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SENSITIVE PLANT SURVEY OF THE SAGE CREEK AREA,
BEAVERHEAD COUNTY, MONTANA
DILLON RESOURCE AREA, BUREAU OF LAND MANAGEMENT

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Executive Summary

Twelve vascular plant species of special concern listed by the Montana Natural Heritage Program are known to occur in the Sage Creek area of southern Beaverhead County. Three of these, *Astragalus terminalis*, *Carex parryana idahoa* and *Sphaeromeria argentea* are on the proposed BLM sensitive species list. Surveys in 1995 located or relocated 25 populations of these species. Two of these species, *Halimolobos virgata* and *Townsendia nuttallii*, appear to be very common and should not be considered sensitive. Five additional species, although not as common, are probably not threatened by current management practices. *Calochortus bruneanus* appears to be very rare in Montana. Four species are associated with wet meadows that usually receive heavy disturbance from livestock grazing. These plants, especially *Carex parryana* ssp. *idahoa* and *Thelypodium sagittatum* are likely declining under current management and should be considered sensitive.

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Introduction

Southwest Montana and southern Beaverhead County in particular are one of Montana's richest floristic regions with a relatively high proportion of regional endemism (Lesica et al. 1984). This area is geologically diverse, resulting in many different soils, especially fine-textured and sandy calcareous soils. Many species with Great Basin or Snake River Plains floristic affinities reach the northern edge of their range here. In addition there are numerous species that occur only in extreme southwest Montana and adjacent Idaho and Wyoming. The Montana Natural Heritage Program lists 41 species of special concern that occur in southern Beaverhead County (Heidel 1995).

Much of southern Beaverhead County is public land managed by the U.S. Forest Service and the Bureau of Land Management (BLM). BLM has jurisdiction over lower elevation public lands that support the largest number of rare plants. It is necessary to know which species are truly rare or endangered and where populations of sensitive species are located in order to protect biological diversity in this unique area. This report describes the results of a sensitive plant survey of the Sage Creek area in southern Beaverhead County. We describe the populations encountered, evaluate the rarity of species of special concern, discuss the ecological relationships of these plants, and make management recommendations based on the acquired knowledge. An additional goal of the study was to document the flora of Sage Creek area.

The Study Area

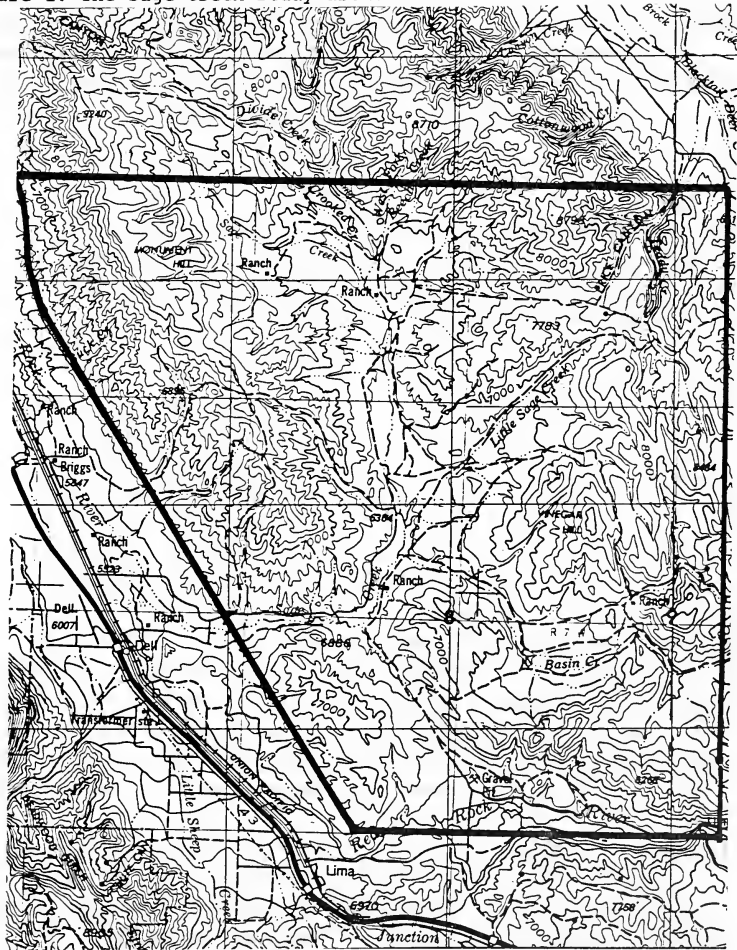
Sage Creek drains an area of low mountains, south of the Blacktail Mountains, west of the Snowcrest Range and east and north of the Red Rock River in southern Beaverhead County (Fig.

1). The lowest point is at 6,150 ft near the confluence of Sage Creek and the Red Rock River, while the highest point is ca. 8,100 ft at Vinegar Hill in the eastern portion of the study area. Parent materials throughout the study area are the Beaverhead gravels and the Beaverhead conglomerate, loose aggregations of stream-rounded pebbles and cobbles in a matrix of calcareous cement (Alt and Hyndman 1986). There are outcrops of Madison limestone in the Basin Creek area. Soils are generally calcareous and well drained except on stream terraces and in some broad, nearly level basins.

Climate of the area is semi-arid. The closest weather station is Lima at the southwest edge of the study area at 6,275 ft. Mean temperatures for January and July are 16.6 and 62.6° F respectively, and mean annual precipitation is 10.74 in (NOAA 1982). Annual precipitation in the low mountains northeast of Lima is estimated to be 16 in. (USDA-SCS 1981). May and June are the wettest months, while the monthly average precipitation during the winter is less than 0.5 in (NOAA 1982).

Vegetation of the Sage Creek area is primarily grassland and sagebrush grassland. *Stipa comata* and *Agropyron spicatum* are dominant grasses on sandy soils, while *Festuca idahoensis* and *A. spicatum* are dominant where textures are loamier. *Artemisia tridentata* ssp. *vaseyana* is common on more mesic slopes with deeper, less stony soils. Stands of *Pinus flexilis* occur on some of the higher hills in the Basin Creek area. Stands of dry *Pseudotsuga menziesii* occur on cool slopes at higher elevations. There are stands of mountain mahogany (*Cercocarpus ledifolius*/*Agropyron spicatum*) on warm slopes at the head of Big Spring and Little Spring gulches. Some stream terraces supported stands of *Artemisia tridentata* ssp. *tridentata*, with an understory of *Elymus cinereus* and *Agropyron smithii*; however, most of these stands have been degraded or lost. Broad terraces along Sage

Figure 1. The Sage Creek study area.



Creek supported subirrigated calcareous wet meadows and willow communities; however, most of these are on private land and have been degraded by livestock grazing. The only wetlands in the Sage Creek area are along the main creek and around springs and seeps. Most of these have remained in private ownership.

