

U.S.D.A. 8/1/90

STATUS REVIEW OF
Agoseris lackschewitzii
U.S.D.A. FOREST SERVICE - REGION 1
GALLATIN NATIONAL FOREST
MONTANA

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I. SPECIES INFORMATION

A. CLASSIFICATION

1. **SCIENTIFIC NAME:** Agoseris lackschewitzii D. Henderson & R. Moseley.
2. **COMMON NAME:** Pink agoseris.
3. **FAMILY:** Asteraceae (= Compositae, Sunflower Family).
4. **GENUS:** The flora of Montana has elements from the Rocky Mountains, Great Plains, and the Pacific Northwest. Rydberg (1922) recognized 33 species of Agoseris in the Rocky Mountains and adjacent plains, which reflects the large amounts of morphologic variation present in this genus. Hitchcock and Cronquist (1973) list seven Agoseris species in the Pacific northwestern states. Dorn (1984) describes four species as present in Montana: three perennials (A. glauca (Pursh) Raf., A. aurantiaca (Hook.) Greene, and A. grandiflora (Nutt.) Greene) and one annual (A. heterophylla (Nutt.) Greene). Agoseris lackschewitzii has been described only recently and has not been included in any flora.
5. **SPECIES:** Henderson et al. (1990) described A. lackschewitzii as an Agoseris that has pink flowers from anthesis (Figure 1, p. 2). This differs from two closely related species: A. aurantiaca and A. glauca. A. aurantiaca has orange flowers, and A. glauca has yellow flowers. Both may age or dry to a pinkish color, but are never pink at anthesis. Additionally, ecological requirements of the species differ; Agoseris lackschewitzii is found in locations moister than either of the other two species (Henderson et al. 1990).

B. PRESENT LEGAL OR OTHER FORMAL STATUS

1. FEDERAL STATUS

- a. **U.S. FISH AND WILDLIFE SERVICE:** This species currently has no status under the U.S. Endangered Species Act of 1973 (U.S. Department of Interior, Fish and Wildlife Service 1990). Because the species has been described only recently, it has not been evaluated for status under the Endangered

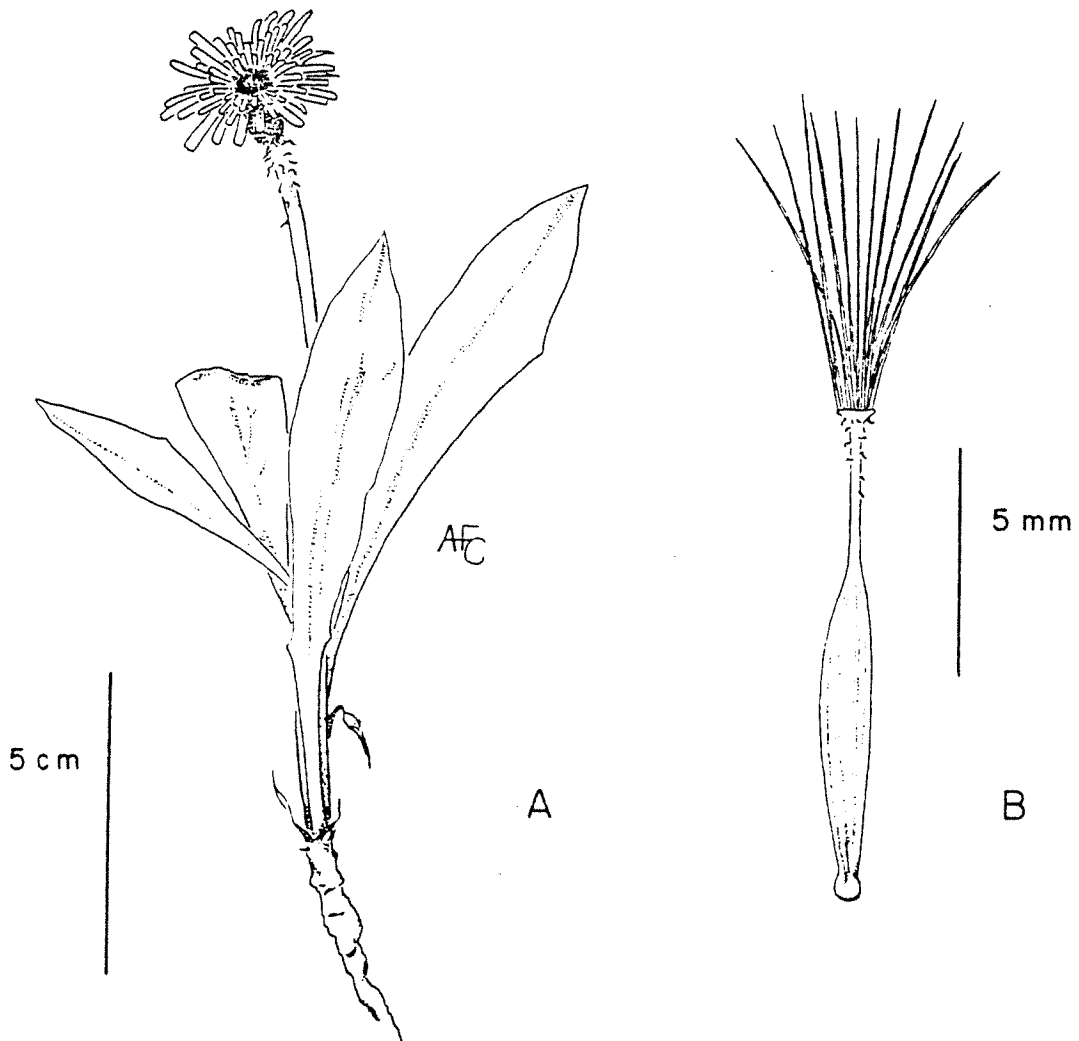


Figure 1. Agoseris lackschewitzii - A. Habit of flowering plant, B. Mature seed (achene).

Species Act. A status of category 2 ("taxa for which there is some evidence of vulnerability, but for which there are not enough data to support listing at this time") may be appropriate for Agoseris lackschewitzii and an evaluation should be made.

- b. **U.S. FOREST SERVICE:** Agoseris lackschewitzii is on the Watch List in Region 1 of the U.S. Forest Service (U.S. Department of Agriculture, Forest Service 1988). Management and protection of sensitive and watch species are provided for under sections 2670.22 and 2670.32 in the 1984 Forest Service Manual. These guidelines specify that the Forest Service is to (a) "maintain viable populations of all native species of plants" (2670.22), (b) "avoid or minimize impacts to species whose viability has been identified as a concern" (2670.32.3) and to (c) "establish objectives for federal candidate species, in cooperation with the Fish and Wildlife Service...and the states" (2670.32.5).

2. **STATE STATUS:** Agoseris lackschewitzii is listed by the Montana Natural Heritage Program as "imperiled globally because of rarity" (6-20 occurrences; global rank = G2). In Montana, it is listed as "imperiled because of rarity" (6-20 occurrences; state rank = S2). Under Montana state laws, there is no direct legal protection for A. lackschewitzii.

C. DESCRIPTION

1. **GENERAL NONTECHNICAL DESCRIPTION:** Agoseris lackschewitzii is a herbaceous perennial plant with milky juice and a taproot. Plants may have one or more stems topped by a pink head (head: a group of flowers in the Sunflower Family). Stems reach 6-49 cm (2.5-19 in) in height and are hairy along their entire length. The leaves of this plant are all basal, 6-20 cm (2.5-8 in) long and 0.7-2.5 cm (0.3-1 in) wide, and are without hairs. Leaves may be entire or have a few small teeth. Dark purple spots may irregularly fleck the leaves. Flowering heads have many (50-70) perfect

florets with pink rays, 5-10 mm (0.2-0.4 in) long, 1.5 mm (0.06 in) wide. Bracts beneath the heads are in two or several series. These are green, with a dark colored strip down the middle, and may be purple dotted on the outer surface; the inner series have membrane-like edges. The beak of the achene (seed) is shorter than the length of the body. Achenes are roundish with 10 ribs on the body and 6-8 mm (0.2-0.3 in) long. The body tapers gradually into a beak, 4.2-6.6 mm (0.1-0.2 in) long. Very white, capillary bristles top the beak. Plants flower in July and August (rarely June), depending on elevation and climate. (Adapted from Henderson et al. 1990.)

2. **TECHNICAL DESCRIPTION:** From Henderson et al. (1990), "Plants perennial herbs with simple or branched caudex and a slender taproot, producing a basal rosette and 1-3 scapes. Leaves thin, oblanceolate, (4)6-20(27) cm long, 0.7-2.2(3.1) cm wide; blade margins entire to rarely distantly toothed, both surfaces glabrous, the apex acute, slightly revolute, with a purple mucro, the base attenuate; petiole broadly to narrowly winged, 1/3 to 1/2 the length of the leaf, sheathing at the base, the margins villous with spreading multicellular hairs with clear cross-walls. Scape 6-29 cm high, villous at base, becoming tomentose below the solitary head. Involucre campanulate remaining so in fruit, 1.1-1.9 cm long in flower, up to 2.5 cm long in fruit; phyllaries mostly imbricate in 3-4 series, light green with a dark purple median stripe and light to heavy purple mottling, the inner lanceolate, acute, with white scarious margins, the outer similar or slightly broader and obtuse, densely villous basally, less so towards apex, the trichomes eglandular, translucent or occasionally with some purple pigment. Receptacle slightly convex, up to 7 mm broad, chaffy, foveolate. Flowers all ligulate, perfect, 50-70 per head, pink at anthesis, drying to deep pink; ligules 5-10 mm long, 1.5 mm wide, 5-toothed, glabrous distally, pubescent proximally with few, multicellular hairs; tube 6.5 mm long; anthers 1.2-1.8 mm long, the apical appendages lanceolate, 0.2-0.3 mm long; style column 8-9 mm long, purple, scabrous; style branches 0.4-0.8 mm long, stigmatic for entire length, the abaxial surface scabrous, the apex rounded. Achenes terete, the body 6-8 mm long, 10-ribbed, minutely scabrous on the ribs, glabrous to sparsely pubescent with short unicellular hairs between the

ribs, gradually tapering to a slender, obscurely nerved or nerveless beak shorter than the body, the beak 4.2-6.6 mm long. Pappus double; capillary bristles numerous, white, minutely scabrous, 6-12 mm long."

3. **LOCAL FIELD CHARACTERS:** Agoseris lackschewitzii has very striking pink rays when in bud or full flower. However, it is important to check the maturity of the plant; the corollas of both A. glauca and A. aurantiaca may age or dry a pink color. Achene shape will separate A. lackschewitzii from A. aurantiaca. Achenes of A. aurantiaca have abrupt edges at the top of the body that form highly visible, graduated, stair-steps, narrowing from the body into the beak; A. lackschewitzii achenes taper gradually. The leaves of A. glauca are usually thicker, wider, and more glaucous than A. lackschewitzii. Additionally, A. glauca occurs on sites that are much drier and more open than where A. lackschewitzii is found.

D. GEOGRAPHICAL DISTRIBUTION

1. **RANGE:** Agoseris lackschewitzii is known from eight counties (Cascade, Deerlodge, Judith Basin, Madison, Meagher, Park, Silver Bow, and Sweetgrass) in southwestern Montana and two counties (Fremont and Lemhi) in south-central Idaho.
2. **CURRENT SITES:** Agoseris lackschewitzii occurs in 16 locations in Montana. Populations occur in Cascade, Deerlodge, Judith Basin, Madison, Meagher, Park, Silver Bow, and Sweetgrass counties. Current distribution of A. lackschewitzii in Montana is mapped in Figure 2, p. 7.

Three-digit occurrence numbers are indicated in parentheses after the site names throughout this report (e.g., Jerry Creek (001)). Specific location and population information on these sites is in the Element Occurrence records, Part IV, p. 15.

Field surveys were conducted by the senior author 23 July to 5 August and 13 to 17 August 1990. During the current study, one new population (Campfire Lake Pothole (005)), consisting of two subpopulations, and one new subpopulation

subpopulation at Haystack Peak (007) was located. However, neither the original Haystack Peak population located in 1989, nor the Sunlight Basin (006) population located in 1980, were relocated during surveys in 1990. Also, Dana Field located five new populations (O'Brien Creek (010), Belt Creek (011), Big Hill Creek (012), Tenderfoot Creek (013)) during a wetlands study, on the Lewis and Clark National Forest.

3. **HISTORICAL SITES:** Frank H. Rose collected a Crepis sp. in 1948. Label data were vague, but indicate that the collection was made between Kings Hill and Neihart in Cascade County. The specimen remained an unidentified Crepis until 1982 when John Pierce annotated it as an Agoseris. Douglass Henderson, one of the authors describing this new species, annotated it as A. lackschewitzii in 1987. This is the first known collection of A. lackschewitzii. Surveys in the area during 1990 by Lewis and Clark National Forest botanist, Dana Field, located a population that probably represents this historic collection. This site is also included within the species range in Figure 2, p. 7.
4. **UNVERIFIED/UNDOCUMENTED REPORTS:** None.
5. **AREAS SURVEYED BUT SPECIES NOT LOCATED:** The following areas were unsuccessfully surveyed for A. lackschewitzii. Actual areas covered were smaller than the part-sections indicated. Land ownership was U.S. Forest Service, except for two sites that are private land, and are denoted with double asterisks (**).

