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**SENSITIVE PLANT SPECIES SURVEY
ASHLAND DISTRICT, CUSTER NATIONAL FOREST**

POWDER RIVER AND ROSEBUD COUNTIES, MONTANA

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By:

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EXECUTIVE SUMMARY

This study represents the results of a sensitive plant species inventory conducted on the Ashland District of the Custer National Forest. Twelve target species known or reported from the District are addressed. Evidence is provided to support nomination of *Carex gravida* as sensitive and to name two species known from historical collections in the District (*Amorpha canescens* and *Ceanothus herbaceus*) as watch. New information and questions are also presented for the twelve species and their habitats.

Foremost among concerns addressed is the heretofore unrecognized need for making distinctions between *Astragalus barrii*, a sensitive species, and *A. hyalinus* because the latter has now been documented from the District. Three previously-identified *A. barrii* population sites and four potential new *A. barrii* sites that were completely in vegetative condition need to be revisited during the flowering times of both species to make positive identifications.

Two new additions to the state flora were documented, one of which has been provisionally added to the list of Montana Species of Special Concern (*Evax prolifera*). The other, *Ipomopsis congesta* var. *pseudotypica*, is locally widespread and under no immediate threats. The Montana distribution and status of the former is particularly intriguing because it seems to be highly disjunct from its more southern range in the Great Plains; likewise, it is not known from the Wyoming flora.

The appropriate state status of three watch list species remains undetermined to date: *Agastache foeniculum*, *Geum canadense*, and *Elatine americana*. The first two are eastern deciduous forest species whose documented distribution outside the District in eastern Montana is under review. The latter is a minute aquatic plant known from few widely-scattered locations in the state that shows little response to disturbance. Forest Service T/E/S consideration for these species is not appropriate until such time as their state statuses have been resolved.

The framework for conducting sensitive species surveys is based upon the assumption that targets can be set and that a systematic plan to survey for such targets can be developed at the onset. However, for many eastern Montana Species of Special Concern, it is not known whether the apparent species' rarity reflects actual distribution patterns or simply a general lack of botanical and vegetation information, so that identifying targets cannot be done much less systematically surveying for them. Many of the target species occupy localized features which have not been studied: successional habitats, wetlands and localized habitat conditions such as well-developed woodlands. Habitats of the latter two are particularly affected by surrounding land-use practices, so it is important to resolve these status questions.

Promoting baseline floristic survey followed by rigorous extended sensitive species survey is presented as the approach for developing a meaningful and effective sensitive species program on the District.

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INTRODUCTION

Systematic sensitive plant species surveys were conducted on the Ashland District of the Custer National Forest in Powder River and Rosebud counties. The primary purpose was to lay the foundation for a District sensitive species baseline by surveying habitats of known and suspected sensitive and potentially sensitive species.

The intentions of sensitive species surveys are to document the full complement of sensitive species in the study area and collect the field information needed to determine their status. It does not represent exhaustive documentation of all sensitive plant locations, though it serves to identify conservation priorities and to integrate the practices and benefits of sensitive species management in agency planning and operations (Reel et al. 1989).

However, few botanical studies have been conducted in eastern Montana. Target species and habitat for the 1995 study were selected based on existing knowledge as represented in the statewide compendium of rare plant information developed by the Montana Natural Heritage Program from secondary sources and from field studies. Previously overlooked secondary source data in herbaria and plant specimens on file at the District were investigated after the fieldwork. The incompleteness of secondary source review and the absence of other floristic baseline data meant that there was an incomplete floristic framework for conducting systematic surveys that we have now begun to fill.

This study represents a first step at investigating all sensitive and potentially sensitive plant species on the District. Much additional work is needed, including general floristic inventory and subsequent sensitive species surveys.

STUDY AREA

Custer National Forest - Ashland District is located on the most rugged breaks and ridges between the Powder and Tongue River valleys, 5 miles east of Ashland and 42 miles west of Broadus, in Rosebud and Powder River counties. Its outline has an irregular "J" shape which curves inward along Otter Creek, extending about 41 miles north-south and up to 31 miles east-west (Figure 1).

The highly-dissected terrain drains in all directions, with the largest watercourses feeding into the Tongue River. Rolling uplands are broken by complex ridge systems, with particularly well-developed badlands topography at the southeast and west areas.

The surface geology throughout is composed solely of the Tongue River Member of the Fort Union Formation, which consists of shallow marine sedimentary deposits from the Cretaceous and Tertiary Periods. Despite the uniform historical geology, the topography and stratigraphy are decidedly heterogeneous. The highly-dissected terrain is carved by water erosion. The horizontally-bedded outcrops include soft sandstones, silty sandstones, clayey shales and lignite. Areas with burnt lignite have baked and oxidized adjacent beds to produce brittle, erosion-resistant porcelainite (Warren 1959).

The nearest long-term weather station is in Broadus (3030 ft.), with monitoring also maintained at Ashland (as cited in Hansen and Hoffman 1987). Both have semi-arid continental climates. The mean annual precipitation is 13 inches at Ashland and 14 inches at Broadus. The mean annual temperature is 44.7° F., with a January mean of 18.2° F., and a July mean of 71.2° F. The mean maximum temperature for July was 30.6° C (87.0° F), while the mean minimum for January was -15.8° C (3.6° F). (U.S. Department of Commerce 1982). The year-round pattern of temperatures and precipitation at Ashland are depicted on below.

Topography of the District intercepts precipitation and influences weather patterns. This climate is more distinguished by its extremes rather than its means. The broken terrain also divides the landscape into an array of microhabitats, each with its own microclimate.

Figure 2. Average monthly temperature and precipitation at Ashland, MT. From Hansen and Hoffman, 1988.

Ashland District Study Area

The prevailing vegetation is an upland grassland, or steppe. Pine woodlands are confined to broken topography and are most extensive on the more sheltered slopes. Large upland areas are dominated by Rocky Mountain juniper in the southern end of the District. The best developed stands of the most mesophytic forest types found in the study area occur on the north side of the high east-west-trending divide in the northern part of the District between the East Fork Otter Creek and Beaver Creek; ponderosa pine dominates, with a variety of hardwoods in the draws (including small stands of *Populus tremuloides*, which is rare on the District). The most fertile, mesic lands in the vicinity are mostly privately owned; particularly the major drainage bottoms have a history of farming or intensive grazing. Large areas of exposed ridges, buttes, and badlands are sparsely vegetated with successional plant associations or topoedaphic climaxes that have not yet been studied. Plant associations that have been sampled to date on the District are:

Agropyron spicatum/Bouteloua curtipendula
Agropyron spicatum/Carex filifolia
Andropogon scoparius/Carex filifolia
Artemisia cana/Agropyron smithii
Artemisia tridentata/Agropyron smithii
Artemisia tridentata/Agropyron spicatum
Festuca idahoensis/Carex heliophila
Fraxinus pennsylvanica/Prunus virginiana
Juniperus scopulorum/Agropyron spicatum
Pinus ponderosa/Agropyron spicatum
Pinus ponderosa/Carex heliophila
Pinus ponderosa/Festuca idahoensis
Pinus ponderosa/Prunus virginiana
Rhus aromatica/Agropyron spicatum
Rhus aromatica/Festuca idahoensis
Sarcobatus vermiculatus/Agropyron smithii
Sarcobatus vermiculatus/Agropyron spicatum
Stipa comata/Carex heliophila

These are provisionally treated as climax habitat types (Hansen and Hoffman 1988). The set is not considered complete for the District (DiBenedetto pers. comm.), and does not fully represent the wetland habitats or successional phases among the habitats occupied by the target species. This area has a history of recurrent wildfires, and some of the areas surveyed had burned in 1993 wildfires. Prescribed burning is also being used on the District as a management tool.

The Ashland District has an admixture of the Great Plains flora combined with the Rocky Mountain flora, as is expressed in the Black Hills. There are also eastern deciduous forest species and widely distributed native species of unknown affinity, as well as exotic species and trace amounts of Great Basin, boreal, and other floristic affinity groups.

Vegetation studies involving ecodata sampling have been done on the District, and the composite species lists from the plots contribute to the flora (Hansen and Hoffman 1987), as does a preliminary vascular species list compiled in studying big game carrying capacity on the District (Taylor no date). The only other floristic references on hand for this study are based on incomplete distribution information presented in Booth (1966, 1959) and a floristic checklist for Rosebud County (anon. no date). The primary focus of these efforts has been in documenting the common species rather than the entire flora across the array of habitats.

Only one species tracked by Montana Natural Heritage Program was known from the District prior to this study, *Astragalus barri*. The CCC made 126 collections in the District in the 1930s that are on file at the District Office, in five volumes under the heading "A Book of Important Range Plants." Among this set was a specimen of *Carex gravida*, a Montana Plant Species of Special Concern which was relocated at or near the original collection area during this study. The YCC set of collections was not fully available for review until after the fieldwork, and review of its list of specimens raised many important questions that are to be pursued in fieldwork and taxonomic consultation. The list includes three more rare species that are tracked by Montana Natural Heritage Program and not previously known from the District. Among these three, it is highly unlikely that the *Aquilegia formosa* specimen is correctly identified based on its known range and habitat requirements. Review of all three specimens is recommended, including:

Aquilegia formosa
Cypripedium calceolus var. *parviflorum*
Mentzelia nuda

Three of the taxa are potential new additions to the state flora. The *Elymus ambiguus* has been reported before in the state (Hitchcock 1973) but there are no known specimens as vouchers (Dorn 1984). Verification of all three is recommended. They include:

Aster porteri
Elyhordeum x montanense
Elymus ambiguus

Five more species collections are labeled with names that have no published synonymy in Kartesz (1994). They, too, warrant review and verification by taxonomic researchers.

Anaphalis subalpina
Astragalus hylophilus
Lupinus pseudoparviflorus
Solidago concinna
Tradescantia larimiensis

METHODS

Prior to fieldwork, the Biological Conservation Database (BCD) maintained by the Montana Natural Heritage Program was queried for records of U.S. Forest Service - Northern Region sensitive species (USDA Forest Service 1994) known from the study area or from immediately adjoining areas. All known records of Barr's milkvetch (*Astragalus barrii*), the only current sensitive species on the District, were retrieved. The U.S. Forest Service Regional list of sensitive species was developed based on the best available botanical information at the time, which was limited in the case of the Ashland District. Therefore, species on the Montana Species of Special Concern list were also considered in the event that they could warrant consideration for sensitive designation (Appendix A). Because of the limited botanical work in this area, species of undetermined status which appeared to warrant consideration for addition to the Montana list were also considered.

Custer National Forest lands in the Ashland District were surveyed for sensitive plants in the summer of 1995 by Hollis Marriott (May 22-31, June 11-27) and by Bonnie Heidel (July 3-13) with the field assistance of Shannon Kimball in the latter period. Fieldwork conducted by Marriott concentrated on potential habitat for *Astragalus barrii* and its semi-xeric to xeric habitat, focussing especially upon early successional outcrops. Other habitat types were surveyed in the course of traversing the landscape between primary habitats. Sites were chosen throughout the District, with the exception of the higher elevations and northerly slopes of the divide north of the East Fork of Otter Creek. Towards the end of June, survey of mesic sites was added as a priority. This proved to be somewhat early for many species of interest, due to the unseasonably cool wet weather of 1995. Later fieldwork focused on woodland and wetland habitats, with concerted efforts to relocate the *Carex gravida* historic collection site and resolve the taxonomic questions associated with *Sphenopholis obtusata* var. *major*. The fieldwork coverage is listed by quad map in Appendix B, along with maps of the general routes.

Searches were conducted on foot in both known and potential habitats of target species, including particularly large, intact, and/or well-developed habitat settings. Special attention was paid to unusual habitats. Efforts were made to visit most large sectors of the study areas during effective times of the field season.

Field information was compiled on the Plant Species of Special Concern Survey Form, and the populations were mapped onto U.S. Geological Survey topographic maps (7.5'). Data collected included detailed information on vegetation, slope, aspect, soil, size of population, species biology, and management considerations. Photographs were taken of target species and of their habitats on color transparencies (35 mm slides), which are submitted with this report.

Voucher specimens of the target species were collected so that there was at least one voucher per county when adequate material was available, in keeping with the Montana Native Plant Society collecting guidelines (1993). For target species with small populations, fragments of the plant were collected for vouchers whenever possible. For tentative identification or for unknown

species, collections were made and identifications finalized at the Rocky Mountain Herbarium, University of Wyoming (Laramie), or at Montana herbaria (Montana State University, and University of Montana). Collections were also made of species for which the sighting represented a significant range extension based on distribution information in Dorn (1984). All specimens collected are deposited at Montana State University (MONT), with duplicates at the University of Montana (MONTU) and the U.S. Forest Service Regional Missoula Resource Center Herbarium (MRC). All vascular plants encountered at the appropriate mature phenological stage were identified to species so as to consider prospective sensitive species not included in the original target list and also to compile a preliminary flora for the District.

Technical references most commonly used to key out plants were Dorn (1984, 1992), and Hitchcock and Cronquist (1973). Nomenclature used in this report generally follows these references. Taxonomic consultations were made for specimens of *Astragalus* spp. with Matt Lavin, Montana State University, for *Sphenopholis* spp. with John Rumely, Montana State University, and for *Juncus* spp. with Ralph Brooks, University of Kansas in select cases.

Review and verification of specimens in the District CCC collection of important range plants is in progress. Even though we are still waiting results from this review, we have included information on two of the eleven species that are least likely to be misidentified, and which represent species currently tracked by the Montana Natural Heritage Inventory. .

RESULTS

Throughout the course of this project, 50 additional records of 9 target species were located (Table 1). Expansion of some previous *Astragalus barrii* occurrences was also revealed. An overview of known sensitive species distribution in the study areas and surroundings is presented in Figure 3, with the local and statewide distributions of individual species elaborated on maps that accompany the text for each species.

This report also incorporates background information on five state plant Species of Special Concern which were not found: *Amorpha canescens*, which was collected at a Forest Service ranger station in 1922 at what is believed to have been on the Ashland District (see text for more information), *Ceanothus herbaceus*, which is known in Montana only from one historic collection on the District near Bloom Creek (not relocated), *Cypripedium calceolus* var. *parviflorum*, which is among the historic plant collections on file at the District Office, *Mentzelia nuda*, also among the historic plant collections on file at the District Office, and *Sphenopholis obtusata* var. *major*, which due to changes in nomenclature has been mistakenly applied to *Sphenopholis intermedia* that is present on the District.

Results are presented for each species in a status report format that presents both District and statewide information. It includes status information, description, distribution, habitat, Population biology, population ecology, land ownership, and overall assessment with management recommendations. This represents an expansion and update of information from Lesica and Shelly (1991), and from other status reports, monographs, and other projects as revised through this field study.

This survey has also documented a preliminary vascular flora of 443 vascular plant taxa, in 65 families (Appendix D.) The flora of eastern Montana is poorly known, and this preliminary District flora is much larger than the preliminary flora compiled for all of Rosebud County (Anon. No date). Although the study was far from thorough as a floristic baseline, many new records for southeast Montana were located based on comparing the preliminary District flora with the distribution information presented in Dorn (1984).

Table 1. Target Species Documented in the Ashland District

SCIENTIFIC NAME	TOTAL # OF EOs	ORIGINAL G/S RANK	REVISED SRANK	CURRENT USFS STATUS	RECOMM. USFS STATUS
<i>Agastache foeniculum</i>	4	G4G5 SU	SU	-	-
(<i>Amorpha canescens</i>) ¹	(1?)	G5 S1	SH	-	Watch
<i>Astragalus barrii</i>	8 (7)	G3 S3	S3	Sensitive	Sensitive
<i>Carex gravida</i>	2	G5 S1	S1	-	Sensitive
<i>Carex torreyi</i>	16	G4S1	S3	-	-
(<i>Ceanothus herbaceus</i>)	1	G?T? S1	SH	-	Watch
(<i>Cypripedium calceolus</i> var. <i>parviflorum</i>)	1	G5Q S2S3	S2S3	Sensitive	Sensitive
<i>Dichanthelium oligosanthes</i> var. <i>scribnerianum</i>	3	G5T5 S1	S1	-	-
<i>Elatine americana</i>	1	G4 SU	SU	-	-
<i>Evax prolifera</i>	1	G5 S1	S1	-	-
<i>Geum canadense</i>	2	G5 SU	SU	-	Watch
<i>Ipomopsis congesta</i> var. <i>pseudotypica</i>	15	G4T?	S3	-	-
(<i>Mentzelia nuda</i>)	1	G5 S1	S1	-	-
<i>Sphenopholis obtusata</i> var. <i>major</i>	0 (6)	G5T5 S2	S1	-	?

¹Species in parentheses were not found during this study, but are known or suspected to occur in the Ashland District.

Rare Plant Species on the Ashland District

Species locations from the Montana Natural Heritage Program, March 13, 1996

Amorpha canescens Pursh
LEADPLANT
Fabaceae

1. FEDERAL STATUS

a. **U.S. FISH AND WILDLIFE SERVICE:** None.

b. **U.S. FOREST SERVICE:** None.

2. **STATE:** G5 S1 (status undetermined). This study provides basis for changing the rank to "SH" (known in the state only from historic records).

B. DESCRIPTION

1. **GENERAL NONTECHNICAL DESCRIPTION:** Lead plant is a shrub with few to several, erect or ascending, simple or sparingly branched stems, 3-8 dm (1-2 ft.) high (Figure 4). In marginal sites, the plant may die back to near the base each year. The alternate leaves have a short petiole and 27-41 narrowly elliptic leaflets, 8-15 mm (ca. 0.5 in.) long. Foliage is covered with very dense, short white hairs, giving the plant a hoary appearance. The bright violet flowers are borne in dense spike-like inflorescences, 7-15 cm (3-6 in.) long, arising on long stems from the leaf axils. Each small flower has a single petal longer than the densely hairy calyx that is ca. 2 mm long. There are 10 stamens exerted beyond the petal, with a conspicuous orange color that contrasts with the violet petal color. The glandular, hairy fruits are 4 mm long and egg-shaped with a long beak.

2. **TECHNICAL DESCRIPTION:** Erect or ascendent shrub, often rhizomatous, 3-8 dm tall; stems 1-several, often branched, usually tomentose but becoming glabrate. Leaves alternate, odd-pinnate; leaflets 13-20 pairs plus 1; leaflet blades ovate-oblong, oblong-elliptic, or rarely ovate, usually canescent, marginally entire or slightly revolute, apex obtuse to broadly rounded or emarginate with a slender brownish mucro, basally obtuse or rounded; petioles 0.5-3 mm long, densely pubescent; stipules inconspicuous, caducous, 1-3.5 mm long, pustular glands absent; petiolules 0.5-1 mm long, stipules acicular. Inflorescence of several racemes in axils of upper leaves and forming a compound cluster, mostly 3-30 or more in number; racemes densely flowered, turbinate, ca. 2 mm long, densely pubescent, hairs somewhat obscuring resinous glands, lobes 5, triangular lanceolate; petal 1, bright violet, broadly obcordate, with a slender claw, incurved and enclosing stamens and pistil; stamens 10, lower 2 mm of filaments united into a tube; ovary ca. 1 mm long, densely pilose, style 4-6 mm long, densely antrorse pubescent. Legume

3.5-4 mm long, ca. 2 mm wide, with a stipelike base of style; seeds 2-2.8 mm long, 1-1.4 mm wide, olive-brown, smooth. Leaves odd-pinnate, alternate, sessile, or petiolate; stipules setaceous, caducous; leaflets entire to rarely crenulate, glandular-punctate or punctate, petiolate, stipulate on upper side. Inflorescences a stipelike terminal raceme or racemes clustered and appearing paniculate. Flowers pedicellate from axil of a caducous bract; calyx obconic, persistent, 5-lobed; corolla reduced to a single petal which is erect, clawed, obovate, purple, and wrapped around stamens and style; stamens 10, monadelphous at very base, distinct above, exserted. Fruit a 1-seeded, indehiscent pod, gland-dotted (Great Plains Flora Association 1986).

3. **LOCAL FIELD CHARACTERS:** Leadplant might be confused with members of the *Dalea* and *Psoralea* genera, but these plants are not truly shrubs, and they have leaves with conspicuous resin-like glands.

C. GEOGRAPHICAL DISTRIBUTION

1. **GLOBAL RANGE:** Great Plains, east to Indiana, south to Texas, and west to Manitoba, Wyoming, and New Mexico.
2. **STATE DISTRIBUTION:** This species is known in Montana from two collections: a 1948 collection in the area of Albion in Carter County, and a 1922 collection from a Forest Service ranger station. No other locality information was provided with the latter, but elevation was listed as "3000 ft." and aspect as "NW." Only the Ashland District in Powder River county has ranger stations close to this low elevation in Montana, so it can only be conjectured that the Ashland District harbored the species.
3. **STUDY AREA DISTRIBUTION:** The District ranger station with the closest elevation is the Ashland Ranger Station where the District Office is headquartered at 2920-3040 feet. The Twenty Mile Ranger Station is at 3,150 feet and the Fort Howe Ranger Station is at 3,350 ft. The hypothesis that this species occurs at the District Office was not developed before the field season, so survey work was not conducted at the Ashland Ranger Station.

No detailed information is available for the species on the following subjects as pertinent to the District or to the state distribution as a whole:

- D. **HABITAT**
- E. **POPULATION BIOLOGY AND DEMOGRAPHY**
- F. **POPULATION ECOLOGY**
- G. **LAND OWNERSHIP (MONTANA)**

Gleason, 1958

Amorpha canescens

on or near the Ashland Ranger District, Montana

?

- H. **ASSESSMENT AND MANAGEMENT RECOMMENDATIONS:** The collection label information indicated that the species was heavily browsed by horses and cattle. This species is variously described as an increaser or decreaser elsewhere in its range, depending on range site and location.

SUMMARY: Leadplant is a distinctive range plant which apparently acts as a decreaser in the Ashland District setting and which should be added to the watch list.

Astragalus barrii Barneby
BARR'S MILKVETCH
Fabaceae

The following text represents an update to the species' status report prepared for the Custer National Forest (Schassberger 1990). It focuses on information which has been expanded or revised from the previous work in the course of this study.

A. **PRESENT LEGAL OR OTHER FORMAL STATUS**

1. **FEDERAL STATUS**

- a. **U.S. FISH AND WILDLIFE SERVICE:** Category 3C (USDI Fish And Wildlife Service 1993). This signifies that the species has "proven to be more abundant or widespread than previously believed and/or...(is) not subject to any identifiable threat."

- b. **U.S. FOREST SERVICE:** Sensitive (Forest Service 1995).

2. **STATE:** G3 S3 (impaired or vulnerable in the state). With fewer than 100 occurrences, the species would typically be considered "impaired;" however, almost half of its 30 known occurrences are on national forest lands, where it is recognized as "sensitive," and where habitat threats are limited.

- B. **DESCRIPTION:** Information on local field characters has been augmented to differentiate between *Astragalus barrii* and *A. hyalinus*; the latter is newly documented from the study area. Nontechnical and technical descriptions are reprinted for reference from Schassberger (1990).

1. **GENERAL NONTECHNICAL DESCRIPTION:** *Astragalus barrii* forms dense mats (cushions), which rarely exceed 10.2 cm (4 in.) in height (Figure 5; Appendix E-1). Prostrate woody stems give rise to numerous leaves, each made up of 3 narrowly elliptic leaflets that are 1-4 cm (3/8-1 1/2 in) long. Both

the stems and leaves of *A. barrii* are densely covered with short, white hairs. Iridescent bluish-purple to pinkish-purple flowers arise on short stalks throughout the mats on narrow, open, few-flowered inflorescences. The petals are 7-17 mm long. The calyx is 3-5 mm long and densely covered with long, white hairs. The sparsely white-hairy pod is narrowly elliptical, 4-8 mm long, and 1-2 mm wide. In Montana, this species blooms from late April to mid-June and later forms narrow, egg-shaped, one- to few-seeded pods (adapted from Reel *et al.* 1989).

