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NlrpiP Schassberger
1991 Rare plant
inventory of the
East Pioneer
Mountains,
U.S.D.A. Forest

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RARE PLANT INVENTORY OF
THE EAST PIONEER MOUNTAINS
U.S.D.A. FOREST SERVICE - REGION 1
BEAVERHEAD NATIONAL FOREST
MONTANA

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INTRODUCTION

The Pioneer Mountains dominate the north-central portion of Beaverhead County, Montana. The mountains are a vast piece of Idaho batholith granite, which broke off and slid east into Montana, crumpling sedimentary rocks to the east. As a result, vast quantities of granitic intrusions penetrate folded sedimentary rocks along the eastern edge of the range. The Wisdom Valley to the west is thought to be a result of the movement of this very large piece of granite (Alt and Hyndman 1986). To the east lies the Dillon Valley (5,200 ft in elevation) from which the Pioneer Mountains rise, up to a maximum elevation of 10,568 ft. Because this range lies to the east of the continental divide, it is dominated by a dry continental climate, and the area receives the highest amounts of precipitation during May through October. Spring and fall bring rain or snow, while the summer months are dominated by convective rain storms. Due to factors of geology and past glaciations, topography, and climate, the area supports a diverse vegetation. Great Basin, southern Rocky Mountain and northern boreal plant species are all found in the Pioneer Mountains. Communities range from wetlands to sagebrush grasslands, montane and subalpine forests, to alpine slopes. Only a small portion of the range has been botanized to any degree, and many of the records for plant species of special concern are old and unverified.

This study was undertaken to try and relocate and verify sensitive species that occur in the Pioneer Mountains. This report contains information on a rare plant inventory conducted 8-13 and 29-31 July 1990 in portions of the Pioneer Mountains. These surveys emphasize the verification of old records for the species involved. Reports describe the status of populations of Haplopappus macronema var. macronema, and Mimulus primuloides that were relocated during the survey and a newly located population of Cirsium subniveum.

METHODS

On the basis of existing floristic information, a list of sensitive plant species that were known or had potential to occur in the Pioneer Mountains was prepared. Species included were:

Known:

- Claytonia lanceolata var. flava (yellow springbeauty)
- Haplopappus macronema var. macronema (discoid goldenweed)
- Mimulus primuloides (primrose monkey flower)
- Saxifraga tempestiva (storm saxifrage)
- Selaginella watsonii (Watson's selaginella)

Potential:

Agoseris lackschewitzii (pink agoseris)
Cirsium subniveum (Jackson's Hole thistle)
Erigeron asperugineus (rough fleabane)
Juncus hallii (Hall's rush)
Polystichum kruckebergii (Kruckeberg's sword-fern)
Salix wolfii var. wolfii (Wolf's willow)
Saussurea weberi (Weber's saw-wort)

Ocular reconnaissance was used to locate potentially rare plant species during searches in the Pioneer Mountains. Owing to the extent of area covered and times constraints, searches of known species were initiated by relocating and verifying old sites, while other areas were covered as time allowed.

Field collections were identified using Flora of the Pacific Northwest (Hitchcock and Cronquist 1973), Vascular Plants of the Pacific Northwest (Hitchcock et al. 1955-1969), and Vascular Plants of Montana (Dorn 1984). Voucher specimens are deposited at the University of Montana Herbarium (MONTU) and Florida State University Herbarium at Tallahassee.

Throughout this report, the three-digit occurrence numbers are indicated in parentheses after the site names; these correspond to the occurrence numbers provided in the tables and computer print-outs.

RESULTS

Field surveys completed in 1990 for the historical locations of both Saxifraga tempestiva at Waukeena Lake, and Selaginella watsonii at Comet Mountain, were unsuccessful. The scant information available for the Saxifraga tempestiva location comes from an undated specimen collected by Hitchcock and Muhlick, which was probably collected the late 1940's or early 1950's. The limited information on the Selaginella watsonii population at Comet Mountain is from a specimen collected in 1921. These plant populations may still exist since the areas are remote enough to be little changed since the last observation. More extensive field surveys are needed to ascertain the existence and exact locations of these two populations.

No new populations of Claytonia lanceolata var. flava were located during this survey. Existing populations are documented in a status report by Shelly (1989). Of the plants with potential to occur in Pioneer Mountains, only a single population of C. subniveum was located during this survey. Individual reports for the relocated populations of Haplopappus macronema var. macronema, Mimulus primuloides, and for the new population of Cirsium subniveum are detailed below.

Haplopappus macronema var. macronema

I. SPECIES INFORMATION

1. SCIENTIFIC NAME: Haplopappus macronema var. macronema Gray.
2. COMMON NAME: discoid goldenweed.
3. FAMILY: Asteraceae (= Compositae, Sunflower Family).
4. GENUS: According to Hitchcock et al. (1955-1969) there are approximately 150 species in the genus, equally distributed between North and South America. Those in North America occur principally in the western cordillera. The genus seems to constitute a natural group, and the species are mostly well defined, their limits only rarely blurred by hybridization.
5. SPECIES: There are currently 14 species of Haplopappus known from Montana. Four of these species (H. aberrans, H. nanus, H. pygmaeus, H. macronema var. macronema) have a limited distribution within the state. Haplopappus macronema var. linearis is more common in the state, and is often misidentified as Chrysothamnus parryii. It differs from variety macronema by having linear leaves 2 mm or less wide, which are somewhat tomentulose. In comparison, variety macronema has leaves that are oblong or oblanceolate, 3-6 mm wide and not tomentulose.

Unless otherwise stated, H. macronema will refer to variety macronema throughout the rest of this report.

B. PRESENT LEGAL OR OTHER FORMAL STATUS

1. FEDERAL STATUS

- a. U.S. FISH AND WILDLIFE SERVICE: No status.
- b. U.S. FOREST SERVICE: Haplopappus macronema is currently included on the U.S. Forest Service list of sensitive species for Region 1 (U.S. Department of Agriculture 1988). 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:** Haplopappus macronema is listed as "apparently globally secure (G4), though it may be quite rare in parts of its range", by the Montana Natural Heritage Program (Shelly 1990). Within Montana, the species is listed as "critically imperiled because of extreme rarity" (S1 = 5 or fewer occurrences).

C. DESCRIPTION

1. **GENERAL NONTECHNICAL DESCRIPTION:** Discoid goldenweed is a low shrub (up to 16 inches) with a rounded silhouette. Wavy-margined leaves are abundant along the green portions of the short stems. The leaves are lance-shaped, widest above the middle, and up to 1 inch in length. Dense white hairs cover the stems and leaves of this shrub. The tips of the stems bear clusters of one to three flowering heads (clusters of flowers characteristic of members of the Sunflower Family). Each head contains 10-25, yellow, tubular, disk flowers, 0.6 inch in length. The bracts surrounding the heads of flowers are in two layers, and are nearly equal in length to the disk flowers. The inflorescences are covered with glands sticky to the touch, and a resinous exudate from the plants' foliage gives discoid goldenweed a pleasant fragrance.
2. **TECHNICAL DESCRIPTION:** A subshrub, 1.5-4 dm high, with numerous short branches from near base that spread to form a densely twiggy rounded bush; bark completely masked by the tomentum except old branches, here brown and shreddy; twigs tough, very leafy, covered with a white pannose tomentum, this usually sparse or wanting near heads, the peduncles then glandular-scabrid; leaves oblong or oblanceolate, ascending, entire or margins crisply undulate, either acute or somewhat obtuse and then mucronate, 1-3 cm long, 3-6 mm wide, 1-nerved, an additional pair of faint nerves sometimes present, glandular-scabrid; heads solitary and terminal, or several and subracemose; involucre broadly

campanulate, 9-13 mm high, 8-12 mm broad; bracts not imbricate, a few of the outer ones oblong, acute or somewhat obtuse, herbaceous, the others lanceolate, acuminate, chartaceous, all exposed parts of the involucre glandular-scabrous or tomentulose; ray-flowers wanting; disk-flowers 10 to 25; disk-corolla tubular-funnelform, 9-11 mm long, the throat longer than the very slender tube, puberulent on tube; lobes ovate, erect, 1-1.5 (2) mm long, glabrous; style-branches long-exserted, the slender appendage much exceeding the stigmatic portion; achenes slenderly prismatic, 5-6 mm long, densely villous; pappus about equaling corolla, soft, dull white (adapted from Hall 1928).

3. **LOCAL FIELD CHARACTERS:** The uniform absence of ray-flowers, and presence of tomentum on the stems, separates Haplopappus macronema from all other members of the genus found within the state. Again, Haplopappus macronema var. macronema differs from variety linearis by having leaves that are oblong or oblanceolate, 3-6 mm wide and not tomentulose; versus the narrower (less than 2 mm) somewhat tomentose leaves that are characteristic of variety linearis. According to Hall (1928), H. macronema var. macronema is most closely related to H. suffruticosus. This species differs from H. macronema var. macronema by the presence of ray flowers, and the lack of tomentum on twigs.

D. GEOGRAPHICAL DISTRIBUTION

1. **RANGE:** Haplopappus macronema is found in the states of California, Oregon, Nevada, Utah, Idaho, and Colorado, and at the northern edge of its range, in Montana. It is apparently much more common to the south and west, and the population in Montana is peripheral to the main range of the species.
2. **CURRENT SITES:** There is currently one verified record for Haplopappus macronema in southwest Montana. The site is on the east side of the East Pioneer Mountains, on Storm Peak (001), in Beaverhead County, Montana. It was collected from this site in 1920 (voucher specimen H. W. Elofson (133)). This specimen is deposited at the Montana State University Herbarium (MONT). Working under contract for the Natural Heritage Program in 1990, Cedron Jones and Sarah Toubman relocated this

population. Their specimen, Jones and Toubman (s.n.), was verified by Dr. Loran Anderson, and is deposited at the Florida State University Herbarium, Tallahassee, Florida.

The single location for H. macronema in Montana is shown on a map, Figure 1, p. 7. The legal description, latitude and longitude, elevation, USGS topographic map name, and location of the occurrence in Montana are found in the Element Occurrence record for this population, p. 12. Also, the exact location is indicated on a U.S.G.S. topographic map on p. 13.

3. **HISTORICAL SITES:** Another record for Haplopappus macronema comes from a specimen collected in the vicinity of the Polaris Mine, at the southern end of the East Pioneer Mountains. During the current study, a photocopy of the specimen was received for examination. It was annotated in October of 1987 by Leila M. Shultz, Intermountain Herbarium as Macronema lineare Rydb., a synonym for Haplopappus macronema var. linearis. This site was previously surveyed for Haplopappus macronema var. macronema by Peter Lesica (Ecological Consulting) with no result; it is assumed that only var. linearis is present here.
4. **UNVERIFIED/UNDOCUMENTED REPORTS:** None.
5. **AREAS SURVEYED BUT SPECIES NOT LOCATED:** The area in the vicinity of the Polaris Mine was resurveyed for H. macronema during 1990, again without success.

- E. **HABITAT:** The Storm Peak (001) population occurs on a south-facing talus slope, at 8,900 ft. (2,712 m) in elevation. A review of available geologic maps places the population in an area underlain by sedimentary rocks of Cretaceous age, belonging to the Colorado Group, Kootenai Formation, which includes shales, sandstones, and limestones (Alt and Hyndman 1980). The population occurs on a sandstone talus slope.

Plant species associated with H. macronema include, scattered Pinus albicaulis, Ribes spp., Artemisia tridentata, and Delphinium spp. In addition, Haplopappus suffruticosus was collected nearby. The Montana population occurs in a similar habitat, and with similar associated species as populations reported for California by Hall (1928).

