

APPENDIX VI

**SENSITIVE PLANTS REPORT
AND
BIOLOGICAL EVALUATION
FOR
ENVIRONMENTAL ASSESSMENT**

**EAST ROSEBUD, WEST ROSEBUD, BUTCHER CREEK,
RED LODGE CREEK ALLOTMENTS & BLACK BUTTE
WILDLIFE HABITAT AREA**

RANGELAND PROJECT

Prepared and Approved by

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Summary Abstract: Based upon existing information, known locations, probability of occurrence, and probability of impacts, there may be impacts from action alternatives to individuals within hiker's gentian's known population and impacts to individuals in suspected habitat of mealy primrose, small yellow lady's-slipper, giant helliborine, threeranked humpmoss, Beartooth goldenweed, and Hall's rush within project area habitats, but the impacts would not likely contribute to a trend towards Federal listing or loss of viability of these species. There would be no impact to musk root, Barratt's willow, Jove' buttercup, and Shoshonea. The Proposed Management Alternative would provide a faster rate for improvement for sensitive plants habitats that may be vulnerable to grazing impacts in comparison with the Current Management Alternative. Both action alternatives comply with all pertinent laws, regulations and policy.

INTRODUCTION

There are no known endangered or threatened plant species in the project area. The three plants listed on the federal Threatened or Endangered Species List as "threatened" and occurring in Montana are water howellia (*Howellia aquatilis*), Spalding's catchfly (*Silene spaldingii*), and Ute ladies'-tresses (*Spiranthes diluvialis*). Species occurrences and suitable habitat are only known on Forests west of the Continental Divide for water howellia and Spalding's catchfly, and in the Missouri, Jefferson, Beaverhead, Ruby, and Madison River drainages for Ute ladies'-tresses. No further analysis will be conducted for the threatened species.

There are known sensitive plants species in the project area. Forest Service sensitive species are defined as "Those plant and animal species identified by a Regional Forester for which population viability is a concern, as evidenced by: a) significant current or predicted downward trends in population numbers or density or b) significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution." The current USFS Northern Region (R-1) sensitive plant species list was developed October 28, 2004.

Effects of livestock on sensitive plants (Issue 4) that occur in the project area are assessed in this biological evaluation. Livestock and associated management activities have the potential to affect sensitive plant health and habitat integrity. As required by Forest Service Manual 2670.22 and 2670.32, a Biological Evaluation for threatened, endangered, and sensitive plants will be conducted. Forest Service policy regarding Biological Evaluations is summarized in Forest Service Manual (FSM) 2672.4. The intent of the Biological Evaluation process is to assess the potential impacts of proposed management activities, and ensure that such activities will not jeopardize the continued existence of 1) species listed, or proposed to be listed, as Endangered or Threatened by the U. S. Fish and Wildlife Service and 2) species designated as sensitive by the Regional Forester.

REGULATORY FRAMEWORK

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", "C", "D", "F", and "M". The management area goals and management standards have been previously disclosed in the environment assessment.

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 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.

ASSUMPTIONS, METHODOLOGY & INFORMATION USED

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. These include the Montana Natural Heritage Program (MNHP, 2008), previous botanical surveys in the project vicinity (2002-2004 Forest Service and contract crew surveys), and the 2004 Northern Region sensitive species list. Field surveys for the plants listed as high potential for occurrence were conducted during the 2002-2004 field seasons by Kim Reid, Linda Spencer, Jeff DiBenedetto, and Geowest contract botanists. Plant surveys emphasized reconnaissance of habitats where sensitive plants might occur in areas of moderate to high grazing. Surveys were conducted at intensity level "Limited Focus". No new populations were located during these surveys.

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 districts¹. Only the listed sensitive species with potential habitat on the Beartooth District were evaluated for inclusion in the biological findings of this assessment. They are shown in Table 2.

Physical and biological parameters were used to screen which sensitive plant species were analyzed in this Environmental Assessment and which species were not considered in detail. (*The project purpose and need is described in detail in the NEPA environmental document. See project maps for general project location. Detailed information on the project area vegetation, water, and soils is found in the project environmental document and project record.*)

Species to be Evaluated Further: Based upon existing information, probability of occurrence, and probability of impacts, effects to Hiker's Gentian (known population in project area), Beartooth goldenweed, Hall's rush, mealy primrose, small yellow lady's-slipper, giant helliborine, and threeranked humpmoss will be evaluated further in this assessment.

Species that will not be Evaluated Further: Based upon existing information, probability of occurrence, and probability of impacts, effects to musk root, Barratt's willow, Jove' buttercup, and Shoshonea will not be evaluated further based on rationale as follows:

Musk Root (*Adoxa moschatellina*)

Description / Distribution: Musk-root is a small, delicate, musky-scented herbaceous perennial, 2-8 inches tall. Distribution is circumboreal; extending irregularly south in North America to New York, Iowa, South Dakota, Colorado, and Utah. Eleven occurrences are in Montana.

Habitat Association: This species occurs in vernal moist places in the mountains at the bottom of undisturbed, open rock slides that have cold air drainage. It also occurs in shady, moist, moss-rich limestone cliffs and ledges in coniferous forests of Engelmann spruce and Douglas- fir at 4400- 8000 feet.

Ecology: Populations are often small. Plants have been observed growing where cold air flow is channelled beneath rock slides. Habitats are in forested areas that have evolved with fire. Flowering occurs in June and

¹ USFS, 2002. **Custer NF TES Plant Protocol.**

early July, and fruiting continues through July.

Rationale for Dismissal from Further Analysis: The habitat for this species is not typically considered as primary grazing land. There is an extremely low probability of any grazing effects occurring on this species, if it occurred within the project area. Therefore, there will be no further analysis on this species. No Impacts are anticipated.

Jove's Buttercup (*Ranunculus jovis*)

Description / Distribution: Jove's buttercup is a glabrous perennial with one to several stems that are 1.5 to 4 inches tall and arising from a cluster of fleshy, club-shaped roots. The yellow flowers are solitary on the ends of stalks. This species can be distinguished from other buttercups by the clustered, fleshy roots and by the deeply 3-5 parted leaves. This species flowers and fruits in April-June.

Global Distribution includes Colorado, Idaho, Montana, Nevada, Utah, Wyoming and Canadian provinces. State Distribution includes Beaverhead, Gallatin, Madison, and Carbon counties, MT. Known to occur at the head of Crooked Creek in the Pryor Mountains, approximately 80 air miles east of the project area.

Habitat Association: Sagebrush grasslands to open forest slopes in the montane and subalpine zones. Elevation 7500-9600 feet.

Ecology: Sites in the Pryor Mountains, Montana are limited to melting snow beds where pocket gopher activity occurs. It is associated with *Claytonia lanceolata*. The species emerges and blooms as the snow banks melt. These sites are later dominated by sedges and grasses. These sites occur in organic loams / clay loams.

As evidenced by the Pryor Mountain populations, livestock grazing does not appear to impact the populations as the populations occur near livestock water developments as well as in disturbed areas resulting from developments (pers. Comm. C. McCracken, 2005). This species life cycle is completed prior to general grazing seasons when forage is ready for use.

Rationale for Dismissal from Further Analysis: Primary grazing lands within the project area occur below the general elevational limits in which this species occurs. This species life cycle is completed prior to general grazing seasons when forage is ready for use. Therefore, there will be no further analysis on this species. No Impacts are anticipated.

Barratt's Willow (*Salix barrattiana*)

Description / Distribution: Barratt's Willow is a much-branched shrub that is up to three feet tall. It has young twigs that are sticky and covered with long, soft hairs. Mature fruit is found during July-August. Barratt's willow forms extensive thickets in alpine/subalpine habitats.

Barratt's willow is distributed from Alaska and the Yukon south to southwestern Alberta, northwestern Montana, and southeastern British Columbia. Barratt's willow is globally secure but critically imperiled in Montana. Populations in Montana are sparse with an occurrence in Glacier National Park - Gunsight Pass, and Line Creek Plateau of the Beartooth Mountains.

The Line Creek clone consists entirely of staminate pistillate plants, sexual reproduction is not possible and long term survival of the clone is in doubt. The clone reproduces entirely by vegetative means (Wyoming Natural Diversity Database, 2008).

Habitat Association: Barratt willow grows on boggy meadows, moist open hillsides in mountains, and along lakeshores and streambanks.

Ecology: It has been reported on rock slides and recent alluvial deposits. Soils range from very calcareous to very acidic. It survives long, cold winters and short, cool summers in areas in Alberta with a mean annual temperature under 32 degrees F. Barratt willow was reported in a krummholz community near timberline with

Engelmann spruce (*Picea engelmannii*), alpine larch (*Larix lyallii*), and subalpine fir (*Abies lasiocarpa*). It has been reported at 8,475 feet in Alberta, between 6,800 and 10,500 feet in Montana, and at 10,000 feet in Wyoming.

