U.S. DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

Locatable Mineral Reports for Colorado, South Dakota, and Wyoming provided to the U.S. Forest Service in Fiscal Year 1998

by

Anna B. Wilson

Open File Report OF 98-514

1998

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INTRODUCTION

The U. S. Geological Survey is required by Congress (under Public Law 86-509) to provide Locatable Mineral Reports to the U. S. Forest Service whenever National Forest System lands are sold or exchanged. This volume is a compilation of the reports already provided to the Forest Service by the author in fiscal year 1998. Altogether, the reports describe the geology and resource potential of about 275 properties covering considerably more than 14,500 acres in 10 National Forests and 3 National Grasslands.

Locatable Mineral Reports must be generated promptly and provide complete and reliable information even though the sizes of land parcels and degree of difficulty in producing the reports varies. Each report must be researched and written using library resources, professional experience, and interviews with other geoscientists as appropriate--no field work was conducted. The reports were not formally reviewed, but appropriate scientists were asked to give informal feedback before they were submitted to the Forest Service. Copies of the reports reside in U.S. Geological Survey Mineral Resource Program and U.S. Forest Service files.

Many of these land exchanges are for mutual convenience to gather both Federal and private lands into manageable blocks. Some are proposals by Towns, Counties, and States to enhance the "common good". Others are motivated by ranchers to improve their grazing lands and efficiency of their operations. Many recent land exchange offers are directed toward acquisition of public lands in high-value recreation areas (such as ski areas). The potential for litigation, controversy, and politics is much higher when land exchanges involve "high-value real estate" than when exchanges involve common grazing lands. Hence, locatable mineral reports must be reliable enough to withstand scrutiny of litigants vying for "high-stakes" real estate.

Thirteen reports are included in this volume. They are grouped by State, then alphabetically by Forest. Each reports starts with a cover letter followed by a page or more summarizing the locations of the properties (either verbatim or paraphrased from descriptions supplied by the Forest Service, designated Exhibits A and B). Geologic descriptions of the properties, mineral potential, and references comprise the main body of each report. Figures and attachments, if any, follow. The figures, normally photocopies of cited references, are provided only for the convenience of the Forest Service minerals examiner--they have not been redrafted.

COLORADO

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August 28, 1998

Mr. John A. Prochazka, Jr.
Regional Grassland Land Exchange Coordinator
U.S. Forest Service
125 N. Main
Chadron, NB 69337

Dear Mr. Prochazka:

This is in response to your July 14, 1998 request for information on locatable mineral resources for the land exchange proposal in which Mike Cervi has offered certain non-Federal lands within the Pawnee National Grassland, administered by the Arapaho and Roosevelt National Forests, in exchange for Federal lands also within the Pawnee National Grassland.

In accordance with the working agreement under Public Law 86-509, I am providing you with a report on the locatable mineral resources on the lands described in Exhibits "A" and "B", included with your request. These lands comprise an unspecified number of acres in Weld County, Colorado.

Sincerely yours,

Anna B. Wilson, Geologist
Mineral Resource Surveys, Central Region

Copies: G.S. Plumlee
E.A. duBray

LOCATABLE MINERAL REPORT FOR MIKE CERVI LAND EXCHANGE OFFER, PAWNEE NATIONAL GRASSLAND, ARAPAHO AND ROOSEVELT NATIONAL FORESTS, WELD COUNTY, COLORADO

By
Anna B. Wilson
U.S. Geological Survey

August 28, 1998

The following report is based on information contained in USGS mineral resource and commodity files, mineral information databases (MRDS and MAS), and on reports and maps available in the USGS library. These are occasionally augmented with unpublished documents and personal experiences. No field studies or on-site visits were performed in preparing this report. Emphasis is primarily on locatable mineral resources. Leasable and salable resources are covered only if they appear in the above documents. Mineral resource assessments are subjective: the opinions expressed herein are entirely those of the author.

EXHIBIT A: Property that Mike Cervi will consider exchanging:

Sixth Principal Meridian, Colorado

T. 12 N., R. 56 W.	Sec. 31
T. 11 N., R. 56 W.	Sec. 13, SW 1/4 SW 1/4 Sec. 14, SE 1/4 SE 1/4 Sec. 23, E 1/2 NE 1/4, SW 1/4 NE 1/4, NW 1/4 SE 1/4 Sec. 24, NW 1/4 NW 1/4, W 1/2 SW 1/4, SE 1/4 SW 1/4, S 1/2 SE 1/4 Sec. 26, W 1/2 NW 1/4 Sec. 27, E 1/2 NE 1/4
T. 10 N., R. 57 W.	Sec. 35, N 1/2

EXHIBIT B: Property that the Forest Service will consider exchanging:

T. 11 N., R. 56 W.	Sec. 9, N 1/2 SW 1/4, NW 1/4 SE 1/4 Sec. 17, NE 1/4 SW 1/4 Sec. 21, NE 1/4 SW 1/4 Sec. 25, SW 1/4, W 1/2 SE 1/4, SE 1/4 SE 1/4 Sec. 26, SE 1/4 SE 1/4 Sec. 35, NW 1/4 NW 1/4

other lands that may be included: Sec. 8, SE 1/4

T. 10 N., R. 56 W.	Sec. 4, NE 1/4 NE 1/4, S 1/2 NE 1/4, SE 1/4 NW 1/4, E 1/2 SW 1/4, SE 1/4 Sec. 21, E 1/2, S 1/2 NW 1/4, SW 1/4 Sec. 27, S 1/2 NW 1/4

other lands that may be included: Sec. 9, SW 1/4

NON-FEDERAL AND FEDERAL LANDS

Fourteen Parcels in Pawnee National Grassland
(Dipper Spring, Battle Canyon, Avalo 1:24,000, Sterling 1:100,000 and 1:250,000 quadrangles)

All of the parcels considered for exchange are in the Denver basin in the vicinity of the Chalk Bluffs, north of the South Platte River (Scott, 1978) in northeastern Weld County, Colorado.

The three northern-most parcels are within the upper part of the fluvial Miocene Ogallala Formation (Scott, 1978; see figure 1). The six east-central parcels are predominantly in fluvial Oligocene White River Formation overlying the upper transition member of the marine Upper Cretaceous Pierre Shale (Scott, 1978). The five southernmost parcels are in White River Formation and are locally overlain by Pre-Bull lake age gravels and alluvium of the Pleistocene Slocum Alluvium (Scott, 1978).

Elsewhere in the Great Plains region, Pierre Shale is locally host to bentonite, marine fossils, uranium, and manganese nodules (Scott, 1978). The parcels should be examined for these commodities and possible sand and gravel deposits. There are no known mineral deposits in the vicinity of the parcels (USGS, 1998a,b). Mineral resource potential for metallic mineral deposits is low.

The tracts are within the oil and gas producing Denver basin. There are several oil fields, gas fields (Scott, 1978; see figure 2), and numerous oil and gas wells in the vicinity. The tracts are within or very close to areas identified in the National Oil and Gas Assessment as oil and gas plays. Specific details can be found in Gautier and others, 1996, Beeman and others, 1996, and Charpentier and others, 1996. At the scale of the assessment and available data, it can not be within the scope of this report to determine which parcels have greater or lesser oil and gas potential. Oil and gas potential is high for most of the tracts.

REFERENCES CITED:

Beeman, W.R., Obuch, R.C., and Brewton, J.D., 1996, Digital map data, text, and graphical images in support of the 1995 National assessment of United States Oil and Gas Resources: U.S. Geological Survey Digital Data Series DDS-35.

Charpentier, R.R., Klett, T.R., Obuch, R.C., and Brewton, J.D., 1996, Tabular data, text, and graphical images in support of the 1995 National assessment of United States Oil and Gas Resources: U.S. Geological Survey Digital Data Series DDS-36.

Gautier, D.L., Dolton, G.L., Takahashi, K.I., and Varnes, K.L., 1996, 1995 National assessment of United States Oil and Gas Resources–Results, methodology, and supporting data: U.S. Geological Survey Digital Data Series DDS-36.

Scott, G.R., 1978, Map showing geology, structure, and oil and gas fields in the Sterling 1° X 2° quadrangle, Colorado, Nebraska, and Kansas: U.S. Geological Survey Miscellaneous Investigations Series Map I-1092, scale 1:250,000.

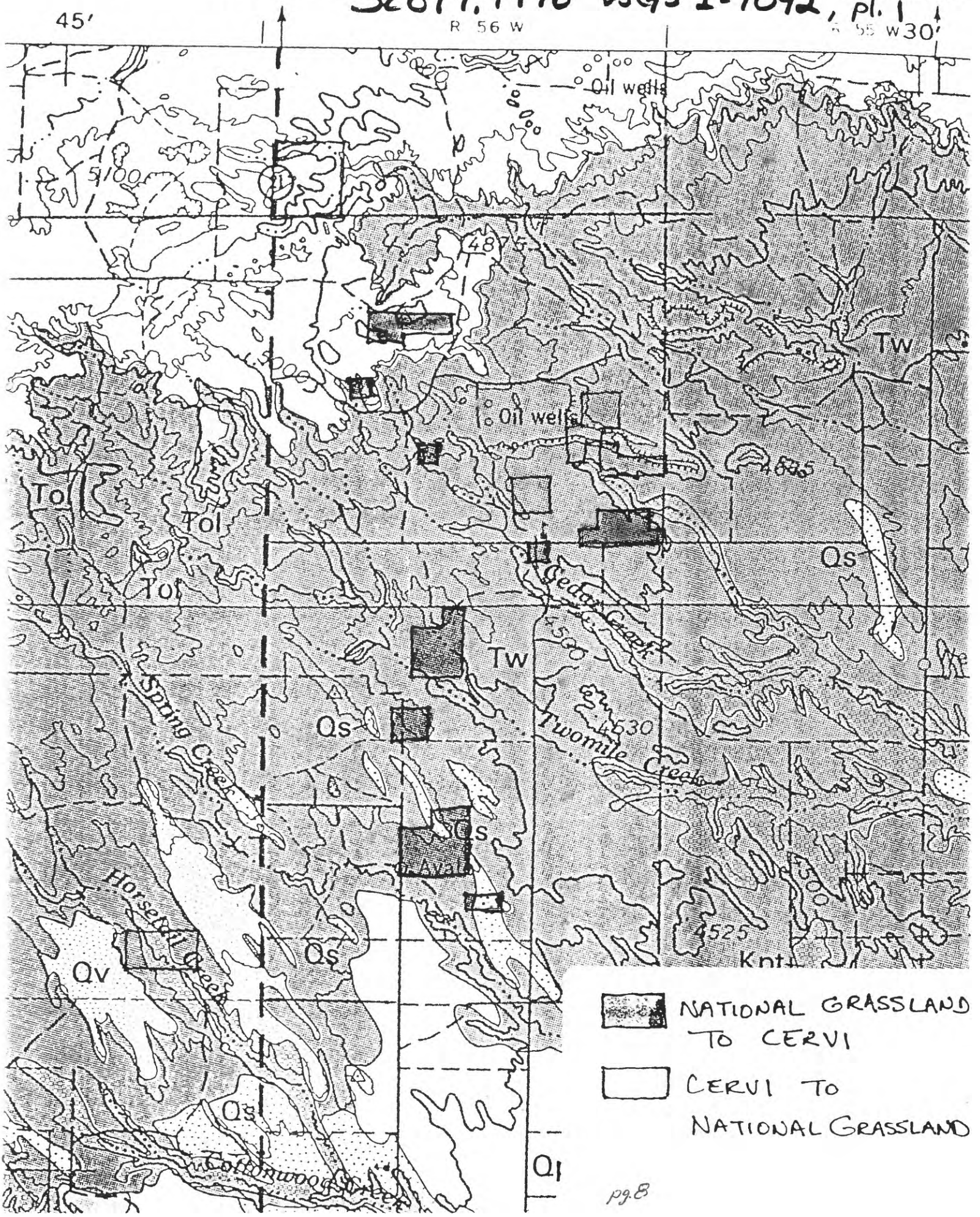
OTHER REFERENCES CONSULTED

U.S. Geological Survey, 1998a, Mineral Resource Data System [MRDS: active computer file; data available from U.S. Geological Survey, Mineral Resources Program, Building 20, Denver Federal Center, Denver CO 80225].

U.S. Geological Survey, 1998b, Minerals Availability System [MAS: active computer file; data available from U.S. Geological Survey, Minerals Information Team (formerly U.S. Bureau of Mines), Building 20, Denver Federal Center, Denver CO 80225].

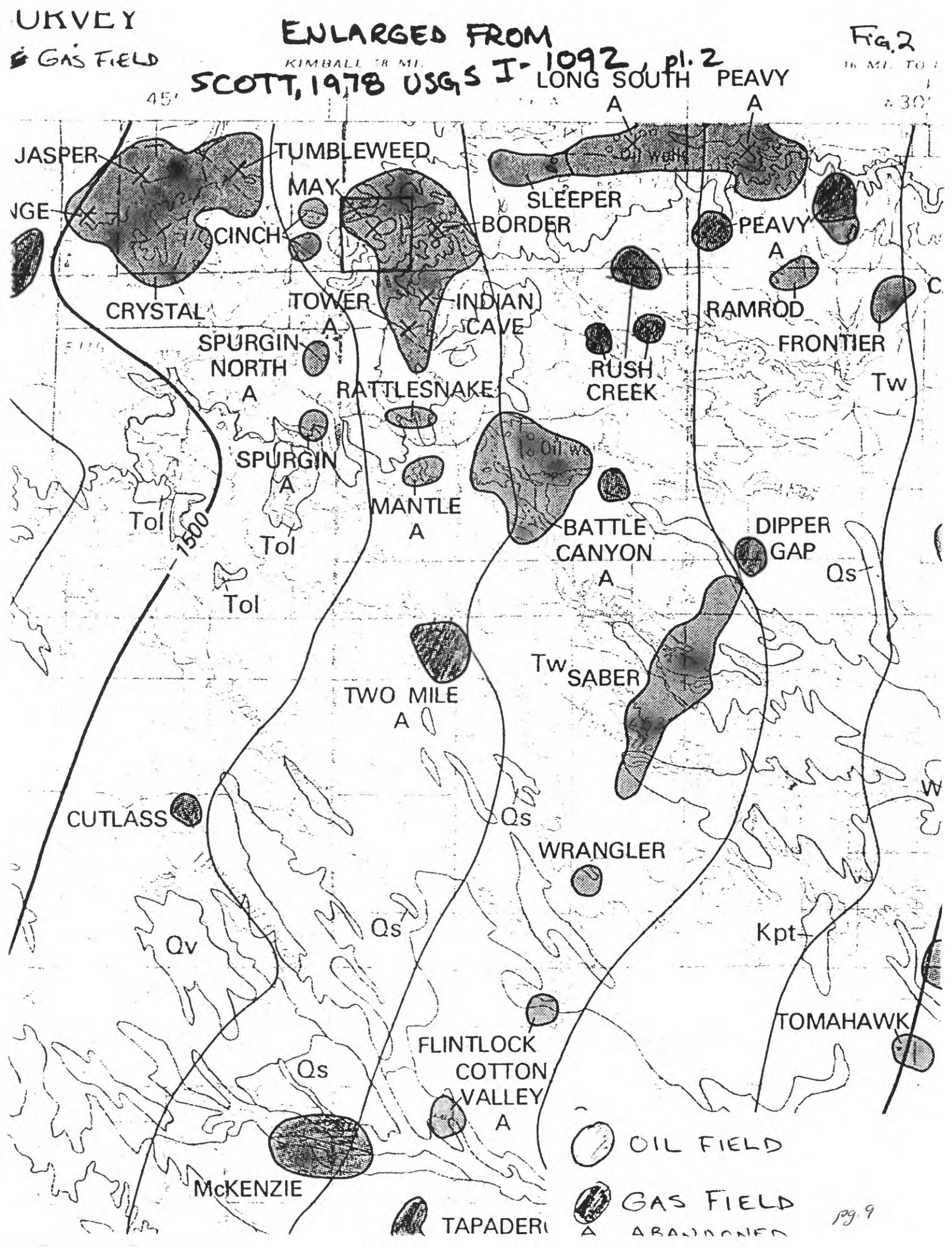
ENLARGED FROM SCOTT, 1978 USGS I-1092, pl. 1

FIG.



NATIONAL GRASSLAND TO CERVI

CERVI TO NATIONAL GRASSLAND


UKVEY
& GAS FIELD
ENLARGED FROM
SCOTT, 1978 USGS I-1092, pl. 2
FIG. 2
KIMBALL 18 MI.
45'
LONG SOUTH A
PEAVY A
JASPER
TUMBLEWEED
MAY
SLEEPER
BORDER
CINCH
PEAVY A
RAMROD
FRONTIER
CRYSTAL
TOWER A
INDIAN CAVE
SPURGIN NORTH A
RUSH CREEK
RATTLESNAKE
SPURGIN A
MANTLE A
BATTLE CANYON A
DIPPER GAP
Tol
1500
Qs
TWO MILE A
SABER
Tw
CUTLASS
WRANGLER
Qv
Kpt
TOMAHAWK
FLINTLOCK COTTON VALLEY A
McKENZIE
OIL FIELD
GAS FIELD
TAPADERO
pg. 9

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January 27, 1997

Mr. M. M. Underwood, Jr.
Director of Physical Resources
U.S. Forest Service - Rocky Mountain Region
P.O. Box 25127
Lakewood, CO 80225-0127

Dear Mr. Underwood:

This is in response to your October 7, 1997 request (received Oct. 10, 1997) for information on locatable mineral resources in the land exchange proposal in which Crested Butte Mountain Resort has offered certain non-Federal lands within the Gunnison National Forest in exchange for Federal lands also within the Gunnison National Forest.

In accordance with the working agreement under Public Law 86-509, I am providing you with a report on the locatable mineral resources on the lands described in Exhibits "A" and "B" and shown on the 18 detail maps and two index maps included with your request. These lands comprise 8,523 acres, more or less, in Gunnison County, Colorado.

Sincerely yours,

Anna B. Wilson, Geologist
Mineral Resource Surveys, Central Region

Copies: G.S. Plumlee
E.A. duBray

LOCATABLE MINERAL REPORT FOR THE CRESTED BUTTE MOUNTAIN RESORT LAND EXCHANGE OFFER, GUNNISON NATIONAL FOREST, GUNNISON COUNTY, COLORADO

By

Anna B. Wilson
U.S. Geological Survey
January 27, 1998

EXHIBIT A: Property that Crested Butte Mountain Resort shall consider exchanging:

Parcel 1: Gothic (Map 1)
T. 12 S., R. 86 W., 6th Principal Meridian (P.M.)
Sec 36: All

Parcel 2: Boris (Map 2)
T. 50 N., R. 3 E., New Mexico Principal Meridian (N.M.P.M.)
Tract 60, also described as Sec. 25, S 1/2 S 1/2 and Sec. 36, All

Parcel 3: Upper Loop (Map 3)
T. 13 S., R. 86 W., 6th P.M.
Sec. 36: NE NW and W 1/2 W 1/2 and SE SW

Parcel 4: Almont (Map 4)
T. 51 N., R. 1 E., N.M.P.M.
Sec. 16: All

Parcel 5: Red Mountain (Map 5)
T. 15 S., R. 85 W., 6th P.M.
Sec. 16: All

Parcel 6: East Beaver Creek (Map 6)
T. 51 N., R. 2 E., N.M.P.M.
Sec. 9, S 1/2 S 1/2 and Sec. 16, All

Parcel 7: North Flattop (Map 7)
T. 15 S., R. 86 W., 6th P.M.
Sec. 36: All

Parcel 8: Rarick Gulch (Map 8)
T. 15 S., R. 84 W., 6th P.M.
Sec. 16: All

Parcel 9: Eagle Ridge (Map 7)
T. 51 N., R. 1 W., N.M.P.M.
Sec. 16: Portion of section lying northeast of irrigation ditch

Parcel 10: South Flattop (Map 9)
T. 51 N., R. 1 W., N.M.P.M.
Sec. 36: All

Parcel 11: Brush Creek (Map 10)
T. 13 S., R. 85 W., 6th P.M.
Sec. 18: Portions of SW SE
Sec. 19: NE SE, Portions of NE NE
Sec. 20: Portions of SW NW, SE SE and SE SW
Sec. 29: Portions of SE NE
Sec. 33: Portions of SE NW

Parcel 12: West Virginia Lode (Map 1)
T. 12 S., R. 86 W., 6th P.M.
Sec. 34: West Virginia Lode Mining Claim, M.S. #5673

Parcel 13: Lode Claims:

Group A - Quartz Creek Area

T. 51 N., R. 4 E., N.M.P.M.

Sec. 20 & 21:	Merrimac Mining Claim, M.S. #1550	Map 12, #1
	Eureka Mining Claim, M.S. #1266	Map 12, #2
Sec. 17 & 20:	78 Lode Mining Claim, M.S. #6567	Map 12, #3

Group B - Taylor Pass Area

T. 12 S., R. 84 W., 6th P.M.

Sec. 2:	Caro Mining Claim, M.S. #8880	Map 18
Sec. 22:	M&M #1 & 2 Mining Claims, M.S. #16967	Map 13, #5,6
Sec. 28:	Robert L. Mining Claim, M.S. #16967	Map 13, #4

T. 12 S., R. 84 W., 6th P.M.

Sec. 34 & 2:	Mt. Vernon Mining Claim, M.S. #7690	Map 13, #3
	Silvertip Mining Claim, M.S. #7690	Map 13, #2
	Charles H. Mining Claim, M.S. #7690	Map 13, #1

Group C - Cumberland Pass Area

T. 51 N., R. 4 E., N.M.P.M.

Sec. 9 & 16:	KK Lode Mining Claim, M.S. #7159	Map 12, #7
Sec. 16:	H & B #1 & #2 Mining Claims, M.S. #5441	Map 12, #5,6
	Blanch B Mining Claim, M.S. #2614	Map 12, #4

Group D - Whitepine Area

T. 49 N., R. 5 E., N.M.P.M.

Sec. 1 & 2:	Leonora & Wolverine Mining Claims, M.S. #7159	Map 16, #4
Sec. 1:	Nancy Mining Claim, M.S. #2187	Map 16, #3
Sec. 2 & 11:	Mogul Mining Claim, M.S. #6777	Map 16, #1
Sec. 4:	Healsburg Mining Claim, M.S. #2674	Map 14, #1

T. 50 N., R. 5 E., N.M.P.M.

Sec. 34 & 35:	Caladonia Mining Claim, M.S. #15544	Map 14, #3
Sec. 35:	Mayflower Mining Claim, M.S. #15544	Map 14, #2
Sec. 11:	Gipsy Mining Claim, M.S. #1640	Map 15, #4
Sec. 16:	Blue Bell Mining Claim, M.S. #5083	Map 15, #2
Sec. 26 & 35:	Bob Lee Mining Claim, M.S. #2494,	Map 14, #6
	Iron Duke Mining Claim, M.S. #1062	Map 14, #7
	Ensign Mining Claim, M.S. #4508	Map 14, #8
Sec. 26:	Jersey Mining Claim, M.S. #2305	Map 14, #9
	Snowden Mining Claim, M.S. #2415	Map 14, #10
Sec. 24:	Modoc #1 & #2 Mining Claims, M.S. #17589	Map 17, #5
	Lexington Mining Claim, M.S. #991	Map 17, #9
Sec. 27 & 28:	Hawkeye Mining Claim, M.S., #2257	Map 14, #5
Sec. 27:	Flirt Mining Claim, M.S. #2073A	Map 14, #4
Sec. 14:	Little Maudie Mining Claim, M.S. #7874	Map 15, #3
Sec. 13 & 24:	E Ford Mining Claim, M.S. #1934	Map 17, #13

	Cinnamon Mining Claim, M.S. #1937	Map 17, #11
	J.B. Trickey Mining Claim, M.S. #992	Map 17, #12
	John Mouat Mining Claim, M.S. #2114	Map 17, #8
Sec. 13:	Oddie Mining Claim, M.S. #2210	Map 17, #10
Sec. 15 & 16:	Lippincott Mining Claim, M.S. #1483	Map 15, #1
T. 50 N., R. 5 E. and T. 50 N., R. 6 E., N.M.P.M.		
Sec. 19 & 24:	Limestone Mining Claim, M.S. #2194	Map 17, #7
	Alert Mining Claim, M.S. #7156	Map 17, #6
T. 50 N., R. 6 E., N.M.P.M.		
Sec. 19:	Oriental Mining Claim #7921	Map 17, #4
	Longfellow Mining Claim #4433	Map 17, #3
	W900' Mining Claim #7922	Map 17, #2
	Montgomery Mining Claim #3146	Map 17, #1
T. 49 N., R. 5 E. and T. 50 N., R. 5 E., N.M.P.M.		
Sec. 2 & 12:	Vulcan Placer Mining Claim #Sub'd	Map 16, #2

All the parcels are in Gunnison County, Colorado, and total approximately 7343 acres, including minerals to all parcels unless the minerals to parcels 2 through 10 have previously been conveyed by the State of Colorado to the United States of America.

EXHIBIT B: Property that the U.S. Forest Service shall consider exchanging:

Parcel A: North (Map 3)
T. 13 S., R. 86 W., 6th P.M.
Sec. 14: Approximately 85 acres in NW NE & E 1/2 NW, west of Forest Road 731.

Parcel B: West (Map 3)
T. 13 S., R. 86 W., 6th P.M.
Sec. 14: E 1/2 SW SE

Parcel C: East (Map 3)
T. 13 S., R. 86 W., 6th P.M.
Sec. 13: Portions of the SE SW
Sec. 24: Portions of the NE, NW & SE
Sec. 25: Portions of the N 1/2 NE 1/4
T. 13 S., R. 85 W., 6th P.M.
Sec. 19: Portions of the W 1/2 W 1/2
Sec. 30: Portions of the W 1/2 NW 1/4

Parcel D: Brush Creek (Map 10)
T. 13 S., R. 85 W., 6th P.M.
Sec. 18: Portions of SW & SE SE
Sec. 19: Portions of NW & SW NE
Sec. 20: Portions of SW SW, NW NW, NE NW, SW NE, & SW SW
Sec. 21: Portions of SW SW
Sec. 28: Portions of E 1/2 NW
Sec. 29: Portions of NE NW, W 1/2 NE, & NW SE
Sec. 33: Portions of NE NW
T. 13 S., R. 86 W., 6th P.M.
Sec. 13: Portions of SE SE

Parcel E: South (Map 3)
T. 13 S., R. 86 W., 6th P.M.
Sec. 25: SW 1/4

Parcel F: Central (Map 3)
T. 13 S., R. 86 W., 6th P.M.
Sec. 24: Portions of S 1/2 S 1/2 N 1/2, SW 1/4 SW 1/4, E 1/2 SW 1/4, and W 1/2 W 1/2 SE 1/4
Sec. 25: Portions of the N 1/2 NW 1/4

All parcels are in Gunnison County, Colorado, and total approximately 1180 acres with all minerals.

Total of approximately 8523 acres Federal and Non-Federal lands considered for exchange.

LOCATABLE MINERAL REPORT FOR THE CRESTED BUTTE MOUNTAIN RESORT LAND EXCHANGE OFFER, GUNNISON NATIONAL FOREST, GUNNISON COUNTY, COLORADO

The following report is based on information contained in USGS mineral resource and commodity files, mineral information databases (MRDS and MAS), and on reports and maps available in the USGS library. These are occasionally augmented with other unpublished documents, personal communications, and professional experiences. No field studies or on-site visits were performed in preparing this report. Emphasis is primarily on locatable mineral resources. Leasable and salable resources are covered only if they appear in the above documents. Geoenvironmental and geohazards are included where geology and readily available data combine to create a local situation that should not be overlooked.

NON FEDERAL LANDS: (With one exception, all properties are on Gunnison 1:100,000 and Montrose 1:250,000 quadrangles. Parcel 13, Group B, Map 18, Caro Claim, is on Leadville 1:100,000 and 1:250,000 quadrangles)

Parcel 1: Gothic (Map 1; Gothic 1:24,000 quadrangle)

The Gothic parcel is on the southwest flank of the White Rock pluton (Oligocene granodiorite) and includes the south- to southwesterly-dipping Paleozoic and Mesozoic strata it intruded. Rock units include the Upper part of the Gothic Formation (Middle Pennsylvanian), Maroon Formation (Lower Permian and Upper and Middle Pennsylvanian), Entrada Sandstone (Middle Jurassic), Morrison Formation (Upper Jurassic), Burro Canyon Formation (Lower Cretaceous), and Dakota Sandstone (Upper Cretaceous) (Gaskill and others, 1991; see attachment A). Miocene rhyolite porphyry dikes cut most of the rock types.

The parcel contains one or two unnamed prospects, the Usona tunnel which is an uncompleted crosscut to mines in Queen Basin, and the Copper Glance mill site patented claim (see #51 and #37, respectively, Gaskill and others, 1991; see attachments B and C). The Silver Bell claim, at the head of Queen Basin, which contains at least four other patented claims (Copper Queen, Silver Queen, Copper Glance, and Iron Duke; see attachment C; and DC00703; see attachment D) extends into the parcel. No production has been recorded (Weisner and Bieniewski, 1984, p. 34, and fig 15, p. 77) from these claims. The workings are small and mineralized material in the veins is discontinuous. Weisner and Bieniewski concluded that there was insufficient evidence to define a resource due to lack of prospects and exposed mineralized material.

A brief description of the Copper Queen claim (Weisner and Bieniewski, 1984) suggests that silver, copper (argentiferous tetrahedrite, azurite, and malachite), sphalerite, galena, and calcite occurred in sub-economic quantities along sheared and brecciated bedding planes in metasedimentary rocks.

The mineral resource potential for similar vein-type deposits in the Gothic parcel is high. Mineral resource potential along the contact with the White Rock Pluton and the Gothic (?) Formation (see attachments A and B) in the northern part of the parcel is low for skarn deposits containing low grade deposits of copper similar to those near the head of Conundrum Pass, at the head of Copper Creek in the Maroon Bells quadrangle (Ed DeWitt, written communication, January, 1998).

Parcel 2: Boris (Map 2; Pitkin 1:24,000 quadrangle)

Geologic mapping (Horlacher, 1987, 1:12,000; see attachment E) indicates that the Boris parcel is underlain by a northwest-striking, steeply-dipping succession of Early Proterozoic amphibolite interlayered with a supracrustal sequence of layered metasedimentary rocks, and metamorphosed basaltic greenstone, felsic volcanic rock, basaltic tuff breccia, and local minor rock types such as metachert, calcite-actinolite rock, calcitic marble, and spotted chlorite-cummingtonite-cordierite rock. A northwest striking fault drops down the northeast corner of the parcel and reveals poorly exposed Paleozoic sedimentary rocks that include Upper Cambrian Sawatch Sandstone and Lower Ordovician Manitou Dolomite. The southern part of the tract is overlain by Upper Jurassic Morrison Formation and Junction Creek Sandstone, and Cretaceous Dakota Group in a south-dipping questa. The supracrustal package is bounded about 2 mi to the east by synkinematic Roosevelt granite and about 2 mi to the west by the coarse-grained, post-kinematic Granite of Wood Gulch (Horlacher, 1987, p. 86).

The parcel includes the Revenue mine (Horlacher, 1987; Crawford and Worcester, 1916; U.S. Geological Survey, 1997a, DC01143; see attachment F) and an unnamed mine (U.S. Geological Survey, 1997a, #DC01142; see attachment G) and is located just east of the Quartz Creek Pegmatite district (Staatz and Trites, 1955).

The Revenue mine, a greenstone-hosted vein-type gold deposit (Horlacher, 1987, p. 92), extracted gold from a 1400-ft vein in schistose amphibolite. The mineralized zone strikes northwest and dips about 65° to the southwest, and is subparallel to lithologic contacts, schistosity, and a shear zone (Horlacher, 1987, p. 107). Sulfides make up less than about 10% of the vein minerals. Opaque minerals observed include pyrite, chalcopyrite, magnetite, pyrrhotite, and trace sphalerite, and secondary bornite and covellite after chalcopyrite (Horlacher, 1987, p. 111). In the oxidized zone, pyrite is altered to limonite and part of the ore is copper-stained (Crawford and Worcester, 1916, p. 110-111). Apparently, gold concentrations ranged from about 0.1 oz/ton in unoxidized ore to 3.0 oz/ton in oxidized ore (Horlacher, 1987, p. 92-93). No production records could be located for this area.

The unnamed mine is associated with roads and prospects at the west edge of the parcel. The deposit probably is a similar gold occurrence although the database (U.S. Geological Survey, 1997a, #DC01142; see attachment G) also lists silver as a resource.

As recently as 1983, Minerals Inc., Golden, Colorado, was actively renovating the workings and exploring for gold at the Revenue mine. They completed a 95 ft drift "on a narrow, gold-bearing zone in sheared amphibolite" but soon thereafter the mine flooded (Horlacher, 1987, p. 93). The exploration work noted that the highest gold concentrations were in narrow shear zones and altered rock enveloping the quartz veins and confirmed the earlier reported range of gold concentrations.

There is high mineral resource potential for similar, mostly small, discontinuous, low grade gold-silver vein deposits on the Parcel.

Pegmatite bodies have been widely prospected in the area nearby, but few, if any, were economic producers. No pegmatite bodies are mapped on the property. The potential for pegmatite bodies on the property is low.

Parcel 3: Upper Loop (Map 3; Gothic and Crested Butte 1:24,000 quadrangles)

Slopes of Quaternary debris conceal Upper Cretaceous Mancos Shale overlain by quartz monzonite porphyry and granodiorite porphyry of the Oligocene Crested Butte Laccolith that crops out immediately to the east (Gaskill and others, 1986, 1991; see attachments H and I).

No mineralized material is known on this parcel and mineral resource potential is low.

Slope stability should be of concern on this parcel. The debris slopes are mostly forested talus, talus streams and protalus ramparts derived from the Crested Butte laccolith. Structures that indicate mass movement have been mapped in this area and include landslides or slump blocks, and debris-earthflow tongues (Gaskill and others, 1986, 1991).

Parcel 4: Almont (Map 4; Almont and Flat Top 1:24,000 quadrangles)

Parcel 4 (Sec. 16) is primarily underlain by Quaternary surficial deposits overlying Upper Cretaceous Mancos Shale, Dakota Sandstone, and Burro Canyon Formation, Upper Jurassic Morrison Formation, and possibly some Middle Jurassic Junction Creek Sandstone (Ellis and others, 1987; see attachment J). A northwest striking fault cuts the southwest corner of the parcel uplifting the corner. Immediately south of the parcel offset is sufficient to repeat the Dakota Sandstone, and Burro Canyon and Morrison Formations but due to Quaternary surficial deposits the offset is not obvious on the parcel.

None of these rock units is known for hosting mineral deposits in this immediate area. Uranium does occur in Morrison Formation, there are thin coal beds in the Dakota Sandstone, and there are sand and gravel deposits in Quaternary gravels and alluvium elsewhere in the region. Most of the coal production from this region is from the Upper Cretaceous Mesaverde Formation

which overlies the Mancos Shale and is higher in the stratigraphic section than is present in the parcel. Mineral resource potential of this parcel is low.

The slopes underlain by Mancos Shale should be examined for stability. As mapped, the Quaternary surficial deposits unit (Ellis and others, 1987, unit Qs) includes several units that are individually mapped in the Crested Butte quadrangle (Gaskill and others, 1986). In the Crested Butte quadrangle, these units show signs of active landslides, debris flows, and other indications of mass movement.

Parcel 5: Red Mountain (Map 5; Crested Butte 1:24,000 and Flat Top 1:24,000 quadrangles)

Parcel 5 is underlain by Quaternary debris slopes and landslide, slump, debris-earthflow complexes mantled with basalt rubble and colluvium. Most of the debris is derived from lava flows on Red Mountain and slope failure in surficial debris and shaly or clayey bedrock. The slopes are underlain by Upper Cretaceous Mancos Shale (Ellis and others, 1987, see attachment J; Gaskill and others, 1986, see attachment K).

None of these rock units is known for hosting mineral deposits in this area. Mineral resource potential of this parcel is low.

Slope stability should be of concern on this parcel. Active mass movement features are mapped in the northern part of the parcel (Gaskill and others, 1986: see attachment K) and in all likelihood extend into the southern part.

Parcel 6: East Beaver Creek (Map 6; Almont and Crystal Creek 1:24,000 quadrangles)

Detailed geologic mapping of this parcel is lacking. The only available geologic mapping that covers this parcel is the Montrose 1° x 2° quadrangle (Tweto and others, 1976; see attachment L). Only the eastern-most part of the parcel is included on the western-most part of two maps by DeWitt and others: a simplified geologic map (1985), and an unpublished map (1:30,000 scale) and manuscript of the Fossil Ridge and surrounding area (Ed DeWitt, U.S. Geological Survey, oral and written communications, December 1997) intended for publication as a U.S. Geological Survey I-Map. By extrapolation from the three maps and from discussion with Ed DeWitt (written and oral communication, January 14, 1998; see attachment M), the parcel appears to be at the contact of Early Proterozoic Henry Mountain Granite and Early Proterozoic metasedimentary rocks. Locally, Pliocene and Miocene gravel and alluvial deposits may overlie the Proterozoic rocks.

No mines or prospects are known in the area. Mineral resource potential is low.

Parcel 7: North Flattop (Map 7; Flat Top 1:24,000 quadrangle)

Parcel 7 is underlain by Quaternary landslide material overlying Upper Cretaceous Mancos Shale (Tweto and others, 1976; Ellis and others, 1987, see attachment J).

No mines or prospects are known on this parcel. Mineral resource potential is low.

The slopes underlain by Mancos Shale should be examined for stability. As mapped, the Quaternary surficial deposits unit (Ellis and others, 1987, unit Qs) includes several units that are individually mapped in the Crested Butte quadrangle (Gaskill and others, 1986). In the Crested Butte quadrangle, these units show signs of active landslides, debris flows, and other indications of mass movement.

Parcel 8: Rarick Gulch (Map 8; Almont and Cement Mtn 1:24,000 quadrangles)

The only readily available geologic mapping that covers this parcel is the Montrose 1° x 2° quadrangle (Tweto and others, 1976; see attachment L). On the basis of unpublished mapping and field observations by Ed DeWitt (U.S. Geological Survey, oral communication, January, 1998), Rarick Gulch is probably entirely underlain by the Middle Proterozoic Taylor River Granite, a 1.4 Ga, peraluminous pluton.

No mines, prospects, or mineral occurrences are known on this parcel or in similar rocks nearby. Mineral potential for pegmatite bodies containing light rare-earth element commodities is low (Ed DeWitt, U.S. Geological Survey, oral communication, January, 1998).

Parcel 9: Eagle Ridge (Map 7; Flat Top 1:24,000 quadrangle)

The Eagle Ridge Parcel is mapped as Quaternary landslide material that probably overlies Upper Cretaceous Mancos Shale (Tweto and others, 1976; Ellis and others, 1987, see attachment J). The slopes underlain by Mancos Shale should be examined for stability. As mapped, the Quaternary surficial deposits unit (Ellis and others, 1987, unit Qs) includes several units that are individually mapped in the Crested Butte quadrangle (Gaskill and others, 1986). In the Crested Butte quadrangle, these units show signs of active landslides, debris flows, and other indications of mass movement.

No mines or prospects are known on this parcel. Mineral resource potential is low.

Parcel 10: South Flattop (Map 9; Flat Top 1:24,000 quadrangle)

The South Flattop Parcel is mapped as Quaternary landslide material. Quaternary gravel and alluvium may cover the southwestern parts, along Ohio Creek (Tweto and others, 1976; Ellis and others, 1987, see attachment J). Mancos Shale probably underlies the Quaternary deposits.

The slopes underlain by Mancos Shale should be examined for stability. As mapped, the Quaternary surficial deposits unit (Ellis and others, 1987, unit Qs) includes several units that are individually mapped in the Crested Butte quadrangle (Gaskill and others, 1986). In the Crested Butte quadrangle, these units show signs of active landslides, debris flows, and other indications of mass movement.

No mines or prospects are known on this parcel. Mineral resource potential is low.

Parcel 11 and Parcel D: Brush Creek (Map 10; Gothic 1:24,000 quadrangle)

Numerous small tracts of land on both sides of East River comprise these Parcels. In general, the parcels are underlain by Cretaceous Mancos Shale mantled by Quaternary surficial deposits. The Quaternary units include alluvial, alluvial fan, debris flow, landslide, slump-scarp, debris slope, earthflow, and moraine deposits (Gaskill and others, 1991; see attachment N).

No mines or prospects are known on the Parcels. Mineral resource potential for locatable commodities is low. The northwestern-most tract of Parcel D should be examined for sand and gravel potential. The southeastern-most tract of Parcel 11 should be examined for active landslide, slump, debris-flow, and earthflow complexes.

Parcel 12: West Virginia Lode (Map 12; Gothic 1:24,000 quadrangle)

The West Virginia Lode is in the Oligocene granodiorite of the Copper Creek Sill. Apparently the sill has slightly different texture and composition from the nearby (and mineralized) White Rock Pluton (Gaskill and others, 1991, #27; see attachment A).

The West Virginia, like its neighbors Virginia, Mineral King, Ophir, Ella Wood, and Frank, was probably a low-grade silver deposit (U.S. Geological Survey, 1997a, part of DC00723, see attachment O; Gaskill and others, 1991, #27-32 on map and p. 3; see attachments B and C). The only activity reported was in 1879. Only a few hundred feet to the northeast, the Virginia Lode (DC00722, see attachment L; Gaskill and others, 1991, #28) contained silver, gold, copper, lead, and zinc and operated from 1879 to 1906, and again in 1947 and 1955. Mineralization in the region appears to be associated with the White Rock Pluton and not the Copper Creek Sill.

Mineral resource potential for small polymetallic veins enriched in silver is high.

Parcel 13: Lode Claims

Group A: Quartz Creek Area (#1-3 on Map 12, Fairview Peak 1:24,000 quadrangle)

The area is Early Proterozoic Fairview Granodiorite (DeWitt and others, unpublished map and manuscript of the Fossil Ridge and surrounding area) overlain by Paleozoic strata including

Cambrian Sawatch Quartzite (Sandstone); Ordovician Manitou Dolomite (Limestone), Harding Sandstone, and Fremont Limestone; Devonian Parting Quartzite member and Chaffee Group; Mississippian Leadville Limestone; and Pennsylvanian Belden and Minturn Formations (Rosenlund, 1984, see attachment Q; terminology from Tweto and others, 1976 and Tweto and others, 1978).

The claims appear to be associated with the Fairview (DC01243 and 80510124; see attachments R and S) and Cleopatra mines (DC01244; see attachment T). In this area, the known mineral deposits are replacement manto deposits of galena and sphalerite in dolomitic beds. The ore is usually in the dolomite just below the "Fairview" shale (Hill, 1909, p. 34-35). Rosenlund (1984, table 6, p. 73-74) equates the dolomite beds to the Fremont Dolomite immediately underlying the basal shales of the Parting Member of the Chaffee Group.

Ore in the district is mostly "argentiferous galena, with possibly some stephanite, and gray copper" (Hill, 1909, p. 35). At the Fairview mine, crystallized galena was "surrounded by a very fine grained dark mineral [...] which reacts like galena but contains a large percentage of silver; [...] and is surrounded by lead and copper carbonates" (Hill, 1909, p. 35).

At the Fairview mine, the ore consists of galena and cerussite with minor sphalerite, malachite, and azurite concentrated along the nose of a tightly folded east-trending anticline (Herald, 1981). Rosenlund (1984, p. 75) identified galena (replaced by chalcocite, covellite, malachite, and cerussite), chalcopyrite (replaced by neodigenite(?)), pyrite (replaced by geothite and lepidocrocite), sphalerite, azurite, malachite, covellite, and tetrahedrite in samples from the Fairview mine and New Dollar tunnel (Rosenlund, 1984, p. 74). How the New Dollar tunnel, completed in 1983 (Rosenlund, 1984), connects with the preexisting workings is unclear.

Mineral resource potential for additional small silver-bearing replacement deposits is high. Due to the presence of carbonate minerals, principally calcite, lack of pyrite, and the oxidized nature of the deposits, the potential for acid mine drainage is low. Bad air is common in mines in the district (CO_2 is released from the carbonate); any mine openings could present a hazard if entered.

Group B: Taylor Pass Area (#1-3 and 4-6 on Map 13, Pearl Pass 1:24,000 quadrangle; only claim shown on Map 18, New York Peak 1:24,000 quadrangle)

(Map 18, only claim shown; New York Peak 1:24,000 quadrangle)

The Caro Claim is in the Collegiate Peaks Wilderness Area, on the southeast flank of Gold Hill in the headwaters of Bowman Creek (Baskin, 1987). The claim is a few miles west of the Grizzly Peak Caldera. The claim is in Early Proterozoic metasedimentary gneiss (Fridrich and others, 1997; see attachment U) in close proximity to 1.4-Ga granitic rocks, overlain by Pleistocene glacial deposits.

No workings are shown in the immediate vicinity of the claim. The claim was not sampled (Baskin, 1987). Mineral resource potential for small precious metal veins in Proterozoic rocks is moderate.

(#4-6 on Map 13, Pearl Pass 1:24,000 quadrangle)

The M&M and Robert L. claims are in the Pearl Pass quadrangle on the north flank of Mount Tilton. Rock units in this area are predominantly Lower Mississippian Leadville Limestone through Upper Cambrian Sawatch Quartzite in fault contact with Early Proterozoic Granite of Henry Mountain (Fridrich and others, 1997; see attachment U).

There are a number of small prospects and mines in the area. These include the Ender (a.k.a. Climax) mine (Slebir, 1957; DC00692, 80510096; see attachments V and W) and Red Cloud mine (Slebir, 1957).

Based on the presence of several small mines and prospects in the vicinity, mineral resource potential of this property is moderate for small veins and replacement deposits of base- and precious-metals.

(#1-3, Map 13, Pearl Pass 1:24,000 quadrangle)

The Mount Vernon, Silvertip, and Charles H. claims are on Lambertson Peak where Oligocene rocks of the 33-34 Ma Italian Mountain Complex intrude Paleozoic sedimentary rocks (Cunningham, 1976, see attachment X; Fridrich and others, 1997, see attachment U). Most of the Paleozoic rocks are contact metamorphosed (Cunningham, 1976). In general, Pennsylvanian Gothic, Belden, and Molas Formations are in the southern part of the parcel and Mississippian Leadville Limestone through Cambrian Sawatch Quartzite are in the northern part. Quartz monzonite underlies most of the rest of the property.

Three intrusive centers compose the Italian Mountain Complex (Cunningham, 1976). The southern and central centers are simple plutons. The Mount Vernon, Silvertip, and Charles H. claims are within the northernmost and youngest composite pluton which is composed of four generally concentric rock types (Cunningham, 1976). In addition to observing that the intrusive rocks contain "halite-bearing fluid inclusions with dense, saline fluids -- a feature shared with 28 out of 30 porphyry copper deposits of the western United States", Cunningham (1976) notes that

> hydrothermal ore deposits have been mined from breccia zones and replacement deposits in the Leadville Limestone near the Italian Mountain Intrusive Complex for nearly a century. The deposits, which form a rough zonal pattern, are close to the northern intrusive center. Sulfide ores are richest in zinc and copper near the intrusive mass and in lead and silver farther away. The zoning and the spatial

association indicate that the hydrothermal sulfides are related to the northern intrusive center.

A vague record in the MRDS database (U.S. Geological Survey, 1997a, #DC00693; see attachment Y) suggests that the Mount Vernon, Silvertip, and Charles H. claims, along with the Climax and Mascot, constitute a lead-zinc-silver deposit. No other information is given.

Mineral resource potential for small lead-zinc-silver veins, replacement bodies, or porphyry copper deposits on these claims is moderate.

Group C: Cumberland Pass Area (#4-7, Map 12; Fairview Peak 1:24,000 quadrangle)

The area is mapped as Early Proterozoic Fairview Granodiorite overlain by Cambrian Sawatch Quartzite, intruded by Oligocene Porphyry of Green Mountain, and locally covered by Holocene and Pleistocene alluvial and glacial deposits (Rosenlund, 1984, see attachment Q; DeWitt and others, unpublished map and manuscript, December, 1997; DeWitt and others, 1985).

Small mines and prospects are in the vicinity. Veins in the Cambrian Sawatch Formation at the Little Anna mine are related to the Oligocene Porphyry of Green Mountain. Mineral resource potential for small polymetallic veins in Proterozoic rocks and Cambrian Sawatch Quartzite is moderate.

Group D: Whitepine Area (Whitepine and Garfield 1:24.000, and Garfield 1:62,500 quadrangles)

(#1, Map14, Whitepine 1:24,000 quadrangle)

The Healsburg claim plots just east of Egg Rock Creek in granite similar in composition to the 1.4 Ga Silver Plume Granite (Dings and Robinson, 1957; see attachment Z). Several prospects are shown in the area (Dings and Robinson, pl. 1; see attachment Z) but there is no mention of production. It is possible that this claim is along the projected strike of another vein in the area, or it could be a "blind structure" in the granite similar to the Star or Morning Glim fault (Ed DeWitt, written communication, January, 1998).

Mineral resource potential for small base- and precious-metal vein deposits in the granite is low to moderate.

(#2,3, Map 14, Whitepine 1:24,000 quadrangle)

The Mayflower and Caladonia claims are underlain by Quaternary moraine that mantles the Mount Princeton Quartz Monzonite (40 Ma). These claims are directly over the haulage

tunnels of some of the productive mines in the area but there are no productive mines on the south end of Porcupine Ridge (Dings and Robinson, 1957, pls. 1 and 5; see attachment Z).

Mineral resource potential for small base- and precious-vein deposits in the Mount Princeton Quartz Monzonite is low.

(#4,5, Map 14, Whitepine 1:24,000 quadrangle)

Both the Flirt (#4) and Hawkeye (#5) (not the Hawkeye of Dings and Robinson, 1957, which is on the east side of the Continental Divide) are at the contact of granite similar in composition to the 1.4 Ga Silver Plume Granite and the 40 Ma Mount Princeton Quartz Monzonite (see attachment Z). This contact was the extension of the Morning Glim fault before the fault was intruded by the Mount Princeton Quartz Monzonite. The Flirt (#4) is near the Lilly mine on the northeast side of Graveyard Gulch and the Hawkeye (#5) is at the headwaters of Graveyard Creek.

Mineral resource potential for small base- and precious-metal deposits in veins is low.

(#6-10, Map 14, Whitepine 1:24,000 quadrangle)

The Spar Copper mine (DC01196 and 80510265; see attachments AA and BB) includes the Morning Glim (DC01200 and 80510237; see attachments CC and DD), Ensign (DC01191 , 80510120; see attachments EE and FF), and Parole tunnels (DC01198, 80510266; see attachments GG and HH), and the Morning Glim, Spar, Jersey, Snowden, Ensign, Iron Duke, and Bob Lee patented claims (Dings and Robinson, 1957, p. 75; see map 14). The tunnels worked the Spar Copper vein and supposedly produced about 4,800 tons of ore (Dings and Robinson, 1957, p. 75). The ore is on both sides of the Morning Glim fault which places 1.4-Ga(?) granite on the east over shale of the Pennsylvanian Belden Formation on the west. East of the fault, ore is in a vein in the granite. West of the fault, replacement ore deposits are in marble layers in the Belden Formation (Dings and Robinson, 1957, p. 75; see attachments Z and II). Mineralization is related to evolution of the Morning Glim Fault which appears to be about 70 Ma (Ed DeWitt, written communication, January, 1998). The Morning Glim fault is intruded by 40-Ma Mount Princeton Quartz Monzonite at the north end of the Iron King workings (see attachments Z and II).

Minerals reported on the property include quartz, pyrite, galena, sphalerite, tetrahedrite, chalcopyrite, enargite, and native copper (Dings and Robinson, 1957, p. 76). The mine produced copper, lead, silver and gold (Dings and Robinson, 1957, p. 75). Bodies of magnetite and limonite iron ore have been reported in the northern part of this claim group (Harder, 1909, p. 195-198).

There is high mineral resource potential for similar small vein and replacement deposits containing base- and precious-metals on these claims.

(#1,2, Map 15; Whitepine 1:24,000 quadrangle)

Both claims are near the head of Canyon Creek on the northwest side of Stella Mountain. The Lippincott claim (#1) appears to be entirely within Tertiary Mount Princeton Quartz Monzonite (Dings and Robinson, 1957; see attachment Z). The Blue Bell (#2) is in the Pennsylvanian and Permian Belden and Minturn Formations (Dings and Robinson, 1957).

High metamorphic grade skarn in the area is probably related both to diorite of probable Late Cretaceous age and Oligocene Mount Princeton Quartz Monzonite (Ed DeWitt, written communication, January, 1998). A small thrust duplex(?) to the west suggests a complex structural geometry (Ed DeWitt, written communication, January, 1998).

A number of small prospects are in the area, but there is no recorded production, nor indications that any ever occurred. Mineral resource potential for small vein deposits in Mount Princeton Quartz Monzonite on the Lippincott claim is low. Mineral resource potential for small skarn deposits in Pennsylvanian Belden Formation on the Blue Bell claim is low.

(#3,4, Map 15; Whitepine 1:24,000 quadrangle)

Both claims are near the head of Tomichi Creek on the east side of Granite Mountain. The Little Maudie claim (#3) is entirely within the Mount Princeton Quartz Monzonite (Toulmin and Hammarstrom, 1990; see attachment JJ, #15-3) near an area where roughly north-striking vertical to steeply west-dipping veins are mapped (Dings and Robinson, 1957; see attachment Z). The Gipsy (#4) appears to follow a north-striking, steeply west-dipping, quartz-fluorite vein (Dings and Robinson, 1957) in the 40-Ma Mount Princeton Quartz Monzonite on the west margin of the Mount Aetna Quartz Monzonite which forms a ring dike at the margin of the Mount Aetna caldera (Toulmin and Hammarstrom, 1990, see attachment JJ, #15-4; Shannon, 1988). Mineralization is related to the 34-35 Ma subsidence of Mt. Aetna caldera or slightly younger (Shannon, 1988).

A number of small prospects are in the area, but other than $2000 worth of gold and $500 worth of silver produced from the Lewiston-Pet (# 90 on attachment Z; DC01174, see attachment KK) which is in Buckhorn Creek, south of the Little Maudie claim, there is no recorded production (Dings and Robinson, 1957, p. 79-81), nor indications that any ever occurred. Other nearby mines include the Hiawatha (# 71 on attachment Z; DC01172, see attachment LL), Day Star (# 32 on attachment Z; DC01169, see attachment MM), and Magna Charta Tunnel (# 105 on attachment Z; DC01175, see attachment NN). Records for these are incomplete. The Hiawatha is credited with pyrite and minor galena and sphalerite on the dump (Dings and Robinson, 1957, p. 80). Fluorite, and scarce chalcopyrite, pyrite, calcite, and stephanite (brittle silver) were reported on the dump of the Day Star (Dings and Robinson, 1957, p. 79). Pyrite, and sparse galena, sphalerite, chalcopyrite and tetrahedrite were reported on the dump of the Magna Charta (Dings and Robinson, 1957, p. 81).

Mineral resource potential for similar small precious-metal-bearing veins is low on the Little Maudie claim but moderate on the Gipsy claim which is at the caldera margin where ore-bearing fluids could potentially have circulated more freely (Ed DeWitt, written communication, January, 1998).

(#1-4, Map 16; Garfield 1:24,000 quadrangle)

All four claims are east of the Akron mine, south and east of Lake Hill. The host rocks are in a stratigraphic package ranging from 1.4-Ga granite through the Pennsylvanian-Permian Belden and Minturn Formation (Dings and Robinson, 1957; see attachments Z and NN). The 1.4-Ga granite is thrust over the Paleozoic rocks by the Morning Glim Fault (Dings and Robinson, 1957; Ed DeWitt, written communication, see attachment OO).

The closest mine, the Annie Hudson (# 6 on attachment Z; DC01199, see attachment PP), along the Morning Glim fault, probably had small, though unrecorded, production (Dings and Robinson, 1957, p. 78). Production was apparently from a replacement body in limestone of the Belden Formation adjacent to the fault zone. Smithsonite ($ZnCO_3$), calamine (also known as hemimorphite: $Zn_4(Si_2O_7)(OH_2)_2 \cdot H_2O$), and galena are reported. Ore assayed in 1910 averaged 41% Zn and 5.25 opt Ag (Dings and Robinson, 1957, p. 78). Numerous small prospects cover the claim area, but none is named nor described in the literature.

Mineral resource potential for similar small veins or replacement bodies of silver, lead, and zinc is moderate.

(#1-13, Map 17; Garfield 1:24,000 quadrangle)

Claims 1-4 are on the west slope of Clover Mountain, east and topographically above the Legal Tender mine (# 89, Dings and Robinson, 1957 and p. 80, see attachment Z; Toulmin and Hammarstrom, 1990, see attachment JJ) near the head of Robbins Creek.

Megabreccia composed mainly of Paleozoic sedimentary rocks (Toulmin and Hammarstrom, 1990; see attachment JJ) is the dominant lithology in the area of the claims. It is immediately north of Precambrian granite (Silver Plume equivalent), and west of Oligocene Sewanee Peak Volcanics, Mount Aetna Quartz Monzonite, and a small exposure of Precambrian augen gneiss on the southwestern margin of the Mount Aetna caldera (Toulmin and Hammarstrom, 1990; see attachment JJ; Shannon, 1988)

The Legal Tender (DC01208; see attachment QQ) was probably a partially oxidized irregular replacement deposit of pyrite, sphalerite, galena, smithsonite, anglesite, and sparse chalcopyrite, and malachite in blocks of megabreccia. No production was recorded.

Mineral resource potential for claims 1-4 is high for low grade deposits in extensively shattered rocks.

Claim 5 (Modoc 1 & 2) is immediately northeast of the Bill Short mine (#13, Dings and Robinson, 1957, see attachment Z). Unlike all the other claims on Map 17, the Modoc 1 & 2 is underlain by Precambrian granite and Oligocene Mount Princeton Quartz Monzonite and Mount Aetna Quartz Monzonite (Toulmin and Hammarstrom, 1990; see attachment JJ).

The Bill Short mine (DC01178; see attachment RR), on trend with the Modoc, and in the same host rocks, was still accessible in 1949 and had produced 14 tons of ore that yielded 158 oz Au, 357 oz Ag, 157 pounds Cu, 712 pounds Pb, and 1,879 pounds Zn (Dings and Robinson, 1957, p. 78). The veins strike roughly north-northeast and dip steeply to the west in altered Mount Princeton Quartz Monzonite and altered 1.4-Ga(?) granite. Pyrite, sphalerite, galena, chalcopyrite, and minor greenockite (CdS) have been reported (Dings and Robinson, 1957).

Mineral resource potential for similar small low grade base- and precious-metal veins in Mount Princeton Quartz Monzonite on claim 5 is high.

Claims 6-9 and 11-13 are on the west flank of Vulcan Mountain between Robbins Creek and Deer Gulch. The claims are primarily in Oligocene megabreccia including volcanic breccia and tuff breccia on the western margin of the Mount Aetna caldera (Toulmin and Hammarstrom, 1990, see attachment JJ; Shannon, 1988). Claims 9 and 13 are mostly underlain by Mount Aetna Quartz Monzonite Porphyry. Claims 11 & 12 and the northern part of claim 9 are in a portion of the megabreccia composed predominantly of Paleozoic sedimentary rocks (Toulmin and Hammarstrom, 1990; see attachment JJ). Mineral resource potential for small low-grade base- and precious-metal veins is moderate to high on claims 6-9 and low for claims 11-13.

An incomplete record in the MRDS database (U.S. Geological Survey, 1997a, D000434; see attachment UU) indicates that this area was prospected by AMAX for molybdenite. Resources or reserves were estimated at 100 lbs Mo at 0.01% Mo. No other mention is made of molybdenum in this area. Potential for a Mo deposit within 1 km of the surface is very low. Mineral resource potential for low grade porphyry molybdenum at substantial depth is moderate.

Claim #10, Oddie, appears to be located at or near the Fort Scott mine. The claim is underlain by megabreccia near the contact with Mount Aetna Quartz Monzonite Porphyry (Toulmin and Hammarstrom, 19990). The Fort Scott (DC01170, DC01171; see attachments SS and TT) probably produced 10-12 carloads of gold and silver ore prior to 1901. The vein probably was north-striking in altered welded tuff. Gold-bearing pyrite and galena were the most probable ore minerals.

Mineral resource potential for small base- and precious-metal veins is low.

FEDERAL LANDS: (All properties are on Gunnison 1:100,000 and Montrose 1:250,000 quadrangles)

Parcel A: North (Map 3; Gothic 1:24,000 quadrangle)

Parcel A is underlain, almost entirely, by undifferentiated Pleistocene moraine deposits containing at least three mapped moraine ridges and undifferentiated surficial deposits, all overlying Cretaceous Mancos Shale. Landslides or slump scarps are prominent on the northeast margin of the tract (Gaskill and others, 1991; see attachment VV).

No mines or prospects are known in this area. Mineral resource potential is low for all locatable and leasable deposit types. There is moderate potential for sand and gravel deposits. Landslide potential, however, is enormous, both because the Mancos Shale that underlies the tract is landslide prone, and because the quartz monzonite and granodiorite porphyry of the Snodgrass laccolith that crop out on the hillsides above, form talus slopes that creep downhill towards the tract. Talus streams and earthflow lobes are visible on the slopes above.

Parcel B: West (Map 3; Gothic 1:24,000 quadrangle)

Parcel B is entirely within Quaternary landslide, slump, debris-flow, and earthflow deposits (Gaskill and others, 1991; see attachment VV). Mapped landslide and slump blocks and surficial debris forming arcuate lobes and ridges, are indications of mass movement typical of unstable slopes.

No mines or prospects are known in this area. Mineral resource potential for all locatable and leasable deposit types is low. There is moderate potential for sand and gravel deposits.

Parcels C and F: East and Central (Map 3; Gothic 1:24,000 quadrangle)

Parcels C and F form a contiguous irregular-shaped block that covers about one sq. mi. The Parcels are underlain by Cretaceous Mancos Shale mantled by Quaternary surficial deposits. These deposits include landslide, slump, debris-flow, earthflow, moraine, talus, colluvial, and glacial deposits. Solifluction, mass creep, slumps, landslides, and earthflows are mapped throughout the block. An inferred west-northwest striking fault cuts the Mancos Shale in the northern part of the block. Small tension fissures are mapped in the Mancos Shale along the northern and eastern part of the block (Gaskill and others, 1991; see attachment VV).

No mines or prospects are known in this area. Mineral resource potential for all locatable and leasable deposit types is low. There is moderate potential for sand and gravel deposits.

Parcel D: Brush Creek (Map 10; Gothic 1:24,000 quadrangle)

See Parcel 11 and Parcel D, above.

Parcel D includes numerous small tracts of land on both sides of East River. In general, the tracts are underlain by Quaternary surficial deposits that overlie Cretaceous Mancos Shale. The Quaternary units include alluvial, alluvial fan, debris flow, landslide, slump-scarp, debris slope, earthflow, and moraine deposits (Gaskill and others, 1991; see attachment N). Slope stability could be the major concern here.

No mines or prospects are known in this area. Mineral resource potential for all locatable and leasable deposit types is low. There is high potential for sand and gravel deposits in the alluvial deposits in the East River valley.

Parcel E: South (Map 3; Gothic 1:24,000 quadrangle)

Parcel E, at the northwest end of the Crested Butte Laccolith is underlain by Mancos Shale that is mantled extensively by Quaternary deposits including debris slopes, and landslide, moraine, thinly mantled with glacial debris. Scarps, arcuate lobes, or ridges indicating mass movement are common in every map unit in the parcel (Gaskill and others, 1991; see attachment VV).

No mines or prospects are known on Parcel E. Mineral resource potential for all locatable and leasable deposit types is low. There is moderate potential for sand and gravel deposits.