Methods

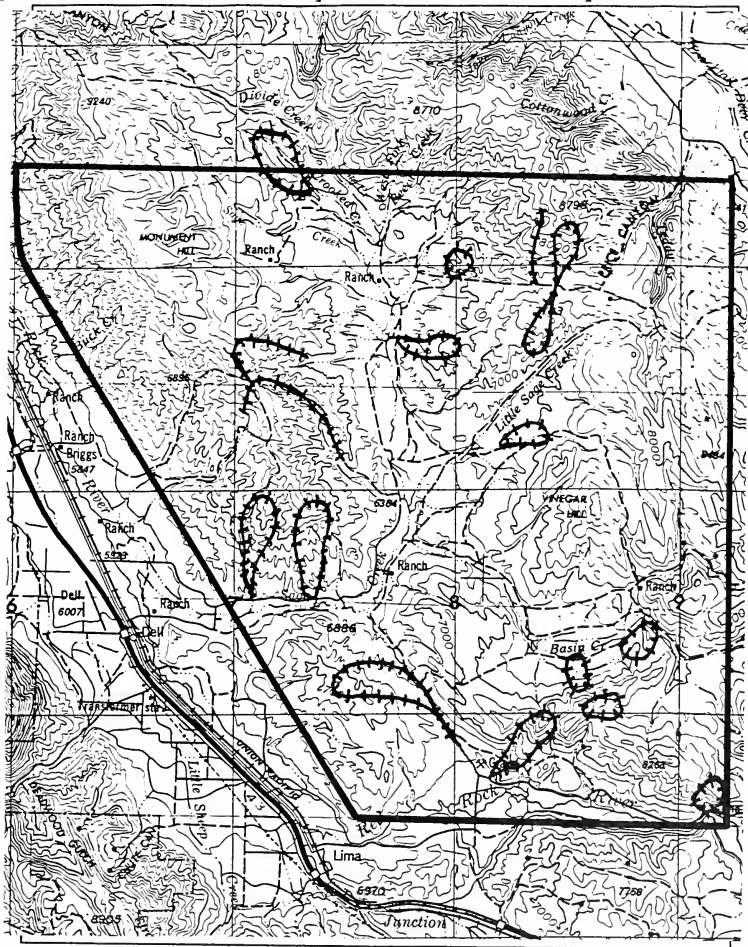
Prior to field work we obtained element occurrence printouts of all known species of special concern in the Sage Creek area from the Biological Conservation Database maintained by the Montana Natural Heritage Program. This query produced the following list of seven species:

Astragalus terminalis
Calochortus bruneanus
Halimolobos virgata
Spaeralcea munroana
Spaeromeria argentea
Townsendia florifer
Townsendia nuttallii

We conducted our surveys of the Sage Creek area on June 19-23, June 29, and July 27-29, 1995. Searches were made on foot in both known and potential habitats of rare or sensitive species. These included large expanses of zonal vegetation. However, we paid special attention to unusual habitats such as wetlands and rock outcrops. Survey transects are shown in Fig. 2.

We kept a running list of vascular plant species observed during the surveys. When we encountered a population of a species of special concern we completed an element occurrence field form and mapped the population on standard USGS 7.5 minute quad maps. Recorded data included location, associated

Figure 2. Locations of survey transects in the study area.



vegetation, slope, aspect, parent material, size of population, quality of population, and threats to the population. Photographs (35 mm transparencies) were taken of the species and their habitats.

We collected voucher specimens of all species of concern when there was adequate material as defined by the Montana Native Plant Society collecting guidelines (MNPS 1993). Specimens will be deposited at the herbarium of the University of Montana (MONTU).

Results

We are aware of 12 species of vascular plants in the Sage Creek area listed as species of special concern by the Montana Natural Heritage Program (Heidel 1995):

Astragalus terminalis
Calochortus bruneanus
Carex parryana idahoa
Eriogonum caespitosum
Halimolobos virgata
Primula incana
Sphaeralcea munroana
Sphaeromeria argentea
Thelypodium sagittatum
Thlaspi parviflorum
Townsendia florifer
Townsendia nuttallii

Three of these, *Astragalus terminalis*, *Carex parryana idahoa* and *Sphaeromeria argentea* are on the proposed BLM sensitive species list. Descriptions of these 12 species, their range and habitat are presented below.

Astragalus terminalis Wats.

Railhead milkvetch

DESCRIPTION: Railhead milkvetch is a tufted perennial herb with several erect stems, 5-30 cm (2-12 in) high, from a taproot. The pinnately compound leaves are 5-20 cm (2-8 in) long with 13-21 oblong leaflets that have blunt tips. Foliage is sparsely covered with gray hairs that branch at the base and spread in opposite directions appressed to the surface of leaves or stem. Inflorescences are borne in the axils of upper leaves and have 10-30 spreading, crowded flowers that become more remote as the plant matures. The white, pea-like flowers are 12-16 mm long with a reflexed upper petal and a purple-spotted lower petal. The calyx is covered with white or black hairs and is 4-5 mm long. Glabrous, cigar-shaped fruits lack a basal stem, are 3-sided in cross-section, and 15-20 mm long. The alpine ecotype is much smaller than plants from the valleys.

Astragalus terminalis is similar to *A. scaphoides* and *A. atropubescens* but can be distinguished by the nearly sessile fruits, while fruits of the other 2 species have stalks that are 3-20 mm long.

GEOGRAPHIC DISTRIBUTION

Global distribution: southwest Montana, east-central Idaho, and northwest Wyoming.

Montana distribution: southern Beaverhead and Madison counties.

Sage Creek distribution: one small population occurs at the base of badlands topography on the west side of Sage Creek.

This population was first documented in 1983 and revisited in 1995.

CONSERVATION STATUS

U.S. Fish and Wildlife Service: None

Montana Bureau of Land Management: Sensitive

Montana Natural Heritage Program rank: G3G4-S2

HABITAT: *Astragalus terminalis* occurs in sagebrush grasslands and open eroding slopes in the valleys to near timberline. The Sage Creek population occurs on relatively barren, fine-textured soils at the base of eroding slopes. It occurs with other "barren site indicators," such as *Astragalus vexilliflexus* and *Haplopappus acaulis*.

POPULATION INFORMATION: The single known population was estimated to be 50-100 plants in 1983. There appeared to be 100-200 plants in 1995.

MANAGEMENT CONSIDERATIONS: Plants occur very close to the main county road along Sage Creek. Any widening of the road could destroy plants.

Densities of *A. terminalis* plants inside a livestock enclosure in Madison County were much higher than outside the enclosure in 1995 (J. Vanderhorst observation). Many of the plants inside the enclosure had inflorescences removed, probably by deer or elk. These observations suggest that *A. terminalis* is palatable to livestock and native ungulates and may decrease under some livestock grazing regimes.

Calochortus bruneauensis Nels. & Macbr.

Bruneau mariposa

DESCRIPTION: Bruneau mariposa lily has a single erect, unbranched stem, 1-4 dm (4-16 in) tall arising from a bulb with a papery coat. The long, linear, alternate leaves are rolled or u-shaped in cross section. Foliage is glabrous. 1-4 flowers are borne on erect stalks subtended by 2 or more linear bracts at the top of the stem. Flowers have 3 pointed, egg-shaped petals, 25-45 mm (1-2 in) long, that are nearly glabrous and white with a vertical green stripe and a red or purple spot above the circular gland near the yellowish base. The 3 sepals are narrowly lance-shaped and shorter than the petals. The fruit is a narrowly lance-shaped, 3-angled capsule, 35-55 mm (1-2 in) long.

This species is similar to the more common *C. nuttallii*; however, the latter has petals sparsely hairy near the base without a vertical green line.

GEOGRAPHIC DISTRIBUTION

Global distribution: eastern OR to southwest Montana, south to California, Nevada and Utah.

Montana distribution: Beaverhead and Madison counties.

Sage Creek distribution: This plant has been collected once 1.5 miles southeast of Lima, probably on private land. This population was not relocated in 1995.

CONSERVATION STATUS

U.S. Fish and Wildlife Service: None

Montana Bureau of Land Management: None

Montana Natural Heritage Program rank: G5-S1

HABITAT: *Calochortus bruneaunis* occurs in sagebrush grasslands in the valleys and lower mountain slopes.

POPULATION INFORMATION: There is no information on the size of this population.

MANAGEMENT CONSIDERATIONS: Some species of *Calochortus* increase with livestock grazing.

Carex parryana Dewey ssp. *idaho* (Bailey) Murray

Idaho sedge

DESCRIPTION: Idaho sedge forms small clumps that arise from short rhizomes. The stems are 20-35 cm (8-14 in) high with most leaves crowded near the base. Leaves are flat and 2-4 mm wide. Flowers are clustered in 3 (usually) oblong-cylindrical spikes, 1-3 cm (0.5-1 in) long, with the uppermost larger than the others. Male flowers are absent or scattered among the female flowers (perigynia) on the largest spike. Spikes form a narrow, interrupted head, subtended by small leaf-like bracts, at the top of the stems. The narrowly oval scales subtending each perigynia taper to the tip and are 2-3 times longer than the perigynia. These scales are brown with membranous margins and a distinct pale center. Glabrous, egg-shaped perigynia are yellow-green and ca. 3 mm long with a short beak. There are 3 stigmas and the seed is 3-sided.

