

MONTANA STATE LIBRARY

This "cover" page added by the Internet Archive for formatting purposes

STATUS REVIEW OF Cirsium subniveum
ON THE BEAVERHEAD NATIONAL FOREST
U.S.D.A. FOREST SERVICE - REGION 1
MONTANA

Prepared by:

Lisa Schassberger Roe, Botanist
Montana Natural Heritage Program
State Library Building
1515 E. 6th Avenue
Helena, MT 59620

STATE DOCUMENTS COLLECTION

OCT 16 1992

MONTANA STATE LIBRARY
1515 E. 6th AVE.
HELENA, MONTANA 59620

November 1991

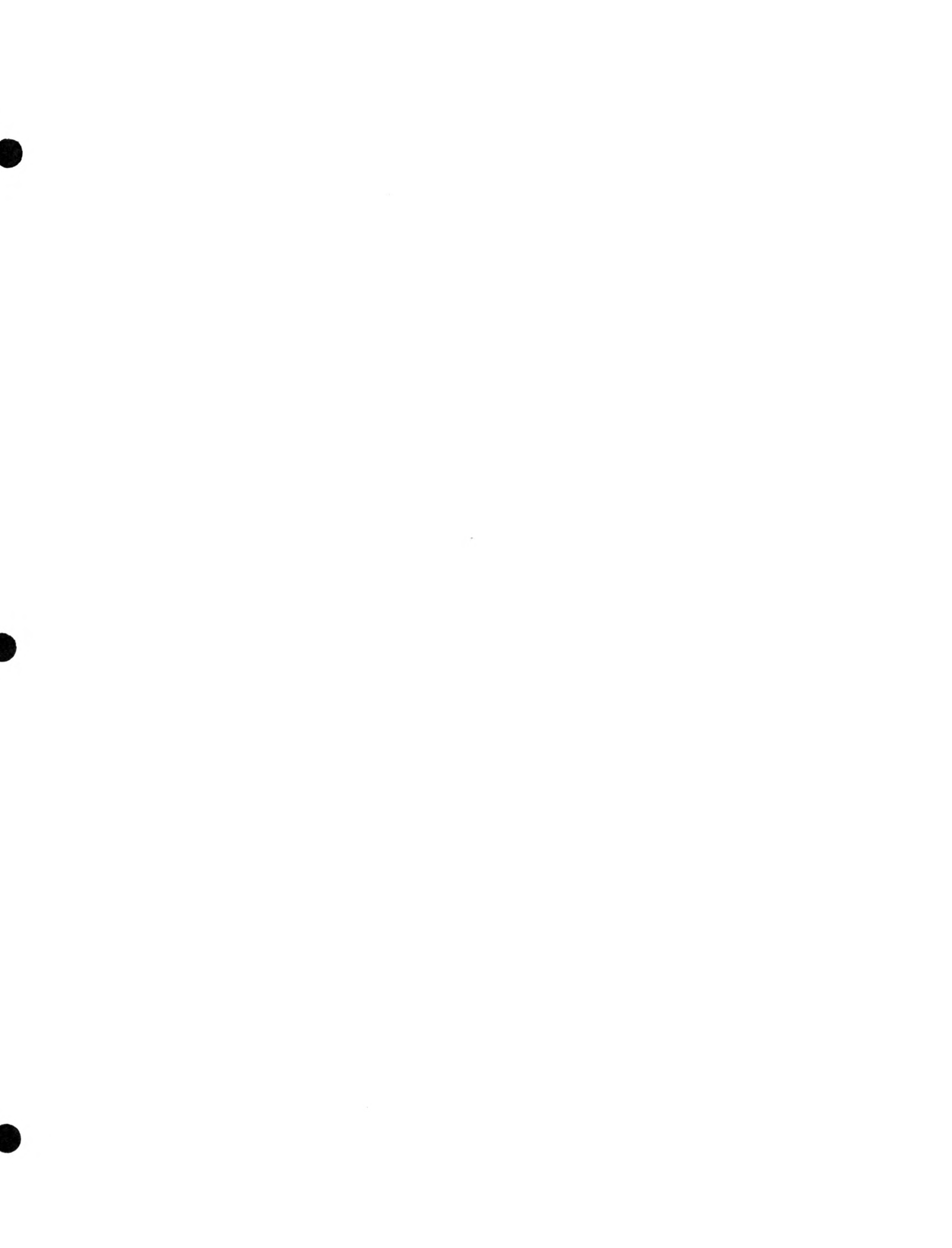
PLEASE RETURN

This is an abridged report

For the full report please contact:

The Montana Natural Heritage Program
1515 E Sixth Ave
Helena, Montana 59620

406-444-3009



© 1991 Montana Natural Heritage Program

This document should be cited as follows:

Roe, L.S. 1991. Status review of Cirsium subniveum on the Beaverhead National Forest, U.S.D.A. Forest Service - Region 1, Montana. Montana Natural Heritage Program. Helena, MT. 37 pp.

TABLE OF CONTENTS

	<u>Page</u>
I. SUMMARY.....	1
II. SPECIES INFORMATION.....	2
A. CLASSIFICATION.....	3
B. PRESENT LEGAL OR OTHER FORMAL STATUS.....	3
C. DESCRIPTION.....	3
D. GEOGRAPHICAL DISTRIBUTION.....	4
E. HABITAT.....	7
F. POPULATION DEMOGRAPHY AND BIOLOGY.....	9
G. POPULATION ECOLOGY.....	10
H. LAND OWNERSHIP.....	11
III. ASSESSMENT AND MANAGEMENT RECOMMENDATIONS.....	11
A. THREATS TO CURRENTLY KNOWN POPULATIONS.....	11
B. MANAGEMENT PRACTICES AND RESPONSE.....	12
C. RECOMMENDATIONS FOR MAINTAINING VIABLE POPULATIONS.	12
D. RECOMMENDATIONS FOR FURTHER ASSESSMENT.....	12
IV. LITERATURE CITED.....	13
V. ELEMENT OCCURRENCE PRINT-OUTS AND MAPS.....	15
VI. PHOTOGRAPH.....	36

I. SUMMARY

Cirsium subniveum is a native, perennial thistle (Sunflower Family). The species' known range extends from central Idaho to Jackson Hole, Wyoming, into Montana (Beaverhead and Madison counties), Utah (Box Elder, Cache, Rich and Sanpete counties), and northeast Oregon (Hitchcock et al. 1955, Welsh et al. 1987).

During field surveys conducted in 1991, seven new occurrences of C. subniveum were located, and additional subpopulations were added to three previously known locations. In addition, two more locations were entered from Montana Rare Plant Project (herbarium) data. This brings the total number of occurrences of C. subniveum in Montana to twelve; five in Madison County, and seven in Beaverhead County. Populations occur on lands managed by the Bureau of Land Management, Dillon Resource Area; U.S. Forest Service, Beaverhead National Forest; and on private lands.