MONTANA

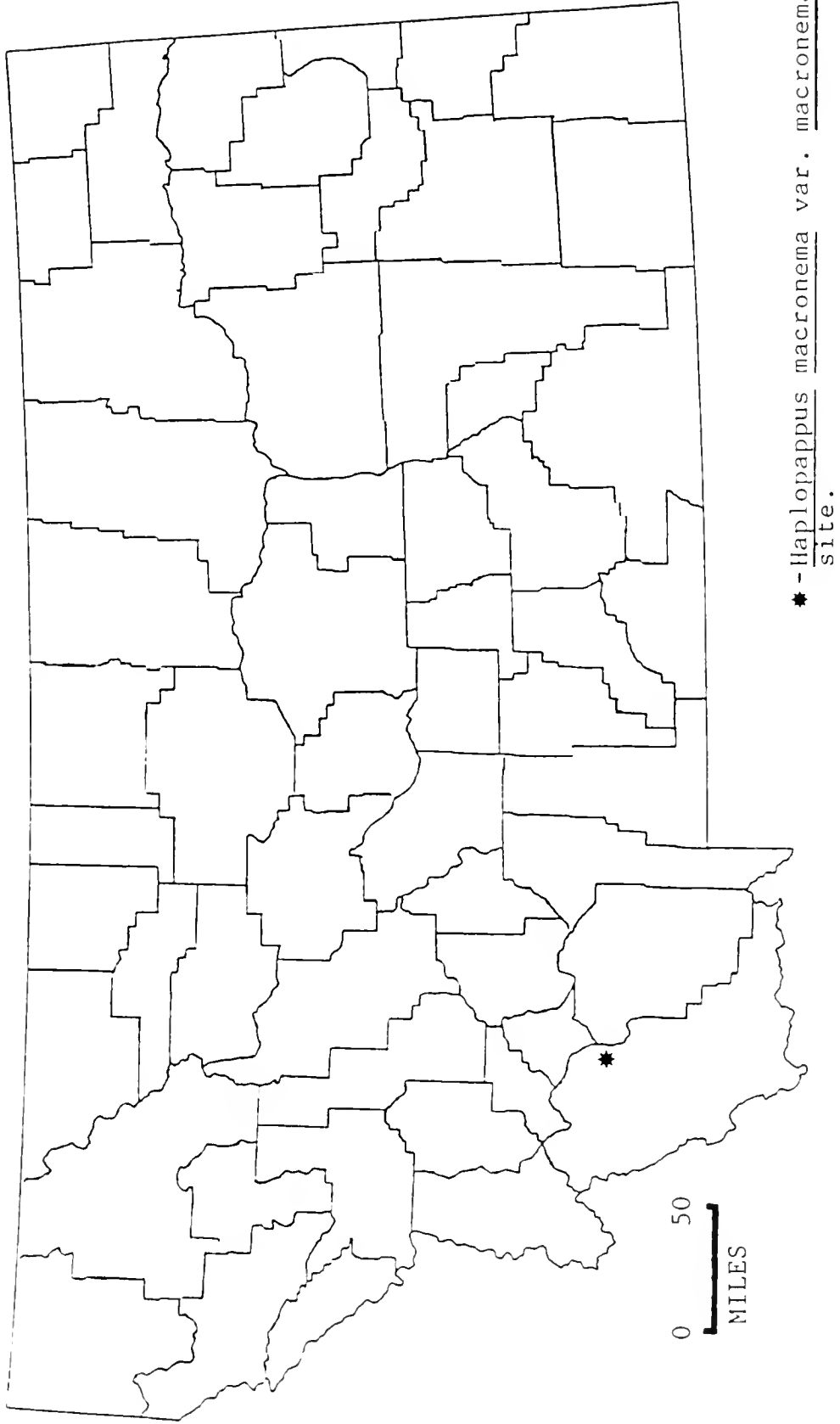


Figure 1. Location of Haplopappus macronema var. macronema population in Beaverhead County, Montana.

1. **REGIONAL CLIMATE:** The H. macronema population occurs in a region of Montana that is generally dominated by dry, continental weather conditions. Much of the yearly precipitation falls as rain or wet snow in May and June, with large convective storms providing the mid- and late summer moisture. Winters are cold and dry, with precipitation occurring mostly in the form of snow. The nearest long term climatological station is at Divide, approximately 23 miles (36 km) northeast of Storm Peak. The weather station at Divide (elevation 5,406 ft (1648 m)) is nearly 3,500 ft (1,067 m) lower than the plant population at Storm Peak (elevation 8,900 ft (2,712 m)). This elevation difference is important because one could expect that the H. macronema population would experience colder temperatures, and could potentially receive 20 inches (50 cm) more precipitation than the mean values given for the station. The mean annual temperature at Divide for the time period 1951-1980 was 40.7° F (4.8° C). The mean maximum temperature for July was 79.4° F (26.5° C), while the mean minimum temperature for January was 8.5° F (-13.2° C). Mean annual precipitation was 12.39 in (30.9 cm), with the highest mean precipitation occurring in the months of May and June (U.S. Department of Commerce 1982).

F. POPULATION DEMOGRAPHY AND BIOLOGY

1. **PHENOLOGY:** Hall (1928) states that flowering and fruiting occurs from July through September. This appears compatible with observations of the Montana population, where only 20 percent of the plants were in flower on 29 July 1990.
2. **POPULATION SIZE AND CONDITION:** Twenty plants were observed in this population, but areas directly to the east were unsurveyed, and may contain more subpopulations. The population was in good condition.
3. **REPRODUCTIVE BIOLOGY:** No information.

G. POPULATION ECOLOGY

1. **BIOLOGICAL INTERACTIONS**
 - a. **COMPETITION:** There is no information available on the competitive ability of H. macronema. However, the population occurs at

a site where interspecific competition is limited due to harsh site conditions. According to Hansen-Bristow et al. (1989), the five factors of soil formation limited by climate, biological activity, and coarse-textured geologic parent materials interact to produce minimally developed soils that are often low in plant-available water-holding capacity and nutrients in whitebark pine ecosystems. Haplopappus macronema may be restricted to these areas due to inherent low competitive ability, paired with the ability to tolerate the site conditions.

- b. **HERBIVORY:** The forage value of H. macronema as reported by foresters and stockmen is low (Hall 1928).

H. LAND OWNERSHIP

1. Beaverhead National Forest, Dillon and Wise River Ranger Districts.

II. ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

A. THREATS TO CURRENTLY KNOWN POPULATIONS

1. **GRAZING:** According to Hall (1928), even in areas where sheep have been grazed, plants show little evidence of browsing.
2. **MINING:** None currently known.
3. **TIMBER HARVESTING:** This species appears to be restricted to subalpine areas, and co-occurs with a non-timber species Pinus albicaulis (whitebark pine). Timber harvest is probably not a threat unless the site is affected indirectly by road building into adjacent areas with salable timber.
4. **WEED CONTROL ACTIVITIES:** The Storm Peak (001) site is remote, and is likely not to be affected by roadside weed control activities.

B. MANAGEMENT PRACTICES AND RESPONSE: None known.

C. RECOMMENDATIONS FOR MAINTAINING VIABLE POPULATIONS:

There are currently no observed threats to the population of H. macronema at Storm Peak (001). However, since this does represent the only population currently known from Montana, any management activities proposed for the area should take this population into

consideration.

- D. **RECOMMENDATIONS FOR FURTHER ASSESSMENT:** A more thorough survey encompassing areas to the east of the known population will be necessary to complete the documentation of this population.
- E. **SUMMARY:** The species Haplopappus macronema var. macronema is known from one location on the Beaverhead National Forest, in Beaverhead County, Montana. The site is on east side of the East Pioneer Mountains, on Storm Peak (001). The population occurs on a south-facing talus slope, at an elevation of 8,900 ft. (2,712 m), with a sparse cover of Pinus albicaulis (whitebark pine). There are currently no known threats to the Storm Peak (001) population. However, since this is the only known population in Montana, any management activities proposed for the area should take this population into consideration. As stated above, a more thorough survey encompassing areas to the east of the known population will be necessary to complete the documentation of this population.

III. ELEMENT OCCURRENCE PRINT-OUTS AND MAPS

HAPLOPAPPUS MACRONEMA VAR. MACRONEMA

Occurrence number: 001

Global rank: G4 Forest Service status: SENSITIVE LIST
State rank: S1 Federal Status:

Survey site name: STORM PEAK
EO rank:
EO rank comments:

County: BEAVERHEAD

USGS quadrangle: STORM PEAK

Township-range: T 3S R 10W Section: 21 Precision: S
Township-range comments: SE4

Survey date: Elevation: 8900
First observation: 1920 Slope/aspect:
Last observation: 1990-07-29 Size (acres): 0

Location:

EAST PIONEER MOUNTAINS, CA. 0.5 MILE SOUTHEAST OF STORM PEAK.

Element occurrence data:

CA. 20 PLANTS OBSERVED IN AREA CA. 20M N-S BY 50M E-W; SOME NOT YET IN FLOWER.

General site description:

TALUS SLOPE, SOUTH FACING, WITH SCATTERED WHITEBARK PINE, RIBES, ARTEMISIA TRIDENTATA, AND DELPHINIUM.

Land owner/manager:

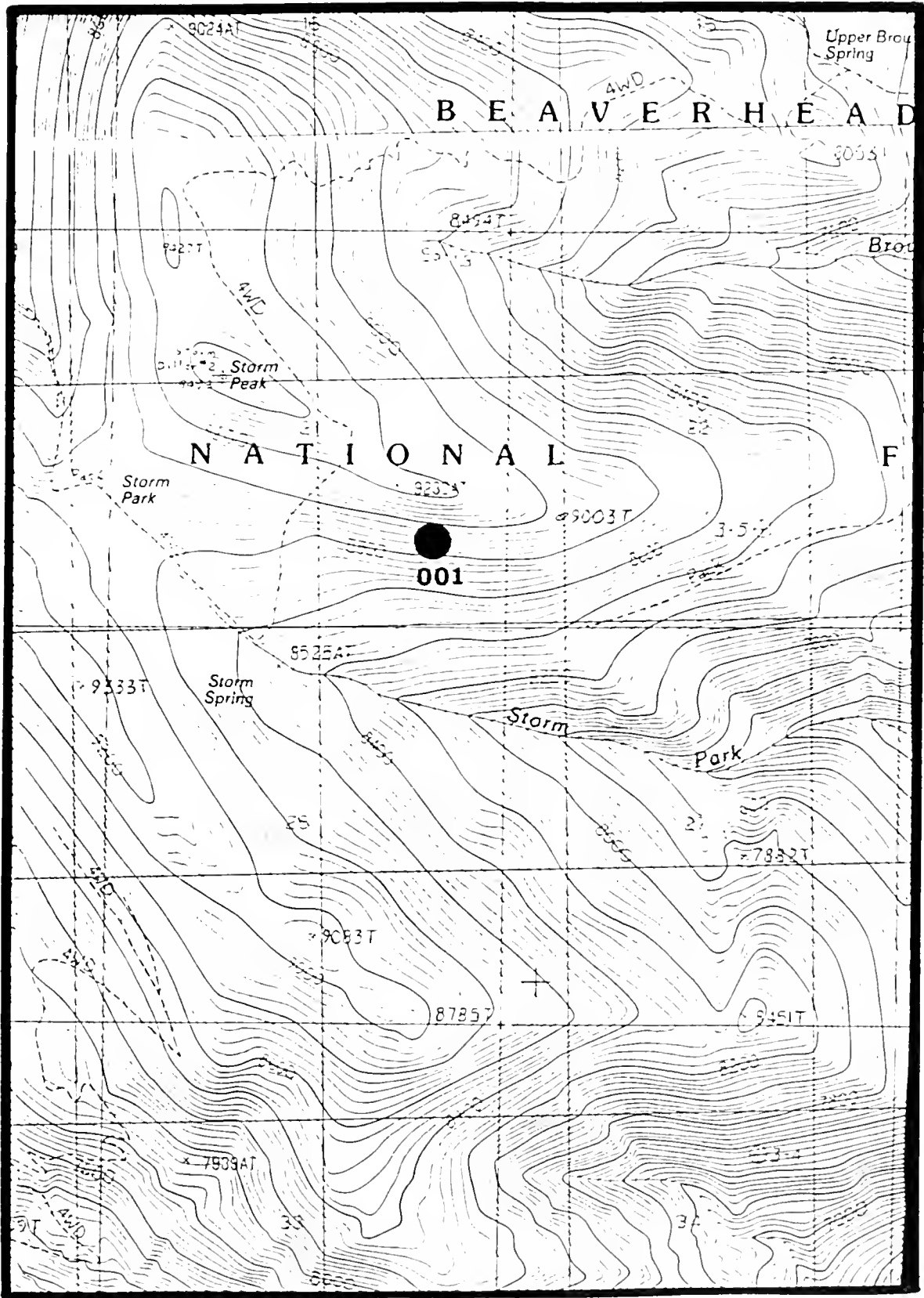
BEAVERHEAD NATIONAL FOREST, WISE RIVER RANGER DISTRICT
BEAVERHEAD NATIONAL FOREST, DILLON RANGER DISTRICT

Comments:

ADDITIONAL HABITAT TO EAST NOT SURVEYED (1990). VOUCHER - ELOFSON, H. W. (133), 1920, MONT; TOUBMAN & JONES (S.N.), 1990, FLORIDA STATE U.

Information source:

JONES, CEDRON. c/o MT NATURAL HERITAGE PROGRAM.



Haplopappus macronema var. macronema

Storm Peak (001)

U.S.G.S. Storm Peak Quadrangle (7.5')

Mimulus primuloides

I. SPECIES INFORMATION

1. SCIENTIFIC NAME: Mimulus primuloides Benth.
2. COMMON NAME: primrose monkey-flower.
3. FAMILY: Scrophulariaceae (Figwort Family).
4. GENUS: The genus Mimulus is quite large. It is best developed in western North America, however native species occur in parts of Asia, Africa, and Australia. According to Hitchcock et al. (1955-1969), there are over 114 species in North America.
5. SPECIES: Dorn (1984) recognizes the presence of 10 species of Mimulus in Montana. Mimulus primuloides is separated from other species in the state by a suite of characters. These include; flowers that are yellow, leaves that are palmately-veined, with three to seven main veins arising at or near the base of the leaf, and subequal calyx teeth.

