STUDIES RELATED TO WILDERNESS

4/75 #8

MINERAL RESOURCES OF THE JOYCE KILMER-SLICKROCK WILDERNESS, NORTH CAROLINA-TENNESSEE

GEOLOGICAL SURVEY BULLETIN 1416

Mineral Resources of the Joyce Kilmer-Slickrock Wilderness, North Carolina-Tennessee

By F. G. LESURE, E. R. FORCE, *and* J. F. WINDOLPH, U.S. GEOLOGICAL SURVEY, *and* J. J. HILL, U.S. BUREAU OF MINES

STUDIES RELATED TO WILDERNESS—WILDERNESS AREAS

GEOLOGICAL SURVEY BULLETIN 1416

An evaluation of the mineral potential of the area

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STUDIES RELATED TO WILDERNESS

WILDERNESS AREAS

Under the Wilderness Act (Public Law 88–577, Sept. 3, 1964) certain areas within the National forests previously classified as "wilderness," "wild," or "canoe" were incorporated into the National Wilderness Preservation System as wilderness areas. The act provides that the Geological Survey and the Bureau of Mines survey these wilderness areas to determine the mineral values, if any, that may be present. The act also directs that results of such surveys are to be made available to the public and submitted to the President and Congress.

This bulletin reports the results of a mineral survey of the Joyce Kilmer-Slickrock Wilderness, North Carolina-Tennessee, which was established as a wilderness by PL 93–622 (January 3, 1975).

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By F. G. LESURE, E. R. FORCE, and J. F. WINDOLPH,
U.S. Geological Survey, and J. J. HILL, U.S. Bureau of Mines

SUMMARY

The Joyce Kilmer-Slickrock Wilderness covers about 60 km^2 (23 mi^2) of steep forested ridges in the western part of the Blue Ridge Mountains along the border between North Carolina and Tennessee. The area is just south of the Little Tennessee River and includes all the area drained by Slickrock and Little Santeetlah Creeks. Bedrock is interlayered light to dark slate and phyllite, gray arkosic metasandstone, metaconglomerate, and metagraywacke of the Great Smoky Group of Precambrian age. The metasedimentary rocks are folded into several orders of open to tight asymmetric folds which are generally overturned toward the northwest. A prominent cleavage strikes northeast and generally dips steeply southeast. One major fault separates the rocks into two stratigraphic sequences that appear to become younger to the southeast and are not repeated in the study area. Metamorphic grade increases from chlorite in the northwest to garnet in the southeast. The Precambrian bedrock is covered in places by unconsolidated poorly sorted gravel, sand, and clay deposits of Quaternary age.

No metallic mineral resources have been identified in the wilderness area or in the immediate surrounding country. The Fontana and Hazel Creek copper mines are 16–20 km (10–12.5 mi) east-northeast, and the Ducktown copper mines are 50 km (31 mi) to the southwest. The Coker Creek gold district is 30 km (18.5 mi) to the southwest. Prospecting permits have been issued or applied for on only five tracts within the study area in the last 25 years;

none of these resulted in any discovery of mineralized ground. Most of the prospecting seems to have been done because of the common presence of traces of iron sulfides in the country rock. Both pyrite and pyrrhotite are accessory minerals throughout the stratigraphic sequence and are probably recrystallized from authigenic or diagenetic sulfide minerals. Only traces of base metals and gold are associated with the iron sulfides. The many quartz veins are metamorphic segregations of nearly pure silica, and only a few contain traces of copper, lead, zinc, or gold. A reconnaissance geochemical survey including samples of stream sediments, soil, forest litter, and rock indicates no obvious anomalous values for some 30 elements.

The only apparent mineral resources in the wilderness area are minor deposits of sand and gravel and abundant rock suitable for crushing. Deposits of both, however, are readily available and more accessible in the surrounding area.

INTRODUCTION

The Joyce Kilmer-Slickrock Wilderness (fig. 1) consists of a little more than 60 km^2 (23 mi^2) or 6,048 ha (14,935 acres) of National Forest land along the continuation of the main crest of the Great Smoky Mountains just south of the Little Tennessee River; more than 43 km^2 (16.75 mi^2) or 4,350 ha (10,742 acres) are in the Nantahala National Forest, Graham County, N.C., and 17 km^2 (6.5 mi^2) or 1,698 ha (4,193 acres) are in the Cherokee National Forest, Monroe County, Tenn. The area includes two watersheds: that of Little Santeetlah Creek (1,555 ha or 3,840 acres) which flows into Santeetlah Creek and forms all of the Joyce Kilmer Memorial Forest (figs. 2, 3), and that of Slickrock Creek (4,493 ha or 11,095 acres, figs. 4, 5), which flows into Calderwood Lake on the Little Tennessee River. The area is in the western part of the Blue Ridge physiographic province. The mountains are the northern part of the Unicoi Mountains, one of several mountain ranges, including the Great Smoky Mountains, that are collectively known as the Unakas (Fenneman, 1938, p. 173). Altitudes range from a low of 331 m (1,086 ft) above sea level where Slickrock Creek flows into Calderwood Lake to a high of 1,630 m (5,341 ft) above sea level on Stratton Bald which is on the divide between Slickrock Creek and Little Santeetlah Creek. The topography is rugged; ridge crests are sharp, valleys are narrow, and slopes are steep. Half or more of the land slopes from 30° to 45°, and less than 10 percent slopes less than 10°.

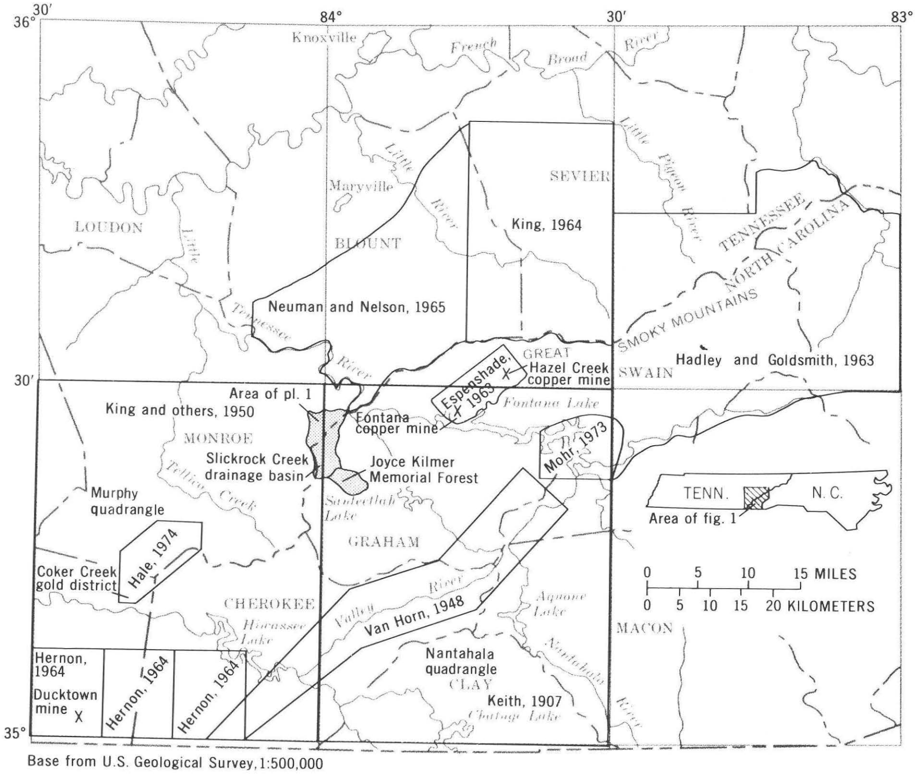


FIGURE 1.—Index map showing location of Joyce Kilmer-Slickrock Wilderness, North Carolina and Tennessee, and references to the published geologic mapping in adjacent areas.

The entire area is heavily forested except for some small cleared fields in Nichols Cove and near the mouth of Hangover Creek, and a natural clearing on Bob Bald. Access is by foot trail from a few roads along the edge of the area.

In the Slickrock drainage basin, many old railroad grades remain from logging operations in the early part of the 20th century, but some of these are now overgrown. The main trails up Slickrock, Little Slickrock, Big Fat, and Hangover Creeks follow railroad grades for part or all of the way. Access to this trail system in the lower part of the Slickrock drainage basin is by boat on Calderwood Lake (pl. 1) or by the Ike Branch Trail which extends from the U.S. Highway 129 bridge over the lake through Yellowhammer Gap to Slickrock Creek. From the west or Tennessee side, U.S. Forest Service road FDR 59, up Doublecamp Creek from Citico Creek, goes to Farr Gap, and a jeep trail follows the ridge

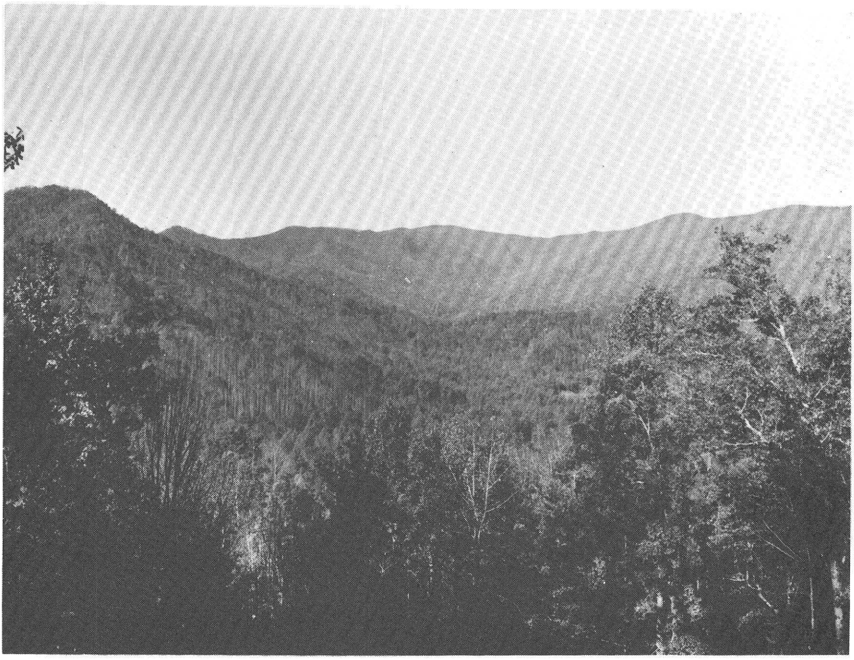


FIGURE 2.—Photograph taken from the Robbinsville road, looking northwest up the valley of Little Santeetlah Creek. The ridge line on either side forms the boundary of the Joyce Kilmer Memorial Forest.

south for about 4 km (2.5 mi). A foot trail from Farr Gap descends along Little Slickrock Creek to Slickrock Creek. From the east, a Forest Service road (FDR 62) extends from U.S. Highway 129 at a bridge over the Cheoah River about 1.6 km (1 mi) south of Tapoco, N.C., to a western spur of Cold Spring Knob about 0.4 km (0.25 mi) beyond Big Fat Gap. From the end of this road, a trail descends into Nichols Cove, and another trail goes from Big Fat Gap to Slickrock Creek. Access from the south is by FDR 81 up Santeetlah Creek. A branching road leads to Wolf Laurel basin (pl. 1). From Beech Gap on the Tennessee-North Carolina boundary, a road goes north along the ridge line to about 2 km south of Bob Bald, where a trail goes up along the ridge and connects with other trails that follow the major ridge lines enclosing the drainage areas.

Forest Service roads extend from the paved road along the Tellico River in Monroe County, Tenn., up the North River to Stratton Meadows and Beech Gap on the State line, and the Tellico-Robbinsville Highway has been partly built as far as Eagle Gap on Sassafras Ridge, about 6.5 km west of Beech Gap.

In Joyce Kilmer Memorial Forest, little or no logging was done, and only a few trails are maintained by the Forest Service. Access by car is limited to the lower end of Little Santeetlah Creek where a parking lot, a visitor center, and a picnic area have been built. Travel away from maintained trails is generally difficult because of extensive areas of rhododendron and laurel. Most of the trails are well marked but do not agree in detail with trails shown on older topographic maps.

PREVIOUS WORK

The earliest published account of the geology in the general area was by Safford (1856, p. 151–152) who noted many thousands of

FIGURE 3.—Photograph showing typical scene along Little Santeetlah Creek in Joyce Kilmer Memorial Forest.

feet of interlayered conglomerate and slate in Polk, Monroe, Blount, Sevier, and Cocke Counties, Tenn. He named these rocks the Ocoee group from exposures in the narrows of the Ocoee River west of Ducktown, Tenn. Safford recognized these as metamorphosed sedimentary rocks (p. 151), noted the repeated lithologic types (p. 152), and discussed the occurrences of gold (p. 80–84) and copper (p. 68–70) in several areas. Later Keith (1907; King and others, 1950) mapped several quadrangles in the Blue Ridge area of North Carolina and Tennessee as part of the folio series of the U.S. Geological Survey. He divided the rocks that Safford had called Ocoee into several formations, two of which, the Great Smoky conglomerate and the overlying Nantahala slate, he mapped in the wilderness area which lies across the common edge of the Nantahala and Murphy quadrangles (fig. 1).

Between 1946 and 1955, geologists of the U.S. Geological Survey mapped much of the Great Smoky Mountains National Park and some surrounding territory (Hadley and Goldsmith, 1963; King, 1964; Neuman and Nelson, 1965). During their work, they were able to redefine the stratigraphy used by Keith and to divide the Ocoee series of Stose and Stose (1944, 1949) into several groups (King and others, 1958, p. 955). Rocks in the wilderness

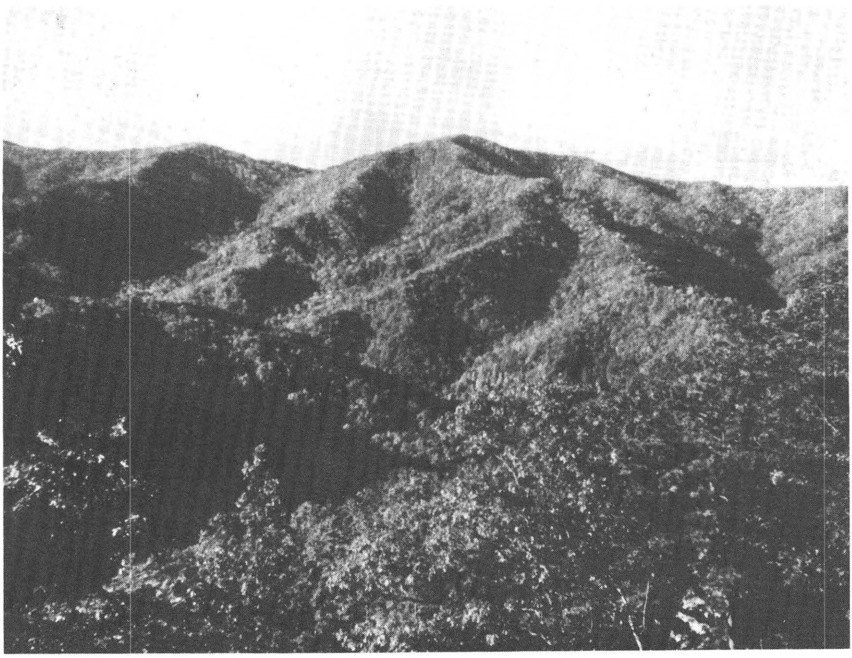


FIGURE 4.—View southwest from near Big Fat Gap looking towards Rockstack across the valley of Slickrock Creek.

