The Status of Rare Plants in Southwest Wyoming

Prepared for the Bureau of Land Management
Wyoming State Office

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10 November 1998

Agreement # K910-A4-0011
Task Order TO-14

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INTRODUCTION

To the traveler on Interstate 80, Southwest Wyoming appears to be a drab and dreary wasteland of sagebrush barrens and low ridges. In reality, the area contains a rich mosaic of landforms, vegetation, and native species, including 18 major land type associations (Reiners and Thurston 1996), 7 of the state's 12 major natural vegetation types (Knight 1994), 28 of the state's 41 recognized land cover types (Driese *et al.* 1997), and over 250 animal species and approximately 900 plant taxa (Merrill *et al.* 1996 a; Welp 1997). The vast majority of these communities and species are poorly represented in existing special management areas (Merrill *et al.* 1996 a; Stoms *et al.* 1998).

Traditionally, the economy of Southwest Wyoming has been based on the extraction of natural resources. Foremost among these have been oil, natural gas production, coal and trona production, farming, and livestock grazing, with transportation and recreation also contributing to the economy. Many of these industries have experienced boom and bust cycles in the past half century. The recent discovery of large natural gas deposits in the Pinedale, La Barge, and Opal areas is ushering in a new period of extensive development and growth in the region. Public land managers are faced with the task of balancing natural resource utilization with maintaining the region's biological values.

The Bureau of Land Management (BLM) is the primary federal land owner in southwest Wyoming and is directed by BLM Manual 6840 to consider impacts on listed or potential threatened and endangered species in management planning. In 1997, the BLM contracted with the Wyoming Natural Diversity Database (WYNDD) to assess the current status of plant species and vegetation types of special concern in southwest Wyoming. The objectives of this study were to determine the current level of protection for these species and identify potential areas where concentrations of rare species or high quality habitats occur.

STUDY AREA

The Southwest Wyoming study area contains the Wyoming portions of the Green River and Bear River watersheds and a small segment of the upper Sweetwater River drainage near South Pass, but excludes mountainous areas managed by the Bridger-Teton, Wasatch-Cache, and Medicine Bow National Forests (Figure 1). The study area includes most of the BLM Rock Springs District, the southwestern quarter of the BLM Rawlins District, and the Wyoming section of Flaming Gorge National Recreation Area (managed by Ashley National Forest). It contains most of Sweetwater and Uinta counties, southern Lincoln County, southern and central Sublette County, western Carbon County, and the southern edge of Fremont County. The total study area occupies approximately 52,000 square kilometers.

Most of the region is composed of three large structural basins (Green River, Great Divide, and Washakie basins) surrounded by mountain ranges or localized uplifts. The lower Green River and Washakie basins consist primarily of ash-rich claystones, oil shales, and sandstones derived from the Eocene Green River and Washakie formations. The Great Divide Basin contains comparably aged deposits of claystones, siltstones, and shales of the Wasatch, Battle Spring, and Green River formations, as well as large Quaternary-age sand dunes (Love and Christiansen 1985; Reiners and

Thurston 1996). These basins primarily support communities of Wyoming big sagebrush, desert shrubs, greasewood playas, and stabilized dune vegetation (Knight 1984; Merrill *et al*. 1996 b). Deep canyons cut by the Green River (and now partly inundated by Flaming Gorge Reservoir) support a wide variety of desert shrub, Utah juniper, and grassland communities. The upper Green River Basin differs from the other basins in having a higher elevation, greater density of streams and rivers draining the adjacent high mountains, and substrates of Quaternary alluvium. Much of this area is dominated by mountain big sagebrush and riparian meadow communities (Reiners and Thurston 1996).

Uplifts, rims, and other low mountainous features are also present in the study area. Low, north-south oriented desert mountains and valleys of the Overthrust Belt form the southwestern boundary of the area and support conifer and aspen forests, mountain shrublands, and desert cushion plant and grassland communities. The northern foothills of the Uinta Mountains consist of outwash plains of conglomerate and alluvium that provide habitat for a suite of rare and endemic forb species. Sedimentary hogback ridges along the foothills also provide habitat for pinyon-juniper communities and uncommon shrub types. The Rock Springs Uplift consists of a series of concentric cuestas and hogbacks of deformed Cretaceous and early Tertiary shales and supports a variety of juniper, grassland, and desert shrub vegetation types. Low, structural arches of resistant Tertiary sediments form a series of rims that surround the Washakie Basin and contain juniper and desert shrub communities (Merrill *et al.* 1996 b; Reiners and Thurston 1996).

METHODS

Potential plant species of concern in Southwest Wyoming were selected according to their state abundance, total geographic range, evidence of decline, and degree of habitat specificity (Table 1). Highest priority was given to state or regional endemics (species with a global distribution limited to Wyoming or 1-2 adjacent states) with low population numbers and fewer than 20 extant occurrences in the state. Plant taxa with wider global distributions, but known from 5 or fewer extant locations in Wyoming were also considered of high concern. Species of limited global distribution, but which are relatively abundant locally in Southwest Wyoming were assigned to a lower priority "Watch List" for this analysis.

Data on the distribution, abundance, trends, and management needs of target species were obtained from the published literature, specimens at the Rocky Mountain Herbarium (RM) and WYNDD files. Unpublished reports from recent floristic surveys of Southwest Wyoming by RM students and staff (Cramer 1997; Delmatier 1998; Hartman and Nelson 1993, 1994; Ward et al. 1998; Welp 1997), natural area inventories (Fertig 1998 b; Jones 1993; Jones and Fertig 1996), and status surveys of specific rare species (Dorn 1989 a, 1989 b, 1989 c, 1990 a; Fertig 1995 a, 1995 b, 1995 c, 1995 d, 1995 e, 1996 a, 1996 b, 1997 a, 1998 c; Marriott 1986 a, 1986 b, 1988 a, 1988 c, 1989, 1992) were also used extensively. Natural vegetation types of high conservation interest in the area were also determined from the literature (Collins 1984; Merrill *et al.* 1996 a, 1996 b; Stoms *et al.* 1998). Locations of species and vegetation of concern and existing special management areas (BLM Areas of Critical Environmental Concern [ACEC], Wilderness Study Areas, etc.) were mapped on 1:24,000 scale USGS topographic maps to determine current land management status for each species. Clusters of rare species or locations of high ranking endemics were then used to

Figure 1.

Southwest Wyoming Study Area
And Potential Conservation Sites

Site Name	Site #	Site Name	Site #
Blacks Fork	7	Linwood Canyon/Flaming Gorge	1
Bridger Butte	23	Lion Bluffs	6
Cedar Mountain/Lonetree	8	Little Firehole Canyon	5
Cherokee Basin/Cherokee Rim	26	Logan Draw	4
Flat Top Mountain	2	Minnies Gap	12
Fossil	17	Oregon Butte/Continental Peak	21
Hay Gulch	19	Pine Butte	24
Henry's Fork at McKinnon	10	Pine Creek Outcrops	20
Hickey Mountain-Sage Creek Mountain	9	Powder Rim	25
Iron Mountain	11	Richard's Gap	13
Jack Morrow Hills	3	Rock Creek Ridge	16
Kemmerer Endemic Cushion Plant Community	17	Ross Butte/Ross Ridge	15
La Barge	14	The Boilers	22
		Upper Green River	18

Figure 1 goes here.

identify potential conservation sites. These sites were ranked on a scale of 1-5 (1 being of the highest biological significance, 5 being of low significance) using criteria developed by The Nature Conservancy (Wyoming Natural Diversity Database 1996). The 27 highest scoring sites were digitized into an ArcView theme and mapped on BLM 1:100,000 scale maps.

The protection status of each plant species was assessed using a 4-part scale originally developed by Gap programs for ranking the protection level of different management areas (Merrill *et al.* 1996 a). The score for each species was based on the highest possible protection score for any individual population. Species were ranked 1 if at least one population occurred on Gap Status 1 lands that are permanently protected and managed to maintain biological processes. Such sites include designated wilderness areas, national parks and monuments, most national wildlife refuges, and Nature Conservancy preserves or easements. A rank of 2 was given to species that occur in designated management areas that still allow some land uses that may reduce the quality of natural communities (Gap Status 2 lands). For the purpose of this project, we follow Stoms *et al.* (1998) rather than Merrill *et al*. (1996 a) in recognizing BLM ACECs as Status 2 lands. Category 3 species are those in which the best protected population is one that occurs on public lands managed for multiple use. These Status 3 lands include undesignated BLM, US Forest Service, and state park lands and wilderness study areas. Lastly, species were ranked 4 if they occur only on private, state, or reservation lands with no legally binding protection mandate. Each species was scored on its current status in Southwest Wyoming, its projected status if populations in potential conservation sites were designated as ACECs, and its current status statewide (including areas outside of the study area).

RESULTS

Plant Species of Special Concern in Southwest Wyoming

Based on WYNDD's most recent list of species of special concern in Wyoming (Fertig 1997 c), 121 plant taxa were evaluated for their rarity and protection status in Southwest Wyoming. After reviewing the latest available field data from 1997-98, 15 species were determined to be sufficiently abundant or unthreatened to be dropped from consideration (Table 2). Twenty-two other species from Southwest Wyoming have been downlisted or dropped since 1994, demonstrating the utility of floristic and rare plant status surveys in determining the true abundance and conservation needs of rare species. The final list of species of special concern for Southwest Wyoming (Table 1) numbers 106 taxa, with 95 considered high priority and 11 classed as lower priority "Watch List" species.

In addition to assessing known rare species, we also investigated the significance of endemism in the Southwest Wyoming flora. Of 292 state and regional endemics known in Wyoming (Fertig unpublished data), 101 (35%) occur in the Southwest Wyoming study area (Table 3). Forty-five of these species are not considered to be of conservation concern at present due to large population numbers or relatively unspecialized habitat requirements. An additional 11 species are Watch List taxa which are abundant enough at the local level to be considered a lower priority for special management. The remaining 55 taxa are probably the most vulnerable to large scale habitat loss due to their small ranges, specialized habitats, and low numbers.

Status of Vegetation Types of Special Concern in Southwest Wyoming

Merrill *et al.* (1996 a, 1996 b) and Driese *et al.* (1997) have documented 28 different land cover types in Southwest Wyoming. Nearly one half of these are poorly represented or completely absent from the existing network of special management areas in the state (Gap Status 1 or 2 lands). Some of these cover types, such as Black sagebrush, Bitterbrush shrub steppe, and Mesic upland shrub vegetation, may simply be underrepresented in Gap models, and are actually more widespread or better protected than current mapping indicates (Merrill *et al.* 1996 a). Juniper woodland and Basin bare rock or soil types are also poorly represented, but are considered lower conservation priorities due to low threats (Table 5). Widespread types, such as Wyoming big sagebrush and Mixed grass prairie are considered of medium protection priority due to their poor representation in the current special management network and their potential vulnerability to changes in grazing management, fire frequencies, and exotic species. Less common land cover types, such as Saltbush fans and flats, Desert shrub, Greasewood fans and flats, Basin big sagebrush, and Unvegetated playas, are also of moderate priority, mainly due to inadequate representation. The highest priority types are those of limited distribution, high threat, and poor protection. These include Grass and Shrub-dominated wetland/riparian types and Vegetated sand dunes (Merrill *et al.* 1996 a, 1996 b).

Stoms *et al.* (1998) conducted a Gap Analysis of the Intermountain Semi-Desert ecoregion, a multistate area that extends from southeast Washington and eastern Oregon to central Wyoming and northwest Colorado (and includes the Southwest Wyoming study area). They identified 27 land type associations that are poorly or incompletely represented in special management areas in the ecoregion, including at least 16 that are of high priority for conservation attention in the Wyoming Basin section (Table 5). As in Wyoming, only a small percentage of lands in the entire ecoregion are within existing Status 1 or 2 lands (3.9% region wide, and 1.9% in the Wyoming Basin). The priorities for conservation in the entire ecoregion are comparable to those identified in the Wyoming Gap project (Merrill *et al.* 1996 a), lending further support to the ecological and biodiversity importance of Southwest Wyoming.

Inventory and classification of desert vegetation types at the fine scale has lagged behind that of forest and grassland ecosystems. Collins (1984) identified a number of uncommon or threatened shrub communities in Southwest Wyoming in need of potential conservation attention, largely from anecdotal sources (Table 6). More recent studies (Jones and Fertig 1996; Fertig 1998 b) have identified additional shrub and cushion plant communities of special concern in the region. More information is needed on the identification and distribution of these and other important or rare communities before a more fine-scaled Gap Analysis of vegetation can be conducted in Southwest Wyoming.

Current and Potential Protective Status of Plant Species of Special Concern

Few areas on public or private lands in Southwest Wyoming are currently managed with an emphasis on natural vegetation or rare plant species. Twenty Status 1 or 2 areas have been established in the study area (Table 4), only 15 of which actually contain rare plant species. Of the additional 15 potential wilderness study areas in the region, only 6 are currently known to contain rare plant populations. At present, only 33 high priority plant species and 7 watch list taxa occur in Status 1 or 2 lands (37.8% of the rare species in the whole study area) (Table 7). Twenty-eight of

the 40 "protected" species can be accounted for in just 4 special management areas: Fossil Butte National Monument, Seedskadee National Wildlife Refuge, and the BLM Special Status Plant and Red Creek ACECs.

Several plant species that are inadequately represented in special management areas in Southwest Wyoming do occur on Status 1 or 2 lands outside of the study area. These are found primarily in BLM ACECs in the Rawlins District or on national forest wilderness areas, national parks, or Nature Conservancy preserves. When populations outside the study area are considered (Table 7), the number of protected high priority species increases to 42 and those on the watch list increases to 9 (a total of 51 species or 58.1%).

We identified 27 potential conservation sites on BLM or Forest Service lands in Southwest Wyoming (Figure 1 and Appendix B) to fill gaps in the existing special management area network. Of these 27, only one (Richard's Gap) is completely under Status 1 or 2 management. Nine others are partially under special management, while the remaining 17 have no formal status. If these sites were to become ACECs (Status 2 level protection), the number of protected species would increase to 66 on the high priority list and 9 on the watch list. The total would represent 70.8% of the region's rare plants, a net gain of 33% from current protection levels. If existing wilderness study areas (currently Status 3, but potentially Status 1 lands) were officially designated, the percentage of protected species would increase to 72.7% (Table 7).

DISCUSSION

Given the amount of regional endemism, number of rare species, and number of under-represented land cover types, Southwest Wyoming is emerging as a high priority landscape for conservation attention in the state. At present, less than 2% of the region is managed specifically for the enhancement of natural vegetation or plant species, and less than 40% of the high-ranking plant species and 80% of the known land cover types are adequately represented (Stoms *et al.* 1998). An impending "boom" cycle in the development of natural gas and other mineral resources in the area makes the status of plants and vegetation a practical management concern.

Twenty-seven potential conservation sites have been identified in Southwest Wyoming based on the occurrence of unusual densities of rare plant species. Designation of these sites as Status 1 or 2 management areas would increase the current number of protected rare plant species in the region from 37.8 to 70.8%.

Four caveats should be noted about these potential conservation sites. The sites are focused on public lands, but often contain adjacent private lands or inholdings. The site boundaries are ecologically based, and so ignore ownership. Nonetheless, it is not here implied that actions be undertaken on private lands within the sites without the participation or consent of the land owner. Secondly, the sites are often very large in order to capture a sufficient area to ensure the functioning of large-scale biological processes and provide an adequate buffer. Many areas within these boundaries may be of low conservation importance or not necessary for the protection of the target species or communities. Management of these lands can be far less restrictive without compromising the integrity of the entire site. Third, sites are geared primarily to rare plants, and secondarily to community types, and are based on current knowledge. Additional sites may be

warranted for unusual vegetation types not considered in our analysis, or may be needed for rare animal species. Better sites may also be discovered with additional field work, or known sites may prove to be less important if the target species is determined to be less threatened than originally suspected. Some flexibility in the establishment and elimination of sites, as has been developed for the Special Status Plant ACECs in the BLM Green River Resource Management Plan (USDI Bureau of Land Management 1997), may be worthwhile. Lastly, these sites have been created primarily to draw management attention to areas of unusual biological significance that may not have been previously recognized. Whether or not the sites receive additional formal protection, they should at least be recognized as important biological areas during planning for resource development.

It may be unrealistic to expect that all, or even a few, of these potential conservation sites will be designated as inviolate nature preserves. Given the multiple use mandate of most public land management agencies and the economic, social, and political incentives to develop natural resources in Southwest Wyoming, a more practical conservation strategy may be to develop and implement guidelines for the management of potentially sensitive plant habitats rather than designate lands. At a minimum, land managers need to be aware of the actual or potential presence of rare species and vegetation types in a given development area and aware of the habitat needs of these organisms when planning road grids, pipeline routes, and well sites. More often than not, the specialized microsites occupied by most rare plants in the region can be avoided with early planning. No Surface Occupancy rules or requirements for directional drilling could also be employed to minimize conflicts. Many of these actions are already being undertaken by producers in the large Jonah Field south of Pinedale.

In addition to implementing management rules, a better effort should be undertaken to determine the floristic composition of existing special management areas. For example, recent surveys of Fossil Butte National Monument by Clay Kyte have dramatically increased the number of rare species known from the park. Finding these species in existing management areas makes it less imperative to protect other populations (although an effort should be made to protect multiple populations as insurance if one occurrence is lost). Many existing ACECs have not been adequately inventoried for plants or were designated to protect other elements of biological diversity. Wilderness Study Areas have also been poorly surveyed, although many of these have been selected more for their aesthetic qualities than their biological importance.

Any conservation strategy for rare plants in Southwest Wyoming depends on the implementation of "on the ground" special management for biodiversity on existing Status 1 and 2 lands. Existing management directives are probably sufficient on Status 1 lands in the study area. Development of management plans, funding for monitoring, and on-site inspections may be necessary for BLM ACECs.

In the end, conservation of rare plants and vegetation types in Southwest Wyoming will require cooperation among public land managers and public land consumers and the recognition by all that these organisms have value and importance.

Table 1.
Plant Species of Special Concern in Southwest Wyoming

Key: **Heritage Ranks** are explained in Appendix C. **Range Notes**: Periph. = Peripheral (at the edge of the species' continuous range in Wyoming), Reg. Endm. = Regional Endemic (restricted to Wyoming and 1-2 adjacent states), State Endm. = State Endemic (restricted to Wyoming), Disj. = Disjunct (Wyoming populations are widely isolated from the species' main contiguous range), Sparse (widely scattered and uncommon throughout Wyoming). **Federal Status**: USFS R2/R4 Sens. = listed Sensitive by the US Forest Service in Region 2 or 4, Rock Sp. SpSt = listed as a "Special Status" plant by the BLM Rock Springs District (Amidon 1994), USFWS Cand. = Candidate for listing as Threatened or Endangered by the US Fish and Wildlife Service. **County**: Wyoming county distribution, using the first 3 letters of each county name. Yel = Yellowstone National Park (divided between Park and Teton counties). **Managed Area**: BLM = Bureau of Land Management, IR = Indian Reservation, NF = National Forest, NM = National Monument, NP = National Park, NWR = National Wildlife Refuge. Ashley NF includes Flaming Gorge National Recreation Area.

1. High Priority Taxa

Species	Common Name	Heritage Rank	Range Notes	Federal Status	County	Managed Area
Abies concolor	White fir	G5/S1	Periph.		Swe, Uin?	Rock Springs BLM Wasatch-Cache NF?
Androstephium breviflorum	Purple funnel-lily	G5/S1	Periph.		Car, Swe	Rawlins BLM
Antennaria arcuata	Meadow pussytoes	G2/S2	Reg. Endm.	USFS R4 Sens. Rock Sp. SpSt	Fre, Sub	Rawlins BLM Rock Springs BLM
Arabis crandallii	Crandall's rock cress	G4/S1	Reg. Endm.		Car, Swe	Ashley NF Rawlins BLM Rock Springs BLM ?
Arabis pusilla	Small rock cress	G1/S1	State Endm.	USFWS Cand. Rock Sp. SpSt	Fre	Rock Springs BLM
Arabis selbyi	Selby rock cress	G4?Q/S1	Periph.		Swe	Ashley NF Rawlins BLM Rock Springs BLM
Artemisia biennis var. *diffusa*	Mystery wormwood	G5T1/S1	State Endm.	Rock Sp. SpSt	Swe	Rock Springs BLM?
Asclepias uncialis	Dwarf milkweed	G3?/SH	Periph.	USFS R2 Sens	Swe?	Rock Springs BLM? Seedskadee NWR?
Astragalus bisulcatus var. *haydenianus*	Hayden's milkvetch	G5T4?/ S1?	Periph.		Car, Fre, Lin, Swe, Uin	Rawlins BLM Rock Springs BLM
Astragalus calycosus var. *calycosus*	King's milkvetch	G5T4?/ S1S2	Periph.		Lin, Swe, Uin	Rock Springs BLM
Astragalus coltonii var. *moabensis*	Moab milkvetch	G4T3?/S1	Reg. Endm.		Swe, Uin	Rock Springs BLM
Astragalus diversifolius var. *diversifolius*	Meadow milkvetch	G3/SH	Reg. Endm.	USFS R4 Sens.	reported	
Astragalus lentiginosus var. *salinus*	Sodaville milkvetch	G5T4/S1	Periph.		Lin, Uin	Fossil Butte NM Rock Springs BLM
Astragalus nelsonianus [A. pectinatus var. *platyphyllus]*	Nelson's milkvetch	G3/S2	Reg. Endm.		Fre, Nat, Swe	Ashley NF Rawlins BLM Rock Springs BLM
Astragalus proimanthus	Precocious milkvetch	G1/S1	State Endm.	Rock Sp. SpSt	Swe	Rock Springs BLM
Astragalus racemosus var. *treleasei*	Trelease's racemose milkvetch	G5T3/S1	Reg. Endm.		Sub, Uin	Rock Springs BLM
Atriplex falcata [A. gardneri var. *falcata]*	Sickle saltbush	G4Q/S1	Periph.		Sub, Swe, Uin	Rock Springs BLM
Atriplex wolfii [Atriplex tenuissima]	Wolf's orache	G3G4/S1	Reg. Endm.		Car, Swe	Rawlins BLM Rock Springs BLM

Species	Common Name	Heritage Rank	Range Notes	Federal Status	County	Managed Area
Brickellia microphylla var. *scabra*	Little-leaved brickell-bush	G4G5T4?/ S1	Periph.		Fre, Nat, Swe	Ashley NF Casper BLM Rawlins BLM Rock Springs BLM
Carex parryana var. *parryana*	Parry sedge	G4T4/S1?	Sparse		Car, Cro, Swe, Tet, Yel	Bridger-Teton NF National Elk Refuge Rawlins BLM Rock Springs BLM Yellowstone NP
Ceanothus martinii	Utah mountain lilac	G4/S1	Periph.		Lin, Swe	Fossil Butte NM Rock Springs BLM
Cercocarpus ledifolius var. *intricatus*	Dwarf mountain mahogany	G5T4/S1	Periph.		Swe	Ashley NF Rock Springs BLM
Chamaechaenactis scaposa var. *parva*	Fullstem	G4T4/ S1S2	Reg. Endm.		Swe	Rock Springs BLM
Chrysothamnus greenei	Greene rabbitbrush	G5/S1?	Periph.		Lin, Swe	Rawlins BLM Rock Springs BLM
Cirsium aridum	Cedar Rim thistle	G2Q/S2	State Endm.	Rock Sp. SpSt	Car, Fre, Sub	Rawlins BLM Rock Springs BLM
Cirsium ownbeyi	Ownbey's thistle	G3/S2	Reg. Endm.	Rock Sp. SpSt	Swe	Ashley NF Rock Springs BLM
Collomia grandiflora	Large-flower collomia	G5/SH	Periph.		Lin?/Swe?	
Cryptantha gracilis	Slender cryptantha	G5/S1	Periph.		Swe	Ashley NF Rock Springs BLM
Cryptantha rollinsii	Rollins' cat's-eye	G4/S1	Reg. Endm.		Swe	Ashley NF? Rock Springs BLM Seedskadee NWR
Cuscuta occidentalis	Western dodder	G5/S1	Periph.		Lin, Swe	Fossil Butte NM Rock Springs BLM?
Descurainia pinnata var. *paysonii*	Payson's tansymustard	G5T3?/S2	Reg. Endm.		Car, Swe	Ashley NF Rawlins BLM Rock Springs BLM
Descurainia torulosa	Wyoming tansymustard	G1/S1	State Endm.	USFS R2 Sens USFS R4 Sens Rock Sp. SpSt	Fre, Par, Swe, Tet	Bridger-Teton NF Rock Springs BLM Shoshone NF Worland BLM?
Downingia laeta	Great Basin downingia	G5/S1	Periph.		Alb, Uin	Rock Springs BLM?
Draba juniperina [*Draba oligosperma* var. *juniperina*]	Uinta draba	G3Q/S2	Reg. Endm.		Swe, Uin	Ashley NF Rock Springs BLM
Elymus simplex [*Leymus simplex*]	Alkali wildrye	G4?Q/S1?	Reg. Endm.		Alb, Lar? Swe	Rock Springs BLM
Ephedra viridis	Green Mormon tea	G5/S1	Periph.		Swe	Rock Springs BLM
Eriastrum wilcoxii	Wilcox eriastrum	G5/S1S2	Sparse		Fre, Swe	Rawlins BLM Rock Springs BLM Seedskadee NWR
Erigeron consimilis [*Erigeron compactus* var. *consimilis*]	San Rafael daisy	G3?/S1	Reg. Endm.		Swe	Rawlins BLM Rock Springs BLM
Eriogonum corymbosum var. *corymbosum*	Crisp-leaf wild buckwheat	G5T5/S1	Periph.		Swe	Rock Springs BLM
Eriogonum divaricatum	Divergent wild buckwheat	G4G5/S1	Periph.		Lin, Sub, Swe, Uin	Rock Springs BLM
Eriogonum hookeri	Hooker wild buckwheat	G5/S1	Periph.		Car, Swe	Rawlins BLM? Rock Springs BLM
Galium coloradoense	Colorado bedstraw	G3G4/S1	Periph.		Swe	Rawlins BLM Rock Springs BLM

Species	Common Name	Heritage Rank	Range Notes	Federal Status	County	Managed Area
Glossopetalon spinescens var. *meionandrum [Forsellesia meionandra]*	Utah greasebush	G5T3/S1	Reg. Endm.		Swe	Ashley NF Rock Springs BLM
Haplopappus macronema var. *linearis [Ericameria discoidea* var. *linearis]*	Narrowleaf goldenweed	G4G5T3/ S2	Reg. Endm.	USFS R4 Sens	Fre, Lin, Par, Tet, Yel	Bridger-Teton NF Rock Springs BLM Shoshone NF Yellowstone NP
Hesperochiron californicus	California hesperochiron	G4G5/S1	Periph.		Sub, Uin	Rock Springs BLM
Ipomopsis polycladon [Gilia polycladon]	Lavender ipomopsis	G4/S1	Periph.		Swe	Ashley NF
Lathyrus lanszwertii var. *lanszwertii*	Nevada sweetpea	G4G5T4/ S1	Periph.		Uin	Rock Springs BLM Wasatch-Cache NF
Lepidium integrifolium var. *integrifolium*	Entire-leaved peppergrass	G3?T2/S1	Reg. Endm.		Lin	Fossil Butte NM Rock Springs BLM
Lepidium montanum var. *alyssoides*	Mountain peppergrass	G5?T5?/ S1	Periph.		Sub	Rock Springs BLM
Leptodactylon watsonii	Watson's prickly-phlox	G3/S1	Periph.		Fre, Hot, Swe, Was	Ashley NF Bighorn NF Wind River IR
Lesquerella alpina var. *parvula [Lesquerella parvula]*	Narrowleaved bladderpod	G5T3?/S1	Reg. Endm.		Car, Swe, Uin	Medicine Bow NF? Rock Springs BLM
Lesquerella macrocarpa	Large-fruited bladderpod	G2/S2	State Endm.	Rock Sp. SpSt	Fre, Lin, Sub, Swe	Rock Springs BLM
Lesquerella multiceps	Western bladderpod	G3/S1	Reg. Endm.		Lin	Rock Springs BLM? Targhee NF
Lesquerella prostrata	Prostrate bladderpod	G3/S1	Reg. Endm.		Lin, Uin	Rock Springs BLM
Loeflingia squarrosa var. *artemisiarum*	Sage-like loeflingia	G5T2T3/ SH	Periph.		Swe	Rock Springs BLM?
Lomatium triternatum var. *anomalum*	Ternate desert-parsley	G5T?/S1	Reg. Endm.		Lin	Fossil Butte NM Rock Springs BLM
Monolepis pusilla	Red poverty-weed	G5/S1	Periph.		Swe, Was	Rock Springs BLM Worland BLM?
Muhlenbergia glomerata [Incl. in *M. racemosa* by some authors]	Marsh muhly	G4/S1	Periph.	USFS R2 Sens.	Cro, Gos?, Par, Sub, Tet, Yel	Black Hills NF National Elk Refuge Rock Springs BLM Shoshone NF Yellowstone NP
Opuntia erinacea var. *utahensis*	Utah old man prickly-pear	G4T4/S1?	Periph.		Swe	Rock Springs BLM?
Opuntia polyacantha var. *juniperina*	Juniper prickly-pear	G5T3?Q/ S1	Periph.		Sub, Swe	Ashley NF Rock Springs BLM Seedskadee NWR
Opuntia polyacantha var. *rufispina*	Rufous-spine prickly-pear	G5T5/S2	Periph.		Lin, Swe	Ashley NF Rawlins BLM Rock Springs BLM
Oryzopsis swallenii	Swallen mountain-ricegrass	G4/S2	Reg. Endm.	Rock Sp. SpSt	Lin, Sub	Rock Springs BLM
Oxytheca dendroidea	Tree-like oxytheca	G4/SH	Periph.		Fre, Hot, Sub?, Swe	Rawlins BLM? Rock Springs BLM? Worland BLM?
Oxytropis besseyi var. *obnapiformis [Oxytropis obnapiformis]*	Maybell locoweed	G5T3/S1	Reg. Endm.		Fre, Swe, Uin	Rawlins BLM Rock Springs BLM
Penstemon acaulis var. *acaulis*	Stemless beardtongue	G3T2/S1	Reg. Endm.	USFS R4 Sens Rock Sp. SpSt	Swe	Rock Springs BLM

