Fertig and Jones 1992; Hitchcock et al. 1969; Jones and Fertig 1998; Lellinger 1985; Markow and Fertig 1993; Spackman et al. 1997; Wagner and Wagner 1993.

BRICKELLIA MICROPHYLLA VAR. *SCABRA* [G4G5T4?/S1]

Occurrences in Wyoming: Known from 6 extant records (3 observed in 1998) and 1 historical location in Wyoming.

Abundance: Populations observed in 1998 usually ranged in size from 30-150 plants.

Range: Peripheral; Known from the Rock Springs uplift and Green River Basin in the vicinity of Flaming Gorge in Sweetwater County, uplifts in the Wind River Basin in Fremont County, and the North Platte River Basin in Natrona County.

Trends: Unknown, but probably stable at most sites.

Protection Status: One occurrence is within the BLM's Sage Creek ACEC. Other Wyoming populations are on public lands managed for multiple use

Threats: Probably low due to the plant's rugged or remote habitat.

Managed Areas: Populations are found on lands managed by the BLM Casper, Lander, and Rock Springs Field Offices and Ashley National Forest (Flaming Gorge NRA).

References: Cronquist 1994; Dorn 1992; Fertig et al. 1998; Welsh et al. 1993.

CAREX CONCINNA [G4G5/S1]

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

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

Range: Peripheral; in Wyoming known from the Wind River and Absaroka ranges and the Yellowstone Plateau in Park and Sublette counties.

Trends: Trend data are lacking.

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.

References: Dorn 1992; Fertig 1992a, 1998a; Fertig and Jones 1992; Hermann 1970; Hitchcock et al. 1969; Ode and Marriott 1990; Spackman et al. 1997.

CAREX DEWEYANA VAR. *BOLANDERI* [G5T5/S1]

Synonym: *Carex bolanderi*.

Occurrences in Wyoming: Known from 3 extant occurrences in Wyoming, all observed between 1976-1987. Also recently reported from the Grand Teton area.

Abundance: Not known.

Range: Peripheral; in Wyoming known only from the Salt River and Absaroka ranges in Lincoln and Park counties. May also occur in 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.

References: Cronquist et al. 1977; Dorn 1992; Fertig 1998 a; Hermann 1970; Hurd et al. 1998.

CAREX LEPTALEA [G5/S2]

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

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.

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 Comments: At least 9 occurrences are found in the Absaroka-Beartooth Wilderness Area, Swamp Lake Special Botanical Area, 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 on Shoshone National Forest.

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.

References: Cronquist et al. 1977; Dorn 1992; Fertig 1997a, 1998a; Fertig and Jones 1992; Hermann 1970; Hurd et al. 1998; Jones and Fertig 1999c; Ode and Marriott 1990; Rosenthal 1998, 1999; Spackman et al. 1997.

CAREX LIMOSA [G5/S2]

Occurrences in Wyoming: Known from 10 occurrences in Wyoming, 9 of which have been observed since 1988 (most recently in 1999).

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.

Trends: Extant populations appear to be stable at present, but the species may have declined in the last century in Wyoming due to loss or degradation of wetland habitats.

Protected Areas: At least 6 occurrences are protected in the Absaroka-Beartooth, Bridger, and Huston Park Wilderness Areas, Swamp Lake Special Botanical Area, and Yellowstone National Park. At least one population is found in the potential Lake Creek Bogs RNA and another may occur in the potential Beartooth Butte RNA.

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.

References: Cronquist et al. 1977; Dorn 1977, 1992; Evert 1986; Fertig 1992a, 1992b, 1997a, 1998a, 1999a; Fertig and Jones 1992; Hermann 1970; Hurd et al. 1998; Jones and Fertig 1999b, 1999c; Mills and Fertig 1996b; Rosenthal 1988, 1999.

CAREX MICROGLOCHIN [G5?/S1]

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

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.

Trends: Not known.

Protection Status: 3 occurrences are found in special management areas (Yellowstone NP, Swamp Lake SBA, and Fitzpatrick Wilderness Area). Populations are also in the potential Kendall Warm Springs Special Interest Area on Bridger-Teton NF and potential Arrow Mountain RNA on Shoshone 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.

References: Dorn 1992; Fertig 1995a, 1998a; Fertig and Jones 1992; Hermann 1970; Hurd et al. 1998; Jones and Fertig 1999a; Mills and Fertig 1996b; Rosenthal 1998, 1999.

CAREX PARRYANA VAR. *PARRYANA* [G4T4/S2]

Occurrences in Wyoming: Known from at least 12 extant occurrences in Wyoming, all observed since 1979 (most recently in 1999). This taxon is also known from 1 additional historical record (last observed in 1901).

Population Abundance: Not known.

Range: Peripheral; in Wyoming, known from the Black Hills (Crook Co.), Sweetwater River Valley (Carbon Co.), Green River and Great Divide basins (Sweetwater Co.), Gros Ventre River Valley (Teton Co.), and Yellowstone Plateau (Park Co.).

Trends: Trend not certain; may be decreasing historically due to loss of wetland habitat or may be stable.

Protection Status: One occurrence is protected within the National Elk Refuge and at least 5 are known from Yellowstone National Park. Other state populations are found on private or public lands managed for multiple use.

Threats: May be threatened by poor management of riparian areas.

Managed Areas: Found on lands managed by the BLM Rawlins and Rock Springs Field Offices, the National Elk Refuge, Jackson Ranger District of Bridger-Teton National Forest, and Yellowstone National Park.

Comments: Jennifer Whipple and Walt Fertig have discovered over one-half dozen new occurrences in the last 3-4 years, indicating that this taxon is more widespread (and overlooked) than once suspected. *Carex parryana* var. *unica*, a related taxon with broader (and typically fewer) spikes is still considered a rare species in Wyoming, but var. *parryana* will probably be dropped as a species of concern in 2000.

References: Dorn 1992 b; Fertig 1998b, Fertig et al. 1998; Hermann 1970; Jones and Fertig 1996; Murray 1969; Welp 1997.

CAREX PROPOSITA [G4/SH]

Occurrences in Wyoming: Known from a single historical record in Wyoming, last observed in 1899.

Abundance: Not known.

Range: Regional endemic of north-central Washington, central Idaho, and northwest Wyoming; in Wyoming known only from the Teton Mountains (Teton County).

Trends: Not known.

Protection Status: The single Wyoming occurrence may be from Grand Teton National Park.

Threats: Not known. This is mostly a high elevation species that may be relatively unthreatened.

Managed Areas: This occurrence may also be from Bridger-Teton NF lands (or possibly the Targhee NF).

Comments: *C. proposita* is thought to be of hybrid origin between *Carex haydeniana* and *C. phaeocephala*.

References: Hitchcock et al. 1969; Hurd et al. 1998.

CERCOCARPUS LEDIFOLIUS VAR. *INTRICATUS* [G5T4/S1]

Occurrences in Wyoming: Known from 4 extant populations, all observed since 1978.

Abundance: Colonies may be locally abundant within its small range.

Range: Peripheral; in Wyoming, known from the southern Rock Springs Uplift and Green River Basin near Flaming Gorge Reservoir in Sweetwater County.

Trends: Probably stable.

Protection Status: All populations are found on public lands managed for multiple use, including recreation and livestock grazing.

Threats: Probably low due to the ruggedness of most sites.

Managed Areas: Occurs on lands managed by the BLM Rock Springs Field Office and Ashley National Forest (Flaming Gorge National Recreation Area).

References: Cronquist et al. 1997; Dorn 1992; Fertig et al. 1998; Refsdal 1996.

CLARKIA PULCHELLA [G4G5/SH]

Occurrences in Wyoming: Known from a single historical collection in Wyoming, last observed in 1892. It is possible that this population could have escaped from cultivation.

Abundance: Unknown; may be extirpated.

Range: Peripheral; In Wyoming, known only from the Snake River watershed in Teton County.

Trends: Unknown; may be extirpated.

Protection Status: The single known occurrence is a vague, historical record and may occur on National Forest or private lands (all of which is managed for multiple use).

Threats: Not known. Flower is attractive and the species may be vulnerable in Wyoming to collection. Riverside habitat may be threatened by recreational or agricultural development.

Managed Areas: May occur within Bridger-Teton National Forest (Jackson RD).

References: Cronquist et al. 1997; Dorn 1992.

CRYPTANTHA GRACILIS [G5/S1]

Occurrences in Wyoming: Known from 4 extant occurrences in Wyoming, all of which have been discovered since 1995.

Abundance: Census figures are not available for the whole state, although populations observed by Fertig in 1997-98 were locally abundant within limited areas

Range: Peripheral; In Wyoming, known only from the Green River Basin and Rock Springs Uplift (around Flaming Gorge) in Sweetwater County.

Trends: Not known; no trend data are available.

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

Threats: Some habitat may have been lost due to flooding by Flaming Gorge Reservoir. May be vulnerable to dislodging and soil erosion caused by ORV use.

Managed Areas: Found in Flaming Gorge National Recreation Area (Ashley National Forest) and the BLM Rock Springs Field Office.

References: Cronquist et al. 1984; Fertig et al. 1998; Refsdal 1996.

DRABA BOREALIS [G4/S2]

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

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: Six occurrences are in special management areas: Grand Teton and Yellowstone National Parks, the National Elk Refuge, and Bridger, Gros Ventre, and Washakie Wilderness Areas. At least 2 populations are found in the proposed Swift Creek and Gros Ventre (Horse Creek) Research Natural Areas on Bridger-Teton National Forest. This

species is listed as Sensitive by Bridger-Teton NF.

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.

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

References: Dorn 1992; Fertig 1992a, 1998a; Fertig and Jones 1994a, 1994b; Fertig and Marriott 1993; Fertig et al. 1991, 1994; Hartman 1995; Hitchcock 1941; Marriott 1991c, 1992c; Mills and Fertig 1996a; Rollins 1993; Spackman et al. 1997; USDA Forest Service 1989, 1991; Welsh 1974.

DRABA PORSILDII VAR. *PORSILDII* [G3G4T3T4/S1]

Occurrences in Wyoming: Known from 5 occurrences in Wyoming, three of which have been discovered or revisited since 1983 (most recently in 1994). Formerly reported from several additional sites, but these records have proven to be misidentified.

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: Not known.

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 in the Osborn Mountain Research Natural Area and the Gros Ventre Wilderness.

Threats: Threats are low due to poor accessibility of most sites.

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

References: Dorn 1992; Fertig 1998a; Jones and Fertig 1999d; Mills and Fertig 1996a; Mulligan 1974; Rollins 1993; Scott 1997.

EPILOBIUM PALUSTRE VAR. *PALUSTRE* [G5/S1S2]

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.

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 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.

Additional Comments: Some populations in northwestern Wyoming are moderately pubescent and may be better treated under var. *gracile*.

References: Cronquist et al. 1997; Dorn 1992; Fertig 1995a, 1997a, 1998a; Jones and Fertig 1999c; Moseley et al. 1991; Roderick et al. 1999.

ERIGERON HUMILIS [G4/S2]

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 (most recently in 1998).

Abundance: Known populations are small in number and occupied area. Surveys in 1996 in the Beartooth Mountains reported colonies of 10-25 plants.

Range: Sparse; in Wyoming known from the Wind River, Beartooth, Bighorn, Gros Ventre, and Absaroka ranges in Big Horn, Park, and Sublette counties. Reports from the Medicine Bow Range (Albany County) are probably based on immature specimens of *Erigeron melanocephalus*.

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). One population in Shoshone National Forest is within the potential Beartooth Butte RNA.

Threats: Not known, but presumed to be low.

Managed Areas: Known from the Bighorn, Bridger-Teton, and Shoshone National Forests.

References: Cronquist 1955; Dorn 1992; Evert 1986; Fertig 1997a, 1998a, 1999a; Jones and Fertig 1999b; Lofgren 1956; Mills and Fertig 1996b; Moseley 1989; Scott 1997.

ERIGERON RADICATUS [G3/S2]

Occurrences in Wyoming: Known from 8 occurrences in the state, 6 of which have been discovered or relocated since 1992 (most recently in 1998).

Abundance: May be locally common within small patches of suitable habitat.

Range: Disjunct; in Wyoming, known from the Wind River, Gros Ventre, Wyoming, 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 Research Natural Area 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 plants rugged alpine habitat.

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

References: Cronquist 1955; Dorn 1992; Fertig 1992a, 1992b, 1997a; 1998a; Fertig and Jones 1994c; Fertig et al. 1991; Jones and Fertig 1999a, 1999b; Mills and Fertig 1996a, 1996b; Moseley 1989; Scott 1997.

ERIOPHORUM GRACILE [G5/S1]

Occurrences in Wyoming: Known from 5-6 extant and 1 historical records in Wyoming. All of the extant populations have been located since 1991 (most recently in 1999).

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

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 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 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 NP and Shoshone National Forest. May also occur on Targhee NF and Bridger-Teton NF.

References: Fertig 1997a, 1998a; Hitchcock et al. 1969; Jones and Fertig 1999c; Marriott 1991c; Mills and Fertig 1996b; Sanderson and March 1996; Spackman et al. 1997.

HETEROCODON RARIFLORUM [G5/S1]

Occurrences in Wyoming: Known from a single record in Wyoming, last observed in 1956.

Abundance: Not known.

Range: Peripheral; in Wyoming, known only from the west slope of the Teton Range (Teton County).

Trends: Not known.

Protection Status: The single known occurrence is on public lands managed for multiple use.

Threats: Not known, but may be impacted by recreational activities.

Managed Areas: Occurs on Targhee National Forest.

