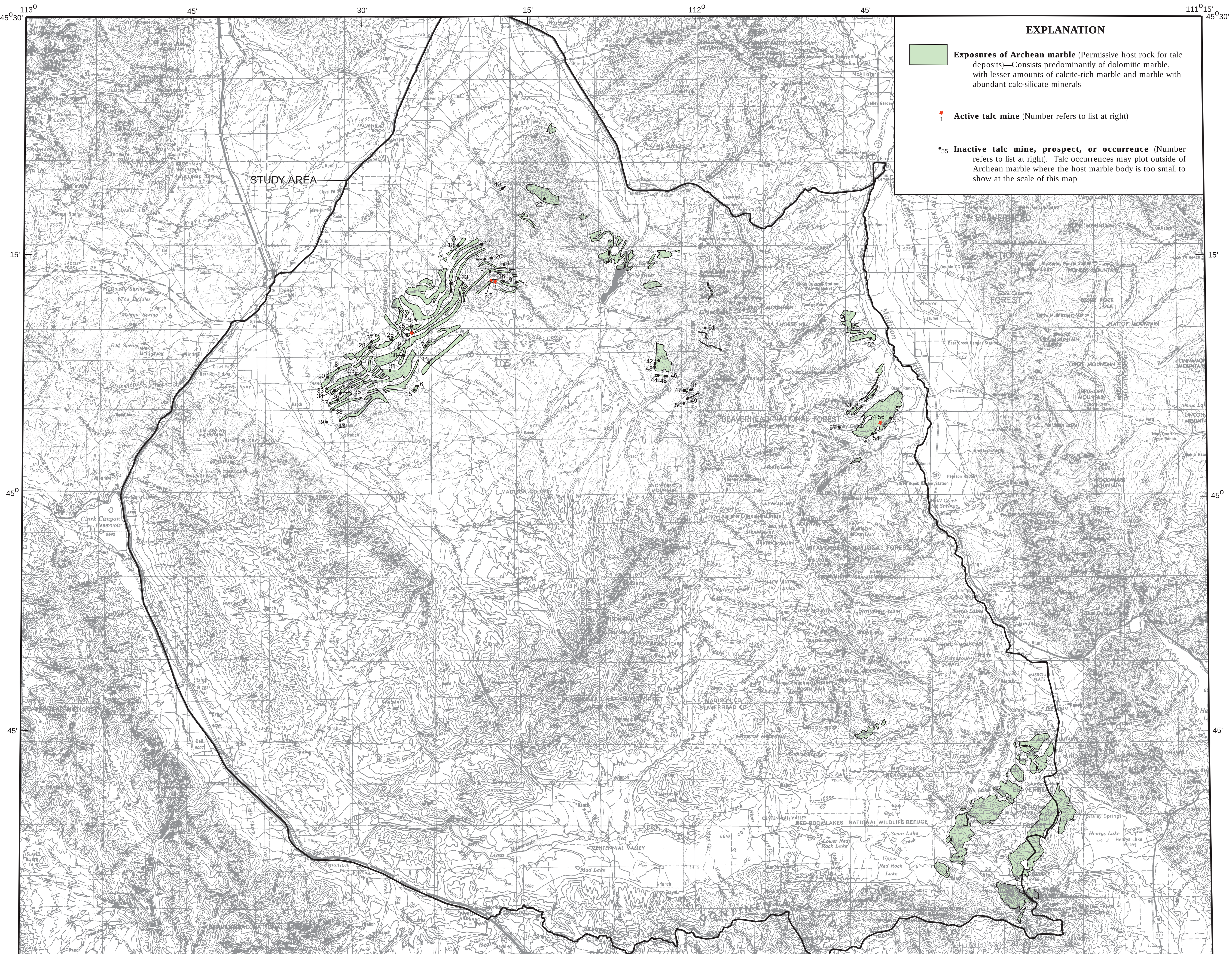


EXPLANATION

Exposures of Archean marble (Permissive host rock for talc deposits)—Consists predominantly of dolomitic marble, with lesser amounts of calcite-rich marble and marble with abundant calc-silicate minerals