Barratt's willow reproduces by seed sexually produced by pollination and fertilization. Fruit matures in late July and August.

Barratt's willow is an off-site colonizer after fire. Seed is transported by wind; after fire in years one and two.

Rationale for Dismissal from Further Analysis: There are no alpine habitat components in the project area. Therefore, there will be no further analysis on this species. No Impacts are anticipated.

Shoshonea (Shoshonea pulvinata)

Description / Distribution: *Shoshonea pulvinata* is a long-lived mat-forming perennial in the Carrot Family. The plants have a woody taproot and branching underground stems. In Montana *Shoshonea pulvinata* is generally restricted to shallow calcareous soils of exposed limestone outcrops rims, ridgetops and talus slopes at 6,800 to 7,800 feet.

In the Pryor Mountains, *Shoshonea* occurs in colonies of approximately 100 to 1,500 plants in narrow belts of habitat on the rims above canyons. Although canopy coverage of this species rarely exceeds 5 to 10%, total vegetation cover is low and *Shoshonea* is often one of the dominant herbaceous species. Although *Shoshonea* sometimes occurs in partial shade at the edges of forest, plants found in these areas appear to be less vigorous than those in full light. These observations indicate that the species prefers full or nearly full sunlight. Forest encroachment of *Shoshonea* habitat would cause increased snow cover, slower spring warming, and lower light intensities, which could in turn cause extirpation of the species. Sites where *Shoshonea pulvinata* occurs are on ridgetops and on the rims above the windward side of deep canyons. These sites are apparently maintained in an early successional stage by their exposure to wind (Lesica and Shelly, 1988).

Habitat Association: The vegetative characteristics of *Shoshonea* sites is sparse vegetation dominated by low herbaceous plants, many of which are mat-forming. In Montana, *Shoshonea* occurs at elevations ranging from 6,440 to 7,800 feet. At this elevation, the dominant zonal vegetation is Douglas fir forest. *Shoshonea* often occurs in windblast areas on the edges of these forests, or on exposed ridges surrounded by them. Other commonly associated species include limber pine, Howard's alpine forget-me-not, and curly sedge.

Ecology: *Shoshonea pulvinata* occurs in sparse vegetation of open or occasionally partially shaded fellfield-like habitats. The species is probably intolerant of intense competition and full shade. In the Pryor Mountains and Meeteetsee Spires, subpopulations occur in narrow belts along the windward rims of canyons. Although large grazing animals such as wild horses or mountain sheep may preferentially use these communities during the winter, when they are more free of snow than adjacent areas, no evidence of grazing damages was observed on known populations (Lesica and Shelly, 1988).

Rationale for Dismissal from Further Analysis: The habitat for this species is not typically considered as primary grazing land. There is an extremely low probability of any grazing effects occurring on this species, if it is within the project area. Therefore, there will be no further analysis on this species. No Impacts are anticipated.

Beartooth District Sensitive Plants

(R1 2004 List)

Table 1 – Beartooth District Sensitive Plant Species Rareness, Habitat, Ecology, and Occurrence Potential within Project Area

Common Name	Scientific Name	Type ^{2*}	Global Rank ³	State Rank ⁴	Elevation (ft)	Habitat	Closest known population	Potential of Occurrence ⁵	Vulnerability to Project Effects	Flowering Period	Fruiting Period	Lifeform
Musk-root	<i>Adoxa maschatellina</i>	3	G5	S2	4,400-6,000	Vernally moist places in the mountains at the bottom of undisturbed, open rock slides that have cold air drainage.	East Rosebud Creek and Spread Creek – approx. 1 air miles from E Rosebud Allotment.	Moderate	Low to None	June-early July	Through July	Musky-scented Perennial Forb
Small yellow lady's slipper	<i>Cypripedium parviflorum</i>	3	G5	S2S3	2,520 – 6,200	Fens, damp mossy woods, seepage areas, and moist forest-meadow ecotones in valley to lower montane	Suspected - Historically Documented Stillwater Co. (State)– approx. 15 air miles	Moderate	Moderate	May-June	July	Perennial Forb
Giant helliborine	<i>Epipactis gigantea</i>	3	G4	S2	2,900 – 6,200	Streambanks, fens with springs/seeps, often near thermal waters	Bluewater Fish Hatchery – approx. 70 air miles	Low	Moderate	June – Early August	June – Early August	Perennial Forb
Hiker's gentian	<i>Gentianopsis simplex</i>	3	G4	S1	4,460 –	Fens, meadows, and	Within East Rosebud	High	Moderate	July - August	July - August	Small Annual

² 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

³ and ³ 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

⁵Potential of Occurrence rated as high, moderate, or low

Common Name	Scientific Name	Type ^{2*}	Global Rank ³	State Rank ⁴	Elevation (ft)	Habitat	Closest known population	Potential of Occurrence ⁵	Vulnerability to Project Effects	Flowering Period	Fruiting Period	Lifeform
					8,400	seeps, usually in areas of crystalline parent material, in the montane and subalpine zones	Allotment					Forb
Beartooth goldenweed	<i>Haplopappus carthamoides</i> var. <i>subsquarrosus</i>	2	G4G5T2T3	S2	5,520 – 7,200	Grasslands and sagebrush steppe on sandy calcareous soils in the foothills and montane zones	Main Fk Rock Cr – approx. 15 air miles	Low to Moderate	Low	July - August	July - August	Perennial Forb
Hall's rush	<i>Juncus hallii</i>	3	G5	S2	4,000 – 8,860	Moist to dry meadows and slopes from valley to montane	Gallatin NF – approx. 90 air miles	Moderate	Low	July - August	July - August	Perennial grass-like
Mealy Primrose	<i>Primula incana</i>	3	G4G5	S2	Below alpine and sub - alpine habitat	Wet meadows, springs and shores, often where alkaline; calcareous bog meadows; wet meadows & quaking bogs; NOT found in alpine or subalpine areas..	Historically known - East Rosebud Lake (approx. 1 air mile away from E Rosebud Allotment), - not recently documented	Moderate	Moderate	May to June	Through July	Perennial Forb
Threeranked humpmoss	<i>Meesia triquetra</i>	3	G5	S2	7850-10,500	Rich fens having surface waters with high pH and calcium	West Fork, 1.5 air miles from Red Lodge Cr. Allotment	Moderate	Moderate			Moss – Non-vascular plant

Common Name	Scientific Name	Type ^{2*}	Global Rank ³	State Rank ⁴	Elevation (ft)	Habitat	Closest known population	Potential of Occurrence ⁵	Vulnerability to Project Effects	Flowering Period	Fruiting Period	Lifeform
						concentrations. It can also be found in alkaline swampy birch and willow woods.						
Jove's Buttercup	<i>Ranunculus jovis</i>		G4	S2	7,500-9,600	Sagebrush grasslands to open forest slopes in the montane and subalpine zones.	Head of Crooked Cr.-Pryor Mtns. – approx. 90 air miles.	Low to Moderate	Low to None	April - June	April - June	Perennial Forb
Barratt's Willow	<i>Salix barrattiana</i>	3	G5	S1	6,800 - 10,500	Grows on boggy meadows, moist open hillsides in mountains, lakeshores, streambanks, rock slides, recent alluvial deposits. Soils range from very calcareous to very acidic.	Line Cr Plateau – approx. 20 air miles	None	None	July - August	July - August	Shrub
Shoshonea	<i>Shoshonea pulvinata</i>	2	G2G3	S1	6,440 – 7,800	Open, exposed limestone outcrops, ridgetops and canyon rims, in thin rocky soils	Meeteetsee Spires – approx. 25 air miles	Low	Low to None	May - July	May - July	Perennial Forb

