APPENDIX F

THREATENED AND ENDANGERED SPECIES CORRESPONDENCE

INTRODUCTION

Forest Service policy regarding Biological Evaluaitons is summarized in Forest Service Manual (FSM) 2672.4. The intent of the Bilogical Evaluation process is to assess the potential impacts of propsed management activities, and ensure that such activities will not jeopardize the continued existence of:

1. Species listed, or proposed to be listed, as Engangered or Threatened by the U. S. Fish and Wildlife Service and

2. Species designated as sensitive by the Regional Forester.

AFFECTED ENVIRONMENT

Project Area

The Sioux Ranger District proposes to update allotment management plans for 11 domestic livestock allotments on National Forest System lands in the North and South Cave Hills and East Short Pine land units. The decision associated with this proposal and analysis will determine where livestock can graze, when grazing will occur and what specific guidelines will be established to regulate the intensity (timing and duration) of grazing. The analysis area includes about 17,700 National Forest acres.

The climate is continental and semi-arid, with large seasonal and daily temperature variations being common. Most of the rainfall during the summer is from thunderstorms; flash flooding can occur form the more severe thunderstorms. Streamflow is erratic with most streams being intermittant in nature. Ecological units include hardwood draws, Ponderosa bench and slope, upland, rolling, and table top grassland, rockland, and rimrocks.

Detailed information regarding plant community composition and location is found elsewhere in the environmental analysis for this proposed action. Field surveys have been conducted within or adjacent to the project area by Linda Spencer, Kim Reid, Jeff DiBenedetto, and Tim McGarvey during the 2001 field season (s). Locations of known sensitive plants were noted by these investigators and have been incorporated into this technical report. Physical and biological parameters will be used in order to screen which sensitive plant species will be analyzed in this Environmental Assessment and which species will not be considered in detail. (*The project purpose and need is described in detail in Chapter 1 of the NEPA environmental document. See project maps for general project location. Detailed information on the project area vegetation, geology, and soils is found in the project environmental document and project record.)*

LAWS, REGULATIONS, AND POLICY PERTAINING TO THREATENED, ENDANGERED AND SENSITIVE PLANT SPECIES

Forest Plan Direction

The 1986 Custer National Forest Land and Resource Management Plan (Forest Plan) provides management guidance to natural resource managers within the framework of Congressional intent (36 CFR 217). As such, the Forest Plan provides land managers and the public a common understanding of anticipated commodity and amenity outputs from lands managed under the direction provided by the Forest Plan. The Forest Plan provides two levels of management direction for lands within the project area, Forest wide direction and management area specific direction. The project area is composed of Management Areas "B", "D", "E", "M", and "N". The management area goals and management standards have been previously disclosed in the environment assessment. The following table outlines

TABLE 1

Land Unit	Allotment Name	Forest Plan Management Areas[3]	Existing AMP Approval Date	Total Acres in Allotment	Total National Forest Acres in Allotment
North Cave Hills	Pelham-Julberg	E, M, N	1994	2286	1842
North Cave Hills	Schleichart	E, M, N	1980	8824	4430
North Cave Hills	Davis Draw	E, M, N	None	1162	921
North Cave Hills	Jenkins	E, M, N	None	781	591
South Cave Hills	John Brown	B, M, N	None	2157	1574
South Cave Hills	JA Clarkson	B, M, N	1977	2108	1430
South Cave Hills	JB Clarkson	B, M, N	1995	2539	1928
South Cave Hills	Van Offern	B, M, N	1995	1552	1004
East Short Pines	Box Springs	D, M, N	1981	5110	1960
East Short Pines	Dunn	D, M, N	1969	1718	1485
East Short Pines	Lone Mountain	D, M, N	1983	871	563
					TOTAL ACRES 17,728

The Custer Forest Plan provides limited forest wide management direction for threatened or endangered plant species. The Forest Plan provides general management direction (page 3) that indicates; "the goal for the management of Threatened and Endangered plant and animal species is to provide habitat that contributes to the recovery of the species". Page 17 of the Plan indicates that no federally listed threatened or endangered plant species occur on the National Forest units of the Custer National Forest at the time the Forest Plan was prepared (1986). Since that time, there continues to be no plants designated as Threatened or Endangered that occur within the Custer National Forest. Within the framework of the Custer Forest Plan, direction is given to manage for retention of habitat of unique plant species which include sensitive species (Forest Plan, p. 20 and Appendix VII). Specific management area standards and goals for management areas "B", "D", "E", "M", and "N" are silent on the topic of sensitive plant species.

Other Laws, Regulations, and Policy

Other laws, regulations, and policy pertaining to the U.S. Forest Service provide that lands held in federal ownership must be evaluated for the presence of and possible affects to threatened, endangered, and sensitive plant species. For instance, the National Forest Management Act (NFMA) directs that federal lands be managed for the optimum biodiversity that the land can provide. Additionally, NFMA indicates that "habitats for all existing native and desired non-native plants, fish, and wildlife species will be managed in order to maintain at least viable populations of such species". As a result of this and other laws, such as the Endangered Species Act, the Forest Service has been evaluating rare plant species via the sensitive species list formulated on a Region by Region basis. This sensitive species list is a list of known species that are currently not formally listed as Threatened and Endangered, but may be moving toward formal listing. The rationale for compiling the sensitive species list is to preclude formal listing through the modification of land management practices conducted on Forest Service lands if those land management activities may potentially lead to the formal listing of a particular plant species. The modification of land use or land management practices is intended to ensure continued viability of the potentially affected population. This policy is found in Forest Service Manual (FSM) 2670, specifically 2670.22 and 2670.32.

REVIEW OF EXISTING INFORMATION

[3] ***Forest Plan Management Area descriptions found on pages 45-48, 53-57, 58-60, and 80-85.**

A literature review was conducted for this analysis with the intent of identifying if plant species classified as "sensitive" may potentially exist within the project area. A number of data sources were reviewed in order to compile a list of plant species that may potentially be found in the project area and, therefore, should be evaluated in this Environmental Assessment. These include the South Dakota Natural Heritage Program (SDNHP, 2002), previous botanical surveys in the project vicintiy (1994 Heidel survey and 2001 Forest Service surveys), and the 1999 Region One sensitive species list.