One factor controlling the distribution of Cirsium subniveum in Montana is its association with unstable rock and gravel slides. However, the species does not appear to be tied to a particular geologic parent material. In Montana, C. subniveum populations occur in Pseudotsuga menziesii/Festuca idahoensis and Pseudotsuga menziesii/Juniperus communis habitat types as described by Pfister et al. (1977).

A number of the populations are in historic mining districts that have seen some renewed attention by geological interests in recent years. Land managers should take these sites into consideration whenever evaluating activities that might effect these populations.

Only a portion of the potential habitat of C. subniveum could be surveyed in the time allowed. Further survey work in the Tendoy and Snowcrest ranges, and particularly in the Gravelly Range, may reveal that C. subniveum is more common in this portion of the state. Due to small population sizes and low densities, C. subniveum should remain on the U.S. Forest Service, Region 1 sensitive species list.

II. SPECIES INFORMATION

A. CLASSIFICATION

1. **SCIENTIFIC NAME:** Cirsium subniveum Rydb.
2. **COMMON NAME:** Jackson's Hole thistle.
3. **FAMILY:** Asteraceae (=Compositae, Sunflower Family).
4. **GENUS:** According to Hitchcock et al. (1955), there are perhaps as many as 200 species of Cirsium native to the northern hemisphere, with about 50 native species occurring in North America. The genus Cirsium is most closely allied with the strictly Old World genus Carduus. Dorn (1984) lists 13 species of thistle for Montana, several of which are introduced.
5. **SPECIES:** Recently, there was some confusion in Montana of Cirsium subniveum with C. neomexicanum var. utahense. In 1988 a collection from French Creek (K. Scow and E. Darfler (s.n.), 1988, MONTU) was identified as C. neomexicanum var. utahense by G. Ownbey. This author made a second collection from the same site (Schassberger (405), 1990, NY), which better fit the description of C. subniveum, and was identified as such by Dr. Arthur Cronquist (pers. comm. 1991), New York Botanical Garden. The Scow and Darfler collection was subsequently sent to Brigham Young University, and annotated C. subniveum by Dr. S. L. Welsh. The closeness of these two easily confused taxa was noted by Cronquist who stated "this species differs from the probably closely related C. utahense chiefly in its smaller and apparently much fewer-flowered heads, and more northern and more montane distribution. Further study may show the two to be conspecific" (Hitchcock et al. 1955).

Moore and Frankton (1963) suggested that C. pulcherrimum and C. subniveum were perhaps conspecific, but were uncertain because of the advanced maturity and insect damage of the type specimen of C. subniveum. Gardner (1974) however, refutes this idea with morphological data from a study of the isotypes at Rocky Mountain herbarium, and karyological and chemical data from field collections.

Nonetheless, the difficulty with the type specimen remains as mentioned by Cronquist, and reiterated by Moore and Frankton (1963): "The type of C. subniveum is more densely hairy than most of the specimens to which the name is here applied, and it is possible that our plants need another name" (Hitchcock et al. 1955). Thus, there may be two taxa involved which both currently are called C. subniveum.

B. PRESENT LEGAL OR OTHER FORMAL STATUS

1. FEDERAL STATUS

- a. **U.S. FISH AND WILDLIFE SERVICE:** No status.
- b. **U.S. FOREST SERVICE:** Cirsium subniveum is on the U.S. Forest Service, Region 1 list of sensitive species (U.S. Department of Agriculture 1991). Objectives and policy of the U.S. Forest Service provide for the management and protection of sensitive species under sections 2670.22 and 2670.32 in the 1984 Forest Service Manual. Under these guidelines, the Forest Service is to (a) "maintain viable populations of all native species of plants" (2670.22), and (b) "avoid or minimize impacts to species whose viability has been identified as a concern" (2670.32.3).

- 2. **STATE:** Prior to the 1991 field season, Cirsium subniveum was listed by the Montana Natural Heritage Program as "very rare and local within its range" (global rank G3G4) by the Montana Natural Heritage Program (Achuff 1991). This species was also listed for the state as "critically imperiled in Montana because of rarity" (S1 = 1-5 occurrences). The current number of known populations within the state is twelve. There will be no change in this species' global rank, but the state rank will be revised to S2 (6-20 occurrences) "imperiled in Montana because of rarity" to reflect the results of the 1991 field surveys.

C. DESCRIPTION

- 1. **GENERAL NONTECHNICAL DESCRIPTION:** This taprooted perennial member of the thistle genus (Sunflower Family) may grow to a height of 28 inches. The freely-branching, slender stems are covered with

long white hairs, while the leaves are sparse woolly-hairy. Leaf margins are coarsely lobed and like most thistles, spine tipped. Solitary flowering heads occur at the tips of branches, with each head containing 25-50 white to light pink, tubular flowers. Each head is also surrounded by a ring of green bracts (the involucre) tipped by yellow spines. The outer bracts are sharply spine-tipped, while the inner bracts are more lax. Cobwebby hairs connect alternate bracts, and cross over the bract in between to give a lace-like appearance to the involucre (adapted from Schassberger 1991).

2. **TECHNICAL DESCRIPTION:** "Perennial from a taproot, 3-7 dm tall, freely branching, the stem crisp-villous to arachnoid-floccose or rather thinly tomentose, often eventually glabrate; leaves rather thinly floccose-tomentose beneath, greener and more glabrate above; heads terminating the branches; involucre mostly 17-25 mm high, more or less arachnoid-tomentose, its rather broad bracts contracted into erect or more spreading yellow spines 3-8 mm long, the innermost slender, but innocuous and somewhat twisted; flowers rather pale pink or purplish" (Hitchcock et al. 1955).
3. **LOCAL FIELD CHARACTERS:** Cirsium subniveum differs from C. neomexicanum var. utahense in its smaller and apparently less numerous-flowered heads. Also, the bases of the leaves are decurrent in C. subniveum, and it has a more northern and montane distribution (Hitchcock et al. 1955, Welsh et al. 1987). Cirsium subniveum is distinguished from other species in the genus found in Montana by a number of characters: the presence of long involucral bracts; leaves that are much reduced upward; decurrent wings of lower leaves that are usually longer than those of the uppermost leaves; and involucral bracts that are pubescent with cobwebby hairs that tend to connect alternate bracts, and cross over the bract between (Dorn 1984).

Due to a faulty camera, only a photograph of a head that contains aging flowers and developing achenes is found in Section VI, p. 36.

D. GEOGRAPHICAL DISTRIBUTION

1. **RANGE:** Cirsium subniveum is known from central Idaho to Jackson Hole Wyoming, Montana (Beaverhead

and Madison counties), Utah (Box Elder, Cache, Rich and Sanpete counties), and northeast Oregon (Hitchcock et al. 1955, Welsh et al. 1987).