B. PRESENT LEGAL OR OTHER FORMAL STATUS

1. FEDERAL STATUS
 - a. U.S. FISH AND WILDLIFE SERVICE: No status.
 - b. U.S. FOREST SERVICE: Mimulus primuloides is currently included on the U.S. Forest Service list of sensitive species for Region 1 (U.S. Department of Agriculture 1988). 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: Mimulus primuloides is listed as "apparently secure globally (G4), though it may be quite rare in parts of its range, especially at the periphery", by the Montana Natural Heritage

Program (Shelly 1990). Mimulus primuloides is also listed for the state as "imperiled in Montana because of rarity" (6-20 occurrences in the state).

C. DESCRIPTION

1. **GENERAL NONTECHNICAL DESCRIPTION:** The primrose monkey-flower (Mimulus primuloides) is a small member of the Figwort Family (Scrophulariaceae). This species has lance-shaped leaves, with smooth edges. Leaves occur opposite one another, and crowd the base of the stem to form small rosettes. The foliage is usually covered with fine, soft to slightly stiff hairs, which are often sticky. Flowering stalks only reach 2-3 inches in height from branched rhizomes, and are topped by a single flower. The bright yellow flowers of the primrose monkey-flower are tubular-shaped, and 0.3-0.8 inch in length. The fused petals form 2 lips, each of which is notched, and the mouth of the flower is often dotted with maroon spots. The rhizomes connecting individuals of this species are visible on the soil surface.
2. **TECHNICAL DESCRIPTION:** Perennial with flagelliform rhizomes, forming dense mats, the leaves all crowded at or near the ground, occasionally more lax, and the stem up to 6 cm long; leaves villous-hirsute on one or both sides and often viscid, or glabrous, oblanceolate or nearly so, essentially sessile, entire or obscurely toothed, 3(5)-nerved from the base, 7-25 mm long, 3-11 mm wide; pedicels slender, usually only 1(3) from a stem, 2-10 cm long, rarely shorter in alpine depauperates; calyx narrow, 4-8 mm long, glabrous except for the often ciliolate margins of the short, acute or mucronulate, about equal teeth; corolla yellow, often dotted with maroon, 1-2 cm long, obscurely bilabiate, with spreading, mostly notched lobes, the throat somewhat flaring from a slender tube (adapted from Hitchcock et al. 1955-1969).
3. **LOCAL FIELD CHARACTERS:** In the field M. primuloides would be most easily confused with several small annual members of the genus Mimulus, but is decisively distinguished from them by the presence of creeping rhizomes connecting individual ramets.

D. GEOGRAPHICAL DISTRIBUTION

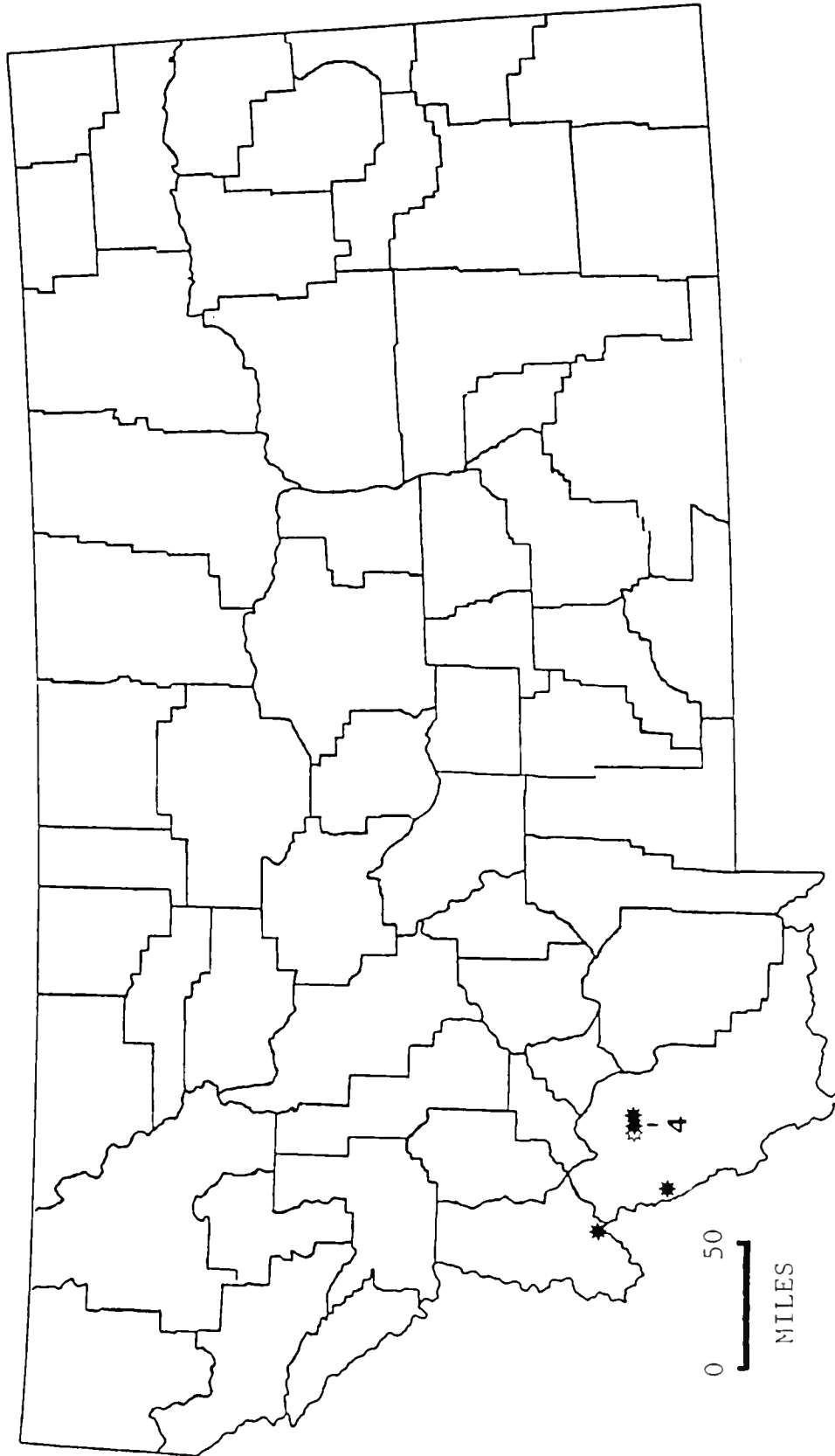
1. **RANGE:** In Montana, M. primuloides is limited to the southwest portion of the state, with one location in Ravalli County and seven current and one historical locations in Beaverhead County. All of the sites are within an approximately 35 mile radius. The Montana populations are at the north-east limit of the range of the species. The main range extends west to Washington and California, and south to Arizona and New Mexico (Hitchcock et al. 1955-1969).
2. **CURRENT SITES:** Mimulus primuloides is recently documented from seven locations, six in Beaverhead County and one in Ravalli County. Three new populations were located in 1990: Odell Creek (007), Rock Island Lakes (008), and Skull Creek (009).

Lost Trail Bog (004) is included here as recently documented (1985) even though the population was not located in either 1989 or 1990.

The eight locations (seven current and one unverified) for M. primuloides are shown in Figure 2, p. 17. The legal description, latitude and longitude, elevation, USGS topographic map name, and location of the occurrences in Montana are found in the Element Occurrence records for these populations, pp. 26-34. Also, the exact locations are indicated on U.S.G.S. topographic maps provided in pp. 35-39.

3. **UNVERIFIED LOCATIONS:** The Odell Lake (005) population has not been relocated since 1946. This site was briefly surveyed in 1990. The area is grazed, and it is possible that the population is no longer extant.
4. **HISTORICAL SITES:** A specimen deposited at Rocky Mountain Herbarium (RM), University of Wyoming, Sparrow (USFS81590), documents the ninth record for this species. The population at "Twin Lakes" (001) was located in 1937. Unfortunately, label data are vague, and several Twin Lakes exist on the Beaverhead National Forest. Surveys of the two possible sites, one in the Pioneer Mountains near Torrey Peak, and another in the Beaverhead Mountains south and west of Wisdom, Montana, will need to be completed to verify the exact location of the population. The site in the Beaverhead

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* - recently documented populations

☆ - historical record, current status unknown

Figure 2. Distribution of Mimulus primuloides populations in southwestern Montana, Beaverhead and Ravalli counties.

Mountains is the more likely location of the two, due to its proximity to a road. Information on this site (001) is included in the element occurrence records p. 26, but it is currently unmappable.

4. **AREAS SURVEYED BUT SPECIES NOT LOCATED:** Lost Trail Bog (004) was surveyed on 18 July 1989 by Andy Kratz (Lolo National Forest), and again on 9 July 1990 by Diane Pavek (Montana Natural Heritage Program). Neither were able to locate any plants, and both suggested that the bog should be resurveyed. Both survey dates were quite early compared to the successful location of other populations by field crews in the last week of July of 1990. It is possible that a survey toward the end of July might reveal the presence of the population.

E. HABITAT

1. **ASSOCIATED VEGETATION:** Populations of M. primuloides occur in open areas at the edges of peatlands and in wet meadows. Species associated with M. primuloides at one or more locations in Montana include:

Carex interior (inland sedge)
Carex spp. (sedge spp.)
Drosera anglica (great sundew)
Eleocharis pauciflora (few-flowered spike-rush)
Gentianopsis simplex (hiker's gentian)
Ligusticum tenuifolium (slender-leafed licorice-root)
Mimulus guttatus (common monkey-flower)
Muhlenbergia filiformis (slender muhly)
Saxifraga arguta (brook saxifrage)
Senecio triangularis (arrowleaf groundsel)
Viola macloskeyi (small white violet)

This list is probably incomplete, and more inventory would be necessary to give a comprehensive list of associated species.

2. **TOPOGRAPHY:** In Montana, populations of Mimulus primuloides are found on level to gently sloping sites, which probably do not much exceed ten percent. The known sites in Montana range from approximately 7,000 ft. (2130 m) to approximately 8,500 ft. (2590 m) in elevation. According to

Douglas (1981), this species is quite common in California, and populations range from 3,940 ft. (1200 m) to 11,300 ft. (3450 m) in elevation.

3. **SOIL RELATIONSHIPS:** Mimulus primuloides appears to be restricted to sites with poorly drained soils which have a water table (at or just below the soil surface) in early June, such as seeps and peatlands. The plant may not be associated with a specific substrate. At least one site, Rock Island Lakes (008), occurs in an area underlain by granitic bedrock.
4. **REGIONAL CLIMATE:** Mimulus primuloides occurs in a region of Montana that is generally dominated by dry, continental weather conditions. Much of the yearly precipitation falls as rain or wet snow in May and June, with large convective storms providing the mid- and late summer moisture. Winters are cold and dry, with precipitation occurring mostly in the form of snow. The nearest long term climatological station to the Mimulus primuloides populations is at Wisdom (6,060 ft (1850 m)). The station is approximately 11 miles west and 2,700 ft (820 m) lower than the populations in the vicinity of Odell Lake, and 24 miles east and 1,200 ft (370 m) lower than the population at Lost Trail Bog (004). This elevation difference is important because one could expect that the M. primuloides populations could potentially receive 20 inches (50.8 cm) more precipitation than the mean value given for the station (Bob Bump, BLM, Dillon, Montana, pers. comm.). The mean annual temperature at Wisdom for the time period 1951-1980 was 35.1° F. The mean maximum temperature for July was 78.2° F, while the mean minimum temperature for January was 1.3° F. Mean annual precipitation was 11.44 in (29.51 cm) (U.S. Department of Commerce 1982).

F. POPULATION DEMOGRAPHY AND BIOLOGY

1. **PHENOLOGY:** A perennial species, M. primuloides is in flower during the latter part of July and early August in Montana, and begins producing fruits by August. During vegetative reproduction, according to Douglas (1981), a rhizome and its terminal bud develop during one growing season, overwinter, produce a shoot and daughter rhizome(s) the following summer, and die. Seedlings were not observed in Montana populations, and reproduction

probably follows this vegetative reproduction pattern.

2. **POPULATION SIZE AND CONDITION:** Populations in Montana tend to be large; the Little Joe Meadows (002), Pine Creek (006) and Skull Creek (009) populations range from 100 to 1,000 stems counted (ramets). Even larger populations (greater than 2,000 ramets) occur at Skull Creek Meadows (003) and Odell Creek (007). At least two of these populations (Skull Creek Meadows (003) and Rock Island Lakes (008)) cover approximately five acres. Although populations were large, reproduction was principally vegetative.
3. **REPRODUCTIVE BIOLOGY**
 - a. **TYPE OF REPRODUCTION:** Mimulus primuloides reproduces both vegetatively through stolon extension and sexually through production of seed. Although fruiting plants were observed in a number of populations in Montana, reproduction by fruit appears to contribute little to population expansion, since most individuals were observed to have arisen by stolon extension.
 - b. **POLLINATION BIOLOGY:** Not known.
 - c. **SEED DISPERSAL AND BIOLOGY:** A study of California populations of M. primuloides at various elevations revealed that mid-elevation populations showed the highest energy allocation to vegetative reproduction. Populations at the highest elevations allocated greater amounts of energy to sexual reproduction (by producing the highest number of inflorescences per individual (stem)), but produced the fewest seeds (successful inflorescences). Observations of natural populations revealed that seedlings were extremely rare in undisturbed populations, and probably contribute only rarely to population increases (Douglas 1981).