FIGURE 5.—Typical view of lower Slickrock Creek showing outcrop of metasandstone and a log bridge.

area include one or more of the formations in the Great Smoky Group as mapped north of the Little Tennessee River by Neuman and Nelson (1965) and King (1964), but the lack of field time made detailed correlations impossible. The reconnaissance mapping of Hadley and Nelson (1971) for the Knoxville 2° sheet included traverses around, but not in, the wilderness area, and their map shows the rocks to be the Great Smoky Group, undivided. In 1971, Prof. Robert D. Hatcher, Jr., Clemson University, made a brief reconnaissance of the wilderness area for the Forest Service and correlated the rocks with the Anakeesta Formation and possibly the Thunderhead Sandstone, both of the Great Smoky Group. His report was incorporated in a special study of the wilderness area prepared by the U.S. Forest Service (1972).

The location and references of some other published geologic mapping near the wilderness area are shown on figure 1.

PRESENT INVESTIGATIONS

During October and early November 1973, Lesure, Force, and Windolph, U.S. Geological Survey, mapped the geology of the wilderness area and collected 168 stream sediment samples, 265 rock samples, 119 soil samples, and 115 forest litter (mor) samples for geochemical analysis. Similar samples were collected in the vicinity of the Fontana and Hazel Creek copper mines to provide a basis for comparison. Hill, U.S. Bureau of Mines, studied records of prospecting activity from the Bureau of Land Management, Washington, D.C., and from U.S. Forest Service offices in Asheville, N.C., and Atlanta, Ga. He contacted persons in industry as well as State and Federal agencies for pertinent information concerning prospects within and adjacent to the study area. Hill, assisted by C. A. Di Francesco, U.S. Bureau of Mines, sampled and evaluated prospects and mineral occurrences in early October and late November 1973.

ACKNOWLEDGMENTS

The completion of this report was greatly facilitated by the friendly cooperation of many interested persons.

P. J. Geraci, U.S. Geological Survey, made mineral separations, determined carbonate content of slates, made X-ray diffraction identifications of sulfide minerals and helped with some of the statistical calculations. Helmuth Wedow, U.S. Geological Survey, and Robin C. Hale, Geologic Branch, Tennessee Valley Authority, spent 2 days with us in the field for orientation and reconnaissance sampling of the Fontana and Hazel Creek copper mines. Leonard S. Wiener and Carl E. Merschat, North Carolina Division of Mineral Resources, Asheville, N.C., discussed the geology of the Ocoee Supergroup [1] with us and provided a compilation copy of their geologic map of southwestern North Carolina. Prof. R. D. Hatcher, Jr., Clemson University, lent us the field sheets from his reconnaissance study of the Joyce Kilmer-Slickrock area made for the U.S. Forest Service. R. B. Neuman and the late J. B. Hadley, U.S. Geological Survey, lent us field sheets of their studies in the general area.

Cities Service Company, Copperhill Operations, allowed us to sample the Fontana mine area and provided data on their exploratory efforts in the general study area. Gaylord C. Yost, U.S. Forest Service, Asheville, N.C., supplied us with pertinent Forest Service reports on the wilderness area. The National Park Service supplied boat and jeep transportation so that we could sample the Hazel Creek copper mine area.

We are grateful to all of these people for their generous help and consideration.

[1]Present U.S. Geological Survey usage (Higgins and Zietz, 1975).

GEOLOGIC APPRAISAL

By F. G. Lesure, E. R. Force, and J. W. Windolph

The wilderness area is underlain by metasedimentary rocks of the Great Smoky Group of Precambrian age, which are covered in some places by unconsolidated deposits of Quaternary age (pl. 1).

PRECAMBRIAN ROCKS

GREAT SMOKY GROUP

Within the Joyce Kilmer-Slickrock Wilderness area, the metasedimentary rocks of the Great Smoky Group form 15 locally mappable units that can be traced across the mapped area but have not been correlated with formations mapped north of the Little Tennessee River. Several of these informal units appear to pinch out or are cut off along a zone of highly sheared rock that is interpreted as a major fault passing through Nichols Cove. All the informal units contain varying proportions of arkosic metasandstone, fine roundstone metaconglomerate, dark-gray graphitic and sulfidic slate, light-gray slate, and metasiltstone; mica-garnet phyllite and schist, metagraywacke, and boulder metaconglomerate are less abundant and are restricted to certain units. In general, the units on either side of the fault through Nichols Cove seem to be continuous stratigraphic sequences that become progressively younger towards the southeast, but correlation between the two groups is impracticable within the study area. The lithologies and estimated thicknesses of the map units are given on plate 1.

LITHOLOGY

Arkosic metasandstone and fine roundstone metaconglomerate.— Arkosic metasandstone and fine roundstone metaconglomerate are commonly interbedded and grade laterally into one another. Metasandstone and metaconglomerate in beds less than 1 m to several metres thick are common throughout the area and are generally separated from similar adjacent beds by a few centimetres or more of interbedded light- to dark-gray slate or metasiltstone. Units of predominantly arkosic metasandstone and metaconglomerate (Units 1, 3, and 5–7) have been traced 1–4 km across the area. Metaconglomerate commonly is about 20 percent of such units and occurs generally near the base of the sandstone beds. Lenticular masses of several sandstone beds range from 1 to 60 m in thickness and appear to pinch out along strike in a few hundred metres. Toward the southern part of the area, more massive units of arkosic metasandstone possibly several hundred metres thick, containing varying amounts of interbedded slate, form mappable units (11, 13, and 15) near the headwaters of Slickrock Creek and in much of Joyce Kilmer Memorial Forest.

Metasandstone and conglomerate are well exposed in some streambeds, and locally form ridges commonly covered with laurel or rhododendron. Slopes and streams adjacent to these ridges are commonly choked with large blocks of sandstone and conglomerate 1–10 m across. Where cleavage is steep and metamorphism relatively high grade, sandstone outcrops form long subvertical crags several metres high, whose shape may be controlled either by bedding or by cleavage.

Beds are mostly thick (1 m or greater) and commonly graded. Channeling, especially of conglomerate into sandstone, is common, but cross stratification and heavy-mineral laminations are rare.

Much of the sandstone is fine to medium grained but generally has abundant coarse to very coarse sand grains and some granules. Roundstone conglomerate generally contains abundant pebbles, 1–3 cm in diameter, and grades into granule sandstone. Clasts in both conglomerate and sandstone are blue, white, and gray quartz, microcline, plagioclase, microperthite, quartzite, granite, and slate, roughly in order of abundance. Biotite is common but may all be of metamorphic origin. Zircon is the most abundant heavy mineral; tourmaline and aggregates of sphene and opaque minerals, which probably represent alteration products of ilmenite, are locally common also. Pyrite or pyrrhotite is generally a minor fine-grained accessory. Carbonate is abundant locally as cement and as sand-size grains which may be replacements of calcic plagioclase.

Carbonate-rich spheroidal concretions (Neuman and Nelson, 1965, p. D7; Hadley and Goldsmith, 1963, p. B51) are common locally. These range from 5 to 20 cm across, and, where elongated parallel to cleavage, their length may be as much as four times their width. They generally form depressions on weathered surfaces and dark-stained spots on fresher surfaces.

Boulder and cobble metaconglomerate.—Although beds of metaconglomerate and conglomeratic metasandstone are common in arkosic metasandstone, one coarse metaconglomerate is distinctive because of the large size and variety of cobbles and boulders. This distinctive metaconglomerate was mapped separately as Unit 1, where it is well exposed in the bed of Slickrock Creek near its mouth and forms Lower Falls. Outcrops are also abundant on the slopes forming the left bank of the creek. Well-rounded boulders and cobbles of granite containing coarse-grained blue quartz and microperthite are in a matrix of fine to coarse sand-size quartz and feldspar. Other types of boulders, cobbles, and pebbles generally present are granitic gneiss, blue quartz, white quartz, perthite, plagioclase, and slate. Slate cobbles are angular and their shape is controlled by layering which is cut by incipient cleavage in the metaconglomerate matrix. Bedding in the metaconglomerate is indistinct. The unit appears to grade laterally into normal arkosic metasandstone.

Slate.—Slate is recurrent throughout the parts of the area in the biotite and chlorite zones of metamorphism and locally in the garnet zone. Slate may completely envelop some arkose-conglomerate units and thus appears to form a "matrix" in which other lithologies are set.

Surprisingly, slate is well exposed in some streambeds and on steep slopes. Ridges within the area are commonly held up by slate, but many small gaps or low saddles in the ridges are also underlain by slate.

Subtle color differences due to the presence of silt layers indicate bedding in most slate outcrops; the bedding is normally at an angle to cleavage, which controls outcrop shape.

Thin graded beds having erosional bases are abundant in slate units. The most extreme grading is from coarse sandstone to mud within in a bed a couple of centimetres thick. Microcrosslaminations may also be present. Grading, channeling, and crosslamination provided a means of determining stratigraphic top independently of cleavage-bedding relations.

The slate consists mostly of sericite and quartz in grains ranging from less than 0.01 to 0.5 mm. Carbonate is present in only a few beds. Both light- and dark-colored slate contain locally abundant pyrite as cubes ranging from 1 to 10 mm in size. Much of the pyrite has been slightly rotated by later deformation, and many pyrite cubes have strain shadows of chalcedonic quartz. Graphite is probably the major cause of the dark color of some slate. The total carbon content of most slate samples taken is shown in table 5.

Phyllite and schist.—In the garnet and to some degree in the biotite metamorphic zones, silvery porphyroblastic phyllite and schist take the place of light- and dark-colored slate that is present at lower metamorphic grade. Phyllite and schist are poorly exposed; much of the map pattern for Unit 14, which is predominantly phyllite, is based on abundant phyllite chips in soil.

The phyllite consists mainly of muscovite (sericite), quartz, and biotite. Porphyroblasts, 0.25 to 2 mm in diameter, of garnet, and books of biotite, both having strain shadows of quartz, are abundant locally. Chlorite porphyroblasts are also present in the darker schist. Pyrrhotite as deformed porphyroblasts (?) is abundant in some beds. Bedding is locally visible as color bands at an angle to schistosity.

Metagraywacke.—Metagraywacke, in the sense of poorly sorted sandstone, is present in two belts in the map area. In Unit 9, the area to the northwest, the metagraywacke is mostly coarse grained and graphitic, and locally it is strongly sheared. Clasts are like those in arkosic metasandstone, but slate clasts are more abundant and locally are predominant. A fine-grained matrix is more abundant in metagraywacke than in arkosic sandstone. Many apparently fresh specimens of metagraywacke are vuggy, but what caused the cavities is not known.

In the area of the divide between Slickrock Creek and Little Santeetlah Creek, a belt of metagraywacke crops out, which contains sandstone boulders and interbedded slate and metasandstone. Cleavage is prominent, and macroscopically the rocks appear sheared, but no evidence of this was found in the many thin sections from this unit. Contorted bedding and clastic dikes are common. Massive arkosic sandstone beds are present within units mapped as metagraywacke.

Quartz veins.—Quartz veins are present in both metasandstone and slate but are most common and conspicuous in slate. The veins range from thin lenses a few centimetres thick and a metre or more long to large masses several metres thick and tens of metres long. Most strike northeast and are vertical or dip steeply southeast. Thinner veins are generally deformed, but thicker veins appear undeformed possibly because of their greater competence. Most veins (table 1) are nearly all milky quartz; some veins contain minor amounts of sulfide minerals, mainly pyrite, but one (table 1, sample no. 3113) contains sphalerite. Veins in slate appear to have slightly more iron, manganese, copper, and lead than veins in metasandstone, which have slightly more magnesium, barium, zinc, and zirconium. The veins are probably metamorphic segregations and are not the product of hydrothermal mineralization from some outside source.

Sulfide minerals.—All the rock units shown on plate 1 contain some disseminated iron sulfides, and one quartz vein contains minor amounts of sphalerite. In the slate of Units 2, 3, and 4, the sulfide mineral is pyrite, generally occurring as euhedral porphyroblasts ranging in size from less than 1 mm to more than 10 mm. Locally pyrite is more abundant in certain beds and may be skewed or rotated along cleavage of the slate. In metasandstone, the

TABLE 1.— *Partial analyses of vein quartz from the Joyce Kilmer-Slickrock Wilderness and vicinity, Graham and Swain Counties, N.C., and Monroe County, Tenn.*

[Sample localities shown on pls. 2, 3. Instrumental and colorimetric analyses were made by C. A. Curtis, A. J. Toevs, and A. L. Meier, U.S. Geological Survey. Semiquantitative spectrographic analyses were made by E. F. Cooley, K. J. Curry, and G. W. Day, U.S. Geological Survey. Letter symbols: L, detected but below limit of determination; N, not detected; G, greater than. Number below element symbol is usual lower limit of determination. Elements looked for spectrographically but not found and their lower limits of determination are: Ag (0.5), As (200), Au (10), Bi (10), Cd (20), Mo (5)[1], Nb (20)[2], Sb (100), Sn (10), Sr (100)[3], W (50), Zn (200)[4]]

Sample number	Semiquantitative spectrographic analyses							
	Percent				Parts per million			
	Fe (0.05)	Mg (0.02)	Ca (0.05)	Ti (0.002)	Mn (10)	B (10)	Ba (20)	Be (1)
Vein quartz in slate								
1061	0.1	L	L	0.002	20	L	20	N
1396	2	0.02	L	.02	200	L	20	N
1438	1	.2	L	.1	100	10	500	2
2127	.5	L	L	.003	30	L	20	N
2139	.7	L	L	.01	20	L	50	L
2184	.7	.03	L	.007	10	N	L	N
2188	2	.15	L	.07	150	20	150	L
2225	.05	L	L	.03	15	N	L	N
2265	1	.2		.07	150	N	150	1
2343	5	.1	L	.05	200	L	100	L
3060	2	L	L	.005	50	L	20	N
3083	.5	.1	L	.003	150	L	20	N
3086	.7	.05	.05	.03	15	L	150	L
3113	1.5	.1	L	.15	70	L	150	N
3172	.7	.2	L	.1	150	10	200	L
2013	.15	L	L	.01	L	N	20	N
H-4	1	.02	L	.02	100	30	20	L
H-6	1	.02	L	.01	150	10	20	N
H-8	5	1	.05	.3	500	70	500	3
Median value	1	.03	L	.02	100	L	20	N
Vein quartz in metasandstone								
1270	.7	.2	L	.003	100	L	30	N
1340	1	.3	L	.15	200	L	300	L
2208	.07	.02	L	.03	20	N	N	N
2210	.1	L	L	.03	70	N	N	N
2293	.5	.05	L	.1	700	N	70	N
2308	.3	.07	L	.02	30	N	150	N
2321	.3	.1	.07	.05	70	N	70	N
2324	.15	.02	L	.007	100	N	L	N
2364	.1	.1	L	.02	30	L	50	N
3090	.7	.1	L	.05	50	L	150	N
H-16	1	.1	L	.05	200	70	50	1
Median value	.3	.1	L	.02	70	N	50	N

See footnotes at end of table.

pyrite is generally finer grained and more disseminated. In sandstone and conglomerate of Unit 1, pyrite may form as much as 1 percent of the rock locally, but in slate of Unit 2, the pyrite content ranges from less than 1 percent to as much as 5 percent. Regionally, there may be a slight decrease in occurrence of sulfides in the units southeast of the fault through Nichols Cove, but some dark slate of Units 14 and 15 may have several percent sulfides. In rocks of garnet-grade metamorphism, the sulfide is pyrrhotite, which occurs as granular masses strung out along cleavage but concentrated in certain thin beds or layers of slate or phyllite.