SUMMARY OF MINERAL RESOURCE POTENTIAL:

Parcel	Mineral Resource Potential	Deposit Type
1	High	Small veins of Ag, Cu, Pb, Zn in sheared and brecciated bedding planes in sedimentary rocks
1	Low	Low-grade Cu skarn
2	High	Small, discontinuous, low-grade gold-silver vein deposits
2	Low	Pegmatite
3,4,5,6,7,9,10,11	Low	All deposit types
8	Low	Light rare-earth element commodities in pegmatite bodies
12	High	Polymetallic silver veins
13A	High	Silver-bearing replacement deposits
13B (Map 18)	Moderate	Precious metal veins in Proterozoic rocks
13B (#4-6, Map 13)	Moderate	Small veins and replacement deposits of base- and precious-metals
13B (#1-3, Map 13)	Moderate	Small lead-zinc-silver veins, replacement bodies, or porphyry copper deposits
13C	Moderate	Polymetallic veins deposits

Parcel	Mineral Resource Potential	Deposit Type
13D (#1, Map 14)	Low to Moderate	Base- and precious-metal vein deposits in granite
13D (#2-5, Map 14)	Low	Base- and precious-metal vein deposits
13D (#6-10, Map 14)	High	Base- and precious-metal vein and replacement deposits
13D (#1, Map 15)	Low	Base- and precious-metal vein deposits
13D (#2, Map 15)	Low	Skarn deposits
13D (#3, Map 15)	Low	Precious-metal-bearing vein deposits
13D (#4, Map 15)	Moderate	Precious-metal-bearing vein deposits
13D (#1-4, Map 16)	Moderate	Veins or replacement bodies of Ag-Pb-Zn
13D (#1-4, Map 17)	High	Low-grade irregular replacement deposits in megabreccia
13D (#5, Map 17)	High	Low-grade base- and precious-metal veins deposits
13D (#6-9, Map 17)	Moderate	Low-grade base- and precious-metal vein deposits
13D (#10-13, Map 17)	Low	Base- and precious-metal vein deposits
13D (#5-13, Map 17)	Low	Low-grade porphyry Mo within 1 km of surface
13D (#5-13, Map 17)	Moderate	Low-grade porphyry Mo at substantial depth
A,B,C,D,E	Low	All deposits containing locatable or leasable commodities
A,B,C,E	Moderate	Sand and gravel deposits
D	High	Sand and gravel deposits

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ATTACHMENTS:

2 Index Maps and Parcel Maps 1-10 and 12-18 (provided by U.S. Forest Service)
(Map 11, Yellow Jacket claim, has been withdrawn from this exchange)

Parcel 1

A Geologic map of part of the Gothic quadrangle (Gaskill and others, 1991)

B Map of mining claims, prospects, and areas of altered and mineralized rock (enlarged from Gaskill and others, 1991, fig. 2)

C Table of patented claims (from Gaskill and others, 1991)

D MRDS DC00703: Queen Basin area

Parcel 2

E Geologic map of part of the Ohio City area (Horlacher, 1987)

F MRDS DC01143: Revenue

G MRDS DC01142: Unnamed

Parcel 3

H Geologic map of part of the Gothic quadrangle (Gaskill and others, 1991)

I Geologic map of part of the Crested Butte quadrangle (Gaskill and others, 1986)

Parcel 4

J Geologic map of part of the Paonia and Gunnison area (Ellis and others, 1987)

Parcel 5

(see attachment J)

K Geologic map of part of the Crested Butte quadrangle (Gaskill and others, 1986)

Parcel 6

L Geologic map of part of Montrose 1° x 2° quadrangle (Tweto and others, 1976)

M Sketch map of East Beaver Creek area (Ed DeWitt, unpub. map, January, 1998)

Parcel 7

(see attachment J)

Parcel 8

(see attachment L)

Parcel 9

(see attachment J)

Parcel 10

(see attachment J)

Parcel 11 and Parcel D

N Geologic map of part of the Gothic quadrangle (Gaskill and others, 1991)

Parcel 12

(see attachment A)

O MRDS DC00723: W. Virginia, Ophir, Ella Wood, Frank, Mineral King

P MRDS DC00722: Virginia Lode

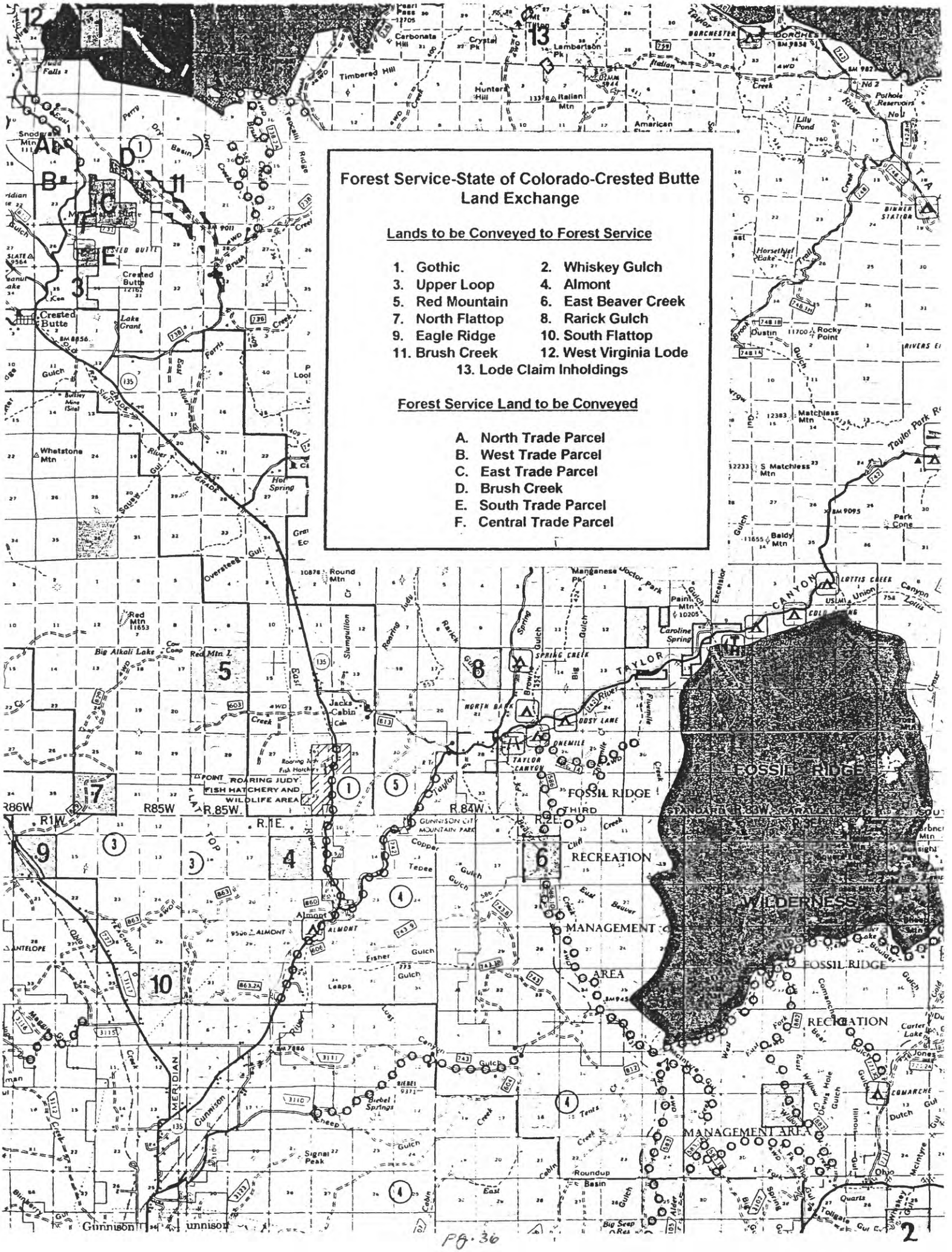
(see attachment B) P. 3 of Gaskill and others

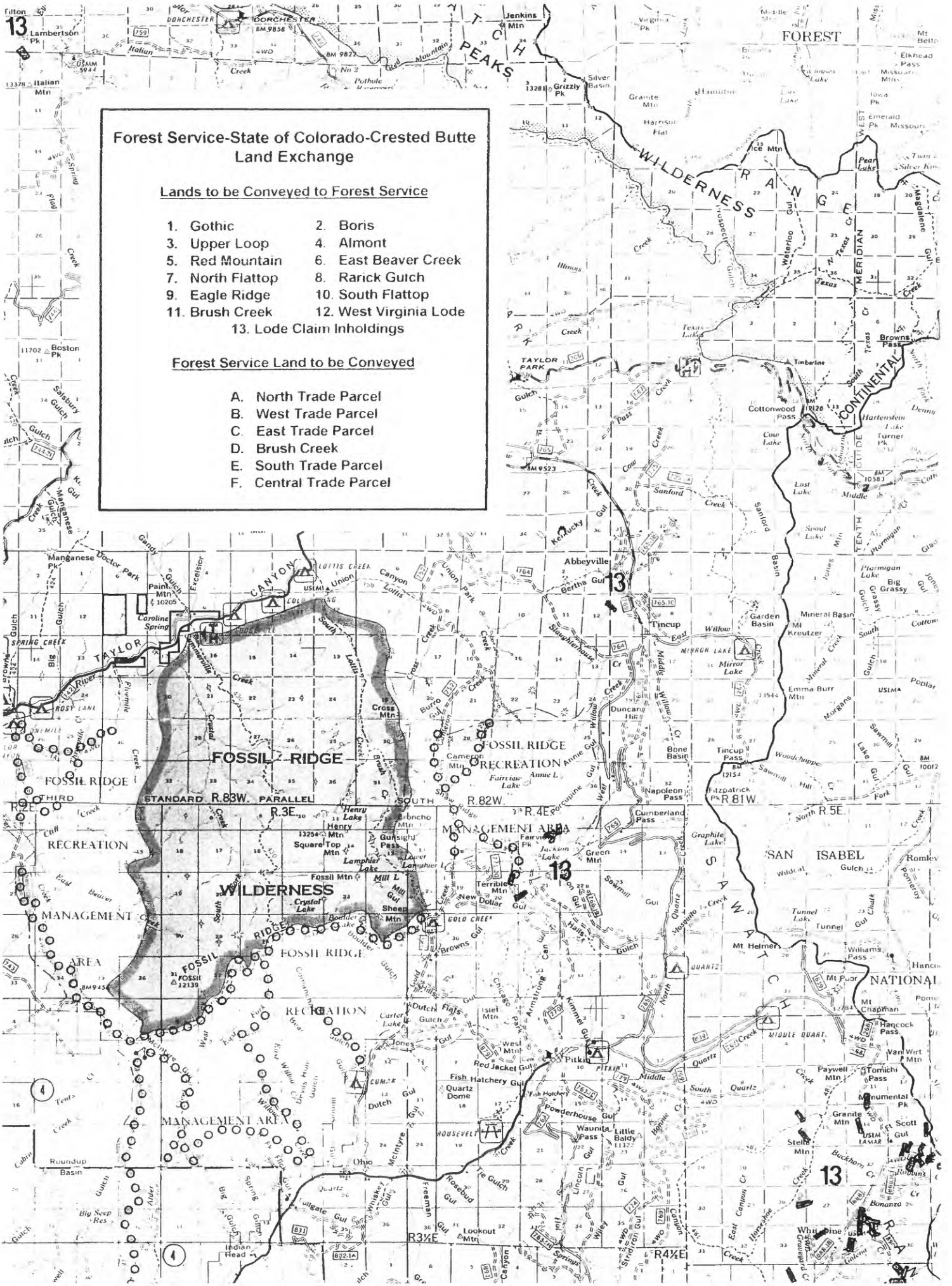
Parcel 13A

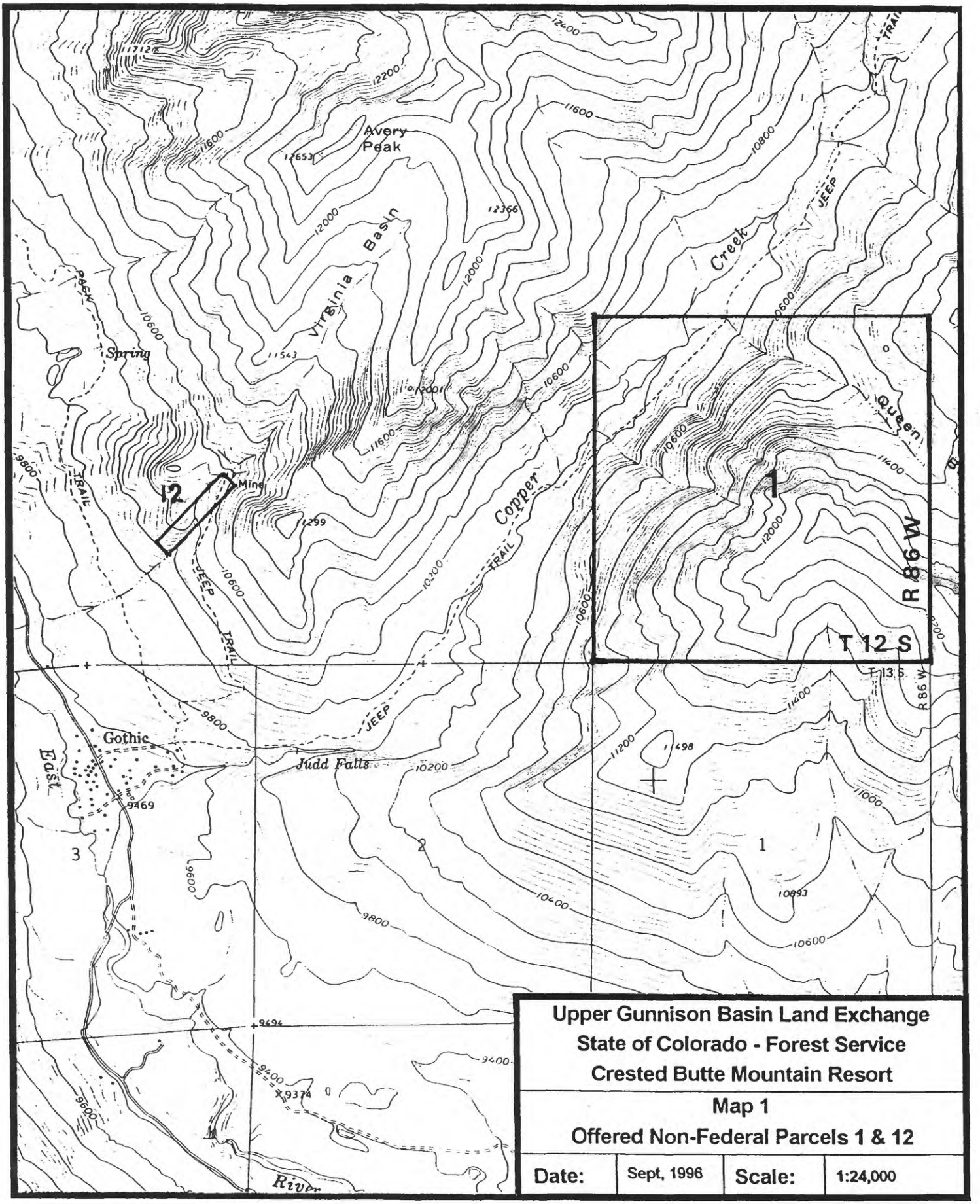
Q Map of Fairview mine/Terrible Mountain area (Rosenlund, 1984)

R MRDS DC01243: Fairview

S MILS 80510124: Fairview
T MRDS DC01244: Cleopatra
Parcel 13B
U Geologic map of part of the Collegiate Peaks WSA (Fridrich and others, 1997)
V MRDS DC00692: Ender (Climax)
W MILS 80510096: Climax (Ender)
X Geologic map of Italian Mountain Intrusive Complex (Cunningham, 1976)
Y MRDS DC00693: Mount Vernon, Silvertip, Charles H.
Parcel 13C
(see attachment Q)
Parcel 13D
Z Geologic map of part of Garfield quadrangle (Dings and Robinson, 1957)
AA MRDS DC01196: Spar Copper
BB MILS 80510265: Spar Copper
CC MRDS DC01200: Morning Glim
DD MILS 80510237: Morning Glim
EE MRDS DC01191: Ensign
FF MILS 80510120: Ensign
GG MRDS DC01198: Parole
HH MILS 80510266: Parole
II Geologic map of the northern Tomichi district (Dings and Robinson, 1957, pl. 5)
JJ Geologic map of Mount Aetna caldera complex (Toulmin and Hammarstrom, 1990)
KK MRDS DC01174: Lewiston-Pet
LL MRDS DC01172: Hiawatha
MM MRDS DC01169: Day Star
NN MRDS DC01175: Magna Charta
OO Sketch X-sect . (DeWitt, written communication, January, 1998)
PP MRDS DC01199: Annie Hudson
QQ MRDS DC01208: Legal Tender
RR MRDS DC01178: Bill Short
SS
MRDS DC01170: Fort Scott
TT MRDS DC01171: Fort Scott, Oddie, Moose, Mason
UU MRDS D000434: Copper Hill; Clover Mountain
Parcel A
VV Geologic map of part of Gothic quadrangle (Gaskill and others, 1991)
Parcel B
(see attachment VV)
Parcel C and F
(see attachment VV)
Parcel D
(see Parcel 11 and D; attachment N)
Parcel E
(see attachment VV)


Forest Service-State of Colorado-Crested Butte
Land Exchange
Lands to be Conveyed to Forest Service
1. Gothic
2. Whiskey Gulch
3. Upper Loop
4. Almont
5. Red Mountain
6. East Beaver Creek
7. North Flattop
8. Rarick Gulch
9. Eagle Ridge
10. South Flattop
11. Brush Creek
12. West Virginia Lode
13. Lode Claim Inholdings
Forest Service Land to be Conveyed
A. North Trade Parcel
B. West Trade Parcel
C. East Trade Parcel
D. Brush Creek
E. South Trade Parcel
F. Central Trade Parcel
FOSSIL RIDGE
RECREATION
WILDERNESS
MANAGEMENT
AREA
FOSSIL RIDGE
RECREATION
MANAGEMENT AREA
ROARING JUDY
FISH HATCHERY AND
WILDLIFE AREA
Crested Butte
Gothic
Almont
Jacks Cabin
Taylor Canyon
Spring Creek
North Bank
Oney Lane
Gunnison
R86W
R85W
R84W
R83W
R1W
R1E.
R2E.
R3E.
Gunnison
Unnison


Forest Service-State of Colorado-Crested Butte Land Exchange
Lands to be Conveyed to Forest Service
1. Gothic
2. Boris
3. Upper Loop
4. Almont
5. Red Mountain
6. East Beaver Creek
7. North Flattop
8. Rarick Gulch
9. Eagle Ridge
10. South Flattop
11. Brush Creek
12. West Virginia Lode
13. Lode Claim Inholdings
Forest Service Land to be Conveyed
A. North Trade Parcel
B. West Trade Parcel
C. East Trade Parcel
D. Brush Creek
E. South Trade Parcel
F. Central Trade Parcel
FOSSIL RIDGE RECREATION MANAGEMENT AREA
WILDERNESS
SAWATCH RANGE
NATIONAL
STANDARD PARALLEL SOUTH
R.83W.
R.82W.
R.81W.
R.4E.
R.5E.
R.3E.
R3½E
R4½E
13



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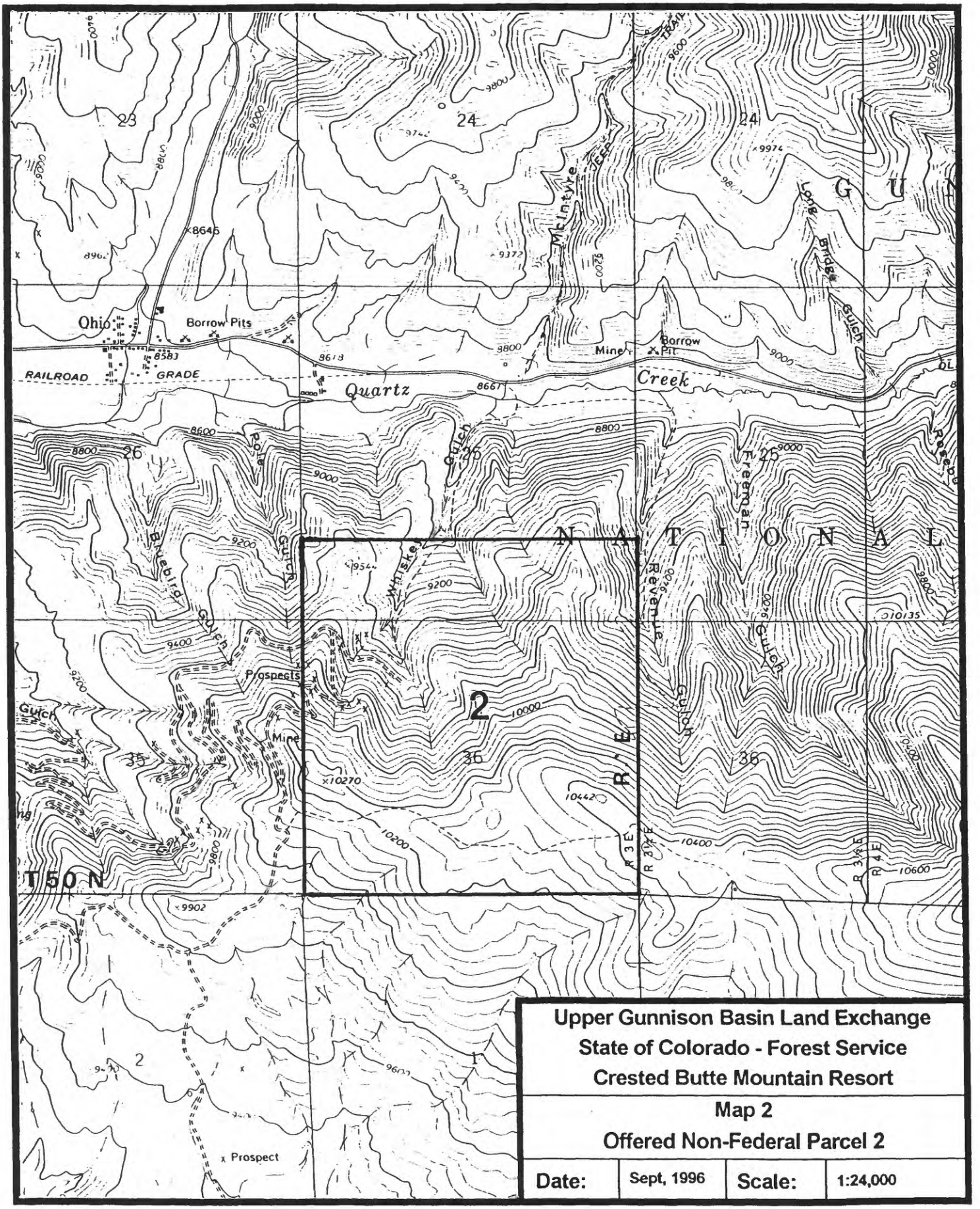
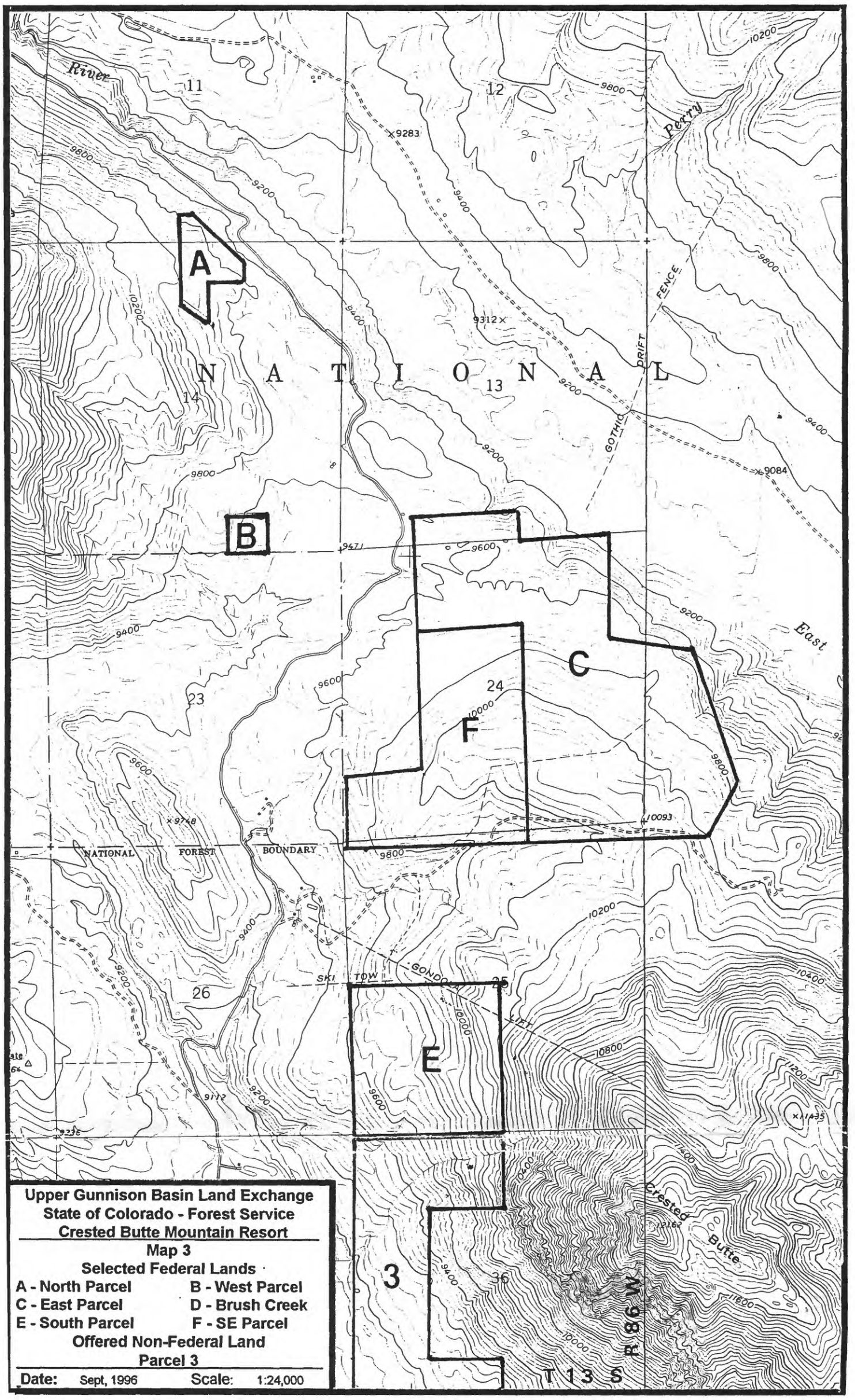


Upper Gunnison Basin Land Exchange			
State of Colorado - Forest Service			
Crested Butte Mountain Resort			
Map 2			
Offered Non-Federal Parcel 2			
Date:	Sept, 1996	Scale:	1:24,000

Boundaries are approximate



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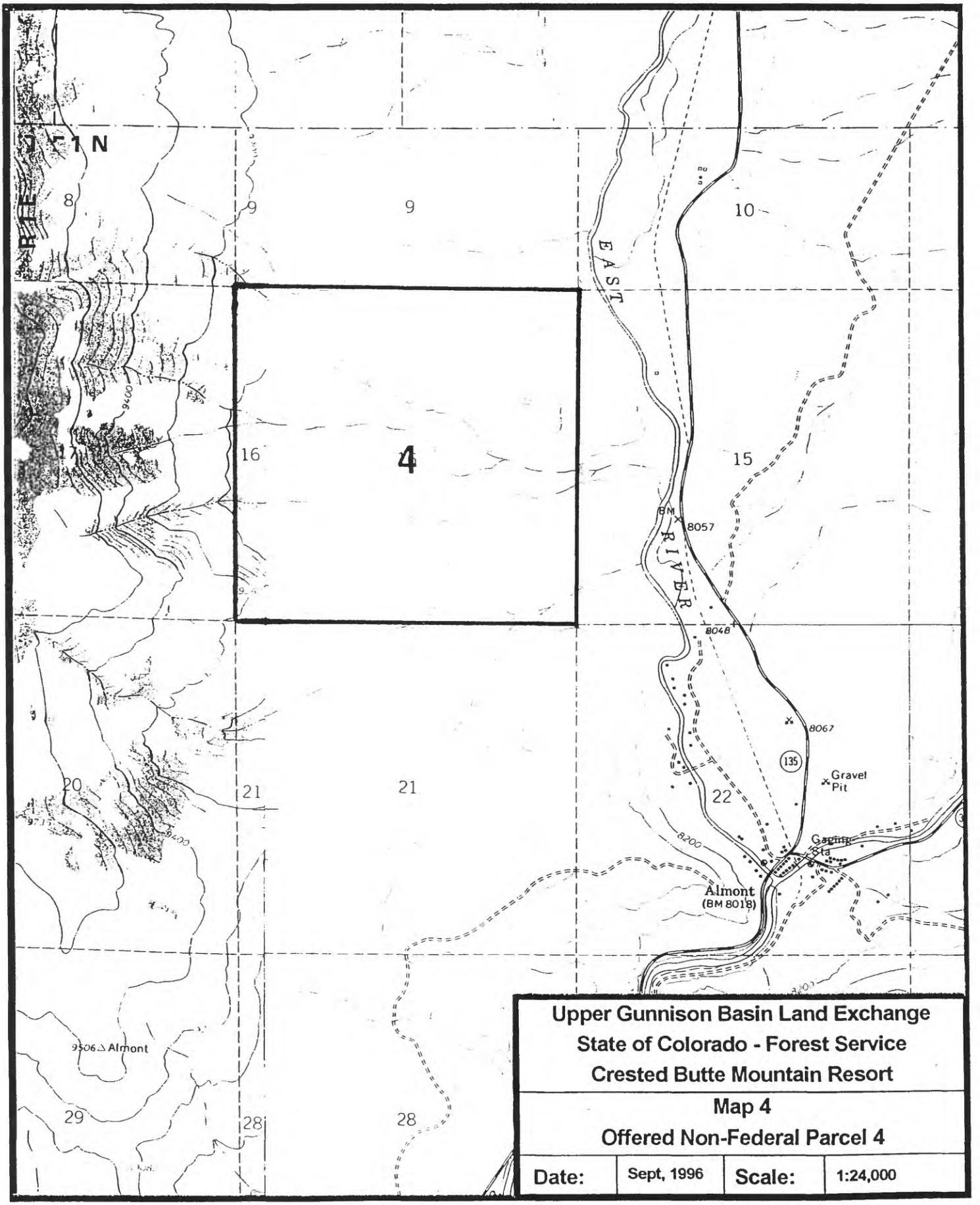

Upper Gunnison Basin Land Exchange
State of Colorado - Forest Service
Crested Butte Mountain Resort

Map 4
Offered Non-Federal Parcel 4

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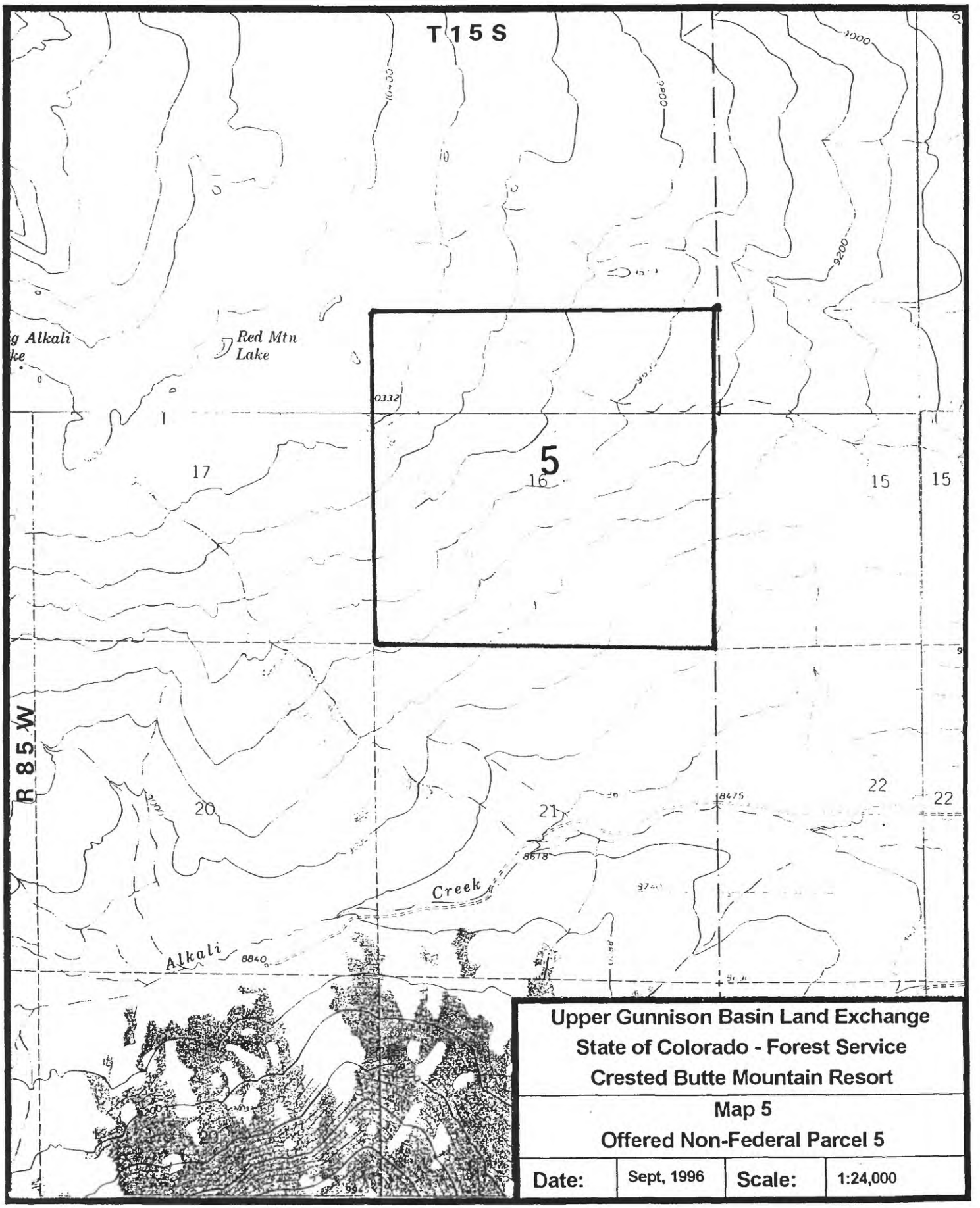
Boundaries are approximate



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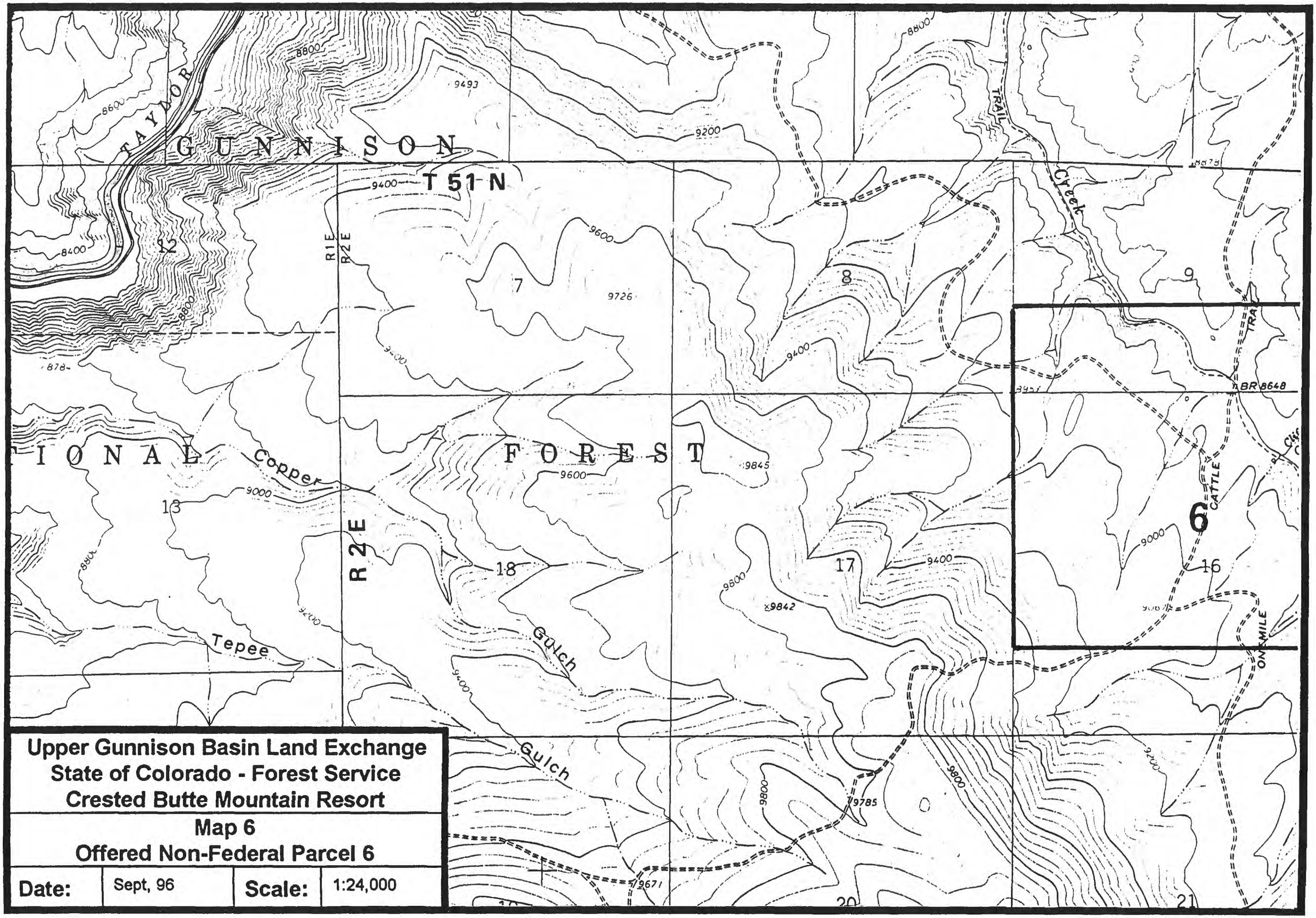


Upper Gunnison Basin Land Exchange
State of Colorado - Forest Service
Crested Butte Mountain Resort

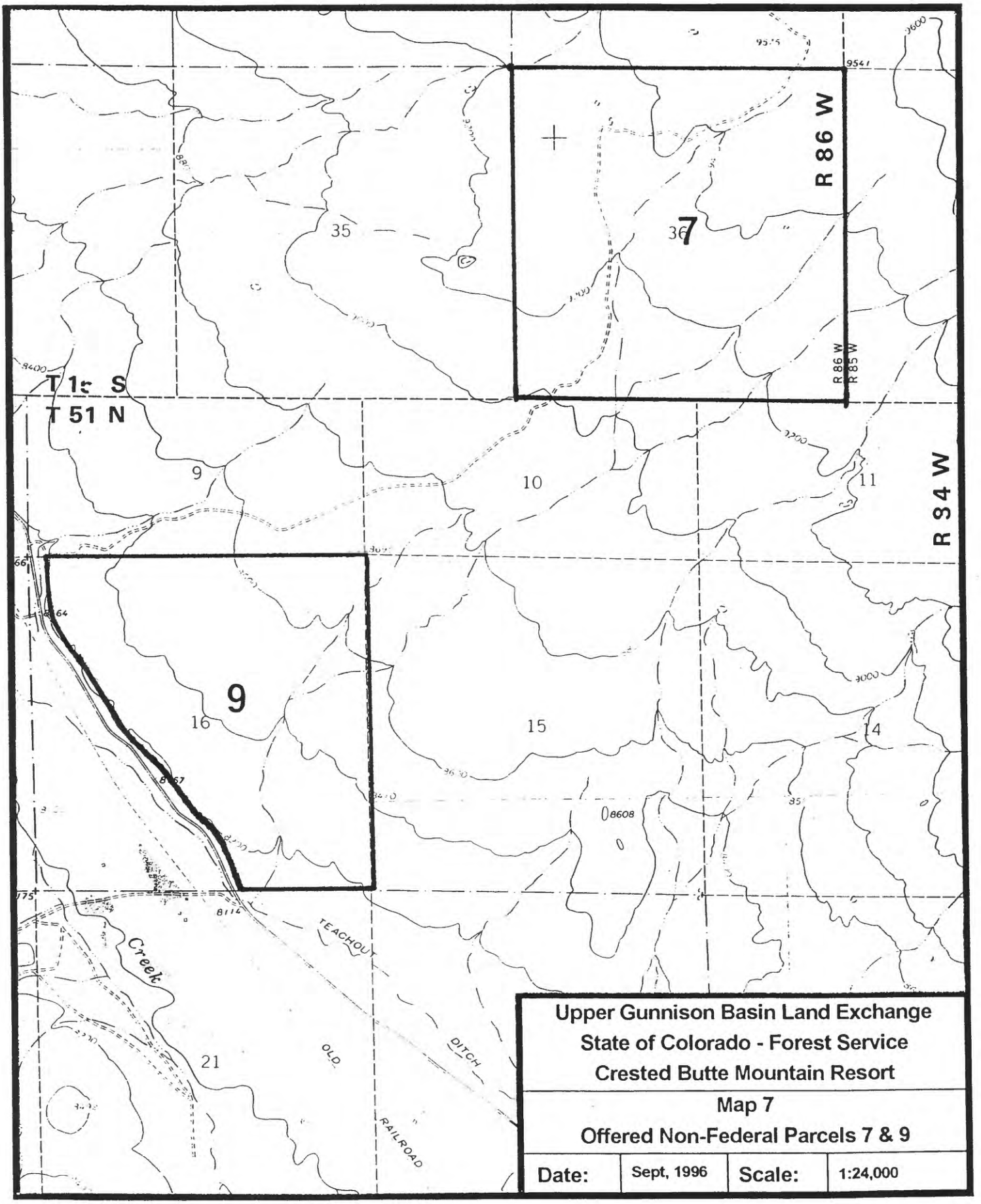
Map 6
Offered Non-Federal Parcel 6

Date:	Sept, 96	**Scale:**	1:24,000

Boundaries are approximate

pg. 43

... onto Crystal Creek 24K to east



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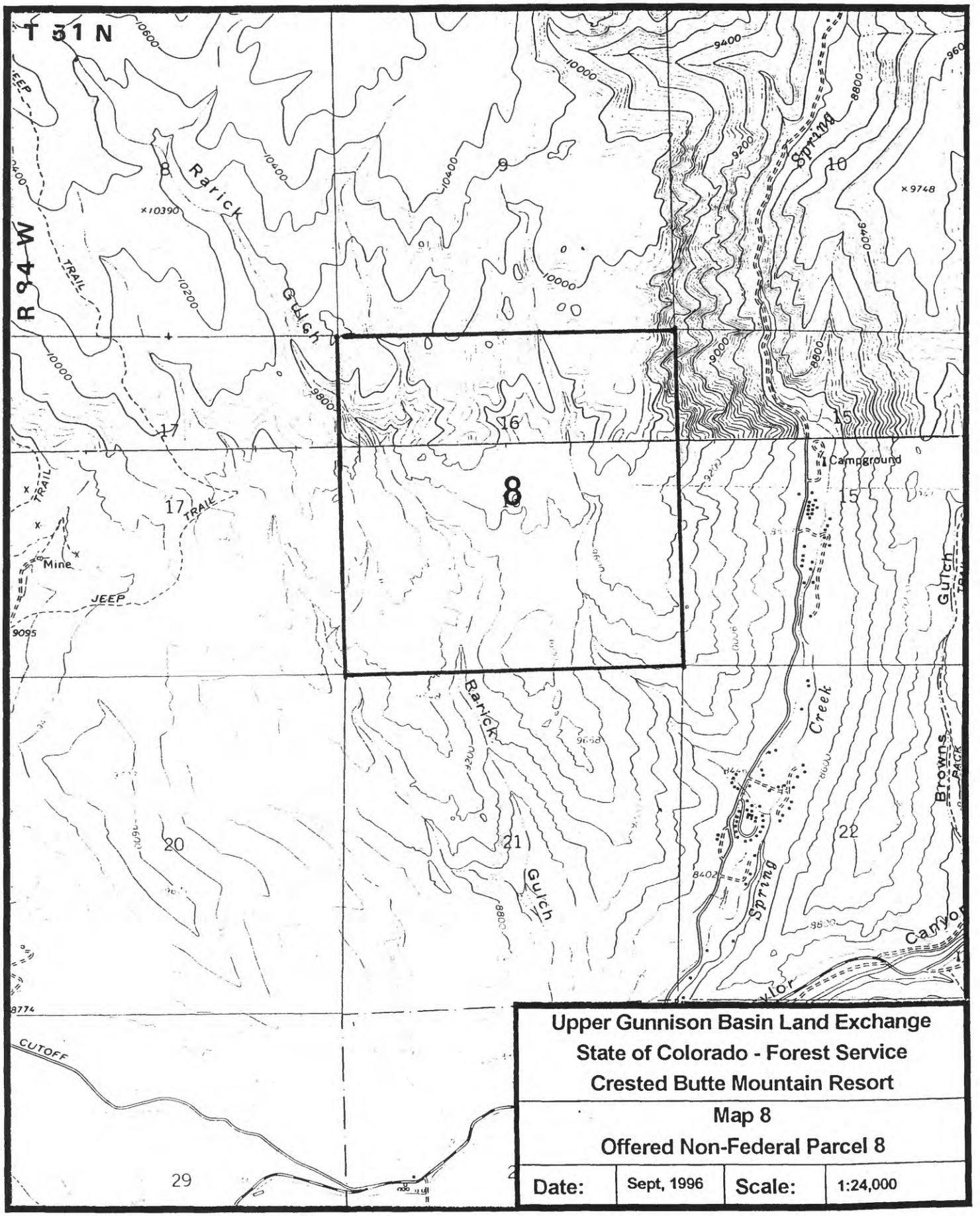
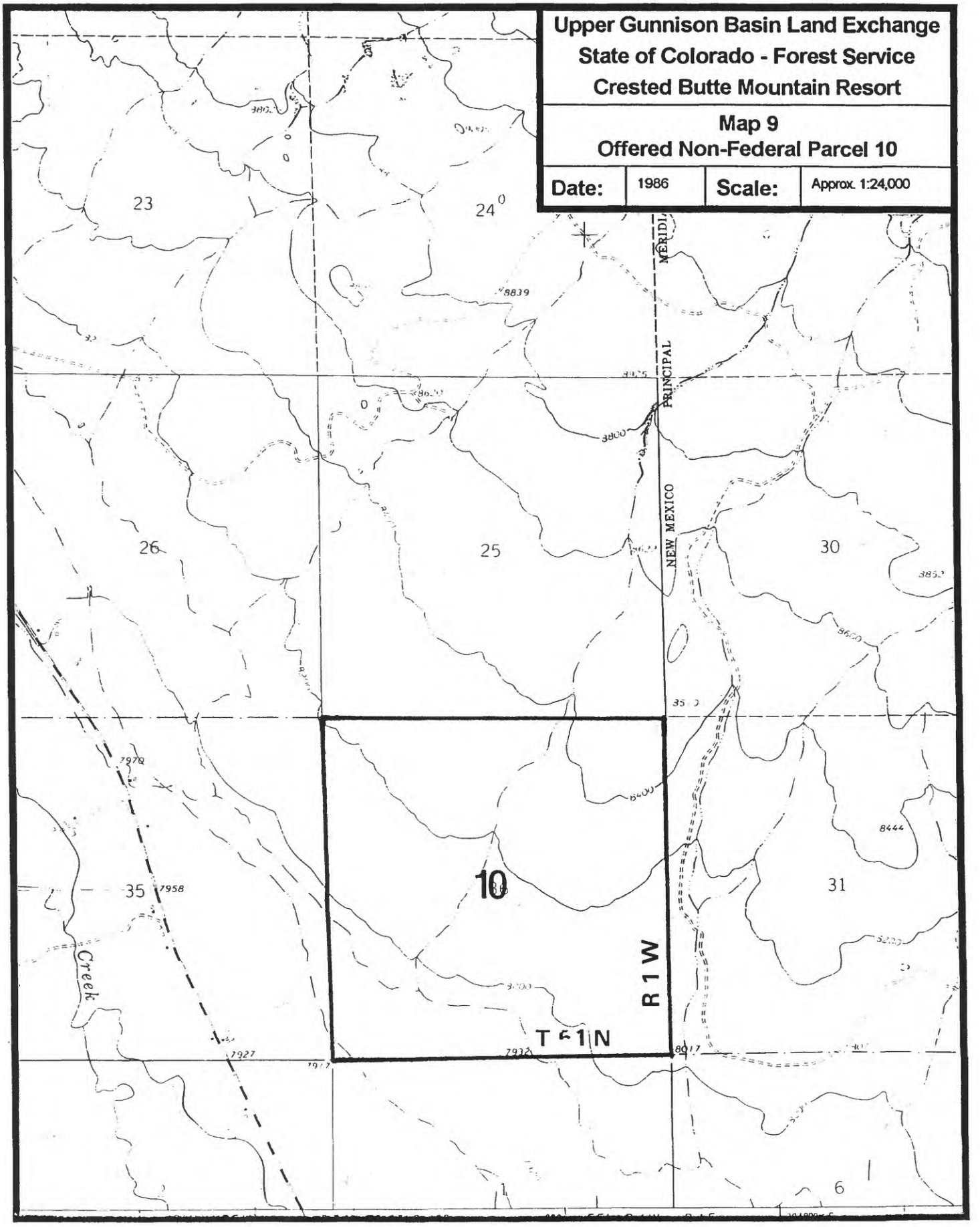


Upper Gunnison Basin Land Exchange
State of Colorado - Forest Service
Crested Butte Mountain Resort

Map 8
Offered Non-Federal Parcel 8

Date:	Sept, 1996	Scale:	1:24,000

Boundaries are approximate



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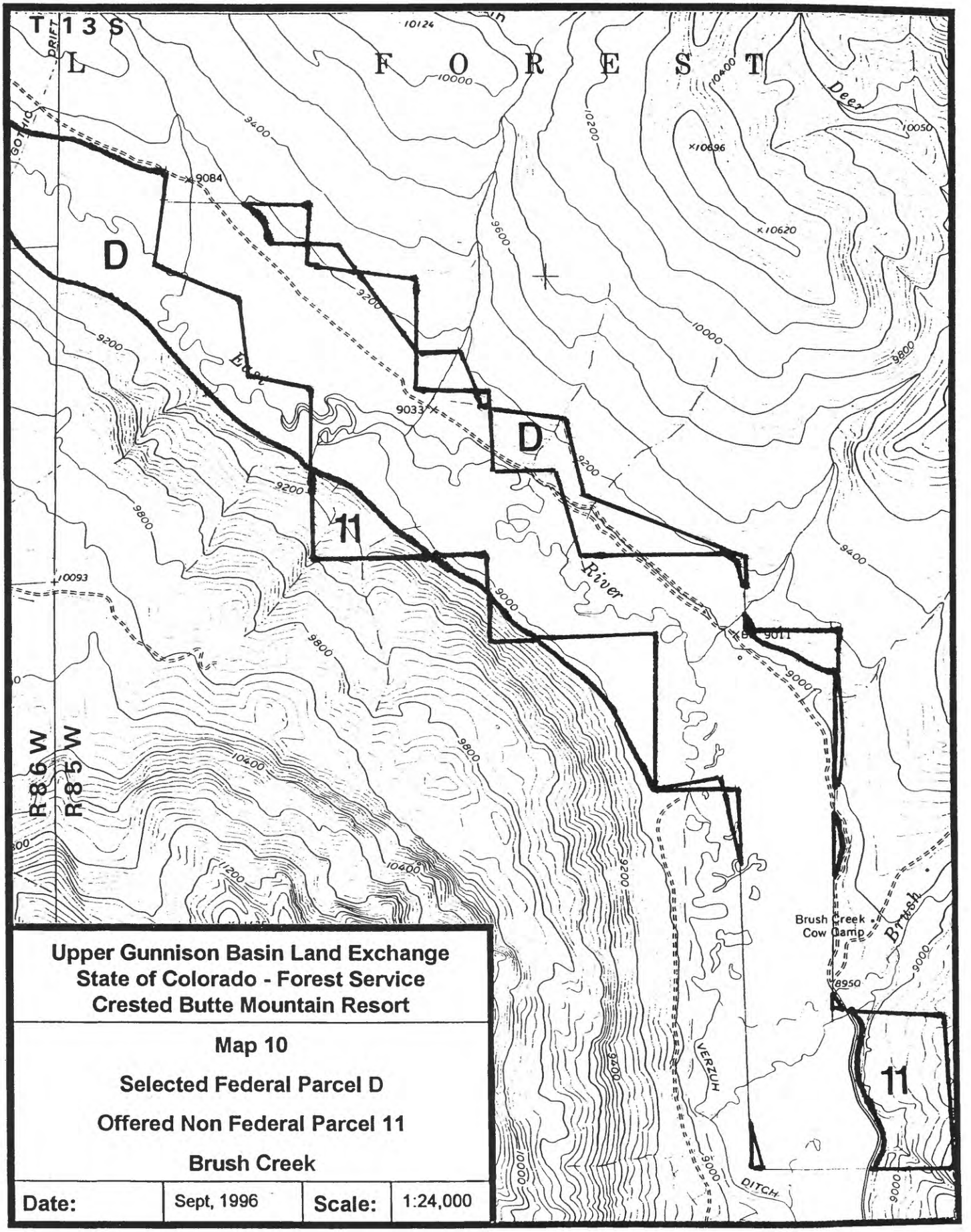


Upper Gunnison Basin Land Exchange
State of Colorado - Forest Service
Crested Butte Mountain Resort

Map 10

Selected Federal Parcel D

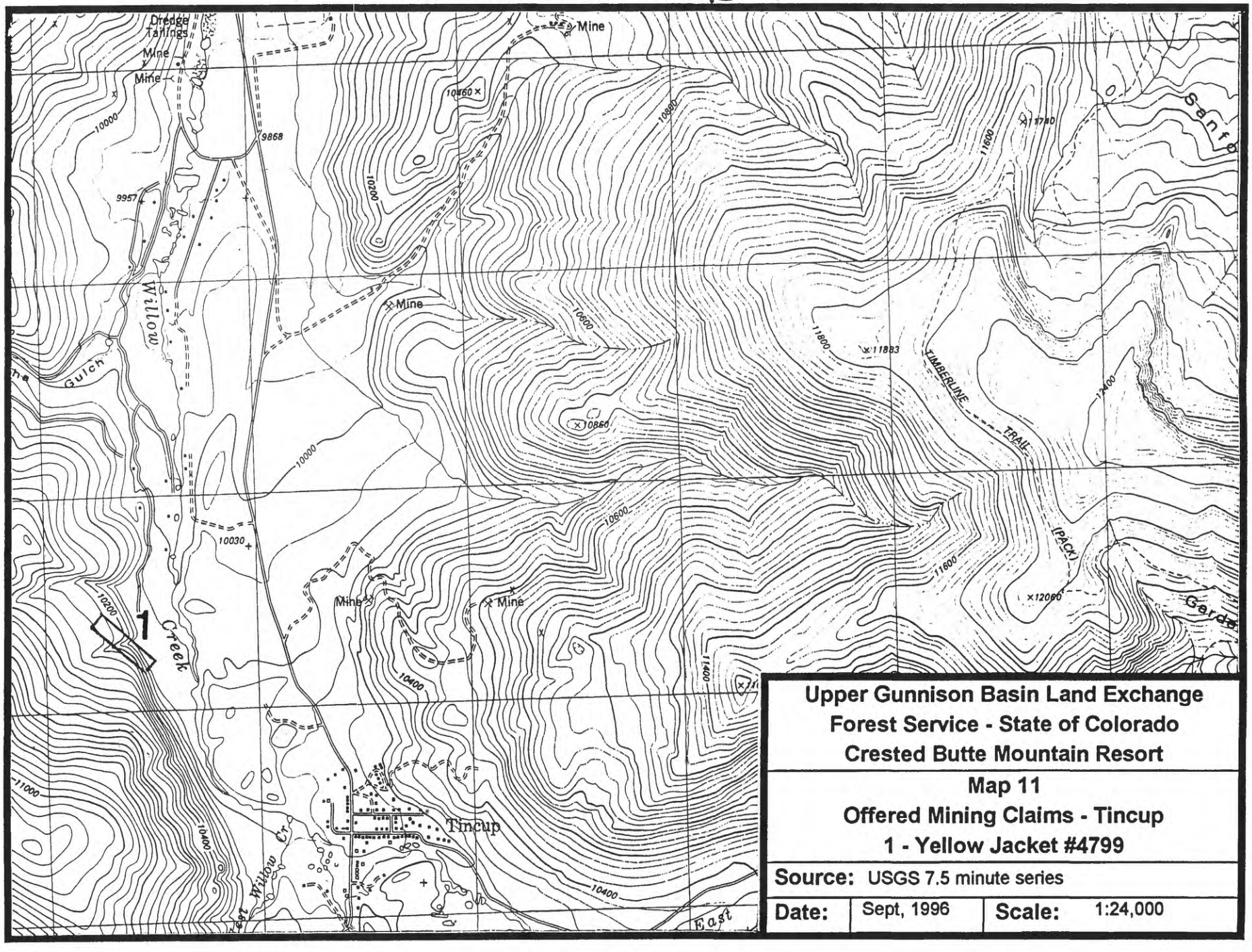
Offered Non Federal Parcel 11

Brush Creek

Date:	Sept, 1996	Scale:	1:24,000

Boundaries are approximate

WITHDRAWN FROM EXCHANGE



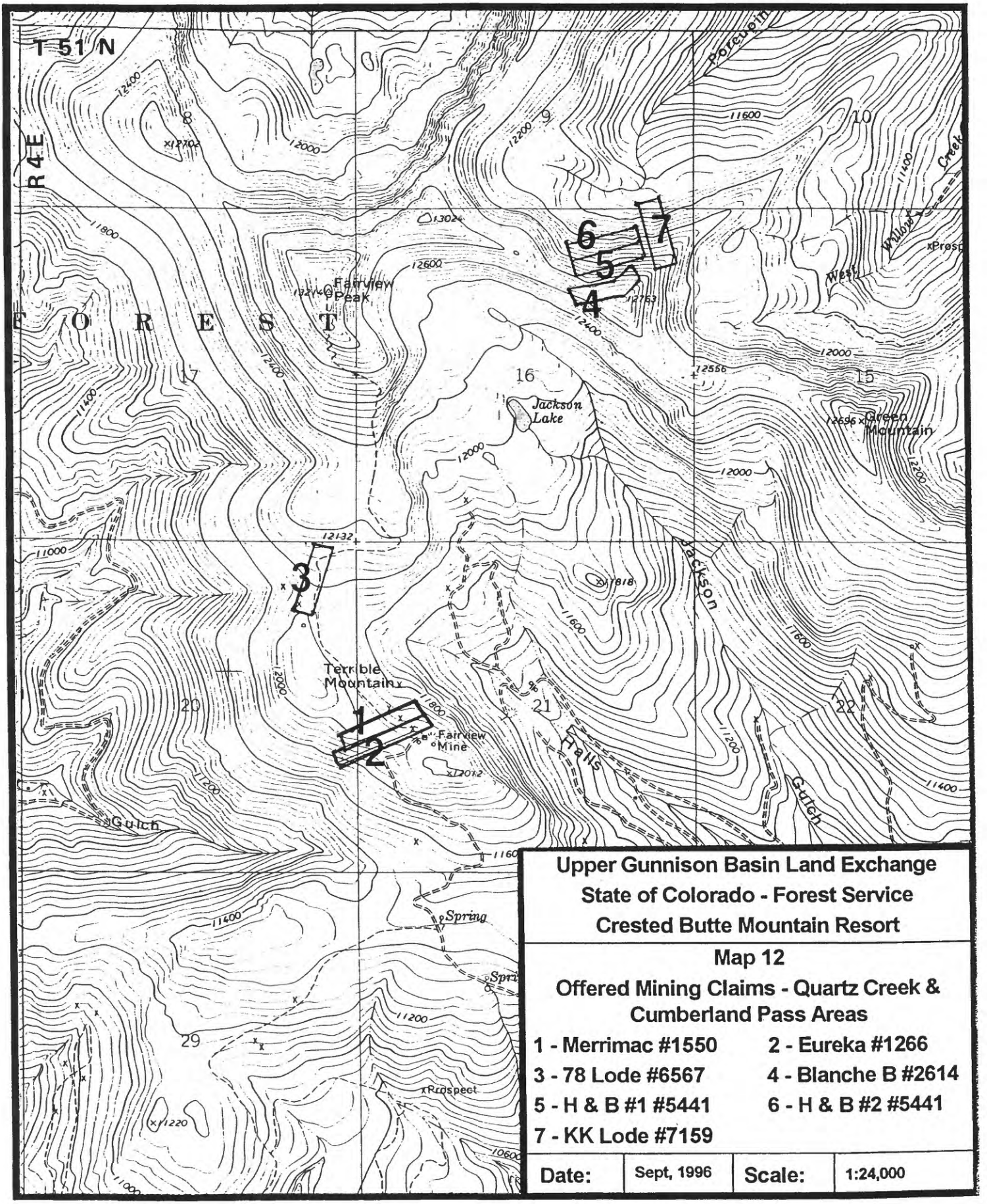
Upper Gunnison Basin Land Exchange
Forest Service - State of Colorado
Crested Butte Mountain Resort

Map 11
Offered Mining Claims - Tincup
1 - Yellow Jacket #4799

Source: USGS 7.5 minute series

Date:	Sept, 1996	**Scale:**	1:24,000

Boundaries are approximate



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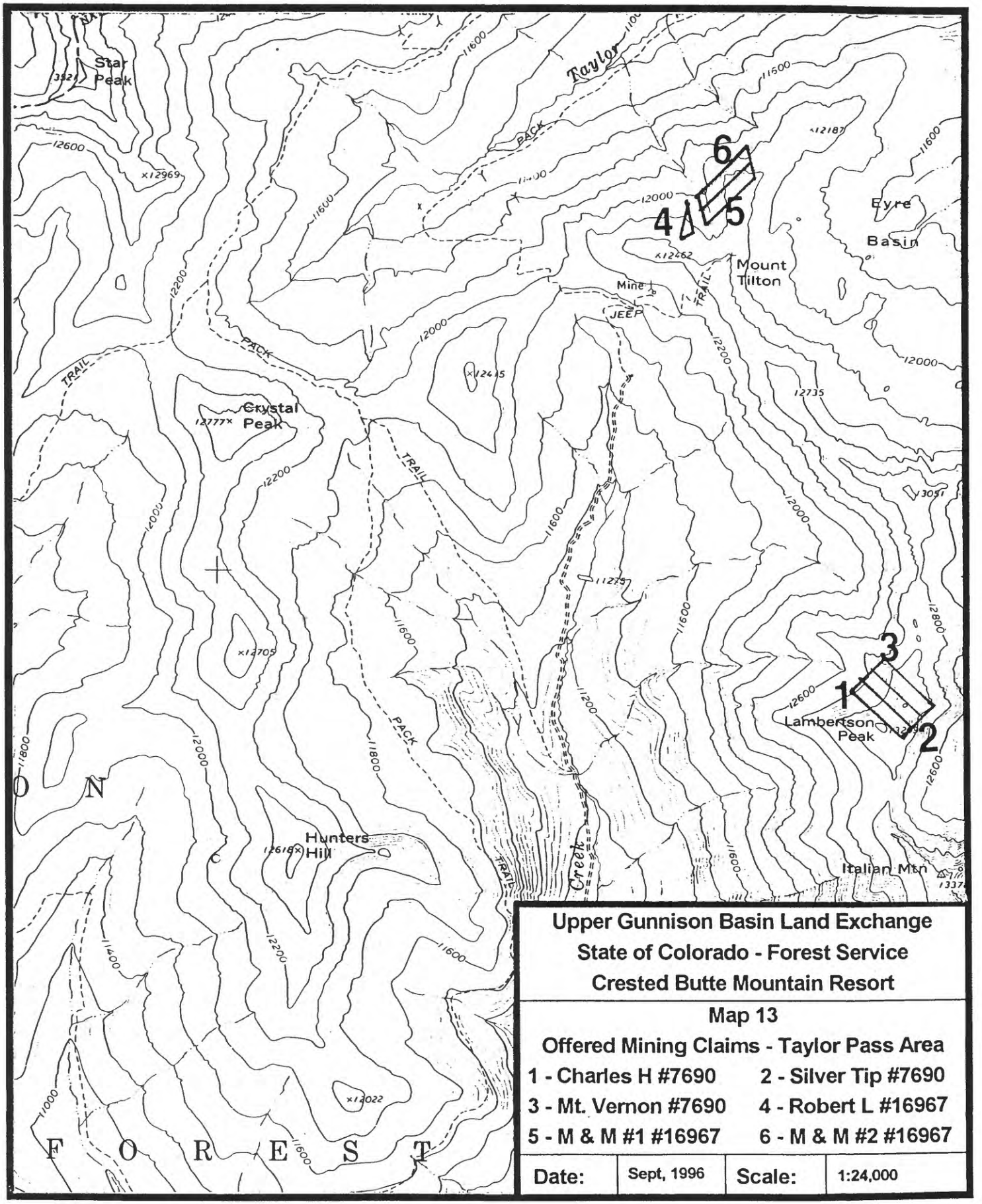


Upper Gunnison Basin Land Exchange
State of Colorado - Forest Service
Crested Butte Mountain Resort

Map 13

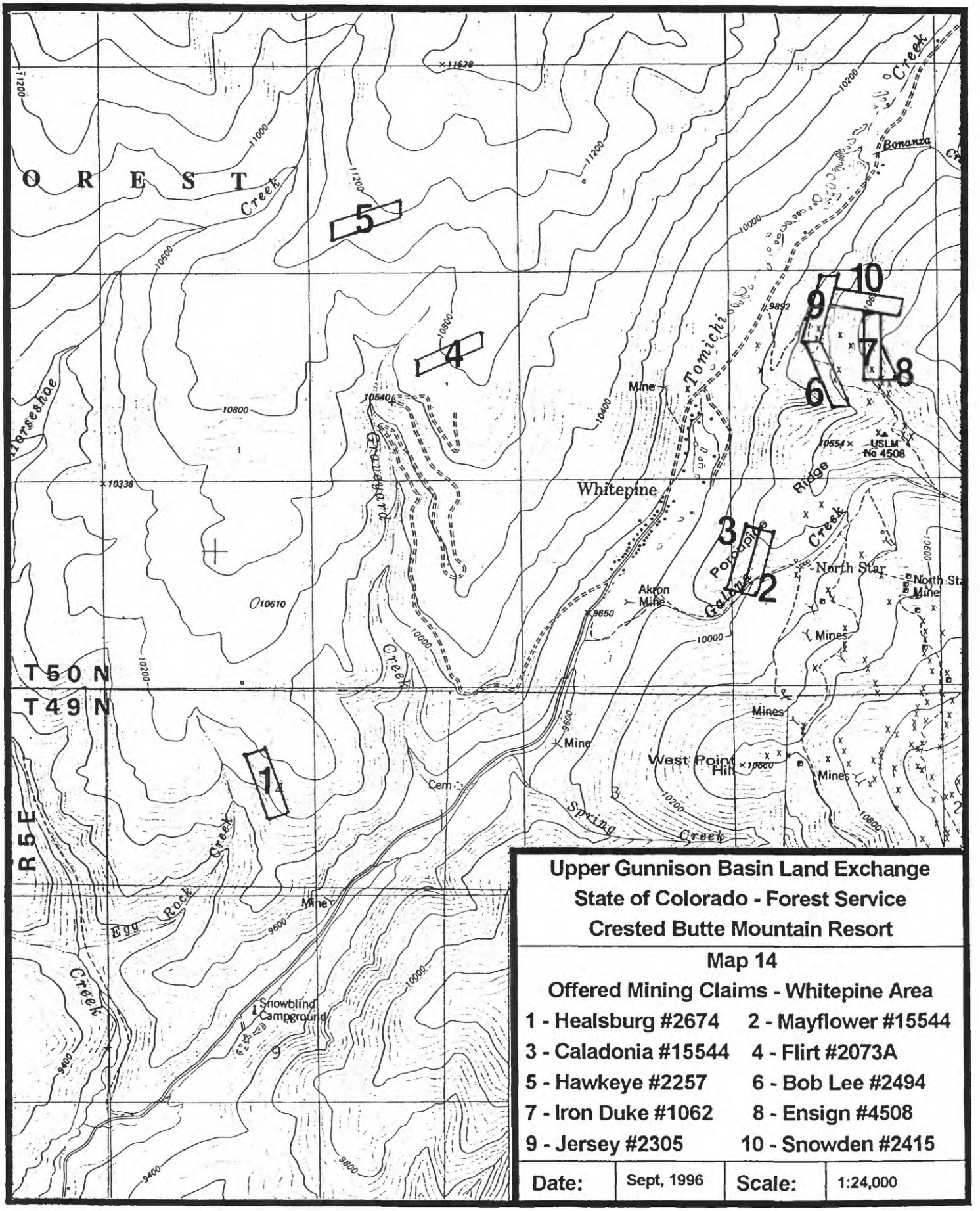
Offered Mining Claims - Taylor Pass Area

1 - Charles H #7690	2 - Silver Tip #7690
3 - Mt. Vernon #7690	4 - Robert L #16967
5 - M & M #1 #16967	6 - M & M #2 #16967