2. **TECHNICAL DESCRIPTION:** Perennial, low cushion forming plant, up to 1.5 dm (4.5 dm) in diameter, with stems reduced to leafy crowns that arise from a closely forking suffruticulose caudex; herbage silvery-strigose with dolabriform hairs up to 1.4 mm long; stipules 4-8 mm long, glabrous dorsally; leaves 1-4 cm long, the 3 leaflets linear-oblongate, oblanceolate or elliptic-ovate, acute or acutish, 3-12 mm long; peduncles slender, 7-16 mm long and shorter than the leaves; raceme loose, (1) 2-4 flowered, with the fruiting axis up to 5-15 mm long; calyx (4.6) 5.5-7.1 mm long, the deeply campanulate or subcylindric tube 3.6-5.1 mm long, the teeth (1.2) 1.5-2.4 mm long; petals pink-purple, the obovate-cuneate or broadly oblanceolate banner (9.6) 10.5-16.7 mm long; wings 9.1-13.5 mm long, the claws 4.1-5.5 mm; anthers (0.45) 0.5-0.7 mm long; pod narrowly lance-ellipsoid, 4.5-6.5 mm long, 1.2-1.8 mm in diameter just above the rounded base and tapering into a slightly incurved lance-subulate beak about as long as the fertile portion, obscurely triquetrous in the lower half, somewhat flattened dorsally, the valves papery, silvery-strigulose; ovules (7) 9-11; seeds (often only one maturing) oblong, scarcely compressed, dull purplish-green, smooth but not lustrous, ca. 2 mm long (adapted from Barneby 1956).
3. **LOCAL FIELD CHARACTERS:** Specimens of *A. barrii* can only be determined with certainty from other species of *Astragalus* that have compound leaves with 3 leaflets and mat forming habit when in flower. Vegetatively, *Astragalus barrii* is similar to *A. gilviflorus*, *A. hyalinus*, *A. sericoleucus*, and *A. aretioides*, and they overlap somewhat in their geographic distributions. In the field, *A. barrii* is distinctive for its small, iridescent, bluish-purple to bluish-pink flowers.

Astragalus sericoleucus has pink-purple flowers with a paler horizontal band, but the flowers are about one-half the size of *A. barrii* flowers. It is not known from the Ashland District area, though occurs nearby in Big Horn County.

The field characteristics of *A. barrii* are most similar to *A. aretioides*; however, the latter has smaller flowers and is more densely mat-forming. It is not known from the Ashland District, and is found at higher elevations in the Pryor Mountains of Carbon County, Montana.

ASTRAGALUS BARRII

ASTRAGALUS BARRII

on or near the Ashland Ranger District, Montana

Species locations from the Montana Natural Heritage Program, March 04, 1996

Astragalus gilviflorus has large cream to yellowish flowers, sometimes with purple etching. It is found throughout the Ashland District and much of Montana.

A. hyalinus has cream to whitish flowers that are typically larger than those of *A. barrii*. The petals are quite hairy on their backs (can be seen with a hand lens). It was first discovered in the state in 1976 and had been tracked as a State Species of Special Concern, known only from the Pryor Mountains. Documentation of its abundance in the Pryor Mountains (Lesica and Achuff 1992) provided the basis for taking it off of the state list. It had not been recorded from the Ashland District until the time of this study, when it was documented by David Schmoller, Biological Technician with the Ashland District, and verified by Matt Lavin, Montana State University (MONT). Because the *Astragalus barrii* survey was targeted for early in the season, while *A. hyalinus* flowered later in the season, we cannot be certain of the identification of populations containing only vegetative material. This is detailed in the study area distribution discussion (below).

An unusual population of white-flowered milkvetch was found in the study area. The flowers were within the size range of *A. barrii*, but were white and strigose dorsally and the banner petals had purple veins (Appendix E-2). In *A. hyalinus*, the petals are cream with purplish tips, with no mention of veins (Great Plains Flora Association 1986). However, populations are occasionally found with veins on the banners (Matt Lavin, Montana State University, pers. comm.). A summary of species characteristics is presented in Table 2. The small-flowered population was characterized as being *A. hyalinus* by Dr. Lavin, who noted that small-flowered populations of *A. hyalinus* are occasionally found. This size dimorphism may be attributable to moisture availability. David Schmoller later found several populations of *A. hyalinus* with normal sized flowers.

In the study area, *Astragalus hyalinus* can be very similar in growth habit to *A. barrii*, at least when it occurs in the habitat to which *A. barrii* is restricted. Six populations in vegetative condition that were tentatively identified as *A. barrii* during this study and in earlier surveys were subsequently determined to be *A. hyalinus* by Schmoller (pers. comm.), who found them in flower (whether these populations had small or normal sized flowers is not known). With the documented presence of *A. hyalinus* in Badlands segments of the study area, reliable identification should only be made with flowering material (Matt Lavin, Montana State University, pers. comm.). Fruiting material may not be reliable because *A. hyalinus* can have short peduncles though it typically has none (Great Plains Flora Association 1986), and vegetative growth may obscure peduncles in *A. barrii* (Marriott pers. obs.).

Four populations were found only in vegetative condition during this study in *A. barrii* habitat. Visits to these sites during the flowering season are needed. Barr's milkvetch is known to bloom early, from April into June. The phenology of *A. hyalinus* in the study area is not as well understood. Although thought to be an early-season species, populations that were strictly vegetative in the first half of June were flowering in early July (Schmoller pers. comm.). The small-flowered population was in early flower on June 21. The unusually wet and cool season may explain the delayed flowering of *A. hyalinus*.

C. GEOGRAPHICAL DISTRIBUTION

1. **GLOBAL RANGE:** A regional endemic, *A. barrii* is known from southeastern Montana, southwestern South Dakota, and northeastern Wyoming.
2. **STATE RANGE:** In Montana, *A. barrii* is currently known from 29 occurrences in Powder River (18), Bighorn (3), and Rosebud (7) counties (Figure 6). In addition, there is one historical record from Carter County that has never been relocated. There are also 7 Powder River County sites that are not included in the tallies because they are held in question.
3. **STUDY AREA DISTRIBUTION:** The 15 known sites are depicted in Figure 6, including 2 new records of *A. barrii* documented during this study. The presence of *A. hyalinus* in the study area provides basis to question all previous determinations based on plants in vegetative condition, due to the similarity of the two species during this stage. Information on three previously recorded populations in vegetative condition and four new records in vegetative condition remain in the database. These seven records are not included in the tally of 15 sites mentioned above, though they are shown on the Figure 6 distribution map and included among the printouts (Appendix C). They require revisits to make definitive distinction between *A. barrii* and *A. hyalinus*.

Study area distribution of the eight known population sites is centered around the Otter Creek drainage. The seven additional occurrences which warrant confirmation represent extensions northward and southward, and are important in understanding District distribution.

Survey was not conducted outside of the Ashland District, though there is potential habitat on lands south of Ashland on the east side of the Tongue River and southwest of Ashland on the west side of the Tongue River (on the Northern Cheyenne Indian Reservation).

Table 2. Summary of characters for *Astragalus barrii*, *A. hyalinus*, and small-flowered population of *A. hyalinus* found in study area.

	<i>Astragalus barrii</i>	<i>Astragalus hyalinus</i>	<i>Marriott 11545</i>
stipule pubescence	ciliate on margins	ciliate on margins	ciliate on margins
peduncle length	7-24 mm	none - 3.5 mm	none to very short
calyx tube	3.5-5 mm	5.5-7 mm	5 mm
banner length	10-16 mm	12-18 mm	10.5 mm
banner color	purple with light purple veins*	whitish corolla with purplish tips	yellowish-cream with purple veins
banner pubescence	very sparse dorsally to glabrous*	villous dorsally	strigose dorsally
wing length	9-13 mm	10-17 mm	slightly <10 mm
keel length	7.5-10 mm	10-13 mm	8.5 mm

All character descriptions for *A. barrii* and *A. hyalinus* are from Great Plains Flora Association (1986), with the exception of those with an asterisk (*), which are based on personal observations in the study area. All measurements of *Marriott 11454*, other than keel and banner length, were made on fresh material; these two characters were measured after specimens had dried.

Vegetative material at four locations was unable to be definitively identified as *A. barrii*. Because these sites are remote from the known populations, confirming their identity is necessary for understanding species distribution on the District. Three populations previously identified as *A. barrii* based on vegetative material need clarification in light of the *A. hyalinus* discovery. The seven undetermined sites follow:

Bloom Creek in Powder River County (034)
Drop Tube Reservoir of Powder River County (033)
Lyon Creek Ridge of Powder River County (014)
North Bloom Creek in Powder River County (032)
NW Buttriss in Powder River County (017)
Wilbur Creek in Powder River County (036)
Sheep Well Road in Powder River County (020)

Seven additional prospective populations were noted in vegetative condition and later visited by David Schmoller who found flowering *A. hyalinus*:

Camps Pass in Powder River County
East Fork Drainage in Powder River County
Erickson Spring in Powder River County
O'Dell Creek in Rosebud County
Slough Grass Reservoir
South Fork of Poker Jim Creek in Rosebud County
Tenmile Creek in Powder River County (with aberrant *A. hyalinus*)

D. HABITAT - The following text is elaborated from Schassberger (1990).

1. **ASSOCIATED VEGETATION:** A very sparse cover of *Pinus ponderosa* (ponderosa pine) or *Juniperus scopulorum* (Rocky Mountain juniper) is found at some locations, but often only a sparse shrub cover of *Artemisia tridentata* (big sagebrush) and/or *Atriplex confertifolia* (shadscale) is present. Vegetative cover of grasses and forbs at these sites is low, with few dominant species (Appendix E-3).

All but one of the sites in southeastern Montana occur in the Clayey and Shallow Clay Range Site Association (Ross and Hunter 1976). This association is described as occurring in the 10-14 inch precipitation zone with dominants western and thickspike wheatgrass, green needlegrass, little bluestem, bluebunch wheatgrass, prairie junegrass, native legumes, big sagebrush, Nuttall saltbush, and winterfat.

In the Custer National Forest, associated species are:

Agropyron spicatum (bluebunch wheatgrass)
Allium textile (textile onion)
Andropogon scoparius (little bluestem)
Artemisia frigida (fringed sagewort)
Artemisia tridentata (big sagebrush)
Astragalus gilviflorus (threeleaved milkvetch)
Astragalus spathulatus (tufted milkvetch)
Atriplex confertifolia (shadscale)
Bouteloua gracilis (blue grama)
Calamovilfa longifolia (prairie sandgrass)
Chrysothamnus nauseosus (common rabbit-brush)
Comandra umbellata (bastard toad-flax)
Cryptantha celosioides (northern cryptantha)
Eriogonum pauciflorum (few flowered-buckwheat)
Festuca idahoensis (Idaho fescue)
Gutierrezia sarothrae (broom snakeweed)
Haplopappus acaulis (cushion goldenweed)
Haplopappus armerioides (thrifty goldenweed)
Hymenopappus filifolius (Columbia cut-leaf)
Juniperus scopulorum (Rocky Mountain juniper)
Koeleria macrantha (prairie junegrass)
Linum perenne (blue flax)
Musineon divaricatum (leafy musineon)
Opuntia polyacantha (plains pricklypear)
Oxytropis sericea (white locoweed)
Phlox hoodii (Hood's phlox)
Phlox alyssifolia (alyssum-leaved phlox)
Pinus ponderosa (ponderosa pine)
Poa secunda (Sandberg's bluegrass)
Yucca glauca (soapweed)
Zigadenus venosus (meadow death-camas)

2. **TOPOGRAPHY:** In southeastern Montana, *A. barrii* is restricted to heavy clay ("gumbo") knobs, buttes, and barren hilltops, most often of a particular calcareous, soft shale and siltstone complex. The calcareous clay soils in which *A. barrii* occurs are likely to be low in organic matter, as these locations are sparsely vegetated. These sites range from level areas to steep slopes (0-35%). Most sites occur on intermediate slopes (3-8%). Elevation range is 3,140 - 4,160 feet. Many of the populations are located along rivers or streams, where downcutting has exposed shale and siltstone outcrops.

Astragalus barrii populations are associated with the harsh edaphic and environmental conditions of badlands areas. These areas receive limited

rainfall and are subject to high light intensities; thus, soil water evaporation is high and is probably a limiting factor in plant establishment and survival. This species often occurs on barren, eroded microsites and may depend on the climate that maintains these sites. At some locations, particularly steep slopes, the soils erode during intense rain storms. Because of its cushion habit and dense foliage, soil is protected from water erosion beneath *A. barrii* plants; therefore, these plants frequently remain perched atop small pedestals of soil (Appendix E-4).

3. **SOIL RELATIONSHIPS:** *A. barrii* sites on the Custer National Forest are on the Midway soil series, and the study area distribution may be partially explained by soil properties. These soils are residuum from calcareous, platy, soft shale parent material, in which the clay is mostly a montmorillonitic mineral type (U.S. Department of Agriculture 1971). The pH of these soils, at 8.0, is quite high (Schassberger pers. measurement 1988; U.S. Department of Agriculture 1971), and the texture is silty to sandy. Soils that have a high content of expandable clay minerals (zeolite, montmorillonite) have a high cation exchange capacity and hold water longer. However, the high pH of the soils in Montana limits the availability of iron and manganese (Hausenbueller 1972). One or more of these soil characteristics may influence the distribution of this species directly. Alternatively, such characteristics could indirectly affect *A. barrii* by restricting the establishment of other plant species, thereby limiting interspecific competition.

Like *A. barrii*, the similarly tufted species, *Astragalus hyalinus* occupies Badlands slopes, but tends to be on coarse sandstone parent material in the study area, rather than on shale or siltstone (Schmoller pers. comm.). In the Pryor Mountains, *A. hyalinus* is on a wide range of sandy to clay soils (Lesica and Achuff 1992). *A. barrii* occurs on sandstone in Montana and elsewhere, so that soil texture does not differentiate the habitats of these two species rangewide. This potential distinction in soil relationships has not been examined with rigor in the study area.

In South Dakota, within the White River drainage, *A. barrii* appears to be restricted to barren outcrops or erosional remnants of one specific geologic unit: the Rockyford Ash Member of the Sharps Formation. The Rockyford Ash Member is comprised of a zeolitic volcanic ash; zeolite minerals are functionally similar to vermiculite and montmorillonite (David Ode pers. comm. to Schassberger).

E. POPULATION BIOLOGY AND SPECIES BIOLOGY

1. **PHENOLOGY:** An early-blooming species, *Astragalus barrii* flowers from

late April to early June, depending on climate conditions, slope, and aspect. At many sites, extensive vegetative mats were observed without flowers. It is not known if this condition is due to senescence of individuals, advanced succession within the habitat, or mistaken identification of *Astragalus hyalinus*.

Flowers or their remnants are necessary to distinguish the two species, and both species may remain in vegetative condition under stress. The phenology of *A. hyalinus* in the study area is less well understood. While considered to be an early-season species, it did not begin flowering until early July in the relatively cool 1995 growing season (Schmoller pers. comm.). The flowering activity of *A. barrii* may have overlapped with that of *A. hyalinus* during June of other years.

2. **POPULATION SIZE AND CONDITION:** Of the 29 currently known populations of *A. barrii* in Montana, the largest populations occur in Powder River County. In Montana, most populations are large, and range from ca. 50 to 3,000 plants (mean ca. 1000). The individual plants of a population are often broadly dispersed across the landscape; therefore, canopy coverage of this species is often low. Population distribution appears to be related to available substrate and may be divided into clusters, or subpopulations that correspond with the local outcrop pattern.

The Custer National Forest sites receive a different moisture regime than surrounding areas, and support more successional advanced habitats. Large *Astragalus* spp. mats in these habitats were noted; because only vegetative material was found, however, identification of these mats remains undetermined.

3. REPRODUCTIVE BIOLOGY

- a. **TYPE OF REPRODUCTION:** Reproduction is strictly by seed. Flowers are not necessarily produced every year, perhaps corresponding with climate or competition. Although the potential life span and population age structure for this species is unknown, other members of the group Orophaca can live in excess of 25 years (Locklear 1986). Compared to related species, Barr's milkvetch is considered prolific with fertile pods (Barneby 1964).
- b. **POLLINATION BIOLOGY:** Insect-pollinated
- c. **SEED DISPERSAL AND BIOLOGY:** Apparently only one seed reaches maturity within each pod of *Astragalus barrii* (Barneby 1964)

from Schassberger 1990). It is believed that seeds fall, remaining near the parent plant, and are aided by gravity on steep slopes, since the seeds have no appendages to aid in long-distance dispersal.

4. BIOLOGICAL INTERACTIONS

- a. **COMPETITION:** Species in the genus *Astragalus* rarely tolerate direct competition or shade cast by other plants (Barneby 1964). Most populations are on barren ground. Total foliage cover rarely approached or exceeded 50%. Sites with large non-flowering plants appeared to be in successional advanced settings with relatively high foliage cover; however, this could also be explained by climate.
- b. **HERBIVORY:** None observed.
- c. **FIRE:** A large portion of one site (NW Buttress Taylor Butte 017) was within an area that had burned nearly 20 years ago. Ground or crown fire would rarely spread in its habitat under most conditions. It is therefore possible that these plants are adapted to landscapes in which fires maintain and expand potential habitat for them.

F. **LAND OWNERSHIP (MONTANA):** Land ownership for the currently known flowering occurrences of *Astragalus barrii* in Montana is as follows:

1. **U.S. Forest Service (Custer National Forest)²:**

Stag Rock Knolls (010)
Fort Howe Ridge (011)
Taylor Butte Rim (012)
Stag Rock Cliff Tops (013)
King Creek Well (015)
Stag Rock Reservoir Ridges (016)
Otter Creek (031)*
Horse Creek/Otter Creek (037)

2. **U.S. Bureau of Land Management (Miles City District)³:**

Butte Creek (002)

²Sites with an asterisk (*) span U.S. Forest Service and private land.

³Sites with an asterisk (*) span U.S. Bureau of Land Management and private lands.

Bobcat Creek (008)*
Wild Bill Creek (009)
Gate Creek (018)*
South Fork Wright Creek #2 (023)
Ranch Creek #1 (024)*
Bell Creek (026)
Stellar Creek Road (030)

3. Department of State Lands:

Biddle School Section (007)

4. Private lands (exclusively):

Biddle (001)
Decker (003)
Colstrip (004)
Miller Coulee (005)
Ekalaka (006)
O'Dell Creek Buttes (019)
Scoles Ranch Road (021)
South Fork Wright Creek #1 (022)
South Biddle (025)
Colstrip SE (027)
Spring Creek #1 (028)
Spring Creek #2 (029)

G. ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

- 1. THREATS TO CURRENTLY KNOWN POPULATIONS:** Coal mining is an existing and potentially localized threat for occurrences outside of the study area in Rosebud County. Quarrying and exotic species encroachment are low-level existing threats found throughout the state.
- 2. MANAGEMENT PRACTICES AND RESPONSES:** This species is found on secondary range and has a low, tufted growth form and early-season flowering. Therefore, it is minimally affected by grazing management, unless livestock developments are placed near populations, or unless grazing fosters weed encroachment or major successional shifts that otherwise increase competition.

The species may be affected by herbicide spraying and early-season pesticide spraying. There are localized invasions of yellow sweetclover (*Melilotus*

officinalis) and a weedy native species called Venus looking glass (*Triodanis perfoliata*) which now dominate the habitat. Such invasions seem to correspond with heavy grazing in directly adjoining habitat.

3. RECOMMENDATIONS FOR MAINTAINING VIABLE POPULATIONS

- a. **PROTECTION OF NATURAL HABITATS THAT CURRENTLY SUPPORT LARGE POPULATIONS:** Several sites with large populations appear to be buffered against drought conditions (Biddle School Section 007; King Creek Well 015 and Taylor Butte Rim 012). Recognition of these sites as natural areas or as botanical special interest areas with Barr's milkvetch elevated to a management priority would contribute to long-term viability of the species in the state.
- b. **REGULATION OF ACTIVITIES DIRECTLY ADJOINING NATIVE HABITATS THAT SUPPORT LARGE POPULATIONS:** Proposed disturbances within or near any of these documented populations should be preceded by detailed survey of the populations in these areas. Further, mitigation measures should be developed to reduce or to eliminate the impacts of management activities. It is appropriate to address this species in allotment and weed management plans and in quarrying permits.

- 4. **RECOMMENDATIONS FOR FURTHER ASSESSMENT:** In order to characterize its status and distribution on the District, revisits to the seven sites of putative *Astragalus barrii* in vegetative condition are needed. Survey work is also recommended for public lands elsewhere in the two counties, concurrently with extended information-gathering on *Ipomopsis congesta* var. *pseudotypica* when it is in flower (see separate discussion for this taxon).

SUMMARY

Astragalus barrii is one of few species endemic to the Great Plains. Most of the species in the Great Plains flora have extensive ranges (Great Plains Flora Association 1986). The 8 occurrences of *A. barrii* on the Ashland District represent the only public lands occurrences in Montana that are covered under a sensitive species program. Recognition as a sensitive species should continue; taxonomic confirmation at the seven additional sites is of prime importance.

Carex gravida Bailey
PREGNANT SEDGE
Cyperaceae

A. PRESENT LEGAL OR OTHER FORMAL STATUS

1. FEDERAL STATUS

- a. U.S. FISH AND WILDLIFE SERVICE: None.
- b. U.S. FOREST SERVICE: None.

2. STATE: G5 S1 (critically imperiled in Montana).

B. DESCRIPTION

- 1. GENERAL NONTECHNICAL DESCRIPTION:** Pregnant sedge is a grass-like plant that forms clumps of stems up to 6 dm (2 ft.) tall from short root stocks (Figure 7, Appendix E-5). Leaves are 4-8 mm wide and clustered near the base of the plant. Flowers are clustered in egg-shaped spikes ca. 1 cm long, the female flowers (perigynia) occupying most of the spike with a few male flowers at the tip. Spikes are aggregated at the top of the stem and subtended by 2-3 leaf-like bracts, shorter than the inflorescence. Scales subtending each perigynia are oval with a long point at the tip. The perigynia are 4-5 mm long and gradually tapering to a beak that is serrated on the edges and notched at the tip. There are few or no nerves visible on the outer face of the perigynia. There are 2 stigmas, and the seed is 2-sided.
- 2. TECHNICAL DESCRIPTION:** Leaf sheaths loose, nodulose-septate on back, with nerveless inner band truncate at summit; the lax blades 3.5-8 mm broad; culms thin and sharply angled scabrous, 0.3-1 m high; spikes greenish to drab, subglobose, approximate in a dense to slightly open ellipsoid head 1-3 cm long; scales long-acuminate to awn-tipped, nearly or quite as long and three-fourths as broad as perigynia; perigynia firm, drab or pale brown, narrowly to broadly ovate, 3.5-5.5 mm long, 2-3 mm broad, gradually tapering from near the middle into a beak with sharp teeth ca. 1 mm long, nerveless on inner, faintly nerved or nerveless on outer face (Gray 1970).
- 3. LOCAL FIELD CHARACTERS:** *Carex* is a large and difficult genus, and there are many species similar to *C. gravida*. It is not included in Dorn (1984), by which it keys to *C. hoodii*, a species which is also present in the study area. The awn-tipped scales of the perigynia distinguish it from *C. hoodii*. It is in the *Bracteosae* subgenus, and might be superficially confused with members of

Gleason, 1958

CAREX GRAVIDA

on or near the Ashland Ranger District, Montana

Species locations from the Montana Natural Heritage Program, March 04, 1996

the *Ovales* subgenus. The *Bracteosae* subgenus has androgynous spikes while the other has gynecandrous spikes. A hand lens or microscope and technical key are essential for positive determination.

C. GEOGRAPHICAL DISTRIBUTION

1. **GLOBAL RANGE:** Pennsylvania to Saskatchewan, south to Virginia, Missouri, Texas, and New Mexico.
2. **STATE DISTRIBUTION:** Known only from 4 collections including the 2 study area sites in Powder River and Rosebud counties, and from 2 collections in Big Horn County (Figure 8).
3. **STUDY AREA DISTRIBUTION:** The two known sites are at north and south ends of the District, at the heads of tributaries into the Tongue River (Figure 8). The southern site is at the head of Hay Creek above O'Dell Creek; the northern site is at the head of a side draw above the East Fork of Otter Creek. The species was sought in many areas in conjunction with surveys for *Carex torreyi*; it is rare and highly localized, however.

D. HABITAT

1. **ASSOCIATED VEGETATION:** *Carex gravida* occurs locally in mesic deciduous vegetation associated with watercourses (Appendix E-6). In the Ashland District, both sites were within a valley otherwise dominated by ponderosa pine. The East Fork of Otter Creek site (004) had scattered tall shrub thickets of serviceberry and a stand of quaking aspen. The Hay Creek site (002) was heavily shaded in its valley setting, with scattered tall chokecherry and graminoids. The two sites of tall shrub communities are not well-developed plant associations but are closely associated with woody draw types. Associated species for the study area and Big Horn County are as follows:

Amelanchier alnifolia
Apocynum androsaemifolium
Carex hoodii
Carex sprengelii
Carex torreyi
Crataegus columbiana
Fraxinus pennsylvanica
Poa interior
Poa pratensis
Populus tremuloides

Prunus virginiana
Rosa woodsii
Sanicula marilandica
Symphoricarpos occidentalis
Viola canadensis

2. **TOPOGRAPHY:** Both Ashland District sites are in the upper reaches of the bottom of narrow, steep-sided draws lacking surface watercourse. Both draw segments trend east-west, providing maximum shelter from the sun. Statewide elevations range from ca. 3800-4300 ft.
3. **SOIL RELATIONSHIPS:** Soils are well-drained loams with deep profiles compared to those on adjoining slopes. Silty alluvium had washed onto one of the Big Horn County collection sites, but there was no apparent surface runoff in the study area.