TABLE 1.— *Partial analyses of vein quartz from the Joyce Kilmer-Slickrock Wilderness and vicinity, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

Sample number	Co (5)	Cr (10)	Cu (5)	La (20)	Ni (5)	Pb (10)	Sc (5)	V (10)	Y (10)	Zr (10)
	Semiquantitative spectrographic analyses — Parts per million									
Vein quartz in slate										
1061	N	N	N	N	5	N	N	L	N	N
1396	7	N	15	N	5	10	5	10	N	10
1438	5	15	15	30	L	1000	5	30	10	70
2127	N	N	10	N	5	10	N	L	N	N
2139	N	N	15	N	L	15	N	10	N	N
2184	7	N	5	N	L	N	N	L	N	N
2188	N	L	10	N	L	15	L	15	N	L
2225	N	N	L	N	L	N	N	L	N	L
2265	N	N	5	N	L	N	N	15	N	30
2343	N	10	10	N	5	N	5	10	10	20
3060	N	N	L	N	L	N	N	L	N	N
3083	N	N	L	N	L	N	N	L	N	10
3086	N	N	L	N	L	N	N	L	N	20
3113	N	N	7	20	L	100	N	L	N	30
3172	N	N	5	N	L	20	5	15	N	30
2013	N	N	15	N	L	L	N	L	N	N
H-4	5	15	30	20	10	N	5	L	N	N
H-6	N	20	30	20	10	N	5	L	N	N
H-8	15	15	50	150	30	70	30	100	50	100
Median value	N	N	10	N	L	N	N	L	N	L
Vein quartz in metasandstone										
1270	N	L	L	N	5	N	N	L	N	N
1340	N	10	L	N	L	N	5	20	10	50
2208	N	N	L	N	N	N	N	L	N	N
2210	N	N	L	N	N	N	N	L	N	N
2293	N	L	L	N	L	N	N	L	N	20
2308	N	N	5	N	L	N	N	L	N	20
2321	N	N	5	N	L	N	N	L	N	L
2324	L	N	L	N	L	N	N	L	N	N
2364	5	N	N	N	5	N	5	10	N	20
3090	N	N	L	N	L	N	N	10	N	70
H-16	5	20	30	20	15	N	5	10	20	20
Median value	N	N	L	N	L	N	N	L	N	20

See footnote at end of table.

The sulfide minerals are considered to be originally diagenetic or authigenic minerals, possibly recrystallized during metamorphism. In the higher rank rocks of the garnet zone, pyrite may have altered to pyrrhotite, as described by Carpenter (1974).

Three samples of sulfides were concentrated from dark slates (table 5, nos. 2340, 2341, and 3202) and analyzed. One contained a trace amount of gold, but none contained more than background amounts of copper, lead, or zinc.

The sulfide minerals generally are altered to limonite on surface exposures. Where there is a concentration of pyrite in slate, ground-water seepage may form moderate amounts of gossan or limonite dripstone, which has encouraged some prospecting. No extensive areas of gossan, such as occur at Hazel Creek and Fontana copper mines, were seen elsewhere in the course of this study.

TABLE 1.— *Partial analyses of vein quartz from the Joyce Kilmer-Slickrock Wilderness and vicinity, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

	Chemical analyses (Parts per million)					Remarks
	Au (.05)	Hg (.02)	Cu (5)	Pb (5)	Zn (5)	
		Vein quartz in slate				
1061	N	0.02	L (5)	10	L (5)	Composite, quartz vein float, >m thick.
1396	N	.04	15	10	15	Composite, 6 quartz veins, 5–15 cm thick.
1438	N	.16	5	550	L (5)	Iron-stained quartz vein.
2127	N	.06	15	30	L (5)	Barren quartz vein, 3 m thick.
2139	N	.08	40	45	5	Quartz vein, minor sulfides 30–60 cm thick.
2184	N	.04	10	L (5)	L (5)	Barren quartz vein, 2 m thick.
2188	N	.04	20	20	35	Composite of four 2 cm thick quartz veins.
2225	N	.08	L (5)	5	L (5)	Quartz vein 5 m thick.
2265	N	.02	20	5	95	Composite of several lenses 2–8 cm thick.
2343	N	.06	L (5)	5	10	Quartz vein 30 cm thick.
3060	N	.02	L (5)	5	L (5)	Quartz vein 2 m thick, contains sulfides.
3083	N	.16	L (5)	5	10	Quartz vein 3 m thick, >15 m long.
3086	N	.06	10	20	10	Quartz vein 30 cm thick, contains pyrite.
3113	0.15	.10	5	240	800	Quartz vein 7.5 cm thick contains sphalerite.
3172	N	.02	5	30	90	Quartz vein 3 cm thick.
2013	N	L (.02)	L (5)	25	10	Quartz vein 15 cm thick.
H-4	N	------	35	5	L (5)	Quartz vein 1 m thick, >20 m long.
H-6	N	------	40	5	L (5)	Quartz vein 60 cm thick, >12 m long.
H-8	N	------	30	50	140	Composite, quartz veins 2 cm thick.
Median value.	N	.05	10	10	10	
		Vein quartz in metasandstone				
1270	N	.06	10	5	25	Quartz vein, 1 m thick.
1340	N	.06	10	10	120	Composite, quartz veins, 2 cm
2208	N	.04	L (5)	L (5)	L (5)	Quartz vein, 1.25 m thick.
2210	N	.02	L (5)	5	L (5)	Quartz vein, 10 cm thick.
2293	N	.04	N (5)	10	95	Quartz vein, 30 cm thick.
2308	N	.06	5	5	90	Quartz vein, 5 cm thick, contains sulfides.
2321	N	.02	L (5)	L (5)	90	Quartz vein, 2 cm thick.
2324	N	.02	L (5)	L (5)	80	Quartz vein, 5 cm thick.
2364	N	.04	L (5)	5	5	Composite 4 quartz veins. 2–5 cm thick.
3090	N	.04	L (5)	5	5	Quartz vein, 5–6 m thick.
H-16	N	------	75	10	10	Small quartz veinlet.
Median value.	N	.04	L	5	25	

[1] Mo, reported as L for no. 2184.
[2] Nb, reported as L for no. 3172 and 20 for no. H 8.
[3] Sr, reported as L for no. 2265, no. 3113, and 200 for no. H 8.
[4] Zn reported as 500 for no. 3113.

STRUCTURE

The metasedimentary rocks of the Joyce Kilmer-Slickrock Wilderness area are folded and faulted. Cleavage is well developed in the fine-grained rocks and less well developed in the coarse-grained rocks. Jointing is common.

Folds.—Several broad folds are apparently present in the study area, but only two are demonstrated by tracing a stratigraphic unit around a fold nose. Northwest of the fault through Nichols Cove, a broad southwest-plunging anticline is suggested by changes in strike and dip in Units 3 and 5, and a broad southwest-plunging syncline probably overturned to the northwest is suggested by bedding attitudes in Units 4, 7, and 8. Long intervals across strike where the rocks are predominantly overturned or dipping to the northwest adjacent to intervals in similar rocks where attitudes are predominantly upright and dipping southeast suggest large asymmetric folds overturned to the northwest, especially in Units 4 and 10. Such folds may have amplitudes of several hundred metres as opposed to several thousand metres for the broader folds to the northwest. Several similar but less overturned folds are suggested by changes of dip in broad areas of Units 12, 13, and 15 in the Joyce Kilmer area. All the folds in the units south of the fault through Nichols Cove appear to be smaller drag folds in the limb of a major fold system; an anticlinal axis to the northwest apparently is cut out by the fault, and a synclinal axis possibly is near the southeast edge of the map area or even farther southeast.

Smaller folds having amplitudes as much as several tens of metres are common, especially in slate. Locally, slate is intensely folded into asymmetric folds a few metres across, and adjacent metasandstone has a homoclinal attitude. Large outcrops of slate and alternations of slate and metasandstone exposed along roads outside the map area show a bewildering complexity of minor folds. Some are nearly isoclinal, and many are slightly overturned to the northwest. In general, fold axes trend northeast and plunge at low angles in either direction.

Faults.—Three probable faults are shown on the geologic map (pl. 1). The most important is the northeast-striking fault through Nichols Cove that separates the area into two stratigraphic sequences. Mylonitic shearing within and along the base of the graphitic coarse metagraywacke of Unit 9 can be traced northeast from the ridge line just south of Harrison Gap on the west edge of the map to the ridge just beyond the intersection of Big Fat drainage basin with Slickrock Creek where the metagraywacke unit either pinches out or is cut off by the fault. A belt of sheared rock which is not as well exposed continues northeast to near Yellowhammer Gap and may extend farther. The amount and direction of movement along this fault are unknown. The stratigraphic sequences on one side of the fault do not seem to be repeated on the other side, at least within the map area. Both high-angle strike-slip and low-angle thrust faults are common in the area mapped north of the Little Tennessee River (Neuman and Nelson, 1965, p. D45–D63), but none seems directly related to the fault through Nichols Cove.

A fault of unknown displacement is exposed on the west bank of Slickrock Creek about 500 m downstream from Big Fat Branch. This fault trends northeast and dips 55° or more southeast. It is probably not very extensive but separates gently folded rocks to the northwest from more highly folded rocks to the southeast.

A third possible fault is shown along the southwest side of Little Slickrock Creek in an area of extreme discordance of bedding attitudes within Unit 2 slate. Again, the amount and direction of movement are not known.

Cleavage.—Cleavage in the mapped area strikes generally northeast and dips moderately to steeply southeast. In the Slickrock area north of Hangover Creek, cleavage dips 20°–70° SE., but south of the mouth of Hangover Creek towards the Joyce Kilmer area, dips tend to become steeper, ranging from 65° to vertical.

Most slate outcrops show bedding and cleavage intersecting. Where bedding is steeper than cleavage, we have inferred that bedding is overturned, an inference that was commonly corroborated by sedimentary structures in the same outcrop. In some slates, cleavage has produced minor transposition of bedding; in most, however, the bedding surfaces remain continuous.

Strikes of bedding and cleavage are commonly roughly parallel. Where this is not the case, bedding normally dips more nearly southward than does cleavage, which dips southeast. The intersection of bedding and cleavage in these exposures thus plunges south or southwest.

Slates having two sets of cleavage are common. The secondary cleavage is mainly crenulation or fracture cleavage, spaced rather than penetrative, and is commonly along bedding. This secondary cleavage commonly deforms the primary cleavage into small chevron folds.

Lineations produced by the intersection of cleavage and bedding or by the intersection of two cleavages are generally parallel, commonly trend northeast, and are horizontal or plunge gently southwestward.

Jointing.—Jointing is common throughout the area, but no well-defined joint sets are apparent. Many of the joints strike northwest and are vertical or steeply dipping to the northeast or less frequently to the southwest. Almost as many strike northeast and are either vertical or dip northwest and less frequently southeast. A few strike north and dip steeply east or strike east and dip steeply north. Gently dipping joints are least common.

METAMORPHISM

The Great Smoky Group rocks are progressively metamorphosed from chlorite grade at the northwest corner of the area to biotite grade over most of the central part and garnet grade in the southeastern part. Isograds between these zones (pl. 1) are based on a study of 140 thin sections and agree roughly with those of Carpenter (1970, p. 751) and Hadley and Nelson (1971).

Rocks in which chlorite, muscovite, and sphene are the only metamorphic minerals are widespread throughout the area; however, in most areas, some rock types contain biotite which is presumed to be metamorphic. Thus, the area of chlorite-zone metamorphism is restricted to the headwaters of Little Slickrock Creek in the northwest corner of the map area.

Sheared graphitic coarse metagraywacke of Unit 9 shows only chlorite-zone assemblages, whereas adjacent rocks are in the biotite zone. This may be due either to compositional control that inhibited formation of biotite or to postmetamorphism shearing that caused retrogression.

Biotite is a common constituent of metasandstone and slate in most of the area. Biotite locally forms euhedral porphyroblasts that have strain shadows, especially in phyllite.

In much of the Joyce Kilmer Memorial Forest, garnet is present as euhedral porphyroblasts in both metasandstone and phyllite. In metasandstone, garnet may form sieve, or skeletal, porphyroblasts around clastic grains. Heavy-mineral concentrates from alluvium contain a colorless euhedral garnet, even in some areas where garnet was not found in any thin sections of the rocks. An electron-microprobe analysis of this colorless garnet by M. L. Bird, U.S. Geological Survey, showed that the MnO_2 content is high, ranging from 18 to 26 percent. The host rocks of the colorless garnet are unknown, as no garnets were found in hand specimens; the distribution of this garnet has therefore been ignored in drawing the metamorphic isograds.

The time relations of metamorphism and deformation cannot be determined with certainty. Flaky metamorphic mica is commonly in the earlier or principal foliation of the rock, suggesting formation during deformation. Later cleavage suggests deformation continued after the peak of metamorphism.

ORIGIN

The metasedimentary rocks of the Great Smoky Group were originally beds of conglomerate, arkosic sandstone, siltstone, shale, and graywacke that probably were deposited in a deep marine environment at or near the base of the Continental Slope. The widespread even bedding, graded bedding, lack of crossbedding, and generally poor sorting are consistent with deposition from turbidity currents off a steep slope. The coarser beds may represent in part submarine channel fillings as described by Stanley (1969, p. DJS–9–1). Discussions of the origin of the Great Smoky Group have been given by Hadley and Goldsmith (1963, p. B67–B68), King (1964, p. 66–71), and Neuman and Nelson (1965, p. D63–D68).

CORRELATION

The rocks of the Joyce Kilmer-Slickrock Wilderness area are lithologically similar to and undoubtedly continuations of rocks mapped as the Great Smoky Group north of the Little Tennessee River (King, 1964; Neuman and Nelson, 1965). The Great Smoky Group consists of three named formations—the Elkmont Sandstone, the Thunderhead Sandstone, and the Anakeesta Formation—and some unnamed higher strata (King and others, 1958, p. 957–960). According to Neuman and Nelson (1965, pl. 2), the Elkmont Sandstone extends to the Little Tennessee River just north of Slickrock Creek, and Units 1 through 4 of this report are probably continuations of what they mapped as Elkmont. The relative proportion of slate to metasandstone appears somewhat higher than the more typical Elkmont farther northeast (Neuman and Nelson, 1965, p. D7–D9), but the lithologic types are certainly similar. The boulder conglomerate of Unit 1, however, is more like conglomerate described by Hadley and Goldsmith (1963, p. B55) from the upper part of the Thunderhead Sandstone, which is younger than type Elkmont. The graphic graywacke in Units 9 and 12 is similar to coarse sandstone from the Anakeesta Formation described by Hadley and Goldsmith (1963, p. B59). The lithologies that we have described, including the boulder conglomerate, are also very similar to the lithology of the Cades Sandstone, except that blue quartz grains are common throughout most of the units of the Joyce Kilmer-Slickrock Wilderness area but are absent from the Cades Sandstone (Neuman and Nelson, 1965, p. D10–D14).