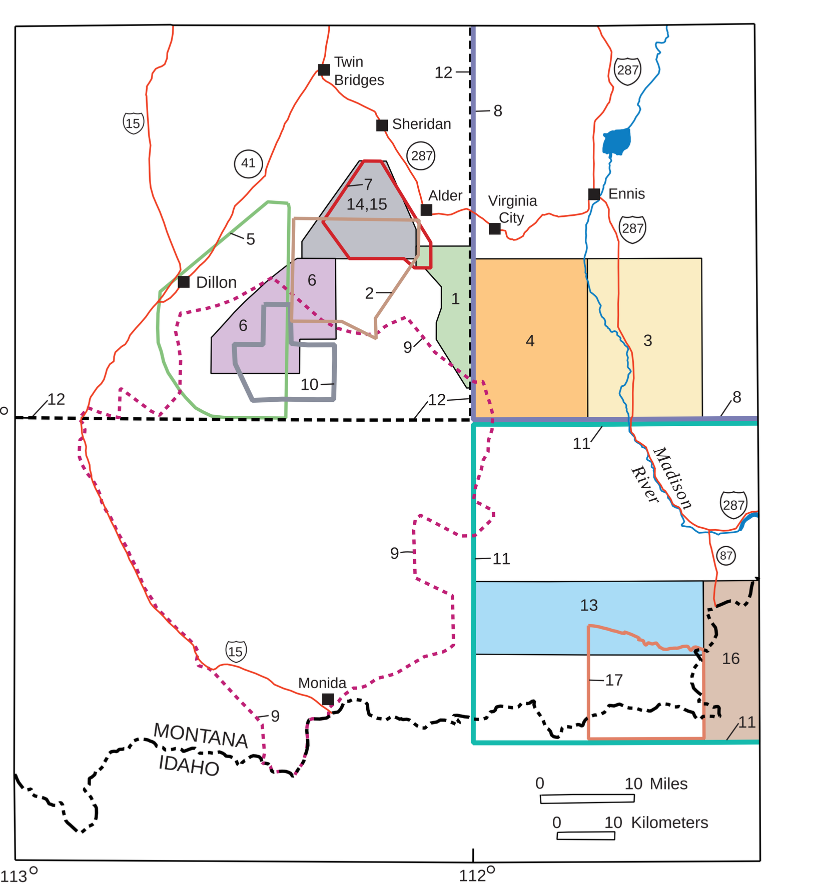
Active talc mine (Number refers to list at right)

Inactive talc mine, prospect, or occurrence (Number refers to list at right). Talc occurrences may plot outside of Archean marble where the host marble body is too small to show at the scale of this map

Base from U.S. Geological Survey, 1:250,000,
Ashton, 1972; Bozeman, 1972; Dillon, 1977; Dubois, 1978.
1927 North American Datum.
Projection: Transverse Mercator.

SCALE 1:250 000

CONTOUR INTERVAL 200 FEET
SUPPLEMENTARY CONTOUR INTERVAL 100 FEET IN DUBOIS QUADRANGLE
NATIONAL GEODETIC VERTICAL DATUM OF 1929



Index Map Showing Sources of Geologic Map Data

Sources of Geologic Map Data

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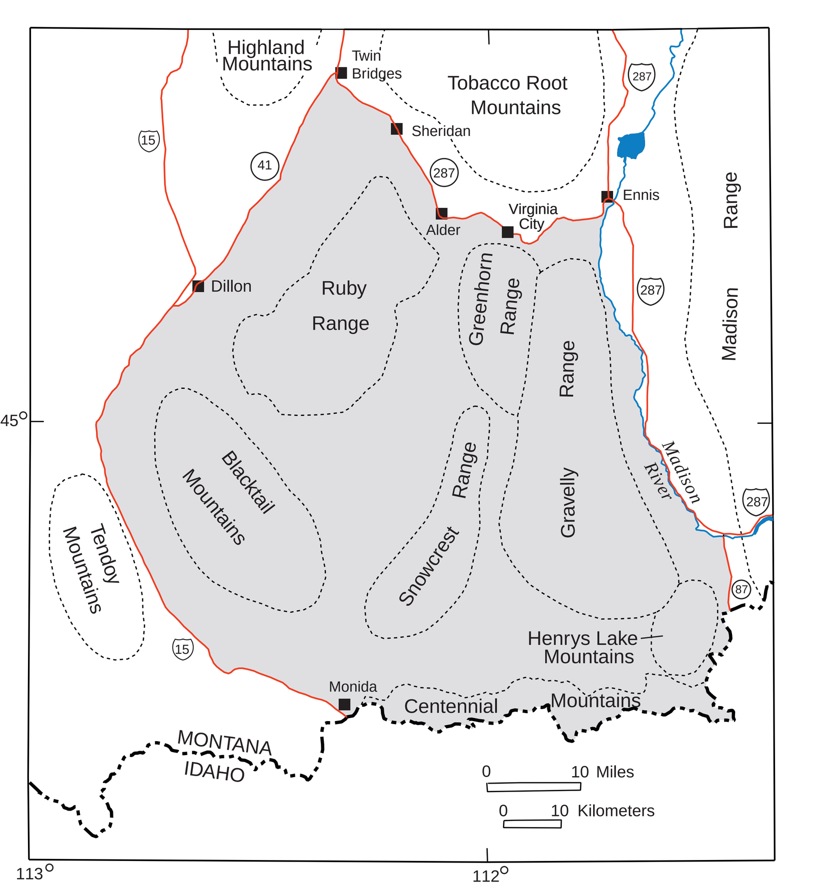