2. **CURRENT SITES:** In Montana, C. subniveum populations occur in the Tobacco Root Mountains (Stonewall Creek (009), Mill Creek (011), (012)) and in the Ruby Range (Laurin Canyon (001) of western Madison County. It is also known from southern Madison County, along the southeast edge of the Gravelly Range (West Fork Madison (004) and Hidden Lake (008)). In adjacent Beaverhead County, this species occurs along the southern flanks of the Gravelly Range (Elk Lake (002, (006), (007)). Finally, two sites are located on the southern flanks of the Pioneer Mountains near Argenta (French Creek (003), Kelly Reservoir (010)), and one in the Tendoy Mountains (Big Sheep Creek (005)), also in Beaverhead County.

The locations of the twelve currently known sites for C. subniveum in Montana are shown in Figure 1, p. 6. The legal descriptions, latitudes and longitudes, elevations, USGS topographic map names, and locations of the occurrences in Montana are found in the Element Occurrence records, pp. 16-27. Exact locations are shown on U.S.G.S. topographic maps pp. 28-35.

3. **HISTORICAL SITES:** None known.
4. **UNVERIFIED/UNDOCUMENTED REPORTS:** None.
5. **AREAS SURVEYED BUT SPECIES NOT LOCATED:** The following areas were surveyed for C. subniveum because the habitat appeared to be suitable on the topographic maps, but the species was not located within them. The actual areas surveyed may be smaller than the portions of the sections indicated.

T3S R2W Section 6, central
 T3S R2W Section 7, SW $\frac{1}{4}$ SW $\frac{1}{4}$
 T3S R3W Section 13, SE $\frac{1}{4}$
 T3S R4W Section 20, NE $\frac{1}{4}$ SW $\frac{1}{4}$, NW $\frac{1}{4}$ NE $\frac{1}{4}$
 T3S R4W Section 31, SE $\frac{1}{4}$ SE $\frac{1}{4}$
 T4S R3W Section 20, SE $\frac{1}{4}$ SE $\frac{1}{4}$
 T4S R3W Section 30, NE $\frac{1}{4}$ NE $\frac{1}{4}$
 T11S R1E Section 10, NE $\frac{1}{4}$ SW $\frac{1}{4}$
 T11S R1E Section 22, SW $\frac{1}{4}$ NE $\frac{1}{4}$
 T12S R1E Section 9, NW $\frac{1}{4}$ NW $\frac{1}{4}$
 T14S R9W Section 26, SW $\frac{1}{4}$ SW $\frac{1}{4}$

MONTANA

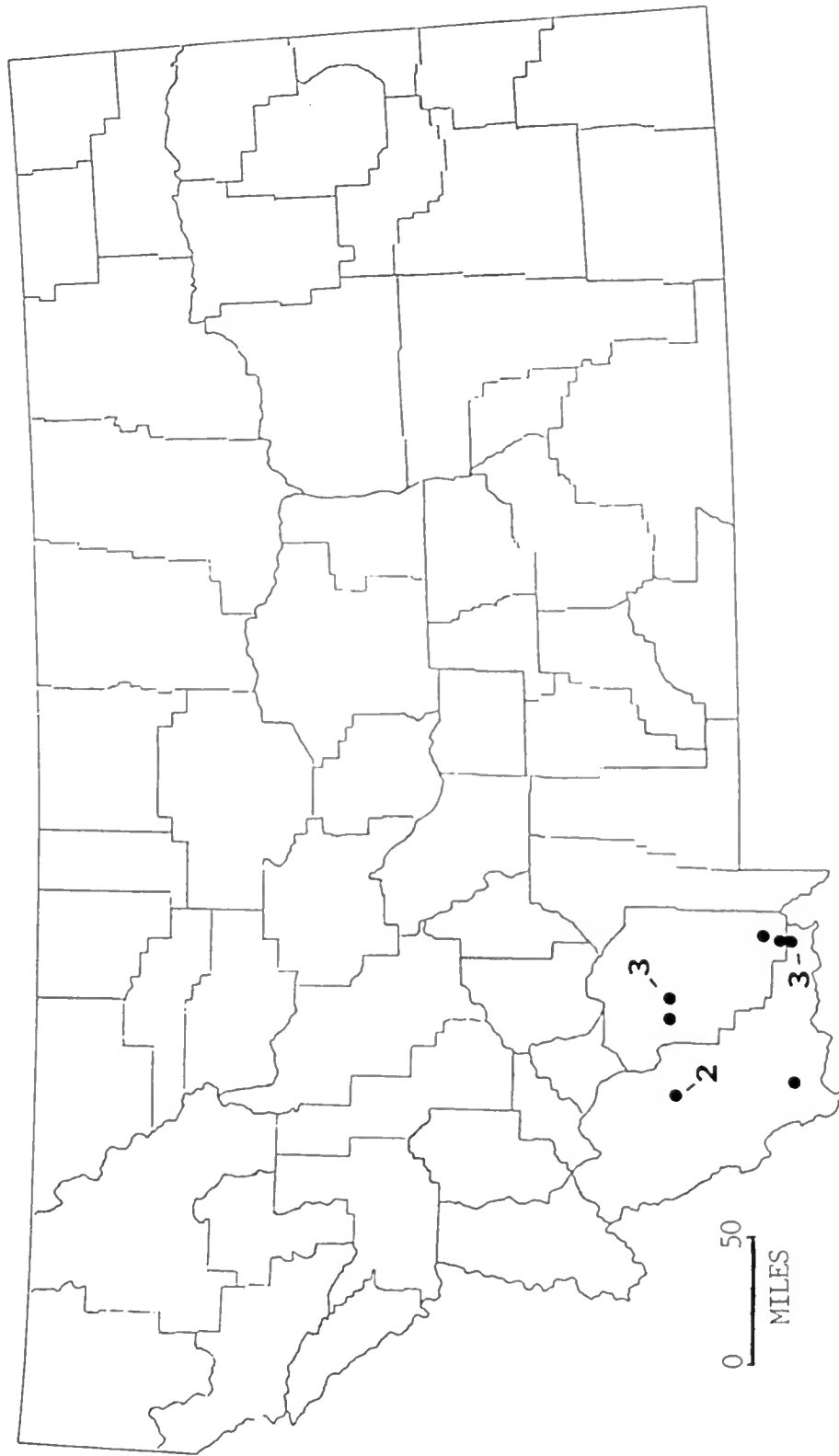


Figure 1. Distribution of *Cirsium subniveum* in Montana. (When a dot represents more than one population, the number of populations present is indicated.)