AFFECTED ENVIRONMENT

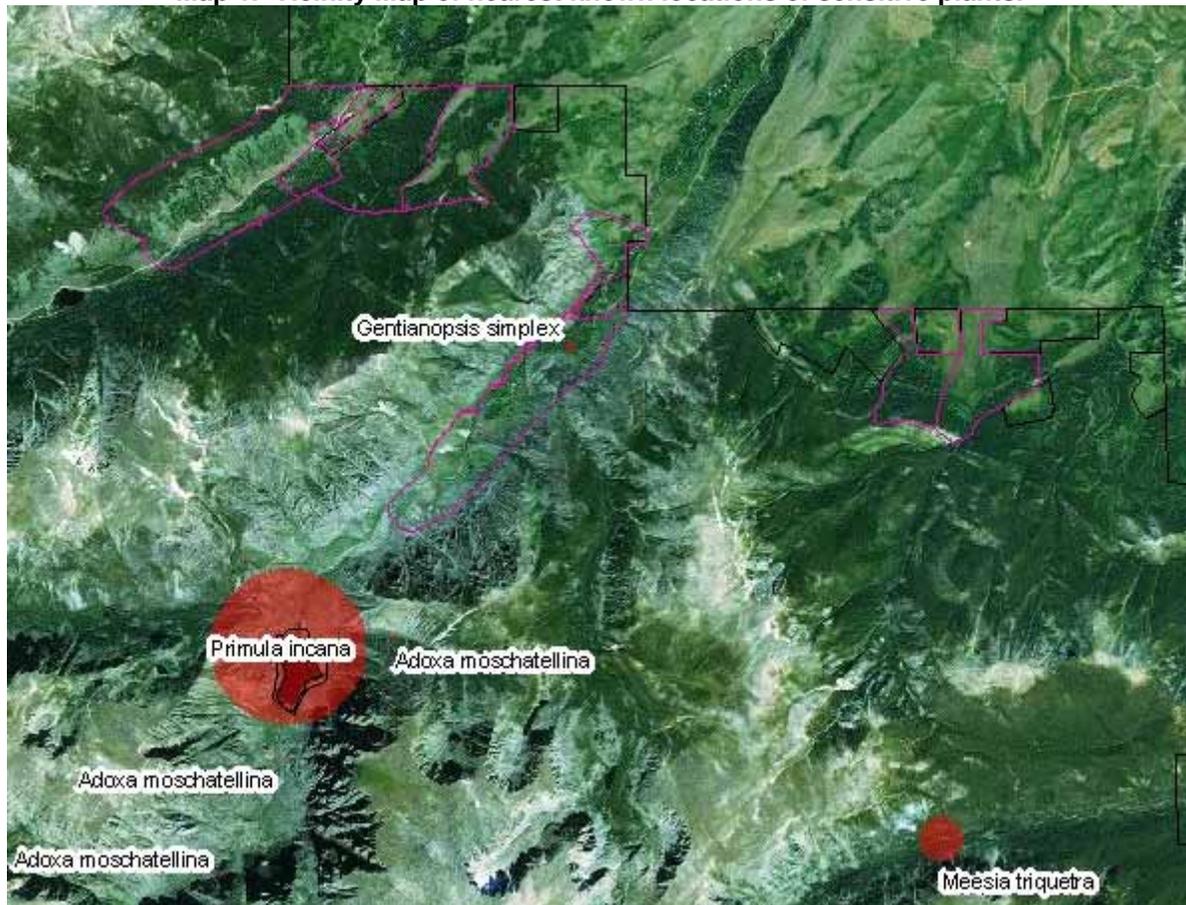
Project Area:

The Beartooth Ranger District proposes to update allotment management plans for East Rosebud, West Rosebud, Butcher Creek, and Red Lodge Creek livestock allotments on National Forest System lands along the Beartooth Front. 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.

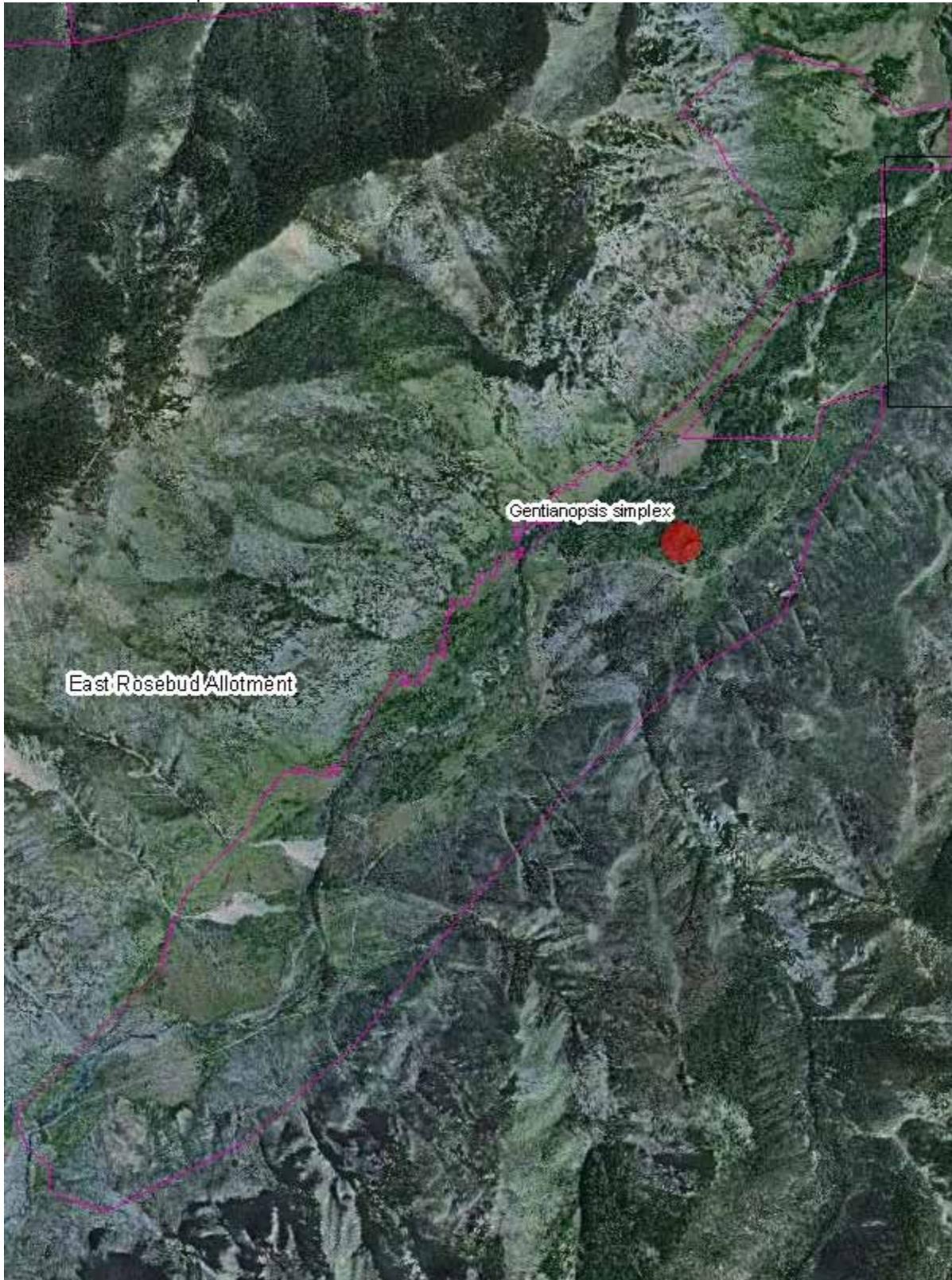
Detailed information regarding riparian and upland plant community composition and location is found elsewhere in the environmental analysis for this proposed action. Field surveys have been conducted within or adjacent to the project area by Forest Service Specialists, Kim Reid, Linda Spencer, and Jeff DiBenedetto, and contract crews during the 2002-2004 field season(s). No new locations of sensitive plants were noted by these investigators.

There is one known location of Hiker's Gentian within a seven acre riparian area of the East Rosebud Allotment. There are habitat components for the remaining six species (four riparian and two upland) to be analyzed, but no known locations within the project area. Table 1 outlines known sensitive plant populations and habitat components of other species found within the project area. It also displays other species which do not have habitat components within the project area.

Map 1. Vicinity Map of nearest known locations of sensitive plants.



Map 2. Location of Hiker's Gentian in East Rosebud Allotment



Riparian Existing Conditions

Fifteen reaches, or 7.4 miles of perennial stream were surveyed using the Lotic (flowing water) Proper Functioning Condition methodology. Five reaches (1.16 miles) were determined to be less than properly functioning, in part due to grazing. Six ponds were surveyed using the Lentic (standing water) PFC methodology and one was determined to be less than properly functioning, in part due to grazing. Four sites were surveyed using the low flow, spring fed wetland water course checklist. Three of these sites (0.48 miles) were determined to be less than properly functioning, in part due to grazing. The individual components of riparian function causing these conditions by Allotment are identified in Tables 2 through 4 of the Water Quality Specialist's Report (project file). This report is incorporated by reference into this analysis. Allotments that contain streams that are less than properly functioning include Butcher Creek, and East and West Rosebud. Proposed changes in grazing management have the potential to improve the condition of these streams because grazing impacts are the most direct and significant of all the activities that influence them. Perennial streams are of limited extent in the Red Lodge Creek Allotment and were not surveyed.

Riparian Related Sensitive Species

Hiker's gentian is the only known population that occurs within the project area. Although there are no known populations in the project area, riparian habitat exists for mealy primrose, small yellow lady's-slipper, giant helliborine, and threerank humpmoss.

Riparian Species - Known Population

Hiker's Gentian (*Gentianopsis simplex*) -

Description / Distribution: Hiker's Gentian has erect, usually simple stems that are 4-8 inches tall. The 2-5 pairs of opposite leaves are broadly lance-shaped to ovate. The lobes have small teeth along the sides but are rounded and entire-margined at the tips. The notches between the lobes are not plaited or fringed. Flowering in July-August. This species can be distinguished from the more common *G. detonsa* by the unbranched stems and entire-margined tips of the corolla lobes. Both have four petals, but the hiker's gentian's are smooth-bordered rather than fringed. Both grow along streams, and in moist meadows at elevations of 7-8000 feet, blooming from mid-July through August.