G. POPULATION ECOLOGY

1. BIOLOGICAL INTERACTIONS

- a. **COMPETITION:** Mimulus primuloides occurs in open habitats, and shading may negatively influence plant establishment. From results

obtained in biomass studies of populations of M. primuloides from various elevations, Douglas (1981) concluded that interspecific competition reduces plant size at low altitudes, resulting in reduced vegetative reproductive allocation. On the other hand, reduced competition at mid-elevations allowed for higher vegetative reproductive allocation. Finally, at the highest altitude, plant size is reduced by the severe environment, again lowering the vegetative reproductive allocation. Thus, when competition from other species arises, one would expect the development of smaller plants (stems), which expend less energy on vegetative reproduction.

- b. **HERBIVORY:** Mimulus primuloides is subject to herbivory, and at least in one study site observed by Douglas (1981), grasshoppers (Melanoplus devastator and Melanoplus spp.) lowered seed production substantially.

H. LAND OWNERSHIP OR MANAGEMENT

1. Beaverhead National Forest

Twin Lakes (001)
 Little Joe Meadows (002)
 Skull Creek Meadows (003)
 Odell Lake (005)
 Pine Creek (006)
 Odell Creek (007)
 Rock Island Lakes (008)
 Skull Creek (009)

2. Bitterroot National Forest

Lost Trail Pass (004)

II. ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

A. THREATS TO CURRENTLY KNOWN POPULATIONS

1. **GRAZING:** By far the greatest threat to M. primuloides in Montana comes from livestock grazing in wetland/riparian situations. The Pine Creek (006) population located in 1989, was thought to be threatened by grazing (John Pierce pers. comm.). In Montana populations, vegetative reproduction was high, with few seedlings

observed. Thus, a population could be lost in grazed areas, since no reliable seed bank is available. Only detailed monitoring will reveal the extent of population loss occurring in those areas which are grazed extensively.

2. **RECREATION:** Two populations of M. primuloides are potentially threatened by recreational activities. The population at Lost Trail Bog (004) occurs along the edge of a sphagnum bog that is adjacent to the parking lot at Lost Trail Pass Ski Area. It is not known if snow-plowing affects this site. Increased snowpack would reduce the length of the growing season. This population was not relocated in either 1989 or 1990.

The population in the meadow at Odell Creek (007) is bisected by a trail, and extensive off-trail use by ORVs has impacted portions of the meadow (Cedron Jones, pers. obs.).

3. **TIMBER HARVESTING:** Timber harvesting could potentially threaten populations if roads, or other activities associated with the harvest extend into the open meadow habitat occupied by M. primuloides.

- B. **MANAGEMENT PRACTICES AND RESPONSE:** None known.
- C. **RECOMMENDATIONS FOR MAINTAINING VIABLE POPULATIONS:** Evaluations of the status of several populations need to be made (as listed below) before any management recommendations can be made for this species.
- D. **RECOMMENDATIONS FOR FURTHER ASSESSMENT:** It is recommended that Lost Trail Bog (004) be surveyed for M. primuloides, evaluating the quality of the bog and noting any effect that recreation area might be having on the site. The population at this site has not been relocated since 1985. The current status of M. primuloides at Odell Lake (005) should be evaluated through a survey of the area. Finally, a survey of the two potential Twin Lakes (001) locations should be completed.
- E. **SUMMARY:** The primrose monkey-flower (Mimulus primuloides) is a small member of the Figwort Family

(Scrophulariaceae). In Montana, M. primuloides is limited to the southwest portion of the state, with one location in Ravalli County, and six current and two historical locations in Beaverhead County. All of the sites are within an approximately 35 mile radius. The Montana populations are at the north-east limit of the range of the species. Populations of M. primuloides occur in open areas at the edges of bogs and in wet meadows. Populations in Montana tend to be large, ranging from 100 to greater than 2,000 ramets. Although populations are large, reproduction is principally vegetative. By far the greatest threat to M. primuloides in Montana comes from livestock grazing in wetland/riparian situations. The Pine Creek (006) population located in 1989, is thought to be threatened by current grazing practices (John Pierce pers. comm.). In Montana populations, vegetative reproduction was high, with few seedlings observed. Thus, a population could be lost in grazed areas, since no reliable seed bank is present to reestablish the population. Only detailed monitoring will reveal if population size and quality is affected by grazing. Two populations of M. primuloides are potentially threatened by recreational activities. The population at Lost Trail Bog (004) occurs along the edge of a sphagnum bog that is adjacent to the parking lot at Lost Trail Pass Ski Area. Although the bog area is roped off the population of M. primuloides has not been observed for several years. It is recommended that Lost Trail Bog (004) be resurveyed for M. primuloides including an evaluation of the quality and condition of the bog. The population in the meadow at Odell Creek (007) is bisected by a trail, and extensive off-trail use by ORVs has impacted portions of the meadow (Cedron Jones pers. obs.); this site should also be surveyed to determine if mitigation plans are necessary. A complete survey of the Odell Lake (005) area should be completed to determine if M. primuloides is still extant at this site. Finally, a survey of the two potential Twin Lakes (001) sites (starting with the one in the Beaverhead Range) should be completed.

III. ELEMENT OCCURRENCE PRINT-OUTS AND MAPS

MIMULUS PRIMULOIDES

Occurrence number: 001

Global rank: G4 Forest Service status: SENSITIVE LIST
State rank: S1 Federal Status:

Survey site name: TWIN LAKES
EO rank:
EO rank comments:

County: BEAVERHEAD

USGS quadrangle: UNMAPPABLE

Township-range: Section: Precision: U
Township-range comments:

Survey date:	1937-07-28	Elevation:	
First observation:	1937	Slope/aspect:	
Last observation:	1937-07-28	Size (acres):	0

Location:
EDGE OF TWIN LAKES.

Element occurrence data:
UNKNOWN.

General site description:
WILLOW HABITAT WITH CAREX.

Land owner/manager:
BEAVERHEAD NATIONAL FOREST

Comments:
THERE ARE 2 SETS OF TWIN LAKES IN BEAVERHEAD COUNTY. EITHER JUMBO
MOUNTAIN QUAD OR TORREY MOUNTAIN QUAD.

Information source:
SPARROW, O. 1937. SPECIMEN #USFS81590 RM.

MIMULUS PRIMULOIDES

Occurrence number: 002

Global rank: G4 Forest Service status: SENSITIVE LIST
State rank: S1 Federal Status:

Survey site name: LITTLE JOE MEADOWS
EO rank: B
EO rank comments: WET PORTIONS OF HABITAT IN GOOD
CONDITION.

County: BEAVERHEAD

USGS quadrangle: MAURICE MOUNTAIN

Township-range: 003S012W Section: 23 Precision: M
Township-range comments: NW4;22, NE4;14, SW4

Survey date: 1987- -	Elevation: 7760
First observation: 1987	Slope/aspect:
Last observation: 1987- -	Size (acres): 1

Location:

PIIONEER MOUNTAINS, LITTLE JOE MEADOWS, ALONG LITTLE JOE CREEK, CA. 1.5
AIR MILES ENE OF LITTLE JOE CAMPGROUND, CA. 17 AIR MILES SSW OF WISE
RIVER (TOWN).

Element occurrence data:

EST. 101-1000 RAMETS; DRIER PORTIONS OF MEADOW HEAVILY IMPACTED BY
CATTLE; SPREADING ASEXUALLY.

General site description:

IN AN ECOTONE BETWEEN CAREX AND ELEOCHARIS PAUCIFLORA, IN WETTER
PORTIONS OF MEADOW; HISTISOL SOILS.

Land owner/manager:

BEAVERHEAD NATIONAL FOREST, WISE RIVER RANGER DISTRICT

Comments:

VOUCHER-PIERCE, J. (1497), 1987, MONTU.

Information source:

PIERCE, JOHN. 737 LOCUST ST., MISSOULA, MT 59802.

MIMULUS PRIMULOIDES

Occurrence number: 003

Global rank: G4 Forest Service status: SENSITIVE LIST
State rank: S1 Federal Status:

Survey site name: SKULL CREEK MEADOWS
EO rank:
EO rank comments:

County: BEAVERHEAD

USGS quadrangle: ODELL LAKE

Township-range: 003S013W Section: 15 Precision: S
Township-range comments: E2

Survey date:	Elevation: 7880
First observation: 1987	Slope/aspect: 0-3% / LEVEL
Last observation: 1990-07-31	Size (acres): 5

Location:
PIONEER MOUNTAINS, SKULL CREEK MEADOWS, SW OF TABLE MOUNTAIN; BOTH
UPPER AND LOWER MEADOWS.

Element occurrence data:
LOWER MEADOW: CA. 1000 FLOWERS IN SEVERAL AREAS; UPPER MEADOW: CA.
2000 FLOWERS IN SEVERAL AREAS.

General site description:
UNIQUE SPHAGNUM BOGS.

Land owner/manager:
BEAVERHEAD NATIONAL FOREST, WISE RIVER RANGER DISTRICT

Comments:
SIGHT RECORD, NO VOUCHER SPECIMEN COLLECTED.

Information source:
PIERCE, JOHN. 737 LOCUST ST., MISSOULA, MT 59802.

MIMULUS PRIMULOIDES

Occurrence number: 004

Global rank: G4 Forest Service status: SENSITIVE LIST
State rank: S1 Federal Status:

Survey site name: LOST TRAIL BOG
EO rank:
EO rank comments:

County: RAVALLI

USGS quadrangle: LOST TRAIL PASS

Township-range: 002S019W Section: 04 Precision: S
Township-range comments: N2

Survey date:	Elevation: 7060
First observation: 1975	Slope/aspect:
Last observation: 1985-07-13	Size (acres): 5

Location:

LOST TRAIL BOG, 0.2 AIR MILES WSW OF LOST TRAIL PASS, 0.15 AIR MILES
NORTH OF ID-MT STATE LINE.

Element occurrence data:

IN FLOWER (13 JULY 1985).

General site description:

EXCELLENT SPHAGNUM BOG; WITH DROSERANGLICA, CAREX INTERIOR, AND
VIOLA MACLOSKEYI.

Land owner/manager:

BITTERROOT NATIONAL FOREST, SULA RANGER DISTRICT

Comments:

VOUCHERS - ARNO, S.F. (1317), 1975, (MRC); LESICA, P. (3510), 1985,
(MONTU). SKI AREA PARKING LOT MAY IMPACT SITE.

Information source:

LESICA, PETER.

MIMULUS PRIMULOIDES

Occurrence number: 005

Global rank: G4 Forest Service status: SENSITIVE LIST
State rank: S1 Federal Status:

Survey site name: ODELL LAKE
EO rank:
EO rank comments:

County: BEAVERHEAD

USGS quadrangle: ODELL LAKE

Township-range: 003S013W Section: 17 Precision: M
Township-range comments: N2

Survey date:	Elevation: 8320
First observation: 1946	Slope/aspect:
Last observation: 1946-07-24	Size (acres): 0

Location:
(PIONEER MOUNTAINS) ODELL LAKE (CA. 9 MILES EAST OF WISDOM).

Element occurrence data:
IN FLOWER (24 JULY 1946).

General site description:
MEADOW.

Land owner/manager:
BEAVERHEAD NATIONAL FOREST, WISE RIVER RANGER DISTRICT

Comments:
NONE.

Information source:
HITCHCOCK, C.L. (14945) AND MUHLENBERG. 1946. WTU.

MIMULUS PRIMULOIDES

Occurrence number: 006

Global rank: G4 Forest Service status: SENSITIVE LIST
State rank: S1 Federal Status:

Survey site name: PINE CREEK
EO rank: C
EO rank comments: EVIDENCE OF GRAZING DISTURBANCE; IN
CATTLE ALLOTMENT.

County: BEAVERHEAD

USGS quadrangle: PETERSON LAKE

Township-range: 007S014W Section: 33 Precision: S
Township-range comments: N2SW4

Survey date:	Elevation: 7720
First observation: 1989	Slope/aspect: 8-15%/N-NE
Last observation: 1989	Size (acres): 0

Location:

CA. 0.9 MILE DUE WEST OF PETERSON LAKE; ALONG PINE CREEK.

Element occurrence data:

101-1000 RAMETS IN LEAF. EVIDENCE OF VEGETATIVE AND IMMATURE FRUIT.

General site description:

IN GRAZING ALLOTMENT WITH ELEOCHARIS PAUCIFLORA, MUHLENBERGIA FILIFOLIA,
AND LIGUSTICUM TENUIFOLIUM.