Many species are listed as sensitive for the Custer National Forest. Portions of the Custer Forest fall within various ecological settings, ranging from the Northern Great Plains, the Northern Great Basin, and the Northern Rocky Mountains. As a result of a review of existing information relative to species extent of distribution and ecological requirements, a list of sensitive plant species have been screened as to its potential habitat by district. As a result, not all Custer listed sensitive species can be found on all three districts. [4]

The seven listed sensitive species for the Sioux Ranger District are specific by state (Montana or South Dakota). Even though the project area is entirely in South Dakota, the surveyors were watching for species listed in each state. However, only the five species with potential habitat on the South Dakota portion of the Sioux District were evaluated for inclusion in the biological findings of this assessment, since the project area is all within the state of South Dakota. These are Dakota buckwheat, Barr's milkvetch , Golden stickleaf, Mountain bluebells, and Prairie gentian.

The following table provides a list of sensitive plant species that have been screened for inclusion in this assessment. Only the listed South Dakota species will be carried forth into the analysis.

[4] USFS, 2002. **Custer NF TES Plant Protocol.**

Sioux District Sensitive Plants

(R1 1999 List)

Common Name	Scientific Name	Type[5] *	Global Rank[6]	State Rank[7]	Elevation (ft)	Habitat	Sensitive in		Closest known population	Potential of Occurrence[8]	Vulnerability to Effects from Livestock	Flowering Period	Fruiting Period	Lifeform
							MT	SD						
Dakota buckwheat (Known)	***Eriogonum visherii***	2	G3	S3	3,140 - 3,760	Barren, often bentonitic badlands slopes and outwashes in the plains.	X	**X**	Slim Buttes - Irish Butte (S. of Mtn Ranch Sp. #1); approx. 40 air miles from project area	High	Low	July - Sept		Annual forb
Barr's milkvetch (Suspected)	***Astragalus barrii***	2	G3	S3	2,940 – 4,000	Gullied knolls, buttes, and barren hilltops, often on calcareous soft shale and siltstone.		**X**	West of Ekalaka Hills; approx. 60 air miles from project area	Moderate	Low	May-early June	May-June	Perennial forb, cushion plant
Golden stickleaf (Suspected)	***Mentzelia pumila***	3	G4		4,050 - 5,100	Open gravelly or sandy ground, roadsides, dry clearings, washes. Desert shrubland/woodland in the valley and foothill zones.		**X**	NE WY, S Central MT, SW ND; approx. 200+ air miles from project area	Low	Low	June – Early July		Biennial or short-lived perennial forb
Pregnant sedge (Suspected)	*Carex gravida var. gravida*	3	G5T	S1	3,880 – 4,000	Open woods, often in ravines with deciduous trees, on the plains.	X		Ashland RD - East Fork Otter Creek; Hay Creek – approx. 200+ air miles from project area	Low	High		July	Perennial grass-like

[5] Scale of risk, per Region 1 Species at Risk Protocol: Type 1: Threatened, Endangered or Proposed (ESA); Type 2: Range-wide Imperilment; Type 3: Regional/State Imperilment

[6] and [6] The international network of Natural Heritage Programs employs a standardized ranking system to denote global (range-wide) and state status (Association for Biodiversity Information 2001). Species are assigned numeric ranks ranging from 1 (critically imperiled) to 5 (demonstrably secure), reflecting the relative degree to which they are "at-risk". 1 = Critically imperiled because of extreme rarity and/or other factors making it highly vulnerable to extinction; 2 = Imperiled because of rarity and/or other factors demonstrably making it vulnerable to extinction; 3 = Vulnerable because of rarity or restricted range and/or other factors, even though it may be abundant at some of its locations; 4 = Apparently secure, though it may be quite rare in parts of its range, especially at the periphery; 5 = Demonstrably secure, though it may be quite rare in parts of its range, especially at the periphery; T = Rank for subspecific taxon (subspecies, variety, or population); appended to the global rank for the full species, e.g. G4T3

[8] Potential of Occurrence rated as high, medium, or low

							Sensitive in							
Ovalleaf milkweed (Known)	*Asclepias ovalifolia*	3	G5	S1	3,760 - 3,840	Sandy, gravelly or clayey soils of prairies and woodlands	X		Long Pines below Icebox Spring; – approx. 30 air miles from project area	High	Low to Moderate	July – Aug	Aug -Oct	Perennial forb
Mountain bluebells (Known)	*Mertensia ciliata*	3	G5	S1	5,500 - 13,000	Forested slopes-damp thickets in course to medium textured soils. Valley bottoms associated with springs, seeps, and spring fed water courses. Intermediate shade tolerance. Very drought intolerant. Its Slim Butte population is located on the lower slope of a steep north facing slope. Usually occurs in wetlands, but occasionally found in non-wetlands		X	Known in Tepee Canyon of Slim Buttes; West Short Pines – 1912 Collection (land ownership unknown); – approx. 40 air miles from project area	High	Low	Late spring to summer		Perennial forb with rhyzomes
Prairie gentian (Known)	*Gentiana affinis*	3	G5	S2	5,870 - 9,740	Wet meadows, shores, springs, seepage areas and low prairie		X	Collected in 1910 from "Cave Hills" & described as abundant. Spring fed springs (most in hardwood draws) in the N. and S. Cave Hills were extensively surveyed in 1994. No plants were found. – project area includes Cave Hills	High	Low to Moderate	Aug - Sept		Perennial forb

Field Surveys

Field surveys for the plants listed as high potential for occurrence were conducted during the 2001 field seaon by Linda Spencer, Kim Reid, Jeff DiBenedetto, and Tim McGarvey. Plant surveys emphasized reconnaisance of habitats where sensitive plants might occur in areas of moderate to high grazing. Surveys were conducted at intensity level "Limited Focus" (see Appendix B) for definitions of plant survey intensities. Appendix B contains a list of plant species documented during the surveys.