Global distribution includes Oregon to central California, and east to central Idaho and Montana, and Columbia Plateau. State distribution includes the Absaroka-Beartooth Mountains and Bitterroot Range. There is one known location on the Beartooth Ranger District in East Rosebud, approximately 20 air miles from the project area.



Habitat Association: East Rosebud Complex is the one known location on the Beartooth Ranger District. It occurs within the East Rosebud Allotment within the project area. The East Rosebud complex of wetlands occurs in a stream valley along low river terraces in which there are numerous old river meanders. These wetlands are primarily fed by groundwater and many have developed peat, so it is reasonable to assume that they have a fairly stable hydrologic regime. Beaver have dammed some of the shallow streams that drain into this complex, thus helping to maintain a high water table at the site.

Open waters of the meanders and small beaver ponds support aquatic vegetation such as yellow water lily (*Nuphar* sp.), small pondweed (*Potamogeton pusillus*), grass leaved pondweed (*Potamogeton gramineus*), water buttercup (*Ranunculus aquatilis*), and common bladderwort (*Utricularia vulgaris*). Some of the old meanders have silted in and have developed water horsetail (*Equisetum fluviatile*) communities, which are also usually permanently flooded. On the margins of the open water there are beaked sedge (*Carex utriculata*) communities. In a slightly drier position outside the beaked sedge community is an undescribed community that has an upper canopy of scattered planeleaf willow (*Salix planifolia*) and an undergrowth with a significant beaked sedge component. This community has standing water and in some spots high cover of *Sphagnum* sp. (moss species characteristic of poor fens and bogs).

Gentianopsis simplex (hiker's gentian, G4, S1) was found in this wetland in 1989. Attempts to relocate the population in 1999 were unsuccessful. However, this species was observed in 1995 (K. Reid) in wetlands associated with the Beaver ponding.

Exotics (*Cirsium arvense* [Canada thistle], *Poa pratensis* [Kentucky bluegrass], *Agrostis alba* [redtop], *Phleum pratense* [timothy]) constitute a very minor problem at this site, presently primarily confined to the driest community represented (*P. tremuloides* / *C. canadensis*) but, just ranging into the *Salix planifolia* / *C. aquatilis* – *C. utriculata* community.

Ecology: This species occurs in fens, meadows, and seeps, usually in areas of crystalline parent material, in the montane and subalpine zones. 4460 - 8400 feet elevational range.

The species is an annual, and probably relies in part on a seed bank for maintenance of population viability. Such a seed bank could be damaged by heavy trampling, which disrupts the soil surface and results in seeds being buried too deeply to germinate. The timing of grazing is important. If the grazing use is occurring during flowering and fruiting periods, this could detrimentally affect seed production. Such effects could be especially adverse if the population size is small. *G. simplex* flowers later in the growing season (July-August, depending on elevation), and fruiting and seed dispersal probably extend into September.

This species is somewhat unique as far as annuals go, in that it tends to occur in fairly dense plant communities occupying moist to wet sites. In many cases annual species are fairly tolerant of disturbance, and in fact there can be population increases in cases where a disturbance "opens up" the plant community to some degree (reduction of competition, which can allow for enhanced seed germination); this phenomenon is more common on drier upland habitats though. In this case it appears that the species is a component of plant communities that have a fair amount of vegetative cover. Populations tend to be in dense graminoid communities of fens, wet meadows, and seepage areas (with *Carex* and *Eleocharis* species are dominant). This higher cover may provide some unique habitat characteristics that allow for seed germination of the species, even in such a "closed," more competitive plant community. Grazing that alters the composition and/or density of the associated plant communities might adversely affect the populations.

In densely vegetated herbaceous wetland, if there is disruption of the sod layer, loss of soil moisture at the surface and exposure of bare soil to compaction could lead to "wringing out the sponge" or breaking apart the protective layer which provides for germination. If the organic matter stays wet, the seed will not desiccate. If the site dries out, the organic matter will not retain water as well as mineral soil and the seed could desiccate.

The following photo is of the known location of Hiker's Gentian and Plot EB2. The July 25-29, 2005 PFC Inventory, Plot EB2, is rated as Properly Functioning (see Water Quality Report).

PFC Plot EB2 – Properly Functioning



Riparian Species with Potential Habitat Components

Small Yellow Lady's Slipper (*Cypripedium parviflorum*)

Description / Distribution: Small Yellow Lady's-slipper is a perennial with leafy stems 6-16 inches tall, which arise from short rhizomes. Flowering in May-June, fruiting in July. Petals conspicuously twisted, pouch small, sepals and petals deep reddish brown.

Global Distribution includes B.C. to Newfoundland, South to OR, UT, NM, TX, MO, GA. Boreal. State Distribution includes Northwest Montana mountain ranges; also historic records in Absaroka-Beartooth Mountains., Bridger Mountains., Garnet Range, Little Belt Mountains, and Madison Range.

The two occurrences of this species listed as being in or near the Beartooth Ranger District. One occurrence is mapped in a general 10 mile radius with the center point being off NFS lands, but the part of the 10 mile radius in Stillwater drainage near Nye is shown as being on the Custer. The other occurrence is unmappable, historic records describes the species being seen in 1939 in Stillwater County at about 5700 feet, in moist woods. Another occurrence shown as being in Stillwater County, is on the Stillwater River near a fishing access near Nye.

Habitat Association: Fens, damp mossy woods, seepage areas, and moist forest-meadow ecotones in the valley to lower montane zones. Elevation 2520 - 6200 feet.

Ecology: This species is a perennial growing 10-24 inches tall. Flowering in May-June, fruiting in July. The scented flowers are hermaphrodite (have both male and female organs) and are pollinated by insects. The plant requires moist soils. The plant prefers acid, neutral and basic (alkaline) soils. It can grow in semi-shade (light woodland) or no shade. This species succeeds in shade or full sun so long as there is adequate moisture.

Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid.

The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil. This plant is becoming very rare in the wild due to overcollecting for medicinal usage.

Giant Helleborine (*Epipactis gigantea*)

Description / Distribution: Giant Helleborine is a large perennial herb with leafy stems that are 1-3 feet and which arise from short rhizomes. The herbage is rough to the touch or smooth and glabrous. The foliage is deciduous - dies back in the fall. After the foliage turns brown, the new shoots begin to spread away from the rhizome. The nodding capsule contains thousands of tiny seeds. The plants will grow in small or large groups, but most commonly form dense stands. Flowering is in late June-early August.

Global distribution includes B.C. south to CA, and in most of w. U.S., south to n. Mexico. State distribution includes Front Range, Pryor Mtns., Tobacco Root Mtns., Flint Range, and Flathead and Clark Fork River drainages. It is the most commonly encountered orchid of the Pacific Coast. There are no known populations on the Beartooth Districts. This species is suspected to occur on the Beartooth District based on its proximity to a known locations near the Pryor Mountains.

Habitat Association: Stream banks, lake margins, fens with springs and seeps, often near thermal waters. Elevational range in Montana is 2900 - 6200 feet.

Ecology: Giant helleborine reproduces from microscopic, aerially dispersed seeds. It will also reproduce vegetatively from rhizome shoots. The rhizomes are slender. One of the known pollinators is the Syrphid fly.

Giant helleborine grows on open, wet sites, often adjacent to mineral hot springs, and along rivers, streams, meadows, seeps, and hanging gardens from warm desert shrub to spruce communities. It grows on calcareous, porous substrates or thin, partially decomposed, wet organic substrates. It is more common in the open than in forests. In the northern part of its range, it prefers hot springs.

Giant helleborine can colonize suitable habitats quickly. It is a species of open, early successional habitats. It is a poor competitor later in succession. It is an early community colonizer after fires.

Threats include any activity that dries up the moisture regime such as development, improper livestock grazing, and water development. Another threat includes competition from invasive species.

Mealy Primrose (*Primula incana*)

Description / Distribution: Mealy Primrose is a perennial with leafless stems 4-18 inches tall, arising from a basal rosette of leaves and fibrous roots. Leaves usually have a mealy, whitish covering. The corolla is lavender with a yellow throat, forming a tube that is equal or slightly longer than the calyx. This species flowers in June.

Mealy primrose is found from Utah and Colorado north to Alaska and east into Quebec, Canada. This species is considered to be rare in southern Utah, Colorado, Wyoming, North Dakota, and Montana, but more common in Canada from British Columbia eastward to the western portion of Manitoba. The species is rare in the Yukon Territories and in adjacent Alaska where it is limited to stable river floodplains.

Historically known to occur in East Rosebud (approx. 20 air miles away), but not recently documented.

