

488 SCHIFFER

STATUS REVIEW OF Astragalus barrii
U.S.D.A. FOREST SERVICE - REGION 1
CUSTER NATIONAL FOREST
MONTANA

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I. SPECIES INFORMATION

A. CLASSIFICATION

1. SCIENTIFIC NAME: Astragalus barrii Barneby.
2. COMMON NAME: Barr's milkvetch.
3. FAMILY: Fabaceae (= Leguminosae; Pea Family).
4. GENUS: Astragalus barrii is one of approximately 2,000 species in the large genus Astragalus. Within this genus, Astragalus barrii belongs to the Orophaca group, section Sericoleuci (Barneby, 1964). According to Barneby (1964) this group contains 7 species, all of which occur in the Rocky Mountain states. Three of these, (A. gilviflorus, A. hyalinus and A. aretioides) also occur in Montana.
5. SPECIES: Astragalus barrii was first described by R. C. Barneby in 1956. He was given specimens of the plant that were originally labeled A. tridactylicus but which he then determined to represent a new species. The two are superficially similar in appearance, both in flower color and vegetative form. However, according to Barneby (1956), "the gap between the two (species) is sharply marked geographically and morphologically". Astragalus tridactylicus is restricted to southern Wyoming and Colorado in contrast to A. barrii which had a more northerly distribution and has stipules that are dorsally pubescent.

B. PRESENT LEGAL OR OTHER FORMAL STATUS

1. FEDERAL STATUS

- a. U.S. FISH AND WILDLIFE SERVICE: Astragalus barrii is currently included in Category 2 of the, U.S. Fish and Wildlife Service Notice of Review, and is under consideration for federal listing as a threatened species (U.S. Department of Interior, 1985). Category 2 taxa are those "for which information now in possession of the Service indicates that proposing to list them as endangered or threatened species is possibly appropriate, but for which substantial data on biological vulnerability and threat(s) are not currently known or on file to support the immediate preparation of rules". Species in this

category are referred to as Federal Candidate Taxa.

- b. U.S. FOREST SERVICE: The U.S. Forest Service list of sensitive species for Region 1 (Northern Region) currently includes Astragalus barrii (USDA Forest Service, 1988). Objectives and policy of the U.S. Forest Service provides 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), (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: Astragalus barrii has been listed as a "vascular plant of undetermined status" by the Montana Rare Plant Project (Lesica et al., 1984). This category includes "those species for which there is currently not enough information available for inclusion or exclusion from rare, threatened or endangered status."

Astragalus barrii is currently listed by the Montana Natural Heritage Program (Shelly, 1987) as "threatened throughout range" (21-100 occurrences; global rank = G3). In Montana, it is listed as "endangered in state" (6-20 occurrences; state rank = S2). These Heritage Program ranks do not currently provide any direct legal protection for A. barrii.

C. DESCRIPTION

1. GENERAL NONTECHNICAL DESCRIPTION: This species is a member of the pea family, but only the shape of the flowers is suggestive of the family. The plant grows in dense mats, rarely exceeding 4 inches in height. It's prostrate woody stems give rise to numerous leaves, each made up of 3 leaflets. The foliage of A. barrii is densely covered with short, white hairs. From 1-3 iridescent bluish-purple to pinkish-purple flowers arise on short stalks in clusters throughout the mats. Astragalus barrii flowers from late April

to early June, and later form one- to few-seeded pods. See Section V pp. 57-61 for color photos of plants and habitat.

2. TECHNICAL DESCRIPTION: Perennial, low cushion forming plant, up to 1.5 dm (4.5 dm) in diameter, with stems reduced to leafy crowns that arise from a closely forking suffruticulose caudex; herbage silvery-strigose with dolabriform hairs up to 1-1.4 mm long; stipules 4-8 mm long, glabrous dorsally; leaves 1-4 cm long, the 3 leaflets linear-oblongate, oblongate or elliptic-obovate acute or acutish, 3-12 mm long; peduncles slender, 7-16 mm long, and shorter than the leaves; raceme loose, 2-4 (1) flowered, with the fruiting axis up to 5-15 mm long; calyx 5.5-7.1 (4.6) mm long, the deeply campanulate or subcylindric tube 3.6-5.1 mm long, the teeth 1.5-2.4 (1.2) mm long; petals pink-purple, the obovate-cuneate or broadly oblongate banner 10.5-16.7 (9.6) mm long; wings 9.1-13.5 mm long, the claws 4.1-5.5 mm; anthers 0.5-0.7 (0.45) mm long; pod narrowly lance-ellipsoid, 4.5-6.5 mm long, 1.2-1.8 mm in diameter just above the rounded base and tapering into a slightly incurved lance-subulate beak about as long as the fertile portion, obscurely triquetrous in the lower half, somewhat flattened dorsally, the valves papery, silvery-strigulose; ovules 9-11 (7); seeds (often only one maturing) oblong, scarcely compressed, dull purplish-green, smooth but not lustrous, about 2 mm long (adapted from Barneby, 1956).
3. LOCAL FIELD CHARACTERS: Astragalus barrii is most easily identified in flower, and is distinguished by its small bluish-purple to bluish-pink flowers, compound leaves with 3 leaflets, and mat forming habit.

Vegetatively, Astragalus barrii is similar to A. gilviflorus, A. hyalinus and A. aretioides, and they overlap in their geographic distributions. However, in the field A. barrii is distinctive for its small, iridescent bluish-purple to bluish-pink flowers. Astragalus gilviflorus and A. hyalinus on the other hand, have much larger flowers, the former cream to yellowish in color, and the latter white with a lilac tinge. The field characteristics of A. aretioides are most similar to A. barrii; however, this species has smaller flowers and is found at higher elevations.

D. GEOGRAPHICAL DISTRIBUTION

1. RANGE: A regional endemic, Astragalus barrii is known from southwest South Dakota (Fall River, Shannon, and Pennington counties), northeast Wyoming (Campbell, Johnson, Natrona, Niobrara, Sheridan, and Weston counties), and Montana (Big Horn, Carter, Powder River, and Rosebud counties). Within Region 1 of the U.S. Forest Service, it has been located on the Custer National Forest in Montana.

2. CURRENT SITES: In Montana, Astragalus barrii is recently documented (1975-1988) from 19 sites in Powder River, Rosebud, and Bighorn counties. A historical location is documented for Carter County. The legal descriptions, latitude and longitude, elevations, USGS topographic map names, and locations of sites in Montana are provided in Table 1 pp. 5-9. This table is broken down into sections; where Table 1A contains those sites that occur wholly or partially on U.S. Forest Service lands, and Table 1B contains sites that occur on lands of other ownership. A map of the distribution of A. barrii in Montana is shown in Figure 1, p. 10; the exact locations are indicated on the maps provided in Section IV, p. 43. Field surveys were conducted by the author on 13-20 May, 1988.

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.

3. HISTORICAL SITES (MONTANA): One location of Astragalus barrii is documented by a voucher specimen cited by Barneby (1964). The existing data on this site is summarized in Section IV, p.46 (Element Occurrence records). Information on this record is incomplete, and only a general location is given. This historical site (Ekalaka (006) record) was unmappable as a specific point, but is marked as occurring on the USGS Ekalaka quadrangle. This historical location is included within the species range in Figure 1.

Table 1A. Astragalus barrii locations wholly or partially on U.S. Forest Service lands.

Occurrence number: 010
 Site name: STAG ROCK KNOLLS
 County: POWDER RIVER
 Township & Range: 006S045E Section: 12 SW4, 13 NW4
 Latitude: 451934 Longitude: 1061002 Elevation: 3450
 USGS Quad: FORT HOWES
 Location: CUSTER NATIONAL FOREST, 1.5 MILES N OF FORT HOWES
 RANGER STATION, 0.5 MILE W OF OTTER CREEK ROAD, NW OF
 STAG ROCK.

Occurrence number: 011
 Site name: FORT HOWES RIDGE
 County: POWDER RIVER
 Township & Range: 006S045E Section: 24 NE4
 Latitude: 451813 Longitude: 1060937 Elevation: 3550
 USGS Quad: FORT HOWES
 Location: CUSTER NATIONAL FOREST, ON HILLS AND CLIFF 0.25 MILES
 NW OF FORT HOWES RANGER STATION.

Occurrence number: 012
 Site name: TAYLOR BUTTE RIM
 County: POWDER RIVER
 Township & Range: 006S046E Section: 30 E2
 Latitude: 451713 Longitude: 1060828 Elevation: 3400
 USGS Quad: FORT HOWES
 Location: CUSTER NATIONAL FOREST, 0.5 MILES E OF OTTER CREEK ROAD
 ON S. FORK OF TAYLOR CREEK ROAD, CLIFFLINE TO E.

Occurrence number: 013
 Site name: STAG ROCK CLIFF TOPS
 County: POWDER RIVER
 Township & Range: 006S045E Section: 13 NE4; 006S046E, S18 SW4
 Latitude: 451911 Longitude: 1060945 Elevation: 3340
 USGS Quad: FORT HOWES
 Location: CUSTER NATIONAL FOREST, 1.5 MILES N OF FORT HOWES
 RANGER STATION, 0.25 MILE W OF OTTER CREEK ROAD, SW OF
 STAG ROCK.

Occurrence number: 014
 Site name: LYON CREEK RIDGE
 County: POWDER RIVER
 Township & Range: 005S046E Section: 36 SW4; S35 SE4; T6SR46E S5
 N2
 Latitude: 452113 Longitude: 1060753 Elevation: 3400
 USGS Quad: FORT HOWES, GOODSPEED BUTTE
 Location: CUSTER NATIONAL FOREST, 3.5 MILES N OF FORT HOWES, 1
 MILE EAST OF OTTER CREEK, JUST N OF LYON CREEK ROAD.

Table 1A. (cont.)

Occurrence number: 015
Site name: KING CREEK WELL
County: ROSEBUD
Township & Range: 004S044E Section: 22 NW4
Latitude: 452847 Longitude: 1061716 Elevation: 3350
USGS Quad: GREEN CREEK
Location: CUSTER NATIONAL FOREST, 5 MILES SOUTH OF ASHLAND, 2.5
MILES SE OF TONGUE RIVER ROAD ON SOUTH SIDE OF KING
CREEK ROAD; WITHIN WALK-IN/RIDE-IN RESTRICTED ZONE.

Occurrence number: 016
Site name: STAG ROCK RESERVOIR RIDGES
County: POWDER RIVER
Township & Range: 006S045E Section: 12 NE4; S1 SE4
Latitude: 452011 Longitude: 1060943 Elevation: 3420
USGS Quad: FORT HOWES
Location: CUSTER NATIONAL FOREST, 2.5 MILES NORTH OF FORT HOWES
RANGER STATION, 0.5 MILE WEST OF OTTER CREEK ROAD, 0.25
MILE NORTH OF STAG ROCK RESERVOIR.

Occurrence number: 017
Site name: NW BUTTRESS, TAYLOR BUTTE
County: POWDER RIVER
Township & Range: 006S046E Section: 20 SW4; S19 SE4
Latitude: 451754 Longitude: 1060759 Elevation: 3360
USGS Quad: FORT HOWES
Location: CA. 0.75 MILE SE OF FORT HOWES RANGER STATION, ALONG
CLIFFS.

Occurrence number: 020
Site name: SHEEP WELL ROAD
COUNTY: POWDER RIVER
Township & Range: 003S046E Section: 20 NE4
Latitude: 453350 Longitude: 1060404 Elevation: 3310
USGS Quad: COLEMAN DRAW
Location: CUSTER NATIONAL FOREST, CA. 10 MILES EAST OF ASHLAND
HIGHWAY 212, 0.5 MILES SOUTH OF HIGHWAY, JUST WEST OF
DIRT ROAD.

Table 1B. Astragalus barrii locations in areas other than U.S. Forest Service lands.

Occurrence number: 001

Site name: BIDDLE

County: POWDER RIVER

Township & Range: 008S052E Section: 22, CENTER, E2E2

Latitude: 450725 Longitude: 1051952 Elevation: 3440

USGS Quad: BIDDLE

Location: ALONG BLUFF ON E. SIDE OF ST. HWY. 59, 1.7 MILES N. OF BIDDLE, OVERLOOKING THE LITTLE POWDER RIVER. ALSO JUST WEST OF HIGHWAY (LESICA, 1986).

Occurrence number: 002

Site name: BUTTE CREEK

County: POWDER RIVER

Township & Range: 007S050E Section: 04, S2SE4

Latitude: 451453 Longitude: 1053558 Elevation: 3350

USGS Quad: BALDY PEAK

Location: POWDER RIVER BADLANDS, 0.2-0.45 AIR MILES E. OF THE BUTTE CREEK RD., 0.8 MI. S. OF ITS JUNCTION WITH THE POWDER RIVER RD., E. OF BUTTE CREEK.

Occurrence number: 003

Site name: DECKER

County: BIG HORN

Township & Range: 009S039E Section: 25, NE4

Latitude: 450102 Longitude: 1065349 Elevation: 3760

USGS Quad: PEARL SCHOOL

Location: CA. 1 MI. SOUTH OF SQUIRREL CREEK AND 1/2 MI. WEST OF DECKER-SHERIDAN ROAD, ON THE CX RANCH.

Occurrence number: 004

Site name: COLSTRIP

County: ROSEBUD

Township & Range: 001N041E Section: 11, NE4

Latitude: 455137 Longitude: 1063540 Elevation: 3580

USGS Quad: COLSTRIP SE

Location: MONTANA STATE DEPT. OF HEALTH MONITORING SITE, 1.5 MI. S. OF COLSTRIP.

Occurrence number: 005

Site name: MILLER COULEE

County: ROSEBUD

Township & Range: 001N041E Section: 22, NW4SW4

Latitude: 454923 Longitude: 1063728 Elevation: 3440

USGS Quad: COLSTRIP SE, COLSTRIP SW

Location: CA. 0.2 AIR MILES NORTH OF MILLER COULEE, CA. 4.5 AIR MILE SOUTH OF COLSTRIP.

Table 1B. (cont.)

Occurrence number: 006
 Site name: EKALAKA
 County: CARTER
 Township & Range: 002N058E Section: 29, 28, 33
 Latitude: 455404 Longitude: 1043257 Elevation: 3700
 USGS Quad: EKALAKA
 Location: "FROM EKALAKA, MONTANA" (BARNEBY, 1964).

Occurrence number: 007
 Site name: BIDDLE SCHOOL SECTION
 County: POWDER RIVER
 Township & Range: 008S052E Section: 36 N2,SW4
 Latitude: 450547 Longitude: 1051739 Elevation: 3600
 USGS Quad: BIDDLE
 Location: CA. 2 AIR MILES ESE OF BIDDLE, 0.3-0.9 AIR MILES NE OF
 THE BIDDLE-RIDGE ROAD, 2.25 MILES SE OF ITS JUNCTION
 WITH STATE HWY 59, NORTH OF RANCH CREEK.

Occurrence number: 008
 Site name: BOBCAT CREEK
 County: POWDER RIVER
 Township & Range: 008S052E Section: 25: NE4;T8SR53E:30SW4
 Latitude: 450642 Longitude: 1051712 Elevation: 3600
 USGS Quad: BIDDLE
 Location: CA. 0.5 AIR MILES NE OF BOBCAT CREEK, 2.6 AIR MILES ENE
 OF BIDDLE, BADLANDS ALONG THE LITTLE POWDER RIVER.

Occurrence number: 009
 Site name: WILD BILL CREEK
 County: POWDER RIVER
 Township & Range: 009S051E Section: 12 SW4
 Latitude: 450338 Longitude: 1052502 Elevation: 3590
 USGS Quad: WILD BILL CREEK
 Location: BUTTE CREEK RD., 1.4 MILES WEST OF WILD BILL CREEK, 1.9
 MILES WEST OF STATE HWY 59; 0.1-0.25 AIR MILES NORTH OF
 THE ROAD.

Occurrence number: 018
 Site name: GATE CREEK
 County: ROSEBUD
 Township & Range: 004S043E Section: 34 SE4; S35 SW4
 Latitude: 452624 Longitude: 1062353 Elevation: 3140
 USGS Quad: BIRNEY DAY SCHOOL
 Location: CA. 0.3 MILES SOUTH OF GATE CREEK ON THE EAST SIDE OF
 BIRNEY CREEK ROAD.

Table 1B. (cont.)

Occurrence number: 019
Site name: O'DELL CREEK BUTTRESS
COUNTY: ROSEBUD
Township & Range: 004S044E Section: 30 center
Latitude: 452735 Longitude: 1062044 Elevation: 3360
USGS Quad: GREEN CREEK
Location: 10 MILES SE OF ASHLAND; CLIFFLINE NE OF INTERSECTION
WITH O'DELL CREEK ROAD.

