DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-1287-D
PAMPHLET ACCOMPANIES MAP

Base from U.S. Geological Survey, 1:24,000
Cashiers, 1946; Highlands, 1946 (photorevised 1967); Satolah, 1961; and Tamassee, 1959

Geology modified from Bell and Luce, in press

EXPLANATION

Areas in which thin quartz veins have a low potential for gold in deposits approximating the grade and tonnage mined nearby. Large-tonnage deposits cannot be expected and the potential for silver and lead associated with gold in quartz veins is insignificant. Area also contains scattered small mica pegmatites that have potential for sheet and scrap mica and possibly beryl. Similar deposits have been mined or prospected to the northeast in the Cashiers pegmatite district (Olson, 1952) and to the southwest in the Rabun pegmatite district (Pureron and Teague, 1943; Lesure and Shirley, 1968, p. 323)

Area of low thorium, uranium, and gold resource potential. Thorium and uranium potential is based on: 1. the presence of a nearby known prospect; 2. rock samples containing anomalous concentrations of thorium and uranium; and 3. anomalous uranium concentrations in stream-sediment samples and at localities showing radiometric readings four to seven times greater than background levels. Low potential for gold deposits is similar to potential described in preceding unit

Ultramafic body having potential for olivine, anthophyllite asbestos, vermiculite, corundum, and soapstone. Similar deposits have been mined or prospected in the surrounding region (Gazdik, in press). Additional similar scattered bodies may be discovered in the study area. Symbol shows mine or prospect; dashed line shows approximate outline of ultramafic body. Numbered prospect (11) is discussed in introduction

15 ⚒ 14 Gold or silver mine (⚒) or prospect (✕). Number indicates mine or prospect mentioned in text and also discussed by Gazdik (in press, table 2)

Pegmatite mine(⊗), prospect (⊗), and occurrence (○)

Alluvium

Brevard fault zone rocks (Proterozoic Y to lower Paleozoic)

Tallulah Falls Formation (Proterozoic Z and (or) lower Paleozoic)

Toxaway Gneiss (Proterozoic Y)