T14S R9W Section 33, SW $\frac{1}{4}$ NE $\frac{1}{4}$
 T14S R9W Section 34, NW $\frac{1}{4}$ NW $\frac{1}{4}$

E. HABITAT

1. **ASSOCIATED VEGETATION:** In Montana, C. subniveum populations occur in Pseudotsuga menziesii/Festuca idahoensis and Pseudotsuga menziesii/Juniperus communis habitat types as described by Pfister et al. (1977). Associated tree and plant species occurring at one or more sites with C. subniveum include:

Abies lasiocarpa (subalpine fir)
Pinus contorta (lodgepole pine)
Populus tremuloides (quaking aspen)
Pseudotsuga menziesii (Douglas fir)

Achillea millefolium (common yarrow)
Agropyron spicatum (bluebunch wheatgrass)
Amelanchier alnifolia (western serviceberry)
Antennaria microphylla (rosy pussy-toes)
Arabis holboellii (Holboell's rockcress)
Arnica longifolia (longleaf arnica)
Artemisia tridentata (big sagebrush)
Artemisia frigida (fringed sagewort)
Artemisia michauxiana (Michaux mugwort)
Aquilegia flavescens (yellow columbine)
Bromus tectorum (cheatgrass)
Chaenactis douglasii (hoary chaenactis)
Chrysothamnus nauseosus (common rabbitbrush)
Chrysothamnus viscidiflorus (green rabbitbrush)
Carex filifolia (thread-leaved sedge)
Elymus cinereus (basin wildrye)
Fragaria vesca (woods strawberry)
Hieracium cynoglossoides (houndstongue hawkweed)
Juniperus communis (common juniper)
Juniperus scopulorum (Rocky Mountain juniper)
Mahonia repens (creeping Oregongrape)
Penstemon cyaneus (dark-blue penstemon)
Penstemon deustus (hot-rock penstemon)
Phleum pratense (common timothy)
Poa secunda (Sandberg's bluegrass)
Polypodium vulgare (western polypody)
Rubus idaeus (red raspberry)
Rosa woodsii (woods rose)
Sambucus cerulea (blue elderberry)
Spiraea betulifolia (shiny-leaf spiraea)
Stipa viridula (green needlegrass)
Tetradymia canescens (gray horse-brush)

In Utah, this species occurs in pinyon-juniper communities (Welsh 1987).

2. **TOPOGRAPHY:** The Montana populations occur on all aspects, but are more often found on the warmer (east, south, west) aspects. Populations in Montana occur at elevations that range from ca. 6100 (1850 m) to 8500 ft (2550 m). In Utah, the species occurs near 6300 ft (1890 m) in elevation (Welsh et al. 1987), while in Wyoming it occurs from 6160 ft. (1880 m) to 6850 ft. (2100 m) in elevation (Gardner 1974).
3. **SOIL RELATIONSHIPS:** The French Creek population occurs in well drained, gravelly to cobbled soils derived from parent material of Devonian or Cambrian origin (Alt and Hyndman 1980). The Elk Lake ((002), (006), (007)), Hidden Lake (008) and West Fork Madison (004) populations occur on unstable gravel and rock slides derived from Huckleberry Ridge Tuff (Sonderegger et al. 1982). The Big Sheep Creek (005) population occurs on talus and gravels derived from the Madison group, Mission and Lodgepole limestone formations (Scholten et al. 1955). This information indicates that the distribution of Cirsium subniveum appears to be related to unstable rock and gravel slides, but it does not appear to be tied to a particular geologic parent material.
4. **REGIONAL CLIMATE:** Cirsium subniveum occurs in a region of Montana that has a very dry, continental climate. Much of the yearly precipitation falls as rain or wet snow in May and June, with large convective storms providing mid- and late summer moisture. Winters are cold and dry, with precipitation occurring mostly in the form of snow. The following data (Table 1, p. 9) come from long term (1951-1980) climatological stations (U.S. Department of Commerce 1982). The nearest long term climatological station to C. subniveum populations on the east edge of the Ruby Mountain, and the south edge of the Tobacco Root Mountains is at Virginia City (elev. 5776 ft. (1760 m)). The station is approximately 13 miles east and 1025 ft (312 m) lower than the Laurin Canyon (001) population, and approximately 14 miles south and 1000-2000 ft. (300-600 m) lower than the Mill Creek (011, 012) and Stonewall Creek (009) populations. The nearest long term climatological station to the Gravelly Range populations is at Lake View (elev. 6710 ft. (2045 m)). This station

is approximately 10 miles southwest, and 10-700 ft (3-200 m) lower than the Elk Lake (002,006,007) and Hidden Lake (008) populations. This station is also ca. 13 miles southwest and 600 ft. (180 m) higher than the West Fork Madison (004) population. Finally, the nearest long term climatological station to the French Creek (003) and Kelly Reservoir (010) C. subniveum populations is at Dillon (elev. 5228 ft. (1595 m)). The station is approximately 11 miles southeast, and 1500-1900 ft (450-570 m) lower than these populations.

Table 1. Long term climatological data for Virginia City, Lakeview, and Dillon, Montana.

weather station	Virginia City	Lakeview	Dillon
station elevation	5776 ft (1733 m)	6710 ft (2010 m)	5228 ft (1565 m)
mean annual temperature	42.4°F (5.7°C)	35.0°F (1.7°C)	42.6°F (5.9°C)
mean maximum temperature in July	81.3°F (21.7°C)	76.5°F (24.9°C)	83.3°F (28.7°C)
mean minimum temperature in January	10.6°F (-11.9°C)	0.5°F (-17.6°C)	9.4°F (-12.7°C)
mean annual precipitation	16.26 in (40.5 cm)	20.52 in (51.3 cm)	9.53 in (23.8 cm)

Due to differences in elevation and geographic position between the Virginia City and Dillon stations and their associated populations, it is likely that the C. subniveum populations receive more precipitation than is listed for the station.

F. POPULATION DEMOGRAPHY AND BIOLOGY

1. **PHENOLOGY:** This species flowers from early July through mid- to late August. Flowering heads may contain mature seeds as early as late July. This late flowering species may be restricted to higher elevation sites where moisture is available later into the summer months.
2. **POPULATION SIZE AND CONDITION:** Population sizes are small ranging from ca. 10 to 210 individuals. The area covered by populations ranges from ca. 1

to 60 acres. The total number of plants observed in Montana is ca. 816, distributed across on 140 acres. Although the populations appeared healthy, plant density is not high.

Visits to the French Creek population in 1990 and 1991 revealed that one subpopulation present in 1990, was not present in 1991. It is possible that seedlings were overlooked at this site, or that weed control activities may have eliminated this subpopulation. Observations should be made in 1992 to confirm the absence of this subpopulation.

3. REPRODUCTIVE BIOLOGY

- a. **TYPE OF REPRODUCTION:** This tap-rooted perennial reproduces by way of seed. Chromosome counts revealed $2N = 34-36$ for C. subniveum (Welsh et al. 1987).
- b. **POLLINATION BIOLOGY:** Bees were observed pollinating Cirsium subniveum plants (pers. obs.), but other insects may also serve as pollinators.
- c. **SEED DISPERSAL AND BIOLOGY:** The wings on the seeds of species in the genus Cirsium aid in dispersal by wind. Dispersal usually occurs in late summer and early fall.