Index map showing the study area (stippled)

Map showing areas with potential for talc deposits in the Gravelly, Greenhorn, and Ruby Ranges and the Henrys Lake Mountains of southwestern Montana

by
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1998

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TALC MINES, PROSPECTS, AND OCCURRENCES

ACTIVE MINES (1997)

Map No.	Mine name	Location	Operator	Mining method; Production; Published reserves	References
1	Beaverhead	NW¼ SE¼ sec. 14, T.7S., R.6W.	Luzenac America, Inc.	Underhand (cemented backfill using borrow material); producing 9,000 short tons of ore per year; 150,000 short tons of proven reserves	Garihan (1973a); Olson (1976); Berg (1979b); McCulloch (1996); Kaas (1996); U.S. Geological Survey (1996)
2	Treasure State	NW¼ sec. 14, T.7S., R.6W.	Barretts Minerals, Inc.	Open pit with significant talc production	Garihan (1973a); Olson (1976); Berg (1979b); Kaas (1996)
3	Regal (Keystone)	NW¼ NE¼ sec. 2, T.8S., R.7W.	Barretts Minerals, Inc.	Open pit; current mine opened in 1997; production & reserve estimates not yet available; mined by a shaft 60 ft deep in the 1940's, mined from an open pit in the 1960's and 1970's	Perry (1948); Olson (1976); Berg (1979b); Kaas (1996)
4	Yellowstone	sec. 4, T.9S., R.1W.	Luzenac America, Inc.	Open pit; producing 300,000 short tons of ore per year; ore reserves of 6,000,000 short tons	Perry (1948); James (1956); Olson (1976); Berg (1979b); McCulloch (1996); Kaas (1996); U.S. Geological Survey (1996)