Date:	Sept, 1996	Scale:	1:24,000

Boundaries are approximate

Pearl Pass 24K



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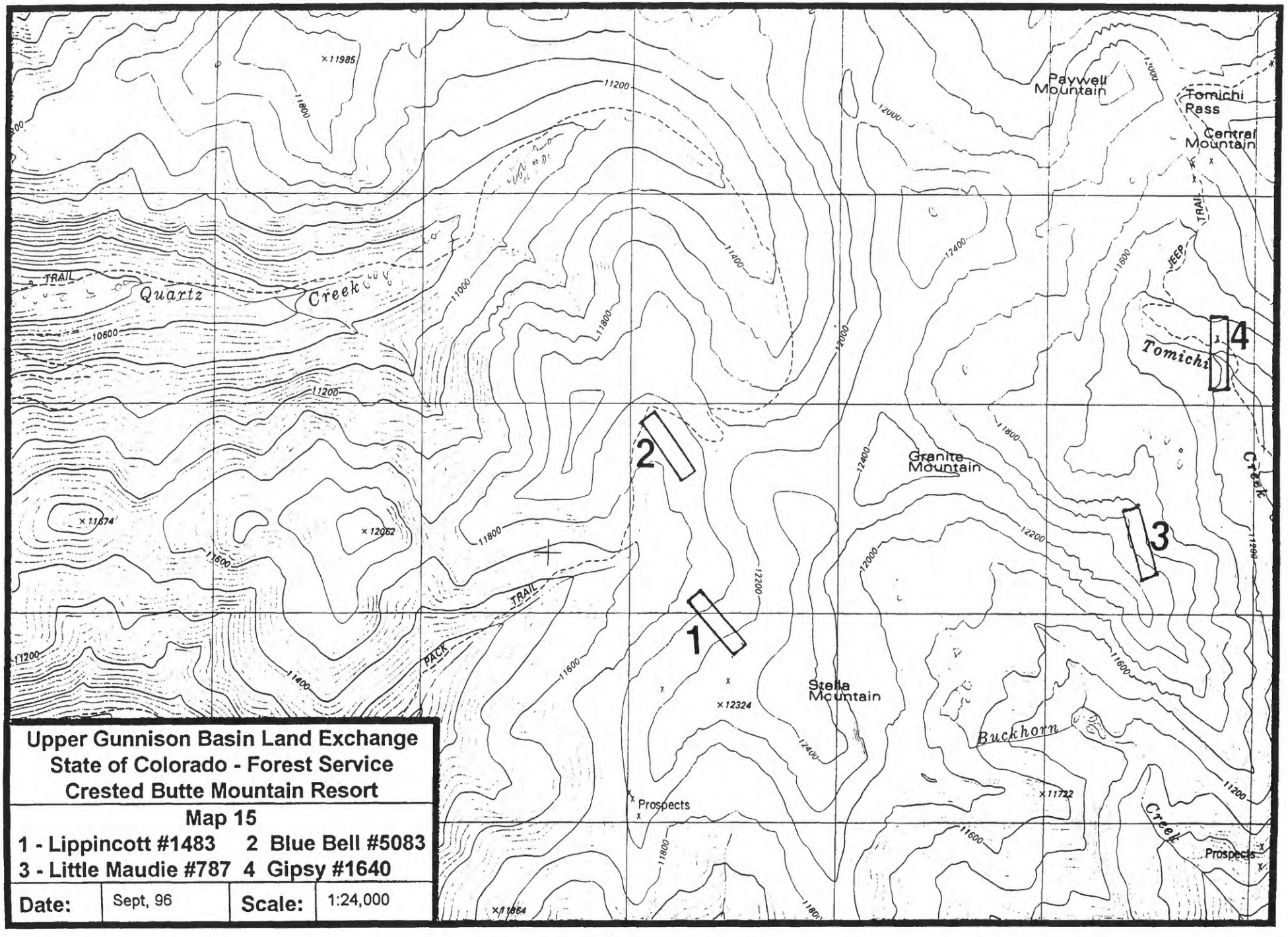
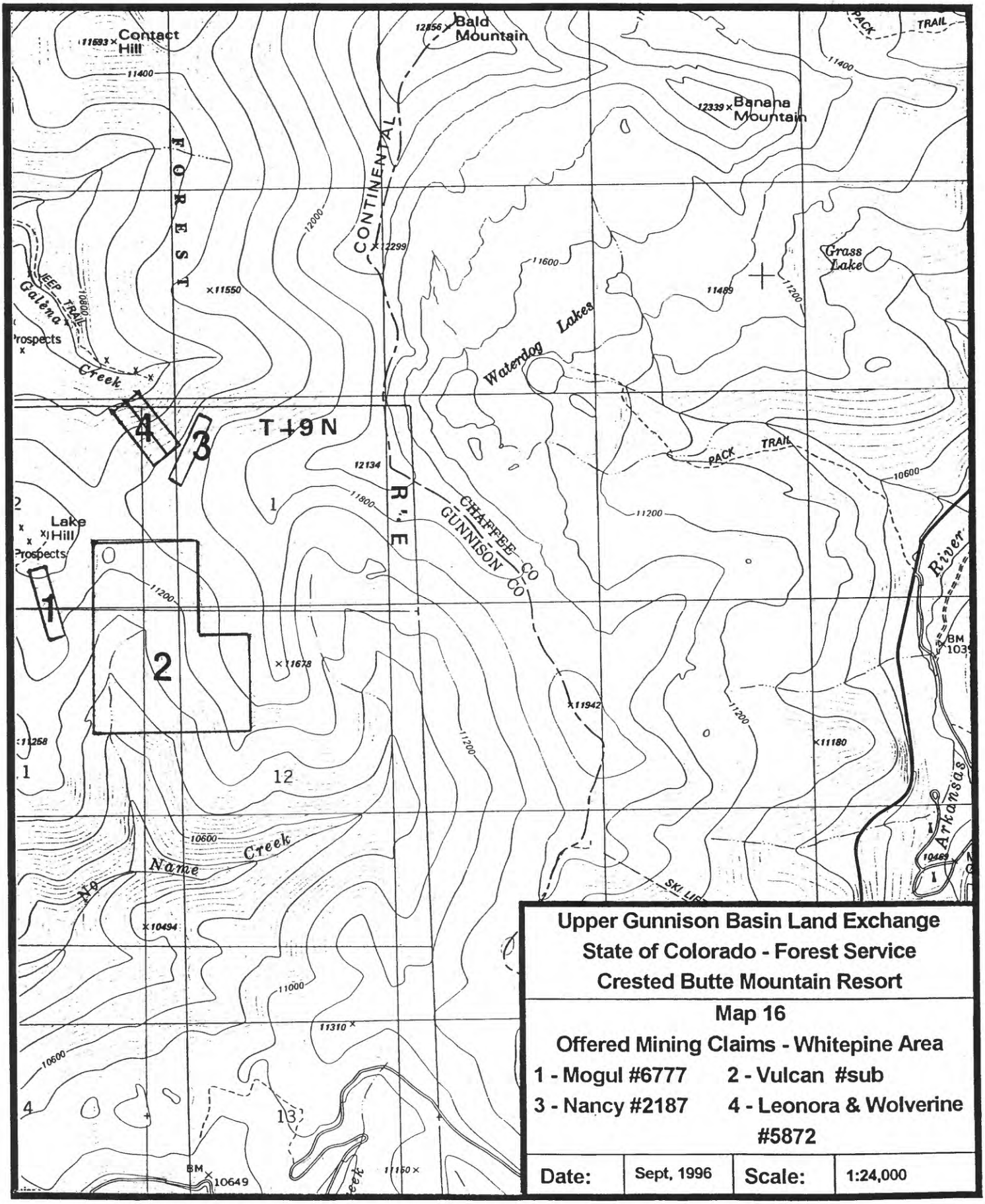


Upper Gunnison Basin Land Exchange
State of Colorado - Forest Service
Crested Butte Mountain Resort

Map 15

1 - Lippincott #1483 2 Blue Bell #5083
3 - Little Maudie #787 4 Gipsy #1640

Date:	Sept, 96	Scale:	1:24,000



Upper Gunnison Basin Land Exchange
State of Colorado - Forest Service
Crested Butte Mountain Resort

Map 16

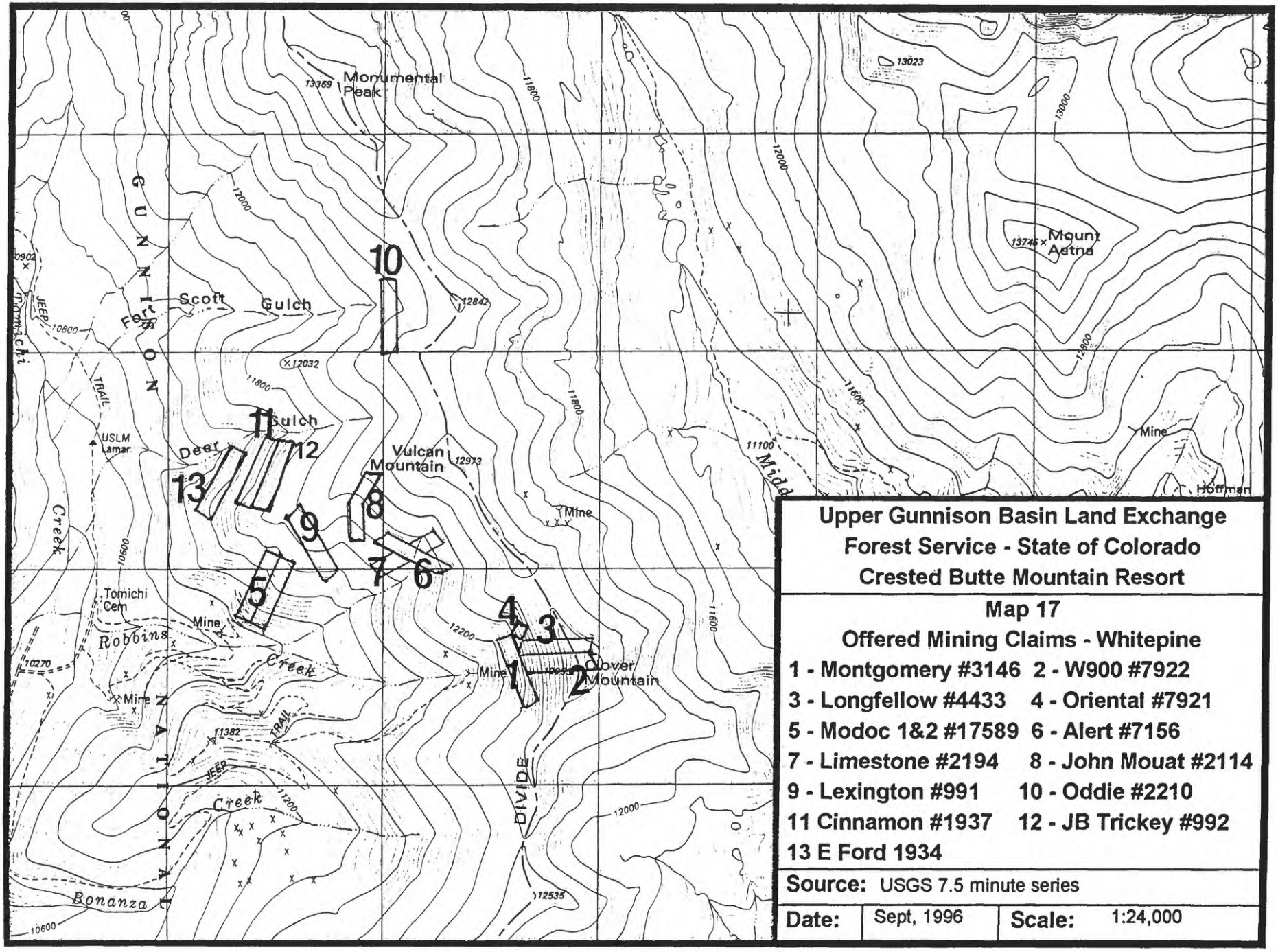
Offered Mining Claims - Whitepine Area

1 - Mogul #6777 **2 - Vulcan #sub**

3 - Nancy #2187 **4 - Leonora & Wolverine #5872**

Date:	Sept, 1996	Scale:	1:24,000

Boundaries are approximate



Upper Gunnison Basin Land Exchange
Forest Service - State of Colorado
Crested Butte Mountain Resort

Map 17

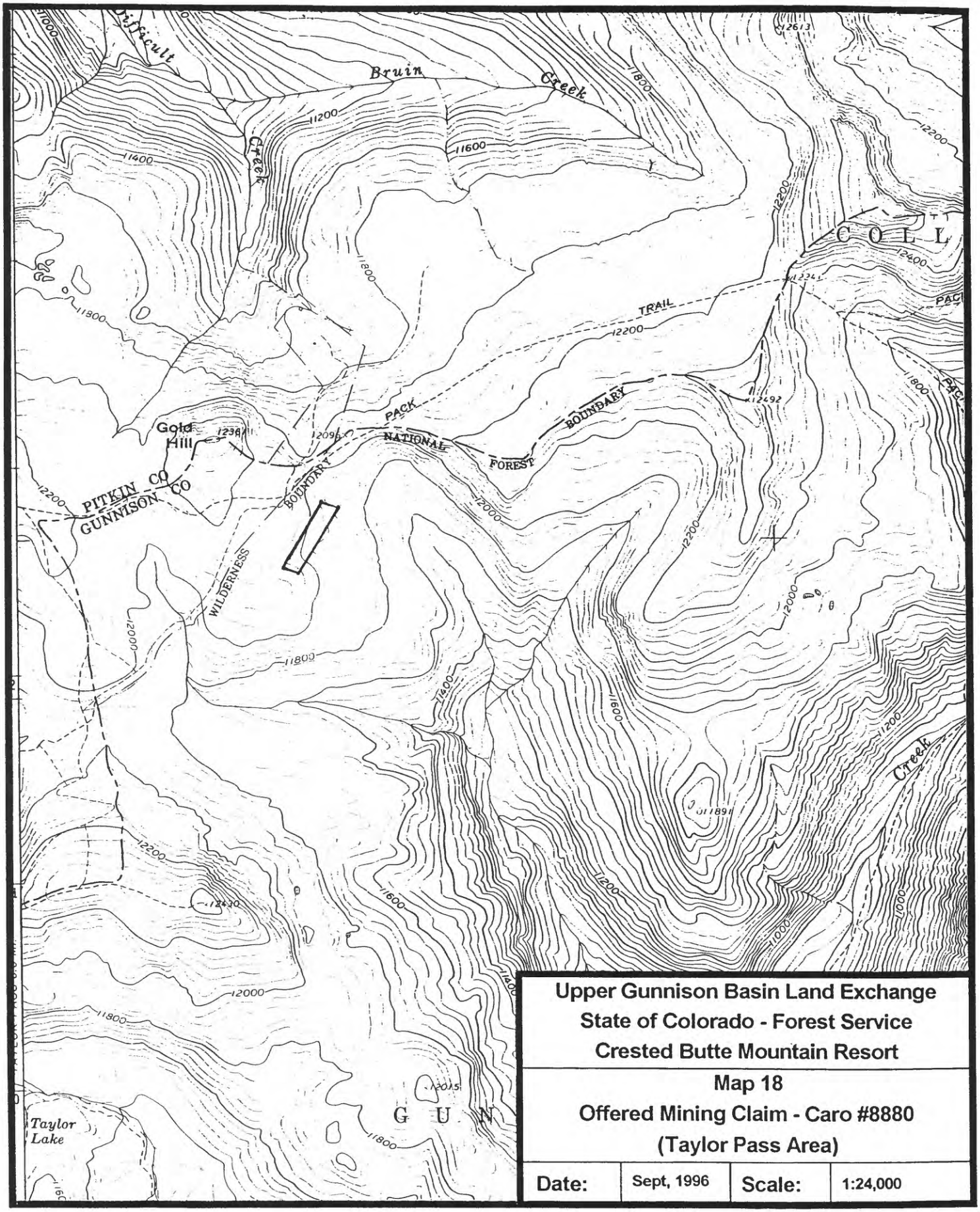
Offered Mining Claims - Whitepine

1 - Montgomery #3146 2 - W900 #7922
3 - Longfellow #4433 4 - Oriental #7921
5 - Modoc 1&2 #17589 6 - Alert #7156
7 - Limestone #2194 8 - John Mouat #2114
9 - Lexington #991 10 - Oddie #2210
11 Cinnamon #1937 12 - JB Trickey #992
13 E Ford 1934

Source: USGS 7.5 minute series

Date:	Sept, 1996	**Scale:**	1:24,000

Boundaries are approximate



Upper Gunnison Basin Land Exchange
State of Colorado - Forest Service
Crested Butte Mountain Resort

Map 18
Offered Mining Claim - Caro #8880
(Taylor Pass Area)

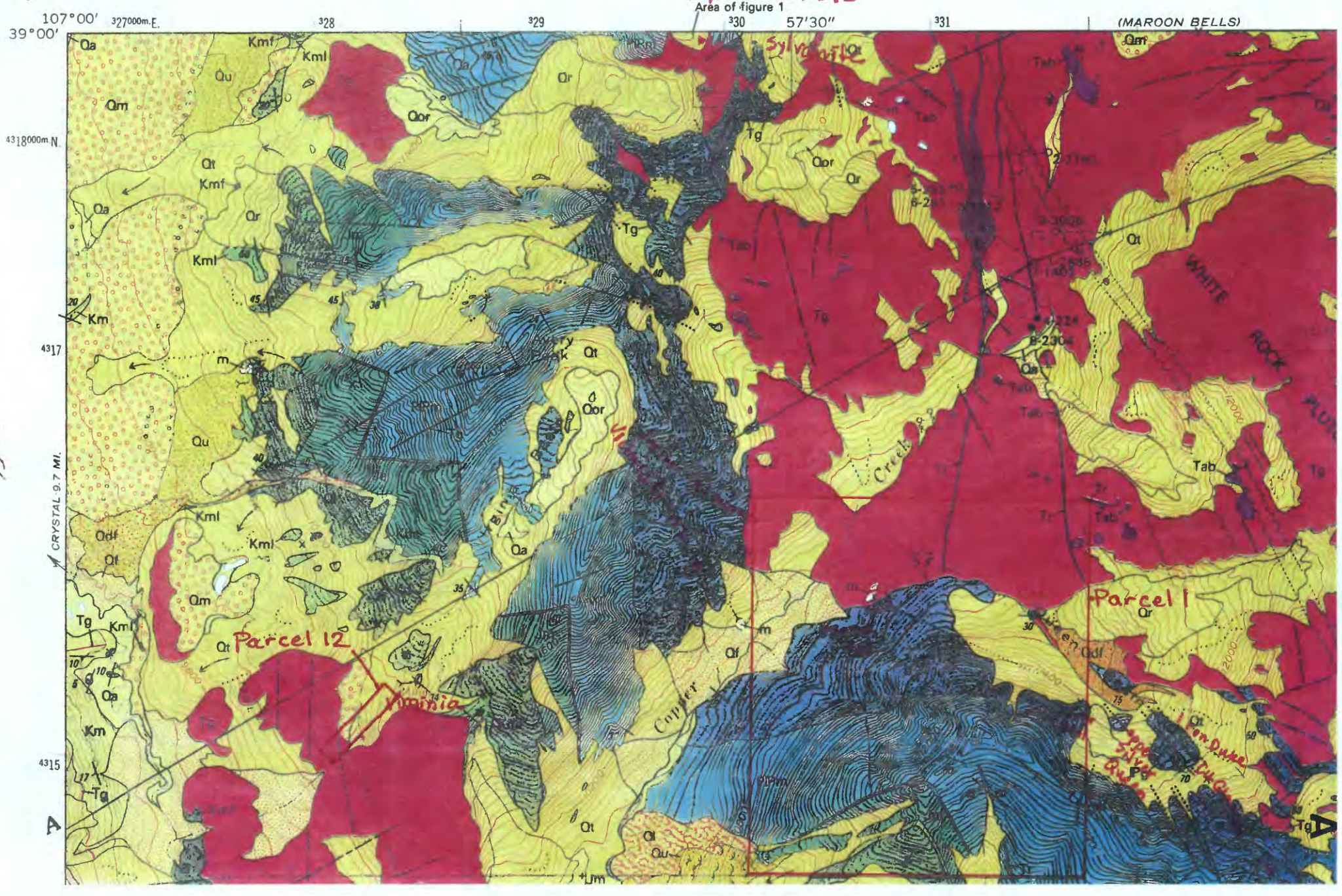
Date:	Sept, 1996	Scale:	1:24,000

Boundaries are approximate

Gaskill and others, 1991, Gothic Qd, USGS GQ-1689

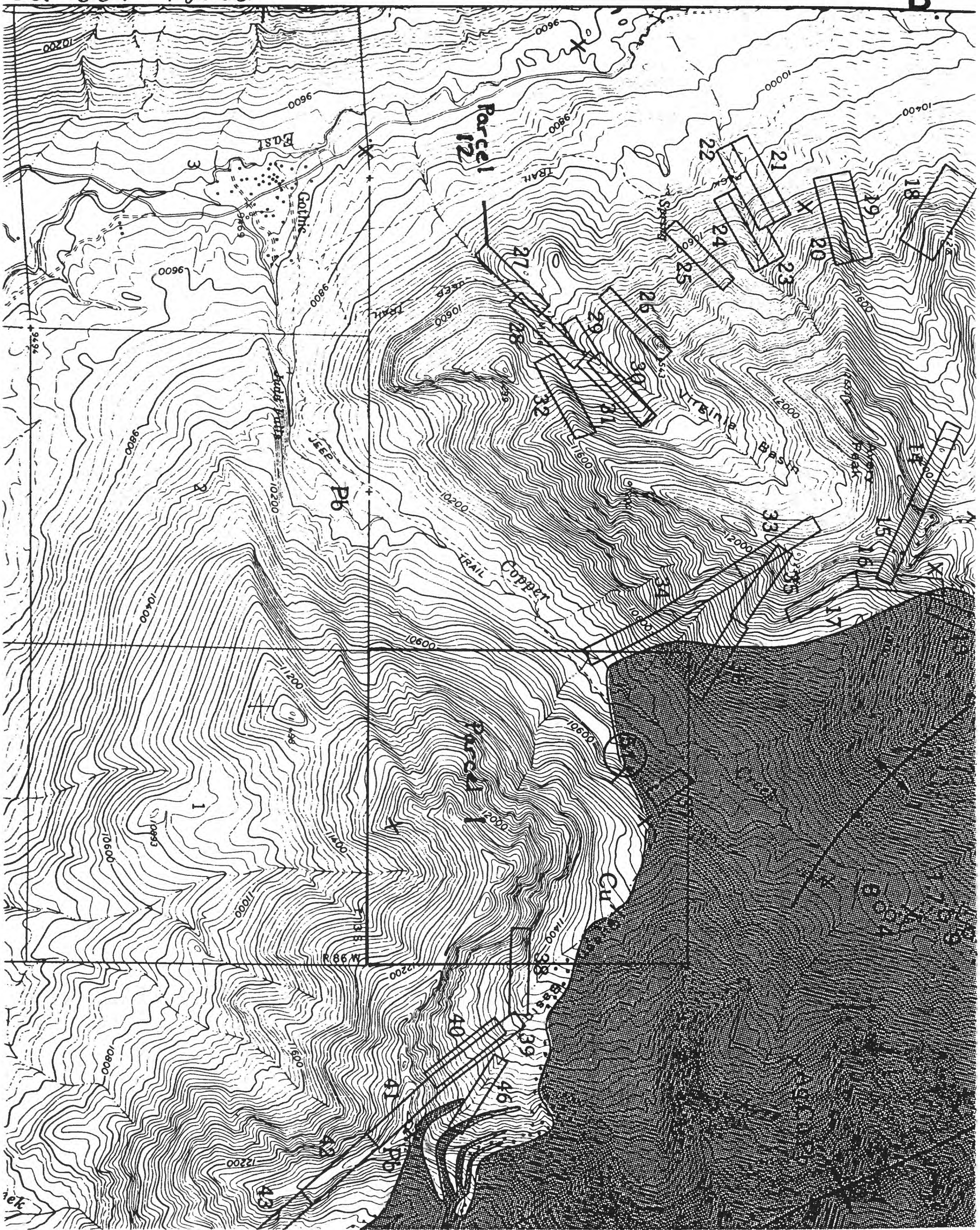
Parcel 1: Gothic
Parcel 12: W. Virginia

ATTACHMENT A



Enlarged from Gaskill and others, 1991
GQ-1689 figure 2

Parcels 1 + 12



FROM GASKILL AND OTHERS, 1991

PARCELS 1+12

C

Table 1.--Patented mining claims, partial list of other mines and prospects, and selected unpatented claims

[Numbered localities are shown on fig. 2, except for No. 50 (shown on map); DH, drill holes 1-9 on map and fig. 2; U, location uncertain. Leaders (--) indicate no data]

Locality No.	Name (mineral survey number)	Year(s) of reported activity	Remarks
		Patented mining claims	
1	Power (15083)	1900	
2	Tunnel (15082)	1887, 1891-93, 1900-01.	Lower adit (at 11,500-ft elevation) and 1,700-ft crosscut tunnel to main 700-ft raise of the Sylvanite mine. No evidence of production from tunnel or lower 500 ft of raise. A 50-ft-wide fault zone of clay and calc-silicate hornfels cuts north-south across tunnel 300 ft from adit (sample here assayed 0.09 oz gold; Weisner and Bieniewski, 1984).
3	J.S. Worden No. 2 (8632)	1891	
4	Buckeye (1330)	1879-83, 1949	
5	Moss Rose (3902)	1879-1910, 1950, 1968, 1984-86.	Main adit (at 12,125-ft elevation) to Sylvanite mine. Includes a 600-ft drift along Sylvanite No. 2 vein that intersects main shaft to upper and lower levels, and two westerly trending drifts (450 ft long and 300 ft long) that cut other veins.
6	Sylvanite (1329) (Silver Knight).	1879-1910, 1950, 1968, 1984-86.	About 2,200 ft of tunnels; 1,200 ft of vertical workings and extensively stoped areas along the Sylvanite and Sylvanite No. 2 veins. Near-vertical fissure veins along normal faults cut metasedimentary rocks and underlying granodiorite. Veins contain native (wire) silver, ruby silver (proustite and pyrargyite), argentiferous tetrahedrite, chalcopyrite, arsenopyrite, barite, massive sulfides, minor gold, and galena. General vein material grades from about 1 to 4 oz silver per ton with bonanza streaks. Estimated production between 100,000 and 300,000 oz of silver (Zahony, 1986b). Mineral specimens at Colorado School of Mines, Golden, Colo., and Smithsonian Institution, Washington, D.C.
7	East Wing (1331)	1879-80	
8	Buck (5354)	1881-82	
9	Spirit of the times (2012)	1880	Prominent dumps and adits at about 12,000-ft elevation at head of west-facing basin. Wire silver.
10	Native Silver (2013)	1881, 1897, 1907	Do.
11	Silver Jenny (2084)	1883 and later	Do.
12	Silver Plume (2204)	1879-82	
13	Denver (7221)	--	
14	Mammoth (19053)	1909	

(2)

P3.58

C

15	Chilicoot (19053)	1909 and prior to 1888.	Silver ore from fissure vein. Shaft at 12,300-ft elevation. (Abdurdix mine?).
16	Ottoe (17033)	1899	
17	Chief of the hills (16249)	1902	
18	Combination Nos. 1 and 2 (16071).	1898-1900	Several adits on shears trending S. 79° E. Quartz breccia and pyritized-argentiferous vein matrix on dumps.
19	Spotted Fawn (12095)	1897, 1908	
20	J.G. (Jim) Blaine (12095)	1880 and earlier, 1884, 1889-92, 1908, 1950's and later.	Several adits and large dump at 10,600-ft elevation; includes 700-ft tunnel (1908) and two or more levels connected by raise. Veins contain argentite, chalcopyrite, malachite, azurite, and galena. Ten-stamp mill in Gothic. Ore shipped from adjacent Lucky Strike mine in 1908-09.
21	Urizilla (16655)	1903	
22	Bonnie Bray (18431)	1903	Adit and dump at 10,250-ft elevation on 6- to 10-in.-wide quartz vein trending N. 75° E.
23	Izetta No. 2 (9775)	1916	
24	Bonanza (6063)	1880-81	
25	Baltimore (2800)	1879-81	
26	Grand View (5526)	1879-82	Dump and tunnel. Mineralized fractures trend N. 70° E. Adjacent to Gray Copper claim (1879) and Grandview Extension lode (1902).
27	West Virginia (3164)	1879	
28	Virginia (3164)	1879-1906, 1947, 1955.	Two adits. Fissure vein trends N. 40° E. Tunnel 375 ft long (1882). Native silver (some bonanza grade), gold (1 oz/ton), copper, lead, and zinc. Ore shipped in 1947.
29	Mineral King (3807)	1907 and earlier	Shaft (and 1,000-ft tunnel?).
30	Ella Wood (3308)	--	
31	Frank (3846)	--	
32	Ophir (3610)	1880, 1901	
33	Victoria (18727)	1906, 1908	
34	Iron King No. 1 (18727)	1887-90, 1908 and later.	Adit and dump in Copper Creek valley (10,180-ft elevation). 500-ft tunnel and 100-ft drift (1907). Ore body 28-65 percent magnetite (specimen in Denver Historical Museum). Some silver, gold, chalcopyrite, sphalerite, and barite.
35	Jupiter (18725)	1880, 1904, 1907-08	
36	A.J. Warner (18725)	1896, 1906, 1908	
37	Copper Glance mill site (16254B).	--	
38	Silver Bell (16254A)	1880 and later	
39	Copper Queen (16254A)	1881-82, 1888-1906.	Pyritized rock and rhyolite porphyry (dike) rock on lower dump at 11,600-ft elevation. Silver (350-500 oz/ton), copper (argentiferous tetrahedrite, azurite, and malachite), sphalerite, galena, and calcite along sheared and brecciated bedding planes in metasedimentary rocks.

pg. 54

(3)

Table 1.--Patented mining claims, partial list of other mines and prospects, and selected unpatented claims--Continued

Locality No.	Name (mineral survey number)	Year(s) of reported activity	Remarks
		Patented mining claims—Continued	
40	Silver Queen (16254A)	1879-82, 1889	
41	Copper Glance (16254A)	1879-81, 1885, 1889-90, 1926.	
42	Copper Extension (16254A)	1902	Several adits and numerous prospects.
43	Maine (16254A)	1902	
44	Columbia (16254A)	1879-81, 1902	
45	Snooks (5461)	1880	Adit (Basken tunnel?) and prospects.
46	Iron Duke (2607)	1880-82, 1886	
47	Horace Porter (3527)	1880	Arsenates of cobalt, nickel, and iron (skutterudite, smaltite, erythrite, and loellengite). Ruby silver (proustite and pyrargyrite), native silver, chalcopyrite, marcasite, and galena in calcite, siderite, and barite.
48	Hancock (5672)	1879-82, 1897	Adjacent to, and may overlap, Luona claim.
49	Silver Thistle (5655)	--	
		Selected unpatented claims, mines, and prospects (other unpatented claim locations are shown by Weisner and Bieniewski, 1984)	
U	Alice	1879-80	Northwest side Teocalli Mountain, parallel to Luona claim.
U	Alice Group	--	In vicinity of J.G. Blaine claim.
DH	Amax T.E. claim block	1973-80	Nine exploratory drill holes in Copper Creek valley totaling 14,450 ft.
U	American	1880-83, 1885, 1889-90, 1903.	In Virginia Basin. Some production.
U	American Eagle	1879-81	Southeast(?) side of White Rock Mountain. Cobalt-nickel arsenates and native and ruby silver.
U	Bunn basin lode	1887 and later	In small basin northeast of Avery Peak. Ore shipped in 1903.
50	Elk Mountain (Pershing-New Ruby) coal mine.	1919-27, 1931-32 and later?	Mined two beds of semianthracite and anthracite, 2-5 ft thick. Total production through 1927 was 262,785 tons. Slope length about 3,700 ft. Located in sec. 34, T. 13 S., R. 86 W.
U	Exchange	1886-87, 1901	Near divide in small basin northeast of Avery Peak.
U	Gold King	1898-99, 1907	In Queen Basin.
U	Jenny Lind	1879-83, 1885-90, 1918.	Second largest mine in Virginia Basin in 1879.
U	Lucky Strike	1896, 1908-09	Adjacent to J.G. Blaine claim (No. 20). Ore shipped in 1896, 1908, and 1909. Five-stamp mill.

U	Luona	1880-81, 1925 and later.	Northwest side of Teocalli Mountain. Cobalt-nickel-iron arsenates, native and ruby silver, chalcopyrite, galena, siderite, and barite. Adjacent to Hancock and Alice claims.
U	New York	1901	Near Usona Tunnel. Magnetite, galena-silver ore.
U	Silver Cord	1880-81, 1884-89	In, or near, small basin northeast of Avery Peak.
U	Silver King	1879-83, 1937	In Queen Basin.
U	Silver Reef	1879, 1926	Lower part of Queen Basin.
U	Ten Yeck	1889-90	In small basin northeast of Avery Peak.
51	Usona Tunnel	1906-07	Portal, large dump, and ruins on southeast side of Copper Creek valley at 10,450-ft elevation. Uncompleted 3,000-ft(?) crosscut to mines in Queen Basin.

REFERENCES USED TO COMPILE TABLE 1

Colorado Division of Mines (1919-27)
Emmons and others (1894)
Engineering and Mining Journal (1888)
Fieldner and others (1937)
Freeman and others (1985)
Gunnison County Court House records
Haase (1971)
Hillebrand (1884)
Iles (1882)
Kemp (1906)
Thomas (1972a, b, 1974, 1975, 1980)
U.S. Bureau of the Mint (1881-91)
U.S. Geological Survey (1906-10)
Weisner and Bieniewski (1984)
Zahony (1985, 1986a, b)

19 Sc (5)

PARCEL 1 D

Mineral Resources Data System (MRDS)

Report Title
Issue Date **Monday, March 9, 1992** *Number* of 23
Current Date Monday, January 5, 1998 *Current Time* 12:35:21 *Printed* 4 of 23

Record Number	DC00703	*User Field*	
Record Type	Site Area QUEEN BASIN Area	*File Link ID*	CONSV, PMR
Reporter	CONSERVATION DIVISION FILES		
Reporter Affiliation	USGS	*Report Date*	72 10
Site Name	IRON DUKE DUNE, COPPER QUEEN, SILVER BELL, COPPER GLANCE, COPPER EXTENSION, SILVER QUEEN (Suggest Syn. QUEEN BASIN AREA) (46, 39, 38, 41, 42, 40)		
	– Location Information –		(no.s. keyed to Gaskill + others, 1991, Table 1 + fig. 2)
District Name	ELK MT.		
Country	**UNITED STATES**	*Country Code*	**US**
State	**COLORADO**	*State Code*	**CO**
County	GUNNISON		GOTHIC 7½' 1:24,000
Land Status	00		GUNNISON 1:100,000
Latitude		*Decimal Lat*	0 MONTROSE 1:250,000
Longitude		*Decimal Long*	0
Accuracy	UNKNOWN PRECISION		

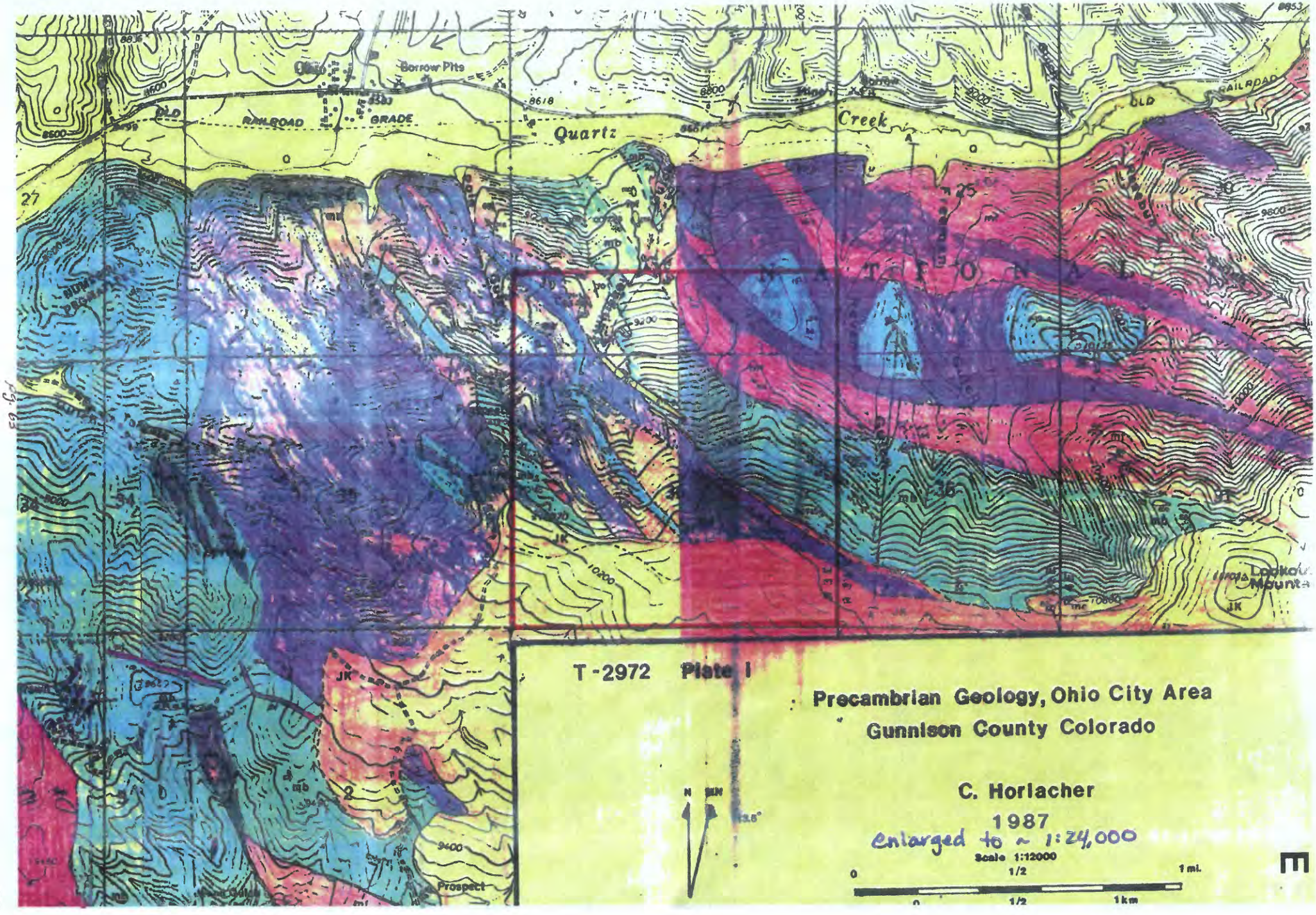
Section	Section Fraction	Township	Range	Meridian
31	SW 1/4	12S	85W	6PM

– Commodity Information –

Commodity Type	Both
Commodities	AG CU ZN BA
Major	AG CU ZN BA
Ore Materials	~~SILVER, COPPER, ZINC, BARIUM~~ Argentiferous tetrahedrite, azurite, malachite, sphalerite, galena, barite
– Geology –	(Gaskill and others, 1991, Table 1, p. 3)
– Deposit Description –	Sheared and brecciated bedding planes in metasedimentary rocks
– Exploration and Development –	(Gaskill and others, 1991, Table 1, p. 3)
Developent Status	Occurrence
– Description of Workings –	Pyritized rock and rhyolite porphyry (dike) rock on
–Individual Workings–	lower dump at 11,600 ft. elevation (Gaskill and others, 1991, Table 1, p 3)
– Reference –	WEISNER AND BIENIEWSKI, 1984, USBM MLA 23-84; GASKILL AND OTHERS, 1991 USGS GQ-1689
Reference	BLM CONNECTING SHEETS
Reference	COLO. STATE HISTORICAL MUSEUM
Reference	CONSV. DIV. COMP. DATE, 9,65
Prod Comments	COPPER QUEEN - 350/1,500 OZ/TON SILVER (GASKILL and others, 1991, Table 1, p. 3)

HORLACHER, C.T., 1987, PRECAMBRIAN GEOLOGY AND GOLD MINERALIZATION IN THE VICINITY OF OHIO CITY, GUNNISON COUNTY, COLORADO: GOLDEN, COLORADO SCHOOL OF MINES, M.S. THESIS, 223 p.

PARCEL 2



pg. 63

Parcel 2 F

Mineral Resources Data System (MRDS)

Report Title
Issue Date **Monday, March 9, 1992** *Number* 1559 of 23
Current Date Monday, January 5, 1998 *Current Time* 12:35:21 *Printed* 8 of 23

Record Number	DC01143	*User Field*	
Record Type	Site	*File Link ID*	CONSV
Reporter	CONSERVATION DIVISION FILES		
Reporter Affiliation	USGS	*Report Date*	72 10
Site Name	REVENUE		
	-- Location Information --		
District Name	GOLD BRICK		
Country	**UNITED STATES**	*Country Code*	US
State	**COLORADO**	*State Code*	**CO**
County	GUNNISON		
Land Status	00		
Elevation	10000		
Latitude		*Decimal Lat*	0
Longitude		*Decimal Long*	0
Accuracy	UNKNOWN PRECISION		

PITKIN 1:24,000
GUNNISON 1:100,000
MONTROSE 1:250,000

Section	**Section Fraction**	**Township**	**Range**	**Meridian**
36	SW 1/4	50N	03E	NMPM
Position	R 3 1/2 E			

CENTER EDGE OF SECTIONS 36 BOTH 3E and 3½E, T 50N

	-- Commodity Information --
Commodity Type	Metallic
Commodities	AU
Ore Materials	GOLD
	-- Geology --
Host Rock Type	HORNBLENDE GNEISS
	-- Deposit Description --
	--Individual Ore Bodies--
Deposit Type	VEIN
	-- Exploration and Development --
Production Size	U
Developent Status	Intermittent Producer
	-- Description of Workings --
	--Individual Workings--

	- Reference - HORLACHER, C.F., 1987, COLO. SCHOOL OF MINES MS THESIS. 109-
Reference	CRAWFORD & WORCHESTER, 1916, COLO. GEOL. SUR. BULL. 10, P. 110, #37 on pl. 1
Reference	CONSV. DIV. COMP. DATE, 9,65
Prod Comments	$24/TON

PARCEL 2

Mineral Resources Data System (MRDS)

G

Report Title
Issue Date **Monday, March 9, 1992** *Number* of 23
Current Date Monday, January 5, 1998 *Current Time* 12:35:21 *Printed* 7 of 23

Record Number	DC01142	*User Field*	
Record Type	Site	*File Link ID*	CONSV, PMR
Reporter	CONSERVATION DIVISION FILES		
Reporter Affiliation	USGS	*Report Date*	72 10
	-- Location Information --		
Country	**UNITED STATES**	*Country Code*	**US**
State	**COLORADO**	*State Code*	**CO**
County	GUNNISON		
Land Status	00		
Latitude		*Decimal Lat*	**0**
Longitude		*Decimal Long*	**0**
Accuracy	UNKNOWN PRECISION		

Section	**Section Fraction**	**Township**	**Range**	**Meridian**
36		50N	03E	NMPM

Position R 3 1/2 E

-- Commodity Information --

Commodity Type	Metallic
Commodities	AU AG
Major	AU AG
Ore Materials	GOLD, SILVER

-- Geology --

-- Deposit Description --

-- Exploration and Development --

Developent Status Occurrence

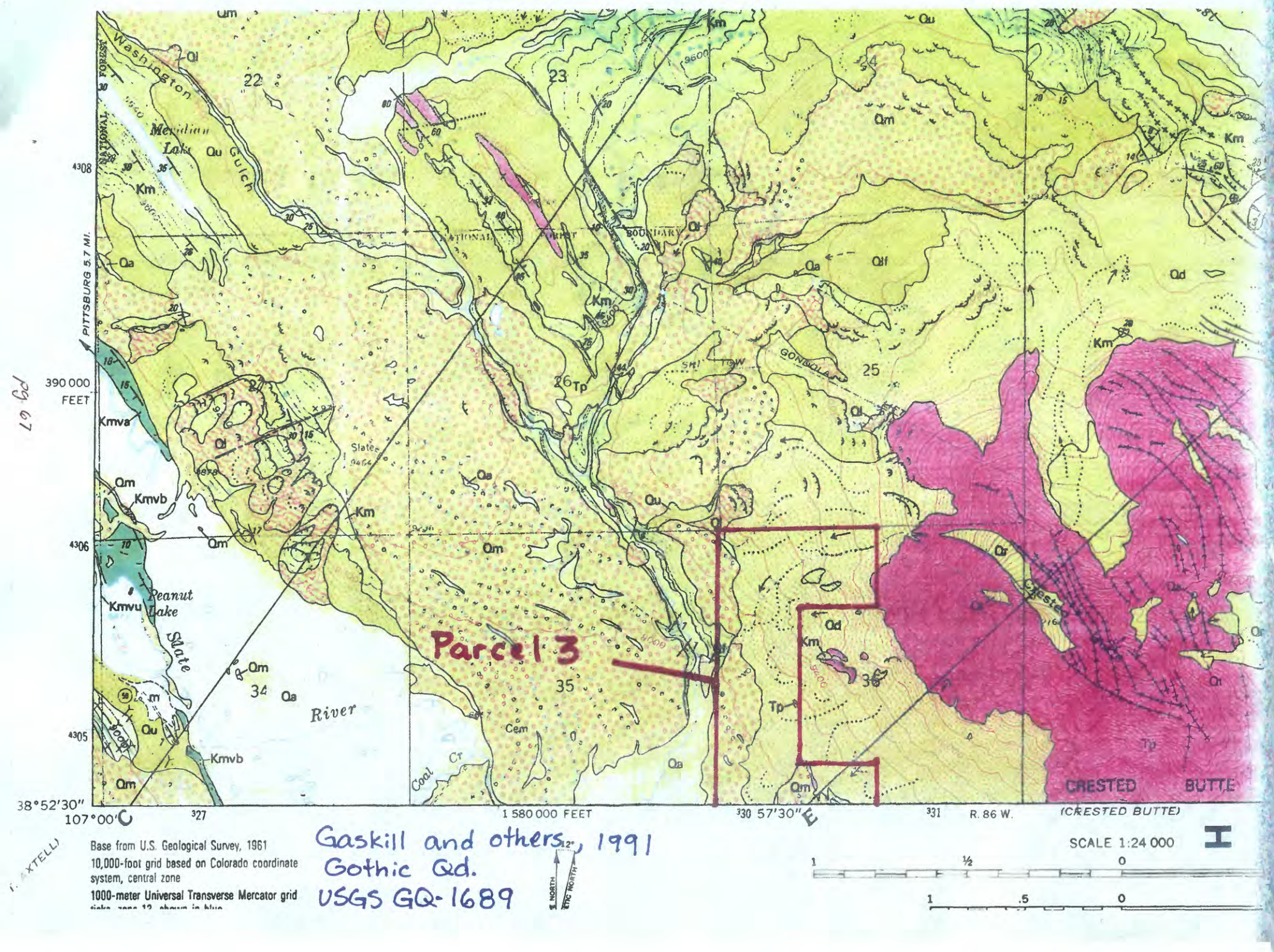
-- Description of Workings --

--Individual Workings--

-- Reference --

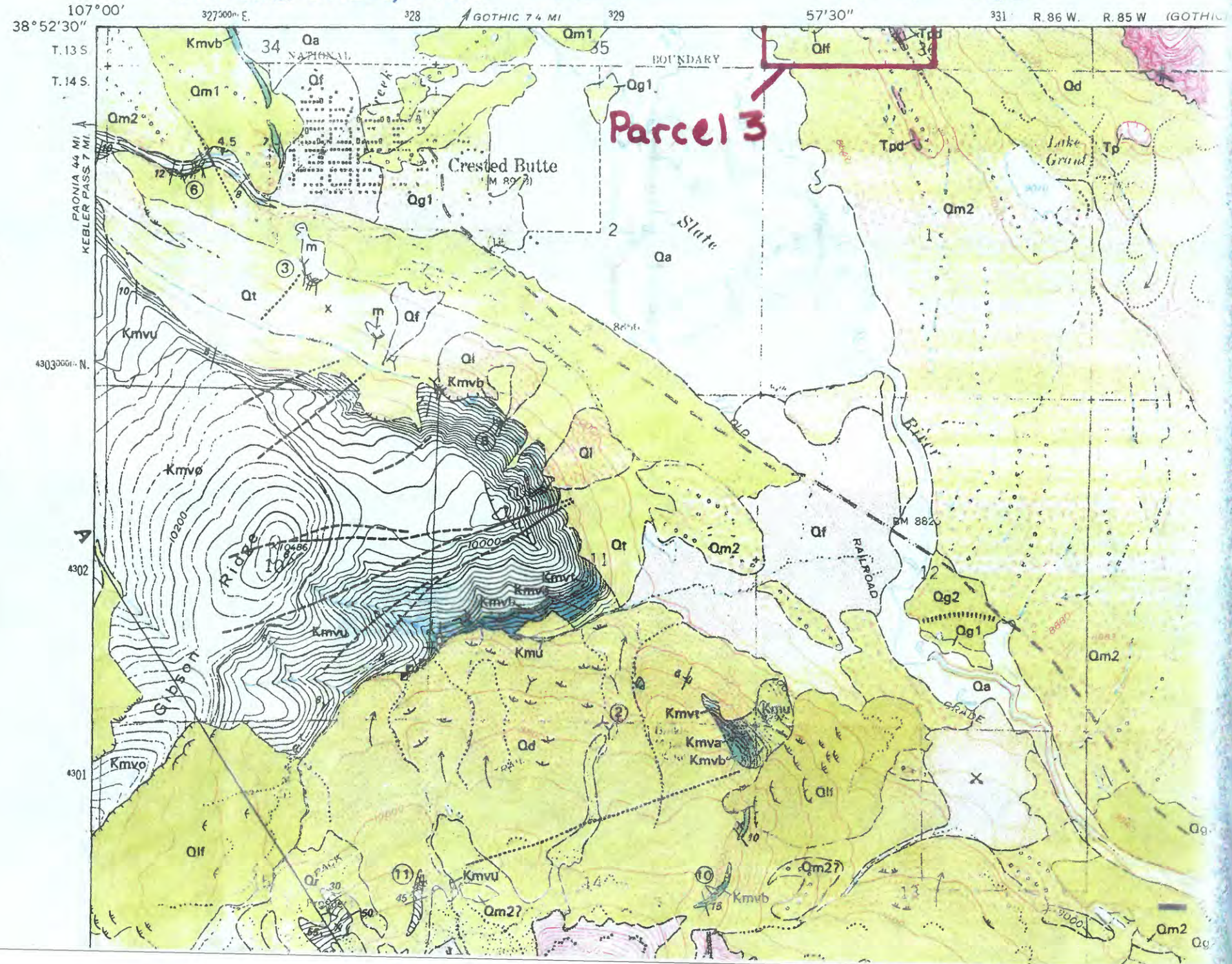
Reference BMC RECORD DATA FILES

HORLACHER, C.F., 1987, COLO. SCHOOL OF MINES, MS THESIS



Gaskill and others, 1991
Gothic Qd.
USGS GQ-1689

Gaskill and others, 1986 Crested Butte Qd USGS GQ-1580



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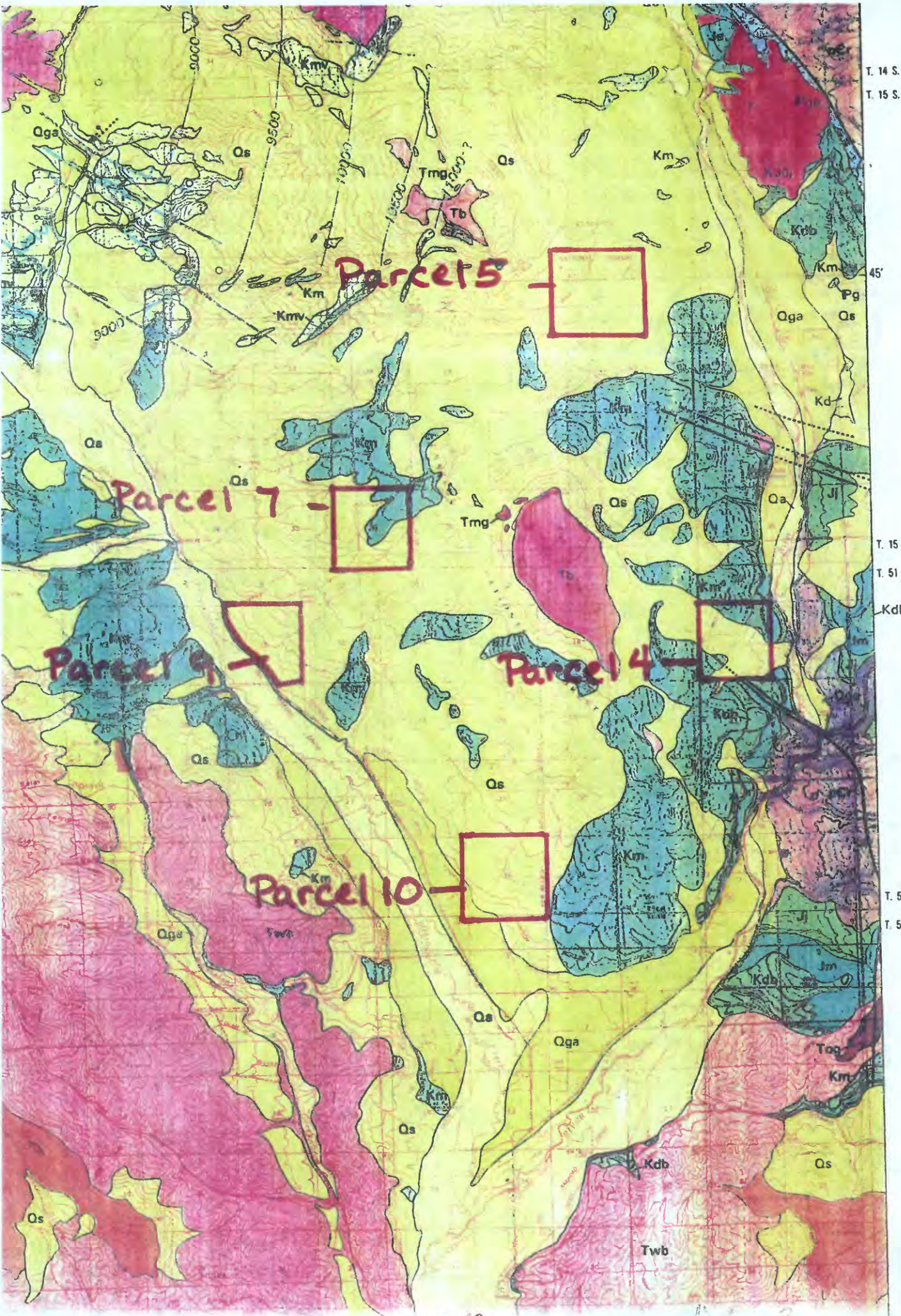
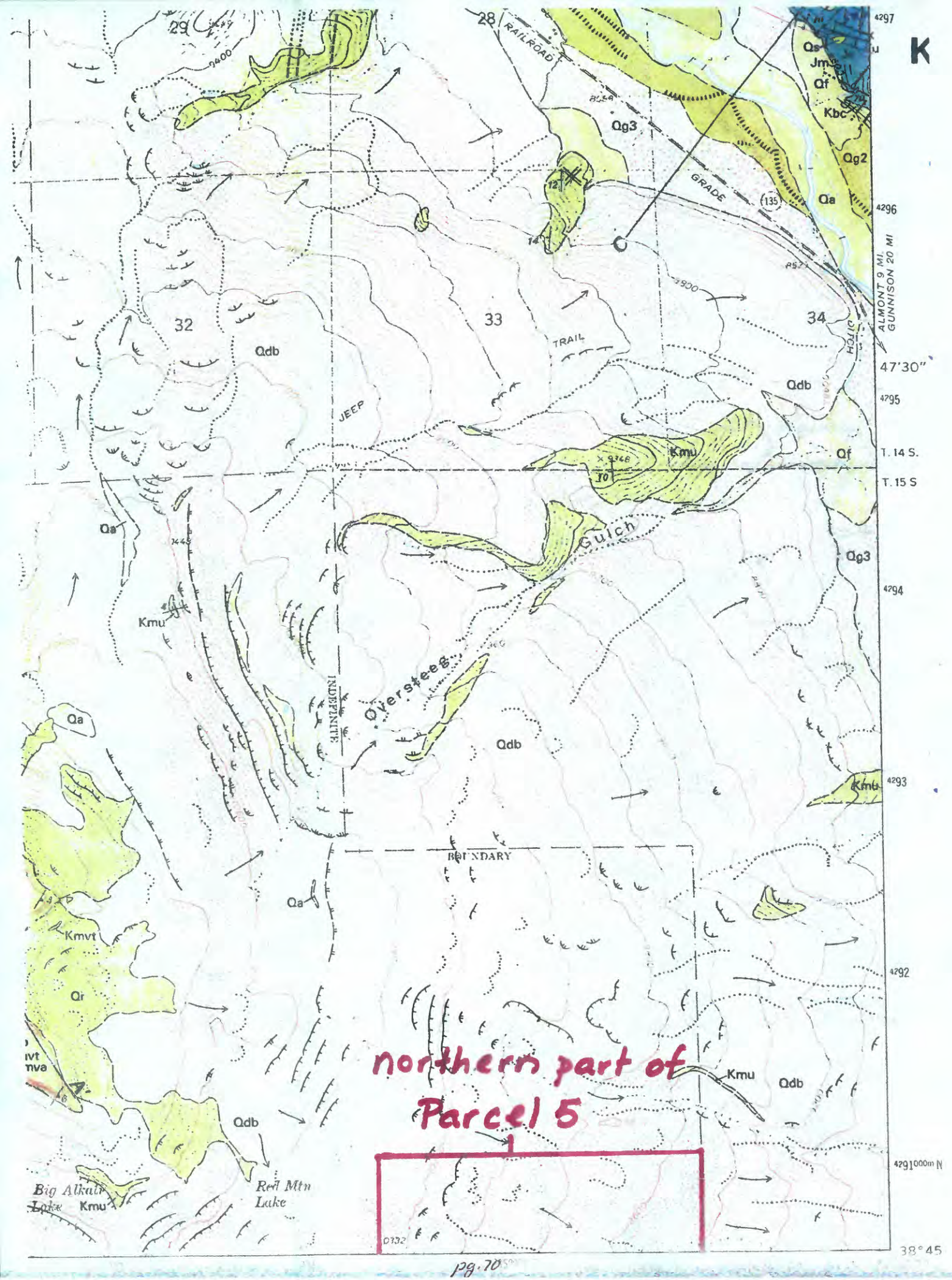


J

Ellis and others, 1987, Paonia and Gunnison area USGS C-109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ALMONT 9 MI.
GUNNISON 20 MI
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T. 14 S.
T. 15 S
Qs
Jm
Qf
Kbc
Qg2
Qg3
Qa
Qdb
Kmu
Gulch
Overstees
INDEPENDENCE
BOUNDARY
Kmvt
Qr
Red Mtn
Lake
Big Alkali
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4295
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4293
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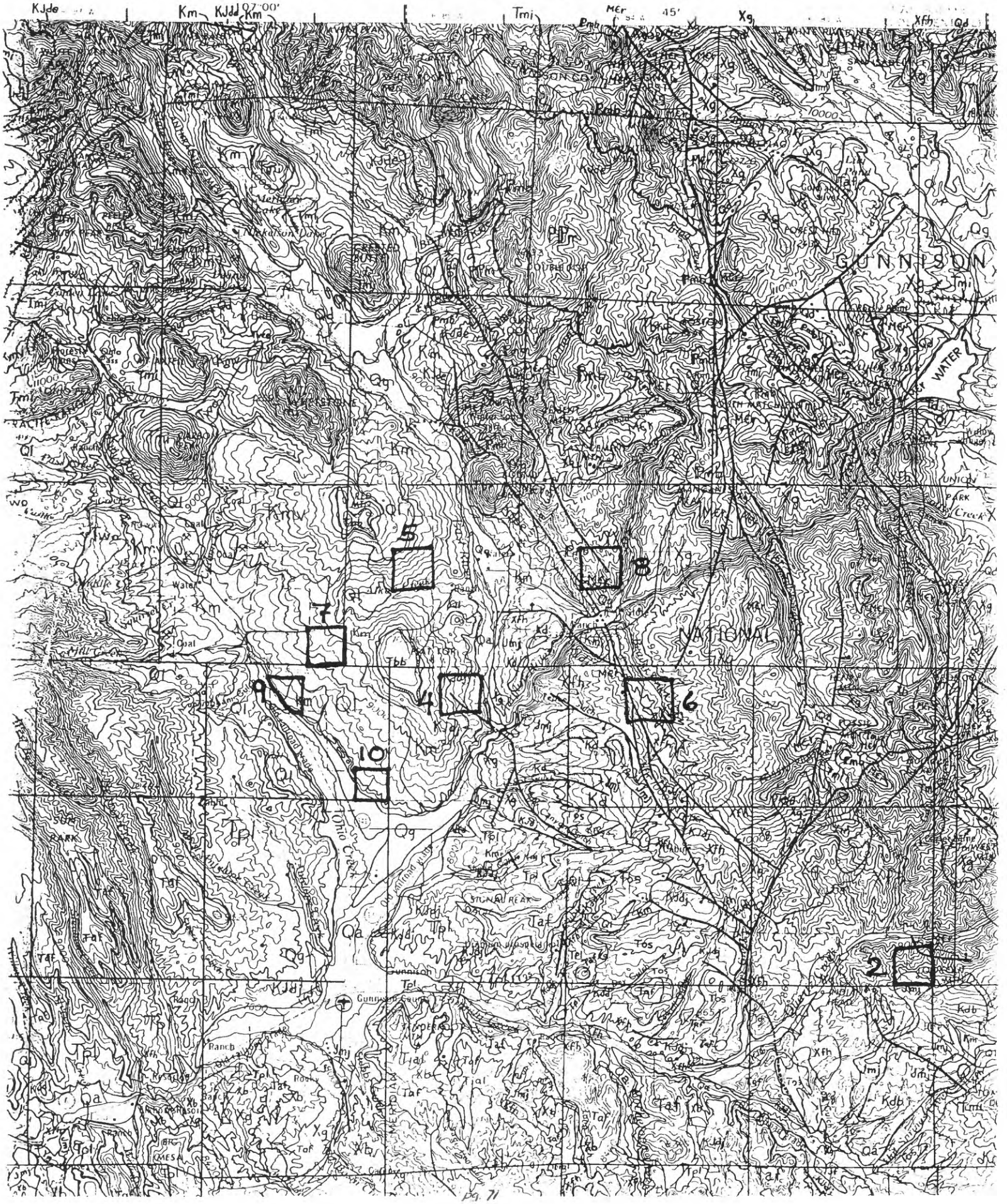
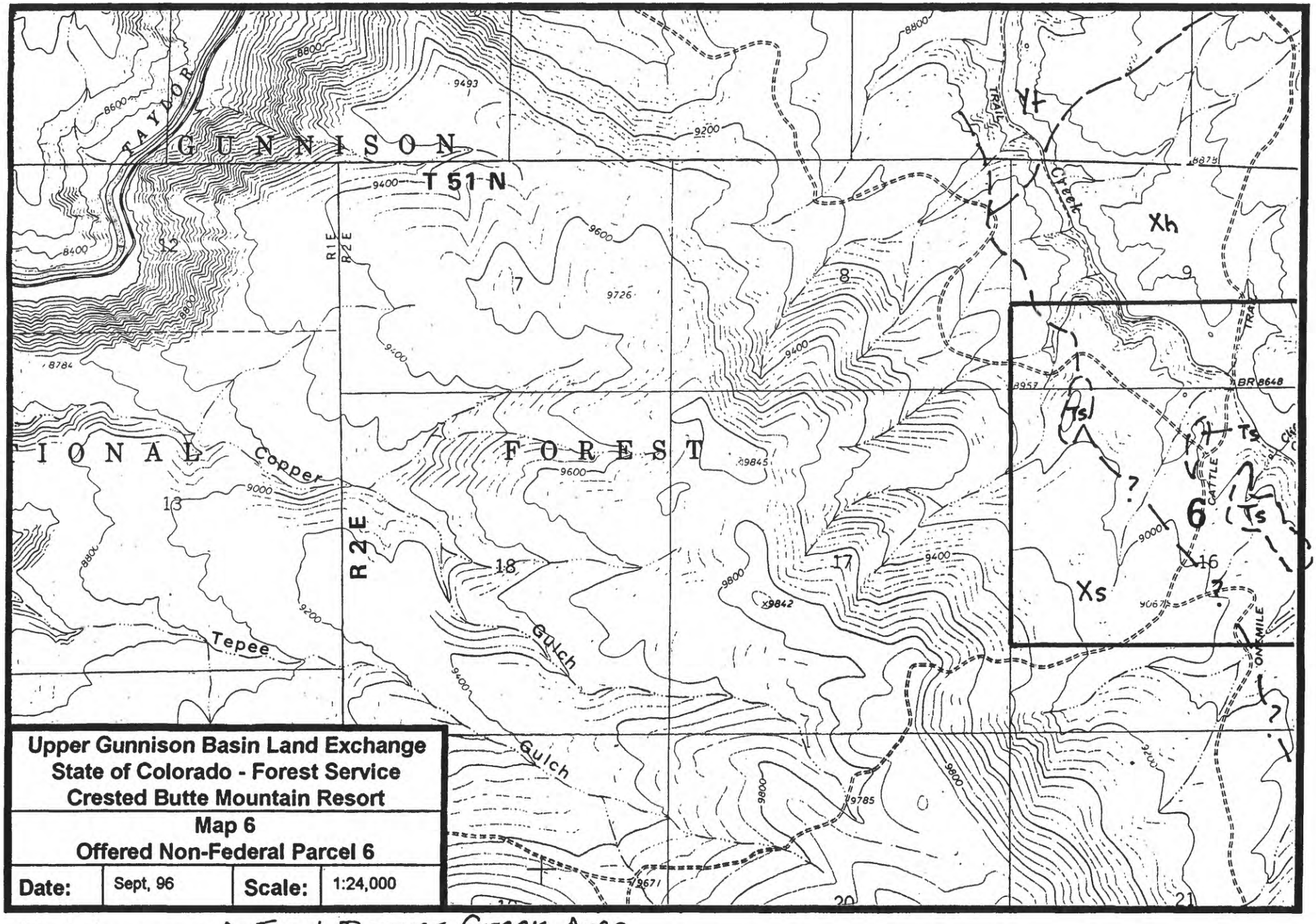
Parcel 5

TWETO AND OTHERS, 1976, MONTROSE QD USGS MF-761 L

APPROXIMATE LOCATIONS OF PARCELS 2, 4-10. ~1:250,000





Upper Gunnison Basin Land Exchange
State of Colorado - Forest Service
Crested Butte Mountain Resort