E. POPULATION BIOLOGY AND ECOLOGY

1. **PHENOLOGY:** This species has been collected in Montana between early June and late July. In the study area, fruiting began during the third week of June; the 1995 growing season was slightly more cool and moist compared with the average.
2. **POPULATION SIZE AND CONDITION:** Individuals were made up of robust, multi-stemmed clumps. The two study area populations were very small, with numbers ranging from 8-20 clumps and were aggregated.

The species was described as "common" in a green ash woody draw in Big Horn Co. (003). Green ash woody draws and their settings possible provide a more suitable habitat for large populations of *Carex gravida*.

3. REPRODUCTIVE BIOLOGY

- a. **TYPE OF REPRODUCTION:** Individual plants can reproduce vegetatively to expand the clump size and to form large clumps which may be very long-lived. Seed production is the only means of establishing new individuals.
- b. **POLLINATION BIOLOGY:** Outcrossing by wind pollination is common in the genus.
- c. **SEED DISPERSAL AND BIOLOGY:** Unknown.

4. BIOLOGICAL INTERACTIONS

- a. **COMPETITION:** In several study area settings that seemed suited for *Carex gravida*, Kentucky bluegrass (*Poa pratensis*) was dominant. This rhizomatous exotic grass outcompetes many native cespitose graminoids.
- b. **HERBIVORY:** No signs of herbivory were observed. The species is located in secondary range for livestock. Likely impacts are direct affects of grazing, indirect shift in vegetation, or competition fostered by grazing.
- c. **FIRE:** The Hay Creek site was in a valley with old-growth ponderosa pine. There were fire scars on the trees, and the distinctively open condition of the stand suggests that there have been ground fires within recent decades. We do not have information on the affect of crown fires, but removal of overstory cover is likely to promote a high competition situation in which *Carex gravida* may not survive.

F. LAND OWNERSHIP (MONTANA)

1. U.S. Forest Service:

Hay Creek (002) Note: this occurrence is near a private inholding boundary; hence, ownership may be split.
East Fork Beaver Creek (004)

2. Crow Indian Reservation:

Bar V Ranch (001)
Corral Creek (003)

G. ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

- 1. **THREATS TO CURRENTLY KNOWN POPULATIONS:** No imminent threats were identified, though the small existing populations are vulnerable. Local livestock water developments and fencing patterns have attracted the livestock to other draws or draw segments. Any major changes in livestock distribution within these allotments may affect the species.
- 2. **MANAGEMENT PRACTICES AND RESPONSES:** This species is expected to respond negatively to logging and any changes in livestock management that would increase use at its population sites.
- 3. **RECOMMENDATIONS FOR MAINTAINING VIABLE POPULATIONS:**

- a. Because of the species' longevity, its viability for these small populations is thought to be fair, despite their small size. Proposed disturbances within or near any of these populations should be preceded by detailed survey of the populations, and mitigation measures should be developed to reduce or to eliminate the impacts of management activities.
 - b. Livestock grazing directly adjoining native habitats should be managed in a manner which would not encourage use at the population sites. Water development, salt block placement, and fences should not be allowed near the populations and should not encourage trailing through the populations.
 - c. The population area near the East Fork of Otter Creek may be appropriate for special management designation and study due to its *Carex gravida* population and the presence of both *C. torreyi* and *Dichanthelium oligosanthes* var. *scribnerianum*.
4. **RECOMMENDATIONS FOR FURTHER ASSESSMENT:** Further survey of woody draws, particularly in the northern end of the District, is needed to round out the local distribution pattern for this and three other species. This study points to a greater need for woody draw sensitive species surveys in eastern Montana.

SUMMARY

Carex gravida is a plant of moist wooded habitat known from four occurrences in Montana. The restricted nature of its habitat, its apparent susceptibility to disturbance, and its small population sizes are reasons for concern regarding its viability in the state. Among the non-designated species considered in this study, *Carex gravida* is the strongest candidate for designation as sensitive by the U.S. Forest Service.

Carex torreyi Tuckerm.
TORREY'S SEDGE
Cyperaceae

A. PRESENT LEGAL OR OTHER FORMAL STATUS

1. FEDERAL STATUS

- a. U.S. FISH AND WILDLIFE SERVICE: None.
- b. U.S. FOREST SERVICE: None.

2. **STATE:** G4 S1 (critically imperiled). Based on this study, its state rank will be changed to "S3" (vulnerable in Montana).

B. DESCRIPTION

1. **GENERAL NONTECHNICAL DESCRIPTION:** Torrey's sedge is a perennial grass-like plant that forms small clumps of stems 2.5-4 dm (10-16 in.) tall from short-prolonged rootstocks (Figure 9, Appendix E-7). Leaves are 1.5-3.2 mm wide, well-developed, and on the lower third of the stem. Flowers are clustered in multiple spikelets, with the male (staminate) spike on top and 1-3 female (pistillate) spikes below, subtended by sheathless bracts, the lowest which is usually longer than the inflorescence. The pistillate spike is usually on a short peduncle, and is 6-16 mm long. The pistillate spikes are sessile of on a very short peduncle, 6-12 mm long, and closely 10-25-flowered. The female flowers (perigynia) are ascending on the spikelet, 2.5-3.2 mm long, obscurely triangular in cross-section, tapering at the base into a short stipe, and abruptly rounded and depressed at the apex. They have mostly 3 stigmas, and trigonous achenes which are pubescent (Hermann 1970). In Montana, fruits develop in mid to late June, depending on climate and local conditions, and usually persist for almost 3 weeks before dispersing.
2. **TECHNICAL DESCRIPTION:** Cespitose from short-prolonged rootstocks; culms slender, erect, 2.5-4 dm high, short-pubescent, very rough above, red-tinged at the base, usually exceeding the leaves; leaves 2 or 3 to a culm, on the lower one-third of the culms, short-pilose, flat with somewhat revolute margins, 1.5-3.25 mm wide, the sheaths tight, soft-pubescent, cinnamon-brown tinged, deeply concave at the mouth, the conspicuous ligule longer than wide; terminal spike staminate, linear-clavate, usually short-peduncled, 8-16 mm long, 2-4 mm wide; pistillate spikes 1-3, short-oblong, -12 mm long, 4-7 mm wide, closely 10-25-flowered, erect, sessile of short-peduncled, approximate or the lowest somewhat separate; bracts sheathless or nearly so, the lowest as long as or longer than the inflorescence, the uppermost much smaller; scales ovate-

orbicular, the lower acuminate, the upper acute, about half the length of the perigynia, reddish- to brownish-yellow with broad hyaline margins and three-nerved, green center; perigynia ascending, broadly ovoid or obovoid, 2.5-3.2 mm long, 1.9-2.2 mm wide, obscurely trigonous in cross-section, round-tapering at the base into a broad stipe, punctulate, glabrous, yellowish-green, strongly many-ribbed (fine), abruptly rounded and depressed at the apex and abruptly short-truncate-beaked; achenes obovoid, trigonous with concave sides, 2.5-1.75 mm, substipitate, and short-apiculate (Hermann 1970).

3. **DIAGNOSTIC CHARACTERISTICS:** The most distinguishing character of the species is its inflated perigynia with short, 0.1 to 0.6 mm beaks. It somewhat resembles a very minute watermelon, which tapers slightly towards the base, with a short but obvious beak on top. In addition, the lower bracts are sheathless or nearly so, and the lowest bract is shorter or equal to the length of the inflorescence. Lower spikes are mostly erect, and the terminal spike is entirely staminate (from Hermann 1970).

C. GEOGRAPHICAL DISTRIBUTION

1. **Global Range:** Manitoba to Alberta, south to Colorado, South Dakota, and Minnesota.
2. **State Distribution:** An historic collection was made in 1889 from Choteau County, in addition to more recent records from Big Horn, Carter, Powder River, and Rosebud counties (Figure 10).
3. **Study Area Distribution:** This species was documented at 15 locations, widely-scattered, mainly in the northern two-thirds (Figure 10).

D. HABITAT

1. **ASSOCIATED VEGETATION:** Within the study area, *Carex torreyi* occurs in a variety of sheltered woodland associations (Appendix E-8). It is found most often in drainage bottoms, but is also found on mesic north-facing slopes and their lower benches, and locally in meadow communities bordering woods. The deciduous cover is variable from trace to more often dominant. The trees generally range from 15 to 20 cm dbh, and canopy coverage ranges from under 20 to ca. 30 percent. Shrub cover ranges from 20 to 50 percent, and consists mostly of low-growing species such as *Mahonia repens*, *Prunus virginiana* saplings (less than 0.5 m tall), and *Toxicodendron rydbergii*. Graminoid cover is usually low, but in one case it is 70 percent. A variety of species includes several species of *Carex*, *Bromus ciliatus*, *Poa pratensis*, and *Stipa nelsonii*. Forbs range from 1 to 20 percent in cover, and include *Galium boreale*, *Apocynum androsaemifolium*, *Arenaria lateriflora*, and *Smilacina stellata*.

Plate 113. CAREX TORREYI

Hermann, 1970

on or near the Ashland Ranger District, Montana

A complete list of associated plant species follows:

Actaea rubra
Agastache foeniculum
Amelanchier alnifolia
Apocynum androsaemifolium
Arctostaphylos uva-ursi
Arenaria laterifolia
Arnica cordifolia
Bromus ciliatus
Carex brevior
Carex foena
Carex hoodii
Carex rossii
Carex sprengelii
Cornus stolonifera
Crataegus
Disporum trachycarpum
Fragaria virginiana
Galium boreale
Geum canadense
Heuchera richardsonii
Monarda fistulosa
Pinus ponderosa
Prunus virginiana
Ribes spp.
Sanicula marilandica
Smilacina stellata
Smilax herbacea
Stipa nelsonii
Symphoricarpos occidentalis
Thalictrum dasycarpum

Note: *Carex torreyi* is the most common of the targeted woody draw species and was present at nearly all of the sites that hosted one of the other species.

In addition, there were a few sites where it was present in trace amounts in open meadow habitat at the edges or heads of draws, in dual association with the above species as well as with prairie or meadow species (*Agropyron caninum*, *Astragalus agrestis*, *Cirsium arvense*, *Festuca idahoensis*, *Lupinus argenteus*, *Poa pratensis*, *Sisyrhincium montanum*, *Solidago* spp.)

2. **TOPOGRAPHY:** Frequency and population numbers were highest in drainage bottom settings, but the species also occurred on north-facing

midslopes and lower benches at the upper end of draws with well-developed meadow communities (i.e. below a spring northeast of Poker Jim Butte), as well as above localized settings with groundwater seepage (i.e. the Home Butte wetland thickets).

3. **SOIL RELATIONSHIPS:** Soils are dark, silty and sandy loams that remain moist through most of the growing season and are often temporarily saturated in early spring. Soils usually contained a rich humus layer and pine duff.

E. POPULATION BIOLOGY AND DEMOGRAPHY

1. **PHENOLOGY:** Fruits (perigynia) were beginning to mature in late June during the relatively cool, somewhat late 1995 growing season. *Carex torreyi* has been collected from mid June through July in Montana. It readily loses its fruits and cannot be identified with certainty when it dries late in the growing season.
2. **POPULATION SIZE AND CONDITION:** Population sizes in the study area are the largest known in Montana, ranging from 5-1000+. All have fewer than 100 plants, except for the large population near the East Fork of Otter Creek. Rangewide the species has been characterized as "rare and local" in dry foothills settings (Hermann 1970). Identification of individual plants can be difficult due to the loosely cespitose growth form. Areas occupied range in size from 2 to 3 acres, but the plants are concentrated within smaller locales.
3. **REPRODUCTIVE BIOLOGY**
 - a. **TYPE OF REPRODUCTION:** Most clumps had multiple flowering stalks. *Carex torreyi* also reproduces vegetatively via rootstock offshoots on the perimeter of cespitose clumps.
 - b. **POLLINATION BIOLOGY:** Outcrossing by wind pollination is common in the genus.
 - c. **SEED DISPERSAL AND BIOLOGY:** Unknown.

F. POPULATION ECOLOGY

1. **COMPETITION:** Torrey's sedge occupies habitat that is widely subject to exotic species invasion, including species which often crowd out native species (*Bromus tectorum*, *Poa pratensis*). Its population numbers are consistently low under high competition settings, where it persists only at the edges of the microrelief and ecotone.

2. **HERBIVORY:** The species is absent from areas which are grazed, and grazing is widespread in its potential habitat, suggesting that it is a decreaser under most conditions or that it is indirectly affected by trampling. Unfortunately, potential habitat is often heavily used because it is usually associated with some of the best local sources of water, shelter, and productive forage.
3. **FIRE:** The Cabin Creek population had burned in 1988 wildfires, where crown fires killed the tree overstory. Plants appeared vigorous, perhaps in response to the nutrient influx and higher light intensities. The surrounding vegetation was also vigorous in 1995; thus, the long-term stability of the population may be jeopardized by competition. The increased grazing activity and recent salvage logging activity in this area has fostered the spread of Canada thistle and has further jeopardized this plant's security.

G. **LAND OWNERSHIP (MONTANA):** The 15 occurrences in the study area are all on the Ashland District. In addition, there are three occurrences on the Sioux District and two on the Crow Indian Reservation. An historical collection was made near the Missouri River near Highwood Canyon that could be either on BLM or on private land.

H. ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

1. **THREATS TO CURRENTLY KNOWN POPULATIONS:** Most populations showed no recent signs of livestock use in the immediate vicinity. The most notable exception was along Poker Jim Creek (T5S, R44E, Sec. 5, SW 1/4).
2. **MANAGEMENT PRACTICES AND RESPONSES:** This species is expected to respond negatively to logging and to any changes in livestock management that would increase use at its population sites.
3. **RECOMMENDATIONS FOR MAINTAINING VIABLE POPULATIONS:** The species has similar requirements to *Carex grvida* for maintaining viable populations. It is a potential management indicator species; therefore, although sensitive species status is not warranted, recognition of some form may be appropriate for management planning purposes.
 - a. Proposed disturbances within or near any of these populations should be mitigated to reduce or to eliminate the impacts of management activities.
 - b. Livestock grazing in directly adjoining native habitats should be managed in a manner that does not encourage use at the population

sites. Water development, salt block placement, trailing, and fences should not be brought in close to the populations.

- c. In addition, the area of the largest population near the East Fork of Otter Creek may warrant special management designation and study, considering its exceptionally large *Carex torreyi* population in addition to the presence of both *C. gravida* and *Dichanthelium oligosanthes* var. *scribnerianum*.

4. **RECOMMENDATIONS FOR FURTHER ASSESSMENT:** The species should be included in woody draw sensitive species studies in eastern Montana for the purpose of testing its value as a management indicator species for rarer species.

SUMMARY

Carex torreyi is recurrent in localized mesic woodland settings over much of the District. It is usually present in low numbers and is likely to be negatively impacted by logging and grazing, so that its state rank has been changed to "S3" (vulnerable in Montana), and it may have use as a management indicator species. It does not warrant a special Forest Service status other than as an indicator species. This recommendation updates that presented in Heidel and Dueholm (1995).

Ceanothus herbaceus (Torr. & Gray ex S. Wats.) Shinners
syn. *C. herbaceus* Raf. var. *pubescens* (T. & G.) Shinners
NEW JERSEY TEA
Rhamnaceae

A. PRESENT LEGAL OR OTHER FORMAL STATUS

1. FEDERAL STATUS

- a. U.S. FISH AND WILDLIFE SERVICE: None.
 - b. U.S. FOREST SERVICE: None; this study provides the basis for recommending watch status.
2. STATE: G5 S1 (critically imperiled); this study provides the basis for changing rank to SH (known only from historic record).

B. DESCRIPTION

1. **GENERAL NONTECHNICAL DESCRIPTION:** New Jersey tea is a highly-branched shrub with stems up to 1 m (3.5 ft.) high (Figure 11). The alternate, lance-shaped to narrowly elliptic leaves are 2-6 cm long. They have serrated edges and are glabrous on top but hairy beneath. Numerous white flowers are born in congested, rounded inflorescences that terminate the growing branches. Each flower is ca. 2-3 mm high with 5 calyx lobes and 5 petals that have a linear basal portion and a hood-shaped blade. There are 5 stamens and a 3-lobed ovary. The fruit is a glossy, brown, 3-lobed, globose capsule that is 3-5 mm wide.
2. **TECHNICAL DESCRIPTION:** Bushy shrub, up to 1 m tall. Leaves oblong to elliptic, or lance-oblong to oblanceolate, 2-6 cm long, blunt to subacute, crenate-serrate with young teeth glandular, veins arising unevenly just above leaf base, upper surface glabrescent, lower surface villous. Panicles several, terminating leafy branches of the season, on peduncles 1-2 (5) cm long. Flowers are white; calyx lobes 5, 1.6 mm long, incurved; petals 5, hooded, 1.5 mm long, clawed $\frac{1}{2}$ length; stamens 5; ovary 3-lobed; surrounded by disk 1.5 mm wide and usually 10-lobed. Capsules 3-4.5 mm wide, 3-lobed, without crests; seeds about 2 mm long, surface smooth and glossy; brownish (Great Plains Flora Association 1986).
3. **LOCAL FIELD CHARACTERS:** The combination of simple alternate leaves, hood-shaped petals, and 3-lobed fruit help identify this as *Ceanothus*. *C. herbaceus* can be distinguished from other members

Gleason, 1958

CEANOTHUS HERBACEUS VAR. PUBESCENS

on or near the Ashland Ranger District, Montana

Species locations from the Montana Natural Heritage Program, March 04, 1996

of the genus by its narrower leaves, less than 2 cm wide, that are not shiny on the upper surface. These species do not overlap in their Montana distribution.

C. GEOGRAPHICAL DISTRIBUTION

1. **GLOBAL RANGE:** Quebec to Manitoba and eastern Montana, south to Georgia, Texas, and Colorado.
2. **STATE DISTRIBUTION:** Known only from the single historic collection (1948) in Powder River County.
3. **STUDY AREA DISTRIBUTION:** We were unable to relocate the 1948 population collection site in the course of this survey. The original collection noted that there were only a "few plants." The vague location information is more likely to correspond with public rather than with private land, yet it is possible that it was not collected on the national forest. If the species had been collected on the Ashland District, it may now be extirpated. An array of habitats were searched by Lesica (1984) and in this study. The generally overgrown habitat along the abandoned roadbed was not thoroughly searched, and should be the focus of attention for any extended survey work.

- D. HABITAT:** Habitat has been described as "rocky, open wooded hillsides, prairie, roadsides" (Great Plains Flora Association 1986). Dry, open woods are common in the vicinity of Sayle, where Montana's only known specimen was collected.

E. POPULATION BIOLOGY AND DEMOGRAPHY

1. **PHENOLOGY:** The previous Montana collection was made in flower on 17 June 1948. It is noted as having an indeterminate flowering from April to August (Great Plains Flora Association 1986), presumably depending on climate.
2. **POPULATION SIZE AND CONDITION:** Unknown.
3. **REPRODUCTIVE BIOLOGY**
 - a. **TYPE OF REPRODUCTION:** By seed.
 - b. **POLLINATION BIOLOGY:** Unknown.
 - c. **SEED DISPERSAL AND BIOLOGY:** Many members of this genus have seeds which are dispersed by birds. The original

collection was made in a roadside setting, which raises the question as to whether it may have been an accidental introduction.

- F. **POPULATION ECOLOGY:** Unknown. This species has diminished elsewhere on the Great Plains. Vegetation competition and woody encroachment are suspected (David Ode, South Dakota Natural Heritage Program, pers. comm.).
- G. **LAND OWNERSHIP (MONTANA):** The vague location given for the historic collection site (001) is on the Ashland District of Custer National Forest.
- H. **ASSESSMENT AND MANAGEMENT RECOMMENDATIONS:** This species should be kept in mind when conducting on-site work east of Sayle. The open pine woodlands and adjoining successional slopes at the upper end of Bloom Creek are thought to be the most likely natural habitat, but no upland settings should be ruled out. If it were relocated in natural habitat, then it would be appropriate for the Forest Service to consider it as being sensitive. The possibility that it was collected from disturbed roadside habitat along what is now abandoned roadbed was not exhaustively ruled out in this study.

SUMMARY

Ceanothus herbaceus is recommended for designation as watch. The only collection of this species in the state came from the Ashland District and is an historic record. Its state rank has been changed to "SH" (state historic).

Cypripedium calceolus var. *parviflorum*
SMALL YELLOW LADY'S-SLIPPER
Orchid Family

Verification is pending for the specimen of this species on file at the District Office. A copy of the Ashland District label information and a line drawing illustration of the species are presented below in the interim. This species is currently designated sensitive by the U.S. Forest Service - Region 1, and a detailed status report for the species is presented in Vanderhorst (1996).

Cypripedium calceolus
var. *parviflorum*
From Gleason 1969

We were unable to get a copy of the herbarium label for this species by the time the report went to press. The specimen on file at the Ashland District Office is to be consulted for any clues as to location and habitat on the District.

Dichanthelium oligosanthes var. *scribnerianum*
syn. *Panicum scribnerianum* Nash
SCRIBNER'S PANIC GRASS
Poaceae

A. PRESENT LEGAL OR OTHER FORMAL STATUS

1. FEDERAL STATUS

- a. U.S. FISH AND WILDLIFE SERVICE: None.
- b. U.S. FOREST SERVICE: None.

2. STATE: G5T5 S1 (critically imperiled).

B. DESCRIPTION

- 1. GENERAL NONTECHNICAL DESCRIPTION:** Scribner's panic grass is a perennial, forming clumps of simple or branched stems, 1-6 dm (4-24 in.) tall (Figure 12; Appendix E-9). Lower leaves are 3-10 cm (1-4 in.) long and 3-12 mm wide, while upper ones are short and relatively broad. Leaves are mostly glabrous, but the sheaths surrounding the stem are glabrous to long-hairy. There is a short fringe of hairs on the leaf where it meets the stem (ligule). Flowers are borne on short to long stalks arranged in a conical inflorescence, 3-8 cm (1-3 in.) high. Inflorescences of the main stems are larger than those of the branches. Each egg-shaped spikelet has one flower, ca. 3 mm long, consisting of two glumes enclosing a lemma and a palea that may or may not be hairy.
- 2. TECHNICAL DESCRIPTION:** Vernal culms 20 to 50 cm tall, glabrous or harshly puberulent, or sometimes ascending-pilose; sheaths striate, papillose-hispid to nearly glabrous; blades ascending or erect, 5-10 cm long, 6-12 mm wide, firm, rounded at the ciliate base, glabrous on the upper surface, appressed pubescent to glabrous beneath; panicle 4-8 cm long; spikelets 3.2-3.3 mm long, obovate, blunt, sparsely pubescent to nearly glabrous. Autumnal phase branching from the middle and upper nodes.
- 3. LOCAL FIELD CHARACTERS:** The relatively large, egg-shaped, single-flowered spikelets help identify this as *Dichanthelium*. This species branches mainly in the upper portions of the stem, while *D. wilcoxianum* usually branches near the base. A hand lens or microscope and technical key are essential for positive determination.

FIGURE 1004.—*Panicum scribnerianum*. Plant, $\times 1$: two views of spikelet, and floret, $\times 10$. (Vernal phase, McDonald 32, Ill.; autumnal phase, Umbach 2993, Ill.)

Hitchcock, 1971

DICHANTHELIUM OLIGOSANTHES VAR. SCRIBNERI

on or near the Ashland Ranger District, Montana

Species locations from the Montana Natural Heritage Program, March 04, 1996

C. GEOGRAPHICAL DISTRIBUTION

1. **GLOBAL RANGE:** Ontario to British Columbia, south throughout most of the United States and northern Mexico.
2. **STATE DISTRIBUTION:** In Montana, this species is known from five collections, including three collections on the Ashland District in Powder River County, and two collections made over 30 years ago from Lake County (Figure 12). Based on its presence in adjoining states, it could potentially occur in much of Montana, but this is not corroborated by collection data.
3. **STUDY AREA DISTRIBUTION:** Two new sites were documented in the course of this study, and we failed to relocate the historic collection near Bloom Creek (Figure 12). The two new sites are in the northern end of the district near the upper ends of draws coming off of the divide between Beaver Creek and the East Fork of Otter Creek.