G. POPULATION ECOLOGY

1. BIOLOGICAL INTERACTIONS

- a. **COMPETITION:** Cirsium subniveum occurs in habitats where competition is limited by harsh site conditions (loose gravelly scree). The restriction of this species to these locations may be due to a lack of competitive ability.
- b. **HERBIVORY:** Native plants in the genus Cirsium support a variety of herbivorous fauna including weevils, and several species of moths (Turner et al. 1987a, 1987b). In addition, young rosettes are grazed by sheep and cattle, but spines usually offer some protection to adult plants. In either case fecundity is likely to be lowered.

H. LAND OWNERSHIP

Sites marked "partial" extend across property boundary lines and occur under more than one land ownership heading.

1. Bureau of Land Management, Dillon Resource Area.

Laurin Canyon (001)
Big Sheep Creek (005) - partial

2. Beaverhead National Forest, Madison Ranger District.

Elk Lake (002)
West Fork Madison (004)
Elk Lake (006)
Elk Lake (007)
Hidden Lake (008)

3. Beaverhead National Forest, Dillon Ranger District.

French Creek (003)
Kelly Reservoir (010)

4. Beaverhead National Forest, Sheridan Ranger District.

Stonewall Creek (009) - partial
Mill Creek (011)
Mill Creek (012)

5. Private lands.

Big Sheep Creek (005) - partial
Stonewall Creek (009) - partial

III. ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

A. THREATS TO CURRENTLY KNOWN POPULATIONS:

1. **GRAZING:** Young rosettes of species in the genus Cirsium are palatable to grazers, but adult flowering plants are often not preferred. Due to unpalatability, many introduced species of Cirsium are increasers with heavy grazing, but the effect on this native species is not known.

2. **MINING:** The French Creek (003), Mill Creek (011, 012), and Stonewall Creek (009) populations occur in historic mining districts. Recently, these areas have received some renewed attention by geological interests. These populations should be considered in any proposed project activities that might affect these areas.
 3. **WEED CONTROL ACTIVITIES:** Weed control activities could pose a problem especially to the roadside populations at Elk Lake (002), French Creek (003), Stonewall Creek (009), and Mill Creek (011, 012). Forest Service weed control managers should be made aware of population locations.
- B. MANAGEMENT PRACTICES AND RESPONSE:** A weevil (Rhinocyllus conicus) introduced as a biological control for Carduus species (introduced Eurasian species), has a high infestation rate in populations of the endemic thistle Cirsium longistylum in the Little Belt Mountains of north-central Montana. The introduced weevil is lowering the fecundity of C. longistylum populations at an unknown rate. This same weevil is also known to infect a number of other thistles in California, including C. brevistylum, also a species of concern in Montana (Turner 1987b). The possibility of infestation occurring with other native thistles including C. subniveum should be taken into account when considering the introduction of biological controls.
- C. RECOMMENDATIONS FOR MAINTAINING VIABLE POPULATIONS:** It is recommended that managers be made aware of the C. subniveum populations with respect to any weed control activities. Also, this species should be considered when evaluating the impacts of proposed mining activities.
- D. RECOMMENDATIONS FOR FURTHER ASSESSMENT:** Only a portion of the potential habitat of C. subniveum could be surveyed in the time allowed. Further survey work in the Tendoy and Snowcrest ranges, and particularly in the Gravelly Range, may reveal that C. subniveum is more common in this portion of the state. Due to small population sizes and low densities, C. subniveum should remain on the U.S. Forest Service Region 1 sensitive species list for the Beaverhead National Forest.

IV. LITERATURE CITED

- Achuff, P. 1991. Plant species of special concern. Montana Natural Heritage Program, Helena. 20 pp. (mimeo).
- Alt, D.A. and D.W. Hyndman. 1980. Preliminary geologic map of the Dillon 1° X 2° quadrangle, Montana. MBMG 52. Montana Bureau of Mines and Geology, Butte, Montana. 2 sheets.
- Cronquist, A.J. 1991. Letter to Lisa A. Schassberger (11 March), concerning annotation of Cirsium specimens, Montana Natural Heritage Program, Helena.
- Dorn, R.D. 1984. Vascular plants of Montana. Mountain West Publishing, Cheyenne, Wyoming. 276 pp.
- Gardner, R.D. 1974. Systematics of Cirsium (Compositae) in Wyoming. Madrono 22:239-265.
- Hitchcock, C.L., A. Cronquist, M. Ownbey, and J.W. Thompson. 1955. Vascular Plants of the Pacific Northwest. Vol. 5. University of Washington Press, Seattle.
- Moore, R.J., and C. Frankton. 1963. Cytotaxonomic notes on some Cirsium species of the western United States. Canadian Journal of Botany 41:1553-1567.
- Pfister, R.D., B.L. Kovalchik, S.F. Arno, and R.C. Presby. 1977. Forest Habitat Types of Montana. General Technical Report INT-34, Intermountain Forest and Range Experiment Station, Ogden, Utah. 174 pp.
- Schassberger, L. A. 1991. Rare plant inventory of the East Pioneer Mountains, U.S.D.A. Forest Service - Region 1, Beaverhead National Forest. Montana Natural Heritage Program, Helena, MT. 55 pp.
- Scholten, R., K.A. Keenmon, and W.O. Kupsch. 1955. Geology of the Lima Region, southwestern Montana and adjacent Idaho. Bulletin of the Geological Society of America. 66:345-404, and maps.
- Sonderegger, J.L., J.D. Scholfield, R.B. Berg, and M.L. Mannick. 1982. The upper Centennial Valley, Beaverhead and Madison counties, Montana. Montana Bureau of Mines and Geology Memoir 50, 53 pp. and maps.
- Turner, C.E., R.W. Pemberton, and S.S. Rosenthal. 1987a. Host range and new host records for the plume moth Platyptilia carduidactyla (Lepidoptera: Pterophoridae) from California thistles (Asteraceae). Proc. Entomol. Soc. Wash. 89(1): 132-136.

- Turner, C.E., R.W. Pemberton, and S.S. Rosenthal. 1987b. Host utilization of native Cirsium thistles (Asteraceae) by the introduced weevil Rhinocyllus conicus (Coleoptera: Curculionidae) in California. *Environmental Entomology* 6(1):111-115.
- U.S. Department of Agriculture, Forest Service. 1991. Sensitive Plant List, U.S. Forest Service, Northern Region (Region 1): Range, Air, Watershed, and Ecology Unit. Missoula, Montana.
- U.S. Department of Commerce. 1982. Monthly normals of temperature, precipitation, and heating and cooling degree days 1951-1980. National Oceanic and Atmospheric Administration. *Climatology of the United States* No. 81. 23 pp.
- Welsh, S.L., N.D. Atwood, S. Goodrich, and L.C. Higgins (eds.). 1987. Utah Flora: Compositae (Asteraceae). *Great Basin Naturalist Memoirs*. No. 9 894 pp.