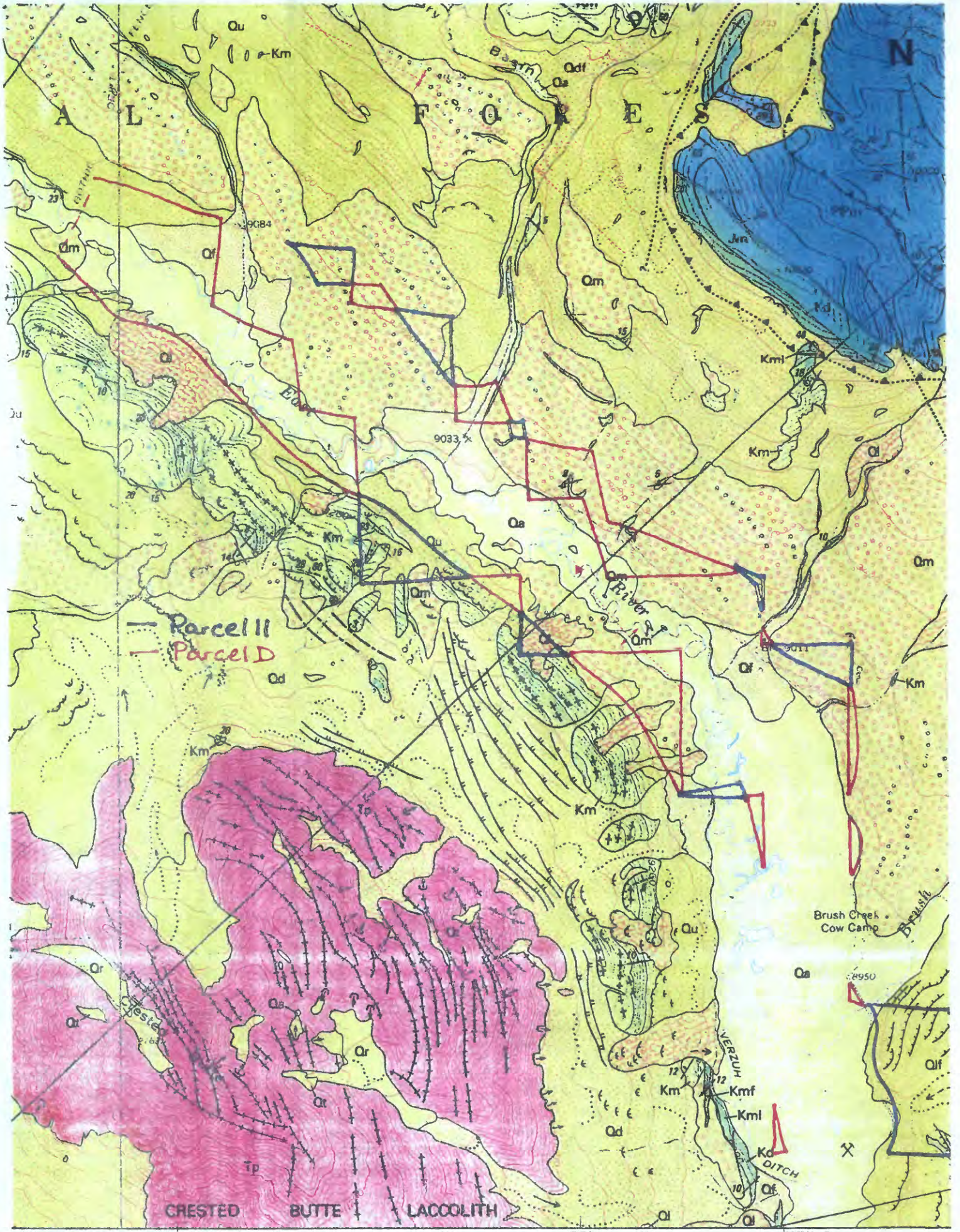
Map 6
Offered Non-Federal Parcel 6

Date:	Sept, 96	Scale:	1:24,000

Sketch map of East Beaver Creek Area
Ed DeWitt, unpub. map, January 1998

Boundaries are approximate

N



331 R 86 W. (CRESTED BUTTE) 333 55' 334 335000m E.

GASKILL and others, 1991 GOTHIC QD USGS GQ-1689

SCALE 1:24 000

½ 0 1 MILE

ALSO SEE DC00721 DC00722

O

Mineral Resources Data System (MRDS)

Report Title
Issue Date **Monday, March 9, 1992** *Number* of 23
Current Date Monday, January 5, 1998 *Current Time* 12:35:21 *Printed* 6 of 23

Record Number	DC00723	*User Field*	
Record Type	Site VIRGINIA BASIN AREA	*File Link ID*	CONSV, PMR
Reporter	CONSERVATION DIVISION FILES		
Reporter Affiliation	USGS	*Report Date*	72 10
Site Name	VIRGINIA, OPHIR, ELLA WOOD, VIRGINIA BASIN, FRANK, MINERAL KING, W. VIRGINIA (28, 32, 30, 31, 29, 27)		

remove from this record

– Location Information –

District Name	ELK MT.		
Country	**UNITED STATES**	*Country Code*	**US** GOTHIC 1:24,000
State	**COLORADO**	*State Code*	**CO** GUNNISON 1·100,000
County	GUNNISON		MONTROSE 1:250,000
Land Status	00		
Latitude	38-58-50	*Decimal Lat*	0
Longitude	106-58-20	*Decimal Long*	0
Accuracy	UNKNOWN PRECISION		

Section	Section Fraction	Township	Range	Meridian
35	NW 1/4 NW 1/4	12S	86W	6PM

– Commodity Information –

Commodity Type	Metallic
Commodities	AG
Major	AG
Ore Materials	SILVER

– Geology –

– Deposit Description –

– Exploration and Development –

Developent Status	Occurrence

– Description of Workings –
--Individual Workings--

IN THIS RECORD LIST:
W. VIRGINIA
MINERAL KING
OPHIR
ELLA WOOD
FRANK

PUT VIRGINIA (# 28 on GASKILL + OTHERS, 1991) IN ITS OWN RECORD DC00722

– Reference –

Reference	BLM CONNECTING SHEETS
Reference	ELDRIDGE, 1894, USGS GEOL. ATLAS, FOLIO 9 – NOT NAMED OR LABELED IN FOLIO 9
Reference	CONSV. DIV. COMP. DATE, 9,65

GASKILL AND OTHERS, 1991, GQ-1689

P

Mineral Resources Data System (MRDS)

Report Title
Issue Date **Monday, March 9, 1992** *Number* of 23
Current Date Monday, January 5, 1998 *Current Time* 12:35:21 *Printed* 5 of 23

Record Number	DC00722	*User Field*	
Record Type	Site	*File Link ID*	CONSV
Reporter	CONSERVATION DIVISION FILES		
Reporter Affiliation	USGS	*Report Date*	72 10
Site Name	VIRGINIA LODE 28 on GASKILL + OTHERS, 1991		
	-- Location Information --		
District Name	ELK MT.		
Country	**UNITED STATES**	*Country Code*	**US**
State	**COLORADO**	*State Code*	**CO**
County	GUNNISON		
Land Status	00		
Latitude	38-58-50	*Decimal Lat*	0
Longitude	106-58-20	*Decimal Long*	0
Accuracy	UNKNOWN PRECISION		

GOTHIC 1:24,000
GUNNISON 1:100,000
MONTROSE 1:250,000

Section	Section Fraction	Township	Range	Meridian
34		12S	86W	6PM

Position VIRGINIA BASIN, GOTHIC

-- Commodity Information --

Commodity Type	Metallic
Commodities	AG AU CU
Major	AG AU CU
Ore Materials	SILVER, GOLD, COPPER

Remove Virginia from records DC00721 + DC00723

-- Geology --

Host Rock Type	DAKOTA SANDSTONE
Host Rock Age	ECRET

-- Deposit Description --

-- Exploration and Development --

Developent Status Occurrence

-- Description of Workings --
--Individual Workings--

General Comm SILVER 2500 OZ/TON GOLD 1 OZ/TON

-- Reference --

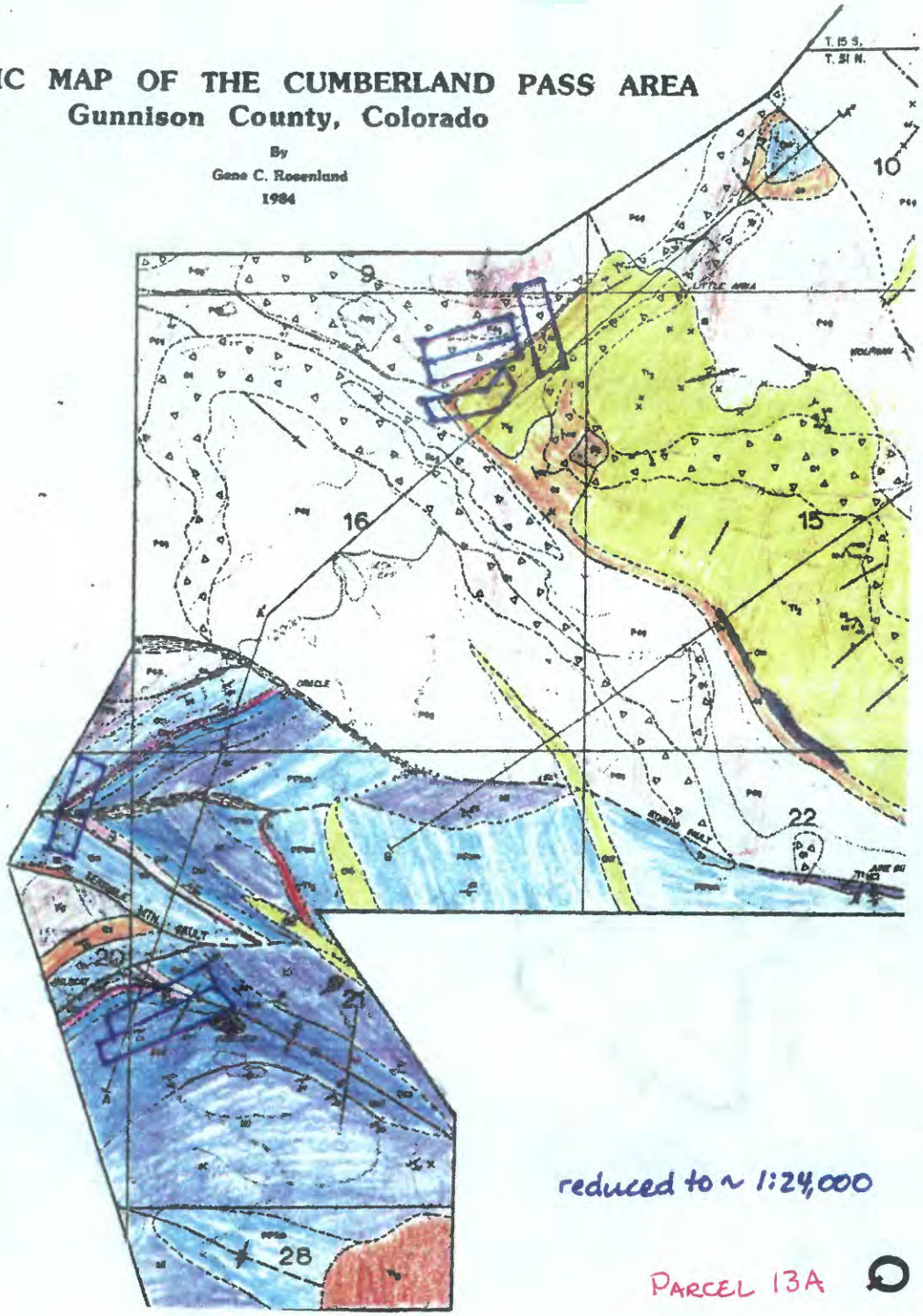
Record Number	DC00722	(....Continued)
Reference	BLM CONNECTING SHEETS	
Reference	COLO. STATE HISTORICAL MUSEUM	
Reference	CONSV. DIV. COMP. DATE, 9,65	

GASKILL + OTHERS, 1991, USGS GQ-1689

(Page 2)

GEOLOGIC MAP OF THE CUMBERLAND PASS AREA
Gunnison County, Colorado

By
Gene C. Rosenlund
1984



QUATERNARY

Qal — ALLUVIUM - Narrow and thin deposits bordering streams.

Qt — TALUS - Occurs locally along most valleys having steep sides and as rock glaciers.

TERTIARY

Tdf — GRANITIC DIKES - Reddish-pink to light-gray aplite. Commonly occurs in dikelet swarms and usually exhibits myrmekitic or graphic textures.

Tmp — MONZONITE PORPHYRY - Brownish-gray monzonite porphyry with abundant phenocrysts of plagioclase and biotite.

Tl_5 — WHITE, SQUARE QUARTZ PORPHYRY - White to light-gray porcelaneous granite porphyry with abundant plagioclase and quartz phenocrysts. Orthoclase phenocrysts are common.

Tl_4 — COARSE-QUARTZ PORPHYRY - Light-gray to green granite porphyry with conspicuous phenocrysts of resorbed quartz and euhedral plagioclase. Biotite is abundant.

EUHEDRAL-QUARTZ PORPHYRY - Light-gray quartz syenite porphyry with conspicuous phenocrysts of euhedral quartz, orthoclase and plagioclase. Biotite and hornblende are present.

Tl_2 — FINE-QUARTZ PORPHYRY - Light-gray monzonite porphyry with euhedral plagioclase phenocrysts and anhedral resorbed quartz phenocrysts. Biotite is present. Epidote is abundant usually occurring as a replacement of the plagioclase phenocrysts.

Tl_1 — ANDESINE PORPHYRY - Light-gray monzonite porphyry with abundant euhedral plagioclase phenocrysts. Quartz phenocrysts are rare. The porphyry contains abundant spherules from 0.5 to 5 inches in diameter. Chlorite and magnetite after biotite and hornblende are common.

Tl_{1C3} — ANDESINE PORPHYRY *COARSE PHASE* - Mineralogically similar to the Andesine Porphyry but contains very large (0.6 to 2.4 cm) plagioclase phenocrysts. It is found in the Monzonite Porphyry breccia zone as closes and as a dike in the Ashana fault zone.

Tl_{1PY} — ANDESINE PORPHYRY *PYRITIC ZONE* - Mineralogically similar to the Andesine Porphyry but contains abundant pyrite, exhibits a pseudodiorum texture and contains fresh biotite and hornblende.

Tdp — DIORITE PORPHYRY - Dark-gray diorite porphyry with plagioclase phenocrysts and abundant chlorite pseudomorphs (up to 35 percent) after hornblende.

Tqcg — QUARTZ CREEK GRANITE - Light-gray to dirty-pink equigranular granite containing abundant biotite and magnetite in addition to quartz, plagioclase and orthoclase.

Tgd — GRANODIORITE - Dark-gray equigranular granodiorite with abundant biotite and hornblende. It is foliated or flow banded near the margins of the stock where composition varies from granodiorite to monzonite.

PENNSYLVANIAN AND PERMIAN

PPbm — BELDEN SHALE AND MINTURN FORMATIONS UNDIFFERENTIATED
Belden Shale: dark carbonaceous argillite or shale, thin beds of dark limestone, and a few beds of quartzite.
Minturn Formation: chiefly gray, greenish-gray, and coarse-grained quartzite and less abundant beds of gray or black argillite or shale. Limestone, conglomerate, and gradational rock types occur locally.

UNCONFORMITY

MISSISSIPPIAN

Ml — LEADVILLE LIMESTONE - Chiefly gray or bluish-gray limestone and dolomite with sandy or shaly beds present locally at base.

UNCONFORMITY

DEVONIAN

Dcd — CHAFFEE FORMATION - *Dyer Dolomite Member* (upper member): gray dolomitic limestone with subordinate limestone or dolomite beds and rare sandy or shaly beds and lenses.

Dcp — *Parting Quartzite Member* (lower member): light-gray dolomitic limestone with subordinate dolomite, limestone, shale, and quartzite beds.

UNCONFORMITY

ORDOVICIAN

Ot — FREMONT DOLOMITE - Bluish-gray somewhat mottled, massive crystalline dolomite. Some beds are limy dolomite or dolomitic limestone and locally the basal few feet are sandy.

UNCONFORMITY

Oh — HARDING QUARTZITE - Chiefly medium-grained, white, pink, brown, gray or bluish-black quartzite. Locally contains thin beds of sandstone or greenish-gray shale.

UNCONFORMITY

Om — MANITOU DOLOMITE - Chiefly bluish-gray, crystalline, well-bedded dolomite that locally contains abundant chert nodules or lenses.

UNCONFORMITY

CAMBRIAN

Sa — SAWATCH QUARTZITE - Three main lithologic units recognized. The lower unit consists chiefly of white, vitreous, medium-grained quartzite, locally micaceous, feldspathic, or conglomeratic; the middle unit is mainly glauconitic sandstone and quartzite, and limy sandstone; and the upper unit is a white, vitreous, medium-grained quartzite.

UNCONFORMITY

LAMPROPHYRIC DIKES - Black, biotite-chlorite-orthoclase grains in dikes within the granitic granite.

reduced to ~ 1:24,000

PARCEL 13A

R

Mineral Resources Data System (MRDS)

Report Title
Issue Date **Monday, March 9, 1992** *Number* 933 of 23
Current Date Monday, January 5, 1998 *Current Time* 12:35:21 *Printed* 22 of 23

Record Number	DC01243	*User Field*	
Record Type	Site	*File Link ID*	CONSV
Reporter	CONSERVATION DIVISION FILES		
Reporter Affiliation	USGS	*Report Date*	72 12
Site Name	FAIRVIEW		
	-- Location Information --		
District Name	QUARTZ CREEK		
Country	**UNITED STATES**	*Country Code*	**US**
State	**COLORADO**	*State Code*	**CO**
County	GUNNISON		
Land Status	00		
Quadrangle 2	PITKIN	*Scale*	62500
Latitude	38-39-50	*Decimal Lat*	**0**
Longitude	106-31-52	*Decimal Long*	**0**
Accuracy	~~UNKNOWN PRECISION~~ 10 meters		

FAIRVIEW PEAK 1:24,000
GUNNISON 1:100,000
MONTROSE 1:250,000

Section	Section Fraction	Township	Range	Meridian
21	NE 1/4 SW 1/4	51N	04E	NMPM

-- Commodity Information --

Commodity Type Metallic
Commodities PB AG CU → MILS: AU, AG
Ore Materials GALENA, COPPER → MILS record says GOLD (Primary) SILVER

-- Geology --

Host Rock Type DOLOMITE

-- Deposit Description --
--Individual Ore Bodies--

Deposit Type REPLACEMENT, IRREGULAR

-- Exploration and Development --

Production Size U
Production Years ?-1908
Developent Status Intermittent Producer

on Gunnison Co. 1:50,000 map
-- Description of Workings -- Shaft is Fairview
--Individual Workings-- adit to east is Cleopatra

– Reference –

Reference HILL, 1908, USGS BULL. 380A, P. 35, #9 pl. 1

Reference CONSV. DIV. COMP. DATE, 9,65

Kluender + McColly, 1983, US Bureau of Mines
(Page 2) MLA 66-83, 47 p. (see p. 11)

Herald, 1981, C.S.M. MS Thesis

Rosenlund, 1984, C.S.M. MS Thesis

S

ATTACH

** THIS REPORT MAY CONTAIN PROPRIETARY INFORMATION **

DATE GENERATED: JAN 7, 1997 — MINERALS AVAILABILITY SYSTEM — DEPOSIT LISTING — PAGE 185

DEPOSIT NAME: FAIRVIEW MINE — SEQUENCE NUMBER: 0080510124

>>>> MILS - TABLE <<<<
(GENERAL LOCATION INFORMATION)

STATE: COLORADO
COUNTY: GUNNISON
TYPE OF OPERATION: UNDERGROUND
CURRENT STATUS: PAST PRODUCER
LATITUDE: N 38DEG 39MIN 50SEC
LONGITUDE: W 106DEG 31MIN 52SEC
UTM - ZONE: 13
HEMISPHERE: NORTHERN
NORTHING: 4280383
EASTING: 366786
POINT OF REFERENCE: MAIN ENT
PRECISION: 10 METERS
ELEVATION: 3645 METERS
PRECISION: 500 METERS
PROPERTY FILE REPORT DATE:

YEAR FIELD CHECKED:
QUADRANGLE: MONTROSE
MILS EVALUATOR: IFOC MILS
DATUM OF ELEVATION:
MAP NAME: FAIRVIEW PEAK
SCALE: 7.5 MIN
DOMAIN: PRIVATE
TYPE OF MINERAL HOLDINGS:

MINE MAP REPOSITORY:
TYPE OF EVALUATION: M
DATE LAST REVIEWED:
YEAR OF INFORMATION ENTRY:
MAINTAINING FIELD CENTER:
MINERAL PROPERTY FILE:
MINES IDENTIFICATION:
GEOLOGICAL SURVEY SYSTEM:
DATE LAST MODIFICATION:
FEB 13, 1978
LAST DEPOSIT MODIFICATION:
NOV 17, 1983
CONTRACTOR:

--PUBLIC LAND SURVEY--
PRINCIPAL MERIDIAN:
TOWNSHIP: 051 N
RANGE: 004 E
SECTION: 21
SECTION SUBDIVISION:
NWSW
SURVEY STATUS:

TYPE OF PLANT:
PLANT IDENTIFIER:
MLA STUDY AREA: NO

PREDOMINANT MINING METHOD
PREDOMINANT MILLING METHOD
PREDOMINANT POST MILL PROCESSING METHOD

(HISTORICAL INFORMATION)

DISCOVERY METHOD:
YEAR OF DISCOVERY:
YEAR OF INITIAL PRODUCTION:
YEAR OF LAST PRODUCTION:

>>>>> COMMODITY - TABLE <<<<<

RECORD NUMBER	COMMODITY	MODIFIER	MARKETABILITY	COMMODITY CLASSIFICATION CODE	INDUSTRY REPORT CODE	STANDARD INDUSTRIAL CODE	S A S	DATE OF LAST MODIFICATION
01	GOLD		PRIMARY	ELEMENT	PRECIOUS METALS			FEB 13, 1978
02	SILVER			ELEMENT	PRECIOUS METALS			FEB 13, 1978

>>>>> BIBLIOGRAPHY - TABLE <<<<<

SET REFERENCE	LINE NO.	
	001	REF:USGS FAIRVIEW PEAK QUAD

** THIS REPORT MAY CONTAIN PROPRIETARY INFORMATION **
** THIS REPORT MAY CONTAIN PROPRIETARY INFORMATION **

T

Mineral Resources Data System (MRDS)

Report Title
Issue Date **Monday, March 9, 1992** *Number* 1592 of 23
Current Date Monday, January 5, 1998 *Current Time* 12:35:21 *Printed* 23 of 23

Record Number	DC01244	*User Field*	
Record Type	Site	*File Link ID*	CONSV
Reporter	CONSERVATION DIVISION FILES		
Reporter Affiliation	USGS	*Report Date*	72 12
Site Name	CLEOPATRA		
	– Location Information –		
District Name	QUARTZ CREEK		
Country	**UNITED STATES**	*Country Code*	US
State	**COLORADO**	*State Code*	CO
County	GUNNISON		
Land Status	00		
Latitude		*Decimal Lat*	0
Longitude		*Decimal Long*	0
Accuracy	UNKNOWN PRECISION		

FAIRVIEW PEAK 1:24,000
GUNNISON 1:100,000
MONTROSE 1:250,000

Section	Section Fraction	Township	Range	Meridian
21		51N	04E	NMPM

Position TUNNEL IN HALL GULCH

Located "just east of the Fairview" (#9 on USGS Bull 380 p1.1)

– Commodity Information –

Commodity Type Metallic
Commodities AG PB
Ore Materials SILVER, LEAD

– Geology –

– Deposit Description –

– Exploration and Development –

Production Size U
Developent Status Intermittent Producer

– Description of Workings –
–Individual Workings–

– Reference –

Reference HILL, 1908, USGS BULL. 380, P. 36–37
Reference CONSV. DIV. COMP. DATE, 9,65

1983
Kluender and McColly, U.S. Bureau of Mines MLA 66-83, 47p. (see p.11)

Rosenlund, 1984, Colo. School of Mines MS Thesis

Herald, 1981,


ATTACHMENT U
U
Approx. area
Map 12
Caro Claim
Approx. area
Map 13
Claims 4-6
Approx. area
Map 13
Claims 1-3
Fridrich and others, in press
Collegiate Peaks Wilderness
USGS Map I-2565
27.9 Ma[1]
1446 Ma[14]
33.9 Ma[4]
Qs
Qg
Xh
Xms
Xhl
MCls
PPmb
Tw
Tp
Ys
Yg
Tm?
KJme

V

Mineral Resources Data System (MRDS)

Report Title
Issue Date **Monday, March 9, 1992** *Number* 904 of 23
Current Date Monday, January 5, 1998 *Current Time* 12:35:21 *Printed* 2 of 23

Record Number	DC00692	*User Field*	
Record Type	Site	*File Link ID*	CONSV
Reporter	CONSERVATION DIVISION FILES		
Reporter Affiliation	USGS	*Report Date*	72 10
Site Name	ENDER		

Synonym: Climax Claim

ENDER mine includes Climax + Mascot claims.

-- Location Information --

District Name	DORCHESTER		
Country	**UNITED STATES**	*Country Code*	**US**
State	**COLORADO**	*State Code*	**CO**
County	GUNNISON		
Land Status	00		
Latitude		*Decimal Lat*	0
Longitude		*Decimal Long*	0
Accuracy	UNKNOWN PRECISION		

PEARL PASS 1:24,000
GUNNISON 1:100,000
MONTROSE 1:250,000

Section	Section Fraction	Township	Range	Meridian
34	NE 1/4 NW 1/4	12S	84W	6PM

Location of Unsurveyed sect

According to modern topos revise location to T12S R84W Sec. 28 SE1/4SE1/4

-- Commodity Information --

Commodity Type	Metallic
Commodities	PB ZN AG
Ore Materials	LEAD, ZINC, SILVER

Excellent location. Adit shown on 24K + 50K topo W of Mt. Tilton at head of Cement Creek.

Note: Remove Climax + Mascot claims from DC00693

-- Geology --

Ore Control	FAULT

-- Deposit Description --

-- Exploration and Development --

Production Size	U
Production Years	1960
Developent Status	Intermittent Producer

-- Description of Workings --

--Individual Workings--

-- Reference --

Reference ~~SLEBER~~ Slebir, 1957, COLO. SCH. MINES MSC THESIS, PG. 61-66
Reference USBM MINERALS YEARBOOK, 1960, P. 237

Named claims include:
Climax
Mascot
Tilden
Moonlight
Red Cloud

Record Number	DC00692	(....Continued)
Reference	CONSV. DIV. COMP. DATE, 9,65	
Prod Comments	SMALL SHIPMENTS OF HIGHGRADE	

W

** THIS REPORT MAY CONTAIN PROPRIETARY INFORMATION **

DATE GENERATED: JAN 7, 1997 — MINERALS AVAILABILITY SYSTEM — DEPOSIT LISTING — PAGE 144

DEPOSIT NAME: CLIMAX MINE — SEQUENCE NUMBER: 0080510096

= ENDER

>>>> MILS - TABLE <<<<
(GENERAL LOCATION INFORMATION)

= MRDS DC00692

STATE: COLORADO
COUNTY: GUNNISON
TYPE OF OPERATION: UNDERGROUND
CURRENT STATUS: PAST PRODUCER
LATITUDE: N 38DEG 57MIN 48SEC
LONGITUDE: W 106DEG 46MIN 18SEC
UTM - ZONE: 13
HEMISPHERE: NORTHERN
NORTHING: 4313992
EASTING: 346500
POINT OF REFERENCE: MAIN ENT
PRECISION: 500 METERS
ELEVATION: 3596 METERS
PRECISION: 500 METERS
PROPERTY FILE REPORT DATE:

YEAR FIELD CHECKED:
QUADRANGLE: MONTROSE
MILS EVALUATOR: IFOC MILS
DATUM OF ELEVATION:
MAP NAME: PEARL PASS
SCALE: 7.5 MIN
DOMAIN: FEDERAL
TYPE OF MINERAL HOLDINGS:

MINE MAP REPOSITORY:
TYPE OF EVALUATION: M
DATE LAST REVIEWED:
YEAR OF INFORMATION ENTRY:
MAINTAINING FIELD CENTER:
MINERAL PROPERTY FILE: 37.318
MINES IDENTIFICATION:
GEOLOGICAL SURVEY SYSTEM:
DATE LAST MODIFICATION:
SEP 21, 1978
LAST DEPOSIT MODIFICATION:
NOV 17, 1983
CONTRACTOR:

--PUBLIC LAND SURVEY--
PRINCIPAL MERIDIAN:
TOWNSHIP: 012 S
RANGE: 084 W
SECTION: 34
SECTION SUBDIVISION:
SURVEY STATUS:

TYPE OF PLANT:
PLANT IDENTIFIER:
MLA STUDY AREA: NO

PREDOMINANT MINING METHOD
PREDOMINANT MILLING METHOD
PREDOMINANT POST MILL PROCESSING METHOD

(HISTORICAL INFORMATION)

DISCOVERY METHOD:	YEAR OF DISCOVERY:	YEAR OF INITIAL PRODUCTION:	YEAR OF LAST PRODUCTION:

>>>>> COMMODITY - TABLE <<<<<

RECORD NUMBER	COMMODITY	MODIFIER	MARKETABILITY	COMMODITY CLASSIFICATION CODE	INDUSTRY REPORT CODE	STANDARD INDUSTRIAL CODE	S A S	DATE OF LAST MODIFICATION
01	LEAD		PRIMARY	ELEMENT	METALLIC			FEB 13, 1978
02	ZINC			ELEMENT	METALLIC			FEB 13, 1978
03	SILVER			ELEMENT	PRECIOUS METALS			FEB 13, 1978

>>>> NAMES(ALTERNATE) - TABLE <<<<

02 CLIMAX MINES #1 2 3

>>>>> BIBLIOGRAPHY - TABLE <<<<<

SET	REFERENCE	LINE NO.	
		001	OWN:[ENDNER] AND ANDERSON

ENDER?

** THIS REPORT MAY CONTAIN PROPRIETARY INFORMATION **
** THIS REPORT MAY CONTAIN PROPRIETARY INFORMATION **

Cunningham, 1976 GSA Bull v. 86 p. 897-908

X

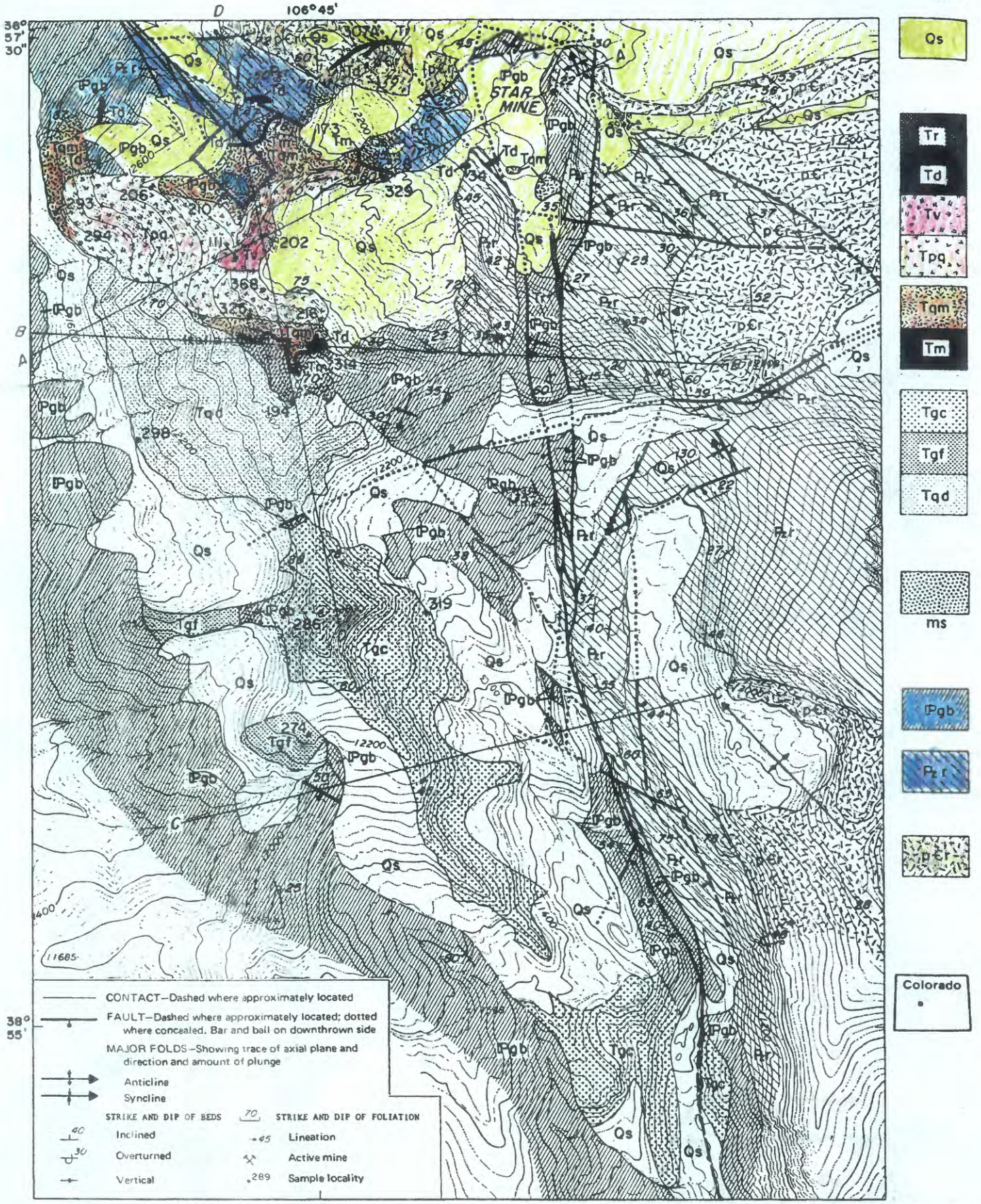


Figure 2. A. Geologic map and sections of Italian Mountain Intrusive Complex, Gunnison County, Colorado. Base from U.S. Geological Survey Pearl Pass and Italian Creek quadrangles (location shown on Fig. 1; explanation of symbols in Fig. 2B caption).

pg. 86

Y

Mineral Resources Data System (MRDS)

Report Title
Issue Date **Monday, March 9, 1992** *Number* of 23
Current Date Monday, January 5, 1998 *Current Time* 12:35:21 *Printed* 3 of 23

Record Number	DC00693	*User Field*	
Record Type	Site	*File Link ID*	CONSV, PMR
Reporter	CONSERVATION DIVISION FILES		
Reporter Affiliation	USGS	*Report Date*	72 10
Site Name	MT. VERNON, SILVER TIP, CHARLES H. CLIMAX, MASCOT claims		remove from this entry Add to DC00692 - ENDER Climax is name in MILS 8051009
	-- Location Information --		
District Name	DORCHESTER		
Country	**UNITED STATES**	*Country Code*	**US**
State	**COLORADO**	*State Code*	**CO**
County	GUNNISON		
Land Status	00		
Latitude		*Decimal Lat*	**0**
Longitude		*Decimal Long*	**0**
Accuracy	UNKNOWN PRECISION		

PEARL PASS 1:24,000
GUNNISON 1:100,000
MONTROSE 1:250,000

Section	Section Fraction	Township	Range	Meridian
34		12S	84W	6PM

-- Commodity Information --

Commodity Type	Metallic
Commodities	PB ZN AG
Major	PB ZN AG
Ore Materials	LEAD, ZINC, SILVER

-- Geology --

-- Deposit Description --

ABW NOTE 10-22-97: Claim map provided by the F.S. for the Crested Butte Land Exchange offer shows these 3 claims on the summit of Lambertson Peak.

-- Exploration and Development --

Developent Status Occurrence

-- Description of Workings --

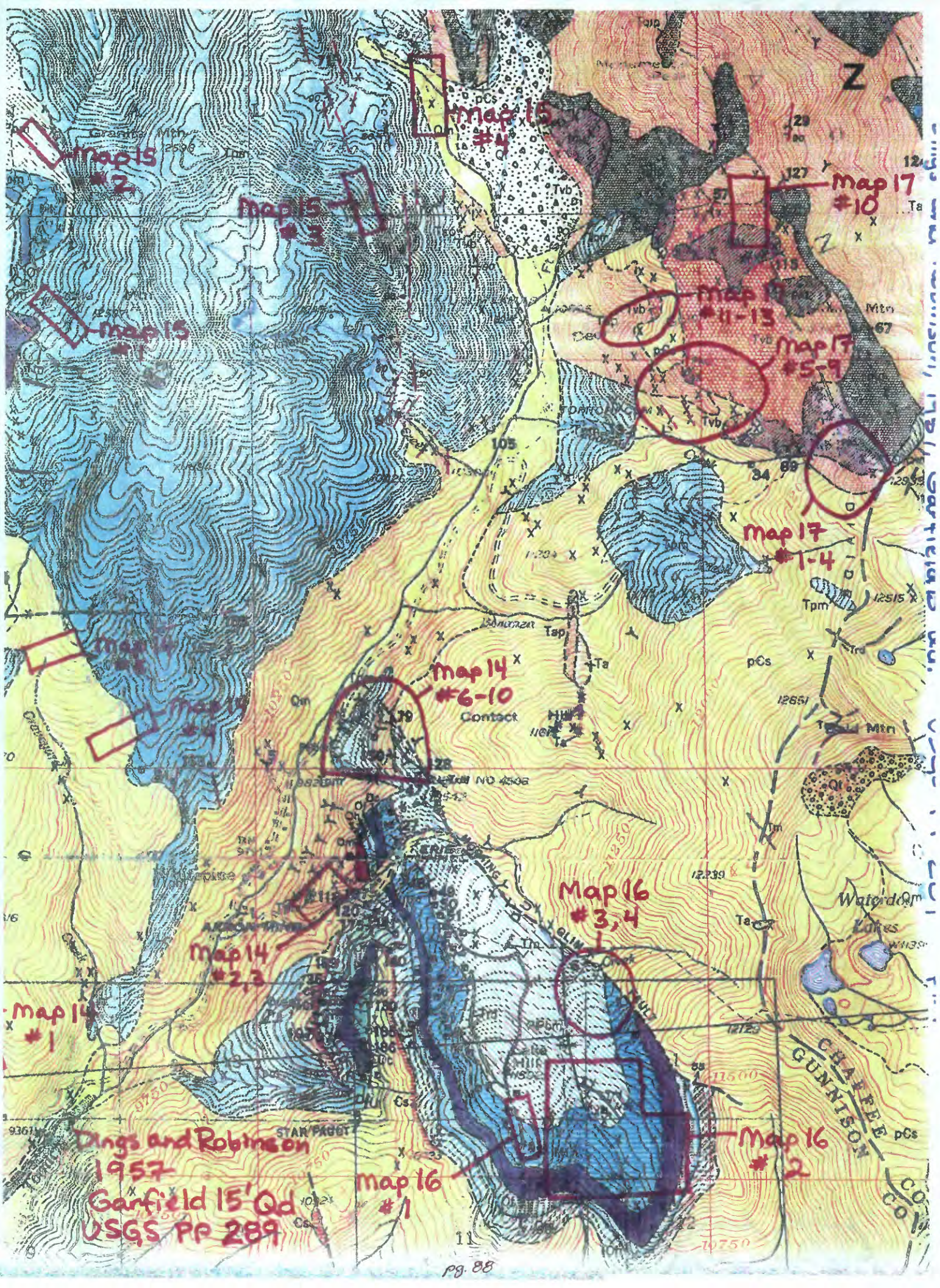
--Individual Workings--

-- Reference --

Reference BLM CONNECTING SHEETS
Reference CONSV. DIV. COMP. DATE, 9,65

CUNNINGHAM, 1976, GSA Bull. v. 86 (Page 1)

FRIDRICH and OTHERS, [1997] USGS I-2565


Map 15 #2
Map 15 #4
Map 15 #3
Map 15 #1
Map 17 #10
Map 17 #11-13
Map 17 #5-9
Map 17 #1-4
Map 14 #6-10
Map 14 #2,3
Map 14 #1
Map 16 #3,4
Map 16 #2
Map 16 #1
Dings and Robinson 1957
Garfield 15' Qd
USGS PP 289
Granite Mtn
Contact
Waterdog Lakes
CHAFFEE
GUNNISON
STAR PACIFIC

AA

Mineral Resources Data System (MRDS)

Report Title
Issue Date **Monday, March 9, 1992** *Number* 1580 of 23
Current Date Monday, January 5, 1998 *Current Time* 12:35:21 *Printed* 17 of 23

Record Number	DC01196	*User Field*	
Record Type	Site	*File Link ID*	CONSV
Reporter	CONSERVATION DIVISION FILES		
Reporter Affiliation	USGS	*Report Date*	72 12
Site Name	SPAR COPPER [SHAFT] MINE		

includes MORNING GLIM #128, ENSIGN #47, and PAROLE TUNNELS #150 and SPAR COPPER SHAFT → DIGITIZE ALL 4 LOCATIONS FROM PP 289

-- Location Information --

District Name	TOMICHI		
Country	**UNITED STATES**	*Country Code*	**US**
State	**COLORADO**	*State Code*	**CO**
County	GUNNISON		
Land Status	00		
Latitude		*Decimal Lat*	0
Longitude		*Decimal Long*	0
Accuracy	UNKNOWN PRECISION		

WHITEPINE 1:24,000
GUNNISON 1:100,000
MONTROSE 1:250,000

Section	Section Fraction	Township	Range	Meridian
35		50N	05E	NMPM

-- Commodity Information --

Commodity Type	Metallic
Commodities	AU AG CU PB ZN
Ore Materials	GOLD, SILVER, COPPER, LEAD, ZINC

- Geology -

PP 289. pl. 5:
Spar Copper Shaft is probably the NE-most shaft (unlabeled) in the Parole-Ensign-Morning Glim group.

- Deposit Description -

- Exploration and Development -

Production Size	U
Developent Status	Intermittent Producer

-- Description of Workings --
--Individual Workings--

- Reference -

Reference	HILL, 1908, USGS BULL. 380A, P. 39, and pl. 1 - Parole Tunnel + Spar Copper are about 900 ft. apart
Reference	CONSV. DIV. COMP. DATE, 9,65

DINGS + ROBINSON, 1957, USGS PP 289, p. 75-76
HARDER, 1909, in HAYES + LINDGREN, USGS Bull 380 p. 188-198

(Page 1)

MILS
80510120 ENSIGN TUNNEL
80510265 (PAROLE OR) SPAR COPPER MINE } COMBINE
80510266 PAROLE TUNNEL

** THIS REPORT MAY CONTAIN PROPRIETARY INFORMATION **

DATE GENERATED: JAN 7, 1997 — MINERALS AVAILABILITY SYSTEM — DEPOSIT LISTING — PAGE 361

DEPOSIT NAME: PAROLE OR SPAR COPPER MINE — SEQUENCE NUMBER: 0080510265

>>>> MILS - TABLE <<<<
(GENERAL LOCATION INFORMATION)

STATE: COLORADO	YEAR FIELD CHECKED:	MINE MAP REPOSITORY:	--PUBLIC LAND SURVEY--
COUNTY: GUNNISON	QUADRANGLE: MONTROSE	TYPE OF EVALUATION: M	
TYPE OF OPERATION: UNDERGROUND		DATE LAST REVIEWED:	PRINCIPAL MERIDIAN:
CURRENT STATUS: PAST PRODUCER		YEAR OF INFORMATION ENTRY:	
LATITUDE: N 38DEG 32MIN 55SEC	MILS EVALUATOR: IFOC MILS	MAINTAINING FIELD CENTER:	TOWNSHIP: 050 N
LONGITUDE: W 106DEG 22MIN 51SEC			RANGE: 005 E
UTM - ZONE: 13	DATUM OF ELEVATION:	MINERAL PROPERTY FILE: 37.115	SECTION: 35
HEMISPHERE: NORTHERN	MAP NAME: GARFIELD		SECTION SUBDIVISION:
NORTHING: 4267384	SCALE: 15 MIN	MINES IDENTIFICATION:	
EASTING: 379669	DOMAIN: FEDERAL	GEOLOGICAL SURVEY SYSTEM:	SURVEY STATUS:
POINT OF REFERENCE: MAIN ENT	TYPE OF MINERAL HOLDINGS:	DATE LAST MODIFICATION:	----------
PRECISION: 10 METERS		SEP 21, 1978	TYPE OF PLANT:
ELEVATION: 3200 METERS		LAST DEPOSIT MODIFICATION:	PLANT IDENTIFIER:
PRECISION: 500 METERS		NOV 17, 1983	MLA STUDY AREA: NO
PROPERTY FILE REPORT DATE:		CONTRACTOR:	

PREDOMINANT MINING METHOD — PREDOMINANT MILLING METHOD — PREDOMINANT POST MILL PROCESSING METHOD

(HISTORICAL INFORMATION)

DISCOVERY METHOD:	YEAR OF DISCOVERY:	YEAR OF INITIAL PRODUCTION:	YEAR OF LAST PRODUCTION:

>>>>> COMMODITY - TABLE <<<<<

RECORD NUMBER	COMMODITY	MODIFIER	MARKETABILITY	COMMODITY CLASSIFICATION CODE	INDUSTRY REPORT CODE	STANDARD INDUSTRIAL CODE	S A S	DATE OF LAST MODIFICATION
01	LEAD		PRIMARY	ELEMENT	METALLIC			FEB 13, 1978
02	ZINC			ELEMENT	METALLIC			FEB 13, 1978
03	COPPER			ELEMENT	METALLIC			FEB 13, 1978
04	SILVER			ELEMENT	PRECIOUS METALS			FEB 13, 1978
05	GOLD			ELEMENT	PRECIOUS METALS			FEB 13, 1978

>>>> NAMES(ALTERNATE) - TABLE <<<<

02 CONTACT MOUNTAIN

>>>>> BIBLIOGRAPHY - TABLE <<<<<

SET REFERENCE	LINE NO.	
	001	OWN:CALLAHAN ZINC-LEAD CO

** THIS REPORT MAY CONTAIN PROPRIETARY INFORMATION **
** THIS REPORT MAY CONTAIN PROPRIETARY INFORMATION **

CC

Mineral Resources Data System (MRDS)

Report Title
Issue Date **Monday, March 9, 1992** *Number* 1582 of 23
Current Date Monday, January 5, 1998 *Current Time* 12:35:21 *Printed* 20 of 23

Record Number	DC01200	*User Field*	
Record Type	Site	*File Link ID*	CONSV
Reporter	CONSERVATION DIVISION FILES		MILS 80510237
Reporter Affiliation	USGS	*Report Date*	72 12
Site Name	MORNING GLIM		
	-- Location Information --		
District Name	TOMICHI		
Country	**UNITED STATES**	*Country Code*	**US** WHITEPINE 1:24,000
State	**COLORADO**	*State Code*	**CO** GUNNISON 1;100,000
County	GUNNISON		MONTROSE 1:250,000
Land Status	00		
Latitude		*Decimal Lat*	0
Longitude		*Decimal Long*	0
Accuracy	UNKNOWN PRECISION		

Section	**Section Fraction**	**Township**	**Range**	**Meridian**
35		50N	05E	NMPM

Location Comments APPROX. SECTION, TOWNSHIP UNDIVIDED

-- Commodity Information --

Commodity Type Metallic
Commodities AU AG CU PB
Ore Materials GOLD, SILVER, COPPER, LEAD

-- Geology --

-- Deposit Description --

-- Exploration and Development --

Production Size U
Developent Status Intermittent Producer

-- Description of Workings --
--Individual Workings--

-- Reference --

Reference DINGS & ROBINSON, 1957, USGS P.P. 289, P. 75
Reference CONSV. DIV. COMP. DATE, 9,65

= MILS 80510237

Record Number **DC01200** *(....Continued)*

-- Annual Production --

Item	Acc	Amount	Th Units	Year	Grade
ORE	ACC	1.40000	TONS	AU AG Cl	

** THIS REPORT MAY CONTAIN PROPRIETARY INFORMATION **

DATE GENERATED: JAN 7, 1997 — MINERALS AVAILABILITY SYSTEM — PAGE 312

DEPOSIT LISTING

DEPOSIT NAME: MORNING GLIM — SEQUENCE NUMBER: 0080510237

>>>> MILS - TABLE <<<<

(GENERAL LOCATION INFORMATION)

STATE: COLORADO
COUNTY: GUNNISON
TYPE OF OPERATION: UNDERGROUND
CURRENT STATUS: PAST PRODUCER
LATITUDE: N 38DEG 33MIN 02SEC
LONGITUDE: W 106DEG 22MIN 50SEC
UTM - ZONE: 13
HEMISPHERE: NORTHERN
NORTHING: 4267599
EASTING: 379697
POINT OF REFERENCE: MAIN ENT
PRECISION: 10 METERS
ELEVATION: 3257 METERS
PRECISION: 500 METERS
PROPERTY FILE REPORT DATE:

YEAR FIELD CHECKED:
QUADRANGLE: MONTROSE
MILS EVALUATOR: IFOC MILS
DATUM OF ELEVATION:
MAP NAME: GARFIELD
SCALE: 15 MIN
DOMAIN: PRIVATE
TYPE OF MINERAL HOLDINGS:

MINE MAP REPOSITORY: I
TYPE OF EVALUATION: M
DATE LAST REVIEWED:
YEAR OF INFORMATION ENTRY:
MAINTAINING FIELD CENTER:
MINERAL PROPERTY FILE:
MINES IDENTIFICATION:
GEOLOGICAL SURVEY SYSTEM:
DATE LAST MODIFICATION:
FEB 13, 1978
LAST DEPOSIT MODIFICATION:
FEB 13, 1978
CONTRACTOR:

--PUBLIC LAND SURVEY--
PRINCIPAL MERIDIAN:
TOWNSHIP: 050 N
RANGE: 005 E
SECTION: 34
SECTION SUBDIVISION:
SURVEY STATUS:

TYPE OF PLANT:
PLANT IDENTIFIER:
MLA STUDY AREA: NO

PREDOMINANT MINING METHOD

PREDOMINANT MILLING METHOD

PREDOMINANT POST MILL PROCESSING METHOD

(HISTORICAL INFORMATION)

DISCOVERY METHOD:

YEAR OF DISCOVERY:

YEAR OF INITIAL PRODUCTION:

YEAR OF LAST PRODUCTION:

>>>>> COMMODITY - TABLE <<<<<

RECORD NUMBER	COMMODITY	MODIFIER	MARKETABILITY	COMMODITY CLASSIFICATION CODE	INDUSTRY REPORT CODE	STANDARD INDUSTRIAL CODE	S A S	DATE OF LAST MODIFICATION
01	GOLD		PRIMARY	ELEMENT	PRECIOUS METALS			FEB 13, 1978
02	SILVER			ELEMENT	PRECIOUS METALS			FEB 13, 1978
03	LEAD			ELEMENT	METALLIC			FEB 13, 1978
04	ZINC			ELEMENT	METALLIC			FEB 13, 1978

** THIS REPORT MAY CONTAIN PROPRIETARY INFORMATION **
** THIS REPORT MAY CONTAIN PROPRIETARY INFORMATION **

EE

Mineral Resources Data System (MRDS)

Report Title
Issue Date **Monday, March 9, 1992** *Number* 1576 of 23
Current Date Monday, January 5, 1998 *Current Time* 12:35:21 *Printed* 16 of 23

Record Number	DC01191	*User Field*	MILS 80510120 - Ensign Tunnel
Record Type	Site	*File Link ID*	CONSV
Reporter	CONSERVATION DIVISION FILES		
Reporter Affiliation	USGS	*Report Date*	72 12
Site Name	SPAR COPPER MINE		
Synonym Name	ENSIGN TUNNEL		

Ensign Tunnel, Spar Copper shaft, Parole Tunnel and Morning Glim tunnels are all part of Spar Copper Mine

-- Location Information --

District Name	TOMICHI		
Country	**UNITED STATES**	*Country Code*	**US**
State	**COLORADO**	*State Code*	**CO**
County	GUNNISON		
Land Status	00		
Latitude		*Decimal Lat*	**0**
Longitude		*Decimal Long*	**0**
Accuracy	UNKNOWN PRECISION		

WHITEPINE 1:241000
GUNNISON 1;100,000
MONTROSE 1:250,000

Section	**Section Fraction**	**Township**	**Range**	**Meridian**
34		50N	05E	NMPM

Location Comments APPROX. SECTION, TOWNSHIP UNDIVIDED UNSURVEYED!

-- Commodity Information --

Commodity Type Metallic
Commodities AU AG CU PB, ZN
Ore Materials GOLD, SILVER, COPPER, LEAD, ZINC

-- Geology -- GLIM

Ore Control MORNING GLEN FAULT
Host Rock Type BELDEN SHALE AND GRANITE LIMESTONE
Host Rock Age PENN

-- Deposit Description --
--Individual Ore Bodies--
Deposit Type VEIN, REPLACEMENT

-- Exploration and Development --
Production Size U
Developent Status Intermittent Producer

-- Description of Workings --

MILS 80510265 Parole or Spar Copper
0266 Parole

pg 94

--Individual Workings--

-- Reference --

Reference DINGS & ROBINSON, 1957, USGS P.P. 289, P. 75-76, #5 128, 47,150 on pl. 1, also see pl. 5

Reference CONSV. DIV. COMP. DATE, 9,65

HILL, 1908, USGS Bull 380, p. 39 and #20 pl. 1.

-- Annual Production --

Parole Tunnel is 900 ft west of and 900 ft below Spar Copper Shaft

Item	Acc	Amount	Th Units	Year	Grade
ORE	ACC	1.44500	TONS	AU AG CU	

** THIS REPORT MAY CONTAIN PROPRIETARY INFORMATION **

DATE GENERATED: JAN 7, 1997 — MINERALS AVAILABILITY SYSTEM DEPOSIT LISTING — PAGE 178

DEPOSIT NAME: ENSIGN TUNNEL — SEQUENCE NUMBER: 0080510120

>>>> MILS - TABLE <<<<
(GENERAL LOCATION INFORMATION)

STATE: COLORADO
COUNTY: GUNNISON
TYPE OF OPERATION: UNDERGROUND
CURRENT STATUS: PAST PRODUCER
LATITUDE: N 38DEG 32MIN 42SEC
LONGITUDE: W 106DEG 22MIN 58SEC
UTM - ZONE: 13
HEMISPHERE: NORTHERN
NORTHING: 4266985
EASTING: 379494
POINT OF REFERENCE: MAIN ENT
PRECISION: 1000 METERS
ELEVATION: 3505 METERS
PRECISION: 500 METERS
PROPERTY FILE REPORT DATE:

YEAR FIELD CHECKED:
QUADRANGLE: MONTROSE
MILS EVALUATOR: IFOC MILS
DATUM OF ELEVATION:
MAP NAME: GARFIELD
SCALE: 15 MIN
DOMAIN: PRIVATE
TYPE OF MINERAL HOLDINGS:

MINE MAP REPOSITORY: I
TYPE OF EVALUATION: M
DATE LAST REVIEWED:
YEAR OF INFORMATION ENTRY:
MAINTAINING FIELD CENTER:
MINERAL PROPERTY FILE:
MINES IDENTIFICATION:
GEOLOGICAL SURVEY SYSTEM:
DATE LAST MODIFICATION:
FEB 13, 1978
LAST DEPOSIT MODIFICATION:
FEB 13, 1978
CONTRACTOR:

--PUBLIC LAND SURVEY--
PRINCIPAL MERIDIAN:
TOWNSHIP: 050 N
RANGE: 005 E
SECTION: 34
SECTION SUBDIVISION:
SURVEY STATUS:

TYPE OF PLANT:
PLANT IDENTIFIER:
MLA STUDY AREA: NO

PREDOMINANT MINING METHOD
PREDOMINANT MILLING METHOD
PREDOMINANT POST MILL PROCESSING METHOD

(HISTORICAL INFORMATION)

DISCOVERY METHOD:
YEAR OF DISCOVERY:
YEAR OF INITIAL PRODUCTION:
YEAR OF LAST PRODUCTION:

>>>>> COMMODITY - TABLE <<<<<

RECORD NUMBER	COMMODITY	MODIFIER	MARKETABILITY	COMMODITY CLASSIFICATION CODE	INDUSTRY REPORT CODE	STANDARD INDUSTRIAL CODE	S A S	DATE OF LAST MODIFICATION
01	GOLD		PRIMARY	ELEMENT	PRECIOUS METALS			FEB 13, 1978
02	SILVER			ELEMENT	PRECIOUS METALS			FEB 13, 1978

** THIS REPORT MAY CONTAIN PROPRIETARY INFORMATION **
** THIS REPORT MAY CONTAIN PROPRIETARY INFORMATION **

Mineral Resources Data System (MRDS)

Report Title
Issue Date **Monday, March 9, 1992** *Number* 1581 of 23
Current Date Monday, January 5, 1998 *Current Time* 12:35:21 *Printed* 18 of 23

Record Number	DC01198	*User Field*	MILS B0510266
Record Type	Site	*File Link ID*	CONSV
Reporter	CONSERVATION DIVISION FILES		
Reporter Affiliation	USGS	*Report Date*	72 12
Site Name	PAROLE TUNNEL (part of Spar Copper Mine)		

-- Location Information --

District Name	TOMICHI		
Country	**UNITED STATES**	*Country Code*	**US**
State	**COLORADO**	*State Code*	**CO**
County	GUNNISON		
Land Status	00		
Latitude		*Decimal Lat*	**0**
Longitude		*Decimal Long*	**0**
Accuracy	UNKNOWN PRECISION		

WHITEPINE 1:24,000
GUNNISON 1:100,000
MONTROSE 1:250,000

Section	**Section Fraction**	**Township**	**Range**	**Meridian**
35		50N	05E	NMPM

Location Comments APPROX. SECTION, TOWNSHIP UNDIVIDED UNSURVEYED

-- Commodity Information --

Commodity Type	Metallic
Commodities	AU AG CU PB ZN
Ore Materials	GOLD, SILVER, COPPER, LEAD, ZINC

-- Geology --

Host Rock Type	BELDEN LIMESTONE AND GRANITE
Host Rock Age	PENN

-- Deposit Description --
--Individual Ore Bodies--

Deposit Type	VEIN, REPLACEMENT

-- Exploration and Development --

Production Size	U
Developent Status	Intermittent Producer

-- Description of Workings --
--Individual Workings--

-- Reference --

Reference	USBM MINERAL EXAM. FILE
Reference	DINGS & ROBINSON, 1957, USGS P.P. 289, P. 75 ; pl. 1, #150
Reference	CONSV. DIV. COMP. DATE, 9,65

-- Annual Production --

Item	Acc	Amount	Th Units	Year	Grade
ORE	ACC	1.00000	TONS	AU AG CU	

(Page 2)

Also see entries for Ensign
Spar Copper
Morning Glim
Iron King

** THIS REPORT MAY CONTAIN PROPRIETARY INFORMATION **

DATE GENERATED: JAN 7, 1997 — MINERALS AVAILABILITY SYSTEM — DEPOSIT LISTING — PAGE 364

DEPOSIT NAME: PAROLE TUNNEL — SEQUENCE NUMBER: 0080510266

>>>> MILS - TABLE <<<<
(GENERAL LOCATION INFORMATION)

STATE: COLORADO
COUNTY: GUNNISON
TYPE OF OPERATION: UNDERGROUND
CURRENT STATUS: PAST PRODUCER
LATITUDE: N 38DEG 32MIN 42SEC
LONGITUDE: W 106DEG 22MIN 58SEC
UTM - ZONE: 13
HEMISPHERE: NORTHERN
NORTHING: 4266985
EASTING: 379494
POINT OF REFERENCE: MAIN ENT
PRECISION: 500 METERS
ELEVATION: 3127 METERS
PRECISION: 500 METERS
PROPERTY FILE REPORT DATE:

YEAR FIELD CHECKED:
QUADRANGLE: MONTROSE
MILS EVALUATOR: IFOC MILS
DATUM OF ELEVATION:
MAP NAME: GARFIELD
SCALE: 15 MIN
DOMAIN: PRIVATE
TYPE OF MINERAL HOLDINGS:

MINE MAP REPOSITORY: I
TYPE OF EVALUATION: M
DATE LAST REVIEWED:
YEAR OF INFORMATION ENTRY:
MAINTAINING FIELD CENTER:
MINERAL PROPERTY FILE:
MINES IDENTIFICATION:
GEOLOGICAL SURVEY SYSTEM:
DATE LAST MODIFICATION:
FEB 13, 1978
LAST DEPOSIT MODIFICATION:
FEB 13, 1978
CONTRACTOR:

--PUBLIC LAND SURVEY--
PRINCIPAL MERIDIAN:
TOWNSHIP: 050 N
RANGE: 005 E
SECTION: 34
SECTION SUBDIVISION:
SURVEY STATUS:

TYPE OF PLANT:
PLANT IDENTIFIER:
MLA STUDY AREA: NO

PREDOMINANT MINING METHOD
PREDOMINANT MILLING METHOD
PREDOMINANT POST MILL PROCESSING METHOD

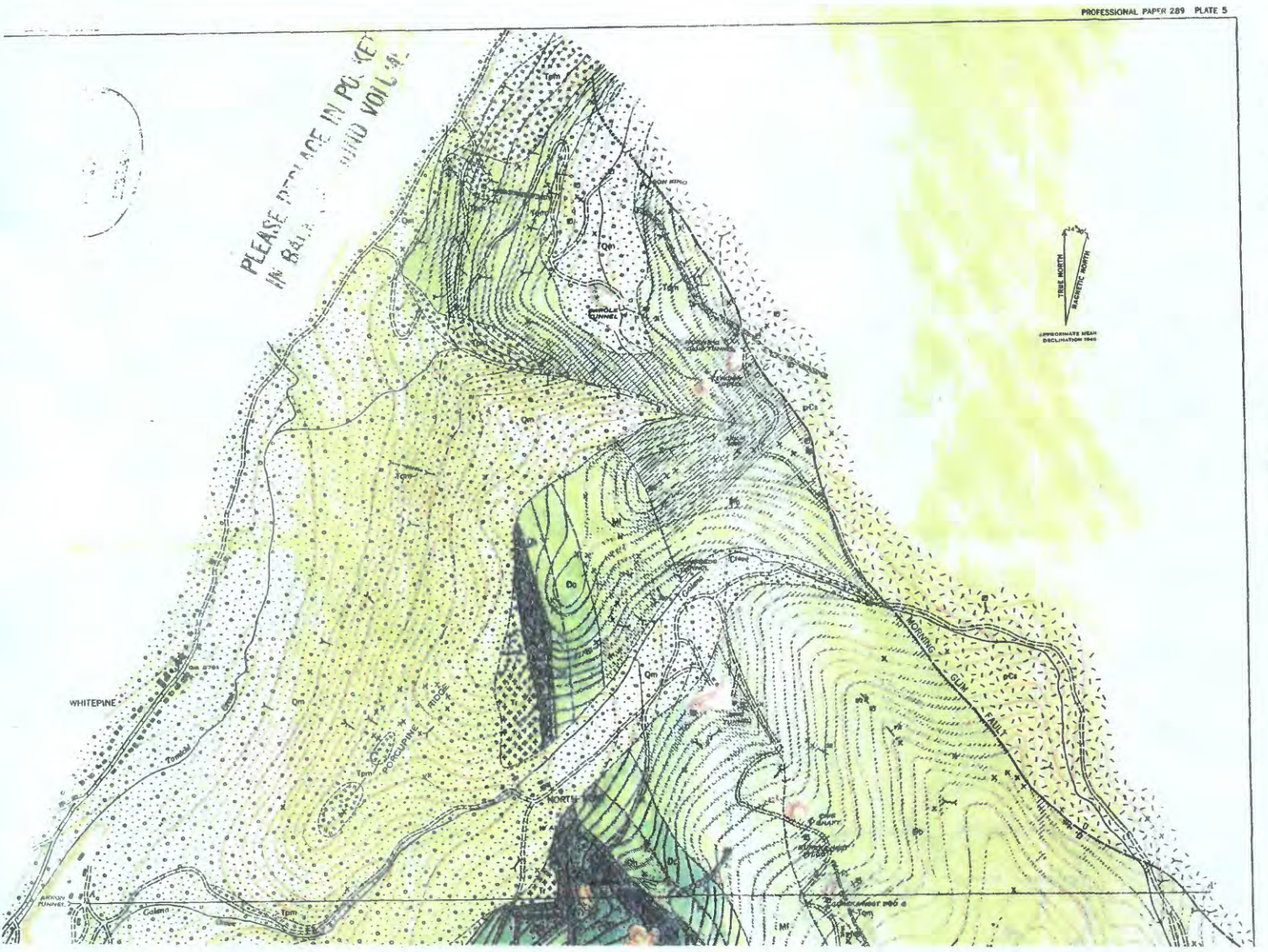
(HISTORICAL INFORMATION)

DISCOVERY METHOD:
YEAR OF DISCOVERY:
YEAR OF INITIAL PRODUCTION:
YEAR OF LAST PRODUCTION:

>>>>> COMMODITY - TABLE <<<<<

RECORD NUMBER	COMMODITY	MODIFIER	MARKETABILITY	COMMODITY CLASSIFICATION CODE	INDUSTRY REPORT CODE	STANDARD INDUSTRIAL CODE	S A S	DATE OF LAST MODIFICATION
01	LEAD		PRIMARY	ELEMENT	METALLIC			FEB 13, 1978
02	SILVER			ELEMENT	PRECIOUS METALS			FEB 13, 1978
03	GOLD			ELEMENT	PRECIOUS METALS			FEB 13, 1978
04	ZINC			ELEMENT	METALLIC			FEB 13, 1978

** THIS REPORT MAY CONTAIN PROPRIETARY INFORMATION **
** THIS REPORT MAY CONTAIN PROPRIETARY INFORMATION **



DINGS and ROBINSON, 1957, USGS PP 289, pl. 5

LOULMIN AND HAMMARSTROM, 1990, USGS Bull. 1864
VOLCANIC CENTER
MOUNT AETNA

Mineral Resources Data System (MRDS)

Report Title
Issue Date **Monday, March 9, 1992** *Number* 1571 of 23
Current Date Monday, January 5, 1998 *Current Time* 12:35:21 *Printed* 13 of 23

Record Number	DC01174	*User Field*	
Record Type	Site	*File Link ID*	CONSV
Reporter	CONSERVATION DIVISION FILES		
Reporter Affiliation	USGS	*Report Date*	72 10
Site Name	LEWISTON-PET		
	-- Location Information --		
District Name	TOMICHI		
Country	**UNITED STATES**	*Country Code*	**US** WHITEPINE 1:24,000
State	**COLORADO**	*State Code*	**CO** GUNNISON 1:100,000
County	GUNNISON		MONTROSE 1:250,000
Land Status	00		
Latitude		*Decimal Lat*	**0**
Longitude		*Decimal Long*	**0**
Accuracy	UNKNOWN PRECISION		

Section	**Section Fraction**	**Township**	**Range**	**Meridian**
23		50N	05E	NMPM

Location Comments APPROX. SECTION, TOWNSHIP UNDIVIDED

-- Commodity Information --

Commodity Type Metallic
Commodities AU AG ZN CU TETRAHEDRITE
Ore Materials PYRITE, SPHALERITE, CHALCOPYRITE, FREE GOLD & SILVER

-- Geology --

Host Rock Type MT. PRINCETON QTZ. MONZONITE
Host Rock Age TERT

-- Deposit Description --
--Individual Ore Bodies--

Deposit Type VEIN
2 NE-striking veins, each 500 ft min. length

-- Exploration and Development --

Production Size U
Developent Status Intermittent Producer

-- Description of Workings --
--Individual Workings--

2 SHAFTS WITHIN 30 FT., SEVERAL PITS AND CUTS

	– Reference –
Reference	DINGS & ROBINSON, 1957, USGS P.P. 289, P. 80, #90 on pl. 1
Reference	CONSV. DIV. COMP. DATE, 9,65
Prod Comments	AT LEAST $2,500 IN AU & AG

1887 Production $2000 Au, $500 Ag
(Page 2)
No production recorded 1901-1950

Mineral Resources Data System (MRDS)

Report Title
Issue Date **Monday, March 9, 1992** *Number* of 23
Current Date Monday, January 5, 1998 *Current Time* 12:35:21 *Printed* 12 of 23

Record Number	DC01172	*User Field*	
Record Type	Site	*File Link ID*	CONSV
Reporter	CONSERVATION DIVISION FILES		
Reporter Affiliation	USGS	*Report Date*	72 10
Site Name	HIAWATHA		
	-- Location Information --		
District Name	TOMICHI		
Country	**UNITED STATES**	*Country Code*	**US**
State	**COLORADO**	*State Code*	**CO**
County	GUNNISON		
Land Status	00		
Latitude		*Decimal Lat*	**0**
Longitude		*Decimal Long*	**0**
Accuracy	UNKNOWN PRECISION		

WHITEPINE 1:24000
GUNNISON 1:100,000
MONTROSE 1:250,000

Section	Section Fraction	Township	Range	Meridian
14		50N	05E	NMPM

Location Comments APPROX. SECTION, TOWNSHIP UNDIVIDED

-- Commodity Information --

Commodity Type	Metallic
Commodities	PB ZN
Major	PB ZN
Ore Materials	GALENA, SPHALERITE

-- Geology --

Host Rock Type	ALTERED MT. PRINCETON QTZ. MONZONITE
Host Rock Age	TERT

-- Deposit Description --
--Individual Ore Bodies--

Deposit Type VEIN

-- Exploration and Development --

Developent Status Occurrence

-- Description of Workings --
--Individual Workings--

– Reference –

Reference DINGS & ROBINSON, 1957, USGS P.P. 289, P. 80) #71 on pl.1

Reference CONSV. DIV. COMP. DATE, 9,65

Mineral Resources Data System (MRDS)

Report Title
Issue Date **Monday, March 9, 1992** *Number* of 23
Current Date Monday, January 5, 1998 *Current Time* 12:35:21 *Printed* 9 of 23

Record Number	DC01169	*User Field*	
Record Type	Site	*File Link ID*	CONSV
Reporter	CONSERVATION DIVISION FILES		
Reporter Affiliation	USGS	*Report Date*	72 10
Site Name	DAY STAR		
	-- Location Information --		
District Name	TOMICHI		
Country	**UNITED STATES**	*Country Code*	**US**
State	**COLORADO**	*State Code*	**CO**
County	GUNNISON		
Land Status	00		
Latitude		*Decimal Lat*	**0**
Longitude		*Decimal Long*	**0**
Accuracy	UNKNOWN PRECISION		

GARFIELD 1:24000
GUNNISON 1:100,000
MONTROSE 1:250,000

Section	**Section Fraction**	**Township**	**Range**	**Meridian**
11		50N	05E	NMPM

Location Comments APPROX. SECTION, TOWNSHIP UNDIVIDED

-- Commodity Information --

Commodity Type Metallic
Commodities AG
Major AG
Ore Materials SILVER

-- Geology --

-- Deposit Description --
--Individual Ore Bodies--
Deposit Type VEIN/SHEAR ZONE

-- Exploration and Development --
Developent Status Occurrence

-- Description of Workings --
--Individual Workings-- Adit S 3W
3 drifts total 640 ft
one crosscut 102 ft.