D. HABITAT

1. **ASSOCIATED VEGETATION:** The two new occurrences were in *Pinus ponderosa*/*Mahonia repens* habitat type (Figure E-10). Both of the Lake County specimens were similarly collected in sandy pinelands. Associated species are:

Agropyron spicatum
Astragalus agrestis
Astragalus americanus
Carex deweyana
Carex sprengei
Crepis acuminata
Elymus glaucus
Euphorbia glyptosperma
Mahonia repens
Panicum scribnerianum
Penstemon gracilis
Pinus ponderosa
Poa pratensis

2. **TOPOGRAPHY:** Both populations were situated at the upper end of draws. The East Fork of Otter Creek occurrence (003) was situated in the bottom of a steep wooded draw on the lower south-facing slope. The Cabin Creek occurrence (002) was located at the gently-sloping upper end near the border between woodland and grassland.

3. **SOIL RELATIONSHIPS:** Soils are well-drained, coarse, sandy or gravelly loams.

E. POPULATION BIOLOGY AND DEMOGRAPHY

1. **PHENOLOGY:** The Lake County specimens of Harvey were collected in fruit on June 29 and July 1. In the study area, however, the species was beginning to produce vernal inflorescences much earlier in the burn site, as compared with the steep valley bottom; the latter began in the second week of July during the relatively cool, wet 1995 growing season conditions. The survey work conducted in 1995 was not optimally timed for this species. Spikelets are expected to persist several weeks. Judging by the lateness of vernal inflorescences, it is not likely that autumnal inflorescences are produced earlier than late August.
2. **POPULATION SIZE AND CONDITION:** Both populations are very small, consisting of five clumps that represent discrete individuals.
3. **REPRODUCTIVE BIOLOGY**
 - a. **TYPE OF REPRODUCTION:** Strictly by seed, produced by vernal (early season) inflorescences and autumnal (late season) inflorescences.
 - b. **POLLINATION BIOLOGY:** Wind-pollinated.
 - c. **SEED DISPERSAL AND BIOLOGY:** Unknown.

F. POPULATION ECOLOGY

1. **COMPETITION:** Members of the *Dichanthelium* genus typically occupy dry habitats in low-competition settings.
2. **HERBIVORY:** Unknown.
3. **FIRE:** Scribner's panic grass survives fire, but the impact on population size has not been discerned. In the burned Cabin Creek occurrence (003), plants were earlier and had more stems as compared to the unburned East Fork of Otter Creek occurrence (002). This species does not exhibit the marked increase in the wake of fire as does Wilcox' panic grass (Heidel and Dueholm 1995).

G. LAND OWNERSHIP (MONTANA)

1. U.S. Forest Service:

Bloom Creek (001)
East Fork of Otter Creek (002)
Cabin Creek (003)

2. Consolidated Salish and Kootenai Tribal lands or private:

Pablo #1 (004)
Pablo #2 (005)

H. ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

1. THREATS TO CURRENTLY KNOWN POPULATIONS: Species

viability may be at risk in light of the very small populations, but no immediate threats were identified.

2. MANAGEMENT PRACTICES AND RESPONSES: This species has been characterized as a decreaser under grazing (Smith 1976). Local livestock water developments and fencing patterns have attracted the livestock to other draws or draw segments. Any major changes in livestock distribution within these allotments may potentially affect the species.

3. RECOMMENDATIONS FOR MAINTAINING VIABLE POPULATIONS:

- a. Proposed disturbances within or near any of these populations should be preceded by detailed survey of the populations in these areas, and mitigation measures should be developed to reduce or to eliminate the impacts of management activities.
- b. Livestock grazing on directly adjoining native habitats should be managed in a manner which would not encourage use at the population sites. Water development, salt block placement, and fences should not be brought in close to the populations or so as to encourage trailing through the populations.
- c. The population area near the East Fork of Otter Creek may be appropriate for special management designation and study, considering its *Dichanthelium oligosanthos* var. *scribnerianum* population and the presence of both *Carex gravida* and *C. torreyi*.

4. RECOMMENDATIONS FOR FURTHER ASSESSMENT: Further survey

of study area draws and the pine woodlands around Bloom Creek would round out the local distribution pattern for this and for three other species. This species is not recommended for U.S. Forest Service consideration as sensitive until more substantial information becomes available regarding its response to management activities. This study reveals a greater need for woody draw sensitive species surveys in eastern Montana.

SUMMARY

Scribner's panic grass is a species of dry woodland known from both southeastern and northwestern Montana. Despite the widely-separated occurrences in Montana, all of the known populations are very small; the state rank should remain as S1 (critically imperiled). Extended survey in late July would be warranted.

Mentzelia nuda (Pursh) T. & G.
DWARF MENTZELIA
Loasa Family

Verification is pending for the specimen of this species on file at the District Office. A copy of the Ashland District label information and a line drawing illustration of the species are presented below in the interim. This species has not been considered to date by the U.S. Forest Service for sensitive species recognition.

We were unable to get a copy of the herbarium label for this species by the time the report went to press. The specimen on file at the Ashland District Office is to be consulted for any clues as to location and habitat on the District.

Mentzelia nuda
From Nelson, 1977

Sphenopholis obtusata var. *major* (Torr.) K. S. Erdman
syn. *Sphenopholis intermedia* (Rydb.) Rydb.
SLENDER WEDGEGRASS
Poaceae

A. PRESENT LEGAL OR OTHER FORMAL STATUS

1. FEDERAL STATUS

a. **U.S. FISH AND WILDLIFE SERVICE:** None.

b. **U.S. FOREST SERVICE:** None.

2. **STATE:** G5T5 SH (historic in Montana). This study clears up taxonomic confusion, documenting that the rare variety is not present on Custer National Forest.

B. DESCRIPTION

1. **GENERAL NONTECHNICAL DESCRIPTION:** Slender wedgegrass is an herbaceous annual or short-lived perennial grass, with a slender nodding open spike at the top of the 0.2-1 m (8-40 in.) stem (Figure 14). It is two-flowered and the seeds drop with the glumes. The shape and difference in width of the two glumes is distinctive, the large second one being very broad at the upper end like the shape of a wedge, hence the common name.
2. **TECHNICAL DESCRIPTION:** Culms erect in small tufts, 30-120 cm tall; sheaths glabrous or pubescent; blades flat, often elongate, lax, mostly 2-6 mm wide, sometimes wider, mostly scaberulous, occasional sparsely pilose; panicle nodding, from rather dense to open, mostly 10 - 20 cm long, the branches spikelet-bearing from base; spikelets 3-4 mm long; second glume relatively thin, acute or subacute, about 2.5 mm long; lemmas subacute, rarely mucronate, smooth or rarely very minutely roughened, mostly 2.5-3 mm long (Hitchcock 1971).
3. **LOCAL FIELD CHARACTERS:** The rare variety, *S. obtusata* var. *major* is synonymous with *Sphenopholis intermedia* (Rydb.) Rydb as treated in Dorn (1984). It has a nodding and somewhat open inflorescence, in contrast to the spike-like inflorescence of *S. obtusata* var. *obtusata*. The second glume is over 3X as long than wide and not cucullate; lower lemma is 1.9-3.1 mm long (Great Plains Flora Association 1986).

The different nomenclature used in taxonomic references may be a source of confusion. Most floras recognize *S. obtusata* as distinct from *S. intermedia*

(e.g., Dorn 1984; exception: Hitchcock *et al.* 1984). However, in revisionary taxonomic work, both are treated as varieties of *S. obtusata* (Kartesz 1994). The herbaria in Montana are consistent with Dorn (1984) in this regards, so that specimens which are labeled as *S. obtusata* refer to the type variety rather than to the rare variety.

C. GEOGRAPHICAL DISTRIBUTION

1. **GLOBAL RANGE:** Most of United States and boreal Canada.
2. **STATE DISTRIBUTION:** The only collection of *S. obtusata* var. *major* in Montana is an historical collection from Gallatin County. The collection of "*S. obtusata*" from the Sioux District was mistakenly treated as synonymous with *S. obtusata* var. *major* and was erroneously reported in Heidel and Dueholm (1995). There are no known collections from eastern or central Montana, though it has been collected nearby in South Dakota (Great Plains Flora Association 1977).
3. **STUDY AREA DISTRIBUTION:** Five *S. obtusata* var. *obtusata* locations were found on the District, but not of the rare variety. These include one area on Bloom Creek, two spring-fed wetlands near the Cow Creek Campground, below Fear Spring, and near Yager Butte. This taxon was also documented with a voucher from a 1992 vegetation plot on the Indian Creek Grazing Allotment (Studiner 51 MONT), and from an historic collection near Poker Jim Butte which is believed to be extirpated. While it appears that this variety has narrow habitat requirements and has decreased under grazing, it remains widespread throughout the state, and is therefore not further treated in this report.

SPECIES OF PREVIOUSLY UNDETERMINED STATUS:

Agastache foeniculum (Pursh) Kuntze
LAVENDER HYSSOP
Lamiaceae

A. PRESENT LEGAL OR OTHER FORMAL STATUS

1. FEDERAL STATUS

a. U.S. FISH AND WILDLIFE SERVICE: None.

b. U.S. FOREST SERVICE: None.

2. **STATE:** G4G5 SU (status undetermined). The widespread alteration of its habitat, few (?) records, and low population numbers would seem to provide the basis for adding this species to the state list, but not until out-of-state herbaria have been checked for additional collections. If it is recurrent in the eastern 1/4 of Montana, as inferred by the Great Plains Flora Association (1986), then it does not warrant tracking on the State Species of Special Concern list.

B. DESCRIPTION

1. **GENERAL NONTECHNICAL DESCRIPTION:** Lavender hyssop is a rhizomatous perennial with erect, simple, or branched stems, 6-12 dm (2-4 ft.) high (Figure 15). The opposite leaves have broadly spade-shaped blades, 4-9 cm (1-3 in.) long, and petioles 5-20 mm long. They are glabrous and green above but white-hairy below. The purplish flowers are borne in whorled clusters in a showy spike-like inflorescence, 4-8 cm (1-3 in.) long. The tubular corolla is 7-10 mm long, forms 2 lips at the mouth, and the tubular calyx is purple above with 5 triangular lobes. The 4 stamens are exserted from the mouth of the flower tube. Plants were beginning to flower in early July of 1995, and might be expected to reach peak flowering activity in late July of most years.
2. **TECHNICAL DESCRIPTION:** Plants 6-12 dm tall; stems simple or sparingly branched, the nodes canescent or sparsely so, internodes glabrous or the lowermost sometimes lightly canescent. Leaf blades ovate or occasionally broadly lanceolate, 4-9 cm long, 2-5.5 cm wide, gradually reduced upwards, glabrous above, white tomentulose below, apex acute to acuminate, margins serrate, base slightly cordate, truncate, rounded, or broadly cuneate; petiole

0.5-2 cm long, gradually reduced upwards, glabrous or hirsute. Spikes 4-8 cm long, 1-2 cm wide, the lowermost verticillasters sometimes remote; bracts ovate, approximately equaling or shorter than the calyx, vestiture as the leaves, acuminate, serrulate pedicels 0-2 mm long, pubescent. Calyx hirtellous throughout, the tube greenish near the base and violet above; 4-6 mm long, the teeth violet, deltoid or slightly narrower, 1-1.5 mm long and acute; corolla blue to violet, hirsutulous without, 7-10 mm long, lobe margins erose. Nutlets yellow-brown, ca. 1.5 mm long (Great Plains Flora Association 1986).

3. **LOCAL FIELD CHARACTERS:** Both *Agastache urticifolia* and *A. cusickii* have white corollas, and neither has leaves that are glabrous on top but white-hairy beneath. They do not overlap in range with *A. foeniculum*.

C. GEOGRAPHICAL DISTRIBUTION

1. **GLOBAL RANGE:** Southern Ontario west to Saskatchewan, south to Iowa, Nebraska and northcentral Colorado; naturalized in some areas of the northeastern United States and eastern Canada (Great Plains Flora Association 1986).
2. **STATE DISTRIBUTION:** Dorn (1984) cites collections of this species from Gallatin and Sanders cos., which seem to be disjunct from the global range. Location and habitat information for the Gallatin County specimen is not provided on the label, but the collector, P. Hawkins, has other collections which were made from experimental plantings and gardens around Bozeman (Rumely pers. comm.). Both of these western disjuncts may actually represent horticultural plantings or "naturalized" occurrences (see above). Lavender hyssop has also been characterized as present across the eastern 1/4 of Montana (Great Plains Flora Association 1986), but has only one eastern Montana collection in Montana herbaria from Richland County (MONTU). Herbaria in Kansas will be consulted.
3. **STUDY AREA DISTRIBUTION:** The species was observed in four scattered locations in the northeastern portion of the Ashland District.

D. HABITAT

1. **ASSOCIATED VEGETATION:** The rangewide habitat is characterized as "moist woodland, especially along streams or lakeshores, infrequent in open, wet ditches and prairies at higher elevations" (Great Plains Flora Association 1986). In the study area, it occupies the moistest of intact forested settings: localized tall shrub ecotones within pine woodland. The Richland County specimen was collected from American elm-green ash forest at the head of a

Gleason, 1958

AGASTACHE FOENICULUM

on or near the Ashland Ranger District, Montana

creek, representing a woody draw habitat which is not represented on the District. The list of associated species in the study area follows:

Amelanchier alnifolia
Apocynum androsaemifolium
Carex hoodii
Carex sprengelii
Carex torreyi
Festuca idahoensis
Fraxinus pennsylvanica
Galium boreale
Pinus ponderosa
Poa pratensis
Prunus virginiana
Symphoricarpos occidentalis
Toxicodendron rydbergii

2. **TOPOGRAPHY:** In the study area it was present in low-lying areas and lower sheltered slopes.
3. **SOIL RELATIONSHIPS:** Relatively deep loams.

E. POPULATION BIOLOGY AND DEMOGRAPHY

1. **PHENOLOGY:** Lavender hyssop usually begins flowering by late June in average years, but had barely begun by the second week of July in the study area under relatively cool, moist growing season conditions. The long spike-like inflorescence has indeterminate flowering, which may be prolonged for several weeks under favorable conditions.
2. **POPULATION SIZE AND CONDITION:** Populations were locally restricted in the study area to single bands and clumps corresponding with suitable habitat. The species is rhizomatous, so the number of stems is likely to be greater than actual population size. In the study area, stem numbers at the sites ranged from ca. 10-100. At the Richland Co. collection site, by contrast, the species was described as locally common.
3. **REPRODUCTIVE BIOLOGY**
 - a. **TYPE OF REPRODUCTION:** Lavender hyssop reproduces by seed and vegetatively by rhizomes.
 - b. **POLLINATION BIOLOGY:** Insect-pollinated.

- c. **SEED DISPERSAL AND BIOLOGY:** Unknown.

F. POPULATION ECOLOGY

- a. **COMPETITION:** Lavender hyssop is taller than most other herbaceous woodland forbs. It may compete for light with the woody canopy.
- b. **HERBIVORY:** Unknown.
- c. **FIRE:** It persisted in a single clump at a sheltered setting in an area that had burned in 1988 (T.2S R.46E Sec. 20). This information is insufficient to interpret fire response for the species.

- G. LAND OWNERSHIP (MONTANA):** The four study area occurrences are on lands administered by the Ashland District of Custer National Forest. The Richland County occurrence is on private land.

H. ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

1. **THREATS TO CURRENTLY KNOWN POPULATIONS:** The four occurrences are in areas that receive light grazing; there were no immediate signs of threats.
2. **MANAGEMENT PRACTICES AND RESPONSES:** The local distribution pattern suggests that it may be a decreaser under grazing. One occurrence was on a north-facing hillside that was logged decades ago (T2S, R47E, Sec. 18), where it persisted in one small patch among brushy growth and limited regeneration that looked as though it had once been a natural opening. Another occurrence was in an area that had been burned by wildfire and subsequently logged (T.2S R.47E Sec. 18); only one large patch or clump was present here. Logging may not have a direct affect on the species, but the associated surface disturbance and weed invasions are potential concerns.
3. **RECOMMENDATIONS FOR MAINTAINING VIABLE POPULATIONS:** No recommendations are presented at this time.
4. **RECOMMENDATIONS FOR FURTHER ASSESSMENT:** Further survey of woody draws, particularly in the northern end of the District, is needed to round out the local distribution pattern for this and for three other species. This study points to a greater need for woody draw sensitive species surveys in eastern Montana.

SUMMARY

Lavender hyssop is considered native to eastern Montana, but voucher specimens are not known to support this. The species is not being added to the state list at this time until out-of-state herbaria are checked. .

Elatine americana (Pursh) Arn.
AMERICAN WATERWORT
Elatinaceae

A. PRESENT LEGAL OR OTHER FORMAL STATUS

1. FEDERAL STATUS

a. U.S. FISH AND WILDLIFE SERVICE: None.

b. U.S. FOREST SERVICE: None.

2. STATE: G4 SU (status undetermined). Not recommended for addition to the state list at this time.

B. DESCRIPTION

1. **GENERAL NONTECHNICAL DESCRIPTION:** American waterwort is an annual that forms small mats of prostrate stems 2-4 cm (0.8-1.6 in.) long (Figure 16; Appendix E-11). The opposite, narrowly elliptic leaves have entire margins and rounded tips and are less than 10 mm long. Foliage is glabrous. Inconspicuous flowers are solitary in the leaf axils. Each flower has 3 minute, separate petals, 3 sepals, and 3 stamens. The fruit is a many-seeded, globose capsule. The strongly curved, sausage-shaped seeds are pointed at one end but rounded on the other and have ca. 10 longitudinal rows of 20-30 pits on their surfaces.

2. **TECHNICAL DESCRIPTION:** Plants are matted or with some branches ascending and 2-4 cm (0.8-1.6 in.) long; leaves are spatulate to obovate, under 10 mm (0.4 in.) long, the tips rounded and not at all emarginate; sepals and petals 3, seeds somewhat curved, the pits mostly 18-27 in each of about 10 longitudinal rows, capsules 2-3 celled (Hitchcock et al. 1984).

3. **LOCAL FIELD CHARACTERS:** *Elatine americana* has a rounded leaf tip compared to *E. triandra* leaves that are notched at the tip. Seeds of *E. americana* are only slightly curved compared to *E. californica*. Both of these

Elatine americana

Hitchcock, et al. 1984

ELATINE AMERICANA

on or near the Ashland Ranger District, Montana

Species locations from the Montana Natural Heritage Program, March 04, 1996

species have 3 petals, sepals, and stamens. A hand lens or microscope is necessary to identify this diminutive species.

C. GEOGRAPHICAL DISTRIBUTION

1. **GLOBAL RANGE:** New Brunswick and Quebec to eastern Virginia; also Missouri, Oklahoma, Montana.
2. **STATE DISTRIBUTION:** Collected from a total of five locations, spanning Cascade, Lake, Lewis and Clark, Powder River, and Teton counties. (Figure 17).
3. **STUDY AREA DISTRIBUTION:** The one known District occurrence is east of Yager Butte (Figure 17). Other similar buffalo wallows and a variety of wetland habitats were surveyed without success.

D. HABITAT

1. **ASSOCIATED VEGETATION:** Associated with sparse, emergent vegetation and with small, submerged species:

Alopecurus aequalis
Eleocharis palustris
Limosella aquatica
Marsilea vestita
Navarretia intertexta
Plagiobothrys scouleri

2. **TOPOGRAPHY:** The District site was a buffalo wallow on the flat ridgetop: a small, shallow depression that completely evaporates before mid-summer and was well over half evaporated at the time of the 1995 visit in early July (Appendix E-12). Other sites in the state are similarly described as ponds and mud flats.
3. **SOIL RELATIONSHIPS:** The District site is on silt that is submerged early in the season. The small basin was trampled throughout by livestock, and American waterwort was present on dry points between hoof prints. One of its other sites is described as an alkali pond (Cascade Co.), but none of its other collection sites give an indication of the water chemistry.

E. POPULATION BIOLOGY AND DEMOGRAPHY

1. **PHENOLOGY:** Flowering occurs both below the water and after evaporation

from exposure to air in the middle of the summer. Plants were in very early fruit at the study area on 8 July 1995.

2. **POPULATION SIZE AND CONDITION:** Estimated population size exceeded 1000, and may be a magnitude higher.

3. **REPRODUCTIVE BIOLOGY**

- a. **TYPE OF REPRODUCTION:** Seed.
- b. **POLLINATION BIOLOGY:** Unknown.
- c. **SEED DISPERSAL AND BIOLOGY:** The small seeds may be dispersed by water within a basin; they also lodge in mud, adhering to and transported by animals.

F. POPULATION ECOLOGY

1. **COMPETITION:** Does not grow under continuous emergent cover.
2. **HERBIVORY:** None.
3. **FIRE:** Not applicable.

- G. LAND OWNERSHIP (MONTANA):** Public lands on which this species occurs include: Custer National Forest (this study), Flathead National Forest, and Ninepipe National Wildlife Refuge. Precise location information is lacking for the other historic collections, which were taken in areas that are mainly privately owned.

H. ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

1. **THREATS TO CURRENTLY KNOWN POPULATIONS:** None known.
2. **MANAGEMENT PRACTICES AND RESPONSES:** No apparent response, either positive or negative, to livestock grazing.
3. **RECOMMENDATIONS FOR MAINTAINING VIABLE POPULATIONS:** No special measures have been identified at this time.
4. **RECOMMENDATIONS FOR FURTHER ASSESSMENT:** Species is known from only five locations; therefore, it remains on the state watch list, awaiting further compilation of distribution information.

SUMMARY

American waterwort is an extremely small plant which is likely to have been overlooked. It is widely distributed in Montana, and there is no evidence to suggest that it is sensitive to disturbance. For these reasons it is being taken off of the Montana Plant Species of Special Concern list and being put onto the watch list.

Evax prolifera Nutt. ex DC.
RABBIT-TOBACCO
Asteraceae

A. PRESENT LEGAL OR OTHER FORMAL STATUS

1. FEDERAL STATUS

- a. U.S. FISH AND WILDLIFE SERVICE: None.
- b. U.S. FOREST SERVICE: None.

- 2. STATE: This species was not previously known from Montana until this study. Its global rank is G5. Because it occupies natural habitat in Montana, it will be added to the State List of Species of Special Concern, and its SRANK will be assigned as "SU" (status unknown).

B. DESCRIPTION

- 1. GENERAL NONTECHNICAL DESCRIPTION: Small, herbaceous, woolly annual usually under 10 cm tall. The illustration in Figure 18 shows a far more robust plant than any seen in the study area (Figure 19). Leaves alternate, narrowly spatulate, at most 6 mm long. Heads clustered, inconspicuous, surpassed by uppermost leaves. No ray flowers. Florets inconspicuous, intermixed with small, thin, pale bracts, pappus none.
- 2. TECHNICAL DESCRIPTION: Gray floccose-woolly annuals with slender taproots. Stems erect, 2-10(15) cm tall, simple or branching from base. Rosette leaves 3-6 mm long, usually spatulate, soon disappearing. Cauline leaves alternate, narrowly oblanceolate to spatulate, 3-15 mm long, 1-nerved, entire. Heads in very dense woolly glomerules terminating stems and branches. Glomerules subtended by leaves 6-12 mm long, and with internal leaves whose tips protrude from between the heads. True involucre absent, the apparent bracts being chaff of the receptacle. Receptacle slightly raised to somewhat conical, chaffy nearly throughout with thin paleae that are

semipersistent. Ray florets absent. Outer peripheral florets pistillate and fertile. Pistillate florets with a minute tubular corolla. The few infertile central florets with a 4-toothed corolla, 4 very small anthers, and a non-functional ovary. Achenes oblong-elliptic in outline, compressed, 0.6-0.9 mm long, sharp-edged, yellowish-brown and somewhat translucent; pappus none (Barkley 1986).

3. **LOCAL FIELD CHARACTERS:** The distinguishing features of *Evax prolifera* are its small size, woolly appearance, and clustered heads. Close examination reveals alternate leaves, no true involucre and no pappus. Several other small woolly species could be confused with rabbit-tobacco, but can be distinguished as follows:

Filago arvensis is usually taller (though still small) with an unbranched stem. Heads are single in leaf axils. The achenes have a pappus of capillary bristles. This species is known from southeast and western Montana (Dorn 1984) and northeast Wyoming (Dorn 1992).

Gnaphalium palustre has a true involucre and a pappus of capillary achenes. Heads are not clustered. This species is known from northeast, central, and western Montana (Dorn 1984), occurs throughout Wyoming (Dorn 1992), and in the Black Hills and along the Missouri River in South Dakota (Van Bruggen 1985).

Psilocarphus brevissimus is perhaps the most similar in appearance. Its leaves are mostly opposite. The receptacular bracts are woolly and enclose the florets (those of *Evax prolifera* are thin, pale, and glabrous). This species is known from north-central Montana (Dorn 1984) and from northeast Wyoming (Dorn 1992).