4. AREAS SURVEYED BUT SPECIES NOT LOCATED: The following areas were surveyed for possible occurrences of this species. The actual areas surveyed were often smaller than the portions of sections indicated. The following, is a list of sites surveyed on the Ashland District of the Custer National Forest, in southeastern Montana. Following this list and marked with a double asterisk (**), is a survey site that occurred on private land.
- T1S, R45E, Section 6 SW1/4 (USGS Hayes Point Quadrangle)
 - T1S, R46E, Section 15 SW1/4NW1/4, SW1/4 (USGS Beaver Creek School Quadrangle)
 - T1S, R46E, Section 22 SE1/4NW1/4, SW1/4NE1/4 (USGS Beaver Creek School Quadrangle)
 - T1S, 46E, Section 23 SE1/4NE1/4 (USGS Beaver Creek School Quadrangle)
 - T1S, R47E, Section 30 N1/3 (USGS Elk Ridge Quadrangle)
 - T2S, R46E, Section 2 SE1/4 (USGS Beaver Creek School Quadrangle)
 - T2S, R46E, Section 11 NE1/4 (USGS Beaver Creek School Quadrangle)
 - T2S, R46E, Section 13 SE1/4SE1/4 (USGS Stacy Quadrangle)
 - T3S, R46E, Section 1 SE1/4SW1/4 (USGS Coleman Draw Quadrangle)
 - T3S, R46E, Section 12 NW1/4NE1/4 (USGS Coleman Draw Quadrangle)
 - T3S, R46E, Section 13 SE1/4SW1/4 (USGS Coleman Draw Quadrangle)
 - T4S, R44E, Section 23 NW1/4, SE/14NE1/4 (USGS Green Creek Quadrangle)
 - T4S, R46E, Section 30 E1/2 (USGS Yager Butte Quadrangle)
 - T4S, R46E, Section 32 NW1/4NW1/4, S1/2NW1/4, S1/2NE1/4 (USGS Yager Butte Quadrangle)

- T4S, R46E, Section 33 S1/2 (USGS Yager Butte Quadrangle)
- T4S, R46E, Section 35 S1/2 (USGS Yager Butte Quadrangle)
- T5S, R43E, Section 35 S1/2NW1/4, NE1/4SW1/4, SE4 (USGS Poker Jim Butte Quadrangle)
- T5S, R44E, Section 10 S1/2NW1/4, S1/2NE4 (USGS Green Creek Quadrangle)
- T5S, R44E, Section 15 SE1/4NW1/4, E1/2SW1/4 (USGS Green Creek Quadrangle)
- T5S, R44E, Section 22 SE1/4NE1/4, NE1/4SE1/4 (USGS Green Creek Quadrangle)
- T5S, R44E, Section 23 NW1/4SW1/4, NE1/4SW1/4, NW1/4SE1/4 (USGS Green Creek Quadrangle)
- T5S, R45E, Section 21 SE1/4 (USGS King Mountain Quadrangle)
- T5S, R45E, Section 27 S1/2NW1/4, N1/2SW1/4 (USGS King Mountain Quadrangle)
- T5S, R45E, Section 28 NE1/4SE1/4 (USGS King Mountain Quadrangle)
- T5S, R46E, Section 3 NW1/4NW1/4 (USGS Yager Butte Quadrangle)
- T5S, R46E, Section 4 NE1/4NE1/4 (USGS Yager Butte Quadrangle)
- T5S, R46E, Section 9 SE1/4NE1/4 (USGS Green Creek Quadrangle)
- T5S, R46E, Section 20 S1/2NE1/4 (USGS Yager Butte Quadrangle)
- T5S, R46E, Section 21 S1/2NW1/4, S1/2NE1/4 (USGS Yager Butte Quadrangle)
- T5S, R46E, Section 22 S1/2NW1/4 (USGS Yager Butte Quadrangle)
- T6S, R43E, Section 5 NW1/4SE1/4 (USGS Poker Jim Butte Quadrangle)
- T6S, R43E, Section 1 S1/2NE1/4 (USGS Poker Jim Butte Quadrangle)

- T6S, R45E, Section 3 S1/2SE1/4 (USGS Goodspeed Butte Quadrangle)
- T6S, R42E, Section 22 N1/2SE1/4 (USGS Browns Mountain Quadrangle)
- T6S, R42E, Section 23 S1/2NW1/4, NE1/4NW1/4 (USGS Browns Mountain Quadrangle)
- T6S, R42E, Section 14 SE1/4SE1/4 (USGS Browns Mountain Quadrangle)
- T6S, R43E, Section 17 NE1/4 (USGS Poker Jim Butte Quadrangle)
- T6S, R43E, Section 16 NW1/4, SE1/4 (USGS Poker Jim Butte Quadrangle)
- T6S, R45E, Section 4 NE1/4SE1/4 (USGS Goodspeed Butte Quadrangle)
- T6S, R45E, Section 13 S1/2NW1/4, NE1/4SW1/4 (USGS Fort Howes Quadrangle)
- T6S, R45E, Section 3 SW1/4, SW1/4SE1/4 (USGS Goodspeed Butte Quadrangle)
- T6S, R45E, Section 4 NE1/4SW1/4 (USGS Goodspeed Butte Quadrangle)
- T6S, R45E, Section 25 SE1/4SE1/4 (USGS Goodspeed Butte Quadrangle)
- T6S, R45E, Section 29 SE1/4 (USGS Goodspeed Butte Quadrangle)
- T6S, R45E, Section 28 SE1/4NW1/4, SW1/4SE1/4 (USGS Goodspeed Butte Quadrangle)
- T6S, R45E, Section 33 NE1/4NW1/4 (USGS Goodspeed Butte Quadrangle)
- T6S, R45E, Section 34 S1/2NW1/4, S1/2NE1/4 (USGS Goodspeed Butte Quadrangle)
- T7S, R44E, Section 21 SE1/4 (USGS Otter Quadrangle)
- T7S, R44E, Section 22 SE1/4 (USGS Otter Quadrangle)
- T7S, R44E, Section 23 S1/2NW1/4 (USGS Otter Quadrangle)

- T7S, R44E, Section 13 SE1/4SE1/4 (USGS Otter Quadrangle)
- T7S, R44E, Section 25 NW1/4NE1/4, SE1/4SE1/4 (USGS Otter Quadrangle)
- T7S, R45E, Section 18 SW1/4SW1/4 (USGS Otter Quadrangle)
- T7S, R48E, Section 4 NE1/4 (USGS Bloom Creek Quadrangle)
- T7S, R48E, Section 3 SW1/4SW1/4 (USGS Bloom Creek Quadrangle)
- T7S, R48E, Section 10 NW1/4, E1/2SW1/4 (USGS Bloom Creek Quadrangle)
- T7S, R48E, Section 8 SW1/4 (USGS Bloom Creek Quadrangle)
- ** T4S, R44E, Section 17 SE1/4NW1/4, SW1/4NE1/4 (USGS Green Creek Quadrangle)

E. HABITAT

1. ASSOCIATED VEGETATION: Astragalus barrii usually occurs in areas of sparse vegetation cover. When an overstory is present, it is dominated by Pinus ponderosa (ponderosa pine) and Juniperous scopulorum (Rocky Mountain juniper). Commonly associated shrubs include Artemisia tridentata (big sagebrush) and Atriplex confertifolia (shadscale). Other native plant species observed with A. barrii included:

Agropyron spicatum.....(bluebunch wheatgrass)
Allium textile.....(textile onion)
Andropogon scoparius.....(little bluestem)
Artemisia frigida.....(fringed sagewort)
Astragalus gilviflorus...(threeleaved milkvetch)
Astragalus spatulatus....(tufted milkvetch)
Bouteloua gracilis.....(blue grama)
Calamovilfa longifolia...(prairie sandgrass)
Chrysothamnus nauseosus..(common rabbit-brush)
Comandra umbellata.....(bastard toad-flax)
Cryptantha celosioides...(northern cryptantha)
Eriogonum pauciflorum....(few flowered-buckwheat)
Festuca idahoensis.....(Idaho fescue)
Gutierrezia sarothrae....(broom snakeweed)
Haplopappus acaulis.....(cushion goldenweed)

Haplopappus armerioides..(thrifty goldenweed)
Hymenopappus filifolius..(Columbia cut-leaf)
Koeleria macrantha.....(prairie junegrass)
Linum perenne.....(blue flax)
Musineon divaricatum.....(Leafy musineon)
Opuntia polyacantha.....(plains pricklypear)
Oxytropis sericea.....(white locoweed)
Phlox hoodii.....(Hood's phlox)
Phlox alyssifolia.....(Alyssum-leaved phlox)
Poa secunda.....(Sandberg's bluegrass)
Yucca glauca.....(soapwell)
Zigadenus venenosus.....(meadow death-camus)

2. TOPOGRAPHY: In Montana, populations of A. barrii are most often found on eroding knolls, buttes, and barren hilltops of a particular limestone caprock. These sites range from level areas to steep slopes (0-35%). Most sites occur on slopes of intermediate steepness (3-8%). All slope aspects are represented; however, many of the sites in Montana are on north or northeast-facing slopes.

The recently verified sites in Montana range from 957 m (3,140 ft.) to 1,146 m (3,760 ft.) in elevation. The historical site in Ekalaka may have been located at approximately 1,128 m (3,700 ft.) in elevation (Ekalaka (006)).

3. SOIL RELATIONSHIPS: Areas that often contain Astragalus barrii have low vegetative cover, and thus the soils are likely to be low in organic matter. Within the White River drainage of South Dakota, one population of Astragalus barrii was found to be restricted to the Rockyford Ash Member of the Sharps Formation (David Ode, S. Dakota Natural Heritage Program, pers. comm.). From a study of the Powder River populations in Wyoming however, it was found to occur on eroding sandstone bluffs (Roberts, 1977).

Sites surveyed in the Otter Creek and Tongue River drainages in Montana, were often found to be high in clays and silts, and low in sands. Many of these sites were also sparsely stony. All of these sites are on the Tongue River Member of the Ft. Union Formation, which is represented by yellowish-gray thick-bedded to massive calcareous sandstone and siltstone, light-gray shaley siltstone and shale, carbonaceous shale, numerous coal beds, and reddish to lavender clinker (Bergantino, 1980). See photographs pp. 59-61.

It appears that Astragalus barrii is not restricted to a particular geologic stratum but may be restricted by a chemical characteristic of the soil such as soil pH. Soil samples from two sites were tested by the Colorimetric Method and found to have a pH near 8.0. This is a fairly high soil pH. A more comprehensive soil study might better reveal any ecological influence this may have on the plants.

4. REGIONAL CLIMATE: The summer climate of southeastern Montana is predominantly hot and dry. Summer storms are largely convective, a common characteristic of areas with continental climates. Winters are cold and dry with precipitation occurring mostly in the form of snow. For areas on the Custer National Forest where A. barrii is located, the nearest long term climatological station is in Broadus (923 m (3,029 ft.) in elevation), located 64 km (40 mi.) to the east of the Custer National Forest. The mean annual temperature for the time period 1951-1980 is 6.9 °C (44.5 °F). The mean minimum and maximum temperatures for July were 12.9 and 30.6 °C (55.3 and 87.0 °F) while for January it was -15.8 and -1.1 °C (3.6 and 30.0 °F) for the same time period. Mean annual precipitation was 33.9 cm (13.84 in.). Most of this precipitation occurs in the form of rain falling from April through August (U.S. Department of Commerce, 1982).

F. POPULATION DEMOGRAPHY AND BIOLOGY

1. PHENOLOGY: An early-blooming species; Astragalus barrii flowers from early May to the first part of June, depending on climatic conditions, latitude, and slope aspect. At many sites extensive vegetative mats were observed without flowers. It is not known if this condition is due to senescence of the individuals through natural aging, advanced succession within the habitat (i.e., increased overstory cover), or other unknown factors.
2. POPULATION SIZE AND CONDITION (MONTANA): Populations of A. barrii range in size from about 70 individual plants, up to sites with several subpopulations totaling 3,050 plants. The average population size is approximately 1,000 individuals.

The average area covered by populations is approximately 101,175 sq. meters (25 acres). Population sizes and condition are summarized in Table 3.

3. REPRODUCTIVE BIOLOGY

- a. TYPE OF REPRODUCTION: Little is known of the reproductive biology of A. barrii. Within the group Orophaca a minimum age of 25 years was established for individual plants of A. aretioides and even small individuals of A. tridactylicus averaged over 15 years of age (Roberts, 1977). A perennial species, it may produce a few or no flowers in some years (Locklear, 1986). This author observed at several sites large mats that bore no flowers, in close proximity to smaller clumps that were flowering.
- b. SEED DISPERSAL AND BIOLOGY: Apparently only one seed reaches maturity within each pod of the flowers of Astragalus barrii (Barneby, 1964). Pods dehisce from the base upwards along both the dorsal and ventral sutures. Having no appendages that would aid in long-distance dispersal, it is likely that seeds fall and remain near the parent plant.

G. POPULATION ECOLOGY

1. BIOTIC AND ABIOTIC INTERACTIONS

- a. COMPETITION: Species in the genus Astragalus rarely tolerate direct competition or shade cast by other plants (Barneby, 1964). It was observed that populations were most often found on barren ground. Total vegetation cover (by ocular estimation) rarely exceeded 50% and it was often lower. It appeared that sites with large non-flowering mats were those areas where succession was more advanced and total vegetation cover values were somewhat higher; however, the lack of flowering may also have been due to the low rainfall in the area for the past 5 years, or other unknown factors.
- b. FIRE: A large portion of one site (NW Buttress Taylor Butte (017) was within an area that had burned nearly 20 years ago. It is possible that these plants are adapted to fire as fires are common on this portion of the Custer National Forest. However, the

fires that occurred in the summer and fall of 1988 did not burn any of the habitat containing recorded populations of A. barrii (Susan Hayman, Ashland District, Custer National Forest, pers. comm.).

H. LAND OWNERSHIP (MONTANA)

1. The list of land ownership for the 19 currently known, and 1 historical occurrence of Astragalus barrii in Montana, appears below. The exact locations are provided in Table 1, pp. 5-9.
 - a. U.S. Forest Service (Custer National Forest):
 - Fort Howes Ridge (011)
 - Taylor Butte Rim (012)
 - Stag Rock Cliff Tops (013)
 - Lyon Creek Ridge (014)
 - King Creek Well (015)
 - Stag Rock Reservoir Ridges (016)
 - NW Buttress Taylor Butte (017)
 - Sheep Well Road (020)
 - b. U.S. Bureau of Land Management (Miles City District):
 - Butte Creek (002)
 - Wild Bill Creek (009)
 - c. U.S. Bureau of Land Management (Miles City District) and private land:
 - Bobcat Creek (008)
 - Gate Creek (018)
 - d. Department of State Lands
 - Biddle School Section (007)
 - e. Private Land
 - Biddle (001)
 - Decker (003)
 - Colstrip (004)
 - Miller Coulee (005)
 - Ekalaka (006) *** historical location
 - O'Dell Creek Buttress (019)

II. ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

- A. THREATS TO CURRENTLY KNOWN POPULATIONS (MONTANA):

Many of the sites on U.S. Forest Service lands are in areas naturally protected from the possible threat of

grazing, (Fort Howes Ridge (011), Taylor Butte Rim (012), Stag Rock Cliff Tops (013), Lyon Creek Ridge (014), King Creek Well (015)). Several sites are located in areas easily reached by cattle, and it is not known how grazing might affect populations in these areas (Stag Rock Reservoir Ridges (016), NW Buttress Taylor Butte (017)). Also, several of the sites on private land (Miller Coulee (005) and Colstrip (004)) are potentially threatened by their proximity to current coal mining activity.

- B. **MANAGEMENT PRACTICES AND RESPONSE:** There are currently no known means of enhancing populations of Astragalus barrii. It is possible that the intolerance of competition, prevents it from establishing in habitats that are in a more advanced successional state, but which might otherwise be suitable.

A number of the areas searched appeared suitable but did not contain populations. This may be due to unknown soil components that are not readily apparent but are a factor in the distribution of this species.

- C. **RECOMMENDATIONS FOR MAINTAINING VIABLE POPULATIONS:**
The following recommendations are made to insure the long-term persistence of viable populations of A. barrii on U.S. Forest Service lands in Montana:

1. Protection of natural habitats that currently support large populations. The following populations on U.S. Forest Service lands should be considered in any habitat alteration projects that may occur in or near these sites:

Fort Howes Ridge (011)
Taylor Butte Rim (012)
Stag Rock Cliff Tops (013)
Lyon Creek Ridge (014)
King Creek Well (015)

Proposed disturbances within or near any of these populations should be preceded by detailed surveys of the populations in these areas. Also mitigation measures should be developed to reduce or eliminate the impacts of management activities.

2. Regulation of livestock grazing in native habitats supporting large populations. A majority of the sites where A. barrii grows are on steep slopes or cliff tops inaccessible to livestock. Some of the

locations however, are in close proximity to stock ponds or are on gentle slopes within grazing allotments. These sites include:

Stag Rock Reservoir Ridges (016)
NW Buttress Taylor Butte (017)
Sheep Well Road (020)

There is currently no information available on how grazing affects this species. In areas with heavy stocking rates, long term monitoring plots might help to determine the effects of grazing.

D. RECOMMENDATIONS FOR FURTHER ASSESSMENT

1. Further surveys in the vicinity of the historical collection near Ekalaka. Areas within the Ekalaka Hills and Chalk Buttes, and in the Long Pines area, may contain suitable habitat for Astragalus barrii.