-- Reference --

pg. 106

Record Number	**DC01169**	*(....Continued)*
Reference	DINGS & ROBINSON, 1957, USGS P.P. 289, P. 79 , #32 pl. 1	
Reference	CONSV. DIV. COMP. DATE, 9,65	
Prod Comments	PROBABLY NONE	

Mineral Resources Data System (MRDS)

Report Title
Issue Date **Monday, March 9, 1992** *Number* of 23
Current Date Monday, January 5, 1998 *Current Time* 12:35:21 *Printed* 14 of 23

Record Number	DC01175	*User Field*	
Record Type	Site	*File Link ID*	CONSV
Reporter	CONSERVATION DIVISION FILES		
Reporter Affiliation	USGS	*Report Date*	72 10
Site Name	MAGNA CHARTA TUNNEL		
	-- Location Information --		
District Name	TOMICHI		
Country	**UNITED STATES**	*Country Code*	**US**
State	**COLORADO**	*State Code*	**CO**
County	GUNNISON		
Land Status	00		
Latitude		*Decimal Lat*	**0**
Longitude		*Decimal Long*	**0**
Accuracy	UNKNOWN PRECISION		

Section	**Section Fraction**	**Township**	**Range**	**Meridian**
23		50N	05E	NMPM

Position N. OF BUCKHORN CR.
Location Comments APPROX. SECTION, TOWNSHIP UNDIVIDED

-- Commodity Information --
Commodity Type Metallic
Commodities PB AG ZN
Major PB AG ZN
Ore Materials GALENA, PYRITE, SPHALERITE, TETRAHEDRITE, CALCITE, QUARTZ

-- Geology --
Host Rock Type QTZ. MONZONITE
Host Rock Age TERT

-- Deposit Description --
--Individual Ore Bodies--
Deposit Type VEIN

N-trending veins
Adit bearing N35 W at portal
Caved as of 1949
Reported to be 4000 ft.

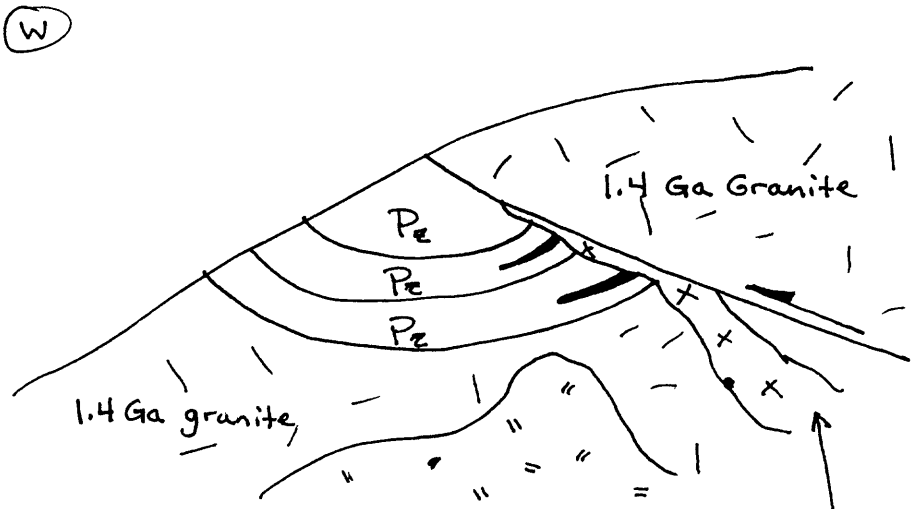
-- Exploration and Development --
Developent Status Occurrence

-- Description of Workings -- No ore shipped
--Individual Workings--

-- Reference --

Reference DINGS & ROBINSON, 1957, USGS P.P. 289, P. 80-81, #105 pl. 1.

Reference CONSV. DIV. COMP. DATE, 9,65



Laramide age MORNING GLIM THRUST FAULT is southern extension of Tincup thrust fault, a major structure in the area

Rhyolite and rhyolite porphyry are very similar to the 70 Ma Pando Porphyry farther north. Here it is localized along the Morning Glim Fault and is probably related to mineralization.

Modified from Ed DeWitt, written commun., January, 1998

PP

Mineral Resources Data System (MRDS)

Report Title
Issue Date **Monday, March 9, 1992** *Number* 927 of 23
Current Date Monday, January 5, 1998 *Current Time* 12:35:21 *Printed* 19 of 23

Record Number	DC01199	*User Field*	
Record Type	Site	*File Link ID*	CONSV
Reporter	CONSERVATION DIVISION FILES		
Reporter Affiliation	USGS	*Report Date*	72 12
Site Name	ANNIE HUDSON		

-- Location Information --

District Name	TOMICHI		
Country	**UNITED STATES**	*Country Code*	**US**
State	**COLORADO**	*State Code*	**CO**
County	GUNNISON		
Land Status	00		
Latitude	38-32-11	*Decimal Lat*	**0**
Longitude	106-22-04	*Decimal Long*	**0**
Accuracy	~~UNKNOWN PRECISION~~ EXCELLENT		

GARFIELD 1:24,000
GUNNISON 1:100,000
MONTROSE 1:250,000

Section	Section Fraction	Township	Range	Meridian
35 36	SW¼, SW¼	50N	05E	NMPM

Location Comments [APPROX. SECTION, TOWNSHIP UNDIVIDED]
Not surveyed but extrapolate from ½ section boundary directly south

-- Commodity Information --

Commodity Type	Metallic
Commodities	ZN AG
Ore Materials	ZINC, SILVER

-- Geology --

Ore Control	MORNING GLIM FAULT
Host Rock Type	LIMESTONE OF BELDEN FM.
Host Rock Age	PENN

-- Deposit Description --
--Individual Ore Bodies--

Deposit Type	REPLACEMENT

-- Exploration and Development --

Production Size	U
Developent Status	Intermittent Producer

-- Description of Workings --
--Individual Workings--

	-- Reference --
Reference	DINGS & ROBINSON, 1957, USGS P.P. 289, P. 78 , #6 on pl. 1
Reference	CONSV. DIV. COMP. DATE, 9,65
Prod Comments	SMALL

(Page 2)

QQ

Mineral Resources Data System (MRDS)

Report Title
Issue Date **Monday, March 9, 1992** *Number* of 23
Current Date Monday, January 5, 1998 *Current Time* 12:35:21 *Printed* 21 of 23

Record Number	DC01208	*User Field*	
Record Type	Site	*File Link ID*	CONSV
Reporter	CONSERVATION DIVISION FILES		
Reporter Affiliation	USGS	*Report Date*	72 12
Site Name	LEGAL TENDER		
	-- Location Information --		
District Name	TOMICHI		
Country	**UNITED STATES**	*Country Code*	**US**
State	**COLORADO**	*State Code*	**CO**
County	GUNNISON		
Land Status	00		
Latitude		*Decimal Lat*	**0**
Longitude		*Decimal Long*	**0**
Accuracy	UNKNOWN PRECISION		

GARFIELD 1:24,000
GUNNISON 1:100,000
MONTROSE 1:250,000

Section	**Section Fraction**	**Township**	**Range**	**Meridian**
18		50N	06E	NMPM

Location Comments APPROX. SECTION, TOWNSHIP UNDIVIDED

-- Commodity Information --

Commodity Type	Metallic
Commodities	PB ZN CU
Major	PB ZN CU
Ore Materials	GALENA, SPHALERITE, CHALCOPYRITE

-- Geology --

Host Rock Type LIMESTONE

-- Deposit Description --
--Individual Ore Bodies--

Deposit Type REPLACEMENT

-- Exploration and Development --

Developent Status Occurrence

-- Description of Workings --
--Individual Workings--

Record Number	**DC01208**	*(....Continued)*
	– Reference –	
Reference	DINGS & ROBINSON, 1957, USGS P.P. 289, P. 80 , #89 pl. 1	
Reference	CONSV. DIV. COMP. DATE, 9,65	

RR

Mineral Resources Data System (MRDS)

Report Title
Issue Date **Monday, March 9, 1992** *Number* 1572 of 23
Current Date Monday, January 5, 1998 *Current Time* 12:35:21 *Printed* 15 of 23

Record Number	DC01178	*User Field*	
Record Type	Site	*File Link ID*	CONSV
Reporter	CONSERVATION DIVISION FILES		
Reporter Affiliation	USGS	*Report Date*	72 10
Site Name	BILL SHORT		
	-- Location Information --		
District Name	TOMICHI		
Country	**UNITED STATES**	*Country Code*	US
State	**COLORADO**	*State Code*	CO
County	GUNNISON		
Land Status	00		
Latitude	38-34-10	*Decimal Lat*	0
Longitude	106-21-48	*Decimal Long*	0
Accuracy	UNKNOWN PRECISION		

GARFIELD 1:24,000
GUNNISON 1:100,000
MONTROSE 1:250,000

Section	Section Fraction	Township	Range	Meridian
24		50N	05E	NMPM

Location Comments APPROX. SECTION, TOWNSHIP UNDIVIDED
NOT SURVEYED

-- Commodity Information --

Commodity Type Metallic
Commodities AU AG CU PB ZN CD
Ore Materials PYRITE, SPHALERITE, GALENA, CHALCOPYRITE, GREENOCKITE

-- Geology --

-- Deposit Description --

-- Exploration and Development --

Production Size U
Developent Status Intermittent Producer

-- Description of Workings --
--Individual Workings--

-- Reference --

Reference DINGS & ROBINSON, 1957, USGS P.P. 289, P. 78, #13 pl. 1
Reference CONSV. DIV. COMP. DATE, 9,65

Record Number **DC01178** *(....Continued)*

-- Annual Production --

Item	Acc	Amount	Th Units	Year	Grade
ORE	ACC	0.01400	TONS	AU AG CU	

SS

Mineral Resources Data System (MRDS)

Report Title
Issue Date **Monday, March 9, 1992** *Number* 1570 of 23
Current Date Monday, January 5, 1998 *Current Time* 12:35:21 *Printed* 10 of 23

Record Number	DC01170	*User Field*	
Record Type	Site	*File Link ID*	CONSV
Reporter	CONSERVATION DIVISION FILES		
Reporter Affiliation	USGS	*Report Date*	72 10
Site Name	FORT SCOTT (remove Fort Scott from DC01171)		
	– Location Information –		
District Name	TOMICHI		
Country	**UNITED STATES**	*Country Code*	**US**
State	**COLORADO**	*State Code*	**CO**
County	GUNNISON		
Land Status	00		
Latitude		*Decimal Lat*	**0**
Longitude		*Decimal Long*	**0**
Accuracy	UNKNOWN PRECISION		

GARFIELD 1:24,000
GUNNISON 1:100,000
MONTROSE 1:250,000

Section	Section Fraction	Township	Range	Meridian
13		50N	05E	NMPM

Location Comments APPROX. SECTION, TOWNSHIP UNDIVIDED

– Commodity Information –
Commodity Type Metallic
Commodities AU AG
Ore Materials GOLD, SILVER

– Geology –
Host Rock Type ALTERED VOLCANIC BRECCIA

– Deposit Description –
–Individual Ore Bodies–
Deposit Type VEIN

– Exploration and Development –
Production Size U
Developent Status Intermittent Producer

– Description of Workings –
–Individual Workings–

Record Number	DC01170	(....Continued)
	-- Reference --	
Reference	DINGS & ROBINSON, 1957, USGS P.P. 289, P. 79, #57 pl. 1	
Reference	CONSV. DIV. COMP. DATE, 9,65	
Prod Comments	10-12 CARLOADS	
	TOULMIN AND HAMMARSTROM, 1990, USGS Bull 1864 (Page 2)	
	also see SHANNON, 1988, C.S.M. PhD Thesis.	

TT

Mineral Resources Data System (MRDS)

Report Title
Issue Date **Monday, March 9, 1992** *Number* of 23
Current Date Monday, January 5, 1998 *Current Time* 12:35:21 *Printed* 11 of 23

Record Number	DC01171	*User Field*	
Record Type	Site	*File Link ID*	CONSV, PMR
Reporter	CONSERVATION DIVISION FILES		
Reporter Affiliation	USGS	*Report Date*	72 10
Site Name	FORT SCOTT, ODDIE, MOORE, D. A., MASON		

MOOSE #92 #91

DELETE - see DC01170 for the FORT SCOTT

REMOVE FROM RECORD - These are in CHAFFEE COUNTY!

-- Location Information --

District Name	TOMICHI		
Country	UNITED STATES	*Country Code*	US
State	COLORADO	*State Code*	CO
County	GUNNISON		
Land Status	00		
Latitude		*Decimal Lat*	0
Longitude		*Decimal Long*	0
Accuracy	UNKNOWN PRECISION		

GARFIELD 1:24,000
GUNNISON 1:100,000
MONTROSE 1:250,000

Section	Section Fraction	Township	Range	Meridian
13		50N	05E	NMPM

-- Commodity Information --

THIS RECORD WILL BE FOR THE ODDIE CLAIM #MS#2210

Commodity Type	Metallic
Commodities	AU AG
Major	AU AG
Ore Materials	GOLD, SILVER

-- Geology --

-- Deposit Description --

-- Exploration and Development --

Developent Status	Occurrence

-- Description of Workings --

--Individual Workings--

-- Reference --

Reference	BLM CONNECTING SHEET
Reference	CONSV. DIV. COMP. DATE, 9,65

DINGS + ROBINSON, 1957, USGS PP 289,

WILSON, 1998, LOCATABLE MINERAL REPORT FOR U.S. FOREST SERVICE CRESTED BUTTE MOUNTAIN RESORT LAND EXCHANGE OFFER. U.S.G.S. UNPUB. REPORT

TOULMIN AND HAMMARSTROM, 1990, USGS Bull 1864 pg 119

Mineral Resources Data System (MRDS)

Report Title
Issue Date 00/00/00 *Number* of 23
Current Date Monday, January 5, 1998 *Current Time* 12:35:21 *Printed* 1 of 23

Record Number	D000434	*User Field*	
Record Type	~~Site~~ Area	*File Link ID*	RRO
Reporter	KING, ROBERT U.		
Reporter Affiliation	USGS	*Report Date*	74 07
Site Name	COPPER HILL; CLOVER MTN.		
	-- Location Information --		
Country	UNITED STATES	*Country Code*	US
State	COLORADO	*State Code*	CO
County	GUNNISON		
Physiographic Prov	09		
Quadrangle 2	GARFIELD	*Scale*	62500
Quad 250k	MONTROSE		
Latitude	38-34- N	*Decimal Lat*	38.56666
Longitude	106-22- W	*Decimal Long*	-106.36666
Accuracy	EST		

GARFIELD 1:24,000
GUNNISON 1:100,000
MONTROSE 1:250,000

Section	Section Fraction	Township	Range	Meridian
24		050N	005E	NEW MEXICO PRINCIPAL

(Summit of Clover Mtn is 50N 6E Sec. 19.

-- Commodity Information --

Commodity Type	Metallic
Commodities	MO CU
Major	MO CU
Ore Materials	MOLYBDENITE

-- Geology --

Host Rock Type Name	Age	Host Rock Unit Name	Age
GRANITE	PREC		
QUARTZ MONZONITE	PREC		

-- Deposit Description --
--Individual Ore Bodies--

Deposit Type	DISSEMINATED

-- Exploration and Development -- Report of an exploration target

Production Size	No		
Developent Status	Occurrence		
Development M$		*Mill M$*	HYDROLOGOIC UNIT CO

Record Number	**D000434**	*(....Continued)*

– Description of Workings –

– References – used only for general geology. No specific mention of this occurrence

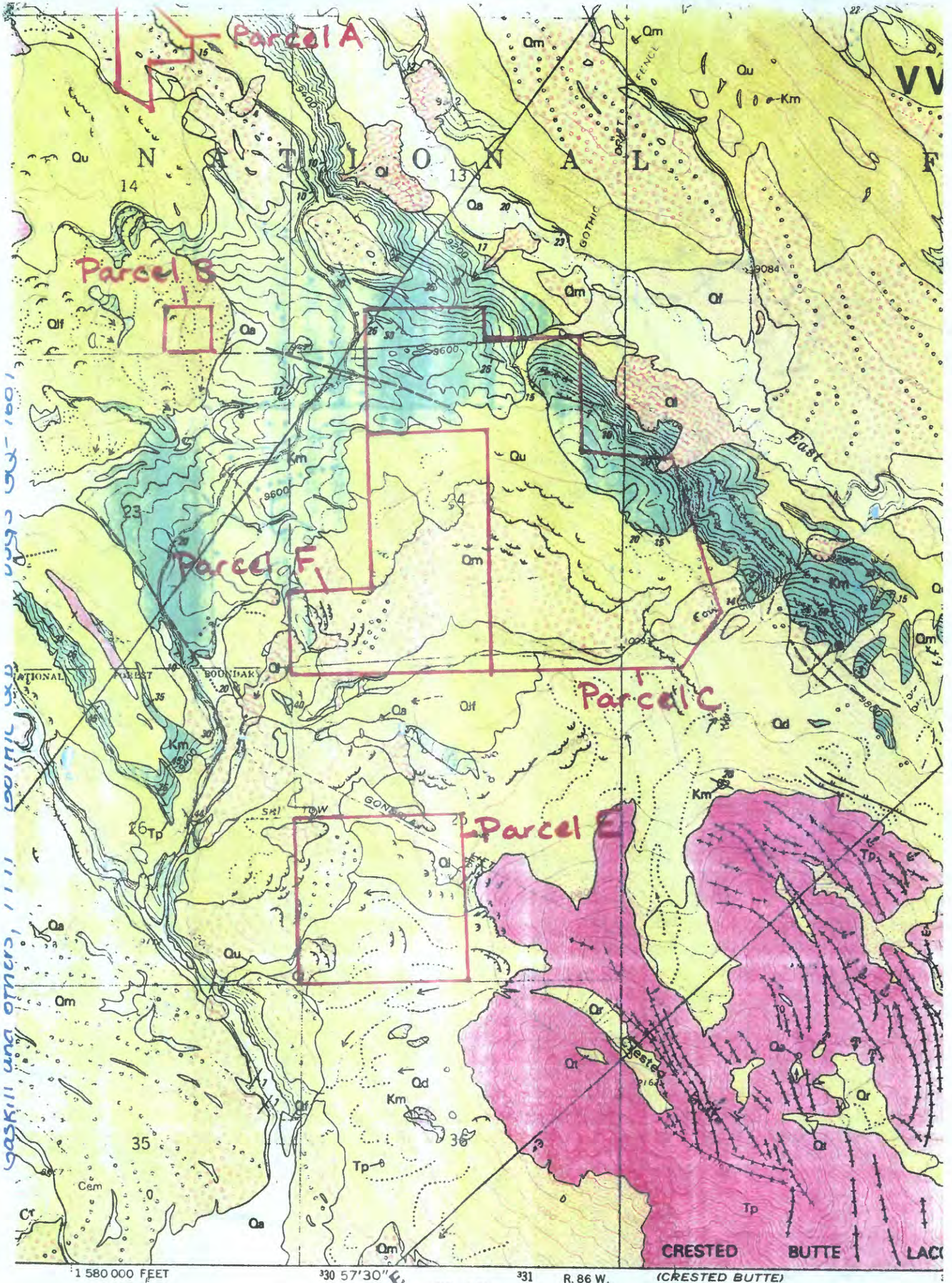
Reference DINGS, M., AND ROBINSON, C., 1957, GEOL. AND ORE DEPOSITS OF GARFIELD QUAD, COLO.: USGS PROF. PAPER 289

– Reserves and Resources –

Item	Acc	Amount	Th Units	Year	Grade
MO	EST	100.000	LB	0.01% MC	
Rsv/Rso Src Info		AMAX			

(*Page 2*)

Taulmin and Hammarstrom, 1990, USGS Bull 1864
Shannon, 1988, C.S.M. PhD Thesis,



pg. 122

(page 124 follows)

United States Department of the Interior

U. S. GEOLOGICAL SURVEY
Box 25046 M.S. 905
Denver Federal Center
Denver, Colorado 80225

IN REPLY REFER TO:

(303) 236-5593
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awilson@usgs.gov

April 3, 1998

Mr. M. M. Underwood, Jr.
Director of Physical Resources
U.S. Forest Service - Rocky Mountain Region
P.O. Box 25127
Lakewood, CO 80225-0127

Dear Mr. Underwood:

This is in response to your March 24, 1998 (received March 26) request for information on locatable mineral resources in the land exchange proposal in which the County of El Paso, acting through its Parks Department and its Transportation Department, has offered certain non-Federal lands within the Pike National Forest in exchange for Federal lands also within the Pike National Forest.

In accordance with the working agreement under Public Law 86-509, we are providing you with a report on the locatable mineral resources on the lands described in Exhibits "A" and "B", included with your request. These lands comprise an unspecified number of acres, well in excess of 240, in El Paso County, Colorado.

Sincerely yours,

Anna B. Wilson, Geologist
Mineral Resource Surveys, Central Region

Copies: G.S. Plumlee
E.A. duBray

LOCATABLE MINERAL REPORT FOR THE
COUNTY OF EL PASO (BLACK FOREST) LAND EXCHANGE OFFER,
PIKE NATIONAL FOREST,
EL PASO COUNTY, COLORADO

By
Anna B. Wilson
U.S. Geological Survey

April 3, 1998

EXHIBIT A: Property that El Paso County will consider exchanging:

Parcel A: Forest Lakes Parcel
Parcel B: Barr Trailhead Fee Parcel
Parcel C: Barr Trailhead Lease Parcel (19,885 ft^2)

Acreage El Paso County will consider exchanging: **?**

EXHIBIT B: Property that the U.S. Forest Service will consider exchanging:

Parcel A:	160 acres
Parcel B:	80 acres
Acreage U.S. Forest Service will consider exchanging:	240 acres
Total acreage	>240 acres

The following report is based on information contained in USGS mineral resource and commodity files, mineral information databases (MRDS and MAS), and on reports and maps available in the USGS library. These are occasionally augmented with unpublished documents and personal experiences. No field studies or on-site visits were performed in preparing this report. Emphasis is primarily on locatable mineral resources. Leasable and salable resources are covered only if they appear in the above documents.

NON-FEDERAL LANDS

Parcel A: Forest Lakes Parcel
(Palmer Lake 1:24,000 quadrangle)

The Forest Lakes parcel is along the nearly north-striking Rampart Range Fault in Pleistocene Rocky Flats, Verdos, and Slocum alluvium and in Upper Holocene colluvium (Trimble and Machette, 1979). The parcel may include some Pikes Peak Granite (Precambrian Y), especially to the west of the fault.

There are no known mineral deposits in the vicinity of the Forest Lakes parcel (USGS, 1998a,b). Mineral resource potential is low.

Parcels B and C: Barr Trailhead Parcels
(Manitou Springs 1:24,000 quadrangle)

The Barr Trailhead parcels are entirely within Pikes Peak Granite (Precambrian Y) immediately west of the Ute Pass Fault (Trimble and Machette, 1979; Scott and Wobus, 1973).

There are no known mineral deposits in the vicinity of the Barr Trailhead parcels (USGS, 1998a,b). Mineral resource potential is low.

FEDERAL LANDS

Parcels A and B
(Black Forest 1:24,000 quadrangle)

Parcels A and B are mapped entirely within the upper part of the Paleocene and Upper Cretaceous Dawson Formation which is composed of arkosic sandstone, siltstone, claystone, and minor conglomerate. Dawson Formation forms most of the bedrock between Colorado Springs and Denver and is as much as 610 m thick (Scott and Wobus, 1973).

There are no known mineral deposits in the vicinity of the Barr Trailhead parcels (USGS, 1998a,b). Mineral resource potential is low.

REFERENCES CITED:

Scott, G.R., and Wobus, R.A., 1973, Reconnaissance Geologic Map of Colorado Springs and vicinity, Colorado: U.S. Geological Survey Miscellaneous Field Studies Map MF-482, scale 1:62,500.

Trimble, D.E., and Machette, M.N., 1979, Geologic map of the Colorado Springs - Castle Rock area, Front Range urban corridor, Colorado: U.S. Geological Survey Miscellaneous Investigations Series Map I-857-F, scale 1:100,000.

OTHER REFERENCES CONSULTED

Davis, M.W., and Streufert, R.K., 1990, Gold occurrences of Colorado: Colorado Geological Survey Resource Series 28, 101 p., 2 plates.

Plumlee, G.S., Streufert, R.K., Smith, K.S., Smith, S.M., Wallace, A.R., Toth, M.I., Nash, J.T., Robinson, Rob, Ficklin, W.H., and Lee, G.K., 1995, Map showing potential metal-mine drainage hazards in Colorado based on mineral-deposit geology: U.S. Geological Survey Open-File Report 95-26, scale 1:750,000.

Streufert, R.K., and Cappa, J.A., 1994, Location map and descriptions of metal occurrences in Colorado with notes on economic potential: Colorado Geological Survey Map Series 28, scale 1:500,000.

U.S. Geological Survey, 1998a, Mineral Resource Data System [MRDS: active computer file; data available from U.S. Geological Survey, Mineral Resources Program, Building 20, Denver Federal Center, Denver CO 80225].

U.S. Geological Survey, 1998b, Minerals Availability System [MAS: active computer file; data available from U.S. Geological Survey, Minerals Information Team (formerly U.S. Bureau of Mines), Building 20, Denver Federal Center, Denver CO 80225].

United States Department of the Interior

U. S. GEOLOGICAL SURVEY
Box 25046 M.S. 905
Denver Federal Center
Denver, Colorado 80225

IN REPLY REFER TO:

(303) 236-5593
FAX (303) 236-3200
awilson@usgs.gov

December 16, 1997

Ms. Nancy Hollenkamp
c/o Mr. M.M. Underwood, Jr.
Director of Physical Resources
U.S. Forest Service - Rocky Mountain Region
P.O. Box 25127
Lakewood, CO 80225-0127

Dear Ms. Hollenkamp:

This is in response to Mr. Underwood's December 4, 1997 request for information on locatable mineral resources for a land exchange proposal in which Kenneth and Lynette Fossey and Eldor and Phyllis Paul have offered certain non-Federal lands within the Roosevelt National Forest in exchange for Federal lands also within the Roosevelt National Forest.

In accordance with the working agreement under Public Law 86-509, we are providing you with a report on the locatable mineral resources on the lands described in Exhibits "A" and "B", included with your request. These lands comprise 157.75 acres, more or less, in Larimer County, Colorado.

Sincerely yours,

Anna B. Wilson, Geologist
Mineral Resource Surveys, Central Region

Copies: G.S. Plumlee
E.A. duBray

LOCATABLE MINERAL REPORT FOR THE FOSSEY/PAUL LAND EXCHANGE OFFER, ROOSEVELT NATIONAL FOREST, LARIMER COUNTY, COLORADO

By
Anna B. Wilson
U.S. Geological Survey

December 16, 1997

EXHIBIT "A": Property that Kenneth and Lynette Fossey and Eldor and Phyllis Paul shall consider exchanging:

T5N, R72W, Sixth Principal Meridian, Colorado
Sec. 25, S 1/2 SW 1/4 — 77.75 acres

EXHIBIT "B": Property that the Forest Service shall consider exchanging:

T5N, R72W, Sixth Principal Meridian, Colorado
Sec. 25, N 1/2 SW 1/4 — 80.00 acres
(and, if needed for equalization, a portion of Sec. 25, NW 1/4 SE 1/4)

Total acreage considered for exchange **157.75 acres**

SUMMARY:
(Panorama Peak 24K, Greeley 250K)

The properties are contiguous and appear to be in Precambrian biotite gneiss, schist and migmatite principally derived from sedimentary rocks with the peak of metamorphism at about 1,750 Ma (Braddock and Cole, 1978; Tweto, 1979). Locally there may be interbedded hornblende gneiss, calc-silicate rock, quartz-rich rock, and metaconglomerate.

There are no mines in the immediate vicinity (U.S. Geological Survey, 1997a, b). The Crystal Mountain pegmatite district is more than 10 miles to the north. Uranium minerals have been reported in the region but none in the Panorama Peak 7 1/2' quadrangle (Nelson-Moore and others, 1978). Reports of copper and gold at Drake, about 5 miles to the northeast, are unsubstantiated (Vanderwilt, 1947).

Mineral potential on the properties is expected to be low.

REFERENCES:

Braddock, W.A., and Cole, J.C., 1978, Preliminary geologic map of the Greeley 1X2 quadrangle, Colorado and Wyoming: U.S. Geological Survey Open-File Report 78-532, scale 1:250,000.

Nelson-Moore, J.L., and others, 1978, Radioactive mineral occurrences of Colorado and Bibliography: Colorado Geological Survey Bulletin 40, p. 209.

Tweto, Ogden, 1979, Geologic map of Colorado: U.S. Geological Survey, scale 1:500,000.

U.S. Geological Survey, 1997a, Mineral Resource Data System [MRDS: active computer file; data available from U.S. Geological Survey, Mineral Resources Program, Building 20, Denver Federal Center, Denver CO 80225].

U.S. Geological Survey, 1997b, Minerals Availability System [MAS: active computer file; data available from U.S. Geological Survey, Minerals Information Team (formerly U.S. Bureau of Mines), Building 20, Denver Federal Center, Denver CO 80225].

Vanderwilt, J.W., 1947, Mineral resources of Colorado: Mineral Resource Board, Denver, Colorado, 547 p.

United States Department of the Interior

U. S. GEOLOGICAL SURVEY
Box 25046 M.S. 905
Denver Federal Center
Denver, Colorado 80225

IN REPLY REFER TO:

(303) 236-5593
FAX (303) 236-3200
awilson@usgs.gov

September 9, 1998

Mr. M. M. Underwood, Jr.
Director of Physical Resources
U.S. Forest Service - Rocky Mountain Region
P.O. Box 25127
Lakewood, CO 80225-0127

Dear Mr. Underwood:

This is in response to your July 8, 1998 request for information on locatable mineral resources in the Rocky Mountain Lodge land exchange proposal in which Hans Von Mende has offered certain non-Federal lands within Roosevelt National Forest in exchange for Federal lands also within Roosevelt National Forest.

In accordance with the working agreement under Public Law 86-509, we are providing you with a report on the locatable mineral resources on the lands described in Exhibits "A" and "B", included with your request. These lands comprise 150 acres, more or less, in Boulder County, Colorado.

Sincerely yours,

Anna B. Wilson, Geologist
Mineral Resource Surveys, Central Region

Copies: G.S. Plumlee
E.A. duBray

LOCATABLE MINERAL REPORT FOR THE ROCKY MOUNTAIN LODGE (Hans Von Mende) LAND EXCHANGE OFFER, ROOSEVELT NATIONAL FOREST, BOULDER COUNTY, COLORADO

By
Anna B. Wilson
U.S. Geological Survey

September 9, 1998

EXHIBIT A: Property that Hans Von Mende of Rocky Mountain Lodge, Inc. will consider exchanging:

6th Principal Meridian, Boulder County, Colorado

	acres
Petzite, La Clede, and Occidental Lode Mining Claims, USMS 9139	14.17
T. 1 N., R. 72 W.	
Secs. 2 and 3:	
T. 2 N., R. 72 W.	
Secs. 34 and 35:	
South St. Vrain Creek tract	40.00
T. 2 N., R. 73 W.	
Sec. 35: SW 1/4 NW 1/4	
Grand Island Mining District:	
T. 1 N., R. 74 W.	
Sec. 35: Arapaho No. 2, MS# 17588	5.10
Sec. 36: Chilkoot Pass, MS #17090	4.95
T. 1 N., R. 74 W.	
Sec. 2: Arapaho No. 1, No. 3, No. 4, MS# 17588	±15.00
T. 1 N., R. 74 W.	
Sec. 1: Klondyke and Klondyke No. 2, MS# 17588	±25.00
Total non-federal property considered for exchange:	±90.0

EXHIBIT B: Property that the Forest Service will consider exchanging:

6th Principal Meridian, Boulder County, Colorado

T. 1 S., R. 73 W.	acres
Sec. 13: SW 1/4 SE 1/4	40.0
Sec. 24: part of NE 1/4	±20.0
Total federal property considered for exchange	±60.0
Total acreage considered for exchange	**±150**

The following report is based on information contained in USGS mineral resource and commodity files, mineral information databases (MRDS and MAS), and on reports and maps available in the USGS library. These are occasionally augmented with unpublished documents and personal experiences. No field studies or on-site visits were performed in preparing this report. Emphasis is primarily on locatable mineral resources. Leasable and salable resources are covered only if they appear in the above documents.

NON-FEDERAL LANDS

Petzite, La Clede and Occidental Lode Mining Claims
(Gold Hill 1:24,000)

Three patented mining claims are located at the intersection of the Hoosier fault and the Caribou antiform in cordierite- and magnetite-bearing sillimanite-biotite gneiss and biotite-quartz-plagioclase gneiss (Gable, 1980, map unit Xgns; see figure 1) that is intruded by 1,700 Ma Boulder Creek granodiorite (Gable, 1980, map unit Xgd).

The claims are more than 1.5 mi. northwest of the productive parts of the Gold Hill mining district. No mines are located in the immediate vicinity of the claims (Lovering and Goddard, 1950; USGS, 1998a,b). Mineral resource potential of the claims is moderate.

T. 2 N., R. 73 W., Sec. 35, SW 1/4 NW 1/4
(Ward 1:24,000 quadrangle)

This property is entirely covered with Upper Pleistocene glacial till of Pinedale age and Holocene and Pleistocene organic-rich (peat bog) sediment (Gable and Madole, 1976, map units Qp and Qo, respectively; see figure 2).

A few miles to the north, peat has been removed commercially (Gable and Madole, 1976). With the exception of peat, no mineral deposits are known in the vicinity of the property. The till should be examined for suitability as a source of sand and gravel. Mineral resource potential for all other deposits is low.

Grand Island Mining District: Chilkoot, Arapaho, and Klondyke Claims
(Monarch Lake, East Portal, and Nederland 1:24,000 quadrangles)

These long strings of claims parallel a NW-striking shear zone in Boulder Creek Granodiorite (Gable, 1969, map unit gd, see figure 3B; Young, 1991, map unit Xb, see figure 3A) and in biotite gneiss (Gable, 1969, map unit gnb, see figure 3B; Young, 1991, map unit Xgb, see figure 3A) on the northeast side of North Fork Middle Boulder Creek.

The property is associated with the 4th of July mine which produced 115 tons or ore containing an average of 1.6 oz/ton gold and 3 oz/ton silver from 1914-1937 (Pearson, 1980, p. 61-63). There are several other mines and prospects in the vicinity, none with recorded production. Pearson (1980) assumed the ore came from a small pocket and presented no evidence that larger deposits

were likely to be present. Mineral resource potential for small base and precious metal veins is moderate.

FEDERAL LANDS
T. 1 S., R. 73 W., Sec. 24, part of NE 1/4; Sec. 13, SW 1/4, SE 1/4
(Nederland 1:24,000 quadrangle)

These four properties are in Proterozoic Boulder Creek Granodiorite and two phases of biotite gneiss all of which are intruded by quartz monzonite (Gable, 1969, map units gd, gnb and gnbc, qm; see figure 4) and cut by a northwest-striking fault.

These tracts are in an unmineralized area about 1 mi. north of the Boulder County Tungsten District (Lovering and Goddard, 1950). Mineral resource potential is low.

REFERENCES CITED:

Gable, D.J., 1969, Geologic map of the Nederland quadrangle, Boulder and Gilpin Counties, Colorado: U.S. Geological Survey Geologic Quadrangle Map GQ-833, scale 1:24,000.

Gable, D.J., 1980, Geologic map of the Gold Hill quadrangle, Boulder County, Colorado: U.S. Geological Survey Geologic Quadrangle Map GQ-1525, scale 1:24,000.

Gable, D.J., and Madole, R.F., 1976, Geologic map of the Ward quadrangle, Boulder County, Colorado: U.S. Geological Survey Geologic Quadrangle Map GQ-1277, scale 1:24,000.

Lovering, T.S., and Goddard, E.N., 1950, Geology and ore deposits of the Front Range, Colorado: U.S. Geological Survey Professional Paper 223, 319 p.

Pearson, R.C., 1980, Mineral resources of the Indian Peaks Study Area, Boulder and Grand Counties, Colorado, *with a section on* Interpretation of aeromagnetic data, by Gordon Johnson: U.S. Geological Survey Bulletin 1463, 109 p, scale 1:250,000.

U.S. Geological Survey, 1998a, Mineral Resource Data System [MRDS: active computer file; data available from U.S. Geological Survey, Mineral Resources Program, Building 20, Denver Federal Center, Denver CO 80225].

U.S. Geological Survey, 1998b, Minerals Availability System [MAS: active computer file; data available from U.S. Geological Survey, Minerals Information Team (formerly U.S. Bureau of Mines), Building 20, Denver Federal Center, Denver CO 80225].

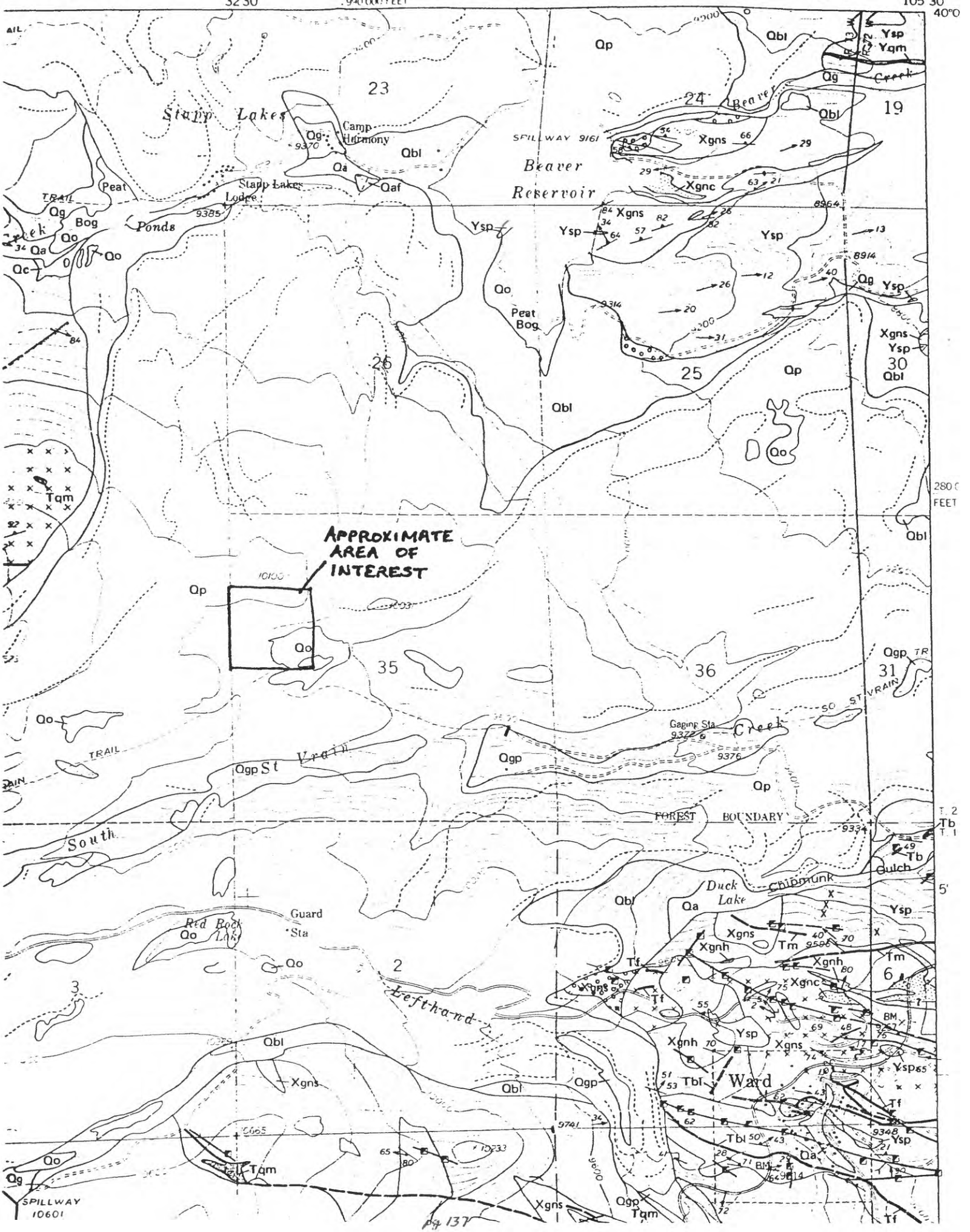
Young, E.J., 1991, Geologic map of the East Portal quadrangle, Boulder, Gilpin, and Grand Counties, Colorado: U.S. Geological Survey Miscellaneous Investigations Series Map I-2212, scale 1:24,000.

GABLE, 1980, GOLD HILL, USGS GQ-1525

FIG. 1

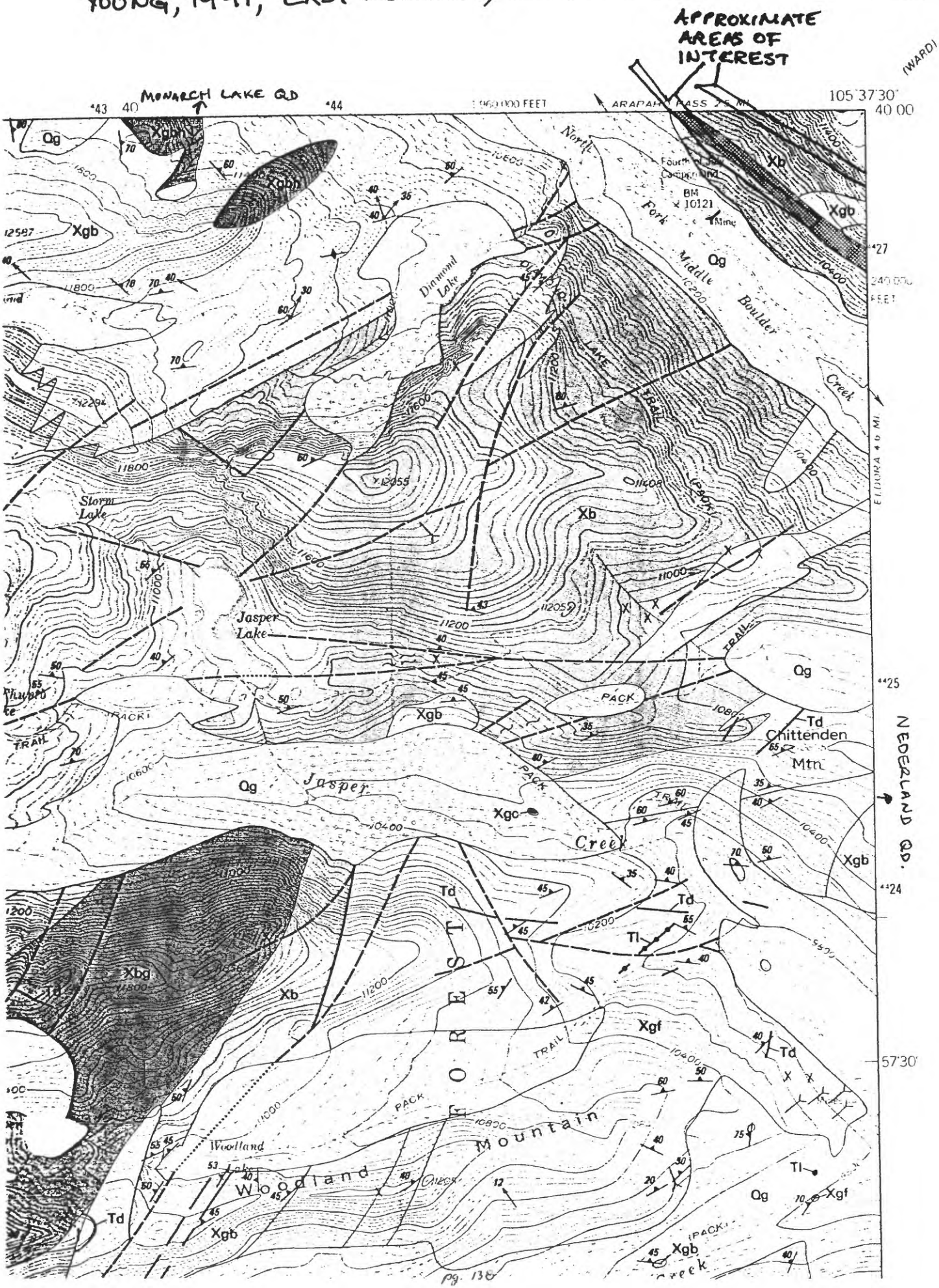
GABLE and MADOLE, 1976, WARD QD, USGS GQ-1277

FIG. 2



YOUNG, 1991, EAST PORTAL, USGS I-2212

FIG 3A



GABLE, 1969, NEDERLAND QD, USGS GQ-833

FIG 3B

Order does

t age

porphyry, gran
grained rhyodacit
rhyodacite porph

Younger Precambrian

Biotite-hornblende
and fine-

Q
Biotite-hornblend
quartz diorite,
porphyry, and fi

Hornblende - py
pyroxene mo
hornblende - py

Diabase, gabbro,
Pyroxenite is comm
blende-pyrox

Quar
Quartz monzonite, q
hornblende-pyrox
blende-quartz mo
monzonite, and b
The age of the qua
Mountain stock is
in his 1964 report
v. 72, p. 493–525

Hornblende-pyrox
blende latite po
hornblende-quart
latite porphyry

Biotite-m
Pinkish-gray to li
equigranular qua
cline, oligoclase,
muscovite. Poss

Hornblend
Black or mottled b
grained massive
Contains small
quartz monzonite
and pegmatite

T 1 S

United States Department of the Interior

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Denver, Colorado 80225

IN REPLY REFER TO:

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February 20, 1998

Ms. Nancy Hollenkamp
c/o Mr. M.M. Underwood, Jr.
Director of Physical Resources
U.S. Forest Service - Rocky Mountain Region
P.O. Box 25127
Lakewood, CO 80225-0127

Dear Ms. Hollenkamp:

This is in response to Mr. Underwood's February 3, 1998 request for information on locatable mineral resources for a land exchange proposal in which Mary Ross Quaintance Estate and Bear Creek Development Corporation have offered certain non-Federal lands within the Roosevelt National Forest in exchange for Federal lands also within the Roosevelt National Forest. Additional non-Federal lands in Gunnison National Forest also may be considered for exchange.

In accordance with the working agreement under Public Law 86-509, I am providing you with a report on the locatable mineral resources on the lands described in Exhibits "A" and "B", included with your request. These lands comprise 300 acres, more or less, in Larimer County, Colorado and as much as 59.073 acres in Gunnison County.

Sincerely yours,

Anna B. Wilson, Geologist
Mineral Resource Surveys, Central Region

Copies: G.S. Plumlee
E.A. duBray

LOCATABLE MINERAL REPORT FOR THE MARY ROSS QUAINTANCE ESTATE/ BEAR CREEK DEVELOPMENT CORPORATION LAND EXCHANGE OFFER, ROOSEVELT NATIONAL FOREST, LARIMER COUNTY, COLORADO

(With additional lands to be considered within Gunnison National Forest, Gunnison County)

By
Anna B. Wilson
U.S. Geological Survey

February 20, 1998

EXHIBIT "A": Property that Mary Ross Quaintance Estate and Bear Creek Development Corporation shall consider exchanging:

T.10 N., R.73 W., Sixth Principal Meridian, Larimer County, Colorado

Sec. 14, SW 1/4 NW 1/4	40 acres ±
Sec. 14, SE 1/4 NE 1/4	40 acres ±
Sec. 27, that portion of the SW 1/4 SW 1/4 owned by the Mary Ross Quaintance Estate	25 acres ±
Total acreage:	105 acres ±

NOTE: If preliminary value estimates indicate that the parcels listed in Exhibit A are less than the values of the parcels listed in Exhibit B, it is understood by both parties that an additional parcel or parcels of land from the following list will be included in Exhibit A to equalize, as close as possible, the value of the parcels listed in Exhibit B.

Grand Ella Lode Mining Claim M.S. No. 10060 Minnie Friend Lode Mining Claim M.S. No. 10060 Sweepstakes Lode Mining Claim M.S. No. 6645 Ruby Mining District, Gunnison County, Colorado	28.103 acres ±
Silver Thistle Lode Mining Claim M.S. No. 5655 Elk Mountain Mining District, Gunnison County, Colorado	10.33 acres ±
Fourth of July Lode Mining Claim M.S. No. 10060 Mountain Quail Lode Mining Claim M.S. No. 6645 Rock Creek Mining District, Gunnison County, Colorado	20.64 acres ±
Total additional acreage:	59.073 acres ±

EXHIBIT "B": Property that the Forest Service shall consider exchanging:

T.10 N., R.73 W., Sixth Principal Meridian, Larimer County, Colorado

Sec. 22, N 1/2 SE 1/4	80 acres ±
Sec. 22, N 1/2 SW 1/4 (also described as lots 5 and 6)	75 acres ±
Sec. 27, NE 1/4 NE 1/4	40 acres ±
Total acreage, more or less	195 acres ±

Total acreage considered for exchange	**300 to 359.073 acres**

SUMMARY:
(Red Feather Lakes 1:24,000, Fort Collins 1:100,000, and Greeley 1:250,000 quadrangles)

Detailed geologic mapping of the Red Feather Lakes area could not be located. Extrapolating from small-scale mapping (Braddock and Cole, 1978; Tweto, 1979) and from adjacent 7 1/2-minute quadrangle maps to the north (Braddock and others, 1989) and south (Shaver and others, 1988), it would appear that the Larimer County properties are underlain by 1.4 Ga Silver Plume Granite.

There are no mines in the immediate vicinity (U.S. Geological Survey, 1998a, b) yet there are small mining districts in the region. The nearest of these is the Manhattan district, about 5 miles to the southwest, which produced about 27 ounces of Au and 9 ounces of Ag from 1932-1941 (Vanderwilt, 1947, p. 139) probably from Tertiary veins in the Silver Plume granite and a small amount of placer gold. Uranium minerals have been reported in veins in the granite in the region but none closer than 5 mi. from the properties (Nelson-Moore and others, 1978).

Mineral resource potential for Au-Ag in Tertiary veins, on the properties is low. The properties should be examined for presence of uranium minerals in fractures in the granite and placer gold in any surficial deposits. Locally, Silver Plume Granite has been used for industrial commodities such as gravel and monument stones.

Note: As of 2/20/98, per Nancy Hollenkamp, the lands in Gunnison County have been withdrawn from this exchange.

REFERENCES:

Braddock, W.A., and Cole, J.C., 1978, Preliminary geologic map of the Greeley 1° x 2° quadrangle, Colorado and Wyoming: U.S. Geological Survey Open-File Report 78-532, scale 1:250,000.

Braddock, W.A., Cole, J.C., and Eggler, D.H., 1989, Geologic map of the Diamond Peak quadrangle, Larimer County, Colorado, and Albany County, Wyoming: U.S. Geological Survey Geologic Quadrangle Map GQ-1614, scale 1:24,000.

Nelson-Moore, J.L., and others, 1978, Radioactive mineral occurrences of Colorado and Bibliography: Colorado Geological Survey Bulletin 40, p. 209.

Shaver, K.C., Nesse, W.D., and Braddock, W.A., 1988, Geologic map of the Rustic quadrangle, Larimer County, Colorado: U.S. Geological Survey Geologic Quadrangle Map GQ-1619, scale 1:24,000.

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Vanderwilt, J.W., 1947, Mineral resources of Colorado: Mineral Resource Board, Denver, Colorado, 547 p.

Quaintance Estate / USDA Forest Service Land Exchange

Location Map

September 4, 1997

1:24000

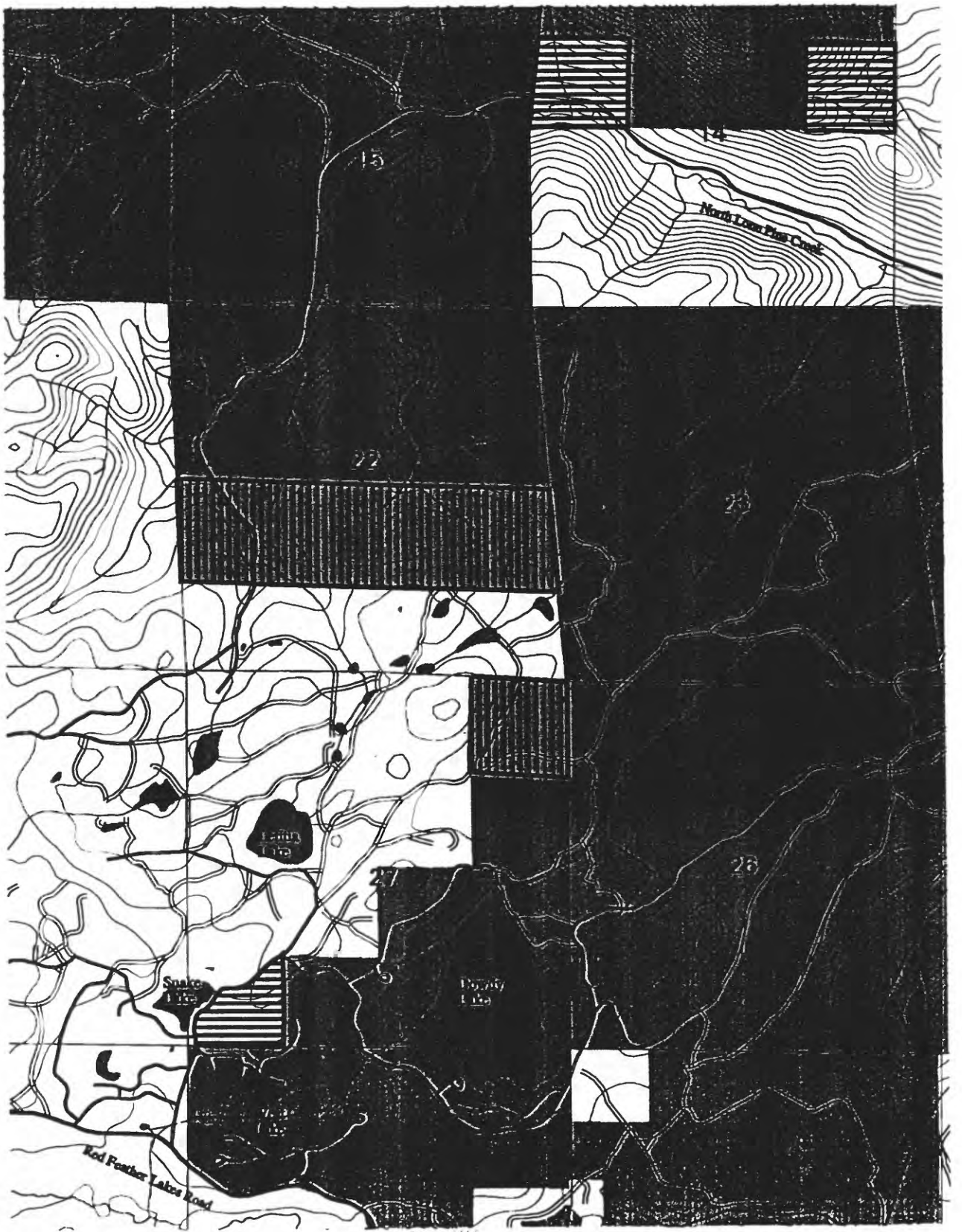
Red Feather Lakes Quad

0 0.25 0.5 0.75 1 Miles

N

T.10N., R.73W., 6th PM
Larimer County, Colorado
Arapaho and Roosevelt National Forests
Redfeather Ranger District

Proposed Land Exchange
- Federal Lands
- Non Federal Lands



United States Department of the Interior

U. S. GEOLOGICAL SURVEY
Box 25046 M.S. 905
Denver Federal Center
Denver, Colorado 80225

IN REPLY REFER TO:

(303) 236-5593
FAX (303) 236-3200
awilson@usgs.gov

September 2, 1998

Mr. M. M. Underwood, Jr.
Director of Physical Resources
U.S. Forest Service - Rocky Mountain Region
P.O. Box 25127
Lakewood, CO 80225-0127

Dear Mr. Underwood:

This is in response to your July 10, 1998 request for information on locatable mineral resources in the Sullivan-Jolley Creek land exchange proposal in which Eleven Bar Ranch LLC has offered certain non-Federal lands within Routt National Forest in exchange for Federal lands also within Routt National Forest.

In accordance with the working agreement under Public Law 86-509, we are providing you with a report on the locatable mineral resources on the lands described in Exhibits "A" and "B", included with your request. These lands comprise 322.32 acres, more or less, in Grand and Rio Blanco Counties, Colorado.

Sincerely yours,

Anna B. Wilson, Geologist
Mineral Resource Surveys, Central Region

Copies: G.S. Plumlee
E.A. duBray

LOCATABLE MINERAL REPORT FOR THE
SULLIVAN-JOLLY CREEK (ELEVEN BAR RANCH LLC) LAND EXCHANGE OFFER,
ROUTT NATIONAL FOREST,
GRAND AND RIO BLANCO COUNTIES, COLORADO

By
Anna B. Wilson
U.S. Geological Survey

September 2, 1998

EXHIBIT A: Property that Milton C. Sullivan will consider exchanging:

6th Principal Meridian, Grand County, Colorado

T. 1 N., R. 82 W.		acres
Secs. 7 & 18, Easterly portion of Tract 39		125.46

EXHIBIT B: Property that the Forest Service will consider exchanging:

6th Principal Meridian, Rio Blanco County, Colorado

T. 3 N., R. 90 W.		acres
Sec. 22:	Lot 14	21.36
	Lot 16	43.02
Sec. 27:	Lot 1	41.25
	Lot 2	10.27
	Lot 9	40.35
	Lot 10	40.61
Total acreage		196.86

Total acreage considered for exchange **322.32**

The following report is based on information contained in USGS mineral resource and commodity files, mineral information databases (MRDS and MAS), and on reports and maps available in the USGS library. These are occasionally augmented with unpublished documents and personal experiences. No field studies or on-site visits were performed in preparing this report. Emphasis is primarily on locatable mineral resources. Leasable and salable resources are covered only if they appear in the above documents.

NON-FEDERAL LANDS

Jolley Creek Property

(Gore Pass and Lynx Pass 1:24,000, and Craig 1:250,000 quadrangles)

The entire area considered for exchange is in Jurassic Morrison Formation overlying 1,700 Ma granitic rocks (Tweto, 1976; see figure 1). The mineral resource assessment of Routt National Forest did not assign any mineral resource potential to this area.

There are no known mineral deposits in the vicinity of the property (USGS, 1998a,b; Soulliere and others, 1996). Mineral resource potential of the Jolley Creek property is low.

FEDERAL LANDS

Eleven Bar Ranch (Sullivan) Property

(Slide Creek 1:24,000 and Craig 1:250,000 quadrangles)

The Eleven Bar Ranch (Sullivan) property is along Pine Creek in the Flat Tops. Cretaceous Mancos Shale (Tweto, 1976; see figure 2) covers the area.

A mineral resource assessment of Routt National Forest (Soulliere and others, 1996) did not evaluate this area as favorable for any metallic mineral resources. There are no known mineral deposits on the property (USGS, 1998a,b; Soulliere and others, 1996). Mineral resource potential is low.

There is moderate potential for oil in fractured shale, coal, and conventional and subthrust gas accumulations (Soulliere and others, 1996). At least two drill holes are adjacent to the property but the target of the holes is not known.

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Tweto, Ogden, 1976, Geologic map of the Craig 1 X 2 quadrangle, northwestern Colorado: U.S. Geological Survey Miscellaneous Investigations Series Map I-972, scale 1:250,000.

OTHER REFERENCES CONSULTED

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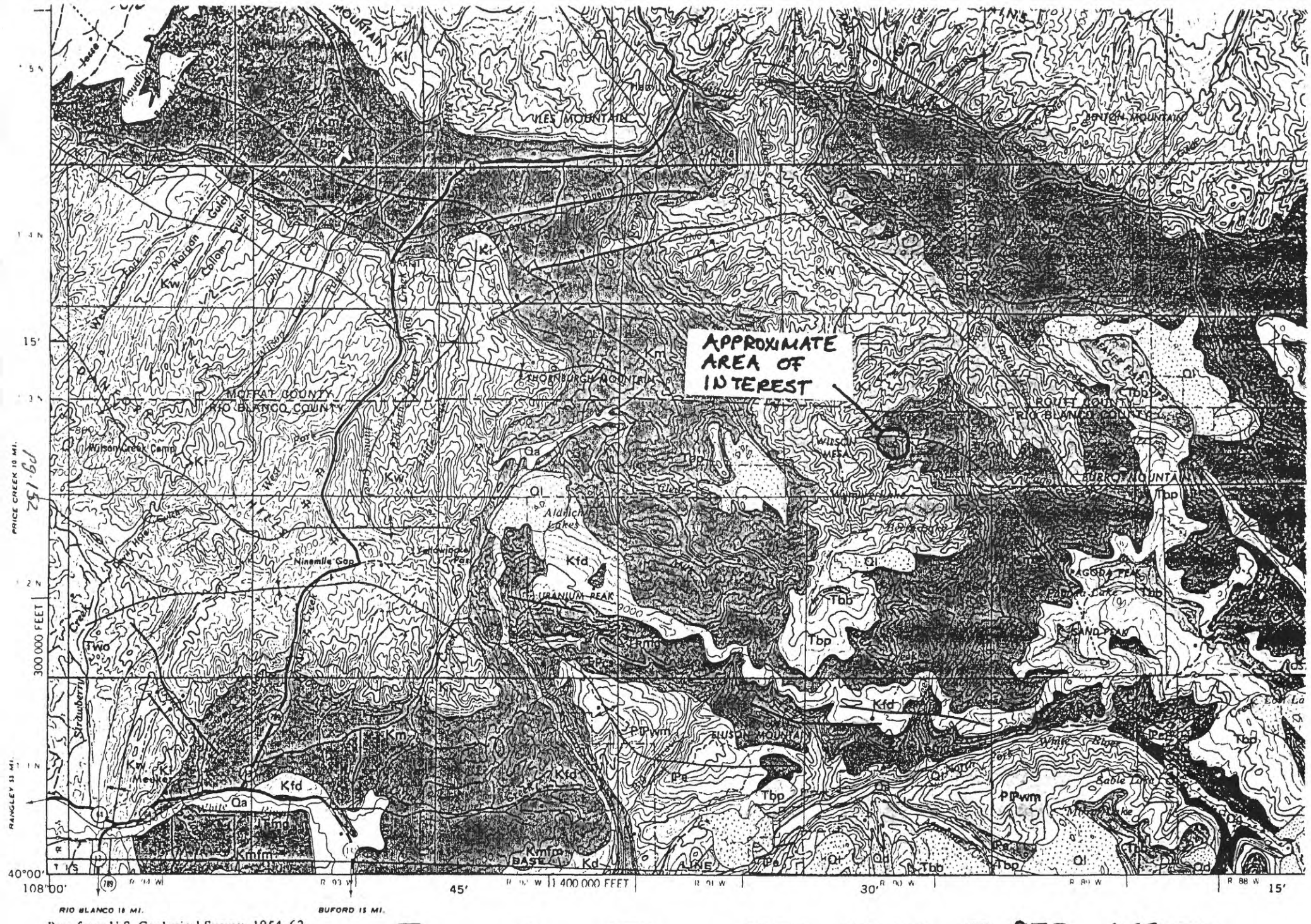
U.S. Geological Survey, 1998b, Minerals Availability System [MAS: active computer file; data available from U.S. Geological Survey, Minerals Information Team (formerly U.S. Bureau of Mines), Building 20, Denver Federal Center, Denver CO 80225].


APPROXIMATE AREA OF INTEREST
DIVIDE
45'
30'
R 84 W
R 83 W
R 82 W
R 81 W
R 80 W
DILLON 38 MI.

pg 151



Base from U.S. Geological Survey, 1954–62

100,000-foot grid based on Colorado coordinate system, north zone

10,000-metre Universal Transverse Mercator grid ticks, zone 13, shown in blue

FIGURE 2 TWETO, 1976, USGS I-972 1:250,000

United States Department of the Interior

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December 17, 1997

Mr. M.M. Underwood, Jr.
Director of Physical Resources
U.S. Forest Service - Rocky Mountain Region
P.O. Box 25127
Lakewood, CO 80225-0127

Dear Mr. Underwood:

This is in response to your November 7, 1997 request for information on locatable mineral resources for a land exchange proposal in which the Jack B. Kelley Enterprizes (sic), Inc., represented by Western Land Group Inc., has offered certain non-Federal lands within the San Juan National Forest in exchange for Federal lands within the San Juan and Uncompahgre National Forests.

In accordance with the working agreement under Public Law 86-509, I am providing you with a report on the locatable mineral resources on the lands described in Exhibits "A" and "B", the Fish Creek Land Exchange, included with your request and faxed or mailed as addenda. These lands comprise 474.5 acres, more or less, in Dolores, Montezuma, San Juan, and San Miguel Counties, Colorado.