- ** T3N, R11E, Section 1 SE1/4 (USGS Crazy Peak Quadrangle)
- T3N, R11E, Section 2 NE1/4NE 1/4 (USGS Crazy Peak Quadrangle)
- T3N, R11E, Section 12 NE1/4 (USGS Crazy Peak Quadrangle)
- ** T3N, R11E, Section 35 SE1/4 (USGS Crazy Peak Quadrangle)
- T3N, R11E, Section 36 SW1/4 (USGS Crazy Peak Quadrangle)

- T3N, R12E, Section 6 SW1/4 (USGS Crazy Peak Quadrangle)
- T4S, R10E, Section 14 SW1/4 (USGS Mt. Cowen Quadrangle)
- T4S, R10E, Section 15 SE1/4 (USGS Mt. Cowen Quadrangle)
- T5S, R6E, Section 12 S1/2 (USGS Fridley Peak Quadrangle)
- T6S, R12E, Section 31 S1/2 (USGS Mt. Douglas Quadrangle)
- T6S, R12E, Section 36 N1/2 (USGS Mt. Douglas Quadrangle)
- T6S, R13E, Section 32 E1/2 (USGS Mt. Douglas Quadrangle)
- T7S, R12E, Section 11 NE1/4 (USGS Haystack Peak Quadrangle)
- T7S, R12E, Section 14 SW1/4 (USGS Haystack Peak Quadrangle)
- T7S, R12E, Section 23 NE1/4, SW1/4 (USGS Haystack Peak Quadrangle)
- T7S, R12E, Section 27 NE1/4 (USGS Haystack Peak Quadrangle)
- T7S, R12E, Section 28 NE1/4 (USGS Haystack Peak Quadrangle)

E. HABITAT:

1. **ASSOCIATED VEGETATION:** Agoseris lackschewitzii occurs in open moist meadows containing forbs, grasses, sedges and rushes, and in ecotones between wet meadows and forest. Dominant overstory species, when present, are Abies lasiocarpa (subalpine fir), Picea engelmannii (Engelmann spruce), Pinus albicaulis (whitebark pine), and Pseudotsuga menziesii (Douglas fir). Other native plant species observed include:

<u>Androsace septentrionalis</u>	(northern androsace)
<u>Antennaria alpina</u>	(alpine pussytoes)
<u>Arnica mollis</u>	(hairy arnica)
<u>Caltha leptosepala</u>	(elkslip)
<u>Carex rostrata</u>	(beaked sedge)
<u>Carex scopulorum</u>	(Holm's Rocky Mountain sedge)
<u>Castilleja rhexifolia</u> ..	(rhexia-leaved paintbrush)
<u>Deschampsia cespitosa</u> ...	(tufted hairgrass)
<u>Erigeron peregrinus</u>	(subalpine daisy)
<u>Habenaria dilatata</u>	(white bog-orchid)
<u>Juncus balticus</u>	(Baltic rush)
<u>Pedicularis groenlandica</u>	(elephant's head)
<u>Phleum alpinum</u>	(alpine timothy)
<u>Poa leptocoma</u>	(bog bluegrass)
<u>Polygonum bistortoides</u> .	(American bistort)
<u>Potentilla diversifolia</u>	(vari-leaf cinquefoil)
<u>Salix drummondiana</u>	(Drummond willow)
<u>Saxifraga oregana</u>	(bog saxifraga)
<u>Senecio triangularis</u> ...	(arrowleaf groundsel)
<u>Veronica wormskjoldii</u> ..	(alpine speedwell)
<u>Zigadenus elegans</u>	(glaucous death camas)

2. **TOPOGRAPHY:** In Montana, populations of A. lackschewitzii are usually found in moist meadows and on the edges of wet meadows. Most locations are flat to gently sloping (0-30%), on slopes with various aspects, predominantly east. Elevations of these sites range from 2120 to 2880 m (6950-9450 ft).
3. **SOIL RELATIONSHIPS:** Agoseris lackschewitzii occurs on various substrates. In the moist meadows, soils are shallow and gravelly to loamy, with high amounts of organic matter present. This species does not appear to be restricted to a specific geologic stratum, physical or chemical characteristic of the soil.
4. **REGIONAL CLIMATE:** The majority of populations lie on the east side of the continental divide. Although Montana has a semi-arid climate, the high elevations, where A. lackschewitzii populations are located, receive approximately 8.0-16.0 cm (20-40 in) of precipitation annually. The meadows they occur in have enough well-distributed rainfall or ground water flow to remain moist throughout the growing season. Thirty-year averages (U.S. Department of Commerce 1982) for eight weather stations from Divide Creek east to Big Timber yield the following statistics:

temperatures range from 2.2° to 16°C (28-61°F) with an average of 6.2°C (43.2°F). This places the populations within a cryic soil temperature regime (7.2°C). Precipitation at the stations range from 4.3 to 7.3 cm (4.5-18.6 in). Since the climate stations are located between 1250 and 1815 m (4103-5950 ft) and the populations occur at 2120 to 2880 m (6950-9450 ft) elevations, average temperatures probably are lower and precipitation higher at A. lackschewitzii population sites.

F. POPULATION DEMOGRAPHY AND BIOLOGY

1. **PHENOLOGY:** Flowering generally occurs during July and August in A. lackschewitzii populations; although, the first collected specimen was in flower in late June (Rose s.n.). Within observed populations of this perennial species, a high proportion of individuals were in the rosette stage in 1990. Conditions that bring a plant to flower are unknown. Plants may require a number of years of food storage before flowering occurs. Few plants were flowering in 1990 and it may be that in any particular year, few plants in a population will produce flowers.
2. **POPULATION SIZE AND CONDITION:** Populations of A. lackschewitzii are small in size, ranging from 15 to 100 plants. The average area covered by a population is one acre.
3. **REPRODUCTIVE BIOLOGY**
 - a. **TYPE OF REPRODUCTION:** Flowers of A. lackschewitzii are perfect. Herbarium specimens have demonstrated that mature achenes are produced, and the presence of rosettes indicates some seed germination is occurring in the populations. There is no information about selfing or apomixis in the species. Some plants have branched caudexes (pers. obs., Henderson et al. 1990), which produce two to few plants vegetatively.
 - b. **POLLINATION BIOLOGY:** There are no reports of pollinators for A. lackschewitzii. Various species of bees and flies were observed visiting the flowers (pers. obs.).

- c. **SEED DISPERSAL AND BIOLOGY:** A double pappus of capillary bristles on the achenes of A. lackschewitzii may assist in the wind distribution of seeds at, or a short distance from, the parent plant. Germination requirements are unknown. It is not known how long achenes remain viable in the soil.

G. POPULATION ECOLOGY

1. BIOLOGICAL INTERACTIONS

- a. **COMPETITION:** While no quantitative studies have been done to assess interspecific competition, casual field observations suggest that A. lackschewitzii is moderately tolerant of close neighboring meadow plants. Agoseris lackschewitzii plants usually occur in close proximity to various species, but it does not occur in tall, dense vegetation, in thick sod-forming grasses, or in areas of bare soil.
- b. **HERBIVORY:** Not much is known of insect or mammal herbivory on A. lackschewitzii. Insect holes were observed in a few leaves in a population at the outlet of Campfire Lake Pothole (005), Sweetgrass County, but excessive damage was not seen (pers. obs.). Insects were not found within the flowering or fruiting heads.

H. LAND OWNERSHIP

1. The U.S. Forest Service manages the land where 14 of the 16 populations occur. Populations occurring on the individual forests are listed below; exact locations are located on maps in Part IV, p. 15.

Beaverhead National Forest
 Storm Lake (002)
 Clover Meadows (008)
 Harkness Lakes (016)

Deerlodge National Forest
 Jerry Creek (001)
 McKelvey Lake (003)
 Hollowtop Lake (004)

Gallatin National Forest
 Campfire Lake Pothole (005)
 Sunlight Basin (006)
 Haystack Peak (007)

Lewis & Clark National Forest
 Holiday Park (009)
 O'Brien Creek (010)
 Belt Creek (011)
 Big Hill Creek (012)
 Tenderfoot Creek (013)

2. The other two populations are on private land covered by the Flying "D" Conservation Easement.

Newell Basin Fen (014)
 Willow Swamp (015)

II. ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

- A. **THREATS TO CURRENTLY KNOWN POPULATIONS:** Populations occur in undisturbed mountain meadows. The only human-caused threats to A. lackschewitzii currently are from trails and their associated maintenance or erosion, and from grazing by sheep and cattle. The full extent of these activities is not known for each population. However, extensive sheep grazing was observed in the Haystack Peak population (007). Cattle graze south of the population at the outlet to the Campfire Lake Pothole (005). Pack trails bisect both populations, and some plants occur near trail edges.
- B. **MANAGEMENT PRACTICES AND RESPONSE:** Agoseris lackschewitzii populations probably will respond to management actions designed to prevent trampling or other mechanical soil damage in moist to wet meadow sites. These management actions include restricting grazing and routing trails around wet areas to more suitable dry sites. If trails cannot be relocated, trails through wet areas should be built to a high standard to prevent wide, multiple paths from developing as users attempt to avoid muddy conditions. Micro-habitat differences may account for sites with seemingly suitable habitat that currently do not contain populations of A. lackschewitzii.
- C. **RECOMMENDATIONS FOR MAINTAINING VIABLE POPULATIONS:** All populations should be considered in any habitat alteration projects on U.S. Forest Service lands. Detailed surveys should precede any proposed disturbances in or near populations. Mitigation

measures should be developed to reduce or eliminate the impacts of management activities.

The effects of grazing on A. lackschewitzii population dynamics are unknown. An excellent area to place long-term monitoring plots and exclosures would be at the Haystack Peak population (007). This area could provide information about population responses to grazing activity and trail impacts.

- D. **RECOMMENDATIONS FOR FURTHER ASSESSMENT:** Much potential habitat remains to be surveyed throughout all southwestern Montana forests. Surveys should include moist to wet meadows along stream courses and surrounding subalpine to alpine lakes, in the mountains of the Anaconda Range, Tobacco Root Mountains, Little Belt Mountains, Absaroka-Beartooth Mountains, Gravelly Range, and portions of the Crazy Mountains not surveyed.
- E. **SUMMARY:** Agoseris lackschewitzii is a regional endemic with very limited distribution in eight Montana counties and two Idaho counties. Field surveys by Montana Natural Heritage Program in 1990 located an additional subpopulation at Haystack Peak (007) and an additional population at Campfire Lake Pothole (005) on the Gallatin National Forest. Five additional populations were located on the Lewis & Clark National Forest in 1990 by Dana Field. It is included on the Watch List for Region 1 of the U.S. Forest Service. Low proportions of flowering plants, lack of information on the population dynamics and on the species' response to grazing pressure, indicate a need to monitor the populations. In the absence of information on species' response, these sites will need to be carefully assessed when planning land use activities that might affect A. lackschewitzii populations.

III. LITERATURE CITED

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IV. ELEMENT OCCURRENCE PRINT-OUTS AND MAPS

ELEMENT OCCURRENCE RECORD
Agoseris lackschewitzii

16

Occurrence number: 001

Global rank: G3 Forest Service status: WATCH LIST
State rank: S2 Federal Status:

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

County: SILVER BOW

USGS quadrangle: DICKIE PEAK

Township-range: 002N010W Section: 18 Precision: M
Township-range comments: NE4

Survey date: 1973-07-11	Elevation: 7760
First observation: 1973	Slope/aspect:
Last observation: 1973-07-11	Size (acres):

Location:
HEADWATERS OF JERRY CREEK, ABOUT 10 MILES NNE OF WISE RIVER.

Element occurrence data:
UNKNOWN.

General site description:
WET SLOPE.

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

Comments:
NONE.

Information source:
STICKNEY (2955). 1973. ID.

ELEMENT OCCURRENCE RECORD
Agoseris lackschewitzii

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Occurrence number: 002

Global rank: G3 Forest Service status: WATCH LIST
State rank: S2 Federal Status:

Survey site name: STORM LAKE

EO rank:
EO rank comments:

County: DEER LODGE

USGS quadrangle: STORM LAKE

Township-range: 004N013W Section: 30 Precision: M
Township-range comments:

Survey date: 1984-08-29	Elevation: 8280
First observation: 1973	Slope/aspect:
Last observation: 1984-08-29	Size (acres):

Location:

SOUTHWEST OF STORM LAKE, ANACONDA RANGE. ABOUT 15 MILES SOUTHWEST OF ANACONDA.

Element occurrence data:
UNKNOWN.

General site description:
MOIST MEADOW.

Land owner/manager:
DEERLODGE NATIONAL FOREST, DEER LODGE RANGER DISTRICT

Comments:
ALSO LACKSCHEWITZ (4547). 1973. MONTU. MEADOW IS SOUTHEAST OF LAKE.

Information source:
MOSELEY (582). 1984. ID.

ELEMENT OCCURRENCE RECORD
Agoseris lackschewitzii

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Occurrence number: 003

Global rank: G3 Forest Service status: WATCH LIST
State rank: S2 Federal Status:

Survey site name: MCKELVEY LAKE

EO rank:
EO rank comments:

County: MADISON

USGS quadrangle: RAMSHORN MOUNTAIN

Township-range: 004S003W Section: 11 Precision: S

Township-range comments: SW4; 14 NW4

Survey date: 1984-08-27	Elevation: 8760
First observation: 1982	Slope/aspect:
Last observation: 1984-08-27	Size (acres):

Location:

SOUTHWEST SHORE OF MCKELVEY LAKE, NEAR INLET; NORTH SHORE. TOBACCO
ROOT MOUNTAINS. ABOUT 13 MILES NORTHWEST OF ENNIS.

Element occurrence data:
UNKNOWN.

General site description:
MOIST MEADOW.

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

Comments:
ALSO COLLECTED BY LACKSCHEWITZ (10191). 1982. MONTU.

Information source:
MOSELEY (579). 1984. ID.