Sensitive Plant Species

Based upon existing information, probability of occurrence, and probability of impacts, effects to the following plant species or their habitat will be evaluated further.

Eriogonum visherii (Dakota Buckwheat)

Description

As of February 28, 1996, this species is no longer listed as a Candidate species for Federal listing. However, it remains a species of management concern.

Dakota buckwheat is a spring annual forb and is distinguished by its skeleton-like form tipped with extremely small clusters of delicate yellowish flowers. Each flower produces a single dark-brown seed. The single, slender stem extends upward 1 to 6 inches above the basal leaves before dividing into 2 or 3 branches. These branches continue to separate into finer and finer divisions of the open flower head. Its yellow flowers distinguish it from *E. gordonii,* which has white flowers. Also, by mid-summer the flowering stems have reached their maximum height, whereby the plant is most visible.

The only known populations of *Eriogonum visheri* in the world are found in the western Great Plains of North America, in western South Dakota, western North Dakota, and southeastern Montana. One population has been located in Montana (Carter county), 14 populations have been located in 7 counties in North Dakota (Billings, Golden Valley, Grant, McKenzie, Mountrail, Sioux, and Slope counties), and at least 79 populations have been located in 8 counties in South Dakota (Corson, Harding, Jackson, Pennington, Perkins, Meade, Mellette, and Ziebach counties). (Schmoller, 2000). There are no known populations occurring either within the project area or the Sioux Ranger District (USGS 2002).

Habitat Association

Dakota buckwheat stays ahead of the competition by living in places where other plants cannot survive. This plant grows predominantly on barren, highly erodible, rock outcrops in badlands habitats. It may also be found on smaller erosional features in mixed grass prairie. It also has documented occurrences along roads on fine soils in sparsely vegetated borrow areas adjacent to low badland hills (Spencer, 2002).

A number of patterns or tendencies appear in *E. visheri* habitat. These are in a) vegetation structure, b) associated vegetation, c) light exposure, d) parent material, e) soil type, and f) disturbance (Schmoller, 1993).

Vegetation Structure: The vegetation structure exhibited in *E. visheri* populations is consistently sparse. An overstory is never present. Trees are absent. Additionally, forbs and grasses are uncommon. Bare ground most often exceeds 90 percent (Schmoller, 1993 and Spencer, 2002).

Associated Vegetation: *Eriogonum visheri* is found within the Short Grass Prairie Province, Wheatgrass-Needlegrass section and the Wheatgrass-Grama-Buffalo Grass section in the west central Great Plains of North

America. The Harding County, South Dakota site is located in the *Agropyron smithii/Carex filifolia* Steppe Habitat Type (Schmoller, 2000).

While vegetation is commonly sparse at the *Eriogonum visheri* sites, associated species do occur. In North Dakota these include *Agropyron dasystachyum, Agropyron smithii, Artemisia tridentata, Astragalus racemosus, Atriplex argentea, Atriplex nuttallii, Distichlis spicata, Eriogonum pauciflorum, Grindelia squarrosa, Gutierrezia sarothrae, Machaeranthera canescens, Melilotus officinalis, Oenethera cespitosa, Salsola iberica*, and *Sarcobatus vermiculatus*. In South Dakota these include *Agropyron trachycaulum, Astragalus racemosus, Artemisia cana, Atriplex argentea, Atriplex canescens, Chrysothamnus nauseosus, Distichlis spicata, Dyssodia papposa, Eriogonum pauciflorum, Gutierrezia sarothrae, Kochia scoparia, Machaeranthera canescens, Oryzopsis hymenoides, Polygonum ramosissimum, Salsola iberica, Solanum rostratum, Sphaeralcea coccinea*, and *Helianthus annus*. In Montana these include *Allium textile, Atriplex confertifolia, Atriplex gardneri, Artemisia tridentata spp. wyomingensis, Elymus lanceolatus, Kraschnekovia lanata, Musineon divaricatum, Oenethera cespitosa*, and *Sitanion hystrix* (Schmoller, 2000).

On the Little Missouri National Grassland, North Dakota Spencer survey area, data indicates slopes are less than 10% and ground cover is 70-90% bare soil with 1-10% scoria gravel. The plots are sparsely vegetated with less than 10% cover by life form. Typical dominants are *Distichlis spicata, Puccinellia nuttalliana*, and *Gutierrezia sarothrae*. Indicator species in order of constancy are: *Agropyron smithii, Distichlis spicata, and Grindelia squarrosa*; (86%); *Ceratoides lanata* and *Gutierrezia sarothrae* (64%); and *Stipa viridula* (50%). Habitat types consistent with these data are *Distichlis spicata* and *Puccinellia nuttalliana / Distichlis spicata, Atriplex confertifolia*, and possibly *Artemisia cana/ Agropyron smithii* and *Artemisia tridentata var. wyomingensis/ Agropyron smithii* if located on sparsely vegetated badland hillslopes (Spencer, 2002).

Light Exposure: Without exception, the plants grow in open light conditions. Apparently, their demand for open light conditions is so pronounced that the plants grow nearer to a badland outcrop than any other, and often in association with no other plants than its kind, and often with a distance of 0.5 to 1.5 meters between individual plants in a community (Schmoller, 1993).

Parent Material: Its entire range is found within the unglaciated Missouri Plateau within the Great Plains physiographic province. Within South Dakota it is found on the Cretaceous and Tertiary Table Lands, but never within the Pierre Hills that overlay the Cretaceous and Tertiary Table Lands. It is consistently associated with at least three geologic formations: the White River formation, Hell Creek formation, and rarely, the Pierre formation. It shows a distinct preference for these geologic formations, shying away from other formations that are adjacent and at similar topographic position. In South Dakota the plants were found on the Chadron and Brule phases of the White River formation and at one site the plants were found on the Yellow Mound Member and Interior phase of the Pierre formation. All three formations are composed of claystones, siltstones, sandstones, and shales with infrequent porcelainite and lignite beds. Within these formations, *Eriogonum visheri* will be found on barren, sedimentary rock outcrops, the alluvium of such outcrops, and small exposures of soil substrates within badlands topography. The geologic structures include buttes, tables, canyons, arroyos, shallow dry washes, blowouts, terraces, and slumps. Amidst these structures, the plant is most often found on the unvegetated clay outwash at the base of slopes, on the unvegetated eroding edge of tables, benches, terraces, and buttes, and on somewhat level patches of soil exposed by wind or water erosion. At some North Dakota sites it has been found within or adjacent to porcelainite within badlands topography (Schmoller, 2000).