INACTIVE MINES, PROSPECTS AND OCCURRENCES

Map No.	Name	Location	Status; Extent of development	Comments	References [The ten-digit numbers below refer to unique sequence numbers in Kaas (1996)]
			Ruby Range		
5	Treasure Chest mine	NW¼ sec. 14, T.7S., R.6W.	Inactive open pit mine	Although recently mined, the Treasure Chest is now inactive	Garihan (1973a, p. 149-156); Olson (1976, p. 121-124); Berg (1979b, p. 34)
6	Sauerbier mine	NW¼ NW¼ sec. 25, T.8S., R.7W.	Inactive mine	Mine established in 1973	Okuma (1971, plate 1); Olson (1976, p. 126-127); Berg (1979b, p. 37); 0300570858
7	American Chemet mine (Apex mine)	NE¼ sec. 12, T.8S., R.7W.	Inactive; three open pits, several bulldozer trenches	Once operated by American Chemet Corp. of Chicago, Illinois	Okuma (1971, p. 108-111); Olson (1976, p. 127); Berg (1979b, p. 35-36); 0300570857
8	Banning-Jones mine (Banjo mine)	SW¼ sec. 13, T.8S., R.8W.	Inactive mine	Same belt of marble as at Smith-Dillon mine one mile to southwest	Geach (1972, p. 161-162); Olson (1976, p. 127); Berg (1979b, p. 36-37); 0300010553
9	Bozo-Zobo mine	NE¼ sec. 19, T.8S., R.7W.	Inactive mine; large open cuts up to 50 ft deep	Shipped 8,000 tons of talc ore in the mid-1960's	Olson (1976, p. 127-128); Berg (1979b, p. 37); 0300570814
10	Smith-Dillon mine	center sec. 23, T.8S., R.8W.	Inactive mine; originally an underground mine (1940's); worked from an open pit in the 1970's	Important producer of high-grade talc in the 1940's	Perry (1948, p. 4-6); Okuma (1971, p. 99-102); Olson (1976, p. 128); Berg (1979b, p. 36); 0300010237
11	Sweetwater (Estelle) mine	E½ sec. 13, T.8S., R.7W.	Inactive open pit mine	Prospect pits follow same marble unit as in adjacent NW¼ NE¼ sec. 24	Okuma (1971, p. 106-107); Olson (1976, p. 128); Berg (1979b, p. 36);0300570447
12	Bennett Owen claim	NW¼ sec. 12, T.7S., R.6W.	Bulldozer cuts	Large body of uniformly dark green, low-purity talc	Garihan (1973a, p. 162-166);Olson (1976, p. 128); Berg (1979b, p. 33);0300570855
13	Crescent (Timber Gulch) prospect	SW¼ sec. 1, T.9S., R.8W.	Mid-1960s prospect of Pfizer, Inc.	Small 1940's era shaft and pits expose graphitic talc to a depth of 10-20 ft	Perry (1948, p. 6); Okuma (1971, p. 105); Olson (1976, p. 129); Berg (1979b, p. 37); 0300010381
14	Gem claim	SE¼ sec. 34, T.6S., R.6W.	Two small bulldozer cuts	Small bodies of dark green, graphitic talc are exposed	Garihan (1973a, p. 180-181); Olson(1976, p. 129); Berg (1979b, p. 32);0300570852
15	Owen-McGovern prospect	SE¼ sec. 23 & E½ sec. 26, T.8S., R.7W.	Minor bulldozer cuts and drill holes	Includes the Badger #1-8 mining claims; exposed talc layers 1-2 ft thick	Okuma (1971, p. 107-108); Olson (1976, p. 129); Berg (1979b, p. 38);0300570859
16	unnamed prospect	SE¼ sec. 11, T.7S., R.6W.	Bulldozer cuts	Graphitic, limonitic talc body 10 ft wide exposed in cut	Garihan (1973a, p. 166-169); Olson(1976, p. 129); Berg (1979b, p. 33);0300570856
17	unnamed prospect	SW¼ sec. 11, T.7S., R.6W.	Two bulldozer cuts	Talc body 7-10 ft thick exposed in cuts; underlain by dark-green graphitic talc	Garihan (1973a, p. 169-171); Berg (1979b, p. 33); 0300570871
18	Spring Creek prospect	SE¼ SE¼ sec. 32, T.6S., R.6W.	A number of cuts and drill holes	Zone of talc extends for 5,000 ft along northeast strike of dolomitic marble	Garihan (1973a, p. 177-180); Olson (1976, p. 129-130); Berg (1979b, p. 32); 0300570747
19	Ruby View prospect	SE¼ NW¼ sec. 13, T.7S., R.6W.	Small prospect pit	Along strike with marble unit of Beaver-head mine; talc masses up to 3 ft thick	Garihan (1973a, p. 160-162); Olson(1976, p. 129); Berg (1979b, p. 35);0300570250
20	Whitney claims	SW¼ sec. 2, T.7S., R.6W.	Bulldozer cuts	Talc body discordant to marble layering; limonite and pyrite locally abundant	Garihan (1973a, p. 171-174); Olson(1976, p. 130); Berg (1979b, p. 33);0300570853