Habitat Association: The mealy primrose is found on moist ground, alkaline / saline meadows and shores. Mealy primrose inhabits disturbed alkaline clay soils throughout its range. This species does not occur in alpine or subalpine habitats.

In southwestern and north-central Montana, mealy primrose has been found in saturated, often calcareous wetlands. Dominants or common associates include *Carex simulata*, *C. nebrascensis*, *Juncus balticus*, *Agrostis stolonifera*, *Muhlenbergia richardsonis*, *Calamagrostis stricta*, and *Eleocharis pauciflora*. In Sheridan County it was restricted to seep habitat with marl deposits beside an alkali lake. The most common associated species there were *Juncus balticus*, *Scirpus pungens*, *Triglochin maritimum*, and *Potentilla anserina*.

Ecology: Mealy primrose in Montana appears to be restricted to wet meadow habitats with relatively stable water tables. Associated streams have a fairly constant water flow; i.e., permanent flows with little flooding in spring. Soils remain moist to saturated throughout the growing season, but there is little or no inundation. *Primula incana* is often found growing on the sides of hummocks where the density of overtopping vegetation is reduced. Hummock habitats are moist without being wet and are more open than wetter microhabitats dominated by sedges and rushes.

The effects of livestock grazing on *Primula incana* appear to be both positive and negative. Leaves of *P. incana* are all at ground level, so herbivory by livestock can eliminate seed production but will not kill the plant or remove significant photosynthetic tissue. Grazing can partially remove the overtopping canopy of grasses and sedges, allowing more light to reach *P. incana* rosettes. Furthermore, trampling by livestock undoubtedly is instrumental in causing hummocks, often the most productive habitat for *P. incana*. No significant association was found between grazing pressure and the abundance of the closely related *P. alcalina* in an Idaho study and grazing was positively associated with the persistence of *P. farinosa*, a closely related European species (MT Natural Heritage Program 2005; <http://nhp.nris.state.mt.us/plants/plantguide.asp>).

Wetland habitats of mealy primrose can be affected by livestock grazing. Livestock congregate in the vicinity of wetlands in summer for the lush, succulent vegetation and proximity to water. Mealy primrose is low to the ground and may benefit by having the canopy of dominant graminoids reduced. Trampling by cattle may also benefit this species by creating mesic microhabitats on the tops and sides of the hummocks. However, livestock grazing in the uplands can reduce vegetal cover, thereby increasing runoff, flash flooding and channel downcutting. The lowered water table that accompanies downcutting causes a loss of wetland habitat, which could result in population declines for this plant.

Threeranked humpmoss (*Meesia triquetra*)

Description / Distribution: *Meesia triquetra* is a species frequent where appropriate habitat is available. It is usually easily distinguished by three-ranked, widely spreading leaves that have serrulate margins. *Meesia uliginosa* has ligulate leaves with clearly revolute margins. It grows in small tufts or cushions. Plants are often large, dark-green to grass-green above, occasionally red-brown below due to dense rhizoids.

This moss occurs in rich fens in arctic and boreal areas and disjunct in a few locations farther south. This species is considered to be rare in southern Utah, Colorado, Wyoming, North Dakota, and Montana, but more common in Canada from British Columbia eastward to the western portion of Manitoba. The species is rare in the Yukon Territories and in adjacent Alaska where it is limited to stable river floodplains. This moss is limited in distribution and numbers in Montana. Known to occur in West Fork Rock Creek (approx. 1.5 air miles south of Red Lodge Creek Allotment).

Habitat Association: The habitat must be permanently wet, primarily spring fed. This species has potential habitat in wet meadows, bogs, and fens. *It can* occurs on calcareous soil banks and in rich fens in boreal, alpine, and Arctic situations. The analysis area has potential habitat for this moss.

Ecology: This species occurs in wetland sites, specifically, within wet woods in the wettest portions of what are called "extreme rich fens" (*i.e.*, fens having surface waters with high pH and calcium concentrations). Associates include *Scorpidium* spp. and *Drepanocladus revolvens*.

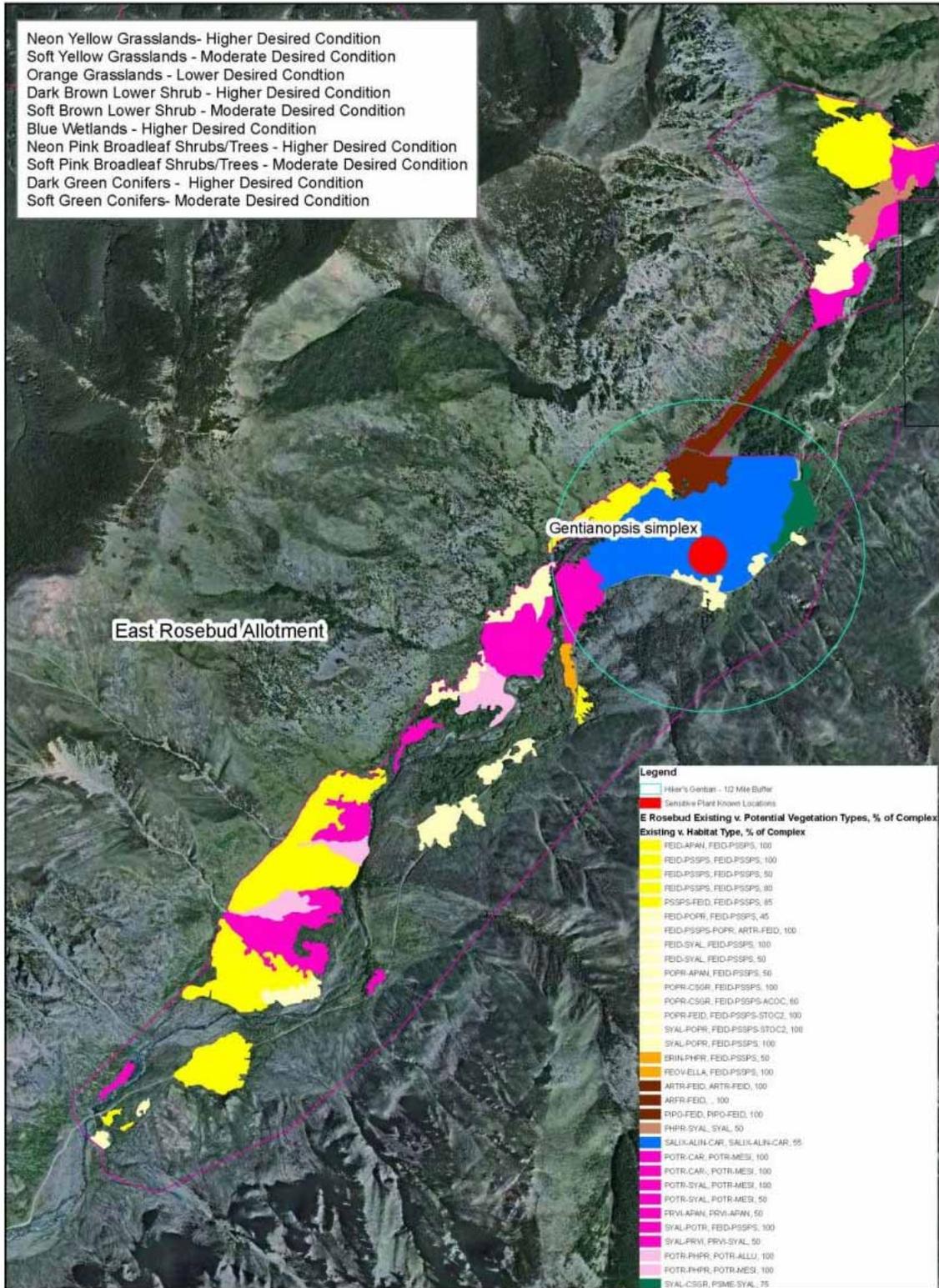
The fire ecology of this plant is not known; however, fens rarely burn. Excess soot from a nearby fire, however, might negatively affect habitat quality. Fire return intervals in conifer bogs, a somewhat similar mire-type habitat, are estimated to be about once every 150-200 years. Fire does significant damage to peat, but the bog must be dry (as during a drought year) in order to burn; typically, bogs are not dry enough.

In general, fens are delicate habitats susceptible to impacts from livestock grazing, hydrologic alteration, construction and continued use of roads, and peat mining. Rich fen habitats are especially susceptible to modification.

Upland Existing Conditions

The Ecology Specialist's Report describes existing upland conditions and is incorporated by reference into this analysis. East Rosebud Allotment is where Hiker's gentian population is known. There is approximately three percent of the capable grazing acreage that is in less than desirable condition. This acreage consists of approximately three upland grassland type acres are in low similarity to desired conditions due to annual sheep fescue dominance and approximately 18 upland grassland acres have moderate similarity to desired conditions due to a mix of desired native species and non-native established species such as timothy grass and Kentucky bluegrass. The total 3% of less than desirable acreage is located outside of the ½ mile buffer around the known location of hiker's gentian. Salting is to be avoided within this ½ mile buffer zone.