Because of the lack of any clearcut lithologic correlation with any of the described formations of the Great Smoky Group and because of the general lithologic similarities to rock types described from all of the formations, the rocks of the Joyce Kilmer-Slickrock Wilderness area are classified as Great Smoky Group, undivided.

QUATERNARY DEPOSITS

Unconsolidated coarse gravel, sand, and clay form colluvial deposits on many lower slopes and alluvial fans in parts of most valleys. Below areas where coarser grained rocks are exposed, boulder debris may choke the streams. Some boulders are as large as a house, and boulders 1 to 3 m across are common. Where streams have cut into fan deposits, as in the lower parts of Hangover Creek, the exposed unconsolidated material ranges from 1 m to more than 6 m in thickness. Minor streams commonly run through the coarse fan deposits rather than over them; elsewhere, running water is found in channels along the boundary of a fan, and channels cut in fan deposits are dry.

Early settlers used the larger areas of fan deposits for fields and pastures in Nichols Cove and near the head of Little Slickrock Creek. The site of a logging camp can be seen in the clearing on the fan at the mouth of Hangover Creek.

The coarse fan deposits are deposited by the sudden torrential runoff from rains that occur sporadically in the mountains. On the southeast side of Little Fodderstack, several small debris slides have formed in chutes or narrow steep drainages on slate bedrock in the past couple of years. Relatively fresh rock is exposed for 100 m or more in a chute 1 to 2 m wide, and a small fan of coarse debris including boulders and broken trees remains at the chute bottom. The amount of material that a single storm can move by debris avalanche and mudflow was illustrated by hurricane Camille which dumped 680 mm (27 in.) of water in one night in August 1969 in Nelson, Amherst, and nearby counties, Virginia, and caused extensive erosion (Webb and others, 1970). Although such storms are infrequent, they are the most important erosional force in the southern Appalachians (Hack and Goodlett, 1960, p. 55–58).

INTERPRETATION OF AEROMAGNETIC DATA

An aeromagnetic map of the general area compiled at a scale of 1:125,000 by F. A. Petrafeso, U.S. Geological Survey, from data

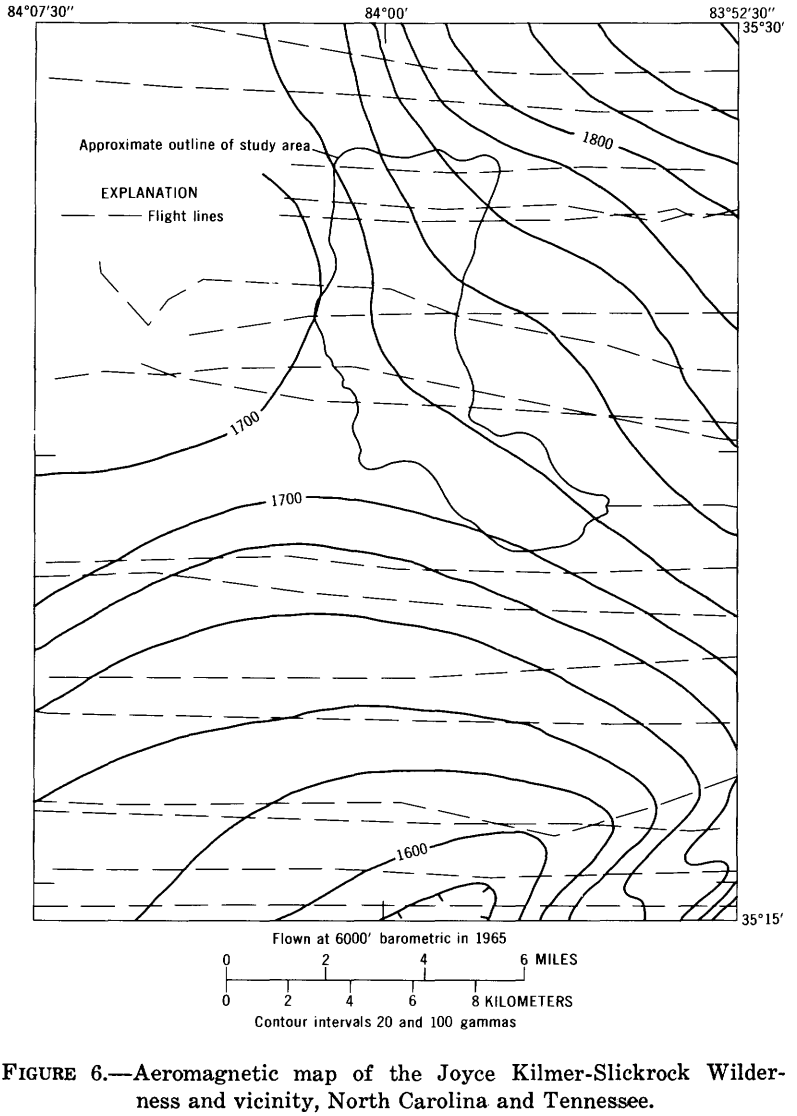


FIGURE 6.—Aeromagnetic map of the Joyce Kilmer-Slickrock Wilderness and vicinity, North Carolina and Tennessee.

obtained from flying at 1,800 m (6,000 ft) barometric in flight lines about 1.6 km (1 mi) apart (fig. 6) shows a low regional gradient in the study area. The exposed metasedimentary rocks are relatively nonmagnetic and thick, nearly concealing what may be a small anomaly in basement rock just east of the wilderness area.

GEOCHEMICAL SURVEY

SAMPLING AND ANALYTICAL TECHNIQUES

A reconnaissance geochemical survey of the Joyce Kilmer-Slickrock Wilderness included analyses for elements which could potentially occur in economic concentrations (tables 2–5). No obvious anomalous concentrations of elements were found. Samples collected include stream sediments (pl. 2A), soil and forest litter (mor) (pl. 2B), and rocks and minerals (pl. 2C).

An attempt was made to collect stream-sediment samples from all tributaries to Slickrock and Little Santeetlah Creeks and also from as many as possible of the small streams draining the area just outside the wilderness area. Except for a few nearly inaccessible streams north of the area that were not sampled and a few sparsely sampled drainage basins west of the area, the coverage is complete. In general, a few handfuls of the finest sediment available were taken in or as near as possible to the flowing stream. Many streams contain mostly sand or coarser sized sediments, and the fine material was rich in organic matter which had to be ashed in order to avoid interference during spectrographic analysis.

In a few places, a sample of soil and one of forest litter were taken near the site of the stream-sediment sample. Soil and forest-litter samples were also collected in areas of no outcrop to produce a roughly uniform sampling pattern over the whole map area. The soil samples were collected below most organic matter; forest litter was collected as leaves, twigs, and humus above mineral soil. Both soil and forest litter were ashed, and percent ash was determined.

The rock samples are representative of all major rock types and most of the rock units shown on the geologic map. Twenty-six samples of quartz veins were collected; some are composite samples of several thin quartz seams. Wall-rock samples were collected near the veins where practical.

All samples were scanned spectrographically for 30 elements and in addition were analyzed chemically for gold in the U.S. Geological Survey laboratories, Denver, Colo. All except the forest-litter samples were also analyzed chemically for copper, lead, mercury, and zinc. Total carbon was determined for many of the slate and some of the graphitic graywacke samples.

Similar samples were collected in and around the Hazel Creek and Fontana copper mines so that the analyses from the wilderness area could be compared with those from areas of known base-metal deposits having similar climate, vegetation, relief, and stratigraphy. These include 35 stream-sediment samples, 31 rock samples, 41 soil samples, and 41 forest-litter samples. They were analyzed in a similar manner, and the results are given in tables 2–5. Sample locations are shown in plate 3.

Splits of a set of 20 stream-sediment samples collected along Yellow Creek (fig. 7) just east of the Slickrock area by J. M. Fagan (1966) were analyzed in the same manner for background comparison. No mineralization is known in the Yellow Creek drainage basin. Analytical results are given in table 2.

In the course of fieldwork, we made 15 heavy-mineral concentrates using a standard gold pan (fig. 8). These concentrates were examined for mineral content but were not analyzed chemically. Gold was visible in three samples. No other valuable minerals were identified.

GOLD

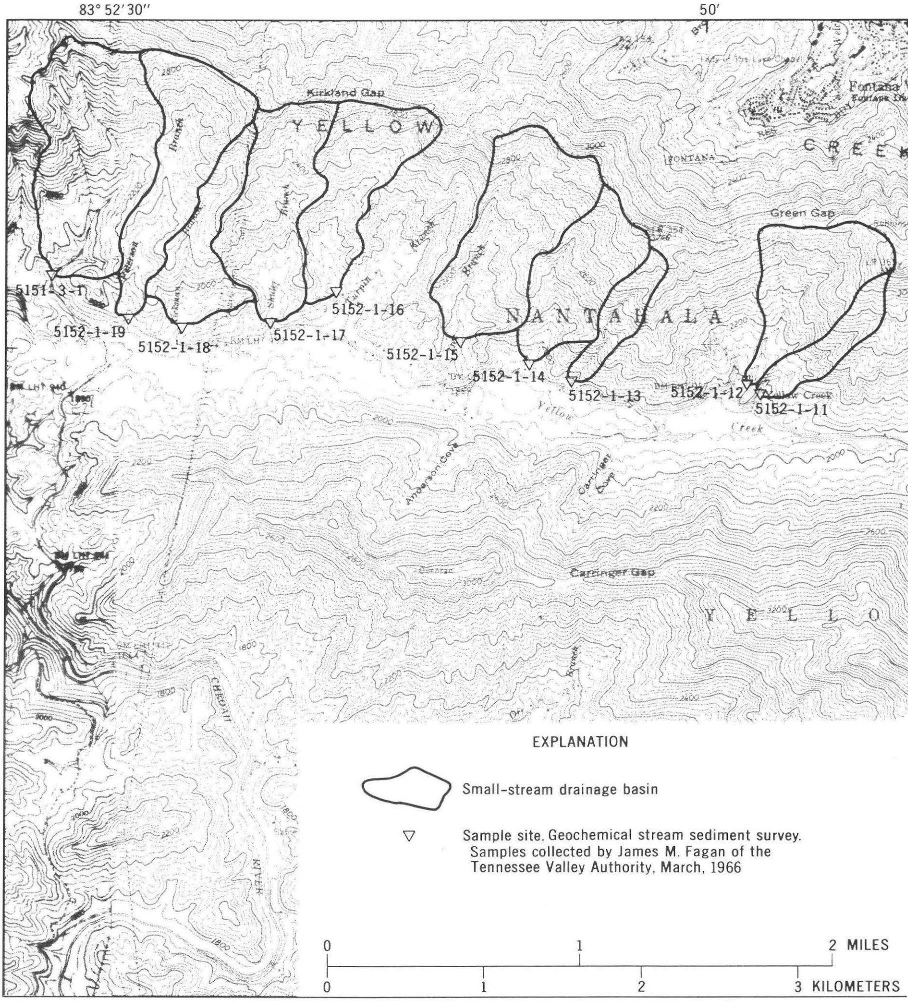
Gold was detected in the Slickrock area in 11 out of 262 rock samples, 1 out of 3 pyrite concentrates, 3 out of 119 soil samples, 1 out of 115 forest-litter samples, and 5 out of 168 stream-sedi-

TABLE 6.—*Gold content of samples from Slickrock area, Monroe County, Tenn., and Graham County, N.C.*

[Atomic-absorption analyses by C. A. Curtis, J. G. Frisken, and J. G. Viets. Sample localities shown on fig. 8.]

Sample No.	Au (ppm)	Sample description
1161	0.28	Stream sediment.
2355	L (0.05)[1]	Do.
2356	L (0.05)	Do.
2368	4.0	Do.
3089	0.16	Do.
1111	0.05	Soil.
1414	L (0.10)	Do.
3136	0.10	Do.
2244	L (0.12)	Forest litter.
2222	0.3	Interlayered light- and medium-gray slate.
2230	0.1	Arkosic metaconglomerate, minor sulfides.
2237	0.1	Dark-gray slate, 30-cm chip sample.
2240	0.1	Sheared light-olive-gray arkosic metasandstone.
3096	0.2	Arkosic metasandstone.
3101	0.25	Medium-light-gray arkosic metasandstone, abundant sulfides.
3113	0.15	7-10 cm quartz vein, chip sample.
3114	0.10	Pyritic slate.
3123	L (0.05)	Arkosic metasandstone.
3129	0.6	Coarse-grained arkosic metasandstone and metaconglomerate.
3202	0.3	Pyrite concentrate, from pyritic slate (sample 3074 (pl. 2).
H–5	L (0.05)	Sample of metasandstone in contact with quartz vein of sample H–4 (pl. 2).

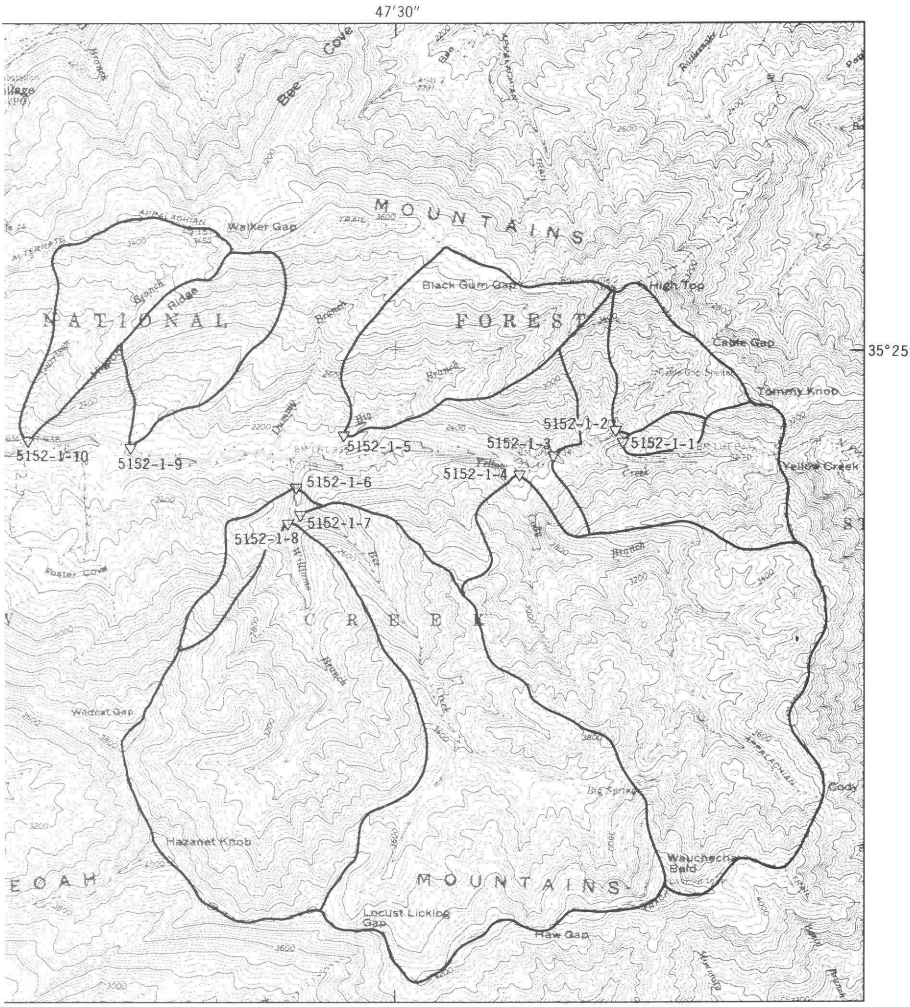
[1] L ( ) = Detected but below limit of determination or below the value shown.