21	unnamed prospect	SE¼ SE¼ sec. 3, T.7S., R.6W.	Bulldozer cuts	Talc bodies 15-20 ft thick; locally abundant graphite	Garihan (1973a, p. 174-175); Olson(1976, p. 130); Berg (1979b, p. 33);0300570252
22	Ruby Peak occurrence	W½ sec. 16, T.6S., R.5W.	Scattered chips of pale-green to green talc in soil	Talc pieces over large area	Berg (1979b, p. 32; 1987a; 1987b, p. A19); 0300570851
23	occurrence	SW¼ sec. 17, T.7S., R.6W.	Occurrences	Lenses and layers of talc an inch thick and less than 3 ft long	Garihan (1973a, p. 181-182); 0300570869
24	occurrence	NW¼ SW¼ sec. 18, T.7S., R.5W.	Talc float	Dark-green talc float, locally graphitic	Garihan (1973a, p. 182); 0300570870
25	occurrence	SW¼ NW¼ sec. 2, T.8S., R.7W.	Talc float	Talc float traced for 200 ft along strike, 100 ft in width	Olson (1976, p. 131); 0300570872
26	occurrence	SW¼ SW¼ sec. 3, T.8S., R.7W.	Zone of talc float	Float of high purity, light-green talc over strike length of 600 ft	Olson (1976, p. 131); 0300570873
27	occurrence	SW¼ SE¼ sec. 5, T.8S., R.7W.	Talc occurrence	Shown on plate 2 of Heinrich and Rabbitt (1960)	Heinrich and Rabbitt (1960, plate 2); 0300010341
28	occurrence	SE¼ NW¼ sec. 8, T.8S., R.7W.	Talc occurrence	Shown on plate 2 of Heinrich and Rabbitt (1960)	Heinrich and Rabbitt (1960, plate 2); 0300010328
29	occurrence	E½ sec. 10 & NW¼ sec. 11, T.8S., R.7W.	Talc in outcrop and as abundant float	Talc exposed across over 7,000 ft of strike length	Olson (1976, p. 131); 0300570874
30	occurrence	NE¼ sec. 15 & SW¼ sec. 11, T.8.S. R.7W.	Abundant talc float on each side of dolomitic marble ridge	Green talc in float extends for 4,000 ft along strike	Olson (1976, p. 131); 0300570875
31	unnamed prospects	NE¼ sec. 21 & NW¼ sec. 22, T.8S., R.7W.	Several talc prospects in dolomitic strata	One talc zone extends for about 500 ft along strike	Olson (1976, p. 131); 0300010558
32	occurrence	SW¼ NW¼ sec. 19, T.8S., R.7W.	Talc in outcrop	Dark talc exposed for about 1,350 ft of strike length	Olson (1976, p. 130); 0300010559
33	occurrence	NE¼ NW¼ sec. 26, T.8S., R.8W.	Talc occurrence	Shown on plate 2 of Heinrich and Rabbitt (1960)	Heinrich and Rabbitt (1960, plate 2); 0300010323
34	occurrence	SE¼ SE¼ NE¼ sec. 26, T.8S., R.8W. crest	Talc in outcrop along ridge	Green talc along strike for 1,200 ft, 5-30 ft wide	Olson (1976, p. 131); 0300010560
35	Valley View prospect	SW¼ sec. 25, T.8S., R.8W.	Bulldozer cuts	Body of dark talc about 90 ft wide and at least 150 ft long	Olson (1976, p. 130-131); 0300010561
36	unnamed prospects	NW¼ NW¼ sec. 36, T.8S., R.8W.	Bulldozer cuts	Dark-green talc exposed in two cuts	Olson (1976, p. 130); 0300010562
37	occurrence	W½ NE¼ sec. 35, T.8S., R.8.W	Talc in outcrop and shallow trenches	Light green talc traced over strike length of about 900 ft; some zones 10 ft thick	Olson (1976, p. 130); 0300010287
38	occurrence	SE¼ SE¼ sec. 35, T.8S., R.8W.	Talc occurrence	Shown on plate 2 of Heinrich and Rabbitt (1960)	Heinrich and Rabbitt (1960, plate 2); 0300010563
39	occurrence	secs. 1 & 2, T.9S., R.8W.	Talcose zones in marble	Well-developed talcose zone traced for 5,000 ft along strike (east-northeast)	Olson (1976, p. 131); 0300010300
40	occurrence	SW¼ SW¼ sec. 12, T.6S., R.6W.	Talc float	Small amount of talc float in marble	Berg (1987b, p. A19)
			Greenhorn Range		
41	Ruby No. 1 & Ruby No. 2 claims	NE¼ NW¼ sec. 14, T.8S., R.4W.	Pit 8 ft deep and shallow bulldozer cuts	Talc and chlorite exposed in pit & cuts associated with a diabase dike	Berg (1979b, p. 40-42)
42	unnamed prospect	SW¼ NW¼ sec. 14, T.8S., R.4W.	Shallow bulldozer cut	Trace of coarse-grained silvery talc in sheared and altered marble	Berg (1979b, p. 42)