Contact between geologic units

Anticlinorium axis

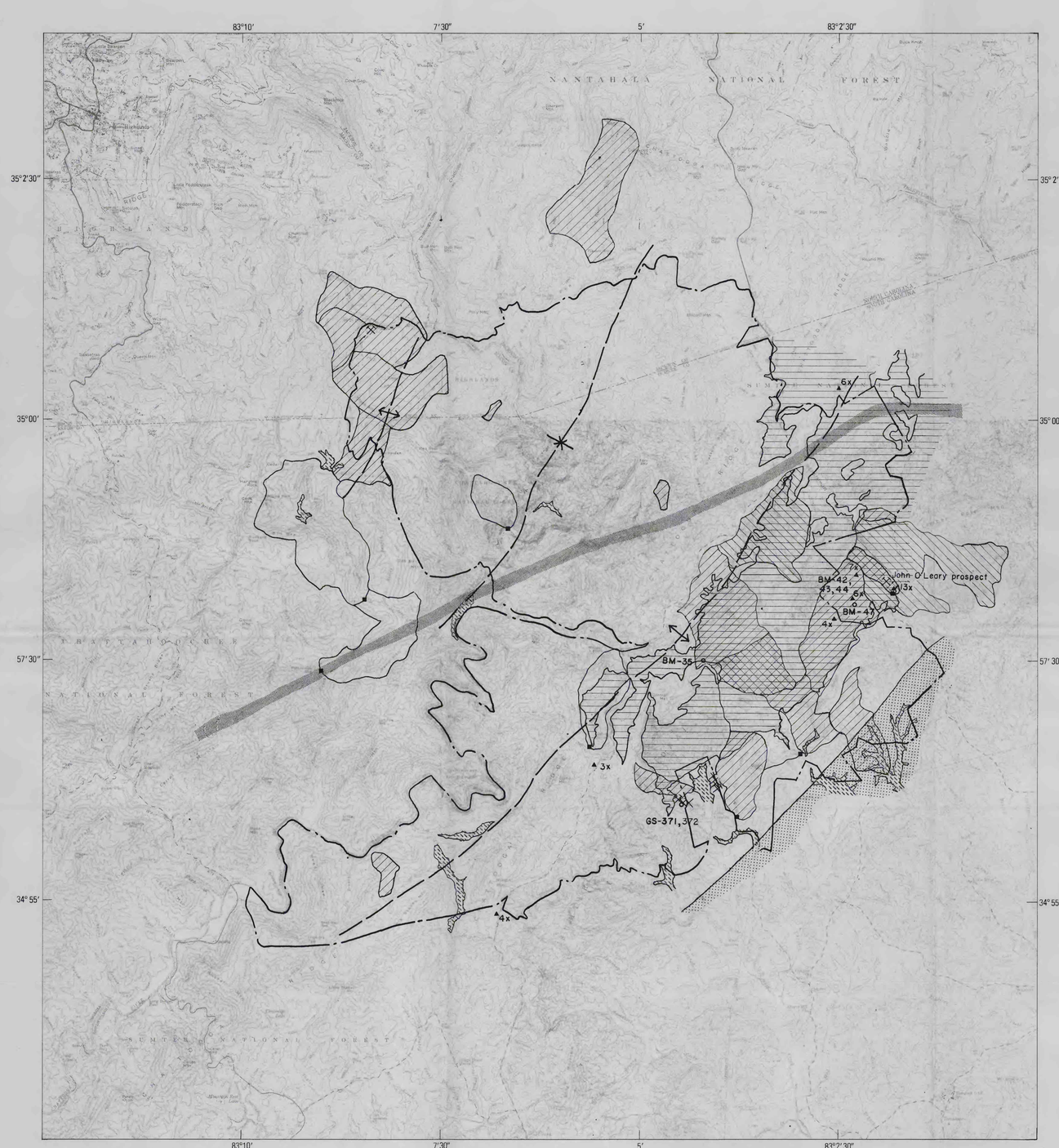
Synclinorium axis

Warwoman lineament; mapped from Landsat imagery and aerial photographs

Boundary of Ellicott Rock Wilderness and additions

Enclave excluded from the wilderness and additions

Figure 2.--Areas of mineral resource potential in the Ellicott Rock Wilderness and additions.



Base from U.S. Geological Survey, 1:24,000
Cashiers, 1946; Highlands, 1946 (photorevised 1967); Satolah, 1961; and Tamassee, 1959

Geology modified from Bell and Luce, in press

EXPLANATION

Stream drainage basin containing 0.9 ppm or more uranium in sampled sediment (Luce and others, in press). Symbol shows sample locality

Stream drainage basin showing anomalous radioactivity as reported by Price (1976)

BM-42 Rock-sample locality showing anomalous uranium-thorium. GS- , USGS sample (Siems and others, 1980); BM- , USBM sample

▲7x Radiometric survey locality showing radiation measured. 7x, seven times greater than background level

Stream drainage basin from which panned-concentrate samples of stream sediment contain more than 1.5 ppm gold. Symbol shows sample locality

Gold or silver mine (⚒) or prospect (✕)

Alluvium

Brevard fault zone rocks (Proterozoic Y to lower Paleozoic)

Tallulah Falls Formation (Proterozoic Z and (or) lower Paleozoic)

Toxaway Gneiss (Proterozoic Y)

Contact between geologic units

Anticlinorium axis

Synclinorium axis

Warwoman lineament; mapped from Landsat imagery and aerial photographs

Boundary of Ellicott Rock Wilderness and additions

Figure 3.--Map showing stream drainage basins having anomalous uranium in stream-sediment and rock samples; spectrometer survey sites where radioactivity is anomalous and localities of panned-concentrate samples containing more than 1.5 ppm gold.

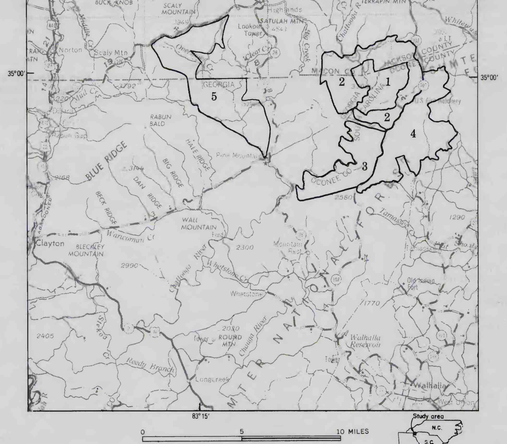


Figure 1.--Index map showing location of the Ellicott Rock Wilderness and additions: 1. Ellicott Rock Wilderness; 2. Ellicott Rock Extension (A8031); 3. Ellicott Rock Expansion (68112); and 4. Persimmon Mountain Area (L8116). The nearby Overflow Roadless Area (5) is also shown.