ELEMENT OCCURRENCE RECORD
Agoseris lackschewitzii

Occurrence number: 004

Global rank: G3 Forest Service status: WATCH LIST
State rank: S2 Federal Status:

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

County: MADISON

USGS quadrangle: POTOSI PEAK

Township-range: 003S003W Section: 04 Precision: S
Township-range comments: W2

Survey date: 1984-08-28	Elevation: 8560
First observation: 1984	Slope/aspect:
Last observation: 1984-08-28	Size (acres):

Location:
WEST SHORE OF HOLLOWTOP LAKE, TOBACCO ROOT MOUNTAINS. ABOUT 6 MILES
SOUTHWEST OF PONY.

Element occurrence data:
UNKNOWN.

General site description:
WET MEADOW.

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

Comments:
NONE.

Information source:
MOSELEY (581). 1984. ID.

ELEMENT OCCURRENCE RECORD
Agoseris lackschewitzii

Occurrence number: 005

Global rank: G3 Forest Service status: WATCH LIST
State rank: S2 Federal Status:

Survey site name: CAMPFIRE LAKE POTHOLE
EO rank: B
EO rank comments: MAIN POPULATION PRISTINE; CATTLE GRAZING
AND TRAIL THROUGH SUBPOPULATION.

County: PARK

USGS quadrangle: CAMPFIRE LAKE

Township-range: 004N011E Section: 19 Precision: S
Township-range comments: SE4SE4; 20 SE4SW4

Survey date: 1990-08-03 Elevation: 8580
First observation: 1990 Slope/aspect: 8-35% / EAST
Last observation: 1990-08-03 Size (acres): 2

Location:
CRAZY MOUNTAINS, CAMPFIRE LAKE; TAKE TRAIL FROM PORCUPINE GUARD
STATION CA. 6 MILES SOUTHEAST.

Element occurrence data:
IN 1990, 11-50 GENETS; 5 PLANTS IN FLOWER, REST IN ROSETTES.
SUBPOPULATION: 11-50 GENETS; 6 PLANTS IN FLOWER, REST IN ROSETTES.

General site description:
GRANITIC PARENT MATERIAL, GRAVELLY SILT LOAM. PINUS FLEXILIS/MEADOW
HABITAT, WITH POLYGONUM BISTORTOIDES, POTENTILLA DIVERSIFOLIA, POA
CUSICKII, PEDICULARIS GROENLANDICA, PHLEUM ALPINUM, ALLIUM SPP.,
TOFIELDIA GLUTINOSA, SAXIFRAGA SPP., HERACLEUM LANATUM, RUMEX, LUPINUS,
DODECATHEON, MERTENSIA, CHRYSOPSIS, DESCHAMPSIA CAESPITOSA.

Land owner/manager:
PRIVATELY OWNED LAND (INDIVIDUAL OR CORPORATE)
GALLATIN NATIONAL FOREST, BIG TIMBER RANGER DISTRICT

Comments:
SUBPOPULATION ELEVATION 7940 FT. VOUCHER - PAVEK (183), 1990, MONTU.

Information source:
PAVEK, D. 1990. FIELD SURVEY OF 24 JULY-11 AUGUST FOR AGOSERIS
LACKSCHEWITZII ON THE GALLATIN NATIONAL FOREST.

ELEMENT OCCURRENCE RECORD
Agoseris lackschewitzii

Occurrence number: 006

Global rank: G3 Forest Service status: WATCH LIST
State rank: S2 Federal Status:

Survey site name: SUNLIGHT BASIN
EO rank:
EO rank comments:

County: PARK

USGS quadrangle: CAMPFIRE LAKE

Township-range: 004N011E Section: 08 Precision: M
Township-range comments: SW4

Survey date: 1980-07-31	Elevation: 9280
First observation: 1980	Slope/aspect:
Last observation: 1980-07-31	Size (acres):

Location:
BELOW NORTH SLOPE OF SUNLIGHT PEAK, CRAZY MOUNTAINS.

Element occurrence data:
UNKNOWN.

General site description:
MOIST MEADOW.

Land owner/manager:
GALLATIN NATIONAL FOREST, BIG TIMBER RANGER DISTRICT

Comments:
BORDERS WATERSHED 10070003.

Information source:
LACKSCHEWITZ K.H. (9421). 1980. MONTU.

ELEMENT OCCURRENCE RECORD
Agoseris lackschewitzii

22

Occurrence number: 007

Global rank: G3 Forest Service status: WATCH LIST
State rank: S2 Federal Status:

Survey site name: HAYSTACK / MONUMENT PEAKS
EO rank: BC
EO rank comments: NOT FULLY ASSESSED; DEPENDS ON SIZE OF
EO. MEADOWS IMPACTED BY ROADS AND
OFF-ROAD TRAIL BIKE USE, (1989). AREA
GRAZED BY SHEEP (1990).

County: SWEET GRASS

USGS quadrangle: HAYSTACK PEAK

Township-range: 007S012E Section: 27 Precision: S
Township-range comments: NE4; 22 SE4, NE4

Survey date: 1990-07-26 Elevation: 9450
First observation: 1989 Slope/aspect: 0-15% / EAST
Last observation: 1990-07-26 Size (acres):

Location:

ABSAROKA-BEARTOOTH MOUNTAINS, EAST FORK BOULDER RIVER DRAINAGE, BASIN
JUST NORTH OF BLUE LAKE, CA. 1 AIR MILE NORTHEAST OF MONUMENT PEAK,
AND 1 AIR MILE NORTHWEST OF HAYSTACK PEAK.

Element occurrence data:

UNKNOWN; POPULATION NOT FULLY SURVEYED (1989). SUBPOPULATION LOCATED
IN 1990 CA. 0.75 MILE NORTH; 11-50 GENETS, 2 PLANTS IN FLOWER.

General site description:

WET SUBALPINE MEADOW IN WHITEBARK PINE OPENING, WITH ANTENNARIA
ALPINA, POLYGONUM BISTORTOIDES, POTENTILLA DIVERSIFOLIA, VERONICA
WORMSKJOLDII.

Land owner/manager:

ABSAROKA-BEARTOOTH WILDERNESS AREA
GALLATIN NATIONAL FOREST, BIG TIMBER RANGER DISTRICT
PRIVATELY OWNED LAND (INDIVIDUAL OR CORPORATE)

Comments:

VOUCHER - MATHEWS, S. (265), 1989, MONT; IDENTIFICATION VERIFIED BY R.
MOSELEY, IDNHP. ADDITIONAL FIELD SURVEY BY DIANE PAVEK (C/O MTNHP),
1990.

Information source:

MATHEWS, SARAH. DEPT. OF BIOLOGY, MONTANA STATE UNIVERSITY, BOZEMAN,
MT 59717.

ELEMENT OCCURRENCE RECORD
Agoseris lackschewitzii

Occurrence number: 008

Global rank: G3 Forest Service status: WATCH LIST
State rank: S2 Federal Status:

Survey site name: CLOVER MEADOWS
EO rank:
EO rank comments:

County: MADISON

USGS quadrangle: BROOMTAIL RIDGE

Township-range: 009S002W Section: 15 Precision: M
Township-range comments:

Survey date:	Elevation: 8600
First observation: 1988	Slope/aspect:
Last observation: 1988-07-09	Size (acres):

Location:

GRAVELLY RANGE (CA. 17 MILES SSE OF VIRGINIA CITY, ALONG FOREST SERVICE ROAD # 290, NEAR CLOVER MEADOWS).

Element occurrence data:
UNKNOWN.

General site description:

IN MOIST MEADOW BELOW LARGE SNOWDRIFT, WITH ARNICA MOLLIS, EPILOBIUM PALUSTRE, CALTHA LEPTOSEPALA, DESCHAMPSIA CESPITOSA/CAREX SCOPULORUM MEADOW.

Land owner/manager:

BEAVERHEAD NATIONAL FOREST, SHERIDAN RANGER DISTRICT
BEAVERHEAD NATIONAL FOREST, MADISON RANGER DISTRICT

Comments:
NONE.

Information source:

LACKSCHEWITZ, K.H. DIVISION OF BIOLOGICAL SCIENCES, UNIVERSITY OF MONTANA, MISSOULA, MT 59812 (11494). 1988. WITH JERRY DESANTO. MONTU.

ELEMENT OCCURRENCE RECORD
Agoseris lackschewitzii

24

Occurrence number: 009

Global rank: G3 Forest Service status: WATCH LIST
State rank: S2 Federal Status:

Survey site name: HOLIDAY PARK

EO rank: B

EO rank comments: SMALL POPULATION; RELATIONSHIP WITH
GRAZING NOT KNOWN; POSSIBILITY FOR
EXCLOSURE IN ALLOTMENT.

County: JUDITH BASIN

USGS quadrangle: RUSSIAN FLAT
ETTIEEN SPRING

Township-range: 012N010E Section: 34 Precision: S

Township-range comments:

Survey date: 1990-07-04	Elevation: 6950
First observation: 1990	Slope/aspect: 3-8% / NORTHEAST
Last observation: 1990-07-04	Size (acres):

Location:

UPPER THIRD OF HOLIDAY PARK (CA. 25 MILES NORTHEAST OF WHITE SULPHUR SPRINGS).

Element occurrence data:

51-100 RAMETS, IN FLOWER (4 JULY 1990).

General site description:

ALONG STREAM BETWEEN LODGEPOLES; HIGH ELEVATION WET MEADOW IN
HISTIC/SHALE/SANDSTONE SOIL; ASSOCIATED WITH HABENARIA DILATATA,
JUNCUS BALTICUS, CAREX ROSTRATA, ANDROSACE SEPTENTRIONALIS,
DODECATHEON SP., RANUNCULUS SP., PHLEUM ALPINUM, SALIX DRUMMONDIANA.

Land owner/manager:

LEWIS & CLARK NATIONAL FOREST, JUDITH RANGER DISTRICT

Comments:

HYDROLOGY OF MEADOW AND/OR COMPETITORS INFLUENCED BY GRAZING; STREAM
AREA DEGRADING.

Information source:

FIELD, D. LEWIS AND CLARK NATIONAL FOREST, AUGUSTA, MT. (070490-1).
1989.

ELEMENT OCCURRENCE RECORD
Agoseris lackschewitzii

25

Occurrence number: 010

Global rank: G3 Forest Service status: WATCH LIST
State rank: S2 Federal Status:

Survey site name: O'BRIEN CREEK
EO rank: A
EO rank comments: PRISTINE.

County: CASCADE

USGS quadrangle: KINGS HILL

Township-range: 013N008E Section: 29 Precision: S
Township-range comments:

Survey date: 1990-08-02 Elevation: 6950
First observation: 1990 Slope/aspect: 8-15% / NORTH
Last observation: 1990-08-02 Size (acres):

Location:

LITTLE BELT MOUNTAINS; PROCEED FROM KINGS HILL PASS CA. 1 MILE NORTH
ON HWY 89 TO FS ROAD #839; FOLLOW ROAD WEST CA. 3 MILES. SITE IS 0.25
MILE NORTH OF ROAD ALONG O'BRIEN CREEK.

Element occurrence data:

51-100 RAMETS; SMALL PROPORTION BLOOMING.

General site description:

ABIES LASIOCARPA-PINUS ALBICAULIS/VACCINIUM SCOPARIUM HABITAT TYPE
UPLAND; PICEA/EQUISETUM ARVENSE IN BOTTOM. WITH MERTENSIA CILIOLATA,
CALAMAGROSTIS CANADENSIS, VALERIANA SITCHENSIS, SALIX MONTICOLA,
HABENARIA DILATATA, PEDICULARIS BRACTEOSA, AND AGOSERIS AURANTIACA.

Land owner/manager:

LEWIS & CLARK NATIONAL FOREST, KINGS HILL RANGER DISTRICT

Comments:

VOUCHER - FIELD, D. (080290-3), 1990. O'BRIEN CREEK IS MUNICIPAL
WATERSHED; CLOSED TO GRAZING.

Information source:

FIELD, D. LEWIS & CLARK NATIONAL FOREST, 1101 15TH ST. N, BOX 871,
GREAT FALLS, MT 59403.

ELEMENT OCCURRENCE RECORD
Agoseris lackschewitzii

Occurrence number: 011

Global rank: G3 Forest Service status: WATCH LIST
State rank: S2 Federal Status:

Survey site name: BELT CREEK
EO rank: AB
EO rank comments: POSSIBLY SOME DISTURBANCE FROM ROAD
CONSTRUCTION (HWY 89).

County: CASCADE

USGS quadrangle: KINGS HILL

Township-range: 013N008E Section: 34 Precision: S
Township-range comments:

Survey date: 1990-08-03 Elevation: 7200
First observation: 1948 Slope/aspect: 3-8% / NORTH
Last observation: 1990-08-03 Size (acres):

Location:

LITTLE BELT MOUNTAINS; CA. 0.5 MILE NORTH OF KINGS HILL PASS NEAR THE
HEAD OF BELT CREEK.

Element occurrence data:

101-1000 RAMETS; SPARSE EVEN IN APPARENTLY SUITABLE HABITAT.

General site description:

ABIES LASIOCARPA-PINUS ALBICAULIS/VACCINIUM SCOPARIUM HABITAT TYPE.
ASSOCIATED SPECIES: LUZULA PARVIFLORA, DESCHAMPSIA CESPITOSA, MIMULUS
LEWISII, ARNICA MOLLIS, PEDICULARIS BRACTEOSA, EPILOBIUM PANICULATUM,
SAXIFRAGA ARGUTA, AGOSERIS AURANTIACA.