Species	Common Name	Heritage Rank	Range Notes	Federal Status	County	Managed Area
Penstemon gibbensii	Gibbens' beardtongue	G1/S1	Reg. Endm.		Car, Swe	Rawlins BLM
Penstemon pachyphyllus var. *mucronatus*	Sheep Creek beardtongue	G5T4/S2	Reg. Endm.		Car, Swe	Ashley NF Rawlins BLM Rock Springs BLM
Penstemon scariosus var. *garrettii*	Garrett's beardtongue	G4T3/S1	Reg. Endm.		Swe?, Uin	Rock Springs BLM
Penstemon watsonii	Watson beardtongue	G5/SH	Periph.		Uin	Rock Springs BLM?
Phacelia demissa	Intermountain phacelia	G5/S1	Reg. Endm.		Fre, Swe	Rock Springs BLM
Phacelia glandulosa var. *deserta*	Desert glandular phacelia	G4T1T2Q /S1?	State Endm.		Lin, Sub, Swe	Ashley NF Rawlins BLM Rock Springs BLM
Phacelia incana	Western phacelia	G3/S1	Periph.		Car, Swe	Ashley NF Rawlins BLM? Rock Springs BLM
Phacelia salina	Nelson phacelia	G3?Q/S1	Periph.		Lin, Sub, Swe	Rawlins BLM Rock Springs BLM
Phacelia tetramera	Tiny phacelia	G4/S1	Periph.		Fre, Swe	Rock Springs BLM
Philadelphus microphyllus var. *occidentalis*	Little-leaf mock-orange	G5?T3T4/ S1	Periph.		Swe	Ashley NF Rock Springs BLM
Phlox albomarginata	White-margined phlox	G4/S1	Reg. Endm.		Lin	Rock Springs BLM
Phlox pungens	Beaver Rim phlox	G2/S2	State Endm.	Rock Sp. SpSt	Fre, Lin, Sub	Rawlins BLM Rock Springs BLM
Physaria condensata	Tufted twinpod	G2/S2	State Endm.	Rock Sp. SpSt	Lin, Sub, Uin	Fossil Butte NM Rock Springs BLM
Physaria dornii	Dorn's twinpod	G1/S1	State Endm.	Rock Sp. SpSt	Lin, Uin	Rock Springs BLM
Physocarpus alternans	Dwarf ninebark	G4/S1	Periph.		Swe	Rock Springs BLM
Populus deltoides var. *wislizenii*	Fremont cottonwood	G5T4/S1	Periph.		Car, Swe	Rawlins BLM
Potentilla diversifolia var. *multisecta*	Deep Creek cinquefoil	G3G4Q/ S1	Periph.		Swe, Uin	Rock Springs BLM
Psilocarphus brevissimus	Dwarf woolly-heads	G5/S1	Periph.		Cam, Fre, Sub	Rawlins BLM Rock Springs BLM
Ranunculus flabellaris	Yellow water-crowfoot	G5/SH	Periph.		Uin	Rock Springs BLM?
Rorippa calycina	Persistent sepal yellowcress	G3/S2S3	Reg. Endm.		Alb, Big, Car, Fre, Par, Swe, Was	Ashley NF Bighorn Canyon NRA Pathfinder NWR Rawlins BLM Worland BLM
Sambucus cerulea	Blue elderberry	G5?/S1	Periph.		She, Swe	Bighorn NF? Rock Springs BLM
Scirpus nevadensis	Nevada bulrush	G4/S1	Periph.		Alb, Car, Fre, Swe	Rawlins BLM Rock Springs BLM
Selaginella mutica	Blunt-leaf spike-moss	G4G5/S1	Periph.		Car, Lar, Swe	Ashley NF Medicine Bow NF
Selaginella selaginoides	Low spike-moss	G5/S1	Periph.		Sub, Tet, Yel	Bridger-Teton NF Rock Springs BLM Targhee NF Yellowstone NP
Senecio crocatus	Saffron groundsel	G3/SH	Reg. Endm.		Alb, Swe	Medicine Bow NF Rock Springs BLM
Senecio spartioides var. *multicapitatus*	Many-headed broom groundsel	G5T4/S1	Periph.		Car, Swe	Rawlins BLM Rock Springs BLM
Stipa nevadensis	Nevada needlegrass	G4/S1	Disj.		Car, Fre	Rawlins BLM Rock Springs BLM

Species	Common Name	Heritage Rank	Range Notes	Federal Status	County	Managed Area
Thelesperma caespitosum	Green River greenthread	G1/S1	Reg. Endm.	USFS R4 Sens. Rock Sp. SpSt	Swe	Ashley NF Rock Springs BLM
Thelesperma pubescens	Uinta greenthread	G1/S1	State Endm.	USFS R4 Sens Rock Sp SpSt	Swe, Uin	Rock Springs BLM Wasatch-Cache NF
Townsendia microcephala	Cedar Mountain Easter-daisy	G1/S1	State Endm.	Rock Sp SpSt	Swe, Uin	Rock Springs BLM

2. Watch List

Species	Common Name	Heritage Rank	Range	Federal Status	County	Managed Area
Arabis pendulina var. *russeola*	Daggett rock-cress	G5T3/S3	Reg. Endm.		Alb, Car, Fre, Nat, Swe	Casper BLM Rawlins BLM Rock Springs BLM
Arabis williamsii var. *williamsii* [*A. pendulocarpa* var. *saximontana*]	Williams' rock cress	G3QT3/ S3	State Endm.	Rock Sp. SpSt	Fre, Par, Sub	Bridger-Teton NF Rock Springs BLM Shoshone NF
Astragalus drabelliformis	Big Piney milkvetch	G2G3/ S2S3	State Endm.	Rock Sp. SpSt	Lin?, Sub	Bridger-Teton NF Rock Springs BLM
Astragalus simplicifolius	Bun milkvetch	G3/S3	State Endm.		Cam, Car, Fre, Nat, Swe, Uin?	Casper BLM Rawlins BLM Rock Springs BLM Wind River IR
Cryptantha stricta	Erect cryptantha	G3/S2	Reg. Endm.		Car, Fre, Nat, Swe, Uin	Ashley NF Casper BLM Rawlins BLM Rock Springs BLM
Cymopterus lapidosus	Echo spring-parsley	G3/S3	Reg. Endm.		Lin, Swe, Uin	Ashley NF Rock Springs BLM Seedskadee NWR
Ipomopsis crebrifolia	Compact gilia	G3/S2S3	Reg. Endm.		Fre, Lin, Sub, Swe, Tet	Bridger-Teton NF Rock Springs BLM
Lesquerella paysonii	Payson's bladderpod	G3/S3	Reg. Endm.	USFS R4 Sens Rock Sp. SpSt	Lin, Sub, Tet	Bridger-Teton NF Grand Teton NP Rock Springs BLM Targhee NF
Lomatium bicolor var. *bicolor*	Wasatch biscuitroot	G4T3/S2	Reg. Endm.		Lin, Sub, Tet, Uin	Bridger-Teton NF Rock Springs BLM Targhee NF?
Penstemon paysoniorum	Payson's beardtongue	G3/S3	State Endm.		Fre, Lin, Nat, Sub, Swe, Uin	Casper BLM Fossil Butte NM Rock Springs BLM Seedskadee NWR
Phlox opalensis	Opal phlox	G3/S3	Reg. Endm.		Lin, Sub, Swe, Uin	Ashley NF Rock Springs BLM Seedskadee NWR

Table 2.

Plants from Southwest Wyoming Dropped as "Species of Special Concern"
1994-1998

Species	Old Rank	New Rank	Reason for Change	Year
Abronia mellifera	G4/S2	G4/S2	Peripheral species, more common than originally thought, no longer tracked	1994
Arabis demissa var. *spatifolia*	G5T3/S2	G5T4/S2	Regional endemic (now considered peripheral), more common than originally thought, no longer tracked	1998
Arabis fendleri var. *spatifolia*	G5T3/S2	G5T4/S2	Regional endemic (now considered peripheral), more common than originally thought, no longer tracked	1998
Arabis pendulina var. *russeola*	G5T3/S3	G5T3/S3	Regional endemic dropped to Watch List	1994
Arabis pulchra var. *pallens*	G5T5/S1	G5T5/S2	Peripheral species, more common than originally thought, no longer tracked	1997
Arabis williamsii var. *williamsii*	G3QT3/S3	G3QT3/S3	State endemic dropped to Watch List	1996
Aster borealis	G5/S1	G5/S2	Peripheral species, more common than originally thought, no longer tracked	1998
Astragalus drabelliformis	G2/S2	G2G3/ S2S3	State endemic dropped to Watch List	1997
Astragalus jejunus var. *jejunus*	G3T3/S3	G3T3/S3	Regional endemic, more common than originally thought, no longer tracked	1996
Astragalus kentrophyta var. *elatus*	G5T4/S1	G5T4/S2	Peripheral species, more common than originally thought, no longer tracked	1998
Astragalus simplicifolius	G3/S3	G3/S3	State endemic, dropped to Watch List	1996
Calyptridium roseum	G5/S1	G5/S2	Peripheral species, more common than originally thought, no longer tracked	1998
Chaenactis stevioides	G4/S1	G4/S2	Peripheral species, more common than originally thought, no longer tracked	1998
Cryptantha caespitosa	G3/S3	G3/S3	Regional endemic, more common than originally thought, no longer tracked	1994
Cryptantha scoparia	G3/S1S2	G4/S2	Peripheral species, more common than originally thought, no longer tracked	1998
Cryptantha stricta	G3/S2	G3/S3	Regional endemic, dropped to Watch List	1998
Cymopterus lapidosus	G2?/S2	G3/S2S3	Regional endemic, dropped to Watch List	1996
Erigeron uintahensis	G4/S1S2	G4/S2	Regional endemic, more common than originally thought, no longer tracked	1998
Eriogonum acaule	G3/S3	G3/S3	Regional endemic, more common than originally thought, no longer tracked	1994
Gentianella amarella var. *heterosepala*	G5T4T5/S1	G5T4T5/S2	Peripheral species, more common than originally thought, no longer tracked	1998
Ipomopsis crebrifolia	G3/S2S3	G3/S2S3	Regional endemic, dropped to Watch List	1997
Leersia virginica	G5/S1	G5/SE?	Probably an exotic in Wyoming (although native to North America), status uncertain	1998
Lesquerella paysonii	G3/S3	G3/S3	Regional endemic, dropped to Watch List	1997
Lomatium bicolor var. *bicolor*	G4T3/S2	G4T3/S2	Regional endemic, dropped to Watch List	1996
Lomatium nuttallii	G3/S2	G3/S3	Regional endemic, more common than originally thought, no longer tracked	1994
Malacothrix torreyi	G4/S1	G4/S2	Peripheral species, more common than originally thought, no longer tracked	1998
Muhlenbergia minutissima	G5/S1	G5/S2	Peripheral species, more common than originally thought, no longer tracked	1996
Oryzopsis contracta	G2/S2	G4/S3S4	Regional endemic, more common than once thought, no longer tracked	1996
Oxytropis nana	G3/S3	G3/S3	Regional endemic, dropped to Watch List	1994
Phacelia glandulifera	G5/S1	G5/S2	Peripheral species, more common than originally thought, no longer tracked	1998

Phacelia scopulina	G4/S1	G4/S2	Peripheral species, more common than originally thought, no longer tracked	1996
Phlox opalensis	G3/S3	G3/S3	Regional endemic, dropped to Watch List	1997
Physaria integrifolia var. *monticola*	G3G4T2Q/ S2	G3G4T2Q/ S2	No longer considered a valid variety	1996
Townsendia nuttallii	G3/S3	G3/S3	Regional endemic, more common than originally thought, no longer tracked	1994
Townsendia spathulata	G3/S3	G3/S3	Regional endemic, more common than originally thought, no longer tracked	1994
Trifolium wormskjoldii	G5/S1	G5/SE?	Probably an exotic in Wyoming (although native to North America), status uncertain	1998
Veronica scutellata	G5/S1	G5/S2	Peripheral species, more common than originally thought, no longer tracked	1998

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

Table 3.
State and Regional Endemic Plants of Southwest Wyoming*

Key: @ indicates species that are not tracked by WYNDD; # indicates species on the WYNDD Watch List. See Appendix C for an explanation of Heritage Ranks.

Species	**Heritage Rank**	**Range**
Antennaria arcuata Meadow pussytoes	G2/S2	Fremont and Sublette counties, Wyoming, Blaine County, Idaho, and Elko County, Nevada.
Arabis crandallii Crandall's rock cress	G4/S1	Southwest Wyoming and southwest Colorado.
# Arabis pendulina var. *russeola* Daggett rock cress	G5T3/S3	Southern and central Wyoming, northern Utah, and western Colorado
# Arabis williamsii var. *williamsii* [Includes *Arabis pendulocarpa* var. *saximontana*] Williams' rock cress	G3QT3Q/S3	Idaho, Montana, and western Wyoming [*A. williamsii* is endemic to western Wyoming]
Arabis pusilla Small rock cress	G1/S1	Fremont County, Wyoming
Arabis selbyi Selby rock cress	G4?Q/S1	Sweetwater County, Wyoming, western Colorado, eastern Utah, and northwestern New Mexico.
Artemisia biennis var. *diffusa* Mystery wormwood	G5T1/S1?	Sweetwater County, Wyoming
@ Artemisia pedatifida Birdsfoot sagewort	G4/S4	Northern and western Wyoming, southwest Montana, and northwest Colorado
Astragalus coltonii var. *moabensis* Moab milkvetch	G4T3?/S1	Southwest Wyoming, eastern Utah, western Colorado, northeast Arizona, northwest New Mexico.
Astragalus diversifolius var. *diversifolius* Meadow milkvetch	G3/SH	Central Idaho, northern Utah, Green River Basin Wyoming
# Astragalus drabelliformis Big Piney milkvetch	G2G3/S2S3	Sublette County, Wyoming
@ Astragalus grayi Gray's milkvetch	G4?/S3	Central Wyoming and south-central Montana
@ Astragalus jejunus var. *jejunus* Starveling milkvetch	G3T3/S3	Southwest Wyoming, northwest Colorado, southeast Idaho, and northern Utah (disjunct in eastern Nevada)
@ Astragalus miser var. *decumbens* Sagebrush weedy milkvetch	G5T5/S5	Western 2/3 of Wyoming and south-central Montana
Astragalus nelsonianus Nelson's milkvetch	G3/S2	Southwest Wyoming, northeast Utah, and northwest Colorado
@ Astragalus oreganus Oregon milkvetch	G4?/S3	Central Wyoming and south-central Montana
Astragalus proimanthus Precocious milkvetch	G1/S1	Sweetwater County, Wyoming
@ Astragalus pubentissimus Green River milkvetch	G4/S2S3	Southwest Wyoming, northwest Colorado, and northeast Utah
Astragalus racemosus var. *treleasei* Trelease's racemose milkvetch	G5T3/S1	Southwest Wyoming and northeast Utah
@ Astragalus sericoleucus var. *aretioides* Silky orophaca	G4/S3	Southeast Montana, central and southern Wyoming, northwest Colorado, and northeast Utah
# Astragalus simplicifolius Bun milkvetch	G3/S3	Central Wyoming
Atriplex wolfii Wolf's orache	G3G4/S1	Eastern Utah, south-central Wyoming, and northern Colorado
Cirsium aridum Cedar Rim thistle	G2Q/S2	Central Wyoming
Cirsium barnebyi Barneby's thistle	G3/SR	Northeast Utah, northwest Colorado, and reported for south-central Wyoming
Cirsium ownbeyi Ownbey's thistle	G3/S2	Northeast Utah, southwest Wyoming, and northwest Colorado

Species	Heritage Rank	Range
@ *Cirsium pulcherrimum* Beautiful thistle	G5/S4	Northeast Utah and western 2/3 of Wyoming
@ *Cryptantha caespitosa* Tufted cryptantha	G3/S3	Southwest Wyoming, northeast Utah, northwest Colorado, and southeast Idaho
Cryptantha rollinsii Rollins' cats-eye	G4/S1	Northeast Utah, northwest Colorado, and southwest Wyoming
@ *Cryptantha sericea* Silky cryptantha	G4/S3	Northeast Utah, northwest Colorado, and southwest Wyoming
# *Cryptantha stricta* Erect cryptantha	G3/S3	Central and southwest WY, northeast UT, northwest CO.
# *Cymopterus lapidosus* Echo spring parsley	G3/S2S3	Northeast Utah and southwest Wyoming
@ *Cymopterus longipes* Long-stalk spring-parsley	G4?/S3	Western Wyoming, northwest Colorado, southeast Idaho, and northern Utah
Descurainia pinnata var. *paysonii* Payson's tansymustard	G5T3?/S2	Southwest Wyoming, eastern Utah, and southeast Idaho
Descurainia torulosa Wyoming tansymustard	G1/S1	Western Wyoming
Draba juniperina Uinta draba	G3Q/S2	Northeast Utah, southwest Wyoming, and northwest Colorado
Elymus simplex Alkali wild-rye	G4?Q/S1?	Southern Wyoming and northwest Colorado.
Erigeron consimilis San Rafael daisy	G3?/S1	Eastern Utah, northern Arizona, and south-central Wyoming
@ *Erigeron nanus* Dwarf daisy	G4/S2	Eastern Idaho, central Wyoming, and northern Utah
@ *Erigeron nematophyllus* Needleleaf daisy	G3/S3	Southern Wyoming, northeast Utah, and northern Colorado
@ *Erigeron uintahensis* Uintah fleabane	G3G4/S2	Western and southern Wyoming and northern Utah
@ *Eriogonum acaule* Single-stemmed wild buckwheat	G3/S3	Western and southern Wyoming and northwest Colorado
@ *Eriogonum brevicaule* var. *micranthum* Shortstem buckwheat	G5T3/S3	Southwest Wyoming
Glossopetalon spinescens var. *meionandrum* Utah greasebush	G5T3/S1	Southwest Wyoming, eastern Utah, northeast Arizona, and western Colorado
@ *Hymenopappus filifolius* var. *luteus* Wyoming hyaline-herb	G5T?/S3S4	Western Wyoming, northeast Utah, and western Colorado
@ *Hymenopappus filifolius* var. *nudipes* Alpine hyaline-herb	G5T?/S2	Southwest Wyoming and northern Utah
@ *Hymenoxys acaulis* var. *epunctata* Spotless hymenoxys	G5T?/SR	Northwest Colorado, northeast Utah, and reported for southwest Wyoming
@ *Hymenoxys torreyana* Torrey's hymenoxys	G4/S3	Northeast Utah and southern Wyoming
# *Ipomopsis crebrifolia* Congested gilia	G3/S2S3	Southwest Montana, westerm Wyoming, eastern Utah
Lepidium integrifolium var. *integrifolium* Entire-leaved peppergrass	G3?T2/S1	Southwest Wyoming and north-central Utah
@ *Lepidium montanum* var. *wyomingense* Wyoming peppergrass	G5?T?/S2	Southern Wyoming and northwest Colorado
@ *Lesquerella alpina* var. *condensata* Condensed bladderpod	G4Q/S2	Southwest Montana, southwest Wyoming, and northwest Colorado
Lesquerella alpina var. *parvula* Narrowleaved bladderpod	G4T3?/S1	North-central Colorado, northeast Utah, and southern Wyoming
Lesquerella macrocarpa Large-fruited bladderpod	G2/S2	Southwest Wyoming
Lesquerella multiceps Western bladderpod	G3/S1	Southeast Idaho, northeast Utah, and southwest Wyoming
# *Lesquerella paysonii* Payson's bladderpod	G3/S3	Western Wyoming and eastern Idaho

Species	Heritage Rank	Range
Lesquerella prostrata Prostrate bladderpod	G3/S1	Southwest Wyoming, central and southeast Idaho, and northern Utah
# Lomatium bicolor var. *bicolor* Wasatch biscuitroot	G4T3/S2	Northeast Utah, southeast Idaho, and western Wyoming
@ Lomatium juniperinum Juniper biscuitroot	G4?/S2	Northeast Utah, southwest Wyoming, and northwest Colorado
@ Lomatium nuttallii Nuttall's biscuitroot	G3/S3	Central and southern Wyoming, western Nebraska, and northeast Colorado
Lomatium triternatum var. *anomalum* Ternate desert-parsley	G5T?/S1	Southern Idaho, northeast Oregon, northeast Utah, and southwest Wyoming
@ Mentzelia pumila Wyoming stickleaf	G4/S2S3	Central Wyoming, northeast Utah, and northwest Colorado
@ Mertensia fusiformis Spindle bladderpod	G4G5/S2	Eastern Utah, western Colorado, and southern Wyoming
@ Oenothera pallida var. *trichocalyx* Pale evening-primrose	G5T?/S3	Western and central Wyoming, northwest Colorado, and northeast Utah
@ Oryzopsis contracta Contracted Indian ricegrass	G4/S3S4	Western Wyoming, southwest Montana, northeast Utah, and north-central Colorado
Oryzopsis swallenii Swallen mountain ricegrass	G4/S2	Western Wyoming and eastern Idaho
@ Oxytropis besseyi var. *fallax* Bessey locoweed	G5T?/S3	North-central Wyoming and south-central Montana
Oxytropis besseyi var. *obnapiformis* Maybell locoweed	G5T3/S1	Southwest Wyoming, northeast Utah, and northwest Colorado
@ Oxytropis besseyi var. *ventosa* Bessey locoweed	G5T3/S3	Central Wyoming
@ Oxytropis multiceps Nuttall's locoweed	G5/S3	Southern Wyoming and north-central Colorado
@ Oxytropis nana Wyoming locoweed	G5T3/S3	Central Wyoming
Penstemon acaulis var. *acaulis* Stemless beardtongue	G3T2/S1	Sweetwater County, Wyoming, northwest Colorado, and northeast Utah
@ Penstemon arenicola Red Desert beardtongue	G3G4/S3S4	Central and southwest Wyoming
@ Penstemon eriantherus var. *cleburnei* Cleburne's beardtongue	G4T?/S2S3	Central and southwestern Wyoming and northeast Utah
@ Penstemon fremontii var. *fremontii* Fremont's beardtongue	G3T?/S3	Southwest Wyoming, northeast Utah, and northwest Colorado
Penstemon gibbensii Gibbens' beardtongue	G1/S1	South-central Wyoming, northeast Utah, and northwest Colorado
Penstemon pachyphyllus var. *mucronatus* Sheep Creek beardtongue	G5T4/S2	Northeast Utah, northwest Colorado, and southwest Wyoming
# Penstemon paysoniorum Payson's beardtongue	G3/S3	Southwest and central Wyoming
Penstemon scariosus var. *garrettii* Garrett's beardtongue	G4T3/S1	Northeast Utah, northwest Colorado, and southwest Wyoming
Phacelia demissa Intermountain phacelia	G5/S1	Southwest Wyoming, southwest Colorado, eastern Utah, and northeast Arizona
Phacelia glandulosa var. *deserta* Desert glandular phacelia	G4T1T2Q/S1	Southwest Wyoming
Phacelia salina Nelson phacelia	G3?Q/S1	Southwest Wyoming, western Utah, and north-central Nevada
Phlox albomarginata White-margined phlox	G4/S1	Southwest Montana, eastern Idaho, and southwest Wyoming
# Phlox opalensis Opal phlox	G3/S3	Southwest Wyoming and northeast Utah
Phlox pungens Beaver Rim phlox	G2/S2	Wind River and Green River basins, Wyoming
Physaria condensata Tufted twinpod	G2/S2	Southwest Wyoming

Species	Heritage Rank	Range
Physaria dornii Dorn's twinpod	G1/S1	Lincoln and Uinta counties, WY
@ *Physaria integrifolia* Creeping twinpod	G3G4/S3	Southwest Montana, eastern Idaho, and western Wyoming
@ *Platyschkuhria integrifolia* Naked-stemmed bahia	G5/S3	Central Wyoming and south-central Montana
Rorippa calycina Persistent sepal yellowcress	G3/S2S3	Central Wyoming, southeast Montana, southwestern North Dakota (with one outlier in the Northwest Territories of Canada)
Senecio crocatus Saffron groundsel	G3/SH	Southern Wyoming, western Colorado, and eastern Utah
@ *Sphaeromeria capitata* False sagebrush	G3/S3	Western and southern Wyoming, southwest Montana, northwest Colorado (with one outlier in southern Utah)
@ *Tetradymia nuttallii* Nuttall's horsebrush	G3G4/S2S3	South-central Wyoming, central Utah, and northeast Nevada
Thelesperma caespitosum Green River greenthread	G1/S1	Sweetwater County, Wyoming and Duchesne County, Utah
Thelesperma pubescens Uinta greenthread	G1/S1	Sweetwater and Uinta counties, Wyoming
@ *Thelypodiopsis elegans* Elegant thelypody	G3G5/S2S3	Southwest Wyoming, western Colorado, and eastern Utah
Townsendia microcephala Cedar Mountain Easter daisy	G1/S1	Sweetwater and Uinta counties, Wyoming
@ *Townsendia nuttallii* Nuttall's Easter daisy	G3/S3	Western Wyoming and south-central Montana
@ *Townsendia spathulata* Swordleaf Easter daisy	G3/S3	Western Wyoming and south-central Montana
@ *Townsendia strigosa* Strigose Easter daisy	G4/S3	Northeast Utah, southwest Wyoming, and northwest Colorado
@ *Trifolium andinum* var. *andinum* Andean clover	G3/S3	Southwest Wyoming, northwest Colorado, eastern Utah, and northeast Arizona
@ *Viola utahensis* Utah violet	G4?Q/S1	Western Wyoming, central Utah, and Nevada

* The following species are state or regional endemics found in the Wyoming Basin Ecoregion outside of the Southwest Wyoming study area: *Artemisia porteri* (Porter's sagebrush, G2/S2), *Astragalus gilviflorus* var. *purpureus* (Dubois milkvetch, G5T2/S2), *Astragalus jejunus* var. *articulatus* (Hyattville milkvetch, G3T1/S1), *Cryptantha subcapitata* (Owl Creek miner's candle, G1/S1), *Cymopterus evertii* (Evert's wafer-parsnip, G2G3/S2S3), *Eriogonum brevicaule* var. *canum* (Rabbit buckwheat, G3/S2), *Eriogonum exilifolium* (Slender leaved buckwheat, G3/S2), *Eriogonum mancum* (Mancos wild buckwheat), *Haplopappus wardii* (Ward's goldenweed, G2/S2), *Physaria eburniflora* (Devil's Gate twinpod), *Physaria saximontana* var. *saximontana* (Rocky Mountain twinpod, G3T2/S2), *Shoshonea pulvinata* (Shoshonea, G2G3/S2), *Stanleya tomentosa* var. *tomentosa* (Hairy prince's plume), *Trifolium barnebyi* (Barneby's clover, G1/S1), and *Yermo xanthocephalus* (Desert yellowhead, G1/S1).

Table 4.
Current Distribution of Plant Species of Special Concern in Existing or Proposed Special Management Areas in Southwest Wyoming

Key: * indicates species formerly tracked by WYNDD; # indicates species on the WYNDD Watch List. Numbers following each managed area indicates the Gap score (1-4) for protection status. See Methods section for explanation of scoring.

I. Bureau of Land Management

A. Rawlins District

1. Great Divide Resource Area

1. Adobe Town Wilderness Study Area (3)
   Senecio spartioides var. *multicapitatus*

2. Gibbens' Beardtongue Site (3)
   (under special management, but not a formal ACEC)
   Penstemon gibbensii

3. Jep Canyon ACEC (2)
   Penstemon pachyphyllus var. *mucronatus*

4. Sand Hills ACEC (2)
   Descurainia pinnata ssp. *paysonii*
   Senecio spartioides var. *multicapitatus*

5. Shamrock Hills ACEC (2)
   None

B. Rock Springs District

1. Green River Resource Area

1. Adobe Town Wilderness Study Area (3)
   Descurainia pinnata ssp. *paysonii*

2. Alkali Basin/East Sand Dunes Wilderness Study Area (3)
   None

3. Alkali Draw Wilderness Study Area (3)
   None

4. Buffalo Hump Wilderness Study Area (3)
   None

5. Cedar Canyon ACEC (2)
   **Malacothrix torreyi*
   * *Phacelia glandulifera*

6. Currant Creek ACEC (2)
   # *Arabis pendulina* var. *russeola*
   Cirsium ownbeyi

Draba juniperina
**Erigeron uintahensis*
 # Penstemon paysoniorum

7. Devils Playground/Twin Buttes Wilderness Study Area (3)
   Chamaechaenactis scaposa var. *parva*
   **Cryptantha scoparia*
   # Cymopterus lapidosus
   # Phlox opalensis

8. Greater Sand Dunes ACEC (2)
   Descurainia pinnata var. *paysonii*
   Scirpus nevadensis

9. Honeycomb Buttes Wilderness Study Area (3)
   Astragalus bisulcatus var. *haydenianus*
   Lesquerella macrocarpa
   **Oryzopsis contracta*
   Phacelia demissa

10. Natural Corrals ACEC (2)
    None

11. Oregon Buttes Wilderness Study Area (partly overlaps with Oregon Buttes ACEC) (3)
    **Cryptantha scoparia*
    # Ipomopsis crebrifolia
    # Penstemon paysoniorum

12. Oregon Buttes ACEC (2)
    #Ipomopsis crebrifolia

13. Pine Spring ACEC (2)
    #Cymopterus lapidosus
    Penstemon pachyphyllus var. *mucronatus*
    #Phlox opalensis

14. Red Creek ACEC (2)
    Arabis selbyi
    # Cryptantha stricta
    # Cymopterus lapidosus
    Draba juniperina
    Ephedra viridis
    **Erigeron uintahensis*
    Eriogonum corymbosum var. *corymbosum*
    Galium coloradoense
    Philadelphus microphyllus

15. Red Creek Badlands Wilderness Study Area (area overlaps with Red Creek ACEC) (3)
    Draba juniperina
    Ephedra viridis
    **Erigeron uintahensis*

16. Red Lake Wilderness Study Area (3)
    None

17. Sage Creek ACEC (2)
    Abies concolor
    # Arabis pendulina var. *russeola*
    Brickellia microphylla var. *scabra*
    # Cryptantha stricta
    # Cymopterus lapidosus
    Draba juniperina
    # Penstemon paysoniorum
    Phacelia incana

18. Sand Dunes Wilderness Study Area (3)
    None

19. South Pass Historic Landscape ACEC (2)
    Antennaria arcuata
    # Arabis pendulina var. *russeola*

20. South Pinnacles Wilderness Study Area (3)
    None

21. Special Status Plant Species ACEC (2)
    1. Target Species
    Arabis pusilla
    Astragalus proimanthus
    Descurainia torulosa
    Thelesperma pubescens

    2. Associated Species (co-occur with targets)
    # Arabis pendulina var. *russeola*
    **Erigeron uintahensis*
    Lesquerella alpina var. *parvula*
    Potentilla diversifolia var. *multisecta*
    Townsendia microcephala

22. Steamboat ACEC (2)
    # Arabis pendulina var. *russeola*
    **Erigeron uintahensis*
    # Ipomopsis crebrifolia
    Lesquerella macrocarpa

23. Whitehorse Creek Wilderness Study Area (3)
    None

24. White Mountain Petroglyphs ACEC (2)
    # Ipomopsis crebrifolia
    # Penstemon paysoniorum

2. Kemmerer Resource Area

1. Kemmerer Cushion Plant Community No Surface Occupancy Area (3)
    # Astragalus simplicifolius
    Physaria condensata

2. *Physaria dornii* No Surface Occupancy Area (3)
    Physaria dornii

3. Raymond Mountain ACEC (2)
None

4. Raymond Mountain Wilderness Study Area (overlaps the Raymond Mountain ACEC) (3)
None

3. Pinedale Resource Area

1. Beaver Creek ACEC (2)
None

2. Lake Mountain Wilderness Study Area (overlaps with Rock Creek ACEC) (3)
None

3. Rock Creek ACEC (2)
None

II. National Park Service

1. Fossil Butte National Monument (1)
Astragalus lentiginosus var. *salinus*
Ceanothus martinii
Cuscuta occidentalis
Lepidium integrifolium var. *integrifolium*
Lomatium triternatum var. *anomalum*
 # Penstemon paysoniorum
Physaria condensata

III. US Fish and Wildlife Service

1. Seedskadee National Wildlife Refuge (1)
Asclepias uncialis ?
Cryptantha rollinsii
 # Cymopterus lapidosus
Eriastrum wilcoxii
Opuntia polyacantha var. *juniperina*
 # Penstemon paysoniorum
 # Phlox opalensis

IV. Other

1. FMC Park (City of Green River) (3)
Thelesperma caespitosum

References:
USDI Bureau of Land Management 1986 a, 1986 b, 1987, 1988 a, 1988 b, 1997.