E. SUMMARY

Astragalus barrii is a regional endemic species that is sparsely distributed in 3 counties in South Dakota, 5 counties in Wyoming and 4 counties in Montana. Field surveys in Montana in 1988 revealed 10 previously unrecorded occurrences on the Custer National Forest and 1 on private land. It is a Category 2 candidate species, being considered for listing under the federal Endangered Species Act of 1973 by the U.S. Fish and Wildlife Service. It is also included on the sensitive species list for Region 1 of the U.S. Forest Service. This species appears to be restricted to specific rock stratum in and along several major drainages in the various states. This restriction and the fact that many of the larger populations consisted largely of non-flowering mats, indicates a need to monitor populations, and also take these areas into consideration when planning land use activities that may affect these populations.

III. LITERATURE CITED

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IV. ELEMENT OCCURRENCE PRINT-OUTS AND MAPS (pp. 23-55)

ELEMENT OCCURRENCE RECORD

EOCODE: PDFABØF15Ø.ØØ1
 NAME: ASTRAGALUS BARRII
 COMNAME: BARR'S MILK-VETCH
 MARGNUM: 1 TENTEN: 4,1 IDENT: Y EORANK: B
 SURVEYSITE: BIDDLE
 EORANKCOMM: MODERATE-SIZED POPULATION, HABITAT IN FAIRLY GOOD CONDITION.
 SURVEYDATE: 1986-Ø5-2Ø LASTOBS: 1986-Ø5-2Ø FIRSTOBS: 1961 GRANK: 6263
 SRANK: S2 STATE: MT COUNTYNAME: MTPOWD
 QUADCODE: 451Ø513
 QUADNAME: BIDDLE PRECISION: .SC
 LAT: 45Ø725 LONG: 1Ø51952 S: 45Ø722 N: 45Ø729 E: 1Ø51938 W: 1Ø52Ø12
 TOWNRANGE: ØØ8SØ52E SECTION: 22 MERIDIAN: PR TRSCOMM: CENTER,22E2E
 2
 PHYSPROV: MB WATERSHED: 1ØØ9Ø2Ø8 RIVERREACH: 1ØØ9Ø2Ø8Ø57ØØ.ØØ
 DIRECTIONS: ALONG BLUFF ON E. SIDE OF ST. HWY. 59, 1.7 MILES N. OF
 BIDDLE, OVERLOOKING THE LITTLE POWDER RIVER. ALSO JUST WEST
 OF HIGHWAY (LESICA, 1986).
 GENDESC: ON LOW SANDSTONE BLUFF; ARTEMISIA TRIDENTATA/GRASSLAND, WITH
 OPUNTIA POLYACANTHA, ARTEMISIA FRIGIDA, BOUTELOUA GRACILIS,
 KOELERIA MACRANTHA, CRYPTANTHA CELOSIIDIDES, PHLOX SP., POA.
 ELEV: 344Ø SIZE: 15
 EODATA: "FORMING DOMED CUSHIONS UP TO 5 DM IN DIAMETER" (BARNEBY
 13233); 1986: CA. 2ØØ-25Ø PLANTS, MOST IN FLOWER; EVIDENCE
 OF LIGHT GRAZING BY HORSES.
 COMMENTS: VOUCHERS-SHELLY, J.S. (1Ø58), 1986, MONTU; BARNEBY, R.C.
 (13233), 1961, RM (264Ø47), VERIFIED BY M. ROBERTS, 1977.
 MACODE1: PRIVATEDOWNMTUS CONTAINED1: Y MACODE2: CONTAINED2:
 MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
 MOREMGMT: B SITECODE:
 SITENAME:
 OWNER: UNKNOWN
 OWNERCOMM:
 PROTCOMM:
 MGMTCOMM:
 MONITOR: MONITORNUM: -
 BESTSOURCE: SHELLY, J.S. 1986. FIELD SURVEY TO SOUTHEASTERN MONTANA OF
 18-22 MAY 1986.
 SOURCECODE: F86SHEØ1MTUS PØDSHEØ1MTUS S86SHEUMMTUS S61BARRMMTUS A56BARØ1MTUS
 B64BARØ1MTUS
 DATASENS: BOUNDARIES: Y PHOTOS: Y OWNERINFO: N
 TRANSCRIBR: 86-Ø2-13 JSS CDREV: Y MAPPER: 86-Ø2-13 JSS QC: Y
 UPDATE: 87-Ø8-13 JEG

ELEMENT OCCURRENCE RECORD

EOCODE: PDFAB0F150.002
 NAME: ASTRAGALUS BARRII
 COMNAME: BARR'S MILK-VETCH
 MARGNUM: 1 TENTEN: 3,1 IDENT: Y EORANK: BC
 SURVEYSITE: BUTTE CREEK
 EORANKCOMM: SMALL POPULATION, LOW % FLOWERING.
 SURVEYDATE: 1986-05-21 LASTOBS: 1986-05-21 FIRSTOBS: GRANK: 6263
 SRANK: S2 STATE: MT COUNTYNAME: MTPOWD
 QUADCODE: 4510525
 QUADNAME: BALDY PEAK PRECISION: SC
 LAT: 451453 LONG: 1053558 S: 451452 N: 451456 E: 1053542 W: 1053600
 TOWNRANGE: 0075050E SECTION: 04 MERIDIAN: PR TRSCOMM: S2SE4

 PHYSPROV: MB WATERSHED: 10090207 RIVERREACH:
 DIRECTIONS: POWDER RIVER BADLANDS, 0.2-0.45 AIR MILES E. OF THE BUTTE
 CREEK RD., 0.8 MI. S. OF ITS JUNCTION WITH THE POWDER RIVER
 RD., E. OF BUTTE CREEK.
 GENDESC: ERODING SILT-CLAY SOIL, IN BARREN, LEVEL TO SLOPING AREAS;
 WITH ARTEMISIA TRIDENTATA/PSEUDOROEGNERIA SPICATA, JUNIPERUS
 SCOPULORUM, ASTRAGALUS SPATULATUS, A. GILVIFLORUS.
 ELEV: 3350 SIZE: 2
 EODATA: CA. 70-80 PLANTS, 2 SUBPOPULATIONS; 50% IN FLOWER AND EARLY
 FRUIT; SOME SIGNS OF LIGHT GRAZING; THIS MAY BE A RELOCATION
 OF A HISTORICAL COLLECTION, "BUTTE CREEK," CITED BY R.
 BARNEBY (1956).
 COMMENTS: VOUCHERS-SHELLY, J.S. (1064), 1986, MONTU; CONSIDINE, MRS.
 (S.N.), NO DATE, "HERB. BARR" (BARNEBY, 1956).
 MACODE1: FBLDOMILE4MTUS CONTAINED1: Y MACODE2: CONTAINED2:
 Y
 MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
 MOREMGMT: B SITECODE:
 SITENAME:
 OWNER:
 OWNERCOMM:
 PROTCOMM:
 MGMTCOMM:
 MONITOR: MONITORNUM: -
 BESTSOURCE: SHELLY, J.S. 1986. FIELD SURVEY TO SOUTHEASTERN MONTANA OF
 18-22 MAY 1986.
 SOURCECODE: F86SHE01MTUS PND8SHE01MTUS S86SHEUMMTUS B64BAR01MTUS A56BAR01MTUS
 SNDCONHBMSTUS
 DATASENS: N BOUNDARIES: Y PHOTOS: Y OWNERINFO:
 TRANSCRIBR: 86-02-13 JSS CDREV: Y MAPPER: 86-02-20 JSS OC: Y
 UPDATE: 87-04-01 LWS

ELEMENT OCCURRENCE RECORD

EOCODE: PDFAB0F150.003
 NAME: ASTRAGALUS BARRII
 COMNAME: BARR'S MILK-VETCH
 MARGNUM: 1 TENTEN: 8,9 IDENT: Y EORANK:
 SURVEYSITE: DECKER
 EORANKCOMM:
 SURVEYDATE: 1983-06-18 LASTOBS: 1983-06-18 FIRSTOBS: 1983 GRANK: G2G3
 SRANK: S2 STATE: MT COUNTYNAME: MTBIGH
 QUADCODE: 451061B
 QUADNAME: PEARL SCHOOL PRECISION: M
 LAT: 450102 LONG: 1065349 S: 0 N: 0 E: 0 W: 0
 TOWNRANGE: 0095039E SECTION: 25 MERIDIAN: PR TRSCOMM: NE4

 PHYSPROV: MB WATERSHED: 10090101 RIVERREACH: 1009010103300.00
 DIRECTIONS: CA. 1 MI. SOUTH OF SQUIRREL CREEK AND 1/2 MI. WEST OF
 DECKER-SHERIDAN ROAD, ON THE CX RANCH.

 GENDESC: BARREN CLAY SOIL ON RIDGETOP, WITH HAPLOPAPPUS ACAULIS AND
 ERIOGONUM PAUCIFLORUM.

 ELEV: 3760 SIZE: 0
 EODATA: COMMON.

COMMENTS: VOUCHER-LESICA, P. (2604), 1983, MONTU (092888).

MACODE1: PRIVATEOWNMTUS CONTAINED1: Y MACODE2: CONTAINED2:

MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: B SITECODE:

SITENAME:

OWNER:

OWNERCOMM:

PROTCOMM:

MGMTCOMM:

MONITOR:

MONITORNUM: -

BESTSOURCE: LESICA, P. DEPT. OF BOTANY, UNIV. OF MONTANA, MISSOULA, MT.

SOURCECODE: PNDLES01MTUS SB3LESUMMTUS A56BAR01MTUS B64BAR01MTUS

DATASENS: BOUNDARIES: PHOTOS: N OWNERINFO: N
 TRANSCRIBR: 86-03-06 JSS CDREV: Y MAPPER: 86-03-06 JSS OC: Y
 UPDATE: 87-04-01 LWS

ELEMENT OCCURRENCE RECORD

EOCODE: PDFAB0F150.004
 NAME: ASTRAGALUS BARRII
 COMNAME: BARR'S MILK-VETCH
 MARGNUM: 1 TENTEN: 2,1 IDENT: Y EORANK:
 SURVEYSITE: COLSTRIP
 EORANKCOMM:
 SURVEYDATE: 1975-05-20 LASTOBS: 1975-05-20 FIRSTOBS: 1975 GRANK: G263
 SRANK: S2 STATE: MT COUNTYNAME: MTROSE
 QUADCODE: 4510675
 QUADNAME: COLSTRIP SE PRECISION: M
 LAT: 455137 LONG: 1063540 S: 0 N: 0 E: 0 W: 0
 TOWNRANGE: 001N041E SECTION: 11 MERIDIAN: PR TRSCOMM: NE4
 PHYSPROV: MB WATERSHED: 10100001 RIVERREACH:
 DIRECTIONS: MONTANA STATE DEPT. OF HEALTH MONITORING SITE, 1.5 MI. SE.
 OF COLSTRIP.

GENDESC: STEEP BUTTE WITH MANY ROADCUTS AND GRAZING MARKS; ON BORDER
 OF WATERSHED 10100003.

ELEV: 3580 SIZE: 0
 EODATA: UNKNOWN.

COMMENTS: DUPLICATE DETERMINED BY R. BARNEBY, NEW YORK BOTANICAL
 GARDEN; LACKSCHEWITZ, K.H. (5950), 1975, MONTU (076530).
 MACODE1: PRIVATEOWNMTUS CONTAINED1: Y MACODE2: CONTAINED2:
 MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
 MOREMGMT: B SITECODE:
 SITENAME:
 OWNER: UNKNOWN
 OWNERCOMM:
 PROTCOMM:
 MGMTCOMM:
 MONITOR: MONITORNUM: -
 BESTSOURCE: LACKSCHEWITZ, K.H. DEPT. OF BOTANY, UNIV. OF MONTANA,
 MISSOULA, MT.
 SOURCECODE: PNDLAC01MTUS S75LACUMMTUS A56BAR01MTUS B64BAR01MTUS
 DATASENS: BOUNDARIES: PHOTOS: N OWNERINFO: N
 TRANSCRIBR: 86-03-06 JSS CDREV: Y MAPPER: 86-03-06 JSS OC: Y
 UPDATE: 87-04-01 LWS

ELEMENT OCCURRENCE RECORD

EOCODE: PDFAB0F150.005
 NAME: ASTRAGALUS BARRII
 COMNAME: BARR'S MILK-VETCH
 MARGNUM: 2 TENTEN: 1,5 IDENT: Y EORANK:
 SURVEYSITE: MILLER COULEE
 EORANKCOMM:
 SURVEYDATE: 1985-05-18 LASTOBS: 1985-05-18 FIRSTOBS: 1985 GRANK: G263
 SRANK: S2 STATE: MT COUNTYNAME: MTROSE
 QUADCODE: 4510675 4510676
 QUADNAME: COLSTRIP SE, COLSTRIP SW PRECISION: S
 LAT: 454923 LONG: 1063728 S: 0 N: 0 E: 0 W: 0
 TOWNRANGE: 001N041E SECTION: 22 MERIDIAN: PR TRSCOMM: NW4SW4

 PHYSPROV: MB WATERSHED: 10100003 RIVERREACH:
 DIRECTIONS: CA. 0.2 AIR MILES NORTH OF MILLER COULEE, CA. 4.5 AIR MILES
 SOUTH OF COLSTRIP.

 GENDESC: ON BARREN, DECOMPOSING SANDSTONE CAP; IN SPARSE VEGETATION
 SURROUNDED BY PINUS PONDEROSA, WITH HYMENOPAPPUS FILIFOLIUS,
 OTHERS.
 ELEV: 3440 SIZE: 0
 EODATA: "JUST OVER FENCE FROM 'AREA A' RECLAMATION" (BIG SKY STRIP
 MINE)."

 COMMENTS: VOUCHER - SCOW, K. (S.N.), 1985, WESTECH (HELENA, MT);
 SPECIMEN KEYED WELL TO THIS SPECIES.
 MACODE1: PRIVATEOWNMTUS CONTAINED1: Y MACODE2: CONTAINED2:

 MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
 MOREMGMT: B SITECODE:
 SITENAME:
 OWNER: MONTCO
 OWNERCOMM:
 PROTCOMM:
 MGMTCOMM:
 MONITOR: MONITORNUM: -
 BESTSOURCE: SCOW, KEN. WESTECH, INC., 2301 COLONIAL DR., HELENA, MT
 59601.
 SOURCECODE: PNDSCO01MTUS S85SCOWTMTUS

 DATASENS: BOUNDARIES: PHOTOS: N OWNERINFO:
 TRANSCRIBR: 86-04-24 JSS CDREV: Y MAPPER: 86-04-24 JSS OC: Y
 UPDATE: 87-04-01 LWS

ELEMENT OCCURRENCE RECORD

EOCODE: PDFAB0F150.006
 NAME: ASTRAGALUS BARRII
 COMNAME: BARR'S MILK-VETCH
 MARGNUM: 1 TENTEN: 6,8 IDENT: Y EORANK:
 SURVEYSITE: EKALAKA
 EORANKCOMM:
 SURVEYDATE: 1943- LASTOBS: 1943- FIRSTOBS: 1943 GRANK: G2G3
 SRANK: S2 STATE: MT COUNTYNAME: MTCART
 QUADCODE: 4510485
 QUADNAME: EKALAKA PRECISION: G
 LAT: 455404 LONG: 1043257 S: 0 N: 0 E: 0 W: 0
 TOWNRANGE: 002N058E SECTION: 29 MERIDIAN: PR TRSCOMM: 28,33
 PHYSPROV: MB WATERSHED: 10110201 RIVERREACH:
 DIRECTIONS: "FROM EKALAKA, MONTANA" (BARNEBY, 1964).

GENDESC: "GULLIED KNOLLS, BUTTES AND BARREN HILLTOPS,...ON LIMESTONE
 OR SANDSTONE" (BARNEBY, 1964).

ELEV: 3700 SIZE: 0
 EODATA: UNKNOWN; TOPO MAP SHOWS NUMEROUS "BUTTES" IN THE VICINITY OF
 EKALAKA.

COMMENTS: VOUCHER - SCHUNK & SCHWANTZ (S.N.), 1943, UTC (CITED IN
 BARNEBY (1964), P.1149).

MACODE1: PRIVATEOWNMTUS CONTAINED1: MACODE2: CONTAINED2:

MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
 MOREMGMT: B SITECODE:

SITENAME:

OWNER: UNKNOWN

OWNERCOMM:

PROTCOMM:

MGMTCOMM:

MONITOR:

MONITORNUM: --

BESTSOURCE: BARNEBY, R. 1964. ATLAS OF NORTH AMERICAN ASTRAGALUS.
 MEM. NY BOTANICAL GARDEN, VOL. 13, PART 2.