The large terminal spike and the long, female scales that are at least twice as long as the perigynia are distinctive and separate this plant from the other varieties of *C. parryana*. However, *Carex* is a large and difficult genus. A hand lens or microscope and technical key are essential for positive determination.

GEOGRAPHIC DISTRIBUTION

Global distribution: southwest Montana and adjacent Idaho

Montana distribution: Beaverhead, Madison, Powell, and Silver Bow counties

Sage Creek distribution: Small populations are associated with springs near the head of Price Creek and Basin Creek.

CONSERVATION STATUS

U.S. Fish and Wildlife Service: 3C, proposed for C2

Montana Bureau of Land Management: Sensitive

Montana Natural Heritage Program rank: G2Q-S2

HABITAT: *Carex parryana idahoensis* occurs in moist, probably calcareous soil at the ecotone between wet meadows and adjacent grasslands. In the Sage Creek area these sites are associated with seeps, springs and small spring creeks at 6,700-8,000 ft in elevation. *Juncus balticus*, *Poa pratensis*, *Carex praegracilis*, *Potentilla gracilis* and *Trifolium longipes* are common associated species.

POPULATION INFORMATION: *Carex parryana idahoa* is rhizomatous, so it is impossible to identify individual plants. The Basin Creek population is estimated to have ca. 200 stems, while the Box Spring population is estimated to have ca. 1,000 stems. Although the wet meadows associated with the springs is somewhat extensive, the ecotonal habitat is restricted.

MANAGEMENT CONSIDERATIONS: *Carex parryana idahoa* occurs in habitats that receive heavy use by livestock; both Sage Creek area sites were grazed and trampled. Hermann (1970) reports that *Carex idahoa* is excellent forage for cattle, but it is not known how the species responds to grazing. The introduced grass, *Poa pratensis*, is common at both *C. parryana idahoa* sites and may be increasing at the expense of the native sedge. It is very likely that current management is detrimental to this species.

Eriogonum caespitosum Nutt.

Mat buckwheat

DESCRIPTION: Mat buckwheat is a low, perennial herb or subshrub, forming cushions up to 5 cm (2 in) high. The alternate, oblong leaves, 10-15 mm long including the petiole, have entire, downturned margins and persist on the stem after withering. Foliage is covered with long, gray hairs. Numerous flowers are borne in crowded, globose inflorescences atop leafless stalks, 3-8 cm (1-3 in) high. Flowers arise from a solitary, cup-shaped involucre with 6-7 reflexed lobes. Each flower has 6 yellow and rose, petal-like tepals, 3-5 mm long. The tepals are united below and taper to a hairy stalk-like base. The seeds are surrounded by the swollen tepals when mature.

The tapered, stalk-like perianth and the solitary involucre distinguish this species from other mat-forming *Eriogonum*.

GEOGRAPHIC DISTRIBUTION

Global distribution: southeast Oregon to southwest Montana, south to California and Colorado.

Montana distribution: southern Beaverhead County.

Sage Creek distribution: Two populations in the East Creek drainage.

CONSERVATION STATUS

U.S. Fish and Wildlife Service: None

Montana Bureau of Land Management: None

Montana Natural Heritage Program rank: G5-S1

HABITAT: *Eriogonum caespitosum* occurs in very fine-textured alluvial soils on relatively level ground at the base of slopes at 6,900-7,400 ft in elevation. It is associated with low sagebrush communities (*Artemisia arbuscula*/*Festuca idahoensis*); common associated species include *Artemisia tridentata*, *Poa secunda*, *Phlox hoodii*, *Chrysothamnus nauseosus* and *Agropyron dasystachyum*.

POPULATION INFORMATION: The high elevation population was small with fewer than 50 plants observed, while the low elevation site had more than 1,000 plants over an area of at least 80 acres. Most plants had some flowering rosettes.

MANAGEMENT CONSIDERATIONS: *Eriogonum caespitosum* is a very low plant with most of its foliage very close to the ground. It is probably not used by livestock, although trampling could be detrimental to the plants. Current management practices are probably not detrimental to the populations of this plant.

Halimolobos virgata (Nutt.) Schulz

Twiggy halimolobos

DESCRIPTION: Twiggy halimolobos is a short-lived perennial with 1-few, simple or branched stems, 10-35 cm (4-14 in) high, arising from a taproot and rootcrown. Spatula-shaped leaves, 2-6 cm (1-2 in) long, with broadly serrated margins are clustered at the base and scattered on the stem, becoming smaller upward. The uppermost leaves clasp the stem at the base. Foliage is covered with a mixture of simple and branched hairs. Flowers on ascending stalks are arranged in a narrow, open inflorescence at the top of the stem. Each flower has 4 separate sepals, 2-3 mm long; 4 separate, white petals, 3-4 mm long, with purplish veins; and 4 long and 2 short stamens. The glabrous linear capsules (siliques), 2-4 cm (ca. 1 in) long, are borne on arching-ascending, hairy stalks up to 12 mm long.

This nondescript plant is similar to many species of *Arabis*. It may be distinguished by the combination of petals less than 4 mm long, branched pubescence, and siliques that are nearly round in cross-section rather than flattened. *H. perplexa* does not have clasping stem leaves. A hand lens or microscope and technical key are essential for determination.

GEOGRAPHIC DISTRIBUTION

Global distribution: Alberta and Saskatchewan south to California and Colorado.

Montana distribution: Beaverhead and Liberty counties

Sage Creek distribution: Five populations were located in lower side drainages of Sage Creek. This plant is inconspicuous, and many other populations probably occur in the Sage Creek area.

CONSERVATION STATUS

U.S. Fish and Wildlife Service: 3C

Montana Bureau of Land Management: None

Montana Natural Heritage Program rank: G4-S2

HABITAT: In the Sage Creek area *Halimolobos virgata* is found in silty alluvial soils of stream terraces at 6,700-7,000 ft in elevation and is associated with big sagebrush (*Artemisia tridentata tridentata/Elymus cinereus*). One population was found in a stand of mountain mahogany (*Cercocarpus ledifolius/Agropyron spicatum*) at 7,600-7,700 ft. Common associated species include *Chrysothamnus nauseosus*, *C. viscidiflorus*, *Agropyron smithii*, *Oryzopsis hymenoides*, *Poa pratensis*, *P. juncifolius*, *Taraxacum officinale*, and *Viola nuttallii*.

POPULATION INFORMATION: Although population density was usually low, the amount of habitat was appreciable. One population was estimated at less than 100 plants, one was estimated to be 100-

1,000 plants, and the other three were estimated to be more than 1,000 individuals.

MANAGEMENT CONSIDERATIONS: *Halimolobos virgata* is probably more common than has been documented because it blooms very early and is so inconspicuous. The big sagebrush habitat is almost always degraded by livestock grazing; however, the species has a tendency to be weedy in some habitats (Rollins 1993) and may increase with grazing disturbance. Current management practices are probably not detrimental to populations of this plant.

Primula incana Jones

Mealy primrose

DESCRIPTION: Idaho primrose is a herbaceous perennial with 1-few, leafless stems, 6-30 cm (2-12 in) high, arising from a basal rosette with fibrous roots. The narrowly elliptic leaves, 1-4 cm (0.5-1.5 in) long, have toothed margins and short winged petioles. Leaves are covered with a dense coat of white powder on the lower surface and a light coating on the upper surface. 3-10 erect, stalked flowers are borne in a single cluster. Each pinkish to lavender flower has a vase-shaped, 5-lobed calyx, covered with white flakes and a tubular corolla, 4-8 mm long, that flares into 5 2-lobed petals. The 5 anthers inside the corolla tube are at nearly the same level as the stigma.

