DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-1586-C
PAMPHLET ACCOMPANIES MAP

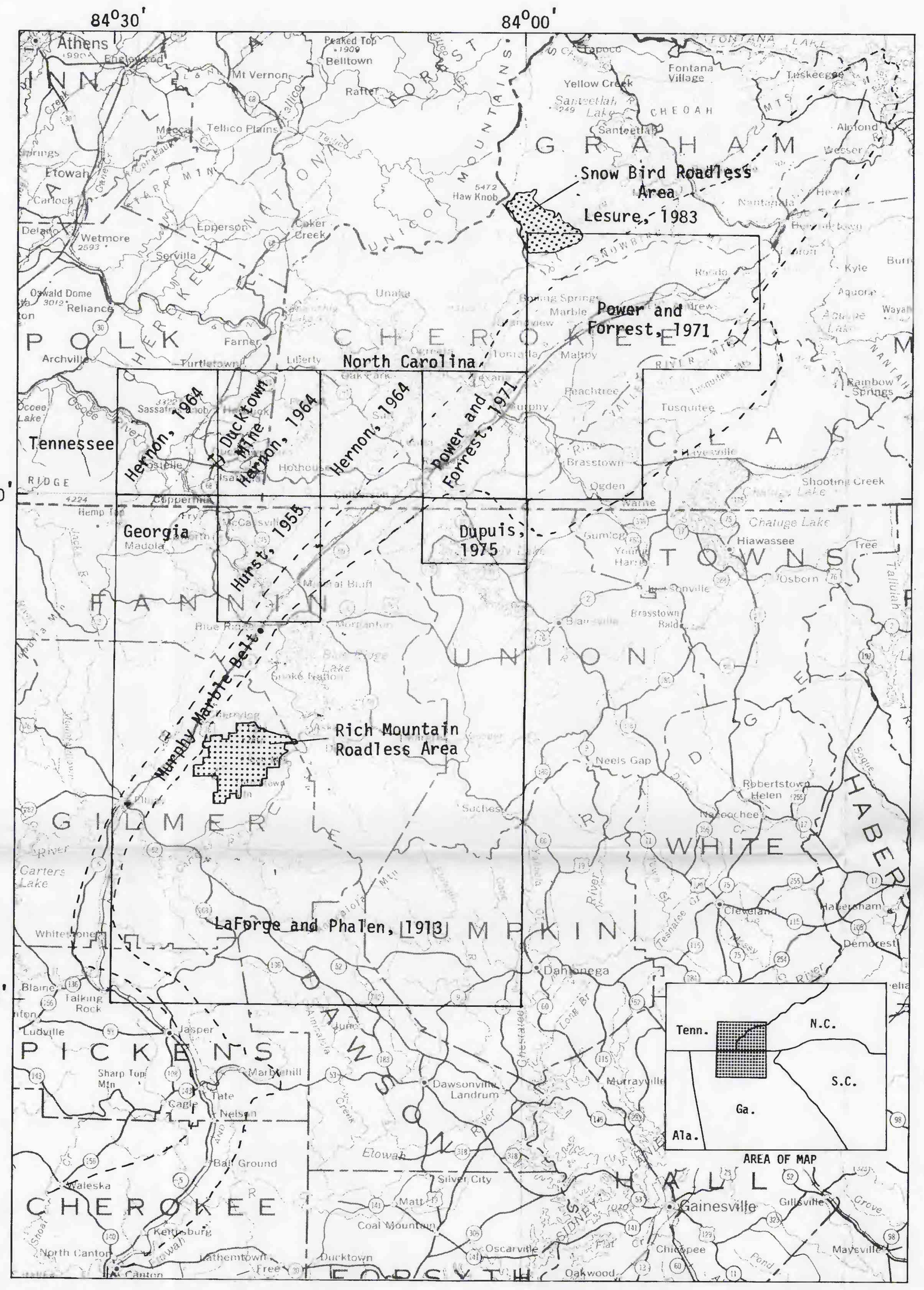

Figure 1.—Index map showing the location of the Rich Mountain Roadless Area in northern Georgia and sources for relevant geologic data.