Table 5.
General Community Types of Conservation Concern in Southwest Wyoming

Modified from Merrill *et al*. 1996, Driese *et al*. 1997, and Stoms *et al*. 1998

First Priority
(Areas with minimal protection of biodiversity and high vulnerability to land use activities under present or projected management and small areal extent)

Seasonally/temporarily flooded cold-deciduous forest [= riparian forests]
Seasonally/temporarily flooded cold-deciduous shrubland [=riparian shrublands]
Dry grassland- *Pseuodroegneria* (synonym = *Elymus spicatus*)- *Poa*
Wet or dry meadows
Sparsely vegetated sand dunes

Second Priority
(Areas with low protection of biodiversity and high vulnerability to land use activities under present or projected management, but cover a relatively large geographic area)

Artemisia tridentata ssp. *vaseyana* shrublands
Artemisia tridentata ssp. *wyomingensis* shrubland
Artemisia tridentata ssp. *tridentata* shrublands
Sarcobatus vermiculatus shrubland
Mixed salt desert shrub [dominated by *Atriplex* spp.]
Atriplex gardneri dwarf-shrubland

Third Priority
(Low representation in protected areas in Wyoming, but threats and vulnerability are low)

Juniper woodland (*Juniperus osteosperma*)
Populus tremuloides forest
Populus tremuloides woodland
Cercocarpus ledifolius or *C. montanus* shrublands
Sparsely vegetated boulders, gravel, talus

Table 6.
Specific Community Types of Conservation Concern
in Southwest Wyoming

Community Type	Reference	Example	Protected Area
Amelanchier/Cercocarpus/ Purshia communities	Collins 1984; Jones 1993	Fossil Site	Fossil Butte NM
Artemisia longiloba grassland	Collins 1984	Fossil Site	Fossil Butte NM
Basin big sagebrush/lemon scurfpea [*Artemisia tridentata* var. *tridentata/Psoralidium lanceolatum*] vegetation type	Jones and Fertig 1996	Jack Morrow Hills Site (Steamboat Rim)	Greater Sand Dunes ACEC, Steamboat ACEC
Artemisia spinescens community	Collins 1984	Jack Morrow Hills	Steamboat ACEC?
Atriplex canescens grassland	Collins 1984	Linwood Canyon, Minnies Gap, and Jack Morrow Hills [Killpecker Dunes] sites	
Ceanothus martinii shrub community	Collins 1984	Cedar Mountain/ Lonetree and Fossil sites	Fossil Butte NM?
Cercocarpus ledifolius var. *intricatus* community	Collins 1984	Linwood Canyon/Flaming Gorge and Minnies Gap sites	
Cercocarpus montanus community	Collins 1984	Little Firehole Canyon	
Chrysothamnus communities	Collins 1984	Jack Morrow Hills [Killpecker Dunes]	
Endemic cushion plant community [variety of cushion plant types dominated by native rare cushion spp., including *Physaria condensata, P. dornii, Phlox pungens, Astragalus drabelliformis*, etc.]	Collins 1984; Fertig 1998 b	Kemmerer Endemic Cushion Plant, Fossil, Rock Creek Ridge, and Ross Butte/Ross Ridge sites	Kemmerer Cushion Plant NSO area, Fossil Butte NM
Glossopetalon spinescens [Forsellesia meionandra] community	Collins 1984	Little Firehole Canyon Site	
Grayia spinosa community	Collins 1984	Jack Morrow Hills Site, Devils Playground Area	Devils Playground/ Twin Buttes WSA
Krascheninnikovia lanata grassland	Collins 1984	Fossil Site	Fossil Butte NM
Populus angustifolia community	Collins 1984	Little Firehole Canyon Site	
Populus tremuloides/shrub types	Jones 1993	Fossil Site	Fossil Butte NM
Rhus trilobata/Symphoricarpos community	Collins 1984	Little Firehole Canyon Site	
Sarcobatus vermiculatus/ Oryzopsis hymenoides/Atriplex gardneri community	Collins 1984	Fossil Site	Fossil Butte NM
Sarcobatus vermiculatus playa types	Collins 1984; Merrill et al. 1996 a, b	Jack Morrow Hills Site	Honeycomb Buttes WSA
Stipa pinetorum-Elymus trachycaulus grassland	Jones 1993	Fossil Site	Fossil Butte NM
Zuckia brandegei community	Collins 1984	Table Mountain Site	

Table 7.

Current and Potential Protection Status of Plant Species of Special Concern in Southwest Wyoming

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

1. High priority species

Species	**Common Name**	**Protection Status**		
		Current SW WY	**Potential SW WY**	**Current WY**
Abies concolor	White fir	2	2	2
Androstephium breviflorum	Purple funnel-lily	3	2	3
Antennaria arcuata	Meadow pussytoes	2	2	1
Arabis crandallii	Crandall's rock cress	3	2	3
Arabis pusilla	Small rock cress	2	2	2
Arabis selbyi	Selby rock cress	2	2	2
Artemisia biennis var. *diffusa*	Mystery wormwood	4	4	4
Asclepias uncialis	Dwarf milkweed	1	1	1
Astragalus bisulcatus var. *haydenianus*	Hayden's milkvetch	3	3 (1)	3
Astragalus calycosus var. *calycosus*	King's milkvetch	3	3	3
Astragalus coltonii var. *moabensis*	Moab milkvetch	3	2	3
Astragalus diversifolius var. *diversifolius*	Meadow milkvetch	4	4	4
Astragalus lentiginosus var. *salinus*	Sodaville milkvetch	1	1	1
Astragalus nelsonianus [A. pectinatus var. *platyphyllus]*	Nelson's milkvetch	3	2	3
Astragalus proimanthus	Precocious milkvetch	2	2	2
Astragalus racemosus var. *treleasei*	Trelease's racemose milkvetch	3	3	3
Atriplex falcata [A. gardneri var. *falcata]*	Sickle saltbush	3	3	3
Atriplex wolfii [Atriplex tenuissima]	Wolf's orache	3	3	3
Brickellia microphylla var. *scabra*	Little-leaved brickell-bush	2	2	2
Carex parryana var. *parryana*	Parry sedge	3	2	1

Species	Common Name	Current SW WY	Potential SW WY	Current WY
Ceanothus martinii	Utah mountain lilac	1	1	1
Cercocarpus ledifolius var. *intricatus*	Dwarf mountain mahogany	3	2	3
Chamaechaenactis scaposa var. *parva*	Fullstem	3	3 (1)	3
Chrysothamnus greenei	Greene rabbitbrush	3	2	3
Cirsium aridum	Cedar Rim thistle	3	3	2
Cirsium ownbeyi	Ownbey's thistle	2	2	2
Collomia grandiflora	Large-flower collomia	4	4	4
Cryptantha gracilis	Slender cryptantha	3	2	3
Cryptantha rollinsii	Rollins' cat's-eye	1	1	1
Cuscuta occidentalis	Western dodder	1	1	1
Descurainia pinnata var. *paysonii*	Payson's tansymustard	2	2 (1)	2
Descurainia torulosa	Wyoming tansymustard	2	2	1
Downingia laeta	Great Basin downingia	4	4	4
Draba juniperina *[Draba oligosperma* var. *juniperina*]	Uinta draba	2	2 (1)	2
Elymus simplex [*Leymus simplex*]	Alkali wild-rye	3	2	3
Ephedra viridis var. *viridis*	Green Mormon tea	2	2 (1)	2
Eriastrum wilcoxii	Wilcox eriastrum	1	1	1
Erigeron consimilis *[Erigeron. compactus* var. *consimilis]*	San Rafael daisy	3	2	3
Eriogonum corymbosum var. *corymbosum*	Crisp-leaf wild buckwheat	2	2	2
Eriogonum divaricatum	Divergent wild buckwheat	3	2	3
Eriogonum hookeri	Hooker wild buckwheat	3	3	3
Galium coloradoense	Colorado bedstraw	2	2	2
Glossopetalon spinescens var. *meionandrum* *[Forsellesia meionandra]*	Utah greasebush	3	2	3
Haplopappus macronema var. *linearis* *[Ericameria discoidea* var. *linearis]*	Narrowleaf goldenweed	3	3	1
Hesperochiron californicus	California hesperochiron	3	2	3
Ipomopsis polycladon *[Gilia polycladon]*	Lavender ipomopsis	3	2	3
Lathyrus lanszwertii var. *lanszwertii*	Nevada sweetpea	3	3	3
Lepidium integrifolium var. *integrifolium*	Entire-leaved peppergrass	1	1	1
Lepidium montanum var. *alyssoides*	Mountain peppergrass	3	3	3
Leptodactylon watsonii	Watson's prickly-phlox	3	2	3
Lesquerella alpina var. *parvula* *[Lesquerella parvula]*	Narrowleaved bladderpod	2	2	2
Lesquerella macrocarpa	Large-fruited bladderpod	2	2 (1)	2
Lesquerella multiceps	Western bladderpod	3	3	3
Lesquerella prostrata	Prostrate bladderpod	3	2	3
Loeflingia squarrosa var. *artemisiarum*	Sage-like loeflingia	4	4	4
Lomatium triternatum var. *anomalum*	Ternate desert-parsley	1	1	1
Monolepis pusilla	Red poverty-weed	3	3	3

Species	Common Name	Current SW WY	Potential SW WY	Current WY
Muhlenbergia glomerata [Incl. in *M. racemosa* by some authors]	Marsh muhly	3	3	1
Opuntia erinacea var. *utahensis*	Utah old man prickly-pear	4	4	4
Opuntia polyacantha var. *juniperina*	Juniper prickly-pear	1	1	1
Opuntia polyacantha var. *rufispina*	Rufous-spine prickly-pear	3	3	3
Oryzopsis swallenii	Swallen mountain-ricegrass	3	2	3
Oxytheca dendroidea	Tree-like oxytheca	3	3	3
Oxytropis besseyi var. *obnapiformis [Oxytropis obnapiformis]*	Maybell locoweed	3	2	3
Penstemon acaulis var. *acaulis*	Stemless beardtongue	3	2	3
Penstemon gibbensii	Gibbens' beardtongue	3	2	1 (in UT/CO)
Penstemon pachyphyllus var. *mucronatus*	Sheep Creek beardtongue	2	2	2
Penstemon scariosus var. *garrettii*	Garrett's beardtongue	3	2	3
Penstemon watsonii	Watson beardtongue	4	4	4
Phacelia demissa	Intermountain phacelia	3	2 (1)	3
Phacelia glandulosa var. *deserta*	Desert glandular phacelia	3	2	3
Phacelia incana	Western phacelia	2	2	2
Phacelia salina	Nelson phacelia	3	2	3
Phacelia tetramera	Tiny phacelia	3	3	1
Philadelphus microphyllus var. *occidentalis*	Little-leaf mock-orange	2	2	2
Phlox albomarginata	White-margined phlox	3	3	3
Phlox pungens "Ross Butte morph"	Beaver Rim phlox "Ross Butte morph"	3	2	3 (1 for typ. form)
Physaria condensata	Tufted twinpod	1	1	1
Physaria dornii	Dorn's twinpod	3	2	3
Physocarpus alternans	Dwarf ninebark	3	2	3
Populus deltoides var. *wislizenii*	Fremont cottonwood	3	2	3
Potentilla diversifolia var. *multisecta*	Deep Creek cinquefoil	2	2	2
Psilocarphus brevissimus	Dwarf woolly-heads	3	2	3
Ranunculus flabellaris	Yellow water-crowfoot	4	4	4
Rorippa calycina	Persistent sepal yellowcress	3	2	1
Sambucus cerulea	Blue elderberry	3	3	3
Scirpus nevadensis	Nevada bulrush	2	2	2
Selaginella mutica	Blunt-leaf spike-moss	3	2	3
Selaginella selaginoides	Low spike-moss	3	2	1
Senecio crocatus	Saffron groundsel	3	3	3
Senecio spartioides var. *multicapitatus*	Many-headed broom groundsel	2	2 (1)	2
Stipa nevadensis	Nevada needlegrass	3	3	1
Thelesperma caespitosum	Green River greenthread	3	2	3
Thelesperma pubescens	Uinta greenthread	2	2	2
Townsendia microcephala	Cedar Mountain Easter-daisy	2	2	2

2. Watch List species

Species	Common Name	Protection Status		
		Current SW WY	Potential SW WY	Current WY
Arabis pendulina var. *russeola*	Daggett rock-cress	2	2	2
Arabis williamsii var. *williamsii* [*A. pendulocarpa* var. *saximontana*]	Williams' rock cress	3	3	1
Astragalus drabelliformis	Big Piney milkvetch	3	2	3
Astragalus simplicifolius	Bun milkvetch	2	2	1
Cryptantha stricta	Erect cryptantha	2	2	2
Cymopterus lapidosus	Echo spring-parsley	1	1	1
Ipomopsis crebrifolia	Compact gilia	2	2 (1)	2
Lesquerella paysonii	Payson's bladderpod	3	2	1
Lomatium bicolor var. *bicolor*	Wasatch biscuitroot	3	3	3
Penstemon paysoniorum	Payson's beardtongue	1	1	1
Phlox opalensis	Opal phlox	1	1	1

3. Protection Summary

A. Current Southwest Wyoming Status

	Status 1	Status 2	Status 3	Status 4
# of High Priority Species	10	23	54	8
# of Watch List Species	3	4	4	0
Total # [High priority & Watch List] and %	13 (12.3%)	27 (25.5%)	58 (54.7%)	8 (7.5%)

B. Potential Southwest Wyoming Status

	Status 1	Status 2	Status 3	Status 4
# of High Priority Species	10	56	21	8
# of Watch List Species	3	6	2	0
Total # [High priority & Watch List] and % (excludes Wilderness Study Areas)	13 (12.3%)	62 (58.5%)	23 (21.7%)	8 (7.5%)
Total if Wilderness Study Areas are formally designated	22 (20.8%)	55 51.9%)	21 (19.8%)	8 (7.5%)

C. Current Statewide Wyoming Status

	Status 1	Status 2	Status 3	Status 4
# of High Priority Species	20	22	45	8
# of Watch List Species	6	3	2	0
Total # [High priority & Watch List] and %	26 (24.5%)	25 (23.6%)	47 (44.4%)	8 (7.5%)

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Appendix A
Status of Plant Species Currently of Special Concern in Southwest Wyoming

1. High Priority Species

Abies concolor

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.

Population 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 District. Historical reports may have occurred on Wasatch-Cache National Forest.

Status in Southwest Wyoming: All known state populations are found within the SW Wyoming study area.

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

Androstephium breviflorum

Occurrences in Wyoming: Known from 5 extant occurrences in Wyoming, only one of which has been observed since 1984.

Population Abundance: Most populations number 25-75 plants and are limited to small areas of suitable habitat.

Range: Peripheral; in Wyoming, restricted to the southern Washakie Basin along the Sweetwater-Carbon county line just north of the Colorado border.

Trends: Population trends are not known.

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

Threats: Not known. Habitat may be impacted by mineral development and recreational activities.

Managed Areas: Populations occur on lands managed by the BLM Rawlins District (Great Divide Resource Area) and state of Wyoming.

Status in Southwest Wyoming: All known state populations are found within the SW Wyoming study area. Two occurrences are found within the potential Cherokee Basin/Cherokee Rim and Powder Rim conservation sites.

References: Cronquist *et al*. 1977; Dorn 1992 b.

Antennaria arcuata

Occurrences in Wyoming: Known from 22 occurrences in Wyoming, 17 of which have been discovered or relocated since 1995.

Population Abundance: Surveys in 1995 found an estimated 99,000-130,000 individuals in 15 populations covering ca 500 total acres. Individuals are usually clustered and the species may be locally dominant in small areas of suitable habitat (Fertig 1996 a). A new population of several thousand plants was discovered near Pinedale by Steve Laster of the BLM in 1997.

Range: Regional endemic of central Wyoming, south-central Idaho, and northwestern Nevada. In Wyoming, it is known from drainage bottoms in the Sweetwater River Valley and the South Pass area of the southern Wind River Range in Fremont County and the Green River Basin in Sublette County.

Trends: Trend data from 12 Wyoming occurrences show slight downward to slight upward increases between 1986-1995. Total population numbers reflect a slight downward trend.

Protection Status: One population outside the study area is protected on The Nature Conservancy's Sweetwater River Preserve. Part of another occurrence is within the Sweetwater Canyon Wilderness Study Area and at least one population is found within the BLM South Pass Historic Site ACEC. Most other occurrences are wholly or partially on public lands managed for multiple use by the BLM. *A. arcuata* was formerly a C2 candidate for

listing under the Endangered Species Act. It is currently listed as Sensitive by US Forest Service Region 4.

Threats: Marriott (1986 a) identified overgrazing, water development (stockpond construction), placer mining, and uranium mining as potential threats to this species. Exclosure studies by the BLM suggest that grazing is less of a threat than originally thought. Populations of *A. arcuata* often abruptly stop inside of ungrazed exclosures where graminoid cover is too dense and soils are too moist. Under appropriate stocking levels and rotation, grazing appears to be beneficial to this species by maintaining low cover and moist (but not too wet) soil conditions (Fertig 1996 a). Trampling by off-road vehicles, mineral development, and water projects appear to be the primary threats at present in Wyoming. Competition from exotic weeds has also been cited as a threat in Idaho.

Managed Areas: Populations occur on lands managed by the BLM Rawlins District and Rock Springs districts.

Status in Southwest Wyoming: 4 occurrences are found within the study area, all on lands managed by the BLM Rock Springs District. Populations of this plant are found within the potential Pine Creek Outcrops and Hay Gulch conservation sites.

References: Bayer 1992; Bayer and Stebbins 1993; Bayer *et al*. 1996; Clark and Dorn 1979; Cronquist 1950, 1955, 1994; Dorn and Dorn 1980; Fertig 1996 a; Fertig *et al*. 1994; Jones and Fertig 1996; Marriott 1986 a, 1988 a; Shultz and Shultz 1978; USDA Forest Service 1991; Welp 1997; Welp *et al*. 1996; Whiskey Basin Consultants 1982.

Arabis crandallii

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

Population 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 District lands within the checkerboard.

Status in Southwest Wyoming: All known state populations are found within the SW Wyoming study area. One occurrence is found within the potential Linwood Canyon/Flaming Gorge conservation site.

References: Dorn 1992 b; Refsdal 1996; Rollins 1941, 1993.

Arabis pusilla

Occurrences in Wyoming: Known only from the type locality on Pine Creek.

Population Abundance: Recent population estimates place the total population at 600-1000 individuals in less than 60 acres of potential habitat (Dorn 1990 a; Marriott 1988 a).

Range: State endemic; restricted to the South Pass area of the southern Wind River Range in Fremont County..

Trends: Probably stable at present. A monitoring study is badly needed to gauge trends and response to management.

Protection Status: The Pine Creek area has been designated a Special Status Plant ACEC in the Green River Resource Area Management Plan (USDI Bureau of Land Management 1997). A mineral withdrawal for the area has been completed by the BLM. *A. pusilla* is currently a candidate for listing under the Endangered Species Act.

Threats: Threatened potentially by recreation development, mining, and trampling. Small population size makes it very vulnerable to disturbance.

Managed Areas: Known only from the BLM Rock Springs District (Green River Resource Area).

Status in Southwest Wyoming: The entire state and global range of this species is contained within the study area. The ACEC is contained within the potential Pine Creek Outcrops conservation site.

References: Cramer and Hartman 1996; Dorn 1990 a; Fertig 1992 a, 1992 b; Fertig *et al*. 1994; Green River Resource Area 1994; Marriott 1986 b, 1988 a; Rollins 1983; USDI Bureau of Land Management 1997; Welp 1997; Weynand and Amidon 1990.

Arabis selbyi

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

Population 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), Rock Springs BLM (Green River RA), and Rawlins BLM (Great Divide RA).
Status in Southwest Wyoming: The entire state range of this species is found within the SW Wyoming study area. Populations are found within the Little Firehole Canyon, Linwood Canyon/Flaming Gorge, Richards Gap, and Powder Rim potential conservation sites.
References: Dorn 1992 b; Rollins 1993.

Artemisia biennis var. *diffusa*
Occurrences in Wyoming: Known only from the type locality near Point of Rocks, last observed in 1980.
Population Abundance: Dorn noted "hundreds of plants present" in 1980. At least 6 surveys of the type locality and vicinity have failed to relocate this taxon (the most recent search was in 1998).
Range: State endemic known only from the Rock Springs Uplift area of Sweetwater County, Wyoming.
Trends: Population has not been relocated since 1980 and may be extirpated. The germination requirements of the plant may be demanding, limiting its appearance to favorable years.
Protection Status: Occurs on public lands managed for multiple use near the Jim Bridger Power Plant. *A. biennis* var. *diffusa* was formerly a C2 candidate for listing under the Endangered Species Act.
Threats: The playa area inhabited by this species is heavily polluted. Impacts from grazing and recreational use in adjacent areas of potential habitat are poorly understood.
Managed Areas: Occurs on lands within the BLM/private land checkerboard in the Rock Springs District.
Status in Southwest Wyoming: The entire state and global range of this taxon is restricted to the SW Wyoming study area. Variety *diffusa* may be extinct.
Comments: Variety *diffusa* differs from the widespread var. *biennis* in its low stature, abundant branching from the base, and dark foliage. Although known only from Dorn's type specimen, it appears to be a valid taxon.
References: Dorn 1988; Fertig *et al*. 1994.

Asclepias uncialis
Occurrences in Wyoming: Known from one historical collection by Charles Parry in 1873. This population has not been relocated. Dr. William Weber of the University of Colorado believes that Parry's Wyoming collection is actually from northeastern Colorado, although Robert Dorn has shown that Parry was in Wyoming on the date the specimen was collected.
Population Abundance: Abundance unknown. May be extirpated in Wyoming.
Range: Disjunct in Wyoming. Known only from the original 1873 collection site, given by Parry as "Green River". According to Dorn and Locklear (Locklear 1991), Parry's party "encountered the Green River near where it is joined by the Big Sandy River in northwest Sweetwater County, Wyoming".
Trends: May be extirpated.
Protection Status: If Dorn and Locklear are correct about Parry's collection site, this area is contained within Seedskadee National Wildlife Refuge. *A. uncialis* was formerly a C2 candidate for listing under the Endangered Species Act.
Threats: Habitat modification is a potential threat.
Status in Southwest Wyoming: Entire state population is found within the study area.
References: Dorn 1992 b; Fertig *et al*. 1994; Locklear 1991, 1993, 1996; Spackman *et al*. 1997.

Astragalus bisulcatus var. *haydenianus*
Occurrences in Wyoming: Known from 3 confirmed occurrences in Wyoming, one of which is historical (1897). Recently reported from 5 additional locations by Refsdal (1996) and Welp (1997). The identity of the specimens from these sites still needs to be confirmed.
Population Abundance: Unknown.
Range: Peripheral; in Wyoming, known from the Washakie and Great Divide Basins in Carbon, Fremont, and Sweetwater counties and reported from the Overthrust Belt in Lincoln and Uinta counties.
Trends: Unknown.
Protection Status: Known populations are all found on public lands managed for multiple use. One occurrence is

within the Honeycomb Buttes Wilderness Study Area.
Threats: Not known.
Managed Areas: Occurs on lands managed by the BLM Rawlins and Rock Springs districts.
Status in Southwest Wyoming: The entire state population is found within the SW Wyoming study area.
Comments: This subspecies is commonly mistaken for the more widespread var. *major.* Variety *haydenianus* can be recognized by its small flower size and prominently cross-roughened fruit pods that are strictly descending and clustered at maturity. This species is probably more widespread in southern Wyoming than currently recognized.
References: Barneby 1964, 1989; Dorn 1992 b; Refsdal 1996; Welp 1997.

Astragalus calycosus var. *calycosus*
Occurrences in Wyoming: Known from 9 extant populations (discovered between 1982 and 1995) and 3 historical records.
Population Abundance: Most populations are very small and localized in suitable microhabitats.
Range: Peripheral; southwest Wyoming. Populations are located in the Overthrust Belt and Green River Basin in Lincoln, Sweetwater, and Uinta counties.
Trends: Not known, but probably stable.
Protection Status: Most occurrences are on public lands managed for multiple use. One historical population may occur on the Fort Bridger Historic Site (managed by the state of Wyoming).
Threats: Populations may be impacted by recreational activity and surface disturbing activities.
Managed Areas: Occurs on lands managed by the BLM Rock Springs District (Kemmerer Resource Area).
Status in Southwest Wyoming: Entire state population is found within the study area. This species may be more abundant in the state than is presently recognized.
References: Barneby 1964, 1989; Hartman and Refsdal 1995; Nelson 1899 b; Refsdal 1996.

Astragalus coltonii var. *moabensis*
Occurrences in Wyoming: Known from 4 occurrences in Wyoming, all of which have been observed since 1981 (most recently in 1995).
Population Abundance: Not known.
Range: Regional endemic of eastern Utah, southwestern Wyoming, and adjacent parts of Colorado, Arizona, and New Mexico. In Wyoming, known only from the northern foothills of the Uinta Range in Sweetwater and Uinta counties.
Trends: Trend data are lacking, but populations are thought to be stable at present.
Protection Status: All known populations are found on public lands managed for multiple use.
Threats: Not known.
Managed Areas: Found on lands managed by the BLM Rock Springs District (Green River and Kemmerer RAs).
Status in Southwest Wyoming: Entire state population is found within the study area. Three occurrences are found in the potential Cedar Mountain/Lonetree and Hickey Mountain-Sage Creek Mountain conservation sites.
References: Barneby 1989; Dorn 1992 b; Refsdal 1996.

Astragalus diversifolius var. *diversifolius*
Occurrences in Wyoming: Reported from one historical site in the "Green River Basin" discovered by Thomas Nuttall in 1838.
Population Abundance: Population size unknown. This species may be extirpated in Wyoming.
Range: Regional endemic of central Idaho, northern Utah, and western Wyoming. In Wyoming, it is reported from the Green River Basin (probably in Sublette or Sweetwater counties).
Trends: Unknown, may be extirpated.
Protection Status: No populations are known to occur in protected areas. *A. diversifolius* var. *diversifolius* is listed as Sensitive by US Forest Service Region 4.
Threats: Considered very threatened in adjacent states, especially due to habitat loss to agriculture.
Managed Areas: Not known.
Status in Southwest Wyoming: Nuttall's type locality is the only known occurrence in the study area.
Comments: Barneby (1964) originally questioned whether Nuttall was really in Wyoming when he discovered this species in 1838, but has since accepted western Wyoming as the type locality (Barneby 1989). This taxon is morphologically very similar to the common dryland species *A. convallarius* (synonym *A. diversifolius* var. *campestris*).

References: Barneby 1964, 1989; Dorn 1992 b; Fertig *et al*. 1994.

Astragalus lentiginosus var. *salinus*

Occurrences in Wyoming: Known from 3 extant populations in Lincoln County. Also reported for Uinta County by Barneby (1964), but neither the specimen nor the location have been relocated.

Population Abundance: Not known.

Range: Peripheral; in Wyoming, known only from the Overthrust Belt in Lincoln and Uinta counties.

Trends: Unknown.

Protection Status: One population is protected within Fossil Butte National Monument. Populations on Rock Creek Ridge occur in the vicinity of known *Physaria dornii* occurrences, but are not protected by no-surface occupancy stipulations.

Threats: Many two-track roads are found in the area and may represent a threat through physical disturbance or introduction of exotic species.

Managed Areas: Found on lands managed by the BLM Rock Springs District (Kemmerer Resource Area) and Fossil Butte National Monument.

Occurrences in Southwest Wyoming: Entire state population is found within the SW Wyoming study area. Occurrences are found in the Fossil and Rock Creek Ridge potential conservation sites.

References: Barneby 1964, 1989; Dorn 1992 b; Hartman and Cramer 1995; Hartman *et al*. 1996; Welsh *et al*. 1993.

Astragalus nelsonianus

Occurrences in Wyoming: Known from 20 extant records in Wyoming and 4 historical reports. Seventeen occurrences have been discovered or relocated since 1980.

Population Abundance: 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 (Jones and Fertig 1996).

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 Rawlins and Rock Springs BLM.

Status in Southwest Wyoming: 11 populations (of 24 in the state) occur within the SW Wyoming study area. At least 3 occurrences are within potential conservation sites (Henry's Fork at McKinnon, Jack Morrow Hills, and Linwood Canyon/Flaming Gorge).

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

Astragalus proimanthus

Occurrences in Wyoming: Known from one extant occurrence and one vague historical record.

Population Abundance: Marriott (1989) estimated the population size at 25,000-40,000 individuals in patches covering an area of less than 10 miles.

Range: Endemic to SW Wyoming. Known from the Green River Basin west of Flaming Gorge and north of the Uinta Mountains in the vicinity of McKinnon (Sweetwater County).

Trends: Baseline trend data were gathered by Marriott in 1989. Follow-up monitoring has been conducted by the Rock Springs BLM.

Protection Status: The entire known population is found within a Special Status Plant ACEC established by the BLM Rock Springs District (USDI Bureau of Land Management 1997). A mineral withdrawal for the area is still being pursued. *A. proimanthus* was formerly a C2 candidate for listing under the Endangered Species Act

Threats: Existing and potential threats include: road construction, off-road vehicle trampling, oil/gas exploration and development, garbage dumps, and range projects (Marriott 1989). The effects of grazing are not known. The plant's limited range makes it vulnerable to extirpation.

Managed Areas: Restricted to lands managed by the Rock Springs BLM (Green River RA) and state.

Status in Southwest Wyoming: The entire state and global range of this species is found in SW Wyoming. The ACEC is contained within the larger potential Henry's Fork at McKinnon conservation site.

References: Barneby 1964; Dorn and Dorn 1980; Fertig *et al*. 1994; Marriott 1988 a, 1989; Refsdal 1996; Roberts 1977; Weynand and Amidon 1990; Whiskey Basin Consultants 1981.

Astragalus racemosus var. *treleasei*
Occurrences in Wyoming: Known from 2 extant occurrences (observed in 1993-94) and 4 historical populations observed between 1937-1949.
Population Abundance: Not known.
Range: Regional endemic of southwestern Wyoming and northeastern Utah (Uinta Basin). In Wyoming, known only from the Green River Basin and the eastern foothills of the Wyoming Range (Sublette and Uinta counties).
Trends: Not known.
Protection Status: All known occurrences are on public lands managed for multiple use.
Threats: May be impacted by surface disturbance associated with mineral development, but more analysis is needed.
Managed Areas: Found on lands managed by the BLM Rock Springs District (Kemmerer and Pinedale RAs).
Occurrences in Southwest Wyoming: Entire state population is within the SW Wyoming study area.
References: Barneby 1964, 1989; Cramer and Hartman 1995, 1996; Dorn 1992 b; Hartman and Nelson 1994; Porter 1945.