C. GEOGRAPHICAL DISTRIBUTION

1. **GLOBAL RANGE:** Southwestern South Dakota, western Nebraska, and Kansas to eastern Colorado; Oklahoma to Texas and Arizona. This species is not known from Wyoming; its discovery in Montana therefore represents a major range extension.
2. **STATE DISTRIBUTION:** Known from Powder River County on the Ashland District and from an historic collection in the Fort Keogh Range Experiment Station in Custer County, about 50 miles farther north (Figure 20). The latter was uncovered in checking the Rocky Mountain Herbarium for other specimens.

Evax prolifera
From Gleason 1952

Evax prolifera Nutt. ex DC.

MT, Powder River Co.; T3S R46E Sec 16 NW4

Custer Nat. Forest, Ashland District, ca. 0.5 mi. N
of Hwy 212 ca. 3 mi. W of Wilbur Cr. Rd. turnoff.

In sagebrush grassland on sparsely-vegetated area
at base of small butte; with *Gutierrezia sarothrae*,
Plantago patagonica, *Allium textile*. Elev. 3400 ft. as

H. Marriott 11570

27 JN 19

EVAX PROLIFERA

on or near the Ashland Ranger District, Montana

Species locations from the Montana Natural Heritage Program, March 04, 1996

3. **STUDY AREA DISTRIBUTION:** This species was documented in one location above lower Home Creek. It was not systematically surveyed for because it was not recognized as a new addition to the state flora at the time of the fieldwork. Much potential habitat appears to exist. However, the species was not seen elsewhere during the course of the study and is not likely to be common in the area.

D. HABITAT

1. **ASSOCIATED VEGETATION:** Within the study area, *Evax prolifera* was found at a single location: a sparsely-vegetated site within sagebrush grassland. The central part of the site had less than 10% vegetative cover. Plants occurred near the periphery of this open area. Associated species include *Gutierrezia sarothrae*, *Allium textile*, and *Plantago patagonica*.
2. **TOPOGRAPHY:** The site is flat, located at the base of a small butte in otherwise rolling upland terrain above lower Home Creek.
3. **SOIL RELATIONSHIPS:** *Evax prolifera* was growing on light-colored alkaline soil at the base of a butte in an area that is elsewhere well-vegetated with sagebrush grassland. The soil may be colluvial material from the butte strata.

E. POPULATION BIOLOGY AND SPECIES BIOLOGY

1. **PHENOLOGY:** Both flowering and vegetative individuals were seen in mid June.
2. **POPULATION SIZE, STRUCTURE AND TREND:** No estimate of population size was made at the time of collection. At least 200 individuals were present (ca. 20 were collected with no significant impact to the population). All individuals were near the lower end of the height range for the species (less than 3 cm tall).
3. **REPRODUCTIVE BIOLOGY**
 - a. **TYPE OF REPRODUCTION:** This annual species reproduces by seed.
 - b. **POLLINATION BIOLOGY:** Wind pollination likely.
 - c. **SEED DISPERSAL AND BIOLOGY:** Unknown.

4. **BIOLOGICAL INTERACTIONS**

- a. **COMPETITION:** Rabbit-tobacco was found in a sparsely-vegetated site, suggesting that this annual does not tolerate competition.
- b. **HERBIVORY:** None apparent.
- c. **FIRE:** Not applicable.

G. **LAND OWNERSHIP (MONTANA)**

- a. **USDA - Agricultural Research Service - Fort Keogh (001)**
- b. **USDA - Custer National Forest (002)**

H. **ASSESSMENT AND MANAGEMENT RECOMMENDATIONS**

- 1. **THREATS TO CURRENTLY KNOWN POPULATIONS:** No threats are known, but with only a single brief site visit, data are inadequate for assessment. The area was being grazed at the time of the site visit.
- 2. **MANAGEMENT PRACTICES AND RESPONSES:** Unknown.
- 3. **RECOMMENDATIONS FOR MAINTAINING VIABLE POPULATIONS:** None currently.
- 4. **RECOMMENDATIONS FOR FURTHER ASSESSMENT:** Systematic surveys for this species are warranted. Additional data on population trends would also be useful, involving periodic site visits throughout the growing season over a course of several years.

SUMMARY

The flora of southeastern Montana is very poorly known, and it is not currently possible to determine the rarity of *Evax prolifera* documented for the first time in the state.

Geum canadense Jacq.
WHITE AVENS
Rosaceae

A. PRESENT LEGAL OR OTHER FORMAL STATUS

1. FEDERAL STATUS

a. **U.S. FISH AND WILDLIFE SERVICE:** None.

b. **U.S. FOREST SERVICE:** None.

2. **STATE:** G5 SU (status undetermined). In addition to the widespread alteration of its habitat, its few records and its low population numbers support adding this species to the state list. Its state distribution has not been corroborated so it remains on the watch list.

B. DESCRIPTION

1. **GENERAL NONTECHNICAL DESCRIPTION:** Herbaceous perennial with 1-several stems, 3-10 dm (12-40 in) tall, with compound, divided leaves, differing between base and stem (Figure 21). The basal leaves usually have 3-5 leaflets, occasionally simple. The stem leaves are similar but with short petioles, becoming either more dissected or else simple above. The flowers appear solitary or in an open inflorescence and have 5 white petals. The mature fruiting heads are globose with a persisting segment projecting outward like a bristle.
2. **TECHNICAL DESCRIPTION:** Perennial herb with short caudices of horizontal rhizomes; stems 1-several, simple, 3-10 dm tall, glabrous or sparingly hirsute below, becoming densely velvety-puberulent above and on pedicels, with or without scattered long hairs, rarely glandular-pubescent on upper stem and pedicels. Basal leaves simple and undivided to usually having 3-5 larger leaflets, serrate and long petioled; cauline leaves similar, but with shorter petioles and becoming ternately cleft or simple above, serrate, acute, stipules 1-2 cm long, ovate-oblong, entire or cleft. Flowers solitary, few or several in a leafy-bracteate asymmetrical cyme. Pedicels velvety-pubescent and with very sparse to somewhat dense long hairs, rarely glandular; hypanthium 2.5-3 mm long, sparsely to densely pubescent; sepals 5, lanceolate to lance-ovate, acuminate 4-8 mm long; petals 5, white, but becoming yellowish, oblong, 5-9 mm long, equaling to longer than sepals; stamens numerous. Mature fruiting heads spherical, 1-2 cm in diameter, with numerous achenes; receptacle densely bristly with long hairs; body of achene 2.5-3.5 mm

Gleason, 1958

GEUM CANADENSE

on or near the Ashland Ranger District, Montana

Species locations from the Montana Natural Heritage Program, March 04, 1996

long, usually hairy above; persistent portion of style 4-7 mm long, glabrous or sparingly hirsute below; deciduous segment of style 1-2 mm long and sparsely bearded at base (Great Plains Flora Association 1986).

3. **LOCAL FIELD CHARACTERS:** It is readily distinguished from the other white-flowered herbaceous members of the Rose Family with compound leaves, having more leaflets than strawberries (*Fragaria* spp.) and a persistent style compared to any atypical white forms of cinquefoils (*Potentilla* spp.).

C. GEOGRAPHICAL DISTRIBUTION

1. **GLOBAL RANGE:** Nova Scotia to Montana, south to Texas, Alabama, and Georgia.
2. **STATE DISTRIBUTION:** Reported from northeast and northcentral Montana (Dorn 1984), though we have not been able to locate voucher specimens in Montana herbaria. Its discovery in southeastern Montana is a minor extension from its known distribution in northeast Wyoming.
3. **STUDY AREA DISTRIBUTION:** Only two populations were found at remote locations, near Poker Jim Butte (T.6S, R.44E, Sec. 8, SW 1/4) and on a sidedraw off of Ash Creek (T.2S, R.46E, Sec. 19, NE 1/4).

D. HABITAT

1. **ASSOCIATED VEGETATION:** The two sites differed in that the Poker Jim site had a watercourse with much more mesic vegetation than the Ash Creek site. The former was along the watercourse, bordered by tall shrubs and pine forest on one side and by tall shrubs and grassland on the other. Associated species are *Carex hoodii* and *Prunus virginiana*. The latter was in a *Pinus ponderosa*/*Mahonia repens* ht also associated with *Carex sprengelii*, *C. torreyi*, *Poa pratensis*, and *Symphoricarpos occidentalis*.
2. **TOPOGRAPHY:** Both sites were near headwaters of forested draw bottoms.
3. **SOIL RELATIONSHIPS:** Relatively deep loams.

E. POPULATION BIOLOGY AND DEMOGRAPHY

1. **PHENOLOGY:** The species was near peak flowering and was just beginning to form fruits in early July. It has indeterminate flowering, and might be expected to continue producing flowers over the season when provided with adequate moisture.

2. **POPULATION SIZE AND CONDITION:** Only two or three plants were found at the sites in mile habitat traverses that were greater than or equaling ½ mile.

3. **REPRODUCTIVE BIOLOGY**

- a. **TYPE OF REPRODUCTION:** By seed.
- b. **POLLINATION BIOLOGY:** Insect-pollinated.
- c. **SEED DISPERSAL AND BIOLOGY:** Unknown.

F. POPULATION ECOLOGY

1. **COMPETITION:** The fact that heavy invasions of exotic species (such as Kentucky bluegrass) were found above and below the populations at both sites suggests that the species' rarity may be due to the competition resulting from habitat alteration.
2. **HERBIVORY:** Unknown.
3. **FIRE:** The Ash Creek population is within the area of the 1988 wildfire.

G. LAND OWNERSHIP (MONTANA): Land ownership affecting the species is unknown, aside from the two District populations.

H. ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

1. **THREATS TO CURRENTLY KNOWN POPULATIONS:** Salvage logging operations at the Ash Creek site could eliminate the population by surface disturbance or by further exacerbation of weed invasion.
2. **MANAGEMENT PRACTICES AND RESPONSES:** Both populations appear to be relicts of once-larger populations, considering of their land use histories. The Ash Creek population has had moderate livestock use and recent fire. The Poker Jim population is in an area providing pasture for lookout pack animals and for more recent livestock grazing.
3. **RECOMMENDATIONS FOR MAINTAINING VIABLE POPULATIONS:**

The two known populations are small and may have low viability. While it would be appropriate to address potential impacts of any proposed changes in the areas of these populations, focus should instead be placed upon further

assessment in order to locate new populations and to better evaluate the species' status and woody draw protection opportunities.

4. **RECOMMENDATIONS FOR FURTHER ASSESSMENT:** Further survey of woody draws, particularly in the northern end of the District, is needed to round out the local distribution pattern for this and for three other species. This study points to the need for woody draw sensitive species surveys in eastern Montana as a whole.

SUMMARY

White avens is not being added to the state list because its state distribution has been characterized as spanning northeast and northcentral Montana, even though this is not corroborated by Montana herbarium specimens. Records are being sought in out-of-state herbaria, and the species will subsequently be reevaluated for addition to the state list based on the number of records, collection dates, and information on local rarity. This species constitutes yet another inhabitant of woody draws of which little is known for Montana.

Ipomopsis congesta var. *pseudotypica* (Constance & Rollins) Dorn
syn. *Gilia congesta* var. *pseudotypica* Constance & Rollins
WYOMING BALLHEAD GILIA
Polemoniaceae

A. PRESENT LEGAL OR OTHER FORMAL STATUS

1. FEDERAL STATUS

- a. **U.S. FISH AND WILDLIFE SERVICE:** None.
- b. **U.S. FOREST SERVICE:** None.

2. **STATE:** This taxon was not previously known from Montana. Its global rank is G4T?. This study documented that it is locally widespread and subject to no immediate threats, which would warrant assignment of a rank of "S3" (vulnerable). Additionally, it is placed on the state watch list as a taxon of limited distribution.

B. DESCRIPTION

1. **GENERAL NONTECHNICAL DESCRIPTION:** Herbaceous perennial with the short flowering stems usually overtopped by basal leaves 3-6 cm (1

1/4-2 ½ in) long (Figure 22; Appendix E-13). The basal leaves are linear, simple, numerous, and sometimes conceal the inflorescence. The corolla is white, tube 4-6 mm long, lobes 2-3 mm long.

2. **TECHNICAL DESCRIPTION:** Perennial, stems several from a deep, usually branching caudex, simple (or rarely branched above) lanate; basal leaves numerous, linear, simple 3-6 cm. Long, sometimes almost concealing the flowering stems; cauline leaves divided, terminal segment exceeding others; inflorescence loosely capitate-glomerate; calyx and bract pilose, lobes acute; corolla salverform, white, tube 4-6 mm long, slightly exceeding calyx, lobes ovate, 2-3 mm long; style exceeding calyx, lobes ovate, 2-3 mm long; style equaling or exceeding corolla-tube, entirely glabrous or pilose below, stigma 3-fid; stamens inserted in sinuses, filaments longer than anthers, anthers rounded to somewhat oblong; capsule globose, maturing 1 or 2 ovules (Rollins and Constance 1936).
3. **LOCAL FIELD CHARACTERS:** This taxon was placed in *Gilia spicata* var. *capitata* by Gray more upon habitat similarity than floral characters. It differs from *G. congesta* var. *crebifolia* in having dissected cauline leaves compared to entire cauline leaves, though they are inconspicuous. The type variety of *Gilia congesta* is also present in the study area, but it is an erect plant having dissected leaves on both the flowering stem and at the base.

C. GEOGRAPHICAL DISTRIBUTION

1. **GLOBAL RANGE:** Wyoming ballhead gilia is known from northeastern Wyoming, western South Dakota and western Nebraska (Hartman pers. commun., Cronquist et al. 1984) and is only newly documented from Montana.
2. **STATE DISTRIBUTION:** The species is known in the state from the Ashland District of the Custer National Forest, where it was discovered in the course of this study, and from two historic collections in central and northern Custer County that were archived at the Rocky Mountain Herbarium (RM) in Laramie, WY (Figure 23). The historic collections were annotated to variety by Marriott and represent the first such collections for Montana. *Ipomopsis* folders at the Montana State University and at the University of Montana herbaria have been checked to no avail for this variety.
3. **STUDY AREA DISTRIBUTION:** Preliminary surveys documented 15 occurrences throughout the central and southeastern areas of the District (Figure 23). The plant's consistent association with shale habitats in the limited number of sites that were visited gives reason to infer that it may be locally widespread.

Form 767
(Revised Apr., 1935)

HERBARIUM OF THE FOREST SERVICE
U. S. DEPARTMENT OF AGRICULTURE

Collector's No. 5292 Date of collection May 17, 1936

Botanical name *Salix serotina*

Common name _____

State Montana County Custer Forest _____

Exact locality Near head of Sweeney Cr., S. of Yellow-
(See T. and G. Forest map sheets)

Altitude _____ feet Slope stone P. Soil sandy loam
(Sandy loam and gravel) (Heavy clay loam, shallow)

Type _____ (Wooded, timber, park, etc.) (Open, barren ground) (Shrub) in timber

Distribution _____ (Principal associated places in order of importance) Use _____ (Ornamental, show, medicinal, etc.)

Forage value _____ (Palatability) (Grazed by C. S. S. and G.) (Shrub or grass)

Other data Upland at edge of canyon beneath pines.
(Draw and if fresh) (Flowering period) (Period of seed dissemination) (Other notes)

Collector's name Lincoln Ellison

IPOMOPSIS CONGESTA VAR. PSEUDOTYPICA
on or near the Ashland Ranger District, Montana

D. HABITAT

1. **ASSOCIATED VEGETATION:** Associated vegetation is made up of pioneer communities with very sparse cover, potentially dominated by *Agropyron spicatum* (Appendix E-14). Some have trace amounts of woody cover (*Pinus ponderosa*, *Rhus aromatica*, *Artemisia cana*) that may point to a steppe or parkland potential natural vegetation. The associated species vary considerable between sites and may include:

Allium textile
Andropogon scoparius
Artemisia cana
Artemisia frigida
Artemisia ludoviciana
Astragalus barrii
Astragalus tenellus
Bouteloua curtipendula
Bromus japonicus
Ceratoides lanata
Commandra umbellata
Cryptantha celosioides
Dalea candida
Echinacea angustifolia
Eriogonum pauciflorum
Gaura coccinea
Grindelia squarrosa
Gutierrezia sarothrae
Hymenoxys richardsonii
Koeleria macrantha
Lesquerella alpina
Linum lewisii
Melilotus officinalis
Musineon spp.
Oxytropis lambertii
Penstemon nitidus
Phlox alyssifolia
Phlox hoodii
Pinus ponderosa
Polygala alba
Psoralea argophylla
Rhus aromatica
Senecio canus
Stephanomeria runcinata

Thermopsis rhombifolia
Townsendia hookeri
Tragopogon dubius
Triodanis perfoliata

2. **TOPOGRAPHY:** In the study area, the species was found to be restricted to mid- and lower-slope settings. This placement is probably due to substrate preference rather than to slope position preference because it was usually found on erodible shales (see soil information, below) capped by more erosion-resistant layers of sandstone or clinker. The outcrop habitats span a range of elevations and landform settings.
3. **SOIL RELATIONSHIPS:** This taxon turned up with high consistency on a fine silt substrate of powdery pale-colored shale. It was also found on a cream-colored shale member and occasionally on gravelly substrates associated with the shales or separate from them. The Custer County collections were made from "sandy upland loam" and from "gumbo soil." All settings represent dry, sedimentary outcrop slopes.

E. POPULATION BIOLOGY AND DEMOGRAPHY

1. **PHENOLOGY:** Wyoming ballhead gilia was collected in late flower on 23 May 1995. Other flowering Montana collections have been made on 17 May and on 6 June. Its ripe fruits dehisce, and only remnants are left by July.
2. **POPULATION SIZE AND CONDITION:** Survey of this taxon was conducted by taking actual counts in the center of its habitat and then by extrapolating the results across adjoining potential habitat. This was done in July when it was past flower and relatively inconspicuous, so actual counts and estimates are likely to be low. Actual counts ranged from 20-72 plants, and estimated numbers ranged from 30-200 for a given locale. The high habitat fidelity and recurrence of its outcrop habitat in the dissected study area terrain suggest that numerous subpopulations may exist, creating a scattered megapopulation up and down the drainages. Such likelihood was examined along the Ten Mile Creek drainage, where four occurrences were found along over 6 miles of valley in the same settings.
3. **REPRODUCTIVE BIOLOGY**
 - a. **TYPE OF REPRODUCTION:** By seed.
 - b. **POLLINATION BIOLOGY:** Insect-pollinated.

- c. **SEED DISPERSAL AND BIOLOGY:** Unknown.

F. POPULATION ECOLOGY

1. **COMPETITION:** The restriction of this species to very sparsely-vegetated habitats indicates that it may be a poor competitor and instead adapted as a stress-resistant pioneer. Several of the smallest populations had heavy yellow sweetclover (*Melilotus officinalis*) invasions, whose nitrogen-fixing capacities may veer the course of competition and succession; others also had Venus looking glass (*Triodanis perfoliata*) present, an adventive native species which has become dominant over some outcrop slopes located farther north on the District.
2. **HERBIVORY:** None observed.
3. **FIRE:** This species' habitat would not carry a fire, though fire could expand its potential habitat by setting back encroachment of woody species around the periphery.

- G. **LAND OWNERSHIP (MONTANA):** The study area populations are all on the Ashland District of the Custer National Forest. The central Custer County collection was made on the Fort Keogh Range Experiment Station, and the northern Custer County collection was likely to have been made either on private land or on BLM-administered land.

H. ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

1. **THREATS TO CURRENTLY KNOWN POPULATIONS:** No direct threats were identified.
2. **MANAGEMENT PRACTICES AND RESPONSES:** Some of this species' drainage course populations are dissected by roads that follow the drainages; in these cases, road maintenance, weed problems, and weed control activities could impact the species. The few populations with heavy sweetclover invasion were in heavily grazed pastures, so that even while grazing is unlikely to have a direct affect on its outcrop habitat, it may indirectly promote the weed invasions that ultimately outcompete this species.
3. **RECOMMENDATIONS FOR MAINTAINING VIABLE POPULATIONS:** No special actions are currently deemed necessary.
4. **RECOMMENDATIONS FOR FURTHER ASSESSMENT:** Survey work for this species was conducted at a relatively late time that was unsuited for

making confirmation of *Astragalus barrii*. The recommendations for extended *Astragalus barrii* survey should be combined with extended information-gathering on *Ipomopsis congesta* var. *pseudotypica* when it is in flower; its state watch list status should be re-examined at such time.

SUMMARY

Wyoming ballhead gilia was found over large portions of the District, suggesting that it is widespread and under no immediate threat. This is the first time that this variety has been reported in Montana. It will be maintained on the state watch list as a taxon of limited distribution, unless a lack of threats or a much broader distribution are confirmed.

DISCUSSION

Interpretation of results is conditioned by all of the challenging new questions surrounding rare species and their habitats on the Ashland District. Foremost among these questions is the heretofore unrecognized need for making distinctions between *Astragalus barrii* and *A. hyalinus*, as the latter has now been documented from the District. Three previously - identified *A. barrii* population sites and four potential new *A. barrii* sites that were found only in vegetative condition need to be revisited and examined during the flowering times of both species in order to make positive identifications.

The study results provide evidence to support nomination of *Carex gravida* as sensitive, in addition to naming two species known only from historical collections in the District (*Amorpha canescens* and *Ceanothus herbaceus*) as watch. Two more species that are represented by historical collections among the YCC set of important range plants are recommended for designation after the specimens are verified: *Cypripedium calceolus* var. *parviflorum* is already designated as sensitive, and *Mentzelia nuda*, not previously documented on Montana units of the Custer National Forest, is appropriate for designation as watch. The failure to turn up these two species and many others among the YCC collection that were considered important range plants during the 1930s calls for further investigation.

Two new additions to the state flora were documented (Heidel in progress), one of which has provisionally been added to the state list (*Evax prolifera*), and the other of which is locally widespread and under no immediate threats (*Ipomopsis congesta* var. *pseudotypica*).

The appropriate state status of three species remains undetermined to date. These include: *Agastache foeniculum*, *Geum canadense*, and *Elatine americana*. The first two are eastern deciduous forest species whose documented distributions outside the District in eastern Montana are under review. The latter is a minute aquatic plant which shows little response to disturbance and is known from a few widely-scattered locations in the state. Forest Service T/E/S consideration is not appropriate as such for these three species, and their state statuses remain under review.

Many of the target species occupy successional habitats dictated by topographic and edaphic features or by localized habitat features such as wetlands or well-developed woodlands, all of which have not been well-studied in eastern Montana. Wetland and mesic woodland habitats are particularly affected by surrounding land-use practices, so further investigation of these status questions would be appropriate to consider as a management priority. The apparent species' rarity may reflect habitat threats, patchy distribution patterns or simply a general lack of botanical and vegetation information available for eastern Montana.

While there are relatively few species that are globally rare in eastern Montana, and relatively little public land, the scarcity of public land places a premium on identifying conservation needs and priorities on the Custer National Forest districts in eastern Montana. In many

cases, the patterns of species rarity are indications of localized sensitive features like woody draws that warrant special management consideration.

The framework for conducting sensitive species surveys is based on assumptions that targets can be set and that a systematic plan to survey for them can be developed at the onset. The lack of baseline floristic information in southeastern Montana is perhaps the biggest obstacle blocking the development of an effective District sensitive species program. Until we know which species occur in the region, it is difficult to plan a systematic survey. Nor can we make an accurate evaluation of the status of a possibly-rare species without understanding the regional context in which it occurs.

Baseline floristic survey followed by rigorous extended sensitive species survey is presented as a course for developing a meaningful and effective sensitive species program on the District. Perhaps one of the best models available is the program at the Rocky Mountain Herbarium at the University of Wyoming. Regions of Wyoming have undergone systematic floristic inventory by students and staff, often with at least partial funding coming from Federal agencies. This type of project has become widely-accepted in Wyoming as the first step in effective sensitive species management. Such a broad-brush approach typically yields a list of potentially-rare species with some information on habitat and distribution within the study area. These species can then be targeted for more intensive survey in order to determine status and management needs.

The sensitive plant species survey studies conducted on both the Ashland and Sioux Districts advance the winnowing process of collecting and sorting botanical status information in eastern Montana. The results represent interim products rather than complete baselines of Ashland District botanical diversity and its significance.

We have not evaluated land use practices potentially affecting *Astragalus barrii* and those species proposed for sensitive or watch status on the Ashland District. But in one sweeping generalization, we note that noxious weed encroachment is at relatively early stages of invasion across the area, and is among the most serious of potential threats to all species in their habitats. This report, in combination with technical references and the Regional Office guidelines for conducting sensitive plant species biological assessments, provides a starting point for advancing sensitive species conservation and avoiding impacts.