Base from Tennessee Valley Authority and U.S. Geological Survey, 1:24,000, Tapoco, 1940, and Fontana Dam, 1961

FIGURE 7.—Map showing stream drainage basins and stream-sediment sample localitie
Geologic Branch, Tenn

ment samples, in addition to the visible gold in 3 out of 15 panned concentrates (table 6, fig. 8). The distribution of gold-bearing samples (fig. 8) suggests that Units 10 and 11 contain the most gold, then Units 4, 3, 7, and 12, in order of decreasing amount. The amount of gold in the rock samples ranges from less than 0.02 ppm to 0.6 ppm (0.017 oz/ton). The largest amount of gold was found by panning all the contents of a small pothole in a metasandstone outcrop in Slickrock Creek about 275 m downstream



(numbered) in Yellow Creek area. Samples collected in March 1966 by J. M. Fagan,
ssee Valley Authority.

from the intersection of the Yellowhammer Gap trail and the main trail along Slickrock Creek (Sample no. 2377, fig. 8). The pothole was 30 cm in diameter and 60 cm deep. It contained 0.27 gm of gold in the form of a dozen flattened particles as much as 4 mm long but less than 0.5 mm thick and many fine particles 1 mm or less in length. A similar-sized pothole across the creek contained no gold but did have one rusty railroad spike left from logging operations. A panned concentrate from near the mouth of Big Fat

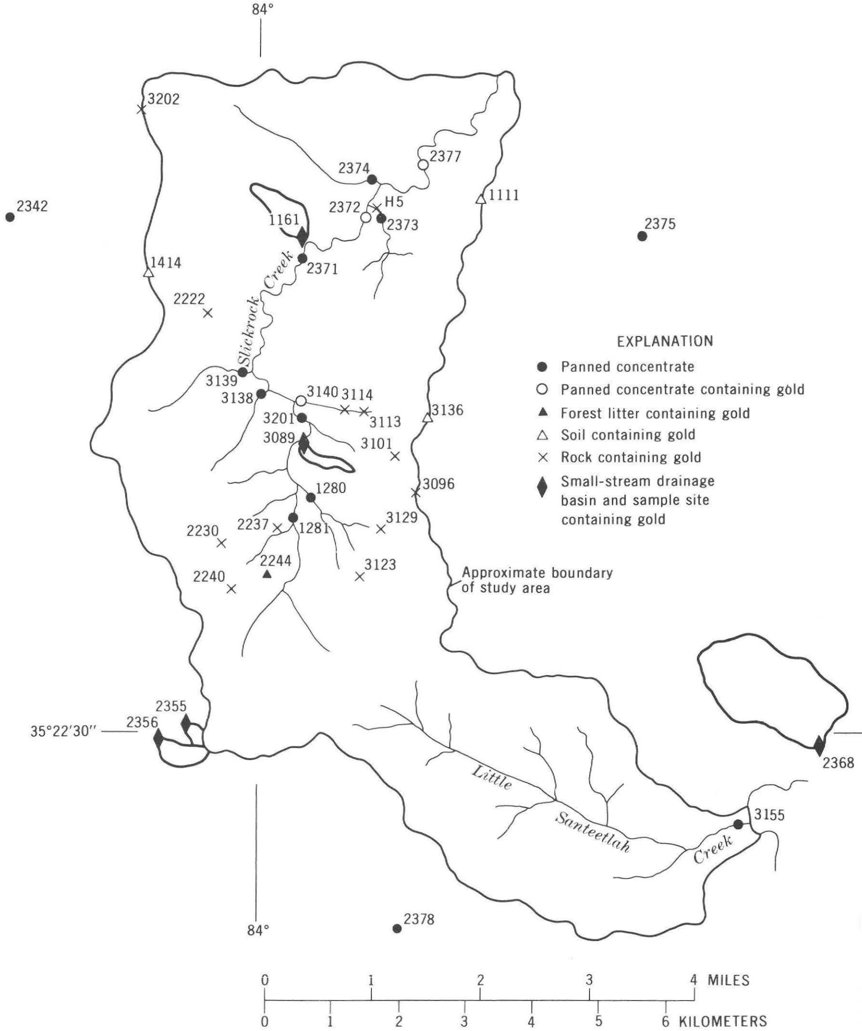


FIGURE 8.—Map showing gold distribution in the Joyce Kilmer-Slickrock Wilderness and vicinity. Samples listed in table 6.

Branch (Sample no. 3140, fig. 8) contained one particle of gold, and a concentrate from a pothole in an outcrop in Slickrock Creek 200 m upstream from the mouth of Nichols Cove Branch (Sample no. 2372, fig. 8) contained a sand grain of quartz intergrown with gold.

The trace amounts of gold determined in 1 sample of pyrite from porphyroblasts in slate, in 1 quartz vein, and in 10 other rock samples indicate the presence of enough minor concentrations of gold in the country rock to produce the small amount of placer gold found. The pothole containing the most gold probably received it in the form of a piece of vein quartz similar to, but larger than, the gold-bearing quartz grain from the pothole upstream. The larger fragment of quartz has long since been destroyed by the grinding action in the pothole during flood stage, and the gold freed by the grinding remained in the pothole. Such a random source adequately explains the lack of gold in the nearby pothole and also discourages any further attempt at prospecting. No estimate of potential gold resources in the wilderness area can be made without more detailed sampling, but such sampling seems unwarranted from the existing data.

Gravel in the lower part of Slickrock Creek is restricted to the creek bed; gravel deposits are thin and discontinuous, and bedrock exposures are common. The total volume of gravel is small. Alluvium-colluvium was mapped along the main creek and tributaries above the mouth of Big Stack Branch. The total alluvial area is about 90 hectares (230 acres). The thickness of gravel ranges from 1 to as much as several metres, but probably does not average as much as 2 m. Although many of the rock samples containing gold are from the source area of these gravel deposits, five panned concentrates from the main creek and larger tributaries in this area did not contain visible gold. The one concentrate in this area that contained gold was from Big Fat Branch where the gravel deposits are thin and discontinuous. Possible ranges of gold values that might be expected by additional sampling are shown by values of 0 to 400 mg/m^3 of gold obtained from large samples collected from more extensive and better sampled alluvial deposits along Coker Creek, Tenn., southwest of the Slickrock area (Hale, 1974, p. 60). The average gold content of the samples, however, was 31 mg. The geology of the two areas is similar, and Hale (1974, p. 6–11) obtained gold values in country rock and vein quartz similar to the values obtained in our sampling (table 6). Hale (1974, p. 1) concluded that, "* * * the gold deposits of the Coker Creek region are not amenable to commercial mining."

In conclusion, at least locally, the bedrock in the wilderness area contains small amounts of gold, and some gold is concentrated locally in the stream valleys. The possibility of finding even low-grade concentrations of economic value seems poor.

OTHER ELEMENTS

No obvious anomalous values of other elements were found in the geochemical survey. All element values are what might be expected from the rock type or sample type. Cumulative frequency-distribution curves for a number of elements in the stream-sediment sample suites were plotted on probability paper to determine a threshold for anomalous values, using the method described by Wedow and Ericksen (1971). An example of this plot (fig. 9) for copper clearly suggests two populations in the stream samples from the Hazel Creek and Fontana copper mines. The break in the curve appears at about 100 ppm Cu. Those samples that contain more than this are all from the immediate mine areas or from streams that head in the mine areas. In contrast,

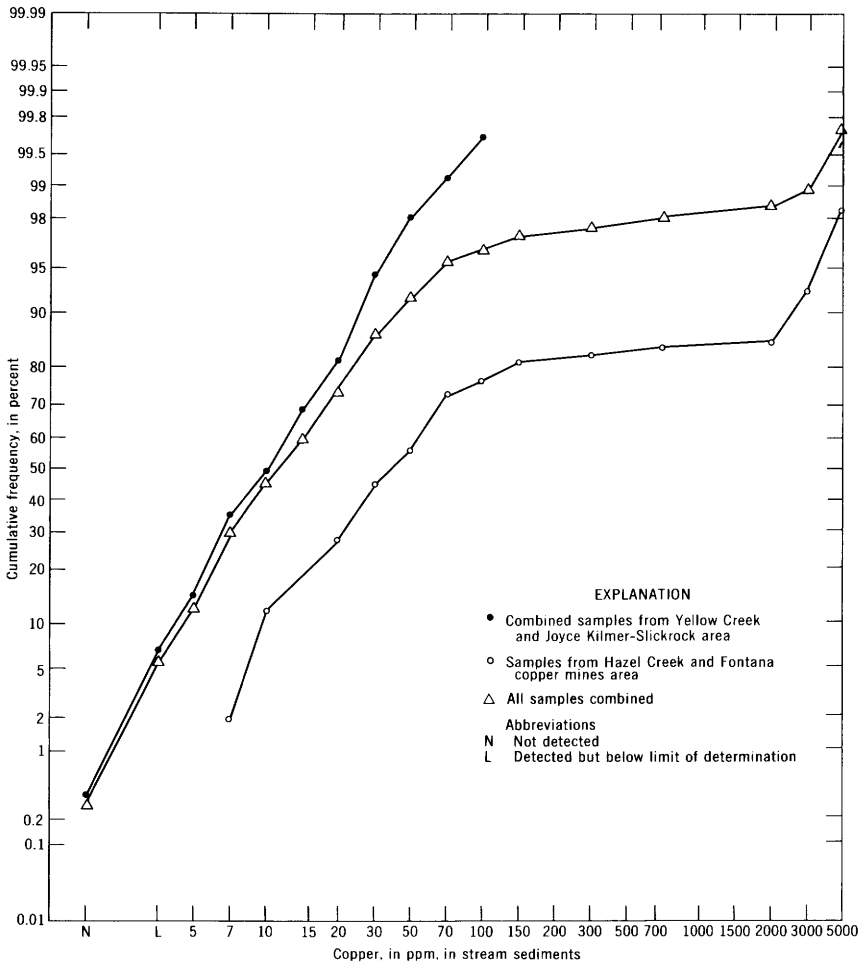


FIGURE 9.—Cumulative frequency distribution of copper in stream-sediment samples.

the combined Yellow Creek and Joyce Kilmer-Slickrock samples plot as a nearly straight line suggesting a single log-normal distribution. Only one sample (no. 2105) contained as much as 100 ppm Cu, and this comes from a small stream just north of the Little Tennessee River outside the wilderness area. Three samples containing 50 ppm Cu and two containing 70 ppm Cu came from small streams draining areas underlain by dark slates of Units 2 and 3 in the northern part of the Slickrock Drainage. Plots of Pb and Zn give results similar to those for Cu, but plots of Fe, Mg, B, Co, Cr, La, and Ni are nearly straight lines and hence are probably simple log-normal distributions for all areas.

FOREST LITTER AND SOIL SAMPLES

The analytical results from the forest-litter and soil samples are difficult to evaluate. The median values of some elements in forest litter and soil from the Hazel Creek-Fontana area and from the Joyce Kilmer-Slickrock area compare moderately well with the average metal content of plant ash and soil (table 7). Differences between the local soils and the average soil are probably due to lithology of parent material. All the forest-litter samples contain leaves and other plant material from more than one type of plant,

TABLE 7.—*Median values (ppm) of some elements in forest-litter and soil samples from the Fontana-Hazel Creek mine area and Joyce Kilmer-Slickrock Wilderness compared with average metal content of plant ash and soil (Cannon, 1960, p. 596; Brooks, 1972, p. 209–228).*

[L, detected, but below limit of determination or below value shown; N, not detected at limit of detection or at value shown]

Element	Fontana-Hazel Creek area		Joyce Kilmer-Slickrock Wilderness		Average in plant ash	Average in soil
	Forest litter (ash)	Soil	Forest litter (ash)	Soil		
Ag	L (0.1)	N (0.5)	L (0.1)	N(0.5)	1	1
B	70	15	150	70	700	10
Ba	3,000	500	2,000	500	280	500
Be	3	1.5	3	1.5	.7	6
Cd	L(1)	N (20)	7	N(20)	.1	.5
Co	70	50	15	7	9	10
Cr	50	70	30	70	9	200
Cu	150	50	100	15	180	20
Ni	100	30	50	15	65	40
Pb	150	30	200	30	70	10
Sn	7	N (10)	10	N(10)	1	10
Sr	300	L (100)	500	L(100)	30	300
V	150	100	150	100	22	100
Zn	700	N(200)	500	N(200)	1,400	50

and, because the abilities of different plants to concentrate various metals vary, a full evaluation of the analytical data from forest litter is not yet possible.

Some variation in median values between the copper-mine areas and the wilderness area may be due to differences in vegetation, and some, to differences in rock type from which the soils came. In both areas some elements, such as B, Ba, Cu, Ni, Pb, and Zn, seem to be concentrated in plant material in amounts relative to the presence of the elements in the soil.

At the Fontana mine, a traverse along which paired forest-litter-soil samples (samples 3008 through 3029, pl. 3B) were taken 15 m apart extends N. 70° W. about 30 m north of the caved stope area near the north end of the mine workings. Although the traverse apparently crossed the mineralized zone, no significant chemical expression of copper was noted in either soil or forest-litter samples.

The forest-litter and soil analyses are reported here for use as comparative data for future geochemical studies in Great Smoky Group rocks.

NONMETALLIC MINERAL RESOURCES

Nonmetallic mineral resources in the Joyce Kilmer-Slickrock Wilderness include minor quantities of sand and gravel in alluvium and abundant metasandstone and metaconglomerate suitable for crushed rock. Old quarries for road material are east of the wilderness area along U.S. Highway 129 near Cochran Creek and to the southeast on the Kilmer road near Avey Branch. Because access to the wilderness area is so poor, and because larger, more readily available deposits are nearby outside the wilderness area, the building materials within the wilderness area are not considered to have economic value.

ECONOMIC APPRAISAL

By J. J. Hill

The U.S. Bureau of Mines examined mineral prospects within and adjacent to the wilderness area. The history and status of prospecting activity were determined, and a field evaluation was made of all known prospects. No mineral deposits of commercial significance were found in the prospect areas. Sulfide mineralization, mainly pyrite, was found in many places. Samples taken at prospect sites indicate all exposed mineralization to be minor.

