Approximate boundary of the

Shining Rock Wilderness

NATIONAL

Base from Tennessee Valley Authority and U.S. Geological Survey 1:24.000

Cruso, 1941 (67-PR); Sam Knob, 1946 (76-PR); Shining Rock, 1946 (76-PR);

35°25′

35°22′30″

35°20′ A M

Waynesville, 1941 (66-PR)

35°30

83000'

82°52′30″

PASGAH

SHERWOOD WHIDELDE

MANAGEMENT LAREA

MANAGEMENT WREA

1 MILE

EXPLANATION

Shining Rock Wilderness

Mica pegmatite

Other mineral occurrences

Cu--Copper

K --Kaolin

Q -- Quartz

S -- Soapstone

C -- Corundum

1 KILOMETER

82045

82°47'30"

CORRELATION OF MAP UNITS

DESCRIPTION OF MAP UNITS

(Note: Contacts between map units are not shown because they

are gradational and were not clearly defined by our

to coarse-grained, tabular, lenticular or irregularly shaped

bodies of feldspar-quartz-muscovite-biotite pegmatite. Some

are zoned and have plagioclase-quartz-muscovite wall zones

and quartz or quartz-perthite-biotite cores. Bodies are

generally discordant or partly concordant to layering and

structure of wall rocks. Most are small. They range in

thickness from 1 to 25 ft (0.3-7.5 m) and may be as much as

100-150 ft (30-45 m) long (Lesure, 1968, p. 94-97). Those

shown in Johns Cove and east of Ugly Creek and Roland Ridge

about 1,500 ft (460m) long; a complexly folded vein or a series

and schist containing abundant granitic and pegmatitic rock

(fine- to coarse-grained quartz, feldspar, and mica) in thin

feldspar schist interlayered with biotite-quartz-feldspar schist, biotite-quartz-feldspar gneiss, and migmatite. Garnet schist,

light- to medium-gray, fine- to medium-grained. Garnets,

generally pink, form crystals 0.02-0.2 in. (0.5-5 mm) in

diameter. Schist locally contains sillimanite, graphite, and (or)

iron sulfides. In some areas, the mica schist is sheared and

contains retrograde chlorite. Such rock is greenish gray and

quartz-feldspar-biotite gneiss interlayered with mica schist,

garnet-mica schist, granitic gneiss, amphibolite, and migmatite. Mica gneiss, light- to medium-gray, very fine- to

fine-grained, and thin- to thick-layered. Some gneiss layers

Mica gneiss (Precambrian)—Mostly biotite-quartz-feldspar gneiss and

Quartz (Paleozoic)—Massive white quartz, 30-60 ft (9-18 m) thick and

Migmatite (Paleozoic and (or) Precambrian)—Interlayered mica gneiss

Garnet-mica schist (Precambrian)—Mostly garnet-mica-quartz-

Pegmatite or closely spaced group of pegmatites (Devonian?)-Fine-

Precambrian

gms

mg

reconnaissance mapping)

are plotted after Morrow (1977)

layers, lenses, and irregular masses

contain garnet and iron sulfides

of en échelon veins

fine grained

1. Little East Fork

3 a. Flower Knob, north

3 b. Flower Knob, west

3 c. Flower Knob, east

4 a. Grassy Knob (Revis)

5 a. Grassy Cove Top, north

5 b. Grassy Cove Top, middle

5 c. Grassy Cove Top, south

Strike and dip of foliation or layering

30,725 Strike and dip of inclined foliation or layering-

Strike and plunge of minor fold axes

Showing plunge of minor folds or lineation

STUDIES RELATED TO WILDERNESS

related acts require the U.S. Geological Survey and the U.S. Bureau of

Mines to survey certain areas on Federal lands to determine their mineral

resource potential. Results must be made available to the public and be

The Wilderness Act (Public Law 88-577, September 3, 1964) and

2. Shining Rock

4 b. Unnamed

Vertical

Generalized

Synclinal

Anticlinal

Named pegmatites

least 130,000 short tons (120,000 t) and possibly as much as 500,000 short tons (450,000 t) of quartz are present within 30-100 ft (10-30 m) of the surface on Shining Rock Mountain. No other mass of quartz of similar size is known to exist in the wilderness; small pods and lenses of quartz a few inches to several feet thick and tens of feet long are widely scattered throughout the gneiss and schist but are not considered a resource.