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 resource potential survey of the Ellicott Rock Wilderness and additions in the Sumter National Forest, Oconee County, South Carolina; the Nantahala National Forest, Macon and Jackson Counties, North Carolina; and the Chattahoochee National Forest, Rabun County, Georgia. The Ellicott Rock Wilderness was established by Public Law 91-422, January 3, 1975. The Ellicott Rock Extension roadless area (A8031), in Sumter, Nantahala, and Chattahoochee National Forests, was recommended for wilderness; and the Ellicott Rock Expansion (68112) and Persimmon Mountain (L8116) roadless areas, in Sumter National Forest, were classified as further planning areas during the Second Roadless Area Review and Evaluation (RARE II) by the U.S. Forest Service, January 1979.

SUMMARY

The Ellicott Rock Wilderness and additions (hereinafter also called study area) comprise about 21,000 acres in the southern Blue Ridge mountains. The potential for large-tonnage ore deposits of the mineral commodities known in the area is low. Only one prospecting permit has been issued, but no development ensued and the permit lapsed. No mining or development has occurred in recent years.

Gold has been mined from thin, near-surface quartz veins and small scattered placers, but ore potential from these sources is low and probably not more than the past production of about 120 ounces. The potential for silver and lead, which occur associated with gold, is similarly low.

Prospecting for uranium and thorium has been undertaken on a small scale near Persimmon Mountain. Thorite as minute inclusions in allanite has been identified in rock samples, and anomalous radioactivity has been identified in several small areas by ground radiometric surveys. However, no stratabound mineral deposits or extended vein system has been recognized. The known occurrences indicate that potential for large-tonnage deposits of uranium or thorium minerals is low. The potential for small deposits of ore in veinlets containing thorite or allanite is also low, but perhaps somewhat more encouraging than for any other type of deposit.

A few mica-bearing pegmatites in the southern part of the Cashiers pegmatite district occur in the Ellicott Rock Wilderness and Ellicott Rock Extension, but no evidence has been found to suggest that the district has more than low potential for sheet and scrap mica in these areas. Large undiscovered pegmatites probably do not exist within the wilderness and additions, and the potential for deposits of book mica or associated pegmatite minerals is insignificant.

Small bodies of ultramafic rocks occur at several locations within the Ellicott Rock Wilderness and additions. These rock bodies have been prospected for asbestos minerals and have been the source of small amounts of soapstone for local consumption. In nearby areas these rocks contain small quantities of gemstones. The potential for economic deposits of any of the commodities associated with ultramafic rocks in the wilderness and additions is insignificant.

Deep seismic-reflection profiles have revealed that flat-lying sedimentary rocks occur below thick layers of much-deformed and metamorphosed crystalline rocks in large parts of the southern Appalachian Mountains. The Ellicott Rock Wilderness and additions are within the area where there may be potential for oil or gas in these deeply buried rocks. However, data to assess this potential do not exist.

INTRODUCTION

The Ellicott Rock Wilderness comprises 3,332 acres in parts of Sumter, Nantahala, and Chattahoochee National Forests. The Ellicott Rock Extension roadless area would expand wilderness boundaries in these national forests by 5,600 acres. The other roadless areas, Ellicott Rock Expansion, 5,512 acres, and the Persimmon Mountain Area, 6,678 acres, are both in Sumter National Forest (fig. 1). Nearly all of land in these parcels is owned by the U.S. Government, and with the exception of the Walhalla National Fish Hatchery, is administered by the U.S. Forest Service. This area of rugged, rhododendron-covered hills and forested mountains surrounds the rock on which Andrew Ellicott in 1813 located the common corner of the three states. Access to the area is from Cashiers, N. C., Walhalla, S. C., and Clayton, Ga., by means of paved state-maintained highways and by improved roads maintained by the U.S. Forest Service.

There are now no privately owned mineral rights on Federal land in the study area. One prospecting permit in the Persimmon Mountain Area (U.S. Bureau of Land Management, number ES-9884) was issued in 1971 to Powhatan Mining Company to prospect for amphibole asbestos (fig. 2, loc. 11), but the prospect was not developed; the permit lapsed and was not renewed (Gazdik, in press).