Atriplex falcata
Occurrences in Wyoming: Known from 4 extant locations found in 1993-95, and one semi-historical location (last observed in 1961).
Population Abundance: Not known.
Range: Peripheral; in Wyoming known from the foothills of the Overthrust Belt and the Green River Basin in Uinta, Sublette, and Sweetwater counties.
Trends: Not known.
Protection Status: All known populations are on public lands managed for multiple use (including oil and gas development, recreation, and livestock grazing).
Threats: Some populations may be impacted by surface disturbances associated with mineral exploration. The Uinta County population may have been eliminated during construction of Interstate 80.
Managed Areas: occurs on lands managed by the Kemmerer, Green River, and Pinedale Resource Areas in the BLM Rock Springs District.
Status in Southwest Wyoming: Entire state range is within the SW Wyoming study area.
Comments: Wyoming specimens are intermediate towards *A. gardneri* var. *gardneri.* Welsh *et al*. (1993) consider this taxon to be a variety of *A. gardneri*.
References: Cramer and Hartman 1996; Dorn 1992 b; Welsh *et al*. 1993.

Atriplex wolfii
Occurrences in Wyoming: Known from 3 presumed extant populations (observed from 1967-1980), and one historical record.
Population Abundance: Unknown.
Range: Regional endemic of eastern Utah, south-central Wyoming, and adjacent Colorado. In Wyoming, this species is known only from the Washakie Basin and Rock Springs Uplift in Carbon and Sweetwater counties.
Trends: Not known.
Protection Status: All known populations are on public lands managed for multiple use.
Threats: May be potentially threatened by oil and gas development activity.
Managed Areas: Known from lands managed by the BLM Green River Resource Area (Rock Springs District) and Great Divide Resource Area (Rawlins District).
Status in Southwest Wyoming: Entire state range is within the SW Wyoming study area.
References: Dorn 1992 b; Welsh *et al*. 1993.

Brickellia microphylla var. *scabra*
Occurrences in Wyoming: Known from 6 extant records (3 observed in 1998) and 1 historical location in Wyoming.
Population 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 Rock Springs BLM (Green River RA), Rawlins BLM (Lander RA), Casper BLM (Platte River RA), and on Ashley National Forest (Flaming Gorge NRA).

Status in Southwest Wyoming: 4 of the state's 6 populations are found in the SW Wyoming study area. Populations occur in the potential Little Firehole Canyon and Linwood Canyon/Flaming Gorge conservation sites.

References: Cronquist 1994; Dorn 1992 b; Welsh *et al*. 1993.

Carex parryana var. *parryana*

Occurrences in Wyoming: Known from at least 7 extant occurrences in Wyoming, all observed since 1979. 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.

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 several 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 Great Divide Resource Area (BLM Rawlins District) and Green River Resource Area (BLM Rock Springs District), the National Elk Refuge, and Jackson Ranger District of the Bridger-Teton National Forest.

Status in Southwest Wyoming: 2 extant and 1 historical records are known from the SW Wyoming study area. Occurrences are found in the Cedar Mountain/Lonetree and Jack Morrow Hills potential conservation sites.

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

Ceanothus martinii

Occurrences in Wyoming: Known from two occurrences in Wyoming, both observed since 1994.

Population Abundance: No census data are available.

Range: Peripheral; in Wyoming, known only from the Overthrust Belt and northern foothills of the Uinta Range in Lincoln and Sweetwater counties.

Trends: Not known. Cedar Mountain population has been known since 1979 and may be stable at present.

Protection Needs: One population is protected within Fossil Butte National Monument. The Cedar Mountain occurrence is on public lands managed for multiple use.

Threats: May be threatened by habitat loss from road construction, off-road vehicles, or grazing. The full extent of these threats has not been determined.

Managed Areas: Found on lands managed by the BLM Rock Springs District (Green River Resource Area) and Fossil Butte National Monument (US Park Service).

Status in Southwest Wyoming: All state occurrences are in the SW Wyoming study area. Both Wyoming occurrences are within potential conservation sites (Cedar Mountain/Lonetree and Fossil).

References: Cronquist *et al*. 1997; Hartman and Refsdal 1995; Refsdal 1996; Welsh *et al*. 1993.

Cercocarpus ledifolius var. *intricatus*

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

Population 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 District and Ashley National Forest (Flaming Gorge National Recreation Area).

Status in Southwest Wyoming: All Wyoming populations occur within the Southwest Wyoming study area. At least 2

occurrences are found in potential conservation sites (Minnies Gap and Linwood Canyon/Flaming Gorge). This species is an important winter forage species and is part of a rare community type in the state with possible significance to a number of rare animals.

References: Cronquist *et al*. 1997; Dorn 1992 b; Refsdal 1996.

Chamaechaenactis scaposa var. *parva*

Occurrences in Wyoming: Known from 5 extant occurrences (all discovered or relocated since 1995) and 1 semi-historical record (observed in 1951).

Population Abundance: Populations are typically very small in numbers and area.

Range: Variety *parva* is a regional endemic of SW Wyoming and NE Utah. The full species is also present in western Colorado and NE Arizona. In Wyoming, it is known only from the southern Green River and Washakie Basins (Sweetwater Co.).

Trends: No known.

Protection Status: Known occurrences are on public lands managed for multiple use, including oil and gas development, recreation, and livestock grazing. One occurrence is partially located within the Devils Playground/Twin Buttes Wilderness Study Area.

Threats: May be threatened by construction associated with oil and gas development.

Managed Areas: Known from lands managed by the Rock Springs BLM (Green River RA).

Status in Southwest Wyoming: The entire state population is located within the SW Wyoming study area.

References: Dorn 1992 b; Preece and Turner 1953; Refsdal 1996, Ward *et al*. 1998.

Chrysothamnus greenei

Occurrences in Wyoming: Known from 3 confirmed occurrences in Wyoming, all of which have been discovered since 1987. Delmatier (1997) reports 4 additional populations from Table Rock, South Table Mountain, Boar's Tusk, and Teapot Rock in Sweetwater County all observed in 1997.

Population Abundance: Not known.

Range: Peripheral; In Wyoming, known from the southern Washakie and Green River basins and Rock Springs Uplift in Sweetwater County and the Overthrust Belt in Lincoln County.

Trends: Not known.

Protection Status: Known populations are on public lands managed for multiple use, with an emphasis on livestock grazing, recreation, and mineral development.

Threats: Not known. This species is probably not adversely affected by grazing.

Managed Areas: Occurs on lands managed by the BLM Rawlins and Rock Springs Districts.

Status in Southwest Wyoming: All known occurrences in the state are within the SW Wyoming study area. Populations occur within the potential Fossil, Linwood Canyon/Flaming Gorge, and Powder Rim conservation sites.

Comments: This species is probably more abundant than presently recognized, partly because it blooms in late summer when field surveys are usually winding down (C. Delmatier, personal communication). The status of this plant as a "species of special concern" may need to be changed in the near future.

References: Cronquist 1994; Delmatier 1997; Dorn 1992 b; Refsdal 1996.

Cirsium aridum

Occurrences in Wyoming: Known from 11 extant occurrences in Wyoming. Reported from 6 additional sites by Fertig (1995 b), but these populations were later found to represent pubescent forms of *C. pulcherrimum* by Robert Dorn and W. Fertig (Fertig 1995 c).

Population Abundance: Fertig (1995 c) estimated the population to be 40,000-50,000 plants in an area of ca 150 acres. These estimates are probably conservative.

Range: State endemic, restricted to the Green River Basin in Sublette County, the Beaver Rim area of Fremont County, and the Sweetwater River Valley in Carbon County.

Trends: Populations are probably stable at present, although long-term trend data are lacking. This species may be capable of colonizing semi-disturbed roadsides in the Beaver Rim area and may actually be increasing locally.

Protection Status: A small portion of one population is located within the Beaver Rim ACEC, managed by the BLM Rawlins District (but located outside of the SW Wyoming study area). All other known populations are found on public lands managed for multiple use. Occurrences in Sublette County are found within active natural gas fields (Fertig 1993 b, 1994 a, 1994 b), but typically occur on slopes and dry washes that are often avoided

during construction. *C. aridum* was formerly a C2 candidate for potential listing under the Endangered Species Act.

Threats: The main threat to this species may be herbicide spraying or release of biocontrol insects intended to control populations of Canada thistle (*Cirsium arvense*) or musk thistle (*Carduus nutans*). Mineral development activities occur within much of the plant's range, but are usually confined to lower-lying areas not inhabited by the plant. Soil erosion or displacement of plants by off-road vehicles is also a potential threat. The plant is not readily grazed and does not appear to be impacted by livestock (Fertig 1995 b).

Managed Areas: Known occurrences are on lands managed by the Rawlins BLM (Lander and Great Divide RAs) and Rock Springs BLM (Pinedale RA).

Status in Southwest Wyoming: 3 of the 11 known populations of this species are found in SW Wyoming. None are found in existing or potential conservation areas in the study area.

Comments: The taxonomic placement of this species remains controversial. Fertig (1995 b) suggested that *C. aridum* may represent a gray-leaved, densely tomentose extreme of the more typically green-leaved, glabrate *C. pulcherrimum.* This view is shared by Dr. David Keil, who is currently monographing the genus *Cirsium* for the Flora of North America project (D. Keil, personal communication).

References: Dorn 1992 b; Fertig 1993 b, 1994 a, 1994 b, 1995 b, 1995 c, Fertig *et al*. 1994; Welp 1997.

Cirsium ownbeyi

Occurrences in Wyoming: Currently known from 7 extant occurrences in the state, 6 of which were discovered in 1998. An additional population reported by Goodrich and Atwood could not be relocated in 1998 but may be equivalent to a known site (Goodrich and Atwood's legal description of the site may be in error).

Population Abundance: State population estimated at 56,000-75,000 by Fertig in 1998.

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 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 District (Green River Resource Area), Flaming Gorge National Recreation Area (Ashley National Forest), and the state of Wyoming.

Status in Southwest Wyoming: The entire state population is found within the SW Wyoming study area. One population is found in the potential Little Firehole Canyon conservation site.

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

Collomia grandiflora

Occurrences in Wyoming: Known from a single report dating from 1878.

Population Abundance: Unknown; this species may not be extant in Wyoming.

Range: Peripheral; the single historical record is from "40 miles north of Granger", placing it in the Overthrust Belt area of Lincoln or Sweetwater counties.

Trends: Not known; species may be extirpated in Wyoming.

Protection Status: Populations, if still extant, may be on public lands managed for multiple use. In the absence of data, this species is considered "Status 4" (unprotected).

Threats: Not known.

Managed Areas: Not known.

Status in Southwest Wyoming: The only known report of this species in the state is from the SW Wyoming study area.

References: Dorn 1992 b; Hitchcock *et al*. 1959.

Cryptantha gracilis

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

Population 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 District (Green River Resource Area).
Status in Southwest Wyoming; Entire state range is within the SW Wyoming study area. Two occurrences are in potential conservation sites (Blacks Fork and Logan Draw).
References: Cronquist *et al*. 1984; Refsdal 1996

Cryptantha rollinsii
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.
Population 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 occurrences is within Seedskadee National Wildlife Refuge. Other populations in the state are found on public lands managed for multiple use.
Threats: Not known.
Managed Areas: Found on lands managed by the BLM Rock Springs District (Green River RA), Seedskadee National Wildlife Refuge and Flaming Gorge NRA (Ashley National Forest).
Comments: Formerly considered a C2 candidate for listing under the Endangered Species Act.
Status in Southwest Wyoming: Entire known state population is located within the SW Wyoming study area. Populations occur within the potential Little Firehole and Cedar Mountain/Lonetree conservation sites.
References: Cronquist *et al*. 1984; Dorn 1992 b; Refsdal 1996; Spackman *et al*. 1997.

Cuscuta occidentalis
Occurrences in Wyoming: Known from a single extant record (observed in 1996) and one historical record (1936) in Wyoming.
Population Abundance: Not known..
Range: Peripheral; in Wyoming, known only from the Overthrust Belt and Rock Springs Uplift in Lincoln and Sweetwater counties.
Trends: Not known.
Protection Status: One population is found within Fossil Butte National Monument.
Threats: *Cuscuta*s are considered agricultural pests and may be subject to eradication efforts.
Managed Areas: Occurs in Fossil Butte National Monument and possibly on lands managed by the BLM Rock Springs District.
Status in Southwest Wyoming: Entire state population is within the SW Wyoming study area. One occurrence is in the potential Fossil conservation site.
References: Dorn 1992 b.

Descurainia pinnata var. *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.
Population 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 Great Divide Resource Area (BLM Rawlins District), Green River Resource Area (BLM Rock Springs District), and Flaming Gorge National Recreation Area (Ashley NF), as well as state and private lands.
Status in Southwest Wyoming: All known occurrences in the state are in the SW Wyoming study area.
References: Detling 1939; Dorn 1992 b; Rollins 1993; Ward *et al*. 1998; Welsh *et al*. 1993.

Descurainia torulosa
Occurrences in Wyoming: Known from 8-11 occurrences in Wyoming, several of which are in the same general area and might be better treated as metapopulations rather than individual occurrences. One population at Carter Mountain (Park County) may not represent this species (Dorn 1989 a). Rollins (1993) recognizes only the type population (Brooks Lake, Fremont County) as authentic.
Population Abundance: The total population of this species probably numbers less than 1500 (Marrriott 1991, 1992, Fertig 1997 b). Most populations average less than 40 individuals and may be restricted to a single ledge. Numbers may vary from year to year (Dorn 1989 a).
Range: State Endemic; known from the southern Absaroka Range (Fremont, Park, and Teton counties) and Rock Springs Uplift (Sweetwater County).
Trends: Generally considered to have fluctuating population sizes, although overall the species is probably stable. Recent follow-up surveys in the BLM Rock Springs District suggest at least a severe short-term decline (B. Amidon, personal communication).
Protection Status: Both populations in the BLM Rock Springs District are within Special Status Plant ACECs, established in 1997. One population in the Absaroka Range is within the Washakie Wilderness (Fertig 1997 b). All other populations are on National Forest lands managed for multiple use. *D. torulosa* was formerly a C2 candidate for listing under the Endangered Species Act. It is listed as Sensitive by US Forest Service Regions 2 and 4.
Threats: Anthropogenic threats are minimal due to the plant's rugged habitat.
Managed Areas: Occurs on lands managed by Bridger-Teton National Forest (Buffalo RD), Shoshone NF (Wapiti and Wind River RDs), and BLM Rock Springs District (Green River RA). Reports from the BLM Worland District (Cody RA), are based on a questionable specimen.
Comments: Bricker and Brown (1998) assessed the genetic structure of populations of this and related species of *Descurainia* and concluded that *D. torulosa* should be recognized as a variety of the more widespread *D. incana*.
Status in Southwest Wyoming: Two populations are found in SW Wyoming. Both occur within the Lion Bluffs and Pine Butte potential conservation sites (these sites are already managed as ACECs).
References: Bricker and Brown 1998; Clark *et al*. 1989; Dorn 1989 a, 1992 b; Fertig 1992 a, 1992 c, 1995 f, 1997 b; Fertig *et al*. 1994; Marriott 1988 a, 1991, 1992; Mills and Fertig 1996; Rollins 1983, 1993; Scott 1997; USDA Forest Service 1989, 1991.

Downingia laeta
Occurrences in Wyoming: Known from 3 occurrences in Wyoming, two of which have not been observed since 1954. The most recent observation is from 1973.
Population Abundance: Not known.
Range: Peripheral; in Wyoming known from the Laramie Basin in Albany County and the vicinity of Evanston in Uinta County.
Trends: Unknown.
Protection Status: All known populations are on state or public lands managed for multiple use. One population on state lands in Albany County (outside the SW Wyoming study area) is within the "Sand Creek special geologic features area", but receives no special management.
Threats: Not known. May be affected by land activities influencing wetlands or water quality.
Managed Areas: May occur on lands managed by the BLM Rock Springs District (Kemmerer RA).
Status in Southwest Wyoming: One historical population near Evanston is known from the study area.
References: Dorn 1992 b.

Draba juniperina
Occurrences in Wyoming: Known from 14 occurrences in Wyoming, all observed since 1977 (4 have been discovered or relocated since 1995).
Population 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 District 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.

Status in Southwest Wyoming: The entire state range of this species is within the SW Wyoming study area. Several populations occur within potential conservation sites at Iron Mountain, Minnies Gap, and Richard's Gap.

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

Elymus simplex

Occurrences in Wyoming: This taxon is known from approximately 20 collections in Wyoming, at least 14 of which are historical (Hatch 1976). There are only 3 recent collections in the Rocky Mountain Herbarium, although this may reflect undersampling rather than rarity.

Population Abundance: Not known. Populations may be locally numerous on sand dune habitats, but reliable census information is lacking.

Range: Regional endemic of the Green River Valley and adjacent southern Wyoming and northwest Colorado (Cronquist *et al*. 1977; Hatch 1976). In Wyoming, it is known primarily from the Green River, Great Divide, and Laramie Basins (Albany and Sweetwater counties), with additional reports from the southern Powder River Basin (Natrona County) and Crook County (Dorn 1992 b; Hallsten *et al*. 1987; Hartman and Nelson 1995; Hatch 1976).

Trends: Not known.

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

Threats: May be negatively impacted by recreational activities on sand dune habitats. Effects of grazing on this rhizomatous species is not known.

Managed Areas: Known to occur on lands managed by the BLM Rock Springs District. Other populations may occur on Flaming Gorge National Recreation Area and the BLM Casper District.

Status in Southwest Wyoming: Most of this species range is within SW Wyoming in the state. Populations may occur within the potential Jack Morrow Hills conservation site.

Comments: Little is known about the abundance of this species in Wyoming. It has often been confused with *Elymus salinus* in the literature. *E. simplex* can be recognized by its long rhizomes, shorter height, and sandy riverbank or clayey soil habitat, while *E. salinus* is typically a tall bunchgrass found on loamy soils of rocky slopes and hills (Cronquist *et al*. 1977; Hatch 1976). Dorn (1992) recognizes 2 varieties of *E. simplex* in Wyoming based on differences in floret and awn length, but these differences seem to be of limited taxonomic value (Cronquist *et al*. 1977).

References: Cronquist *et al*. 1997; Dorn 1992 b; Hallsten *et al*. 1987; Hartman and Nelson 1995; Hatch 1976.

Ephedra viridis

Occurrences in Wyoming: Known from 4 records in Wyoming, 3 of which have been observed since 1979 (the most recent in 1997).

Population Abundance: Known populations are very small, often with fewer than 100-150 individuals. The amount of suitable habitat appears to be quite limited in Wyoming.

Range: Peripheral; in Wyoming, known only from the Rock Springs Uplift and the northern foothills of the Uinta Range near the Utah/Wyoming border in Sweetwater County.

Trends: Not known.

Protection Status: One occurrence is found within the BLM Red Creek ACEC (and the Red Creek Badlands Wilderness Study Area). All other populations are on public lands managed for multiple use.
Threats: May be over-collected for medicinal uses. Habitat may be impacted by high use of off-road vehicles.
Managed Areas: All known sites in Wyoming are on lands managed by the BLM Rock Springs District. Potential habitat may occur on Flaming Gorge NRA (Ashley National Forest).
Status in Southwest Wyoming: Entire state population is located within the SW Wyoming study area in the Cedar Mountain/Lonetree, Minnies Gap, and Iron Mountain potential conservation sites.
References: Cronquist *et al*. 1972; Cutler 1939.

Eriastrum wilcoxii
Occurrences in Wyoming: Known from 7 occurrences in Wyoming, all located since 1973 (with 5 occurrences being found since 1992).
Population Abundance: Individual populations apparently are small and often restricted to suitable microsites.
Range: Peripheral; in Wyoming known from the Wind River and Green River basins in Fremont and Sweetwater counties.
Trends: Probably stable, at least in recent times.
Protection Status: One occurrence is found on Seedskadee National Wildlife Refuge. All other populations are on public lands managed for multiple use.
Threats: May be threatened by trampling from off-road vehicles in sand dune areas. Otherwise, threats appear to be low.
Managed Areas: Found on lands managed by the BLM Rawlins and Rock Springs districts and Seedskadee NWR.
Status in Southwest Wyoming: Five of the 7 known occurrences in the state are within the study area.
References: Cramer and Hartman 1996; Harrison 1972; Jones and Fertig 1996; Mason 1945; Nelson 1902; Welp 1997.

Erigeron consimilis
Occurrences in Wyoming: Known from 5 occurrences in Wyoming, all of which have been documented or relocated since 1980.
Population Abundance: No census information is available, but at one site the species was described as "frequent to infrequent".
Global Range: Regional endemic of eastern Utah, southern Wyoming, and Arizona. In Wyoming, it is restricted to the Washakie Basin, Powder Rim, and Rock Springs Uplift area in Sweetwater County.
Trends: Not known.
Protection Status: All known populations are found on public lands managed for multiple use, including livestock grazing, mineral development, and recreation.
Threats: Several subpopulations in the Powder Rim area are found within a large oil and natural gas field. Possible impacts from mineral development are poorly known.
Managed Areas: Found on lands managed by the Rawlins and Rock Springs Districts, BLM.
Status in Southwest Wyoming: The entire state population is found in the SW Wyoming study area. Populations are found in the Cherokee Basin/Cherokee Rim and Powder Rim potential conservation sites.
References: Dorn 1992 b; Ward *et al*. 1998; Welsh *et al*. 1993.

Eriogonum corymbosum var. *corymbosum*
Occurrences in Wyoming: Known from 6 extant populations, 3 of which have been discovered or relocated since 1991.
Population Abundance: No census data are available, but the species has been described as "common" to "occasional" at different sites.
Range: Peripheral; in Wyoming, known from the Rock Springs Uplift and Washakie Basin in Sweetwater County.
Trends: Not known.
Protection Status: Two populations are found in the BLM Red Creek ACEC. All other occurrences are on public lands managed for multiple use.
Threats: Not known.
Managed Areas: Found on land managed by the BLM Rock Springs District.
Status in Southwest Wyoming: The entire state range is within the SW Wyoming study area. One occurrence is in the Richard's Gap potential conservation site.
References: Dorn 1992 b; Nelson 1904; Ward *et al*. 1998.

Eriogonum divaricatum

Occurrences in Wyoming: Known from 5 extant populations (4 located since 1995) and 3 historical collections. Two additional obscure historical reports need to be confirmed.

Population Abundance: Populations may be locally abundant, numbering in the hundreds to low thousands. Colonies may be restricted to specialized microhabitats and occupy small areas (Jones and Fertig 1996).

Range: Peripheral; In Wyoming, known only from the Green River and Great Divide basins in Lincoln, Sublette, Sweetwater, and Uinta counties.

Trends: Not known. As a desert annual, this species may appear to fluctuate in abundance from year to year based on seasonal moisture (Jones and Fertig 1996).

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

Threats: Populations may occur in the vicinity of oil and gas developments, but impacts are not known.

Managed Areas: Occurs on lands managed by the BLM Rock Springs District.

Status in Southwest Wyoming: The entire state range of this species is within the SW Wyoming study area. Populations occur within the Hickey Mountain-Sage Creek Mountain and Jack Morrow Hills potential conservation sites.

References: Cramer and Hartman 1996; Dorn 1992 b; Jones and Fertig 1996.

Eriogonum hookeri

Occurrences in Wyoming: Known from a single extant population, discovered by Tom Cramer in 1995 (Cramer and Hartman 1996). Previously it was ranked "SH" (state historical) based on 2 records observed between 1897-1907.

Population Abundance: Not known.

Range: Peripheral; in Wyoming, known only from the Green River and Great Divide basins and Rock Springs Uplift (Carbon and Sweetwater counties).

Trends: Unknown.

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

Threats: Not known, although the single extant population is found within an active oil and natural gas producing area.

Managed Areas: Known from lands managed by the BLM Rock Springs District. May also occur on the BLM Rawlins District.

Status in Southwest Wyoming: Two populations are known from the study area in SW Wyoming.

References: Cramer and Hartman 1996; Dorn 1992 b; Welp 1997.

Galium coloradoense

Occurrences in Wyoming: Known from 5 extant occurrences in Wyoming, all observed since 1970 (with 3 being discovered or relocated since 1991).

Population Abundance: Not known, but probably small.

Range: Peripheral; in Wyoming known only from the Washakie Basin and Rock Springs Uplift in Sweetwater County.

Trends: Unknown.

Protection Status: One occurrence is in the Red Creek ACEC. All other known populations are on public lands managed for multiple use.

Threats Disturbances associated with oil and gas development may be a threat.

Managed Areas: Occurs on lands managed by the BLM Rawlins and Rock Springs districts.

Status in Southwest Wyoming: Entire state population is found in the SW Wyoming study area. One occurrence is within the Richard's Gap potential conservation site.

References: Dorn 1992 b; Welsh *et al*. 1993.

Glossopetalon spinescens var. *meionandrum*

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

Population 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 flood control, recreation, livestock grazing, and mineral development.

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 District (Green River RA) and Ashley National Forest (Flaming Gorge NRA).
Status in Southwest Wyoming: All known populations in the state are in the SW Wyoming study area. Two occurrences are within potential conservation sites (Little Firehole Canyon and Linwood Canyon/Flaming Gorge).
References: Cronquist *et al*. 1997; Dorn 1992 b; Welsh *et al*. 1993.

Haplopappus macronema var. *linearis*
Occurrences in Wyoming: Known from 16 extant occurrences in Wyoming, all of which have been discovered or relocated since 1981. Also known from at least 6 historical records, several of which are too vague to be located.
Population Abundance: Census data are lacking for most occurrences, but those populations that have been surveyed are usually very small in number and area. Populations in the Gros Ventre River drainage typically contain 12-2000 individuals in areas of 0.5-10 acres.
Range: Regional endemic of western Wyoming and southwestern Montana. In Wyoming, known only from the southern Absaroka Range, northern Wind River Range (Gros Ventre River drainage), Yellowstone Plateau, and Overthrust Belt in Fremont, Lincoln, Park, and Teton counties.
Trends: Apparently stable, although trend data are lacking for most occurrences.
Protection Status: At least 5 occurrences are known from designated Wilderness areas on Shoshone and Bridger-Teton National Forests. One occurrence is also protected in Yellowstone National Park. All other populations are on public lands managed for multiple use. Listed as Sensitive by US Forest Service Region 4.
Threats: Threats are probably low at sites on Bridger-Teton National Forest. The species is not preferred browse and may benefit from low level disturbance associated with recreational activities. Some populations could be impacted by mineral exploration and development on erosive soils (Fertig 1996 c).
Managed Areas: Found on lands managed by Bridger-Teton and Shoshone NF, Yellowstone NP, Wind River Indian Reservation, and Rock Springs BLM (Kemmerer RA).
Comments: Designated as Sensitive by USFS Region 4 in 1994. Recommended for dropping from Sensitive status by Fertig (1996 c).
Status in Southwest Wyoming: One extant and one vague historical record are known from the study area (Fertig 1996 c; Refsdal 1996).
References: Anderson 1995; Cronquist 1955, 1994; Dorn 1992 b; Fertig 1996 c; Fertig *et al*. 1991, 1994; Hall 1928; Hartman *et al*. 1991; Mills and Fertig 1996; Nesom 1990; Refsdal 1996; Scott 1997; Winkler and Wambolt 1991.

Hesperochiron californicus
Occurrences in Wyoming: Known from one extant occurrence, discovered in 1995 by Steve Laster and Tom Cramer (Cramer and Hartman 1996). Previously, this species was known from a single historical report in 1898.
Population Abundance: Several thousand plants observed at the Hay Gulch site by Laster and Fertig in 1998.
Range: Peripheral; in Wyoming known only from the Evanston area (Uinta County) and the upper Green River Basin in Sublette County.
Trends: Not known.
Protection Status: Occurs on public lands managed for multiple use (primarily early summer livestock grazing).
Threats: The Hay Gulch population does not appear to be negatively impacted by short-term, heavy cattle grazing in early summer.
Managed Areas: Found on lands managed by the BLM Rock Springs District.
Status in Southwest Wyoming: The entire state range is within the SW Wyoming study area. The Sublette County population is in the Hay Gulch potential conservation site.
References: Cramer and Hartman 1996; Dorn 1992 b.

Ipomopsis polycladon
Occurrences in Wyoming: Known from 2 occurrences, both observed since 1995.
Population 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/Rock Springs Uplift area of Sweetwater County.
Trends: Not known.
Protection Status: Both known occurrences are found within Flaming Gorge National Recreation Area, and are

managed primarily for recreation and flood control.
Threats: Not known.
Managed Areas: Occurs in Flaming Gorge National Recreation Area (Ashley National Forest).
Status in Southwest Wyoming: The entire known state distribution is limited to the SW Wyoming study area. One occurrence is in the Blacks Fork potential conservation site.
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; Refsdal 1996; Welsh *et al*. 1993.

Lathyrus lanszwertii var. *lanszwertii*
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.
Population 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 Rock Springs District (Kemmerer Resource Area) and the Wasatch-Cache National Forest (Mountain View Ranger District).
Status in Southwest Wyoming: All confirmed occurrences in the state are within the SW Wyoming study area.
References: Barneby 1989; Dorn 1992 b; Refsdal 1996; Welsh *et al*. 1996.

Lepidium integrifolium var. *integrifolium*
Occurrences in Wyoming: Known from 2 occurrences in the state, the most recent observed in 1996.
Population Abundance: Not known.
Range: Regional endemic of southwestern Wyoming and northeastern Utah. In Wyoming, known only from the Overthrust Belt in Lincoln County.
Trends: Not known. The Fossil Butte population was first documented in the 1880s and was relocated in 1996.
Protection Status: One population is protected in Fossil Butte National Monument. The other Wyoming occurrence is on public land managed for multiple use.
Threats: This species occurs in saline meadows that may have been seriously impacted by a century of human development. Many populations in Utah are thought to be extirpated.
Status in Southwest Wyoming: The entire known state distribution is restricted to the SW Wyoming study area. The Fossil Butte population is within the potential Fossil conservation site.
References: Fertig 1995 g; Hitchcock 1936; Rollins 1993.

Lepidium montanum var. *alyssoides* [*L. alyssoides*]
Occurrences in Wyoming: Known from one occurrence, most recently observed in 1987.
Population Abundance: No population data are available, but the species has been reported as "common".
Range: Peripheral; in Wyoming, known from the Green River Basin near Big Piney/Marbleton (Sublette County).
Trends: Not known, but presumed to be stable.
Protection Status: Occurs on public lands managed for multiple use.
Threats: The roadside habitat of this species makes it potentially vulnerable to disturbance or herbicide spraying. Better life history information is needed, however, to determine if this species is actually semi-weedy and adapted to disturbances.
Managed Areas: The known occurrence is on lands managed by the Rock Springs BLM (Pinedale RA).
Status in Southwest Wyoming: Entire state range is within the SW Wyoming study area.
References: Dorn 1992 b; Rollins 1993.

Leptodactylon watsonii
Occurrences in Wyoming: Known from 4 occurrences in Wyoming, all of which have been relocated or discovered since 1984 (3 have been observed since 1991).

Population 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.
Occurrences in Southwest Wyoming: Known from one occurrence in the SW Wyoming study area in the Linwood Canyon/Flaming Gorge potential conservation site.
References: Cronquist *et al*. 1984; Dorn 1992 b; Hartman *et al*. 1985.