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Appendix A - Preliminary list of survey target species potentially occurring in Powder River and Rosebud counties

On Forest Service land?	Scientific Name	Common Name	Phenology
Yes	<i>Amorpha canescens</i>	Leadplant	July
No	<i>Aster simplex</i> var. <i>ramosissimus</i>	Panicked aster	late July-August
Yes	<i>Astragalus barrii</i>	Barr's milkvetch	May-early June
Yes	<i>Carex gravida</i>	Pregnant sedge	late June-July
No	<i>Ceanothus herbaceus</i>	New Jersey tea	late June
Yes	<i>Dichanthelium oligosanthes</i> var. <i>scribnerianum</i>	Scribner's panic grass	late June-July
No	<i>Mentzelia nuda</i>	Dwarf mentzelia	unknown
No	<i>Psoralea hypogaea</i>	Little indian breadroot	May-early June
Yes	<i>Sphenopholis obtusata</i> var. <i>major</i>	Slender wedgegrass	July

(This is a subset of the list of State Plant Species of Special Concern in Big Horn, Powder River and Rosebud counties based on extrapolation from habitat and distribution information.)

Appendix B - Ashland District areas surveyed for sensitive plant species

(This list is organized alphabetically by the map name of the USGS Quad (7.5'). The maps showing survey routes on the annotated Custer National Forest map follows. Annotated topo maps are available upon request.)

BEAVER CREEK SCHOOL

T.2S R.46E	Sec. 19	E1/2
	Sec. 20	NW1/4 of NE1/4
	Sec. 23	S1/2
	Sec. 24	NE1/4 of NW1/4; NW1/4 of NE1/4

BIRNEY DAY SCHOOL

T.5S R.43E	Sec. 21	
	Sec.. 22	SW1/4

BLOOM CREEK

T.7S R.48E	Sec. 8	E1/2
------------	--------	------

BROWNS MOUNTAIN

T.5S R.43E	Sec. 35	E1/2
T.6S R. 44E	Sec. 4	W1/2
	Sec. 6	NE1/4 of NE1/4
T.6S R.43E	Sec. 12	E1/2 of SE1/4
	Sec. 23	SE1/4 of SE1/4; NE1/4 of NE1/4

COLEMAN DRAW

T.3S R.46E	Sec. 9	SW1/4 of SW1/4
	Sec. 16	NW1/4
	Sec. 17	

FORT HOWES

T.6S R.45E	Sec. 9	E1/2 of NE1/4
	Sec. 13	
	Sec. 14	S1/2 of NE1/4
	Sec. 24	NE1/4 of NW1/4; NE1/4
	Sec. 16	SW1/4 of SW1/4
	Sec. 17	S1/2 of SE1/4
	Sec. 36	E1/2 of SW1/4; SE1/4
T.7S R.46E	Sec. 1	NE1/4 of NE1/4

GREEN CREEK

T.5S R.44E	Sec. 9	E1/2
	Sec. 10	N1/2; N1/2 of SW1/4

HAMILTON DRAW

T.7S R.45E	Sec. 17	W1/2 of SW1/4
	Sec. 18	E1/2 of SE1/4
	Sec. 19	NE1/4
	Sec. 20	NW1/4 of NW1/4

HOME CREEK BUTTE

T.3S R.46E	Sec. 1	NE1/4 of SW1/4; NW1/4 of SE1/4
	Sec. 13	W1/2

T.3S R.47E	Sec. 4	NW1/4
	Sec. 20	SE1/4 of SE1/4
	Sec. 29	NE 1/4 of NE1/4
	Sec. 22	S1/2 of SE1/4
	Sec. 23	SW1/4 of SW1/4; E1/2

T.4S R.47E	Sec. 2	NE1/4 of SW1/4
	Sec. 4	SW1/4 of SW1/4
	Sec. 5	SE1/4

KING MOUNTAIN

T.5S R.45E	Sec. 21	
	Sec. 22	SW1/4 of NW1/4

OTTER

T.7S R.45E	Sec. 21	E1/2 of SE1/4
	Sec. 22	W1/2 of SW 1/4
	Sec. 27	NW1/4 of NW1/4
	Sec. 23	SE1/4 of SW1/4
	Sec. 26	NW1/4

PHILLIPS BUTTE

T.6S. R.47E	Sec. 28	E1/2
	Sec. 36	NE1/4 of NE1/4

T.6S R.48E	Sec. 30	W ½
	Sec. 31	N1/2 of NW1/4

POKER JIM BUTTE

T.5S R.43E	Sec. 33	E1/2 of SW1/4
	Sec. 36	
T.6S R.43E	Sec. 4	SW1/4 OF SW1/4
	Sec. 5	E1/2
	Sec. 8	
	Sec. 9	S1/2 of SW1/4
	Sec. 16	N1/2 of NW1/4
	Sec. 17	N1/2 of NE1/4
	Sec. 1	NE1/4

T.6S R.45E	Sec. 7	NE1/4 of SW1/4
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REANUS CONE

T.7S R.46E	Sec. 12	SE1/4
T.7S R.47E	Sec. 30	SE1/4 of NW1/4

SAYLE

T.7S R.47E	Sec. 12	S1/2 of SW1/4
	Sec. 13	N1/2 of SW1/4; NW1/4
T.7S R.48E	Sec. 7	SE1/4 of SW1/4
	Sec. 18	SW1/4
	Sec. 30	NW1/4 of NW1/4

STACEY

T.46E R.1S	Sec. 25	S1/2 of NE1/4
T.47E R.1S	Sec. 30	S1/2 of NW1/4
T.46E R.2S	Sec. 24	E1/2
T.47E R.2S	Sec. 7	E1/2 of SE1/4
	Sec. 19	SE1/4 of SW1/4

THREEMILE BUTTES

T.4S R.46E	Sec. 25	
	Sec. 36	E1/2 of NE1/4
T.4S R.47E	Sec. 31	NW 1/4

THREEMILE BUTTES (cont.)

T.5S R.47E Sec. 2 W1/2

Sec. 19 NW1/4 of NW1/4

Sec. 20 NW1/4 of SW1/4; NE1/4 of NE1/4

Sec. 32 SW1/4 of SW1/4

WILLOW CROSSING

T.3S R.45E Sec. 3 SW1/4

Sec. 14

YAGER BUTTE

T.5S R.46E Sec. 14 NW1/4 of SW1/4

Sec. 24 SW1/4

Sec. 26

Sec. 35 N1/2

Sec. 27 N1/2 of NW1/4

Sec. 28 SE1/4 of SE1/4

Sec. 33 N1/2; NW1/4 of SW1/4

Sec. 31 NW1/4

Sec. 33 S1/2 of NW1/4

[illegible]

Survey routes Ashland District southcentral

Survey routes
Ashland district central

Survey routes
Ashland District northeast

Appendix C - Element occurrence records and maps of species of special concern on the Ashland District

January 3, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: AMORPHA CANESCENS
Common Name: LEAD PLANT

Global rank: G5 Forest Service status:
State rank: S1 Federal Status:

Element occurrence code: PDFAB08020.002
Element occurrence type:

Survey site name:
EO rank:
EO rank comments:

County:

USGS quadrangle: UNMAPPABLE

Township: Range: Section: TRS comments:

Precision: U
Survey date: Elevation: 3000 -
First observation: 1922 Slope/aspect:
Last observation: 1922-07-18 Size (acres): 0

Location:
CUSTER FOREST-RANGER STATION PASTURE.

Element occurrence data:
SCARCE; 2.5 FEET HIGH.

General site description:
GRAVELLY LOAM, SOUTHWEST EXPOSURE; WITH STIPA VIRIDULA, BLUE GRAMMA,
BUFFALO GRASS.

Land owner/manager:
CUSTER NATIONAL FOREST, ASHLAND RANGER DISTRICT

Comments:
NONE.

Information source: SENSITIVE PLANT COORDINATOR, CUSTER NATIONAL
FOREST, 2602 FIRST AVENUE NORTH, P.O. BOX 2556,
BILLINGS, MT 59103.

Specimens: LOCKHART AND YORK. (25). 1922. SPECIMEN #USFS 40675.
RM.

April 17, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: ASTRAGALUS BARRII
Common Name: BARR'S MILKVETCH

Global rank: G3 Forest Service status: SENSITIVE
State rank: S3 Federal Status:

Element occurrence code: PDFABOF150.010
Element occurrence type:

Survey site name: STAG ROCK KNOLLS
EO rank: B
EO rank comments: GRAZED SITE CLOSE TO ROAD.

County: POWDER RIVER

USGS quadrangle: FORT HOWES

Township: Range: Section: TRS comments:
006S 045E 12 SW4; 13 NW4

Precision: S
Survey date: 1988-05-14 Elevation: 3450 -
First observation: 1988 Slope/aspect:
Last observation: 1988-05-14 Size (acres): 15

Location:
CUSTER NATIONAL FOREST, 1.5 MILES NORTH OF FORT HOWES RANGER STATION,
0.5 MILE WEST OF OTTER CREEK ROAD, NW OF STAG ROCK.

Element occurrence data:
CA. 1250 PLANTS, IN 4 SUBPOPULATIONS; FLOWERING.

General site description:
ERODING HILLSIDES AND KNOLLS, IN SILTY-CLAY DERIVED SOILS; OPEN SOIL
BENEATH PINUS PONDEROSA, JUNIPERUS SCOPULORUM, WITH ARTEMISIA
TRIDENTATA.

Land owner/manager:
CUSTER NATIONAL FOREST, ASHLAND RANGER DISTRICT

Comments:

Information source: SCHASSBERGER, L. S. 1988. [FIELD SURVEYS IN POWDER
RIVER AND ROSEBUD COS. OF 12-21 MAY (ASTRAGALUS
BARRII).]

Specimens: SCHASSBERGER, L. A. (176, 177, 180). 1988. MONTU.

March 1, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: ASTRAGALUS BARRII
Common Name: BARR'S MILKVETCH

Global rank: G3 Forest Service status: SENSITIVE
State rank: S3 Federal Status: 3C

Element occurrence code: PDFAB0F150.011 ID: Y
Element occurrence type:

Survey site name: FORT HOWES RIDGE
EO rank: A
EO rank comments: GOOD POPULATION SIZE, PROTECTED

County: POWDER RIVER

USGS quadrangle: FORT HOWES

Township: Range: Section: TRS comments:
006S 045E 24 NE4

Precision: S
Survey date: 1988-05-14 Elevation: 3550 -
First observation: 1988-05-14 Slope/aspect:
Last observation: 1995-06-14 Size (acres): 4

Location:
CUSTER NATIONAL FOREST, ON HILLS AND CLIFF 0.25 MILES NW OF FORT HOWES
RANGER STATION.

Element occurrence data:
1995: 50 PLANTS, 90% IN FLOWER. 1988: CA. 600 PLANTS, IN 2
SUBPOPULATIONS; MOST IN FLOWER.

General site description:
ERODING HILLSIDE AND ABOVE SILTSTONE CLIFF WITH ARTEMISIA TRIDENTATA,
GUTIERREZIA SAROTHRAE, CRYPTANTHA CELOSIODES, YUCCA GLAUCA.

Land owner/manager:
CUSTER NATIONAL FOREST, ASHLAND RANGER DISTRICT

Comments:
SEE GMF FOR BASE MAP SHOWING SUBPOPULATIONS. SURVEYED BY H. MARRIOTT
IN 1995.

Information source: SCHASSBERGER, L. S. 1988. [FIELD SURVEYS IN POWDER
RIVER AND ROSEBUD COS. OF 12-21 MAY (ASTRAGALUS
BARRII).]

Specimens: SCHASSBERGER, L. A. (178). 1988. MONTU.

April 17, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: ASTRAGALUS BARRII
Common Name: BARR'S MILKVETCH

Global rank: G3 Forest Service status: SENSITIVE
State rank: S3 Federal Status:

Element occurrence code: PDFAB0F150.012
Element occurrence type:

Survey site name: TAYLOR BUTTE RIM
EO rank: A
EO rank comments: EXCELLENT SITE NATURALLY PROTECTED BY CLIFFLINE.

County: POWDER RIVER

USGS quadrangle: FORT HOWES

Township: Range: Section: TRS comments:
006S 046E 30 E2

Precision: S
Survey date: 1988-05-14 Elevation: 3400 -
First observation: 1988 Slope/aspect:
Last observation: 1988-05-14 Size (acres): 35

Location:
CUSTER NATIONAL FOREST, 0.5 MILES EAST OF OTTER CREEK ROAD ON SOUTH
FORK OF TAYLOR CREEK ROAD, CLIFFLINE TO EAST.

Element occurrence data:
CA. 2000 INDIVIDUALS SCATTERED ABOVE AND BELOW CLIFF LINE.

General site description:
ABOVE AND BELOW ERODING CLIFFLINE; SILTY CLAY; OPEN PINUS PONDEROSA,
JUNIPERUS SCOPULORUM WITH ARTEMISIA TRIDENTATA AND HAPLOPAPPUS
ARMERIOIDES.

Land owner/manager:
CUSTER NATIONAL FOREST, ASHLAND RANGER DISTRICT

Comments:
MONTU; SEE GMF FOR BASE MAP SHOWING SUBPOPULATIONS.

Information source: SCHASSBERGER, L. S. 1988. [FIELD SURVEYS IN POWDER
RIVER AND ROSEBUD COS. OF 12-21 MAY (ASTRAGALUS
BARRII).]

Specimens: SCHASSBERGER, L. A. (179). 1988. MONTU.

April 17, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: ASTRAGALUS BARRII
Common Name: BARR'S MILKVETCH

Global rank: G3 Forest Service status: SENSITIVE
State rank: S3 Federal Status:

Element occurrence code: PDFAB0F150.013
Element occurrence type:

Survey site name: STAG ROCK CLIFF TOPS
EO rank: BC
EO rank comments: GOOD-SIZED POPULATION; NOT FLOWERING EXTENSIVELY.

County: POWDER RIVER

USGS quadrangle: FORT HOWES

Township: Range: Section: TRS comments:
006S 045E 13 NE4
006S 046E 18 SW4

Precision: S
Survey date: 1988-05-19 Elevation: 3340 -
First observation: 1988 Slope/aspect:
Last observation: 1988-05-19 Size (acres): 45

Location:
CUSTER NATIONAL FOREST, 1.5 MILES NORTH OF FORT HOWES RANGER STATION,
0.25 MILE WEST OF OTTER CREEK ROAD, SW OF STAG ROCK.

Element occurrence data:
CA. 1750 PLANTS IN 3 SUBPOPULATIONS SCATTERED ALONG CLIFF- LINE; LESS
THAN 10 PERCENT IN FLOWER; LARGE MATS.

General site description:
ERODING CLIFF-LINES IN SILTY-CLAY SOILS, BENEATH MODERATE COVER OF
PINUS PONDEROSA AND JUNIPERUS SCOPULORUM, WITH CALAMOVILFA LONGIFOLIA
AND ANDROPOGON SCOPARIUS.

Land owner/manager:
CUSTER NATIONAL FOREST, ASHLAND RANGER DISTRICT

Comments:
SEE GFM FOR BASE MAP SHOWING SUBPOPULATIONS.

Information source: SCHASSBERGER, L. S. 1988. [FIELD SURVEYS IN POWDER
RIVER AND ROSEBUD COS. OF 12-21 MAY (ASTRAGALUS
BARRII).]

Specimens: SCHASSBERGER, L. A. (190, 191). 1988. MONTU.

March 12, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: ASTRAGALUS BARRII
Common Name: BARR'S MILKVETCH

Global rank: G3 Forest Service status: SENSITIVE
State rank: S3 Federal Status: 3C

Element occurrence code: PDFAB0F150.014 ID: ?
Element occurrence type:

Survey site name: LYON CREEK RIDGE
EO rank: C
EO rank comments: NO APPARENT REPRODUCTION; GRAZING ON ALLOTMENT.

County: POWDER RIVER

USGS quadrangle: FORT HOWES
GOODSPEED BUTTE

Township: Range: Section: TRS comments:
005S 046E 36 SW4; 35 SE4
006S 046E 5 N2

Precision: S
Survey date: 1988-05-16 Elevation: 3400 -
First observation: 1988 Slope/aspect:
Last observation: 1988-05-19 Size (acres): 40

Location:
CUSTER NATIONAL FOREST, 3.5 MILES NORTH OF FORT HOWES, 1 MILE EAST OF
OTTER CREEK, JUST NORTH OF LYON CREEK ROAD.

Element occurrence data:
CA. 2,400 PLANTS IN 4 SUBPOPULATIONS; LARGE MATTED POPULATIONS, NOT
FLOWERING. LIGHT GRAZING IN SURROUNDING AREAS.

General site description:
ERODING CLIFF-LINES & RIDGES, IN SILTY-CLAY SOILS, BENEATH PINUS
PONDEROSA, JUNIPERUS SCOPULORUM; WITH ANDROPOGON SCOPARIUS, FESTUCA
IDAHOENSIS, SENECIO CANUS.

Land owner/manager:
CUSTER NATIONAL FOREST, ASHLAND RANGER DISTRICT

Comments:
VEGETATIVE MATERIAL ONLY; CONFORMATION IN FLOWER WARRANTED.

Information source: SCHASSBERGER, L. S. 1988. [FIELD SURVEYS IN POWDER
RIVER AND ROSEBUD COS. OF 12-21 MAY (ASTRAGALUS
BARRII).]

Specimens: SCHASSBERGER, L. A. (184). 1988. MONTU.

March 1, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: ASTRAGALUS BARRII

Common Name: BARR'S MILKVETCH

Global rank: G3 Forest Service status: SENSITIVE

State rank: S3 Federal Status: 3C

Element occurrence code: PDFAB0F150.015

ID: Y

Element occurrence type:

Survey site name: KING CREEK WELL

EO rank: A

EO rank comments: EXCELLENT SITE

County: ROSEBUD

USGS quadrangle: GREEN CREEK

Township: Range: Section: TRS comments:

004S 044E 22 NW4

Precision: S

Survey date: 1988-05-16

Elevation: 3350 -

First observation: 1988

Slope/aspect:

Last observation: 1988-05-16

Size (acres): 2

Location:

CUSTER NATIONAL FOREST, 5 MILES SOUTH OF ASHLAND, 2.5 MILES SE OF
TONGUE RIVER ROAD ON SOUTH SIDE OF KING CREEK ROAD; WITHIN
WALK-IN/RIDE-IN RESTRICTED ZONE.

Element occurrence data:

CA. 2,000 PLANTS, FLOWERING PROLIFICALLY; ACTIVE POLLINATION OBSERVED.

General site description:

ERODING HILLSIDE OF SILTY-CLAY SOIL, WITH ARTEMISIA TRIDENTATA,
ATRIPLEX CONFERTIFOLIA, YUCCA GLAUCA, COMANDRA UMBELLATA.

Land owner/manager:

CUSTER NATIONAL FOREST, ASHLAND RANGER DISTRICT

Comments:

Information source: SCHASSBERGER, L. S. 1988. [FIELD SURVEYS IN POWDER
RIVER AND ROSEBUD COS. OF 12-21 MAY (ASTRAGALUS
BARRII).]

Specimens: SCHASSBERGER, L. A. (185). 1988. MONTU.

March 1, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: ASTRAGALUS BARRII

Common Name: BARR'S MILKVETCH

Global rank: G3 Forest Service status: SENSITIVE

State rank: S3 Federal Status: 3C

Element occurrence code: PDFAB0F150.016 ID: Y

Element occurrence type:

Survey site name: STAG ROCK RESERVOIR RIDGES

EO rank: B

EO rank comments: TOO CLOSE TO RESERVOIR FOR CATTLE.

County: POWDER RIVER

JSGS quadrangle: FORT HOWES

Township: Range: Section: TRS comments:

006S 045E 12 NE4; 1 SE4

Precision: S

Survey date: 1988-05-18

Elevation: 3420 -

First observation: 1988

Slope/aspect:

Last observation: 1988-05-18

Size (acres): 35

Location:

CUSTER NATIONAL FOREST, 2.5 MILES NORTH OF FORT HOWES RANGER STATION,
0.5 MILE WEST OF OTTER CREEK ROAD, 0.25 MILE NORTH OF STAG ROCK
RESERVOIR.

Element occurrence data:

CA. 950 PLANTS IN 3 SUBPOPULATIONS; ABOUT 75 PERCENT OF POPULATION IN
FLOWER.

General site description:

ERODING BARREN KNOLLS AND RIDGES IN SILTY-CLAY SOIL, WITH PHLOX
HOODII, FESTUCA IDAHOENSIS, HAPLOPAPPUS ARMERIOIDES, AND GUTIERREZIA
SAROTHRAE.

Land owner/manager:

CUSTER NATIONAL FOREST, ASHLAND RANGER DISTRICT

Comments:

SEE GMF FOR BASE MAP SHOWING SUBPOPULATIONS.

Information source: SCHASSBERGER, L. S. 1988. [FIELD SURVEYS IN POWDER
RIVER AND ROSEBUD COS. OF 12-21 MAY (ASTRAGALUS
BARRII).]

Specimens: SCHASSBERGER, L. A. (187, 188, 189). 1988. MONTU.

March 12, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: ASTRAGALUS BARRII
Common Name: BARR'S MILKVETCH

Global rank: G3 Forest Service status: SENSITIVE
State rank: S3 Federal Status: 3C

Element occurrence code: PDFAB0F150.017 ID: ?
Element occurrence type:

Survey site name: NW BUTTRESS, TAYLOR BUTTE
EO rank: C
EO rank comments: POOR REPRODUCTION

County: POWDER RIVER

USGS quadrangle: FORT HOWES

Township: Range: Section: TRS comments:
006S 046E 20 SW4; 19 SE4

Precision: S
Survey date: 1988-05-19 Elevation: 3360 -
First observation: 1988 Slope/aspect:
Last observation: 1988-05-19 Size (acres): 30

Location:
CA. 0.75 MILE SE OF FORT HOWES RANGER STATION, ALONG CLIFFS.

Element occurrence data:
CA. 3,050 PLANTS SCATTERED ALONG RIM ROCK. LARGE MATS. NOT FLOWERING.

General site description:
ERODING CLIFF IN SILTY CLAY SOILS; ONE SUBPOPULATION IN THE MIDDLE OF
BURN AREA (1966).

Land owner/manager:
CUSTER NATIONAL FOREST, ASHLAND RANGER DISTRICT

Comments:
VEGETATIVE MATERIAL ONLY; CONFORMATION IN FLOWER WARRANTED.

Information source: SCHASSBERGER, L. S. 1988. [FIELD SURVEYS IN POWDER
RIVER AND ROSEBUD COS. OF 12-21 MAY (ASTRAGALUS
BARRII).]

Specimens:

March 12, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: ASTRAGALUS BARRII
Common Name: BARR'S MILKVETCH

Global rank: G3 Forest Service status: SENSITIVE
State rank: S3 Federal Status: 3C

Element occurrence code: PDFAB0F150.020 ID: ?
Element occurrence type:

Survey site name: SHEEP WELL ROAD
EO rank: C
EO rank comments: NO CURRENT REPRODUCTION; GRAZED SITE

County: POWDER RIVER

USGS quadrangle: COLEMAN DRAW

Township: Range: Section: TRS comments:
003S 046E 20 NE4

Precision: S
Survey date: 1985-05-20 Elevation: 3310 -
First observation: 1988 Slope/aspect:
Last observation: 1988-05-20 Size (acres): 1

Location:
CUSTER NATIONAL FOREST, CA. 10 MILES EAST OF ASHLAND (HIGHWAY 212),
0.5 MILES SOUTH OF HIGHWAY, JUST WEST OF DIRT ROAD.

Element occurrence data:
CA. 200-250 PLANTS SCATTERED ALONG A LOW EMBANKMENT; NOT FLOWERING.

General site description:
LOW ERODING HILLSIDE IN SILTY-CLAY SOILS, WITH CHRYSOTHAMNUS
NAUSEOSUS, ANDROPOGON SCOPARIUS AND GUTIERREZIA SAROTHRÆ.

Land owner/manager:
CUSTER NATIONAL FOREST, ASHLAND RANGER DISTRICT

Comments:
VEGETATIVE MATERIAL ONLY; CONFIRMATION IN FLOWER WARRANTED. OBSERVED
BY SCHASSBERGER. NOT REVISITED BY SCHMOLLER.

Information source: SCHASSBERGER, L. S. 1988. [FIELD SURVEYS IN POWDER
RIVER AND ROSEBUD COS. OF 12-21 MAY (ASTRAGALUS
BARRII).]

Specimens:

March 12, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: ASTRAGALUS BARRII

Common Name: BARR'S MILKVETCH

Global rank: G3 Forest Service status: SENSITIVE

State rank: S3 Federal Status: 3C

Element occurrence code: PDFAB0F150.031 ID: Y

Element occurrence type:

Survey site name: OTTER

EO rank:

EO rank comments:

County: POWDER RIVER

USGS quadrangle: OTTER

Township: Range: Section: TRS comments:

007S 045E 26 NW4NW4

Precision: S

Survey date: Elevation: 3500 - 3640

First observation: 1995-05-24 Slope/aspect: 0-15% / E-NE

Last observation: 1995-05-24 Size (acres): 2

Location:

NEXT TO FS RD 501, CA. 0.25 MILE EAST OF OTTER POST OFFICE; CA. 1.5
AIR MILES SOUTHWEST OF CONFLUENCE OF BEAR AND OTTER CREEKS. FROM HWY
212 CA 4 MILES EAST OF ASHLAND, DRIVE SOUTH ON OTTER CREEK ROAD. CA. 6
MILES SOUTH OF FORT HOWES WORK CENTER, TURN RIGHT AND GO UP BEAR
CREEK.