43	Doubtful claim	NW¼ SW¼ sec. 14, T.8S., R.4W.	Small, shallow pit and two shallow cuts	One pod of limonite-stained talc less than 6 ft in horizontal extent	Berg (1979b, p. 42-43); 0300570860
44	unnamed prospect	SE¼ NW¼ sec. 23, T.8S., R.4W.	Shallow prospect pit	Minor talc in two marble layers (4 inches thick) exposed in pit	Berg (1979b, p. 42)
45	unnamed prospect	SE¼ NE¼ sec. 23, T.8S., R.4W.	Shallow cut	Minor talc along two shear zones exposed in cut	Berg (1979b, p. 42)
46	unnamed prospect	SE¼ NE¼ sec. 23, T.8S., R.4W.	Shallow cuts	Dark-green talc poorly exposed for 45 ft in one cut & 50 ft in a second cut	Berg (1979b, p. 42)
47	Greenhorn claims	SW¼ NW¼ sec. 30, T.8S., R.3W.	Bulldozer cuts	Sheared and contorted talcose marble	Berg (1979b, p. 42-44); 0300570861
48	Willow Creek mine (Ruby Ridge mine) (Talc Ridge mine)	SW¼ NE¼ sec. 30, T.8S., R.3W.	Inactive mine	Only significant production was from 1970 to June 1979	Olson (1976, p. 136); Berg (1979b, p. 43-46); 0300570740
49	Adam and Eve No. 1 and No. 2 claims (Pettus No. 1 prospect)	SE¼ SW¼ sec. 30, T.8S., R.3W.	Six prospect cuts	Talc pods 2 inches long and talc veinlets 1 inch thick	Chidester and Worthington (1962, p. 4); Olson (1976, p. 136-137); Berg (1979b, p. 46); 0300570862
50	Pettus No. 2 prospect	SW¼ NW¼ sec. 31, T.8S., R.3W.	Prospect trench	Trace of talc in bottom of prospect trench	Chidester and Worthington (1962, p. 4); Berg (1979b, p. 46)
51	Calverts claims	SW¼ SE¼ sec. 32, T.7S., R.3W.	Bulldozer cuts	Irregular veinlets and pods of talc, most less than 4 inches thick	Berg (1979b, p. 46-48); 0300570864
	[Berg (1979b) noted and described 35 relatively minor talc occurrences in the Greenhorn Range that are in addition to the mines and prospects listed above. These occurrences include talc chips in the soil, as well as small pods and veinlets in outcrops of dolomitic marble; they are too numerous and closely spaced to show on this map. Instead, refer to Berg (1979b, p. 39-42, 46, and plates 2 and 3; Berg sites GH-1 to GH-27, GH-31 to GH-37, and GH-45), where the occurrences are described and plotted individually at a map scale of 1:28,800.]				
			Gravelly Range		
52	Tait Mountains claims	NW¼ SE¼ sec. 5, T.8S., R.1W.	A number of trenches; prospect pits; a pre-1948 shaft 25 ft deep	Minor talc on dumps and in float, associated with abundant chlorite	Perry (1948, p. 8); Olson (1976, p. 136); Berg (1979b, p. 49-51); 0300570439
53	Cherry Gulch prospect	NE¼ SW¼ sec. 31, T.8S., R.1W.	Caved adit, small pits, shallow trenches	Talc 1.5-2 ft thick exposed in pits; talcose zone 5 ft thick in other pit	Berg (1979b, p. 50-53); 0300570865
54	Queen claim	SE¼ NE¼ sec. 8, T.9S., R.1W.	Small inactive mine in bulldozer cut; other cuts also	Small amount of pale-green talc layers 4-10 inches thick mined from one cut	Olson (1976, p. 136); Berg (1979b, p. 55-56); 0300570866
55	Burlington Northern mine	NW¼ sec. 3, T.9S., R.1W.	Inactive open pit mine	Several thousand tons of talc removed in early 1960's from a small pit	Olson (1976b, p. 135-136); Berg (1979b, p. 54-56); 0300570867
56	Johnny Gulch mine	N½ sec. 9, T.9S., R.1W.	Inactive open pit mine	Acquired in 1994 by Luzenac America and now part of Yellowstone mine	Olson (1976, p. 136); McCulloch (1994, p. 60); 0300570941
57	Talc-bearing conglomerate	S½ sec. 1 & N½ sec. 12, T.9S., R.2W.	Poorly exposed conglomerate	Talc pebbles form a minor constituent of an Oligocene conglomerate	Berg (1979b, p. 56-57); 0300570868
			Henrys Lake Mountains		
	[During geologic mapping in the Henrys Lake Mountain area (Sonderegger and others, 1982), four small talc occurrences were noted (Berg, 1979b, p. 58). The occurrences are in dolomitic marble in contact with metagranodiorite, diabase and gabbro.]				