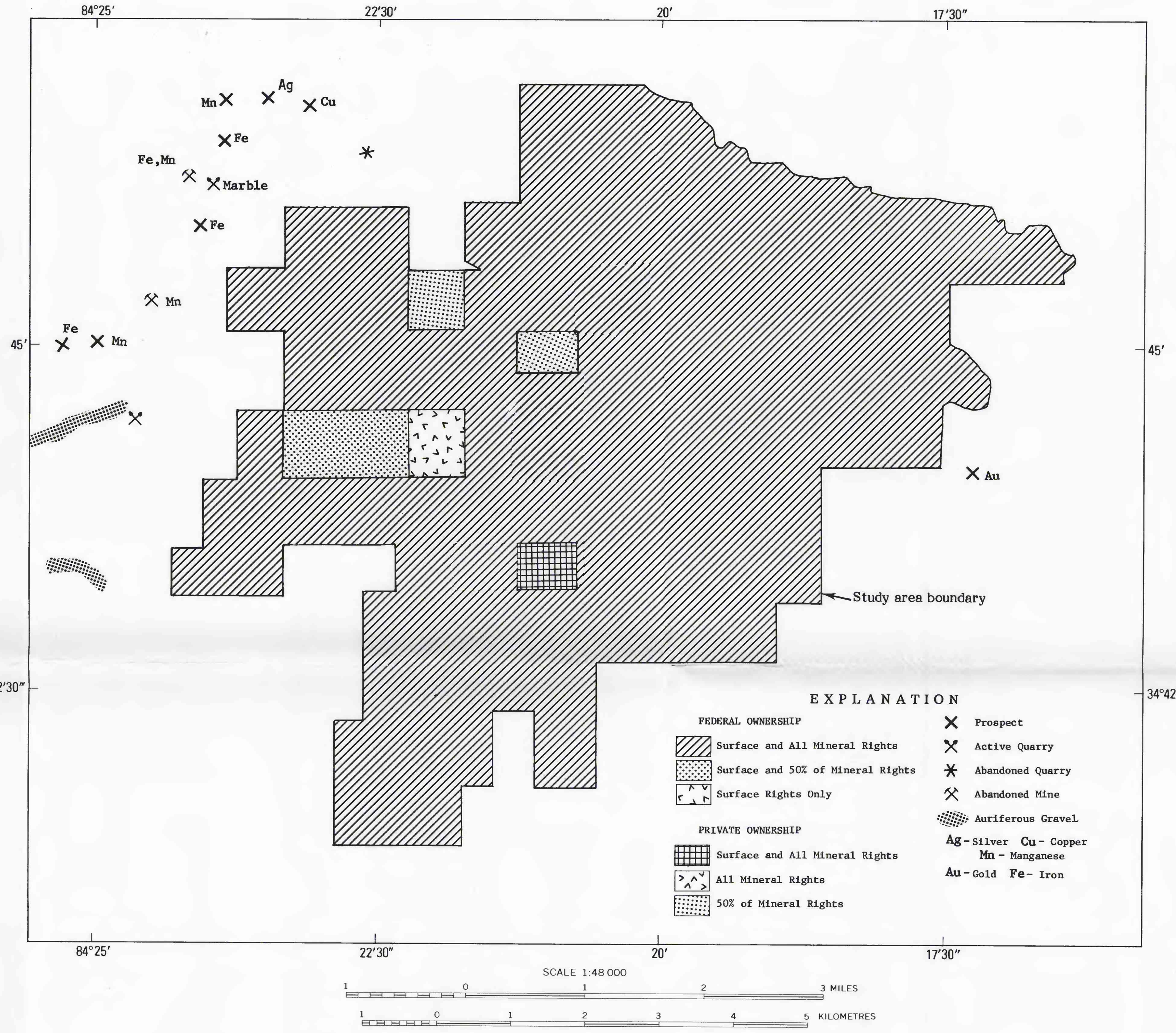

Figure 2.—Map showing the status of land in the Rich Mountain Roadless Area and location of adjacent mines and prospects.