References: Cronquist 1984; Dorn 1992; Evert (no date); Hitchcock et al. 1959; Lesica and Shelly 1991; Markow and Fertig 1993; McVaugh 1941.

HIERACIUM SCOULERI [G4G5/S1]

Occurrences in Wyoming: Known from 4 confirmed occurrences in Wyoming, all observed since 1972. Also reported from the SW Absaroka Mountains by Snow, but specimen has not been seen for confirmation.

Abundance: Most populations are small, consisting of fewer than 30-50 plants.

Range: Peripheral; In Wyoming, known from the west slope of the Teton Range and Jackson Hole in Teton County. Reported from the SW Absaroka Mountains (Park Co.) by Snow.

Trends: Not known, although probably stable.

Protection Status: 2 occurrences are protected within Grand Teton National Park.

Threats: Not known.

Managed Areas: Occurs in Grand Teton NP and Bridger-Teton and Targhee National Forests. May also occur in Shoshone NF.

References: Cronquist 1955; Dorn 1992; Evert (no date); Markow 1994, 1996; Shaw 1992.

IPOMOPSIS POLYCLADON [G4/S1]

Synonym: *Gilia polycladon*.

Occurrences in Wyoming: Known from 2 occurrences, both observed since 1995 (most recently in 1998).

Abundance: Not known, but currently thought to be limited to a small area in the Flaming Gorge region.

Range: Peripheral; in Wyoming known only from the banks of Flaming Gorge Reservoir in the Green River Basin area of Sweetwater County.

Trends: Not known.

Protection Status: Known occurrences are on public lands managed for multiple use.

Threats: Not known.

Managed Areas: Occurs in Flaming Gorge National Recreation Area (Ashley National Forest).

Comments: This species was first discovered in Wyoming by Ernie Nelson, Charmaine Refsdal-Delmatier, and Laura Welp in 1995 (Refsdal 1996).

References: Cronquist et al. 1984; Fertig et al. 1998; Refsdal 1996; Welsh et al. 1993.

JUNCUS FILIFORMIS [G5/S1]

Occurrences in Wyoming: Known from 6 extant (last observed in 1997) and 3 historical records in Wyoming.

Abundance: Individual populations often small. Markow observed 30 plants in a 0.1 acre site in 1995.

Range: Peripheral; in Wyoming known from the Yellowstone Plateau, Jackson Hole, Absaroka Range, and the Sierra Madre in Carbon, Park, and Teton counties.

Trends: Not known.

Protection Status: At least 4 extant populations and 3 historical records are from Grand Teton or Yellowstone National Parks. Other populations are found on public lands managed for multiple use.

Threats: May be threatened by development of wetlands.

Managed Areas: Occurs in Medicine Bow and Targhee National Forests and Grand Teton and Yellowstone National Parks.

References: Cronquist et al. 1977; Dorn 1992; Hitchcock et al. 1969; Hulten 1968; Markow 1994; Markow and Fertig 1993; Porsild and Cody 1980.

JUNCUS VASEYI [G5?/S1]

Occurrences in Wyoming: Known from 4 extant populations in Wyoming, all of which have been discovered or relocated since 1990 (most recently in 1991).

Abundance: Exact population size unknown, although often reported as "common" where it does occur.

Range: Peripheral; known only from the shores of glacial lakes east of Pinedale in the foothills of the Wind River Range (Sublette Co.) and in the Laramie Range east of Laramie (Albany Co.).

Trends: Trends suspected to be stable based on resurvey of 2 of the known populations over time.

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

Threats: Threats unknown, although the 3 Sublette County populations occur on lakeshores with moderate to high recreation use. Cattle grazing may occur in the vicinity of the Albany Co. site.

Managed Areas: Occurs in Bridger-Teton and Medicine Bow National Forests.

References: Dorn 1992; Fertig 1992b; Gleason and Cronquist 1991; Great Plains Flora 1986;

Harrington 1954; Hitchcock et al. 1969.

KELLOGGIA GALIOIDES [G5/S1]

Occurrences in Wyoming: Known from 3 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.

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 NPs 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 Bridger-Teton and Shoshone National Forests.

References: Cronquist et al. 1984; Dorn 1992; Fertig 1998a; Hitchcock et al. 1959; Lesica and Shelly 1991; Scott 1997; Welsh et al. 1993.

LATHYRUS LANSZWERTII VAR. *LANSZWERTII* [G4G5T4/S1]

Occurrences in Wyoming: Only 1-2 populations of this taxon are known in Wyoming, one of which is historical and whose authenticity is somewhat doubtful (the specimen appears to be intermediate between var. *lanszwertii* and var. *leucanthus*). Variety *lanszwertii* has also been reported from Fremont County by Dorn (1992), but all Fremont County specimens attributed to this taxon at the Rocky Mountain Herbarium have been annotated to *L. eucosmus* by Steve Broich.

Abundance: Not known.

Range: Peripheral; In Wyoming known only from the northern foothills of the Uinta Range (Uinta County). Reports from Fremont County (Dorn 1992 b) appear to be based on misidentified material.

Trends: Not known.

Protection Status: Known populations occur on public lands managed for multiple use.

Threats: Not known.

Managed Areas: Found on lands managed by the BLM Kemmerer Field Office and the Wasatch-Cache National Forest (Mountain View Ranger District).

References: Barneby 1989; Dorn 1992; Fertig et al. 1998; Refsdal 1996; Welsh et al. 1996.

LIGUSTICUM CANBYI [G5/S1]

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

Abundance: Not known.

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

Trends: Not known.

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

References: Cronquist et al. 1997; Dorn 1992; Fertig 1998a.

LISTERA CONVALLARIOIDES [G5/S1]

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

Abundance: Evert noted populations of several hundred individuals near Story in 1985. Census data are lacking for most other populations.

Range: Peripheral; in Wyoming, known from the Laramie, Medicine Bow, Bighorn, and Teton ranges in Albany, Converse, Sheridan, and Teton counties.

Trends: Not known.

Protection Status: Two populations are protected within Grand Teton National Park. Other known occurrences are on public or state lands managed for multiple use.

Threats: May be threatened by overcollection, loss of moist forest habitat to logging, and impacts from recreation.

Managed Areas: Occurs on Bighorn, Medicine Bow, and Targhee National Forests and Grand Teton National Park. An historical record from the Laramie Basin may be on lands managed by the BLM Rawlins Field Office.

References: Bighorn National Forest 1992; Cronquist et al. 1977; Dorn 1992; Fertig 1999a; Hitchcock et al. 1969.

LONICERA CAERULEA [G5/S1]

Synonym: *Lonicera caerulea* var. *caurina*.

Occurrences in Wyoming: Known from 2 extant occurrences (last observed in 1997) and 3 historical records in Wyoming.

Abundance: Not known.

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

Trends: Not known.

Protection Status: All known occurrences are protected in Yellowstone National Park and the Teton Wilderness.

Threats: Populations could be impacted by heavy grazing pressure.

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

References: Dorn 1992; Hitchcock et al. 1959.

LUZULA GLABRATA VAR. *HITCHCOCKII* [G5T4/S1]

Synonym: *Luzula hitchcockii*.

Occurrences in Wyoming: Known from 3 extant occurrences in Wyoming (most recently observed in 1998) and 1 historical record.

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 4 known occurrences are protected in Grand Teton NP. The Beartooth Mountains occurrence is probably located within the potential Beartooth Butte Research

Natural Area.

Threats: Not known.

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

References: Dorn 1992; Fertig 1998a; Jones and Fertig 1999b; Shaw 1976, 1992.

MARSILEA VESTITA VAR. *OLIGOSPORA* [G5/S1]

Synonym: *Marsilea oligospora*.

Occurrences in Wyoming: Known from one extant record (last observed in 1973) and 3-4 historical reports in Wyoming.

Abundance: Reported as "locally common" at one site in Grand Teton National Park by Richard Shaw and as "abundant" at the type locality by Nelson and Nelson in 1899.

Range: Peripheral; in Wyoming known from Jackson Hole and the upper Green River valley bordering the western slope of the Wind River Range in Sublette and Teton counties.

Goodding (1902) reports the type as being from Jackson's Lake, Uinta County, but this site is now in Teton County.

Trends: May be extirpated at sites in the foothills of the Wind River Range.

Protection Status: 2-3 populations occur in Grand Teton National Park. Other known sites are on public lands managed for multiple use.

Threats: May be impacted by water development and recreation.

Managed Areas: Occurs in Grand Teton National Park and may occur in Bridger-Teton National Forest.

References: Cronquist et al. 1972; Dorn 1998, 1992; Goodding 1902.

MELICA SMITHII [G4/SH]

Occurrences in Wyoming: Known from a single historical record in Wyoming, last observed in 1899.

Abundance: Unknown; may be extirpated in the state.

Range: Peripheral; in Wyoming known from a single report from the Teton Range (Teton County).

Trends: Unknown; may be extirpated in Wyoming.

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

Threats: Poorly known. May be impacted by grazing or recreational activities.

Managed Areas: May occur in Grand Teton National Park or Targhee National Forest.

References: Dorn 1992; Hallsten et al. 1987.

MONARDELLA ODORATISSIMA VAR. *GLAUCA* [G4G5T?/S1]

Occurrences in Wyoming: Known from 4 extant populations (last observed in 1988) and 1 historical record.

Abundance: Known populations are small.

Range: Peripheral; in Wyoming, known only from the Salt River and Wyoming ranges (Lincoln County).

Trends: Not known.

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

Threats: Not known.

Managed Areas: Found on lands managed by the Bridger-Teton National Forest.

References: Cronquist et al. 1984; Dorn 1992; Epling 1925; Hartman et al. 1985; Hitchcock et al.

1959; Scott 1997.

NAJAS GUADALUPENSIS [G5/S1]

Occurrences in Wyoming: Known from one confirmed location in the state and reported from one additional locality.

Abundance: Population size is not known, but total range is less than 5 acres.

Range: Peripheral; in Wyoming, known from one confirmed location in Jackson Hole (Teton County) and reported from Kendall Warm Springs on the west side of the Wind River Range (Sublette County).

Trends: Not known.

Protection Comments: One occurrence is found in Grand Teton National Park. May also occur within the Kendall Warm Springs Special Interest Area on Bridger-Teton National Forest.

Threats: May be threatened by high recreation use of its habitat and competition from exotics.

Managed Areas: Occurs in Grand Teton National Park and possibly in Bridger-Teton National Forest.

References: Cronquist et al. 1977; Dorn 1992; Fertig 1995a; Lesica and Shelly 1991.

OPUNTIA POLYACANTHA VAR. *RUFISPINA* [G5T5/S2]

Occurrences in Wyoming: Known from 7 extant locations, all discovered since 1995. Prior to this, the only reports for the state were from Benson (1982).

Abundance: Not known.

Range: Peripheral; known from the Green River and Washakie basins in southwest Wyoming (Sweetwater and Lincoln counties).

Trends: Population trends are not known, but additional locations are being discovered as more desert areas of the state are surveyed.

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

Threats: Probably none.

Managed Areas: Occurs on land managed by the BLM Rawlins, Rock Springs and Kemmerer Field Offices and Ashley National Forest (Flaming Gorge National Recreation Area).

References: Benson 1982; Dorn 1992; Fertig et al. 1998; Refsdal 1996; Ward et al. 1998.

OROBANCHE CORYMBOSA VAR. *CORYMBOSA* [G4T4/S1]

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

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 Comments: 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.

References: Cronquist et al. 1984; Dorn 1992; Fertig 1998a; Hartman and Nelson 1993, 1994; Hitchcock et al. 1959; Lesica and Shelly 1991.

PAEONIA BROWNII [G5/S1]

Occurrences in Wyoming: 5 extant populations are known, all from the vicinity of Grand Teton NP in Teton county.

Abundance: Populations in Grand Teton NP are all small, ranging in size from 40-170 plants. Area ranges from 1-5 acres (Marriott 1990b).

Range: Peripheral in Wyoming. Known only from Teton County.

Trends: Suspected to be declining due to negative impacts from development in Grand Teton NP (Marriott 1990b).

Protection Status: 3 populations are legally protected within Grand Teton NP.

Threats: Biggest threat at this time is road construction in Grand Teton NP. One population at Lupine Meadows Turnoff has been lost due to road expansion and other populations have been reduced in size from this activity. Transplanting of plants at these sites has occurred, but survival rates are not known. Trampling or picking by visitors may also be a threat.

Managed Areas: Known occurrences are found on lands managed by Grand Teton National Park and Targhee National Forest.

References: Hitchcock and Cronquist 1964; Markow and Fertig 1993; Marriott 1990b.

PAPAVER KLUANENSE [G5T3?/S2]

Synonyms: *Papaver lapponicum* var. *occidentale*, *P. radicum* ssp. *kluanensis*.

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).

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 Cody Field Office.

References: Fertig 1992b, 1998a, 1999a; Jones 1991b; Jones and Fertig 1999e; Kiger 1975; Kiger and Murray 1997; Lesica and Shelly 1991; Love 1969; Moseley 1989; Rosenthal 1998, 1999; Scott 1997; Spackman et al. 1997; USDA Forest Service 1991

PARRYA NUDICAULIS [G5/S2]

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

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 northwestern and southeastern Wind River Range (Sublette and Fremont counties), Gros Ventre Range (Teton and Sublette counties), and the

Beartooth Range (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).

References: Dorn 1992; Fertig 1992a, 1992b, 1995b, 1997a, 1998a; Fertig and Jones 1994c; Fertig et al. 1991, 1994; Jones and Fertig 1999a, 1999b; Mills and Fertig 1996a, 1996b; Rollins 1993; Rosenthal 1998, 1999; Scott 1997.