V. ELEMENT OCCURRENCE PRINT-OUTS AND MAPS

Occurrence number: 001

Global rank: G3G4 Forest Service status: SENSITIVE
 State rank: S1 Federal Status:

Survey site name: LAURIN CANYON
 EO rank:
 EO rank comments:

County: MADISON

USGS quadrangle: LAURIN CANYON

Township: 006S Range: 005W Section: 10 Precision: S
 Township-range comments: NW4

Survey date: 1991-08-19	Elevation: 6800
First observation: 1982	Slope/aspect:
Last observation: 1991-08-19	Size (acres): 5

Location:

SLOPE OF RUBY MOUNTAIN RIDGE ABOVE LAURIN CANYON, RUBY RANGE.

Element occurrence data:

CA. 115 PLANTS IN 3 SUBPOPULATIONS; THE LARGEST IS ABOVE THE LOWEST
 SPRING ON LAURIN CANYON.

General site description:

OPEN PLACES IN SUBALPINE FOREST, WITH ARTEMISIA MICHAUXIANA, MAHONIA
 REPENS, ACHILLEA MILLEFOLIUM, AND STIPA VIRIDULA.

Land owner/manager:

BLM: DILLON RESOURCE AREA, BUTTE DISTRICT

Comments:

VOUCHER-LACKSCHEWITZ (10282) AND ROSENRETER, 1982, MONTU, NY
 (VERIFIED BY A. CRONQUIST, NY). LACKSCHEWITZ/ROSENRETER COLLECTION
 MAY BE FROM AN UNSURVEYED HIGHER ELEVATION, (T6SR5W,S9,SW4).

Information source:

ROE, LISA S., MONTANA NATURAL HERITAGE PROGRAM, 1515 EAST SIXTH AVE.,
 HELENA, MT 59620.(475). 1991. MONT.

Occurrence number: 002

Global rank: G3G4 Forest Service status: SENSITIVE
 State rank: S1 Federal Status:

Survey site name: ELK LAKE
 EO rank: B
 EO rank comments: GRAZING AND WEEDY SPECIES.

County: BEAVERHEAD

USGS quadrangle: ELK SPRINGS

Township: 013S Range: 001E Section: 29 Precision: S
 Township-range comments: SW4,32NW4

Survey date: 1991-08-21	Elevation: 6800
First observation: 1986	Slope/aspect: 0-45 % / EAST, SOUTH
Last observation: 1991-08-21	Size (acres): 60

Location:
 ABOVE ELK LAKE.

Element occurrence data:
 125+ PLANTS.

General site description:
 ON STEEP, UNSTABLE GRAVEL AND ROCK SLIDES, EAST SLOPE, NEAR CHAENACTIS
 DOUGLASII, PENSTEMON CYANEUS, AND P. DEUSTUS.

Land owner/manager:
 BEAVERHEAD NATIONAL FOREST, MADISON RANGER DISTRICT

Comments:
 VOUCHER - LACKSCHEWITZ, K. (10993), 1986, SPECIMEN # 103712 (MONTU).

Information source:
 ROE, LISA S. MONTANA NATURAL HERITAGE PROGRAM, 1515 EAST SIXTH AVE.,
 HELENA, MT 59620. (479). 1991. MONT.

Occurrence number: 003

Global rank: G3G4 Forest Service status: SENSITIVE
State rank: S1 Federal Status:

Survey site name: FRENCH CREEK
EO rank: C
EO rank comments: POPULATION SIZE VARIABLE, SEVERAL ACTIVE
GOLD MINES IN THE AREA.

County: BEAVERHEAD

USGS quadrangle: ERMONT

Township: 006S Range: 011W Section: 01 Precision: S
Township-range comments: SW4,2SE4,11E2.

Survey date:	1991-08-23	Elevation:	7240
First observation:	1988	Slope/aspect:	50% / SOUTHEAST
Last observation:	1991-08-23	Size (acres):	1

Location:

PIONEER MOUNTAINS, CA. 4 MILES NORTHWEST OF ARGENTA, SLOPES ABOVE
FRENCH CREEK.

Element occurrence data:

1991: NO SIGN OF PLANTS IN THE NORTHERN SUBPOPULATION, BUT 30 PLANTS
WERE LOCATED FURTHER DOWNSTREAM. 1988: CA. 40 PLANTS IN TWO
SUBPOPULATIONS, SCATTERED PRIMARILY ALONG HISTORIC MINING AND ROAD
DISTURBANCE.

General site description:

IN PSEUDOTSUGA MENZIESII/ARTEMISIA TRIDENTATA/FESTUCA IDAHOENSIS
COMMUNITY TYPE, WITH ELYMUS CINEREUS, ARTEMISIA FRIGIDA, AGROPYRON
SPICATUM, TETRADYMIA CANESCENS, CHRYSOTHAMNUS NAUSEOSUS, CHRYSOTHAMNUS
VISCIDIFLORUS, BROMUS TECTORUM AND POA SECUNDA.

Land owner/manager:

BEAVERHEAD NATIONAL FOREST, DILLON RANGER DISTRICT

Comments:

VOUCHER - DARFLER, E., AND KEN SCOW (S.N.), 1988, MONTU; ORIGINALLY
IDENTIFIED AS C. NEOMEXICANUM VAR. UTAHENSE G. B. OWNBEY, UNIV. OF
MINNESOTA, ST. PAUL. ANNOTATED AS C. SUBNIVEUM, S. WELSH, BRIGHAM
YOUNG UNIVERSITY, MARCH, 1991.

Information source:

ROE, LISA S., MONTANA NATURAL HERITAGE PROGRAM, 1515 E. 6TH AVE.,
HELENA, MT. (405). 1990. NY.

Occurrence number: 004

Global rank: G3G4 Forest Service status: SENSITIVE
 State rank: S1 Federal Status:

Survey site name: WEST FORK MADISON
 EO rank:
 EO rank comments:

County: MADISON

USGS quadrangle: CLIFF LAKE

Township: 011S Range: 001E Section: 27 Precision: M
 Township-range comments: NE4

Survey date:	Elevation: 6100
First observation: 1983	Slope/aspect:
Last observation: 1983-07-20	Size (acres): 0

Location:

30 MILES SOUTH OF ENNIS; 3.5 MILES FROM JUNCTION OF WEST FORK ROAD AND
 HWY 287 ON WEST FORK ROAD.

Element occurrence data:

SCATTERED; IN FLOWER AND FRUIT.

General site description:

ON STEEP SAGEBRUSH HILLSIDE WITH FESTUCA AND GERANIUM.

Land owner/manager:

PRIVATELY OWNED LAND (INDIVIDUAL OR CORPORATE)
 BEAVERHEAD NATIONAL FOREST, MADISON RANGER DISTRICT

Comments:

MRPP CARD READS "SECTION 7," WHICH DOES NOT MATCH DIRECTIONS.
 OCCURRENCE MAPPED IN SECTION 27.