Element occurrence data:

200-250 PLANTS, 90% IN FLOWER, 10% VEGETATIVE.

General site description:

DRY, OPEN LOWER-TO-MIDSLOPE BREAKLANDS. SANDSTONE PARENT MATERIAL.
ASSOCIATED SPECIES: PHLOX HOODII, COMMANDRA UMBELLATA, ASTRAGALUS
GILVIFLORUS, HYMENOPAPPUS POLYCEPHALUS.

Land owner/manager:

CUSTER NATIONAL FOREST, ASHLAND RANGER DISTRICT
PRIVATELY OWNED LAND (INDIVIDUAL OR CORPORATE)

Comments:

OBSERVED BY H. MARRIOTT. POPULATION VERY CLOSE TO ROAD.

Information source:

HEIDEL, B. L. AND H. MARRIOTT. 1996. SENSITIVE
PLANT SPECIES SURVEY OF THE ASHLAND DISTRICT,
CUSTER NATIONAL FOREST, POWDER RIVER AND ROSEBUD
COUNTIES, MT. UNPUBLISHED REPORT TO THE U.S.
FOREST SERVICE. MONTANA NATURAL HERITAGE PROGRAM.
PP.

Specimens: MARRIOTT, H. (11498). 1995. MONTU.

March 12, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: ASTRAGALUS BARRII
Common Name: BARR'S MILKVETCH

Global rank: G3 Forest Service status: SENSITIVE
State rank: S3 Federal Status: 3C

Element occurrence code: PDFAB0F150.032 ID: ?
Element occurrence type:

Survey site name: NORTH FORK BLOOM CREEK
EO rank:
EO rank comments:

County: POWDER RIVER

USGS quadrangle: BLOOM CREEK

Township: Range: Section: TRS comments:
007S 048E 10 SW4NW4

Precision: S
Survey date: Elevation: 3800 -
First observation: 1995-05-30 Slope/aspect: 0-40% / SOUTH, WEST
Last observation: 1995-05-30 Size (acres): 1

Location:
RIDGE WEST OF NORTH FORK BLOOM CREEK CA. 0.5 MILE NORTH OF CONFLUENCE
WITH SOUTH FORK; ACCESS VIA BLOOM CREEK ROAD (FROM POWDER RIVER ROAD).

Element occurrence data:
40-50 PLANTS, ALL VEGETATIVE, VERY LOCALIZED.

General site description:
OPEN, DRY UPPERSLOPE. SANDY-SILTY BREAKLANDS WITH ROCK FRAGMENTS NEXT
TO SANDSTONE OUTCROP. SANDSTONE PARENT MATERIAL. DOMINATED BY
PONDERSOA PINE AND ROCKY MOUNTAIN JUNIPER. CAREX FILIFOLIA ALSO
PRESENT.

Land owner/manager:
CUSTER NATIONAL FOREST, ASHLAND RANGER DISTRICT

Comments:
VEGETATIVE MATERIAL ONLY; CONFORMATION IN FLOWER WARRANTED. OBSERVED
BY H. MARRIOTT. ADDITIONAL PLANTS MAY BE PRESENT ON SIMILAR MICROSITES
JUST BELOW RIMS OF SANDSTONE-CAPPED RIDGETOPS (NOT ALL WERE SURVEYED).

Information source: BOTANIST, MONTANA NATURAL HERITAGE PROGRAM, 1515
EAST SIXTH AVENUE, HELENA, MT 59620-1800.

Specimens:

March 12, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: ASTRAGALUS BARRII
Common Name: BARR'S MILKVETCH

Global rank: G3 Forest Service status: SENSITIVE
State rank: S3 Federal Status: 3C

Element occurrence code: PDFAB0F150.033 ID: ?
Element occurrence type:

Survey site name: DROP TUBE RESERVOIR
EO rank:
EO rank comments:

County: POWDER RIVER

USGS quadrangle: KING MOUNTAIN

Township: Range: Section: TRS comments:
005S 045E 21 N2

Precision: S
Survey date: Elevation: 3400 - 3550
First observation: 1995-06-14 Slope/aspect: 0-45% / ALL
Last observation: 1995-06-14 Size (acres): 5

Location:
SANDSTONE CLIFFS ON NORTH SIDE OF PAGET CREEK JUST WEST OF DROP TUBE
RESERVOIR. TAKE OTTER CREEK ROAD SOUTH FROM HWY 212 CA. 15 MILES TO
PAGET ROAD; TURN RIGHT. PARK NEAR RESERVOIR AND HIKE TO SITE.

Element occurrence data:
>400 PLANTS, VEGETATIVE.

General site description:
DRY CREST AND UPERSLOPE OFTEN IN SANDSTONE OUTCROPS; OPEN TO PARTIAL
SHADE. SANDSTONE PARENT MATERIAL. ASSOCIATED SPECIES: ANDROPOGON
SCOPARIUS, AGROPYRON SPICATUM, ARTEMISIA TRIDENTATA, A. FRIGIDA,
KOELERIA MACRANTHA, YUCCA GLAUCA.

Land owner/manager:
CUSTER NATIONAL FOREST, ASHLAND RANGER DISTRICT

Comments:
OBSERVED BY H. MARRIOTT. NOT ALL SUITABLE HABITAT IN AREA SURVEYED.

Information source: HEIDEL, B. L. AND H. MARRIOTT. 1996. SENSITIVE
PLANT SPECIES SURVEY OF THE ASHLAND DISTRICT,
CUSTER NATIONAL FOREST, POWDER RIVER AND ROSEBUD
COUNTIES, MT. UNPUBLISHED REPORT TO THE U.S.
FOREST SERVICE. MONTANA NATURAL HERITAGE PROGRAM.
PP.

Specimens:

March 12, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: ASTRAGALUS BARRII
Common Name: BARR'S MILKVETCH

Global rank: G3 Forest Service status: SENSITIVE
State rank: S3 Federal Status: 3C

Element occurrence code: PDFABOF150.034 ID: ?
Element occurrence type:

Survey site name: BLOOM CREEK
EO rank:
EO rank comments:

County: POWDER RIVER

USGS quadrangle: BLOOM CREEK

Township: Range: Section: TRS comments:
007S 048E 23 SE4NE4, NE4SE4, CENTER; 15 SE4; 14 SW4

Precision: S
Survey date: Elevation: 3600 - 3700
First observation: 1995-05-25 Slope/aspect: 0-30+° / ALL
Last observation: 1995-05-29 Size (acres): 5

Location:
TAKE POWDER RIVER ROAD TO MOORHEAD FROM BROADUS. AFTER 20-25 MILES,
TURN UP BLOOM CREEK (ROAD SIGN READS "TO FORT HOWES"). PLANTS ARE JUST
INSIDE FOREST BOUNDARY ON LOWER RIDGES ON SOUTHWEST SIDE OF DRAINAGE.

Element occurrence data:
3 SUBPOPULATIONS WITH 400, 30, AND 13 PLANTS; ALL VEGETATIVE.

General site description:
OPEN TO PARTIALLY SHADED, DRY BREAKLANDS ASSOCIATED WITH SANDSTONE
OUTCROPS. SANDY-SILTY SOIL, OFTEN WITH MANY ROCK FRAGMENTS. LOTS OF
PINE DUFF IN SOME AREAS. DOMINATED BY PINUS PONDEROSA, JUNIPERUS
SCOPULORUM. OTHER ASSOCIATED SPECIES: CAREX FILIFOLIA, ANDROPOGON
SCOPARIUS, ARISTIDA LONGISETA, BOUTELOUA GRACILIS, YUCCA GLAUCA,
GUTIERREZIA SAROTHRAE.

Land owner/manager:
CUSTER NATIONAL FOREST, ASHLAND RANGER DISTRICT

Comments:
VEGETATIVE MATERIAL ONLY; CONFORMATION IN FLOWER WARRANTED. OBSERVED
BY H. MARRIOTT. NATURAL EROSION ON STEEPER, SPARSELY-VEGETATED SLOPES
PRODUCES PEDESTALLED PLANTS.

Information source: BOTANIST, MONTANA NATURAL HERITAGE PROGRAM, 1515
EAST SIXTH AVENUE, HELENA, MT 59620-1800.

Specimens:

March 12, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: ASTRAGALUS BARRII
Common Name: BARR'S MILKVETCH

Global rank: G3 Forest Service status: SENSITIVE
State rank: S3 Federal Status: 3C

Element occurrence code: PDFAB0F150.036 ID: ?
Element occurrence type:

Survey site name: WILBUR CREEK
EO rank:
EO rank comments:

County: POWDER RIVER

USGS quadrangle: HOME CREEK BUTTE

Township: Range: Section: TRS comments:
003S 046E 13 NW4

Precision: S

Survey date: Elevation: 3540 - 3600
First observation: 1995-06-25 Slope/aspect: 0-45% / ALL
Last observation: 1995-06-25 Size (acres): 2

Location:

FROM HWY 212 EAST OF ASHLAND, TAKE WILBUR CREEK ROAD (#775) NORTH CA.
0.5 MILE. SITE IS ON BADLANDS-TYPE BUTTES AND RIDGES ON LEFT BEFORE
DROPPING DOWN TO WILBUR CREEK.

Element occurrence data:

350-400 INDIVIDUALS IN 3 SUBPOPULATIONS; VEGETATIVE.

General site description:

DRY, OPEN LOWERSLOPE THROUGH CREST. ASSOCIATED WITH SOME
SPARSELY-VEGETATED SANDSTONE OUTCROPS AND IN SMALL ERODED GULLY AT
BASE OF RIDGE. SANDY-SILTY SOIL, WHITISH TO SANDY IN COLOR. ASSOCIATED
SPECIES: HAPLOPAPPUS ARMERIOIDES, AGROPYRON SPICATUM, COMMANDRA
UMBELLATA, HYMENOPAPPUS POLYCEPHALUS, CAREX FILIFOLIA.

Land owner/manager:

CUSTER NATIONAL FOREST, ASHLAND RANGER DISTRICT

Comments:

OBSERVED BY H. MARRIOTT. VEGETATIVE MATERIAL ONLY; CONFORMATION IN
FLOWER WARRANTED.

Information source:

SENSITIVE PLANT COORDINATOR, CUSTER NATIONAL
FOREST, 2602 FIRST AVENUE NORTH, P.O. BOX 2556,
BILLINGS, MT 59103.

Specimens:

March 12, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: ASTRAGALUS BARRII
Common Name: BARR'S MILKVETCH

Global rank: G3 Forest Service status: SENSITIVE
State rank: S3 Federal Status: 3C

Element occurrence code: PDFAB0F150.037 ID: Y
Element occurrence type:

Survey site name: HORSE CREEK / OTTER CREEK
EO rank:
EO rank comments:

County: POWDER RIVER

USGS quadrangle: FORT HOWES

Township: Range: Section: TRS comments:
006S 045E 36 NE4SW4
007S 045E 1 NE4NE4

Precision: S
Survey date: Elevation: 3400 - 3800
First observation: 1995-05-24 Slope/aspect: 0-30% / ALL
Last observation: 1995-05-24 Size (acres): 1

Location:
RIDGE NORTHWEST OF CONFLUENCE OF HORSE AND OTTER CREEKS. ONE
SUBPOPULATION IS ON WEST SIDE OF KNOB BETWEEN OTTER CREEK ROAD AND
ABANDONED ROAD (SOUTH OF OLD SCHOOL). OTHER SUBPOPULATION IS ALONG
RIDGECREST CA. 0.8 AIR MILE TO THE NORTHWEST; THIS SITE IS JUST OFF
OTTER CREEK ROAD CA. 2.5 MILES SOUTH OF FORT HOWES WORK CENTER.

Element occurrence data:
SOUTHERN SUBPOPULATION HAS CA. 50 PLANTS, >90 FLOWERING, REMAINDER
VEGETATIVE. NORTHERN SUBPOPULATION HAS 150-200 PLANTS, CA. 75%
FLOWERING, REMAINDER VEGETATIVE.

General site description:
PARTIALLY SHADED, DRY CREST AND UPPERSLOPE WITH SMALL SANDSTONE
OUTCROPS. SANDY-SILTY BREAKLANDS. PINUS PONDEROSA AND JUNIPERUS
SCOPULORUM WITH SPARSE UNDERSTORY DOMINATES SOUTHERN SUBPOPULATION.
ASTRAGALUS BARRII DOMINATES NORTHERN SUBPOPULATION. ASSOCIATED
SPECIES: COMMANDRA UMBELLATA, CAREX FILIFOLIA, ANDROPOGON SCOPARIUS.

Land owner/manager:
CUSTER NATIONAL FOREST, ASHLAND RANGER DISTRICT

Comments:
OBSERVED BY H. MARRIOTT. NATURAL EROSION ON STEEPER SLOPES HAS
PRODUCED PEDESTALED PLANTS.

Information source: HEIDEL, B. L. AND H. MARRIOTT. 1996. SENSITIVE
PLANT SPECIES SURVEY OF THE ASHLAND DISTRICT,
CUSTER NATIONAL FOREST, POWDER RIVER AND ROSEBUD
COUNTIES, MT. UNPUBLISHED REPORT TO THE U.S.
FOREST SERVICE. MONTANA NATURAL HERITAGE PROGRAM.
PP.

Specimens:

March 12, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: CAREX GRAVIDA
Common Name: PREGNANT SEDGE

Global rank: G5 Forest Service status:
State rank: S1 Federal Status:

Element occurrence code: PMCYP035G0.002
Element occurrence type:

Survey site name: HAY CREEK
EO rank:
EO rank comments:

County: ROSEBUD

USGS quadrangle: POKER JIM BUTTE

Township: Range: Section: TRS comments:
005S 044E 33 SE4SW4

Precision: S
Survey date: Elevation: 3880 -
First observation: 1955-07-21 Slope/aspect: LEVEL
Last observation: 1995-07-06 Size (acres): 10

Location:
(CA. 8 MILES EAST OF BIRNEY) NEAR THE HEAD OF HAY CREEK AT FLETCHER
RANCH.

Element occurrence data:
1995: UNCOMMON WITH 8 VIGOROUS CLUMPS IN NARROW BAND OF HABITAT. 1955:
IN FRUIT.

General site description:
MOIST SOIL IN BOTTOM OF STEEP-SIDED OLD GROWTH PINE DRAW. ASSOICATED
SPECIES: CAREX SPRENGELII, POA PRATENSIS, PRUNUS VIRGINIANA, AND LOW
AMOUNTS OF MEDICAGO LUPULINA FROM LIMITED CATTLE TRAILING.

Land owner/manager:
PRIVATELY OWNED LAND (INDIVIDUAL OR CORPORATE)
CUSTER NATIONAL FOREST, ASHLAND RANGER DISTRICT

Comments:
SITE IS MOST INTACT OF MESIC HABITAT IN SW4. BURNED WITHIN LAST 20
YEARS.

Information source: HEIDEL, B. L. AND H. MARRIOTT. 1996. SENSITIVE
PLANT SPECIES SURVEY OF THE ASHLAND DISTRICT,
CUSTER NATIONAL FOREST, POWDER RIVER AND ROSEBUD
COUNTIES, MT. UNPUBLISHED REPORT TO THE U.S.
FOREST SERVICE. MONTANA NATURAL HERITAGE PROGRAM.
PP.

Specimens: BENNETT, H. R. (S.N.). 1955. WTU.
HEIDEL, B. L. (1337). 1995. MONTU.

January 4, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: CAREX GRAVIDA

Common Name: PREGNANT SEDGE

Global rank: G5 Forest Service status:

State rank: S1 Federal Status:

Element occurrence code: PMCYP035G0.004

Element occurrence type:

Survey site name: EAST FORK OTTER CREEK

EO rank: C

EO rank comments:

County: POWDER RIVER

USGS quadrangle: BEAVER CREEK SCHOOL

Township: Range: Section: TRS comments:

002S 046E 23 SE4SE4

Precision: S

Survey date: 1995-07-03

Elevation: 3900 -

First observation: 1995-06-24

Slope/aspect: LEVEL

Last observation: 1995-07-03

Size (acres): 1

Location:

CA. 5 MILES EAST OF ASHLAND ON HWY 212, CA. 10.5 MILES NORTHEAST ON FS
RD 423, CA. 1.5 MILES WEST ON FS RD 1409.

Element occurrence data:

20+ WIDELY SCATTERED VIGOROUS CLUMPS, IN VERY EARLY FRUIT 24 JUNE
1995.

General site description:

UPPER SHELTERED END OF DRAW IN PINUS PONDEROSA/MAHONIA REPENS HABITAT
TYPE, WITH WIDELY SCATTERED AMELANCHIER ALNIFOLIA THICKETS AND A
POPULUS TREMULOIDES CLONE IN NARROW BOTTOM. MOST OF POPULATION IS NEAR
ASPEN CLONE, IN PARTIAL SHADE. ASSOCIATED SPECIES: CAREX TORREYI, C.
HOODII, APOCYNUM ANDROSAEMIFOLIUM.

Land owner/manager:

CUSTER NATIONAL FOREST, ASHLAND RANGER DISTRICT

Comments:

OBSERVED BY H. MARRIOTT. PLANT OCCURS IN SAME LOCALE AS DICHANTHELIUM
SCRIBNERIANUM BUT ON MORE LEVEL, SHADED SETTING.

Information source:

HEIDEL, B. L. AND H. MARRIOTT. 1994. SENSITIVE
PLANT SPECIES SURVEY OF THE ASHLAND DISTRICT,
CUSTER NATIONAL FOREST, POWDER RIVER AND ROSEBUD
COUNTIES, MT. UNPUBLISHED REPORT TO THE U.S.
FOREST SERVICE. MONTANA NATURAL HERITAGE PROGRAM.
PP.

Specimens:

January 3, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: CEANOTHUS HERBACEUS VAR PUBESCENS

Common Name: NEW JERSEY TEA

Global rank: G?T? Forest Service status:

State rank: S1 Federal Status:

Element occurrence code: PDRHA040K1.001

Element occurrence type:

Survey site name: SAYLE

EO rank:

EO rank comments:

County: POWDER RIVER

USGS quadrangle: SAYLE

Township: Range: Section: TRS comments:

007S 047E 16

Precision: G

Survey date: 1948-06-17

Elevation: 3860 -

First observation: 1948

Slope/aspect:

Last observation: 1948-06-17

Size (acres): 0

Location:

30 MI. SW. OF BROADUS, NEAR SAYLE (HISTORICAL COLLECTION).

Element occurrence data:

FEW PLANTS; P. LESICA "THOROUGHLY SEARCHED THE AREA ALONG THE MAIN
BLOOM CREEK ROAD AS WELL AS THE AREA AROUND OTHER NEARBY ROADS...WITH
NO SUCCESS" (SEE EF).

General site description:

N. SLOPE; GRASSY, PINE COVERED HILL.

Land owner/manager:

PRIVATELY OWNED LAND (INDIVIDUAL OR CORPORATE)
CUSTER NATIONAL FOREST, ASHLAND RANGER DISTRICT

Comments:

Information source: LESICA, PETER. DIVISION OF BIOLOGICAL SCIENCES,
UNIVERSITY OF MONTANA, MISSOULA, MT 59812. PHONE
406/728-8740.

Specimens: BOOTH (S.N.). 1948. MONT.

March 12, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: DICHANTHELIUM OLIGOSANTHES VAR SCRIBNERIANUM
Common Name: SCRIBNER'S PANIC GRASS

Global rank: G5T5 Forest Service status:
State rank: S1 Federal Status:

Element occurrence code: PMPOA240Q2.002
Element occurrence type:

Survey site name: EAST FORK OTTER CREEK
EO rank: D
EO rank comments:

County: POWDER RIVER

USGS quadrangle: BEAVER CREEK SCHOOL

Township: Range: Section: TRS comments:
002S 046E 23 SE4SE4

Precision: S
Survey date: 1995-07-03 Elevation: 3920 -
First observation: 1995-07-03 Slope/aspect: 2-15% / SOUTH
Last observation: 1995-07-03 Size (acres): 1

Location:
TRAVEL CA. 5 MILES EAST OF ASHLAND ON HWY 212, CA. 10.5 MILES
NORTHEAST ON FS RD 423, THEN CA. 1.5 MILES WEST ON FS RD 1409.

Element occurrence data:
UNCOMMON; ONLY 5 PLANTS FOUND IN 2 SUBPOPULATIONS, IN VERY EARLY FRUIT
3 JULY 1995.

General site description:
UPPER END OF DRAW IN PINUS PONDEROSA/MAHONIA REPENS HABITAT TYPE. IN
SEMI-OPEN POCKETS, IN A SIDEARM MEADOW AND ON LOWER SOUTH-FACING
SLOPE. ASSOCIATED SPECIES: AGROPYRON SPICATUM, CAREX SPRENGELII, POA
PRATENSIS.

Land owner/manager:
CUSTER NATIONAL FOREST, ASHLAND RANGER DISTRICT

Comments:
OBSERVED BY B. HEIDEL. PLANT OCCURS IN SAME LOCALE AS CAREX GRAVIDA,
BUT ON MORE WELL-DRAINED, OPEN SETTINGS.

Information source: HEIDEL, B. L. AND H. MARRIOTT. 1996. SENSITIVE
PLANT SPECIES SURVEY OF THE ASHLAND DISTRICT,
CUSTER NATIONAL FOREST, POWDER RIVER AND ROSEBUD
COUNTIES, MT. UNPUBLISHED REPORT TO THE U.S.
FOREST SERVICE. MONTANA NATURAL HERITAGE PROGRAM.
PP.

Specimens:

March 12, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: DICHANTHELIUM OLIGOSANTHES VAR SCRIBNERIANUM
Common Name: SCRIBNER'S PANIC GRASS

Global rank: G5T5 Forest Service status:
State rank: S1 Federal Status:

Element occurrence code: PMPOA240Q2.003
Element occurrence type:

Survey site name: CABIN CREEK
EO rank: D
EO rank comments:

County: POWDER RIVER

USGS quadrangle: BEAVER CREEK SCHOOL

Township: Range: Section: TRS comments:
002S 046E 20 NW4NE4

Precision: S
Survey date: 1995-07-03 Elevation: 3900 -
First observation: 1995-07-03 Slope/aspect: 0% / NW
Last observation: 1995-07-03 Size (acres): 1

Location:

TRAVEL CA. 5 MILES EAST OF ASHLAND ON HWY 212, CA. 10.5 MILES
NORTHEAST ON FS RD 423, THEN CA. 5.5 MILES WEST ON FS RD 1409.

Element occurrence data:

5 MULTI-STEMMED PLANTS IN ONE CLUSTER; FRUITING RELATIVELY EARLY 3
JULY 1995 IN A BURNED AREA.

General site description:

HEADWATERS OF DRAW ABOVE CABIN CREEK ON GENTLE UPPER END IN AREA OF
OPEN PINE STAND KILLED IN CROWN FIRE. ASSOCIATED SPECIES: CAREX
DEWEYANA, POA PRATENSIS, ASTRAGALUS AMERICANUS, A. AGRESTIS.

Land owner/manager:

CUSTER NATIONAL FOREST, ASHLAND RANGER DISTRICT

Comments:

Information source: HEIDEL, B. L. AND H. MARRIOTT. 1996. SENSITIVE
PLANT SPECIES SURVEY OF THE ASHLAND DISTRICT,
CUSTER NATIONAL FOREST, POWDER RIVER AND ROSEBUD
COUNTIES, MT. UNPUBLISHED REPORT TO THE U.S.
FOREST SERVICE. MONTANA NATURAL HERITAGE PROGRAM.
PP.

Specimens:

March 1, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: ASTRAGALUS BARRII
Common Name: BARR'S MILKVETCH

Global rank: G3 Forest Service status: SENSITIVE
State rank: S3 Federal Status: 3C

Element occurrence code: PDFAB0F150.012 ID: Y
Element occurrence type:

Survey site name: TAYLOR BUTTE RIM
EO rank: A
EO rank comments: EXCELLENT SITE NATURALLY PROTECTED BY CLIFFLINE.

County: POWDER RIVER

USGS quadrangle: FORT HOWES

Township: Range: Section: TRS comments:
006S 046E 30 E2

Precision: S
Survey date: 1988-05-14 Elevation: 3400 -
First observation: 1988 Slope/aspect:
Last observation: 1988-05-14 Size (acres): 35

Location:
CUSTER NATIONAL FOREST, 0.5 MILES EAST OF OTTER CREEK ROAD ON SOUTH
FORK OF TAYLOR CREEK ROAD, CLIFFLINE TO EAST.