PEDICULARIS PARRYI SSP. *MOGOLLONICA* [G5T2T4Q/S1]

Occurrences in Wyoming: Known from 2 occurrences in Wyoming, one of which is questionable and historical.

Abundance: Not known, but most populations appear small.

Range: Peripheral; in Wyoming known from the Uinta Range and a questionable record from the Bighorn Range in Uinta and Big Horn counties.

Trends: Not known.

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

Threats: Not known.

Managed Areas: Occurs in Wasatch-Cache and Bighorn National Forests.

Comments: Information is needed on the basic taxonomy of this species in Wyoming (is it truly var. *mogollonica*, or an atypically robust form of var. *parryi*?). Population size, trend, and habitat information also needed.

References: Carr 1971; Cronquist et al. 1984; Dorn 1992; Fertig 1999a.

PELLAEA SUKSDORFIANA [G5T4?/S1]

Synonym: *Pellaea glabella* var. *simplex*.

Occurrences in Wyoming: Known from 4 extant occurrences in Wyoming, most recently observed in 1984.

Abundance: Not known.

Range: Peripheral; in Wyoming known from the Black Hills and Teton Range in Crook and Teton counties.

Trends: Not known.

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

Threats: Not known.

Managed Areas: Occurs on Black Hills and Targhee National Forests.

References: Cronquist et al. 1972; Dorn 1992; Evert (no date); Markow and Fertig 1993.

PHACELIA INCANA [G3/S1]

Occurrences in Wyoming: Known from 6 extant locations (5 of which have been discovered since

1995) and 2 vague historical records.
Abundance: Populations may be locally abundant, numbering in the low thousands.
Range: Peripheral; in Wyoming, known from the Green River and Great Divide basins and Rock Springs Uplift in Carbon and Sweetwater counties.
Trends: Not known, but probably stable.
Protection Status: One population is found in the BLM Sage Creek ACEC. All other known occurrences are on public lands managed for multiple use.
Threats: Often occurs on steep, clayey slopes which may be vulnerable to erosion under moderate to heavy use.
Managed Areas: Occurs on land managed by the BLM Rock Springs Field Office and Ashley National Forest (Flaming Gorge National Recreation Area). The Carbon County population may be on lands managed by the BLM Rawlins Field Office.
Comments: The rank of G3 for this species seems low, G4 may be more suitable.
References: Cronquist et al. 1984; Dorn 1992; Fertig et al. 1998; Refsdal 1996; Welp 1997.

PHILADELPHUS MICROPHYLLUS VAR. *OCCIDENTALIS* [G5?T3T4/S1]

Occurrences in Wyoming: Known from 3 extant records (all observed since 1978) and 1 historical report in Wyoming. The most recent observation was in 1997.
Abundance: The Glades population was estimated at 100 individuals in a 1997 survey by Fertig. Estimates are not available for other extant occurrences.
Range: Peripheral; in Wyoming, restricted to the Rock Springs Uplift and the lower Green River Basin in Sweetwater County.
Trends: Not known.
Protection Status: The Richard's Gap population is within the BLM's Red Creek ACEC. All other known sites are on public lands managed for multiple use.
Threats: Probably low due to the ruggedness of most sites.
Managed Areas: Found on lands managed by the BLM Rock Springs Field Office and Ashley National Forest (Flaming Gorge NRA).
References: Cronquist et al. 1997; Dorn 1992 b; Fertig et al. 1998; Hitchcock 1943.

POLYSTICHUM SCOPULINUM [G5/SH]

Occurrences in Wyoming: Known from 2 historical records in Wyoming, the most recent dating from 1930.
Abundance: Unknown. Species may not be extant in the state.
Range: Peripheral; Known from the west slope of the Teton Range and the Yellowstone Plateau in Teton County.
Trends: Unknown; species may be extirpated in the state.
Protection Status: One occurrence is known from within Yellowstone National Park. The other is on public lands managed for multiple use.
Threats: May be vulnerable to over-collection.
Managed Areas: Known occurrences are from Targhee National Forest and Yellowstone National Park.
References: Cronquist et al. 1972; Dorn 1992; Evert (no date); Lesica and Shelly 1991; Soltis et al. 1989, 1991.

PORTERELLA CARNOSULA [G4/S1]

Occurrences in Wyoming: Known from 5 records in Wyoming, only 3 of which have been

observed since 1963 (most recently in 1999).
Abundance: Not known, although Porter reported a Grand Teton National Park population as "abundant" in 1963.
Range: Peripheral; in Wyoming, known only from Jackson Hole, the Yellowstone Plateau, and Uinta Range in Teton and Uinta counties.
Trends: Not known.
Protection Status: Several populations occur in Grand Teton and Yellowstone National Parks.
Threats: Some populations could be impacted by development of wetlands.
Managed Areas: Occurs in Grand Teton and Yellowstone National Parks and Wasatch-Cache National Forest.
References: Cronquist et al. 1984; Dorn 1992; Hitchcock et al. 1959; McVaugh 1940; Nelson 1900.

POTAMOGETON AMPLIFOLIUS [G5/S1]

Occurrences in Wyoming: Known from 3 extant occurrences in Wyoming (all located since 1980, most recently in 1996) and 2 historical records.
Abundance: Not known.
Range: Sparse; in Wyoming, known from the Sierra Madre, Beartooth, Bighorn, and Wind River ranges in Carbon, Johnson, Fremont, Park, and Sublette counties.
Trends: Not known.
Protection Status: One population occurs in the Cloud Peak Wilderness Area. All other known occurrences are on public lands managed for multiple use.
Threats: May occur in lakes used for motorized boat recreation.
Managed Areas: Occurs in Bighorn, Bridger-Teton, Medicine Bow, and Shoshone National Forests.
References: Cronquist et al. 1977; Dorn 1992; Fertig 1999a; Gleason and Cronquist 1991; Great Plains Flora Association 1986; Hitchcock et al. 1969.

POTAMOGETON ILLINOENSIS [G5/S1]

Occurrences in Wyoming: Known from 3 records in Wyoming, one of which is historical (last observed in 1897). The most recent collection is from 1954.
Abundance: Unknown.
Range: Sparse in Wyoming; known only from the Laramie Basin (Albany Co.), Sweetwater River Valley (Natrona County), and NW Wind River Range (Sublette County). Former reports from Fremont County are based on material from Natrona County.
Trends: Unknown. One population may not be extant.
Protection Status: Not known to occur in any formally designated special management area.
Threats: Unknown; may be sensitive to changes in water quality.
Managed Areas: Occurs on lands managed by Bridger-Teton NF and possibly the BLM Lander Field Office.
References: Cronquist et al. 1977; Dorn 1992.

SALIX CANDIDA [G5/S2]

Occurrences in Wyoming: Known from 10 extant occurrences and 1 historical record in Wyoming. Eight of these populations have been discovered or relocated since 1994 (most recently in 1999).
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, Jackson Hole, Yellowstone Plateau, and Laramie, Medicine Bow, Absaroka, Beartooth, and Wind River ranges in Albany, Park, Sublette and Teton counties.

Trends: Not known. Some habitat may have been lost in the Laramie Valley since European settlement.

Protection Status: At least 5 occurrences are found in national parks, national wildlife refuges, or designated special interest areas (Yellowstone NP, National Elk Refuge, Swamp Lake SBA, Sheep Mountain Wildlife Refuge). Three other occurrences are within potential Research Natural Areas or Special Interest Areas on National Forest lands (Lake Creek Bogs, Sheep Mountain, Kendall Warms Springs).

Threats: Populations may be threatened by grazing pressure on the National Elk Refuge.

Managed Areas: Occurs on lands managed by Bridger-Teton, Medicine Bow, and Shoshone National Forests, Yellowstone National Park, the National Elk Refuge, and possibly the BLM Pinedale Field Office.

References: Brunfeld and Johnson 1985; Dorn 1992, 1997; Fertig 1995a, 1998a, 1998b; Fertig and Jones 1992; Fertig and Markow 1998; Markow and Fertig 1993; Mills and Fertig 1996b; Mills and Neighbours 1995; Moseley et al. 1991; Rosenthal 1998, 1999; Sanderson and March 1996; Spackman et al. 1997; Walford et al. 1997.

SALIX ERIOCEPHALA VAR. *MACKENZIEANA* [G5T4/S1]

Occurrences in Wyoming: Known from 4-5 extant occurrences (all observed since 1983) and 1 historical record (1926) in Wyoming. Three populations have been discovered since 1994.

Abundance: Not known.

Range: Peripheral; In Wyoming, known from the Wyoming and Absaroka ranges, Upper Green River Basin, and Jackson Hole in Fremont, Lincoln, Park, and Teton counties.

Trends: Not known.

Protection Status: Two occurrences are found in Grand Teton National Park. All other known populations are on public lands managed for multiple use.

Threats: Heavy grazing by ungulates may be a potential threat, as is development of riparian areas, but more research on threats is needed.

Managed Areas: Found on Bridger-Teton and Shoshone National Forest, Grand Teton National Park, and the BLM Pinedale Field Office.

References: Dorn 1992, 1995, 1997; Fertig and Markow 1998.

SALIX FARRIAE [G4/S2]

Occurrences in Wyoming: Known from 10 extant occurrences in Wyoming, 9 of which have been relocated or discovered since 1995, and 2 historical populations.

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 sites are small in area and may be 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.

Trends: Trend data are not available for most occurrences, but populations are thought to be stable.

Protection Status: Two occurrences are known from the North Absaroka Wilderness Area and at

least 2 occurrences are found in Yellowstone National Park. A population is found in the potential Beartooth Butte RNA and the species is to be expected in the Lake Creek potential RNA. All other populations occur on National Forest 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 NP.

References: Brunsfeld and Johnson 1985; Dorn 1992, 1997; Fertig 1997a, 1998a; Fertig and Markow 1998; Hartman 1996; Jones and Fertig 1999c.

SAXIFRAGA SERPYLLIFOLIA VAR. *CHRYSANTHA* [G4/S1]

Synonym: *Saxifraga chrysantha*.

Occurrences in Wyoming: Known from 6-7 records, but these may represent only 4 distinct populations (Scott 1997).

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

Range: Sparse; 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 1994a).

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.

References: Dorn 1992; Duft and Moseley 1989; Fertig 1993b, 1998a; Fertig and Bynum 1994a; Fertig and Jones 1994c; Harrington 1954; Hitchcock and Cronquist 1961; Lesica and Shelly 1991; Scott 1997.

SELAGINELLA MUTICA [G4G5/S1]

Occurrences in Wyoming: Known from 3 extant records discovered or relocated between 1972-1995.

Abundance: Not known, although believed to be sparse at most locations.

Range: Peripheral; in Wyoming, known from the Laramie Range, Medicine Bow Mountains, and the Green River Basin in Laramie, Carbon, and Sweetwater counties.

Trends: Not known.

Protection Status: One population in the Laramie Range is within Curt Gowdy State Park. All other occurrences are on public lands managed for multiple use.

Threats: Low due to rugged cliff habitat.

Managed Areas: Occurs on lands managed by Curt Gowdy State Park, Ashley National Forest (Flaming Gorge National Recreation Area), and Medicine Bow National Forest (Brush Creek Ranger District).

References: Cronquist et al. 1972; Dorn 1992.; Fertig et al. 1998.

SELAGINELLA SELAGINOIDES [G5/S1]

Occurrences in Wyoming: Known from 5 occurrences in Wyoming, 2 of which are extant (most recently observed in 1997) and 3 which are historical.

Abundance: Populations are usually small and restricted to specialized microhabitats.

Range: Peripheral; in Wyoming known from the upper Green River Basin, foothills of the Wind River Range, Teton Range, and Yellowstone Plateau in Sublette and Teton counties.

Trends: Not known. Some wetland sites near the New Fork Lakes in the Wind River Range may have been destroyed during dam and campground construction in the 1930s.

Protection Status: One occurrence is protected in Yellowstone National Park. All other known sites are on public lands managed for multiple use (primarily recreation and livestock grazing).

Threats: Dam construction or habitat loss from subdivision are potential threats in the Upper Green River Basin.

Managed Areas: Occurs in Bridger-Teton and Targhee National Forests, the BLM Pinedale Field Office, and Yellowstone National Park.

References: Cronquist et al. 1972; Dorn 1992; Fertig et al. 1998; Hitchcock et al. 1969; Lesica and Shelly 1991.

TOWNSENDIA LEPTOTES [G4/S1]

Occurrences in Wyoming: Confirmed from 6 occurrences in Wyoming, 4 of which have been documented since 1990. Reported from 4-6 additional locations by Scott (1997), but these still need to be verified.

Abundance: Not known.

Range: Peripheral; Known from the Gros Ventre, Wind River, and Absaroka mountains and Yellowstone Plateau in Sublette, Park, and Teton counties. Also reported from Carbon and Fremont counties by Scott (1997).

Trends: Not known.

Protection Status: All 3 confirmed occurrences are found within special management areas (either designated wilderness or national parks).

Threats: Presumably low due to the ruggedness of the plant's habitat. The population on White Rock Mountain in the Wind River Range is probably secure due to the low use of the area.

Managed Areas: Populations are found on lands managed by Bridger-Teton NF (Pinedale and Jackson RDs, Bridger and Gros Ventre Wilderness areas) and Yellowstone National Park.

References: Dorn 1992; Hartman 1995, 1996; Scott 1997.

TRITELEIA GRANDIFLORA [G4/S1]

Synonym: *Brodiaea grandiflora*.