Lesquerella alpina var. *parvula*
Occurrences in Wyoming: Known from 8 extant populations in Wyoming, all located since 1979.
Population Abundance: Not known, but usually described as "local" or "low" at known sites.
Range: Regional endemic of north-central Colorado, northeast Utah, and southern Wyoming. In Wyoming, known from the Green River Basin, Sierra Madre, and Uinta Range in Carbon, Sweetwater, and Uinta counties.
Trends: Not known.
Protection Status: One population on Cedar Mountain is within the Special Status Plant ACEC established by the BLM for *Thelesperma pubescens*. All other occurrences are on public lands managed for multiple use.
Threats: Populations may be vulnerable to surface disturbances along rim areas.
Managed Areas: Occurs on lands managed by the BLM Rock Springs District. The Carbon County occurrence is in a private inholding within Medicine Bow National Forest.
Status in Southwest Wyoming: Seven of the known occurrences in the state are in the SW Wyoming study area. Several populations are in potential conservation sites at Cedar Mountain/Lonetree and Hickey Mountain/Sage Creek Mountain.
References: Hartman and Refsdal 1995; Refsdal 1996; Rollins 1993; Rollins and Shaw 1973.

Lesquerella macrocarpa
Occurrences in Wyoming: Known from 9 occurrences in Wyoming, 6 of which have been discovered or relocated since 1994.
Population Abundance: Populations range in size from several hundred to tens of thousands of individuals. Area ranges from 80 to over 1000 acres (Marriott 1988 a). Total population size estimated at ca 52,000 plants in 1994 covering an area of 2079 acres (Fertig 1995 a).
Range: State endemic known only from the Bush Rim/Continental Peaks area (Fremont & Sweetwater cos.), Roberson Creek (Lincoln County), and Ross Butte area (Sublette Co.).
Trends: Population trend data are limited, but most occurrences are probably stable over the long term. Annual fluctuations are probably common and depend on seedling survival rates.
Protection Status: Two populations are found in the Steamboat ACEC managed by the BLM Rock Springs District. Two other occurrences are located in the Honeycomb Buttes Wilderness Study Area. All other known populations are found on public lands managed for multiple use, including recreation, livestock grazing, and mineral development. *L. macrocarpa* was formerly a C2 candidate for listing under the Endangered Species Act.
Threats: Whiskey Basin Consultants (1981) listed trampling by wild horses and off-road vehicles as potential threats. Marriott (1988 a) and Fertig (1995 a) found the threat from horses to be largely unfounded. Surface disturbances associated with oil and gas exploration are potential threats, although many populations occur on unstable shrink-swell clay flats and slopes that are unsuited for roads or permanent structures.
Managed Areas: Occurs on lands managed by the Rock Springs BLM (Green River, Pinedale, and Kemmerer Resource Areas).
Status in Southwest Wyoming: The entire state and global range of this species is restricted to the SW Wyoming study area. Several populations occur within the Jack Morrow Hills, Oregon Buttes/Continental Peak, and Ross Butte/Ross Ridge potential conservation sites.
References: Clark and Dorn 1981; Cramer and Hartman 1995, 1996; Dorn and Dorn 1980; Dorn 1992 b; Fertig 1995 a,

1998 b; Fertig *et al*. 1994; Jones and Fertig 1996; Lichvar *et al*., no date; Marriott 1988 a; Nelson 1902; Payson 1921; Rollins 1993; Rollins and Shaw 1973; Welp 1997; Weynand and Amidon 1990; Whiskey Basin Consultants 1981.

Lesquerella multiceps
Occurrences in Wyoming: Known from 2 records in Wyoming, the most recent dating from 1964.
Population Abundance: Not known.
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 known populations in Wyoming are on public lands managed for multiple use. This species has been recommended for Sensitive status in US Forest Service Region 4.
Threats: Not known.
Managed Areas: Found in Targhee National Forest (the WY portion managed by Bridger-Teton NF) and the BLM Rock Springs District (Kemmerer RA).
Status in Southwest Wyoming: One population is found in the SW Wyoming study area.
References: Markow and Fertig 1993; Rollins 1993; Rollins and Shaw 1973.

Lesquerella prostrata
Occurrences in Wyoming: Known from 3 extant occurrences in Wyoming (all observed since 1995) and 2 somewhat vague historical records.
Population Abundance: Population data are available from only 2 locations, but suggest that the species may be locally numerous in small microhabitats. Additional undersurveyed habitat is present in the southern Overthrust Belt region southeast of Evanston.
Range: Regional endemic of southwest Wyoming and adjacent Idaho and Utah. In Wyoming, known only from the Overthrust Belt area and Bridger Basin in Lincoln and Uinta counties.
Trends: Trend data are lacking, but known occurrences are found largely in areas with low threats or little signs of habitat loss, suggesting a stable trend.
Protection Status: All known populations are found on public lands managed for multiple use.
Threats: Development activity is generally low in the microhabitats occupied by the species. Increased oil and gas exploration in its habitat may become a greater threat. Populations are often found on steep slopes or unstable soils making the sites less suitable for well siting and pipeline/road construction.
Managed Areas: Occurs on lands managed by the BLM Rock Springs District.
Status in Southwest Wyoming: Entire state range is found in the SW Wyoming study area. Three populations are found in potential conservation sites (Bridger Butte, Fossil, and The Boilers).
References: Dorn 1992 b; Nelson 1899 a; Refsdal 1996; Rollins 1993; Rollins and Shaw 1973.

Loeflingia squarrosa var. *artemisiarum*
Occurrences in Wyoming: Known from only one vague, probably historical report cited by Barneby and Twisselmann (1970).
Population Abundance: Not known, may be extirpated.
Range: Peripheral; in Wyoming, known only from the Green River Basin "26 miles east of Farson" (probably in Sweetwater County).
Trends: Not known.
Protection Status: May occur on public lands managed by the BLM for multiple use [but ranked as Status 4 due to inadequate information].
Threats: Not known.
Managed Areas: May be on lands managed by the BLM Rock Springs District (Green River Resource Area).
Status in Southwest Wyoming: Entire state range is within the SW Wyoming study area.
References: Barneby and Twisselmann 1970; Dorn 1992 b.

Lomatium triternatum var. *anomalum*
Occurrences in Wyoming: Known from at least 2 extant populations in Wyoming, both observed since 1996. Dr. Ron Hartman (Rocky Mountain Herbarium) has been studying this taxon and may have additional locations and information.
Population Abundance: Not known.

Range: Regional endemic of southern Idaho and northeastern Oregon, with outlying populations in northeast Utah and southwestern Wyoming (Overthrust Belt of Lincoln County).
Trends: Not known.
Protection Status: One population is protected within Fossil Butte National Monument. All other known populations are on public lands managed for multiple use.
Threats: Not known.
Managed Areas: Occurs on lands managed by the BLM Rock Springs District (Kemmerer RA) and Fossil Butte National Monument.
Status in Southwest Wyoming: Entire state distribution is within the SW Wyoming study area. The Fossil Butte population is within the Fossil potential conservation site.
References: Cronquist *et al*. 1997; Dorn 1992 b.

Monolepis pusilla
Occurrences in Wyoming: Known from 5 extant locations, (4 have been discovered since 1981), and 1 historical report.
Population Abundance: Not known.
Range: Peripheral; known from the Bighorn, Green River, and Great Divide basins and the Rock Springs Uplift in Washakie and Sweetwater counties.
Trends: Not known.
Protection Status: One population on state lands in Sweetwater County is adjacent to Seedskadee National Wildlife Refuge. All known occurrences are on public lands managed for multiple use.
Threats: May be impacted by ORV activity on stabilized sand dunes.
Managed Areas: Occurs on lands managed by the BLM Worland District (Bighorn Basin Resource Area) and the BLM Rock Springs District (Green River Resource Area).
Status in Southwest Wyoming: Four populations are found in the SW Wyoming study area.
References: Dorn 1992 b; Jones and Fertig 1996; Standley 1916.

Muhlenbergia glomerata
Occurrences in Wyoming: Known from 6 extant records (most recent is from 1997) and 1 historical report in Wyoming.
Population Abundance: Census data are lacking for most sites, but populations appear to be highly restricted to specialized habitats.
Range: Peripheral; in Wyoming, known from the Black Hills, Yellowstone Plateau, Southeastern Plains, Green River Basin, Clarks Fork Valley, and Jackson Hole (Crook, Goshen [?], Park, Sublette, and Teton counties, and Yellowstone National Park).
Trends: Not known.
Protected Status: Listed as Sensitive by US Forest Service Region 2. Protected populations occur in the Swamp Lake Special Botanical Area (Shoshone NF), National Elk Refuge, and Yellowstone National Park.
Threats: May be threatened by changes in hydrology, grazing, or competition from exotics.
Managed Areas: Occurs on lands managed by Black Hills and Shoshone National Forests, National Elk Refuge, Yellowstone National Park, and the BLM Rock Springs District.
Status in Southwest Wyoming: One population is known from BLM lands in Sublette County within the study area.
References: Dorn 1992 b; Fertig and Jones 1992; Fertig 1993 a, 1995 f, 1998 a; Fertig *et al*. 1994; Hallsten *et al*. 1987; Mills and Fertig 1996.

Opuntia erinacea var. *utahensis*
Occurrences in Wyoming: Reported for Wyoming by Benson (1982), but exact locations are not known.
Population Abundance: Not known.
Range: Peripheral; reported for Sweetwater County by Benson (1982).
Trends: Not known.
Protection Status: Not known.
Threats: Not known.
Managed Areas: May occur on lands managed by the BLM Rock Springs District.
Status in Southwest Wyoming: Entire state range is within the SW Wyoming study area.
References: Benson 1982; Dorn 1992 b.

Opuntia polyacantha var. *juniperina*
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).
Population 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 Seedskadee 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 Rock Springs District (Kemmerer Resource Area), and Seedskadee National Wildlife Refuge. One population is in the Blacks Fork Potential Conservation Site.
Status in Southwest Wyoming: Entire state range is within the SW Wyoming study area. One population is in the Blacks Fork potential conservation site.
References: Benson 1982; Cramer and Hartman 1996; Dorn 1992 b; Refsdal 1996.

Opuntia polyacantha var. *rufispina*
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).
Population 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 Rock Springs District (Green River and Kemmerer Resource Areas), the BLM Rawlins District (Great Divide Resource Area), and Ashley National Forest (Flaming Gorge National Recreation Area).
Status in Southwest Wyoming: The entire state population is located in the SW Wyoming study area.
References: Benson 1982; Refsdal 1996; Ward *et al*. 1998.

Oryzopsis swallenii
Occurrences in Wyoming: Known from 10 extant locations in Wyoming, 6 of which have been discovered since 1993.
Population Abundance: Not known.
Range: Regional endemic of southern Idaho and western Wyoming. In Wyoming, known only from the western Green River Basin in Lincoln and Sublette Counties.
Trends: Not known.
Protection Status: All known occurrences are on state or public lands managed for multiple use.
Threats: Most occurrences are found on ridge crests within active oil and natural gas fields. Most of these sites are probably not threatened due to their proximity to unstable slopes. Impacts from grazing are not known.
Managed Areas: Occurs on land managed by the BLM Rock Springs District (Pinedale, Green River and Kemmerer Resource Areas) and on state and private land.
Status in Southwest Wyoming: Entire state range is within the SW Wyoming study area. Two populations occur in potential conservation sites in La Barge and Ross Butte/Ross Ridge.
References: Cramer and Hartman 1996; Hartman and Nelson 1993; Hitchcock and Spellenberg 1968; Kass 1993; Reveal 1980.

Oxytheca dendroidea
Occurrences in Wyoming: Known from only 3 historical records in Wyoming, all observed from 1873-1922.
Population Abundance: No extant populations are known in Wyoming.
Range: Peripheral; in Wyoming known only from the Green River Basin (Sweetwater or Sublette counties), Owl Creek Range (Hot Springs County), and South Pass area (Fremont County).
Trends: Not known, may be extirpated?
Protection Status: Known locations are from public lands managed for multiple use.
Threats: Not known.

Managed Areas: Historical occurrences are probably from lands managed by the BLM Rock Springs, Rawlins, and Worland districts.
Status in Southwest Wyoming: One occurrence is found in the SW Wyoming study area.
References: Dorn 1992 b; Ertter 1980; Jones and Fertig 1996.

Oxytropis besseyi var. *obnapiformis*
Occurrences in Wyoming: Known from 4 extant populations in Wyoming, 3 of which have been observed since 1981.
Population Abundance: Populations in the Beaver Rim area contained 300-550 plants in 1997. Population data are not available for other populations.
Range: Regional endemic of northwest Colorado and southwest Wyoming. In Wyoming, it is known from the Bridger and Green River basins and Beaver Rim area of Fremont, Sweetwater, and Uinta counties. Reports from the Bighorn Range (Porter 1947) have proven to be erroneous.
Trends: Not known.
Protection Status: All Wyoming populations are on public lands managed for multiple use. One occurrence is just outside the Beaver Rim ACEC in Fremont County.
Threats: Not known.
Managed Areas: Occurs on land managed by the BLM Rawlins District (Lander Resource Area) and the BLM Rock Springs District (Kemmerer Resource Area).
Status in Southwest Wyoming: Two populations are found in the SW Wyoming study area in the Bridger Butte and Henry's Fork at McKinnon potential conservation sites.
References: Barneby 1989; Dorn 1992 b; Porter 1947.

Penstemon acaulis var. *acaulis*
Occurrences in Wyoming: Known from 3 occurrences consisting of 6 subpopulations in Wyoming. The most recent observation was in 1995.
Population Abundance: Individual populations are typically small, consisting of 30-200 plants.
Range: Regional endemic of northwestern Colorado, northeast Utah, and southwest Wyoming. In Wyoming, known only from the northern foothills of the Uinta Range in Sweetwater County.
Trends: Not known.
Protection Status: Two occurrences are on public lands managed for multiple use (grazing, recreation, and mineral exploration). One other occurrence is on private land with multiple owners. *P. acaulis* was formerly a C2 candidate for listing under the Endangered Species Act and is listed as Sensitive by US Forest Service Region 4.
Threats: Threatened by disturbances associated with gravel quarrying and recreational vehicles.
Managed Areas: Occurs on lands managed by the BLM Rock Springs District.
Status in Southwest Wyoming: Entire state range is within the SW Wyoming study area. One population is within the potential Henry's Fork at McKinnon conservation site.
References: Clark and Dorn 1979; Dorn 1992 b; Dorn and Dorn 1980; Fertig *et al*. 1994; Keck 1937; Marriott 1988 a; Refsdal 1996; Welsh *et al*. 1993; Weynand and Amidon 1990.

Penstemon gibbensii
Occurrences in Wyoming: Known from 3 occurrences in Wyoming, all of which were surveyed in 1995.
Population Abundance: Fertig and Neighbours (1996) surveyed 8600-8900 plants in Wyoming in 1995. Previous studies by Dorn (1989) placed the population at 3900-4200 plants. At present, the total area occupied by this species in Wyoming is about 62 acres.
Range: Regional endemic of south-central Wyoming, northeast Utah, and northwest Colorado. In Wyoming, known only from the Washakie Basin and Flattop Mountain areas in Carbon and Sweetwater counties.
Trends: Long-term trend data are lacking, but the species appears to be stable to slightly increasing at present. This may reflect short-term responses to favorable climate conditions in the last few years. Overall, the species may be losing some habitat to development.
Protection Status: The BLM has built an exclosure around one site to study the plant's response to grazing and disturbance (Warren 1992). This area is managed as a "No-Surface Occupancy" site rather than an ACEC in the Great Divide Resource Area management plan (USDI Bureau of Land Management 1988). All other known populations in Wyoming are on public lands managed for multiple use (primarily oil and gas development and grazing). The Utah/Colorado population is in the Brown's Park National Wildlife Refuge. *P. gibbensii* was formerly a C2 candidate for listing under the Endangered Species Act.

Threats: Grazing, mineral development, and recreation are the primary threats. This species often occurs on steep slopes prone to soil erosion. Natural phenomena, such as grazing by deer and drought, may be equally significant.
Managed Areas: Occurs on lands managed by the BLM Rawlins District.
Status in Southwest Wyoming: The entire state population is within the SW Wyoming study area. Populations occur within the Cherokee Basin/Cherokee Rim and Flat Top Mountain potential conservation sites.
References: Dorn 1982, 1989 b, 1992 b; Dorn and Lichvar 1990; Fertig and Neighbours 1996; Fertig *et al*. 1994; O'Kane 1988; Spackman *et al*. 1997; Warren 1992; Welsh *et al*. 1993; Whiskey Basin Consultants 1982

Penstemon pachyphyllus var. *mucronatus*
Occurrences in Wyoming: Known from 15 extant occurrences (12 of which have been discovered or relocated since 1980) and 3 historical records.
Population 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 districts.
Status in Southwest Wyoming: All but one occurrence in the state are found in the SW Wyoming study area. Populations occur in the potential Linwood Canyon/Flaming Gorge, Iron Mountain, Flat Top Mountain, and Minnies Gap conservation sites.
References: Cronquist *et al*. 1984; Dorn 1992 b; Refsdal 1996; Ward *et al*. 1998.

Penstemon scariosus var. *garrettii*
Occurrences in Wyoming: Known from at least one occurrence in Wyoming, first discovered in 1995 (Refsdal 1996). Several additional populations may have been discovered by Fertig in 1998, but corroboration of the specimens is still needed.
Population Abundance: Not known.
Range: Regional endemic; in Wyoming, known only from the desert foothills of the Uinta Range in Uinta County. Additional populations may be found in the Little Mountain area of Sweetwater County.
Trends: Not known.
Protection Status: Confirmed populations are found on public lands managed for multiple use. Populations believed to represent this species in the Little Mountain area are within the BLM Sage Creek ACEC.
Threats: Occurs in habitats being developed for natural gas, where it may be impacted by surface disturbances from vehicles.
Managed Areas: Found on lands managed by the BLM Rock Springs District.
Status in Southwest Wyoming: Entire state range is within the SW Wyoming study area. One occurrence is in the Hickey Mountain/Lonetree site.
References: Cronquist *et al*. 1984; Refsdal 1996.

Penstemon watsonii
Occurrences in Wyoming: Known from a single historical record in Wyoming, last observed in 1873 (Pennell 1920).
Population Abundance: Unknown; may be extirpated in Wyoming.
Range: Peripheral; in Wyoming known only from the Bridger Basin (Uinta County).
Trends: Unknown; may be extirpated.
Protection Status: The only known occurrence is probably on state park lands or public lands managed for multiple use [considered Status 4 due to lack of information].
Threats: Not known.
Managed Areas: May occur on lands managed by the BLM Rock Springs District or the state of Wyoming (Fort Bridger State Historic Site).
Status in Southwest Wyoming: Entire state range is within the SW Wyoming study area.
References: Cronquist *et al*. 1984; Dorn 1992 b; Pennell 1920; Welsh *et al*. 1993.

Phacelia demissa

Occurrences in Wyoming: Known from 4 extant sites, 3 of which were discovered or relocated in 1995.

Population Abundance: Population estimated at 7500-14,000 plants at 3 sites in 1995 (Jones and Fertig 1996). Populations may be locally abundant, although limited to specialized microhabitats.

Range: Regional endemic of northeast Utah and southwest Wyoming. In Wyoming known from the Great Divide Basin in Sweetwater and Fremont counties.

Trends: Not known. Populations may fluctuate annually in response to spring precipitation (Jones and Fertig 1996).

Protection Status: One occurrence is within the Honeycomb Buttes Wilderness Study Area. All other populations are on public lands managed for multiple use, including livestock grazing, mineral development, and recreation.

Threats: May be impacted by surface disturbances associated with off-road vehicles.

Managed Areas: Occurs on land managed by the BLM Rock Springs District (Green River Resource Area).

Status in Southwest Wyoming: Entire state range is in the SW Wyoming study area. Populations occur in the Jack Morrow Hills and Oregon Buttes potential conservation sites.

References: Cronquist *et al*. 1984; Dorn 1992 b; Howell 1943; Jones and Fertig 1996; Lichvar *et al*. (no date); Welp 1997; Welsh *et al*. 1993.

Phacelia glandulosa var. *deserta*

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

Population 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.

Range: Apparently endemic to Wyoming, although populations may also occur in northeast Utah. In Wyoming, it is known from the Green River Basin in Lincoln, Sublette, and Sweetwater counties. A recent collection from the Washakie Basin in eastern Sweetwater County may also represent this taxon.

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 Rock Springs District and Ashley National Forest (Flaming Gorge National Recreation Area). May also occur on the BLM Rawlins District.

Status in Southwest Wyoming: Entire state range is within the SW Wyoming study area. Populations occur within the potential Blacks Fork, Logan Draw, and Ross Butte/Ross Ridge conservation sites.

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 (1998-99, in preparation) 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, 1998-99 (in preparation); Nelson 1898; Refsdal 1996; Ward *et al*. 1998.

Phacelia incana

Occurrences in Wyoming: Known from 6 extant locations (5 of which have been discovered since 1995) and 2 vague historical records.

Population 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 District (Green River Resource Area) and Ashley National Forest (Flaming Gorge National Recreation Area). The Carbon County population may be on lands managed by the BLM Rawlins District.

Status in Southwest Wyoming: All known extant populations in the state are in the SW Wyoming study area.

Populations occur in the Little Firehole and Blacks Fork potential conservation sites.
References: Cronquist *et al*. 1984; Dorn 1992 b; Refsdal 1996; Welp 1997.

Phacelia salina
Occurrences in Wyoming: Known from 7 extant occurrences (6 of which have been found since 1995) and one historical record in Wyoming.
Population Abundance: Not known. This species appears to be an ephemeral annual that probably flowers only in favorably moist years. It also appears to have a narrow ecological amplitude. The largest known surveyed population had 75-100 plants in 1997 (Fertig 1998 b).
Range: Peripheral; In Wyoming, found in the Green River and Great Divide basins and the foothills of the Overthrust Belt and Rock Springs Uplift in Lincoln, Sublette, and Sweetwater counties.
Trends: Trend may be stable over the long term, but individual populations may have a cyclical "boom and bust" pattern due to the infrequency of good flowering years following wet springs (Jones and Fertig 1996).
Protection Status: All known populations are on private or public lands managed for multiple use. One occurrence on the BLM Rawlins District is located just outside the boundaries of the Red Lake Wilderness Study Area.
Threats: This species typically occurs on sparsely vegetated clay barrens that could be vulnerable to surface disturbances by off-road vehicles or seismic equipment.
Managed Areas: Known occurrences are on lands managed by the BLM Rawlins (Great Divide RA) and Rock Springs (Green River and Pinedale RAs) districts.
Status in Southwest Wyoming: All known populations in the state are in the SW Wyoming study area. Populations occur in the potential Jack Morrow Hills and Ross Butte/Ross Ridge conservation sites.
References: Cramer and Hartman 1996; Cronquist *et al*. 1984; Dorn 1992 b; Fertig 1998 b; Halse 1981; Hitchcock et al. 1959; Howell 1944; Jones and Fertig 1996; Welp 1997; Welp *et al*. 1996.

Phacelia tetramera
Occurrences in Wyoming: Known from 2 occurrences in Wyoming, the most recent discovered in 1993.
Population Abundance: Approximately 100 individuals observed in small colony in 1994. This species may be more abundant and widespread than currently known due to its tiny stature.
Range: Peripheral; in Wyoming known from the Washakie Basin (Sweetwater Co.) and the Sweetwater River Valley (Fremont Co.).
Trends: Not known.
Protection Status: The Fremont County population is within The Nature Conservancy's Sweetwater River Preserve, while the Sweetwater County occurrence is on public lands managed for multiple use.
Threats: Not known.
Managed Areas: Occurs on lands managed by the BLM Rock Springs District (Green River RA) and The Nature Conservancy.
Status in Southwest Wyoming: One of the two state populations is in the SW Wyoming study area.
References: Cronquist *et al*. 1984; Welp 1997.

Philadelphus microphyllus var. *occidentalis*
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.
Population 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 District and Ashley National Forest (Flaming Gorge NRA).
Status in Southwest Wyoming: The entire state range is within the SW Wyoming study area. Populations occur in the Minnies Gap, Richard's Gap, and Linwood Canyon/Flaming Gorge potential conservation sites.
References: Cronquist *et al*. 1997; Dorn 1992 b; Hitchcock 1943.

Phlox albomarginata
Occurrences in Wyoming: Known from a single occurrence in Wyoming, discovered in 1994.
Population Abundance: Not known, but apparently limited to one site.
Range: Regional endemic of southwestern Montana and adjacent Idaho and southwestern Wyoming. In Wyoming, known only from the Overthrust Belt region near the Utah border (Lincoln Co.).
Trends: Not known.
Protection Status: Occurs on public lands managed for multiple use.
Threats: Not known.
Managed Areas: Found on lands managed by the BLM Rock Springs District (Kemmerer Resource Area).
Status in Southwest Wyoming: Entire state population is within the SW Wyoming study area.
References: Cronquist *et al*. 1984; Fertig 1996 b; Refsdal 1996.

Phlox pungens
Occurrences in Wyoming: Known from 16 occurrences in the state, all of which have been discovered or relocated since 1990.
Population Abundance: Populations may be extremely large and locally abundant, often numbering in the tens of thousands to hundreds of thousands (Fertig 1998 b).
Range: State endemic; known only from the southeast foothills of the Wind River Range and Sweetwater River Plateau (Fremont County) and Green River Basin (Lincoln and Sublette counties).
Trends: Not known, but probably stable overall.
Protection Status: Several populations of the "typical" form of this species are protected on Nature Conservancy conservation easements and the Red Canyon Ranch preserve (Fertig 1995 h). An additional population is found in the Beaver Rim ACEC managed by the BLM Rawlins District (Jones 1989). All other occurrences of the typical form and all known occurrences of the "Ross Butte morph" are found on public lands managed for multiple use (primarily oil and gas development, livestock grazing, and recreation). *P. pungens* was formerly a C2 candidate for listing under the Endangered Species Act.
Threats: Surface disturbance associated with oil and gas development, pipeline construction, highway construction, and off-road vehicles are potential threats (Dorn 1990 c).
Managed Areas: Occurs on lands managed by the BLM Rawlins and Rock Springs Districts.
Status in Southwest Wyoming: Nine of the 16 known occurrences in the state are found in the SW Wyoming study area. All of these populations represent the "Ross Butte morph" of the species. It occurs in the La Barge and Ross Butte/Ross Ridge potential conservation sites.
Comments: Populations in the Green River Basin differ from the "typical" form in the Beaver Rim and southeast Wind River Range in having short-stalked glandular hairs on the leaves and narrower leaf blades (under 1 mm wide) that lack thickened midribs and margins (Fertig 1998 b). Populations of this "Ross Butte morph" may represent an undescribed variety (Cramer and Hartman 1996; Fertig 1998 b).
References: Cramer and Hartman 1996; Dorn 1988, 1990 c, 1992 b; Fertig 1995 h, 1998 b; Fertig *et al*. 1994; Jones 1989.

Physaria condensata
Occurrences in Wyoming: Reported from 16 occurrences, 13 of which have been discovered or relocated since 1982.
Population Abundance: Whiskey Basin Consultants (1982) estimated a population size of 21,200 plants at 6 large occurrences in 1982. The total state population probably numbers in the 40,000-60,000 range, although no census has been completed in recent years.
Range: State endemic; known only from the Overthrust Belt and Green River Basin of Lincoln, Sublette, and Uinta counties.
Trends: Apparently stable.
Protection Status: 2 occurrences are protected within Fossil Butte National Monument, and one population is within the Kemmerer Cushion Plant No Surface Occupancy Area (USDI Bureau of Land Management 1986 a). All other known occurrences are on state or public lands managed for multiple use (mineral exploration, fossil quarrying, livestock grazing, and recreation). *P. condensata* was formerly a C2 candidate for listing under the Endangered Species Act.
Threats: Some populations may be threatened by habitat disturbance associated with limestone or fossil quarrying. This species is not affected by grazing and most populations are in rim areas that are typically avoided in well pad construction. Some sites on erosive slopes may be vulnerable to surface disturbances.
Managed Areas: Found on lands managed by Fossil Butte NM and the BLM Rock Springs District (Kemmerer, Green

River, and Pinedale Resource Areas).

Status in Southwest Wyoming: The entire state and global range of this species is restricted to the SW Wyoming study area. Populations are found in the potential Bridger Butte, Fossil, La Barge, and Kemmerer Endemic Cushion Plant conservation sites.

Comments: This species is locally abundant in suitable sites within its relatively small range. A thorough status survey would be useful in clarifying its conservation needs (if any).

References: Cramer and Hartman 1996; Dorn 1992 b; Fertig *et al*. 1994; Hartman and Cramer 1995; Hartman and Refsdal 1995; Hartman *et al*. 1996; Lichvar 1982; Marriott 1988 a; Refsdal 1996; Rollins 1939, 1993; Whiskey Basin Consultants 1982.

Physaria dornii

Occurrences in Wyoming: Known from 4 extant occurrences, all surveyed in 1997. An additional report from Lichvar (1983 a) could not be relocated in 1996-97 and is suspected to be erroneous (Fertig 1998 c).

Population Abundance: Total known habitat covers less than 50 square miles. Population size estimated at 20,000 plants in 1996-97 survey (Fertig 1998 c). Individual populations range in size from 50-5000 plants in areas of 0.5-20 acres. Overall density is often low, with as few as 0.4 plants per square meter in monitoring plots.

Range: State endemic, known only from the Overthrust Belt in Lincoln and Uinta counties.

Trends: Unknown, but presumed to be stable at present.

Protection Status: Four subpopulations of the extensive Rock Creek Ridge population are within the "*Physaria dornii* No-Surface Occupancy area" managed by the BLM Rock Springs District (USDI Bureau of Land Management 1986 a). All other populations occur on public lands managed for multiple use. *P. dornii* was formerly a C2 candidate for listing under the Endangered Species Act.

Threats: Threats are currently low, although populations on steep, erosive slopes could be impacted by ORV use. Its small global range makes the species extremely vulnerable to habitat disturbance. Grazing is not believed to be a threat (Fertig 1998 c).

Managed Areas: All known occurrences are on lands managed by the BLM Rock Springs District (Kemmerer RA) or on adjacent state and private lands.

Status in Southwest Wyoming: Entire state and global range is restricted to the SW Wyoming study area. Populations occur in potential conservation sites at Rock Creek Ridge and The Boilers.

Comments: *Physaria dornii* is closely related to *P. integrifolia* and *P. condensata* and may be better treated as a taxonomic variety rather than a full species.

References: Dorn 1992 b; Fertig *et al*. 1994; Fertig 1998 c; Hartman and Refsdal 1995; Hartman *et al*. 1996; Lichvar 1982, 1983 a; Marriott 1988 a; Refsdal 1996; Weynand and Amidon 1990; Whiskey Basin Consultants 1982.

Physocarpus alternans

Occurrences in Wyoming: Known from a single record along the Utah/Wyoming state line, last observed in 1986.

Population Abundance: Not known, but presumably very low.

Range: Peripheral; in Wyoming, restricted to the Rock Springs Uplift in southern Sweetwater County.

Trends: Not known.

Protection Needs: Known only from public lands managed for multiple use.

Threats: Threats to the habitat of this species appear low due to the ruggedness of the area and lack of roads.

Managed Areas: Occurs on lands managed by the BLM Rock Springs District.

Status in Southwest Wyoming: Entire state range is within the SW Wyoming study area in the Minnies Gap potential conservation site.

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

Populus deltoides var. *wislizenii*

Occurrences in Wyoming: Known from 3 occurrences in Wyoming, all dating since 1987.

Population Abundance: Abundance not fully known. This species may be the dominant component of a community type that barely reaches the state.

Range: Peripheral; all Wyoming occurrences are found in the Little Snake River drainage and adjacent Powder Rim area of southern Carbon and Sweetwater counties.

Trends: Not known.