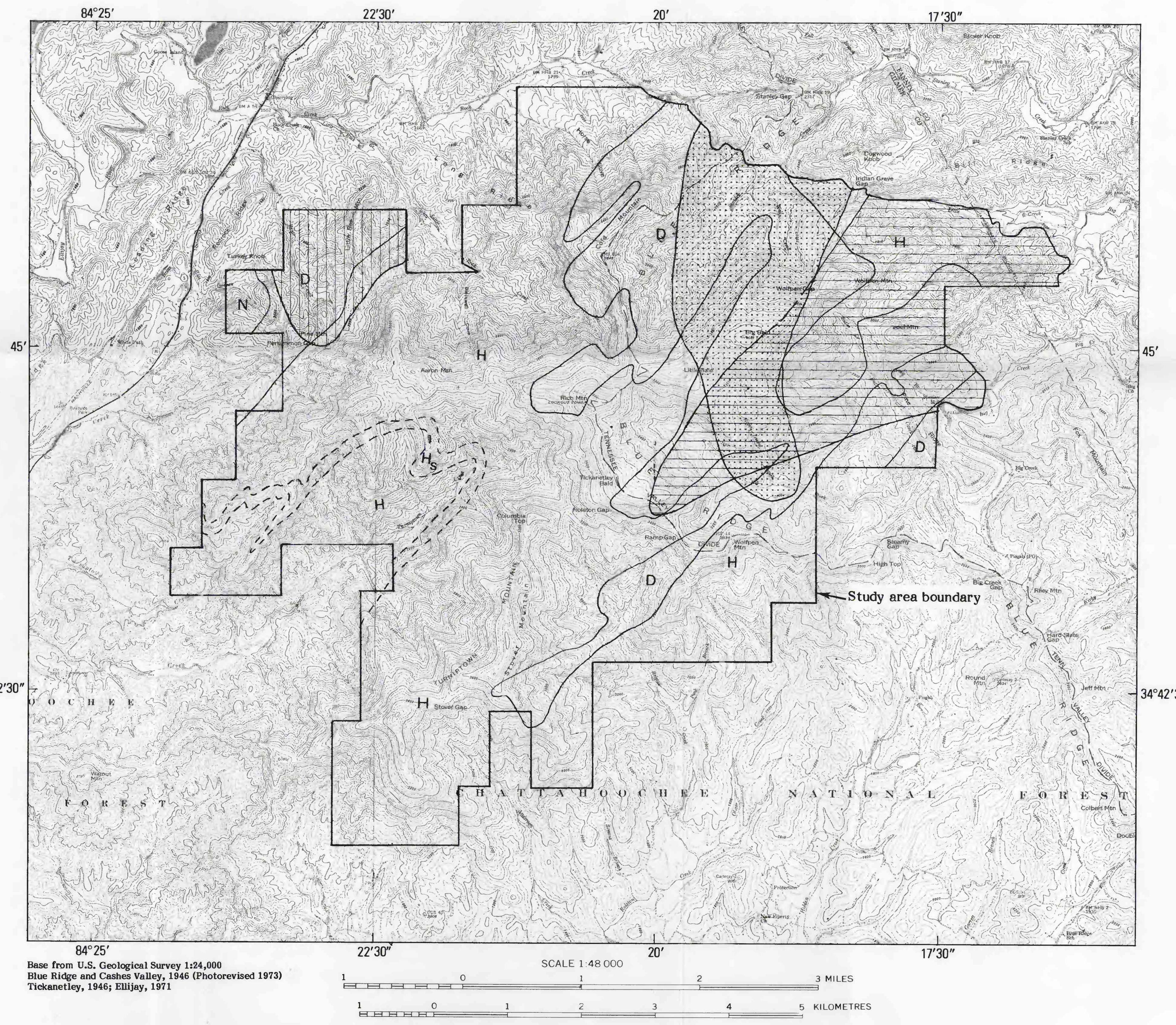

Figure 3.—Generalized geologic map of the Rich Mountain Roadless Area showing location of areas with high-background metal values.

DESCRIPTION OF MAP UNITS

Murphy sequence (Lower Paleozoic)

N — Nantahala Slate - Thinly laminated black to light gray, carbonaceous slates.

Great Smoky Group (Upper Precambrian to Lower Paleozoic)

D — Dean Formation (Hurst, 1955) - Predominantly mica schists that have 2- to 4-mm biotite porphyroblasts that grow across the predominant rock foliation. Some metasiltstones and metasandstones are interlayered with the schists and become more abundant towards the top of the unit

H / H_S — Hothouse Formation (Hurst, 1955) - Mostly metasiltstones and metasandstones, but also containing some lenses of metaconglomerate, calc-silicates, and mica schists. Mica schists with large biotite porphyroblasts (H_S) make a traceable horizon within this formation

High background values of boron in stream sediments, copper in stream sediments and soils, and zinc in rock and soils

High background values of copper and lead in stream sediments, soils, and rock

High background values of chromium, cobalt, and nickel in stream sediments, soils, and rock

——— Geologic contacts, approximately located

– – – Intraformational contact

Studies Related To Wilderness

The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts require the U.S. Geological Survey and the U.S. Bureau of Mines to survey certain areas of Federal lands to determine their mineral resource potential. Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a mineral survey of the Rich Mountain Roadless Area, Chatahoochee National Forest, Gilmer and Fannin Counties, Georgia. This area was classified as a further planning area during the Second Roadless Area Review and Evaluation (RARE II) by the U.S. Forest Service, January 1979.