Occurrences in Wyoming: Known from 7-8 extant populations (last observed in 1998) and 1 historical record in Wyoming.

Abundance: Individual populations are often very small (6-50 plants) according to Jennifer Whipple. One of the largest populations in Grand Teton NP consists of several hundred plants.

Range: Peripheral; in Wyoming known from the Star Valley, Jackson Hole, Yellowstone Plateau, and Teton Range in Lincoln and Teton counties.

Trends: Not known.

Protection Status: 3-4 populations occur in Grand Teton and Yellowstone National Parks. Other populations are on public lands managed for multiple use.

Threats: Could be threatened by heavy recreational use of its habitat and over-collection for showy flowers. Impacts from grazing are not understood.

Managed Areas: Occurs in Grand Teton and Yellowstone National Parks, and Bridger-Teton, Caribou, and Targhee National Forests.

References: Cronquist et al. 1977; Dorn 1992.

XEROPHYLLUM TENAX [G4G5/S1]

Occurrences in Wyoming: Known from 3-4 extant locations in Wyoming.

Abundance: Reported as "locally frequent" at 2 sites in Grand Teton National Park by Shaw (1992).

Range: Peripheral; in Wyoming known from northern Jackson Hole and the Yellowstone Plateau in Teton County.

Trends: Not known.

Protection Status: At least 4 populations are protected in Grand Teton and Yellowstone National Parks and the JDR Parkway.

Threats: Could be threatened by overharvest for commercial use and impacts from high recreational activity.

Managed Areas: Occurs in Grand Teton and Yellowstone National Parks, the JDR Parkway, and possibly in Targhee National Forest.

References: Cronquist et al. 1977; Dorn 1992; Shaw 1976, 1992.

IV. WYNDD WATCH LIST

AGOSERIS LACKSCHEWITZII [G4Q/S3]

Occurrences in Wyoming: Known from at least 45 extant occurrences (over 40 of which have been discovered or relocated since 1991) and one historical record. This species was not known from Wyoming until 1993, when herbarium material was determined to be *A. lackschewitzii* by the late Dr. Doug Henderson of the University of Idaho (Fertig 1993a). The species was first collected in the state in 1951 by C.L. Porter.

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 several thousand 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.

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

Protection Status: At least 15 occurrences are protected within designated Wilderness Areas (North Absaroka, Cloud Peak, Gros Ventre, and Bridger) or in Yellowstone and Grand Teton National Parks and the JDR Parkway. One population is also found within the potential McLain Lake Research Natural Area on Bighorn National Forest. 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 also a potential threat in some areas.

Managed Areas: This species occurs in Bridger-Teton, Bighorn, and Shoshone National Forests, the JDR Parkway, and Grand Teton and Yellowstone National Parks.

Comments: Identification of this species can be tricky, especially without mature fruits. 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. Some researchers have concluded that *A. lackschewitzii* may not warrant taxonomic status, but breeding and genetic studies to prove this have not been completed.

References: ERO Resources Corporation 1999; Fertig 1993a, 1997a, 1998a, 1999a; Fertig et al. 1994; Hartman 1996; Henderson et al. 1990; Jones and Fertig 1999b, 1999c; Lesica and Shelly 1991; Markow 1994; Markow and Fertig 1993; Mills and Fertig 1996a, 1996b; Rosenthal 1998, 1999; USDA Forest Service 1989, 1991; Welp et al. 1998c.

ANTENNARIA AROMATICA [G3G4/S2]

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

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 BLM Cody Field Office.

References: Bayer 1989; Bayer and Stebbins 1993; Bayer et al. 1996; Chmielewski 1993; Clark et al. 1989; Croft et al. 1997; Evert 1984, 1986; Fertig 1992a, 1992b, 1997a, 1998a; Fertig and Bynum 1994b; Fertig and Jones 1994a, 1994c; Hartman 1995; Hartman and Nelson 1993, 1994; Jones 1991a; Jones and Fertig 1999a, 1999b, 1999d; Marriott 1988a; Mills and Fertig 1996b; Scott 1997; Snow 1994.

ARABIS WILLIAMSII VAR. *WILLIAMSII* [G3QT3/S3]

Synonym: *Arabis pendulocarpa* var. *saximontana*.

Occurrences in Wyoming: Reported from 25 occurrences, although several of these probably should be combined due to their close proximity.

Abundance: Colonies tend to be large, ranging from ca 100 to several hundred individuals. Total population may be from 2000-5000.

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

Trends: Probably stable.

Protection Status: At least 4 occurrences are protected in the Fitzpatrick, North Absaroka, and Washakie Wilderness areas on Shoshone National Forest.

Threats: Not known.

Managed Areas: Occurs on lands managed by Shoshone and Bridger-Teton National Forests and the BLM Rock Springs Field Office.

Comments: This taxon is considered a synonym of *A. pendulocarpa* var. *saximontana* by Dorn (1988). Most populations consist of hybrid swarms with other related taxa, suggesting that the species may not be valid.

References: Dorn 1988; Fertig 1998a; Fertig et al. 1998; Marriott 1986, 1988a, 1988b; Rollins 1993; Scott 1997; Snow 1994.

ASTRAGALUS DRABELLIFORMIS [G2G3/S2S3]

Occurrences in Wyoming: Currently known from over 30 occurrences, all within a relatively small geographic area. Surveys by Kass (1993, 1995) for the BLM suggest that many of these occurrences are confluent and may represent 1 to several extremely large populations.

Abundance: Populations are extremely abundant locally (in the hundreds of thousands), but are restricted overall to a very small geographic area.

Range: Endemic to the Green River Basin in the vicinity of Big Piney, Wyoming in Sublette County, Wyoming. Reports from adjacent Lincoln County have not been confirmed and may be based on mis-identified specimens of *A. spatulatus*.

Trends: Populations are declining locally due to habitat alteration associated with large scale natural gas development. The extent of this decline, however, appears to be less great than originally anticipated.

Protection Status: No occurrences are currently protected within a formally designated management area (either an ACEC or area with "no-surface occupancy" stipulations).

Threats: Threatened primarily by habitat loss and vehicle trampling associated with natural gas development and exploration activities.

Managed Areas: Recently confirmed within Bridger-Teton National Forest. Otherwise, known only from lands managed by the BLM Pinedale Field Office.

References: Barneby 1964; Cramer and Hartman 1995, 1996; Dorn 1992; Fertig 1998c; Fertig et al. 1994; Kass 1993, 1995; Marriott 1988b; Shultz and Shultz 1978; Weynand and Amidon 1990.

ASTRAGALUS SHULTZIORUM [G3Q/S3]

Synonyms: *Astragalus molybdenus*, *A. molybdenus* var. *shultziorum*.

Occurrences in Wyoming: Known from 25 occurrences in Wyoming, all of which have been surveyed or discovered since 1987.

Abundance: Individual populations may be extremely abundant locally or cover large areas of suitable ridge-top alpine habitat.

Range: Endemic to Wyoming; known from the Salt River, Wyoming, Teton, and Wind River ranges in Lincoln, Sublette, and Teton counties. Dorn (1988) includes this species with *A. molybdenus*, a regional endemic of Montana and Colorado.

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

Protection Status: One occurrence is protected within the Bridger Wilderness (Bridger-Teton NF), and parts of 4 other occurrences are within Grand Teton National Park. All other reports are from public lands that are not under special management for wildlife.

Threats: Sheep grazing may be a potential threat at some sites, but most occurrences are at sufficiently high elevation and in physically protected sites that receive little use or impacts.

Managed Areas: Known occurrences are on lands managed by Bridger-Teton and Targhee NFs and Grand Teton NP.

References: Barneby 1981; Clark et al. 1989; Dorn 1989a; Fertig 1992a, 1992b; Fertig and Jones 1994a; Hartman 1995; Hartman and Nelson 1993, 1994; Lavin and Marriott 1997; Lichvar and Dorn 1982; Markow and Fertig 1993; Marriott 1990a; Schassberger and Shelly 1990; Scott 1997.

CRYPTANTHA STRICTA [G3/S2]

Occurrences in Wyoming: Known from 18 occurrences in Wyoming, many of which are clumped in small areas that could be combined into fewer EORs. All state occurrences have been observed since 1977, with the most recent observations in 1998.

Abundance: Census data lacking for most occurrences.

Range: Regional endemic of NE Utah, SW Wyoming, and adjacent Colorado. In Wyoming, known from 4 main areas: (1) the Flaming Gorge-Rock Springs uplifts; (2) Green Mountain-Ferris Mountains; (3) Rattlesnake Mountains; and (4) foothills of the Uinta Mountains. Occurs in Carbon, Fremont, Natrona, Sweetwater, and Uinta counties.

Trends: Population trend data are mostly lacking, but occurrences appear to be stable.

Protection Status: No occurrences are currently known from areas receiving special management attention. One population on Hickey Mountain may occur within the proposed *Thelesperma pubescens* ACEC (BLM Rock Springs Field Office). Some occurrences in the Ferris Mountains may be within the Ferris Mountains Wilderness Study Area.

Threats: May be impacted by erosion or soil compaction from off-road vehicle recreation.

Managed Areas: Populations are found on lands managed by Ashley National Forest (Flaming Gorge NRA), and the BLM Casper, Kemmerer, Lander, Rawlins, and Rock Springs Field Offices.

References: Cronquist et al. 1984; Dorn 1992; Hartman and Refsdal 1995; Refsdal 1996; Roderick et al. 1999; Ward 1998; Welp 1997; Welp et al. 1995, 1996; Welsh et al. 1993.

CYMOPTERUS LAPIDOSUS [G3/S3]

Occurrences in Wyoming: Known from 20-23 extant occurrences and 3 historical records in Wyoming.

Abundance: Population data lacking for nearly all occurrences.

Range: Regional endemic of NE Utah and SW Wyoming. Known from the Green River and Washakie basins, North Platte River Valley, and Rock Springs uplift in Carbon, Lincoln, Park, Sweetwater, and Uinta counties.

Trends: Stable.

Protection Status: Five populations occur in the Pine Springs, Red Creek, and Sage Creek ACECs, Seedskaadee National Wildlife Refuge, and the Devil's Playground/Twin Buttes Wilderness Study Area. All other known occurrences are on public lands managed for multiple use.

Threats: Populations could be impacted by erosion or compaction associated with heavy recreation

use.

Managed Areas: Occurs on lands managed by the BLM Kemmerer and Rock Springs Field Offices (and possibly the Worland Field Office), Seedskaadee National Wildlife Refuge, and Ashley National Forest (Flaming Gorge NRA).

References: Dorn 1992; Hartman and Refsdal 1995; Refsdal 1996; Roderick et al. 1999; Welsh et al. 1993.

DRABA CRASSA [G3/S2]

Occurrences in Wyoming: Known from 14 occurrences in Wyoming, 8 of which have been documented since 1988.

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, Gros Ventre, 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.

References: Fertig 1992a, 1992b, 1998a; Fertig et al. 1991; Hitchcock 1941; Hitchcock and Cronquist 1964; Jones and Fertig 1999e; Rollins 1993; Scott 1997.

DRABA GLOBOSA [G3/S2]

Occurrences in Wyoming: Known from 17 extant occurrences in Wyoming, 9 of which have been documented since 1990. Also known from 3-4 vague historical records cited by Hitchcock (1941).

Abundance: Few populations have been surveyed. Fertig and Welp observed two large populations in the Bridger-Teton National Forest that numbered 500-3000 plants. Individual colonies may contain 10-30 plants in small clusters.

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, 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 human threats by its inaccessible habitat.

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

References: Dorn 1992; Fertig 1992a, 1992b, 1997a, 1998a, 1999b; Fertig et al. 1991, 1994; Fertig and Jones 1994c; Hartman 1995; Hartman and Nelson 1993; Hitchcock 1941; Hitchcock and Cronquist 1964; Jones and Fertig 1999b; Lesica and Shelly 1991; Markow 1996; Mills and Fertig 1996a; Rollins 1953, 1993; Scott 1997; Spackman et al. 1997; Stone 1995.

HETEROTHECA DEPRESSA [G5T3/S3]

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

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, Absaroka Range, and Yellowstone Plateau in Park and Teton counties. Also reported for Lincoln County by Semple (1996).

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 Pinedale Field Office, and the National Elk Refuge.

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

IPOMOPSIS CREBRIFOLIA [G3/S2S3]

Occurrences in Wyoming: Known from 23 extant records in Wyoming, 20 of which have been discovered or relocated since 1990.

Abundance: Poorly known, although many occurrences appear to be at least locally abundant.

Range: Regional endemic of SW Montana, W Wyoming, and W Utah and N New Mexico (although many Utah populations may represent a different taxon, Welsh 1993). In Wyoming, known from the Great Divide and Green River basins, and the foothills of the the Wind River and Wyoming ranges in Fremont, Lincoln, Sublette, Sweetwater, and Teton counties.

Trends: Trend data are mostly lacking

Protection Status: At least 5 populations occur in the Oregon Buttes, Steamboat, and White Mountain Petroglyphs ACECs. An occurrence is also in the Oregon Buttes Wilderness Study Area.

Threats: Threats mostly low, although road construction or other disturbances associated with mineral development could be a threat.

Managed Areas: Occurs on lands managed by Bridger-Teton NF and the BLM Kemmerer, Pinedale, and Rock Springs Field Offices.

References: Constance and Rollins 1936; Cramer and Hartman 1995, 1996; Cronquist et al. 1984; Day 1980; Fertig 1998b; Hitchcock et al. 1959; Jones and Fertig 1996; Lesica and Shelly 1991; Ward et al. 1998; Welp 1997; Welp et al. 1995, 1996.