SOURCECODE: B64BAR01MTUS S43SCHUTMTUS

DATASENS: BOUNDARIES: PHOTOS: N OWNERINFO:

TRANSCRIBR: 86-04-24 JSS CDREV: Y MAPPER: 86-04-24 JSS QC: Y

UPDATE: 87-04-01 LWS

ELEMENT OCCURRENCE RECORD

EOCODE: PDFAB0F150.007
 NAME: ASTRAGALUS BARRII
 COMNAME: BARR'S MILK-VETCH
 MARGNUM: 2 TENTEN: 7,3 IDENT: Y EORANK: A
 SURVEYSITE: BIDDLE SCHOOL SECTION
 EORANKCOMM: LARGE POPULATION, MOST SITES NOT HEAVILY IMPACTED BY GRAZING
 SURVEYDATE: 1986-05-20 LASTOBS: 1986-05-20 FIRSTOBS: 1986 GRANK: G2G3
 SRANK: S2 STATE: MT COUNTYNAME: MTPOWD
 QUADCODE: 4510513
 QUADNAME: BIDDLE PRECISION: SC
 LAT: 450547 LONG: 1051739 S: 450526 N: 450601 E: 1051708 W: 1051752
 TOWNRANGE: 008S052E SECTION: 36 MERIDIAN: PR TRSCOMM: N2,SW4

PHYSPROV: MB WATERSHED: 10090208 RIVERREACH:
 DIRECTIONS: CA. 2 AIR MILES ESE OF BIDDLE, 0.3-0.9 AIR MILES NE OF THE
 BIDDLE-RIDGE ROAD, 2.25 MILES SE OF ITS JUNCTION WITH STATE
 HWY 59, NORTH OF RANCH CREEK.

GENDESC: GULLIED SLOPES, BLUFFS, AND ALONG RIDGELINES, IN CLAY SOIL
 DERIVED FROM SAND AND SILTSTONE; ARTEMISIA TRIDENTATA/
 ATRIPLEX CONFERTIFOLIA/GRASSLAND "BADLANDS".

ELEV: 3600 SIZE: 128
 EODATA: CA. 600-700 PLANTS, IN 10 SUBPOPULATIONS; FLOWER AND EARLY
 FRUIT; EVIDENCE OF LIVESTOCK GRAZING, ESPECIALLY ON LOWER
 SLOPES.

COMMENTS: VOUCHER-SHELLY, J.S. (1059), 1986, MONTU; SEE GMF FOR BASE
 MAP SHOWING SUBPOPULATIONS.

MACODE1: SSLGNXXX1MTUS CONTAINED1: Y MACODE2: CONTAINED2:

MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: B SITECODE:

SITENAME:

OWNER: STATE OF MONTANA

OWNERCOMM:

PROTCOMM:

MGMTCOMM:

MONITOR:

MONITORNUM:

BESTSOURCE: SHELLY, J.S. 1986. FIELD SURVEY TO SOUTHEASTERN MONTANA OF
 18-22 MAY 1986.

SOURCECODE: F06SHE01MTUS PND6SHE01MTUS S86SHEUMMTUS B64BAR01MTUS A56BAR01MTUS

DATASENS: BOUNDARIES: Y PHOTOS: Y OWNERINFO:

TRANSCRIBR: 86-05-27 JSS CDREV: Y MAPPER: 86-05-27 JSS QC: Y

UPDATE: 87-04-01 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PDFAB0F150.008
 NAME: ASTRAGALUS BARRII
 COMNAME: BARR'S MILK-VETCH
 MARGNUM: 3 TENTEN: 7,2 IDENT: Y EORANK: C
 SURVEYSITE: BOBCAT CREEK
 EORANKCOMM: SMALLER POPULATIONS, PRIVATE LAND, HEAVY GRAZING IN AREA.
 SURVEYDATE: 1986-05-21 LASTOBS: 1986-05-21 FIRSTOBS: 1986 GRANK: 6263
 SRANK: S2 STATE: MT COUNTYNAME: MTPOWD
 QUADCODE: 4510513
 QUADNAME: BIDDLE PRECISION: SC
 LAT: 450642 LONG: 1051712 S: 450624 N: 450645 E: 1051650 W: 1051718
 TOWNRANGE: 008S052E SECTION: 25 MERIDIAN: PR TRSCOMM: NE4;T8SR53E
 30SW4
 PHYSPROV: MB WATERSHED: 10090208 RIVERREACH:
 DIRECTIONS: CA. 0.5 AIR MILES NE OF BOBCAT CREEK, 2.6 AIR MILES ENE OF
 BIDDLE, BADLANDS ALONG THE LITTLE POWDER RIVER.

GENDESC: BARREN SLOPES AND RIDGES OF SILT-CLAY SOIL; WITH ARTEMISIA
 TRIDENTATA, ATRIPLEX CONFERTIFOLIA, ALLIUM TEXTILE,
 PENSTEMON, ZIGADENUS.

ELEV: 3600 SIZE: 34

EODATA: CA. 80-100 PLANTS, 3 SUBPOPULATIONS, ONLY 2 PLANTS SEEN ON
 BLM LAND; LOWER SLOPES AROUND THE SITES ARE HEAVILY GRAZED,
 AND THERE IS EVIDENCE OF LIVESTOCK ON HIGHER SLOPES; SEE GMF
 FOR BASE MAP.

COMMENTS: VOUCHER NOT TAKEN, PHOTOGRAPHS AVAILABLE; COLLECTION MADE AT
 ADJACENT BIDDLE SCHOOL SECTION SITE.

MACODE1: PRIVATEOWNMTUS CONTAINED1: N MACODE2: FBLDOMILE4MTUS CONTAINED2:
 N

MACODE3: CONTAINED3: N ADLMAS: MORELAN: MOREPROT:

MOREMGMT: B SITECODE:

SITENAME:

OWNER:

OWNERCOMM:

PROTCOMM: LARGEST SUBPOPULATIONS OCCUR ON PRIVATE LAND.

MGMTCOMM:

MONITOR:

MONITORNUM:

BESTSOURCE: SHELLY, J.S. 1986. FIELD SURVEY TO SOUTHEASTERN MONTANA OF
 18-22 MAY 1986.

SOURCECODE: F86SHE01MTUS PND SHE01MTUS A56BAR01MTUS B64BAR01MTUS

DATASENS: BOUNDARIES: Y PHOTOS: Y OWNERINFO: N

TRANSCRIBR: 86-05-30 JSS CDREV: Y MAPPER: 86-05-30 JSS OC: Y

UPDATE: 87-04-01 LWS

ELEMENT OCCURRENCE RECORD

EOCODE: PDFAB0F150.009
 NAME: ASTRAGALUS BARRII
 COMNAME: BARR'S MILK-VETCH
 MARGNUM: 1 TENTEN: 7,6 IDENT: Y EORANK: B
 SURVEYSITE: WILD BILL CREEK
 EORANKCOMM: MODERATE-SIZED POPULATION, LIGHT GRAZING IMPACTS.
 SURVEYDATE: 1986-05-21 LASTOBS: 1986-05-21 FIRSOBS: 1986 GRANK: 6263
 SRANK: S2 STATE: MT COUNTYNAME: MTPOWD
 QUADCODE: 4510514
 QUADNAME: WILD BILL CREEK PRECISION: SC
 LAT: 450338 LONG: 1052502 S: 450334 N: 450342 E: 1052453 W: 1052508
 TOWNRANGE: 009S051E SECTION: 12 MERIDIAN: PR TRSCOMM: SW4

PHYSPROV: MB WATERSHED: 10090208 RIVERREACH:
 DIRECTIONS: BUTTE CREEK RD., 1.4 MILES WEST OF WILD BILL CREEK,
 1.9 MILES WEST OF STATE HWY 59; 0.1-0.25 AIR MILES NORTH OF
 THE ROAD.
 GENDESC: IN SILT-CLAY SOIL ALONG A LOW RIDGELINE; WITH ARTEMISIA
 TRIDENTATA, PSEUDOROEGNERIA SPICATA, POA SECUNDA, MUSINEON
 DIVARICATUM, ASTRAGALUS SPATUALTUS.
 ELEV: 3590 SIZE: 5
 EODATA: CA. 200-225 PLANTS, 1 POPULATION; SOME EVIDENCE OF LIGHT
 GRAZING.

COMMENTS: VOUCHER-SHELLY, J.S. (1062), 1986, MONTU.

MACODE1: FBLDOMILE4MTUS CONTAINED1: Y MACODE2: CONTAINED2:
 Y
 MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
 MOREMGMT: B SITECODE:
 SITENAME:
 OWNER:
 OWNERCOMM:
 PROTCOMM:
 MGMTCOMM:
 MONITOR: MONITORNUM:
 BESTSOURCE: SHELLY, J.S. 1986. FIELD SURVEY TO SOUTHEASTERN MONTANA OF
 18-22 MAY.
 SOURCECODE: F86SHE01MTUS PND6SHE01MTUS S86SHEUMMTUS A56BAR01MTUS B64BAR01MTUS
 DATASENS: BOUNDARIES: Y PHOTOS: N OWNERINFO:
 TRANSCRIBR: 86-05-30 JSS CDREV: Y MAPPER: 86-05-30 JSS OC: Y
 UPDATE: 87-04-01 LWS

ELEMENT OCCURRENCE RECORD

EOCODE: PDFAB0F150.010
 NAME: ASTRAGALUS BARRII
 COMNAME: BARR'S MILK-VETCH
 MARGNUM: 8 TENTEN: 6,4 IDENT: Y EORANK: B
 SURVEYSITE: STAG ROCK KNOLLS
 EORANKCOMM: GRAZED SITE CLOSE TO ROAD.
 SURVEYDATE: 1988-05-14 LASTOBS: 1988-05-14 FIRSTOBS: 1988 GRANK: G263
 SRANK: S2 STATE: MT COUNTYNAME: MTPOWD
 QUADCODE: 4510632
 QUADNAME: FORT HOWES PRECISION: SC
 LAT: 451934 LONG: 1061002 S: 451920 N: 451948 E: 1060957 W: 1061007
 TOWNRANGE: 006S045E SECTION: 12 MERIDIAN: PR TRSCOMM: SW4;13,NW4

PHYSPROV: MB WATERSHED: 10090102 RIVERREACH: 1009010204200.00
 DIRECTIONS: CUSTER NATIONAL FOREST, 1.5 MILES NORTH OF FORT HOWES RANGER
 STATION, 0.5 MILE WEST OF OTTER CREEK ROAD, NW OF STAG ROCK.

GENDESC: ERODING HILLSIDES AND KNOLLS, IN SILTY-CLAY DERIVED SOILS;
 OPEN SOIL BENEATH PINUS PONDEROSA, JUNIPEROUS SCOPULORUM,
 WITH ARTEMESIA TRIDENTATA.

ELEV: 3450 SIZE: 15
 EODATA: CA. 1250 PLANTS, IN 4 SUBPOPULATIONS; FLOWERING.

COMMENTS: VOUCHER, SCHAASSBERGER, L.A. (176, 177, 180), 1988, MONTU.
 SEE GMF FOR BASE MAP SHOWING SUBPOPULATIONS.

MACODE1: FFSNFCUST4MTUS CONTAINED1: Y MACODE2: CONTAINED2:

MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
 MOREMGMT: B SITECODE:

SITENAME:
 OWNER: CUSTER NATIONAL FOREST

OWNERCOMM:

PROTCOMM:

MGMTCOMM:

MONITOR:

MONITORNUM:

BESTSOURCE: SCHAASSBERGER, L.A. 1988. FIELD SURVEY, CUSTER NATIONAL FOR-
 EST, 13-20 MAY 1988.

SOURCECODE: F8BSCH01MTUS PNDSCHE02MTUS S8BSCHUMMTUS

DATASENS: BOUNDARIES: Y PHOTOS: Y OWNERINFO:

TRANSCRIBR: 88-05-23 LAS CDREV: Y MAPPER: 88-08-04 LAS QC: Y

UPDATE: 88-08-15 MEZ

ELEMENT OCCURRENCE RECORD

EOCODE: PDFAB0F150.011
 NAME: ASTRAGALUS BARRII
 COMNAME: BARR'S MILK-VETCH
 MARGNUM: 9 TENTEN: 7,6 IDENT: Y EORANK: A
 SURVEYSITE: FORT HOWES RIDGE
 EORANKCOMM: GOOD POPULATION SIZE, PROTECTED
 SURVEYDATE: 1988-05-14 LASTOBS: 1988-05-14 FIRSTOBS: 1988 GRANK: G263
 SRANK: S2 STATE: MT COUNTYNAME: MTPOWD
 QUADCODE: 4510632
 QUADNAME: FORT HOWES PRECISION: SC
 LAT: 451813 LONG: 1060937 S: 451808 N: 451817 E: 1060930 W: 1060941
 TOWNRANGE: 006S04E SECTION: 24 MERIDIAN: PR TRSCOMM: NE4

PHYSPROV: MB WATERSHED: 10090102 RIVERREACH: 1009010204200.00
 DIRECTIONS: CUSTER NATIONAL FOREST, ON HILLS AND CLIFF 0.25 MILES NW OF
 FORT HOWES RANGER STATION.

GENDESC: ERODING HILLSIDE AND ABOVE SILTSTONE CLIFF WITH ARTEMESIA
 TRIDENTATA, GUTIERREZIA SAROTHRAE, CRYPTANTHA CELOSIODES,
 YUCCA GLAUCA.

ELEV: 3550 SIZE: 4
 EODATA: CA. 600 PLANTS, IN 2 SUBPOPULATIONS; MOST IN FLOWER.

COMMENTS: VOUCHER - SCHAASSBERGER, L.A. (178). 1988, MONTU; SEE GMF FOR
 BASE MAP SHOWING SUBPOPULATIONS.

MACODE1: FFSNFCUST4MTUS CONTAINED1: Y MACODE2: CONTAINED2:

MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: B SITECODE:

SITENAME:

OWNER: CUSTER NATIONAL FOREST

OWNERCOMM:

PROTCOMM:

MGMTCOMM:

MONITOR:

MONITORNUM:

BESTSOURCE: SCHAASSBERGER, L.A. 1988. FIELD SURVEY, CUSTER NATIONAL
 FOREST, 13-20 MAY, 1988.

SOURCECODE: F88SCH01MTUS PND8SCH02MTUS S88SCHUMMTUS

DATASENS: N BOUNDARIES: Y PHOTOS: Y OWNERINFO:

TRANSCRIBR: 88-05-23 LAS CDREV: Y MAPPER: 88-10-03 LAS OC: Y

UPDATE: 88-10-21 MEZ

ELEMENT OCCURRENCE RECORD

EOCODE: PDFAB0F150.012
 NAME: ASTRAGALUS BARRII
 COMNAME: BARR'S MILK-VETCH
 MARGNUM: 10 TENTEN: 9,7 IDENT: Y EORANK: A
 SURVEYSITE: TAYLOR BUTTE RIM
 EORANKCOMM: EXCELLENT SITE NATURALLY PROTECTED BY CLIFFLINE.
 SURVEYDATE: 1988-05-14 LASTOBS: 1988-05-14 FIRSTOBS: 1988 GRANK: G263
 SRANK: S2 STATE: MT COUNTYNAME: MTPOWD
 QUADCODE: 4510632
 QUADNAME: FORT HOWES PRECISION: SC
 LAT: 451713 LONG: 1060828 S: 451705 N: 451734 E: 1060825 W: 1060837
 TOWNRANGE: 006S046E SECTION: 30 MERIDIAN: PR TRSCOMM: E2

PHYSPROV: MB WATERSHED: 10090102 RIVERREACH: 1009010205400.00
 DIRECTIONS: CUSTER NATIONAL FOREST, 0.5 MILES EAST OF OTTER CREEK ROAD
 ON SOUTH FORK OF TAYLOR CREEK ROAD, CLIFFLINE TO EAST.

GENDESC: ABOVE AND BELOW ERODING CLIFFLINE; SILTY CLAY; OPEN PINUS
 PONDEROSA, JUNIPERUS SCOPULORUM WITH ARTEMESIA TRIDENTATA
 AND HAPLOPAPPUS ARMERIOIDES.

ELEV: 3400 SIZE: 35
 EODATA: CA. 2000 INDIVIDUALS SCATTERED ABOVE AND BELOW CLIFF LINE.

COMMENTS: VOUCHER - SCHASSBERGER, L.A. (179). 1988, MONTU; SEE GMF FOR
 BASE MAP SHOWING SUBPOPULATIONS.