Land owner/manager:

LEWIS & CLARK NATIONAL FOREST, KINGS HILL RANGER DISTRICT

Comments:

VOUCHER - FIELD, D. (080390-2), 1990. ALSO COLLECTED ("BETWEEN KINGS
HILL AND NEIHART") BY ROSE, FRANK H. (S.N.), 1948, SPECIMEN # 088310,
MONTU.

Information source:

FIELD, D. LEWIS & CLARK NATIONAL FOREST, 1101 15TH ST. N, BOX 871,
GREAT FALLS, MT 59403 (080390-2).

ELEMENT OCCURRENCE RECORD
Agoseris lackschewitzii

27

Occurrence number: 012

Global rank: G3 Forest Service status: WATCH LIST
State rank: S2 Federal Status:

Survey site name: BIG HILL CREEK
EO rank: B
EO rank comments: IN ALLOTMENT; WILLOWS MODERATELY
BROWSED.

County: JUDITH BASIN

USGS quadrangle: RUSSIAN FLAT

Township-range: 011N010E Section: 09 Precision: S
Township-range comments:

Survey date: 1990-07-18 Elevation: 6640
First observation: 1990 Slope/aspect: 3-8% / NORTHEAST
Last observation: 1990-07-18 Size (acres):

Location:

LITTLE BELT MOUNTAINS, BIG HILL CREEK, NEAR JUNCTION OF FS ROAD #487
AND ETTIEN RIDGE ROAD (#821).

Element occurrence data:

11-50 RAMETS, MOSTLY PAST BLOOMING. OTHER AGOSERIS SPP. NEARBY, ALSO
WITH IMMATURE HEADS.

General site description:

NORTHEAST SLOPE OF STREAMBANKS. ASSOCIATED SPECIES: HABENARIA
DILATATA, PEDICULARIS GROENLANDICA, PHLEUM ALPINUM, PHLEUM PRATENSE,
DESCHAMPSIA CESPITOSA, SALIX PLANIFOLIA, SALIX GEYERIANA, AGOSERIS
GLAUCA.

Land owner/manager:

LEWIS & CLARK NATIONAL FOREST, JUDITH RANGER DISTRICT

Comments:

SEARCH OF STREAMSIDES AND WET MEADOW RECOMMENDED IN LATE JUNE-EARLY
JULY.

Information source:

FIELD, D. LEWIS & CLARK NATIONAL FOREST, 1101 15TH ST. N, BOX 871,
GREAT FALLS, MT 59403.

ELEMENT OCCURRENCE RECORD
Agoseris lackschewitzii

28

Occurrence number: 013

Global rank: G3 Forest Service status: WATCH LIST
State rank: S2 Federal Status:

Survey site name: TENDERFOOT CREEK
EO rank: A
EO rank comments: PRISTINE; WITHIN BOUNDARY OF ONION PARK
PROPOSED RNA.

County: MEAGHER

USGS quadrangle: BELT PARK BUTTE

Township-range: 013N007E Section: 04 Precision: S
Township-range comments:

Survey date: 1990-08-06 Elevation: 7350
First observation: 1990 Slope/aspect: 3-8% / NORTH
Last observation: 1990-08-06 Size (acres):

Location:

LITTLE BELT MOUNTAINS, CA. 6 AIR MILES WSW OF NEIHART. TAKE FS ROAD #586 CA. 3 MILES NORTHEAST OF BUBBLING SPRINGS; SITE IS NE OF ONION PARK, AT HEAD OF TENDERFOOT CREEK.

Element occurrence data:

51-100 RAMETS, PROBABLY PAST PEAK FLOWERING; SPARSE, EVEN IN PRISTINE, APPARENTLY SUITABLE HABITAT.

General site description:

HIGH-ELEVATION WET MEADOW, ABIES LASIOCARPA/VACCINIUM SCOPARIUM HABITAT TYPE, WITH PEDICULARIS GROENLANDICA, ALLIUM SCHOENOPRASUM, SALIX MONTICOLA, TROLLIUS LAXUS, EQUISETUM ARVENSE, DESCHAMPSIA CESPITOSA, AGOSERIS GLAUCA, AND A. AURANTIACA.

Land owner/manager:

LEWIS & CLARK NATIONAL FOREST, KINGS HILL RANGER DISTRICT

Comments:

VOUCHER - FIELD, D. (080690-1), 1990.

Information source:

FIELD, D. LEWIS & CLARK NATIONAL FOREST, 1101 15TH ST. N, BOX 871, GREAT FALLS, MT 59403.

ELEMENT OCCURRENCE RECORD
Agoseris lackschewitzii

29

Occurrence number: 014

Global rank: G3 Forest Service status: WATCH LIST
State rank: S2 Federal Status:

Survey site name: NEWELL BASIN FEN
EO rank: C
EO rank comments: SMALL POPULATION, MANY EXOTICS PRESENT.

County: MADISON

USGS quadrangle: WILLOW SWAMP

Township-range: 004S003E Section: 29 Precision: S
Township-range comments: NE4

Survey date: 1990-06-25 Elevation: 6150
First observation: 1990 Slope/aspect: 0-3% / FLAT
Last observation: 1990-06-25 Size (acres):

Location:

NEWELL BASIN; CA. 16 MILES SOUTHWEST OF BOZEMAN, AND CA. 1 MILE
NORTHWEST OF SPANISH CREEK RECREATION SITE.

Element occurrence data:

1-10 PLANTS, SOME FLOWERING.

General site description:

JUNCUS BALTICUS/DESCHAMPSIA CESPITOSA MEADOW, WITH POA PRATENSIS,
SENECIO FOETIDUS, ALLIUM GEYERI, TRIFOLIUM LONGIPES, LUZULA
CAMPESTRIS, AND PERHAPS AGOSERIS GLAUCA. EXOTIC PLANT SPECIES WERE
ALSO COMMON. MOIST BOTTOM LAND, IN FULL SUN.

Land owner/manager:

FLYING "D" RANCH CONSERVATION EASEMENT

Comments:

BECAUSE PLANTS WERE NOT ALL IN BLOOM, POPULATION SIZE MAY HAVE BEEN
UNDERESTIMATED.

Information source:

LESICA, P. DIVISION OF BIOLOGICAL SCIENCES, UNIVERSITY OF MONTANA,
MISSOULA, MT 59812.

ELEMENT OCCURRENCE RECORD
Agoseris lackschewitzii

30

Occurrence number: 015

Global rank: G3 Forest Service status: WATCH LIST
State rank: S2 Federal Status:

Survey site name: WILLOW SWAMP
EO rank: C
EO rank comments: SMALL POPULATION WITH MANY EXOTICS, BUT
EASILY DEFENSIBLE.

County: MADISON

USGS quadrangle: WILLOW SWAMP

Township-range: 004S002E Section: 26 Precision: S
Township-range comments: SW4NW4

Survey date: 1990-06-25 Elevation: 6950
First observation: 1990 Slope/aspect: 0-3% / FLAT
Last observation: 1990-06-25 Size (acres):

Location:

WILLOW SWAMP; CA. 19 MILES SOUTHWEST OF BOZEMAN, AND CA. 3.25 MILES
NORTHWEST OF SPANISH CREEK RECREATION SITE.

Element occurrence data:
1-10 PLANTS.

General site description:

JUNCUS BALTICUS/DESCHAMPSIA CESPITOSA MEADOW, WITH POA PRATENSIS,
PHLEUM PRATENSE, RANUNCULUS UNCINATUS, AND TARAXACUM OFFICINALE. MOIST
BOTTOM LAND, IN FULL SUN.

Land owner/manager:

FLYING "D" RANCH CONSERVATION EASEMENT

Comments:

BECAUSE SPECIES WAS NOT IN FULL BLOOM, POPULATION WAS PROBABLY
UNDERESTIMATED

Information source:

LESICA, P. DIVISION OF BIOLOGICAL SCIENCES, UNIVERSITY OF MONTANA,
MISSOULA, MT 59812. (5111). MONTU.

ELEMENT OCCURRENCE RECORD
Agoseris lackschewitzii

31

Occurrence number: 016

Global rank: G3 Forest Service status: WATCH LIST
State rank: S2 Federal Status:

Survey site name: HARKNESS LAKES
EO rank: C
EO rank comments: SMALL POPULATION; DISTURBED HABITAT WITH
WEED INVASION.

County: BEAVERHEAD

USGS quadrangle: EIGHTEENMILE PEAK

Township-range: 016S011W Section: 4 Precision: S
Township-range comments: NE4SW4

Survey date: 1990-07-01 Elevation: 8220
First observation: 1990 Slope/aspect: 0-3% / NORTHEAST
Last observation: 1990-07-01 Size (acres):

Location:

BEAVERHEAD MOUNTAINS, HARKNESS LAKES; CA. 22 MILES SOUTHWEST OF DELL.

Element occurrence data:

32 FLOWERING PLANTS; TOTAL POPULATION 51-100 PLANTS.

General site description:

DESCHAMPSIA CESPITOSA/TRIFOLIUM LONGIPES MEADOW, WITH ALOPECURUS
ALPINUS, JUNCUS BALTICUS, PHLEUM ALPINUM, SENECEO FOETIDUS, POTENTILLA
DIVERSIFOLIA, TARAXACUM OFFICINALE, CAREX AQUATILIS. MOIST BOTTOM
LAND, IN FULL SUN.

Land owner/manager:

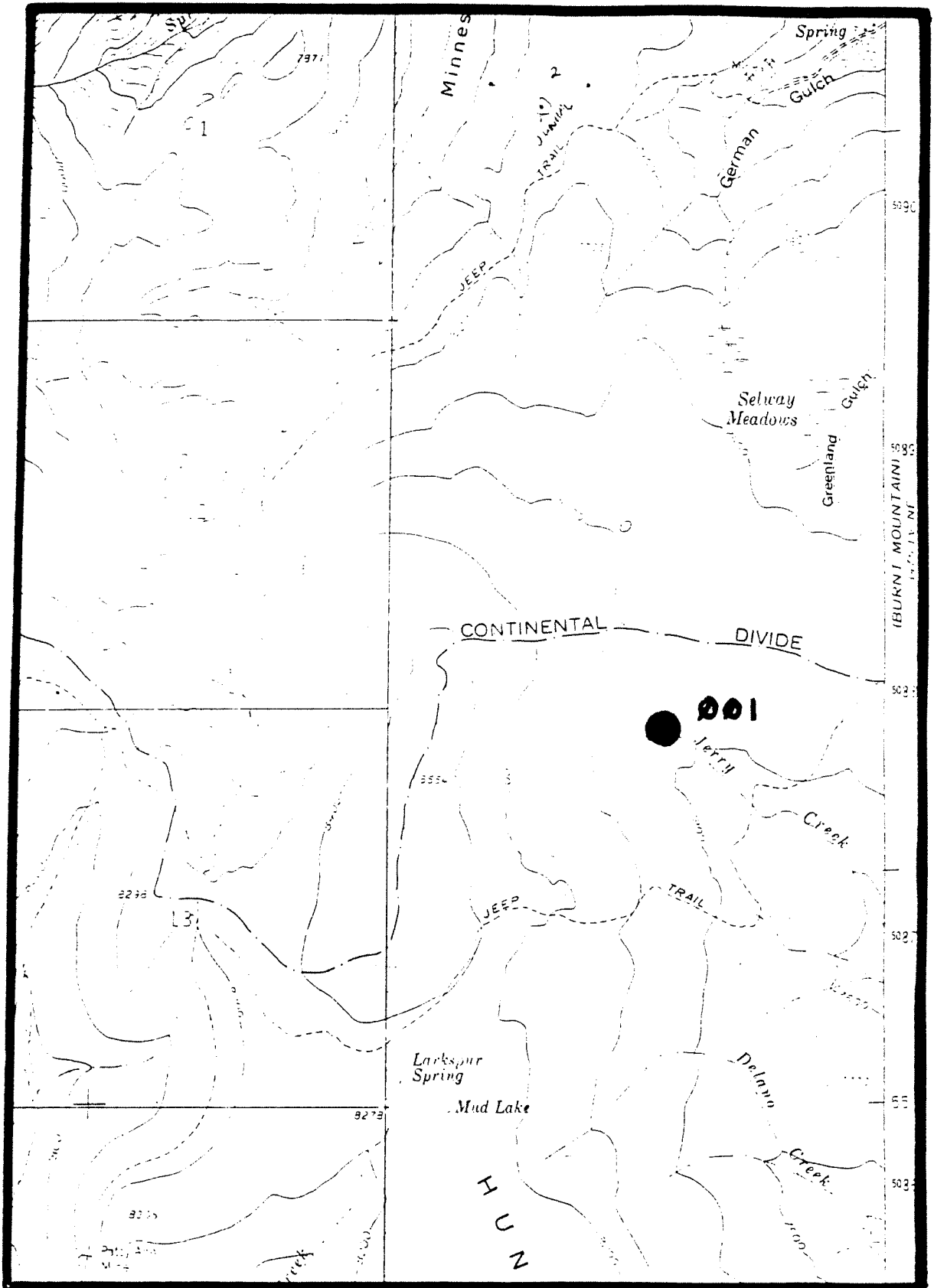
BEAVERHEAD NATIONAL FOREST, DILLON RANGER DISTRICT

Comments:

HIGH FORB COVER, DANDELIONS, NEARBY CONSTRUCTION.