Introduction

For the last several years, Montana has been the leading talc producing state in the United States (U.S. Geological Survey, 1996). For example, in 1992 Montana supplied about 40 percent of the U.S. mine production of talc (Virta, 1992). All of this production has come from the large deposits of high purity talc in the southwestern part of the state. All Montana talc is currently (1997) extracted from four mines, each within the study area of this map—the open pit operations of the Treasure State, Regal, and Yellowstone mines and the underground operation of the Beaverhead mine (see map numbers 1-4 on list and map to the left). The related mineral chlorite is mined at the Antler mine, located nearby, but outside of the study area in the Highland Mountains. Montana talc has at least two market advantages: (1) some deposits are very large and near surface, allowing economic mining by open pit methods; and (2) the deposits are of high purity and lack tremolite or other amphibole mineral contaminants (such as absestos) that occur in some other talc-rich deposits. Talc from southwest Montana is used in ceramics, paint, paper, plastics, cosmetics, rubber, roofing, flooring, caulking, and agricultural applications. The talc is also used in the processes of recycling paper and plastics.

Talc was first discovered in the early 1900's at the present site of the Yellowstone mine (Perry, 1948, p. 9). Modest production began in 1942 from shallow pits and adits, supplying steatite (massive, compact, high-purity) talc that was used to make ceramic insulators. The southwest Montana talc industry grew to become a significant part of the region's economy; this history is described by Perry (1948), Olson (1976), and Berg (1997). Exploration and development are likely to continue for the foreseeable future for several reasons: (1) mines are active in the area at present and an infrastructure for talc processing exists; (2) large changes in domestic and export talc markets are not expected in the next few years based on recent market trends (Virta, 1997); (3) the talc of this region is especially pure and asbestos-free; and (4) except for potential ground stabilization problems and land disturbance associated with large-scale open pit mining, no significant environmental impacts are associated with talc mining.

Location of the Study Area

The study area is entirely within Montana and includes the eastern part of Beaverhead County and the western part of Madison County. The study area, designated the "Gravelly's Landscape Analysis Unit" by the regional land managers of the Bureau of Land Management (BLM) and U.S. Forest Service (USFS), is defined as follows: (1) The western boundary is U.S. Interstate Highway 15 from Monida to Dillon, and State Highway 41 from Dillon to Twin Bridges; (2) The northern boundary is State Highway 287 from Twin Bridges to Ennis; (3) The eastern boundary is the Madison River from Ennis to Raynolds Pass (2.5 miles west of Earthquake Lake) and State Highway 87 from Raynolds Pass south to the Montana-Idaho border; and (4) The southern boundary is the Montana-Idaho border (the Continental Divide) between Monida and State Highway 87. This study area includes rugged mountains of the Blacktail, Centennial, and Henrys Lake Mountains and the Gravelly, Greenhorn, Ruby and Snowcrest Ranges, as well as the intervening basins. Within this study area, Archean dolomitic marble is the only rock type known to host talc deposits of economic size and this marble occurs within the study area only in the Gravelly, Greenhorn and Ruby Ranges and the Henrys Lake Mountains.

Purpose of the Study

In response to requests from the BLM and the USFS, the U.S. Geological Survey conducted a mineral resource assessment of the Gravelly's Landscape Analysis Unit. These agencies use mineral resource data in developing land-use management plans for the reasonably foreseeable future for federal lands in the region. Because the Gravelly's Landscape Analysis Unit includes the area that leads the U.S. in commercial talc production (U.S. Geological Survey, 1996), talc resource exploration and development potential must be evaluated and considered in planning. This map shows areas of surface exposure of Archean-age marble, which is the only rock type within the study area known to host talc deposits of economic size. Only exposed marble is shown because it is most probable that talc bodies will be discovered in this area by recognizing talc alteration in surface exposures or in the excavations of mines or prospects. Subsurface extensions of promising talc bodies are delineated by exploratory drilling and trenching. The subsurface extensions of the host marble units, and thus possible buried talc deposits, are not projected on this map. Identication of specific targets for potential mines is beyond the scope of this study. Multiple economic and social considerations (for example, purity of talc, mining and processing costs, proximity to markets, transportation costs, talc markets and prices, and environmental and reclamation issues and expenses) are factors that will effect the economic viability of any future development.

Geologic Setting of the Southwest Montana Talc Deposits

All of the economically important talc deposits of southwest Montana are found as replacements of dolomitic marble of Archean age. Most of this talc [ideal formula $Mg_3Si_4O_{10}(OH)_2$] formed through hydrothermal processes, which introduced significant amounts of Mg^{+2} and SiO_2 in solution and replaced dolomite [$CaMg(CO_3)_2$] (Anderson and others, 1990). In smaller amounts, talc also replaced magnesite, quartz, tremolite, serpentine, and calcite. Talc occurrences range from thin veinlets and pods a few inches thick to extensive thick masses, such as the 95-ft-thick talc body at the Treasure Chest mine (map number 5). Talc lenses parallel lithologic layering in some places; in others (Yellowstone mine), talc lenses appear to cut across layering. Most of the talc bodies are lenticular and elongate (Chidester and others, 1964). The origin of these deposits is not completely understood; they all appear to have formed during the Precambrian and are restricted to Archean dolomitic marbles. While host rock lithology (dolomitic marble) was clearly a control in their formation, the roles of regional metamorphism, structures, and hydrothermal systems are much less certain. The origin and timing of talc formation in southwest Montana are discussed by Anderson (1987); Anderson and others (1990); Berg (1977, 1979b, 1987b, 1995); Blount and Parkison (1991); Brady and others (1991); Garihan (1973a, 1973b); Kovaric and others (1996); Okuma (1971); Olson (1976); Piniazkiewicz (1984); Smith (1980); Whitehead (1979); and Wilson (1981).