Primula incana is very similar to *P. alcalina*; however, the latter has white flowers and the anthers and stigma are at different levels inside the corolla. A hand lens is required to observe these floral characters.

GEOGRAPHIC DISTRIBUTION

Global distribution: Alaska south in the Rocky Mountains to Colorado.

Montana distribution: Beaverhead, Carbon, Deer Lodge, Gallatin, Lewis and Clark, and Teton counties.

Sage Creek distribution: Two known populations along Little Sage Creek and East Creek.

CONSERVATION STATUS

U.S. Fish and Wildlife Service: None

Montana Bureau of Land Management: None

Montana Natural Heritage Program rank: G4-S2

HABITAT: *Primula incana* occurs on hummocks in moist alkaline meadows of stream terraces or associated with seeps and springs. The two known Sage Creek populations were at 6,500-6,800 ft in elevation. Common associated species include *Juncus balticus*, *Thermopsis montana*, *Equisetum laevigatum*, *Zigadenus elegans* and *Senecio debilis*.

POPULATION INFORMATION: The two known populations are each estimated to be 50-100 plants over ca. 10 acres. Only 10% of the Little Sage Creek plants were in flower in 1995.

MANAGEMENT CONSIDERATIONS: Although *Primula incana* has been found in quite a few locations, habitat is limited and populations are always small. The wet meadow habitat is prone to

serious disturbance from livestock. However, *P. incana* often occurs in relatively open soil on hummocks; thus, the micro-habitat may be maintained by moderate disturbance (Kelso 1987). It seems possible that moderate grazing enhances the habitat for *P. incana*, while heavy grazing and trampling destroys the habitat (Fig. 3). Monitoring is needed in order to determine the effects of current management practices on this species.

Sphaeralcea munroana (Dougl.) Spach

White-stemmed globemallow

DESCRIPTION: White-stemmed globemallow is a perennial herb with numerous simple or branched stems up to 2-8 dm (8-32 in) tall from a thick, woody root crown. The alternate leaves have slender petioles and spade-shaped blades, 2-6 cm (1-2 in) long, with wavy and shallowly lobed margins. Stem leaves become smaller upward, and the foliage is covered with star-shaped hairs. Small clusters of short-stemmed flowers are borne at the top of the stem subtended by reduced leaves (bracts). Each flower has a 5-lobed calyx with 3 narrow bracts at the base and 5 shallowly lobed, apricot to reddish petals, 1-2 cm long. The numerous stamens are united into a column that surrounds the style below the 8-12 tipped stigma. The mature ovary is hemispheric and divided into sections (carpels) like a grapefruit half. Each section has a single seed.

Sidalcea oregana has pink flowers. *Sphaeralcea coccinea* has more deeply divided leaves and rarely grows more than 20 cm (8 in tall).

Figure 3. Moderately grazed (top) and heavily grazed (bottom) alkaline meadows in southern Beaverhead County.



GEOGRAPHIC DISTRIBUTION

Global distribution: eastern Washington to southwest Montana south to California, Utah and Wyoming.

Montana distribution: Beaverhead County

Sage Creek distribution: Two small populations occur along the Red Rock River east of Lima.

CONSERVATION STATUS

U.S. Fish and Wildlife Service: None

Montana Bureau of Land Management: None

Montana Natural Heritage Program rank: G4-S1

HABITAT: Most *Sphaeralcea munroana* plants have been observed in disturbed roadsides. However, some plants were observed in native vegetation on steep south-facing slopes of calcareous Beaverhead conglomerate. Elevations range from 6,300 ft to 7,000 ft. Surrounding native vegetation is sagebrush grassland (*Artemisia tridentata vasseyana*/*Festuca idahoensis*). Common associated species include *Stipa comata*, *Agropyron spicatum*, *Hesperocloa kingii*, *Artemisia frigida*, *Achillea millefolium* and *Erigeron caespitosus*.

POPULATION INFORMATION: The Lima population was estimated to be 25-30 plants in 1993. Approximately five plants were observed in native vegetation at the Lima Dam Cliff site in 1986; 100-150 plants were seen along the road below the cliffs in 1993; 5-10 plants were observed on the banks of the Red Rock River in 1995.

MANAGEMENT CONSIDERATIONS: It appears that *Sphaeralcea munroana* is favored by moderate to high levels of disturbance associated with road maintenance or river flooding. There is no evidence that livestock grazing adversely affects this species. Current management practices are probably not detrimental to populations of this plant.

Sphaeromeria argentea Nutt.

Chicken sage

DESCRIPTION: Chicken sage is a perennial herb or subshrub with many flowering stems, 5-20 cm (2-8 in) high, and numerous short, sterile stems from a branched rootcrown. The alternate leaves, up to 15 mm long, are narrowly fan-shaped and usually 3-lobed at the tip. Foliage is aromatic and densely covered with appressed, gray hair. Several, short-stalked flower heads are borne on the stem tips. Each hemispheric head has 2-3 series of overlapping, membranous-margined, involucre bracts, 3-4 mm high, and numerous disk flowers. Ray flowers are lacking. The seeds are without bristles or awns (pappus) on top.

The leaves, heads and subshrub habit make this plant resemble a tiny sagebrush. *S. capitata* forms dense mats and has more deeply divided leaves and dense clusters of flower heads.

GEOGRAPHIC DISTRIBUTION

Global distribution: Central Idaho, northeast Nevada, southwest Montana and northwest Wyoming.

Montana distribution: Beaverhead County

Sage Creek distribution: There are five known populations in the south half of the Sage Creek study area.

CONSERVATION STATUS

U.S. Fish and Wildlife Service: None

Montana Bureau of Land Management: Sensitive

Montana Natural Heritage Program rank: G3-S2

HABITAT: *Sphaeromeria argentea* occurs in three distinct habitats in the Sage Creek area: (1) dry rocky bunchgrass slopes (*Agropyron spicatum*/cushion plant) at 6,700-7,200 ft; common associated species include *Ceratoides lanatus*, *Selaginella densa*, *Antennaria microphylla*, *Astragalus miser*, *Haplopappus acaulis*, *Eriogonum mancum* and *Erigeron caespitosus*, (2) low sagebrush grasslands (*Artemisia arbuscula*/*Festuca idahoensis*) at ca. 6,600 ft.; common associated species include *Chrysothamnus viscidiflorus*, *Antennaria microphylla*, *Agropyron spicatum* and *Phlox hoodii*, and (3) heavy soil of eroding slopes at ca. 6,300 ft.; common associates species include *Haplopappus acaulis* and *Erigeron tweedyi*. *Sphaeromeria argentea* occurs on limestone outcrops in other portions of southern Beaverhead County.

POPULATION INFORMATION: There were "several small colonies" of *Sphaeromeria argentea* on Red Butte in 1984, and the plant was reported to be "locally common" on the badlands west of the Matador Ranch in 1983. The three populations located in the Basin Creek area in 1995 have plants widely scattered over large areas of habitat, and numbers are difficult to estimate but probably vary between 100 and 1,0000.

MANAGEMENT CONSIDERATIONS: *Sphaeromeria argentea* is a low, aromatic subshrub that is probably unpalatable to livestock. Current management practices are probably not detrimental to populations of this plant.

Thelypodium sagittatum (Nutt.) Endl.

Slender thelypody

DESCRIPTION: Slender thelypody is a herbaceous biennial or short-lived perennial with solitary, simple or branched stems, 3-8 dm (1-2.5 ft) high, from a taproot. The lower leaves, 6-20 cm (2-8 in) long, have petioles and broadly lance-shaped, entire-margined blades, while upper leaves are smaller, narrowly arrow-shaped, and without petioles. Foliage is glabrous or nearly so and has a thin, waxy coating. Flowers are densely clustered on ascending stalks in cylindrical inflorescences that expand greatly in fruit. Each flower has 4 separate sepals, 3-7 mm long; 4 separate, lavender petals, 7-14 mm long and 1-3 mm wide; 4 long and 2 short stamens. The ascending, straight, cylindrical (siliques) are 18-53 mm (1-2 in) long and less than 1 mm wide.