Information source:

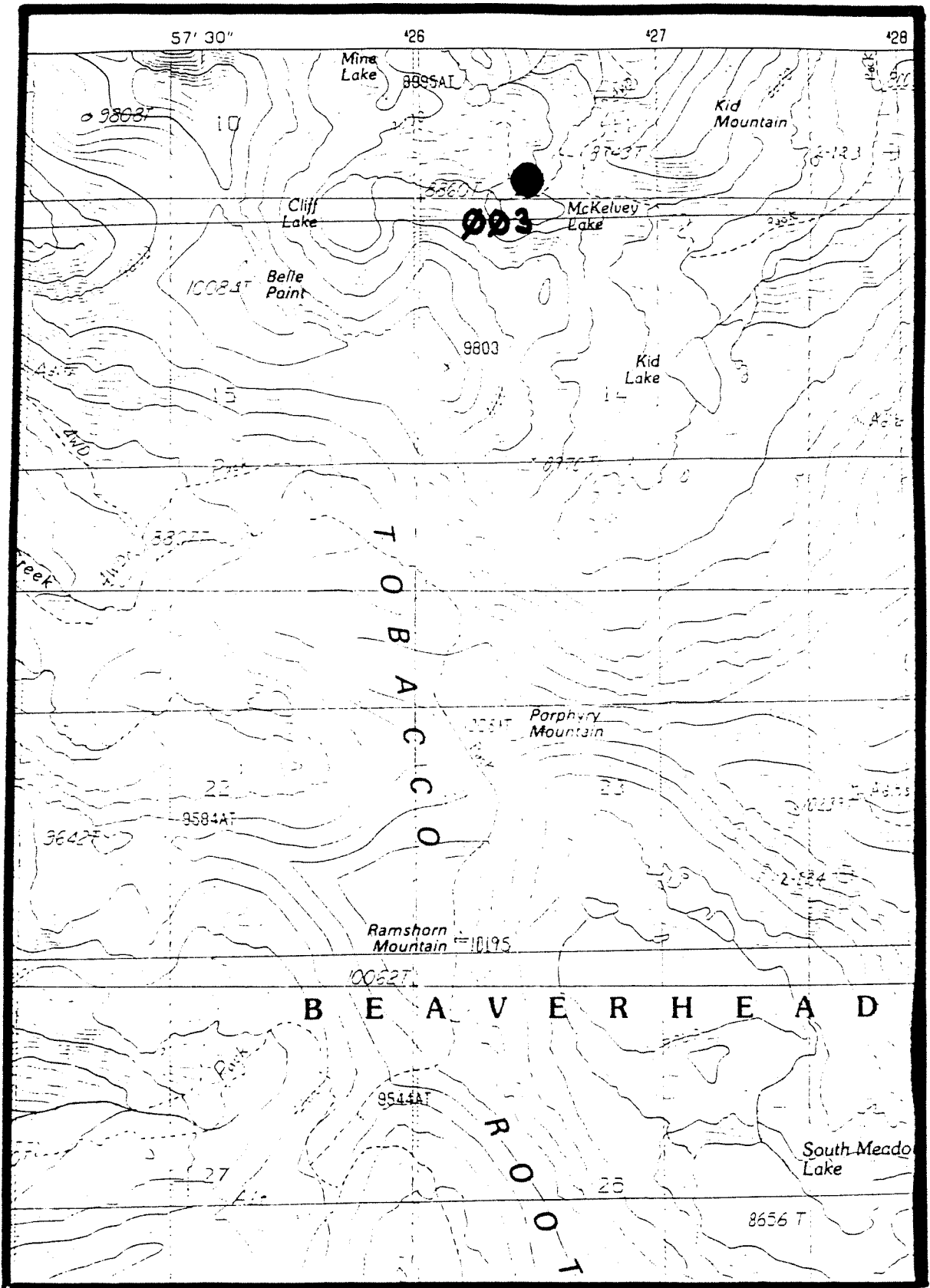
LESICA, P. DIVISION OF BIOLOGICAL SCIENCES, UNIVERSITY OF MONTANA,
MISSOULA, MT 59812. (5130). MONTU.



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

Agoseris lackschewitzii

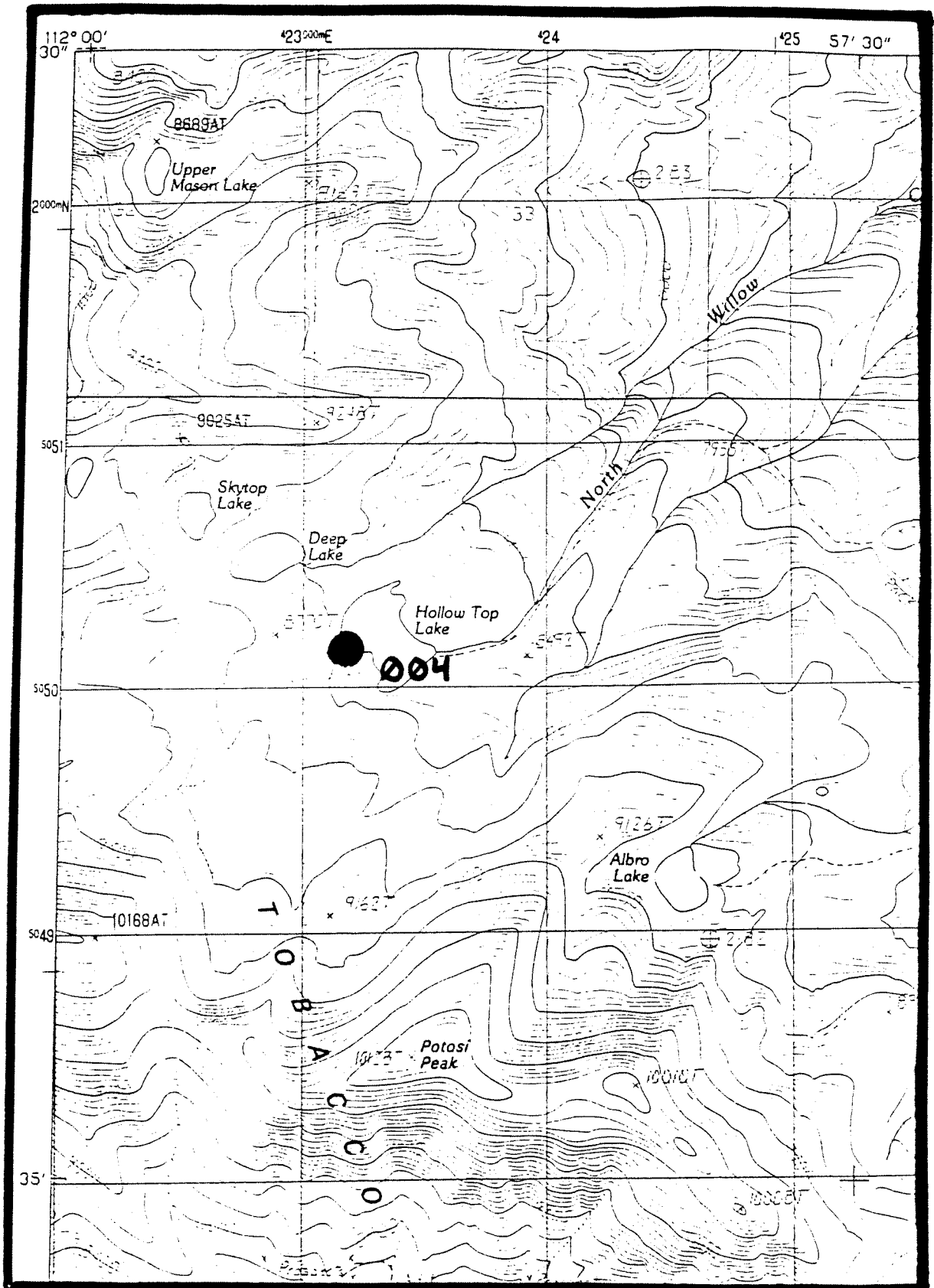
Jerry Creek (001)



U.S.G.S. Ramshorn Mountain (7.5')

Agoseris lackschewitzii

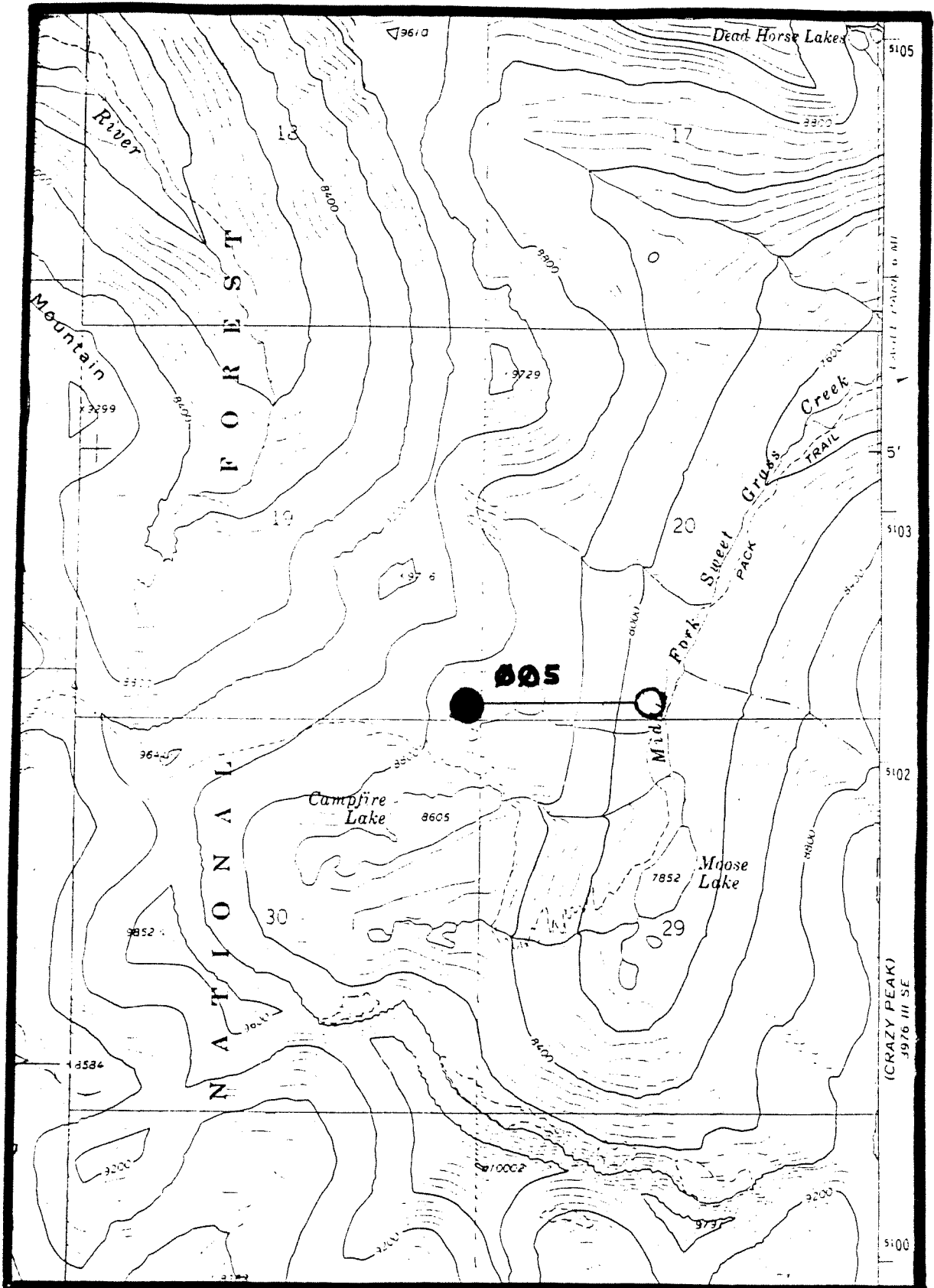
McKelvey Lake (003)



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

Agoseris lackschewitzii

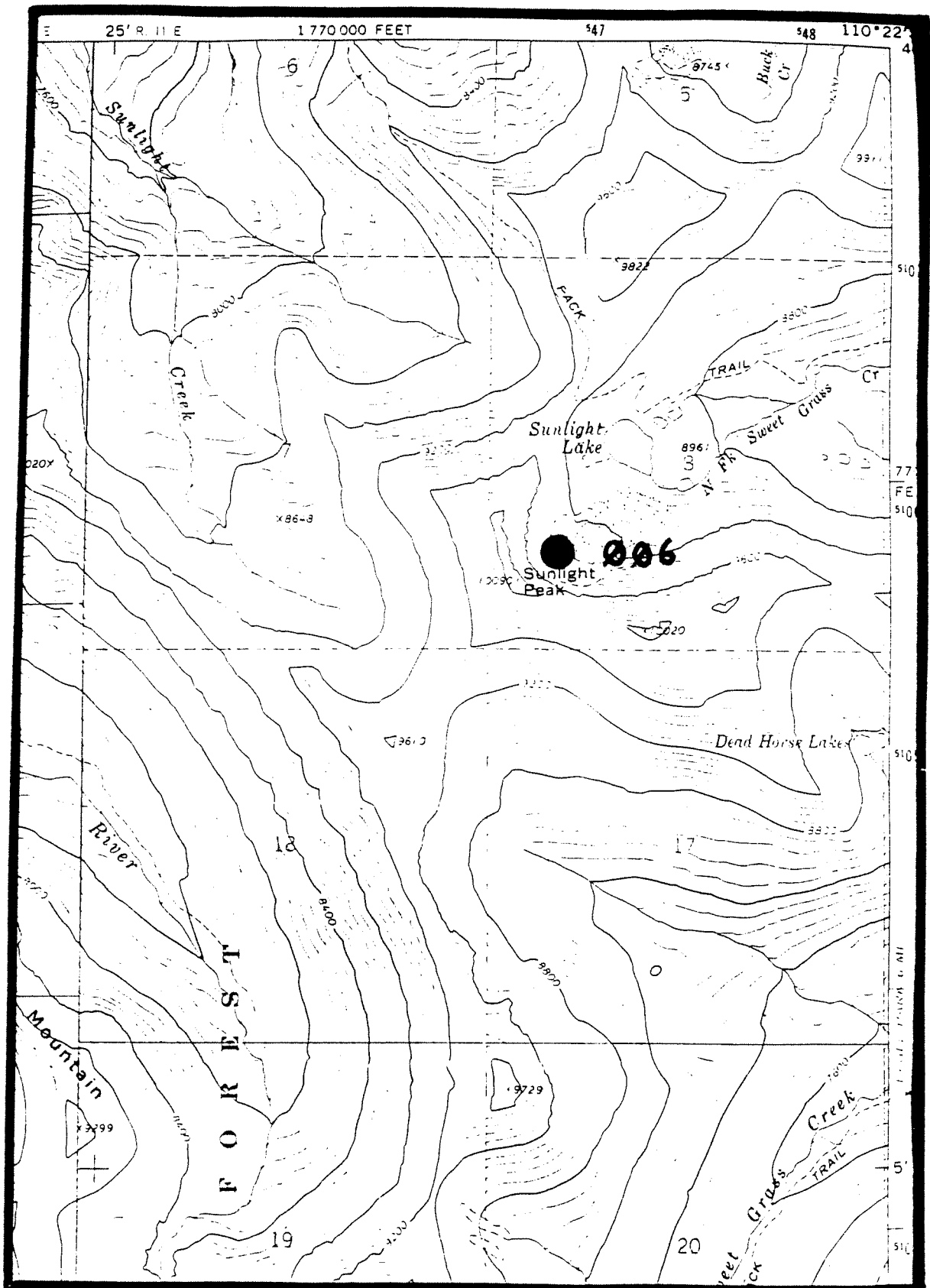
Hollowtop Lake (004)