Sincerely yours,

Anna B. Wilson, Geologist
Mineral Resource Surveys, Central Region

Copies: G.S. Plumlee
E.A. duBray

LOCATABLE MINERAL REPORT FOR THE
JACK B. KELLEY ENTERPRIZES FISH CREEK LAND EXCHANGE OFFER,
SAN JUAN AND UNCOMPAHGRE NATIONAL FORESTS,
DOLORES, MONTEZUMA, SAN JUAN, AND SAN MIGUEL
COUNTIES, COLORADO

By
Anna B. Wilson
U.S. Geological Survey

December 17, 1997

EXHIBIT A: Property that the U.S. Forest Service shall consider exchanging:

T40N, R13W, New Mexico Principal Meridian (NMPM), Dolores County, Colorado:

Parcel A:	40 acres
Sec. 11: N1/2NE1/4NE1/4SE1/4 and S1/2SE/4SE1/4NE1/4	
Sec. 12: S1/2SE1/4NW1/4 and S1/2S1/2SW1/4NW1/4	
Parcel B:	20 acres
Sec. 12: W1/2NW1/4SE1/4	
Parcel C:	20 acres
Sec. 13: E1/2NW1/4NW1/4	
Parcel D:	21.65 acres
Sec. 13: W1/2 Lot 2	
Acreage USFS will consider exchanging:	**101.65 acres**

EXHIBIT B: Property that Jack B. Kelley Enterprizes shall consider exchanging:

T38N, R15W, NMPM, Montezuma County, Colorado:
Section 21: N1/2NW1/4, SE1/4NW1/4, NW1/4NE1/4 (House Creek tract) 160 acres

LODE CLAIMS:

T41N, R8W, NMPM, San Juan and San Miguel Counties:
Sec. 7: Beauty of the West (MS 1837, Pat #10809 8/13/1886)

T41N, R8W, NMPM, San Juan County:
Sec. 7: Thunder Shower (MS 1808, Pat #14310 9/20/1888)
Sec. 34: Tin Horn, Woods (MS 16194, Pat #39590 9/16/1904)

T40N, R9W and T41N, R9W, NMPM, San Juan County:
Sec. 1&2 and Sec. 35&36:
Capitol, Diamond Pillow, Grandview, Mayflower, Mammoth, O.K., Pride of the West, Round Up, Silver Crown (4870, Pat #16946 12/26/1890)

T41N, R9W, NMPM, San Miguel County:
Sec. 36: Vermillion (MS 4773, Pat #16943 12/26/1890)
Black Bear (MS 4778, Pat #16942 12/26/1890)

T41N, R9W, NMPM, San Juan and San Miguel Counties:
Sec. 35&36: Hidden Treasure, Mountain Queen (MS 4774, Pat #16941 12/26/1890)

T40N, R9W, NMPM, San Juan County:
Sec. 10Silver Star (MS 4889, Pat #16796 11/19/1890)

Acreage Jack B. Kelley Enterprizes, Inc. will consider exchanging: 372.85 acres

Total Federal and Non-Federal acreage considered for exchange 474.5 acres

(Note that lands in Dolores, Montezuma, and San Juan Counties are in San Juan National Forest. Lands in San Miguel County are in Uncompahgre National Forest.)

LOCATABLE MINERAL REPORT FOR THE JACK B. KELLEY ENTERPRIZES FISH CREEK LAND EXCHANGE OFFER, SAN JUAN AND UNCOMPAHGRE NATIONAL FORESTS, DOLORES, MONTEZUMA, SAN JUAN, AND SAN MIGUEL COUNTIES, COLORADO

The following report is based on information contained in USGS mineral resource and commodity files, mineral information databases (MRDS and MAS), and on reports and maps available in the USGS library. These are occasionally augmented with unpublished documents and personal experiences. No field studies or on-site visits were performed in preparing this report. Emphasis is primarily on locatable mineral resources. Leasable and salable resources are covered only if they appear in the above documents.

FEDERAL LANDS

Parcels A-D
(Dove Creek 100K and Clyde Lake 24K quadrangles)

The area of the parcels is in gently southwest-dipping Mesozoic and upper Paleozoic sedimentary rocks which host natural gas, carbon dioxide, coal, uranium-vanadium, and limestone deposits elsewhere in the region (Neubert and others, 1992). All four parcels are in Permian through Jurassic strata exposed by the down-cutting of Fish Creek, a tributary of the Dolores River. Quaternary alluvium fills the creek bottom (Haynes and others, 1972). Besides the alluvium, rock units include arkosic sandstone, siltstone, and conglomerate of the Permian Cutler Formation, red fluvial siltstone, sandstone, and shale of the Triassic Dolores Formation, and cross-bedded sandstone, limey sandstone, and limestone of the Jurassic Junction Creek Sandstone, Wanakah Formation, and Entrada Sandstone, undifferentiated (Cross and Ransome, 1905; Haynes and others, 1972; Van Loenen and others, 1997; see **attachment A**).

No mines, prospects, or occurrences are known in this area (Van Loenen and others, 1997; USGS, 1997 a, b). The Fish Creek parcels are located well west of the mining and exploration activity at Rico and well east of the area prospected for uranium and vanadium and has not been assigned mineral potential for locatable or leasable minerals (Van Loenen and others, 1997). There may be a sand and gravel resource in the alluvium in Fish Creek (Van Loenen and others, 1997).

NON-FEDERAL LANDS

House Creek tract
(Dove Creek 100K, Yellow Jacket 62.5K, and Trimble Point 24K quadrangles)

This tract, termed House Creek for this report, is northwest of the northeast-trending House Creek Fault which is dropped down to the northwest (Hackman, 1959; Haynes and others, 1972; Van Loenen and others, 1997). Rock units are mapped as Cretaceous Dakota Sandstone and Burro Canyon Formation, undifferentiated, and overlain by Mancos Shale (Hackman, 1959; Van Loenen and others, 1997).

This region is known more for its wealth of Native American artifacts and recreation potential adjacent to McPhee Reservoir than for any mineral potential. No mines, prospects, or occurrences are known in this area and it is not in a region with potential for locatable minerals (Van Loenen and others, 1997; U.S. Geological Survey, 1997a, b).

The area is within a much larger region assigned favorable potential for leasable oil and gas accumulations in the Carbonate Buildup Play where there are conventional oil and gas accumulations in porous carbonate mounds in equivalents of the Hermosa Group on the eastern margin of the Paradox Basin (Van Loenen and others, 1997).

The tract is also in an area outlined as favorable for salable commodities including dimension stone and aggregates (Van Loenen and others, 1997). The tract should be examined to determine if, on a site-specific scale, there is potential for these commodities.

Beauty of the West and Thunder Shower
(Silverton 100K and Ophir 24K quadrangles)

Unless otherwise cited, the geologic descriptions on which this assessment is based are from newly available mapping (Luedke, 1996; see **attachment B**). Bedrock is upper Paleozoic and Mesozoic, mainly clastic, sedimentary rocks that dip west to southwest. These rocks are unconformably overlain by Tertiary volcanic rocks that are flat lying to gently eastward-dipping. This volcanic assemblage is predominantly volcaniclastic rocks of intermediate composition in the lower part and welded ash-flow tuff of silicic composition in the upper part. Middle to late(?) Tertiary igneous dikes, sills, and small bodies of intermediate composition intruded the bedded rocks. Two large stocks, the Ophir (northwest of the tracts) and Grizzly Peak (southwest of the tracts) were emplaced about 26 Ma. Contact metamorphism extends about several hundred meters from these stocks but isn't prominent near the small intrusions. During Pleistocene the region was extensively glaciated: the resulting alpine topography is locally covered with a variety of surficial deposits (Luedke, 1996).

In the northern part of Ophir quadrangle, faults are oriented E-W, are long, pronounced, and mineralized. In the central and southern part of the quadrangle, including the Ice Lake Basin area (where the tracts considered for exchange are located), faults are generally NE- and NW- trending, short, and only minimally mineralized (Luedke, 1996).

At small scale (1:250,000), the general area including the Ice Lake Basin area is identified as favorable for the occurrence of two types of deposits: polymetallic replacement and skarn deposits and Creede-type epithermal veins in Tertiary volcanic terrane (Van Loenen and others, 1997). In the San Juan National Forest, the quantitative implication of a favorable designation means only that a 50 acre parcel of land so designated, would have between a 1 in 5,000 and a 1 in 10,000 chance for the occurrence of either a polymetallic replacement or epithermal (Creede-type) vein deposit (G.T. Spanski, U.S. Geological Survey, written communication 2/12/97).

On a site-specific scale, the geology within these tracts differs considerably from the regional generalizations on which the favorable designation is based. Primarily, these tracts are not in carbonate terrane, are quite distant from porphyry deposits, and are south of the area of intense mineralization. Little is known about any of the mining activity, past or present, in this district. Neither of these claims appear in the MRDS or MAS databases. Considerable local exploration work in the Ice Lake Basin area in the 1960's yielded no significant discoveries (R.G. Luedke, U.S. Geological Survey, retired, verbal communication 2/5/97)--nor did prospectors find much in the previous 80 years or so. Intermittent, small-scale exploration for veins of Au, Ag, (Cu, Pb, Zn) is likely to continue in the Ice Lake Basin area (Neubert and others, 1992).

Mineral potential on these claims is expected to be moderate. It is unlikely that any deposit in this district would be economically viable in the foreseeable future. There could be potential for acidic, sulfide-rich,

drainage from mines in this area: any existing mine dumps and effluent should be examined for potential metal-mine drainage hazards.

Beauty of the West follows northeast-trending veins in the Burns Member of the Oligocene Silverton Volcanics and underlying San Juan Formation (see attachment B). These are intruded by a small mass of ~26 Ma granodiorite. Both the intrusive and extrusive rocks are hydrothermally altered-- predominantly to quartz-sericite-clay. The northeastern end of the claim is buried under a rock glacier, the southwestern end is covered with talus. An early map (Cross and Purington, 1899) shows a gold quartz vein in this vicinity. Gold concentrations in samples taken from known mineralized veins and abandoned mine dumps in the vicinity are anomalous but subeconomic (Neubert and others, 1992). The claim map from 1883 shows a shaft and tunnel in San Juan County and the discovery cut and a tunnel in San Miguel County.

Thunder Shower follows a vein in the Burns Member of the Silverton Volcanics (see attachment B). Hydrothermal alteration is prominent at the northern end of the claim. There is no indication from the available literature of mineralization on this claim. The claim map from 1883 shows two north-trending tunnels near the center of the claim.

Tin Horn and Woods
(Silverton 100K and Silverton 24K quadrangles)

"A northwest-trending calcite-cemented breccia zone with some quartz veining is exposed at caved workings in Putnam Basin" and continues for about a mile to the southeast (Neubert and others, 1992, p. 203). A select sample of limonite- and manganese-oxide-stained quartz vein material at the southeast end, at or close to the claim in question, yielded 0.765 opt gold and minor amounts of other metallic elements (Neubert and others, 1992, p. 203, table 21, appendices A, B, C; see **attachment C**)).

As extrapolated from two maps (Steven and others, 1974; Luedke, 1996) the parcel is underlain by Permian Cutler Formation overlain by Eocene Telluride Conglomerate and Oligocene San Juan Formations.

No mention is made of these claims in the literature or databases. The claims are at the periphery of the area designated as favorable for polymetallic replacement veins and skarns and Creede-type epithermal replacement deposits. Mineral potential is expected to be moderate.

Capitol, Diamond Pillow, Grandview, Mayflower, Mammoth, O.K., Pride of the West, Round Up, Silver Crown and Hidden Treasure and Mountain Queen
(Silverton 100K and Ophir 24K quadrangles)

WARNING: This location is in question. The block is on the northwest end of Rolling Mtn straddling the San Juan/San Miguel county line on the BLM land status maps (attachment D) and county claim plats. According to BLM Master Title Plats (attachment E) it is on the east end of Rolling Mountain. For this assessment, I have assumed the former is the correct location.

This claim block is in an area of Oligocene granodiorite of the Grizzly Peak stock and is cut by veins or mineralized fissures (Luedke, 1996; see **attachment F**). The northern part of the block is hydrothermally altered to quartz-sericite-clay type that is commonly associated with ore deposits or with structural features related to ore localization (Luedke, 1996). Locally includes quartz-clay acid-sulfate type alteration. Overlying Holocene talus and Pleistocene glacial drift obscure the granodiorite (Luedke, 1996).

The area was not included in favorable terrane for any locatable mineral deposits (Van Loenen and others, 1997). Mineral potential is expected to be low to moderate.

Vermillion and Black Bear:
(Silverton 100K and Ophir 24K quadrangles)

WARNING: This location is in question. The claims are in San Miguel County according to the County claim plats, on the west end of Rolling Mtn straddling the San Juan/San Miguel county line on the BLM land status maps (attachment D), or on the east end of Rolling Mountain immediately south of the Big Three Mine (USGS Ophir 7 1/2 topo) according to aligning the county lines and Hope Lake on the BLM Master Title Plats (attachment E) with the USGS 7 1/2 topo (Master Title plat scale of 30 chains/inch = 1:23,720 so alignment is pretty good). For this assessment, I have assumed the first is the correct location.

The location of these two claims is unclear. However, if they are in San Miguel County the geology as mapped (Luedke, 1996) is almost identical to that of the Capitol claim block.

If the location on the Master Title Plat is correct, these claims are primarily in fresh Oligocene granodiorite of the Grizzly Peak stock immediately south of the Big Three mine (Luedke, 1996; see **attachments F and G**). Portions may be concealed by Pleistocene glacial drift and Holocene talus.

At the Big Three mine, there are north-trending, steeply dipping shears and veins in partially bleached and clay altered Grizzly Peak monzonite stock and all samples contained at least 600 ppb (0.018 oz/ton) gold and 60 ppm (1.8 oz/ton) silver (Neubert and others, 1992, p. 196). However, south of the mine, ore grades are lower, and alteration and veins are not mapped.

On the Black Bear and Vermillion claims as assumed to be located about 1 mile to the northwest of the Big Three mine, mineral potential for polymetallic vein deposits is expected to be low to moderate.

Silver Star
(Silverton 100K and Ophir 24K quadrangles)

This claim block is in an area of relatively fresh Oligocene granodiorite of the Grizzly Peak stock. Veins and mineralized fissures are shown in the area, though perhaps not on this claim (Luedke, 1996; see attachment F).

The area was not included in favorable terrane for any locatable mineral deposits (Van Loenen and others, 1997). Mineral potential is expected to be low.

SUMMARY:

Parcels A-D: No mines, prospects, or occurrences are known in this area (Van Loenen and others, 1997; USGS, 1997 a, b). The Fish Creek parcels were not designated favorable for locatable or leasable minerals (Van Loenen and others, 1997). There may be a sand and gravel resource in the alluvium in Fish Creek (Van Loenen and others, 1997).

House Creek tract: No mines, prospects, or occurrences are known in this area and it is not in a region with potential for locatable minerals (Van Loenen and others, 1997; U.S. Geological Survey, 1997a, b).

The tract is within a much larger region assigned favorable potential for leasable oil and gas accumulations in the Carbonate Buildup Play where there are conventional oil and gas accumulations in porous carbonate mounds in equivalents of the Hermosa Group on the eastern margin of the Paradox Basin (Van Loenen and others, 1997).

The tract is also in an area outlined as favorable for salable commodities including dimension stone and aggregates (Van Loenen and others, 1997). The tract should be examined to determine if, on a site-specific scale, there is potential for these commodities.

Lode Claims:

All of the claims are within an area outlined as favorable for oil and gas accumulations of the Silverton Delta Play in which conventional accumulations may occur in permeable deltaic sandstones or equivalents of the Hermosa Group along the flank of the Paradox Basin (Van Loenen and others, 1997).

All but Tin Horn, Woods, and Silver Star may be in, or close to, areas assigned favorable potential for dimension stone and large aggregate from Tertiary and Late Cretaceous intrusive rocks (Van Loenen and others, 1997).

Mineral potential for locatable resources is assigned as follows:

Beauty of the West and Thunder Shower, in Ice Lake Basin area occur in an area designated favorable for polymetallic replacement and skarn, and epithermal vein (Creede- type) deposits (Van Loenen and others, 1997). Mineral potential is expected to be moderate.

Tin Horn and Woods are on the periphery of the favorable area. If the mineralized vein in Putnam Basin continues southeast to these claims, mineral potential would be moderate.

Capitol...Mountain Queen block was not included in favorable terrane for any locatable mineral deposits (Van Loenen and others, 1997). This is somewhat unusual in that at the time of patent (1890) the claims

must have been proven to be economically viable. Although outside the favorable area, these could have as much as moderate potential for polymetallic vein deposits.

Vermillion and Black Bear: Mineral potential could be as much as moderate if alteration and veins continue north of the ridge into San Miguel County, otherwise low.

Silver Star was not included in favorable terrane for any locatable mineral deposits (Van Loenen and others, 1997). Mineral potential is expected to be low.

ATTACHMENTS:

A Geologic map of part of the Rico (15') quadrangle (Cross and Ransome, 1905)
B Geologic map of part of the Ophir (7 1/2') quadrangle (Luedke, 1996)
C Sample locality map for the Bear Mountain-Sultan Mountain areas (Neubert and others, 1992, p. 202)
D Part of the BLM 1:100,000 Land Status Map
E Part of BLM Master Title Plat
F Geologic map of part of the Ophir (7 1/2') quadrangle (Luedke, 1996)
G Sample locality map for the upper South Fork Mineral Creek area (Neubert and others, 1992, p. 197)

REFERENCES:

Cross, Whitman, and Ransome, F.L., 1905, Description of the Rico quadrangle, Colorado: U.S. Geological Survey Geologic Atlas, Folio 130, scale 1:62,500.

Hackman, R.J., 1959, Photogeologic map of the Yellow Jacket quadrangle, Montezuma and Dolores Counties, Colorado: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-281, scale 1:62,500.

Haynes, D.D., Vogel, J.D., and Wyant, D.G., 1972, Geology, structure, and uranium deposits of the Cortez quadrangle, Colorado and Utah: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-629, scale 1:250,000.

Luedke, R.G., 1996, Geologic map of the Ophir quadrangle, San Juan, San Miguel, and Dolores Counties, Colorado: U.S. Geological Survey Geologic Quadrangle Map GQ-1760, scale 1:24,000.

Neubert, J.T., Ellis, C.E., Hannigan, B.J., Jeske, R.E., Martin, C.M., Thompson, J.R., Tuftin, S.E., Wood, R.H., II, Zelten, J.E., 1992, Mineral appraisal of San Juan National Forest, Colorado, *with a section on* Industrial minerals, by A.G. Raby: U.S. Bureau of Mines Mineral Land Assessment Open-File Report MLA 2-92, 311 p.

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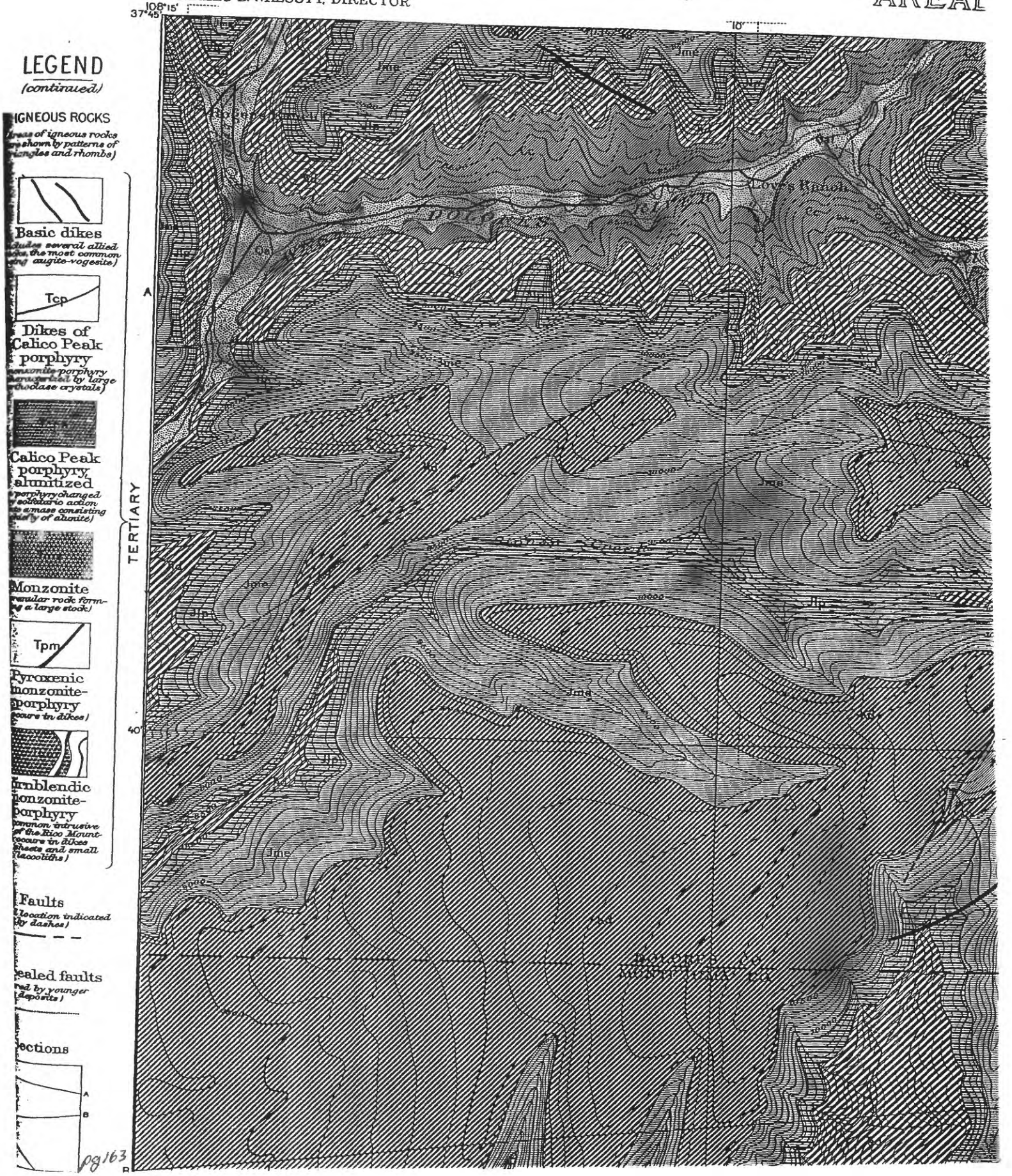
ATTACHMENT A
CROSS AND RANSOME, 1905
USGS ATLAS FOLIO 130

U. S. GEOLOGICAL SURVEY
CHARLES D. WALCOTT, DIRECTOR

AREAL



pg163

ATTACHMENT B LUEDKE, 1996 USGS MAP GQ-1760

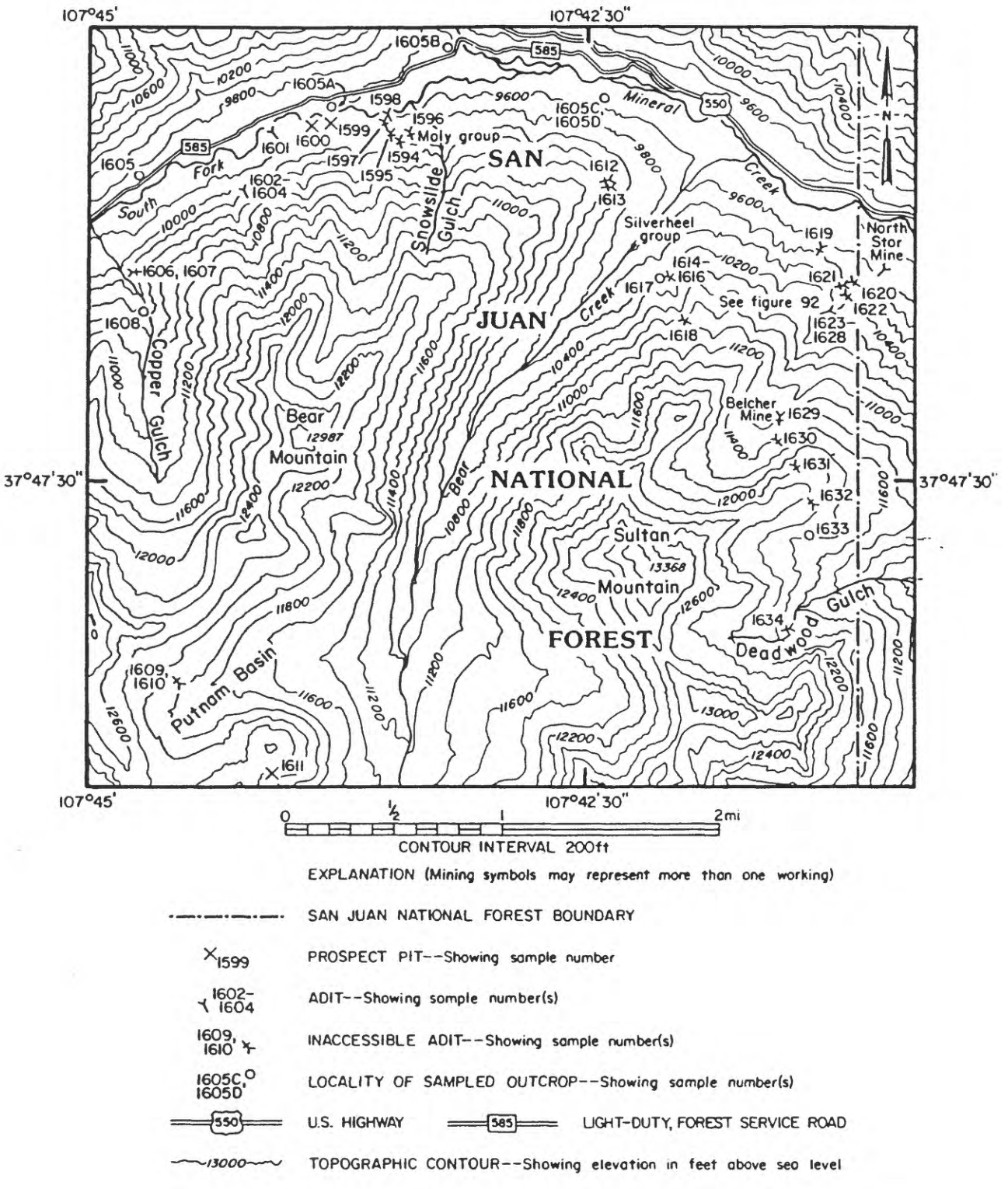
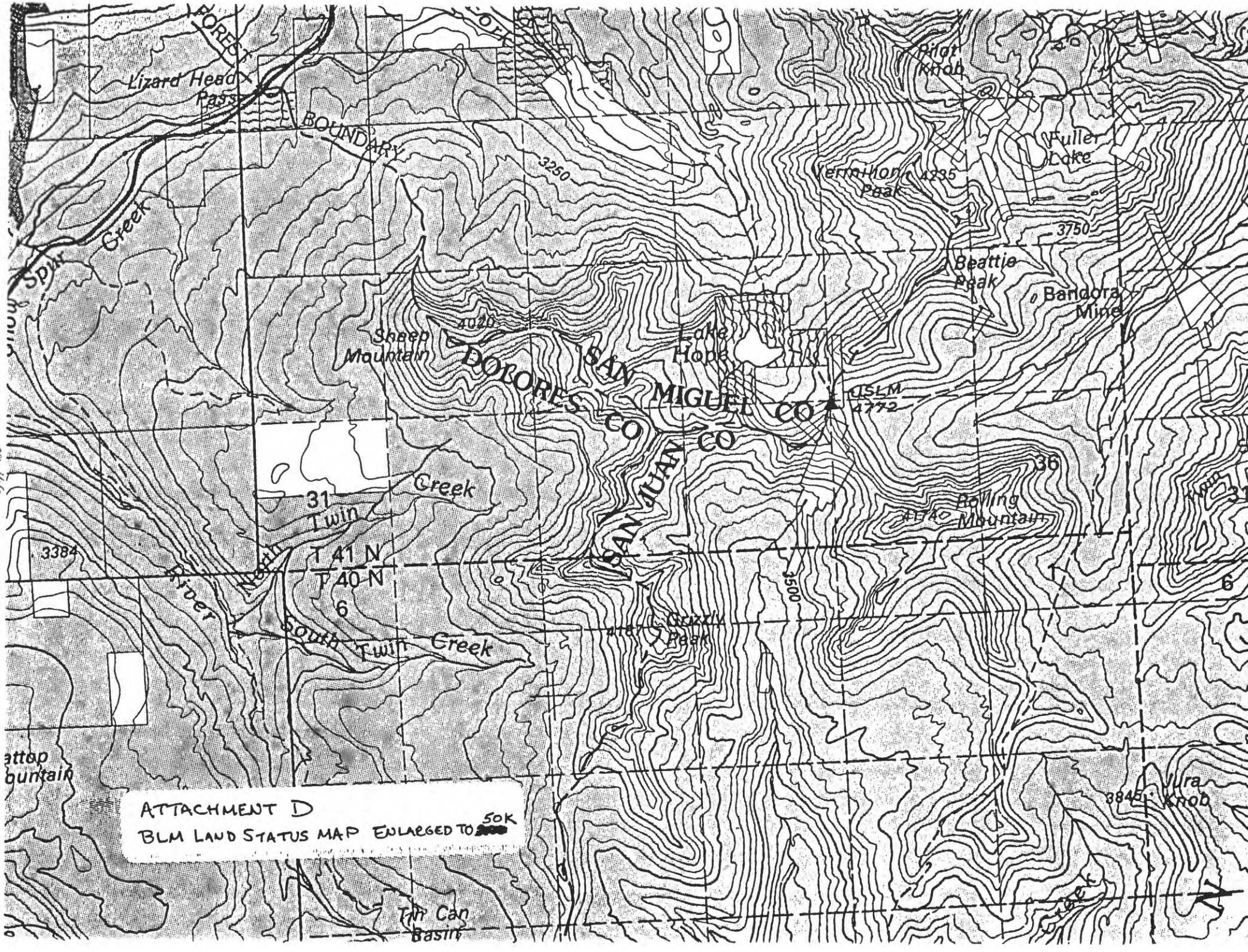
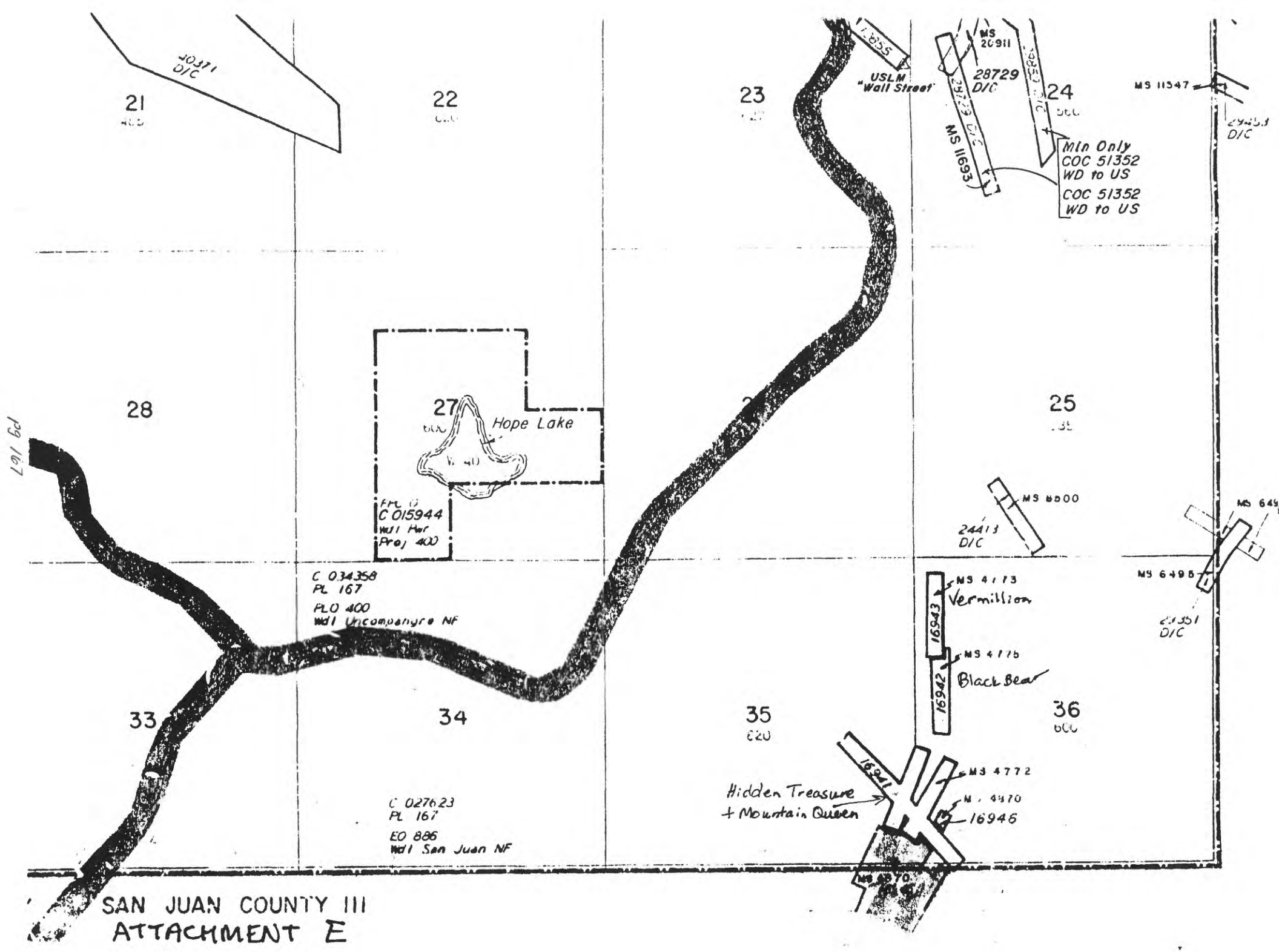


Figure 91.--Sample locality map for the Bear Mountain-Sultan Mountain areas.

ATTACHMENT C
(FROM NEUBERT AND OTHERS, 1992, p. 202)



ATTACHMENT D
BLM LAND STATUS MAP ENLARGED TO 50K


21
22
23
24
25
27
28
33
34
35
36
30371 D/C
USLM "Wall Street"
MS 20911
28729 D/C
29223 D/C
MS 11693
MS 11547
Min Only
COC 51352
WD to US
COC 51352
WD to US
Hope Lake
FPL ID
C 015944
Wdl Nat Proj 400
C 034358
PL 167
PLO 400
Wdl Uncompahgre NF
MS 6500
24413 D/C
MS 6496
MS 4173
Vermillion
16943
MS 4175
Black Bear
16942
MS 4772
16941
Hidden Treasure
+ Mountain Queen
M. 4570
16946
C 027623
PL 167
EO 886
Wdl San Juan NF
SAN JUAN COUNTY III
ATTACHMENT E

7°52'30"

1 320 000 FEET

50'

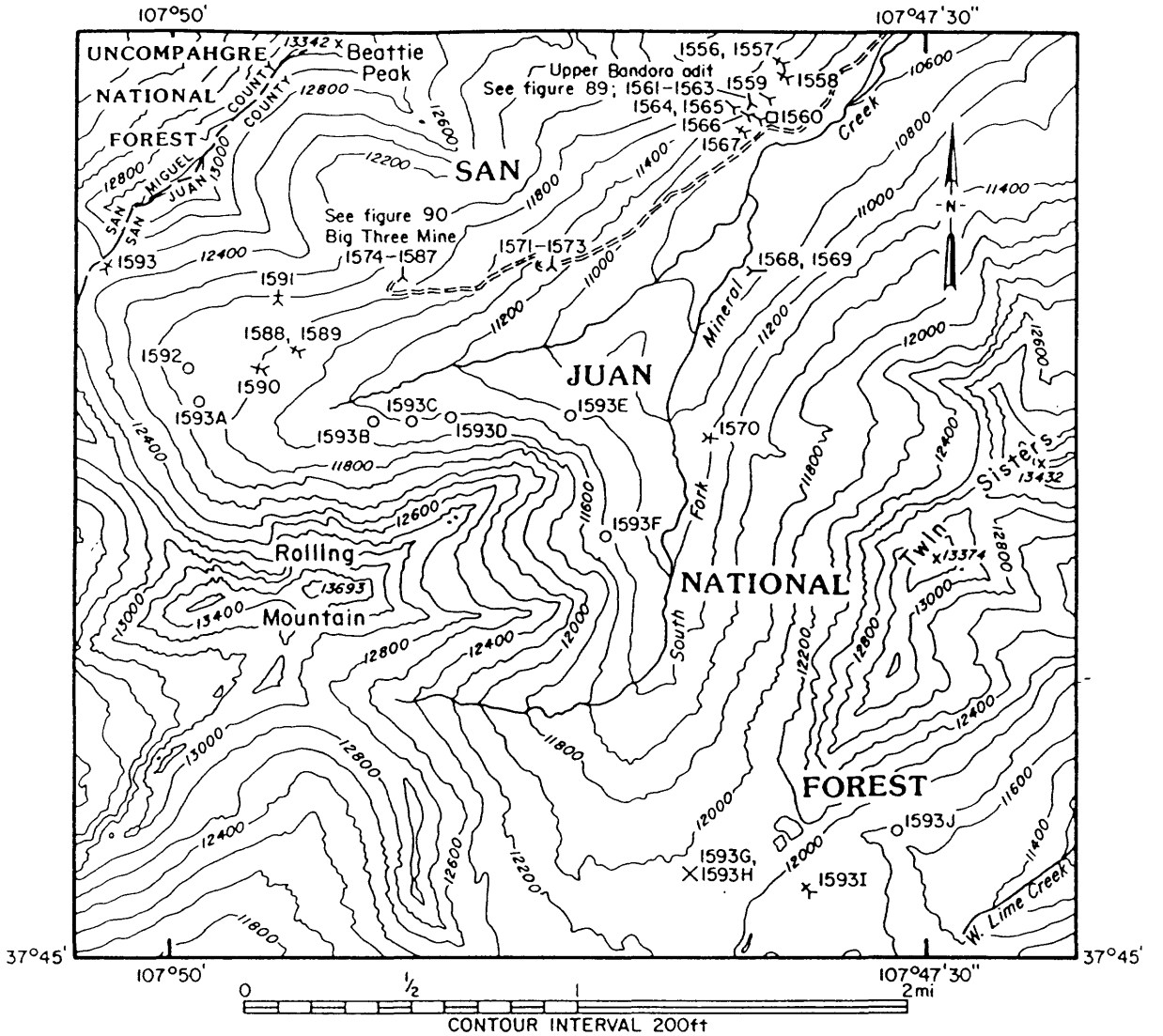
ATTACHMENT F

Base from U.S. Geological Survey, 1955

pg 168

claim: LUEDKE, 1996 OPHIR QD

USGS GQ-1760



EXPLANATION (Mining symbols may represent more than one working)

1571–1573	ADIT--Showing sample number(s)
1556, 1557	INACCESSIBLE ADIT--Showing sample number(s)
1593G, 1593H	PROSPECT PIT--Showing sample numbers
□1560	LOCALITY OF SAMPLED ORE HOPPER--Showing sample number
1593A	LOCALITY OF SAMPLED OUTCROP--Showing sample number
==========	UNIMPROVED DIRT ROAD
~~12400~~	TOPOGRAPHIC CONTOUR--Showing elevation in feet above sea level
x13374	UNCHECKED SPOT ELEVATION--Showing feet above sea level

Figure 88.--Sample locality map for the upper South Fork Mineral Creek area.

ATTACHMENT G
(FROM NEUBERT AND OTHERS, 1992, p.197)

SOUTH DAKOTA

United States Department of the Interior

U. S. GEOLOGICAL SURVEY
Box 25046 M.S. 905
Denver Federal Center
Denver, Colorado 80225

IN REPLY REFER TO:

(303) 236-5593
FAX (303) 236-3200
awilson@usgs.gov

February 26, 1998

Mr. M.M. Underwood, Jr.
Director of Physical Resources
U.S. Forest Service - Rocky Mountain Region
P.O. Box 25127
Lakewood, CO 80225-0127

Dear Mr. Underwood:

This is in response to your February 9, 1998 request for information on locatable mineral resources in a land exchange proposal in which South Dakota Department of Transportation has offered certain non-Federal lands within the Black Hills National Forest in exchange for Federal lands also within the Black Hills National Forest.

In accordance with the working agreement under Public Law 86-509, we are providing you with a report on the locatable mineral resources on the lands described in Exhibits "A" and "B", included with your request. These lands comprise 156 acres, more or less, in Pennington County, South Dakota.

Sincerely yours,

Anna B. Wilson, Geologist
Mineral Resource Surveys, Central Region

Copies: G.S. Plumlee
E.A. duBray

LOCATABLE MINERAL REPORT FOR THE
SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION
LAND EXCHANGE OFFER,
BLACK HILLS NATIONAL FOREST,
PENNINGTON COUNTY, SOUTH DAKOTA

By
Anna B. Wilson
U.S. Geological Survey

February 26, 1998

EXHIBIT A: Property that South Dakota Department of Transportation will consider exchanging:

T. 2 S., R. 6 E., Black Hills Meridian, Pennington County, South Dakota:	acres
Sec. 8, S 1/2 SW 1/4 and SW1/4 SE1/4, less Trammy Lot	103
Acreage South Dakota Department of Transportation will consider exchanging:	103

EXHIBIT B: Property that the U.S. Forest Service will consider exchanging:

T. 1 S., R. 5 E., Black Hills Meridian, Pennington County, South Dakota:	
Secs. 21 and 22, tract 37 (per BLM survey of 11-6-97)	52.95
Acreage U.S. Forest Service will consider exchanging:	approx. 52.95
Total acreage	approx. 156

The following report is based on information contained in USGS mineral resource and commodity files, mineral information databases (MRDS and MAS), and on reports and maps available in the USGS library. These data are occasionally augmented with other unpublished documents, personal communications, and professional experiences. No field studies or on-site visits were performed in preparing this report. Emphasis is primarily on locatable mineral resources. Leasable and salable resources are covered only if they appear in the above documents.

Non-Federal: South Dakota Department of Transportation
Mount Rushmore 1:24,000 quadrangle

This tract is in quartz schist, quartz-mica schist, and quartz-mica-staurolite schist (Norton, 1976; see attachment A) that corresponds with Early Proterozoic graywacke (DeWitt and others, 1989).

The tract is at a complex intersection and overlapping of several metallic mineralized districts (Wilson and DeWitt, 1995; see attachment B). The area is well within the Hugo district which contains the nearby Hugo and Monte Carlo mines (DeWitt and others, 1988b; see attachment C), and hosts potassium feldspar and mica pegmatites. The Etta district which contains Be- and Li-bearing pegmatites overlaps the eastern part of the tract. The tract is also at the eastern periphery of the Mount Rushmore district which hosts mica-bearing pegmatites and the western edge of the Keystone and Holy Terror districts which host Early Proterozoic syngenetic Au and Au-Ag vein deposits (Wilson and DeWitt, 1995).

At an assessment scale of 1:250,000, DeWitt and others (1986) assigned this area high mineral resource potential for small- to medium-size pegmatite deposits containing all pegmatite commodities except tin (Sn). On a site-specific scale, and based on lack of prospects and pegmatites at 1:24,000 scale geologic mapping (Norton, 1976), the potential is low to moderate.

Federal Property
Hill City 1:24,000 quadrangle

Geology of this area (Hill City 7 1/2-minute quadrangle) was mapped and described by Ratté and Wayland (1969). Early Proterozoic pegmatitic Harney Peak Granite forms a dome intruding folded pelitic phyllites and schists, and meagraywackes (DeWitt and others, 1989). The Federal property is north of the dome in Bugtown Formation composed of staurolite-grade quartz phyllite interlayered with thick-bedded quartzose rocks (Ratté and Wayland, 1969; see attachment D). Quaternary alluvium and terrace gravels surround the tract on the south and east margins.

An adit with a dump and a prospect are mapped on the property (Ratté and Wayland, 1969; DeWitt and others, 1988a). The tract is within 1 mi. of five mines and numerous other claims and prospects (DeWitt and others, 1988a; see attachment E). The J.R., J.R. Extension, and Eldorado mines are Early Proterozoic vein deposits. Typical commodities expected would be Au, Ag, and minor Pb, As, and Cu. The Carnbray mine is an Early Proterozoic Sn- and W-bearing pegmatite. The Hidden Treasure mine is a potassium feldspar-bearing pegmatite. Three mineralized districts overlap the tract including the Three Forks, Hill City, and Spring Creek districts (Wilson and DeWitt, 1995; see attachment B).

All of the above named deposits are within thick-bedded metagraywacke locally interlayered with thin layers of phyllite and schist and not within the same subunit of Bugtown Formation that is mapped in the tract (Ratté and Wayland, 1969; see attachment E). The tract is included in larger areas that were assigned moderate mineral resource potential for small vein deposits of Au and Ag and for small to medium Sn and Li pegmatites (DeWitt and others, 1986, pl. 2, fig. 17, p. 64-65) at an assessment scale of 1:250,000. Mapping at 1:24,000 (Ratté and Wayland, 1969) indicates no pegmatite nor the "correct" unit of the Bugtown Formation. Thus, on a site-specific scale, mineral resource potential for deposits of potassium feldspar or Sn- and Li- or W- bearing pegmatite, or Au-Ag veins is low to moderate.

ATTACHMENTS:

A Geologic map of part of Mount Rushmore quadrangle (Norton, 1976)
B Map of metallic mineralized districts (Wilson and DeWitt, 1995)
C Map of mines, claims, and prospects of the Mount Rushmore quadrangle (DeWitt and others, 1988b)
D Geologic map of part of Hill City quadrangle (Ratté and Wayland, 1969)
E Map of mines, claims, and prospects of the Hill City quadrangle (DeWitt and others, 1988a)

REFERENCES:

DeWitt, Ed, Buscher, David, Wilson, Anna, and Johnson, Tom, 1988a, Map showing locations of mines, prospects, and patented mining claims, and classification of mineral deposits in the Hill City 7 ½-minute quadrangle, Black Hills, South Dakota: U.S. Geological Survey Miscellaneous Field Studies Map MF-1978-J, scale 1:24,000.

DeWitt, Ed; Buscher, David; Wilson, Anna; and Johnson, Tom, 1988b, Map showing locations of mines, prospects, and patented mining claims, and classification of mineral deposits in the Mount Rushmore 7 ½-minute quadrangle, Black Hills, South Dakota: U.S. Geological Survey Miscellaneous Field Studies Map MF-1978-K, scale 1:24,000.

DeWitt, Ed, Redden, J.A. Redden, Buscher, David, and Wilson, A.B., 1989, Geologic map of the Black Hills area, South Dakota and Wyoming: U.S. Geological Survey Miscellaneous Investigations Series Map I-1910, scale 1:250,000.

DeWitt, Ed; Redden, J.A., Wilson, A.B., and Buscher, David, 1986, Mineral resource potential and geology of the Black Hills National Forest, South Dakota and Wyoming, *with a section on* salable commodities, by J.S. Dersch: U.S. Geological Survey Bulletin 1580, 135 p, 4 pls. (scale 1:250,000) in pocket.

Norton, J.J., 1976, Field compilation map of the geology of the Keystone area, Black Hills, South Dakota: U.S. Geological Survey Open-File Report 76-297, scale 1:24,000.

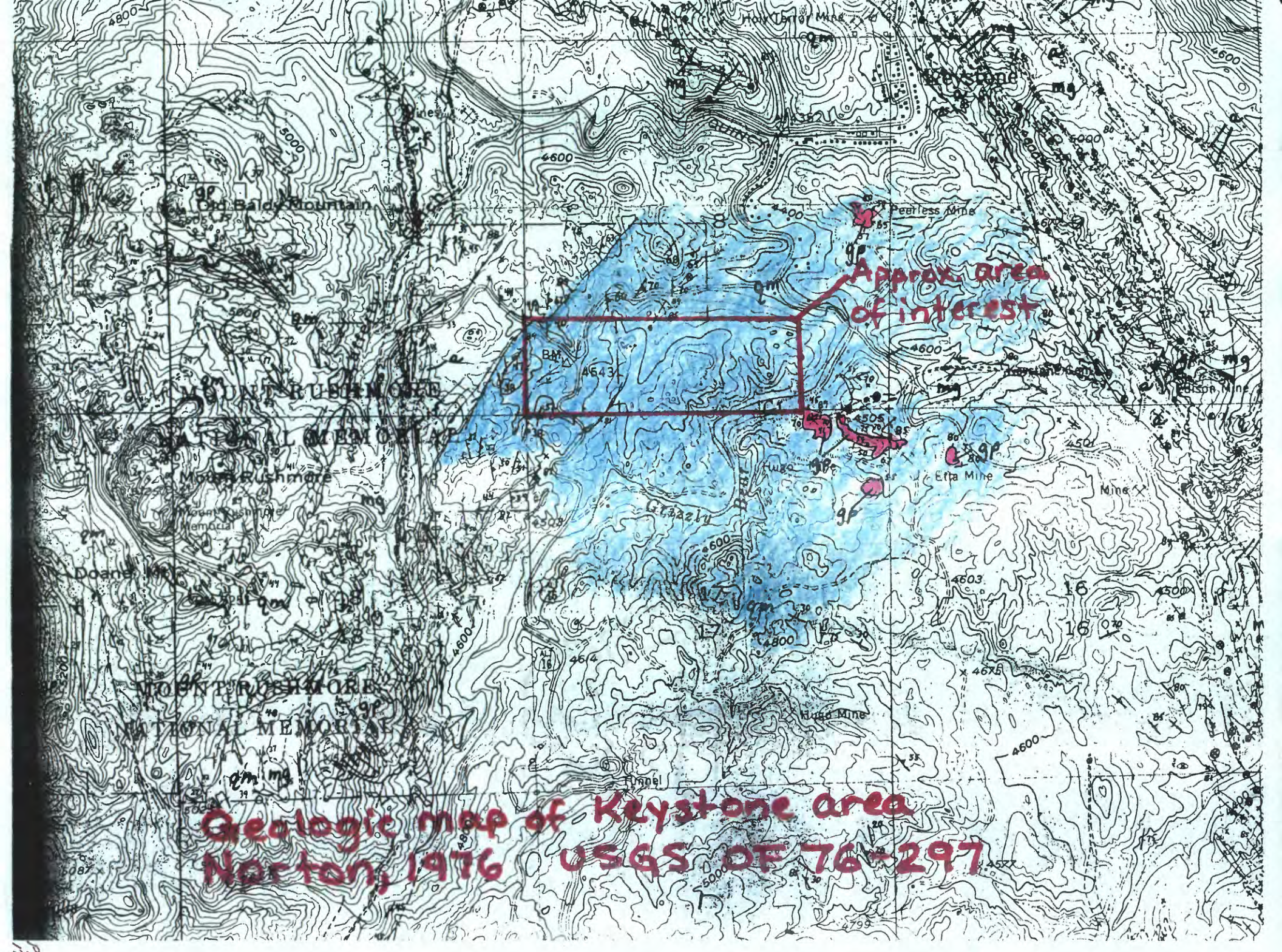
Ratté, J.C., and Wayland, R.G., 1969, Geology of the Hill City quadrangle, Pennington County, South Dakota--A preliminary report: U.S. Geological Survey Bulletin 1271-B, 14 p., 1 pl. (scale 1:24,000) in pocket.

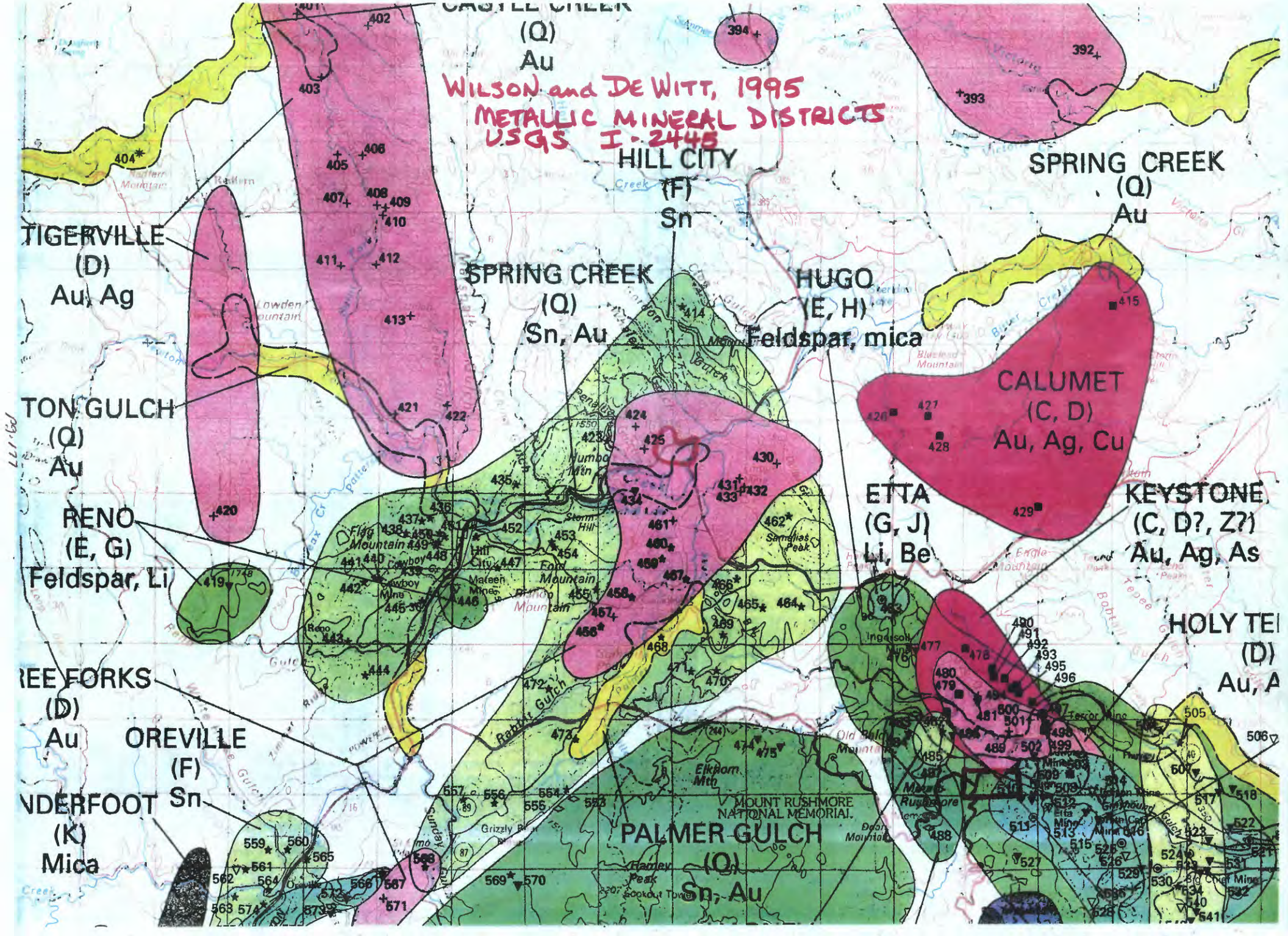
Wilson, A.B., and DeWitt, Ed, 1995, Maps showing metallic mineral districts and mines in the Black Hills, South Dakota and Wyoming: U.S. Geological Survey Miscellaneous Investigations Series Map I-2445, scale 1:100,000.

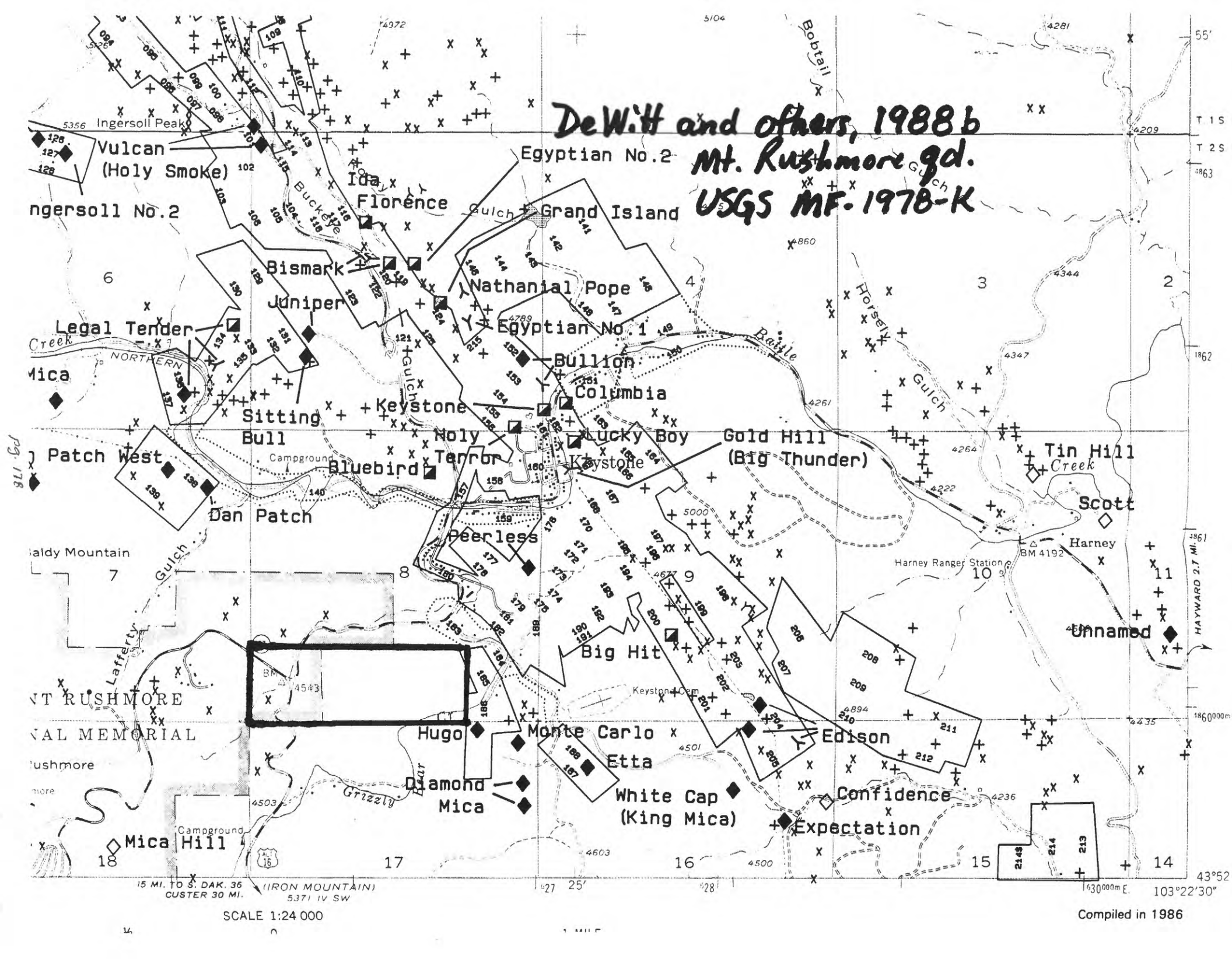
OTHER INFORMATION SOURCES:

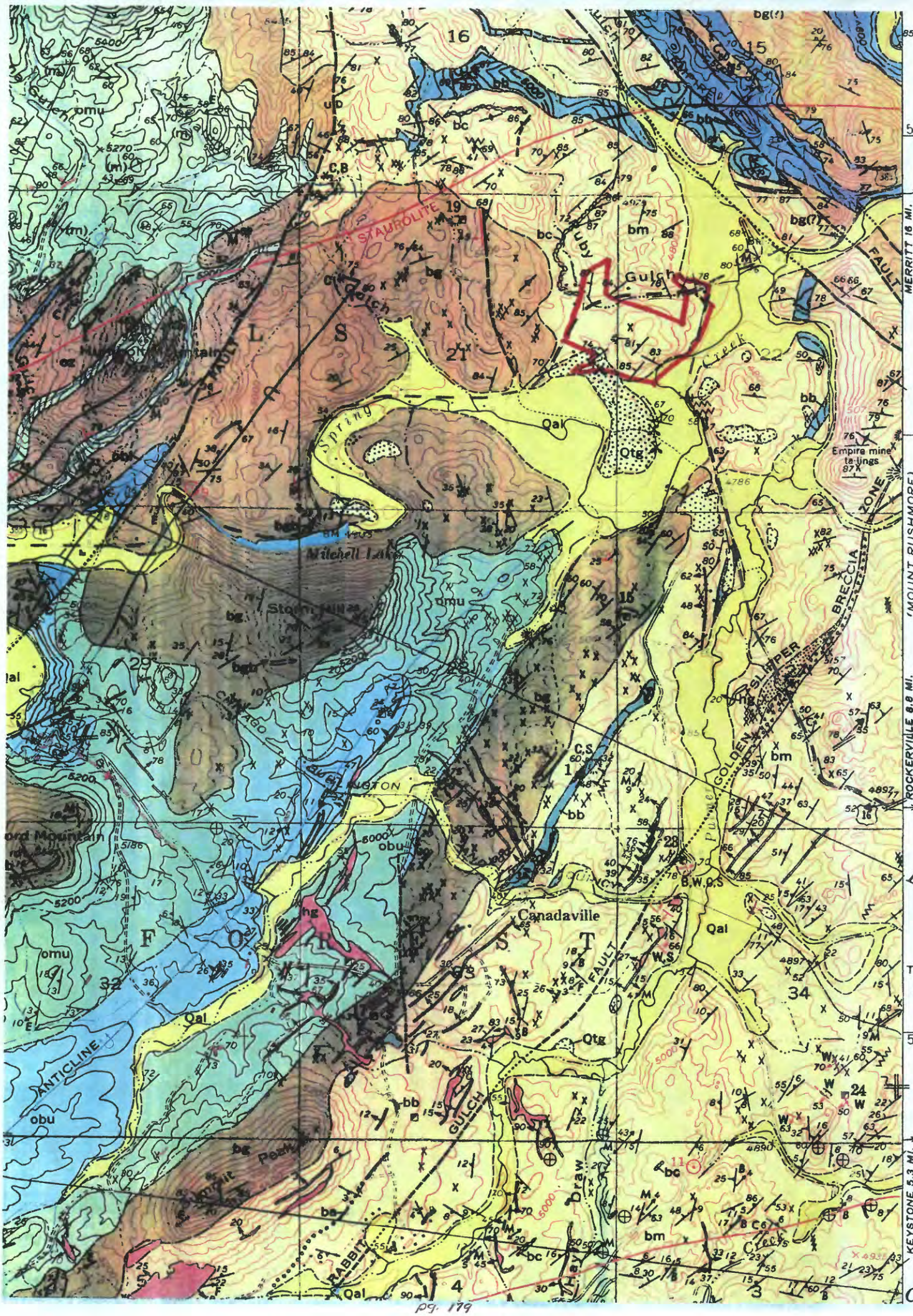
U.S. Geological Survey, 1998a, Mineral Resource Data System [MRDS: active computer file; data available from U.S. Geological Survey, Mineral Resources Program, Building 20, Denver Federal Center, Denver CO 80225].

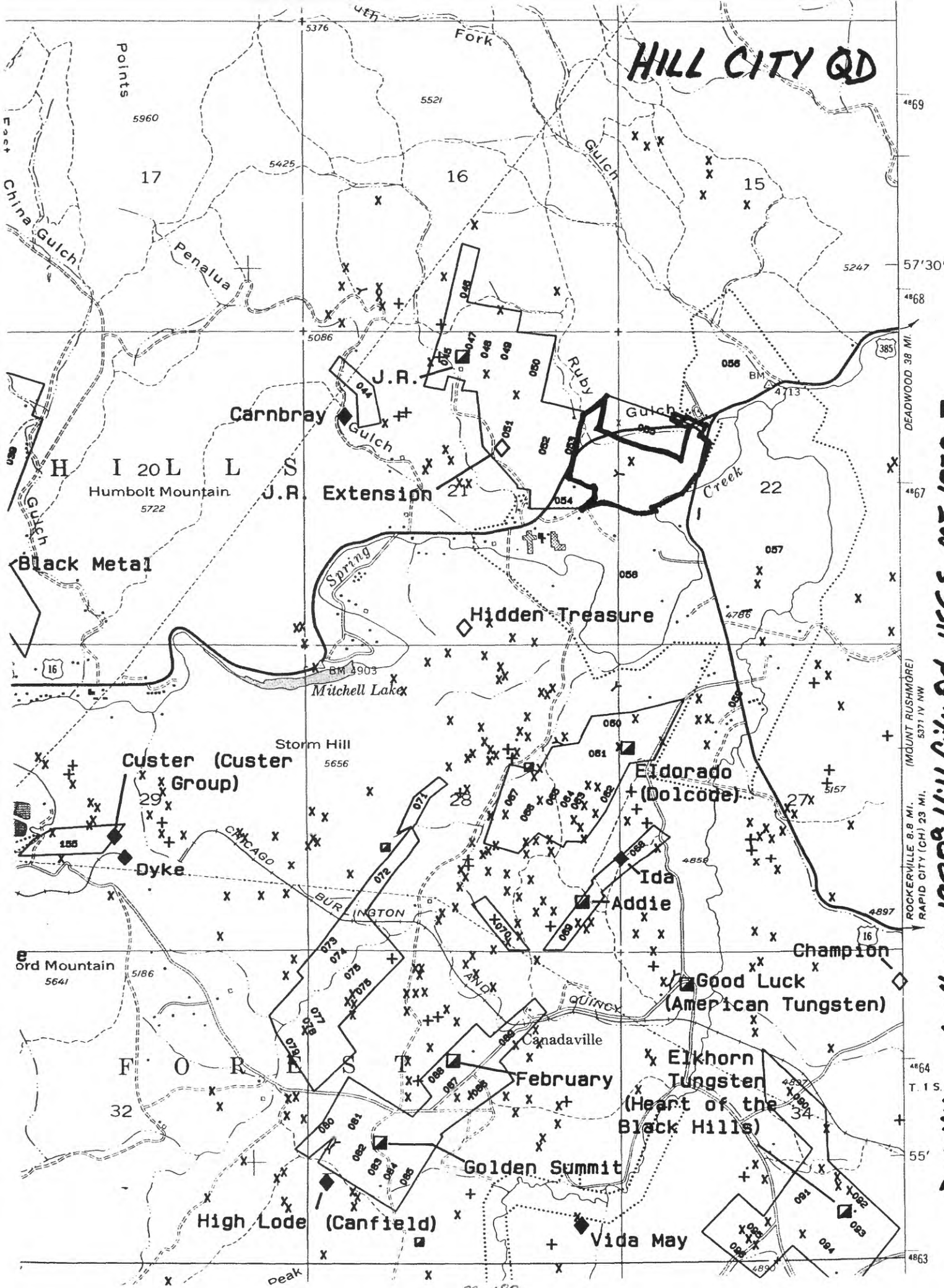
U.S. Geological Survey, 1998b, Minerals Availability System [MAS: active computer file; data available from U.S. Geological Survey, Minerals Information Team (formerly U.S. Bureau of Mines), Building 20, Denver Federal Center, Denver CO 80225].