Land owner/manager:

BEAVERHEAD NATIONAL FOREST, DILLON RANGER DISTRICT

Comments:

NONE.

Information source:

PIERCE, JOHN. 737 LOCUST STREET, MISSOULA, MT 59802. (1503). MONTU.

MIMULUS PRIMULOIDES

Occurrence number: 007

Global rank: G4 Forest Service status: SENSITIVE LIST
State rank: S1 Federal Status:

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

County: BEAVERHEAD

USGS quadrangle: ODELL LAKE

Township-range: 003S013W Section: 16 Precision: S
Township-range comments:

Survey date:	Elevation: 7900
First observation: 1990	Slope/aspect: 0-3% / LEVEL
Last observation: 1990-07-31	Size (acres): 0

Location:

IN WEST PIONEER MOUNTAINS, SOUTHWEST OF WISE RIVER; APPROACH VIA ODELL CREEK OR SKULL CREEK TRAILS - SITE IS IMMEDIATELY NORTHWEST OF TRAIL JUNCTION.

Element occurrence data:

SEVERAL THOUSAND FLOWERS IN CA. 20M X 50M AREA. SEVERAL SMALLER PATCHES OBSERVED BELOW TRAIL CA. 0.5 AND 1.0 MILE UPSTREAM.

General site description:

WET MEADOWS, WITH CAREX, PEDICULARIS, HABENARIA, TOWNSENDIA, ERIOGONUM.

Land owner/manager:

BEAVERHEAD NATIONAL FOREST, WISE RIVER RANGER DISTRICT

Comments:

AREA ONLY CURSORILY SURVEYED - MORE OCCURRENCES LIKELY. MEADOW STRADDLES TRAIL; MANY ORV TRACKS PRESENT.

Information source:

JONES, CEDRON. c/o MT NATURAL HERITAGE PROGRAM.

MIMULUS PRIMULOIDES

Occurrence number: 008

Global rank: G4 Forest Service status: SENSITIVE LIST
State rank: S1 Federal Status:

Survey site name: ROCK ISLAND LAKES
EO rank: B
EO rank comments: POPULATION IN GOOD CONDITION, BUT
HABITAT IS GRAZED.

County: BEAVERHEAD

USGS quadrangle: HOMER YOUNGS PEAK

Township-range: 006S017W Section: 22 Precision: S
Township-range comments: SW4NW4

Survey date: 1990-09-03 Elevation: 8440
First observation: 1990 Slope/aspect: 5% / SOUTHWEST
Last observation: 1990-09-03 Size (acres): 5

Location:

BEAVERHEAD RANGE, ROCK ISLAND LAKES BASIN, SOUTH BASE OF HOMER YOUNGS PEAK; 0.7 AIR MILE SSW OF SUMMIT OF HOMER YOUNGS PEAK, 0.2 AIR MILE ENE OF SOUTHEAST CORNER OF NORTHERNMOST OF THE LAKES.

Element occurrence data:

NUMEROUS COLONIES OBSERVED, ESPECIALLY IN MOISTER AREAS; SPECIES SPREADS RHIZOMATOUSLY; MOST PLANTS IN FRUIT, BUT A FEW STILL FLOWERING; HABITAT IMPACTED BY LIVESTOCK GRAZING.

General site description:

IN MOIST, MOSSY AREAS OF MEADOWS, SATURATED BY SPRINGS AND SEEPS FROM BASE OF ADJACENT MOUNTAIN SLOPE; WITH MIMULUS GUTTATUS, SAXIFRAGA ARGUTA, SENECIO TRIANGULARIS, GENTIANOPSIS SIMPLEX, CAREX SPP. GRANITIC BEDROCK.

Land owner/manager:

BEAVERHEAD NATIONAL FOREST, WISDOM RANGER DISTRICT

Comments:

VOUCHER - SHELLY, J.S. (1638), 1990, MONTU.

Information source:

SHELLY, J. STEPHEN. US FOREST SERVICE/TNC, FEDERAL BUILDING, RAWE, P.O. BOX 7669, MISSOULA, MT 59807.

MIMULUS PRIMULOIDES

Occurrence number: 009

Global rank: G4 Forest Service status: SENSITIVE LIST
State rank: S1 Federal Status:

Survey site name: SKULL CREEK
EO rank: A
EO rank comments: NO GRAZING ALLOTMENT IN THE AREA;
EVIDENCE OF OLD HUNTING CAMPS.

County: BEAVERHEAD

USGS quadrangle: ODELL LAKE

Township-range: 003S013W Section: 09 Precision: S
Township-range comments: SE4SE4; 10CENTER;15NW4NW4

Survey date: 1990-08-14 Elevation: 8000
First observation: 1990 Slope/aspect: 3-8% / EAST
Last observation: 1990-08-14 Size (acres): 1

Location:

WEST PIONEER MOUNTAINS, CA. 1 MILE NORTH OF SKULL CREEK MEADOWS AND 1
MILE EAST OF ODELL LAKE, ON NORTH FORK OF SKULL CREEK, CA. 40 AIR
MILES NORTHWEST OF DILLON.

Element occurrence data:

PLANTS IN 1 GROUP OF 1001-10,000 PLANTS AND 2 GROUPS OF 51-100, 10% OF
EACH IN BUD, FLOWER AND IMMATURE FRUIT ON 14 AUGUST 1990; VIGOR NORMAL
WITH APPARENT VEGETATIVE REPRODUCTION.

General site description:

IN SEEPY MEADOW AND ALONG EPHEMERAL STREAM.

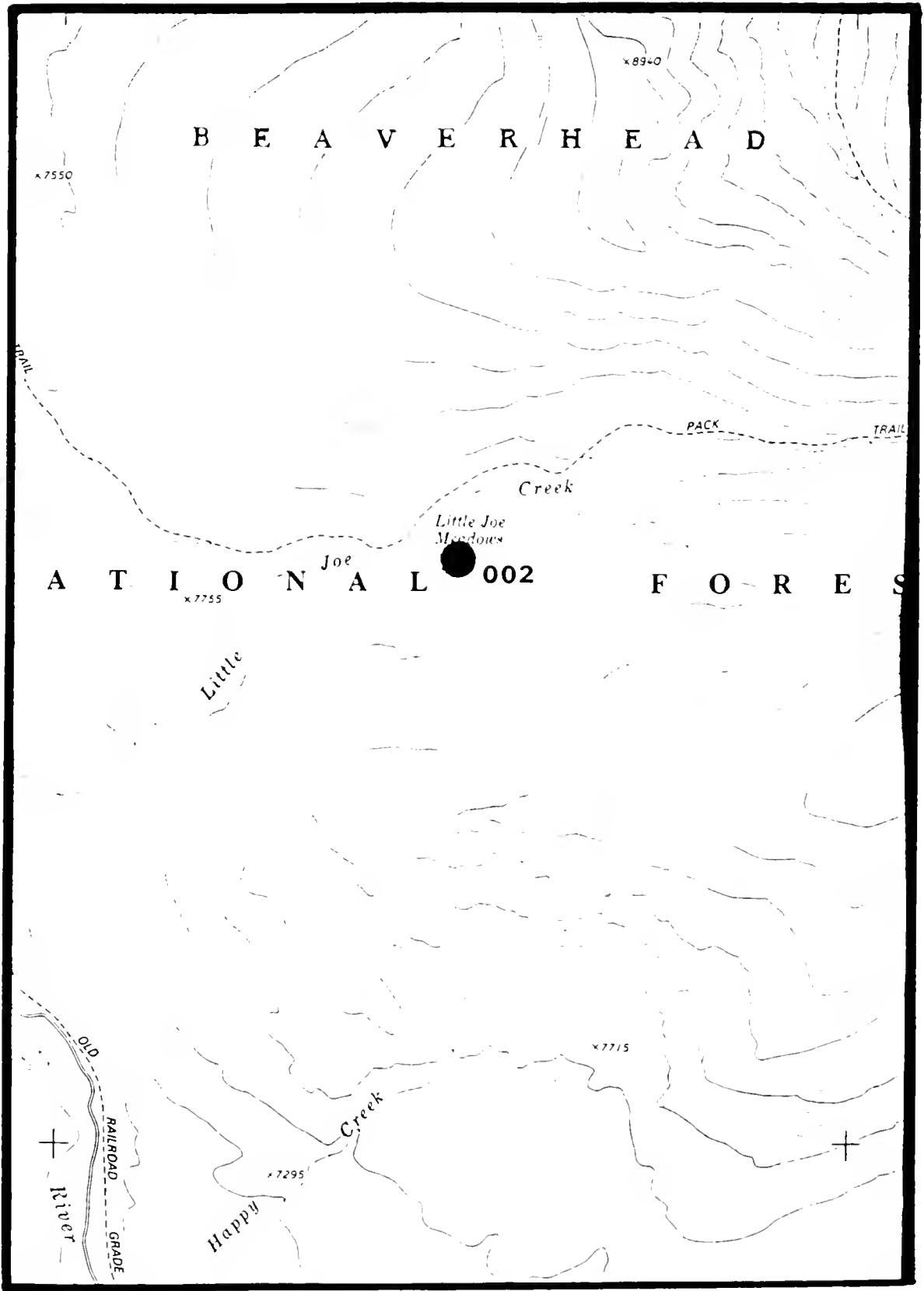
Land owner/manager:

BEAVERHEAD NATIONAL FOREST, WISE RIVER RANGER DISTRICT

Comments:

Information source:

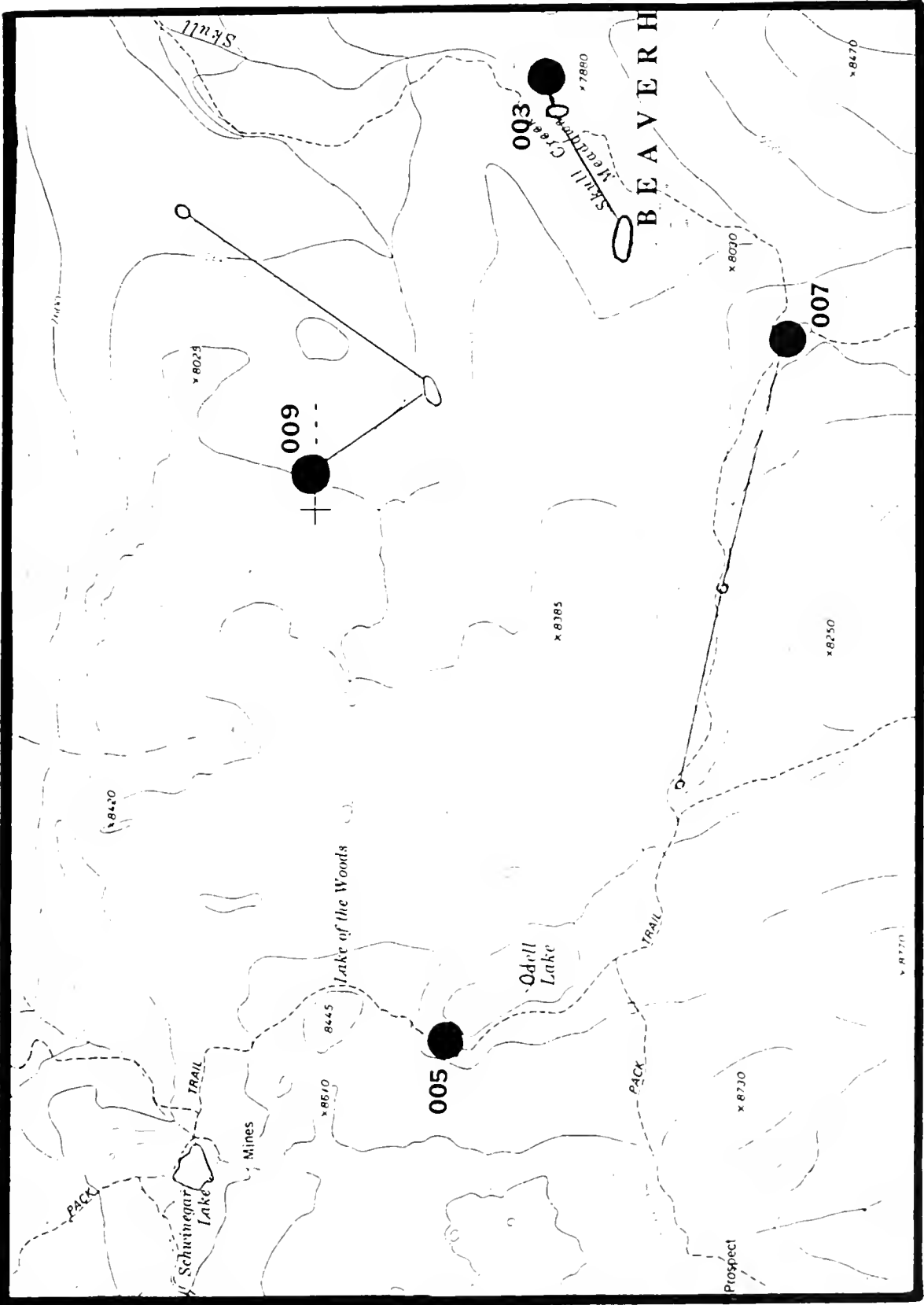
PIERCE, J. 737 LOCUST ST, MISSOULA, MT 59802.