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

Agoseris lackschewitzii

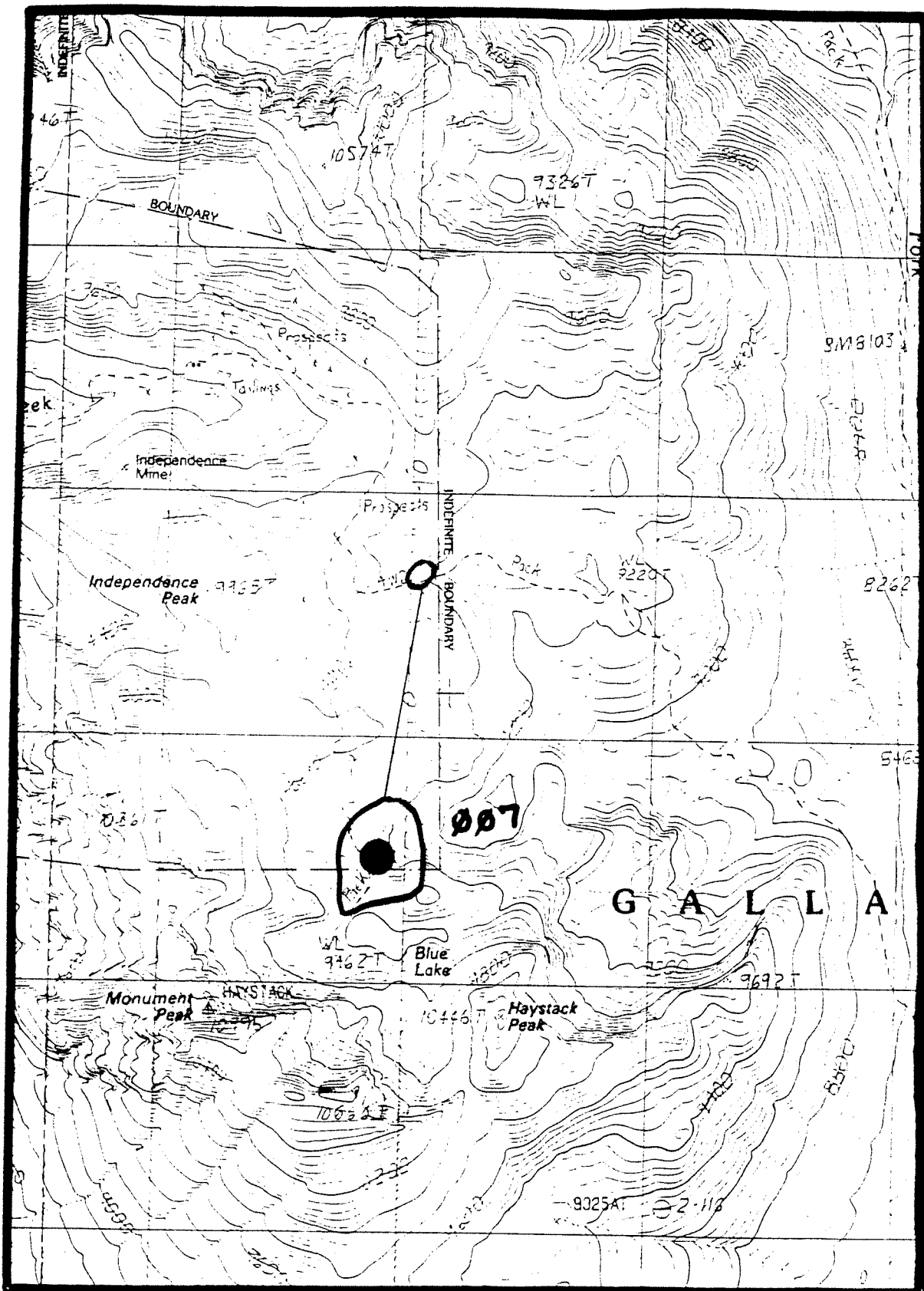
Campfire Lake Pothole (005)



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

Agoseris lackschewitzii

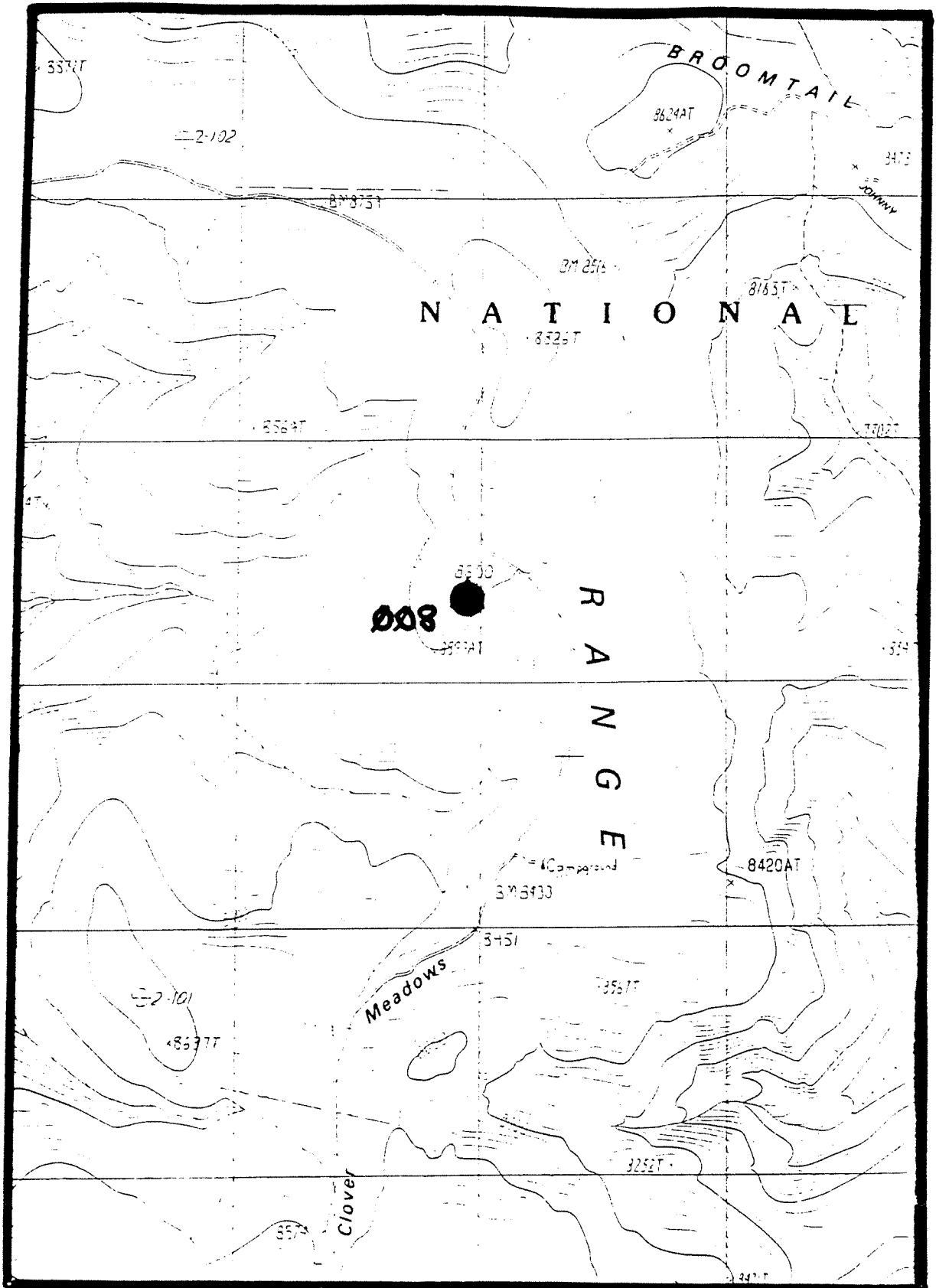
Sunlight Basin (006)



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

Agoseris lackschewitzii

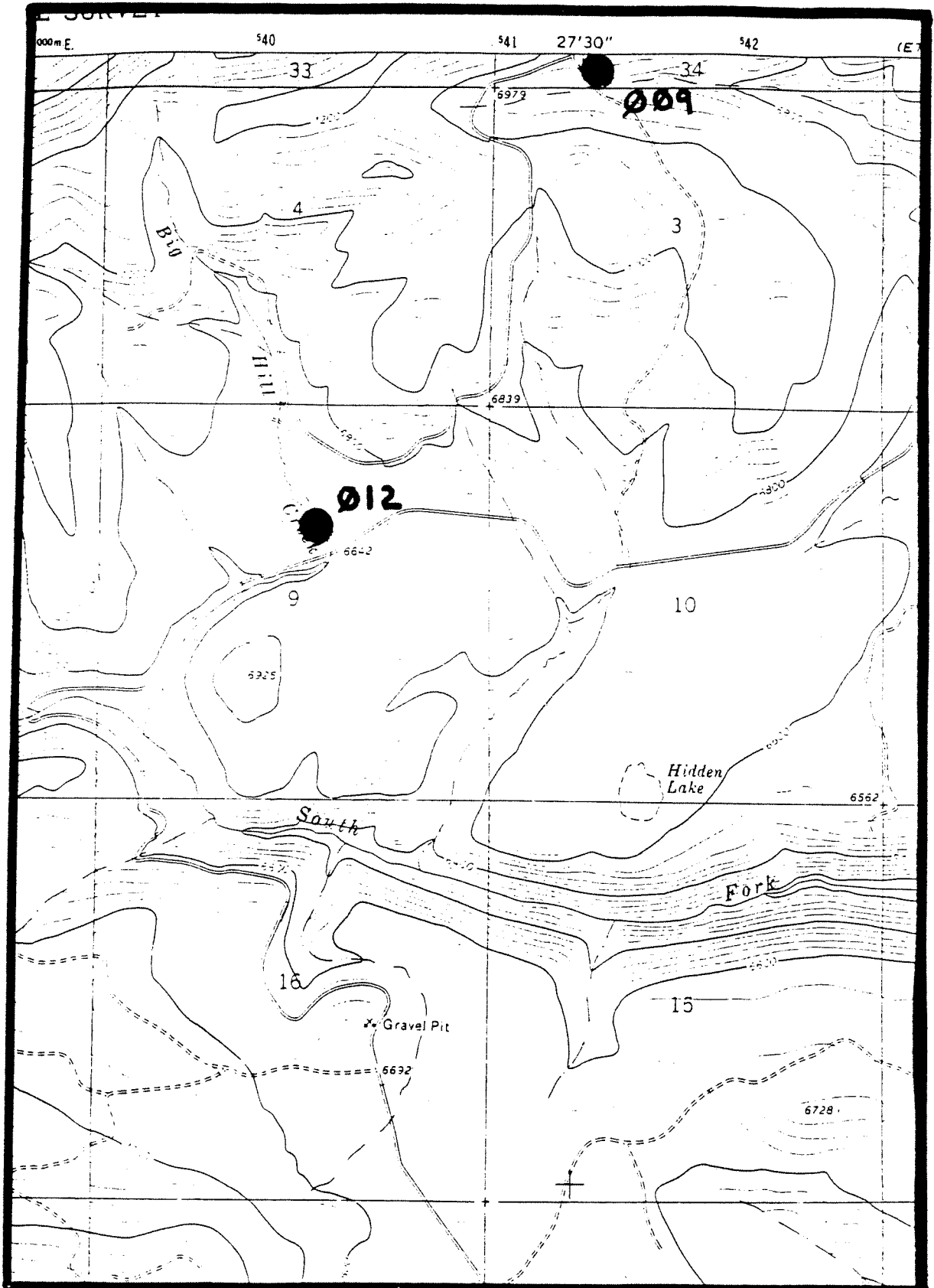
Haystack/Monument Peaks (007)



U.S.G.S. Broomtail Ridge Quadrangle (7.5')