This species is similar to *T. paniculatum*, but the latter has fruits greater than 1.3 mm wide and petals more than 2.5 mm wide. *T. sagittatum* might also be confused with species of *Arabis*, but these plants have flattened rather than cylindrical siliques.

GEOGRAPHIC DISTRIBUTION

Global distribution: southeast Washington to California east to southwest Montana, Wyoming and Colorado.

Montana distribution: Beaverhead, Gallatin and Madison counties.

Sage Creek distribution: A single population was located at the head of Price Creek.

CONSERVATION STATUS

U.S. Fish and Wildlife Service: None

Montana Bureau of Land Management: None

Montana Natural Heritage Program rank: G3G4-S2

HABITAT: *Thelypodium sagittatum* occurs in wet calcareous meadows, often associated with springs, seeps or stream terraces. The one known population in the Sage Creek area was at 7,600-7,800 ft in elevation. Common associated species include *Juncus balticus*, *Carex praegracilis*, *Agropyron caninum*, *Potentilla gracilis* and *Trifolium longipes*.

POPULATION INFORMATION: At the time of the survey in early June the plants were just beginning to bolt and were difficult to detect; therefore, there is no population estimate. However, there is only ca. 1 acre of habitat, so the population is probably small.

MANAGEMENT CONSIDERATIONS: *Thelypodium sagittatum* occurs in habitats that receive heavy livestock use. It is not known whether this plant is palatable to livestock, but there is no evidence that it responds positively to disturbance. Trampling and compaction of the wet soil-habitat may well be detrimental.

It is very likely that current management is detrimental to this species.

Thlaspi parviflorum A. Nels.

Small-flowered pennycress

DESCRIPTION: Small-flowered pennycress is a short-lived perennial with 1-few simple stems, up to 20 cm (8 in) tall, from a simple or branched rootcrown. Lance-shaped basal leaves, 1-4 cm (0.5-2 in) long, have entire margins and a slender petiole ca. as long as the blade. The alternate stem leaves are smaller with bases that clasp the stem. Foliage is glabrous. Short-stalked, white flowers are born at the tip of each stem in a dense inflorescence that expands as the fruits mature. Each flower has 4 glabrous sepals, ca. 1 mm long; 4 petals, ca. 3 mm long; and 4 long and 2 short stamens. The narrowly heart-shaped fruits, 4-10 mm long with a style that is ca. 0.5 mm long, spread away from the stem.

Thlaspi parviflorum is very similar to the more common *T. fendleri*, but the latter has sepals that are 2-3 mm long and petals that are 4-6 mm long, and the style on mature fruits is 1-3 mm long.

GEOGRAPHIC DISTRIBUTION

Global distribution: central Idaho, northwest Wyoming and southwest Montana.

Montana distribution: Beaverhead, Carbon, Madison, Park and Silver Bow counties.

Sage Creek distribution: Three known populations distributed throughout the study area.

CONSERVATION STATUS

U.S. Fish and Wildlife Service: None

Montana Bureau of Land Management: None

Montana Natural Heritage Program rank: G3-S2

HABITAT: *Thlaspi parviflorum* occurs in moist sagebrush grassland (*Artemisia tridentata vaseyana*/*Festuca idahoensis*) on cool slopes or in moist meadows (*Deschampsia cespitosa*-*Juncus balticus*) in an ecotonal position between grassland and subirrigated wet meadow at 7,200-7,700 ft in elevation. Common associated species include *Geum triflorum*, *Ranunculus glaberrimus*, *Iris missouriensis*, *Carex praegracilis*, *Trifolium longipes*, *Polygonum bistortoides* and *Potentilla gracilis*.

POPULATION INFORMATION: The three populations occupied 1-5 acres each, but density was relatively high. Estimated population size was 1,000-10,000 at the Box Spring and Little Basin Spring sites and 200-500 at the head of Big Spring Gulch. *Thlaspi parviflorum* is small and flowers very early, making it difficult to detect. In addition, much of the wetlands associated habitat is on private land. Consequently, there are likely to be many additional sites in the study area.

MANAGEMENT CONSIDERATIONS: *Thlaspi parviflorum* occurs in moist grasslands or meadows, often associated with springs or streams in the Sage Creek study area. Although these sites are usually heavily impacted by livestock, *T. parviflorum* is low growing and

completes its life cycle early in the growing season. Furthermore, *T. parviflorum* is a short-lived perennial and populations probably benefit from moderate disturbance. Current management practices are probably not detrimental to populations of this plant.

Townsendia florifer (Hook.) Gray

Showy townsendia

DESCRIPTION: Showy townsendia is an annual to short-lived perennial herb with 1-several ascending stems, 5-15 cm (2-6 in) high, from a simple taproot. Leaves are spoon-shaped, 2-6 cm (1-2 in) long at the base, and reduced upward. Foliage is sparsely to densely covered with short, appressed hairs. 1-few stalked flower heads are borne at the tips of the stems. Each head has 3-4 series of narrow, overlapping, green or purple, involucre bracts, 7-10 mm long; 13-34 pink ray flowers, 7-12 mm long; and yellow disk corollas, 3-6 mm long. The hairy seeds (achenes), are topped by straight, stiff bristles, 1-6 mm long in ray flowers and 3-8 mm long in disk flowers.

Most of our species of *Townsendia* are low, nearly stemless plants. The only other species with stems greater than 5 cm (2 in) is *T. parryi* which has blue to lavender rays and involucre bracts, 9-16 mm long.

GEOGRAPHIC DISTRIBUTION

Global distribution: central Washington to Nevada east to southwest Montana and northwest Wyoming.

Montana distribution: Beaverhead County

Sage Creek distribution: Two small populations on the east side of Sage Creek between Little Sage Creek and East Creek.

CONSERVATION STATUS

U.S. Fish and Wildlife Service: None

Montana Bureau of Land Management: None

Montana Natural Heritage Program rank: G5-S1

HABITAT: *Townsendia florifer* occurs in sparsely vegetated soil of sagebrush grasslands (*Artemisia tridentata*/*Festuca idahoensis*) or eroding slopes at ca. 6,500 ft elevation. Common associated species include *Penstemon aridus*, *Lesquerella alpina*, *Gilia spicata*, *Eriogonum mancum*, *Chrysothamnus nauseosus* and *Artemisia frigida*.

POPULATION INFORMATION: *Townsendia florifer* was uncommon and local at both sites in 1985. The species was found only at the White Hills site in 1995 and was rare. Probably fewer than 20 plants were observed during these two years.

MANAGEMENT CONSIDERATIONS: *Townsendia florifer* is weedy in the main part of its range in south-central Oregon (S. Shelly, pers. comm.), and may be favored by disturbance associated with livestock grazing. *Townsendia florifer* appears to require open soil in Montana as well. However, *T. florifer* does not appear to be increasing and may be decreasing under the current livestock grazing regime. It is not known whether heavier grazing will benefit populations of this species on the extreme edge of its range.

Townsendia nuttallii Dorn

Nuttall's daisy

DESCRIPTION: Nuttall's daisy is a small, cushion-forming, stemless perennial from a taproot and branched rootcrown. The clustered basal leaves are narrow and linear, but they expand into a small spoon-like tip. They are 5-20 mm long, and 1-3 mm wide with entire margins. Foliage is densely covered with long, straight, silvery hairs. Flower heads are borne among the basal leaves. Each head has 3-4 series of narrow, pointed, green and hairy involucral bracts, 4-9 mm long. The white to (more commonly) lavender ray flowers are ca. 8 mm long, and the yellow disk corollas are 4-5 mm long. The flattened, lance-shaped seeds (achenes) have only a few scattered hairs when mature and are topped by straight, stiff bristles (pappus) ca. 5-6 mm long in disk flowers and ca. 0.5 mm long in ray flowers.