Mimulus primuloides

Little Joe Meadows (002)

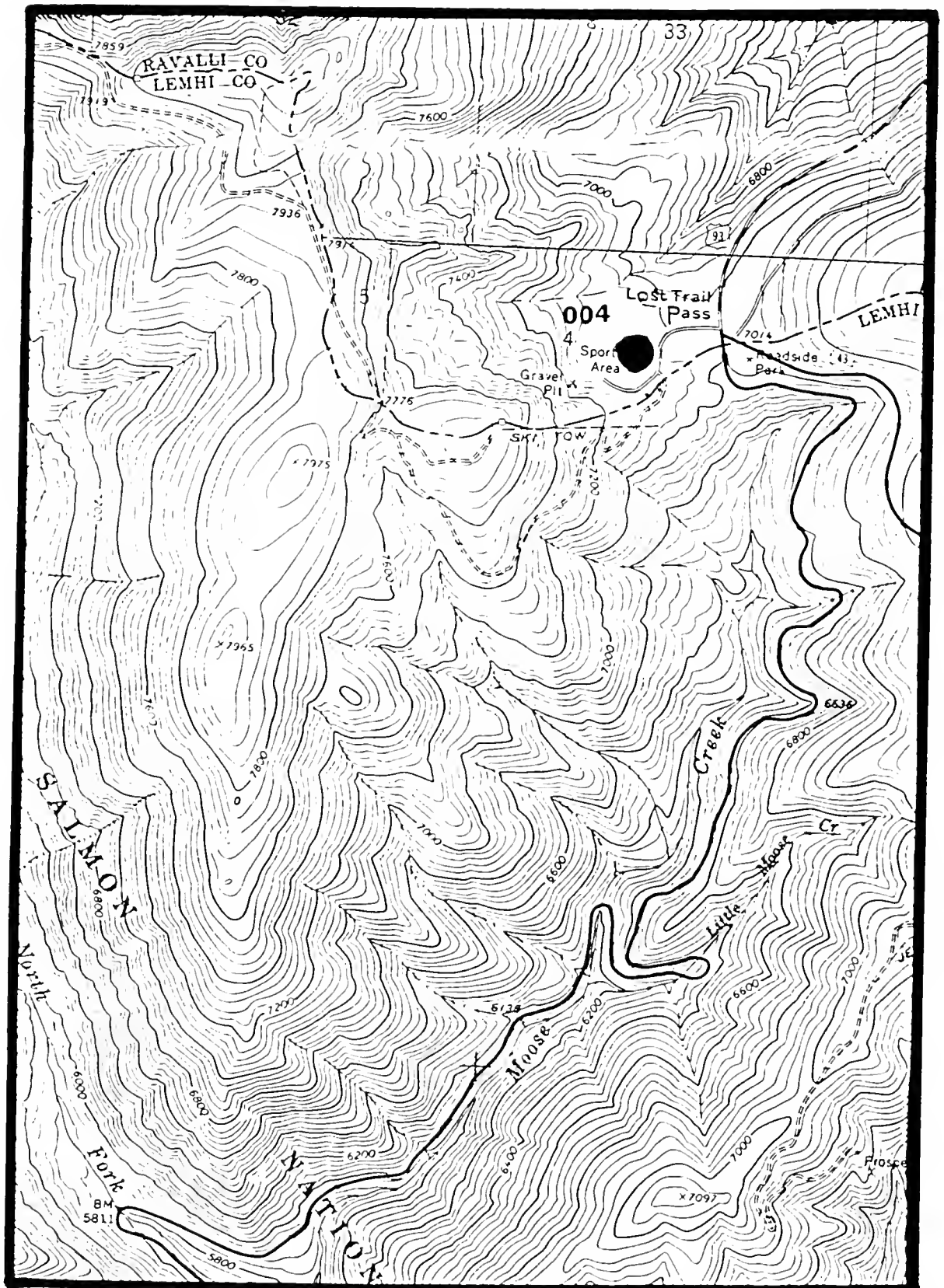
U.S.G.S. Maurice Mountain Quadrangle (7.5')



- Skull Creek Meadows (003)
- Odell Lake (005)
- Odell Creek (007)
- Skull Creek (009)

Mimulus primuloides

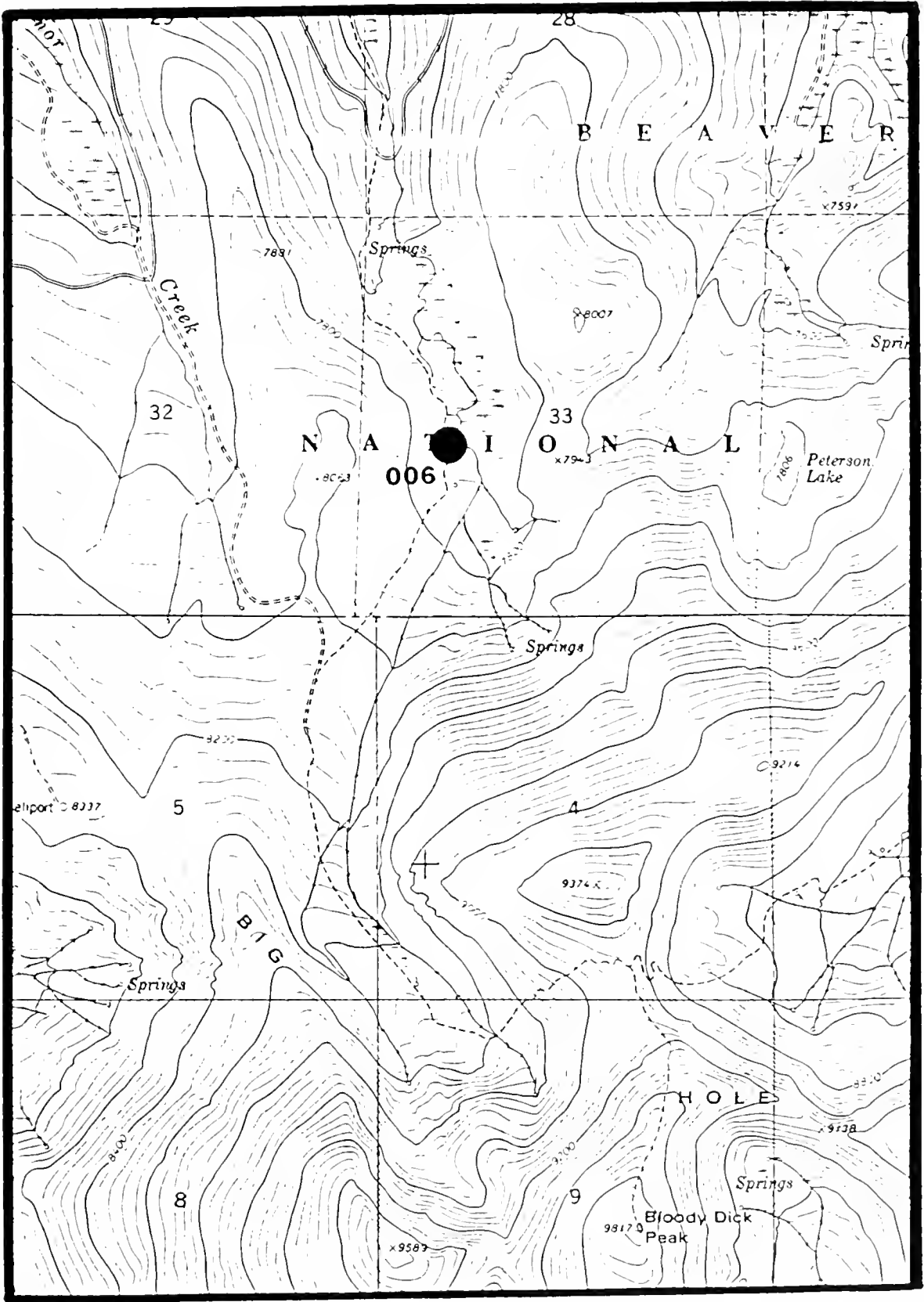
U.S.G.S. Odell Lake Quadrangle (7.5')



Mimulus primuloides

Lost Trail Bog (004)

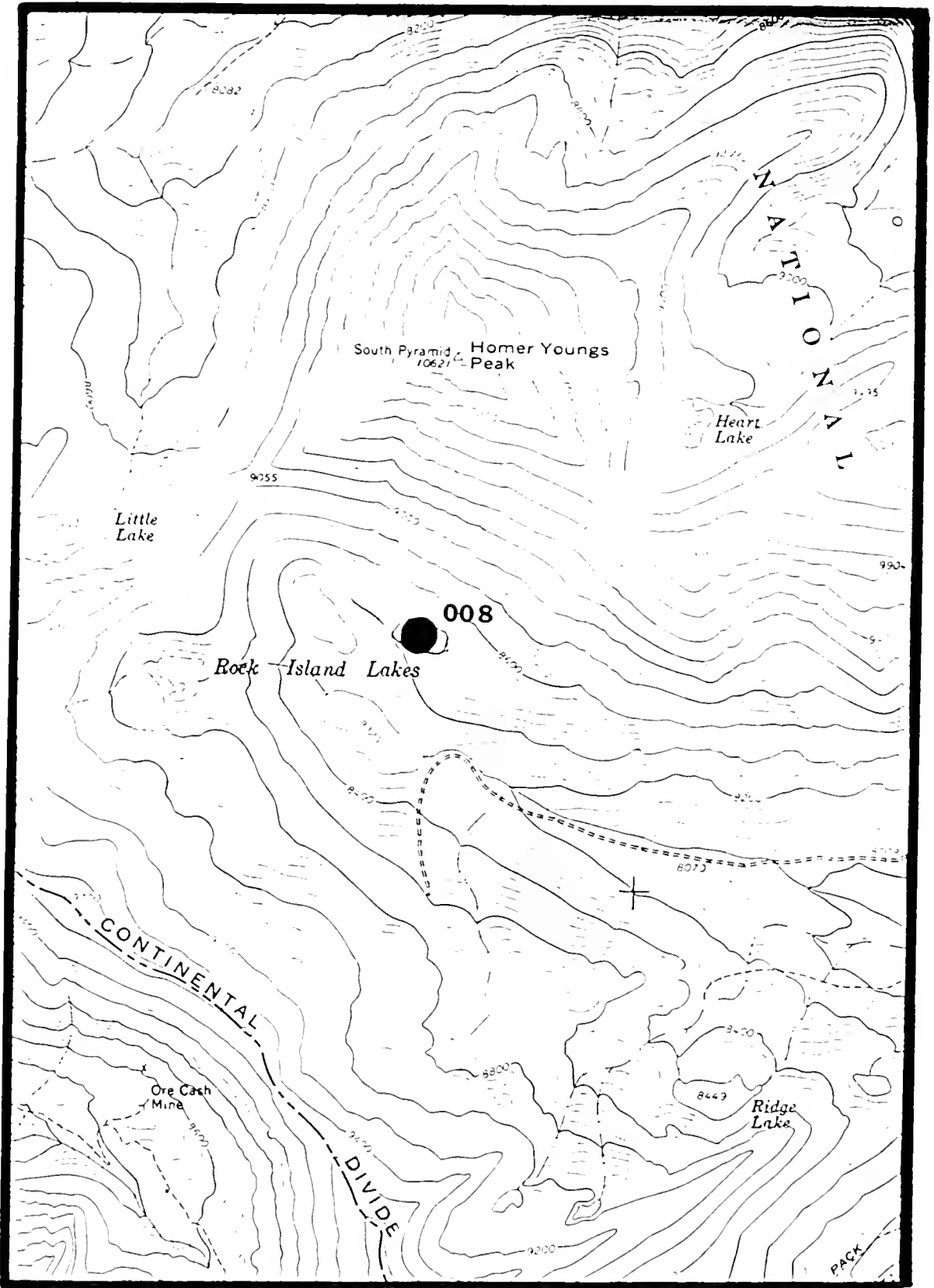
U.S.G.S. Lost Trail Pass Quadrangle (7.5')



Mimulus primuloides

Pine Creek (006)

U.S.G.S. Peterson Lake Quadrangle (7.5')



Mimulus primuloides

Rock Island Lakes (008)

U.S.G.S. Odell Lake Quadrangle (7.5')

Cirsium subniveum

I. SPECIES INFORMATION

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. (1955-1969), 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: There are currently three locations for C. subniveum in the state. One collection from French Creek (003) was originally thought to be C. neomexicanum Gray var. utahense (Pettrak) Welsh as identified by Dr. G. Ownbey, but a second collection from the same area fit the description of C. subniveum, and was identified as such by Dr. Cronquist of the New York Botanical Garden (pers. comm.). Cronquist (Hitchcock et al. 1955-1969) states: "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." The original collection (K. Scow and E. Darfler (s.n.), (MONTU) was recently sent to Dr. S.L. Welsh for annotation.