Agoseris lackschewitzii

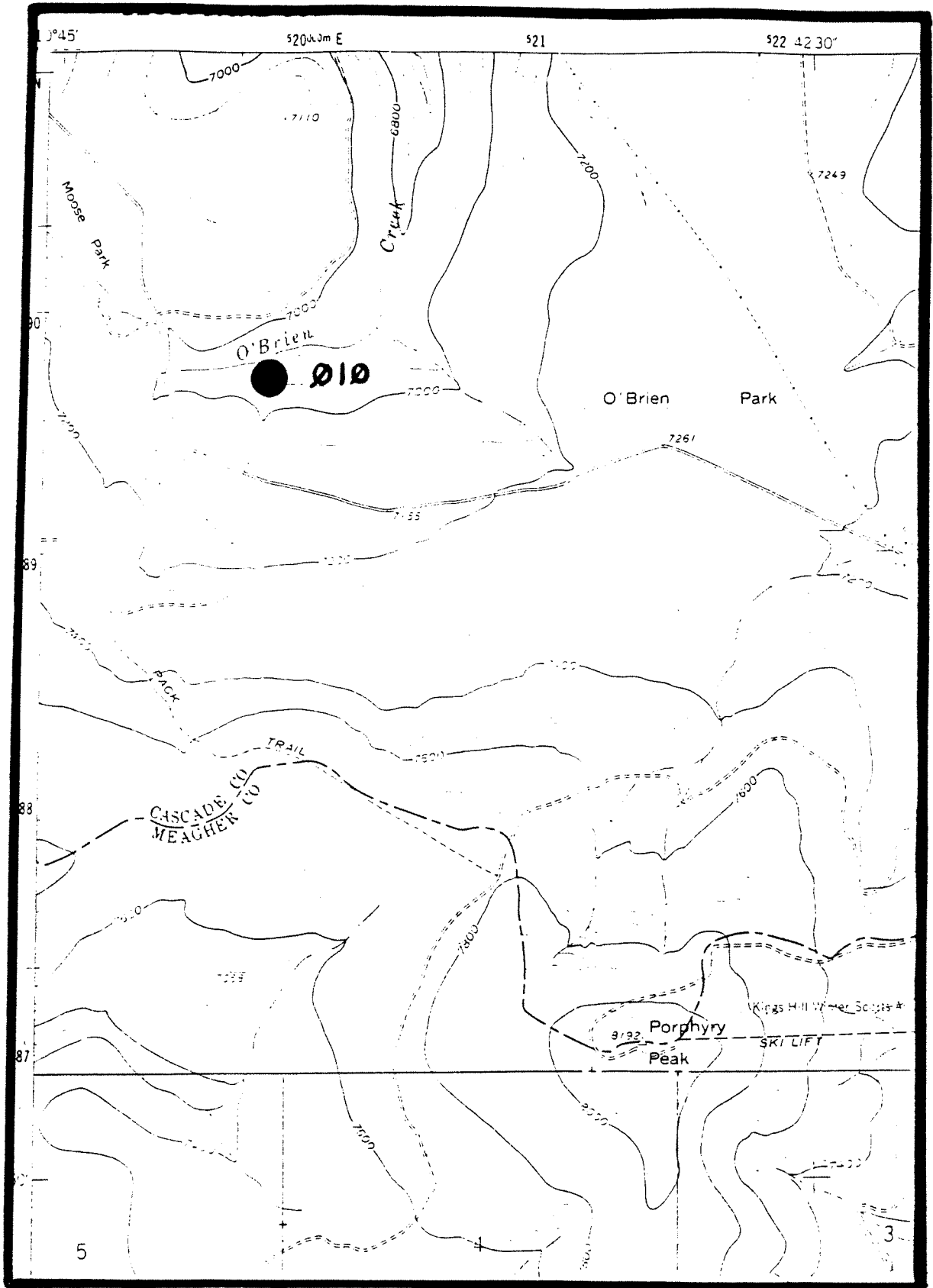
Clover Meadows (008)



U.S.G.S. Russian Flat Quadrangle (7.5')

Agoseris lackschewitzii

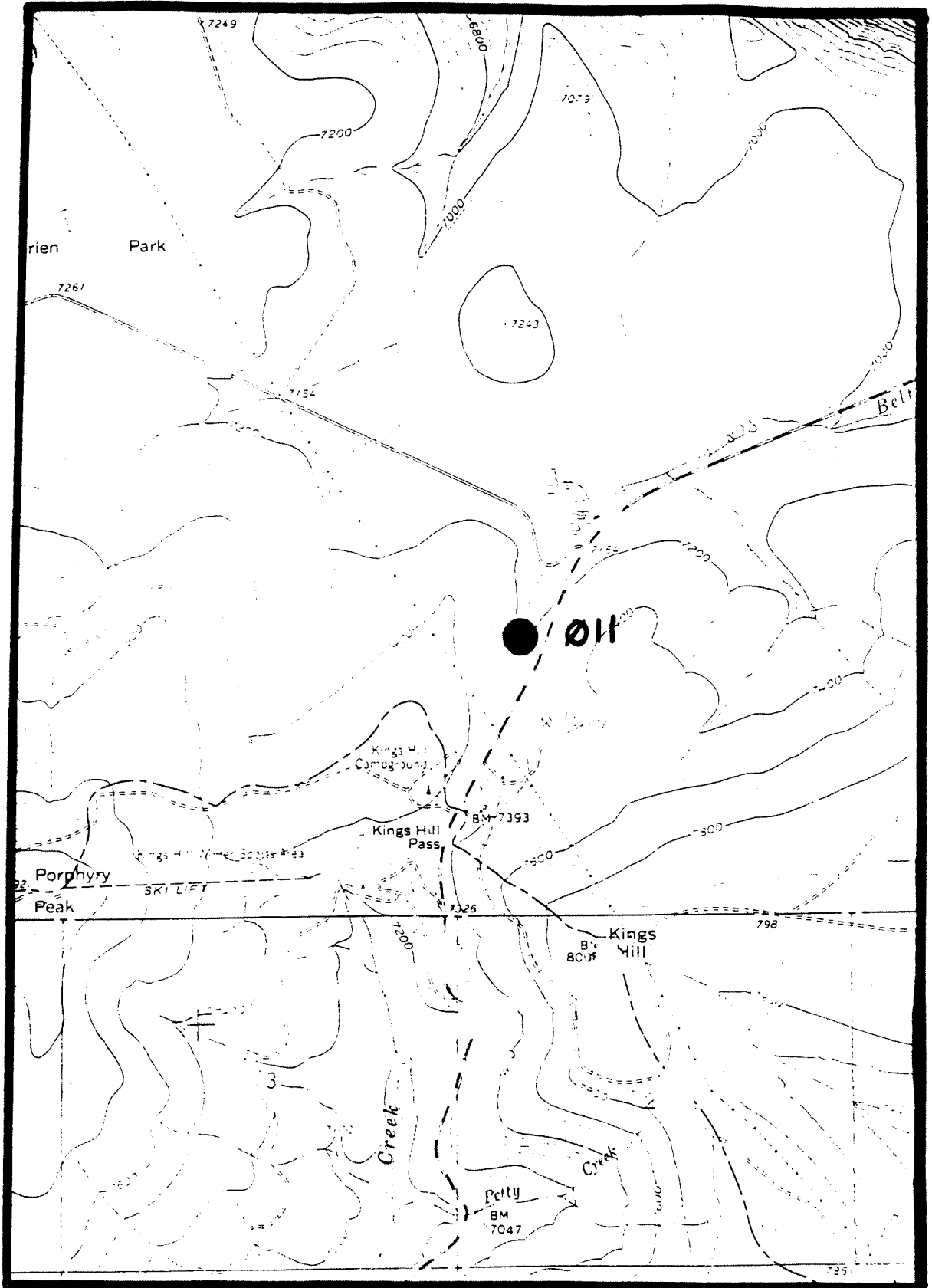
Holiday Park (009) & Big Hill Creek (012)



U.S.G.S. Kings Hill Quadrangle (7.5')

Agoseris lackschewitzii

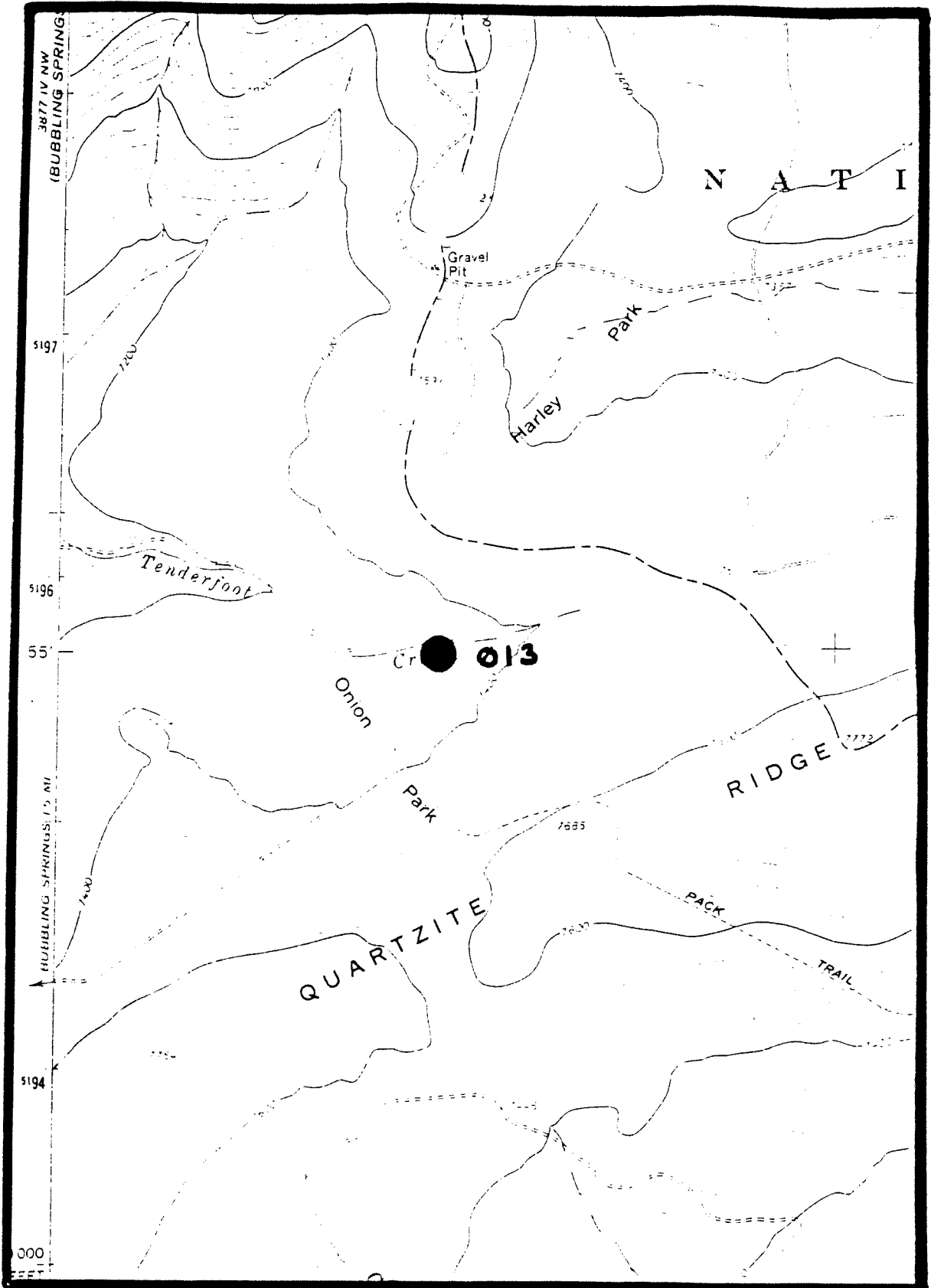
O'Brien Creek (010)



U.S.G.S. Kings Hill Quadrangle (7.5')