Quartz resources are available outside the wilderness. Large masses of quartz are common in the cores of zoned pegmatite bodies in the Franklin-Sylva pegmatite district, 5-40 mi (8-64 km) southwest of the wilderness (Lesure, 1968, p. 94-121). Similar quartz cores in pegmatite in the Spruce Pine pegmatite district, 50 mi (80 km) northeast, have been mined for quartz.

Stone

Most of the gneiss and schist in the study area is suitable for use as crushed rock or aggregate and rough building stone. The area, however, is too far from large markets for aggregate, and because similar stone is abundant throughout the region, rock in the wilderness has no significant value for the usual uses of stone.

Within the wilderness, at least ten mica pegmatite deposits have been mined or prospected for sheet muscovite (table 1). Total production of sheet mica from these deposits is less than 2,000 lbs (900 kg), and scrap mica production is about 30,000 lbs (13,600 kg). The value of this production was probably no more than \$3000 in 1952 dollars, and the average quality of mica produced was low.

The largest workings are at the Little East Fork mine (Klepper and others, 1944). This deposit was prospected during World War I, mined sporadically from 1942 to 1944, and prospected again in 1952-53 (Lesure, 1968, p. 94-95). The last work was not successful. The deposit has a small potential for mostly scrap-quality mica.

The other known workings—the Shining Rock mine or prospect, three small prospects on Flower Knob, the Grassy Knob prospects, and three prospects north of Grassy Cove Top-have even less potential. All contain small pegmatite dikes that range in thickness from 1 to 8 ft (0.3-2.4 m) and in length from 10 to 100 ft (3-30 m); they have minor concentrations of generally poor quality muscovite. Most of the mica within these dikes is only of scrap quality.

In summary, the Shining Rock Wilderness contains a few scattered mica-pegmatite dikes that are generally small and poorly zoned. Most of the muscovite mica crystals are small and of poor quality. The economic potential is thus judged to be low in the known deposits, and probably is no greater in undiscovered deposits.

Metallic Resources

No metallic mineral resources are known in the Shining Rock Wilderness, and no evidence of any economic deposit was found in the geochemical survey (Lesure, 1981b).

Oil and Gas

Recent seismic studies (Cook and others, 1979) indicate that the metamorphic rocks of the Blue Ridge Mountains in North Carolina, including the Shining Rock Wilderness, have been thrust at least 100 mi (160 km) up and over a thick sequence of younger sedimentary rocks, 3,000-15,000 ft (900-4500 km) thick. These sedimentary rocks have an unknown potential for hydrocarbons. The depths at which they occur—5,000-45,000 ft (1,500-14,000 m)—and the implied degree of metamorphism for rocks at such depths suggest that any hydrocarbons present would be in the form of natural gas (Cook and others, 1979, p. 566). Until deep drilling is done to test the results of the seismic studies, no reasonable estimate of the gas potential can be made, but the presence of gas cannot be totally

REFERENCES CITED

Cook, F. A., Albaugh, D. S., Brown, L. D., Kaufman, Sidney, Oliver, J. E., and Hatcher, R. D., Jr., 1979, Thin-skinned tectonics in the crystalline southern Appalachians; COCORP seismic-reflection profiling of the Blue Ridge and Piedmont: Geology, v. 7, no. 12, p.

Hadley, J. B., and Nelson, A. E., 1971, Geologic map of the Knoxville quadrangle, North Carolina, Tennessee, and South Carolina: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-654,

Keith, Arthur, 1907, Description of the Pisgah quadrangle, North Carolina-South Carolina: U.S. Geological Survey Geological Atlas, Folio 147,

Klepper, M. R., Heinrich, E. W., and Pray, L. C., 1944, Little East Fork Mica Mine, Haywood County, North Carolina: U.S. Geological Survey Open-File Report, available in Reston, Va.

Lesure, F. G., 1968, Mica deposits of the Blue Ridge in North Carolina: U.S. Geological Survey Professional Paper 577, 124 p.