SUMMARY

The Rich Mountain Roadless Area includes approximately 16,880 acres in mountainous northern Georgia. Geological surveys of this area show it to be underlain by folded and metamorphosed rocks of the Great Smoky Group and of the Murphy sequence in the synclinal Murphy belt. Geochemical surveys, carried out to identify mineral deposits or indications of mineralization, failed to show any unusual concentrations of metals.

This area is considered to have a low potential for mineral resources. Resources of stone for aggregate exist in the area, but availability of abundant alternative sources of crushed stone makes development of these resources extremely unlikely. Although no evidence of precious metals was found, the area has a low potential for resources of gold on the basis of past production of gold from streams immediately adjacent to the study area. Rocks underlying the area are partly correlative with those that are known to host strata-bound base-metal deposits, but no evidence for this type of mineralization was found to indicate a potential for this type of deposit in the area. Recent seismic surveys indicate that rocks that could contain natural gas might exist in this region at depths of between 5,000 and 45,000 ft.

INTRODUCTION

The approximately 16,880 acres which make up the Rich Mountain Roadless Area are located in the Chattahoochee National Forest in Gilmer and Fannin Counties, Ga. The area is situated between the towns of Blue Ridge and Ellijay, Ga. and has an irregular boundary that is east of U.S. Highway 76, south of county highway 153, and north and west of county roads 216 and S1010 (fig. 1). Numerous small roads extending in from this perimeter provide good access to the edges of the area and one primitive road provides limited access to the central part. Altitudes range from 1,600 ft to 4,081 ft. Although maximum relief is in excess of 2,400 ft, local relief is on the order of 800 to 1,800 ft. Slopes steeper than 20 degrees are common. Moderately heavy second-growth hardwood forests cover most ridges and slopes, but do not significantly restrict foot access; locally heavy growths of laurel and rhododendron do impair access along many drainages.

The Federal Government owns about 99 percent of the surface rights and 96 percent of the mineral rights in the study area. The outstanding one percent of the surface rights, with accompanying mineral rights, are privately owned (fig. 2). Oil and gas lease applications, filed in 1979 and 1980, include about 96 percent of the Federal mineral rights. These applications had not been acted upon as of August 1981.

GEOLOGY

The Rich Mountain Roadless Area is underlain by sedimentary rocks of the Great Smoky Group and the Murphy sequence (fig. 3). Three formations are recognized (Foose, in press); the lowest is correlated with the Hothouse Formation as defined by Hurst (1955) and is a greater than 1,970-foot-thick sequence that is composed predominantly of metasiltstones, lesser metasandstones, and minor amounts of interlayered metaconglomerates and calc-silicates. These rocks grade upward into a 2,625- to 2,950-foot-thick sequence that is predominantly mica schists with some interlayered metasiltstones, metasandstones, metaconglomerates, and calc-silicates of the Dean Formation (Hurst, 1955). These schists commonly have a distinctive texture as a result of large biotite porphyroblasts that have grown across the dominant rock foliation. These rocks are part of the Great Smoky Group and are overlain by distinctly different rocks of the Murphy sequence. The Nantahala Slate, which makes the base of this sequence, is the highest unit exposed in the study area and is a finely laminated, gray to black carbonaceous slate.

Upper parts of the Murphy sequence have yielded Ordovician fossils (McLaughlin and Hathaway, 1973), indicating that the Nantahala Slate is early Paleozoic in age. The exact age of the underlying Great Smoky Group is uncertain, but it is generally considered to be late Precambrian to Early Cambrian.

Two deformations are identifiable. The first and most intense folding generated northeast-trending, step-shaped anticlinal folds that have gently dipping southeast limbs and steeply dipping northwest limbs. Although most are of small amplitude, these folds combine to form a relatively large anticlinal structure that passes through the center of the study area (fig. 3). The structures are cross-folded by indistinct and open northwest-trending folds, the effect of which is to reverse the orientation of the earlier fold axes from shallow northeast to shallow southwest plunges. Fault offsets have not been recognized within the study area.

Mineral assemblages in the Rich Mountain Roadless Area are characteristic of the middle-amphibolite facies of metamorphism. Isotopic ages from other parts of the Blue Ridge Province indicate that peak metamorphism occurred about 450 b.y. ago, during the Taconic orogeny (Butler, 1973).