MACODE1: FFSNFCUST4MTUS CONTAINED1: Y MACODE2: CONTAINED2:

MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: B SITECODE:

SITENAME:

OWNER: CUSTER NATIONAL FOREST

OWNERCOMM:

PROTCOMM:

MGMTCOMM:

MONITOR:

MONITORNUM:

BESTSOURCE: SCHASSBERGER, L.A., 1988. FIELD SURVEY, CUSTER NATIONAL
 FOREST, 13-20 MAY, 1988

SOURCECODE: F88SCH01MTUS PND8SCH02MTUS S88SCHUMMTUS

DATASENS: N BOUNDARIES: Y PHOTOS: Y OWNERINFO:

TRANSCRIBR: 88-05-23 LAS CDREV: Y MAPPER: 88-10-03 LAS OC: Y

UPDATE: 88-10-21 MEZ

ELEMENT OCCURRENCE RECORD

EOCODE: PDFABØF15Ø.Ø13
 NAME: ASTRAGALUS BARRII
 COMNAME: BARR'S MILK-VETCH
 MARGNUM: 11 TENTEN: 7,4 IDENT: Y EORANK: BC
 SURVEYSITE: STAG ROCK CLIFF TOPS
 EORANKCOMM: GOOD-SIZED POPULATION; NOT FLOWERING EXTENSIVELY.
 SURVEYDATE: 1988-Ø5-19 LASTOBS: 1Ø88-Ø5-19 FIRSOBS: 1988 GRANK: G263
 SRANK: S2 STATE: MT COUNTYNAME: MTPOWD
 QUADCODE: 451Ø632
 QUADNAME: FORT HOWES PRECISION: SC
 LAT: 451911 LONG: 1Ø6Ø945 S: 451853 N: 451914 E: 1Ø6Ø919 W: 1Ø6Ø957
 TOWNRANGE: ØØ6SØ45E SECTION: 13 MERIDIAN: PR TRSCOMM: NE4;ØØ6SØ46E
 ,S18,SW4
 PHYSPROV: MB WATERSHED: 1ØØ9Ø1Ø2 RIVERREACH: 1ØØ9Ø1Ø2Ø42ØØ.ØØ
 DIRECTIONS: CUSTER NATIONAL FOREST, 1.5 MILES NORTH OF FORT HOWES RANGER
 STATION, Ø.25 MILE WEST OF OTTER CREEK ROAD, SW OF STAG
 ROCK.
 GENDESC: ERODING CLIFF-LINES IN SILTY-CLAY SOILS, BENEATH MODERATE
 COVER OF PINUS PONDEROSA AND JUNIPERUS SCOPULORUM, WITH CAL-
 AMOVILFA LONGIFOLIA AND ANDROPOGON SCOPARIUS.
 ELEV: 334Ø SIZE: 45
 EODATA: CA. 175Ø PLANTS IN 3 SUBPOPULATIONS SCATTERED ALONG CLIFF-
 LINE; LESS THAN 1Ø PERCENT IN FLOWER; LARGE MATS.

COMMENTS: VOUCHERS - SCHAßBERGER (181, 19Ø, 191). 1988. MONTU. SEE
 GMF FOR BASE MAP SHOWING SUBPOPULATIONS.

MACODE1: FFSNFCUST4MTUS CONTAINED1: Y MACODE2: CONTAINED2:
 MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
 MOREMGMT: B SITECODE:
 SITENAME:
 OWNER: CUSTER NATIONAL FOREST
 OWNERCOMM:
 PROTCOMM:
 MGMTCOMM:
 MONITOR: MONITORNUM:
 BESTSOURCE: SCHAßBERGER, L.A. 1988. FIELD SURVEY, CUSTER NATIONAL FOR-
 EST, 13-2Ø MAY 1988.
 SOURCECODE: F88SCHØ1MTUS PND8SCHØ2MTUS S88SCHUMMTUS

DATASENS: N BOUNDARIES: Y PHOTOS: Y OWNERINFO:
 TRANSCRIBR: 88-Ø5-23 LAS CDREV: Y MAPPER: 88-1Ø-Ø3 LAS QC: Y
 UPDATE: 88-1Ø-25 MEZ

ELEMENT OCCURRENCE RECORD

EOCODE: PDFAB0F150.014
 NAME: ASTRAGALUS BARRII
 COMNAME: BARR'S MILK-VETCH
 MARGNUM: 12 TENTEN: 10,2 IDENT: Y EORANK: CC
 SURVEYSITE: LYON CREEK RIDGE
 EORANKCOMM: NO APPARENT REPRODUCTION; GRAZING ON ALLOTMENT.
 SURVEYDATE: 1988-05-16 LASTOBS: 1988-05-19 FIRSTOBS: 1988 GRANK: 6263
 SRANK: S2 STATE: MT COUNTYNAME: MTPOWD
 QUADCODE: 4510632 4510631
 QUADNAME: FORT HOWES, GOODSPEED BUTTE PRECISION: SC
 LAT: 452113 LONG: 1060753 S: 452049 N: 452120 E: 1060727 W: 1060802
 TOWNRANGE: 005S046E SECTION: 36 MERIDIAN: PR TRSCOMM: SW4;S35,SE4
 T6SR46E+
 PHYSPROV: MB WATERSHED: 10090102 RIVERREACH: 1009010205500.00
 DIRECTIONS: S5,N2. CUSTER NATIONAL FOREST, 3.5 MILES NORTH OF FORT
 HOWES, 1 MILE EAST OF OTTER CREEK, JUST NORTH OF LYON CREEK
 ROAD.
 GENDESC: ERODING CLIFF-LINES & RIDGES, IN SILTY-CLAY SOILS, BENEATH
 PINUS PONDEROSA, JUNIPEROUS SCOPULORUM; WITH ANDROPOGON
 SCOPARIUS, FESTUCA IDAHOENSIS, SENICIO CANUS.
 ELEV: 3400 SIZE: 40
 EODATA: CA. 2,400 PLANTS IN 4 SUBPOPULATIONS; LARGE MATTED POPULA-
 TIONS, NOT FLOWERING. LIGHT GRAZING IN SURROUNDING AREAS.

COMMENTS: VOUCHERS - SCHAASSBERGER (184, 192, 193). 1988. MONTU. SEE
 GMF FOR BASE MAP SHOWING SUBPOPULATIONS.

MACODE1: FFSNFCUST4MTUS CONTAINED1: Y MACODE2: CONTAINED2:

MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: B SITECODE:

SITENAME:

OWNER: CUSTER NATIONAL FOREST

OWNERCOMM:

PROTCOMM:

MGMTCOMM:

MONITOR:

MONITORNUM:

BESTSOURCE: SCHAASSBERGER, L.A. 1988. FIELD SURVEY, CUSTER NATIONAL FOR-
 EST, 13-20 MAY 1988.

SOURCECODE: F88SCH01MTUS PND8SCH02MTUS S88SCHUMMTUS

DATASENS: N BOUNDARIES: Y PHOTOS: Y OWNERINFO:

TRANSCRIBR: 88-05-23 LAS CDREV: Y MAPPER: 88-10-03 LAS QC: Y

UPDATE: 88-10-25 MEZ

ELEMENT OCCURRENCE RECORD

EOCODE: PDFAB0F150.015
 NAME: ASTRAGALUS BARRII
 COMNAME: BARR'S MILK-VETCH
 MARGNUM: 5 TENTEN: 7,2 IDENT: Y EORANK: AA
 SURVEYSITE: KING CREEK WELL
 EORANKCOMM: EXCELLENT SITE
 SURVEYDATE: 1988-05-16 LASTOBS: 1988-05-16 FIRSTOBS: 1988 GRANK: 6263
 SRANK: S2 STATE: MT COUNTYNAME: MTROSE
 QUADCODE: 4510643
 QUADNAME: GREEN CREEK PRECISION: SC
 LAT: 452847 LONG: 1061716 S: 452845 N: 452851 E: 1061710 W: 1061720
 TOWNRANGE: 004S044E SECTION: 22 MERIDIAN: PR TRSCOMM: NW4

PHYSPROV: MB WATERSHED: 10090102 RIVERREACH: 1009010200000.00
 DIRECTIONS: CUSTER NATIONAL FOREST, 5 MILES SOUTH OF ASHLAND, 2.5 MILES
 SE OF TONGUE RIVER ROAD ON SOUTH SIDE OF KING CREEK ROAD;
 WITHIN WALK-IN/RIDE-IN RESTRICTED ZONE.

GENDESC: EORDING HILLSIDE OF SILTY-CLAY SOIL, WITH ARTEMESIA TRIDEN-
 TATA, ATRIPLEX CONFERTIFOLIA, YUCCA GLAUCA, COMMANDRA UMBEL-
 LATA.

ELEV: 3350 SIZE: 2
 EODATA: CA. 2,000 PLANTS, FLOWERING PROLIFICALLY; ACTIVE POLLIN-
 ATION OBSERVED.

COMMENTS: VOUCHER - SCHAASSBERGER (185). 1988. MONTU.

MACODE1: FFSNFCUST4MTUS CONTAINED1: Y MACODE2: CONTAINED2:

MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: B SITECODE:

SITENAME:

OWNER: CUSTER NATIONAL FOREST

OWNERCOMM:

PROTCOMM:

MGMTCOMM:

MONITOR:

MONITORNUM:

BESTSOURCE: SCHAASSBERGER, L.A. 1988. FIELD SURVEY, CUSTER NATIONAL
 FOREST, 13-20 MAY 1988.

SOURCECODE: F88SCH01MTUS PND8SCH02MTUS S88SCHUMMTUS

DATASENS: N BOUNDARIES: Y PHOTOS: Y OWNERINFO:

TRANSCRIBR: 88-05-23 LAS CDREV: Y MAPPER: 88-10-03 LAS QC: Y

UPDATE: 88-10-24 MEZ

ELEMENT OCCURRENCE RECORD

EOCODE: PDFABØF15Ø.Ø16
 NAME: ASTRAGALUS BARRII
 COMNAME: BARR'S MILK-VETCH
 MARGNUM: 13 TENTEN: 7,3 IDENT: Y EORANK: BB
 SURVEYSITE: STAG ROCK RESERVOIR RIDGES
 EORANKCOMM: TOO CLOSE TO RESERVOIR FOR CATTLE.
 SURVEYDATE: 1988-Ø5-18 LASTOBS: 1988-Ø5-18 FIRSTOBS: 1988 GRANK: G2G3
 SRANK: S2 STATE: MT COUNTYNAME: MTPWD
 QUADCODE: 451Ø632
 QUADNAME: FORT HOWES PRECISION: SC
 LAT: 452Ø11 LONG: 1Ø6Ø943 S: 452ØØ8 N: 452Ø22 E: 1Ø6Ø939 W: 1Ø6Ø955
 TOWNRANGE: ØØ6SØ45E SECTION: 12 MERIDIAN: PR TRSCOMM: NE4;S1,SE4

PHYSPROV: MB WATERSHED: 1ØØ9Ø1Ø2 RIVERREACH: 1ØØ9Ø1Ø2ØØØØØ.ØØ
 DIRECTIONS: CUSTER NATIONAL FOREST, 2.5 MILES NORTH OF FORT HOWES RANGER
 STATION, Ø.5 MILE WEST OF OTTER CREEK ROAD, Ø.25 MILE NORTH
 OF STAG ROCK RESERVOIR.

GENDESC: ERODING BARREN KNOLLS AND RIDGES IN SILTY-CLAY SOIL, WITH
 PHLOX HOODII, FESTUCA IDAHOENSIS, HAPLOPAPPUS AMERIOIDES,
 GUTIERREZIA SAROTHRÆ.

ELEV: 342Ø SIZE: 35
 EODATA: CA. 95Ø PLANTS IN 3 SUBPOPULATIONS; ABOUT 75 PERCENT OF POP-
 ULATION IN FLOWER.

COMMENTS: VOUCHERS - SCHAßBERGER (187, 188, 189). 1988. MONTU. SEE
 GMF FOR BASE MAP SHOWING SUBPOPULATIONS.

MACODE1: FFSNFCUST4MTUS CONTAINED1: Y MACODE2: CONTAINED2:

MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: B SITECODE:

SITENAME:

OWNER: CUSTER NATIONAL FOREST

OWNERCOMM:

PROTCOMM:

MGMTCOMM:

MONITOR:

MONITORNUM:

BESTSOURCE: SCHAßBERGER, L.A. 1988. FIELD SURVEY, CUSTER NATIONAL FOR-
 EST, 13-2Ø MAY 1988.

SOURCECODE: F88SCHØ1MTUS PNDSCHØ2MTUS S88SCHUMMTUS

DATASENS: N BOUNDARIES: Y PHOTOS: Y OWNERINFO:

TRANSCRIBR: 88-Ø5-23 LAS CDREV: Y MAPPER: 88-1Ø-Ø4 LAS OC: Y

UPDATE: 88-1Ø-24 MEZ

ELEMENT OCCURRENCE RECORD

EOCODE: PDFAB0F150.017
 NAME: ASTRAGALUS BARRII
 COMNAME: BARR'S MILK-VETCH
 MARGNUM: 14 TENTEN: 10,6 IDENT: Y EORANK: CC
 SURVEYSITE: NW BUTTRESS, TAYLOR BUTTE
 EORANKCOMM: POOR REPRODUCTION
 SURVEYDATE: 1988-05-19 LASTOBS: 1988-05-19 FIRSTOBS: 1988 GRANK: 6263
 SRANK: S2 STATE: MT COUNTYNAME: MTPOWD
 QUADCODE: 4510632
 QUADNAME: FORT HOWES PRECISION: SC
 LAT: 451754 LONG: 1060759 S: 451744 N: 451757 E: 1060755 W: 1060821
 TOWNRANGE: 006S046E SECTION: 20 MERIDIAN: PR TRSCOMM: SW4;S19,SE4

PHYSPROV: MB WATERSHED: 10090102 RIVERREACH: 1009010204200.00
 DIRECTIONS: CA. 0.75 MILE SE OF FORT HOWES RANGER STATION, ALONG CLIFFS.

GENDESC: ERODING CLIFF IN SILTY CLAY SOILS; ONE SUBPOPULATION IN THE
 MIDDLE OF BURN AREA (1966).

ELEV: 3360 SIZE: 30
 EODATA: CA. 3,050 PLANTS SCATTERED ALONG RIM ROCK. LARGE MATS. NOT
 FLOWERING.

COMMENTS: VOUCHERS - SCHAESSBERGER (194, 195). 1988. MONTU. SEE GMF
 FOR BASE MAP SHOWING SUBPOPULATIONS.

MACODE1: FFSNFCUST4MTUS CONTAINED1: Y MACODE2: CONTAINED2:

MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: B SITECODE:

SITENAME:

OWNER: CUSTER NATIONAL FOREST

OWNERCOMM:

PROTCOMM:

MGMTCOMM:

MONITOR:

MONITORNUM:

BESTSOURCE: SCHAESSBERGER, L.A. 1988. FIELD SURVEY, CUSTER NATIONAL FOR-
 EST, 13-20 MAY 1988.

SOURCECODE: F08SCH01MTUS P08SCH02MTUS S08SCHUMMTUS

DATASENS: N BOUNDARIES: Y PHOTOS: Y OWNERINFO:

TRANSCRIBR: 88-05-23 LAS CDREV: Y MAPPER: 88-10-04 LAS QC: Y

UPDATE: 88-10-24 MEZ

ELEMENT OCCURRENCE RECORD

EOCODE: PDFAB0F150.018
 NAME: ASTRAGALUS BARRII
 COMNAME: BARR'S MILK-VETCH
 MARGNUM: 4 TENTEN: 8,5 IDENT: Y EORANK: CC
 SURVEYSITE: GATE CREEK
 EORANKCOMM: HEAVILY GRAZED AREA NEAR ROAD.
 SURVEYDATE: 1988-05-20 LASTOBS: 1988-05-20 FIRSTOBS: 1988 GRANK: G263
 SRANK: S2 STATE: MT COUNTYNAME: MTROSE
 QUADCODE: 4510644
 QUADNAME: BIRNEY DAY SCHOOL PRECISION: SC
 LAT: 452624 LONG: 1062353 S: 452622 N: 452626 E: 1062348 W: 1062356
 TOWNRANGE: 004S043E SECTION: 34 MERIDIAN: PR TRSCOMM: SE4;S35,SW4

PHYSPROV: MB WATERSHED: 10090102 RIVERREACH: 1009010200000.00
 DIRECTIONS: 0.3 MILES SOUTH OF GATE CREEK ON THE EAST SIDE OF BIRNEY
 CREEK ROAD.

GENDESC: ERODING KNOLL; WITH ARTEMESIA TRIDENTATA, ATRIPLEX
 CONFERTIFOLIA, ANDROPOGON SCOPARIUS.

ELEV: 3140 SIZE: 1
 EODATA: CA. 200-250 PLANTS, FLOWERING; EVIDENCE OF LIVESTOCK
 GRAZING.

COMMENTS: VOUCHER - SCHAASSBERGER, L.A. (196), 1988, MONTU.

MACODE1: PRIVATEOWNMTUS CONTAINED1: N MACODE2: FBLDOMILE4MTUS CONTAINED2:
 N

MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:

SITENAME:

OWNER: PRIVATE / BLM

OWNERCOMM:

PROTCOMM:

MGMTCOMM:

MONITOR:

MONITORNUM:

BESTSOURCE: SCHAASSBERGER, L.A. 1988. FIELD SURVEY, CUSTER NATIONAL
 FOREST, 13-20 MAY 1988.

SOURCECODE: F88SCH01MTUS PNDSCHE02MTUS S88SCHUMMTUS

DATASENS: N BOUNDARIES: Y PHOTOS: Y OWNERINFO:

TRANSCRIBR: 88-05-23 LAS CDREV: Y MAPPER: 88-10-04 LAS QC: Y

UPDATE: 88-10-21 MEZ

ELEMENT OCCURRENCE RECORD

EOCODE: PDFAB0F150.019
 NAME: ASTRAGALUS BARRII
 COMNAME: BARR'S MILK-VETCH
 MARGNUM: 6 TENTEN: 3,3 IDENT: Y EORANK: B
 SURVEYSITE: O'DELL CREEK BUTTRESS
 EORANKCOMM: GRAZING
 SURVEYDATE: 1988-05-20 LASTOBS: 1988-05-20 FIRSTOBS: 1988 GRANK: 6263
 SRANK: S2 STATE: MT COUNTYNAME: ROSE
 QUADCODE: 4510643
 QUADNAME: GREEN CREEK PRECISION: SC
 LAT: 452735 LONG: 1062044 S: 0 N: 0 E: 0 W: 0
 TOWNRANGE: 004S044E SECTION: 30 MERIDIAN: PR TRSCOMM:

PHYSPROV: MB WATERSHED: 10090102 RIVERREACH: 1009010203500.00
 DIRECTIONS: 10 MILES SE OF ASHLAND; CLIFFLINE NE OF INTERSECTION WITH
 O'DELL CREEK ROAD.