__1981a, Geology of the Shining Rock Wilderness, Haywood County, North Carolina: U.S. Geological Survey Miscellaneous Field Studies Map MF-1290-A, scale 1:48,000.

____1981b, Geochemical survey of the Shining Rock Wilderness, Haywood County, North Carolina: U.S. Geological Survey Miscellaneous Field Studies Map MF-1290-B, scale 1:48,000.

Olson, J. C., and others, 1946, Mica deposits of the Franklin-Sylva district, North Carolina: North Carolina Department of Conservation and Development, Division of Mineral Resources Bulletin 49, 56 p.

submitted to the President and the Congress. This report presents the results of a geological and mineral resource survey of the Shining Rock Wilderness in the Pisgah National Forest, Haywood County, N.C. Shining Rock Wilderness was established by Public Law 88-577, September 3, 1964. SUMMARY The Shining Rock Wilderness is in the Blue Ridge Mountains of

Haywood County, N. C., and is underlain by complexly folded, high-grade metamorphic rocks. These rocks contain a few small, subeconomic deposits of sheet muscovite mica that have a small potential for scrap mica. Quartz, as a source of silica (SiO2), and gneiss and schist suitable for common building stone and crushed rock are the only identified economic mineral resources. Other minerals and rocks, including kaolin, soapstone, copper, corundum, and dunite, have been prospected or mined nearby, but either they do not occur or have no current economic potential in the wilderness. A possibility exists for the presence of natural gas at depths greater than 5,000 ft (1,500 m).

The Shining Rock Wilderness contains about 13,400 acres (5,423 ha) within the Pisgah National Forest in the Blue Ridge Mountains of western North Carolina. The study area is in Haywood County, 9 mi (14 km) southeast of Waynesville and 20 mi (32 km) southwest of Asheville (fig. 1). The Blue Ridge Parkway forms the southeast boundary. Forest Service road F.S. 816 from the parkway west of milepost 420 provides access to the southern part of the wilderness at Ivestor Gap. Access to the eastern part is from U.S. Highway 276 at the bridge over East Fork of the Pigeon River and from the road up Crawford Creek. On the west side access is by North Carolina State Roads 215 and 1129 up Little East Fork.

SURFACE AND MINERAL-RIGHTS OWNERSHIP

Service. The Forest Service owns mineral rights to about 1,200 acres (486 ha) on the west and south flanks of Cold Mountain; mineral rights are outstanding in perpetuity on the remaining acreage (fig. 2). Although prospecting and mining development permits are granted in the Pisgah National Forest, no outstanding permits exist in the wilderness.

GEOLOGY

The Shining Rock Wilderness contains high-grade, regionally metamorphosed sedimentary rocks of probable Precambrian age (Hadley and Nelson, 1971). Most of the area is underlain by mica gneiss containing varying amounts of interlayered mica schist, garnet-mica schist, granitic gneiss, amphibolite, and migmatite (Lesure, 1981a). Locally, mica-garnet schist, generally containing sillimanite and less commonly iron sulfides, is the dominant rock type. In other areas the gneiss and schist are intruded by abundant thin layers and lenses of granitic material forming a mixture of rock types called migmatite.

ed. Small folds, a few feet to more than 30 ft (10 m) in wavelength, plunge northeast, generally at angles of less than 40°. Larger folds are suggested by the outcrop patterns of garnet-mica schist, but were not completely identified in the reconnaissance mapping. No faults were observed, but the presence of sheared mica schist containing retrograde chlorite suggests at least local faulting.

A few quartz veins and small dikes or sills of mica pegmatite and trondhjemite intrude the gneiss and schist. The largest mass of quartz is a complexly folded vein or series of en échelon veins about 1,750 ft (530 m) long and 30-60 ft (9-20 m) thick exposed on top of Shining Rock Mountain. The white quartz can be seen from afar and consequently is the "shining rock" from which the mountain and in turn the wilderness take their names.