LESQUERELLA PAYSONII [G3/S3]

Occurrences in Wyoming: Known from 34 extant occurrences and 4 historical records in Wyoming. 25 populations have been discovered or relocated since 1990.

Abundance: Censused populations range in size from 10-1500 individuals in areas between 1-30 acres. Total population is conservatively estimated at 20,000 individuals (Fertig 1997c).

Range: Regional endemic of west-central Wyoming, E Idaho, and SW Montana. In Wyoming, known from the Gros Ventre, Salt River, Snake River, Teton, Wind River, and Wyoming ranges, the northern Green River Basin, and Jackson Hole in Lincoln, Sublette, and Teton counties. Scott (1997) also reports populations from the east slope of the Wind River Range in Fremont County, but these may represent *L. fremontii*.

Trends: Trend data are lacking for nearly all occurrences, but at least 3 are known to have persisted since the 1920s. Short-term observations suggest that population size may change notably from year to year based on climatic conditions (Fertig 1997c).

Protection Status: Seven occurrences are found within the Gros Ventre Wilderness Area and 4 more are protected in Grand Teton National Park. 5 other occurrences are found in proposed Research Natural Areas or Special Management Areas on the Bridger-Teton National Forest. Formerly a C2 candidate for listing under the Endangered Species Act. Listed as Sensitive in USFS Region 4, but recommended for downlisting by Moseley (1996) and Fertig (1997c).

Threats: Impacts from recreation (hiking and off-road vehicles), ski development, grazing, and mining are potential threats in lower elevation populations. Overall, however, threats are low at most sites.

Managed Areas: Occurs on lands managed by Grand Teton NP, Bridger-Teton and Targhee NFs, and the BLM Pinedale Field Office.

References: Croft et al. 1997; Dorn 1992; Fertig 1992a, 1992b, 1995a, 1996a, 1997c; Fertig and Jones 1994a; Fertig et al. 1991, 1994, 1998; Hartman 1995; Hartman and Cramer 1995; Hartman and Nelson 1993, 1994; Hartman et al. 1991; Maguire 1950; Markow 1994, 1996; Markow and Fertig 1993; Marriott 1990b, 1993; Moseley 1996; Rollins 1950, 1993; Rollins and Shaw 1973; Schassberger 1991; Scott 1997; Shultz and Shultz 1978.

LOMATIUM BICOLOR VAR. *BICOLOR* [G4T3/S2]

Occurrences in Wyoming: Known from approximately 20 extant occurrences and 4 historical records in Wyoming. At least 9 populations have been newly discovered or relocated since 1990.

Abundance: Populations may be locally abundant.

Range: Regional endemic of NE Utah, SE Idaho, and W Wyoming. In Wyoming, known from the Wyoming, Salt River, and Teton ranges and the southern Overthrust Belt in Lincoln, Sublette, Teton, and Uinta counties.

Trends: Probably stable.

Protection Status: One population occurs just outside of Fossil Butte National Monument. Other populations are found on public lands managed for multiple use.

Threats: Not known. Plants appear to tolerate soil disturbance from gophers and grazing.

Managed Areas: Occurs in Bridger-Teton and Targhee National Forests and the BLM Rock Springs Field Office.

References: Cronquist et al. 1997; Dorn 1992; Hartman 1995; Hartman and Cramer 1995; Hartman et al. 1991; Markow 1994; Schlessman 1982.

PENSTEMON PACHYPHYLLUS VAR. *MUCRONATUS* [G5T4/S2]

Occurrences in Wyoming: Known from 15 extant occurrences (12 of which have been discovered or relocated since 1980) and 3 historical records.

Abundance: Total state abundance is poorly known, but probably numbers in the tens of thousands.

Range: Regional endemic of northeastern Utah and southwestern Wyoming. In Wyoming, known from the Green River, North Platte, and Washakie basins and Rock Springs Uplift in Carbon and Sweetwater counties.

Trends: Not known, but probably stable.

Protection Status: Populations are known from the BLM Pine Spring and Jep Canyon ACECs. All other known populations are on public lands managed for multiple use.

Threats: Not known.

Managed Areas: Occurs on lands managed by Ashley National Forest (Flaming Gorge National Recreation Area) and the BLM Rawlins and Rock Springs Field Offices..

References: Cronquist et al. 1984; Dorn 1992; Fertig et al. 1998; Refsdal 1996; Ward et al. 1998.

PHLOX OPALENSIS [G3/S3]

Occurrences in Wyoming: Currently known from 33 extant occurrences in Wyoming and Utah. Also reported from 5 other unconfirmed sites in Wyoming. Prior to 1995, it was only known from 8 occurrences (all in Wyoming), one of which was historical.

Abundance: Census data from 1995 surveys suggest a minimum population size of 1,300,000 plants. Individual colonies are often quite extensive and locally dominant.

Range: Regional endemic of southwestern Wyoming and northeastern Utah. In Wyoming, known from the Green River and Bridger basins and the northern foothills of the Uinta Range in Lincoln, Sublette, Sweetwater, and Uinta counties.

Trends: Trend data are lacking for most sites, but populations appear to be stable.

Protection Status: A portion of one occurrence is found within Seedskaadee National Wildlife Refuge. Two of the largest known populations are within the Twin Buttes and Black Mountain Wilderness Study Areas. One population is within the proposed extension of the Pine Creek ACEC. Colonies in the foothills of Sage Creek and Hickey Mountains could be protected within the TES Plant ACECs for *Thelesperma pubescens* if the boundaries were extended.

Threats: This species is protected from most threats due to its steep, shale slope habitat. Flat-land populations are potentially threatened by disturbance associated with natural gas development (roads, pipelines, and well pads). Trampling by recreational vehicles is also a potential threat. Overall, however, these threats are low and the plant shows great resiliency.

Managed Areas: Found on lands managed by the BLM Kemmerer and Rock Springs Field Offices, Ashley National Forest (Flaming Gorge National Recreation Area) and Seedskaadee National Wildlife Refuge.

References: Cramer and Hartman 1996; Dorn 1992; Fertig 1996c, 1998c; Fertig et al. 1994; Hartman and Refsdal 1995; Refsdal 1996.

V. LISTED SENSITIVE, BUT NOT TRACKED BY WYNDD

ASTRAGALUS JEJUNUS VAR. *JEJUNUS* [Not Tracked by WYNDD]

This taxon is known from over 60 occurrences in southwestern Wyoming and is not tracked as a species of special concern by WYNDD, even though it is considered Sensitive by USFS Region 4 in Idaho and Utah. This plant barely gets onto Bridger-Teton National Forest and is widespread in Ashley National Forest (Flaming Gorge National Recreation Area).

LITERATURE CITED

- Anderson, L.C. 1995. The *Chrysothamnus-Ericameria* connection (Asteraceae). Great Basin Naturalist 55(1):84-88.
- Atwood, N.D. 1975. A revision of the *Phacelia crenulatae* group (Hydrophyllaceae) for North America. Great Basin Naturalist 35 (2): 160-161.
- Atwood, N.D., J. Holland, R. Bolander, B. Franklin, D.E. House, L. Armstrong, K. Thorne, and L. England. 1991. Utah Threatened, Endangered, and Sensitive Plant Field Guide. US Forest Service Region 4, National Park Service, Bureau of Land Management, Utah Natural Heritage Program, US Fish & Wildlife Service, EPA Region 8, Navajo Natural Heritage Program, Skull Valley Goshute Tribe.
- Barneby, R.C. 1944. Pugillus Astragalorum III. Leaflets of Western Botany 4:60.
- Barneby, R.C. 1964. Atlas of North American *Astragalus*. Memoirs of the New York Botanical Garden 13:1-1188.
- Barneby, R.C. 1981. *Dragma Hippomanicum* VII: A new alpine *Astragalus* (Leguminosae) from western Wyoming. Brittonia 33(2):156-158.
- Barneby, R.C. 1989. Fabales, Vol. 3 Part B. In: A. Cronquist, A. H. Holmgren, N.H. Holmgren, J.L. Reveal, and P.K. Holmgren. Intermountain Flora: Vascular Plants of the Intermountain West, USA. New York Botanical Garden, Bronx, NY.
- Bayer, R. J. 1989. A systematic and phytogeographic study of *Antennaria aromatica* and *A. densifolia* (Asteraceae: Inuleae) in the western North American cordillera. Madrono 36 (4):248-259.
- Bayer, R.J. and G.L. Stebbins. 1993. A synopsis with keys for the genus *Antennaria* (Asteraceae: Inuleae: Gnaphaliinae) of North America. Canadian Journal of Botany 71: 1589-1604.
- Bayer, R.J., D.E. Soltis, and P.S. Soltis. 1996. Phylogenetic inferences in *Antennaria* (Asteraceae: Gnaphaliinae: Cassiniinae) based on sequences from nuclear ribosomal DNA internal transcribed spacers (ITS). American Journal of Botany 83(4): 516-527.
- Beetle, A.A. 1941. Studies in the genus *Scirpus* L. II. The section *Baeothyron* Ehrh. Amer. Bot. 28(6):469-476.
- Benson, L. 1982. The Cacti of the United States and Canada. Stanford University Press, Stanford, CA.
- Bighorn National Forest. 1992. Sensitive and Watch Plant Species of the Bighorn National Forest. Bighorn National Forest, Sheridan, WY.
- Bricker, J.S. and G.K. Brown. 1998. ITS-RFLP (Restriction Fragment Length Polymorphism) analysis of *Descurainia torulosa* (Brassicaceae). Report prepared for the Bureau of Land Management Wyoming State Office. Department of Botany, University of Wyoming, Laramie WY.
- Brunsfeld, S.J. and F.D. Johnson. 1985. Field Guide to the Willows of East-Central Idaho. Forest, Wildlife and Range Experiment Station, University of Idaho, Moscow, ID.
- Carr, G.D. 1971. Taxonomy of *Pedicularis parryi* (Scrophulariaceae). Brittonia 23:280-291.
- Cary, M. 1917. Life Zone Investigations in Wyoming. North American Fauna. 42: 1-95.
- Chmielewski, J. G. 1993. *Antennaria pulvinata* Greene: the legitimate name for *A. aromatica* Evert (Asteraceae: Inuleae). Rhodora 95 (883/884):261-276.

- Clark, T.W. and R.D. Dorn (eds.). 1981. Rare and Endangered Vascular Plants and Vertebrates of Wyoming, second edition. Published by the authors.
- Clark, T.W., A.H. Harvey, R.D. Dorn, D.L. Genter, and C. Groves, (eds). 1989. Rare, Sensitive, and Threatened Species of the Greater Yellowstone Ecosystem. Northern Rockies Conservation Cooperative, Montana Natural Heritage Program, The Nature Conservancy, and Mountain West Environmental Services.
- Colorado Native Plant Society. 1989. Rare Plants of Colorado. Rocky Mountain Nature Association, Estes Park, CO.
- Constance, L. and R. C. Rollins. 1936. A revision of *Gilia congesta* and its allies. American Journal of Botany 23 (6): 433-440.
- Coulter, J. and A. Nelson. 1909. New Manual of Botany of the Central Rocky Mountains (Vascular Plants). American Book Co.
- Cramer, T. 1997. A floristic survey of the upper Green River Basin, Wyoming. Master's Thesis, Department of Botany, University of Wyoming, Laramie.
- Cramer, T. and R. L. Hartman. 1995. General floristic/sensitive plant species survey of the Upper Green River Basin, Wyoming. Unpublished report prepared for the Rock Springs District and Wyoming State Office, BLM, by the Rocky Mountain Herbarium.
- Cramer, T. and R.L. Hartman. 1996. General floristic/sensitive plant species survey of the Upper Green River Basin, Wyoming, final report. Unpublished report prepared for the Bureau of Land Management by the Rocky Mountain Herbarium, University of Wyoming.
- Croft, L.K., W.R. Owen, and J.S. Shelly. 1997. Interior Columbia Basin Ecosystem management project: analysis of vascular plants. US Forest Service.
- Cronquist, A. 1955. Pt. 5. Compositae. In: C. L. Hitchcock, A. Cronquist, M. Ownbey, and J. W. Thompson, eds. Vascular Plants of the Pacific Northwest. Univ. Washington Publ. Biol. 17 (5):1-343.
- Cronquist, A. 1994. Intermountain Flora, Volume 5: Asterales. Intermountain Flora: Vascular Plants of the Intermountain West, USA. New York Botanical Garden, Bronx, NY.
- Cronquist, A., A.H. Holmgren, N.H. Holmgren, and J.L. Reveal. 1972. Intermountain Flora, Volume 1: Geological and Botanical History of the Region, its Plant Geography and a Glossary. The Vascular Cryptogams and the Gymnosperms. The New York Botanical Garden, Bronx, NY.
- Cronquist, A., A.H. Holmgren, N.H. Holmgren, J.L. Reveal, and P.K. Holmgren. 1977. Volume 6: Monocotyledons. Intermountain Flora: Vascular Plants of the Intermountain West, USA. Columbia University Press, New York.
- Cronquist, A., A. H. Holmgren, N. H. Holmgren, and J. L. Reveal. 1984. Volume 4 Subclass Asteridae (except Asteraceae). Intermountain Flora: Vascular Plants of the Intermountain West, USA. New York Botanical Garden, Bronx, NY.
- Cronquist, A., N.H. Holmgren, and P.K. Holmgren. 1997. Volume 3 Part A Subclass Rosidae (except Fabales). Intermountain Flora: Vascular Plants of the Intermountain West, USA, New York Botanical Garden, Bronx, NY.
- Culver, D. and H. Marriott. 1989. General Floristic/Sensitive Plant surveys of four proposed project areas on Bridger-Teton National Forest, 1989. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.
- Day, A. G. 1980. Nomenclatural changes in *Ipomopsis congesta* (Polemoniaceae). Madrono 27 (2): 111-112.
- Delmatier, C.R. 1998. A general floristic survey of southwest Wyoming and northeast Utah.