GEOLOGY

Most of the rocks in the study area are the Toxaway Gneiss, a complex mass having granitic to granodioritic composition, and the unconformably overlying gneisses and schists of the Tallulah Falls Formation (Bell and Luce, in press; Hatcher, 1977). The Toxaway Gneiss and the Tallulah Falls Formation are probably metasedimentary rather than igneous in origin. The Tallulah Falls is of early Paleozoic and (or) Proterozoic Z age. The Toxaway Gneiss is of Proterozoic Y age.

Other rocks in the study area include small bodies of ultramafic rocks that crop out in a northeast-trend near the western contact of the Toxaway Gneiss and Tallulah Falls Formation (fig. 2). These rocks, originally olivine-rich, are mostly altered to talc and antigorite, a minor amount of which is asbestiform. Pegmatites and quartz veins are common throughout the study area, but occur mostly in the Tallulah Falls Formation where they are typically concordant with compositional layering. None was seen to crosscut from the Toxaway Gneiss into the Tallulah Falls Formation. The larger pegmatites, mined or prospected for mica, are shown in figure 2. Mylonitic schist and graphitic phyllite of the Brevard fault zone crop out in the southeast corner of the study area. All these rocks are Proterozoic Z and (or) early Paleozoic in age.

Geologic mapping (Bell and Luce, in press) reveals that foliation, lithologic contacts, and fold axial surfaces in the Toxaway Gneiss and the Tallulah Falls Formation generally have a northeastward strike and a moderate dip to the southeast. The formations have been complexly deformed by several periods of folding. A major structural feature in the study area is a northeast-trending anticlinorium which is a possible nappe or dome (Luce and Daniels, in press; Hatcher, 1977). Another major structural feature is the Brevard fault zone. The presence of kyanite, with abundant inclusions, as well as sillimanite, and migmatites of granitic composition indicates that these rocks have been raised to the amphibolite facies of regional metamorphism. Where most abundant the kyanite-bearing layers contain less than 20 percent by volume kyanite. Neither kyanite nor sillimanite has significant mineral resource potential. Minor retrograde metamorphism is evident within the Brevard fault zone and adjacent Tallulah Falls Formation.

GEOCHEMISTRY

Semiquantitative spectrographic analyses for 31 elements were made of 103 stream-sediment samples, 76 panned concentrates and 73 rock samples (Siems and others, 1981) in order to recognize geochemical anomalies that might reflect either new areas having potential for mineral deposits or extensions of known deposits. Samples collected by the U.S. Bureau of Mines (USBM) include 63 rock and mineral samples and 10 panned concentrates. Interpretations have been made for mineral resources assessment purposes based on these geochemical analyses and on pertinent aeromagnetic and aeroradiometric data (Luce and others, in press; Luce and Daniels, in press). Most samples analyzed were found to be without anomalous concentrations of metals when comparison with similar samples from within the study area and elsewhere.

Stream-sediment sample, however, in the study area and adjacent areas contained anomalous amounts of gold in concentrations ranging from 0.002 to 4 parts per million (ppm). Anomalies with high or intermediate concentrations range from 0.05 to 4 ppm. The anomalies occur in the areas that have low potential for gold resources (fig. 2). The gold concentrations correspond to the range expected for streams draining weakly gold-mineralized areas such as those described by Fischer and Fisher (1968) in the western United States and the weakly mineralized gold mines and prospects that are known in the Ellicott Rock Wilderness.

A few rock samples from the study area showed traces of various metals including silver, arsenic, bismuth, molybdenum, tin, and thorium. These elements are common trace constituents of sulfide minerals such as pyrite and galena, and other rarer sulfide minerals which occur widely scattered in small amounts in many quartz-rich veins. None of the concentrations are high enough to be significant for potential new ore deposits of sulfide minerals, and the concentrations in the study area occur only in widely scattered quartz-rich veins.

Figure 3 shows the sites of anomalous radioactivity, many of which are within the area underlain by Toxaway Gneiss. Thorium may be the source of much of this radioactivity. Samples BM-42, BM-43, and BM-44 have uranium concentrations of 11 to 20 ppm and thorium concentrations of 120 to 2160 ppm. Additional evidence of uranium and thorium enrichment was found at rock-sample localities GS-371, GS-372, BM-35, and BM-47; uranium concentrations at these localities range from 8.2 to 10.7 ppm, and the thorium concentration at two localities was 30 ppm.