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

Threats: Cottonwood ecosystems in the west in general are considered to be highly vulnerable to changes in riparian management that affect seedling establishment and recruitment.

Managed Areas: Known occurrences in Wyoming are on private or BLM lands managed by the Rawlins District (Great Divide RA).
Occurrences in Southwest Wyoming: All known occurrences in the state are within the SW Wyoming study area. One population is within the potential Cherokee Basin/Cherokee Rim conservation site.
References: Dorn 1992 b.

Potentilla diversifolia var. *multisecta*
Occurrences in Wyoming: Known from 4 occurrences, all discovered since 1994.
Population Abundance: Not known. May be locally common within a restricted area.
Range: Peripheral; in Wyoming known only from the Rock Springs-Flaming Gorge Uplift area and the northern foothills of the Uinta Range in Sweetwater and Uinta counties.
Trends: Not fully known.
Protection Needs: One population on Cedar Mountain is within the Special Status Plant ACEC established for *Thelesperma pubescens*. All other occurrences are on public lands managed for multiple use.
Threats: Not known.
Managed Areas: Occurs on lands managed by the Rock Springs BLM (Green River RA).
Occurrences in Southwest Wyoming: The entire state range is within the SW Wyoming study area. Populations occur in the potential Cedar Mountain/Lonetree and Hickey Mountain/Sage Creek Mountain conservation sites.
References: Cronquist *et al*. 1997; Refsdal 1996; Welsh *et al*. 1993

Psilocarphus brevissimus
Occurrences in Wyoming: Known from 4 occurrences in Wyoming, 3 of which have been discovered since 1995.
Population Abundance: Populations may be locally abundant (at least in favorable years), but are usually very limited in area.
Range: Peripheral; in Wyoming, known only from the Powder River Basin in Campbell County, the Sweetwater River Valley in Fremont County, and the upper Green River Basin in Sublette County.
Trends: Unknown. Due to the plant's annual growth habit, population size may fluctuate greatly from year to year.
Protection Needs: One occurrence is on BLM lands immediately adjacent to The Nature Conservancy's Sweetwater River Preserve. Other occurrences are on public lands managed for multiple use or private lands leased for coal mining.
Threats: Severe surface disturbances could be a threat, although this species may be tolerant of low-level disturbances.
Managed Areas: Occurs on lands managed by the Rawlins BLM (Lander RA) and Rock Springs BLM (Pinedale RA).
Occurrences in Southwest Wyoming: One population is found in the SW Wyoming study area in the Hay Gulch potential conservation site.
References: Cronquist 1955; Dorn 1992 b; Welp 1997.

Ranunculus flabellaris
Occurrences in Wyoming: Known only from one authenticated, historical occurrence in the state, last observed in 1932. A more recent report from the 1950s is probably based on a misidentified specimen.
Population Abundance: Not known.
Range: Peripheral; in Wyoming, known from the Green River Basin in Uinta County. A report from Grand Teton National Park (Shaw 1976) has not been confirmed and is not recognized by Dorn (1992 b).
Trends: No populations have been located recently.
Protection Status: If legitimate, the Teton County population is located within Grand Teton National Park. The Uinta County record is somewhat vague, but probably is from BLM or private lands.
Threats: As an aquatic plant, this species may be vulnerable to water pollution or water removal.
Managed Areas: Believed to occur on lands managed by the BLM Rock Springs District (Kemmerer Resource Area), and possibly Grand Teton National Park.
Status in Southwest Wyoming: Only confirmed occurrence in the state is within the SW Wyoming study area.
References: Dorn 1992 b; Shaw 1976.

Rorippa calycina
Occurrences in Wyoming: Known from 23 occurrences in Wyoming, all of which have been discovered since 1977. The total population consists of more than 70 subpopulations, some of which were formerly recognized as separate occurrences.
Population 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 of *R. calycina* are on protected lands managed by The Nature Conservancy, US Fish and Wildlife Service (Pathfinder National Wildlife Refuge), BLM Red Canyon ACEC (BLM Rawlins District), or Wyoming state parks (Boysen, Buffalo Bill, and Seminoe state parks). All other known populations (including those from Southwest Wyoming) are on private or public lands managed for multiple use, including water storage, recreation, livestock grazing, and mineral development. *R. calycina* was formerly a C2 candidate for listing under the Endangered Species Act.

Threats: Changes in water management that reduce the periodicity of flooding is probably the main threat to this species (Fertig and Welp 1998). Other potential threats include competition from exotic plants, herbicide spraying, trampling by livestock, recreational activities, and 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 Rawlins and Worland districts. Also present on Wyoming state park lands at Boysen, Buffalo Bill, and Seminoe reservoirs.

Status in Southwest Wyoming: Only 2 occurrences are found in the SW Wyoming study area. One of these is in the Blacks Fork potential conservation site.

References: Clark and Dorn 1981; Dorn 1992 b; Dorn and Dorn 1980; Fertig *et al*. 1994; Fertig and Welp 1998; Lichvar 1981; Rollins 1993; Stuckey 1972; Welp 1997; Welp *et al*. 1996

Sambucus cerulea

Occurrences in Wyoming: Known from a single extant population in Wyoming (last observed in 1980) and 2 historical records (predating 1932).

Population Abundance: Not known.

Range: Peripheral; known from the foothills of the Bighorn Range (Sheridan County) and the Green River Basin (Sweetwater County).

Trends: Not known.

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

Threats: Not known.

Managed Areas: Occurs on lands managed by the BLM Rock Springs District (Green River Resource Area) and possibly by Bighorn National Forest.

Status in Southwest Wyoming: One extant population is found in the study area.

References: Dorn 1992 b.

Scirpus nevadensis

Occurrences in Wyoming: Known from 7 extant records (5 of which have been documented since 1994) and 1 historical record.

Population Abundance: Not known, although it has been reported as “common” at one site.

Range: Peripheral; known from the Laramie Basin, Sweetwater River Uplift, and Great Divide and Green River basins (Albany, Fremont, Sweetwater, and Carbon counties).

Trends: Not known.

Protection Status: One population is found within the Greater Sand Dunes ACEC, managed by the BLM Rock Springs District. All other occurrences are on public lands managed for multiple use.

Threats: May be affected by grazing or changes in wetland management.

Managed Areas: Occurs on land managed by the BLM Rawlins District (Great Divide and Lander Resource Areas) and the BLM Rock Springs District (Green River Resource Area).

Status in Southwest Wyoming: 5 occurrences are found in the SW Wyoming study area.

Comments: The recent increase in number of locations suggests that this species may be more abundant than once thought and perhaps not in need of conservation attention in the state.

References: Cramer and Hartman 1995, 1996; Dorn 1992 b; Ward *et al*. 1998; Welp 1997; Welp *et al*. 1995, 1996.

Selaginella mutica
Occurrences in Wyoming: Known from 3 extant records discovered or relocated between 1972-1995.
Population 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).
Status in Southwest Wyoming: One occurrence is found in SW Wyoming in the potential Linwood Canyon/Flaming Gorge conservation site.
References: Cronquist *et al*. 1972; Dorn 1992 b.

Selaginella selaginoides
Occurrences in Wyoming: Known from 6 occurrences in Wyoming, 3 of which are historical. Two populations have been located since 1994.
Population 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 extant and one historical population are protected within 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 on lands managed by Targhee and Bridger-Teton National Forests, Yellowstone National Park, and the BLM Rock Springs District.
Status in Southwest Wyoming: One population occurs within the SW Wyoming study area in the Upper Green River potential conservation site.
References: Dorn 1992 b.

Senecio crocatus
Occurrences in Wyoming: Known from 3 historical records in Wyoming, all observed between 1896-1914.
Population Abundance: Unknown; may be extirpated in state.
Range: Regional endemic of western Colorado, eastern Utah, and southern Wyoming; In Wyoming known from the Medicine Bow Range, Laramie Basin, and Washakie Basin (Albany and Sweetwater counties).
Trends: Unknown; may be extirpated.
Protection Status: All known populations occur on private or public lands managed for multiple use.
Threats: May be impacted by grazing or disturbances in riparian habitats.
Managed Areas: Found on lands managed by Medicine Bow National Forest and the BLM Rock Springs District.
Status in Southwest Wyoming: One historical population is found in the study area.
Comments: Many Wyoming specimens show possible hybrid influences from *Senecio streptanthifolius*.
References: Dorn 1992 b; Nelson 1984; Welsh *et al*. 1993.

Senecio spartioides var. *multicapitatus*
Occurrences in Wyoming: Known from 4 occurrences in Wyoming, all of which have been discovered since 1980. The most recent observation of this species was in 1996.
Population Abundance: Census data are lacking for all known populations.
Range: Peripheral; in Wyoming, known only from the southern Washakie Basin in Carbon and Sweetwater counties.
Trends: Not known.
Protection Status: One population occurs in the BLM's Sand Hills ACEC. An additional occurrence is within the Adobe Town Wilderness Study Area. All other populations are on public lands managed for multiple use.
Threats: Not known. May be potentially impacted by ORV recreation in its sand dune habitat.
Managed Areas: All known occurrences are on lands managed by the BLM Rawlins and Rock Springs districts.
Status in Southwest Wyoming: The entire state range is within the SW Wyoming study area.

References: Cronquist 1994; Dorn 1992 b; Ward *et al*. 1998.

Stipa nevadensis
Occurrences in Wyoming: Known from 4 extant occurrences (all observed since 1992) and one historical record.
Population Abundance: Not known.
Range: Disjunct; in Wyoming, known only from the Sweetwater River plateau (Fremont County) and the Ferris Mountains (Carbon County).
Trends: Not known.
Protection Status: One population is protected within The Nature Conservancy's Sweetwater River Preserve. All other known populations are on public lands managed for multiple use.
Threats: Grazing or disturbance of habitat by road construction or off-road vehicles are potential threats. Most *Stipa* species however are protected from herbivory by sharp awns on their fruits.
Managed Areas: Found on lands managed by the BLM Rawlins (Lander RA) and Rock Springs districts (Green River RA) and The Nature Conservancy.
Status in Southwest Wyoming: One extant population is found within the study area.
References: Cronquist *et al*. 1977; Dorn 1992 b; Welp 1997; Welp *et al*. 1996.

Thelesperma caespitosum
Occurrences in Wyoming: Known from 2 occurrences (consisting of 12 subpopulations) in Wyoming, last surveyed in 1998.
Population Abundance: Total population estimated at 26,500-31,500 in 1997-98 survey by Fertig. Occupied habitat is 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: Part of one population is within a city park donated to the city of Green River by FMC Corporation. This park is managed primarily for motorized recreation, day use, and shooting sports and affords little to no protection to this species. All other populations are on public lands managed for multiple use, including oil and gas development, recreation, and livestock grazing. No areas on BLM lands have been set aside for this species as a Special Status Plant ACEC under provisions in the Green River Resource Management Plan (USDI Bureau of Land Management 1997). *T. caespitosum* was formerly a C2 candidate for listing under the Endangered Species Act and is listed as Sensitive in US Forest Service Region 4.
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 lands managed by the city of Green River, BLM Rock Springs District (Green River Resource Area) and Ashley National Forest (Flaming Gorge National Recreation Area).
Status in Southwest Wyoming: The entire state range of this species is within the SW Wyoming study area in the Logan Draw potential conservation site.
References: Dorn 1990 b, 1992 b; Fertig 1995 e; Fertig *et al*. 1994; Hartman and Refsdal 1995; Refsdal 1996; USDI Bureau of Land Management 1997.

Thelesperma pubescens
Occurrences in Wyoming: Known from 4 occurrences in Wyoming.
Population Abundance: Dorn (1989 c) estimated the total population at 9200 plants covering 270 acres. This estimate is probably conservative, based on observations by Marriott (1988 c) and Fertig.
Range: State endemic restricted to the north 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.
Status in Southwest Wyoming: Entire state and global range is restricted to the SW Wyoming study area in the Cedar Mountain/Lonetree and Hickey Mountain-Sage Creek Mountain potential conservation sites.

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

Townsendia microcephala
Occurrences in Wyoming: Known from 3 extant occurrences, all observed or relocated in 1994.
Population Abundance: 330-380 plants were observed in about 16 acres of habitat during field surveys in 1994. Based on density patterns, the total population is conservatively estimated at 2280-4550 plants (Fertig 1995 d).
Range: State endemic known only from the northern foothills of the Uinta Range in Sweetwater and Uinta counties, Wyoming.
Trends: Trend data are lacking, although demographic monitoring was initiated in 1994. The species is now known to be more abundant than originally suspected by Dorn (personal comm.) and is believed to be stable at present.
Protection Status: All 3 known populations co-occur with *Thelesperma pubescens* in designated Special Status Plant ACECs on the Rock Springs District. *T. microcephala* was formerly a C2 candidate for listing under the Endangered Species Act.
Threats: Potentially threatened by surface disturbances associated with oil and gas exploration and development. Road construction over rim areas is also a threat due to habitat loss and dislodgment of plants. Some populations may also be threatened by changes in vegetation composition in rim areas resulting from fire suppression (Fertig 1995 d).
Managed Areas: Occurs on lands managed by the Rock Springs BLM (Green River RA).
Status in Southwest Wyoming: Entire state and global range is restricted to the SW Wyoming study area. Populations occur in the Cedar Mountain/Lonetree and Hickey Mountain-Sage Creek Mountain potential conservation sites.
References: Dorn 1992 a, 1992 b; Fertig 1995 d; Fertig *et al*. 1994; Hartman and Refsdal 1995; Refsdal 1996.

2. Watch List Species

Arabis pendulina var. *russeola*
Occurrences in Wyoming: Known from 25-30 extant populations in Albany, Carbon, Fremont, Natrona, and Sweetwater counties.
Protection Status: At least five occurrences are found within the Currant Creek, Sage Creek, South Pass Historic Landscape, Steamboat, and Special Status plant ACECs on the BLM Rock Springs District.
Potential Conservation Sites in SW Wyoming: Pine Creek Outcrops.
References: Dorn 1992 b; Fertig 1992 a, 1992 b; Fertig and Jones 1997; Rollins 1941, 1982, 1993.

Arabis williamsii var. *williamsii* [*A. pendulocarpa* var. *saximontana*]
Occurrences in Wyoming: Reported from 27 locations in Fremont, Park, and Sublette counties.
Protection Status: At least four occurrences are protected within designated wilderness areas in Shoshone National Forest. Only 2 populations are found on BLM lands within the Southwest Wyoming study area.
Comments: This taxon is considered a synonym of *A. pendulocarpa* var. *saximontana* by Dorn (1992). Most populations consist of hybrid swarms with other related taxa, suggesting that the species may not be valid. Surveys by Marriott (1986 c, 1988 b) found this species to be more widespread than originally suspected.
Potential Conservation Sites in SW Wyoming: None.
References: Dorn 1988; Marriott 1986 c, 1988 a, 1988 b; Rollins 1993; Scott 1997.

Astragalus drabelliformis
Occurrences in Wyoming: Currently known from approximately 30 occurrences in Sublette County. Reports from Lincoln County have been based on misidentified specimens of *A. spatualtus* (Fertig 1998 b).
Protection Status: All known occurrences are on public lands managed for multiple use. *A. drabelliformis* was formerly a C2 candidate for listing under the Endangered Species Act.
Comments: This species is locally abundant (probably numbering in the millions) in Sublette County and is capable of rapidly reestablishing in disturbed areas (Steve Laster, personal communication). Populations in the eastern Ross Butte area intergrade with *A. spatulatus*, suggesting that *drabelliformis* may warrant varietal status (Dorn 1988).
Potential Conservation Sites in SW Wyoming: La Barge and Ross Butte/Ross Ridge (Fertig 1998 b).
References: Barneby 1964; Cramer and Hartman 1995, 1996; Dorn 1988, 1992 b; Fertig 1993 b, 1998 b; Fertig *et al*.

1994; Hartman and Nelson 1993, 1994; Kass 1993, 1995; Marriott 1988 a; Weynand and Amidon 1990.

Astragalus simplicifolius
Occurrences in Wyoming: State endemic known from 40-50 occurrences in Campbell, Carbon, Fremont, Natrona, Sweetwater, and possibly Uinta counties.
Protection Status: Occurs in The Nature Conservancy's Sweetwater River Preserve and in the BLM's Beaver Rim and Kemmerer Cushion Plant ACECs Most other populations occur on public lands managed for multiple use.
Potential Conservation Sites in SW Wyoming: None.
References: Barneby 1964; Dorn 1992 b; Welp 1997; Welp *et al*. 1995, 1996.

Cryptantha stricta
Occurrences in Wyoming: Known from 22 occurrences in the Flaming Gorge area, Green and Ferris mountains, and foothills of the Uinta Range (Carbon, Fremont, Natrona, Sweetwater, and Uinta counties).
Protection Status: Of 15 occurrences in southwest Wyoming, 3 are found in the Red Creek and Sage Creek ACECs. All other populations are on public lands managed for multiple use.
Potential Conservation Sites in SW Wyoming: Minnies Gap, Cedar Mountain/Lonetree, Powder Rim, Richard's Gap, and Hickey Mountain/Sage Creek Mountain
References: Cronquist *et al*. 1984; Dorn 1992 b; Hartman and Refsdal 1995; Refsdal 1996; Ward *et al*. 1998; Welp 1997; Welp *et al*. 1995, 1996; Welsh *et al*. 1993.

Cymopterus lapidosus
Occurrences in Wyoming: Known from 20-25 occurrences in Lincoln, Sweetwater, and Uinta counties.
Protection Status: Populations occur in the Pine Springs, Red Creek, and Sage Creek ACECs, Seedskadee National Wildlife Refuge, and the Devil's Playground/Twin Buttes Wilderness Study Area.
Potential Conservation Sites in SW Wyoming: Cedar Mountain/Lonetree, Hickey Mountain-Sage Creek Mountain, and Logan Draw.
References: Cronquist *et al*. 1997; Dorn 1992 b; Hartman and Refsdal 1995; Refsdal 1996; Welsh *et al*. 1993.

Ipomopsis crebrifolia
Occurrences in Wyoming: Known from 23 extant records (20 of which have been documented since 1990) in Fremont, Lincoln, Sublette, Sweetwater, and Teton counties.
Protection Status: At least 5 populations occur in the Oregon Buttes, Steamboat, and White Mountain Petroglyphs ACECS. An occurrence is also found in the Oregon Buttes Wilderness Study Area.
Potential Conservation Sites in SW Wyoming: Jack Morrow Hills, Kemmerer Endemic Cushion Plant, Oregon Buttes/Continental Peak, and Ross Butte/Ross Ridge.
References: Constance and Rollins 1936; Cramer and Hartman 1995, 1996; Cronquist *et al*. 1984; Day 1980; Dorn 1992 b; Fertig 1998 b; Jones and Fertig 1996; Ward *et al*. 1998; Welp 1997; Welp *et al*. 1995, 1996.

Lesquerella paysonii
Occurrences in Wyoming: Known from 34 populations in Wyoming, 25 of which have been discovered or relocated since 1990. Restricted to the Teton, Gros Ventre, Wyoming/Salt River and Wind River ranges, upper Green River Basin and Jackson Hole in Lincoln, Sublette, and Teton counties (Fertig 1997 a).
Protection Status: At least 16 occurrences in northwest Wyoming are protected in national parks, wilderness areas, and proposed research natural areas. One occurrence in the upper Green River Basin is found on BLM lands managed as a campground (Fertig 1997 a). Formerly a C2 candidate for listing under the Endangered Species Act.
Potential Conservation Sites in SW Wyoming: Upper Green River.
References: Dorn 1992 b; Fertig 1997 a; Fertig *et al*. 1991, 1994; Hartman *et al*. 1996; Hartman and Nelson 1993, 1994; Payson 1921; Rollins 1993; Rollins and Shaw 1973.

Lomatium bicolor var. *bicolor*
Occurrences in Wyoming: Known from approximately 20 occurrences in the Wyoming, Salt River, and Teton ranges and southern Overthrust Belt (Lincoln, Sublette, Teton, and Uinta counties). Only 3 populations are known from BLM lands in the SW Wyoming study area (the remainder are on Bridger-Teton National Forest).
Protection Status: One population is found just outside the boundaries of Fossil Butte National Monument. All known sites are on public lands managed for multiple use.

Potential Conservation Sites in SW Wyoming: None.
References: Cronquist *et al*. 1997; Dorn 1992; Hartman and Nelson 1994.

Penstemon paysoniorum
Occurrences in Wyoming: Known from approximately 40 extant occurrences in Fremont, Lincoln, Natrona, Sublette, Sweetwater, and Uinta counties.
Protection Status: Populations occur in the Currant Creek, White Mountain Petroglyphs, and Beaver Rim ACECs, Fossil Butte National Monument, Seedskadee National Wildlife Refuge, and the Oregon Buttes Wilderness Study Area.
Potential Conservation Sites in SW Wyoming: Bridger Butte, Fossil, Henry's Fork at McKinnon, Jack Morrow Hills, Oregon Butte/Continental Peak, Kemmerer Cushion Plant Community, and Ross Butte/Ross Ridge potential conservation sites.
References: Cramer and Hartman 1995; Dorn 1992 b; Fertig 1993 b, Fertig 1995 h, 1998 b; Hartman and Refsdal 1995; Jones and Fertig 1996; Keck 1947; Ward *et al*. 1998.

Phlox opalensis
Occurrences in Wyoming: Known from 33 extant occurrences, 28 of which have been discovered or relocated since 1995. At least 5 additional locations have been reported, but need to be confirmed (Fertig 1996 b).
Protection Status: Part of one population is within Seedskadee National Wildlife Refuge, two other populations occur in the Pine Creek ACEC, and others are within the Devils Playground/Twin Buttes Wilderness Study Area. *P. opalensis* was formerly a C2 candidate for listing under the Endangered Species Act.
Potential Conservation Sites in SW Wyoming: Cedar Mountain/Lonetree, Henry's Fork at McKinnon, Hickey Mountain-Sage Creek Mountain, and Ross Butte/Ross Ridge.
References: Cramer and Hartman 1995; Dorn 1992 b; Fertig 1996 b, 1998 b; Fertig *et al*. 1994; Hartman and Refsdal 1995; Refsdal 1996.

Appendix B.

Summary of Potential Conservation Sites in Southwest Wyoming

Notes: * indicates a species not currently tracked by WYNDD; # indicates a species on the WYNDD Watch List. Unless otherwise noted, all sites are on BLM managed lands (at least in part).

1. Blacks Fork

County: Sweetwater.

Location: Green River Basin, along both sides of Flaming Gorge Reservoir from the confluence of the Blacks Fork and Green River, south to Currant Creek, extending to approximately 0.5 miles from the shoreline on both the east and west sides. Access to the western portion is via WY state highway 530, departing from Interstate 80 at the city of Green River. Approximately 20 road miles south of Green River and 2 road miles southeast of McKinnon Junction is an unnamed road on the east side of the highway. This road leads directly to the site, approximately 5 miles east of Highway 530. Access to the eastern portion of the site is uncertain, with roadblocks likely on all roads leading to the area.

Town/Range/Section: T15N R107W S18; T15N R108W S11-14,23-24.

Acres: ca 1600.

USGS 1:24,000 Quad: Halfway Hollow East.

Site Description: The site consists of rocky slopes, beds and ridges of the Green River Formation (Laney Member), composed of oil shale and marlstone. Vegetation is dominated by desert shrubs including *Sarcobatus vermiculatus, Artemisia,* and *Atriplex*.

Site Designer: Welp and Markow.

Biodiversity Significance Rating: B4.

Biodiversity Significance Comments: The site is ranked B4 because it contains a high concentration of "S1" ranked plant species, most of which are peripheral in the state of Wyoming. Several populations of regionally rare species, including *Rorippa calycina* and *Phacelia glandulosa* var. *deserta* are also found. This site may warrant a higher rank due to the potential presence of Colorado River endemic fish and a variety of peripheral Great Basin terrestrial vertebrates.

Current Management: This area is within Flaming Gorge National Recreation Area (Ashley National Forest) and is managed primarily for hydropower, flood control, and recreation.

Protection Comments: Much of the area is poorly accessible except by boat. The steep cliffs and barren slopes offer some natural protection from many activities. Mineral development, expanded recreational access (especially by land), or changes in watershed management could impact this area.

Species on Site	Grank/Srank
* *Arabis pulchra* var. *pallens* (Beautiful rock cress)	G5T5/S2
* *Chaenactis stevioides* (Desert dustmaiden)	G4/S2
Cryptantha gracilis (Slender cryptantha)	G5/S1
Ipomopsis polycladon (Lavender ipomopsis)	G4/S1
**Malacothrix torreyi* (Torrey's desert dandelion)	G4/S2
Opuntia polyacantha var. *juniperina* (Juniper prickly-pear)	G5T3?Q/S1
Phacelia glandulosa var. *deserta* (Desert glandular phacelia)	G4T1T2/S1?
Phacelia incana (Western phacelia)	G3/S1
Rorippa calycina (Persistent sepal yellowcress)	G3/S2S3

References: Refsdal 1996.

1. Blacks Fork Map

2. Bridger Butte

County: Uinta.
Location: Bridger Basin, Bridger Butte, approximately 1.5 miles south of Interstate 80, extending south to within 1 mile of Cottonwood Reservoir. Site is visible from Interstate 80 and most easily accessed on foot from exit 33, 1.5 miles to the northeast.
Town/Range/Section: T15N R116W S03,10-11,14-16.
Acres: ca 1300.
USGS 1:24,000 Quads: Fort Bridger.
Site Description: Bridger Butte is an isolated glacial outwash plain. It is composed of locally derived clasts and Tertiary gravel, underlain by the Bridger Formation consisting of sandstone and claystone, lenticular marlstone and conglomerate. Soils range from fine-gravelly to clay. Vegetation is dominated by desert shrubs including *Juniperus* and *Artemisia*.
Site Designer: Welp, Fertig, and Markow.
Biodiversity Significance Rating: B3.
Biodiversity Significance Comments: The site is ranked B3 because it contains a concentration of state and regional endemics including *Lesquerella prostrata*, *Physaria condensata* and *Oxytropis besseyi* var. *obnapiformis*. Further survey is needed to determine if the occurrences are of high enough quality to warrant a B2 rank for the site.
Current Management: The area is managed for multiple use, including grazing, mineral exploration, and recreation.
Protection Comments: The habitats occupied by rare plants at this site are primarily along windy rims where competing land uses may be unsuitable due to concerns over erosion and slope instability.

Species on Site	GRank/SRank
Lesquerella prostrata (Prostrate bladderpod)	G3/S1
Oxytropis besseyi var. *obnapiformis* (Maybell locoweed)	G5T3/S1
Penstemon paysoniorum (Payson beardtongue)	G3/S3
Physaria condensata (Tufted twinpod)	G2/S2

Bridger map

3. Cedar Mountain/Lonetree

County: Sweetwater and Uinta.

Location: Northern foothills of the Uinta Range, summit and upper slopes of Cedar Mountain from north of the Henry's Fork River to the south side of the Cedar Mountain-Burntfork Road. Includes the western and southern rims of Cedar Mountain, the far western edge of Big Hollow, and clay badlands on the north slope of the mountain.

Town/Range/Section: T13N R111W S02-10,15-22,29-30; T13N R112W S01-03,10-34,36; T13N R113W S24-25,36; T14N R111W S01-05,07-11,14-22,26-35; T14N R112W S24-25,35-36; T15N R110W S19,30; T15N R111W S15-16,20-29,32-36.

Acres: ca 48,640.

USGS 1:24,000 Quads: Black Spring Reservoir, Burntfork, Horse Ranch, Needle Reservoir, McKinnon, Soap Holes Reservoir, and Winter Fat Reservoir

Site Description: The relatively flat, mesa-like summit of Cedar Mountain is dominated by rolling sagebrush-bunchgrass grasslands with scattered pockets of mountain mahogany. The rim of the mountain on the west and south ends contains a low cushion plant community on exposures of Bishop Conglomerate with a number of local endemic plant species. The south flank of the mountain is clothed in Utah juniper woodlands. Clay-shale badlands on the north end of the mountain contain a sparse desert cushion plant community and expanses of Gardner saltbush. Several endemic plant species are also present in these badlands.

Site Designer: W. Fertig

Biodiversity Significance Rating: B1.

Biodiversity Significance Comments: This site contains high quality occurrences of two G1 plants (*Thelesperma pubescens* and *Townsendia microcephala*) and excellent-quality occurrences of 2 G3 plants (*Phlox opalensis* and *Cymopterus lapidosus*). In addition, the site has habitat for 9 other high ranking plant and animal species.

Current Management: Active oil and gas wells are present in the area. Lands are also managed for recreation and livestock grazing.

Protection Comments: A small portion of this site is within the Special Status Plant ACEC for *Thelesperma pubescens* on Cedar Mountain (USDI Bureau of Land Management 1997).

Species on Site	GRank/SRank
Catostomus discobolus (Bluehead sucker)	G4/S2S3
Bufo boreas boreas (Western boreal toad)	G4T4/S1
Charadrius montanus (Mountain plover)	G2/S2B,SZN
Astragalus coltonii var. *moabensis* (Moab milkvetch)	G4T3?/S1
Carex parryana var. *parryana* (Parry sedge)	G4T4/S1
Ceanothus martinii (Utah mountain lilac)	G4/S1
Cryptantha rollinsii (Rollins' catseye)	G3/S1
# Cryptantha stricta (Erect cryptantha)	G3/S2
# Cymopterus lapidosus (Echo spring-parsley)	G3/S3
Ephedra viridis var. *viridis* (Green Mormon tea)	G5T5/S1
* *Eriogonum acaule* (Single-stemmed wild-buckwheat)	G3/S3
Lesquerella alpina ssp. *parvula* (Narrowleaved bladderpod)	G4T3?/S1
# Phlox opalensis (Opal phlox)	G3/S3
Potentilla diversifolia var. *multisecta* (Deep Creek cinquefoil)	G3G4Q/S1
Thelesperma pubescens (Uinta greenthread)	G1/S1
Townsendia microcephala (Cedar Mountain easter daisy)	G1/S1

References: Fertig 1995 d; Marriott 1988 c; USDI Bureau of Land Management 1997.

Cedar Mtn map 1

Cedar Mtn map 2

4. Cherokee Basin/Cherokee Rim

Counties: Carbon and Sweetwater.

Location: Southern Washakie Basin, Cherokee Basin and Cherokee Rim from east bank of Sand Creek and north side of the Little Snake River west along Cherokee Rim through the Cherokee Basin to the southern slopes of Powder Rim and West Fork Cherokee Creek. Bounded on the south by the Wyoming-Colorado state line. This site is located 11-16 air miles west of Baggs, Wyoming.

Town/Range/Section: T12N R93W S01-12; T12N R94W S01-24; T12N R95W S01,11-14,23-24; T13N R94W S31-33.

Acres: ca 16,640.

USGS 1:24,000 Quads: McPherson Springs, Poison Basin, and Rotten Springs

Site Description: This site encompasses a ridge and basin system with a variety of outcrops of red sandstones, whitish clays, and yellowish shales. The vegetation is a mosaic of Wyoming big sagebrush grasslands, bitterbrush shrub communities, Utah juniper woodlands, and a variety of desert grasslands. Wetter valleys and the banks of the Little Snake River contain scattered communities of Fremont cottonwood (*Populus deltoides* var. *wislizenii*), a community type that is widespread in the Great Basin but uncommon in Wyoming.

Site Designer: W. Fertig.

Biodiversity Significance Rating: B1.