Soil Type: The soils associated with *Eriogonum visheri* are less often considered soils and more often considered rock outcrops with minimal podzolization. Where soil has been formed it is considered to be of the Entisol soil order. In South Dakota, these were Badlands, Interior, Cedar Pass or Cabbart soil types. In Montana, the soils were derived from eroding bentonite and were vesicular silt (Schmoller, 1993 and 2000). Typically, the soil is low in organic matter, has high pH, fine texture, high shrink-swell capacity, low infiltration rates, low soil moisture, and low fertility. Often these soils are strongly calcareous and high in sodium. At the sites where there were soils had better horizonation, lower pH, and higher organic matter the plants displayed a more vigorous, robust appearance (Schmoller, 2000).

Disturbance: Sites bearing *E. visheri* are highly disturbed sites naturally or human-caused. This height of disturbance is indicated by the lack of cover, bare ground being mainly in the range of 90-99%. It is also indicated by the abundance of erosional and depositional features. These included rivulets, miniature sandbars and deltas,

and large fans of alluvium. Other site disturbances include results of cattle trampling and in the form of ditching for roads. Whether by trampling, road construction, or by water, the disturbance produced appeared to favor the *E. visheri* by reducing competition from other plants and by dispersal of seeds (Schmoller, 1993).

Wind may have played a part in the distribution of plants within the Wall, South Dakota sites (Schmoller, 1993). At some sites the plants appeared with regularity on the south facing exposures. As the exposures turned to the north the plants decreased in number, becoming absent at northwest exposures. It is possible that the strong northerly winds that prevail after seed dispersal in the fall will sweep any seeds from north exposures into the dense cover beyond the bare soil or onto the southern exposure sheltered from these winds.

Other Site Conditions: *Eriogonum visheri* inhabits sites at elevations between 1900 and 3000 feet. It occurs amidst relatively harsh growing conditions. Ground cover is lean, with a minimum of 50% bare ground, and more often an excess of 90% bare ground. Light is open, with minimal shading from surrounding geology. Erosion and deposition rates are high. Where the species occupies the badlands outwash, the slopes are low, where the species occupies the edges of alluvium the slopes are steep. The climate is severe, influenced by the Rocky Mountains to the west. In South Dakota the climate is classified as middle latitude, semi-arid steppe. Seasonal precipitation and temperatures vary widely. Lemmon, South Dakota, in the midst of the range of *Eriogonum visheri*, has recorded a record high of 115º F and a record low of -45º F. Others have observed high temperatures of 121ºF at Kadoka, South Dakota, and a low of -46ºF in Philip, South Dakota. Rainfall is sparse. In western South Dakota it averages about 15 or 16 inches a year, most of it coming in the form of spring and early summer showers and thunderstorms. Precipitation in the rest of the range of *Eriogonum visheri* is similar (Schmoller, 2000).

Ecology

Dakota buckwheat is a spring annual (it grows one year and then dies) that germinates and emerges in May. Flowers first appear in late June and continue to be produced into September if there is rainfall. Flowers are produced even after the basal leaves and stems have turned reddish brown. Seeds ripen and fall throughout this period. Plants may be killed by drought any time during the growing season, but typically maintain some living branches until killed by freezing temperatures.

Detailed trend data is lacking. Ten broad surveys for the species in Montana, North Dakota, and South Dakota: Ode in 1987, Buffalo Gap National Grassland in 1991 and 1993, Vanderpool in 1993, Lenz in 1993, Peabody in 1995, Heidel and Dueholm in 1995, surveys in Badlands National Park and Theodore Roosevelt National Park, and Spencer in 1997-2000 Little Missouri National Grasslands (Schmoller, 2000 and Spencer, pers. comm.).

Whether Dakota buckwheat populations have increased, decreased, or remained stable is unknown since detailed trend data is lacking. Dakota buckwheat may face long-term decline in population levels from invasion of introduced plants such as Russian thistle and kochia. As an annual plant, Dakota buckwheat survival is dependent on the size and condition of its seed bank and on the availability of habitat suitable for germination and seedling establishment (Schmoller, 2000).

Reproduction: *E. visheri* inhabits harsh and erosive environments where competition and succession are limited; refuges from more competitive plants. The high erosion and deposition rates at the sites uproot or bury plants. The soils have a high shrink-swell potential that damages plant roots. The high sodium, high pH, and low nutrition of these sites also serves to limit competition and succession. Wind erosion may also be a factor. The strong winds seen in this province may aid in the exposure of soil, creating blowouts, thus limiting competition and succession. While limiting competition and succession, the wind and water erosion present in its environment appears to serve to both disperse seeds and create suitable microhabitats or safe-sites for the species. Small mammals and resident and passerine birds may collect and disperse the seeds. No mycorrhizal, symbiotic, or parasitic relationships are known for this species (Schmoller, 2000).

It appears that dispersal, germination, and seedling establishment of *Eriogonum visheri* are dependent upon several factors. As an annual plant, it is dependent upon the size and condition of its seed bank for germination and seedling establishment. Its seed production and viability are not known. The erosional factors that limit the

populations of other species appear to create safe-sites for the germination and seedling establishment of *E. visheri*. Dispersal of *E. visheri* seeds may be accomplished by both wind and water erosion since its seeds, lacking wings or plumes, are very small. The seed rain has been observed to remain largely beneath the parent plant. It has been suggested that Least chipmunks, resident and migratory passerine birds such as Baird's sparrow, Snow buntings, Lapland longspurs, Say's phoebes, and Rock wrens may collect and disperse the seeds. Both seed scarification and stratification may be required prior to germination. The species is wind pollinated and self-fertile (Schmoller, 2000).