Seismic studies (Cook and others, 1979) show these rocks to be entirely allochthonous and thrust westward over the relatively unmetamorphosed Paleozoic rocks that are now exposed west of the Blue Ridge Province.

GEOCHEMICAL SURVEY

The U.S. Geological Survey made a reconnaissance geochemical survey of the Rich Mountain Roadless Area. Analyses of over 600 samples for 33 elements reveal no unusual concentrations of metals (Foose and Sears, in press; Sears and others, 1983). Three slightly higher-than-normal concentrations of metallic elements found by this geochemical survey are shown in figure 3. All three clusters are associated with areas where bedrock is schist and reflect the slightly higher average abundance of many metals within this rock type.

Rock samples mostly show normal distribution of elements with values falling within normal ranges. An exception is boron, which is higher than usual and which reflects the relative abundance of the mineral tourmaline in these rocks. Most metals have lowest concentrations in metasandstones and greatest abundance in schists or slates. Vein quartz, which may be a host for gold, showed only background values of metallic elements and had no detectable gold.

Soil and stream samples also failed to define anomalous areas. Their trace-element content mostly reflected local changes in bedrock, such that soils collected either over or down-slope from areas of schists generally had the highest metal concentrations as did samples collected from streams that drained areas of schists. Careful panning and laboratory processing of stream samples was carried out in an unsuccessful attempt to locate gold, other heavy metals, or mineral suites that may be indicative of mineralization.

MINERAL RESOURCE POTENTIAL

Areas adjacent to the Rich Mountain Roadless Area have experienced considerable mineral-related activity (fig. 2) that includes the mining of iron, manganese, talc, and marble, and the prospecting for copper and silver (Thompson and Girol, 1982). Stone for road aggregate is quarried on White Path Creek, close to the study area's western margin. The sites of all these are confined to stratigraphic units that overlie those exposed in the study area and thus are not considered to reflect potential for similar resources with this area.

Conglomeratic sandstones occur within parts of the Great Smoky Group and may provide a source of crushed stone. However, they are relatively inaccessible and occur as discontinuous lenses; more easily worked sources of stone are readily available.

Rocks of the Great Smoky Group host the major base-metal sulfide deposit near Ducktown, Tenn. The Copperhill Formation (Hurst, 1955), in which this strata-bound mineralization occurs, is stratigraphically below rocks in the study area. Further, Great Smoky Group rocks around Rich Mountain contain only trace amounts of sporadically distributed iron sulfides, have no significant metal anomalies, and show no unusual concentrations of minerals that are commonly associated with sulfide deposits. Low potential, therefore, exists for this type of base-metal deposit in the study area.

Gold is reported as occurring in placers along streams issuing from the study area and in veins located to the south and east. Placers on White Path Creek, near the study area's west margin, produced 5,000 troy ounces of gold (Yeates and others, 1896, p. 254) and four of the five largest gold nuggets found in Georgia (Cook, 1978); one of these weighed 4.5 pounds (LaForge and Phalen, 1913). Searches for a vein source of this gold have been unsuccessful (Yeates and others, 1896; LaForge and Phalen, 1913). Jones (1909) postulates the source to have been gold-bearing veins that have been removed by erosion.

Gold, or its companion element silver, were looked for in all samples but not detected by semiquantative methods (detection limit of 10 ppm for gold and 0.5 ppm for silver). Additional analyses by atomic absorption methods (detection limit of 0.05 ppm) of twenty samples that were considered most likely to contain gold also had negative findings. All samples of vein quartz were barren of sulfides and had only trace amount of metals. Careful processing of the heavy fraction of stream sediments, both by panning and by laboratory heavy-liquid separation, failed to identify concentrations of gold. However, because of the area's past association with gold production, it has a low potential for the occurrence of resources of minor amounts of additional gold.

Recent seismic profiles across the southern Appalachians have generated much interest in oil and gas exploration. These studies (Cook and others, 1979) suggest that the metamorphic rocks in this region were thrust over unmetamorphosed sedimentary rocks which occur approximately 3 mi below the surface. The potential for hydrocarbon production from these rocks is unknown, but the depth and temperatures at which they occur make existence of liquid hydrocarbons unlikely. Natural gas, however, could be present. No reasonable estimate of this resource can be made without deep test drilling.

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MINERAL RESOURCE POTENTIAL MAP OF THE RICH MOUNTAIN ROADLESS AREA, FANNIN AND GILMER COUNTIES, GEORGIA

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