Sparse showings on the surface do not rule out the possibility of mineralization beneath colluvium or at depth. Further evaluation would require geophysical methods of detection or core drilling.

RECORDS OF MINING ACTIVITY

Land-office mining-claim records do not exist in the Eastern States, where public-domain lands were acquired under authority of the Weeks Act of 1911. Prior to this time, all lands in the East were in private ownership and are not now open to prospecting and location under the General Mining Laws of 1872.

The lands in the wilderness area were acquired from private interests by the U.S. Forest Service in 1935–36 under the authority of the Weeks Act, and little record of prospecting activities prior to this period is available.

Gold was discovered in 1827 in the Coker Creek area, Monroe County, Tenn., 30 km to the southwest (Ashley, 1911, p. 83, 84). The name Gold Mine Branch (5 km east of the wilderness area) appears on maps and possibly attests to early prospecting activity in the general area.

Under the authority of Section 402 of the President's Reorganization Plan No. 3 of 1946, the Bureau of Land Management receives applications for prospecting and mining permits on acquired lands. Records from Bureau of Land Management files aided this investigation.

PROSPECT INVESTIGATIONS

COLE PROSPECT

An iron-ore prospecting permit (BLM–A–073771), issued in June 1964 to John J. Cole of Lenoir City, Tenn., covered a 227-ha (563-acre) tract in T. 1 N., R. 6 E., fractional sec. 14, Monroe County, Tenn. (fig. 10, area 1). The prospect is on the second drainage southwest of Wildcat Branch.

Personnel of the Tennessee Valley Authority (TVA) visited the prospect with Mr. Cole and an industry representative in August of 1964. TVA files in Knoxville, Tenn., contain the following note:

The prospect is situated within the outcrop area of rocks of the Ocoee series. Bedrock above the exposure of the gossan has an altitude of N51°W/11°N * * * The gossan has developed along a sheared zone as indicated by the outcrop. Prospecting efforts have exposed approximately 10 sq. ft. of gossan (after slumping). Analysis by U.S. Pipe and Foundry Co. (for Mr. Cole): 60% Fe, 0.021% P, 0.08% Mn. Analyses courtesy Bear Creek Mining Com-

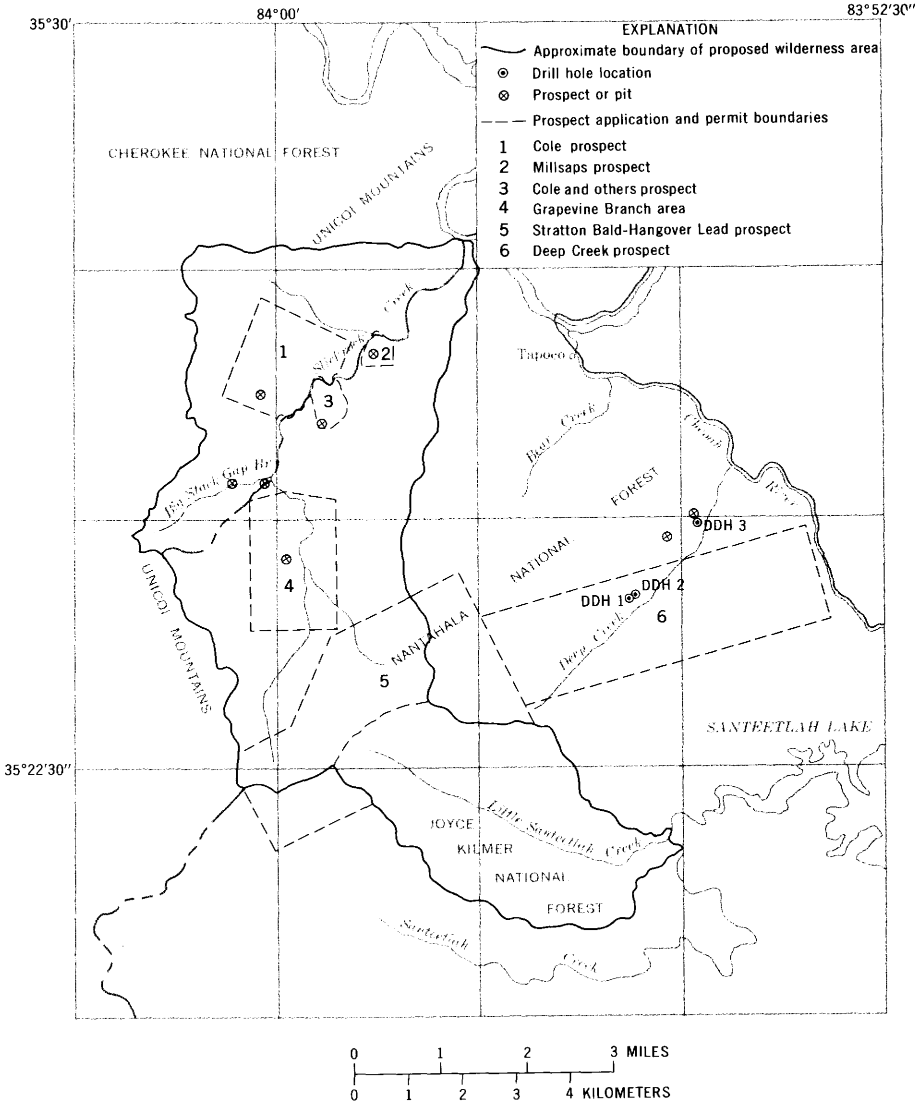


FIGURE 10.—Location of prospect permit areas, prospects or pits, and drill holes in Joyce Kilmer-Slickrock Wilderness and vicinity.

pany (10/2/64): Stream sediment 100 ft. downstream from occurrence: base exchange (cold extractable) Cu–0; total copper—20 ppm. Gossan—total Cu–50 ppm.

Rocks within the general area are a sequence of phyllite, graywacke, and quartz pebble conglomerate. The gossan on a minor shear zone in phylite is exposed in a cutbank on the north side of the drainage at an altitude of 603 m (2,010 feet). The cutbank is about 12 m high, 9 m wide at its base, and is covered, in large part, with slumped debris. Sheared bedrock is exposed on the western edge, having a clearly defined color contact between light-gray phyllite and the overlying dark-gray limonitic phyllite. Sample H–1 was taken 30 cm below the color contact, and sample H–2 was taken about 60 cm above the contact (table 8). Sample H–3, more limonitic than the other samples, was taken 2 m above the contact. Heavy limonitic accumulations, which could account for the high iron assays described in TVA files, were not found.

The small size of the exposure and the minute metallic values indicate that the prospect does not represent a potential resource value.

MILLSAPS PROSPECT

A prospecting permit for gold and other minerals (BLM–A–024402), issued to Harvey L. Millsaps of Tapoco, N.C., in July 1953, pertained to a tract of approximately 24 ha (60 acres) on Nichols Cove Branch (fig. 10, area 2). In 1955–58, prospecting permits for gold, copper, and silver (BLM–A–040865, BLM–A–066008, ES–4605) were granted or applied for on the same tract of land under the names of F. D. Icenhower and Mrs. Siller Icenhower. No workings were found during field investigation of the tract. The prospectors were investigating quartz veins exposed in two places.

At the base of a small waterfall on Nichols Cove Branch, about 183 m from its mouth, a massive white quartz vein as much as 1 m thick is exposed for a length of 21 m. The quartz vein is in a sequence of slate, graywacke, and conglomerate. The strike of the beds is N. 55° E., and the dip is 30° N. The quartz vein appears to be concordant with the bedding except where it splits at the southern extremity of the exposure. At the base of the waterfall, a 4.5-m segment of the vein is exposed, possibly a slump or fault block off the main vein.

The weighted assay of a composite chip sample taken at 2.5–3-m intervals along the exposed length of the vein (sample H–4), and the assay of a 2.5-cm sample of the country rock in contact with the quartz vein (sample H–5) are shown in table 8.

Ninety metres south of the point where Nichols Cove Branch enters Slickrock Creek, a quartz vein, 60 cm thick, is exposed for 12 m. The vein is 6 m above Slickrock Creek trail. Lying within a sequence of slate, graywacke, and conglomerate, the vein appears to be concordant with bedding which strikes N. 45° E. and dips

TABLE 8.—*Analyses of samples*

[Assay values determined by U.S. Bureau of Mines, Reno Metallurgy Research Center, Reno, Fe, and Ni determined by atomic absorption. V determined by a semiquantitative spectrographic emission spectrographic analysis. Estimated detection limits reflected by the "less than" values.

Sample Number	Sample width, inches	Sample type	Cu	Pb	Zn	Ni	V
			(ppm)				
H-1	2	Chip	10	40	10	---	<30
H-2	2	Chip	20	20	30	---	40
H-3	3	Chip	40	20	60	---	30
H-4	36	Chip	50	<10	<10	---	<30
H-5	1	Chip	30	<10	130	---	50
H-6	24	Chip	40	<10	10	---	<30
H-7	1	Select	60	10	200	---	<30
H-8	3	Chip	20	40	130	---	30
H-9	--	Select	210	90	270	---	<30
H-10	12	Chip	50	10	40	---	40
H-11	12	Chip	10	10	170	---	50
H-12	--	Select	50	35	60	50	<30
H-13	6	Select	70	20	120	80	50
H-14	72	Chip	70	<10	140	---	40
H-15	72	Chip	50	<10	110	---	40
H-16 [1]	1	Chip	80	<50	*	---	<30

[1] Detection limit for Pb,50 ppm.

35° NW. The weighted assay of a composite of chip samples taken at 1.5-m intervals along the exposed vein is shown as sample H–6 in table 8. Assay data do not indicate any potential resources here.

COLE (AND OTHERS) PROSPECT

A prospecting permit for gold (BLM–A–024194), issued in November 1951 to E. M. Cole (and others) of Lenoir City, Tenn., pertained to a tract of about 46 ha (115 acres) on the east side of Slickrock Creek (fig. 10, area 3). The prospect is on the southern edge of the permit area, along a drainage entering Slickrock Creek from the southeast.

At the head of the drainage, at an altitude of 610 m (2,000 ft), black graphitic slate occurs in a vertical exposure 24 m high. Pyrite occurs in crystals as much as 5 mm wide and in veinlets oriented with the bedding in the slate. The strata strike N. 85° E., and dip 56° S. Some quartz veins are present, and limonite accumulations occur around water seeps.

The assays of selected composite samples from the limonite accumulations (sample H–7), from composite chip samples of 2.5-cm-wide quartz veins associated with the pyritic, graphitic slate (sample H–8), and from specimens of selected pyrite-rich (65 percent pyrite) slate (sample H–9), are shown in table 8. The assays do not indicate any mineral-resource potential.

BIG STACK GAP BRANCH AREA

Local hunters provided directions to two small prospect pits along Big Stack Gap Branch on the west side of Slickrock Creek *from prospect areas*

Nev. S determined by chemical procedure. Au and Ag determined by fire assay. Cu, Pb, Zn, procedure. Leaders (---), element not looked for; asterisk (*), not detected by qualitative Sample localities shown on pl. 2B.]

Au	Ag	Fe	S	Sample description
(ppm)		(percent)		
---	---	---	---	Phyllite.
---	---	---	---	Slightly limonitic phyllite.
---	---	3.1	---	Limonitic phyllite.
*	---	---	---	Quartz vein.
*	---	---	---	Fine-grained graywacke.
*	---	---	---	Quartz vein.
*	*	---	---	Limonite developed on slate.
*	*	---	---	Quartz vein with graphitic slate.
<0.1	<3.0	---	---	Graphitic slate, abundant pyrite.
---	---	---	---	Slate.
---	---	---	---	Slate.
---	---	---	0.56	Graywacke, disseminated sulfides.
---	---	---	2.07	Graphitic slate, abundant sulfides.
*	---	---	---	Graywacke.
*	---	---	---	Graywacke.
*	---	---	---	Quartz vein.

(fig. 10). Barely perceptible tree blazes led to a shallow excavation concealed in a dense rhododendron thicket on the side of the hill nearest the mouth of the branch at Slickrock Creek. Bedrock consists of thin-bedded dark-gray slate having traces of iron staining. No significant indication of mineralization was noted in the outcrop (sample H–10, table 8). Thin-bedded gray slate, slightly iron stained, was exposed in the second prospect pit. No significant evidence of mineralization was noted (sample H–11, table 8).

GRAPEVINE BRANCH AREA

A prospecting permit (BLM–A–031039), applied for in April 1952 by Willard D. Rogers of Oak Ridge, Tenn., pertained to approximately 390 ha (960 acres) on Grapevine Branch in the Slickrock drainage basin (fig. 10, area 4).

No definite signs of prospecting activity were found in the area. A cutbank, possibly the result of prospecting activity, is on the north edge of Grapevine Branch at an altitude of 760 m (2,490 ft). An iron-stained coarse-grained graywacke, 1–1.5 m thick, containing many blebs of pyrrhotite and pyrite, is exposed. Sample H–12 (table 8) was selected from the iron-rich parts of this section. In the creek bottom immediately below the cutbank, dark-gray thin-bedded graphitic slate striking N. 75° E. and dipping 57° S. is exposed. Thin discontinuous films of pyrrhotite and pyrite occur on bedding surfaces. Sample H–13 (table 8) is a select sample of the mineralized slate. Sample assays showed no potential resource values.

STRATTON BALD—HANGOVER LEAD AND DEEP CREEK PROSPECTS

Prospecting permits for iron sulfide, copper, and zinc (BLM–A–024859, BLM–A–024861), issued in August 1952 to Tennessee Corporation, New York, N.Y., involved approximately 1125 ha (2,780 acres) and 1050 ha (2,600 acres) in Graham County, N.C. (fig. 10, areas 5, Stratton Bald-Hangover Lead prospect and 6, Deep Creek prospect respectively). Area 6 is outside the wilderness boundary.