GEOCHEMICAL SURVEY

for indistinct or unexposed mineral deposits that might be recognized by their geochemical halos. None of the elements tested for appears in unusually large concentrations that might be indicative of mineral resources. Gold, present in trace amounts, ranges from less than 0.002

MINERAL RESOURCE POTENTIAL

Quartz (SiO₂) and building stone are the only identified potentially economic mineral resources in the Shining Rock Wilderness. Known deposits of mica pegmatite are too small and of too low grade to be of current economic interest. Other minerals and rocks, such as kaolin, soapstone, or dunite, have been mined or prospected nearby but have no known potential in the wilderness. A possibility exists for the presence of natural gas at great depth.

Quartz

potential source of almost pure silica (SiO₂). It is a sinuous vein or series of en échelon veins about 1,750 ft (530 m) long and 30-60 ft (9-20 m) wide. It is exposed above ground to a height of 3-20 ft (1-6 m) and probably extends an equal or greater distance below ground. We estimate that at

INTRODUCTION

All surface rights in the wilderness are held by the U.S. Forest

The gneiss and schist have been complexly folded and possibly fault-

The pegmatites are medium- to coarse-grained mixtures of quartz, feldspar, and muscovite. They are generally tabular or lens shaped and small. The average size is 1-8 ft (0.3-2.4 m) wide and probably less than 100 ft (30m) long (table 1). The trondhjemite dikes are light-colored, finegrained mixtures of mostly feldspar and quartz containing minor amounts

The U.S. Geological Survey (USGS) made a reconnaissance geochemical survey of the Shining Rock Wilderness (Lesure, 1981b) to test parts per million (ppm) to 0.024 ppm in 21 rock samples, but was not detected in soil or stream-sediment samples at a detection limit of 0.05

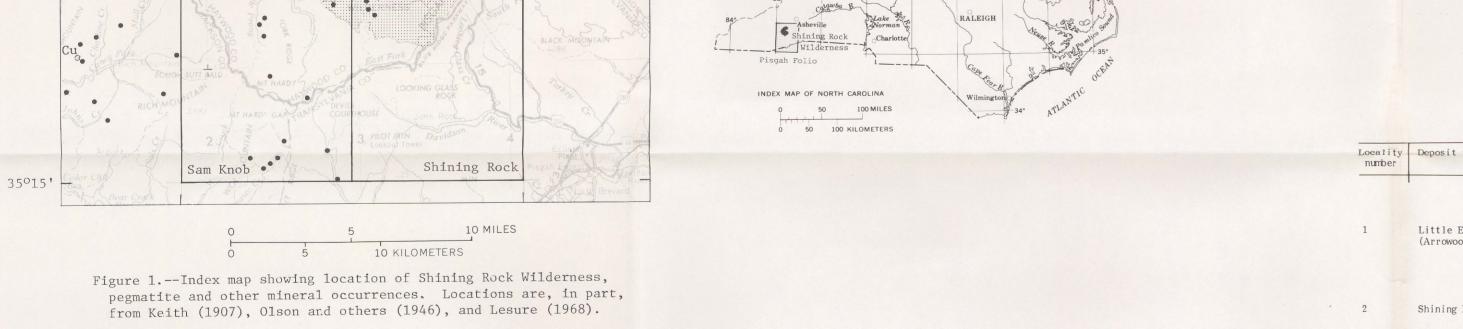
The large mass of quartz exposed on Shining Rock Mountain is a

Table 1.-Summary description of mica pegmatite deposits in Shining Rock Wilderness, Haywood County, N.C.