Approx. area of interest
Geologic map of Keystone area
Norton, 1976 USGS OF 76-297


(Q)
Au
WILSON and DE WITT, 1995
METALLIC MINERAL DISTRICTS
USGS I-2445
HILL CITY
(F)
Sn
SPRING CREEK
(Q)
Au
TIGERVILLE
(D)
Au, Ag
SPRING CREEK
(Q)
Sn, Au
HUGO
(E, H)
Feldspar, mica
CALUMET
(C, D)
Au, Ag, Cu
TON GULCH
(Q)
Au
RENO
(E, G)
Feldspar, Li
ETTA
(G, J)
Li, Be
KEYSTONE
(C, D?, Z?)
Au, Ag, As
HOLY TE
(D)
Au, A
EE FORKS
(D)
Au
OREVILLE
(F)
Sn
NDERFOOT
(K)
Mica
PALMER GULCH
(Q)
Sn, Au
MOUNT RUSHMORE
NATIONAL MEMORIAL


DeWitt and others, 1988b
Mt. Rushmore qd.
USGS MF. 1978-K
Vulcan
(Holy Smoke)
Ingersoll No.2
Ingersoll Peak
Egyptian No.2
Ida
Florence
Grand Island
Bismark
Juniper
Nathanial Pope
Egyptian No.1
Bullion
Columbia
Legal Tender
Mica
Sitting
Bull
Keystone
Holy
Terror
Lucky Boy
Gold Hill
(Big Thunder)
Tin Hill
Patch West
Bluebird
Dan Patch
Peerless
Scott
Harney
Harney Ranger Station
Unnamed
Big Hit
Hugo
Monte Carlo
Etta
Edison
Diamond
Mica
White Cap
(King Mica)
Confidence
Expectation
Mica Hill
Campground
Keystone Cem
Bobtail
Gulch
Bucktail
Gulch
Gulch
Horsely
Gulch
Baisle
Creek
Tin Hill
Creek
Lafferty
Gulch
Grizzly
Gulch
NORTHERN
Aldy Mountain
NT RUSHMORE
NAL MEMORIAL
Rushmore
T 1 S
T 2 S
HAYWARD 2.7 MI.
15 MI. TO S. DAK. 36
CUSTER 30 MI.
(IRON MOUNTAIN)
5371 IV SW
SCALE 1:24 000
Compiled in 1986
43°52
103°22'30"


Rathé and Wayland, 1969, Hill City Qd., USGS Bull. 1271-B
Mitchell Lake
Canadaville
Qal
Qtg
omu
obu
bb
bc
bm
bg
hg
Gulch
Creek
Spring
Draw
Empire mine tailings
FAULT
ANTICLINE
STAUROLITE
SLIPPER
BRECCIA
ZONE
GOLDEN
PUNCH
MERRITT 16 MI.
DEADWOOD 38 MI.
(MOUNT RUSHMORE)
ROCKERVILLE 8.8 MI.
RAPID CITY (CH) 23 MI.
KEYSTONE 5.3 MI.
T. 1 S.
B'
C'



DeWitt and others 1988, Hill City Qd, USGS MF-1978-J

United States Department of the Interior

U. S. GEOLOGICAL SURVEY
Box 25046 M.S. 905
Denver Federal Center
Denver, Colorado 80225

IN REPLY REFER TO:

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FAX (303) 236-3200
awilson@usgs.gov

May 1, 1998

Mr. M.M. Underwood, Jr.
Director of Physical Resources
U.S. Forest Service - Rocky Mountain Region
P.O. Box 25127
Lakewood, CO 80225-0127

Dear Mr. Underwood:

This is in response to your March 10, 1998 request for information on locatable mineral resources in a land exchange proposal in which The Nature Conservancy has offered certain non-Federal lands within the Black Hills National Forest in exchange for Federal lands also within the Black Hills National Forest.

In accordance with the working agreement under Public Law 86-509, we are providing you with a report on the locatable mineral resources on the lands described in Exhibits "A" and "B", included with your request. These lands comprise 1286.02 acres, more or less, in Custer County, South Dakota.

Sincerely yours,

Anna B. Wilson, Geologist
Mineral Resource Surveys, Central Region

Copies: G.S. Plumlee
E.A. duBray

LOCATABLE MINERAL REPORT FOR THE NATURE CONSERVANCY LAND EXCHANGE OFFER, BLACK HILLS NATIONAL FOREST, CUSTER COUNTY, SOUTH DAKOTA

By
Anna B. Wilson
U.S. Geological Survey

May 1, 1998

The following report is based on information contained in USGS mineral resource and commodity files, mineral information databases (MRDS and MAS), and on reports and maps available in the USGS library. These data are occasionally augmented with other unpublished documents, personal communications, and professional experiences. No field studies or on-site visits were performed in preparing this report. Emphasis is primarily on locatable mineral resources. Leasable and salable resources are covered only if they appear in the above documents. Mineral resource assessments are subjective: the opinions expressed herein are entirely those of the author.

EXHIBITS A and B: Supplied by U.S. Forest Service, attached (see figs. 1-13).

LIST OF ATTACHMENTS: (followed by 7 1/2-minute quadrangle for figs. 1-13)

Fig. 1	Pass Creek Parcels HES 369 and Miscellaneous area parcels HES 351, 353	Jewel Cave (NE) quadrangle
Fig. 2	Pass Creek Parcels HES 406 and Water Draw area parcels HES 457, 528	Fourmile quadrangle
Fig. 3	Miscellaneous area parcels HES 345	Custer quadrangle
Fig. 4	Miscellaneous area parcels HES 405	Jewel Cave NW quadrangle
Fig. 5	Miscellaneous area parcels HES 474	Jewel Cave (NE) quadrangle
Fig. 6	Miscellaneous area parcels HES 55	Jewel Cave (NE) quadrangle
Fig. 7	Area 1	Hayward quadrangle
Fig. 8	Area 2	Custer quadrangle
Fig. 9	Area 3 and Area 4	Custer quadrangle
Fig. 10	Area 5	Fourmile and Cicero Peak quadrangles
Fig. 11	Area 6	Cicero Peak quadrangle
Fig. 12	Area 7	Pringle quadrangle
Fig. 13	Area 8	Jewel Cave SE quadrangle

Fig. 14 Mine and claim location map of the area including HES 345 (fig. 3), Easement, Area 2 (fig 8), Area 3 (fig. 9), and Area 4 (fig.9) on Custer 7 1/2-minute quadrangle (DeWitt and others, 1988a).

Fig. 15 Mine and claim location map in the vicinity of Area 1 (fig. 7) on Hayward 7 1/2-minute quadrangle (DeWitt and others, 1988b).

Fig. 16 Mine and claim location map in the vicinity of Areas 5 and 6 on Cicero Peak and Fourmile 7 1/2-minute quadrangles (Dewitt and others, 1988c, d).

Fig. 17 Mine and claim location map in the vicinity of Area 7 on Pringle 7 1/2-minute quadrangle (DeWitt and others, 1988d)

Fig. 18 Part of metallic mineral district map showing approximate locations of many of the land exchange parcels (Wilson and DeWitt, 1995)

Non-Federal: The Nature Conservancy
Jewel Cave (NE), Fourmile, Custer, and Jewel Cave NW 1:24,000 quadrangles

HES 369, 406, 457, 528, 351, 353, 405, 474, 55 (Figs. 1, 2, 4, 5, 6)

These tracts are entirely within areas mapped as Lower Permian and Pennsylvanian Minnelusa Formation (DeWitt and others, 1989). In this region, the Minnelusa Formation is composed of sandstone, solution breccia (anhydrite in subsurface), limestone, and shale; slight uranium enrichment may occur in the basal part (DeWitt and others, 1989).

The tracts are a few miles west of the mineralized part of the Black Hills (Wilson and DeWitt, 1995; see fig. 18), but the area was not deemed to be favorable for any locatable mineral commodities at an assessment scale of 1:250,000 (DeWitt and others, 1986, pl. 2) .

There is low potential for small to medium oil and gas accumulations beneath the tracts. These may have formed about 100-400 Ma in marine environments where organic remains were modified into kerogen and petroleum-related substances (DeWitt and others, 1986, pl. 3).

HES 345 (Fig. 3)

The geology of the tract and easement are mapped at 1:250,000 scale primarily as Early Proterozoic metagraywacke with some metaconglomerate and iron-formation in the southern part (DeWitt and others, 1989).

The lands are in an area with a number of unidentified prospect pits and within a half mile of several small pegmatite deposits (DeWitt and others, 1988a; see fig. 14).

The tract is located in the southwestern part of the Harney Peak metallic mineral district which is known to host Early Proterozoic mica and potassium feldspar-bearing pegmatite deposits (Wilson and DeWitt, 1995; see fig. 18).

At 1:250,000 scale, the area is included in areas assigned high mineral resource potential for various commodities found in pegmatite deposits (DeWitt and others, 1986). Abundant small prospects and mines are in the area but the lack of them on this particular tract would suggest that pegmatite is not exposed near the surface and that the mineral resource potential would be low to moderate.

Federal Property
Hayward, Custer, Fourmile, Cicero Peak, Pringle, and Jewel Cave SE 1:24,000 quadrangles

Area 1 (Fig. 7)

At 1:250,000 scale, Area 1 is mapped as Lower Mississippian Pahasapa Limestone and Lower Mississippian to Upper Devonian Englewood Formation (DeWitt and others, 1989). Both of these units are dolomitic limestones: the Pahasapa is gray to light-tan, cavernous, and cliff-forming, the Englewood is pink to light-gray (DeWitt and others, 1989).

Area 1 is east of the Hugo pegmatite district, west of the Battle Creek placer district, and outside of any outlined metallic mineral districts (Wilson and DeWitt, 1995). Three unnamed Tertiary and Holocene stream placer deposits are located about a mile to the northeast (DeWitt and others, 1988b; see fig. 15) in the Battle Creek district (Wilson and DeWitt, 1995).

At 1:250,000 mineral resource assessment, the area was assigned moderate potential for high-calcium limestone (DeWitt and others, 1986).

Area 2 (Fig. 8)

At 1:250,000 scale, Area 2 is mapped as Early Proterozoic metagraywacke (DeWitt and others, 1989).

The parcel is located between Old Mike (Great Northern), Phelps (Roosevelt), and Poppy (claim #18) deposits (DeWitt and others, 1988a; see fig 14), but in an area not assigned to any metallic mineral district (Wilson and DeWitt, 1995; see fig. 18).

At 1:250,000, the area was assigned high potential for small to medium size deposits containing most pegmatite commodities except for tin (Sn) and mica (DeWitt and others, 1986). At 1:100,000, Area 2 is not included in any metallic mineral districts (Wilson and DeWitt, 1995; see fig. 18) and thus would have low potential for these commodities.

Area 3 (Fig. 9)

At 1:250,000 scale, Area 3 is mapped as the middle part of the Early Proterozoic metagraywacke unit (DeWitt and others, 1989).

The tract is close to numerous small pegmatite deposits including the Surprise Mica, Lame Deer, Knowles Lode, Big Horn Lode, Tin Key, and Victory (DeWitt and others, 1988a; see fig. 14). One prospect pit is located in the northwest part of Area 3 (lot 12). Area 3 is partly in the Harney Peak, Custer, and Calamity Peak metallic mineral districts (Wilson and DeWitt, 1995; see fig. 18).

At 1:250,000 the mineral resource potential for pegmatite commodities (except tin and mica) was expected to be high (DeWitt and others, 1986). On a site-specific scale, the mineral resource potential for pegmatite deposits is moderate.

Area 4 (Fig. 9)

Area 4 is located along the southern boundary of the Custer town-site. It is mapped at 1:250,000 as being in the lower part of the Early Proterozoic metagraywacke unit (DeWitt and others, 1989). The graywacke is not necessarily the same graywacke as that which underlies Area 3, due to an intervening fault (DeWitt and others, 1989).

The tract is close to the Aladdin pegmatite deposit (DeWitt and others, 1988a; see fig. 14) and is in an area where the Calamity Peak and Custer metallic mineral districts overlap (Wilson and DeWitt, 1995; see fig. 18).

At 1:250,000 scale, there is high potential for small to medium pegmatite commodities and their common commodities except Sn (DeWitt and others, 1986). On a site-specific scale, the mineral resource potential for pegmatite deposits is moderate.

Area 5 (Fig. 10)

Area 5 is mapped as Early Proterozoic upper metagraywacke (DeWitt and others, 1989).

The tract includes the MacArthur (see fig. 16) and is immediately east of the Short Lode, Ray Prospect and Red Bird (Consolidated) Lode (DeWitt and others, 1988c). It is immediately west of the White Cloud, Ray, Roadside, and Jack Rabbit deposits (DeWitt and others, 1988d). Area 5 is within the Custer and Cicero Peak metallic mineral districts; expected commodities would be mica and potassium feldspar (Wilson and DeWitt, 1995; see fig. 18).

At 1:250,000 scale, there is high potential for small to medium pegmatite deposits and their common commodities except Sn (DeWitt and others, 1986). On a site-specific scale, the mineral resource potential for pegmatite deposits is also high.

Area 6 (Fig. 11)

Area 6 is mapped as Early Proterozoic upper metaraywacke (DeWitt and others, 1989).

The tract is adjacent to the Soda Spar, Lucky Twist (Sutherland), Red Bird (McClaren), and Blue Bird deposits (DeWitt and others, 1998d; see fig. 16) and is within the Custer metallic mineral district where mica and potassium feldspar are the expected commodities (Wilson and DeWitt, 1995; see fig. 18).

At 1:250,000 scale, there is high potential for small to medium pegmatite deposits and their common commodities except Sn (DeWitt and others, 1986). On a site-specific scale, the mineral resource potential for pegmatite deposits is also high.

Area 7 (Fig. 12)

Area 7 is mapped mostly as Early Proterozoic upper metagraywacke possibly with some Upper Ordovician Whitewood Dolomite, Middle Ordovician Winnipeg Formation, and Lower Ordovician to Upper Cambrian Deadwood Formation, undivided (DeWitt and others, 1989).

The tract contains a quarry immediately northwest of Pringle townsite (DeWitt and others, 1988d, see fig. 17; Wilson and DeWitt, 1995, #896) where high purity silica sand was produced from a Cambrian paleoplacer in the basal part of the Deadwood Formation. This industrial commodity, known as "cracking sand", is valued for its consistent grain size and sphericity for use in drilling muds (Ed DeWitt, written communication, April 1998).

Area 7 is within three overlapping metallic mineral districts: Custer (feldspar and mica), Pringle (Li, Be, and feldspar), and Shirttail (Si) (Wilson and DeWitt, 1995; see fig. 18). At an assessment scale of 1:250,000, it was assigned high potential for non Sn-bearing pegmatites and moderate potential for medium sized, high-calcium limestone deposits (DeWitt and others, 1986). On a site-specific scale, the tract has moderate mineral resource potential for pegmatite deposits. Elsewhere in the Black Hills, high-calcium limestone is an important product of the Minnekahta and Pahasapa Limestones and to a much lesser extent the Whitewood Dolomite and Englewood Formation (DeWitt and others, 1986, p. 85). Only the Whitewood Dolomite, which has high magnesium content, may be present in Area 7. Therefore, the resource potential for high-calcium limestone is low.

Area 8 (Fig. 13)

Area 8 is mapped entirely within Lower Permian Minnekahta Limestone (Redden and others, in press).

At a mineral resource assessment scale of 1:250,000, the tract was assigned moderate potential for medium sized oil and gas accumulations (DeWitt and others, 1986, pl. 3) and high potential for large bedded deposits of high-calcium limestone. The region immediately to the southwest was assigned high potential for medium-sized bedded gypsum deposits.

Based on mapping by Redden and others (in press), this tract has high mineral resource potential for high-calcium limestone and for high purity limestone for use in cement. Minnekahta Limestone is commonly used as road aggregate (Ed DeWitt, oral communication, May 1, 1998).

REFERENCES:

DeWitt, Ed, Buscher, David, Wilson, Anna, and Johnson, Tom, 1988a, Map showing locations of mines, prospects, and patented mining claims, and classification of mineral deposits in the Custer 7 ½-minute quadrangle, Black Hills, South Dakota: U.S. Geological Survey Miscellaneous Field Studies Map MF-1978-M, scale 1:24,000.

DeWitt, Ed; Buscher, David; Wilson, Anna; and Johnson, Tom, 1988b, Map showing locations of mines, prospects, and patented mining claims, and classification of mineral deposits in parts of the Iron Mountain and Hayward 7 ½-minute quadrangles, Black Hills, South Dakota: U.S. Geological Survey Miscellaneous Field Studies Map MF-1978-N, scale 1:24,000.

DeWitt, Ed, Buscher, David, Wilson, Anna, and Johnson, Tom, 1988c, Map showing locations of mines, prospects, and patented mining claims, and classification of mineral deposits in the Fourmile 7 ½-minute quadrangle, Black Hills, South Dakota: U.S. Geological Survey Miscellaneous Field Studies Map MF-1978-O, scale 1:24,000.

DeWitt, Ed; Buscher, David; Wilson, Anna; and Johnson, Tom, 1988d, Map showing locations of mines, prospects, and patented mining claims, and classification of mineral deposits in the Cicero Peak 7 ½-minute quadrangle and part of the Pringle 7 ½-minute quadrangle, Black Hills, South Dakota: U.S. Geological Survey Miscellaneous Field Studies Map MF-1978-P, scale 1:24,000.

DeWitt, Ed, Redden, J.A. Redden, Buscher, David, and Wilson, A.B., 1989, Geologic map of the Black Hills area, South Dakota and Wyoming: U.S. Geological Survey Miscellaneous Investigations Series Map I-1910, scale 1:250,000.

DeWitt, Ed; Redden, J.A., Wilson, A.B., and Buscher, David, 1986, Mineral resource potential and geology of the Black Hills National Forest, South Dakota and Wyoming, *with a section on* salable commodities, by J.S. Dersch: U.S. Geological Survey Bulletin 1580, 135 p, 4 pls. (scale 1:250,000) in pocket.

Redden, J.A., and others, in press, Geologic map of the central Black Hills, South Dakota: U.S. Geological Survey Miscellaneous Investigations Series Map I-XXXX, scale 1:100,000.

Wilson, A.B., and DeWitt, Ed, 1995, Maps showing metallic mineral districts and mines in the Black Hills, South Dakota and Wyoming: U.S. Geological Survey Miscellaneous Investigations Series Map I-2445, scale 1:100,000.

OTHER INFORMATION SOURCES:

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U.S. Geological Survey, 1998b, Minerals Availability System [MAS: active computer file; data available from U.S. Geological Survey, Minerals Information Team (formerly U.S. Bureau of Mines), Building 20, Denver Federal Center, Denver CO 80225].

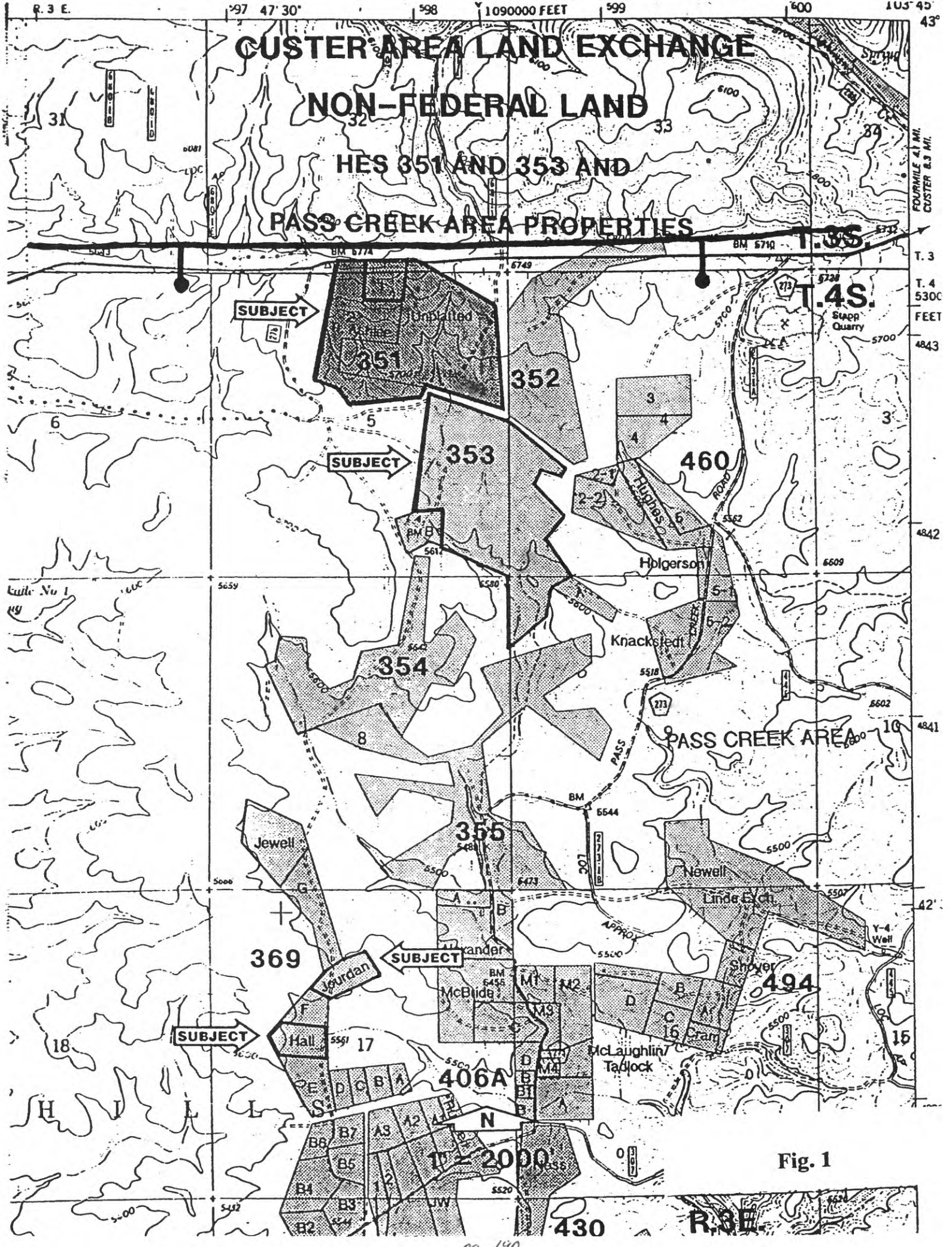
CUSTER AREA LAND EXCHANGE
NON-FEDERAL LAND
HES 351 AND 353 AND
PASS CREEK AREA PROPERTIES
T.3S.
T.4S.
SUBJECT
SUBJECT
SUBJECT
SUBJECT
Unplatted
351
352
353
354
355
460
494
406A
369
Holgerson
Knacksted
PASS CREEK AREA
Jewell
Newell
Linde Exch.
Shaver
McBride
Jourdan
Hall
McLaughlin/
Tadlock
Crain
Stapp
Quarry
Hughes
ROAD
PASS
CREEK
1" = 2000'
R.3E.

Fig. 1

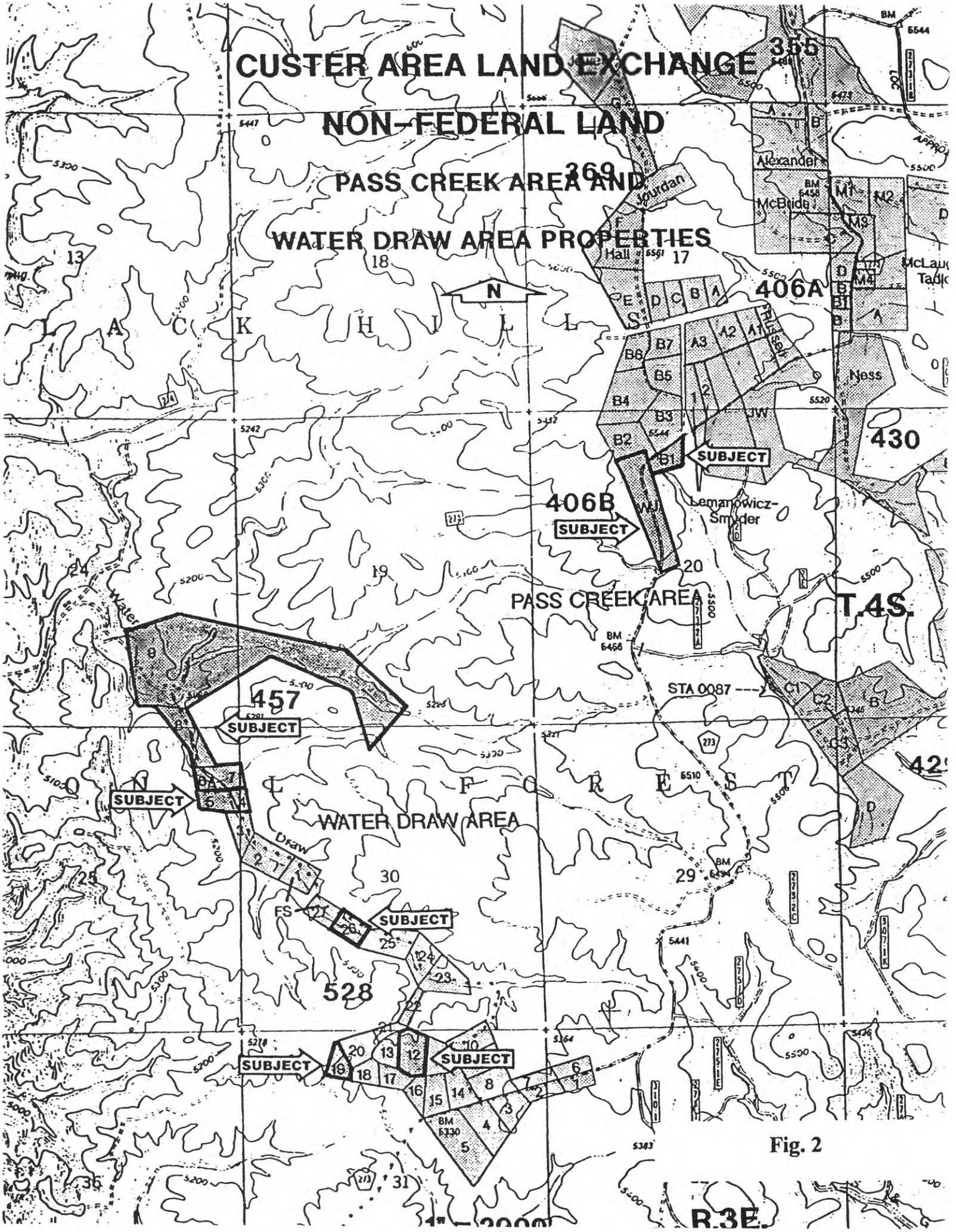
CUSTER AREA LAND EXCHANGE
NON-FEDERAL LAND
PASS CREEK AREA AND
WATER DRAW AREA PROPERTIES
N
355
369
406A
406B
430
457
528
SUBJECT
PASS CREEK AREA
WATER DRAW AREA
STA 0087
Alexander
McBride
Hall
Jourdan
Ness
Lemanowicz-Smyder
T.4S.
R.3E.
Draw
Water

Fig. 2

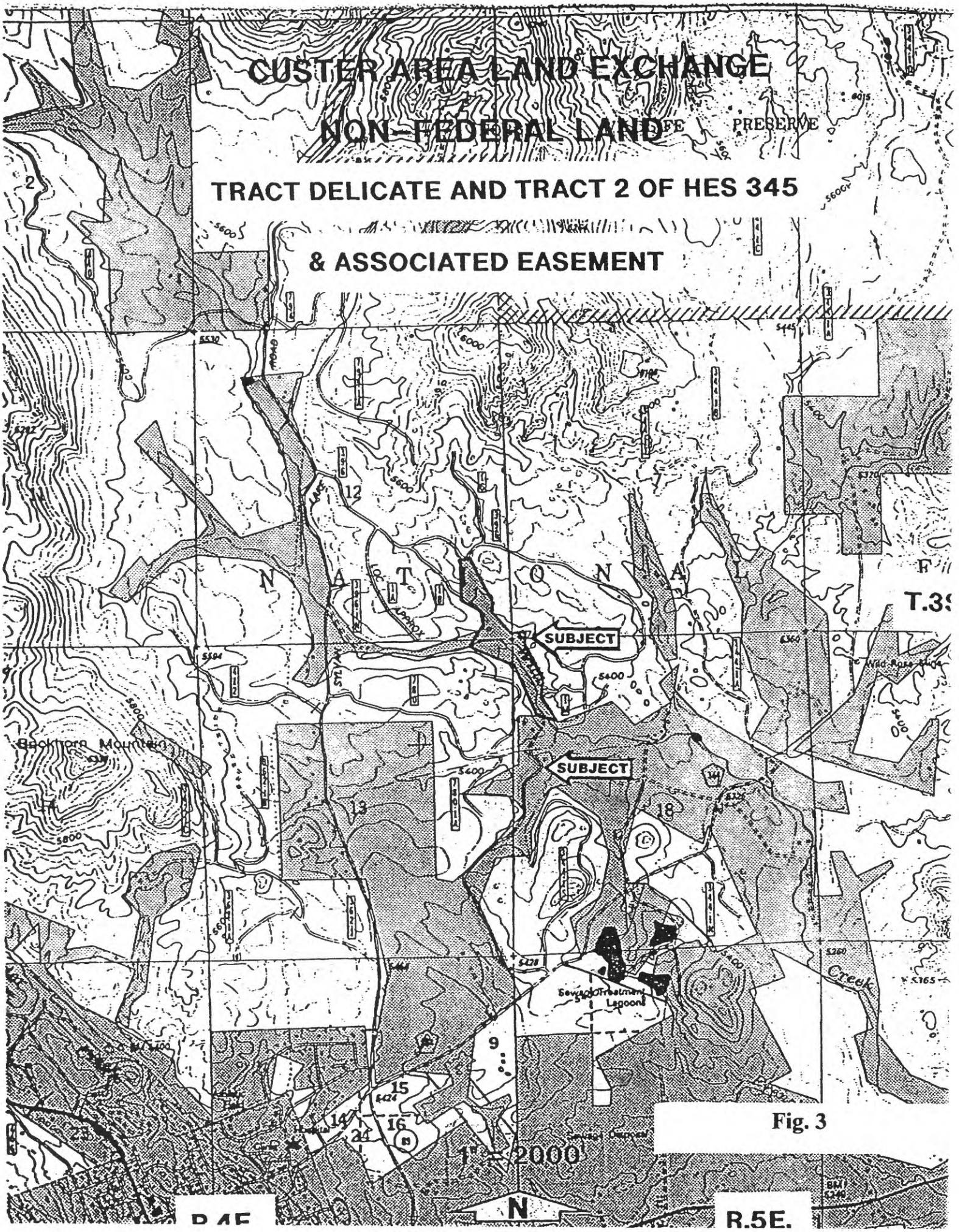
CUSTER AREA LAND EXCHANGE
NON-FEDERAL LAND
TRACT DELICATE AND TRACT 2 OF HES 345
& ASSOCIATED EASEMENT
SUBJECT
SUBJECT
Beaktorn Mountain
Sewage Treatment Lagoons
1" = 2000'
N
R.4E.
R.5E.
T.3

Fig. 3

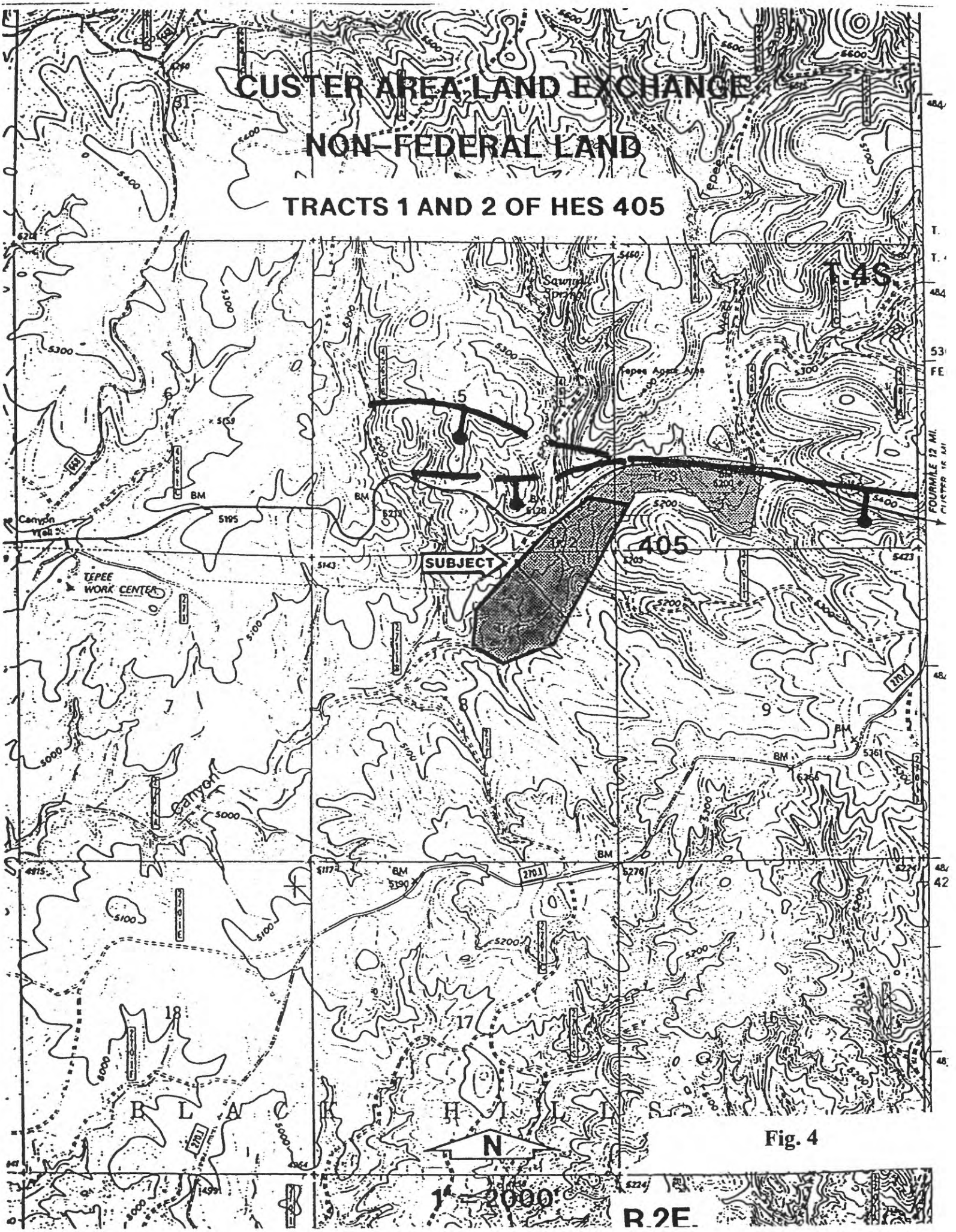
CUSTER AREA LAND EXCHANGE
NON-FEDERAL LAND
TRACTS 1 AND 2 OF HES 405
T.4S
405
SUBJECT
TEPEE WORK CENTER
Canyon
Sawmill Spring
Tepee Agate Area
BLACK HILLS
N
1" = 2000'
R.2E.

Fig. 4

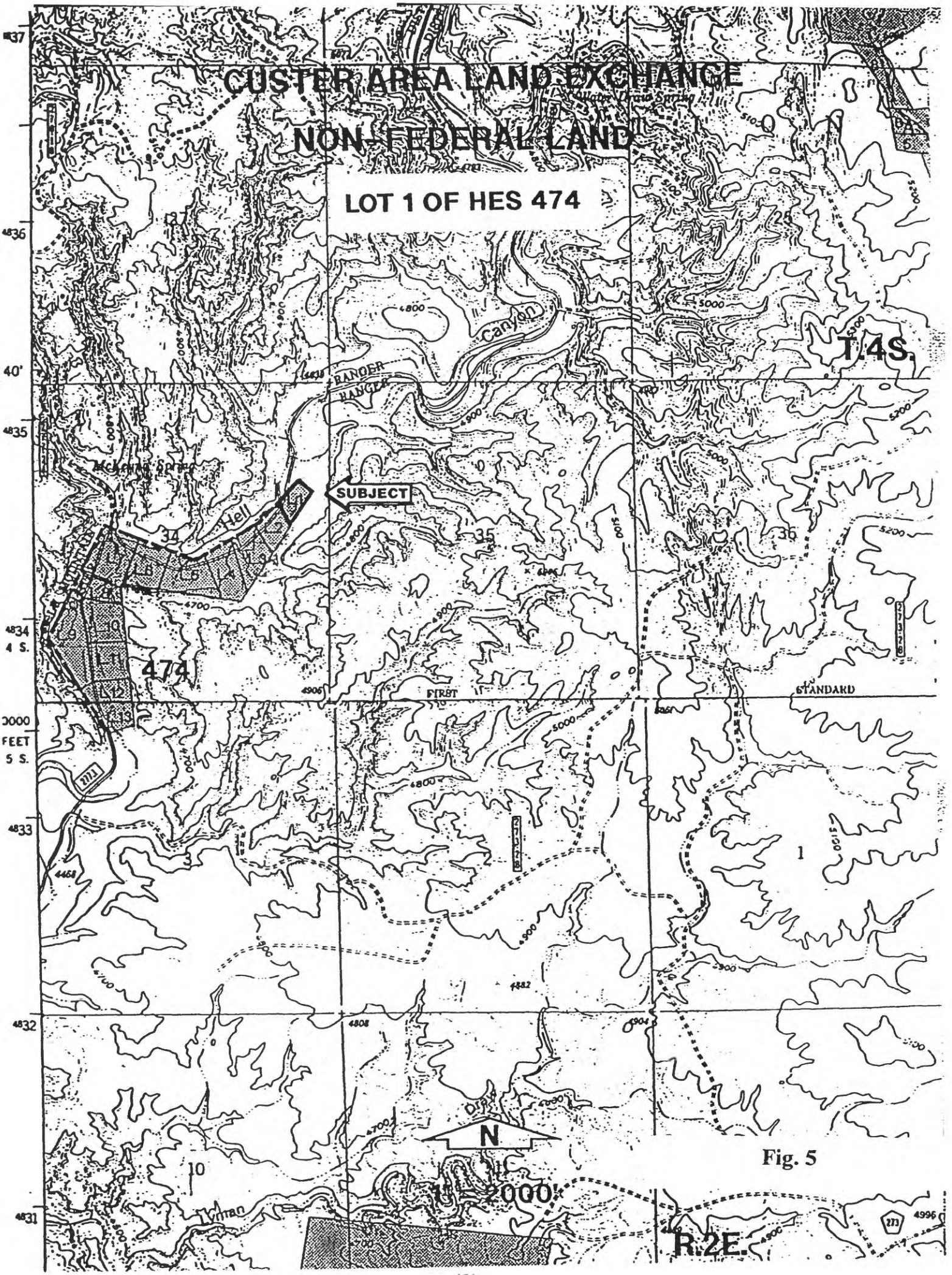
CUSTER AREA LAND EXCHANGE
NON-FEDERAL LAND
LOT 1 OF HES 474
SUBJECT
T.4S.
R.2E.
474
N
2000'
Canyon
RANGER
McKenna Spring
Hell
FIRST
STANDARD
Lyman

Fig. 5

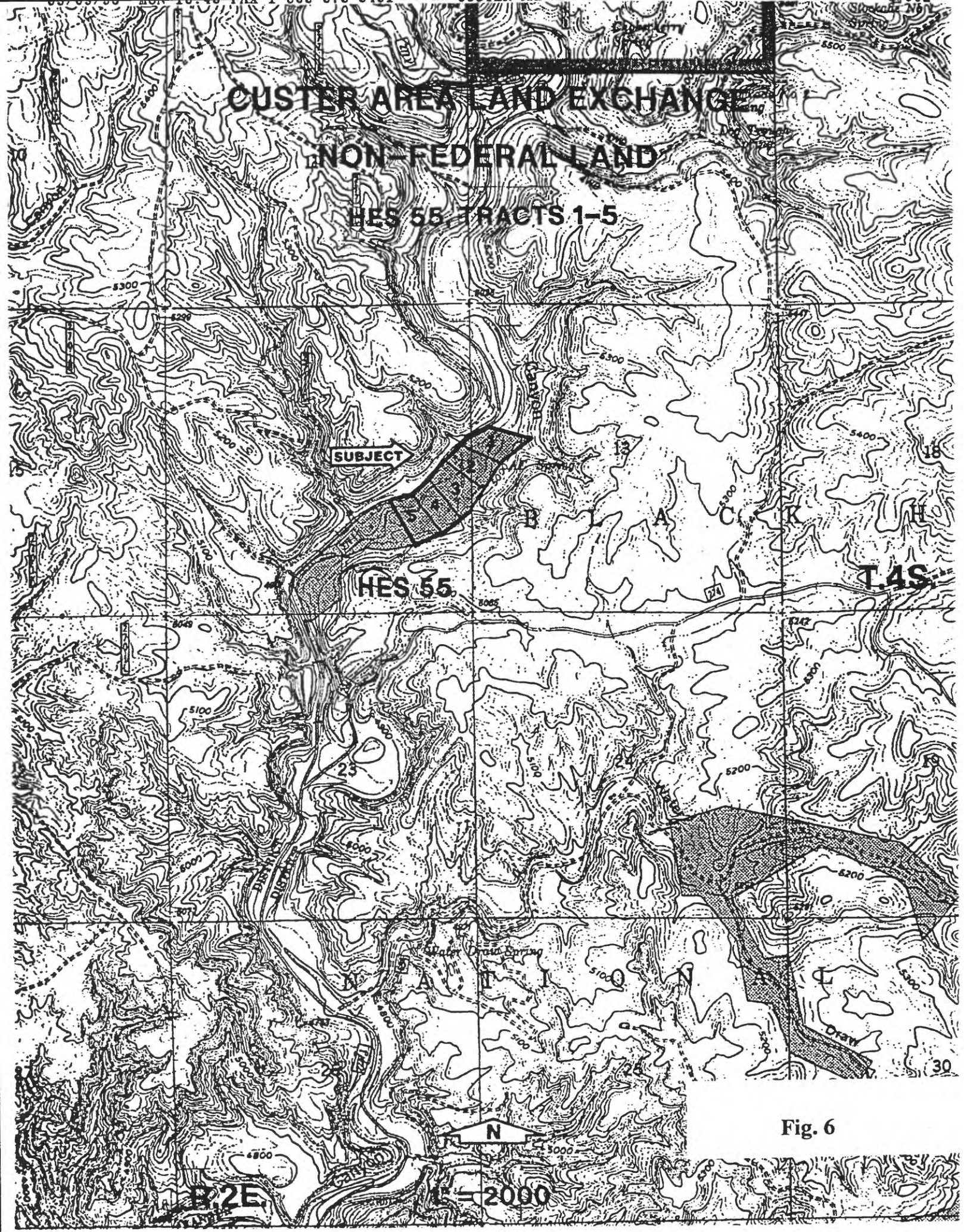
CUSTER AREA LAND EXCHANGE
NON-FEDERAL LAND
HES 55 TRACTS 1-5
SUBJECT
HES 55
T.4S.
R.2E.
1" = 2000
N

Fig. 6

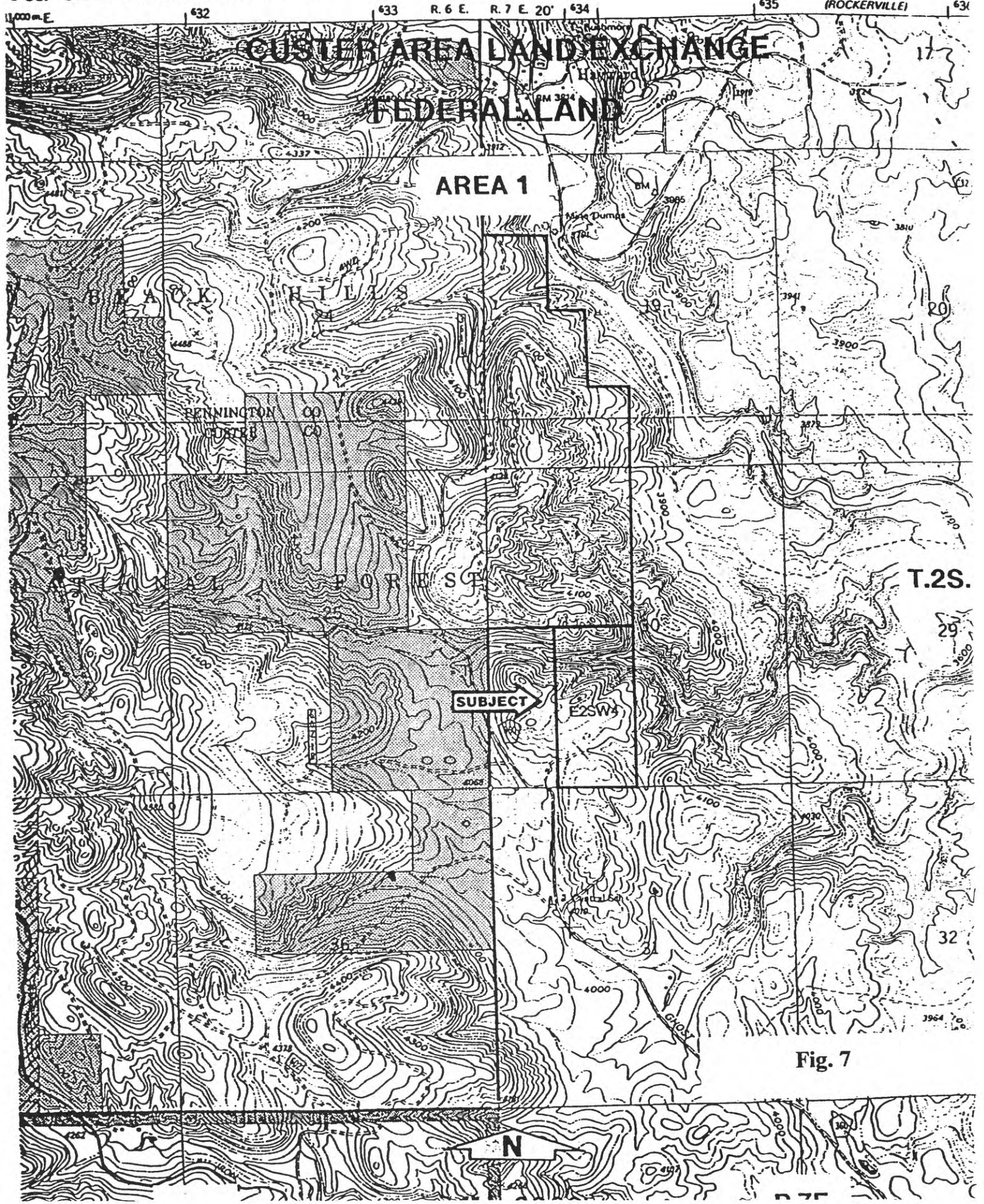

Fig. 7

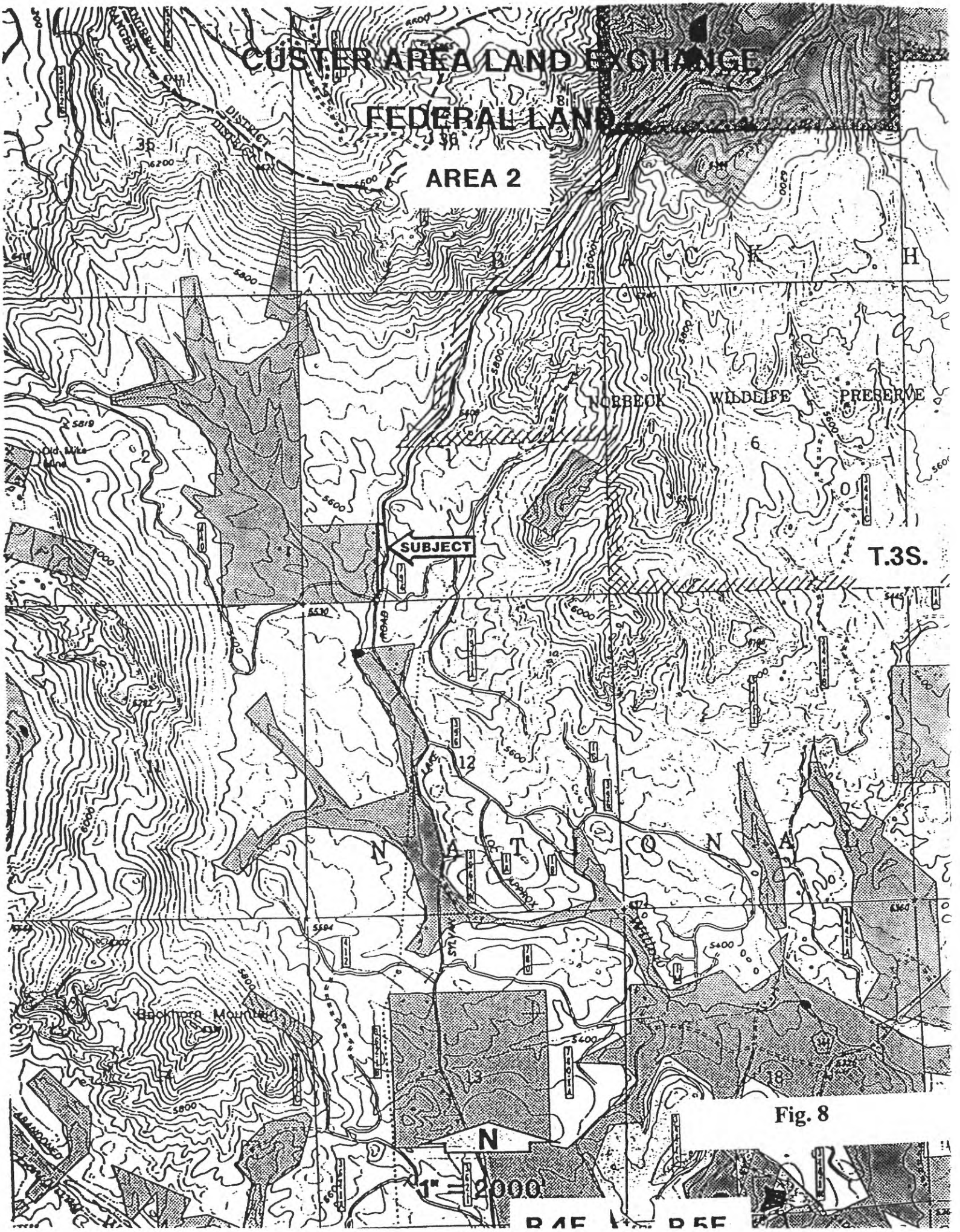
CUSTER AREA LAND EXCHANGE
FEDERAL LAND
AREA 2
SUBJECT
NORBECK WILDLIFE PRESERVE
T.3S.
Backhorn Mountain
1" = 2000'

Fig. 8

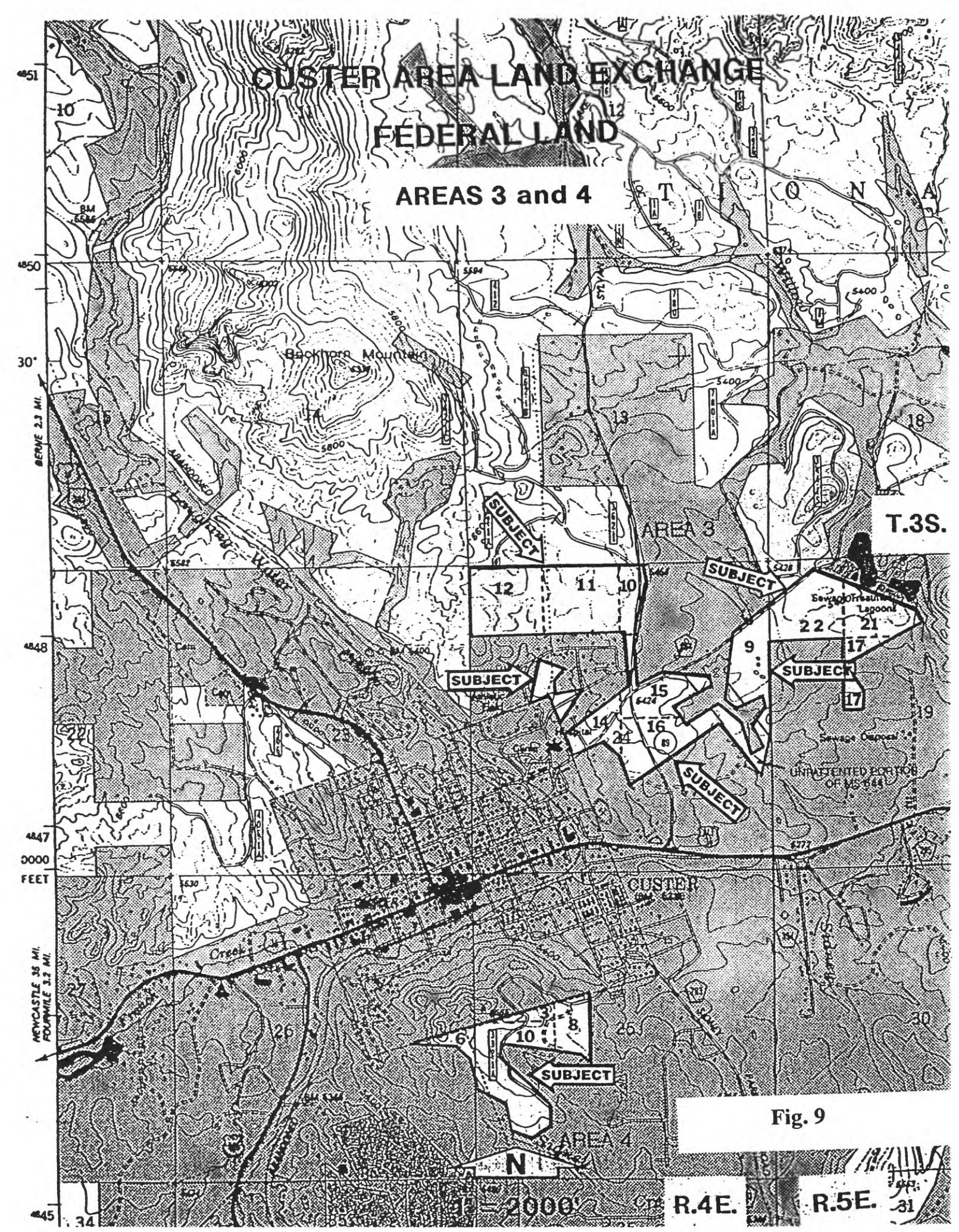
CUSTER AREA LAND EXCHANGE
FEDERAL LAND
AREAS 3 and 4
T. 3 S.
R.4E.
R.5E.
AREA 3
AREA 4
SUBJECT
Beaches Mountain
CUSTER
UNPATENTED PORTION OF MS 644
Sewage Disposal
Sewage Treatment Lagoons
N
1" = 2000'
2000 FEET
BERNE 2.3 MI.
NEWCASTLE 3.8 MI.
FOURMILE 3.2 MI.

Fig. 9

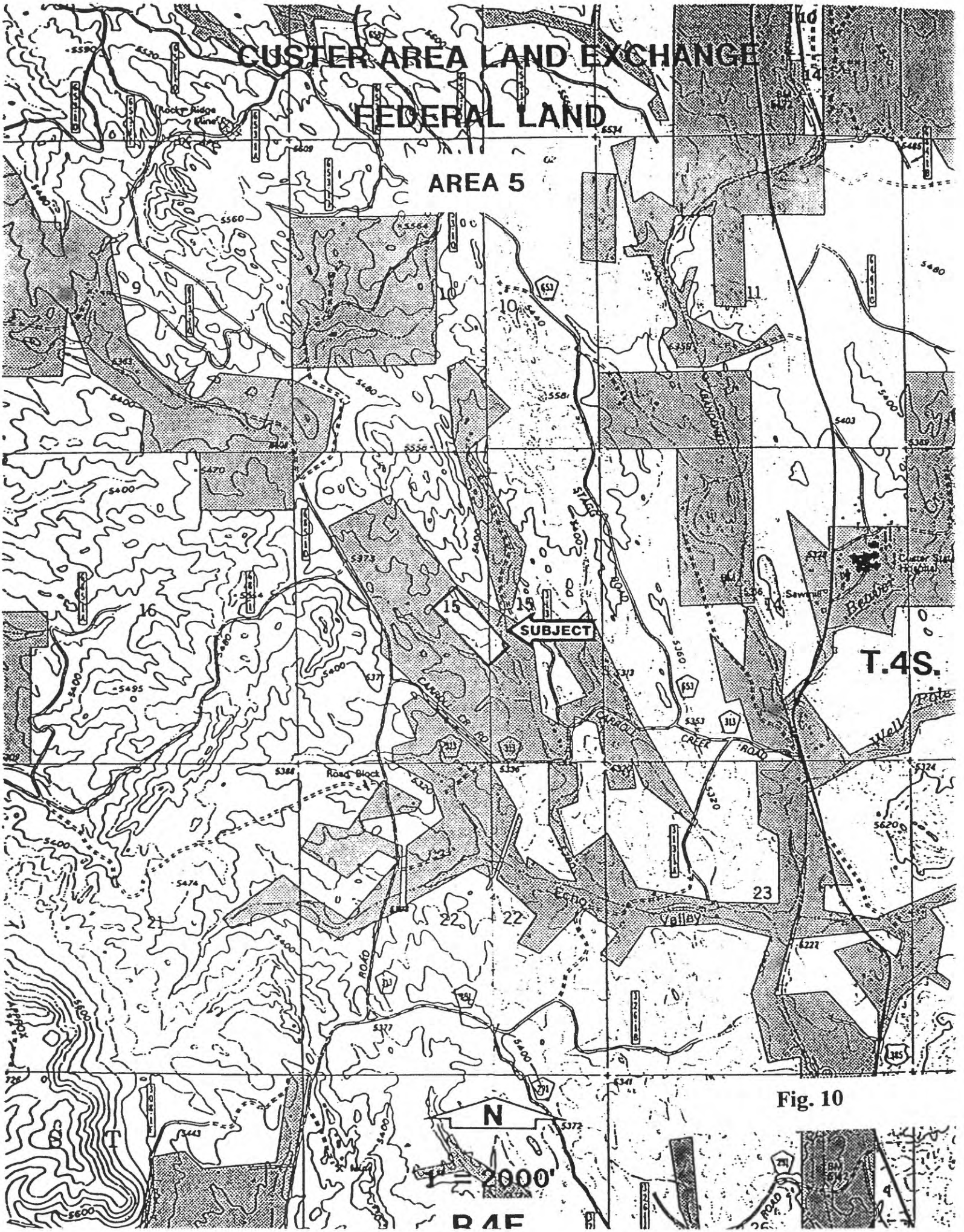
CUSTER AREA LAND EXCHANGE
FEDERAL LAND
AREA 5
SUBJECT
T.4S.
N
1" = 2000'
R4E

Fig. 10

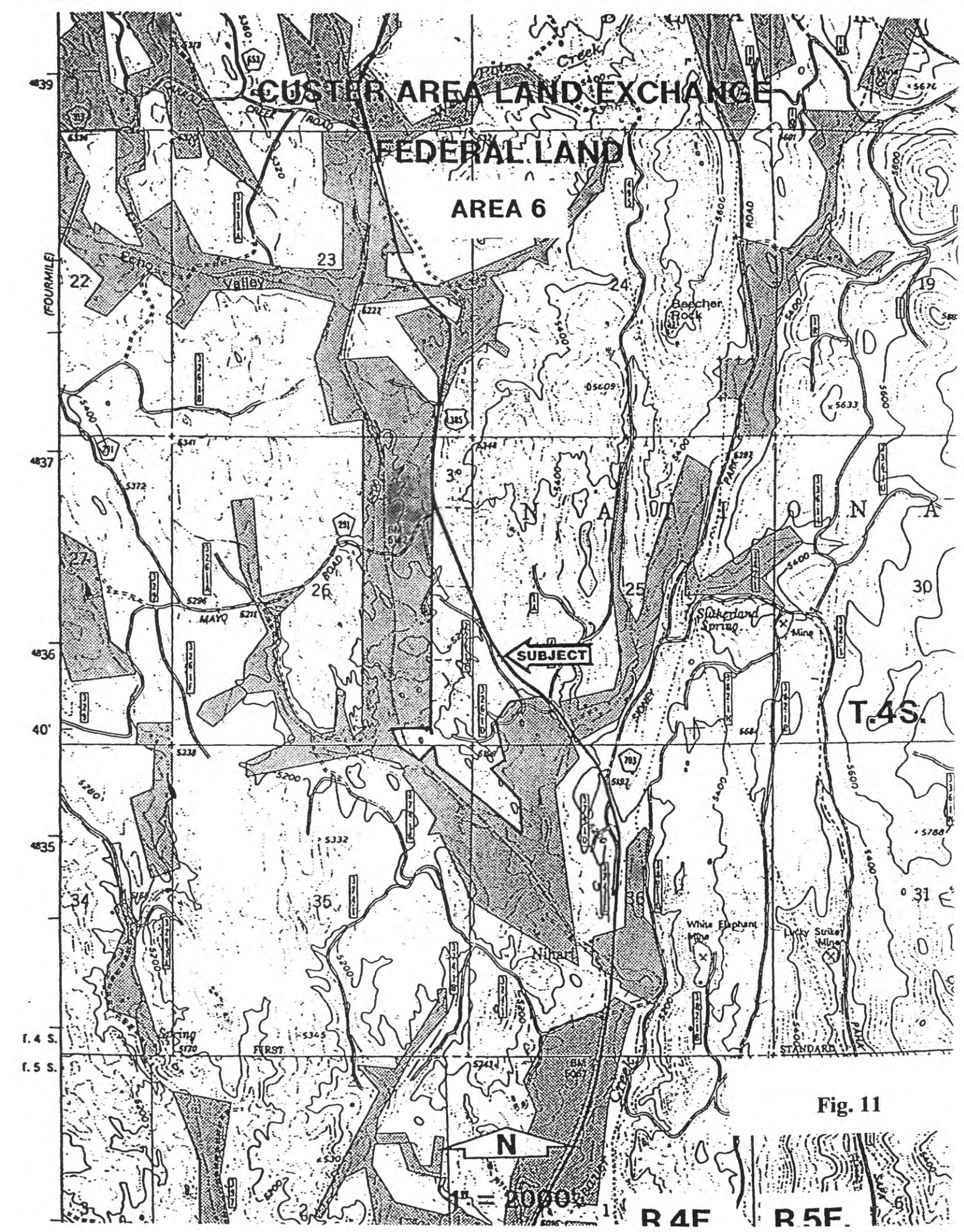
CUSTER AREA LAND EXCHANGE
FEDERAL LAND
AREA 6
SUBJECT
N
1" = 2000'
T.4S.
R.4E
R.5E
NIAGARA
Echo Valley
Beecher Rock
Sutherland Spring
Mine
Nihart
White Elephant Mine
Lucky Strike Mine
MAYO
SIDNEY
STANDARD
FIRST
PARK
ROAD
CREEK
(FOURMILE)

Fig. 11

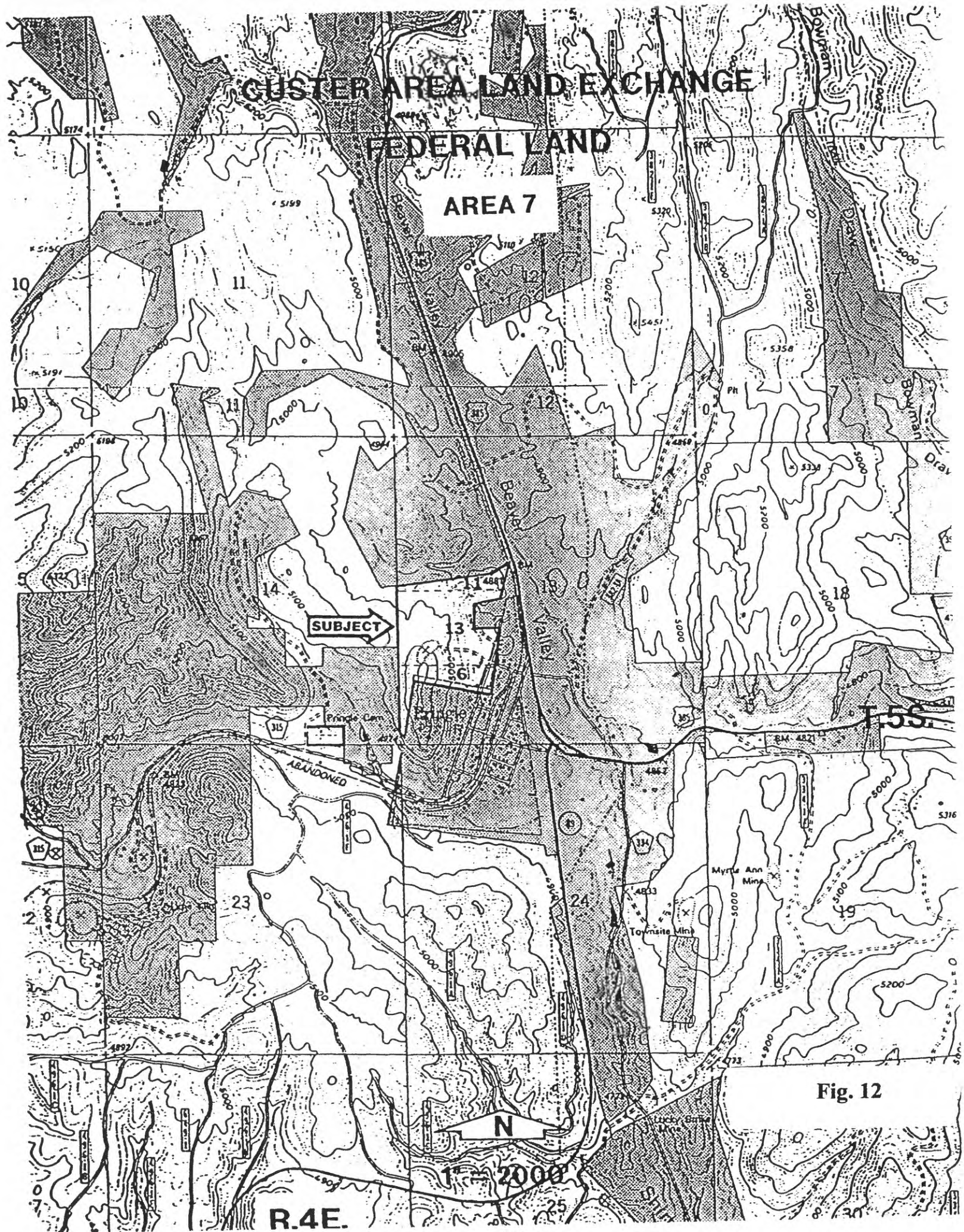
CUSTER AREA LAND EXCHANGE
FEDERAL LAND
AREA 7
SUBJECT
Beaver Valley
Bowman Draw
Pringle Cem.
ABANDONED
Myrtle Ann Mine
Townsite Mine
T.5S.
R.4E.
N
1" = 2000'

Fig. 12

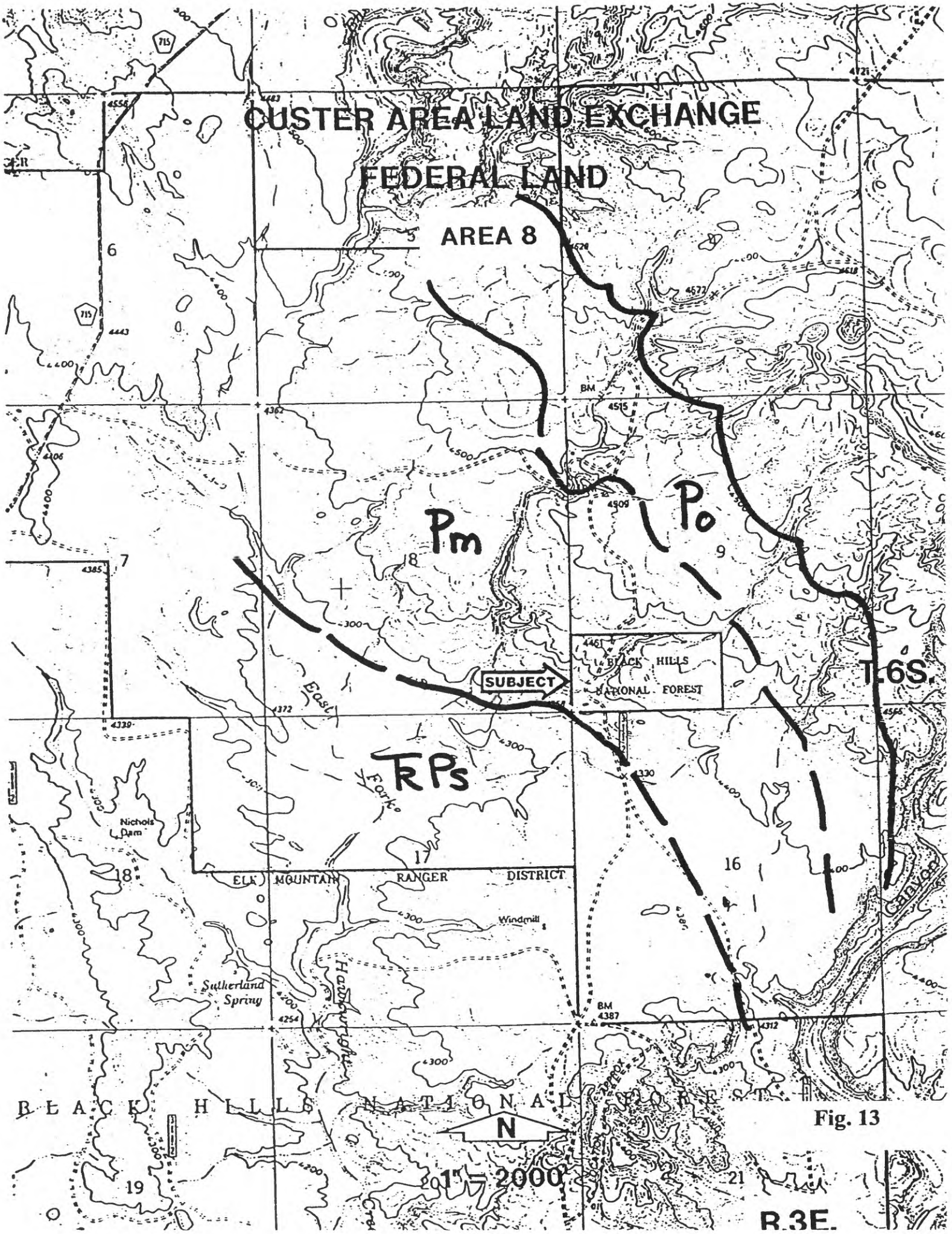
CUSTER AREA LAND EXCHANGE
FEDERAL LAND
AREA 8
Pm
Po
RPs
SUBJECT
BLACK HILLS
NATIONAL FOREST
T.6S.
R.3E.
East
Fork
ELK MOUNTAIN RANGER DISTRICT
Nichols Dam
Windmill
Sutherland Spring
Hawthorne
BM
4515
BM
4387
BLACK HILLS NATIONAL FOREST
N
1" = 2000'
6
7
8
9
16
17
18
19
21

Fig. 13

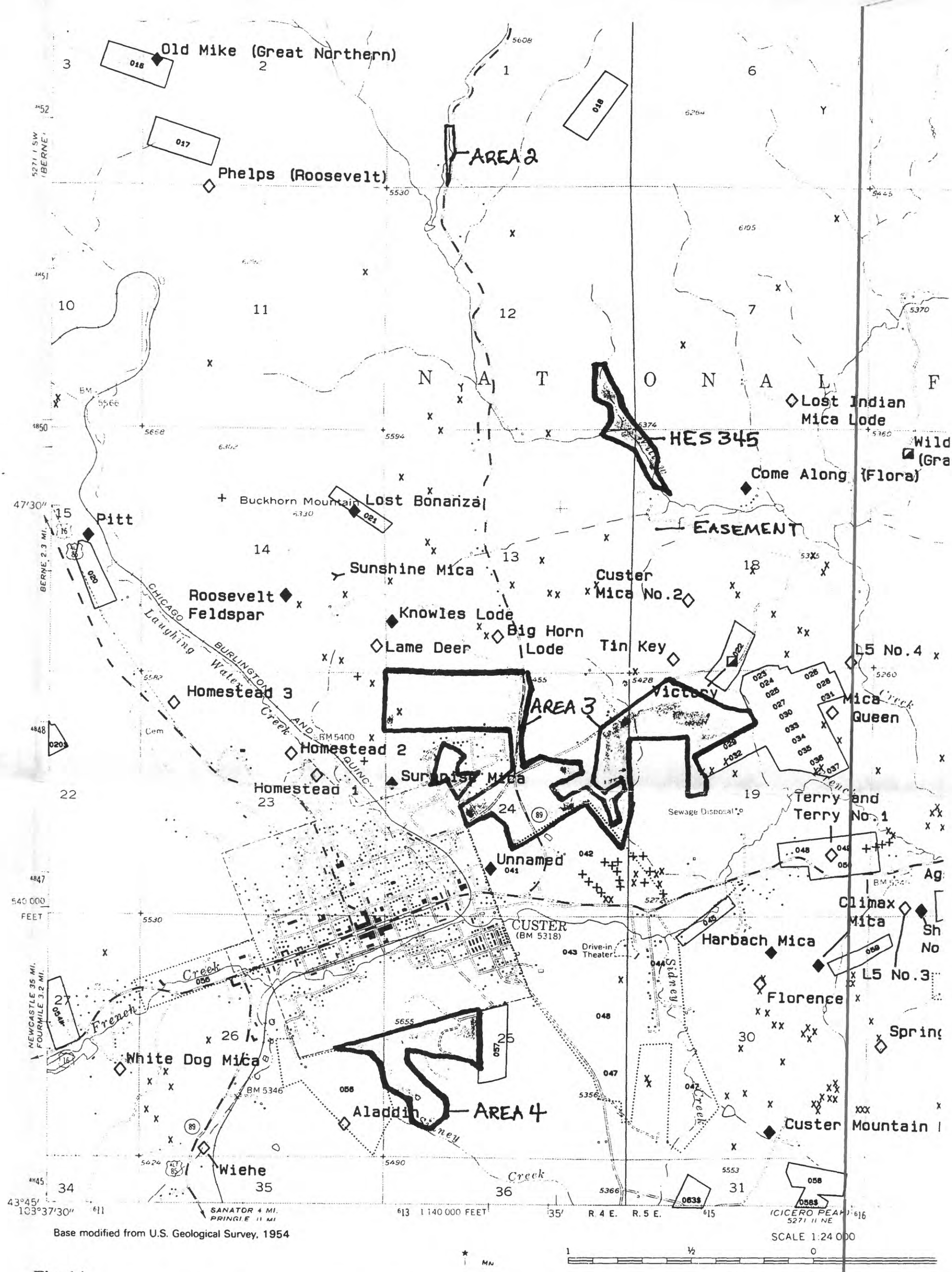

Fig. 14.