Radioactivity was found at the John O'Leary prospect (fig. 3), which is about 0.5 mi outside the east-central part of the study area. The prospect was chosen as a control site for studies of uranium in stream sediments, conducted by Savannah River Laboratories (SRL) of the Dupont Company as part of the National Uranium Resource Evaluation (NURE) program (Price, 1976). Many of the streams sampled by SRL drain the study area, and were resampled by the U.S. Geological Survey (USGS) as part of the present investigation (Siems and others, 1981; Luce and others, in press). Uranium anomalies determined from these data are in drainages within the boundaries of the Persimmon Mountain Area.

Stream drainage basins having anomalous concentrations of uranium are clustered in areas underlain by the Toxaway Gneiss and in the northwestern and northern parts of the study area (fig. 3). Stream drainage basins containing anomalous thorium, lead, scandium, niobium, and lanthanum have a distribution similar to those basins showing uranium anomalies. These elements of high or intermediate atomic weight are characteristic of detrital heavy minerals, such as allanite. The grouping of anomalous concentrations of these elements together in contiguous drainage basins suggests a probable common source for the metals, probably allanite.

A 0.5-m-thick magnetite-rich layer in the Toxaway Gneiss is exposed about 1 mi east of the Persimmon Mountain Area. Semiquantitative spectrographic analyses of USBM samples indicate that several elements associated with the magnetite have anomalously high concentrations: uranium, 5.8 ppm; gallium, 60 ppm; niobium, 100 ppm; tin, 400 ppm; and vanadium, 600 ppm. USGS samples of similar material show 300 ppm vanadium and 700 ppm lanthanum. The layer has not been traced into the study area and similar rocks have not been recognized there.

Geochemical analyses of stream-sediment samples with copper, cobalt, and chromium concentrations above the median for the study area were reported for scattered drainage basins. These analyses probably reflect abundant hornblende, pyroxene, or olivine with traces of chromite in the stream sediment. Small undiscovered ultramafic bodies or amphibolite units may be indicated by these analyses and may have potential for olivine, small amounts of anthophyllite asbestos, vermiculite, corundum, and soapstone similar to the small ultramafic bodies known in the area.

ASSESSMENT OF MINERAL RESOURCE POTENTIAL

No evidence was found during this investigation to indicate that a potential exists for large deposits of mineral commodities not previously known in the Ellicott Rock Wilderness and additions. A low potential may exist within two areas shown in figure 2 for small additional deposits of a few of the mineral commodities known in the study area. These include gold and silver, radioactive minerals, pegmatite minerals, and commodities associated with ultramafic rocks.

Gold and Silver

Thin quartz veins are the ore-bearing rocks at all the lode gold and silver mines in the study area. Gold in small placer deposits originally led to the discovery of lodes and the subsequent development of underground mines, which are now inactive and mostly inaccessible. Recorded production of gold and silver is small.

The mineralized rock is commonly iron-stained quartz veins that range in thickness from a few inches to 2 ft containing free gold and argentiferous galena (Yeates and others, 1896; Sloan, 1908). Quartz veins, wallrock, and dump material collected during fieldwork showed less than 0.2 ppm gold. The early reports, however, indicate that gold in quartz veins occurs locally in considerably greater concentrations. The Ammons Branch Mine (fig. 2, loc. 1) is known to have been a gold mine; mine sites located in the Persimmon Mountain Area are presumably old silver-lead mines. An adit at location 16 (fig. 2) shows two 1-in. quartz veins separated by 15 to 20 in. of a much-weathered, red, gouge-like material. Analyses of vein quartz, wallrock, and dump material for gold showed less than 0.2 ppm in the samples; galena is present in vein quartz on the mine dump. At another site (fig. 2, loc. 15), a few inch-wide, black-stained quartz veins occur. Analyses of a small select sample of vein quartz yielded 0.5 ppm silver and no gold. Sloan (1908, p. 94) reports that a 6- to 8-in.-wide quartz vein bearing argentiferous galena was exposed in a streambed probably near locality 14 (fig. 2). However, it was not seen during this study.