Locality number	Deposit name	Principal periods worked	Workings	Description of mica	Production	Pegmatite					Wall rock	Weathering	Internal structure, textu and mineralogy of pegmati
						Shape	Size	Attitude		Relation to			
								Strike	Dip	structure			
1	Little East Fork (Arrowood)	World War I, and World War II, 1952-53	4 cuts, 20-40 ft (6-12 m) long; 3 adits, 20-106 ft (6-32 m) long; prospect pits in area 150 by 200 ft (45 x 60 m)	Ruby color, "A" structure, biotite intergrowths, cracked, bent	Less than 100 lbs sheet; 6-7 tons of scrap	Tabular	6-25 ft (2-7 m) thick, more than 160 ft (50 m) long and 70 ft (21 m) deep		Northwest	Partly concordant	Biotite gneiss	Partly weathered	Feldspar-quartz-muscovite biotite wall zone, coarse grained; perthite-quartz-muscovite-biotite core, coarse-grained; quartz fracture fillings.
2	Shining Rock mine	1900, 1953-54	Cut, 40 ft (12 m) long; shaft, 40 ft (12 m) deep; drift, 54 ft (16 m) long	Ruby color, "A" structure, hard, bent, ruled	Less than 1,000 lbs. mine-run in 1950's	Irregular	3-8 ft(1-2.5m) thick, 100 ft (30 m) long, 40 ft (12 m) deep		Southwest	Discordant	Interlayered biotite gneiss and hornblende gneiss		Kaolinized plagioclase- quartz-perthite-muscovit wall zone, medium-grained quartz core.
3a	Flower Knob prospect, north	1950's (?)	Prospect pit	Clear, bent, ruled, small	Unknown	Tabular	3-6 ft (1-2 m) thick	Northeast	Vertical	Discordant	Biotite gneiss	Partly weathered	Feldspar-quartz-muscovite biotite pegmatite, medium to coarse-grained.
3ь	Flower Knob prospect, west	1950's (?)	Prospect pit, 6 by 9 ft (2x3 m), possibly 6 ft (2 m) deep, caved	Small, bent	Unknown	Tabular	3-6 ft (1-2m) thick	Northeast	Vertical	Discordant(?)	Biotite gneiss	Partly weathered	Quartz-feldspar-muscovite- biotite pegmatite, fine- medium-grained.
3c	Flower Knob prospect, east (Middle Old Field)	1950's (?)	Adit, 6 ft (2 m) long, eaving	Small, bent, ruled	Unknown	Lens	1-5 ft (0.3- 1.5 m) thick	Northwest	Northeast	Partly concordant	Biotite gneiss	Partly weathered	Feldspar-quartz-muscovite pegmatite, fine- to medium grained.
4 a	Grassy Knob prospect (Revis)	1952-53	Adit, 86 ft (26 m) long, drift 14 ft (4 m) long	Ruby color, hard, clear, tied, bent, small	None	Small lenses	1-5 ft (0.3- 1.5 m) thick, 20 ft (6 m) long (largest)	Northeast	Vertical	Concordant	Biotite gneiss	Unweathered	Plagioclase-quartz-muscov pegmatite, medium-grained accessory biotite, garnet pyrite.
1 4 b	Unnamed prospect	1950's (?)	Shallow cut in road bank	Small, bent	Unknown	Lens (?)	1-5 ft (0.3-1.5 m) thick	Northwest	Northeast	Partly concordant	Biotite gneiss	Partly weathered	Feldspar-quartz-muscovite pegmatite, fine- to medium grained.
1 5 a	Grassy Cove Top prospect, north	1950's (?)	Cut, 50 ft (15 m) long	Bent, tied	Unknown	Lens	1-4 ft (0.3- 1.2 m) thick	Northwest	Northeast	Partly concordant	Biotite gneiss	Partly weathered	Do.
¹ 5 b	Grassy Cove Top prospect, middle	1950's (?)	Trench, 23 ft (7 m) long, caving	None seen	Unknown				Covered				
1 5 c	Grassy Cove Top prospect, south	1950's (?)	Cut, 50 ft (15 m) long	Ruby color, bent, tied, ruled	Unknown	Lens	1-3 ft (0.3- 1 m) thick	Northwest	Northeast	Partly concordant	Biotite gneiss	Partly weathered	Feldspar-quartz-muscovite pegmatite, fine- to medium grained.

MINERAL RESOURCE POTENTIAL MAP OF THE SHINING ROCK WILDERNESS, HAYWOOD COUNTY, NORTH CAROLINA

¹ M. L. Dunn, Jr. (unpub. data, 1980).



Geology mapped by F. G. Lesure, J. D. Bliss, and G. L. Shaffer, October 1978

5° 20' +

82⁰ 47' 30" Figure 2. -- Status of mineral rights in the Shining Rock Wilderness. Forest Service owns all surface rights.