- Master's Thesis, Department of Botany, University of Wyoming, Laramie.
- Detling, L.E. 1939. A revision of the North American species of *Descurainia*. The American Midland Naturalist 22(3): 481-520.
- Dorn, R.D. 1977. Manual of the Vascular Plants of Wyoming (in 2 volumes). Garland Publ., New York.
- Dorn, R.D. 1978. A new species of *Draba* (Cruciferae) from Wyoming and Utah. Madrono 25:101-103.
- Dorn, R.D. 1983. A new species of *Thelesperma* (Asteraceae) from Wyoming. Great Basin Naturalist 43: 749-750.
- Dorn, R.D. 1988. Vascular Plants of Wyoming. Mountain West Publishing, Cheyenne, WY.
- Dorn, R.D. 1989a. Report on the status of *Astragalus shultziorum*, a candidate Threatened species. Report prepared for the US Fish and Wildlife Service by Mountain West Environmental Services.
- Dorn, R. D. 1989b. Report on the status of *Descurainia torulosa*, a candidate Threatened species. Report prepared for the US Fish and Wildlife Service by Mountain West Environmental Services.
- Dorn, R.D. 1989c. Report on the status of *Thelesperma pubescens*, a Candidate Threatened species. Prepared for the US Fish and Wildlife Service by Mountain West Environmental Services, Cheyenne, WY.
- Dorn, R.D. 1990. *Thelesperma caespitosum* (Asteraceae), a new species from Wyoming and Utah. Madrono 37:293-298.
- Dorn, R.D. 1992. Vascular Plants of Wyoming, second edition. Mountain West Publishing, Cheyenne, WY.
- Dorn, R.D. 1995. A taxonomic study of *Salix* section *Cordatae* subsection *Luteae* (Salicaceae). Brittonia 47:160-174.
- Dorn, R.D. 1997. Rocky Mountain Region Willow Identification Field Guide. US Forest Service Region 2, Denver, CO.
- Dorn, R.D. and J. Dorn. 1972. Ferns and other Pteridophytes of Montana, Wyoming, and the Black Hills of South Dakota. Published by the authors.
- Dorn, R.D. and J.L. Dorn. 1980. Illustrated Guide to Special Interest Vascular Plants of Wyoming. Published by US Fish and Wildlife Service and Bureau of Land Management.
- Duft, J.E. and R.K. Moseley. 1989. Alpine Wildflowers of the Rocky Mountains. Mountain Press Publ., Missoula, MT.
- Epling, C.C. 1925. Monograph of the genus *Monardella*. Annals Missouri Botanical Garden 12:1-106.
- ERO Resources Corporation. 1999. Final Report: Plant species of concern, portions of US 212 (FH4), the Beartooth Highway, Park County, Wyoming. Report prepared for the Federal Highway Administration by ERO Resources Corp., Denver, CO.
- Evert, E.F. No Date. Rare Plants: Teton-Darby Canyon Area. Report prepared for The Nature Conservancy.
- Evert, E. F. 1982. Noteworthy Collections, Wyoming. Madrono 29 (2): 124-125.
- Evert, E.F. 1984. A new species of *Antennaria* (Asteraceae) from Montana and Wyoming. Madrono 31: 109-112.
- Evert, E.F. 1986. The Yellowstone region: endemics and other interesting plants. In: Williams, J., ed. Rocky Mountain Alpines. American Rock Garden Society and Denver Botanic Gardens.
- Evert, E. F. 1991. Annotated checklist of the vascular plants of the North Fork Shoshone River

- drainage area, northwestern Wyoming. Report on file at the Rocky Mountain Herbarium, University of Wyoming, Laramie, WY.
- Evert, E.F., R.D. Dorn, R.L. Hartman, and R.W. Lichvar. 1986. Noteworthy collections, Wyoming. *Madrono* 33(4): 315-317.
- Fertig, W. 1992 a. Checklist of the Vascular plant flora of the west slope of the Wind River Range and status report on the sensitive plant species of Bridger-Teton National Forest. Report prepared by the Rocky Mountain Herbarium, University of Wyoming, Laramie.
- Fertig, W. 1992 b. A floristic survey of the west slope of the Wind River Range, Wyoming. Master's Thesis, University of Wyoming, Department of Botany.
- Fertig, W. 1992 c. Distinguishing *Aster mollis* from "look-alike" species in the Bighorn Mountains. Report prepared for Bighorn National Forest by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. 1992 d. Sensitive plant species surveys and revised species checklist, Grass Creek Resource Area, BLM. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. 1993a. Pink agoseris (*Agoseris lackschewitzii*), a newly discovered sensitive plant species from the west slope of the Wind River Range, Bridger-Teton National Forest. Addendum to Fertig's 1992 Checklist of the flora and Sensitive species of the Wind River Mountains on the Bridger-Teton NF.
- Fertig, W. 1993b. Survey of alpine plant species of special concern in the Medicine Bow Peak Special Botanical Area. Report prepared for Medicine Bow National Forest by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. 1995a. Biological report on the potential Kendall Warm Springs Special Management Area. Report prepared for Bridger-Teton National Forest by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. 1995 b. Status report on *Parrya nudicaulis* in Bridger-Teton National Forest. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. 1995 c. Report on the potential vulnerability of Shoshone National Forest Candidate and Sensitive plant species to livestock grazing. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. 1995 d. Plants of The Nature Conservancy's Red Canyon Ranch. Report prepared for the Wyoming Nature Conservancy by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. 1995 e. Status report on *Thelesperma caespitosum* in southwestern Wyoming. Report prepared for the BLM Rock Springs District by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. 1996a. Biological report on the Big Fall Creek potential special management area. Report prepared for Bridger-Teton National Forest by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. 1996b. Status report on *Haplopappus macronema* var. *linearis* in Bridger-Teton National Forest. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. 1996c. Status report on *Phlox opalensis* in southwestern Wyoming and northeastern Utah. Report prepared for the Bureau of Land Management, Wyoming State Office, and the Rock Springs District by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. 1996d. Status report on *Primula egaliksensis* in Bridger-Teton National Forest. Report

- prepared for Bridger-Teton National Forest by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. 1996e. Additions and deletions to the flora of Wyoming. *Castilleja* 15(4):6-7.
- Fertig, W. 1997a. Plant species of special concern on Shoshone National Forest: 1996 survey results. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. 1997b. Status report on *Lesquerella carinata* var. *carinata* in northwest Wyoming. Report prepared for Bridger-Teton National Forest by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. 1997c. Status report on *Lesquerella paysonii* in northwest Wyoming. Report prepared for Bridger-Teton National Forest by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. 1998a. The status of rare plants on Shoshone National Forest: 1995-97 survey results. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. 1998b. Plant species of special concern and vascular plant flora of the National Elk Refuge. Report prepared for the US Fish and Wildlife Service by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. 1998c. Plant species of special concern of the Ross Butte ecosystem, Sublette County, Wyoming. Report prepared for the Bureau of Land Management Wyoming State Office and Rock Springs District by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. 1998d. Additions to the flora of Wyoming. *Castilleja* 17(4):3.
- Fertig, W. 1999a. The status of rare plants in the Bighorn Landscape. Report prepared for The Nature Conservancy Wyoming Field Office by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. 1999b. Sensitive plant surveys and status of rare plant species on Bridger-Teton National Forest, 1997-1998. Report prepared for Bridger-Teton National Forest by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. 1999c. Status report on Ownbey's thistle (*Cirsium ownbeyi*) in southwest Wyoming. Report prepared for the Bureau of Land Management Wyoming State Office by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. 1999d. Status report on Desert glandular phacelia (*Phacelia glandulosa* var. *deserta*) in southwestern Wyoming. Report prepared for the BLM Wyoming State Office by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. 1999e. Updated status report on Green River greenthread (*Thelesperma caespitosum*) in southwestern Wyoming. Report prepared for the Bureau of Land Management Wyoming State Office and Rock Springs Field Office by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. 1999f. Wyoming Basins Ecoregion target plant species and potential plant conservation sites. Report prepared for the Wyoming Nature Conservancy by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. and G. Beauvais. 1999. Wyoming Plant and Animal Species of Special Concern. Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. and M. Bynum. 1994 a. Biological report on the proposed Twin Lakes Research Natural Area. Report prepared for Shoshone National Forest by the Wyoming Natural Diversity Database, Laramie WY.
- Fertig, W. and M. Bynum. 1994 b. Biological report on the proposed Bald Ridge Research Natural Area. Report prepared for Shoshone National Forest by the Wyoming Natural Diversity Database, Laramie WY.

- Database, Laramie, WY.
- Fertig, W. and G. Jones. 1992. Plant communities and rare plant species of the Swamp Lake Botanical Area, Clark's Fork Ranger District, Shoshone National Forest. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. and G. Jones. 1994 a. Establishment record for Swift Creek Research Natural Area within Bridger-Teton National Forest, Lincoln County, Wyoming. Report prepared for US Forest Service Region 4, by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. and G. Jones. 1994b. Establishment record for Horse Creek Research Natural Area within Bridger-Teton National Forest, Teton County, Wyoming. Report prepared for US Forest Service Region 4, by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. and G. Jones. 1994c. Establishment record for Osborn Mountain Research Natural Area within Bridger-Teton National Forest, Sublette County, Wyoming. Report prepared for US Forest Service Region 4, by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. and S. Markow. 1998. Guide to the Willows of Shoshone National Forest. Report prepared for the Shoshone National Forest by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. and H. Marriott. 1993. Field survey for *Astragalus paysonii* (Payson's milkvetch) and *Draba borealis* (Boreal draba), Bridger-Teton National Forest, Final Report. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W. and L. Welp. 1998. Status report on persistent sepal yellowcress (*Rorippa calycina*) in Wyoming. Report prepared for the Bureau of Land Management Wyoming State Office by the Wyoming Natural Diversity Database, Laramie, WY.
- Fertig, W., R.L. Hartman, and B.E. Nelson. 1991. General floristic survey of the west slope of the Wind River Range, Bridger-Teton National Forest, 1990. Report prepared by the Rocky Mountain Herbarium, University of Wyoming.
- Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne, WY.
- Fertig, W., L. Welp, and S. Markow. 1998. The status of rare plants in southwest Wyoming. Report prepared for the Bureau of Land Management by the Wyoming Natural Diversity Database, Laramie, WY.
- Gleason, H.A. and A. Cronquist. 1991. Manual of Vascular Plants of Northeastern United States and Canada. New York Botanical Garden, Bronx, NY.
- Goodding, L. 1902. Rocky Mountain plant studies 1. Botanical Gazette 33:66-67.
- Gottlieb, L.D. 1999. A new species of *Stephanomeria* (Asteraceae) from northwestern Wyoming. Madrono 46(1):58-60.
- Great Plains Flora Association. 1986. Flora of the Great Plains. University Kansas Press, Lawrence, KS.
- Greenlee, J. 1994. The conservation biology of *Lesquerella carinata* var. *languida* (Brassicaceae). The Nature Conservancy, Arlington, VA.
- Hall, H.M. 1928. The Genus *Haplopappus*, a phylogenetic study in the Compositae. Carnegie Institute of Washington.
- Hallsten, G.P., Q.D. Skinner, and A.A. Beetle. 1987. Grasses of Wyoming, Third edition. Research Journal 202, Agricultural Experiment Station, University of Wyoming, Laramie.
- Hansen, C.J. 1998. Biosystematic analysis of the *Thelesperma subnudum* (Asteraceae) complex. Master's thesis, Brigham Young Univ., Provo, UT.
- Harrington, H. D. 1954. Manual of the Plants of Colorado. Sage Books, Denver, CO.