Biodiversity Significance Comments: This site contains Wyoming's two largest occurrences of *Penstemon gibbensii* (a G1 species) and occurrences of 4 other state rare plant and animal species. Potential habitat may also exist for *Penstemon pachyphyllus* var. *mucronatus*, an uncommon regional endemic. Potential bald eagle habitat may occur along the Little Snake River in communities of *Populus deltoides* var. *wislizenii* (an S1 species). Canyons and ridges in the area are important winter habitat for mule deer.

Current Management: This entire area is currently being explored for oil and gas development. Some drilling is already taking place, such as within occurrence # 002 of *Penstemon gibbensii*. Additional road construction and trampling associated with seismic activity are potential threats to some species..

Protection Comments: One population of *Penstemon gibbensii* on Cherokee Rim is found within an 8 foot tall fenced exclosure. This area was proposed for designation as an ACEC, but was rejected in the final Great Divide Resource Area Management Plan (USDI Bureau of Land Management 1988). The area is still managed for no-surface occupancy to protect Gibbens' beardtongue habitat. The exclosure needs to be maintained permanently to ensure this plant's survival.

Species on Site	GRank/SRank
Icterus parisorum (Scott's oriole)	G5/S2B,S5N
Androstephium breviflorum (Smallflower androstephium)	G5/S1
Erigeron consimilis (San Rafael daisy)	G3?/S1
Penstemon gibbensii (Gibbens' beardtongue)	G1/S1
Populus deltoides var. *wislizenii* (Fremont cottonwood)	G5T?/S1

References: Fertig and Neighbours 1996; USDI Bureau of Land Management 1988.

Cherokee Basin map 1

Cherokee Basin map 2

5. Flat Top Mountain

Counties: Carbon and Sweetwater.

Location: Washakie Basin, Flat Top Mountain ridge system, including West and North Flat Top and the north end of Hangout Ridge, ca 15 air miles north-northwest of Baggs and 8-8.5 miles west of WY Highway 789. The site extends from Double Peak at the west end of West Flat Top Mountain east to the northeast end of North Flat Top, south to the north end of Hangout Ridge at the head of North Prong Red Creek. This site excludes East Flat Top and the Potters Spring area.

Town/Range/Section: T14N R93W S01-11,14-15; T14N R94W S01-02; T15N R93W S26-27,31,34-36; T15N R94W 35-36.

Acres: ca. 7,680.

USGS 1:24,000 Quads: Dripping Rock Spring and Flat Top Mountain.

Site Description: This site contains a series of barren to semi-barren ridges and buttes with a variety of yellowish sandstone-shale gravel, clay-shale, and reddish-brown sandstone outcrops. Vegetation is composed primarily of a mosaic of desert shrub and cushion plant communities, including Wyoming big sagebrush, mountain mahogany, bitterbrush, and spiny hop-sage communities.

Biodiversity Significance Rating: B1.

Biodiversity Significance Comments: The site contains a good-quality occurrence of *Penstemon gibbensii* (G1/S1) and one of only 4 known occurrences of this species range-wide. It also contains occurrences of several regional endemic plant species including *Penstemon pachyphyllus*, *Oryzopsis contracta*, and *Astragalus jejunus* var. *jejunus*. Communities dominated by *Zuckia brandegei* are also present (this shrub community is uncommon in the state). The site also contains winter range for mule deer.

Current Management: Area is managed for multiple use, including mineral development, grazing, and recreation.

Protection Comments: Some fencing may be needed at the *P. gibbensii* population to reduce heavy grazing by mule deer. Construction of additional roads should be discouraged to prevent trampling and more erosion. Area was recommended for potential ACEC designation by Fertig and Neighbours (1996).

Species on Site	GRank/SRank
* *Astragalus jejunus* var. *jejunus* (Starveling milkvetch)	G3T3/S3
Penstemon gibbensii (Gibbens' beardtongue)	G1/S1
Penstemon pachyphyllus var. *mucronatus* (Sheep Creek beardtongue)	G5T4/S2

References: Fertig and Neighbours 1996.

Flat Top Mountain map

6. Fossil

County: Lincoln.

Location: Overthrust Belt, southern Tunp Range in the vicinity of Fossil Butte National Monument. The site is a composite of four subunits located between 5 and 12 miles northwest of Kemmerer. The two easternmost subunits are ca 6 road miles northwest of Kemmerer, each within 1/8 of a mile of Wyoming State Highway 30, one on the north side, the other on the south side. Each extends for ca 1.5 miles north to south. The western subunits are ca 10-11 road miles northwest of Kemmerer, each within 0.5 miles of Highway 30, and each extending about 3 1/2 miles north to south. The northwest subunit occupies the eastern half of Fossil Butte National Monument.

Town/Range/Section: T21N R117W S01-03,12-13,16-17,19-21,28-29,32-33. T22N R117W S27,29-32, 34-35; T22N R118W S11-14,23-25.

Acres: ca 10,560.

USGS 1:24,000 Quads: Fossil, Nugget, and The Rock Slide.

Site Description: The site is composed of variegated red to gray, brown, and gray mudstone and sandstone of the Wasatch Formation, with buff laminated marlstone and limestone, brown oil shale and siltstone of the Green River Formation. Soil is fine-textured and often calcareous. Vegetation is dominated by desert shrubs including *Artemisia, Atriplex, Chrysothamnus* and *Amelanchier*, along with cushion plant and bunchgrass communities. Aspen woodlands grow on north and east-facing slopes and conifer woodlands occur on north-facing slopes at the higher elevations. Small areas of wet meadow, saline shrub and mountain shrub types occur in the Monument.

Site Designer: Welp and Markow.

Biodiversity Significance Rating: B3.

Biodiversity Significance Comments: The site is ranked B3 because it contains two high quality occurrences of a state endemic (*Physaria condensata*) and two regional endemics (*Lepidium integrifolium* var. *integrifolium* and *Lesquerella prostrata)* as well as five other peripheral taxa of concern. Several rare community types have been identified from Fossil Butte National Monument (Collins 1984; Jones 1993).

Current Management: Most of the area outside of Fossil Butte National Monument is managed for cattle grazing and is open to oil and gas exploration. Additionally, the area is quarried for Eocene-age fossils. Recreational activities outside the Monument include hiking and ORV use. Areas within the Monument are protected from surface disturbing activities, but are managed for outdoor recreation.

Protection Needs: Major surface disturbing activities outside of the Monument could impact rare plant species. Degradation of riparian areas may be an important threat to *Lepidium integrifolium.*

Species on Site	Grank/Srank
Astragalus lentiginosus var. *salinus* (Sodaville milkvetch)	G5T5/S1
Ceanothus martinii (Utah mountain lilac)	G4/S1
Chyrsothamnus greenei (Greene rabbitbrush)	G5/S1
* *Eriogonum acaule* (Single-stemmed wild buckwheat)	G3/S3
Lepidium integrifolium var. *integrifolium* (Entire-leaved peppergrass)	G3?T2/S1
Lesquerella prostrata (Prostrate bladderpod)	G3/S1
Lomatium triternatum var. *anomalum* Ternate desert-parsley)	G5T?/S1
# *Penstemon paysoniorum* (Payson beardtongue)	G3/S3
Physaria condensata (Tufted twinpod)	G2/S2

References: Collins 1984; Dorn *et al*. 1984; Jones 1993; Knight *et al.* 1976.

6. Fossil site map

7. Hay Gulch

County: Sublette

Location: Upper Green River Basin, 1-2 air miles southwest of Soda Lake and 6 air miles northwest of Pinedale. The site is accessible via Willow Lake Road, departing from State Highway 191, 1/2 mile west of Pinedale. Five road miles north of intersection with Highway 191, Willow Lake Road passes through the east end of the site, which extends 1 1/4 miles to the west.

Town/Range/Section: T34N R109W S03-04.

Acres: ca 480.

USGS 1:24,000 Quads: Cora and Fremont Lake South.

Site Description: The site is a seasonally flooded depression surrounded by low hills and ridges and a permanent spring. The substrate is glacial till and outwash deposits of sand, gravel and boulders. Vegetation is dominated by wet meadow species including *Carex* and *Juncus* along with a variety of forbs. A flooded wetland of quaking mats dominated by *Carex simulata* is located near the permanent spring.

Site Designer: Fertig, Welp, and Markow.

Biodiversity Significance Rating: B2.

Biodiversity Significance Comments: The site contains a high-quality occurrence of *Antennaria arcuata* (G2/S2),as well as three lower ranked species of concern.

Current Management: The area is leased by the BLM for cattle grazing in early summer. Grazing appears to be compatible with the local rare plants under current management. Site also includes some lands managed for wildlife habitat by the Wyoming Game and Fish Department.

Protection Needs: The watershed could be vulnerable to degradation by ORV use. Changes in grazing management could encourage denser graminoid cover and negatively impact rare plants adapted to wet, open conditions.

Species on Site	GRank/SRank
Antennaria arcuata (Meadow pussytoes)	G2/S2
* *Calyptridium roseum* (Rosy pussy-paws)	G5/S1
Hesperochiron californicus (California hesperochiron)	G4G5/S1
Psilocarphus brevissimus (Dwarf woolly-heads)	G5/S1

References: Steve Laster, BLM Pinedale Resource Area.

7. Hay Gulch Map

8. Henry's Fork at McKinnon

County: Sweetwater.

Location: North foothills of the Uinta Range, uplands on north and south bank of Henry's Fork River from ca 1-1.25 miles west of junction of WY Highway 414 and Sweetwater County Highway 1 (vicinity of Birch Creek) east ca 7 air miles to head of tributaries of Little Dry Creek and Antelope Creek. Includes the vicinity of the town of McKinnon and the drainage bottom of the Henry's Fork.

Town/Range/Section: T12N R110W S04-09,16-20; T12N R111W S01-18; T13N R110W S19,29-33; T13N R111W S21-29,31-36.

Acres: ca 23,680. .

USGS 1:24,000 Quads: Antelope Wash and McKinnon.

Site Description: This site contains relatively flat, mesa-like ridge systems paralleling both sides of the Henry's Fork River. These ridges and slopes have a mosaic of cushion plant and sagebrush grassland vegetation on a variety of exposed substrates. A number of locally endemic plant species are found in cushion plant communities on shallow, gravel soils. The Henry's Fork river valley contains hay meadows and stands of narrowleaf cottonwood.

Biodiversity Significance Rating: B1.

Biodiversity Significance Comments: Includes all known populations of *Astragalus proimanthus* and most of the habitat for *Penstemon acaulis* in Wyoming. In addition, the site contains known populations of *Phlox opalensis*, *Oxytropis besseyi* var. *obnapiformis* , *Penstemon paysoniorum*, and *Astragalus nelsonianus*. Potential habitat may also exist for *Lesquerella alpina* var. *parvula* and *Eriogonum acaule*.

Current Management: Most of the public lands in the site are managed for mineral development, livestock grazing, hay production, and recreation. Private lands in the river bottom are managed for agriculture. Part of the site contains the Special Status Plant ACEC for *Astragalus proimanthus* (USDI Bureau of Land Management 1997).

Protection Comments: Current seismic exploration indicates interest in oil/gas development. Habitat on private lands is potentially threatened by gravel mining, home construction, road widening, and other disturbances.

Species on Site	GRank/SRank
Astragalus nelsonianus (Nelson's milkvetch)	G2/S2
Astragalus proimanthus (Precocious milkvetch)	G1/S1
Oxytropis besseyi var. *obnapiformis* (Maybell locoweed)	G5T3/S1
# Phlox opalensis (Opal phlox)	G3/S3
Penstemon acaulis (Stemless beardtongue)	G2/S1
# Penstemon paysoniorum (Payson's beardtongue)	G3/S3

References: Marriott 1988 a, 1989; USDI Bureau of Land Management 1997.

Henrys Fork map

9. Hickey Mountain-Sage Creek Mountain

County: Uinta.

Location: Northern foothills of the Uinta Range just north of the Wyoming-Utah state border. Includes the summit and north, east, and west slopes of Hickey Mountain, Sage Creek Mountain, and the intervening badlands basin from Sage Creek to the Henry's Fork River. Site is bisected by WY State Highway 414 and is located between Mountain View and Lonetree, Wyoming. To reach the site from Interstate 80, take the Mountain View exit south on State Highway 414.

Town/Range/Section: T12N R114W S01-04,09-10; T13N R113W S02-11,15-21,28-31; T13N R114W S01-02,11-16,21-29,32-36; T14N R113W S19-22,26-36; T14N R114W S01-02,11-12.

Acres: ca 29,440.

USGS 1:24,000 Quads: Burntfork, Lonetree, Reed Reservoir, Soap Holes Reservoir, and Table Mountain.

Site Description: This site contains two mesa-like low mountains and an extensive basin of clay-shale badlands. The flat summits of Hickey and Sage Creek mountains contain big sagebrush grasslands and pockets of mountain mahogany vegetation. The west slopes of Hickey Mountain contain forests of aspen and lodgepole pine. Wind-blasted rims of these mountains contain outcrops of cobbley Bishop Conglomerate and a unique cushion plant community containing two strict endemics and a cluster of regional endemic species. Lower east slopes of these mountains contain a mix of Utah juniper and sagebrush on gravelly clay slopes. The barren badlands slopes on the lower slopes of these mountains and in the intervening basin contain sparse cushion plant communities with several rare endemic species. Bottomlands are dominated by sagebrush and greasewood stands.

Site Designer: W. Fertig.

Biodiversity Significance Rating: B1.

Biodiversity Significance Comments: This site contains two high-quality and one medium-quality occurrence of *Thelesperma pubescens* (G1) and a medium-ranked population of *Townsendia microcephala* (G1). Seventy-five percent of the global occurrences of *Thelesperma* and 33% of the *Townsendia* populations are contained within this site. In addition, there are 6 other regionally endemic plants in the site. In all, at least 14 plants and animals tracked by WYNDD are present, as well as several other locally uncommon species not currently tracked.

Current Management: Bottomlands at the base of these ridges have active natural gas wells. A communication tower is present on Hickey Mountain. Much of the area is used for livestock grazing, off-road vehicle recreation, and hunting. Part of the site is within the Special Status Plant ACEC created for *Thelesperma pubescens* (USDI Bureau of Land Management 1997).

Protection Comments: Rare plant populations may be vulnerable to surface disturbing activities along rims and steep slopes. Most of these sites are too unstable for roads or active mineral development. Off-road vehicle use may be the primary threat at this site.

Species on Site	GRank/SRank
Bufo boreas boreas (Western boreal toad)	G4T4/S1
Numenius americanus (Long-billed curlew)	G5/S3B,SZN
Lynx canadensis (North American lynx)	G5/S1
Astragalus coltonii var. *moabensis* (Moab milkvetch)	G4T3?/S1
# Cryptantha stricta (Erect cryptantha)	G3/S2
# Cymopterus lapidosus (Echo spring-parsley)	G3/S2S3
Eriogonum divaricatum (Divergent wild buckwheat)	G4G5/S1
Lesquerella alpina ssp. *parvula* (Narrowleaved bladderpod)	G4T3?/S1
# Penstemon paysoniorum (Payson's beardtongue)	G3/S3
Penstemon scariosus var. *garrettii* (Garrett's beardtongue)	G4T3/S1
# Phlox opalensis (Opal phlox)	G3/S3
Potentilla diversifolia var. *multisecta* (Deep Creek cinquefoil)	G3G4Q/S1
Thelesperma pubescens (Uinta greenthread)	G1/S1
* *Townsendia nuttallii* (Nuttall easter-daisy)	G3/S3
Townsendia microcephala (Cedar Mountain easter-daisy)	G1/S1

References: Fertig 1995 d; Marriott 1988 c; USDI Bureau of Land Management 1997.

Hickey Mountain map

10. Iron Mountain

County: Sweetwater.

Location: The Iron Mountain site is located in the southeast corner of the Wyoming portion of the Green River Basin. Its western boundary is located approximately 3.5 miles to the east of Flaming Gorge Reservoir and 0.75 miles west of Wildhorse Basin. The eastern boundary is situated 7 miles beyond, near the head of Spring Creek. To the south, the site is within 2 miles of the Utah border, and the northern edge approaches Krause Marsh Creek drainage. The area may be accessed via Wyoming State Highway 191, departing from Interstate 80 five miles west of Rock Springs. Approximately 37 road miles to the south, Highway 191 enters the eastern portion of the site, exiting 5 miles to the southwest, 1 mile north of Minnies Gap.

Town/Range/ Section: T12N R106W S03-09,17-18; T12N R107W S01-04,09-16; T13N R106W S31-34; T13N R107W S33-36.

Acres: ca 11,200.

USGS 1:24,000 Quads: Hawks Nest and Minnies Gap.

Site Description: The site consists of a broad ridge system of the Wasatch and Green River Formations, dissected by numerous narrow drainages. The northern half is composed of green, brown and gray tuffaceous sandstone, shale and marlstone, the southern half being variegated red-to-gray, brown and gray mudstone and sandstone with conglomerate lenses. Soils range from sandy to heavy clay. Vegetation is dominated by *Juniperus osteosperma, Cercocarpus montanus, Artemisia tridentata, Chrysothamnus nauseousus* and *Poa secunda.*

Site Designer: Welp and Markow.

Biodiversity Significance Rating: B3.

Biodiversity Significance Comments: The site is ranked B3 because it contains an excellent occurrence of *Draba juniperina* (a regional endemic), along with other plant and animal species of concern. A number of state rare juniper obligate songbirds also nest in the area.

Current Management: This area is managed for multiple use, including livestock grazing, recreation, and mineral exploration.

Protection Comments: Species of interest within this site may be vulnerable to surface disturbing activities, especially in areas with erosive soils. Fire management may become an important issue for juniper-obligate species.

Species on Site	GRank/SRank
Baeolophus inornatus (Plain titmouse)	G5/S2B,SZN
Polioptila caerulea (Blue-gray gnatcatcher)	G5/S2B,SZN
Dendroica nigrescens (Black-throated gray warbler)	G5/S3S4B,S5N
Draba juniperina (Uinta draba)	G3Q/S2
Ephedra viridis (Green Mormon tea)	G5T5/S1
Penstemon pachyphyllus var *mucronatus* (Sheep Creek beardtongue)	G5T4/S2

Iron Mountain map

11. Jack Morrow Hills

County: Sweetwater.

Location: Great Divide Basin, Greater Jack Morrow Hills ecosystem, extending from the south side of WY highway 28 to the south side of Oregon Buttes and Honeycomb Buttes, south to the north end of White Mountain, the Boars Tusk and the Killpecker Sand Dunes south of Steamboat Mountain. From Rock Springs, Wyoming, travel north on U.S. Hwy 191 ca. 8 miles to the intersection with Sweetwater County Road 17; thence east and north on Sweetwater County Road 17 ca. 20 miles to the southwestern corner of the site, in T23N, R103W, Sec 19.

Town/Range/Section: T23N R101W S01-10; T23N R102W S01-23,27-30; T23N R103W S01-30; T23N R104W S01-17,23-26; T24N R100W S04-09,16-20,30-31; T24N R101W S01-36; T24N R102W S01-36; T24N R103W S01-36; T24N R104W S01-03,05-36; T24N R105W S13,24-25,36; T25N R100W S07,18-19,30; T25N R101W S01-36; T25N R102W S01-04,06-36; T25N R103W S01-03,10-16,20-36; T25N R104W S36.

Acres: ca 191,626.

USGS 1:24,000 Quads: Black Rock North, Boars Tusk, Essex Mountain, Freighter Gap, Joe Hay Rim, Monument Ridge, North Packsaddle Canyon, North Table Mountain, Oxyoke Spring, Rock Cabin Spring, The Pinnacles, and Tule Butte

Site Description: The landscape consists of the mesas and stream valleys cut into the gently-dipping sedimentary rocks of the Jack Morrow Hills, with stabilized and active sand dunes along the southern part of the site (in the Killpecker Dunes) and nearly flat sediments and claystones of the Great Divide Basin in the eastern part of the site. The vegetation is a matrix of Wyoming big sagebrush/bottlebrush squirreltail grassland and Gardner saltbush vegetation on the mesas and in the bottoms of stream valleys, with patches of mountain big sagebrush-Utah snowberry/basin wildrye shrublands on east-facing escarpments, small stands of Utah juniper woodland and true mountain mahogany woodland on some valley sides, cushion plant vegetation (especially *Phlox muscoides* patches) on limestone rims, and basin big sagebrush/lemon scurfpea shrub stands on the sand dunes in the southwestern part of the site.

Site Designer: George Jones.

Biodiversity Significance Rating: B1.

Biodiversity Significance Comments: This macrosite is ranked B1 because it contains the only known occurrence of the basin big sagebrush/lemon scurfpea (*Artemisia tridentata* ssp. *tridentata/Psoralidium lanceolatum*) association (G1?S1?). It also is an integrated landscape containing a number of plant associations typical of the Green River Basin Section of the Intermountain Semi-Desert Province, especially cushion plant vegetation (probably the *Phlox muscoides* association), the Wyoming big sagebrush/bottlebrush squirreltail (*Artemisia tridentata* ssp. *wyomingensis/Elymus elymoides*) association, the bluebunch wheatgrass association (*Pseudoroegneria spicata*), several Gardner saltbush (*Atriplex gardneii*) associations, several herbaceous riparian associations (especially the *Juncus balticus* association), small Bebb willow (*Salix bebbiana*) stands near springs, the mountain big sagebrush-Utah snowberry/basin wildrye (*Artemisia tridentata* ssp. *vaseyana-Symphoricarpos oreophilus/Leymus cinereus*) association (G?S3), the basin big sagebrush/basin wildrye (*Artemisia tridentata* ssp. *tridentata/Leymus cinereus*) association (G2G3S1S2), the basin big sagebrush/western wheatgrass (*Artemisia tridentata* ssp. *tridentata/Pascopyrum smithii*) association (G2G3S2S3), the true mountain mahogany/bluebunch wheatgrass (*Cercocarpus montanus/ Pseudoroegneria spicata*) association (G4S4), the Utah juniper/bluebunch wheatgrass (*Juniperus osteosperma/ Pseudoroegneria spicata*) association (G4S3S4), aspen (*Populus tremuloides*) woodlands, and limber pine (*Pinus flexilis*) woodlands. These vegetation types provide crucial habitat for the desert elk herd in the Killpecker Dunes area and important habitat for the rare pygmy rabbit The site also contains occurrences of several vascular plant species endemic to the intermountain Semi-Desert Province in Wyoming.

Current Management: The Jack Morrow Hills area is part of an active natural gas field (thousands of wells are predicted to be drilled in the next 20 years) and is also managed for livestock grazing and recreation. Parts of the area are within the Greater Sand Dunes and Steamboat ACECs (USDI Bureau of Land Management 1997), and part of the area is within the Red Desert Watershed management area. The area is considered to be an especially significant big game range.

Protection Comments: Many of the aspen stands in the site, other than the large stands on Steamboat Mountain, are small patches of decadent trees, and prescribed fire and careful grazing management will be necessary to restore and maintain them. Control of the exotic plant whitetop (*Cardaria pubescens*) should be started soon to prevent the plant's spread. Livestock should be managed to prevent deterioration of the condition of the vegetation and, perhaps, to improve the condition of some of the Wyoming big sagebrush associations and

Gardner saltbush associations by increasing the amount of native wheatgrasses and decreasing the amount of bottlebrush squirreltail. Livestock grazing also should be managed to allow enough fuel to accumulate for prescribed fires necessary for rejuvenating the aspen stands and some of the mountain big sagebrush stands.

Species on Site	GRank/SRank
Astragalus nelsonianus (Nelson's milkvetch)	G2/S2
Carex parryana var. *parryana* (Parry sedge)	G4T4/S1
Elymus simplex (Alkali wild rye)	G4?Q/S1?
* *Erigeron uintahensis* (Uintah fleabane)	G3G4/S2
Eriogonum divaricatum (Divergent wild buckwheat)	G4G5/S1
# *Ipomopsis crebrifolia* (Compact gilia)	G4?/S2S3
Lesquerella macrocarpa (Large-fruited bladderpod)	G2/S2
* *Oryzopsis contracta* (Contracted Indian ricegrass)	G3G4/S3S4
# *Penstemon paysoniorum* (Payson beardtongue)	G3/S3
Phacelia demissa (Intermountain phacelia)	G5/S1
Phacelia salina (Nelson phacelia)	G3?Q/S1

References: Collins 1984; Jones and Fertig 1996; Knight *et al.* 1976; USDI Bureau of Land Management 1997.

Jack Morrow Map 1

Jack 3

12. Kemmerer Endemic Cushion Plant Community

County: Lincoln.

Location: Overthrust Belt, ridges east of North Alkali Creek and south of Middle Fork Slate Creek, along US Highway 189 10 miles northeast of Kemmerer.

Town/Range/Section: T23N R114W S30-31; T23N R115W S25,33-36; T22N R114W S05-08,19,30-31; T22N R115W S01-04,09-15,22-27,36

Acres: ca 12,160.

USGS 1:24,000 Quads: Round Mountain and Willow Springs.

Site Description: The cushion plant community occurs on limey-clay rolling knolls with an extreme climate of winter cold and little rainfall in the summer and with constant strong winds. The combination of these harsh factors contributes to the very low vegetation throughout and the development of cushions - tufts of plants with bare soil and rock between individuals. In this area, the community is found in narrow strips, 100-150 feet wide, on the windward edges of west-facing knolls and ridges of the Green River Shale Formation.

Site Designer: ML Neighbours.

Biodiversity Significance Rating: B2.

Biodiversity Significance Comments: The outcropping of the Green River Shale Formation in the area provides suitable habitat for the endemic cushion plant community. The community is described as one of the best examples of a cushion plant community in the area due to its content of several state or regional endemic plant species (*Astragalus simplicifolius, Cryptantha caespitosa, Eriogonum acaule, Ipomopsis crebrifolia, Penstemon paysoniorum*, and *Physaria condensata*). The original description (Collins 1984) included several regional endemic plant species, and some plant taxa that are no longer tracked by WYNDD. Sagebrush vegetation on lower slopes may support a population of the pygmy rabbit, a former C2 candidate.

Current Management: Much of this area is managed for multiple use, including livestock grazing, mineral development, pipeline and electrical line corridors, and recreation. A small area within the site has been designated the Kemmerer Cushion Plant No-Surface Occupancy Area (USDI Bureau of Land Management 1986 a).

Protection Comments: The current NSO area is probably too small to capture the full extent of this unusual habitat type. Low-lying cushion areas are vulnerable to surface disturbance, especially by off-road vehicles.

Species on Site	GRank/SRank
* *Astragalus jejunus* var. *jejunus* (Starveling milkvetch)	G3T3/S3
# *Ipomopsis crebrifolia* (Compact gilia)	G4?/S2S3
# *Penstemon paysoniorium* (Payson beardtongue)	G3/S3
Physaria condensata (Tufted twinpod)	G2/S2

References: Collins 1984; Hardy 1987.

Kemmerer map

13. La Barge

Counties: Lincoln and Sublette.

Location: Green River Basin, Little Colorado Desert area, 1.5-6 air miles northeast of La Barge and 14 air miles south of Big Piney. This site is accessible via State Highway 109. One road mile north of La Barge, an unnamed road on the east side of Highway 109 crosses Whelan Bridge and leads directly to the west end of the site, ca 3 road miles to the northeast.

Town/Range/Section: T26N R112W S01-04,09-10; T27N R111W S19-20,29-31; T27N R112W S13-15,22-28,33-36.

Acres: ca 11,200.

USGS 1:24,000 Quads: La Barge and La Barge SE.

Site Description: The site is characterized by slopes and ridges dissected by numerous steep-walled drainages emptying into Bird Canyon. The substrate is dull-red and green mudstone, brown sandstone and thin limestone of the New Fork tongue of the Wasatch Formation, overlain by oil shale and marlstone of the Green River Formation (Laney Member). Vegetation is dominated by sagebrush steppe and other desert shrubs including *Chrysothamnus, Atriplex, Sarcobatus*, and *Juniperus*, with ground cover of *Stipa, Elymus* and *Oryzopsis*, and scattered patches of *Pinus flexilis*.

Site Designer: Welp and Markow.

Biodiversity Significance Rating: B3.

Biodiversity Significance Comments: The site is ranked B3 because it contains medium-quality occurrences of three state endemic species (*Physaria condensata*, *Astragalus drabelliformis*, and *Phlox pungens*) as well as three uncommon regional endemics.

Current Management: The area is currently being developed for oil and natural gas, and is used for grazing and recreation.

Protection Comments: Most of the species of interest in this area occur on steep slopes or badlands outcrops that are technically unstable and typically avoided during construction of access roads, pipelines, and drill pads. Management of these slope areas for the native flora should be compatible with current development. These sites could be impacted by exotic species that might become established along access roads.

Species on Site	GRank/SRank
# *Arabis demissa* var *languida* (Daggett rock cress)	G5T4/S2
# *Astragalus drabelliformis* (Big Piney milkvetch)	G2G3/S2S3
* *Cryptantha scoparia* (Desert cryptantha)	G4/S2
Oryzopsis swallenii (Swallen mountain-ricegrass)	G5/S2
**Phacelia glandulifera* (Sticky scorpion-weed)	G5/S2
Phlox pungens (Beaver Rim phlox)	G2/S2
Physaria condensata (Tufted twinpod)	G2/S2

Reference: Knight *et al.* 1976.

La Barge map

14. Linwood Canyon/Flaming Gorge

County: Sweetwater.

Location: Green River Basin, south end of the Wyoming portion of Flaming Gorge Reservoir, extending approximately 1.5 miles to the east and approximately 5 miles to the west, bordering Linwood Bay and the Henrys Fork valley. The northern boundary is very irregular but extends to approximately 2 miles north of the Utah border, and the southern extreme abuts the Wyoming/Utah state line. Access to the western portion of the site is from Interstate 80 at Green River, via Wyoming State Highway 530. Approximately 45 road miles southwest of the intersection of Highways 80/530 at Green River, Highway 530 enters the site at Linwood Canyon. The eastern portion may be accessed through Wyoming State Highway 191, departing from Interstate 80 5 miles west of Rock Springs. Approximately 50 road miles to the southwest (1/2 mile north of Minnies Gap), an unnamed road intersects Highway 530 on the west side. At 1/8 of a mile to the west, Canyon Road diverges from said unnamed road on the south side, and continues west. At 4 1/2 miles to the west, a pipeline road intersects the north side of Canyon Road and enters the east side of the Linwood Canyon/Flaming Gorge site, approximately 2 road miles to the north.

Town/Range/Section: T12N R108W S11,13-17,19-20; T12N R109W S12-15,23-24.

Acres: ca 4160.

USGS 1:24,000 Quads: Haystack Buttes South and Linwood Canyon.

Site Description: The site consists of rocky slopes and ridges representing the Green River Formation, the Rock Springs Formation, the Bridger Formation, and the Baxter Shale. Consequently, bedrock consists predominately of green, brown and gray tuffaceous sandstone, shale and marlstone, greenish-gray, olive-drab and white tuffaceous sandstone and claystone, lenticular marlstone and conglomerate, white-to-brown sandstone, shale and claystone, and gray-to-black soft, sandy shale and shaley sandstone. Vegetation is dominated by a mix of Great Basin and Rocky Mountain foothills communities, including *Juniperus osteosperma* woodlands, sagebrush grasslands, and *Cercocarpus* shrublands.

Site Designer: Markow and Fertig.

Biodiversity Significance Rating: B3.