Geochemical sampling of alluvium (Luce and others, in press), as well as of rocks and dumps, shows that the distribution of gold in the study area is scattered, but that high and intermediate anomalies are in several areas (fig. 3). Thin quartz veins are common in the study area, mostly in the Tallulah Falls Formation and near the Brevard fault zone. Additional thin gold-bearing veins may be found particularly in areas where geochemical sampling indicates gold-bearing alluvium. Large-tonnage deposits cannot be expected from thin quartz veins characteristic of the study area, but a low potential exists in the two areas shown in figure 2 for additional deposits of approximately the same tonnage and grade as have been mined, possibly totalling an estimated 120 oz. The potential for silver and lead associated with quartz veins is similarly low.

Placer deposits of gold in the vicinity of the lodes have been mined, but narrow steep valleys have prevented the formation of large gold-bearing alluvial deposits. Analyses of stream-concentrate samples (Siems and others, 1981; Luce and others, in press) show that gold has been concentrated to 4 ppm in some of the streams.

Radioactive Minerals

There has been prospecting for uranium and thorium in the study area but no widespread radioactive horizon or extended vein system has been recognized.

Analyses of rock samples collected during the present field investigation have the highest uranium and thorium values are from the John O'Leary prospect (fig. 3). Radioactivity there is approximately 13 times background and samples containing uranium ranging from 8.2 to 60. ppm and thorium ranging from 60 to 2160 ppm were collected. Thorium mineralization rather than uranium mineralization appears to be the source of most of the radioactivity. Mineral identification by means of the scanning electron microscope indicates that the radioactivity in fresh rock samples originates in minute grains of thorite usually found as inclusions in the mineral allanite. A thorium/uranium ratio of 33 for separated grains is reported (Luce and others, in press).

The potential in the study area for large deposits of radioactive minerals is low. The potential for small deposits, however, is more encouraging than for any other type of deposit, but it is also low. The assessment of low potential for small deposits is based on: (1) rock samples collected by the USGS and the USBM containing anomalous concentrations of thorium and uranium (fig. 3, samples GS-371, GS-372, BM-35, BM-47); (2) anomalous uranium concentrations in stream-sediment samples (Siems and others, 1981; Luce and others, in press; Price, 1976); (3) sites having radiometric readings four to seven times greater than background levels (fig. 3); and (4) the presence of the nearby John O'Leary prospect (fig. 3). Figure 3 shows that the localities of samples on which this potential is based are in clusters mostly within the outcrop area of the Toxaway Gneiss (Bell and Luce, in press). Geophysical data shows that these rocks are deeply buried elsewhere in the study area.

Pegmatite Minerals

The potential for production of mica and other pegmatite minerals such as feldspar, beryl, and allanite from the known and undiscovered pegmatites in the study area is low. The pegmatites are typical of those that commonly produce mica and feldspar and only rarely have a trace of beryl or high-density minerals such as allanite, which contains rare-earth elements or uranium. Two pegmatite mining districts are in the vicinity of the study area (fig.2). These are the Cashiers district to the northeast in North Carolina (Olson, 1952) and the Rabun district to the southwest in Georgia (Pureron and Teague, 1943; Lesure and Shirley, 1968). The presence of a few exposed pegmatite bodies and coarse flakes of pegmatitic mica in soil indicate that the zone of pegmatites is possibly continuous through the northwestern part of the study area and that the two pegmatite districts may be connected. Pegmatite bodies in both areas, however, are usually small. Olson (1952, p. 5) reported that 80 percent of those in the Cashiers district are less than 15 ft wide. Mica produced from these districts was mostly green or brownish green, generally stained, bent or ruled, and of poor quality. Only minor amounts of clear, good-quality sheet mica were produced from a few mines in the Cashiers district during World War II (Olson, 1952, p. 9). Feldspar has been mined locally but production of this mineral from small scattered pegmatites is now uneconomic. The only recorded production of beryl from local mines was in the Cashiers district at the Sheep Cliff mine approximately 9 mi northeast of the study area (Olson, 1952, p. 12-13). No beryl was seen in pegmatites of the study area during the present investigation.

Geochemical analyses of stream sediments from contiguous drainage basins in the area known to contain pegmatites show anomalous amounts of thorium, lead, scandium, niobium, lanthanum, and uranium. These anomalies are attributed to small accumulations of allanite in stream sediments. The anomalies are not significant for potential resources of these metals, but they may indicate the presence of scattered small pegmatites similar to those known in the nearby mining districts.