Potential Threats:

Grazing and Trampling: The presence of the species in badlands within the short grass province is to its advantage. Development and other anthropogenic factors are at a minimum in these locations, and the primary use of these and adjacent sites for grazing does not appear to present any imminent threat of extirpation (Schmoller, 2000).

Cattle grazing and trampling is a current, man-induced potential threat. Increased stocking levels have the potential to threaten the species to a greater degree. The effect of cattle grazing and trampling upon populations of *Eriogonum visheri* is complex. Due to the sparseness of vegetation, livestock grazing is not common at these sites. Livestock do not select *Eriogonums* as a whole. (USDA, 1988) *E. visheri* is associated with plants that, on the whole, are not selected by cattle. When grazing does occur, it appears to be inadvertent or when little else is available for forage. It is suggested that some grazing may bring benefits by selecting species that compete with *E. visheri*, species such as *Salsola iberica*. It is also suspected that some of the grazing observed may actually be the result of small mammals or other wildlife (Schmoller, 2000).

Trampling is not common at these sites, again, due to the lack of good and ample forage. When trampling is observed, it appears to be from the travel of cattle from one patch of favored forage to another. Trampling has been observed to damage some plants. And trampling may disturb habitat suitability and create sites suitable for species that compete with *E. visheri*, species such as *Kochia scoparia, Salsola iberica,* and *Melilotus officinalis.* But the presence of the *E. visheri* within cattle trails suggests that trampling may disperse and implant its seeds. An increase in stocking levels that would result in degradation of the range would likely override any benefits to the species and hasten its decline (Schmoller, 1993 and Schmoller, 2000).

Mineral Activity: At present, mining is not a threat to the species. But some significant coal deposits occur in the vicinity of several populations in northwestern South Dakota, thus mining has the potential to be a serious human induced threat. Strip mining of these reserves, which is the method of choice in this region, would result in the destruction or disruption of several populations. It must be noted that ground-disturbing activities are not necessarily detrimental to the species. It has been observed that the species has colonized areas disturbed by human activity such as ditching for a pasture road. However, human activity may expose substrate making it open to invasion by nonnative weedy species that may have a competitive advantage over *E. visheri* (Schmoller, 2000).

Exotic Weeds: Exotic weeds are a current, man induced threat. Exotic weeds have been observed in the same habitats as *Eriogonum visheri*. The two exotic species of particular concern are *Salsola iberica* and *Kochia scoparia*. While these species have been observed growing alongside healthy *E. visheri* plants, these species produce a tremendous amount of seeds and, in early spring, a dense carpet of seedlings. The competition between *E. visheri* and these two species for suitable seedbeds, water, and nutrients is likely to be intense. Further, *E. visheri* appears to be a poor competitor. Other species that may pose a similar threat are *Bromus tectorum, Bromus japonicus*, and *Melilotus officinalis*. Degradation of the range, which benefits exotic weeds, would increase the potential threats posed by exotic weeds. (Schmoller, 2000).

Regional Endemics: One natural, current threat is the set of problems inherent to regionally endemic populations. They face the threat of genetic depression, seed bank decay, and greater vulnerability to rapid habitat changes. (Schmoller, 2000)

Management Considerations: In many ways, present management does not appear to spell a sudden demise for *Eriogonum visheri*. For example, one threat, the proliferation of exotic weeds, has been continuing a pace since their explosion during the drought of the 1930's. The continued existence of *E. visheri* during this period

suggests that these exotics do not pose a short-term threat to its existence. Similar remarks might be made for slight or moderate levels of cattle grazing which have continued for decades.

Nevertheless, it cannot be stated whether or not the past decades of exotic species, cattle grazing, farming, or climate change have altered the range of the species. And should current management worsen, adverse effects would be expected. The impacts of overgrazing would be felt, not only in the general degradation of the range, but in the advance of exotics, destruction of safe-sites, and an increase of direct grazing and trampling of the species. Hence, modest stocking levels and sensible grazing rotations should be established or maintained. Efforts to eradicate exotic species should continue. Farming is not likely to impact the species directly, due to the unsuitability of the land for raising crops (Schmoller, 2000).

Astragalus barrii (Barr's Milkvetch)

Description

Astragalus barrii is a perennial that grows in low, dense mats. Leaves have 3 narrowly lance-shaped leaflets and are 1-4 cm long, densely covered with short white hairs. Stipules at the leaf bases are membranous. Purple or pinkish-purple flowers that are shaped like pea flowers are borne in a narrow, open, few-flowered inflorescence. 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 in diameter. Flowering in May-early June, fruiting late May-June.

Ecology

Astragalus barrii is a regional endemic found in three states of the Northern Great Plains. In Northeastern Wyoming it is found in Campbell, Converse, Johnson, Natrona, Niobrara, Sheridan, and Washakie counties, and reported as endemic in the area. In South Dakota it is found in Fall River, Shannon, and Pennington counties. In Pennington County a population is reported to number an estimated 12,530,000 plants (Schmoller, 1993). In Montana it is found in Bighorn, Carter, Powder River, and Rosebud Counties. Bighorn County had two populations of indefinite number. Carter County had one site with an indefinite number of plants. Powder River County had 19 populations with a total of 14,000 plants; Rosebud County had six sites with a total of 2,400 plants.

Within the Custer National Forest there were nine sites with a total estimated population of 14,200 to 14,250 plants. All sites were within Powder River County and were observed in 1988. The closest known population to the project area occurs west of Ekalaka Hills approximately 60 air miles away. However, suitable habitat for this species occurs within the project area.

Habitat Association

Habitat preferences of *A. barrii* are gullied knolls, buttes, barren hills or clifftops with soils derived from claystones, siltstones, or sandstones that are low in organic matter, have high pH, fine texture, and low fertility. Often these soils are strongly calcareous. It favors open light conditions with high percentages of bare ground and dry sites where the rate of surface runoff is high. Sites containing *A. barrii* tend to be highly erodible and steeply sloped. Elevations range from 2940 to 4000 feet in Montana and 3700 to 5700 feet in Wyoming (MNHP 2002 and WYNDD 2002).