- Hartman, R. L. 1995. General floristic/Sensitive plant species survey of the Gros Ventre Range, Wyoming. Report prepared for Bridger-Teton National Forest by the Rocky Mountain Herbarium, University of Wyoming, Laramie, WY.
- Hartman, R.L. 1996. General floristic/sensitive plant species survey of the Gros Ventre area and the Mount Leidy Highlands, Wyoming. Report prepared for Bridger-Teton National Forest by the Rocky Mountain Herbarium, University of Wyoming.
- Hartman, R.L. and B.E. Nelson. 1993. General floristic/sensitive plant species survey of the Wyoming and Salt River ranges, northern portions, Wyoming. Report prepared for Bridger-Teton National Forest by the Rocky Mountain Herbarium, University of Wyoming, Laramie.
- Hartman, R.L. and B.E. Nelson. 1994. General floristic/sensitive plant species survey of the Wyoming and Salt River ranges, southern portions, Wyoming and concluding remarks on the entire area. Report prepared for Bridger-Teton National Forest by the Rocky Mountain Herbarium, University of Wyoming, Laramie.
- Hartman, R.L. and C.H. Refsdal. 1995. Status report on the general floristic inventory of southwest Wyoming and adjacent northeast Utah. Report prepared for the BLM Wyoming State Office, Vernal, Utah BLM, US Fish and Wildlife Service, and Region 4, US Forest Service, by the Rocky Mountain Herbarium, University of Wyoming, Laramie.
- Hartman, R.L., B.E. Nelson, K.H. Dueholm, and R.D. Dorn. 1980. Noteworthy Collections, Wyoming. *Madrono* 27 (4): 181-186.
- Hartman, R.L., B.E. Nelson, and K.H. Dueholm. 1985. Noteworthy collections - Wyoming. *Madrono* 32:125-128.
- Hartman, R.L., B.E. Nelson, and W. Fertig. 1991. General floristic/sensitive plant species surveys of Fish Creek/Moccasin Basin Implementation Area, Gros Ventre Burn Areas, and Willow Creek Implementation Area on Bridger-Teton National Forest, 1990. Report prepared by the Rocky Mountain Herbarium, University of Wyoming, Laramie.
- Harvey, M.J. 1993. *Agrostis*. IN: J.C. Hickman, ed. The Jepson Manual, Higher Plants of California. Univ. California Press, Berkeley, CA.
- Hawksworth, F.G. and D. Wiens. 1972. Biology and Classification of dwarf mistletoes (*Arceuthobium*). Agriculture Handbook # 401, USDA Forest Service, Washington, DC.
- Haynes, R.R. 1974. A revision of North American *Potamogeton* Subsection *Pusilli*. *Rhodora* 76:564-649.
- Heidel, B. 1996. Noteworthy Collections - Montana. *Madrono* 43: 436-440.
- Henderson, D. M., R. K. Moseley, and A. F. Cholewa. 1990. A new *Agoseris* (Asteraceae) from Idaho and Montana. *Systematic Botany* 15:462-465.
- Hermann, F. J. 1970. Manual of the Carices of the Rocky Mountains and Colorado Basin. USDA Forest Service Ag. Handbook 374:1-397.
- Hermann, F.J. and W.A. Weber. 1977. *Juncus triglumis* in North America. *Rhodora* 79:160-162.
- Hitchcock, A. S. 1950. Manual of the Grasses of the United States, second edition, revised by Agnes Chase. USDA Misc Publ. 200.
- Hitchcock, C.L. 1941. A revision of the *Drabas* of western North America. University of Washington Publ. Biology 11: 1-132.
- Hitchcock, C.L. 1943. The xerophyllous species of *Philadelphus* in southwestern North America. *Madrono* 7:35-53.
- Hitchcock, C.L. and A. Cronquist. 1961. Pt. 3. Saxifragaceae to Ericaceae. In: C.L. Hitchcock, A. Cronquist, M. Ownbey, and J. W. Thompson, eds. Vascular Plants of the Pacific

- Northwest. University of Washington Publ. Biology 17 (3):1-614.
- Hitchcock, C.L. and A. Cronquist. 1964. Pt. 2. Salicaceae to Saxifragaceae. In: C.L. Hitchcock, A. Cronquist, M. Ownbey, and J. W. Thompson, eds. Vascular Plants of the Pacific Northwest. University of Washington Publ. Biology 17 (2):1-597.
- Hitchcock, C.L. and B. Maguire. 1947. A revision of the North American species of *Silene*. Univ. Washington Publ. Biology 13:1-73.
- Hitchcock, C.L., A. Cronquist, and M. Ownbey. 1959. Pt. 4: Ericaceae through Campanulaceae. In: Hitchcock, C.L., A. Cronquist, M. Ownbey, and J. W. Thompson, eds. Vascular Plants of the Pacific Northwest. University of Washington Publ. Biology 17 (4):1-510.
- Hitchcock, C.L., A. Cronquist, and M. Ownbey. 1969. Pt. 1. Vascular Cryptogams, Gymnosperms, and Monocotyledons. In: C.L. Hitchcock, A. Cronquist, M. Ownbey, and J. W. Thompson, eds. Vascular Plants of the Pacific Northwest. Univ. Washington Publ. Biol. 17 (1): 1-914.
- Hulten, E. 1959. A new species of *Saussurea* from Colorado. Svensk Botanisk Tidskrift 53 (2): 200-202.
- Hulten, E. 1968. Flora of Alaska and Neighbouring Territories. Stanford Univ. Press, Stanford, CA.
- Hurd, E.G., N.L. Shaw, J. Mastrogiuseppe, L.C. Smithman, and S. Goodrich. 1998. Field guide to intermountain sedges. Rocky Mountain Research Station General Technical Report RMRS-GTR-10.
- IHI Environmental. 1995. Draft Conservation Strategy and Action Plan, *Thelesperma pubescens* (Uinta greenthread). Unpublished report prepared for Wasatch-Cache National Forest by IHI Environmental, Salt Lake City, UT.
- Johnson, P.L. 1962. The occurrence of new arctic-alpine species in the Beartooth Mountains, Wyoming-Montana. Madrono 16:229-233.
- Jones, A.G. 1984. Typification of *Aster jessicae* Piper and reinstatement of *A. mollis* Rydberg (Asteraceae). Madrono 31(2): 113-122.
- Jones, G.P. 1991 a. Report on the proposed Bald Ridge Special Botanical Area. Report prepared for Shoshone National Forest by the Wyoming Natural Diversity Database, Laramie, WY.
- Jones, G.P. 1991 b. Survey of plant species and plant communities of interest in the Carter Mountain Area of Critical Environmental Concern. Report prepared for the Bureau of Land Management Worland District by the Wyoming Natural Diversity Database, Laramie, WY.
- Jones, G. and W. Fertig. 1996. Plant associations and plant species of special concern in the Jack Morrow Hills Ecosystem. Unpublished report prepared for the Bureau of Land Management Rock Springs District by the Wyoming Natural Diversity Database, Laramie, WY.
- Jones, G.P. and W. Fertig. 1998. Ecological evaluation of the Mann Creek potential Research Natural Area within the Bighorn National Forest, Sheridan County, Wyoming. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.
- Jones, G.P. and W. Fertig. 1999a. Ecological evaluation of the potential Arrow Mountain Research Natural Area within the Shoshone National Forest, Fremont County, Wyoming. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.
- Jones, G.P. and W. Fertig. 1999b. Ecological evaluation of the potential Beartooth Butte Research Natural Area within the Shoshone National Forest, Park County, Wyoming. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.
- Jones, G.P. and W. Fertig. 1999c. Ecological evaluation of the potential Lake Creek Research Natural Area within the Shoshone National Forest, Fremont County, Wyoming. Report

- prepared by the Wyoming Natural Diversity Database, Laramie, WY.
- Jones, G.P. and W. Fertig. 1999d. Ecological evaluation of the potential Pat O'Hara Mountain Research Natural Area within the Shoshone National Forest, Park County, Wyoming. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.
- Jones, G.P. and W. Fertig. 1999e. Ecological evaluation of the potential Sheep Mesa Research Natural Area within the Shoshone National Forest, Park County, Wyoming. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.
- Joslin, R.C. 1994. Region 4 Sensitive plant list. Memorandum dated 29 April 1994, USFS Intermountain Region, Ogden, UT.
- Kass, R. J. 1993. Status of Bastard draba milkvetch (*Astragalus drabelliformis*) and Swallen mountain ricegrass (*Oryzopsis swallenii*) in Sublette and Lincoln Counties, Wyoming. Report prepared for Mobil Exploration & Producing US & Enron Oil and Gas Co. by Intermountain Ecosystems, LC, Springville, UT.
- Kass, R. J. 1995. Status of Bastard draba milkvetch (*Astragalus drabelliformis*) in the Upper Green River Basin, Wyoming. Report prepared for the BLM Rock Springs District by Intermountain Ecosystems, LC., Springville, UT.
- Kelso, S. 1991. Taxonomy of *Primula* sects. *Aleurita* and *Armerina* in North America. *Rhodora* 93: 67-99.
- Kiger, R. W. 1975. *Papaver* in North America north of Mexico. *Rhodora* 77: 410-422.
- Kiger, R.W. and D.F. Murray. 1997. *Papaver*. In: Flora of North America Editorial Committee. Flora of North America North of Mexico. Vol 3 Magnoliophyta: Magnoliidae and Hamamelidae. Oxford Univ. Press, New York.
- Lavin, M. and H. Marriott. 1997. *Astragalus molybdenus* s.l. (Leguminosae): higher taxonomic relationships and identity of constituent species. *Systematic Botany* 22(2):199-217.
- Lellinger, D.B. 1985. A Field Manual of the Ferns and Fern Allies of the United States and Canada. Smithsonian Institution Press, Washington, DC.
- Lesica, P. & J. S. Shelly. 1991. Sensitive, Threatened and Endangered Vascular Plants of Montana. Montana Natural Heritage Program, Occ. Publ. No. 1. Helena, MT.
- Lichvar, R.W. 1981. Field survey for *Rorippa calycina* (Engelm.) Rydb. Report prepared for the Bureau of Land Management by the Wyoming Natural Heritage Program, Cheyenne, WY.
- Lichvar, R.W. 1983. Evaluation of *Draba oligosperma*, *D. pectinipila*, and *D. juniperina* complex (Cruciferae). *Great Basin Naturalist* 43: 441-444.
- Lichvar, R. and R. Dorn. 1982. Additions to the vascular flora of Montana and Wyoming. *Great Basin Naturalist* 42:413-414.
- Lofgren, L.G. 1956. Alpine flowering plants of the Cloud Peak-Cliff Lake area, Big Horn County, Wyoming. Masters Thesis, Department of Botany, University of Wyoming.
- Lorain, C. C. 1990. Field investigations of *Astragalus paysonii* (Payson's milk-vetch), a Region 1 Sensitive species, on the Nez Perce National Forest. Report prepared by the Idaho Natural Heritage Program, Idaho Dept. of Fish and Game, Boise, ID.
- Love, D. 1969. *Papaver* at high altitudes in the Rocky Mountains. *Brittonia* 21: 1-10.
- Maguire, B. 1946a. Studies in the Caryophyllaceae – I. *Bulletin Torrey Botanical Club* 73(3):326.
- Maguire, B. 1946b. Studies in the Caryophyllaceae – II. *Arenaria nuttallii* and *Arenaria filiorum*, section *Alsine*. *Madrono* 8(8): 258-263.
- Maguire, B. 1950. *Lesquerella* collected by H.D. Ripley and R.C. Barneby. *Leaflets Western Botany* 6:73-75.
- Maguire, B. 1958. *Arenaria rossii* and some of its relatives in America. *Rhodora* 60:44-53.

- Markow, S. 1994. A floristic survey of the Targhee National Forest and vicinity, East-Central Idaho and West-Central Wyoming. Master's Thesis, Dept. of Botany, University of Wyoming, Laramie.
- Markow, S. 1996. A sensitive species and general floristics survey of the Bridger Ridge Ski Development Area. Unpublished report prepared for the Jackson Hole Ski Corporation and Bridger-Teton National Forest.
- Markow, S. and W. Fertig. 1993. Report on a general floristic survey of vascular plants of Targhee National Forest and vicinity. Report prepared by the Rocky Mountain Herbarium and the Wyoming Natural Diversity Database, Laramie, WY.
- Marriott, H.J. 1986. A report on the status of *Arabis williamsii*, a Candidate Threatened species. Prepared for the US Fish and Wildlife Service by the Wyoming Natural Diversity Database, Laramie, WY.
- Marriott, H. 1988a. 1988 survey of sensitive plant species on Shoshone National Forest. Report prepared by the Wyoming Natural Diversity Database, Laramie WY.
- Marriott, H.J. 1988b. Draft habitat management plan for threatened, endangered and sensitive plant species and their habitats on the Rock Springs District, Bureau of Land Management. Prepared for the Bureau of Land Management by the Wyoming Natural Diversity Database, Laramie, WY.
- Marriott, H.J. 1988c. Inventory and monitoring of *Thelesperma pubescens* (Uinta greenthread), a Category 2 candidate plant species for federal listing, on Wasatch National Forest and the Rock Springs District, BLM. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY
- Marriott, H.J. 1990a. Survey and taxonomic study of *Astragalus shultziorum* (Shultz's milkvetch). Report prepared for Bridger-Teton National Forest by the Wyoming Natural Diversity Database, Laramie, WY.
- Marriott, H.J. 1990b. Rare plants of Grand Teton National Park, annual report. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.
- Marriott, H.J. 1991a. Status report for *Descurainia torulosa* (Wyoming tansymustard). Prepared for Bridger-Teton and Shoshone National Forests by the Wyoming Natural Diversity Database, Laramie, WY.
- Marriott, H. 1991b. Field survey for *Androsace chamaejasme* var. *carinata* and *Saussurea weberi*, northwest Wind River Range, Wyoming. Report prepared for Bridger-Teton National Forest by the Wyoming Natural Diversity Database, Laramie, WY.
- Marriott, H.J. 1991 c. Rare plants of Grand Teton National Park, annual report. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY
- Marriott, H.J. 1992 a. Field survey for *Aster mollis*, *Astragalus barrii* and *Lesquerella arenosa* var. *argillosa* in northeast and central Wyoming. Report prepared for the Bureau of Land Management Casper District, by the Wyoming Natural Diversity Database, Laramie, WY.
- Marriott, H. 1992 b. Status report for *Descurainia torulosa* (Wyoming tansymustard), Sweetwater County, Wyoming. Report prepared for the BLM Rock Springs District by the Wyoming Natural Diversity Database, Laramie, WY.
- Marriott, H.J. 1992 c. Field survey for *Astragalus paysonii* and *Draba borealis*, Bridger-Teton National Forest, Wyoming: First-year progress report. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.
- Marriott, H.J. 1993. Rare Plants of Grand Teton National Park, final report. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.