GENDESC: LOW ERODING HILLSIDE IN SILTY-CLAY SOILS, WITH ARTEMESIA
 TRIDENTATA, FESTUCA IDAHOENSIS, AND GUTIERREZIA SAROTHRAE.

ELEV: 3360 SIZE: 1
 EODATA: CA. 200 PLANTS SCATTERED ATOP CLIFF AND BELOW; 25% FLOWER-
 ING.

COMMENTS: VOUCHER - SCHAASSBERGER (197), 1988, MONTU.

MACODE1: PRIVATEOWNMTUS CONTAINED1: Y MACODE2: CONTAINED2:

MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:

SITENAME:

OWNER: PRIVATE

OWNERCOMM:

PROTCOMM:

MGMTCOMM:

MONITOR:

MONITORNUM:

BESTSOURCE: SCHAASSBERGER, L.A. 1988 FIELD SURVEY, CUSTER NATIONAL
 FOREST, 13-20 MAY 1988.

SOURCECODE: F8BSCH01MTUS PND5SCH02MTUS S8BSCHUMMTUS

DATASENS: N BOUNDARIES: Y PHOTOS: Y OWNERINFO:

TRANSCRIBR: 88-05-23 LAS CDREV: Y MAPPER: 88-10-04 LAS QC: Y

UPDATE: 88-10-21 MEZ

ELEMENT OCCURRENCE RECORD

EOCODE: PDFAB0F150.020
 NAME: ASTRAGALUS BARRII
 COMNAME: BARR'S MILK-VETCH
 MARGNUM: 2 TENTEN: 5,5 IDENT: Y EORANK: CC
 SURVEYSITE: SHEEP WELL ROAD
 EORANKCOMM: NO CURRENT REPRODUCTION; GRAZED SITE
 SURVEYDATE: 1985-05-20 LASTOBS: 1988-05-20 FIRSTOBS: 1988 GRANK: G2G3
 SRANK: S2 STATE: MT COUNTYNAME: POWD
 QUADCODE: 4510651
 QUADNAME: COLEMAN DRAW PRECISION: SC
 LAT: 453350 LONG: 1060404 S: 0 N: 0 E: 0 W: 0
 TOWNRANGE: 0035046E SECTION: 20 MERIDIAN: PR TRSCOMM: NE4

PHYSPROV: MB WATERSHED: 10090102 RIVERREACH: 1009010205900.00
 DIRECTIONS: CUSTER NATIONAL FOREST, CA. 10 MILES EAST OF ASHLAND HIGHWAY
 212, 0.5 MILES SOUTH OF HIGHWAY, JUST WEST OF DIRT ROAD.

GENDESC: LOW ERODING HILLSIDE IN SILTY-CLAY SOILS, WITH CHRYSOTHAMNUS
 NAUSEOSUS, ANDROPOGON SCOPARIUM AND GUTIERREZIA SAROTHRAE.

ELEV: 3310 SIZE: 1
 EODATA: CA. 200-250 PLANTS SCATTERED ALONG A LOW EMBANKMENT; NOT
 FLOWERING.

COMMENTS: VOUCHER - SCHAASSBERGER (198), MONTU; SEE GMF FOR BASE MAP
 SHOWING POPULATION.

MACODE1: FFSNFCUST4MTUS CONTAINED1: Y MACODE2: CONTAINED2:

MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: B SITECODE:

SITENAME:

OWNER: CUSTER NATIONAL FOREST

OWNERCOMM:

PROTCOMM:

MGMTCOMM:

MONITOR:

MONITORNUM:

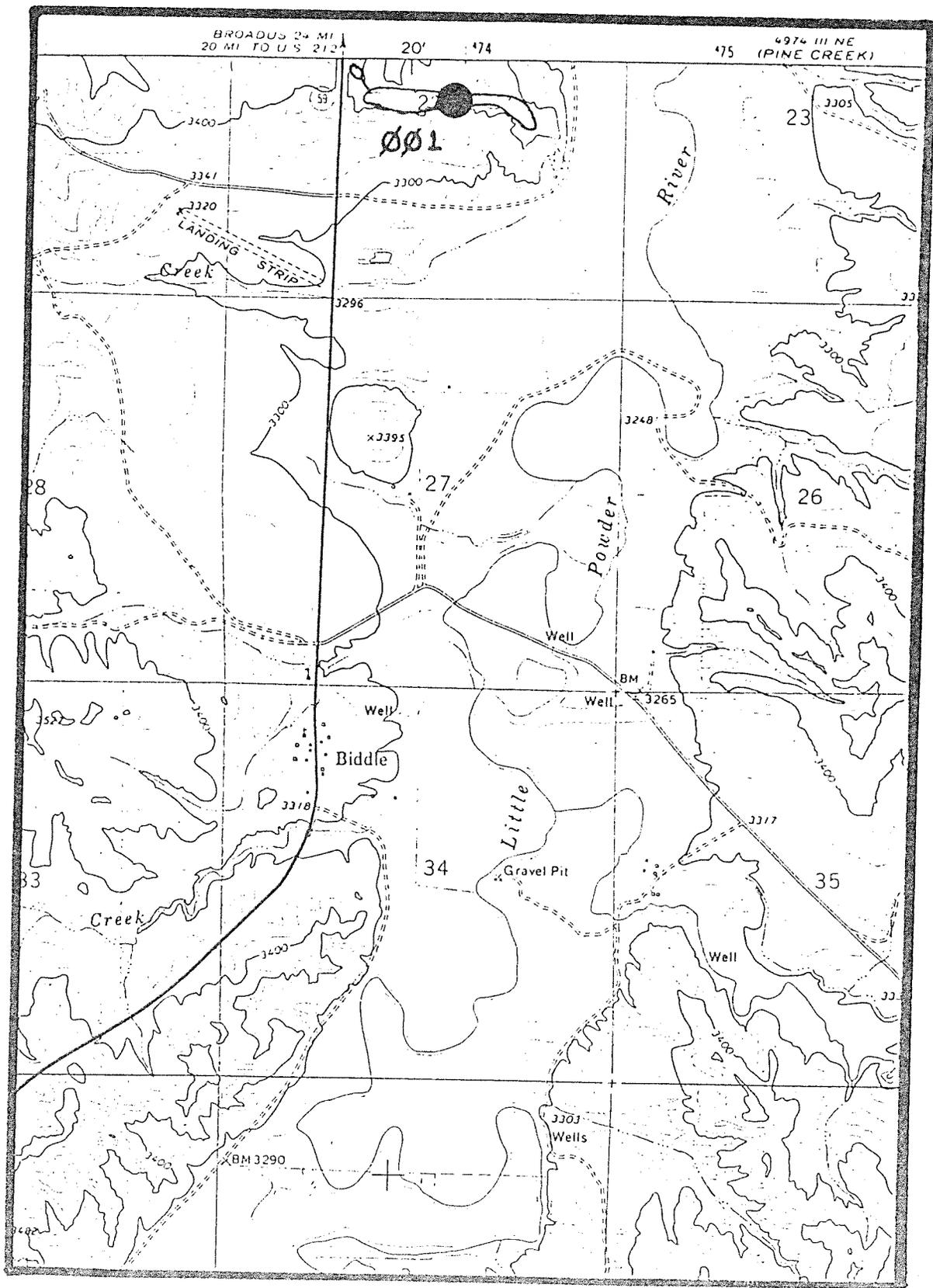
BESTSOURCE: SCHAASSBERGER, L.A. 1988. FIELD SURVEY, CUSTER NATIONAL
 FOREST, 13-20 MAY 1988.

SOURCECODE: F88SCH01MTUS PND8SCH02MTUS S88SCHUMMTUS

DATASENS: N BOUNDARIES: Y PHOTOS: Y OWNERINFO:

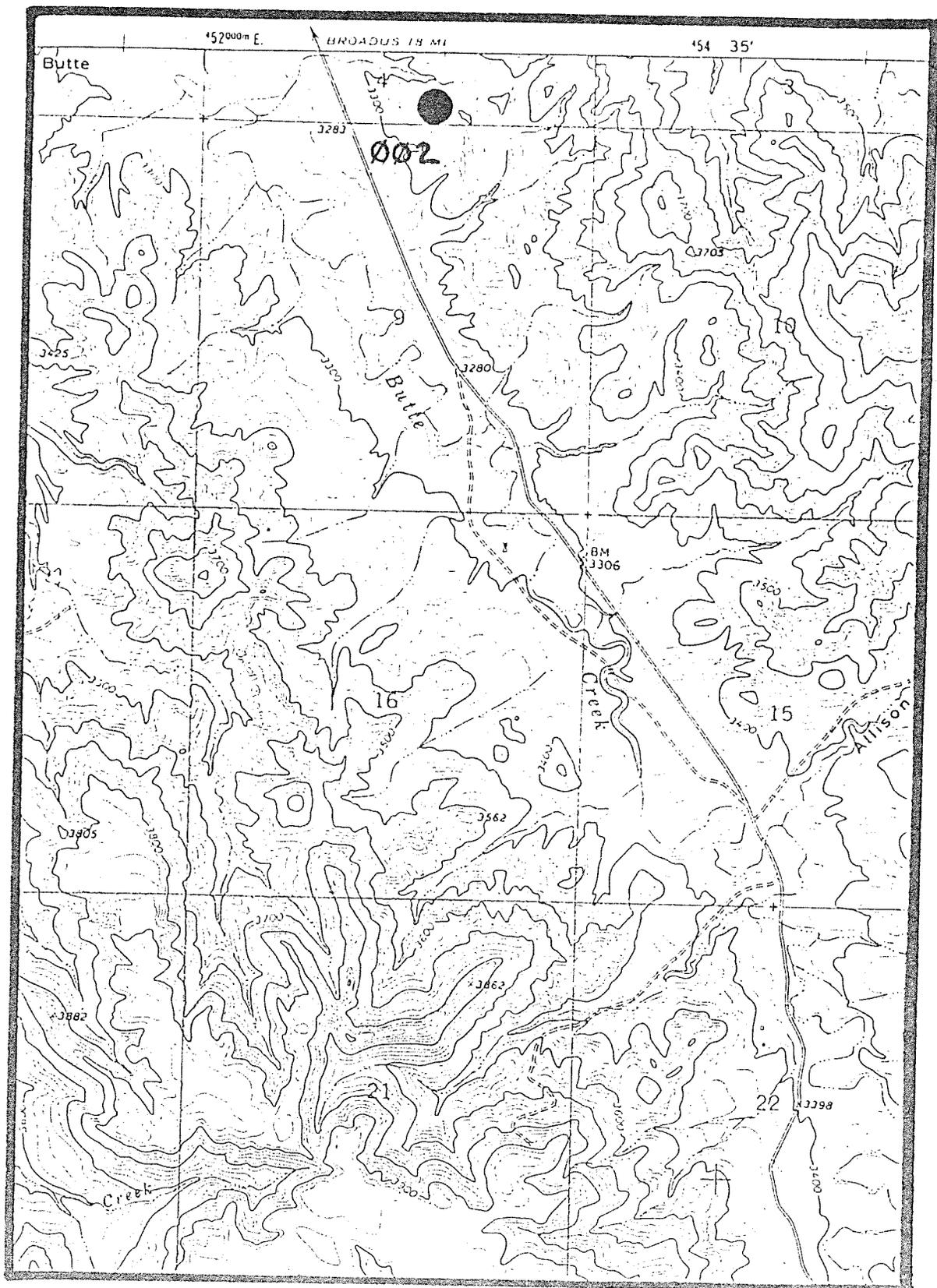
TRANSCRIBR: 88-05-23 LAS CDREV: Y MAPPER: 88-10-04 LAS QC: Y

UPDATE: 88-10-21 MEZ



USGS Biddle Quadrangle (7.5')
Astragalus barrii

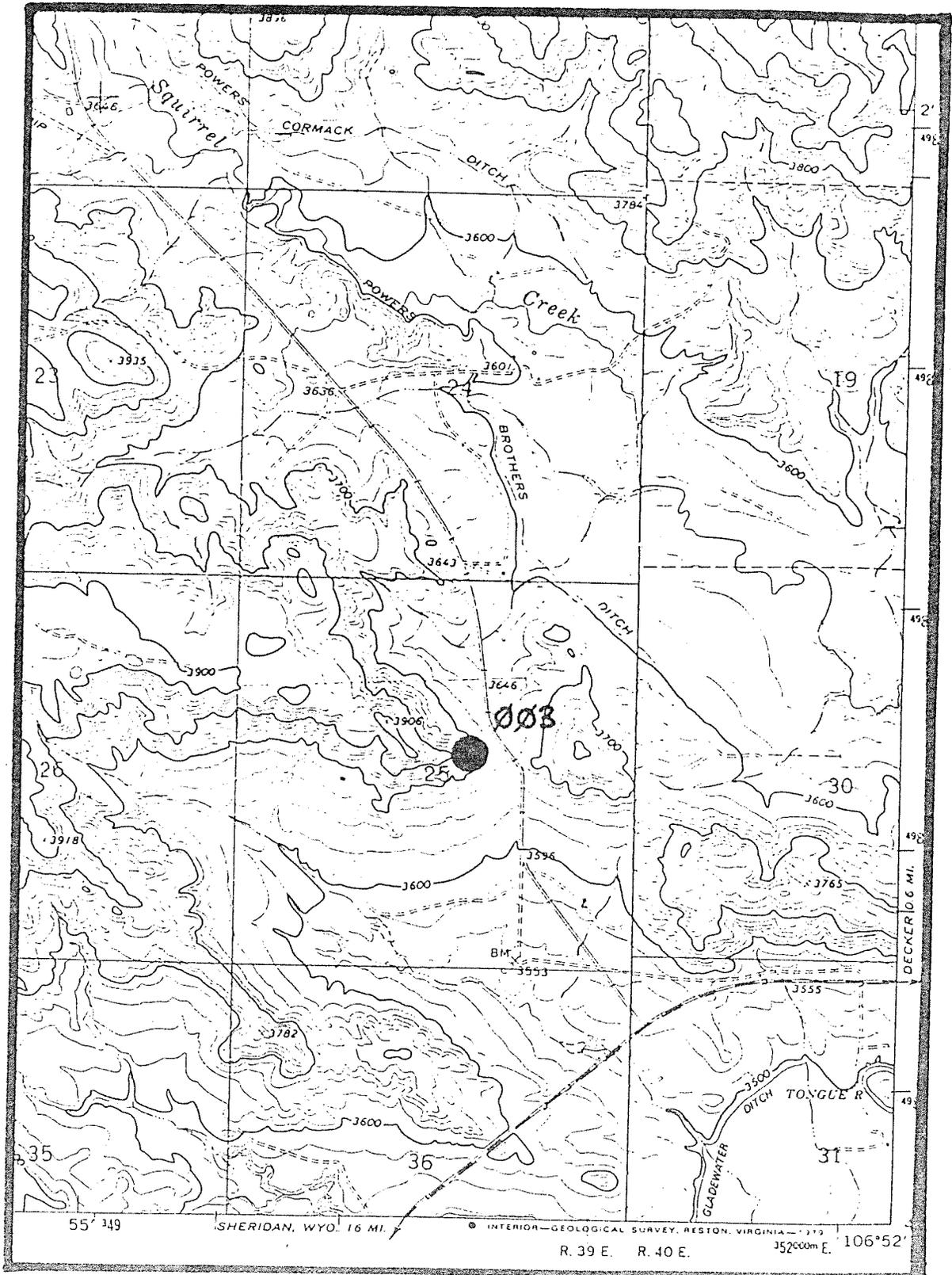
Biddle (001)



USGS Baldy Peak Quadrangle (7.5')