Biodiversity Significance Comments: The site is ranked B3 because it contains a high concentration of taxa of concern, including *Leptodactylon watsonii* and *Astragalus nelsonianus*, two high-ranking regional endemics and 9 other rare plants. Additionally, the site provides habitat for bald eagles and a variety of uncommon Great Basin animals, including cliff chipmunk, canyon mouse, pinyon mouse, midget faded rattlesnake, and Great Basin gopher snake.

Current Management: The area is managed for multiple use, with an emphasis on flood control and recreation on Flaming Gorge Reservoir. The Forest Service maintains a campground at Linwood Canyon.

Protection Comments: Most of the species of interest at this site occur in rocky areas that are somewhat naturally protected from disturbance. Increased recreation could have negative impacts, especially on the more accessible west shore of the reservoir.

Species on Site	GRank/SRank
Haliaeetus leucocephalus (Bald eagle)	G4/S2B,S3N
Arabis crandallii (Crandall's rock cress)	G4/S1
Arabis selbyi (Selby rock cress)	G4?Q/S1
Astragalus nelsonianus (Nelson's milkvetch)	G2/S2
Brickellia microphylla var. *scabra* (Little-leaved brickell-bush)	G4G5/S1
Cercocarpus ledifolius var. *intricatus* (Dwarf mountain mahogany)	G5T4/S1
* *Chaenactis stevioides* (Desert dustmaiden)	G4/S2
Chrysothamnus greenei (Greene rabbitbrush)	G5/S1
Glossopetalon spinescens var. *meionandrum* (Utah greasebush)	G5T3/S1
Leptodactylon watsonii (Watson's prickly-phlox)	G3?/S1
Penstemon pachyphyllus var. *mucronatus* (Sheep Creek beardtongue)	G5T4/S2
Philadelphus microphyllus (Little-leaf mock-orange)	G5?/S1
Selaginella mutica (Blunt-leaf spike-moss)	G4G5/S1

Reference: Knight *et al.* 1976.

Linwood map

15. Lion Bluffs

County: Sweetwater.
Location: Rock Springs Uplift, summit and uppermost slopes of NE end of Quaking Asp Mountain and Table Mountain, east of the radio tower, ca. 12 air mi SE of Rock Springs. Accessible via several roads south of WY Highway 430 south of Rock Springs.
Town/Range/Section: T17N R103W S05-08,18; T17N R104W S01,04,11-14,24.
Acres: ca 2400.
USGS 1:24,000 Quads: Lion Bluffs.
Site Description: This site is composed of sandstone cliffs and smaller rock outcrops at NE end of Quaking Asp Mountain (a long, ridge-like mountain). *Descurainia torulosa* habitat consists of sparsely vegetated sandy soils at the base of the cliffs.
Site Designer: W. Fertig.
Biodiversity Significance Rating: B1.
Biodiversity Significance Comments: Largest known high-quality population of *Descurainia torulosa*, (G1S1). Site may also contain important wildlife habitat.
Current Management: Most of the area is managed for multiple use, including grazing and recreation. Part of the area is a Special Status Plant ACEC designated by the BLM (USDI Bureau of Land Management 1997).

Species on Site	Grank/SRank
Descurainia torulosa (Wyoming tansymustard)	G1/S1
* *Erigeron uintahensis* (Uintah fleabane)	G3G4/S2

References: Marriott 1992; USDI Bureau of Land Management 1997.

Lion Bluff map

16. Little Firehole Canyon

County: Sweetwater.
Location: Rock Springs Uplift, Little Firehole Canyon and slopes bordering Little Firehole Canyon Road on east side of Flaming Gorge Reservoir. Accessible from Interstate 80 ca 8 miles east of city of Green River, Taking US Highway 191 south ca 7 miles to Little Firehole Road. Take Little Firehole Road west and south ca 8 miles.
Town/Range/Section: T17N R106W S13-14,22-23,26-29,33-35.
Acres: ca 3000.
USGS 1:24,000 Quads: Whalen Butte and Wilkins Peak.
Site Description: Canyon contains a high quality desert riparian woodland dominated by narrowleaf cottonwood (*Populus angustifolia*) and an undisturbed shrub understory. At least 9 uncommon animal species are suspected to occur here, as well as several state rare plants (Collins 1984). Surrounding ridges contain Utah juniper and *Glossopetalon* shrub communities.
Site Designer: W. Fertig.
Biodiversity Significance Rating: B2.
Biodiversity Significance Comments: Site contains an excellent example of a functioning narrowleaf cottonwood community (ranked G2) as well as several uncommon plant and animal occurrences. Not all of the animal species potentially present in the area are listed below. A large concentration of rare plants is found at the east end of the ridge forming the divide between Little and Middle Firehole canyons, including high-quality occurrences of *Cirsium ownbeyi* and *Glossopetalon spinescens*.
Current Management: Managed for multiple use, including recreation and livestock grazing.
Protection Comments: Recommended for special management by Collins (1984).

Species on Site	GRank/SRank
Icterus parisorum (Scott's oriole)	G5/S2B,S5N
Arabis selbyi (Selby rock cress)	G4?Q/S1
Brickellia microphylla var. *scabra* (Little-leaved brickell-bush)	G4G5T4?/S1
Cirsium ownbeyi (Ownbey's thistle)	G3/S1
Cryptantha rollinsii (Rollins' cats-eye)	G4/S1
Glossopetalon spinescens var. *meionandrum* (Utah greasebush)	G5T3/S1
Phacelia incana (Western phacelia)	G3/S1

References: Collins 1984; Hardy 1987.

Little Firehole map

17. Logan Draw

County: Sweetwater.

Location: Green River Basin, slopes on west and east side of the Green River ca 1.5 air miles east and south of the city of Green River. Accessible via the FMC park on the east side of the Green River or via the Whalen Butte Road on the south end of town. The site boundaries extend from Whalen Butte south along the lower slopes of the "Green River Airport ridge" to Lauder Slide and east across the river to the slopes east of Whalen Bottom and Slippery Jim Bottom.

Town/Range/Section: T17N R106W S04-10,16-20; T17N R107W S01,11-13,24; T18N R106W S31-32.

Acres: ca 5120.

USGS 1:24,000 Quads: Whalen Butte.

Site Description: This site contains a series of low, mesa-like ridges of whitish shale-clay of the Green River Formation. These sparsely vegetated ridgetops contain cushion plant communities with a number of regionally endemic plant species. Bottomlands along the Green River contain scattered groves of cottonwood and willow. The site contains a midreach of the Green River which has been partially flooded by the creation of Flaming Gorge Reservoir. This area may have formerly contained populations of several Colorado River drainage fish species which are now considered threatened or endangered.

Site Designer: W. Fertig.

Biodiversity Significance Rating: B1.

Biodiversity Significance Comments: This site contains the only 2 known extant occurrences of *Thelesperma caespitosum* in the world. It also contains habitat for several regionally endemic plant species (including *Cryptantha caespitosa*, *Phacelia glandulosa* var. *deserta*, and *Cymopterus lapidosus*). Potential habitat may have formerly existed for several Colorado River drainage fish species that are now thought to be extirpated.

Current Management: Area is managed primarily for mineral development, recreation, and livestock grazing. Part of the site is within FMC Park, managed by the city of Green River.

Protection Comments: *Thelesperma caespitosum* populations are highly threatened by off-road vehicle trampling and surface disturbances associated with mineral development. Populations on BLM lands warrant “Special Status Plant” ACEC status. Mineral development within critical habitat should be conducted with no-surface occupancy rules.

Species on Site	GRank/SRank
* *Chaenactis stevioides* (Desert dustmaiden)	G4/S2
Cryptantha gracilis (Slender cryptantha)	G5/S1
# *Cymopterus lapidosus* (Echo spring-parsley)	G3/S3
Phacelia glandulosa var. *deserta* (Desert glandular phacelia)	G4T1T2/S1?
Thelesperma caespitosum (Green River greenthread)	G1/S1

References: Fertig 1995 e.

17 Logan Draw Map

18. Minnies Gap

County: Sweetwater .

Location: Southern Rock Springs Uplift, 'The Glades' and Minnies Gap, on the east side of Flaming Gorge Reservoir on the Wyoming-Utah State line. Site extends from the east side of the Gorge east to Minnies Gap (where it is crossed by US Highway 191) and 2 miles east of the highway. The site includes the entire ridge system occupied by 'The Glades', Linwood Peak, and Spring Creek.

Town/Range/Section: T12N R106W S19; T12N R107W S19-24; T12N R108W S24.

Acres: ca 2720.

USGS 1:24,000 Quads: Haystack Buttes South and Minnies Gap.

Site Description: The Glades are dominated by Utah juniper and pinyon pine communities found on dipping slopes of sandstone. The understory of these communities contains a rich variety of Great Basin shrubs, including *Cercocarpus ledifolius* var. *intricatus* and *Philadelphus microphyllus*. Foothill communities contain a mix of black sagebrush and big sagebrush grasslands and Utah juniper woodlands on redbeds and brown clays.

Site Designer: W. Fertig.

Biodiversity Significance Rating: B3.

Biodiversity Significance Comments: The highest ranked elements within the site are G3 plants (*Draba juniperina* and *Cryptantha stricta*). A cluster of S1-S2 state rare plants (mostly peripherals) are also present. Pinyon-juniper is an uncommon community in Wyoming, although it is extremely common in the Great Basin of Utah, Colorado, and Nevada. Based on the quality of the G3 occurrences and cluster of other elements, the site warrants a B3 rank.

Current Management: Managed for multiple use, including livestock grazing and recreation.

Protection Comments: Many of the elements at this site are also found in other potential conservation sites along Flaming Gorge and the Utah border. The Minnies Gap area is probably in the best condition of these sites due to its ruggedness.

Species on Site	GRank/SRank
Cercocarpus ledifolius var. *intricatus* (Dwarf mountain mahogany)	G5T4/S1
# Cryptantha stricta (Erect cryptantha)	G3/S2
Draba juniperina (Uinta Draba)	G3Q/S2
Ephedra viridis (Green Mormon tea)	G5T5/S1
Penstemon pachyphyllus var. *mucronatus* (Sheep Creek beardtongue)	G5T4/S2
Philadelphus microphyllus (Little-leaf mock-orange)	G5?/S1
Physocarpus alternans (Dwarf ninebark)	G4/S1

References: Collins 1984.

18. Minnies Gap Map

19. Oregon Butte/Continental Peak

Counties: Fremont and Sweetwater.
Location: Great Divide Basin, along the Continental Divide from Oregon Buttes east to Continental Peak, ca 12 air miles south of South Pass City.
Town/Range/Section: T26N R100W S01-08; T26N R101W S01-04, 09-16; T27N R99W S30-31; T27N R100W S25-29,31-36; T27N R101W S34-36.
Acres: ca 15,360.
USGS 1:24,000 Quads: Continental Peak, Dickey Springs, and Joe Hay Rim.
Site Description: The site is composed of oil shale and marlstone of the Green River Formation (Laney Member), greenish-gray, olive drab and white tuffaceous sandstone and claystone, marlstone and conglomerate of the Bridger Formation, white tuffaceous Miocene sandstone, variegated claystone and lenticular sandstone and conglomerate of the Wasatch Formation, and Quaternary landslide deposits. Vegetation is characterized by a variety of desert shrubs including *Atriplex gardneri* and *Artemisia tridentata*. Understory species include *Oryzopsis hymenoides, Elymus elymoides* and *Krasheninnikovia lanata*. Small areas are forested by *Pseudotsuga menziesii, Pinus flexilis* and *Populus tremuloides.*
Site Designer: W. Fertig.
Biodiversity Significance Rating: B2.
Biodiversity Significance Comments: Includes an excellent-quality occurrence of *Lesquerella macrocarpa* (G2/S2) and other regional endemics.
Current Management: Most of the area is managed for multiple use, including livestock grazing, mineral exploration, and recreation. Part of the site is within the Oregon Butte ACEC (USDI Bureau of Land Management 1997).
Protection Comments: Many of the rare plants at this site may be vulnerable to surface disturbances caused by off-road vehicles.

Species on Site	GRank/SRank
Brachylagus idahoensis (Pygmy rabbit)	G4/S2
* *Cryptantha scoparia* (Desert cryptantha)	G4/S2
# Ipomopsis crebrifolia (Compact gilia)	G4?/S2S3
Lesquerella macrocarpa (Large-fruited bladderpod)	G2/S2
* *Oryzopsis contracta* (Contracted Indian ricegrass)	G3G4/S3S4
# *Penstemon paysoniorum* (Payson beardtongue)	G3/S3
Phacelia demissa (Intermountain phacelia)	G5/S1

References: Fertig 1995 a; Jones and Fertig 1996; Lichvar *et al*. no date.

19. Oregon Butte/Continental Peak

20. Pine Butte

County: Sweetwater.

Location: Leave I-80 at the Patrick Draw exit about 41 miles east of Rock Springs and 31 miles west of Wamsutter. About 7.2 miles from the freeway, shortly after crossing the UP railroad, go right on a road that heads southwest following Bitter Creek and Patrick Draw. After about 15.3 miles, turn left on a road going to Sand Butte. After 4.9 miles, turn left on a road (may be signed "to Bittercreek Road") that winds east then south. Pine Butte is visible much of the time (radio tower on summit). After crossing a draw at the base of the butte and before the road climbs up to the rim, turn right on an old dirt road (4.1 miles from last junction) that leads to an old ranch house/horse corral. Park nearby and walk towards the slopes on the north side of the butte.

Town/Range/Section: T16N R100W S32-34; T15N R100W S03-05.

Acres: ca 750.

USGS 1:24,000 Quads: Pine Butte.

Site Description: Pine Butte is at the north end of Kinney Rim, and is part of an easterly-dipping sandstone lens of the Laney Member of the Green River Formation. On the north side of the butte, the steep slopes below the sandstone rim (cliff) are covered with Douglas-fir, aspen and open talus/scree. Below the steep slopes is rolling topography with sagebrush. The tope of the butte is covered with a low sagebrush-grassland with a cushion plant community on the very coarse soil near the edges.

Site Designer: Hollis Marriott.

Biodiversity Significance Rating: B1.

Biodiversity Significance Comments: One of only 2 known occurrences of the "Sweetwater County morph" of *Descurainia torulosa*. Also contains habitat for *Erigeron uintahensis*, a regional endemic.

Current Management: Most of the area is within a Special Status Plant ACEC designated for *Descurainia torulosa*.

Protection Comments: Steep, dangerous talus slopes provide natural protection for much of the *D. torulosa* population.

Species on Site	Grank/SRank
Descurainia torulosa (Wyoming tansymustard)	G1/S1
* *Erigeron uintahensis* (Uintah fleabane)	G3G4/S2

References: Collins 1984; Marriott 1992.

20. Pine Butte Map

21. Pine Creek Outcrops

County: Fremont.
Location: Southern Wind River Range, South Pass area along Pine Creek about 1 air mile northwest of WY Highway 28 at east end of Anderson Ridge.
Town/Range/Section: T26N R101W S26-27,34-35.
Acres: ca 1200.
USGS 1:24,000 Quads: Anderson Ridge and South Pass City.
Site Description: Site contains extensive granite-pegmatite outcrops in rolling sagebrush-grassland bordering a willow-lined creek. Also contains subirrigated meadows of *Juncus balticus, Deschampsia cespitosa,*and *Hordeum brachyantherum* at edge of willow and silver sagebrush thickets along Fish Creek.
Site Designer: W. Fertig.
Biodiversity Significance Rating: B1.
Biodiversity Significance Comments: Only known occurrence of *Arabis pusilla* (G1S1), a USFWS Candidate species. The site also contains a small occurrence of *Antennaria arcuata* (G2/S2) and several regionally or state rare mustards including *Arabis pendulina* var. *russeola* and *A. demissa* var. *languida* (both G3T3). The *Antennaria* site is noteworthy in that it is in a different habitat type than other known Wyoming occurrences.
Current Management: The Pine Creek area receives high recreation use and is also managed for livestock grazing. The BLM has designated the pegmatite outcrops occupied by *Arabis pusilla* a Special Status Plant ACEC and has secured a mineral withdrawal for the area (USDI Bureau of Land Management 1997).
Protection Comments: The South Pass area is a potential gold mining area.

Species on Site	GRank/SRank
Antennaria arcuata (Meadow pussytoes)	G2/S2
# Arabis pendulina var. *russeola* (Daggett rock cress)	G5T3?/S3
Arabis pusilla (Small rock cress)	G1/S1

References: Collins 1984; Dorn 1990 a; Green River Resource Area 1994; Marriott 1986; USDI Bureau of Land Management 1997.

21. Pine Creek Outcrops Map

22. Powder Rim

County: Sweetwater.

Location: The Powder Rim site is located along the western 2/3 of Powder Rim in the southern Washakie Basin. The eastern extreme is ca 2 miles west of the West Fork of Cherokee Creek, and the southern boundary is within 1/4 mile of the Colorado border. The western boundary is approximately 3 miles east of Shell Creek, and the northern boundary is defined by the base of Powder Rim, ca 5 miles north of the Colorado border. The site is accessible from Interstate Highway 80 via Wyoming State Highway 739 at Creston Junction. Forty-two miles south of Creston Junction, Highway 739 crosses Cottonwood Creek, then immediately intersects Cherokee Trail Road which leads directly to the Powder Rim site. The site's easternmost boundary is 28-30 miles west of this intersection, and the site extends for an additional eleven miles to the west.

Town/Range/Section: T12N R96W S01-10,17-19; T12N R97W S01-04,10-14; T13N R95W S30-31; T13N R96W S23,25-36; T13N R97W S25-36.

Acres: ca 20,480.

USGS 1:24,000 Quads: Powder Mountain and Upper Powder Spring.

Site Description: The site consists of a ridge system which is steeply tilted on the north and gently sloping to the south It is characterized by rocky slopes composed of a mix of Tertiary-age Brown's Park white tuffaceous sandstone, and Washakie Formation gray-green tuffaceous sandstone and claystone. Soils are medium-to-fine textured. Vegetation is dominated by *Juniperus osteosperma*, *Artemisia tridentata, Oryzopsis hymenoides, Chrysothamnus* and *Atriplex* species.

Site Designer: Markow, Fertig, and Welp.

Biodiversity Significance Rating: B4.

Biodiversity Significance Comments: The site is ranked B4 because it contains an unusual concentration of G3-G5/S1 peripheral species including *Erigeron consimilis* and *Cryptantha stricta*. However, the quality of these occurrences is poorly-known, thus the relatively low ranking. Additional information may eventually provide a basis for upgrading to B3.

Current Management: Area is managed by the BLM Rawlins District for multiple use, including oil and natural gas development, livestock grazing, and recreation.

Protection Comments: Many of the rare species in this site occur on slopes and rocky areas that may be unsuitable for mineral exploration due to erosion concerns.

Species on Site	Grank/SRank
Polioptila caerulea (Blue-gray gnatcatcher)	G5/S2B,SZN
Icterus parisorum (Scott's oriole)	G5/S2B,S5N
Androstephium breviflorum (Smallflower androstephium)	G5/S1
Arabis selbyi (Selby rock cress)	G4?Q/S1
Chrysothamnus greenei (Greene rabbitbrush)	G5/S1
# Cryptantha stricta (Erect cryptantha)	G3/S2
Erigeron consimilis (San Rafael daisy)	G3?/S1

Reference: Knight *et al.* 1976.

22. Powder Rim map

23. Richards Gap

County: Sweetwater.
Location: Southern Rock Springs Uplift, Richards Gap, roughly 15 air miles east of Flaming Gorge Reservoir in the valley between the Richards Mountains and Tepee Mountains on the WY/UT state line. Accessible via the Richards Gap Road off WY Highway 373.
Town/Range/ Section: T12N R105W S21-24.
Acres: ca 1500.
USGS 1:24,000 Quads: Richards Gap.
Site Description: Richard's Gap is a narrow valley carved by Red Creek through a limey sandstone ridge. The surrounding slopes are dominated by pinyon-juniper woods and desert shrub vegetation.
Site Designer: W. Fertig.
Biodiversity Significance Rating: B3.
Biodiversity Significance Comments: The site contains a cluster of S1 plant elements and colonies of two regional endemics (*Draba juniperina*, G3/S2, and *Cryptantha stricta*, G3/S2).
Current Management: The area is partly managed for livestock grazing, recreation, and as a pipeline corridor. The entire area is within Red Creek ACEC (USDI Bureau of Land Management 1997).
Protection Needs: The Red Creek watershed is a major source of sediment for the Green River system. Riparian improvements are being developed for the area.

Species on Site	Grank/SRank
Arabis selbyi (Selby rock cress)	G4?Q/S1
* *Balsamorhiza hookeri* var. *hispidula* (Hooker's balsamroot)	G5T?/S2
# *Cryptantha stricta* (Erect cryptantha)	G3/S2
Draba juniperina (Uinta draba)	G3Q/S2
Eriogonum corymbosum var. *corymbosum* (Crisp-leaf wild buckwheat)	G5T5/S1
Galium coloradoense (Colorado bedstraw)	G3G4/S1
Philadelphus microphyllus (Little-leaf mock-orange)	G5?/S1

References: Collins 1984; USDI Bureau of Land Management 1997.

23. Richards Gap Map

24. Rock Creek Ridge

County: Lincoln.

Location: Overthrust Belt, Rock Creek Ridge, at south end of the Tunp Range ca 3.5 miles west of Fossil Butte National Monument and 5 miles east of Sage Junction. Site is bounded by tributaries of Trail Creek on the north and continues to just over 1 mile south of US Highway 30 at the south end. It is bisected by US Highway 30, the Union Pacific Railroad, and Twin Creek.

Town/Range/Section: T21N R119W S01-03,11-12; T22N R119W S01-02,11-15,22-27,34-36; T23N R118W S06-07,18-19,30-31; T23N R119W S01,12-13,24-25,36; T24N R118W S31.

Acres: ca 13,120.

USGS 1:24,000 Quads: Beckwith, Nugget, The Rock Slide, and Sage.

Site Description: This site contains a series of north-south oriented ridges of barren, loose, calcareous shales of the Twin Creek Limestone. The vegetation is dominated by true mountain mahogany, Indian ricegrass, and Sandberg bluegrass or big sagebrush, snowberry, black sagebrush, and bitterbrush communities.

Site designer: Fertig and Markow.

Biodiversity Significance Rating: B1.

Biodiversity Significance Comments: Contains the largest of the known occurrences of *Physaria dornii* (G1). Also contains habitat for pygmy rabbit and *Astragalus lentiginosus* var. *salinus.*

Current Management: Most of the area is managed for multiple use, including livestock grazing and trailing, recreation, and mineral development. A portion of the site is managed with No Surface Occupancy stipulations to protect *Physaria dornii* habitat by the BLM Kemmerer Resource Area (USDI Bureau of Land Management 1986 a).

Protection Comments: Rare plant species on this site occur on loose, shifting, semi-barren slate slopes that have little forage for livestock. These slopes are probably too unstable for mineral development. These slopes are vulnerable to erosion by ORV use.

Species on Site	GRank/SRank
Brachylagus idahoensis (Pygmy rabbit)	G4/S2
Astragalus lentiginosus var. *salinus* (Sodaville milkvetch)	G5T5/S1
Physaria dornii (Dorn's twinpod)	G1/S1

References: Fertig 1998 c; Marriott 1988 a; USDI Bureau of Land Management 1986 a.

24. Rock Creek Ridge map

Rock Creek ridge 2

25. Ross Butte/Ross Ridge

County: Sublette.

Location: Green River Basin, Ross Butte and Ross Ridge on south side of New Fork River, extending from the west end of the ridge system at ca 6900 ft east to the west end of Blue Rim (ca 0.25 miles east of Burma Road). Also includes North Alkali Draw and the unnamed ridge between this draw and Granite Wash. Accessible via WY Highway 351, ca 14.5 road miles west of junction with Highway 351 and US Highway 191. Take Gaging Station Road (County Rd 175) south, crossing the New Fork River. Take fork to the left and continue to the top of Ross Butte and the radio tower. Also accessible by the Burma Road (BLM Rd 5406) located ca 1.5 miles east of bridge over New Fork River on Highway 351.

Town/Range/Section: T29N R109W S03-05,08; T30N R109W S18-23,26-35; T30N R110W S13-14,23-27,34-36.

Acres: ca 10,880.

USGS 1:24,000 Quads: Olsen Ranch and Ross Butte.

Site Description: Site contains a prominent east-west trending butte and ridge system of white, gravelly-chalky sandy soil and clay badlands. Vegetation consists of cushion plant communities on rims and semi-barren slopes, low grasslands on summit flats, and black sagebrush-rubber rabbitbrush communities on north-facing slopes.

Site Designer: W. Fertig.

Biodiversity Significance Rating: B2.

Biodiversity Significance Comments: This site contains known or potential habitat for 11 regional and globally rare plant species tracked by WYNDD, including several former USFWS C2 candidate species [*Phlox pungens, Astragalus drabelliformis, Phlox opalensis, Lesquerella macrocarpa*]. Most of these EOs are of high quality due to minimal impacts from human activities. The site may also contain an undescribed taxon of *Phlox* [*P. pungens* "Ross Butte" morph]. Shrub communities on north slopes provide important winter range for mule deer.

Current Management: This area is managed for multiple use, including cattle grazing, recreation, and telecommunications. The steep slopes of Ross Butte make the area unsuited for on-site mineral development. The general area provides important big game winter range.

Protection Needs: No surface occupancy stipulations or mineral withdrawals would protect the area from many surface disturbances. Regulation of off-road vehicles may be needed to protect fragile slope communities. ACEC or equivalent recognition was recommended by Fertig (1998 b).

Species on Site	GRank/SRank
# Astragalus drabelliformis (Big Piney milkvetch)	G2G3/S2S3
** Calyptridium roseum* (Rosy pussy-paws)	G5/S1
** Cryptantha scoparia* (Desert cryptantha)	G4/S2
# Ipomopsis crebrifolia (Compact gilia)	G4?/S2S3
Lesquerella macrocarpa (Large-fruited bladderpod)	G2/S2
Oryzopsis swallenii (Swallen mountain-ricegrass)	G5/S2
# Penstemon paysoniorum (Payson beardtongue)	G3/S3
Phacelia glandulosa var. *deserta* (Desert glandular phacelia)	G4T1T2/S1?
Phacelia salina (Nelson phacelia)	G3?Q/S1
# Phlox opalensis (Opal phlox)	G3/S3
Phlox pungens (Beaver Rim phlox)	G2/S2

References: Fertig 1998 b.

25. Ross Butte map

26. The Boilers

County: Uinta.
Location: Overthrust Belt, ca 13 air miles east of Evanston, 3-5 air miles SW of intersection of State Highway 189 and Interstate 80. Access is through "The Boilers" via County Road 181 and 180 (Evanston Road), departing from Interstate Highway 80 at exit 18. Three road miles SE of Interstate 80, the road enters the northwest portion of the site.
Town/Range/Section: T15N R118W S15,21-22,28-29,32-33.
Acres: ca 1200.
USGS 1:24,000 Quads: Piedmont Reservoir and Ragan.
Site Description: The site consists of slopes and ridges overlooking Albert Creek composed of drab-to-variegated claystone and siltstone, carbonaceous shale and coal, buff sandstone, arkose and conglomerate, all of the Wasatch Formation. Vegetation is dominated by woodlands of Utah juniper and desert shrubs including *Chrysothamnus viscidiflorus, Cercocarpus montanus, Artemisia tridentata,* and *Amelanchier utahensis* with an understory of *Poa secunda, Oryzopsis hymenoides* and *Cymopterus longipes*.
Site Designer: Fertig, Welp, and Markow.
Biodiversity Significance Rating: B2.
Biodiversity Significance Comments: The site is rated B2 because it contains 2 medium-quality occurrences of a G1 plant (*Physaria dornii*), and a medium-ranked occurrence of a G3 plant (*Lesquerella prostrata*).
Current Management: The area is managed for multiple use, including cattle grazing, mineral development, recreation, and as a pipeline and railroad corridor. The site is within the BLM/private checkerboard.
Protection Needs: The site may be impacted by recreational vehicle use and other ground disturbing activities.

Species on Site	GRank/SRank
Lesquerella prostrata (Prostrate bladderpod)	G3/S1
Physaria dornii (Dorn's twinpod)	G1/S1

References: Fertig 1998 c.

26. The Boilers map

27. Upper Green River

County: Sublette.

Location: Green River Basin, upper Green River and upper New Fork River valley between Daniel Junction and the Bridger-Teton National Forest boundary.

Town/Range/Section: T34N R110W S01-23,28-30; T34N R111W S01-30; T35N R110W S02-11,14-36; T35N R111W S01-36; T36N R110W S05-08,15-22,27-34; T36N R111W S01-05,08-17,20-29,31-36; T37N R110W S01-04,08-36; T37N R111W S36; T38N R110W S34-36.

Acres: ca 119,040.

USGS 1:24,000 Quads: Cora, Daniel Junction, Dodge Butte, Kendall Mountain, New Fork Lakes, Signal Hill, Warren Bridger, and Webb Draw.

Site Description: The site is designed to include the middle reaches of the upper Green River and the upper reaches of the New Fork River and its upper tributaries (including Willow Creek). These stretches are within a broad, mesic valley framed on three sides by the Wind River, Gros Ventre, and Wyoming ranges. It purposely excludes the stretch of the Green River south of Daniel Junction which is an ecotonal area between the mesic valley to the north and arid semi-desert of the Green River Basin to the south. It also excludes agricultural and residential lands west of Pinedale and National Forest lands (where the influence of forested communities is greater). The site is primarily a wetland corridor that includes extensive areas of sedge marsh and willow carrs, as well as transition areas between sagebrush grassland (including silver and big sagebrush) and upland woods of aspen and Douglas-fir. The site is defined primarily to encompass the habitat of waterfowl, but also includes habitat occupied by a suite of boreal disjunct marsh plants tied to cold pockets with calcareous substrates.

Site Designer: W. Fertig.

Biodiversity Significance Rating: B3.

Biodiversity Significance Comments: The area is of importance for reintroduction of trumpeter swans and as habitat for other waterfowl. It may be especially important during migration. The site also has potential habitat for a number of boreal disjunct plant species (mostly in the G5/S1 range) which are dependent on cold, calcareous fens and seeps. These include: *Salix candida, Marsilea oligospora, Epilobium palustre, Carex microglochin, Muhlenbergia glomerata, Astragalus diversifolius* var. *diversifolius,* and *Selaginella selaginoides.*

Current Management: Public lands within the site are managed primarily for livestock grazing, mineral development, and recreation. Private lands have traditionally been managed as rangeland or for hay production, but are increasingly being subdivided for ranchettes.

Protection Comments: The Wyoming Nature Conservancy has several conservation easements on private lands in the upper Green River valley near Cora. Private lands in the area are being rapidly subdivided for new housing. Maintaining water quality is critical to the wetland birds and kettle hole wetland plants of the site.

Species on Site		GRank/SRank
Grus americana (Whooping crane)		G1/SA
Cygnus buccinator (Trumpeter swan)		G4/S2
Numenius americanus (Long-billed curlew)		G5/S3B,SZN
# Lesquerella paysonii (Payson's bladderpod)		G3/S3
Marsilea vestita var. *oligospora* (Pepperwort)	[not on BLM lands]	G5/S1
Selaginella selaginoides (Low spike-moss)		G5/S1

References: Wyoming Natural Diversity Database 1996.

27. Upper Green River map

green 2

green 3

green 4

Appendix C.

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.