Element occurrence data:
CA. 2000 INDIVIDUALS SCATTERED ABOVE AND BELOW CLIFF LINE.

General site description:
ABOVE AND BELOW ERODING CLIFFLINE; SILTY CLAY; OPEN PINUS PONDEROSA,
JUNIPERUS SCOPULORUM WITH ARTEMISIA TRIDENTATA AND HAPLOPAPPUS
ARMERIOIDES.

Land owner/manager:
CUSTER NATIONAL FOREST, ASHLAND RANGER DISTRICT

Comments:
MONTU; SEE GMF FOR BASE MAP SHOWING SUBPOPULATIONS.

Information source: SCHASSBERGER, L. S. 1988. [FIELD SURVEYS IN POWDER
RIVER AND ROSEBUD COS. OF 12-21 MAY (ASTRAGALUS
BARRII).]

Specimens: SCHASSBERGER, L. A. (179). 1988. MONTU.

March 1, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: ASTRAGALUS BARRII
Common Name: BARR'S MILKVETCH

Global rank: G3 Forest Service status: SENSITIVE
State rank: S3 Federal Status: 3C

Element occurrence code: PDFAB0F150.013 ID: Y
Element occurrence type:

Survey site name: STAG ROCK CLIFF TOPS
EO rank: BC
EO rank comments: GOOD-SIZED POPULATION; NOT FLOWERING EXTENSIVELY.

County: POWDER RIVER

USGS quadrangle: FORT HOWES

Township:	Range:	Section:	TRS comments:
006S	045E	13	NE4
006S	046E	18	SW4

Precision:	S	
Survey date:	1988-05-19	Elevation: 3340 -
First observation:	1988	Slope/aspect:
Last observation:	1988-05-19	Size (acres): 45

Location:

CUSTER NATIONAL FOREST, 1.5 MILES NORTH OF FORT HOWES RANGER STATION,
0.25 MILE WEST OF OTTER CREEK ROAD, SW OF STAG ROCK.

Element occurrence data:

CA. 1750 PLANTS IN 3 SUBPOPULATIONS SCATTERED ALONG CLIFF- LINE; LESS
THAN 10 PERCENT IN FLOWER; LARGE MATS.

General site description:

ERODING CLIFF-LINES IN SILTY-CLAY SOILS, BENEATH MODERATE COVER OF
PINUS PONDEROSA AND JUNIPERUS SCOPULORUM, WITH CALAMOVILFA LONGIFOLIA
AND ANDROPOGON SCOPARIUS.

Land owner/manager:

CUSTER NATIONAL FOREST, ASHLAND RANGER DISTRICT

Comments:

SEE GMF FOR BASE MAP SHOWING SUBPOPULATIONS.

Information source: SCHASSBERGER, L. S. 1988. [FIELD SURVEYS IN POWDER
RIVER AND ROSEBUD COS. OF 12-21 MAY (ASTRAGALUS
BARRII).]

Specimens: SCHASSBERGER, L. A. (190, 191). 1988. MONTU.

March 1, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: ASTRAGALUS BARRII
Common Name: BARR'S MILKVETCH

Global rank: G3 Forest Service status: SENSITIVE
State rank: S3 Federal Status: 3C

Element occurrence code: PDFAB0F150.010 ID: Y
Element occurrence type:

Survey site name: STAG ROCK KNOLLS
EO rank: B
EO rank comments: GRAZED SITE CLOSE TO ROAD.

County: POWDER RIVER

USGS quadrangle: FORT HOWES

Township: Range: Section: TRS comments:
006S 045E 12 SW4; 13 NW4

Precision: S
Survey date: 1988-05-14 Elevation: 3450 -
First observation: 1988 Slope/aspect:
Last observation: 1988-05-14 Size (acres): 15

Location:
CUSTER NATIONAL FOREST, 1.5 MILES NORTH OF FORT HOWES RANGER STATION,
0.5 MILE WEST OF OTTER CREEK ROAD, NW OF STAG ROCK.

Element occurrence data:
CA. 1250 PLANTS, IN 4 SUBPOPULATIONS; FLOWERING.

General site description:
ERODING HILLSIDES AND KNOLLS, IN SILTY-CLAY DERIVED SOILS; OPEN SOIL
BENEATH PINUS PONDEROSA, JUNIPERUS SCOPULORUM, WITH ARTEMISIA
TRIDENTATA.

Land owner/manager:
CUSTER NATIONAL FOREST, ASHLAND RANGER DISTRICT

Comments:

Information source: SCHASSBERGER, L. S. 1988. [FIELD SURVEYS IN POWDER
RIVER AND ROSEBUD COS. OF 12-21 MAY (ASTRAGALUS
BARRII).]

Specimens: SCHASSBERGER, L. A. (176, 177, 180). 1988. MONTU.

March 12, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: DICHANTHELIUM OLIGOSANTHES VAR SCRIBNERIANUM
Common Name: SCRIBNER'S PANIC GRASS

Global rank: G5T5 Forest Service status:
State rank: S1 Federal Status:

Element occurrence code: PMPOA240Q2.001
Element occurrence type:

Survey site name: BLOOM CREEK
EO rank:
EO rank comments:

County: POWDER RIVER

USGS quadrangle: SAYLE

Township: Range: Section: TRS comments:
007S 047E 13
007S 048E 7

Precision: G
Survey date: 1984- - Elevation: 3800 -
First observation: 1948 06-19 Slope/aspect:
Last observation: 1995 Size (acres): 0

Location:
BLOOM CREEK DRAINAGE, 30 MILES SW OF BROADUS (HISTORICAL COLLECTION).

Element occurrence data:
UNKNOWN; SOME FIELD SURVEYS DONE IN 1984 AND IN 1995, BUT SPECIES NOT
RELOCATED: LESICA "...SEARCHED ALONG THE ROADS IN THE BLOOM CREEK
DRAINAGE EAST OF FORT HOWES WITHOUT SUCCESS." (SEE EF).

General site description:
ALONG MOIST DITCH, PLANTS SCATTERED IN BUNCHGRASS UNDER PINUS
PONDEROSA.

Land owner/manager:
CUSTER NATIONAL FOREST, ASHLAND RANGER DISTRICT

Comments:

Information source: HEIDEL, B. L. AND H. MARRIOTT. 1996. SENSITIVE
PLANT SPECIES SURVEY OF THE ASHLAND DISTRICT,
CUSTER NATIONAL FOREST, POWDER RIVER AND ROSEBUD
COUNTIES, MT. UNPUBLISHED REPORT TO THE U.S.
FOREST SERVICE. MONTANA NATURAL HERITAGE PROGRAM.
PP.

Specimens: BOOTH, W. E. (2599). 19 JUNE 1948. MONT.

March 12, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: EVAX PROLIFERA
Common Name: BIG-HEAD EVAX

Global rank: G5 Forest Service status:
State rank: S1 Federal Status:

Element occurrence code: PDAST3S050.002
Element occurrence type:

Survey site name: HOME CREEK
EO rank:
EO rank comments:

County: POWDER RIVER

USGS quadrangle: COLEMAN DRAW

Township: Range: Section: TRS comments:
003S 046E 16 NE4NW4

Precision: S
Survey date: Elevation: 3400 -
First observation: 1995-06-27 Slope/aspect: LEVEL
Last observation: 1995-06-27 Size (acres): 1

Location:

CA. 10 MILES EAST OF ASHLAND, CA. 0.5 MILES NORTH OF HWY 212.

Element occurrence data:

AT LEAST 200 PLANTS IN AN AREA LESS THAN 100 SQUARE METERS, AS
DETERMINED IN PRELIMINARY SURVEY. BOTH FLOWERING AND VEGETATIVE PLANTS
PRESENT 27 JUNE 1995.

General site description:

BASE OF SMALL BUTTE IN ROLLING UPLANDS ON OPEN OUTWASH FLAT OF
LIGHT-COLORED, FINE, POSSIBLY ALKALINE SOIL. SPARSE VEGETATION
INCLUDES: GUTIERREZIA SAROTHRAE, PLANTAGO PATAGONICIA, ALLIUM TEXTILE.
SURROUNDED BY SAGEBRUSH GRASSLAND.

Land owner/manager:

CUSTER NATIONAL FOREST, ASHLAND RANGER DISTRICT

Comments:

Information source: HEIDEL, B. L. AND H. MARRIOTT. 1996. SENSITIVE
PLANT SPECIES SURVEY OF THE ASHLAND DISTRICT,
CUSTER NATIONAL FOREST, POWDER RIVER AND ROSEBUD
COUNTIES, MT. UNPUBLISHED REPORT TO THE U.S.
FOREST SERVICE. MONTANA NATURAL HERITAGE PROGRAM.
PP.

Specimens: MARRIOTT, H. (11570). 1995. MONT, RM. !R. HARTMAN.

Appendix D. Preliminary list of vascular plants on the Custer National Forest, Ashland District¹

ACERACEAE

*Acer glabrum**

Acer negundo

AGAVACEAE

Yucca glauca

ALISMATACEAE

Alisma gramineum

ANACARDIACEAE

Rhus trilobata

Toxicodendron rydbergii

APIACEAE

Berula erecta

Cicuta douglasii

Conium maculatum

Cymopterus acaulis

Heracleum lanatum

Lomatium foeniculaceum

Musineon divaricatum

***Osmorhiza longistylis*²**

Perideridia gairdneri

Sanicula marilandica

APOCYNACEAE

Apocynum androsaemifolium

Apocynum cannabinum

ASCLEPIADACEAE

Asclepias viridiflora

ASTERACEAE

Achillea millefolium

Acroptilon repens (*Centaurea repens*)

¹ Species marked by an asterisk were collected by CCC collectors in the 1930s but were not observed in the course of 1995 fieldwork.

² Voucher specimens were collected of those species which are bold-faced.

Ambrosia psilostachya
Ambrosia trifida
Antennaria corymbosa
Antennaria dimorpha
Antennaria neglecta
Antennaria parvifolia
Antennaria rosea
Arctium minus
Arnica cordifolia
Arnica sororia
Artemisia campestris
Artemisia cana
Artemisia dracunculus
Artemisia frigida
Artemisia ludoviciana
Artemisia tridentata
Aster conspicuus
Aster falcatus
Aster laevis
Balsamorhiza sagittata
Brickellia eupatorioides (Kuhnia eupatorioides)
Chaenactis douglasii
Chrysothamnus nauseosus
Chrysothamnus viscidiflorus
Cirsium arvense
Cirsium canescens
Cirsium foliosum
Cirsium undulatum
Cirsium vulgare
Conyza canadensis
Crepis acuminata
Crepis occidentalis
Echinacea angustifolia
Erigeron compositus
Erigeron ochroleucus
Erigeron philadelphicus
Erigeron pumilus
Erigeron strigosus
Evax prolifera
Filago arvensis
Gaillardia aristata
Grindelia squarrosa
Gutierrezia sarothrae
Haplopappus armerioides

Helianthus annuus
Helianthus nuttallii
Helianthus pauciflorus
Heterotheca villosa
Hymenopappus filifolius
Iva axillaris
Lactuca oblongifolia (L. pulchella)*
Lactuca serriola
Lactuca tatarica
Liatris punctata
Lygodesmia juncea
Lygodesmea rostrata*
Lygodesmia juncea
Machaeranthera grindelioides
Machaeranthera tanacetifolia
Matricaria matricarioides
Microseris nutans
Picradeniopsis oppositifolia
Ratibida columnifera
Senecio canus
Senecio integerrimus
Senecio plattensis
Senecio vulgaris
Solidago canadensis
Solidago missouriensis
Solidago nemoralis
Solidago rigida*
Sonchus arvensis
Stephanomeria runcinata
Stephanomeria tenuifolia
Taraxacum officinale
Tetradymia canescens
Townsendia hookeri
Tragopogon pratensis
Xanthium strumarium

BERBERIDACEAE

Mahonia repens

BORAGINACEAE

Cryptantha celosioides
Cryptantha torreyana
Cynoglossum officinale
Lappula occidentalis
Lappula occidentalis

Lithospermum incisum
Mertensia lanceolata
Mertensia oblongifolia
Plagiobothrys scouleri

BRASSICACEAE

Alyssum desertorum
Arabis holboellii
Berteroa incana
Camelina microcarpa
Camelina sativa
Capsella bursa-pastoris
Chorispora tenella
Descurainia incana ssp incana
Descurainia sophia
Draba nemorosa
Draba reptans
Erysimum asperum
Erysimum cheiranthoides
Hesperis matronalis
Lesquerella alpina
Malcolmia africana
Physaria acutifolia
Physaria didymocarpa
Rorippa curvisiliqua
Rorippa nasturtium-aquaticum
Sisymbrium altissimum
Sisymbrium loeselii
Sisymbrium officinale
Thlaspi arvense

CACTACEAE

Coryphantha missouriensis
Opuntia fragilis
Opuntia polyacantha

CAMPANULACEAE

Campanula parryi
Campanula rotundifolia
Triodanis leptocarpa
Triodanis perfoliata

CANNABACEAE

Humulus lupulus

CAPPARACEAE

*Cleome serrulata**

CAPRIFOLIACEAE

Linnaea borealis

Symphoricarpos albus

Symphoricarpos occidentalis

*Symphoricarpos oreophilus**

CARYOPHYLLACEAE

Cerastium arvense

Mochringia lateriflora (*Arenaria lateriflora*)

Paronychia sessiliflora

Silene antirrhina

Silene douglasii

Silene latifolia

CHENOPODIACEAE

Atriplex argentea

Atriplex confertifolia

Atriplex gardneri

Ceratoides lanata

Chenopodium album

Chenopodium leptophyllum

Sarcobatus vermiculatus

Suaeda moquinii

Suaeda nigra

COMMELINACEAE

Tradescantia occidentalis

CONVOLVULACEAE

Evolvulus nuttallianus

CORNACEAE

Cornus stolonifera

CUPRESSACEAE

Juniperus communis

Juniperus horizontalis

Juniperus scopulorum

CYPERACEAE

Carex backii

Carex bebbii

Carex brevior
Carex deweyana
Carex filifolia
Carex geyeri
Carex gravida
Carex hoodii
Carex hystericina
Carex lanuginosa
Carex nebrascensis
Carex pennsylvanica
Carex praegracilis
Carex praticola
Carex rossii
Carex sprengei
Carex torreyi
Carex vulpinoidea
Cyperus aristatus
Eleocharis acicularis
Eleocharis palustris
Eleocharis spp.
Scirpus acutus
Scirpus americanus
Scirpus pungens
Scirpus validus

DRYOPTERIDACEAE
Cystopteris fragilis

ELAEAGNACEAE
Elaeagnus commutata

ELATINACEAE
Elatine americana

EQUISETACEAE
Equisetum arvense
Equisetum laevigatum

ERICACEAE
Pyrola asarifolia*
Vaccinium scoparium*

EUPHORBIACEAE
Chamaesyce serpyllifolia
Euphorbia esula

Euphorbia marginata*
Euphorbia robusta
Euphorbia spathulata

FABACEAE

Amorpha canescens*
Astragalus adsurgens
Astragalus agrestis
Astragalus americanus
Astragalus barrii
Astragalus bisulcatus
Astragalus canadensis
Astragalus crassicaupus
Astragalus drummondii
Astragalus flexuosus
Astragalus gilviflorus
Astragalus gracilis
Astragalus lotiflorus
Astragalus missouriensis
Astragalus purshii
Astragalus spatulatus
Astragalus striatus
Astragalus tenellus
Dalea candida
Dalea purpurea
Glycyrrhiza lepidota
Hedysarum boreale
Lupinus argenteus
Lupinus caudatus
Lupinus pusillus
Lupinus sericeus
Medicago lupulina
Medicago sativa
Melilotus officinalis
Oxytropis lambertii
Oxytropis nana var. besseyi
Oxytropis sericea
Psoralea argophylla
Psoralea esculenta
Psoralea lanceolata
Psoralea tenuiflorum
Thermopsis rhombifolia
Vicia americana

GENTIANACEAE

*Gentiana affinis**

GERANIACEAE

Geranium carolinianum

*Geranium richardsonii**

*Geranium viscosissimum**

GROSSULARIACEAE

Ribes americanum

Ribes aureum

Ribes cereum

Ribes inerme

Ribes oxycanthoides

HYDROPHYLLACEAE

Ellisia nyctelea

Phacelia hastata

Phacelia linearis

IRIDACEAE

Sisyrinchium montanum

JUNCACEAE

Juncus balticus

Juncus bufonis

Juncus longistylis

Juncus tenuis

***Juncus* spp.**

LAMIACEAE

Agastache foeniculum

Hedeoma drummondii

Hedeoma hispida

Mentha arvensis

Monarda fistulosa

Prunella vulgaris

Salvia reflexa

LEMNACEAE

Lemna minor

LILIACEAE

Allium textile

Calochortus nuttallii

Disporum trachycarpum
Fritillaria atropurpurea
Leucocrinum montanum
Maianthemum racemosum (Smilacina racemosa)
Maianthemum stellatum (Smilacina stellata)
Zigadenus venenosus

LINACEAE

Linum lewisii
Linum rigidum

LOASACEAE

Mentzelia decapetala
Mentzelia dispersa
Mentzelia laevicaulis
Mentzelia nuda*

MALVACEAE

Sphaeralcea coccinea

MARSILEACEAE

Marsilea vestita

NYCTAGINACEAE

Mirabilis linearis

OLEACEAE

Fraxinus pennsylvanica

ONAGRACEAE

Calylophus serrulatus
Epilobium angustifolium
Epilobium ciliatum
Epilobium minutum
Gaura coccinea
Oenothera albicaulis
Oenothera cespitosa
Oenothera nuttallii
Oenothera villosa
Oenothera strigosa*

ORCHIDACEAE

Coeloglossum viride
Corallorrhiza maculata
Cypripedium calceolus var. parviflorum*

OROBANCHACEAE

Orobanche fasciculata

PINACEAE

Pinus ponderosa

PLANTAGINACEAE

Plantago major

Plantago patagonica

POACEAE

Agropyron cristatum

Agrostis capillaris

Agrostis exarata

Agrostis scabra

Alopecurus aequalis

Alopecurus geniculatus

Andropogon gerardii

Aristida purpurea

Aristida purpurea

Bouteloua curtipendula

Bouteloua gracilis

Bromus anomalus

Bromus brizaeformis

Bromus carinatus

*Bromus commutatus**

Bromus inermis

Bromus japonicus

*Bromus marginatus**

Bromus tectorum

Buchloe dactyloides

Calamagrostis canadensis

Calamagrostis montanensis

Calamagrostis rubescens

Calamovilfa longifolia

Catabrosa aquatica

*Danthonia californica**

Danthonia intermedia

Danthonia spicata

Danthonia unispicata

Deschampsia cespitosa

Dichanthelium oligosanthos* var *scribnerianum

Distichlis spicata

*Echinochloa crusgalli**

Elymus canadensis

Elymus glaucus
Elymus lanceolatus
Elymus macounii
Elymus smithii (*Agropyron smithii*)
Elymus spicata (*Agropyron spicatum*)
Elymus trachycaulus
Festuca idahoensis
Festuca ovina
Glyceria borealis
Glyceria grandis
Glyceria striata
Hordeum brachyantherum
Hordeum jubatum
Hordeum pusillum
Koeleria macrantha
Munroa squarrosa
Muhlenbergia cuspidata
*Muhlenbergia racemosa**
Oryzopsis hymenoides
Oryzopsis micrantha
*Panicum capillare**
*Phalaris arundinacea**
Phleum pratense
Poa arida
Poa bulbosa
Poa interior
Poa palustris
Poa pratensis
Poa secunda
Puccinellia nuttalliana
Schedonnardus paniculatus
Schizachne purpurascens
Schizachyrium scoparium
Spartina gracilis
Sphenopholis obtusata
Sporobolus airoides
Sporobolus cryptandrus
Stipa comata
Stipa nelsonii
Stipa viridula
Vulpia octoflora

POLEMONIACEAE

Collomia linearis

Ipomopsis congesta* var. *congesta

Ipomopsis congesta var. *pseudotypica*

Linanthus septentrionalis

Microsteris gracilis

Navarretia intertexta

Phlox alyssifolia

Phlox hoodii

POLYGALACEAE

Polygala alba

POLYGONACEAE

Eriogonum annuum

Eriogonum flavum

Eriogonum pauciflorum

Polygonum aviculare

Polygonum douglasii

Polygonum erectum

Rumex crispus

Rumex salicifolius

PORTULACACEAE

Claytonia lanceolata

Claytonia perfoliata

PRIMULACEAE

Androsace occidentalis

Androsace septentrionalis

PTERIDACEAE

Pellaea occidentalis

*Pteridium aquilinum**

RANUNCULACEAE

Actaea rubra

Anemone multifida

Ceratocephala testiculata (*Ranunculus testiculatus*)

Clematis ligusticifolia

Delphinium bicolor

Myosurus minimus

Pulsatilla patens (*Anemone patens*)

Ranunculus abortivus

Ranunculus acrifolius

Ranunculus aquatilis

Ranunculus circinatus

Ranunculus cymbalaria

Ranunculus longirostris
Ranunculus scleratus
Ranunculus uncinatus
Thalictrum dasycarpum

RHAMNACEAE
Ceanothus herbaceus*

ROSACEAE
Agrimonia striata
Amelanchier alnifolia
Crataegus chrysocarpa
Fragaria vesca
Fragaria virginiana
Geum canadense
Geum macrophyllum
Geum triflorum
Potentilla arguta
Potentilla glandulosa
Potentilla gracilis
Potentilla recta
Potentilla fruticosa*
Prunus americana
Prunus virginiana
Rosa acicularis ssp. sayi*
Rosa arkansana
Rosa woodsii
Rubus idaeus
Rubus parviflorus
Spiraea betulifolia

RUBIACEAE
Galium aparine
Galium boreale

SALICACEAE
Populus angustifolia
Populus deltoides
Populus tremuloides
Salix amygdaloides
Salix bebbiana
Salix exigua
Salix lucida

SANTALACEAE

Comandra umbellata

SAXIFRAGACEAE

Heuchera richardsonii

Lithophragma parviflorum

SCROPHULARIACEAE

Besseyia wyomingensis

Castilleja sessiliflora

Collinsia parviflora

Limosella aquatica

*Mimulus guttatus**

Orthocarpus luteus

Penstemon albidus

Penstemon eriantherus

Penstemon glaber

Penstemon gracilis

Penstemon nitidus

*Penstemon rydbergii**

Scrophularia lanceolata

Veronica americana

Veronica arvensis

Veronica peregrina

SMILACACEAE

Smilax herbacea

SOLANACEAE

Hyoscyamus niger

Physaria longifolia

TYPHACEAE

Typha latifolia

URTICACEAE

Parietaria pensylvanica

Urtica dioica

VERBENACEAE

Verbena bracteata

VIOLACEAE

Viola adunca

Viola canadensis

Viola nephrophylla
Viola nuttallii
Viola vallicola

ZANNICHELLIACEAE
Zannichellia palustris

Appendix E - Color xeroxes of sensitive species and their habitats

E-1. *Astragalus barrii* close-up

E-2. Small-flowered form of *Astragalus hyalinus*

E-3. *Astragalus barri* habitat (037. Horse Creek - Otter Creek confluence)

E-6. *Carex gravida* habitat (foreground)
(004, East Fork of Otter Creek)

E-4. *Astragalus barrii* pedastalling (037, Horse Creek - Otter Creek confluence)

E-4. *Astragalus barrii* pedestalling (037, Horse Creek - Otter Creek confluence)

E-6. *Carex gravida* habitat (foreground)
(004, East Fork of Otter Creek)

E-5. *Carex gravida* close-up

E-5. *Carex gravida* close-up

E-6. *Carex gravida* habitat (foreground)
(004, East Fork of Otter Creek)

E-7. *Carex torreyi* close-up

E-8. *Carex torreyi* habitat (Poker Jim Creek)

E-7. *Carex torreyi* close-up

E-8. *Carex torreyi* habitat (Poker Jim Creek)

E-8. *Carex torreyi* habitat (Poker Jim Creek)

E-9. *Dichanthelium oligosanthes* var. *scribnerianum* close-up

E-10. *Dichanthelium oligosanthes* var. *scribnerianum* habitat (foreground) (East Fork Otter Creek)
Carex gravida and *C. torreyi* habitat (background)

E-11. *Elatine americana* close-up

E-12. *Elatine americana* habitat (Yager Butte)

E-13. *Ipomopsis congesta* var. *pseudotypica* close-up

E-14. *Ipomopsis congesta* var. *pseudotypica* habitat (south of Camps Pass)