Information source:

RAMSTETTER, J. (14). 1983. MONTU. (MRPP CARD).

Occurrence number: 005

Global rank: G3G4 Forest Service status: SENSITIVE
State rank: S1 Federal Status:

Survey site name: BIG SHEEP CREEK
EO rank:
EO rank comments:

County: BEAVERHEAD

USGS quadrangle: CABOOSE CANYON

Township: 014S Range: 010W Section: 27 Precision: M
Township-range comments: E2

Survey date:	Elevation: 6600
First observation: 1983	Slope/aspect: /NORTH
Last observation: 1983-08-26	Size (acres): 0

Location:

BIG SHEEP CREEK CANYON, CA. 11.5 MILES SOUTH OF DELL, ABOVE ROAD.

Element occurrence data:

IN FLOWER.

General site description:

ON STABILIZED LIMESTONE RUBBLE-SLIDE.

Land owner/manager:

PRIVATELY OWNED LAND (INDIVIDUAL OR CORPORATE)
BLM: DILLON RESOURCE AREA, BUTTE DISTRICT

Comments:

Information source:

LACKSCHEWITZ, K. DIVISION OF BIOLOGICAL SCIENCES, UNIVERSITY OF
MONTANA, MISSOULA, MT 59812. (10673). 1983. MONTU. (MRPP CARD).

Occurrence number: 006

Global rank: G3G4 Forest Service status: SENSITIVE
State rank: S1 Federal Status:

Survey site name: ELK LAKE
EO rank: A
EO rank comments: EXCELLENT SITE WITH WELL ESTABLISHED
POPULATIONS.

County: BEAVERHEAD

USGS quadrangle: ELK SPRINGS

Township: 013S Range: 001E Section: 17 Precision: S
Township-range comments: SW4,S20,CENTRAL

Survey date: 1991-08-20 Elevation: 7400
First observation: 1991 Slope/aspect: 0-40% / SOUTHWEST,
WEST, EAST
Last observation: 1991-08-20 Size (acres): 25

Location:

CENTENNIAL VALLEY; SITE IS CA. 1 MILE NORTH OF ELK LAKE. FOLLOW ROAD ON WEST SIDE OF LAKE TO RIDGE TOP, PARK AND WALK WEST CA. 0.2 MILE TO SMALL ROCKY RIDGE. OTHER SITES ARE UP A DRY FORK OF NARROWS CREEK.

Element occurrence data:

120 PLANTS IN FOUR SUBPOPULATIONS, IN FLOWER AND FRUIT.

General site description:

OPEN, ERODING SCREE SLOPES (TERTIARY VOLCANIC ROCK), WITH RUBUS IDAEUS, JUNIPERUS COMMUNIS, SPIRAEA BETULIFOLIA AND POLYPODIUM VULGARE. SURROUNDING FOREST IS PSEUDOTSUGA MENZIESII, JUNIPERUS SCOPULORUM AND POPULUS TREMULOIDES.

Land owner/manager:

BEAVERHEAD NATIONAL FOREST, MADISON RANGER DISTRICT

Comments:

PLANTS ARE MORE OFTEN AT THE TOP OF SCREE SLOPES.

Information source:

ROE, LISA S., MONTANA NATURAL HERITAGE PROGRAM, 1515 EAST SIXTH AVE., HELENA, MT 59620.

Occurrence number: 007

Global rank: G3G4 Forest Service status: SENSITIVE
 State rank: S1 Federal Status:

Survey site name: ELK LAKE
 EO rank: B
 EO rank comments: LARGE, HEALTHY POPULATION, SURROUNDING
 AREA IS HEAVILY GRAZED.

County: BEAVERHEAD

USGS quadrangle: HIDDEN LAKE BENCH

Township: 013S Range: 001E Section: 16 Precision: S
 Township-range comments: SE4

Survey date: 1991-08-21	Elevation: 6800
First observation: 1991	Slope/aspect: 0-40% / NORTHWEST
Last observation: 1991-08-21	Size (acres): 30

Location:

CENTENNIAL VALLEY, CA. 0.3 MILE NORTH OF ELK LAKE, NORTHWEST-FACING
 ROCKY SLOPE.

Element occurrence data:

100+ PLANTS, MOSTLY IN FRUIT.

General site description:

OPEN, ERODING SCREE SLOPE (TERTIARY VOLCANIC ROCK), WITH ARTEMISIA
 TRIDENTATA, AGROPYRON SPICATUM, POA SECUNDA, JUNIPERUS COMMUNIS AND
 POLYPODIUM VULGARE.

Land owner/manager:

BEAVERHEAD NATIONAL FOREST, MADISON RANGER DISTRICT

Comments:

Information source:

ROE, LISA S., MONTANA NATURAL HERITAGE PROGRAM, 1515 EAST SIXTH AVE.,
 HELENA, MT 59620. (480). 1991. MONT.

Occurrence number: 008

Global rank: G3G4 Forest Service status: SENSITIVE
 State rank: S1 Federal Status:

Survey site name: HIDDEN LAKE
 EO rank: A
 EO rank comments: SMALL POPULATION, BUT EXCELLENT LOCATION
 WITH NO WEED INVASION.

County: MADISON

USGS quadrangle: HIDDEN LAKE BENCH

Township: 013S Range: 001E Section: 3 Precision: S
 Township-range comments: NW4SW4

Survey date:	1991-08-22	Elevation:	6760
First observation:	1991	Slope/aspect:	10-35% / SOUTHWEST
Last observation:	1991-08-22	Size (acres):	15

Location:

NORTH OF CENTENNIAL VALLEY, JUST NORTH OF HIDDEN LAKE. FROM RED ROCK LAKE WILDLIFE REFUGE, TAKE FS RD #8384 NORTH PAST ELK LAKE TO END OF ROAD. PARK AND WALK NORTH ON TRAIL #35 TO NEAR THE END OF HIDDEN LAKE; TURN WEST ON TRAIL #19 FOR 0.2 MILES; SCREE SLOPES ARE ABOVE TRAIL.

Element occurrence data:

CA. 43 PLANTS IN 3 SMALL SUBPOPULATIONS, SCATTERED OVER A LARGE AREA.

General site description:

ALONG THE UPPER AND LOWER EDGES OF OPEN SCREE SLOPES WITH SPARSE VEGETATIVE COVER OF PENSTEMON DEUSTUS, POA SECUNDA, CAREX FILIFOLIA, JUNIPERUS COMMUNIS; SURROUNDING FOREST IS SPARSE PSEUDOTSUGA MENZIESII.

Land owner/manager:

BEAVERHEAD NATIONAL FOREST, MADISON RANGER DISTRICT

Comments:

Information source:

ROE, LISA S., MONTANA NATURAL HERITAGE PROGRAM, 1515 EAST SIXTH AVE., HELENA, MT 59620. (481). 1991. MONT.