Townsendia nuttallii is very similar to *T. hookeri*, but the latter has achenes that are hairy when mature and pappus of both ray and disk flowers is long. *Townsendia hookeri* always has linear leaves that do not expand near the tip.

GEOGRAPHIC DISTRIBUTION

Global distribution: western Wyoming and southwest Montana

Montana distribution: Beaverhead and Granite counties

Sage Creek distribution: Six populations were located throughout the study area.

CONSERVATION STATUS:

U.S. Fish and Wildlife Service: None

Montana Bureau of Land Management: None

Montana Natural Heritage Program rank: G3-S2S3

HABITAT: *Townsendia nuttallii* is most common in sparse bunchgrass grasslands (*Agropyron spicatum*/cushion plant) of ridge tops at 6,900-7,500 ft, but also occurs in sagebrush grasslands (*Artemisia tridentata vaseyana*/*Festuca idahoensis*) and grasslands (*Agropyron smithii*) of alluvial fans at 6,500-7,400 ft. Common associated species include *Poa secunda*, *Oxytropis lagopus*, *Eriogonum mancum*, *Phlox hoodii*, *Artemisia frigida*, *Cymopterus bipinnatus*, *Antennaria microphylla*, *Astragalus miser* and *Penstemon aridus*.

POPULATION INFORMATION: *Townsendia nuttallii* flowers very early and is low and inconspicuous. It is sparsely distributed but occurs over large areas of widespread habitat. Thus, population size is difficult to estimate, but many are large, and there are likely many other populations that have not been mapped.

MANAGEMENT CONSIDERATIONS: *Townsendia nuttallii* is low growing and completes its life cycle early in the growing season. It is likely favored by the moderate levels of disturbance resulting from livestock grazing. Current management practices are probably not detrimental to populations of this plant.

Discussion

Halimolobos virgata and *Townsendia nuttallii* appear to be common in the Sage Creek study area. Although the big sagebrush (ssp. *tridentata*), low sagebrush (*Artemisia arbuscula*) and mountain mahogany habitats of *H. virgata* are somewhat restricted in the study area, the plant can usually be found in these habitats. The many habitats supporting *T. nuttallii* are common and widespread in the study area. There are no apparent threats to either of these species because they likely respond positively to disturbance from grazing. Furthermore, both of these species are probably just as common in other portions of southern Beaverhead County (Vanderhorst and Lesica 1994). Both *H. virgata* and *T. nuttallii* should be dropped from consideration as sensitive species.

Eriogonum caespitosum, *Sphaeralcea munroana*, *Sphaeromeria argentea* and *Townsendia florifer* all occur in sagebrush grasslands, and all probably increase or remain stable under moderate grazing by cattle. These species appear to be rare in Montana and southern Beaverhead County. Nonetheless, there is no reason to believe that populations these five species are declining as a result of current management practices. These species should probably not be considered sensitive under current definitions.

Astragalus terminalis also occurs in sagebrush grasslands; however, there is evidence suggesting that this regional endemic may decrease with livestock grazing. This species should be retained on the BLM sensitive plant list until there is evidence indicating that it is not decreasing under current management practices.

Calochortus bruneaunis has been found in Montana only two or three times and only once recently. Its sagebrush-grassland habitat is common throughout the area, and yet we were unable to locate any populations. The response of this species to livestock grazing is not known. The rarity of this plant indicates that it should be considered for sensitive status if populations are found on lands administered by BLM.

Carex parryana ssp. *idaho*, *Primula incana*, *Thelypodium sagittatum* and *Thlaspi parviflorum* are all associated with calcareous wet meadows, and with the exception of *T. parviflorum*, are restricted to these habitats. *Carex parryana idaho* is palatable and probably decreases with cattle grazing, while the responses of *P. incana*, *T. sagittatum* and *T. parviflorum* to grazing are not known. *Primula incana* and *Thlaspi parviflorum* may require moderate levels of disturbance to persist. However, it is likely that all species will decline with heavy disturbance early in the year when the ground is wet (Fig. 3). Furthermore, moderate to heavy grazing often leads to an increase of exotics such as Kentucky bluegrass (*Poa pratensis*) and Canada thistle (*Cirsium arvense*) that displace natives. Wet meadow habitats are uncommon in the study area and, with few exceptions, throughout the rangelands of southern Beaverhead County. Most wet meadows are on private land and receive heavy livestock use or are used for hay production. The chances of long-term persistence of *C. parryana idaho*, *P. incana* and *T. sagittatum* on these private lands are not great. *Carex parryana idaho* is proposed for listing as sensitive by Montana BLM. *Primula incana* and *T. sagittatum* should also be placed on a list of sensitive species, and calcareous wet meadows on public land should be managed in a manner that is compatible with the long-term persistence of these rare species. The springs and meadows north of Box Spring are relatively extensive and should be given special consideration.

Stream terraces without substantial subirrigation often support big sagebrush (*Artemisia tridentata* ssp. *tridentata*) in southern Beaverhead County. We believe that communities dominated by big sagebrush, basin wildrye (*Elymus cinereus*) and western wheatgrass (*Agropyron smithii*) were once common in southwest Montana, but most of these bottomland habitats have been seriously degraded by livestock grazing. Good condition examples of the *Artemisia tridentata tridentata*/*Elymus cinereus* plant association are rare in Montana. A good example of this plant community occurs on the west side of Sage Creek in the Big Spring Gulch drainage. Public lands along the bottom of the gulch should be managed to protect this community if possible.

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Appendix A. Vascular plants observed in the Sage Creek area June 21-29 and July 27-29, 1995. Nomenclature follows Hitchcock and Cronquist (1973). An asterisk indicates an introduced species.

APIACEAE

Angelica arguta
Cymopterus acaulis
Cymopterus bipinnatus
Heracleum lanatum
Lomatium cous
Lomatium foeniculaceum
Lomatium triternatum
Musineon divaricatum
Perideridea gairdneri

ASTERACEAE

Achillea millefolium
Agoseris glauca
Antennaria anaphaloides
Antennaria corymbosa
Antennaria dimorpha
Antennaria microphylla
Antennaria umbrinella
Arnica cordifolia
Arnica mollis
Arnica sorroria
Artemisia arbuscula
Artemisia cana
Artemisia dracunculus
Artemisia frigida
Artemisia nova
Artemisia tridentata
Artemisia tripartita
Aster occidentalis
Aster pansus
Aster scopulorum
Aster subspicatus
Balsamorhiza sagittata
Carduus nutans*
Centaurea maculosa*
Chaenactis douglasii
Chrysothamnus nauseosus
Chrysothamnus viscidiflorus
Cirsium hookerianum
Cirsium scariosum
Cirsium subniveum
Cirsium undulatum
Crepis acuminata
Crepis occidentalis
Crepis runcinata
Erigeron compositus
Erigeron lonchophyllus

Erigeron ochroleucus
Erigeron pumilus
Erigeron tweedyi
Erigeron ursinus
Grindellia squarrosa
Gutierrezia sarothrae
Haplopappus acaulis
Haplopappus integrifolius
Haplopappus uniflorus
Helianthella uniflora
Machaeranthera canescens
Matricaria maritima*
Microseris cuspidata
Microseris nigrescens
Microseris troximoides
Senecio canus
Senecio debilis
Senecio foetidus
Senecio integerrimus
Solidago missouriensis
Sphaeromeria argentea
Stephanomeria runcinata
Taraxacum ceratophorum
Taraxacum laevigatum*
Taraxacum officinale*
Tetradymia canescens
Townsendia florifer
Townsendia hookeri
Townsendia nuttallii
Townsendia parryi
Townsendia spatulata
Tragopogon dubius*