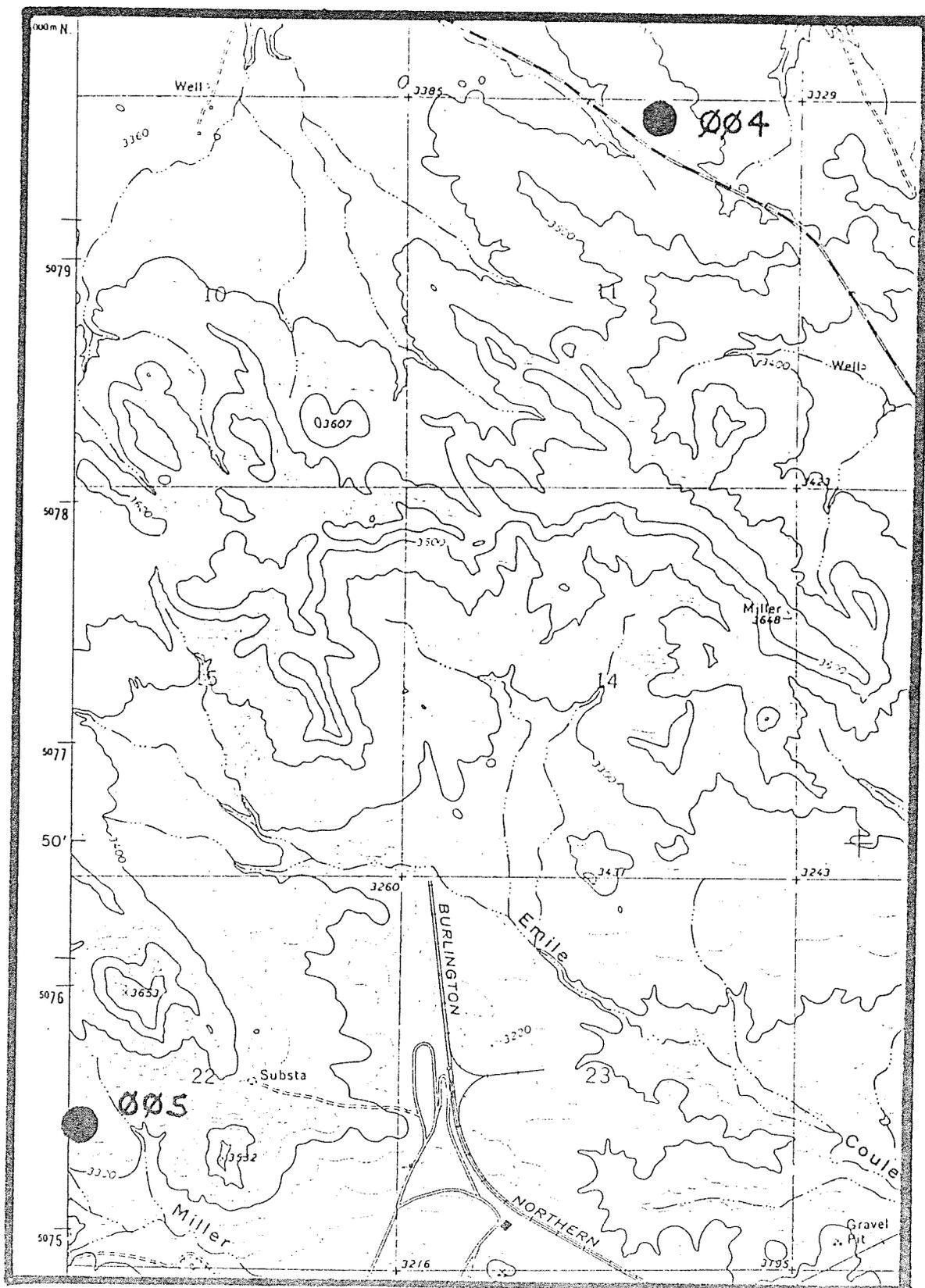
Butte Creek (002)

Astragalus barrii



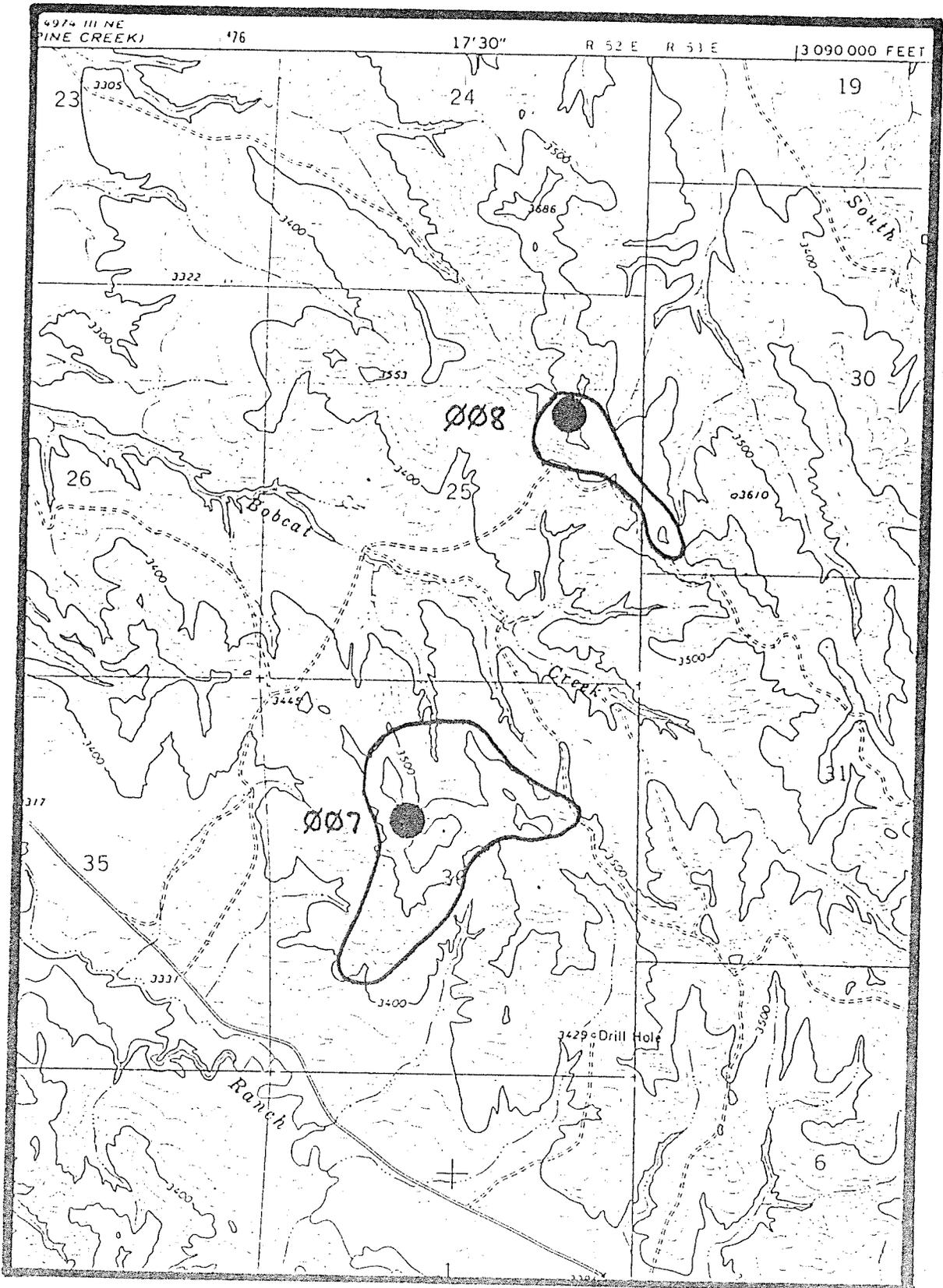
USGS Pearl School Quadrangle (7.5')
Astragalus barrii

Decker (003)



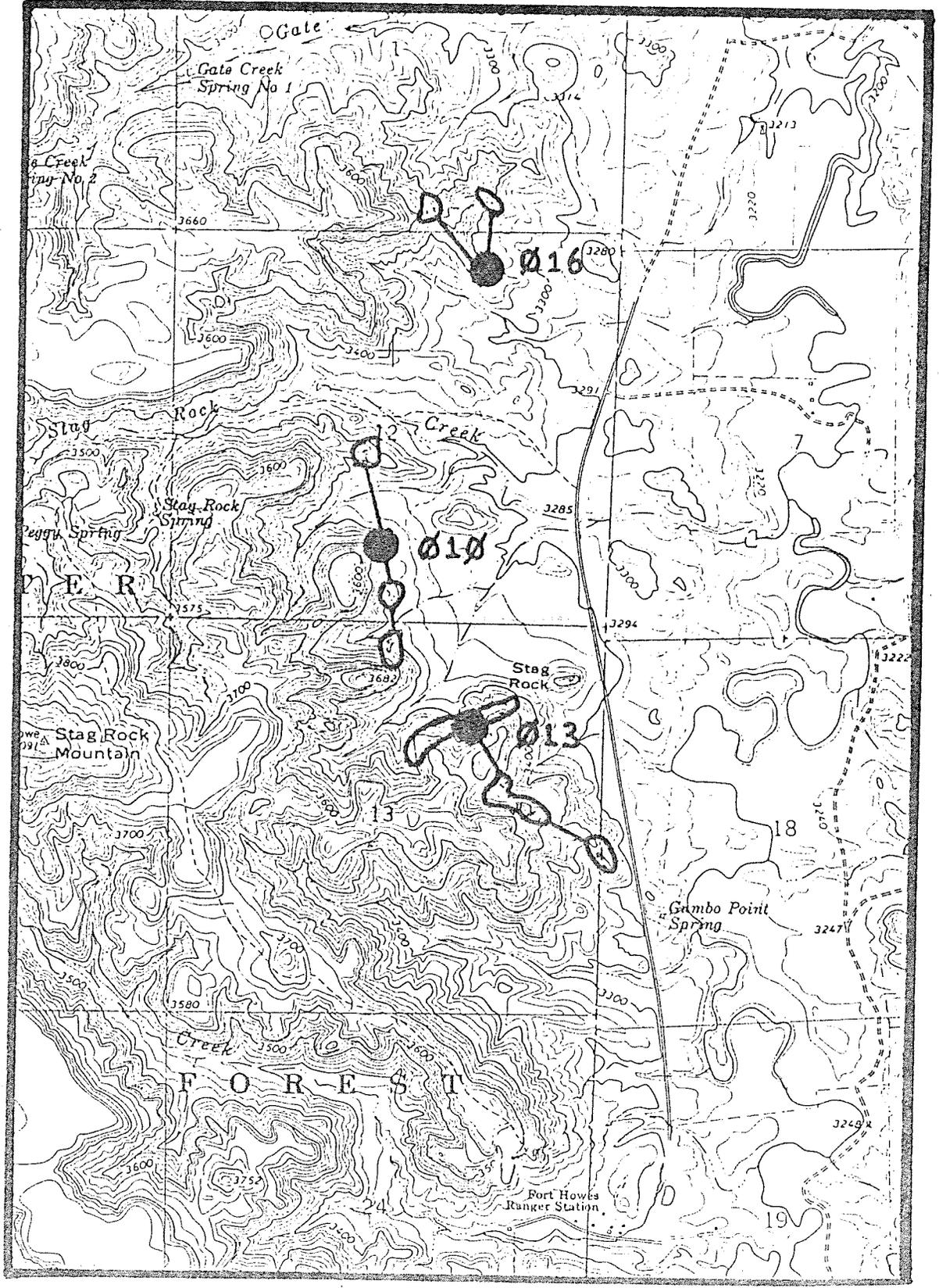
USGS Colstrip SE Quadrangle (7.5')
Astragalus barrii

Colstrip (004)
Miller Coulee (005)



USGS Biddle Quadrangle (7.5')
Astragalus barrii

Biddle School Section (007)
 Bobcat Creek (008)



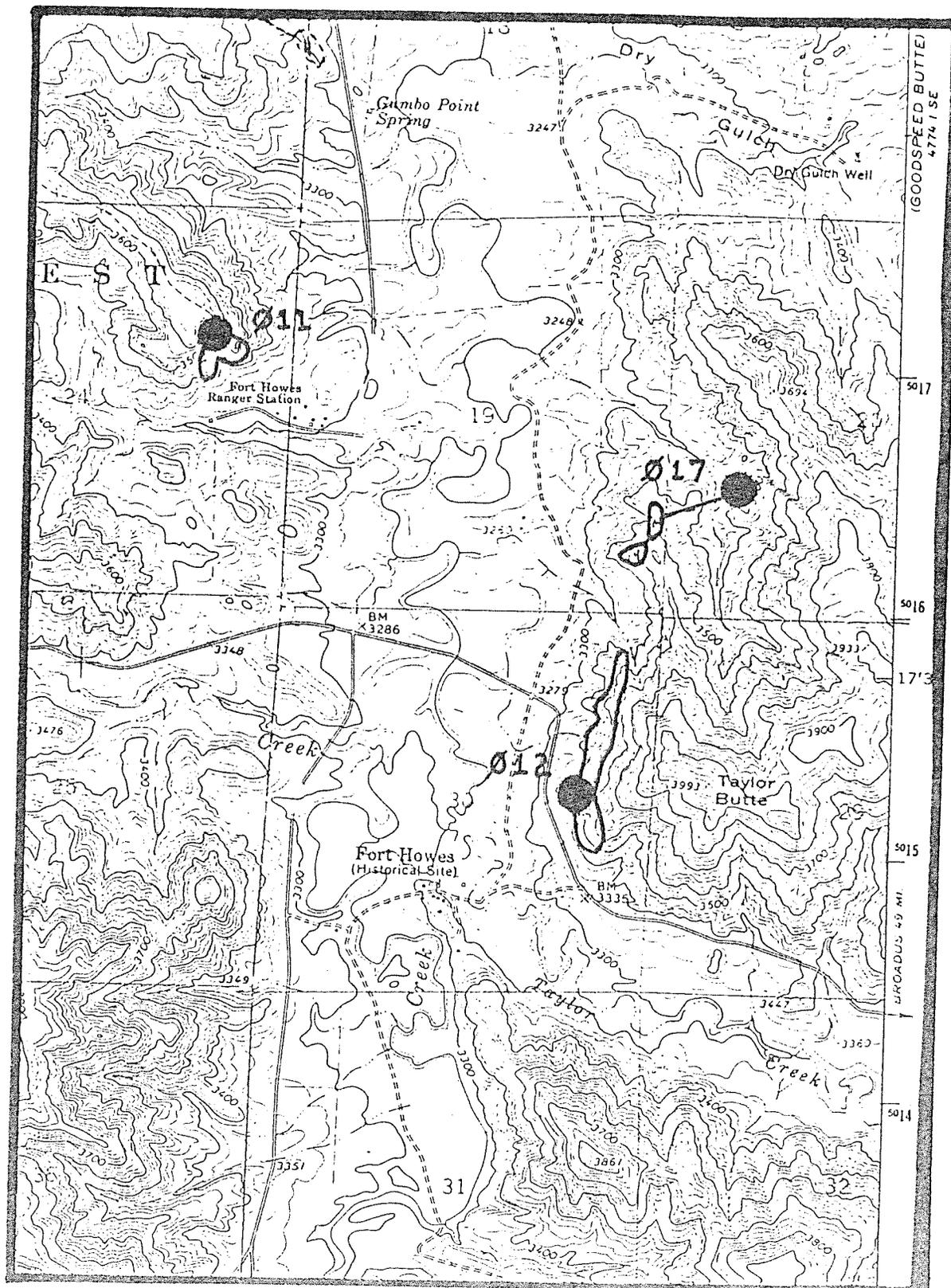
USGS Fort Howes Quadrangle (7.5')

Astragalus barrii

Stag Rock Knolls (010)

Stag Rock Cliff Tops (013)

Stag Rock Reservoir Ridges (016)



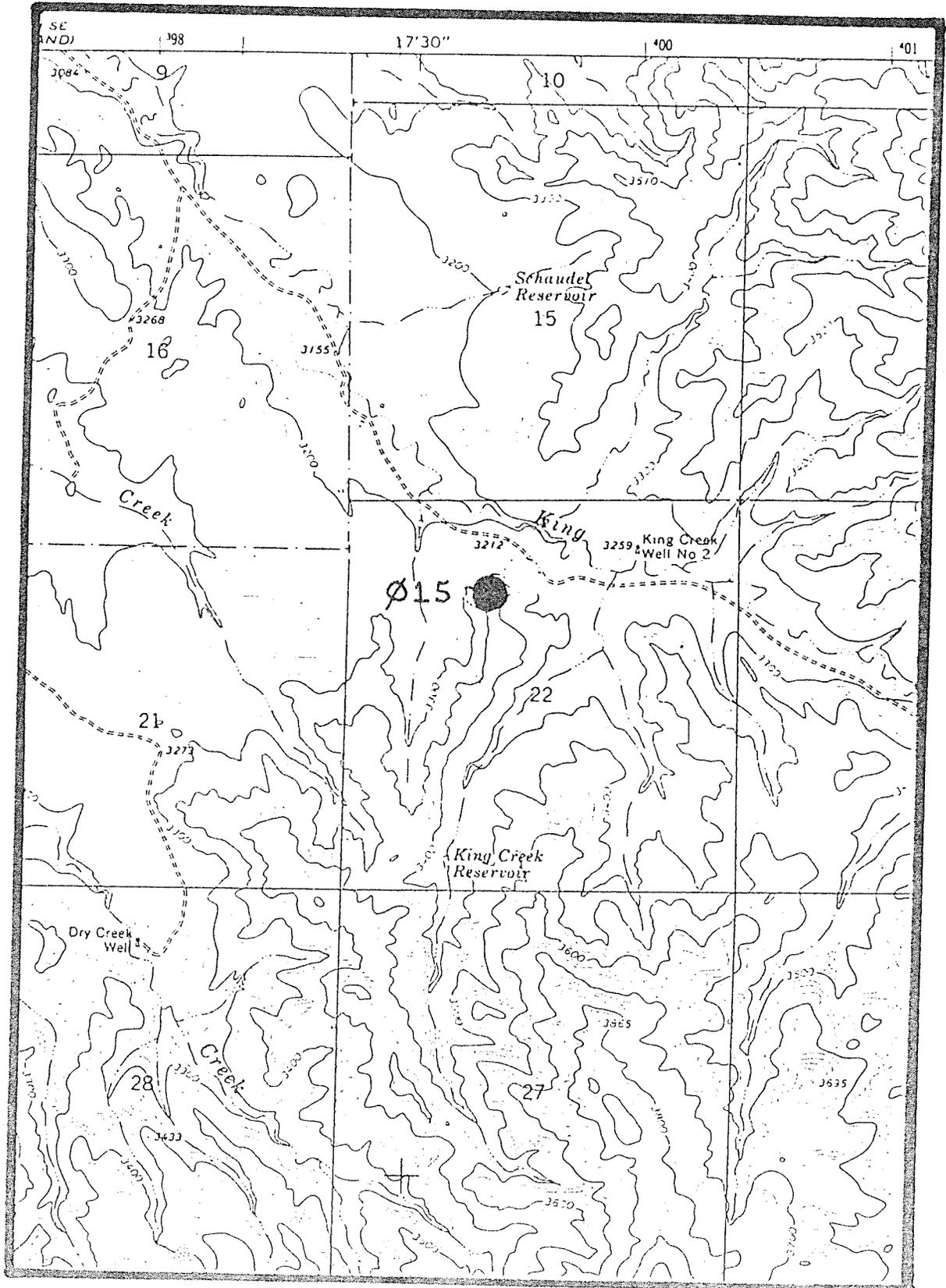
USGS Fort Howes Quadrangle (7.5')