Map 3. Upland Vegetation Conditions and 1/2 Mile Salting Buffer Hiker's Gentian - Avoid Salting within 1/2 Mile Buffer



Upland Related Sensitive Species

Although there are no known upland related populations in the project area, habitat might exist for Hall's rush and Beartooth goldenweed.

Upland Species with Potential Habitat Components

Beartooth Goldenweed (*Haplopappus carthamoides* var. *subsquarrosus*)

Description / Distribution: Goldenweed is a perennial with one to few stems, spiny margined leaves, spiny margined outer involucre bracts. There are one to four relatively large heads per stem, and inconspicuous or absent ray flowers. It generally flowers in late July through August. This species, is a regional endemic found only in South-central Montana (Carbon County) and the Absaroka Mountains of Northwest Wyoming (Park County).

There are currently eight known occurrences of this species in Montana, six along the East Front of the Beartooth Mountains and two in the foothills of the Pryor Mountains in Sage Creek. There are 13 documented occurrences of this species in Wyoming.

Habitat Association: In the Montana populations, *Haplopappus carthamoides* var. *subsquarrosus* is primarily associated with *Festuca idahoensis*/*Agropyron spicatum*, *Artemisia arbuscula*/*Agropyron spicatum* habitat types. Shrub cover is typically low, usually 1-5%. Common shrubs associated with this species are *Chrysothamnus nauseosus*, *Artemisia frigida*, *A. tridentata*, and *A. nova*. Grass cover is high (20-50% with *Agropyron spicatum* and *Festuca idahoensis* being the most common species). Forb cover is high (30-75%). Common forbs include *Erigeron caespitosus*, *Antennaria microphylla*, *Phlox hoodii* and *Astragalus adsurgens*. Amounts of bare ground are usually around 5%, but can be as high as 30%. Some sites have scattered *Pinus flexilis* (Lesica 1995).

In the Wyoming populations, this species may be found in grasslands dominated by *Elymus spicatur*/*Poa secunda*, *Poa cusickii*/*Koeleria macrantha*, *Festuca hallii*/*Poa secunda*, *Artemisia tridentata*/*Elymus spicatus*, or *Frasera speciosa*/ bunchgrasses. At many sites along the east front of the Absaroka Mountains in Northwestern Wyoming, it is negatively associated with *Festuca idahoensis* (USDA, 2000).

Ecology: *Haplopappus carthamoides* var. *subsquarrosus* occurs in open grasslands/sparse sagebrush steppe, slopes, and ridges, generally on sandstone or limestone substrates (although colonies may occasionally be found on volcanic and granitic substrates as well). Soils associated with this species have a sandy texture and are moderately deep with a high coarse fragment content.

This species most commonly occurs on moderate to steep slopes (10-50% slope) with a cool aspect (NW, N, NE, E). It can be found on warm slopes (as just north of Robertson Draw), but then the slope is more gentle and the plants are sparsely distributed. This species occurs in the foothills and montane zones. Elevations in Park County Wyoming range from 6400-10,300 feet, while elevations in Carbon County, Montana range from 5,520 to 7,200 feet, but are most common at 6,00-6,500 feet.

This species does not produce rhizomes or other means of vegetative propagation; reproduction is entirely from seed. *H. carthamoides* has a stout, woody rootcrown, suggesting that it is a long-lived perennial.

Some areas of habitat have been disturbed by road construction and have some degree of competition with invasive weeds.

Grazing does not appear to be a significant threat in most areas (the plant is not favored forage). In areas where *H. carthamoides* is found in sites where *E. caespitosus*, *Artemisia frigida* and *Antennaria microphylla* were abundant. These three latter species increase under grazing pressure. These observations suggest that *H. carthamoides* var. *subsquarrosus* is able to persist in communities with relative high levels of competitive pressure, but that establishment may be facilitated by moderate disturbances that produce small-scale safe sites. Cattle grazing was found to be heavy at the Sheridan Campground site in 1995. However, there was no evidence of cattle razing on the *H. carthamoides* plants at this site (Lesica 1995). This was also observed during the 2001 grazing season at the same site where heavy to extreme grazing occurred. However, some trampling effects were observed (Reid, 2001). No evidence of herbivory was observed in 1994 or 1995 Wyoming surveys (USDA, 2000). The tough, spiny tissue and perhaps resinous chemicals may make this plant unpalatable to cattle. Lesica (1995) indicates that it seems likely that *H. carthamoides* var. *subsquarrosus* populations are stable or increase with moderate livestock

grazing.

Fire appears to play an important role in structuring the vegetation associated with this species (Lesica 1995). The relationship among *H. carthamoides*, *A. tridentata* and fire is not known, but it may be that *H. carthamoides* does not tolerate the shade created by dense stands of *A. tridentata* or *Pinus flexilis*. In this case, *H. carthamoides* will occur only at sites where *A. tridentata* and/or *P. flexilis* will not grow or where they are burned frequently enough to prevent dominance. Throughout the areas surveyed, this species was common only in vegetation with tree and/or shrub cover lower than 10%. *H. carthamoides* did not occur or was only sparsely distributed in habitats with dense sagebrush, even though these sites had similar potential to areas with dense population. (Lesica 1995).

Hall's Rush (*Juncus hallii*)

Description / Distribution: Hall's Rush is a densely tufted perennial with erect stems that are 8-12 inches tall and fibrous roots. This species flowers from July-August.

Global Distribution includes Rocky Mtns., from SW. MT to CO. Southern Rocky Mountains. State Distribution includes Big Belt Mtns., Gravelly Range, Highland Mtns., Madison Range, Ovando Valley, and Continental Divide in SW. MT. There are eleven occurrences in Montana.

There are no known populations of Hall's Juncus on the Custer NF, but this species is suspected to occur on the Beartooth District.

Habitat Association: Moist to dry meadows and slopes, from valley to montane zones. Elevation 4000 - 8860 feet (USDA, Gallatin NF, 2003).

Wyoming's Pat O'Hara Research Natural Area evaluation indicate that this species can occur in the community types of *Festuca idahoensis* – *Potentilla diversifolia* (30-40% canopy cover) and *Carex rupestris* – *Potentilla ovina* (1% canopy cover) (USDA –Shoshone NF, 1999).

Ecology: Threats could include any activity that dries up the moisture regime such as development, trampling from improper livestock grazing, and invasive species.

ENVIRONMENTAL CONSEQUENCES

Effects Common to All Action Alternatives

General Grazing Effects: Livestock grazing and trampling are activities that have potential to affect the habitat and any unknown populations that might occur within the project area. Grazing and trampling could be most adverse during the flowering and fruiting stages where trampling or grazing could remove the reproductive plants or damage the reproductive structures. While trampling may not necessarily kill plants, it can destroy portions of the plant to where it fails to produce flowers and seeds. Cattle might also serve to disperse seeds, establishing new or expanded populations. There could be indirect in the disruption of critical habitat components by grazing and trampling. These components are:

- **Associated species.** Associated species could be altered by grazing or trampling of these other species. Also, the alteration of community of associated species may change the successional stage of the site in which a sensitive plant species has a niche.
- **Structure.** Grazing or trampling could increase the amount of bare ground through the removal of vegetation and increased erosion, or it could decrease the amount of bare ground by creating conditions favorable for the introduction of more competitive species, such as Timothy grass, Kentucky bluegrass, or Canada thistle.
- **Topography.** Topography can influence distribution patterns and levels of use.
- **Geography.** Cattle grazing and trampling has the potential to alter the surface and subsurface hydrology.

Expected Short Term Effects: Cattle grazing and trampling have the potential to have adverse and beneficial effects upon populations in the short term. The adverse effects would be by the direct removal or destruction of plants through grazing and trampling. This would be most critical during the flowering and fruiting periods. Yet, the trampling and grazing may also serve to benefit the species by dispersing the seeds and impressing them into the soil. Over the short term, permitted use levels of cattle grazing and trampling are not expected to have any

significant adverse or beneficial impact on sensitive plant habitat components.

Expected Long Term Effects: Cattle grazing and trampling have the potential for adverse and beneficial long term effects. Cattle grazing and trampling could benefit sensitive plant populations in two ways. First, cattle activity could produce and maintain habitat conditions beneficial to sensitive plants. Livestock grazing and trampling could aid in the dispersal and sowing of seeds amidst locations with suitable habitats.

Conversely, cattle grazing and trampling could prove to be adverse to populations in two ways. First, cattle grazing and trampling could maintain habitat conditions adverse to the species. These habitat conditions would include unfavorable successional states and associated species, structure with limited bare ground and open light, and increased erosion that would bury plants, uproot plants, change slopes, or alter runoff gradients. Second, cattle grazing and trampling could result in the loss of significant numbers of flowers, fruits, or the plants themselves, thus reducing the capacity of the populations to sustain itself through reproduction.