- McVaugh, R. 1940. A revision of "*Laurentia*" and allied genera in North America. *Bulletin Torrey Botanical Club* 27:258-274.
- McVaugh, R. 1941. A new name for *Heterocodon rariflorum*. *Leaflets of Western Botany* 3(2):48.
- Mills, S. and W. Fertig. 1996 a. Field guide to rare and Sensitive plants of the Shoshone National Forest. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.
- Mills, S. and W. Fertig. 1996 b. Survey of plant species of special concern on the Shoshone National Forest, 1995. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.
- Mills, S. and M. Neighbours. 1995. Intensive data gathering project (fine-filter analysis) for occurrences of rare, threatened, endangered and sensitive species in sections M331H and M331I, north central highlands and northern parks and ranges, in Wyoming. Report prepared for Medicine Bow National Forest by the Wyoming Natural Diversity Database, Laramie, WY.
- Moseley, R. K. 1989. Field investigations of seven rare alpine plant species in the southern Lemhi Range and Beaverhead Mountains, Dubois Ranger District, Targhee National Forest. Report prepared by the Idaho Conservation Data Center, Boise ID.
- Moseley, R.K. 1996. Report on the conservation status of *Lesquerella paysonii* in Idaho. Report prepared for the Idaho Department of Parks and Recreation by the Conservation Data Center, Idaho Department of Fish and Game, Boise, ID.
- Moseley, R.K., R. Bursik, and M. Mancuso. 1991. Floristic inventory of wetlands in Fremont and Teton Counties, Idaho. Unpublished report prepared for Targhee National Forest by the Conservation Data Center, Idaho Department of Fish and Game, Boise, ID.
- Mulligan, G.A. 1974. Cytotaxonomic studies of *Draba* and its close allies in Canada and Alaska. *Canadian Journal of Botany* 52:1793-1801.
- Murray, D. F. 1969. Taxonomy of *Carex* sect. *Atratae* (Cyperaceae) in the southern Rocky Mountains. *Brittonia* 21: 55-76.
- Nelson, A. 1898. New plants for Wyoming II. *Bulletin Torrey Botanical Club* 25(5): 275-284
- Nelson, A. 1900. New plants for Wyoming - XII. *Bulletin Torrey Botanical Club* 27:258-274.
- Nesom, G.L. 1990. Taxonomic summary of *Ericameria* (Asteraceae: Astereae), with the inclusion of *Haplopappus* sects. *Macronema* and *Asiris*.
- Ode, D. J., and H. Marriott. 1990. Sensitive plant surveys in the northwestern Black Hills. Report prepared for the Black Hills National Forest, Spearfish and Bearlodge Ranger Districts, by the South Dakota Natural Heritage Program and the Wyoming Natural Diversity Database, Laramie, WY.
- O'Kane, S.L. 1988. Colorado's rare flora. *Great Basin Naturalist* 48 (4):434-484.
- Pennell, F.W. 1942. Some new Scrophulariaceae from Montana and adjacent Idaho and Wyoming. *Notulae Naturae of the Academy of Natural Sciences of Philadelphia*. 95:1-11.
- Porsild, A. E. and W. J. Cody. 1980. Vascular Plants of Continental Northwest Territories, Canada. National Museums of Canada, Ottawa.
- Refsdal, C.H. 1996. A general floristic inventory of southwest Wyoming and adjacent northeast Utah, 1994-1995. Unpublished report prepared for the Bureau of Land Management Wyoming State Office, Bureau of Land Management Vernal Supervisor's Office, US Fish and Wildlife Service, and US Forest Service Region 4 by the University of Wyoming, Rocky Mountain Herbarium, Laramie, WY.
- Roderick, A.J., B.E. Nelson, and R.L. Hartman. 1999. Final report on the general floristic inventory of the Upper North Platte and Laramie River drainages. Report prepared for the

- Bureau of Land Management Rawlins and Casper districts by the Rocky Mountain Herbarium, University of Wyoming, Laramie, WY.
- Rollins, R.C. 1941. A Monographic Study of *Arabis* in western North America. *Rhodora* 43:289-380.
- Rollins, R.C. 1950. Studies on some North American cruciferae. *Contributions Gray Herbarium* 171:42-53.
- Rollins, R.C. 1953. *Draba* on Clay Butte, WY *Rhodora* 55:229-235.
- Rollins, R.C. 1983. Studies in the Cruciferae of western North America. *Journal Arnold Arboretum* 64: 491-510.
- Rollins, R.C. 1993. The Cruciferae of Continental North America, Systematics of the Mustard Family from the Arctic to Panama. Stanford Univ. Press, Stanford, CA.
- Rollins, R.C., and Shaw, E.A. 1973. The Genus *Lesquerella* (Cruciferae) in North America. Harvard Univ. Press, Cambridge, MA.
- Rosenthal, D.M. 1998. Report on a general floristic survey of vascular plants in selected areas of Shoshone National Forest. Report prepared by the Rocky Mountain Herbarium, University of Wyoming, Laramie.
- Rosenthal, D.M. 1999. A floristic survey of selected areas in Shoshone National Forest, Wyoming. Master's Thesis, Department of Botany, University of Wyoming, Laramie, WY.
- Rydberg, P.A. 1927. Notes on Fabaceae - VII. *Bulletin Torrey Botanical Club* 54:13-23.
- Sanderson, J. and M. March. 1996. Extreme rich fens of South Park, Colorado: their distribution, identification, and natural heritage significance. Unpublished report prepared for Park County, the Colorado Department of Natural Resources, and the US Environmental Protection Agency by the Colorado Natural Heritage Program, Ft. Collins, CO.
- Schassberger, L.A. 1991. Status review of *Lesquerella carinata* and *L. paysonii*, USDA Forest Service- Region 1, Deerlodge National Forest, Montana. Report prepared by the Montana Natural Heritage Program, Helena, MT.
- Schassberger, L.A. and J.S. Shelly. 1990. Status review and taxon status of *Astragalus molybdenus*, Lewis and Clark National Forest. Report prepared by the Montana Natural Heritage Program, Helena, MT.
- Schlessmann, M.A. 1982. Taxonomy of *Lomatium bicolor* (Umbelliferae). *Madrono* 29:118-119.
- Shultz, J.S. and L.M. Shultz. 1978. Report on the botanical survey of Endangered and Threatened plants, Bridger-Teton National Forest. Report prepared for the US Forest Service.
- Scott, R. W. 1997. The Alpine Flora of the Rocky Mountains: Volume 1 The Middle Rockies. Univ. of Utah Press, Salt Lake City, UT.
- Semple, J.C. 1996. A revision of *Heterotheca* sect. *Phyllothea* (Nutt.) Harms (Compositae: Astereae): the prairie and montane goldenasters of North America. *Univ. of Waterloo Biology Series* 37: 1-164.
- Shaw, R. J. 1976. Field Guide to the Vascular Plants of Grand Teton National Park and Teton County, Wyoming. Utah State University Press, Logan, UT.
- Shaw, R.J. 1992. Annotated checklist of the vascular plants of Grand Teton National Park and Teton County, Wyoming. Grand Teton Natural History Association, Moose, WY.
- Shultz, J.S. and L.M. Shultz. 1978. Report on the botanical survey of Endangered and Threatened plants, Bridger-Teton National Forest. Report prepared for USDA Forest Service Region 4.
- Snow, N. 1994. The vascular flora of southeastern Yellowstone National Park and the headwaters of the Yellowstone River, Wyoming. *Wasmann Journal of Biology* 59(1-2):52-95.
- Soltis, P.S., D.E. Soltis, and P.G. Wolf. 1991. Allozymic and chloroplast DNA analyses of

- polyploidy in *Polystichum* (Dryopteridaceae). I. The origins of *P. californicum* and *P. scopulinum*. *Systematic Botany* 16(2):245-256.
- Soltis, P.S., D.E. Soltis, P.G. Wolf, and J.M. Riley. 1989. Electrophoretic evidence of interspecific hybridization in *Polystichum*. *American Fern Journal* 79(1):7-13.
- Soreng, R. J. 1984. Noteworthy Collections: Wyoming. *Madrono* 31: 127.
- Spackman, S., B. Jennings, J. Coles, C. Dawson, M. Minton, A. Kratz, and C. Spurrier. 1997. Colorado Rare Plant Field Guide. Prepared for the Bureau of Land Management, US Forest Service, and US Fish and Wildlife Service by the Colorado Natural Heritage Program, Ft. Collins, CO.
- Stone, R. D. 1995. Status review of *Draba globosa* Payson (Brassicaceae) [= *D. densifolia* var. *apiculata* (C. L. Hitchcock) Welsh] and related species [*D. densifolia* Nutt. ex Torrey & Gray, *D. daviesiae* (C. L. Hitchcock) Rollins]. Final report for 1994 challenge cost share project. Report prepared for the USDA Forest Service Intermountain Region by the Utah Natural Heritage Program, Salt Lake City, UT.
- Stuckey, R. 1972. Taxonomy and distribution of the genus *Rorippa* (Cruciferae) in North America. *Sida* 4:279-430.
- USDA Forest Service. 1989. Idaho and Wyoming: Endangered and Sensitive Plant Field Guide. USDA Forest Service Intermountain Region, Ogden UT.
- USDA Forest Service. 1991. Threatened, Endangered, and Sensitive Species of the Intermountain Region. US Forest Service Region 4, Ogden, UT.
- USDI Bureau of Land Management. 1997. Record of Decision and Green River Resource Management Plan. Bureau of Land Management Rock Springs District.
- Wagner, W.H., Jr. and F.S. Wagner. 1993. Ophioglossaceae. In: *Flora of North America* Editorial Committee. *Flora of North America North of Mexico*. Vol. 2 Pteridophytes and Gymnosperms. Oxford Univ. Press, New York.
- Walford, G., G. Jones, W. Fertig, and K. Houston. 1997. Riparian and wetland community types of the Shoshone National Forest. Report prepared by Shoshone National Forest, Cody, WY and the Wyoming Natural Diversity Database, Laramie, WY.
- Ward, B.A. 1998. A floristic survey of south-central Wyoming. Master's Thesis, Department of Botany, University of Wyoming, Laramie, WY.
- Ward, B., B.E. Nelson, and R.L. Hartman. 1998. Final report on the general floristic inventory of south-central Wyoming. Report prepared for the Bureau of Land Management Rawlins and Rock Springs districts by the Rocky Mountain Herbarium, University of Wyoming.
- Welp, L.A. 1997. A floristic survey of the Great Divide Basin, Green Mountains, and Upper Sweetwater Plateau in southwest Wyoming. Unpublished Master's thesis, University of Wyoming Botany Department, Laramie WY.
- Welp, L., B. E. Nelson, and R. L. Hartman. 1995. Status report on the general floristic inventory of the Great Divide Basin, Green and Crooks Mountains, and Upper Sweetwater River drainage. Report prepared for the Rock Springs and Rawlins Districts BLM by the Rocky Mountain Herbarium, University of Wyoming, Laramie.
- Welp, L., B.E. Nelson, and R.L. Hartman. 1996. General floristic inventory of the Great Divide Basin, Green and Crooks Mountains, and upper Sweetwater River drainage, final report. Report prepared for the Bureau of Land Management Rock Springs District and Great Divide Resource Area by the Rocky Mountain Herbarium, University of Wyoming.

- Welp, L., W. Fertig, and G. Jones. 1998 a. Ecological evaluation of the potential Tensleep Canyon Research Natural Area within the Bighorn National Forest, Washakie County, Wyoming. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.
- Welp, L., W. Fertig, and G. Jones. 1998 b. Ecological Evaluation of the Potential Tongue River Research Natural Area Within the Bighorn National Forest, Sheridan County, Wyoming. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.
- Welp, L., W. Fertig, and G. Jones. 1998 c. Ecological evaluation of the potential McLain Lake Research Natural Area within the Bighorn National Forest, Big Horn and Johnson counties, Wyoming. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY
- Welp, L., W. Fertig, and G. Jones. 1998 e. Ecological Evaluation of the potential Dry Fork Research Natural Area Within the Bighorn National Forest, Sheridan County, Wyoming. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.
- Welp, L., W. Fertig, and G. Jones. 1998 f. Ecological Evaluation of the Potential Pete's Hole Research Natural Area Within the Bighorn National Forest, Big Horn County, Wyoming. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.
- Welp, L., W. Fertig, and G. Jones. 1998 g. Ecological Evaluation of the Potential Devil Canyon Research Natural Area Within the Bighorn National Forest, Big Horn County, Wyoming. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.
- Welp, L., W. Fertig, and G. Jones. 1998 h. Ecological Evaluation of the Potential Poison Creek Natural Area Within the Bighorn National Forest, Johnson County, Wyoming. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.
- Welp, L., W. Fertig, and G. Jones. 1998 i. Ecological Evaluation of the Potential Elephant Head Research Natural Area Within the Bighorn National Forest, Big Horn County, Wyoming. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.
- Welsh, S.L. 1974. Anderson's Flora of Alaska and Adjacent Parts of Canada. Brigham Young Univ. Press, Provo, UT.
- Welsh, S. L. 1982. New taxa of thistles (*Cirsium*; Asteraceae) in Utah. Great Basin Naturalist 42 (2): 199-202.
- Welsh, S. L., N. D. Atwood, S. Goodrich, and L. C. Higgins. 1993. A Utah Flora, second edition, revised. Brigham Young Univ., Provo, UT.
- Weynand, B., and B. Amidon. 1990. An illustrated field guide to the sensitive plants of the Rock Springs District. Bureau of Land Management.
- Winkler, G. and C.L. Wambolt. 1991. Range extension, description, and habitat for *Haplopappus macronema* ssp. *linearis* (Asteraceae). Prairie Naturalist 23 (2): 101-106.
- Woodson, R. E. Jr. 1954. The North American species of *Asclepias* L. Annals Missouri Botanical Garden 41:1-211.