Data provided through the courtesy of Cities Service Company, Copperhill Operations, reveal that exploration efforts in 1952–54 consisted of geological and geophysical mapping and diamond-drill coring. Two drill holes (fig. 10, area 6, tables 9 and 10) tested a magnetic anomaly which had been detailed by superdip traverse during exploratory efforts. Insignificant quantities of sul-

TABLE 9.—*Log of Tennessee Corporation diamond-drill hole No. 1 in the Deep Creek prospect, Graham County, N.C.*

[Bearing, N. 45° W.; dip, 30°. Surface elevation of collar, 2,680 ft (approx.). AX-core. A. N. C. Drilling Company. December 1953]

Depth (feet)	*Remarks*	*Assays*	
		Sampled interval (feet)	*Percent magnetite*
0– 10	------No core.	0– 10	--
10– 24	------Graywacke and blue quartz conglomerate. 1 ft slate at about 15 ft. Bedding about 80°	10– 20	Tr.
24– 26	------Slate containing pyrite.	20– 30	Tr.
26– 60	------Graywacke and blue quartz conglomerate. Limonite in fractures at 28 ft. Slate at 33 ft., 42 ft., 45 ft., 53 ft. Bedding about 75°. Occasional sulfide grains.	30– 40	Tr.
60– 61	------Slate containing pyrite. Bedding about 75°.	40– 50	0.60
61–103	------Graywacke, some conglomerate and blue quartz. Occasional pyrrhotite grains and slate banding. Bedding about 80°.	50– 60	.30
103–104	------Slate and pyrite in fractures.	60– 70	Tr.
104–130	------Graywacke, some conglomerate, and blue quartz. 3 ft. of quartz vein at 112 ft.	70– 80	.50
130–133	------Slate, locally mottled, containing disseminated sulfides. Bedding about 80°.	80– 90	.40
133–154	------Graywacke, some conglomerate, and blue quartz. Bedding about 70°.	90–100	.86
154–155	------Slate containing pyrite.	100–110	Tr.
155–172	------Graywacke, blue quartz, and occasional sulfide grains.	110–120	.40
172–174	------Slate, and pyrite in seams.	120–130	.50
174–196	------Graywacke. Fault at 189 ft. Bedding about 50° at 182 ft.	130–140	.40
196–209	------Slate, slightly mineralized.	140–150	.80
209–214	------Graywacke.	150–160	.80
214–218	------Slate.	160–170	Tr.
218–243	------Graywacke, containing disseminated sulfides. Fault at 223 ft. Some blue quartz.	170–180	Tr.
243–251	------Alternating graywacke and slate.	180–190	.30
251–262	------Graywacke.	190–200	Tr.
262–268	------Slate containing disseminated sulfides.	200–210	.80
268–286	------Graywacke and some conglomerate and blue quartz. Disseminated sulfides.	210–220	.70
286–291	------Slate. Bedding about 60°.	220–230	.40
291–318	------Graywacke and some conglomerate and blue quartz. Slate at 300 ft., 302 ft., 307 ft. Bedding about 80°. Disseminated sulfides.	230–240	.20
318–320	------Slate.	240–250	Tr.
320–350	------Graywacke, slate band at 349 ft. Bedding about 60°. Slightly calcareous.	250–260	Tr.
		260–270	Tr.
		270–280	.70
		280–290	.30
		290–300	.60
		300–310	Tr.
		310–320	Tr.
		320–330	Tr.
		330–340	Tr.
		340–350	1.00

TABLE 10.—*Log of Tennessee Corporation diamond-drill hole No. 2 in the Deep Creek prospect, Graham County, N.C.*

[Bearing, N. 45° W.; dip, 50°. Surface elevation of collar, 2,640 ft (approx.). AX-core. A. N. C. Drilling Company. January 1954]

Depth (feet)	*Remarks*
0– 19	No core.
19– 65	Graywacke, some conglomerate. 1 ft. slate at about 28 ft., about 40 ft., and about 61 ft. Bedding about 70° at 40 ft.
65– 69	Slate. Slightly mineralized fractures at 67 ft.
69–100	Graywacke, blue quartz, and slate. Some conglomerate. Bedding about 65° at 89 ft. and 91 ft. Slate bands at 75 ft., 80 ft., 85 ft. 89 ft., 91 ft., 92 ft., and 95 ft.
100–103	Slate, slightly mineralized with pyrrhotite.
103–125	Graywacke, blue quartz, and slate. Some conglomerate. 1 ft. slate at about 120 ft.
125–128	Slate, slightly mineralized.
128–143	Graywacke and blue quartz conglomerate.
143–146	Slate. Fractures at 145 ft. and 146 ft.
146–151	Graywacke and blue quartz, containing disseminated sulfides.
151–153	Slate.
153–158	Graywacke and blue quartz, containing disseminated sulfides.
158–164	Graywacke and slate, containing disseminated sulfides.
164–167	Graywacke.
167–168	Slate.
168–170	Graywacke.
170–172	Slate.
172–216	Graywacke, fine-grained. Occasional bands and sulfides. Fractures at 211 ft.
216–222	Slate.
222–225	Graywacke.
225–231	Graywacke and slate.
231–257	Graywacke containing disseminated sulfides. Fractures at 235 ft., 240 ft., 243 ft., 256 ft. Some blue quartz.
257–259	Graywacke and slate, fine-grained.
259–268	Graywacke. Fractures at 260 ft. and 265 ft.
268–270	Slate.
270–272	Graywacke.
272–275	Alternating layers of graywacke and slate.
275–295	Graywacke, fine-grained at 283 ft.
295–299	Slate, somewhat fractured.
299–330	Graywacke. Bands of slate at 304 ft., 310 ft., 326 ft., and 328 ft.
330–333	Slate bands and graywacke, somewhat fractured.
333–364	Graywacke, bands of slate.
364–367	Slate.
367–400	Graywacke. Layers of slate at 380 ft., 389 ft., 391 ft., and 397 ft.

fide were reported. Drill hole No. 1 was assayed for magnetite content, which was as much as 1 percent and averaged about 0.32 percent.

KITCHEN PROSPECT

The early history and background of the Kitchen prospect (immediately north of area 6, fig. 10) have not been determined. This prospect is outside the wilderness boundary. Forest Service records indicate interest in the area in early 1942, when Barclay McGhee requested a 500-acre mineral claim and permission to drain the copper tunnel on the Deep Creek road. Espenshade (1963, p. I36) reported the prospect and mentioned a short adit, shallow shaft, and prospect pit in the Sam Cove area.

In June 1943, the prospect was visited by M. H. Staatz, U.S. Geological Survey. His notes contain the following information:

Around the bend to the north of location 1 along the side of the road is a small cut in which a little pyrite is found disseminated in the rock. From here to 30 feet [9 m] vertically below the road, there is a small (15 ft. long) adit. In the trench in front of the adit was a shaft filled with water * * * * Pyrite is found in 3 inch thick vein above adit. Pyrite and chalcopyrite are also found disseminated in the wall rock north of the adit. Most of this sulfide is pyrite. A little chalcopyrite was also found in a small ⅛ inch veinlet. Most of the dump rock was barren with only a little disseminated sulfide noted. Country rock is quartzite with small phyllite layers.

Data provided through the courtesy of Cities Service Company, Copperhill Operations, reveal that the company drilled an exploratory hole (DDH 3, fig. 10, table 11) on the prospect in January 1954, after a weak anomaly near the adit was located by superdip traverses. A 91-m hole penetrated graywacke and sericitized schist containing insignificant sulfide. A 2-m interval was sampled (122–129 ft) which assayed 0.11 percent copper, 2.9 percent sulfide, 4.8 percent iron, nil gold, and nil silver.

The narrow adit is 9 m below Deep Creek road and penetrates 4.5 m into the hillside at a bearing of S. 65° W. A 15-m-long trench is in front of the adit. Within the trench, 6 m from the mouth of the adit, is a shallow (1–1.5 m) water-filled shaft, visible from the edge of the road.

The adit was inaccessible. Scattered chips of a 2-m section of the graywacke (having sparsely disseminated sulfides) were taken from the north and south walls of the trench (samples H–14 and H–15, table 8). A small quartz veinlet in the south wall of the trench was also sampled (sample H–16, table 8). Present sampling and past drilling show no known mineral resources, but as

TABLE 11.—*Log of Tennessee Corporation diamond-drill hole No. 3 in the Deep Creek (Kitchen) prospect, Graham County, N.C.*

[Bearing, N. 25° W.; dip, 55°. Surface elevation of collar 1,960 ft (approx.). AX-core. A. N. C. Drilling Company. January 1954]

Depth (feet)	*Remarks*
0– 40	No core.
40– 68	Schist, quartz and sericite. Bedding about 60° at 66 ft. 2 in. quartz at 68 ft. Weathered at 55–63 ft.
68– 96	Graywacke and blue quartz conglomerate. Fault at 89 ft. Schist band at 93 ft and 95 ft.
96–100	Schist, quartz schist, and blue quartz conglomerate.
100–101	Sericite schist. Bedding about 60° at 100 ft.
101–111	Sericitized graywacke and blue quartz conglomerate.
111–115	Graywacke and schist.
115–122	Sericite schist.
122–129	Quartz sericite schist, slightly mineralized with pyrrhotite and chalcopyrite. Assay 122–129 ft. shows 0.11 percent Cu, 2.9 percent S, 4.8 percent Fe, and nil Au.
129–131	Sericite schist.
131–161	Graywacke. 4 in. quartz at 158 ft. Some blue quartz. Occasional sulfide bleb.
161–165	Biotite sericite schist.
165–169	Quartz sericite schist, slightly mineralized. 8 in. quartz at 168 ft.
169–185	Biotite schist. Bedding about 75° at 180 ft.
185–213	Graywacke. Schist band at 189 ft and 191 ft. Bedding about 80° at 191 ft.
213–214	Slightly mineralized quartz.
214–218	Biotite schist. Bedding about 60°.
218–223	Graywacke.
223–233	Biotite schist.
233–300	Graywacke. Quartz and schist at about 260 ft.

this prospect is on the Hazel Creek-Fontana copper trend (Espenshade, 1963, p. I15), prospecting activity is likely to continue.

Traces of prospecting activity were found farther up Sam Cove at an altitude of 688 m (2,260 ft) (possibly the same area mentioned by Espenshade, 1963, p. I36). A small excavation is in weathered graywacke. No mineralization was noted, and samples were not taken.

MINING IN NEARBY AREAS

No mines having recorded production exist within the wilderness area. Mines in surrounding areas have undoubtedly encouraged exploration efforts throughout the region.

FONTANA MINE

The Fontana mine is in Swain County, N.C., approximately 16 km northeast of the wilderness area (fig. 1). Copper was mined from 1926 to 1944; the mine was closed when the rising water level of Fontana Reservoir flooded road and rail access to it. The average grade of ore shipped during operation of the mine was more than 7 percent copper. Production totaled more than 83 million pounds of copper (Espenshade, 1963, p. I28).

HAZEL CREEK MINE

Hazel Creek mine, also known as the Everett or Adams mine, is on a tributary of Sugar Fork of Hazel Creek in Swain County, N.C., 22 km northeast of the wilderness area (fig. 1). The mine was first opened in 1900 and operated intermittently until November 1944, when it was permanently closed. No records exist of ore shipments from the mine prior to 1943. The ore shipped in 1943–44 contained 415,722 pounds of copper. Exploration indicated that about 17,000 short tons of high-grade ore (3–3.5 percent copper and 3–3.5 percent zinc) and 32,000 short tons of low-grade ore (1–1.7 percent combined copper and zinc) were present prior to the active mining in 1943 (Espenshade, 1963, p. I30–I31).

COKER CREEK AREA

In 1827, gold was discovered in the Coker Creek area, Monroe County, Tenn., approximately 30 km southwest of the wilderness area (fig. 1). By 1854, a total of $46,023 worth of gold had been extracted from placers in the area (Ashley, 1911, p. 83, 84). This discovery influenced prospecting efforts throughout the region. The geology and mineral resources of the Coker Creek area have been described in more detail by Hale (1974).

DUCKTOWN DISTRICT

The Ducktown district is in the southeast corner of Tennessee (fig. 1) approximately 50 km southwest of the wilderness area. Massive sulfide deposits in the area have yielded iron, sulfur, copper, zinc, gold, and silver. Discovered in 1843, the Ducktown district has produced continuously from 1850 to the present time, except during the Civil War from 1862–65 and in 1887 (Kinkel and others, 1968, p. 377–378). In 1971, the copper metal produced was 13,916 short tons valued at $14.5 million. Byproducts recovered during copper refining in 1971 included 192 troy ounces of gold valued at $7,920 and 131,000 troy ounces of silver valued at $203,000 (Babitzke and others, 1973, p. 683). In 1968, this district was the 20th largest zinc ore producer in the United States. Sulfuric acid is a major product here.

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TABLE 2.—*Geochemical analyses of stream sediments from Yellow Creek, Fontana-Hazel Creek area, and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*

[Sample localities shown on figure 7 and plates 2 and 3. Chemical analyses (AA, atomic absorption) were made by C. A. Curtis, A. L. Meier, A. J. Toevs, and J. G. Viets, U.S. Geological Survey. Semiquantitative spectrographic analyses (S) were made by R. N. Babcock, E. F. Cooley, K. J. Curry, and J. M. Motooka, U.S. Geological Survey. Letter Symbols: L, detected but below limit of determination; N, not detected; G, greater than. Values in parts per million (ppm) except where indicated as percent. X and Y coordinates are Universal Transverse Mercator grid. Elements looked for spectrographically but not found and their lower limits of determination: As (200), Au (10), Bi (10), Cd (20), Sb (100), and W (50)].

SAMPLE	X-COORD.	Y-COORD.	S-FE %	S-MG %	S-CA %	S-TI %	S-MN	S-AG	S-B	S-BA	S-BE	S-CO	S-CR	S-CU
STREAM SEDIMENT														
1001	248885	929505	5	.70	.07	.70	1000	.5 N	10	300	1	15	30	300
1007	249040	929180	5	.70	.15	.50	1000	.5 N	10	300	1	15	70	70
1008	249160	929235	7	.70	.07	.70	1500	.5 N	10	500	1	15	30	150
1011	249160	929235	5	.70	.10	.70	1500	.5 N	10	300	1	15	70	70
1012	249160	929235	5	.70	.15	.50	1500	.5 N	20	300	1	15	30	50
1015	249460	929480	3	.50	.10	.30	1000	.5 N	10	300	1	7	30	100
1019	249790	929565	2	.20	.07	.50	1000	.5 N	10 L	150	1	7	10	20
1022	249740	929410	3	.30	.20	1.00	3000	.5 N	10	300	1	7	15	50
1025	248790	928860	5	1.50	.15	.50	1000	.5 N	10 L	300	1	15	70	30
1037	230270	927380	3	.30	.10	1.00	1500	.5 N	20	700	1 L	7	15	7
1041	230660	927370	3	.30	.07	1.00	700	.5 N	15	700	1 L	7	20	7
1046	230870	927520	3	.20	.07	1.00	300	.5 N	20	500	1 L	5 L	20	7
1067	230370	925590	5	.70	.50	.70	5000	.5 N	100	700	1	20	30	10
1069	230020	925220	3	.70	.30	.70	2000	.5 N	70	700	1	10	30	7
1072	229670	924790	3	.70	.30	.70	2000	.5 N	70	700	1	15	50	15
1076	229000	924620	3	.50	.07	1.00	2000	.5	150	300	1	10	30	15
1084	229460	925480	5	.70	.05	.70	2000	.5 N	150	500	1	20	70	7
1089	229600	925880	3	.30	.20	1.00	2000	.5 N	100	500	1	10	30	7
1097	229470	926230	5	.50	.15	1.00 G	1500	.5 N	200	700	1	15	30	20
1150	229040	925600	5	.50	.10	1.00	1500	.5 N	150	300	1	20	70	20
1158	228310	925460	3	.70	.15	.50	500	.5 N	100	300	2	5	70	5
1161	228350	925770	5	.50	.15	.70	1500	.5 N	150	500	1	20	70	10
1182	229130	924660	3	.30	.15	.70	1500	.5 N	70	500	1	7	50	7
1211	230780	923250	5	.50	.15	.70	5000	.5 N	70	700	1	70	30	30
1215	772290	923440	5	.50	.07	1.00	1500	.5 N	150	500	1	7	30	20
1216	772320	923300	3	.50	.15	.70	1500	.5 N	100	500	1	10	20	15
1224	771740	922470	5	.70	.10	.50	1500	.5 N	50	500	1	15	30	15
1235	771750	923950	5	.70	.15	.30	1500	.5 N	70	500	2	15	50	15
1237	771430	923750	5	.50	.07	.50	300	.5 N	100	300	1	7	70	20
1242	771230	923510	5	.70	.15	.50	1500	.5 N	100	500	1	15	50	20
1273	228070	920800	3	.50	.15	.50	1500	.5 N	10	500	1	10	20	10
1274	227890	920620	5	.70	.15	.50	1500	.5 N	15	700	1	15	30	15
1276	227530	920260	5	.70	.10	.70	1500	.5 N	30	500	1	10	30	20
1277	772330	919920	3	.70	.15	.30	1500	.5 N	20	500	1	10	30	10
1278	772280	919830	3	.70	.15	.50	1500	.5 N	50	300	1	10	30	20
1279	772200	919840	3	.70	.15	.70	1500	.5 N	70	500	1	7	30	15
1303	768290	921000	3	.30	.10	.70	1000	.5 N	20	300	1	7	15	7
1304	768330	921140	3	.50	.10	.70	1500	.5 N	70	300	1	10	30	15
1305	768310	921280	5	.70	.15	.70	1500	.5 N	70	500	1	20	50	15
1319	231820	923750	3	.70	.07	.50	1500	.5 N	50	700	1	15	30	10

TABLE 2.—*Geochemical analyses of stream sediments from Yellow Creek, Fontana-Hazel Creek area, and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Cont.