Occurrence number: 009

Global rank: G3G4 Forest Service status: SENSITIVE
State rank: S1 Federal Status:

Survey site name: STONEWALL CREEK
EO rank: C
EO rank comments: SMALL POPULATION, GRAZED AREA.

County: MADISON

USGS quadrangle: COPPER MOUNTAIN

Township: 004S Range: 003W Section: 30 Precision: S
Township-range comments: SW4

Survey date: 1991-08-20	Elevation: 6860
First observation: 1991	Slope/aspect: 0-5% / SOUTH
Last observation: 1991-08-20	Size (acres): 1

Location:

TOBACCO ROOT MOUNTAINS; FROM HIGHWAY 287, GO 3.5 MILES NORTHWEST OF LAURIN. HEAD NORTHEAST ON RAMSHORN CREEK ROAD CA. 6.1 MILES TO STONEWALL CREEK. SITE IS NORTHWEST OF ROAD AT INTERSECTION OF CREEKS.

Element occurrence data:

30 PLANTS ON CA. 0.25 ACRE.

General site description:

BENEATH ROCK OUTCROP, WITH RUBUS IDAEUS, AMELANCHIER ALNIFOLIA, SPIREA BETULIFOLIA AND SAMBUCUS CERULEA, SURROUNDED BY PSEUDOTSUGA MENZIESII FOREST.

Land owner/manager:

PRIVATELY OWNED LAND (INDIVIDUAL OR CORPORATE)
BEAVERHEAD NATIONAL FOREST, SHERIDAN RANGER DISTRICT

Comments:

NONE.

Information source:

ROE, LISA S., MONTANA NATURAL HERITAGE PROGRAM, 1515 EAST SIXTH AVE., HELENA, MT 59620. (478). 1991. MONT.

Occurrence number: 010

Global rank: G3G4 Forest Service status: SENSITIVE
State rank: S1 Federal Status:

Survey site name: KELLY RESERVOIR
EO rank: C
EO rank comments: SMALL POPULATION IN GRAZED AREA.

County: BEAVERHEAD

USGS quadrangle: ERMONT

Township: 006S Range: 011W Section: 10 Precision: S
Township-range comments: SE4SW4

Survey date:	1991-08-23	Elevation:	6800
First observation:	1991	Slope/aspect:	0-10% / SOUTHEAST
Last observation:	1991-08-23	Size (acres):	1

Location:

PIONEER MOUNTAINS; FROM ARGENTA, TRAVEL WEST ON FS RD# 606 FOR CA. 3.5 MILES, THEN LEFT ON FS RD# 192.2 FOR CA. 1 MILE TO BRIDGE ACROSS STREAM.

Element occurrence data:

CA. 30 PLANTS.

General site description:

PSEUDOTSUGA MENZIESII, POPULUS TREMULOIDES, PINUS CONTORTA FOREST WITH ROSA WOODSII, FRAGARIA VESCA, ARABIS HOLBOELLII, AND ACHILLEA MILLEFOLIUM.

Land owner/manager:

BEAVERHEAD NATIONAL FOREST, DILLON RANGER DISTRICT

Comments:

NONE

Information source:

ROE, LISA S., MONTANA NATURAL HERITAGE PROGRAM, 1515 EAST SIXTH AVE., HELENA, MT 59620. (483). 1991. MONT.

Occurrence number: 011

Global rank: G3G4 Forest Service status: SENSITIVE
State rank: S1 Federal Status:

Survey site name: MILL CREEK
EO rank: C
EO rank comments: SMALL SUBPOPULATIONS, HEAVILY GRAZED
AREA.

County: MADISON

USGS quadrangle: COPPER MOUNTAIN

Township: 004S Range: 004W Section: 23 Precision: S
Township-range comments: NW4NW4, 22NW4NW4

Survey date:	1991-08-20	Elevation:	6680
First observation:	1991	Slope/aspect:	0-30%/ SOUTH
Last observation:	1991-08-20	Size (acres):	1

Location:

TOBACCO ROOT MOUNTAINS; FROM SHERIDAN, MT, HEAD EAST ON FS RD# 111,
CA. 4 MILES, FIRST SITE IS JUST ACROSS FOREST SERVICE BOUNDARY.

Element occurrence data:

CA. 13 PLANTS IN 3 SMALL SUBPOPULATIONS (4,1,7 INDIVIDUALS AS MAPPED
FROM WEST TO EAST).

General site description:

IN ROCKY, GRAVELLY OPEN AREAS OF ABIES LASIOCARPA/PINUS CONTORTA
FOREST, WITH ARTEMISIA TRIDENTATA, MAHONIA REPENS, HIERACIUM
CYNOGLOSSOIDES AND ARNICA LONGIFOLIA.

Land owner/manager:

BEAVERHEAD NATIONAL FOREST, SHERIDAN RANGER DISTRICT

Comments:

NONE

Information source:

ROE, LISA S., MONTANA NATURAL HERITAGE PROGRAM, 1515 EAST SIXTH AVE.,
HELENA, MT 59620.

Occurrence number: 012

Global rank: G3G4 Forest Service status: SENSITIVE
State rank: S1 Federal Status:

Survey site name: MILL CREEK
EO rank: B
EO rank comments: ONE POPULATION QUITE LARGE, BUT ALSO
HEAVY GRAZING IMPACTS.

County: MADISON

USGS quadrangle: COPPER MOUNTAIN

Township: 004S Range: 003W Section: 17 Precision: S
Township-range comments: SE4NW4,4S4W,13SE4

Survey date:	1991-08-20	Elevation:	7600
First observation:	1991	Slope/aspect:	10-35% / SOUTH
Last observation:	1991-08-20	Size (acres):	1

Location:

TOBACCO ROOT MOUNTAINS: FROM SHERIDAN, MT, HEAD EAST ON FS RD 111 CA.
6 MILES, THE FIRST SITE IS ON NORTH SIDE OF ROAD.

Element occurrence data:

TWO SUBPOPULATIONS, EASTERN-MOST WITH 100 PLANTS EACH; WESTERN WITH
CA. 10 PLANTS.

General site description:

IN ROCKY, GRAVELLY OPEN AREAS OF ABIES LASIOCARPA/PINUS CONTORTA
FOREST, WITH: ARTEMISIA TRIDENTATA, MAHONIA REPENS, HIERACIUM
CYNOGLOSSOIDES, AND ARNICA LONGIFOLIA. HIGH EROSION, LOW VEGETATION
COVER, PLANTS OCCURRING ON OLD MINE TAILINGS.

Land owner/manager:

BEAVERHEAD NATIONAL FOREST, SHERIDAN RANGER DISTRICT

Comments:

NONE.

Information source:

ROE, LISA S., MONTANA NATURAL HERITAGE PROGRAM, 1515 EAST SIXTH AVE.,
HELENA, MT 59620. (476) 1991. MONT.

**MONTANA
STATE
LIBRARY**