In comparison to Alternative 2, Alternative 3 proposed actions will help improve overall riparian and upland conditions that will provide for ecological integrity needed for these species.

Direct and Indirect Effects of Alternative 1 (No Grazing/No Action)

Direct and Indirect Effects: No grazing would occur under this alternative. Selection of the no grazing alternative would be expected to not impact any sensitive plant populations that may exist within the project area. The direct effect of this alternative would be by the elimination of cattle grazing or trampling of the plants themselves. Livestock grazing impacts to associated sensitive species riparian and upland habitats and will no longer occur under this alternative. Streambanks that are currently trampled from past grazing will gradually stabilize and over-utilized riparian vegetation will increase in vigor and density. Infiltration and absorption capacity of overly compacted soils at spring sites and along low discharge, spring fed systems will increase, thereby improving habitat components and hydrologic processes.

Forest Plan Consistency and Other Required Disclosures: Compliance with Forest Plan standards and Forest Service policy will occur over a relatively short timeframe as at-risk riparian areas attain a properly functioning condition which may maintain sensitive species and their habitats.

Conclusion: Based upon existing information, known locations, probability of occurrence, and probability of impacts, there are No Impacts anticipated to Hiker's Gentian, mealy primrose, small yellow lady's-slipper, giant helliborine, threeranked humpmoss, Beartooth goldenweed, Hall's rush, musk root, Barratt's willow, Jove' buttercup, and Shoshonea. The No Grazing/No Action alternative would provide the fastest rate for improvement for sensitive plants habitats that may be vulnerable to grazing impacts. This alternative complies with all pertinent laws, regulations and policy.

Direct and Indirect Effects of Alternative 2 (Current Management)

Direct and Indirect Effects: This alternative proposes no change from current *permitted* management. However, it is important to understand that *actual use* in four of the five allotments over the last two decades has been substantially lower than *permitted use* (10 to 32% lower), and three of the five allotments have had significant *non-use* (22-44% non-use). No grazing is proposed for the Black Butte area under this alternative and therefore, there is no risk of affecting potential sensitive species habitat.

Assuming future management under this alternative reflects past *actual use*, five riparian systems currently functioning at-risk, in part due to recent grazing management, will continue to be at-risk. Four systems currently at-risk, due in part to historical grazing management, will continue on an upward trend. Sixteen riparian systems are expected to continue to function properly. Upland habitats will be maintained or improved.

Since actual use has been substantially lower than permitted use over the last two decades, it is unlikely that future management under this alternative would reflect *permitted use*. If permitted use were routinely authorized, however, grazing pressure on riparian and upland systems is expected to increase and at-risk riparian and upland systems with an upward trend, and some of the more accessible and sensitive systems currently functioning properly may revert to a declining trend.

Riparian Species: The riparian area supporting the known population of hiker's gentian in East Rosebud Allotment is properly functioning. Although individuals may be impacted by some livestock trampling, existing management activities would not likely contribute to a trend towards Federal listing or loss of viability to the population or species.

The project area contains suitable riparian habitat for four other sensitive plant species. Because of the uncertainty that these four sensitive species exist within the project area, even though habitat components exist, current management might impact individual sensitive plants, but would not likely contribute to a trend towards Federal listing or loss of viability to small yellow lady's slipper (*Cypripedium parviflorum*), giant helleborine (*Epipactis gigantea*), threeranked humpmoss (*Meesia triquetra*), and mealy primrose (*Primula incana*).

Upland Species: The project area contains suitable upland habitat for two other sensitive plant species. Because of the uncertainty that these two sensitive species exist within the project area, even though habitat components may exist, current management might impact individual sensitive plants, but would not likely contribute to a trend towards Federal listing or loss of viability to Beartooth goldenweed (*Haplopappus cartamoides* var. *subsquarrosus*), and Hall's rush (*Juncus hallii*). In addition, the following aspects of livestock use relative to these two species adds to the rationale for the impact determination.

Lesica (1995) indicates that it seems likely that *H. carthamoides* var. *subsquarrosus* populations are stable or increase with moderate livestock grazing. The tough, spiny tissue and perhaps resinous chemicals may make this plant unpalatable to cattle. However, trampling could occur. *Juncus hallii* belongs to the Rush family which generally loses palatability as the growing season progresses. However, rushes may be utilized more when found in a mix with other more palatable species than when found in more of a monoculture. However, trampling could occur.

Forest Plan Consistency and Other Required Disclosures: Compliance with the Forest Plan and Forest Service policy regarding sensitive plant conservation will be possible under this alternative, but improvement in habitat conditions may not occur or may occur.

Conclusion: Based upon existing information, known locations, probability of occurrence, and probability of impacts, there may be impacts to individuals within hiker's gentian's known population and impacts to individuals of mealy primrose, small yellow lady's-slipper, giant helleborine, threeranked humpmoss, Beartooth goldenweed, and Hall's rush within project area habitats, but the impacts would not likely contribute to a trend towards Federal listing or loss of viability of these species. There would be No Impact to musk root, Barratt's willow, Jove' buttercup, and Shoshonea. The Current Management Alternative would provide the slowest to no rate for improvement for sensitive plants habitats that may be vulnerable to grazing impacts. This alternative complies with all pertinent laws, regulations and policy.

Direct and Indirect Effects of Alternative 3 (Proposed Action)

Direct and Indirect Effects: Under this alternative, the proposed action incorporates several livestock management considerations into each specific allotment as outlined in the environmental assessment. Grazing utilization standards are established. Practices such as improved salting, lowered stocking rates, tailored seasonal timing and rotations, reduced durations, and rangeland developments are incorporated. The earliest livestock entry date would generally be July 1, but never before June 15 in all allotments except East Rosebud which would begin only after September 1. Management intensity intended to improve livestock distribution would be increased through improved mineral distribution (salting away from hiker's gentian population and other water sources, fencelines, and other key livestock use areas). Anticipated range developments that would be constructed or improved to allow for more deferment. Duration in most units is not to exceed 30 days in order to improve vegetation and soil conditions.

The changes in grazing management proposed under this alternative are designed to reduce grazing duration and improve livestock distribution. Better livestock distribution will increase use of under-utilized secondary range and reduce over-utilization on primary range and grazing pressure on riparian areas. The riparian objective is to change the existing at-risk conditions associated with grazing to an upward or improving trend, and ultimately achieve properly functioning condition for these areas.

The effects are that same as those described under Alternative 2 with the exception that conditions are likely to be maintained or improved and less likely to decline. Sensitive plant species vulnerable to grazing impacts may have individual plant impacts, but would not likely contribute to a trend towards Federal listing or loss of viability.

Forest Plan Consistency and Other Required Disclosures: Compliance with the Forest Plan and Forest Service policy regarding sensitive plant conservation will be possible under this alternative, but improvement in habitat conditions may not occur or may occur, but not as fast as under Alternatives 1.

Conclusion: Based upon existing information, known locations, probability of occurrence, and probability of impacts, there may be impacts to individuals within hiker’s gentian’s known population and impacts to individuals of mealy primrose, small yellow lady’s-slipper, giant helliborine, threeranked humpmoss, Beartooth goldenweed, and Hall’s rush within project area habitats, but the impacts would not likely contribute to a trend towards Federal listing or loss of viability of these species. There would be No Impact to musk root, Barratt’s willow, Jove’ buttercup, and Shoshonea. The Proposed Management Alternative would provide a faster rate for improvement for sensitive plants habitats that may be vulnerable to grazing impacts in comparison with the Current Management Alternative. This alternative complies with all pertinent laws, regulations and policy.

Cumulative Effects

Scope of the Cumulative Effects Analysis: The area chosen for the cumulative effects analysis is the project area. The reason for this area being selected is that the landscape is similar in geomorphic features within these units. This cumulative effects analysis area is approximately 2245 primary grazing acres (Table 9 of the Stocking Rate Report, incorporated by reference); of which the known sensitive plant population is approximately seven acres. Surrounding lands are primarily AB Wilderness Area, and private lands managed for livestock use, with a minor amount of lands managed by the state and will not be considered in detail in this analysis.

The temporal scale (time limits for past activities) selected for this project is from the 1950s to the present. This temporal timeframe captures shifts on the landscape due to reductions in the levels of livestock grazing. This grazing era had a significant impact on the project area and the subsequent management activities that resulted from this activity is within a timeframe where the impacts can overlap with the rangeland project.