Agoseris lackschewitzii

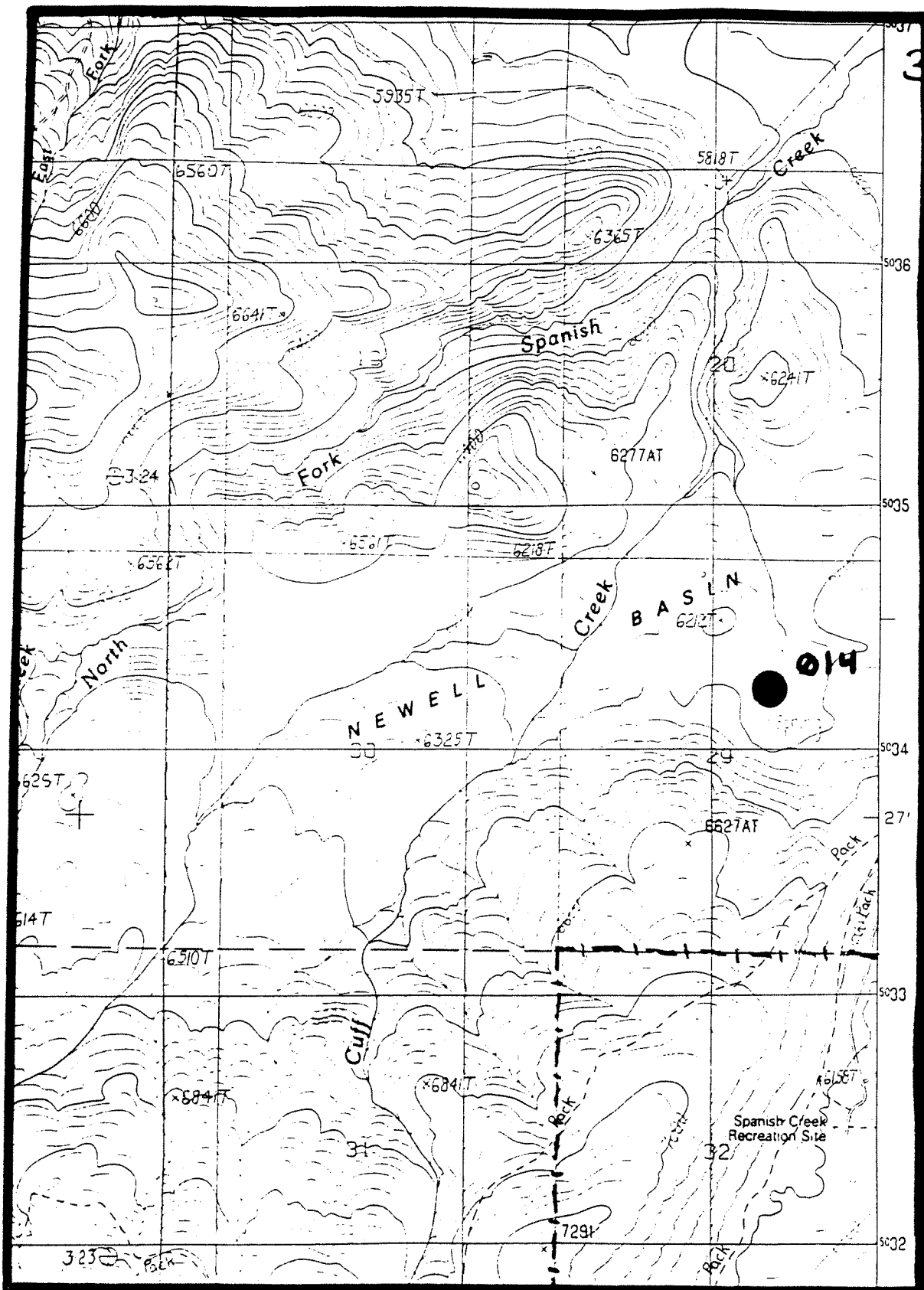
Belt Creek (011)



U.S.G.S. Belt Park Butte Quadrangle (7.5')

Agoseris lackschewitzii

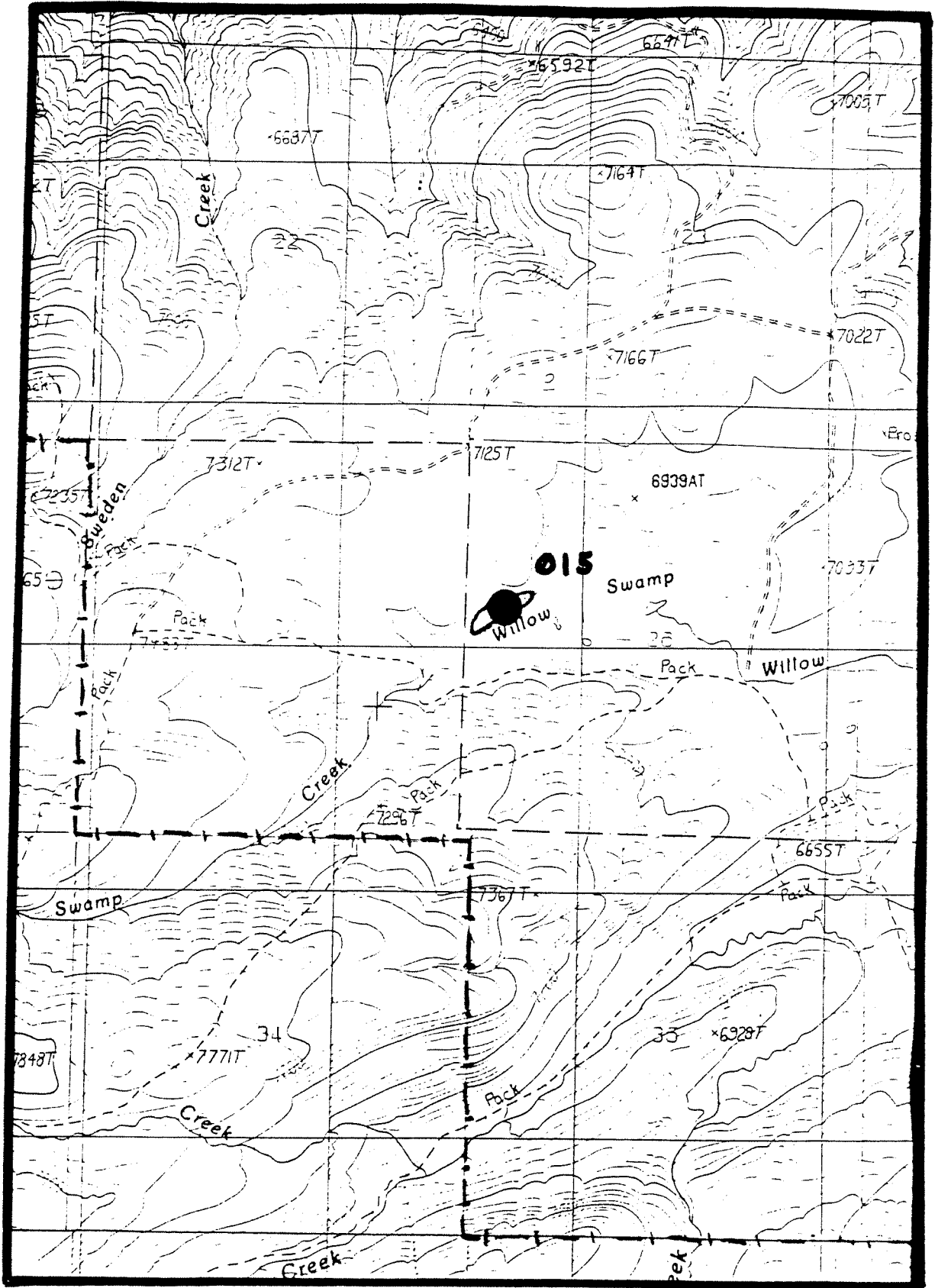
Tenderfoot Creek (013)



U.S.G.S. Willow Swamp Quadrangle (7.5')

Agoseris lackschewitzii

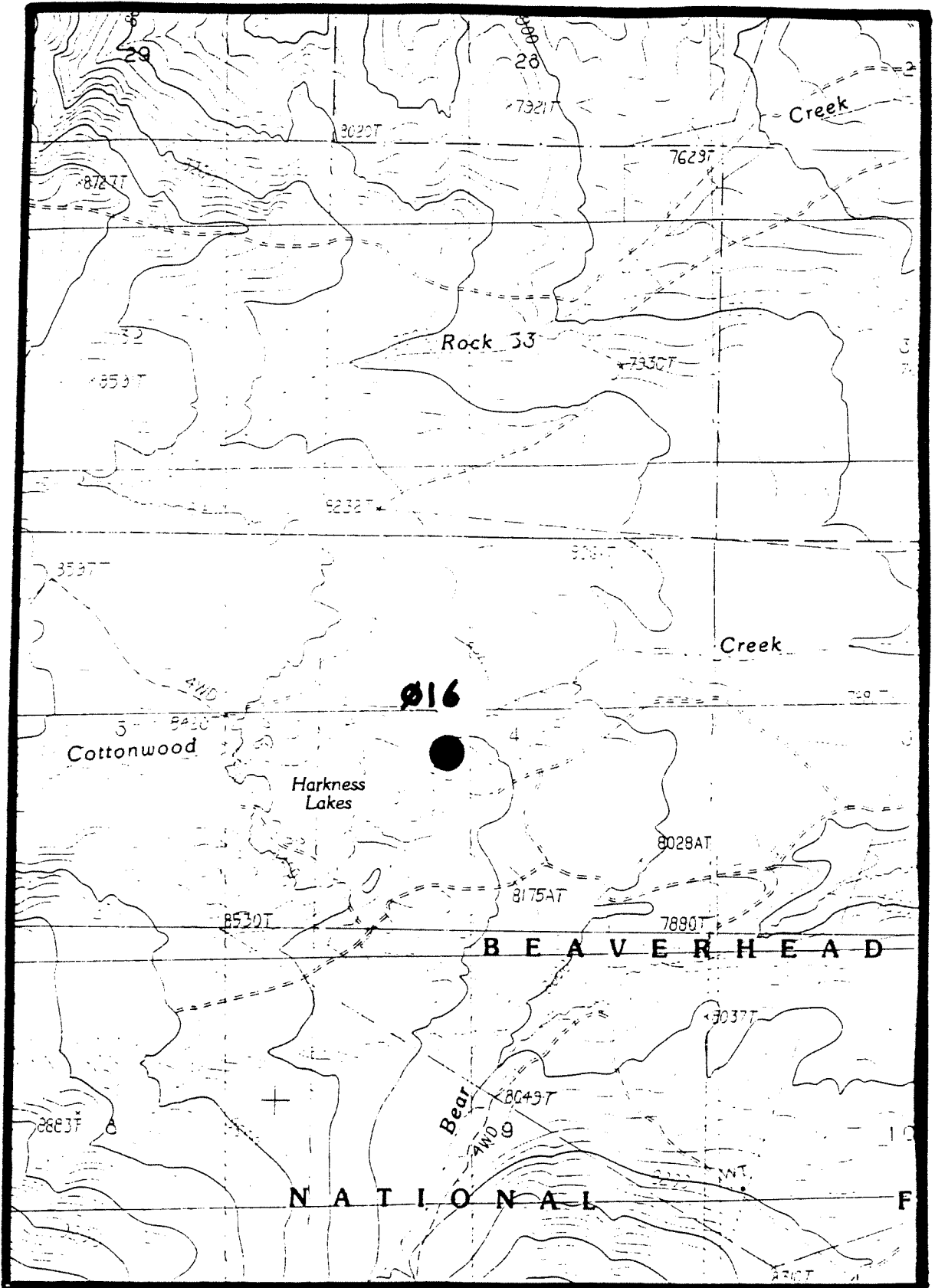
Newell Basin Fen (014)



U.S.G.S. Willow Swamp Quadrangle (7.5')

Agoseris lackschewitzii

Willow Swamp (015)



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

Agoseris lackschewitzii

Harkness Lakes (016)

V. PHOTOGRAPHS



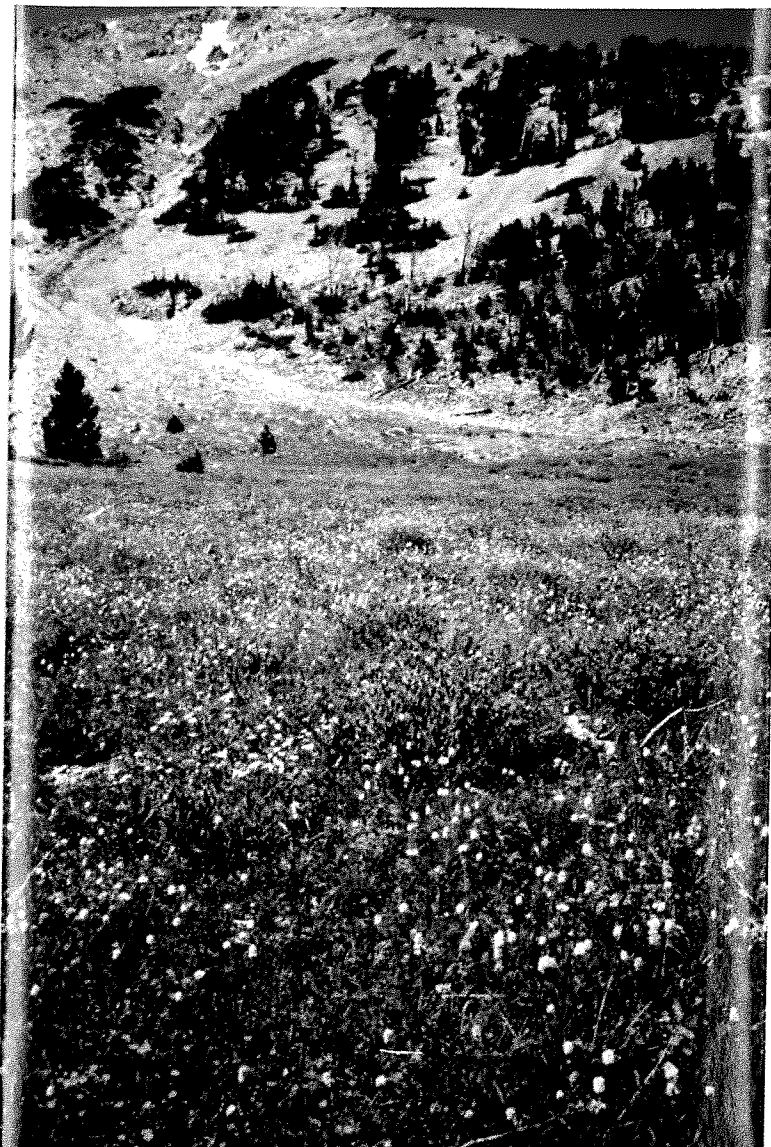
A. Agoseris lackschewitzii in flower (Haystack/Monument Peaks (007) site).



B. Agoseris lackschewitzii in moist meadow-forest ecotone
(Campfire Lake Pothole (005) site).



C. Agoseris lackschewitzii with other meadow forbs (Campfire Lake Pothole (005) site).



D. Agoseris lackschewitzii in moist willow/forb meadow
(Campfire Lake Pothole (005) site).



E. Agoseris lackschewitzii in flower (Campfire Lake Pothole (005) site).