Astragalus barrii has been found growing in the *Pinus ponderosa/Agropyron spicatum* Forest Habitat Type. This zone includes *Rhus aromatica/Carex filifolia, Artemisia tridentata/Agropyron spicatum*, and *Sarcobatus vermiculatus/Agropyron spicatum* Shrub-Steppe Habitat Types (Hansen and Hoffman 1985).

Associated species of *A. barrii* are *Artemisia tridentata, Eriogonum pauciflorum, Musineon divaricatum, Atriplex confertifolia, Yucca glauca, Comandra umbellata, Andropogan scoparious, Gutierrezia sarothrae,* and *Phlox hoodii. Astragalus barrii* will be found within mixed grass and short grass vegetation communities, and on the edges of *Pinus ponderosa* or *Juniperus scopulorum* vegetation communities.

Potential Threats:

Grazing and Trampling: *Astragalus barrii* has low vulnerability to grazing. Increased stocking levels have the potential to threaten the species to a greater degree. Due to the sparseness of vegetation and steepness of slope, livestock grazing is not common at these sites. Cattle do not select *Astragalus* as a whole. (USDA, 1988) *E. visheri* is associated with plants that, on the whole, are not selected by cattle. When grazing does occur, it appears to be inadvertent or when little else is available for forage. It is suggested that some grazing may bring benefits by selecting species that compete with *E. visheri*, species such as *Salsola iberica*. It is also suspected that some of the grazing observed may actually be the result of small mammals or other wildlife (Schmoller, 2000).

Trampling is not common at these sites, again, due to the lack of good forage. When trampling is observed, it appears to be from the travel of cattle from one patch of favored forage to another. Trampling has been observed to damage some plants. And trampling may disturb habitat suitability and create sites suitable for species that compete with *E. visheri*, species such as *Kochia scoparia, Salsola iberica,* and *Melilotus officinalis*. But the presence of the *E. visheri* within cattle trails suggests that trampling may disperse and implant its seeds. An increase in stocking levels that would result in degradation of the range would likely override any benefits to the species and hasten its decline (Schmoller, 1993 and Schmoller, 2000).

Mineral Activity: Most Wyoming populations appear to be stable, although one population has been lost due to expansion of a surface coal mine. In South Dakota, zealite mining and off-road vehicle recreation have been cited as threats.

Oil and gas development has been cited as a potential future threat, but was not considered a problem in the early 1990s. The marked expansion of coal bed methane, oil, and gas development since the late 1990s has increased the threats to many populations through increased road development (often associated with increased spread of competing weeds) and loss of habitat to industrial siting (WYNDD 2002).

Mentzelia pumilla (Golden Stickleaf)

Description

Dwarf Mentzelia is an herbaceous biennial or short-lived perennial herb with branched, white stems that arise from a stout taproot and that are 2-6 dm tall. The lance-shaped basal leaves are 8-10 cm long and have short petioles and broadly-toothed margins. The alternate leaves become sessile, smaller, and more deeply lobed higher on the stem. The foliage is covered with short, barbed hairs that cause it to stick to clothing like velcro. 1-3 flowers are borne on short stalks arising from the axils of the reduced upper leaves, or bracts. Flowers have ten yellow petals that are 9-15 mm long and numerous stamens, the outer of which are petal-like. The calyx forms a deep bowl with 5 narrow, pointed lobes that are 4-10 mm long; it also contains the ovary and bears the stamens. The cylindrical seed capsules are 15-20 mm long. Flowering in June-early July.
This is the only Mentzelia with ten yellow petals and only perennial member of the genus with calyx lobes less than ten mm long. (MT Heritage).

Ecology

This species has one undocumented historical occurrence in Slope County, North Dakota. Dwarf Mentzelia is listed S2 and is referenced in the Montana Natural Heritage Program Rare Plant Field Guide (http://orion2.nris.state.mt.us/mtnhp/plants/index.html). Its global distribution includes south-central Montana and North Dakota, and south to Colorado, Utah, and Nevada. There are 14 known occurrences in dry shrubland and woodland in Montana in the Pryor Mountains-Big Horn Canyon area where it inhabits open, coarse (sandy) soils.

Habitat Association

One population was sampled on Square Butte near Medora in 1987. This plot also contained *Oxytropis sericea*. Dominant vegetation was *Rhus aromatica* and *Agropyron spicatuml*. Surface ground cover was 30% soil, and 10% each gravel and rock. Slope was 25%. Other indicator plant species present on the sites reflect both xeric and mesic environments. ***Xeric*** *– Agropyron spicatuml, Andropogon scoparium, Artemisia dracunculoides, Bouteloua curtipendula, Calamogrostis longifolia, Guteresia sarothrae, Muhlenbergia cuspidata, Opuntia spp., Rhus aromatica, Stipa comata, Stipa spartea, and Yucca glauca.* ***Mesic*** *– Juniperus horizontilis, Prunus virginiana, Ribes odoratum, and Sumphoricarpos occidentalis.* Potential natural vegetation associated with this species include *Rhus aromatica* and sparsely vegetated slopes (Spencer, 2002).

Threats

Grazing and Trampling: *Mentzelia pumilla* has low vulnerability to grazing. Increased stocking levels have the potential to threaten the species to a greater degree. Due to the sparseness of vegetation and steepness of slope, livestock grazing is not common at these sites. Cattle do not tend to select *M. pumilla*. *M. pumilla* is associated with plants that, on the whole, are not selected by cattle. When grazing does occur, it appears to be inadvertent or when little else is available for forage. It is suggested that some grazing may bring benefits by selecting species that compete with *M. pumilla*. Trampling is not common at these sites, again, due to the lack of good forage. When trampling is observed, it appears to be from the travel of cattle from one patch of favored forage to another. Trampling has been observed to damage some plants. And trampling may disturb habitat suitability and create sites suitable for species that compete with *M. pumilla*. Trampling may disperse and implant its seeds. An increase in stocking levels that would result in degradation of the range would likely override any benefits to the species and hasten its decline.