DeWitt, Ed, Buscher, David, Wilson, Anna, and Johnson, Tom, 1988a, Map showing locations of mines, prospects, and patented mining claims, and classification of mineral deposits in the Custer 7 ½-minute quadrangle, Black Hills, South Dakota: U.S. Geological Survey Miscellaneous Field Studies Map MF-1978-M, scale 1:24,000.

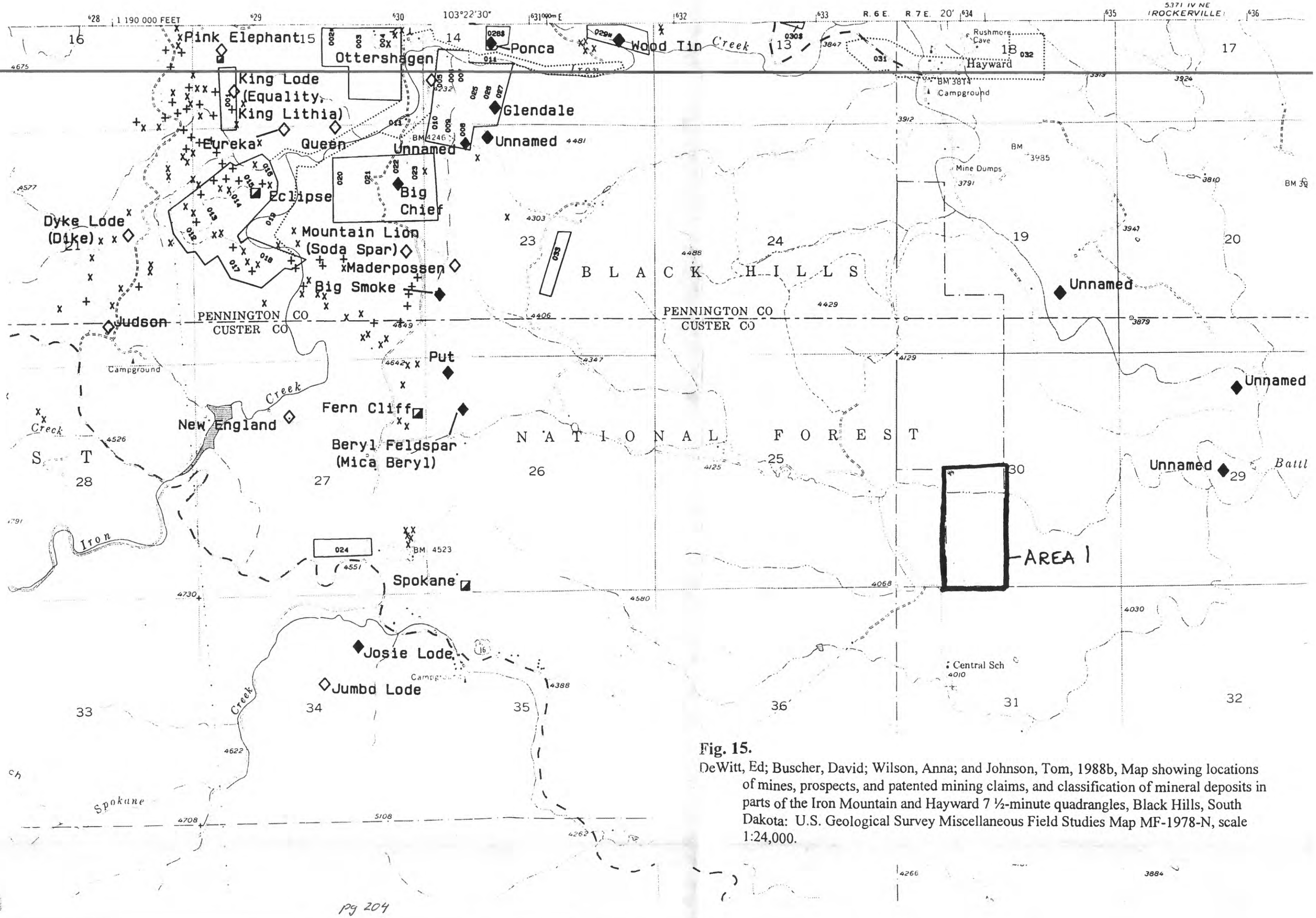

Fig. 15.

DeWitt, Ed; Buscher, David; Wilson, Anna; and Johnson, Tom, 1988b, Map showing locations of mines, prospects, and patented mining claims, and classification of mineral deposits in parts of the Iron Mountain and Hayward 7 ½-minute quadrangles, Black Hills, South Dakota: U.S. Geological Survey Miscellaneous Field Studies Map MF-1978-N, scale 1:24,000.

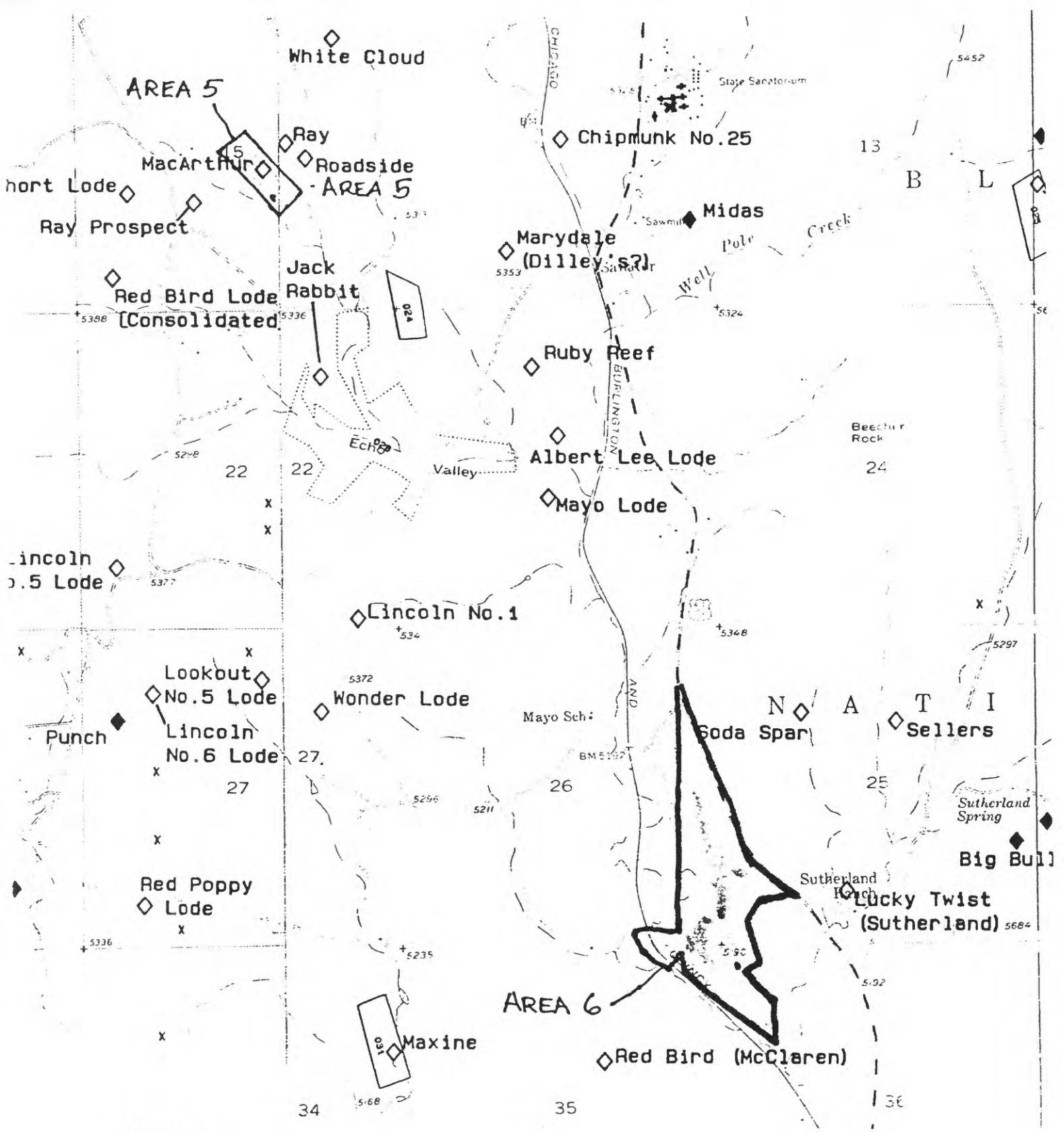

Fig. 16.

DeWitt, Ed, Buscher, David, Wilson, Anna, and Johnson, Tom, 1988c, Map showing locations of mines, prospects, and patented mining claims, and classification of mineral deposits in the Fourmile 7 ½-minute quadrangle, Black Hills, South Dakota: U.S. Geological Survey Miscellaneous Field Studies Map MF-1978-O, scale 1:24,000.

DeWitt, Ed; Buscher, David; Wilson, Anna; and Johnson, Tom, 1988d, Map showing locations of mines, prospects, and patented mining claims, and classification of mineral deposits in the Cicero Peak 7 ½-minute quadrangle and part of the Pringle 7 ½-minute quadrangle, Black Hills, South Dakota: U.S. Geological Survey Miscellaneous Field Studies Map MF-1978-P, scale 1:24,000.

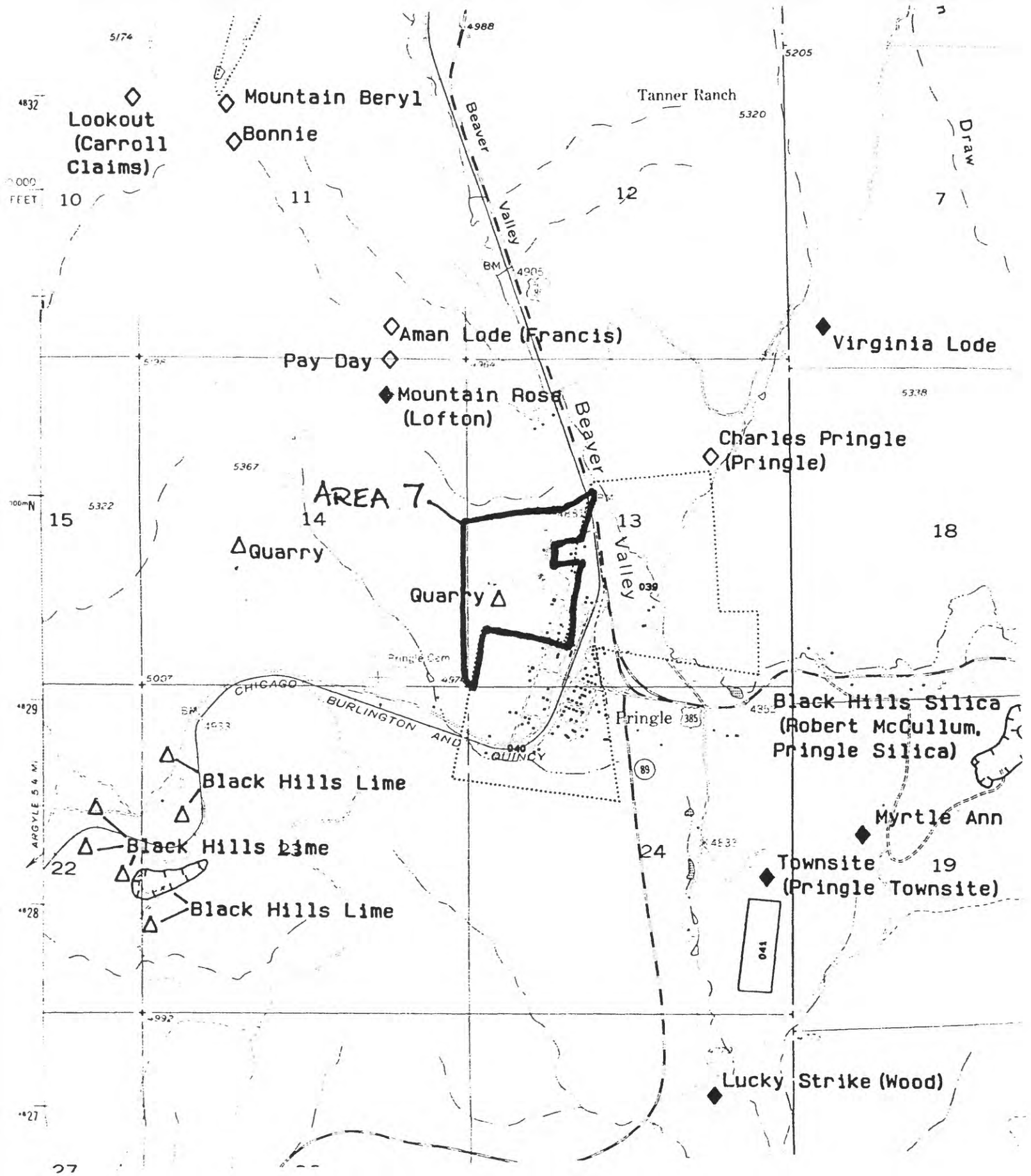

Fig. 17.

DeWitt, Ed; Buscher, David; Wilson, Anna; and Johnson, Tom, 1988d, Map showing locations of mines, prospects, and patented mining claims, and classification of mineral deposits in the Cicero Peak 7 ½-minute quadrangle and part of the Pringle 7 ½-minute quadrangle, Black Hills, South Dakota: U.S. Geological Survey Miscellaneous Field Studies Map MF-1978-P, scale 1:24,000.

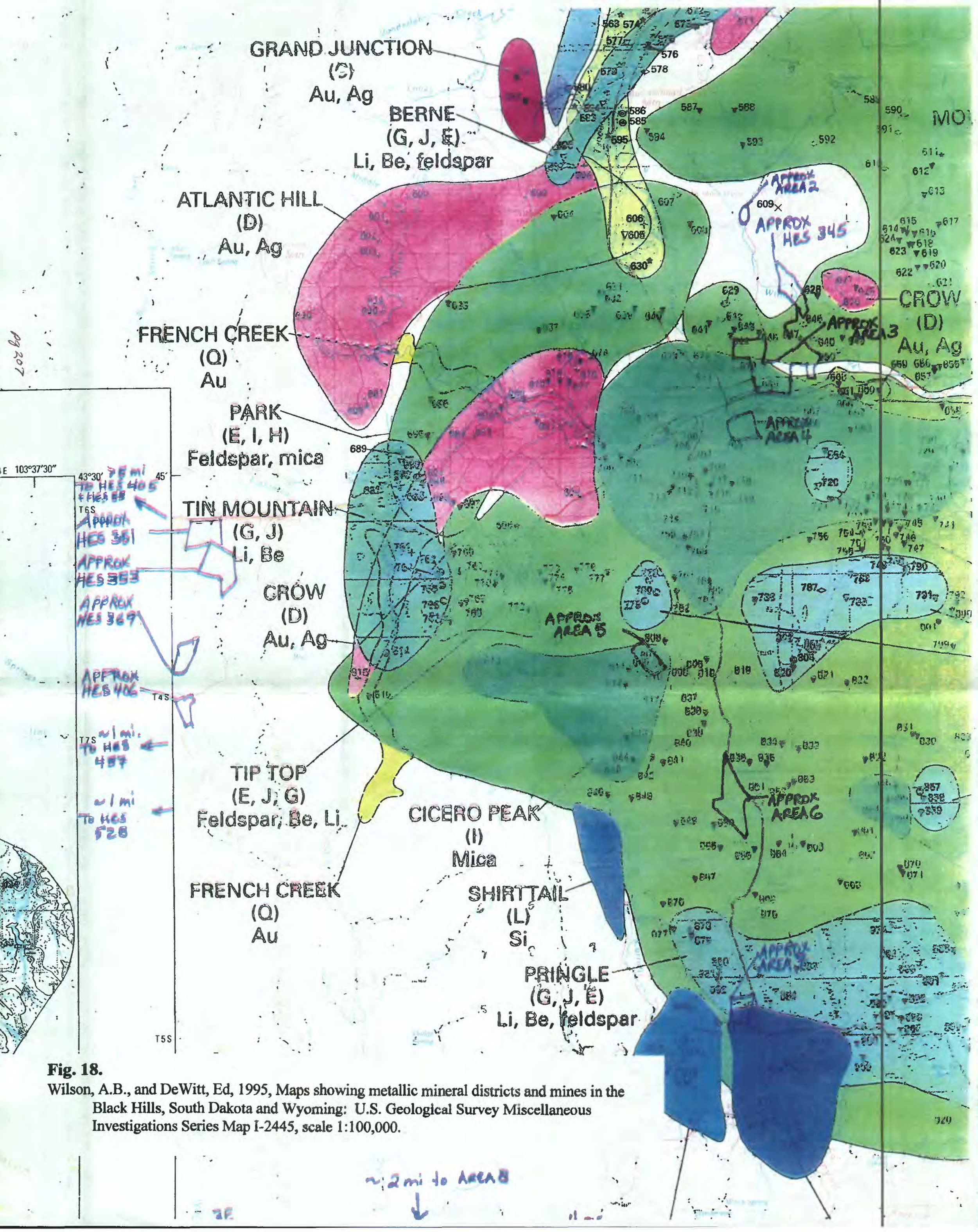

Fig. 18.

Wilson, A.B., and DeWitt, Ed, 1995, Maps showing metallic mineral districts and mines in the Black Hills, South Dakota and Wyoming: U.S. Geological Survey Miscellaneous Investigations Series Map I-2445, scale 1:100,000.

United States Department of the Interior

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Box 25046 M.S. 905
Denver Federal Center
Denver, Colorado 80225

IN REPLY REFER TO

(303) 236-5593
FAX (303) 236-3200
awilson@usgs.gov

April 14, 1998

Mr. John A. Prochazka, Jr.
Regional Grassland Land Exchange Coordinator
U.S. Forest Service
125 N. Main
Chadron, NB 69337

Dear Mr. Prochazka:

This is in response to your March 24, 1998 request for information on locatable mineral resources in the land exchange proposal in which Travis and Pamela DeJong have offered certain non-Federal lands within the Buffalo Gap National Grassland in exchange for Federal lands also within the Buffalo Gap National Grassland.

In accordance with the working agreement under Public Law 86-509, we are providing you with a report on the locatable mineral resources on the lands described in Exhibits "A" and "B", included with your request. These lands comprise an unspecified number of acres in Jackson County, South Dakota.

Sincerely yours,

Anna B. Wilson, Geologist
Mineral Resource Surveys, Central Region

Copies: G.S. Plumlee
E.A. duBray

LOCATABLE MINERAL REPORT FOR THE
DEJONG LAND EXCHANGE OFFER,
BUFFALO GAP NATIONAL GRASSLAND,
JACKSON COUNTY, SOUTH DAKOTA

By
Anna B. Wilson
U.S. Geological Survey

April 14, 1998

EXHIBIT A: Property that Travis and Pamela DeJong will consider exchanging:

T. 3 S., R. 19 E.

Sec. 3:	Lot 3, SE 1/4 NW 1/4
Sec. 9:	SE 1/4
Sec. 10:	NW 1/4

T. 2 S., R. 19 E.

Sec. 34:	SE 1/4

EXHIBIT B: Property that the Buffalo Gap National Grassland will consider exchanging:

T. 2 S., R. 19 E.

Sec. 35:	SE 1/4 SW 1/4, E 1/2 SW 1/4 SW 1/4

T. 3 S., R. 19 E.

Sec. 3:	W 1/2 SE 1/4
Sec. 5:	E 1/2 SE 1/4
Sec. 9:	E 1/2 NW 1/4
Sec. 10:	E 1/2 NE 1/4, E 1/2 SE 1/4, SW 1/4 SE 1/4
Sec. 10:	NW 1/4

T. 3 S., R. 20 E.

Sec. 1:	Lot 4, S 1/2 NW 1/4, N 1/2 S 1/2

The following report is based on information contained in USGS mineral resource and commodity files, mineral information databases (MRDS and MAS), and on reports and maps available in the USGS library. These are occasionally augmented with unpublished documents and personal experiences. No field studies or on-site visits were performed in preparing this report. Emphasis is primarily on locatable mineral resources. Leasable and salable resources are covered only if they appear in the above documents. Mineral resource assessments are subjective - the opinions expressed are entirely those of the author.

NON-FEDERAL AND FEDERAL LANDS

DeJong and Buffalo Gap National Grassland Parcels
(Cottonwood SE 1:24,000, Kadoka 1:100,000, and Martin 1:250,000 quadrangles)

The geology of all of the parcels considered for exchange are mapped at 1:500,000 scale as being within Oligocene White River Group (includes Brule and Chadron Formations) which unconformably overlies Cretaceous Pierre Formation, undifferentiated (Darton, 1951, see attachment A; Petsch, 1953, see attachment B). Mapping at 1:250,000 scale (Sawyer and Martin, 1998) indicates that most of the parcels are in the White River Group, the easternmost of the parcels near Martin Dam may be underlain by Pierre Shale. Only the lone parcel southeast of Chamberlain Pass appears to be mostly in Quaternary terrace gravels overlying Pierre Shale.

Elsewhere in the Great Plains region the White River Group is known to contain bentonite and certain ash layers may locally contain zeolites. Mammalian fossils may also be found in parts of the White River Group.

There are no known mineral deposits in the vicinity of the parcels (USGS, 1998a,b; J.F. Sawyer, South Dakota Geological Survey, personal communication, April 1998). Mineral resource potential on the Martin Dam parcels is low. Potential for sand and gravel deposits on the easternmost tract could be as much as moderate. To the best of my knowledge, the underlying formations have not been tested for oil and gas.

REFERENCES CITED:

Darton, N.H., compiler, 1951, Geologic map of South Dakota: U.S. Geological Survey, scale 1:500,000.

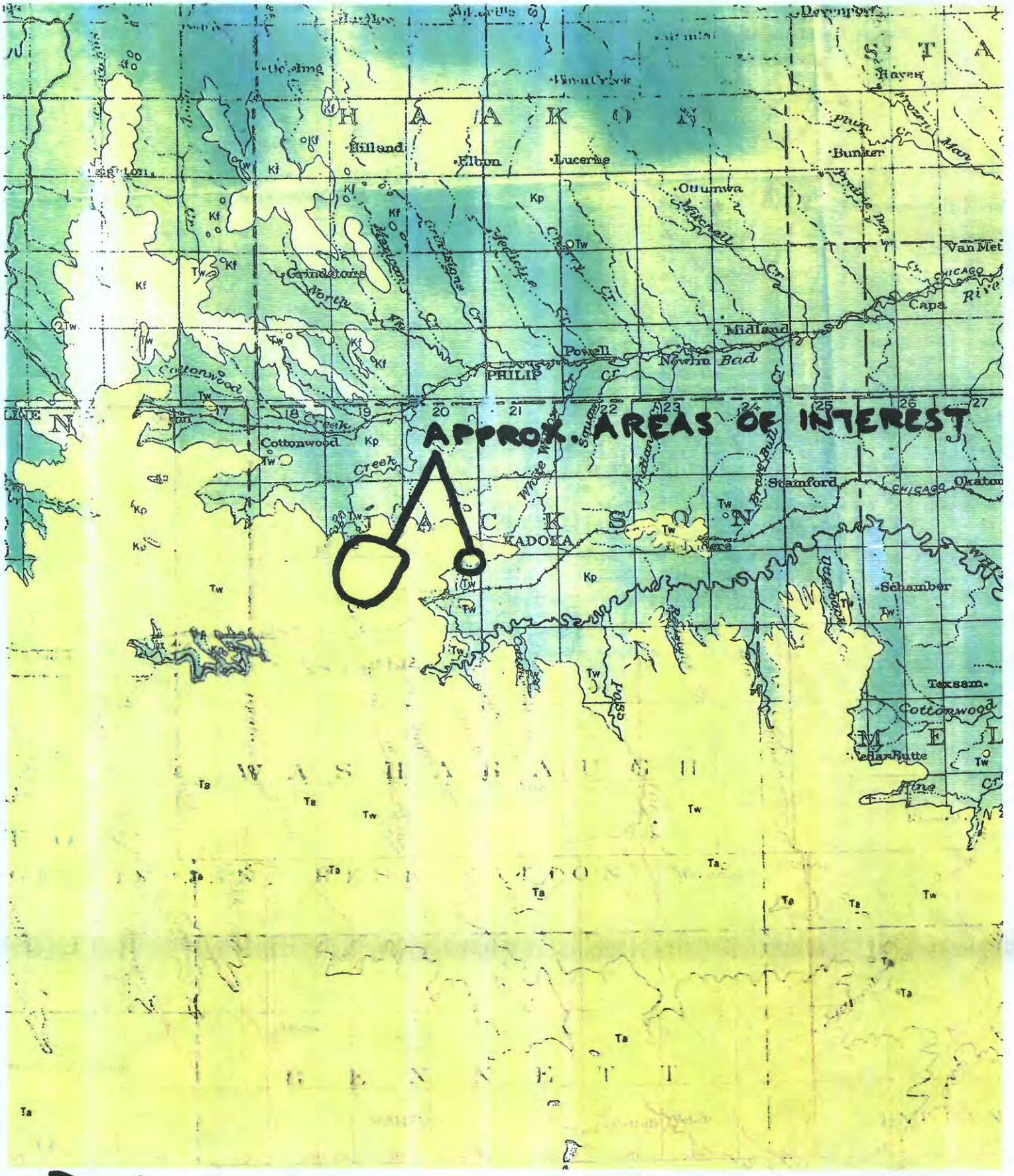
Petsch, B.C., compiler, 1953, Geologic map of State of South Dakota: State Geological Survey, scale 1:500,000.

Sawyer, J.F., and Martin, J.E., 1998, Preliminary geologic map of the Martin 1° X 2° quadrangle, South Dakota: South Dakota Geological Survey, unpublished map files, scale 1:250,000.

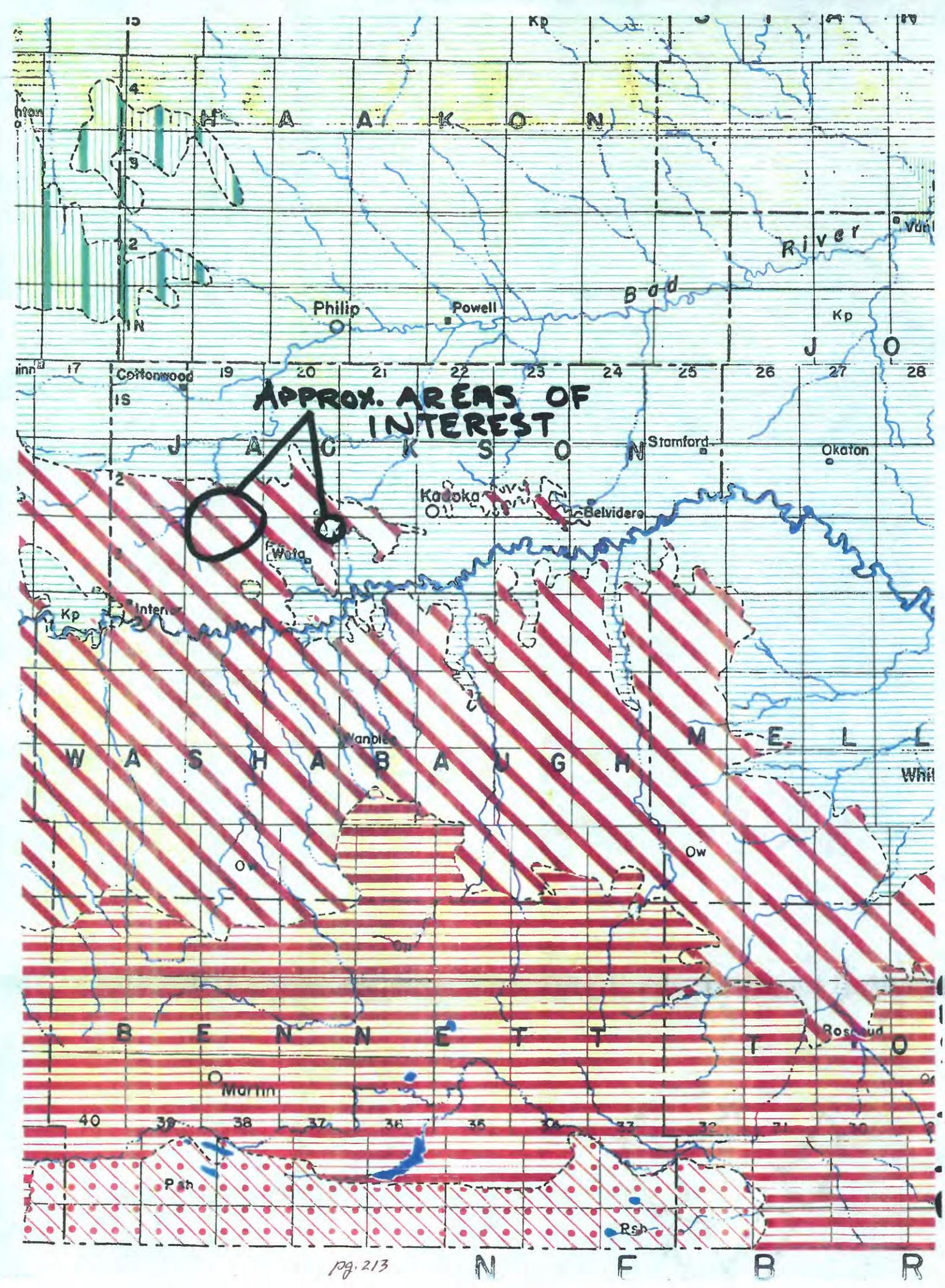
OTHER REFERENCES CONSULTED

U.S. Geological Survey, 1998a, Mineral Resource Data System [MRDS: active computer file; data available from U.S. Geological Survey, Mineral Resources Program, Building 20, Denver Federal Center, Denver CO 80225].

U.S. Geological Survey, 1998b, Minerals Availability System [MAS: active computer file; data available from U.S. Geological Survey, Minerals Information Team (formerly U.S. Bureau of Mines), Building 20, Denver Federal Center, Denver CO 80225].


APPROX. AREAS OF INTEREST
Hilland
Elbon
Lucerne
Bunker
Quumwa
Midland
Powell
Cottonwood
Stamford
Schamber
Texsam
Cottonwood
Cedar Butte
Kf
Kp
Tw
Ta

Darton, 1951


APPROX. AREAS OF INTEREST
JACKSON
WASHABAUGH
MELLETT
BENNETT
Philip
Powell
Cottonwood
Kadoka
Belvidere
Stamford
Okaton
Interior
Wanblee
Martin
Rosebud
Bad River
Kp
Ow
Psh

United States Department of the Interior

U. S. GEOLOGICAL SURVEY
Box 25046 M.S. 905
Denver Federal Center
Denver, Colorado 80225

IN REPLY REFER TO:

(303) 236-5593
FAX (303) 236-3200
awilson@usgs.gov

May 4, 1998

Mr. John A. Prochazka, Jr.
Regional Grassland Land Exchange Coordinator
U.S. Forest Service
125 N. Main
Chadron, NB 69337

Dear Mr. Prochazka:

This is in response to your March 24, 1998 request for information on locatable mineral resources on lands in the Ft. Pierre National Grassland, near Pierre, SD pertaining to the land exchange proposal by Nebraska National Forest and six landowners. I understand that no report is requested for the Mervin Peterson exchange.

In accordance with the working agreement under Public Law 86-509, we are providing you with a report on the locatable mineral resources on the lands described in Exhibits 1 - 5, included with your request. These lands comprise 2745.345 acres, more or less, in Stanley, Lyman, and Jones Counties, South Dakota.

Sincerely yours,

Anna B. Wilson, Geologist
Mineral Resource Surveys, Central Region

Copies: G.S. Plumlee
E.A. duBray

LOCATABLE MINERAL REPORT FOR SIX LAND EXCHANGE OFFERS, FT. PIERRE NATIONAL GRASSLAND, NEBRASKA NATIONAL FOREST, STANLEY, LYMAN, AND JONES COUNTIES, SOUTH DAKOTA

By
Anna B. Wilson
U.S. Geological Survey

May 4, 1998

The following report is based on information contained in USGS mineral resource and commodity files, mineral information databases (MRDS and MAS), and on reports and maps available in the USGS library. These are occasionally augmented with unpublished documents and personal experiences. No field studies or on-site visits were performed in preparing this report. Emphasis is primarily on locatable mineral resources. Leasable and salable resources are covered only if they appear in the above documents. Mineral resource assessments are subjective: the opinions expressed herein are entirely those of the author.

EXHIBIT 1: Everett Smalley Exchange, Lyman County (#4 on index map)

Property that Everett Smalley will consider exchanging		acres
T. 108 N., R. 78 W.	Sec. 28, NE 1/4 SW 1/4	40
Property that the U.S. Forest Service will consider exchanging		
T. 108 N., R. 78 W.	Sec. 20, NW 1/4 NE 1/4	40

EXHIBIT 2: Michael Cruse Exchange, Lyman County (#5 on index map)

Property that Michael Cruse will consider exchanging		
T. 108 N., R. 78 W.	Sec. 30, Lots 3 and 4, E 1/2 SW 1/4	153.52
Property that the U.S. Forest Service will consider exchanging:		
T. 108 N., R. 78 W.	Sec. 19, SE 1/4	160

EXHIBIT 3: Tom Larson Exchange, Lyman County (#1 on index map)

Property that Tom Larson will consider exchanging		
T. 107 N., R. 79 W.	Sec. 33, SE 1/4	160
T. 107 N., R. 78 W.	Sec. 8, NE 1/4	160
Property that the U.S. Forest Service will consider exchanging		
T. 108 N., R. 78 W.	Sec. 11, N 1/2	320

EXHIBIT 4: Ross Nielsen Exchange, Jones and Lyman Counties (#6 on index map)

Property that Ross Nielsen will consider exchanging		
T. 108 N., R. 79 W.	Sec. 34, S 1/2	320
T. 2 N., R. 31 E.	Sec. 21, NE 1/4 S 1/2	480
Property that the U.S. Forest Service will consider exchanging:		
T. 1 N., R. 31 E.	Sec. 15, SW 1/4 NE 1/4, NW 1/4 SE 1/4	160
	Sec. 27, Lots 1-4, W 1/2 E 1/2, W 1/2	615.36

EXHIBIT 5: Clay Roberts Exchange, Stanley and Lyman Counties (#2 on index map)

Property that Ross Nielsen will consider exchanging		
T. 108 N., R. 77 W.	Sec. 7, S 1/2 lot 2, SW 1/4 SE 1/4 SW 1/4	28.025
T.109 N., R. 78 W.	Sec. 11, NW 1/4 SE 1/4	40
Property that the U.S. Forest Service will consider exchanging:		
T. 109 N., R. 77 W.	Sec. 17, E 1/2 SE 1/4	80

Total acreage considered for exchange ± 2745.345 acres

NON-FEDERAL AND FEDERAL LANDS

Six Private Parcels and Ft. Pierre National Grassland Parcels
(Pierre 1:100,000 quadrangle)

The geology of all of the parcels considered for exchange is mapped at 1:500,000 scale as being within Cretaceous Pierre Formation (Darton, 1951, see attachment A; Petsch, 1953, see attachment B). More recent mapping at 1:250,000 (Martin and Sawyer, unpublished mapping, 1998) suggests that some parcels may contain Quaternary surficial deposits.

Elsewhere in the Great Plains region Pierre Shale is locally host to bentonite, marine fossils, uranium, and manganese nodules. The parcels should be examined for these commodities and possible sand and gravel.

There are no known mineral deposits in the vicinity of the parcels (USGS, 1998a,b).

REFERENCES CITED:

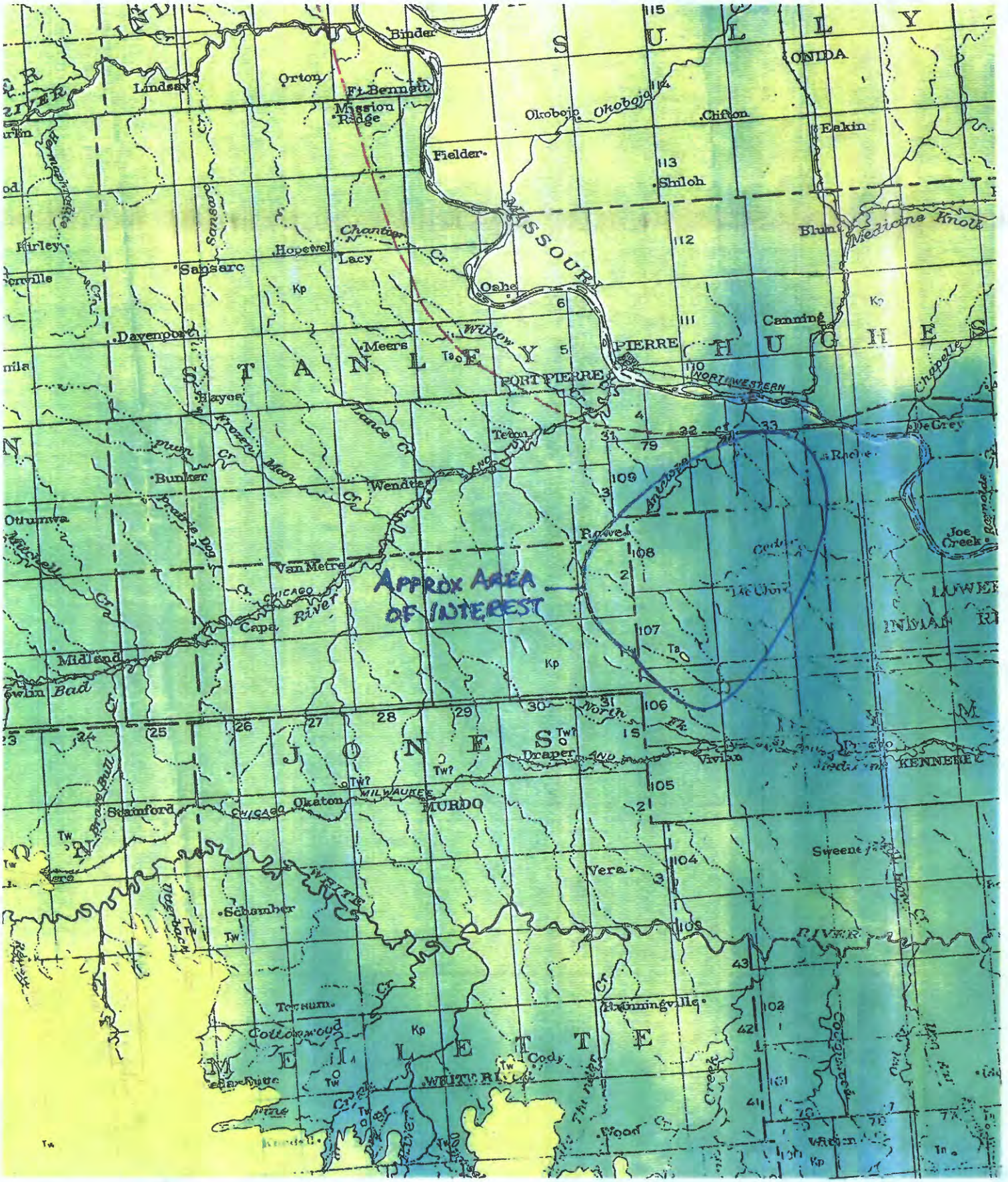
Darton, N.H., compiler, 1951, Geologic map of South Dakota: U.S. Geological Survey, scale 1:500,000.

Martin, J.E., and Sawyer, J.F., 1998, Preliminary geologic map of the Pierre 1° x 2° quadrangle: South Dakota Geological Survey, unpublished map files, scale 1:250,000.

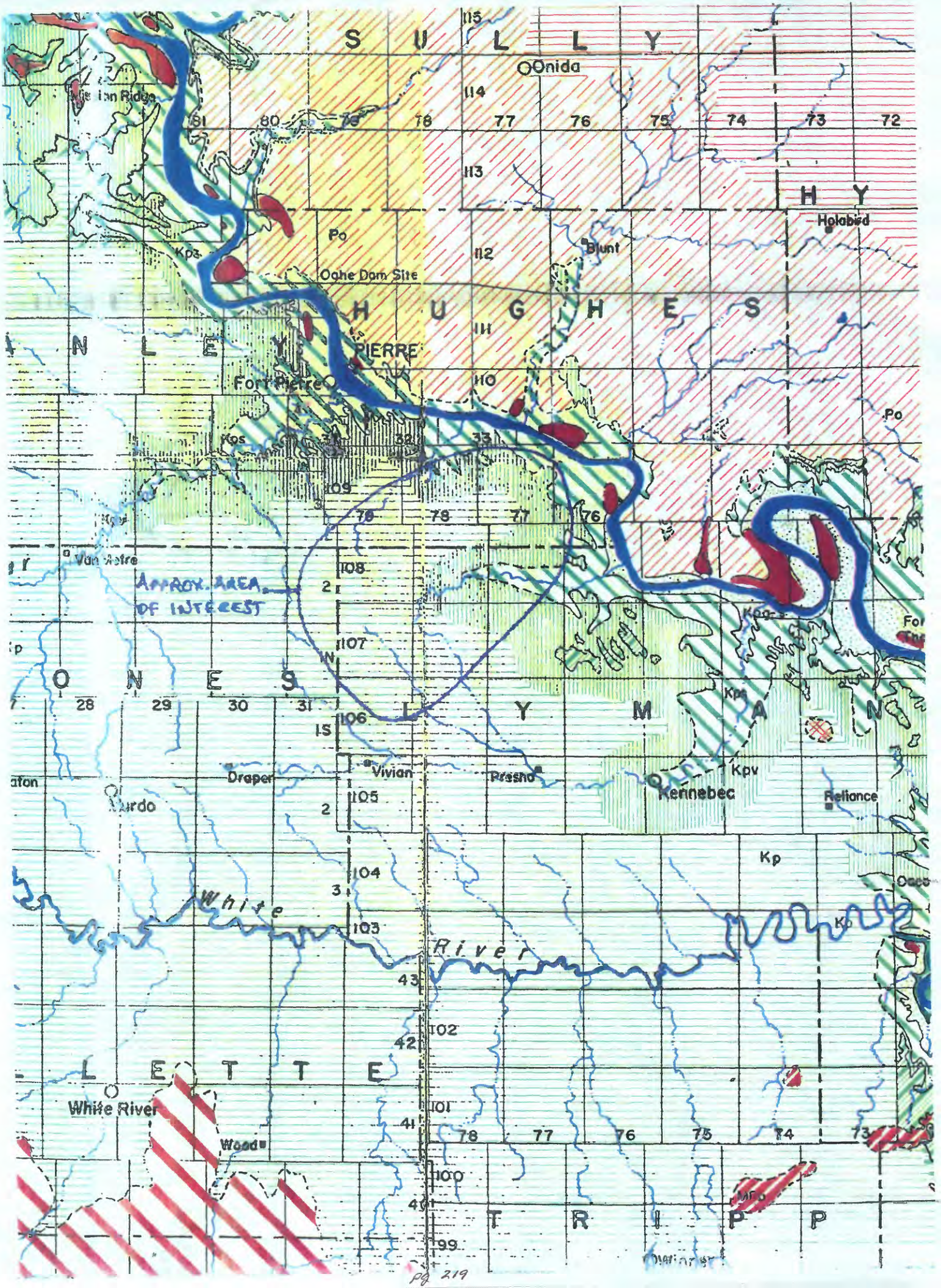
Petsch, B.C., compiler, 1953, Geologic map of State of South Dakota: State Geological Survey, scale 1:500,000.

U.S. Geological Survey, 1998a, Mineral Resource Data System [MRDS: active computer file; data available from U.S. Geological Survey, Mineral Resources Program, Building 20, Denver Federal Center, Denver CO 80225].

U.S. Geological Survey, 1998b, Minerals Availability System [MAS: active computer file; data available from U.S. Geological Survey, Minerals Information Team (formerly U.S. Bureau of Mines), Building 20, Denver Federal Center, Denver CO 80225].



DARTON, 1951, GEOLOGIC MAP OF SOUTH DAKOTA: USGS


SULLY
HYDE
HUGHES
JONES
LYMAN
TRIPP
LETTE
Onida
Blunt
Holabird
Ogahe Dam Site
PIERRE
Fort Pierre
Van Metre
APPROX. AREA OF INTEREST
Vivian
Presho
Draper
Kennebec
Reliance
White River
Wood
White River
115
114
113
112
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107
106
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104
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Mfp

pg 219

WYOMING

United States Department of the Interior

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Denver, Colorado 80225

IN REPLY REFER TO:

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awilson@usgs.gov

September 2, 1998

Mr. M. M. Underwood, Jr.
Director of Physical Resources
U.S. Forest Service - Rocky Mountain Region
P.O. Box 25127
Lakewood, CO 80225-0127

Dear Mr. Underwood:

This is in response to your July 15, 1998 request for information on locatable mineral resources in the Centennial Valley land exchange proposal in which T.A. Bragg has offered certain non-Federal lands within the Medicine Bow National Forest in exchange for Federal lands also within the Medicine Bow National Forest.

In accordance with the working agreement under Public Law 86-509, we are providing you with a report on the locatable mineral resources on the lands described in Exhibits "A" and "B", included with your request. These lands comprise 120 acres, more or less, in Albany and Converse Counties, Wyoming.

Sincerely yours,

Anna B. Wilson, Geologist
Mineral Resource Surveys, Central Region

Copies: G.S. Plumlee
E.A. duBray

LOCATABLE MINERAL REPORT FOR THE
CENTENNIAL VALLEY (T.A. BRAGG) LAND EXCHANGE OFFER,
MEDICINE BOW NATIONAL FOREST,
ALBANY AND CONVERSE COUNTIES, WYOMING

By
Anna B. Wilson
U.S. Geological Survey

September 2, 1998

EXHIBIT A: Property that T.A. Bragg will consider exchanging:

6th Principal Meridian, Converse County, Wyoming

	acres
T. 29 N., R. 73 W.	
Sec. 31, W 1/2 NW 1/4	80 ±

EXHIBIT B: Property that the Forest Service will consider exchanging:

6th Principal Meridian, Albany County, Wyoming

	acres
T. 14 N., R. 78 W.	
Sec. 2, SE 1/4 NW 1/4	40 ±
Total acreage	± 120

The following report is based on information contained in USGS mineral resource and commodity files, mineral information databases (MRDS and MAS), and on reports and maps available in the USGS library. These are occasionally augmented with unpublished documents and personal experiences. No field studies or on-site visits were performed in preparing this report. Emphasis is primarily on locatable mineral resources. Leasable and salable resources are covered only if they appear in the above documents.

NON-FEDERAL LANDS
(School Section Mountain 1:24,000, Laramie Peak 1:100,000, and Torrington 1:250,000 quadrangles)

T.A. Bragg's parcel is along a nearly north-trending section of Curtis Gulch, east of Downey Park. An established trail runs along the west side of the gulch.

Although a considerable portion of the Laramie Range has been mapped in detail (Snyder, 1984, 1992, 1993; Snyder and others, 1995; Houston and Karlstom, 1992), detailed geologic mapping of the area covering the parcel could not be located. At 1:500,000 scale, the parcel is shown in the core of the Laramie Range in Archean 2,600 Ma granite, amphibolite, and minor metasedimentary rocks (Love and Christiansen, 1985; Spencer, 1916). These are cut by Proterozoic and Late Archean mafic intrusive dikes (Love and Christiansen, 1985).

Several mines and mining districts surround the parcel. The closest of these, "prospects north of Fortymile Ranch", part of the War Bonnet (Warbonnet) district, were prospected for copper (Spencer, 1916; Hausel, 1989; see fig. 1). More than 6 miles to the west of the parcel at least two mines associated with diabase dikes produced copper with small amounts of gold and silver. There is no mention of quantity of production (Hausel, 1989). At 1:500,000 scale mapping, the geology of these deposits appears to be identical to that in the parcel.

There are no known mineral deposits on the T.A. Bragg parcel (USGS, 1998a,b). Mineral resource potential is low.

FEDERAL LANDS
(Albany and Lake Owen 1:24,000, Saratoga 1:100,000, Rawlins 1:250,000 quadrangles)

The federal land is about 2 mi. north of Albany and about 30 mi southwest of Laramie. It straddles Precambrian granite and the west flank of a syncline of Pennsylvanian to Cretaceous rocks in Centennial Valley (Houston and Orback, 1976). Much of the parcel is overlain by Quaternary sediments (fig. 2). Detailed geologic maps of the western part of the tract could not be located.

The basement rocks are separated by a northwest-striking, southwest-dipping, thrust fault. Sherman Granite (Precambrian Y) is exposed southwest of the fault. Pennsylvanian to Cretaceous sedimentary rocks are presumed to be buried northeast of the fault (Houston and Orback, 1976). Quaternary and Tertiary (undivided) pediment gravels and colluvium, conglomerates and

conglomeratic sandstones, Browns Park(?) or North Park(?) Formation, and White River Formation (Houston and Orback, 1976) overlie most of the tract. Quaternary alluvium is locally present in the stream valleys. (Houston and Orback, 1976).

There are no known mineral deposits in the vicinity of the parcel (USGS, 1998a,b; Houston and Orback, 1976). There is a report of chalcopyrite in sheared epidote-rich Sherman Granite 5-6 mi to the southeast. Niobrara Formation (Cretaceous), may contain argillaceous limestone that could be used in portland cement (Houston and Orback, 1976), but it is uncertain that any occurs in the tract. Calcareous sedimentary rocks near the base of the undivided Quaternary/Tertiary sedimentary rocks could be a potential source for pozzolan cement (Houston and Orback, 1976). Mineral resource potential of this tract is low.

REFERENCES CITED:

Hausel, W.D., 1989, The geology of Wyoming's precious metal lode and placer deposits: Geological Survey of Wyoming Bulletin 68, 248 p.

Houston, R.S., and Orback, C.J., 1976, Geologic map of the Lake Owen Quadrangle, Albany County, Wyoming: U.S. Geological Survey Geologic Quadrangle Map GQ-1304, scale 1:24,000.

Love, J.D., and Christiansen, A.C., 1985, Geologic map of Wyoming: U.S. Geological Survey, scale 1:500,000.

Spencer, A.C., 1916, Economic geology of the North Laramie Mountains, Converse and Albany Counties, Wyoming, *in* Spencer, A.C., The Atlantic Gold District and the North Laramie Mountains, Fremont, Converse, and Albany Counties, Wyoming: U.S. Geological Survey Bulletin 626, p.47-81.

OTHER REFERENCES CONSULTED

Blackstone, D.L., 1996, Structural geology of the Laramie Mountains, southeastern Wyoming and northeastern Colorado: Wyoming State Geological Survey Report of Investigations No. 51, 28 p.

Houston, R.S., and Karlstrom, K.E., 1992, Geologic map of Precambrian metasedimentary rocks of the Medicine Bow Mountains, Albany and Carbon Counties, Wyoming: U.S. Geological Survey Miscellaneous Investigations Series Map I-2280, scale 1:50,000.

Houston, R.S., and Ebbett, B.E., 1977, Geologic map of the Sierra Madre and western Medicine Bow Mountains, southeastern Wyoming: U.S. Geological Survey Miscellaneous Field Studies Map MF-827, scale 1:125,000.

Snyder, G.L., Siems, D.F., Grossman, J.N., Ludwig, K.R., and Nealey, L.D., 1995, Geologic map, petrochemistry, and geochronology of the Precambrian rocks of the Fletcher Park-Johnson Mountain area, Albany and Platte Counties, Wyoming, with a section on the Fletcher Park shear zone by B.R. Frost, K.R. Chamberlain, and G.L. Snyder: U.S. Geological Survey Miscellaneous Investigations Series Map I-2233, scale 1:24,000.

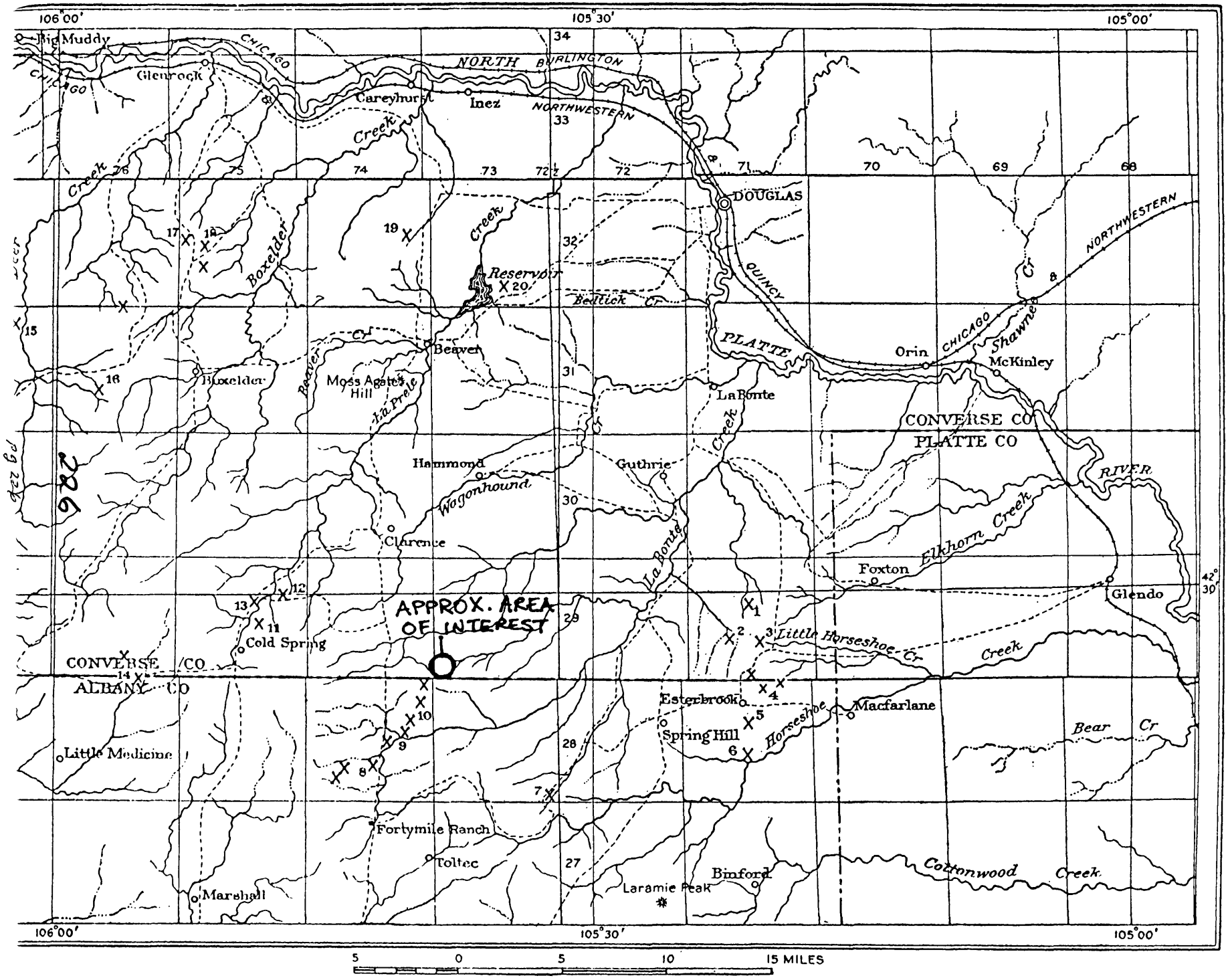
Snyder, G.L., 1992, Geologic map of the La Bonte Gabbro area, Albany and Converse Counties, Wyoming: U.S. Geological Survey Miscellaneous Investigations Series Map I-2231, scale 1:24,000.

Snyder, G.L., 1993, Geologic map of the Esterbrook-Braae area, Albany, Converse, and Platte Counties, Wyoming: U.S. Geological Survey Miscellaneous Investigations Series Map I-2232, scale 1:24,000.

U.S. Geological Survey, 1998a, Mineral Resource Data System [MRDS: active computer file; data available from U.S. Geological Survey, Mineral Resources Program, Building 20, Denver Federal Center, Denver CO 80225].

U.S. Geological Survey, 1998b, Minerals Availability System [MAS: active computer file; data available from U.S. Geological Survey, Minerals Information Team (formerly U.S. Bureau of Mines), Building 20, Denver Federal Center, Denver CO 80225].

Fig 1



LIST OF PROSPECTS

1 TRAIL CREEK
2 SNOWBIRD
3 SAUL'S CAMP
4 KREISLEY PROSPECTS
5 THREE CRIPPLES
6 MAGGIE MURPHY
7 HOOSIER BOY
8 MAMMOTH
9 PYRAMID
10 LA BONTE CLAIMS
11 MAGNETITE LOCALITY
12 COPPER KING
13 ORIOLE
14 BRENNING
15 CHROMITE
16 SWEDE BOY
17 MORMON CANYON (copper and asbestos)
18 SMITH PROSPECT
19 MEWIS PROSPECT
20 HAZENVILLE

X⁴ Prospect (Number refers to list)

SKETCH MAP OF THE NORTH LARAMIE MOUNTAINS, WYO., SHOWING LOCATION OF PRINCIPAL MINERAL PROSPECTS.

SPENCER 1916 USGS Bull 626

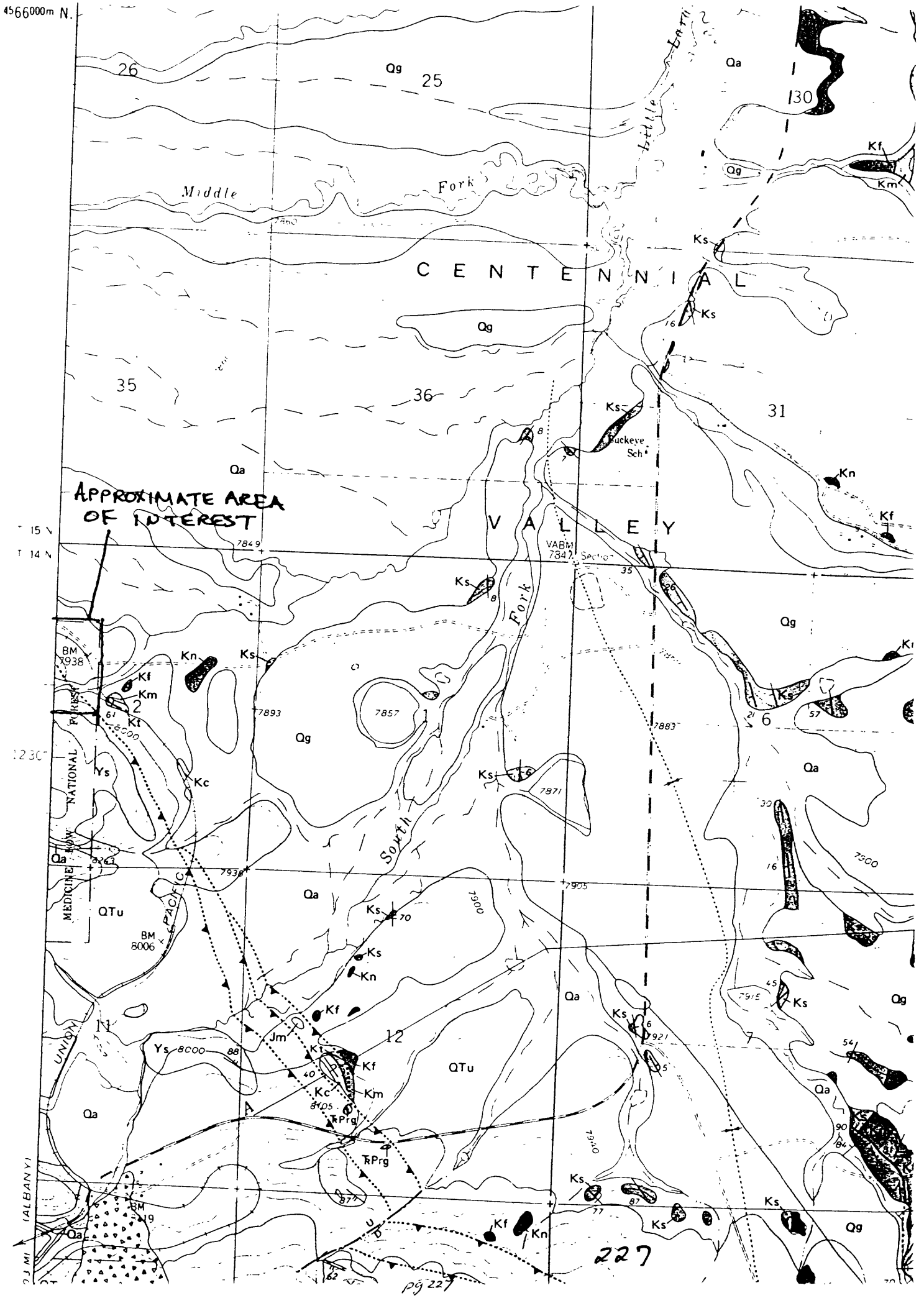


FIG. 2 HOUSTON + ORBACK, 1976, USGS GQ-1304