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 1988). 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: Cirsium subniveum is listed by the Montana Natural Heritage Program as "very rare and local within its range" (global rank G3G4) by the Montana Natural Heritage Program (Shelly 1990). This species is also listed for the state as "imperiled in Montana because of rarity" (S1 = 1-5 occurrences).

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 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; each head contains 25-50 tubular flowers. The flowers are white to light pink, and each head is surrounded by a ring of green bracts tipped by yellow spines. The outer bracts are sharply spine tipped, while the inner bracts are more lax.
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 (adapted from Hitchcock et al. 1955-1969).
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 this species, and it has a more northern and montane distribution (Hitchcock et al. 1955-1969,

Welsh et al. 1987). Cirsium subniveum is distinguished from other species in the genus Cirsium 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 apparently alternate bracts, and cross over the bract between (Dorn 1984).

D. GEOGRAPHICAL DISTRIBUTION

1. **RANGE:** Cirsium subniveum is known from central Idaho to Jackson Hole Wyoming, Montana (Beaverhead County), Utah (Box Elder, Cache, Rich and Sanpete counties), and northeast Oregon (Hitchcock et al. 1955-1969, Welsh et al. 1987).
2. **CURRENT SITES:** In Montana, C. subniveum populations occur in the Ruby Range in western portion of the Madison County (Laurin Canyon (001)), and in Beaverhead County, along the flanks of the Gravelly Range (Elk Lake (002)), and the southern flanks of the Pioneer Mountains near Argenta (French Creek (003)). A 1990 collection from the French Creek site (Schassberger (405)) was sent to Dr. A. Cronquist and identified as C. subniveum. Subsequently, a specimen from nearby originally identified as Cirsium neomexicanum var. utahense (Scow and Darfler (s.n.) (MONTU)), was annotated by Dr. Stanley Welsh as C. subniveum.

The locations of three currently known sites for C. subniveum in Montana are shown on a map, Figure 3, p. 42. 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. 47-50. Exact locations are shown on U.S.G.S. topographic maps pp. 51-53.

3. **HISTORICAL SITES:** None known.
4. **UNVERIFIED/UNDOCUMENTED REPORTS:** None.

E. HABITAT

1. **ASSOCIATED VEGETATION:** In Montana, C. subniveum populations occur in a Pseudotsuga menziesii/Festuca idahoensis habitat type as

MONTANA

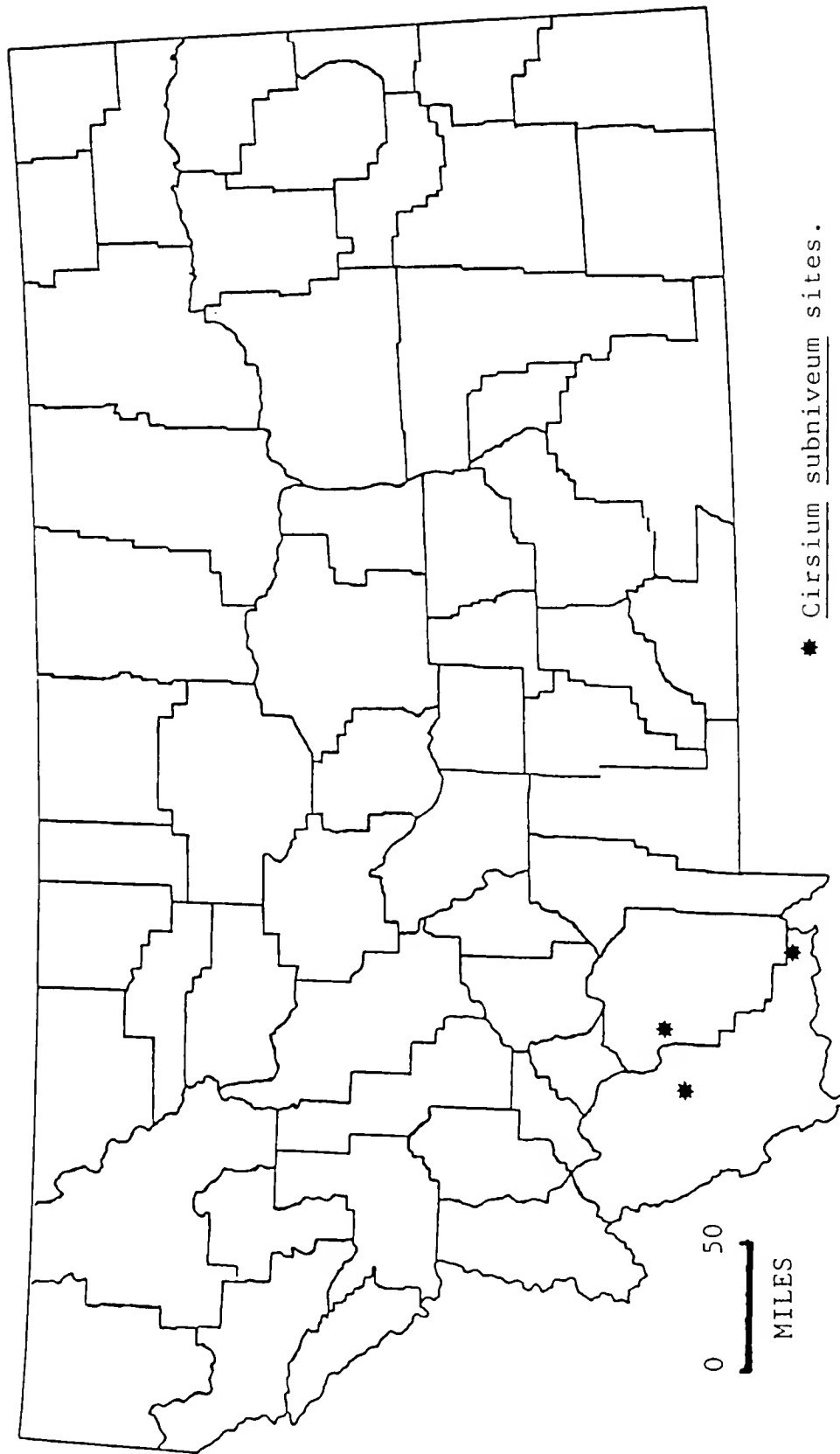


Figure 3. Locations of Cirsium subniveum populations in Beaverhead and Madison counties, Montana.

described by Pfister et al. (1977). Associated species occurring at one or more sites with C. subniveum include: Artemisia tridentata (big sagebrush), Artemisia frigida (fringed sagewort), Agropyron spicatum (bluebunch wheatgrass), Chaenactis douglasii (hoary chaenactis), Penstemon cyaneus (dark-blue penstemon), and Penstemon deustus (hot-rock penstemon).

In Utah, this species occurs in pinyon-juniper communities.

2. **TOPOGRAPHY:** The Montana populations occur primarily on southeast-facing slopes, at ca. 6800 (2040 m) to 8500 ft (2550 m) in elevation. In Utah, the species occurs near 6300 ft (1890 m) in elevation (Welsh et al. 1987).
3. **SOIL RELATIONSHIPS:** The French Creek population occurs in well drained, gravelly to cobbly soils derived from parent material of Devonian or Cambrian origin (Alt and Hyndman 1980). The Elk Lake (002) population also occurs on unstable gravel and rockslides.
4. **REGIONAL CLIMATE:** Cirsium subniveum occurs in a region of Montana that has very dry, continental climate conditions. Much of the yearly precipitation falls as rain or wet snow in May and June, with large convective storms providing the mid- and late summer moisture. Winters are cold and dry, with precipitation occurring mostly in the form of snow. The following data (Table 1) come from long term (1951-1980) climatological stations (U.S. Department of Commerce 1982). The nearest long term climatological station to the Laurin Canyon (001) C. subniveum population is at Virginia City. The station is approximately 13 miles east and 2,800 ft (840 m) lower than the Laurin Canyon (001) population. The nearest long term climatological station to the Elk Lake (002) population is at Lake View. This station is approximately 8 miles northeast, and 90 ft (27 m) higher than the Elk Lake (001) population. Finally, the nearest long term climatological station to the French Creek (003) C. subniveum population is at Dillon. The station is approximately 11 miles southeast, and 1,900 ft (570 m) lower than the French Creek (003) population.

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

Sites = elevation =	Laurin Canyon (001) 8500 ft (2550 m)	Elk Lake(002) 6800 ft (2040 m)	French Creek (003) 7200 ft (2160 m)
nearest 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 elevational differences between the Virginia City and Dillon stations and their associated populations, one could expect that the populations would receive more precipitation than is listed for the station.

F. POPULATION DEMOGRAPHY AND BIOLOGY

1. **PHENOLOGY:** This species flowers from June through early July, with seeds maturing by late July and early August.
2. **POPULATION SIZE AND CONDITION:** Population size estimates and condition are not available.
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:** Species in the genus Cirsium are pollinated most often by bees, but other insects may serve as pollinators (pers. obs.).
 - 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:** Many introduced species of Cirsium are increasers with heavy grazing. Cirsium subniveum occurs at sites where competition is limited by harsh site conditions (loose gravelly moving soils), and the species may be restricted to these locations through 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 protect adult plants.

H. LAND OWNERSHIP

1. Laurin Canyon (001) - Bureau of Land Management, Dillon Resource Area.
2. Elk Lake (002) - Beaverhead National Forest, Dillon Ranger District.
3. French Creek (003) - Beaverhead National Forest, Dillon Ranger District.

II. 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. Grazing could impact this species if done at high levels early in the season.
2. **MINING:** The French Creek (003) population occurs in a historic mining district, which has recently had some renewed attention by geological interests. This population should be considered in any proposed project activities that might affect the area.

3. **WEED CONTROL ACTIVITIES:** Weed control activities could pose a problem especially to the roadside populations at Elk Lake (002) and French Creek (003), and managers should be made aware of population locations.
- B. **MANAGEMENT PRACTICES AND RESPONSE:** A weevil introduced as a biological control for Carduus species (introduced Eurasian species), has a high infection 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. This same weevil is also known to infect a number of other thistles in California, including C. brevistylum, another species of concern in Montana (Turner 1987b). The possibility of this occurring with other native thistles should be taken into account when considering introduction 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 scheduled for these areas. Also, this species should be considered when evaluating the impacts of proposed mining activities.
- D. **RECOMMENDATIONS FOR FURTHER ASSESSMENT:** Currently, there are three known locations for C. subniveum in Montana. All three sites should be resurveyed to gain population information, and an inventory of areas that contain potential habitat for the species should be initiated. Information from the inventory would provide information on the range of the species in Montana, and improve our knowledge of its presence on National Forest lands.
- E. **SUMMARY**

There are currently three locations for C. subniveum in southwestern Montana. Two of the populations (Elk Lake (002) and French Creek (003)) occur in Beaverhead County on lands managed by the Beaverhead National Forest. A third population (Laurin Canyon (001)) occurs in Madison County, on lands managed by the Bureau of Land Management. A collection from French Creek (003) (just north and west of Argenta, Montana) was identified by A. Cronquist in 1991 as C. subniveum. The French Creek (003) population is in a historic mining district that has had some renewed attention by geological interests in recent years. Land managers should take this population into consideration whenever evaluating activities that might affect the site.

ELEMENT OCCURRENCE PRINT-OUTS AND MAPS

Element Occurrence Record
Cirsium subniveum

48

Occurrence number: 001

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

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

County: MADISON

USGS quadrangle: LAURIN CANYON

Township-range: 006S005W Section: 09 Precision: M
Township-range comments: SW4

Survey date: 1982-08-21	Elevation: 8500
First observation: 1982	Slope/aspect:
Last observation: 1982-08-21	Size (acres): 0

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

Element occurrence data:
UNKNOWN.

General site description:
OPEN PLACES IN SUBALPINE FOREST.

Land owner/manager:
BLM: DILLON RESOURCE AREA, BUTTE DISTRICT

Comments:
VOUCHER-LACKSCHEWITZ (10282) AND ROSENRETER, 1982, MONTU, NY
(VERIFIED BY A. CRONQUIST, NY).

Information source:
LACKSCHEWITZ, K., ET AL . 1984. NOTEWORTHY COLLECTIONS- OREGON.
MADRONO 31: 254-257.

Element Occurrence Record
Cirsium subniveum

Occurrence number: 002

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

Survey site name: ELK LAKE
EO rank:
EO rank comments:

County: BEAVERHEAD

USGS quadrangle: ELK SPRINGS

Township-range: 013S001E Section: 29 Precision: S
Township-range comments: SW4

Survey date:	Elevation: 6800
First observation: 1986	Slope/aspect:
Last observation: 1986-07-10	Size (acres): 0

Location:
ABOVE ELK LAKE.

Element occurrence data:
UNKNOWN.

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

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

Comments:
NONE.

Information source:
LACKSCHEWITZ, K. (10993). 1986. SPECIMEN # 103712. MONTU.