Astragalus barrii

Fort Howes Ridge (011)

Taylor Butte Rim (012)

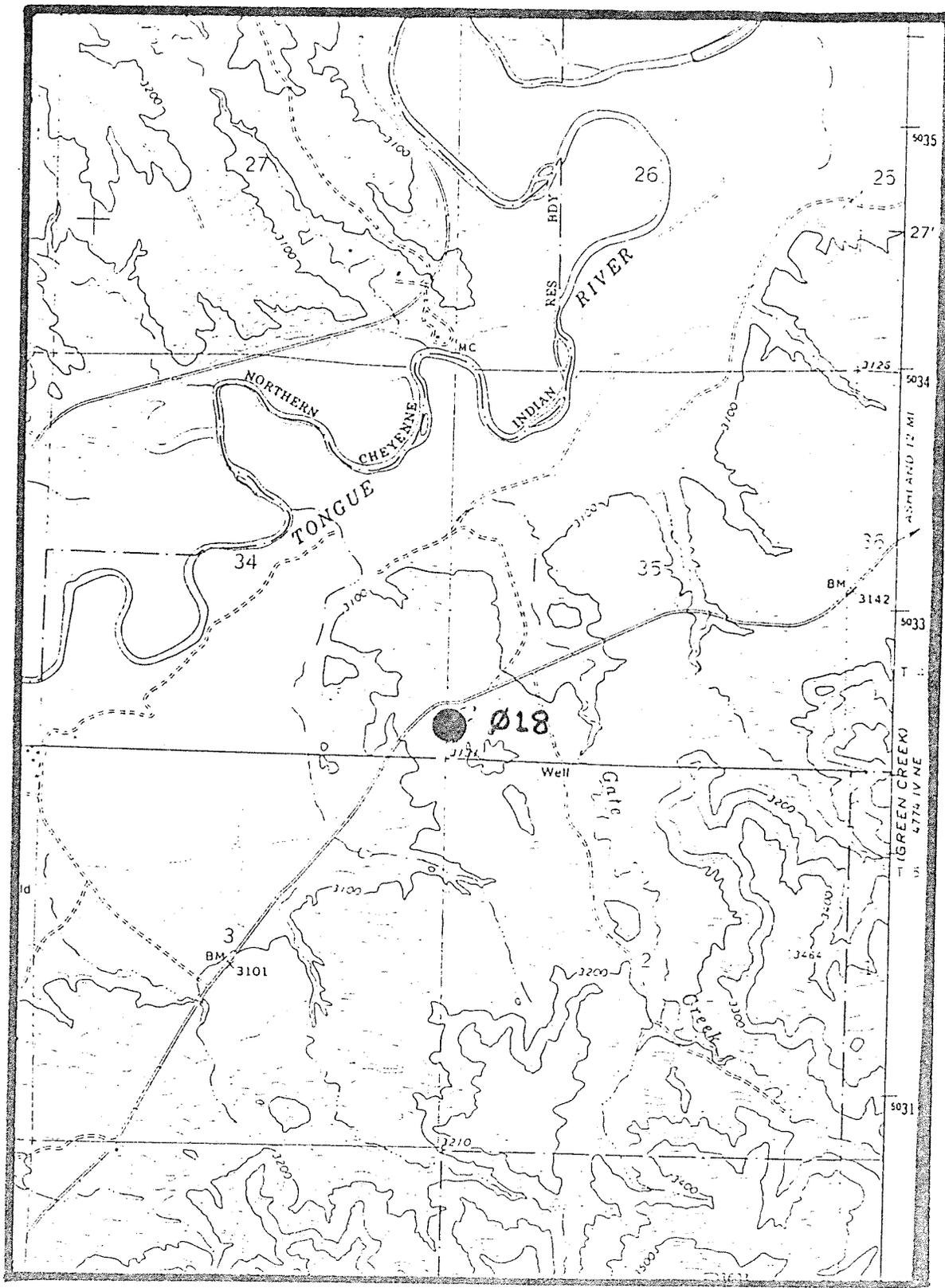
NW Buttress Taylor Butte (017)



USGS Green Creek Quadrangle (7.5')

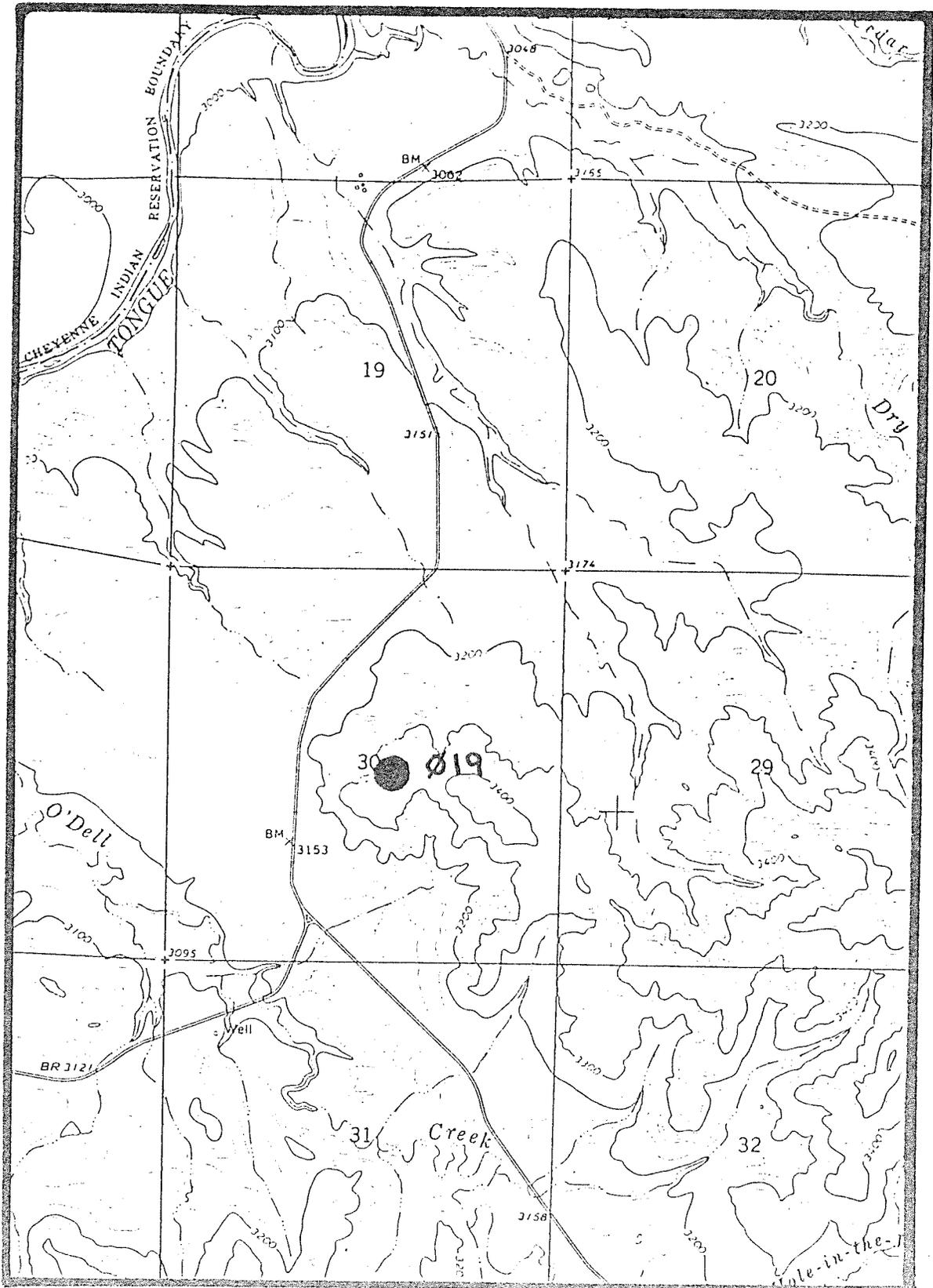
King Creek Well (015)

Astragalus barrii



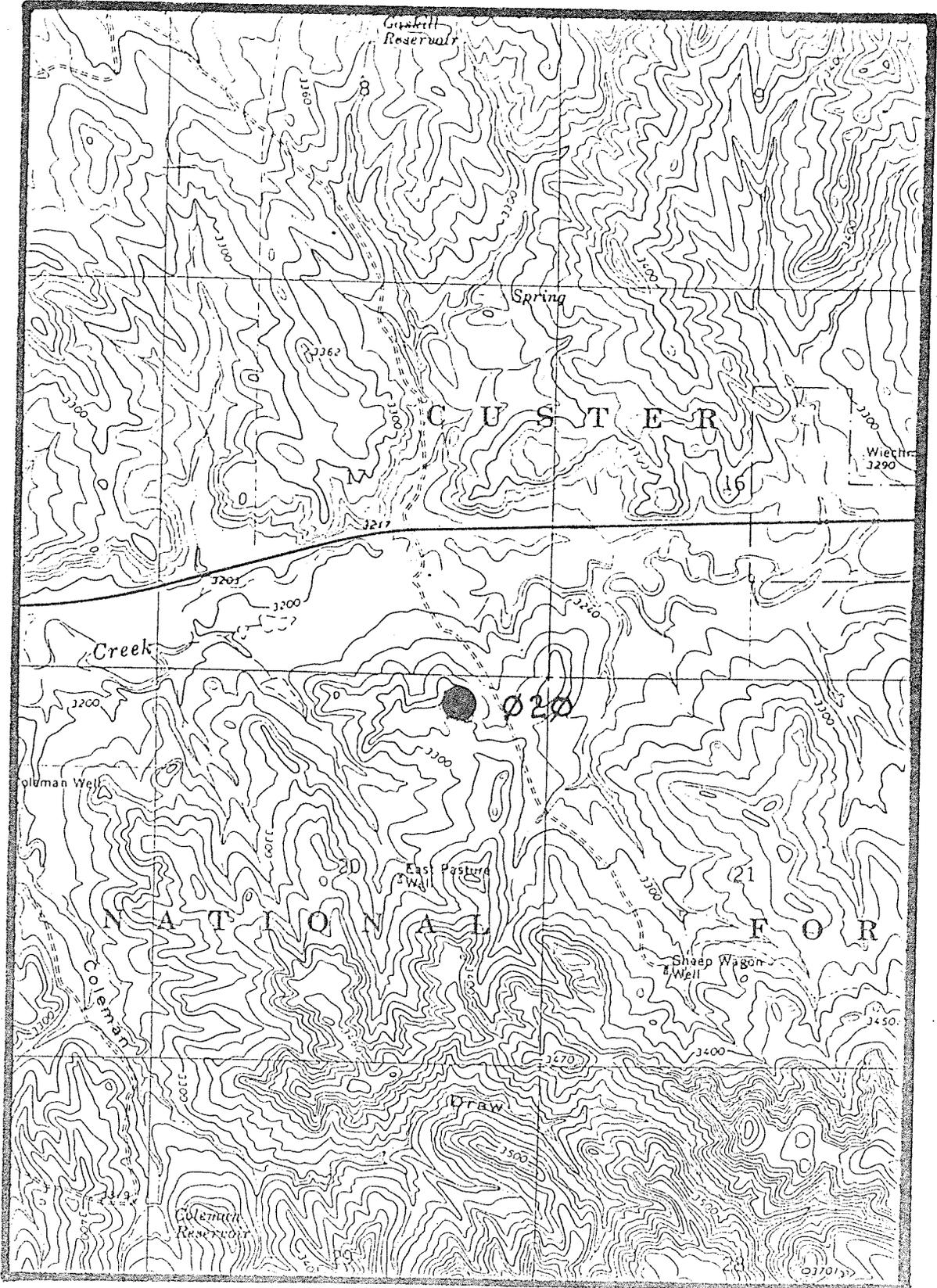
USGS Birney Day School Quadrangle (7.5')
Astragalus barrii

Gate Creek (018)



USGS Green Creek Quadrangle (7.5')
Astragalus barrii

O'Dell Creek Buttruss (019)



USGS Coleman Draw Quadrangle (7.5')

Sheep Well Road (020)

Astragalus barrii

V. PHOTOGRAPHS (pp. 57-61)

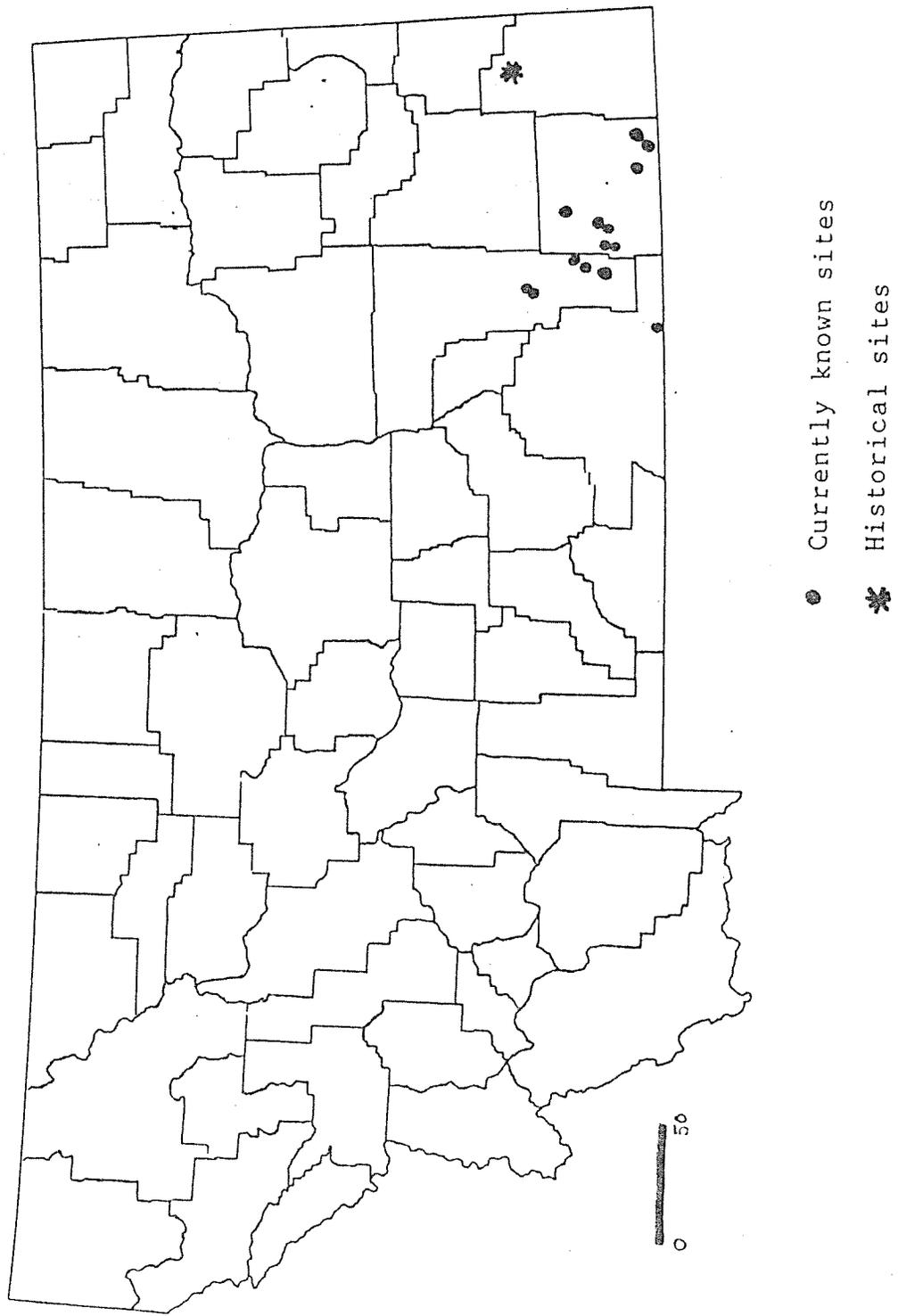


Figure 1. Distribution of *Astragalus barrii* in Montana.