In order to conduct a cumulative effects analysis, the alternatives considered under this Environmental Assessment must be considered in light of past, present, and reasonably foreseeable future projects (36 CFR 1508.6). For the purposes of this cumulative effects analysis, the following projects will be considered:

Table 2. Past, Present, and Reasonably Foreseeable Activities

Past	Present	Reasonably Foreseeable
Livestock Grazing	Livestock Grazing	Livestock Grazing-ongoing
Dispersed Recreation	Dispersed Recreation	Dispersed Recreation-ongoing
Post and Pole Cutting	Post and Pole Cutting	Post and Pole Cutting- ongoing
Mining Exploration		Timber Harvest

Cumulative Effects Common to All Alternatives: Past and present timber harvest activities, prescribed fire, and dispersed recreation will continue to be an insignificant influence on riparian and upland systems as described under the affected environment. However, natural flood, landslides, and wildfire events may impact these systems and dependant species in the future. The degree of impact may be compounded by continued livestock grazing under the current management, but mainly for those areas currently functioning at-risk.

Gentianopsis simplex (Hiker's Gentian), *Cypripedium parviflorum* (Small Yellow Lady’s Slipper), *Epipactis gigantea* (Giant Helliborine), *Meesia triquetra* (threeranked humpmoss), and *Primula incana* (Mealy Primrose) inhabits sites that present few options for future activity other than livestock grazing. Riparian areas, where these species is most often associated, has experienced grazing activity in the past, but little or no other activity from logging, mining, recreation, or other activities.

Haplopappus carthamoides var. subsquarrosus (Beartooth Goldenweed), *Juncus hallii* (Hall's Rush) and *Ranunculus jovis* (Jove’s Buttercup) can inhabit upland sites in areas where some livestock grazing and some isolated dispersed recreational use may occur.

Past, present, and reasonably foreseeable impacts should not be significant due to the types of sensitive plants’ habitat that are not affected to a great degree by the project activities. Ongoing riparian use by livestock has the most likelihood of cumulative impacts on riparian related sensitive plants, because grazing use may be concentrated in this type of habitat.

There are no known sensitive plant locations within the project area. Any suitable habitats occupy sites that presents few options for future activity and has experienced little activity in the past, whether the activity be logging, mining, grazing, recreation, prescribed burning, or other activities.

SENSITIVE PLANT SPECIES BIOLOGICAL EVALUATION

SUMMARY OF CONCLUSION OF EFFECTS **

Consultation with the U. S. Fish and Wildlife Service (USFWS): Interagency cooperation between the Forest Service and the USFWS, regarding proposed, threatened or endangered species is described in Section 7 of the Endangered Species Act. Definitions relating to “consultation” and “conference” are given in FSM Supplement 2600-90-6.

Currently, no federally listed known or suspected Threatened or Endangered plant species or critical habitat occurs on lands managed by the Custer National Forest and therefore consultation is not needed.

Summary of Findings: The risk of adverse effects from proposed project activities was evaluated for sensitive plant species (Project Record, Sensitive Plants Biological Evaluation). No proposed, endangered, threatened, or new populations of sensitive plant species were located during field surveys in the analysis area.

There is one known population of hiker’s gentian in East Rosebud Allotment. Potential habitat in the project area occurs in areas where livestock seek water, forage, and shade. Design criteria were incorporated into the Proposed Action in Alternative 3 that should maintain or improve population and habitat conditions. Proposed actions in Alternative 3 will help improve upland and riparian conditions that will provide for ecological integrity needed for these species. The Proposed Management Alternative would provide a faster rate for improvement for sensitive plants habitats that may be vulnerable to grazing impacts in comparison with the Current Management Alternative. Both action alternatives comply with all pertinent laws, regulations and policy.

Based upon existing information, known locations, probability of occurrence, and probability of impacts, there may be impacts from action alternatives, but impacts will not likely contribute to a trend towards federal listing or loss of viability to the population or species. None of the alternatives proposed are expected to have any impact on individuals or habitat for *Adoxa moschatellina* (Musk-Root), *Ranunculus jovis* (Jove’s Buttercup), *Salix barrattiana* (Barratt’s Willow), or *Shoshonea pulvinata* (Shoshonea) because habitat components are not found within the project area.

Although Alternative 3 would increase the rate of recovery from impacts, selection of either action alternative 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 of *Gentianopsis simplex* (Hiker’s Gentian), *Cypripedium parviflorum* (Small Yellow Lady’s Slipper), *Epipactis gigantea* (Giant Helliborine), *Meesia triquetra* (threeranked humpmoss), *Primula incana* (Mealy Primrose) *Haplopappus carthamoides* var. *subsquarrosus* (Beartooth Goldenweed), and *Juncus hallii* (Hall’s Rush), that may exist within the project area.

No mitigation is needed or recommended. Monitoring is recommended to ensure that salt is not placed within ½ mile of the known Hiker’s gentian population (see Map 3 of the biological evaluation for buffer location). If sensitive plant populations are found during project implementation, design criteria should be developed and implemented to avoid or minimize impacts in order to conserve the species and not contribute to a trend towards Federal listing or loss of viability. The following table summarizes findings by alternative relative to species effects determination:

Sensitive Species Biological Evaluation - Summary of Conclusion of Effects⁶

Species	Alternative 1 – No Grazing	Alternative 2 – Current Mgt	Alternative 3 – Proposed Action
<i>Adoxa moschatellina</i> (Musk-Root)	NI	NI	NI
<i>Cypripedium parviflorum</i> (Small Yellow Lady’s Slipper)	NI	MIIH	MIIH
<i>Epipactis gigantea</i> (Giant Helliborine)	NI	MIIH	MIIH

⁶ Prepared and Approved by Kim Reid, Sensitive Plant Coordinator, Custer National Forest;

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

Species	Alternative 1 – No Grazing	Alternative 2 – Current Mgt	Alternative 3 – Proposed Action
<i>Gentianopsis simplex</i> (Hiker's Gentian) – Only Known Population in Project Area	NI	MIIH	MIIH
<i>Haplopappus carthamoides</i> var. <i>subsquarrosus</i> (Beartooth Goldenweed)	NI	MIIH	MIIH
<i>Juncus hallii</i> (Hall's Rush)	NI	MIIH	MIIH
<i>Meesia triquetra</i> (Threeranked humpmoss)	NI	MIIH	MIIH
<i>Primula incana</i> (Mealy Primrose)	NI	MIIH	MIIH
<i>Ranunculus jovis</i> (Jove's Buttercup) ⁷¹	NI	NI	NI
<i>Salix barrattiana</i> (Barratt's Willow)	NI	NI	NI
<i>Shoshonea pulvinata</i> (Shoshonea)	NI	NI	NI

Unavoidable Adverse Effects

There are no unavoidable adverse effects to sensitive plant populations that are located within the project area. Implementation of any alternative would not be anticipated to move any sensitive plant species within the project area toward federal listing.

Conformance with 36 CFR 1508.27 Significance of Effects

The distinction between conducting an Environmental Assessment (EA) vs. and Environmental Impact Statement (EIS) hinges upon whether the environmental consequences anticipated as a result of Selected Alternative implementation will result in "significant" effects. Direction for conducting this "significance" test is found at 36 CFR 1508.27. In order to evaluate the possibilities for significant effects, both intensity and context of the proposal must be considered. Further defining information is found at 36 CFR 1508.27(a) and (b) that explains what intensity and context within the framework of "significance" means.

The Proposed Action within this project area must pass the "significance" of effects test, in order to support a Finding of No Significant Impacts (FONSI) and, ultimately, effects documentation and disclosure in an Environmental Assessment. The following discussion evaluates the significance elements found in the FONSI that are associated with sensitive plant species, and provides a brief narrative of how the anticipated effects do not surpass the "significance" test.

Beneficial vs. Adverse Effects: The action alternatives will have No Impact on *Adoxa moschatellina* (Musk-Root), *Ranunculus jovis* (Jove's Buttercup), *Salix barrattiana* (Barratt's Willow), or *Shoshonea pulvinata* (Shoshonea) populations and habitats. The action alternatives May Impact Individuals or Habitat of *Gentianopsis simplex* (Hiker's Gentian), *Cypripedium parviflorum* (Small Yellow Lady's Slipper), *Primula incana* (Mealy Primrose), *Meesia triquetra* (threeranked humpmoss), *Epipactis gigantea* (Giant Helliborine), *Haplopappus carthamoides* var. *subsquarrosus* (Beartooth Goldenweed), and *Juncus hallii* (Hall's Rush), and but will Not Likely Contribute to a trend towards Federal Listing or Loss of Viability to the Population or Species.

Whether the Action is Related to Other Actions with Individually Insignificant but Cumulatively Significant Impacts: Selection of any of the alternatives when considered with past, present, and reasonably foreseeable projects or activities would not be anticipated to contribute to significant cumulative effects.

The Degree to which the Action may Adversely Affect an Endangered or Threatened Species or its Habitat: Adverse effects that would contribute towards federal listing or loss of viability to designated sensitive plant species are not anticipated. There are no designated threatened and endangered plant species that occur or that could potentially occupy the project area.

⁷¹ Species is on the USFS Northern Region Sensitive Plant list, but not shown as occurring on the Custer NF. However, this species was recently identified in the Pryor Mountains of the Beartooth District and is included in this analysis.

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