Element Occurrence Record
Cirsium subniveum

50

Occurrence number: 003

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

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

County: BEAVERHEAD

USGS quadrangle: ERMONT

Township-range: 006S011W Section: 02 Precision: M
Township-range comments: SE4SE4

Survey date:	Elevation: 7240
First observation: 1988	Slope/aspect: 50% / SOUTHEAST
Last observation: 1990-08-03	Size (acres): 1

Location:

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

Element occurrence data:

CA. 40 PLANTS IN TWO SUBPOPULATIONS, SCATTERED PRIMARILY ALONG
HISTORIC MINING AND ROAD DISTURBANCE.

General site description:

IN DOUGLAS-FIR / MOUNTAIN BIG SAGEBRUSH / IDAHO FESCUE COMMUNITY TYPE.

Land owner/manager:

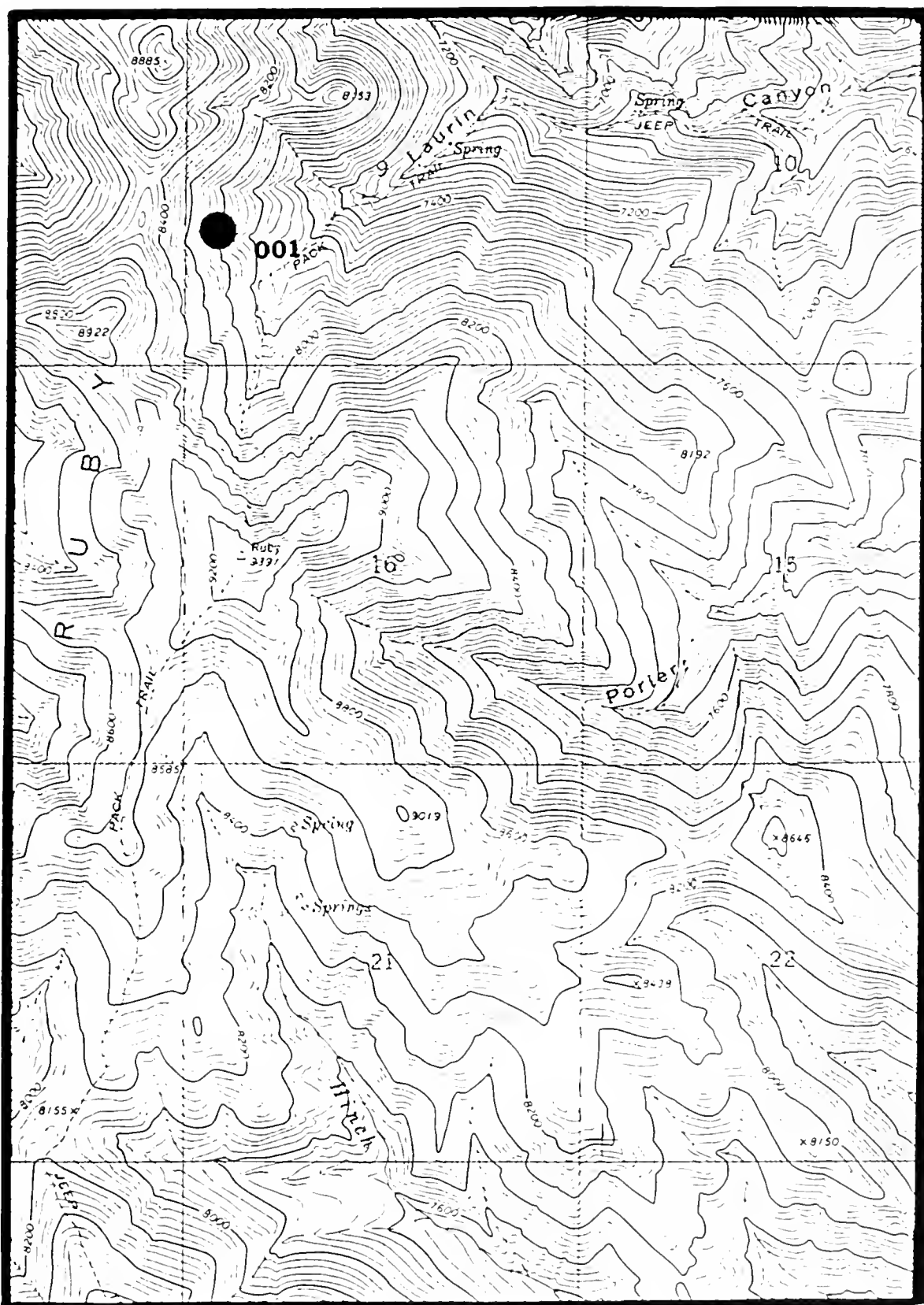
BEAVERHEAD NATIONAL FOREST, DILLON RANGER DISTRICT

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, 1990.

Information source:

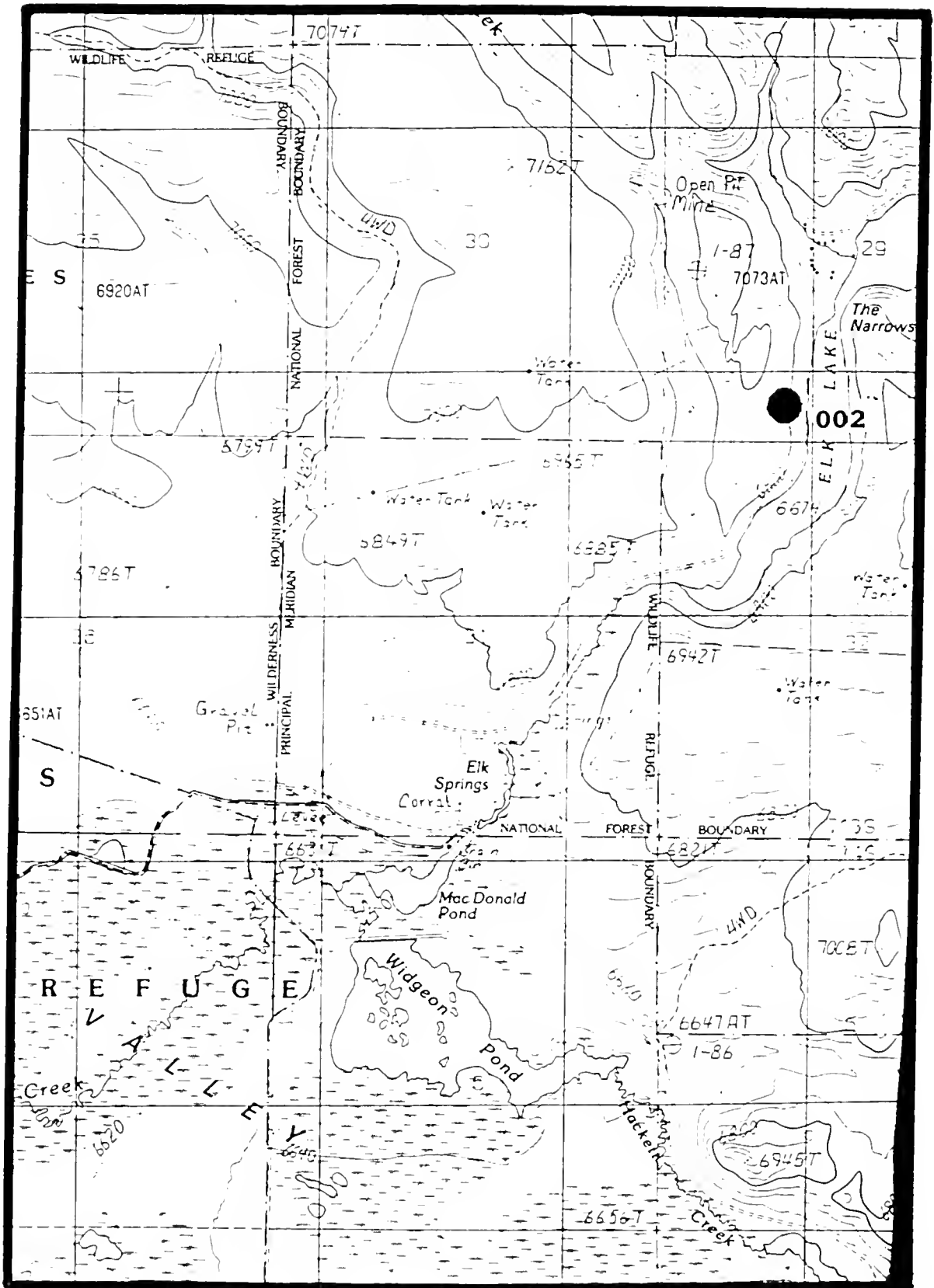
SCHASSBERGER, L. A. MONTANA NATURAL HERITAGE PROGRAM, 1515 E. 6TH AVE.
HELENA, MT.



Cirsium subniveum

Laurin Canyon (001)

U.S.G.S. Laurin Canyon Quadrangle (7.5')

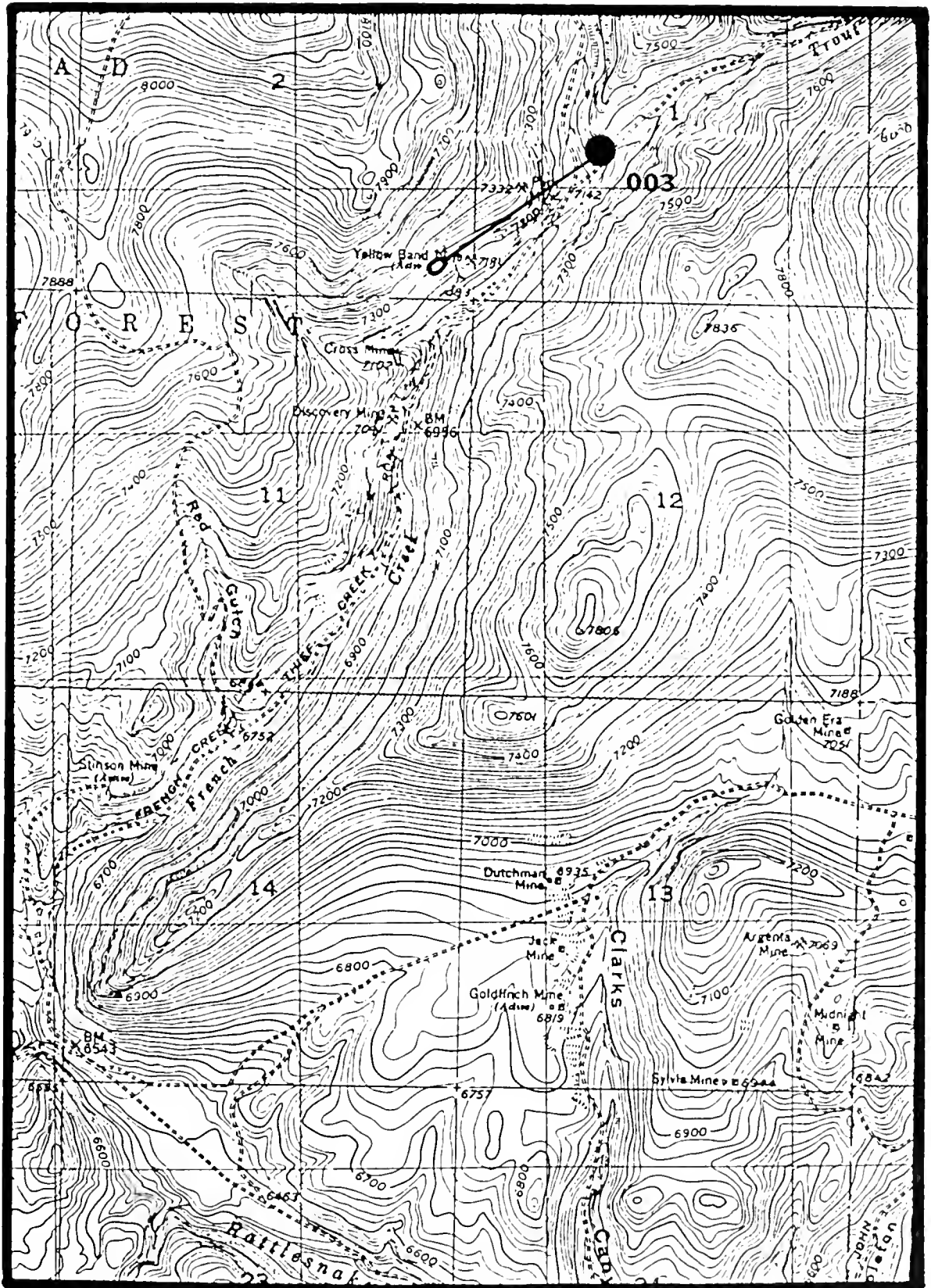


Cirsium subniveum

Elk Lake (002)

U.S.G.S. Elk Springs Quadrangle (7.5')

Montana



Cirsium subniveum

French Creek (003)

U.S.G.S. Ermont Quadrangle (7.5')

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