Mineral Activity: At present, mining is not a threat to the species. But some significant coal deposits occur in the vicinity of several populations in northwestern South Dakota, thus mining has the potential to be a serious human induced threat. Strip mining of these reserves, which is the method of choice in this region, would result in the destruction or disruption of several populations. Oil and Gas exploration and production, and the facility construction associated with those activities are also a potential threat. It must be noted that ground-disturbing activities are not necessarily detrimental to the species. It has been observed that the species has colonized areas disturbed by human activity such as ditching for a pasture road. However, human activity may expose substrate making it open to invasion by nonnative weedy species that may have a competitive advantage over *M. pumilla*.

Exotic Weeds: Exotic weeds are a current, man induced threat. Exotic weeds have been observed in the same habitats as *M. pumilla*. Exotic species could out compete *M. pumilla*. Degradation of the range, which benefits exotic weeds, would increase the potential threats posed by exotic weeds.

Mertensia cilliata (Mountain Bluebells)

Description

The ciliate bluebell's species name, "*ciliata*," means "fringed" because a fringe of fine hairs can be seen on the margins of backlighted leaves. The plants are found from mid- to sub-alpine altitudes growing along streambanks, often in prodigious numbers where they form rivers of green and blue. Typically the petals are longer than the tube and flare outward. Their color is a delicate blue when they grow in shady areas, and brighter in the open at higher altitudes. The plants are often several feet tall, the lush leaves are deep green, elliptical to broadly lanceolate, and up to six inches long.

Mertensia ciliata is a perennial herb from a thickened rootstock. Upright, up to 4 1/2 feet tall, smooth, sometimes bluish. Leaves are alternate, simple, elliptic to ovate to lanceolate, up to 6 inches long, up to 2 inches wide, more or less pointed at the tip, tapering or less commonly rounded at the base, smooth, the basal leaves larger and on long stalks. Bluebells are distinguished by their usually bluish, tubular flowers and toothless, alternate leaves. *Mertensia ciliata* differs from the others by usually being at least 2 feet tall, by having leaves smooth on both surfaces,

Mertensia ciliata is a much taller plant than *M. lanceolata* and *M. oblongifolia*, the other two species of bluebells in the area, growing 4-15 dm (15.7-59 inches) at maturity vs. less than 4 dm (less than 15.7 inches) for the other two species. It has distinctly veined stem leaves vs. no prominent lateral veins.

Ecology

Mertensia ciliata flowers June-August in habitats of wet meadows, along streams, and particularly in the mountains. It is rhyzomotous and can propagate by root as well as by seed.

Habitat Association

This occurs in obligate wetlands (occurs almost always -estimated probability 99%- under natural conditions in wetlands and in facultative wetlands (usually occurs in wetlands -estimated probability 67%-99%-, but occasionally found in non-wetlands).

Threats

Grazing and Trampling: *Mertensia ciliata* has low vulnerability to grazing. Increased stocking levels have the potential to threaten the species to a greater degree. Due to the sparseness of forage availability, livestock grazing is not common at these sites. Cattle do not tend to select *M. ciliata*. *M. ciliata* is associated with plants that, on the whole, are not selected by cattle. When grazing does occur, it appears to be inadvertent or when little else is available for forage. Trampling is not common at these sites, again, due to the lack of good forage. When trampling is observed, it appears to be from the travel of cattle from one patch of favored forage to another. Trampling has been observed to damage some plants. And trampling may disturb habitat suitability and create sites suitable for species that compete with *M. ciliata*. Trampling may disperse and implant its seeds. An increase in stocking levels that would result in degradation of the range would likely override any benefits to the species and hasten its decline.

Mineral Activity: At present, mining is not a threat to the species. But some significant coal deposits occur in the vicinity of several populations in northwestern South Dakota, thus mining has the potential to be a serious human induced threat. Strip mining of these reserves, which is the method of choice in this region, would result in the destruction or disruption of several populations. Oil and Gas exploration and production, and the facility construction associated with those activities are also a potential threat. It must be noted that ground-disturbing activities are not necessarily detrimental to the species. It has been observed that the species has colonized areas disturbed by human activity such as ditching for a pasture road. However, human activity may expose substrate making it open to invasion by nonnative weedy species that may have a competitive advantage over *M. ciliata*.

Exotic Weeds: Exotic weeds are a current, man induced threat. Exotic weeds have been observed in the same habitats as *M. ciliata*. Exotic species could out compete *M. ciliata*. Degradation of the range, which benefits exotic weeds, would increase the potential threats posed by exotic weeds.

Gentiana affinis (Prairie Gentian)

Description

Stems are one to several from the base, 4-16 inches tall, simple or with short, erect branches above in the inflorescence, puberulent on the decurrent leaf bases especially in the upper part. Leaves are lanceolate to elliptic-lanceolate, or the lower ones sometimes ovate to elliptic, 1-4 cm long, 0.3-1.5 cm wide, thick-textured and roughened, bluntly acute to obtuse at the tip, rounded and not clasping at the base. Flowers are few to many (sometimes only one), 2-3.5 cm long; calyx tube is funnelform, 4-8 mm long, the lobes unequal, erect to ascending, linear-lanceolate. *G. puberulenta* Pringle (*G. puberula* of many authors), which is similar to *G. affinis*, typically grows in drier settings. A few collections, however, have come from low prairie. *G. puberulenta* is distinguished from *G. affinis* by its larger flowers (3.5-5 cm long), longer calyx tube (ca. 1 cm long), subequal calyx lobes and longer corolla lobes (4-8 mm long). *Gentianella amarella* is widespread among the Sioux District

land units. As a gentian, Gentiana affinis has plicate fringes between the lobes of the corolla compared to Gentianella amarella whifch has no fringes. It also has a larger flower of 2-3 cm (7.9-1.2 inchesO vs. 0.8-1.5 cm (0.31-0.59 inches); and a deep blue-purple flower color vs. a pale blue, white, or greenish color.

Northern gentian usually is found in clumps of a dozen or more smooth stems up to 16 inches tall from cord-like perennial roots. From 5 to 10 beautiful blue flowers about an inch long form in clusters at the tips of the stems. The sides of the flowers are folded or pleated. Seven to 13 pairs of clasping leaves are spaced quite regularly along the stem. Fruit is a 2-valved capsule.