BERBERIDACEAE

Berberis repens

BORAGINACEAE

Cryptantha spiculifera
Cryptantha torreyi
Lappula redowskii
Lithospermum incisum
Lithospermum ruderale
Mertensia oblongifolia
Mertensia sp.
Myosotis sylvatica
Plagiobothrys scouleri

BRASSICACEAE

Alyssum alyssoides*
 Arabis drummondii
 Arabis hirsuta
 Arabis holboellii
 Arabis nuttallii
 Camelina microcarpa*
 Capsella bursa-pastoris
 Descurainia richardsonii
 Descurainia sophia*
 Draba crassifolia
 Draba incerta
 Draba oligosperma
 Draba nemorosa
 Erysimum asperum
 Halimolobos virgata
 Lepidium densiflorum
 Lesquerella alpina
 Physaria saximontana
 Schoenocrambe linifolia
 Stanleya viridiflora
 Thelypodium sagittatum
 Thlaspi arvense*
 Thlaspi parviflorum

CACTACEAE

Opuntia polyacantha
 Pediocactus simpsonii

CAPRIFOLIACEAE

Symphoricarpos albus
 Symphoricarpos occidentalis
 Symphoricarpos oreophilus

CARYOPHYLLACEAE

Arenaria congesta
 Arenaria kingii
 Stellaria longipes

CHENOPODIACEAE

Atriplex gardneri
 Ceratoides lanatus
 Monolepis nuttalliana

CRASSULACEAE

Sedum lanceolatum

CUPRESSACEAE

Juniperus scopulorum

CYPERACEAE

Carex atrata

Carex aurea

Carex douglasii
 Carex filifolia
 Carex microptera
 Carex nebrascensis
 Carex obtusata
 Carex parryana
 Carex parryana idahoensis
 Carex petasata
 Carex praeegracilis
 Carex rupestris
 Carex scopulorum
 Carex stenophylla
 Carex utriculata
 Eleocharis pauciflora

EQUISETACEAE

Equisetum variegatum

FABACEAE

Astragalus adsurgens
 Astragalus agrestis
 Astragalus argophyllus
 Astragalus cibaricus
 Astragalus drummondii
 Astragalus lentiginosus
 Astragalus leptaleus
 Astragalus miser
 Astragalus purshii
 Astragalus vexilliflexus
 Lupinus argenteus
 Lupinus sericeus
 Lupinus wyethii
 Oxytropis besseyi
 Oxytropis deflexa
 Oxytropis lagopus
 Oxytropis sericea
 Thermopsis montanus
 Trifolium longipes
 Trifolium repens*
 Vicia americana

GENTIANACEAE

Frasera speciosa

GERANIACEAE

Geranium richardsonii
 Geranium viscosissimum

GROSSULARIACEAE

Ribes aureum
 Ribes cereum

Ribes setosum

HYDROPHYLLACEAE

Phacelia hastata

IRIDACEAE

Iris missouriensis

Sisyrinchium angustifolium

JUNCACEAE

Juncus balticus

Juncus ensifolius

Luzula campestris

Luzula parviflora

JUNCAGINACEAE

Triglochin maritimum

LAMIACEAE

Stachys palustris

LILIACEAE

Allium brevistylum

Allium cernuum

Allium geyeri

Allium textile

Fritillaria atropurpurea

Smilacina stellata

Zigadenus elegans

Zigadenus venenosus

LINACEAE

Linum perenne

LOASACEAE

Mentzelia albicaulis

Mentzelia laevicaulis

MALVACEAE

Sphaeralcea coccinea

Sphaeralcea munroana

ONAGRACEAE

Epilobium palustre

Gayophytum diffusum

Oenothera caespitosa

ORCHIDACEAE

Habenaria hyperborea

OROBANCHACEAE

Orobanche corymbosa

PINACEAE

Pinus flexilis

Pseudotsuga menziesii

PLANTAGINACEAE

Plantago eriopoda

POACEAE

Agropyron smithii

Agropyron spicatum

Agrostis abla*

Alopecurus pratensis*

Beckmannia syzigachne

Bouteloua gracilis

Bromus inermis*

Calamagrostis montanensis

Deschampsia cespitosa

Deschampsia atropurpurea

Elymus cinereus

Festuca idahoensis

Hesperocloa kingii

Hordeum brachyantherum

Hordeum jubatum

Koeleria cristata

Muhlenbergia richardsonis

Phleum alpinum

Phleum pratense*

Poa compressa*

Poa cusickii

Poa juncifolia

Poa pratensis*

Poa secunda

Puccinellia distans

Sitanion hystrix

Stipa comata

Stipa viridula

POLEMONIACEAE

Collomia linearis

Ipomopsis spicata

Leptodactylon pungens

Phlox hoodii

Phlox kelseyi

Phlox longifolia

Phlox multiflora

Phlox muscoides

Polemonium occidentale

POLYGONACEAE

Eriogonum caespitosum
 Eriogonum flavum
 Eriogonum mancum
 Eriogonum microthecum
 Eriogonum ovalifolium
 Eriogonum umbellatum
 Polygonum aviculare*
 Polygonum bistortoides
 Polygonum douglasii
 Rumex acetosella
 Rumex crispus*
 Rumex paucifolius

POLYPODIACEAE

Cystopteris fragilis

PORTULACACEAE

Montia parvifolia

POTAMOGETONACEAE

Potamogeton pectinatus

PRIMULACEAE

Androsace septentrionalis
 Dodecatheon conjugens
 Dodecatheon pulchellum
 Douglasia montana
 Primula incana

RANUNCULACEAE

Delphinium bicolor
 Delphinium glaucum
 Delphinium occidentale
 Myosotis aristatus
 Ranunculus cymbalaria
 Ranunculus glaberrimus
 Ranunculus macounii
 Ranunculus natans
 Ranunculus sceleratus

ROSACEAE

Amelanchier alnifolia
 Fragaria virginiana
 Geum triflorum
 Ivesia gordonii
 Potentilla anserina
 Potentilla concinna
 Potentilla diversifolia
 Potentilla fruticosa
 Potentilla glandulosa
 Potentilla gracilis

Potentilla ovina
 Potentilla pensylvanica
 Prunus virginiana
 Rosa woodsii
 Rubus idaeus

RUBIACEAE

Galium boreale

SALICACEAE

Salix bebbiana
 Salix lemmonii
 Salix wolfii

SANTALACEAE

Comandra umbellata

SAXIFRAGACEAE

Heuchera grossularifolia
 Heuchera parvifolia
 Lithophragma parviflora
 Parnassia fimbriata
 Parnassia parviflora
 Saxifraga oregana
 Saxifraga rhomboidea

SCOPHULARIACEAE

Besseyia wyomingensis
 Castilleja angustifolia
 Castilleja miniata
 Castilleja pallescens
 Castilleja rustica
 Collinsia parviflora
 Cordylanthus ramosus
 Mimulus guttatus
 Pedicularis groenlandica
 Penstemon aridus
 Penstemon eriantherus
 Penstemon procerus
 Penstemon radicosus
 Veronica peregrina