Dolomitic marbles in the Gravelly, Greenhorn, and Ruby Ranges occur within an Archean-age sequence of marble, quartzite, schist, amphibolite, gneiss, and iron-formation. Marble layers in the sequences range from about 10 ft to over 1,600 ft thick and individual layers can be traced for distances of up to 10 miles (Berg, 1979a). Berg (1987a, 1987b) identified three different types of marble in the sequence of the Ruby Range: (1) a dolomitic variety that forms slabby and angular outcrops, weathers to a tan color, and is white on fresh surfaces; (2) a calcite-rich variety; and (3) a variety bearing calc-silicate minerals. Talc occurrences in the northern Ruby Range are most common in the dolomitic marbles, but do occur in the latter two varieties.

Geophysical and Geochemical Signatures of Talc Deposits

No gravity or magnetic signatures are associated with these talc deposits. Airborne imaging spectrometer data proved useful for detecting talc-rich soils in a small-scale study (about 6 miles of ground track) in the Ruby Mountains (Crowley and others, 1989). Remote sensing data acquired by NASA's "Airborne Visible and Infrared Imaging Spectrometer" (AVIRIS) system could be used to map exposed talc deposits in the area. The AVIRIS system is a NASA (National Aeronautics and Space Administration) instrument flown in an ER-2 aircraft (a modified U-22 spy plane) at about 65,000 ft altitude, collecting spectral data in 224 channels. Minerals have unique spectral signatures, which are measured in the laboratory from known samples and compared to the remote AVIRIS measurements. This method of mapping specific minerals with AVIRIS data is described by Clark and others (1993).

Geochemical methods have not proven successful for talc exploration in southwestern Montana (Berg, 1987b). Regional surveys of fine-grained stream sediment fractions and fine-grained soil fractions for talc (readily determined by X-ray diffraction) may be useful exploration tools in this region (Blount and Parkison, 1991; McHugh, 1985; Nelridge, 1987; Nelridge and Blount, 1991; Piniazkiewicz, 1984).

Summary of Areas Permissive for Talc Deposits

The northeast part of the Gravelly Range and much of the Ruby Range are favorable for talc deposits of significant size, whether such deposits represent new discoveries or subsurface extensions of known occurrences. In these areas the abundance of talc attests to the past existence of obviously large hydrothermal systems. These areas include world class mines exploiting high grade talc deposits of considerable size and they contain a number of abandoned shallow mine workings or prospects in talc and other known talc occurrences. Talc alteration is also present in the northern Greenhorn Range; this area includes an abandoned talc mine that had moderate of production in the 1970's—the Willow Creek mine (map number 48). Federal land managers should expect continued talc exploration in these areas in the foreseeable future; trenching and exploratory drilling will be used to evaluate targets.

The amount of known and estimated talc reserves in the region of the Ruby, Greenhorn, and Gravelly Ranges has been increased significantly in recent years, over past estimates, due to the exploration and development efforts of Barretts Minerals, Inc., and Luzenac America, Inc. For example, Chidester and others (1964) estimated inferred reserves of more than 1 million (short) tons of talc rock for this area. Now a single mine, the Yellowstone mine, has known reserves of 6 million short tons of ore. For comparison, in 1995 the total U.S. mine production of crude talc was 1.17 million short tons (1.06 million metric tons) (Virta, 1997).

Although the Henrys Lake Mountains area contains a large amount of rock that is permissive to host talc—dolomitic marble of Archean age—it appears much less prospective for undiscovered deposits. In the course of mapping the geology of this area (Sonderegger and others, 1982), Berg examined the dolomitic marbles for talc. Only four small occurrences of talc were found. These occur in dolomitic marble in contact with a small body of Precambrian metagranodiorite and with Precambrian dikes of diabase and gabbro. The large-scale hydrothermal systems that formed talc deposits in the northern mountain ranges apparently did not operate in the Henrys Lake Mountains area.

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