Ecology

Gentiana affinis occurs in the cool northern prairies, then disappears toward the arid west only to reappear in cool mountain grasslands that stretch from British Columbia to California and Colorado, where it is sometimes called "Rocky Mountain pleated gentian. *G. affinis* flowers from August through September. This species occurs in wet meadows, shores, springs, seepage areas and low prairie, indicating it could be in full or partial sun.

The setting of the historical 1910 collection in the Cave Hills was described as "brooks", suggesting a small, spring-fed, freshwater stream setting. Spring-fed streams in both the North and South Cave Hills were extensively surveyed in 1994, most of these associated with hardwood draws. *Gentianella amarella* was locally abundant in moist headwater areas at the north end of the North Cave Hills, but there were no other species found of the Gentian Family (Heidel, 1995).

Soils are most likely loamy and remain moist for most of all of the growing season (Heidel, 1995).

This species occupies primary range in settings which are favored for livestock grazing, watering, and shelter. Most gentians do not tolerate extreme grazing, because livestock overuse tends to dry the soil. References indicate many gentians contain bitter principles used as tonics, stomachics, and in liqueurs, but no mention is made of northern gentian in this regard.

Threats

Grazing and Trampling: *Gentiana affinis* has low vulnerability to proper grazing. Improper stocking levels have the potential to threaten the species to a greater degree due to trampling and/or plant compositional change. Cattle do not tend to select *G. affinis*. When grazing does occur, it appears to be inadvertent or when little else is available for forage. Trampling can occur at these sites. Trampling may disturb habitat suitability and create sites suitable for species that compete with *G. affinis*. Trampling may disperse and implant its seeds. An increase in stocking levels that would result in degradation of the range would likely override any benefits to the species and hasten its decline.

Mineral Activity: At present, mining is not a threat to the species. But some significant coal deposits occur in the vicinity of several populations in northwestern South Dakota, thus mining has the potential to be a serious human induced threat. Strip mining of these reserves, which is the method of choice in this region, would result in the destruction or disruption of several populations. Oil and Gas exploration and production, and the facility construction associated with those activities are also a potential threat. It must be noted that ground-disturbing activities are not necessarily detrimental to the species. It has been observed that the species has colonized areas disturbed by human activity such as ditching for a pasture road. However, human activity may expose substrate making it open to invasion by nonnative weedy species that may have a competitive advantage over *G. affinis*.

Exotic Weeds: Exotic weeds are a current, man induced threat. Exotic weeds have been observed in the same habitats as *G. affinis*. Exotic species could out compete *G. affinis*. Degradation of the range, which benefits exotic weeds, would increase the potential threats posed by exotic weeds.

Sioux Oil and Gas Leasing EIS

APPENDIX A
PROJECT FILES

VOLUME #9

4. Biodiversity
    4. Goshawk
    5. Merlin
    6. Pheasant
    7. Prairie Falcon
    8. Turkey Vulture
    9. Wild Turkey
  H. Management Indicator Species
    1. Sharp-tailed Grouse
    2. White-tailed Deer
  I. Neotropical Migratory Birds
  J. Raptor Surveys
  K. T&E Species
    1. American Burying Beetle
    2. Bald Eagle
    3. Black-footed Ferret
    4. Eskimo Curlew
    5. General
    6. Gray Wolf
    7. Least Tern
    8. Pallid Sturgeon
    9. Peregrine Falcon
    10. Piping Plover
    11. Western Prairie Fringed Orchid
    12. Whooping Crane

Sioux Oil and Gas Leasing EIS

APPENDIX A
PROJECT FILES

VOLUME #10

4. Biodiversity
   L. USFS Sensitive Species
      1. Baird's Sparrow
      2. Bats
         a. General
         b. Townsend's Big-eared Bat
      3. Bighorn Sheep
      4. Black-backed Woodpecker
      5. Boreal Owl
      6. Butterflies
         a. Dakota Skipper
         b. General
         c. Regal Fritillary
         d. Tawny Crescent
      7. Ferruginous Hawk
      8. Fisher
      9. General
      10. Grouse
         a. Ruffed Grouse
         b. Sage Grouse
      11. Mountain Plover
      12. Northern Bog Lemming

SENSITIVE PLANT BIOLOGICAL REPORT and EVALUATION

North and South Cave Hills, and East Short Pines Rangeland Project

Sioux Ranger District
Custer National Forest

Prepared and Approved by

Kim Reid, Rare Plant Coordinator

July 15, 2002

Note: *This report is for placement in the project file. A condensed version of this document will be presented in the project environmental document.*

Summary ABSTRACT (This information is from the conclusion section of this document). Documented sites or potential suitable habitat exists in the project area for the following sensitive plants. Determinations of impacts are noted.

Sensitive Species Biological Evaluation
Summary of Conclusion of Effects[1]

Species	Alternative 1 – No Action	Alternative 2 – No Grazing	Alternative 3 – Proposed Action
Dakota buckwheat (Known)	NI[2]	NI	NI
Barr's milkvetch (Suspected)	NI	NI	NI
Golden stickleaf (Suspected)	NI	NI	NI
Mountain bluebells (Known)	NI	NI	NI
Prairie gentian (Known)	MIIH	NI	MIIH

MANAGEMENT RECOMMENDATIONS

Recommended Mitigation

No mitigation is needed or recommended.

Recommended Monitoring

If sensitive plant populations are found during project implementation, monitoring of those populations should be accomplished.

[1] Prepared and Approved by Kim Reid, Rare Plant Coordinator, Custer National Forest
[2] NI=No Impact
MIIH=May Impact Individuals or Habitat, but will not Likely Contribute to a trend towards Federal Listing or Loss of Viability to the Population or Species
WIFV*=Will Impact Individuals or Habitat with a consequence that the action may Contribute to a trend towards federal listing or cause a loss of viability to the population or species
BI=Beneficial Impact
*Trigger for a Significant Action as Defined in NEPA
**Note: Rational for Conclusion of Effects is Contained in the NEPA Document