URTICACEAE

Urtica dioica

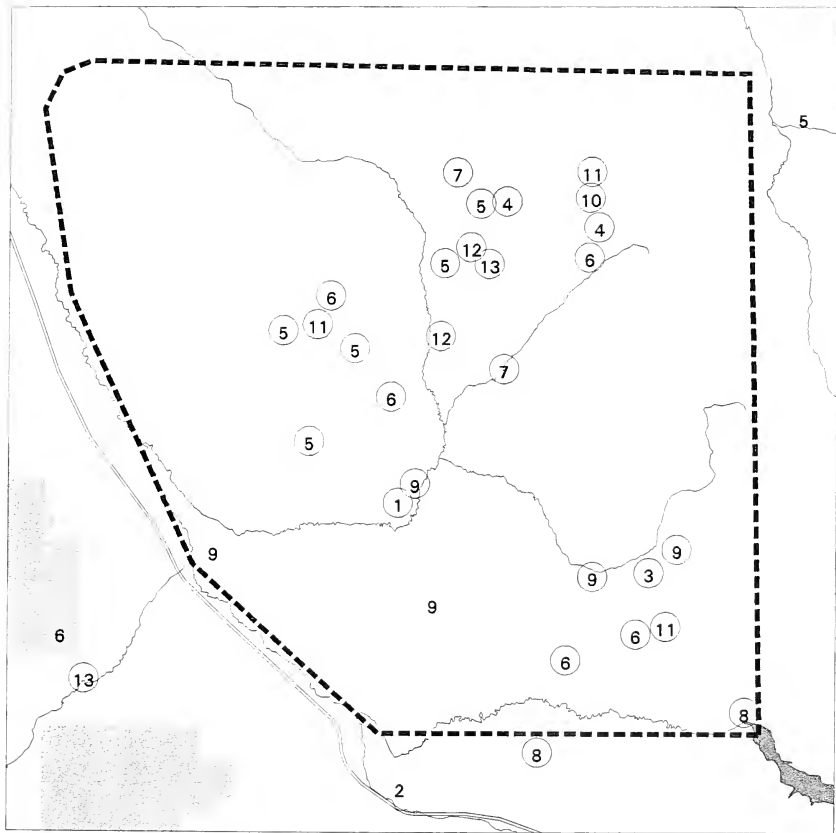
VALERIANACEAE

Valeriana edule

VIOLACEAE

Viola adunca
 Viola nuttallii

Sensitive Plant Species of the Sage Creek Area



- 1 ASTRAGALUS TERMINALIS
- 2 CALOCHORTUS BRUNEAUNIS
- 3 CAREX PARRYANA SSP IDAHOA
- 4 ERIOGONUM CAESPITOSUM
- 5 HALIMOLOBOS VIRGATA
- 6 ORYZOPSIS CONTRACTA
- 7 PRIMULA INCANA

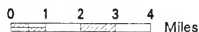
- 8 SPHAERALCEA MUNROANA
- 9 SPHAEROMERIA ARGENTEA
- 10 THELYPODIUM SAGITTATUM SSP SAGITTATUM
- 11 THLASPI PARVIFLORUM
- 12 TOWNSENDIA FLORIFER
- 13 TOWNSENDIA NUTTALLII



indicates occurrences located on BLM lands



National Forest



January 18, 1996

Carex idahoensis
habitat



Beaverhead Co.
June 1995

Small Wetland
Carex idahoensis



Basin Creek
June 1995

Townsendia nuttallii
Sage Creek



Beaverhead Co.
June 1995

Townsendia nuttallii
habitat



Beaverhead Co.
June 1995

Habenaria
virgata



Sage Creek
Beaverhead June 95

Townsendia nuttallii
Sage Creek



Beaverhead Co.
June 1995

Townsendia floribunda
Sage Creek



Beaverhead Co.
June 1995

Eriogonum
caespitosum



Sage Creek June
Beaverhead Co 1995

Eriogonum caespitosum
habitat



Beaverhead Co.
June 1995

Carex parryana
Idahoensis



Beaverhead Co.
June 1995

Figure 1. The Sage Creek study area.

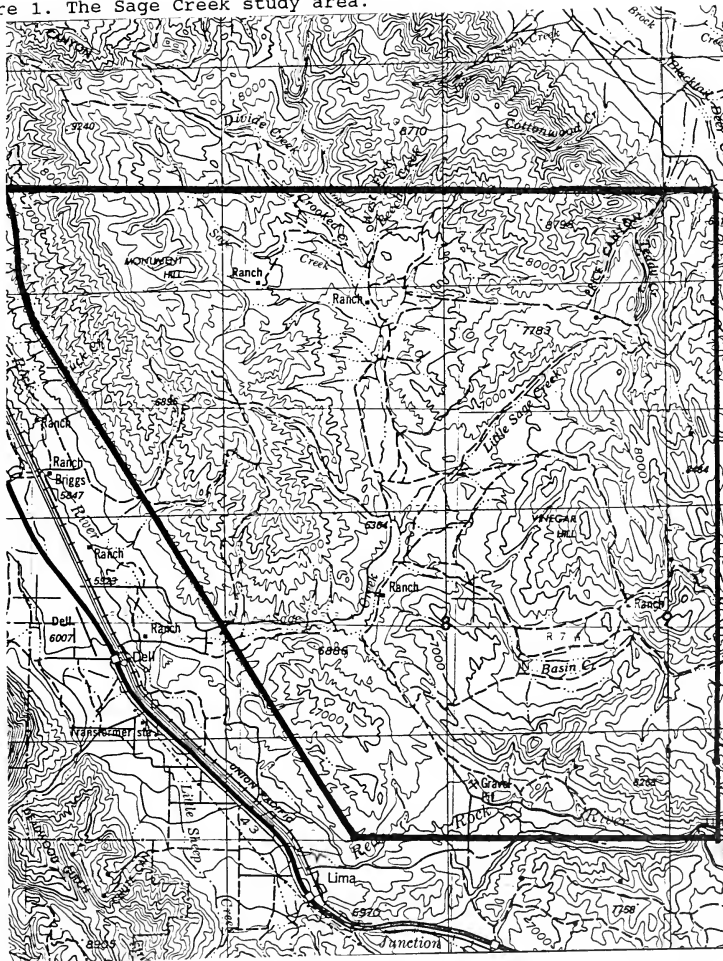
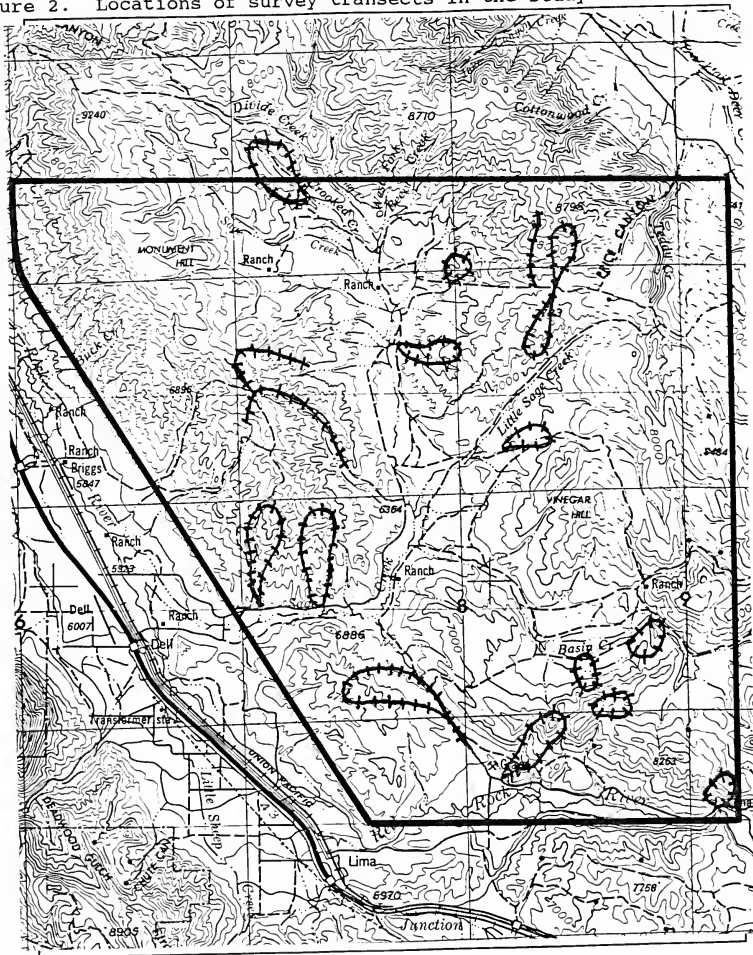


Figure 2. Locations of survey transects in the study area.





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