Commodities Associated with Ultramafic Rock

Figure 2 shows the location of ultramafic rocks in the study area and vicinity. An ultramafic body to the west has yielded corundum and has been prospected for asbestos, vermiculite, and olivine. Anthophyllite asbestos has been produced from a number of small ultramafic bodies northeast and west of the study area. The potential for these commodities in the small ultramafic rock bodies in the study area is low and is confined to the immediate vicinity of the known outcrops and the few similar outcrops that may be discovered.

REFERENCES

Bell, Henry, III, and Luce, R. W., in press, Geologic map of the Ellicott Rock Wilderness and additions, South Carolina, North Carolina, and Georgia: U.S. Geological Survey Miscellaneous Field Studies Map MF-1287-B, scale 1:48,000.

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. 563-567.

Fischer, R. P., and Fisher, F. S., 1968, Interpreting pan-concentrate analyses of stream sediments in geochemical exploration for gold: U.S. Geological Survey Circular 592, 9 p.

Pureron, A. S., and Teague, K. H., 1943, Mica-bearing pegmatites of Georgia: Georgia Geological Survey Bulletin 48, 192 p.

Gazdik, G. C., in press, Map showing mines, prospects, and mineral sites in the Ellicott Rock Wilderness and additions, South Carolina, North Carolina, and Georgia: U.S. Geological Survey Miscellaneous Field Studies Map MF-1287-E.

Hatcher, R. D., Jr., 1971, The geology of Rabun and Habersham Counties, Georgia--a reconnaissance study: Georgia Geological Survey Bulletin 83, 48 p.

_____1977, Macroscopic polyphase folding illustrated by the Toxaway Dome, eastern Blue Ridge, South Carolina-North Carolina: Geological Society of America Bulletin, v. 88, no. 11, p. 1678-1688.

Lesure, F. G., 1981, Geochemical survey of Shining Rock Wilderness, Haywood County, North Carolina: U.S. Geological Survey Miscellaneous Field Studies Map MF-1290-B, scale 1:48,000.

Lesure, F. G., and Shirley, L. E., 1968, Mica, in U.S. Geological Survey and Bureau of Mines, Mineral resources of the Appalachian region: U.S. Geological Survey Professional Paper 580, p. 311-325.

Lesure, F. G., Gross, A. E., Williams, B. B., and Gazdik, G. C., 1982, Mineral resources of the Craggy Mountain Wilderness Study Area and Extension, Buncombe County, North Carolina: U.S. Geological Survey Bulletin 1515, 27 p., maps.

Luce, R. W., Bell, Henry, III, and Gazdik, G. C., in press, Geochemical maps of the Ellicott Rock Wilderness and additions, South Carolina, North Carolina, and Georgia: U.S. Geological Survey Miscellaneous Field Studies Map MF-1287-A.

Luce, R. W., and Daniels, D. L., in press, Aeromagnetic map and selected aeroradiometric data for the Ellicott Rock Wilderness and additions, South Carolina, North Carolina, and Georgia: U.S. Geological Survey Miscellaneous Field Studies Map MF-1287-C, scale 1:48,000.

Olson, J. C., 1952, Pegmatites of the Cashiers and Zirconia districts, North Carolina: U.S. Geological Survey Bulletin 64, 33 p.

Price, Vaneston, 1976, Raw data from orientation studies in crystalline rock areas of the southeastern United States: U.S. Energy Research and Development Administration report GJBX-9 (76), 117 p.

Siems, D. F., Meier, A. L., Luce, R. W., and Bell, Henry, III, 1981, Analyses and descriptions of geochemical samples, Ellicott Rock Wilderness and additions, South Carolina, North Carolina, and Georgia: U.S. Geological Survey Open-File Report 81-594, 37 p.

Sloan, Earle, 1908, Catalogue of the mineral localities of South Carolina: South Carolina Geological Survey Bulletin 2, 505 p.

Yeates, W. S., McCallie, S. W., and King, F. P., 1896, A preliminary report on a part of the gold deposits of Georgia: Georgia Geological Survey Bulletin 4-A, 342 p.

MINERAL RESOURCE POTENTIAL MAP OF THE ELLICOTT ROCK WILDERNESS AND ADDITIONS, SOUTH CAROLINA, NORTH CAROLINA, AND GEORGIA

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