SAMPLE	S-LA	S-MO	S-NB	S-NI	S-PB	S-SC	S-SN	S-SR	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	AA-CU-P	AA-PB-P	AA-ZN-P
STREAM SEDIMENT																
1001	50	5 N	20 L	20	30	15	10 N	100 N	70	20	700	300	.05 N	380	35	850
1007	30	5 N	20 L	30	30	15	10 N	100 L	70	30	200 L	200	.05 N	110	30	220
1008	20	5 N	20 L	20	30	15	10 N	100 L	70	30	300	300	.05 N	180	25	390
1011	20	5 N	20 L	30	15	15	10 N	100 L	50	20	200 N	300	.05 N	45	20	120
1012	20	5 N	20 L	15	30	15	10 N	100 L	50	30	200 N	1000	.05 N	25	15	90
1015	30	5 N	20 L	15	15	15	10 N	100 L	50	20	200 N	300	.05 N	170	25	200
1019	20	5 N	20 L	5	10	10	10 N	100 L	30	20	200 N	300	.05 N	25	20	100
1022	20 N	5 N	20 L	7	15	10	10 N	100	30	15	200 N	300	.05 N	15	15	60
1025	30	5 N	20 L	30	30	15	10 N	100 L	100	20	200 N	150	.05 N	25	20	65
1037	300	5 N	20	5	30	15	10 N	100 L	50	70	200 N	1000 G	.05 N	5	20	50
1041	500	5 N	20	5	30	15	10 N	100 L	50	70	200 N	1000 G	.05 N	5	20	30
1046	700	5 N	20	5	30	15	10 N	100 L	30	100	200 N	1000 G	.05 N	5	20	10
1067	70	5 L	20 L	30	70	15	10 N	100	70	50	200 N	300	.10 N	15	50	100
1069	70	5 N	20 L	10	30	15	10 N	100	70	70	200 N	1000	.25 N	10	30	60
1072	200	5 N	20 L	15	50	15	10 N	100	70	150	200 N	500	.25 N	10	20	60
1076	70	5 N	20	10	100	15	10 N	100 L	50	70	200 N	1000 G	.05 N	10	30	50
1084	70	5 N	20 L	20	150	15	100	100	100	50	200 N	200	.25 N	10	100	70
1089	70	5 N	20	10	30	15	10 N	100	70	70	200 N	1000 G	.25 N	10	20	90
1097	500	5 N	30	15	30	20	10 N	100 L	70	70	200 N	1000 G	.05 N	5	10	50
1150	70	5 N	20	15	30	15	10 N	100	100	50	200 N	500	.05 N	15	20	60
1158	30	5 N	20 L	10	30	15	10 N	150	70	30	200 N	300	.10 N	10	20	40
1161	50	5 L	20	20	30	15	10 N	100 L	100	100	200 N	500	.28	15	20	80
1182	50	5 N	20 L	7	30	15	10 N	100 L	50	100	200 N	1000	.10 N	10	30	60
1211	100	5 N	20 L	70	30	15	10 N	100	50	70	200 N	700	.05 N	10	30	120
1215	150	5 N	20	10	50	15	30	100 L	50	70	200 N	1000	.05 N	20	30	60
1216	70	5 N	20 L	10	30	10	10 N	100 L	50	100	200 N	1000	.25 N	40	40	80
1224	100	5 N	20 L	15	30	10	10 N	100	50	30	200 N	500	.10 N	10	20	90
1235	70	5 N	20 L	20	30	15	10 N	100	70	50	200 N	300	.05 N	10	30	100
1237	70	5 N	20 L	15	30	15	10 N	150	70	30	200 N	200	.10 N	10	20	40
1242	70	5 N	20 L	20	30	15	10 N	100 L	70	30	200 N	500	.10 N	30	20	60
1273	20	5 N	20 L	10	15	10	10 N	100 L	30	50	200 N	1000	.10 N	10	30	80
1274	50	5 N	20 L	10	50	15	10 N	100 L	50	50	200 N	500	.05 N	10	30	80
1276	30	5 N	20 L	10	20	15	10 N	100	50	50	200 N	700	.05 N	20	50	100
1277	30	5 N	20 L	10	30	10	10 N	100 L	50	30	200 N	300	.05 N	10	20	70
1278	30	5 N	20 L	7	20	7	10 N	100 L	50	30	200 N	700	.05 N	10	20	70
1279	20	5 N	20 L	7	20	7	10 N	100 L	50	30	200 N	700	.05 N	10	20	80
1303	50	5 N	20 L	5	15	10	10 N	100	30	30	200 N	1000	.05 N	5	35	50
1304	70	5 N	20 L	10	20	15	10 N	100	50	70	200 N	1000 G	.05 N	15	40	95
1305	150	5 L	20	15	30	20	10 N	100	100	70	200 N	500	.05 N	20	20	100
1319	70	5 L	20 L	15	20	15	10 N	100 L	70	30	200 N	500	.05 N	15	45	95

TABLE 2.—*Geochemical analyses of stream sediments from Yellow Creek, Fontana-Hazel Creek area, and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Cont.

SAMPLE	X-COORD.	Y-COORD.	S-FE %	S-MG %	S-CA %	S-TI %	S-MN	S-AG	S-B	S-BA	S-BE	S-CO	S-CR	S-CU
1320	231830	923810	5	.70	.15	.50	2000	.5 N	30	700	1	30	50	20
1321	231470	923140	3	.50	.15	.70	1000	.5 N	30	700	1	7	20	15
1322	231650	923190	3	.70	.15	.50	1500	.5 N	10 L	500	1	10	20	7
1341	229880	917240	5	.70	.20	.70	1000	.5 N	50	500	1	10	30	10
1458	771020	917670	3	.30	.10	.70	700	.5 N	10 L	300	1 L	5	15	30
1459	770860	918680	3	.50	.15	.70	1500	.5 N	50	300	1	7	20	15
2001	254200	932640	3	.70	.10	.70	1500	.5 N	10 L	300	1 L	7	20	70
2005	254190	932710	5	.70	.10	.50	1500	.5 N	10 L	500	1	10	30	50
2008	254170	932780	5	.70	.07	.50	1500	.5 N	10 L	500	1	10	30	70
2022	254235	932565	3	.70	.15	.50	1000	.5 N	10 L	300	1	7	20	150
2025	254250	932415	5	1.50	.07	.30	1500	.5	10 L	300	1	15	30	2000
2028	254260	932340	7	1.00	.20	.30	1000	1.5	10 L	300	1	15	50	3000
2029	254260	932340	3	.70	.15	.50	700	.5 N	50	300	2	10	30	70
2032	254340	932170	3	.50	.07	.50	500	.5 N	30	300	1	10	30	30
2035	254300	932190	10	1.50	.30	.30	1000	1.5	10 L	150	1	10	15	5000
2036	254310	931975	7	1.50	.30	.30	1500	1.5	10 L	150	1	15	20	5000
2039	254305	931930	3	.50	.15	.70	1500	.5 N	10 L	300	1	15	15	70
2043	254910	932040	5	.70	.15	.30	700	.5 N	10 L	500	1	15	30	20
2046	254950	932065	3	.50	.15	.50	1000	.5 N	20	300	1	7	15	10
2049	255100	931780	3	.50	.10	.70	1000	.5 N	15	300	1	7	15	50
2050	253910	932000	1	.30	.10	.70	1000	.5 N	10 L	300	1	5 L	15	20
2051	253900	931920	3	.30	.10	1.00	1500	.5 N	20	300	1	7	15	30
2052	253630	931850	3	.70	.10	.70	1000	.5 N	30	300	1	7	30	20
2053	253560	931920	1	.15	.05	.30	500	.5 N	10 L	150	1	5	15	10
2054	253440	931880	3	.30	.10	.70	1500	.5 N	10	300	1	10	20	20
2062	255540	931560	3	.70	.15	.70	1000	.5 N	10 L	300	1	7	15	700
2065	255610	931560	3	.30	.10	.70	700	.5 N	20	300	1 L	5 L	15	30
2071	248920	929620	1	.07	.20	.15	1000	.5 N	10 L	150	1	7	20	7
2080	248960	929860	5	.30	.07	.50	1500	.5 N	30	300	2	15	30	10
2084	248700	929755	5	.30	.07	.50	2000	.5 N	30	300	3	15	50	30
2087	248470	929535	3	.30	.07	.30	3000	.5 N	20	300	2	20	30	20
2092	248430	929235	7	.70	.15	.70	1500	.5 N	15	700	2	15	70	30
2100	234165	929880	2	.30	.07	.50	1500	.5 N	50	500	1	5	10	50
2101	234560	929820	2	.30	.07	.50	1000	.5 N	30	700	1 L	5	10	30
2102	235260	929525	3	.50	.10	.50	700	.5 N	30	700	1 L	5	15	30
2103	235200	929585	3	.50	.07	.70	700	.5 N	30	700	1	7	15	50
2104	235025	929305	3	.50	.05	.50	700	.5 N	70	500	1	7	15	10
2105	234840	928910	1	.30	.05	.70	700	.5 N	50	300	1 L	5 L	10	100
2107	234690	927840	5	.50	.10	.50	5000 G	.5 N	30	700	1	20	30	30
2111	233900	926830	3	.30	.10	.70	1000	.5 N	30	700	1	7	20	15
2118	230070	927115	3	.30	.20	1.00	1500	.5 N	100	500	1	10	50	15

TABLE 2.—*Geochemical analyses of stream sediments from Yellow Creek, Fontana-Hazel Creek area, and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Cont.

SAMPLE	S-LA	S-MO	S-NB	S-NI	S-PB	S-SC	S-SN	S-SR	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	AA-CU-P	AA-PB-P	AA-ZN-P
1320	70	5 L	20	15	30	15	10 N	100 L	70	70	200 N	500	.05 N	15	30	80
1321	20 L	5 N	20 L	5	15	15	10 N	100 L	50	50	200 N	1000	.05 N	5	25	55
1322	30	5 N	20 L	10	15	10	10 N	100	70	30	200 N	300	.05 N	5	25	55
1341	20	5 N	20 L	10	15	15	10 N	100	70	30	200 N	1000	.05 N	10	45	100
1458	20 L	5 N	20 L	5	20	7	10 N	150	30	30	200 N	700	.05 N	15	20	40
1459	20	5 N	20 L	7	20	7	10 N	150	30	30	200 N	700	.05 N	10	20	70
2001	20 L	5 N	20 L	7	20	10	10 N	100 L	50	50	200 N	1000 G	.05 N	40	20	90
2005	20 L	5 N	20 L	10	30	10	10 N	100 L	70	30	200 N	1000	.05 N	50	20	100
2008	20 N	5 N	20 L	7	20	15	10 N	100 L	70	50	200 N	1000 G	.05 N	60	20	100
2022	20	5 N	20 L	7	100	15	10 N	100 L	50	30	200 N	1000	.05 N	130	40	120
2025	50	5 N	20 L	7	300	10	10 N	100 L	50	30	300	300	.05 N	28000	350	600
2028	70	5 N	20 L	15	500	10	10 N	100 L	70	30	5000	300	.05 N	43000	400	75000
2029	20	5 N	20 L	15	30	10	10 N	100 L	70	30	200 N	300	.05 N	40	25	110
2032	50	5 N	20 L	15	15	10	10 N	100 L	50	30	200 N	300	.05 N	20	15	80
2035	30	5 N	20 L	10	300	7	10 N	100 L	30	20	5000	200	.05	5000	370	6000
2036	70	5 N	20 L	10	300	7	10 N	100 L	30	30	3000	300	.15	5500	370	5000
2039	20	5 N	20 L	7	20	10	10 N	100 L	50	20	200 N	1000	.05 N	50	20	95
2043	50	5 N	20 L	20	20	10	10 N	100 L	70	20	200 N	200	.05 N	40	25	120
2046	20 L	5 N	20 L	7	10	7	10 N	100 L	30	20	200 N	1000	.05 L	15	15	70
2049	20 L	5 N	20 L	7	15	7	10 N	100 L	50	30	200 N	700	.05 L	15	15	65
2050	20	5 N	20 L	7	15	10	10 N	100 L	30	30	200 N	1000	.05 N	20	20	80
2051	20 L	5 N	20 L	7	20	15	10 N	100 L	30	30	200 N	1000 G	.05 N	15	15	60
2052	20 L	5 N	20 L	10	20	15	10 N	100 L	50	20	200 N	700	.05 N	20	15	80
2053	30	5 N	20 L	7	10	7	10 N	100 L	30	20	200 N	200	.05 N	30	20	130
2054	20 L	5 N	20 L	10	10	10	10 N	100 L	50	15	200 N	700	.05 N	15	15	70
2062	50	5 N	20 L	10	70	10	10 N	100 L	50	30	500	700	.05 N	900	60	830
2065	20 N	5 N	20 L	7	10	10	10 N	100 L	30	30	200 N	1000	.05 N	20	10	60
2071	50	5 N	20 L	7	15	7	10 N	100 L	30	30	200 N	150	.05 N	25	40	60
2080	30	5 N	20 L	15	15	15	10 N	100 L	70	15	200 N	100	.05 N	20	30	90
2084	50	5 N	20 L	15	20	15	10 N	100 L	70	20	200 N	150	.05 N	25	25	90
2087	30	5 N	20 L	15	30	10	10 N	100 L	70	20	200 N	70	.05 N	30	35	120
2092	50	5 N	20 L	20	30	15	10 N	100 L	70	30	200 N	150	.05 N	20	20	90
2100	20	5 N	20 L	7	15	10	10 N	100 L	30	30	200 N	1000 G	.05 N	5	15	40
2101	20 L	5 N	20 L	7	15	10	10 N	100 L	30	20	200 N	1000 G	.05 N	5	15	35
2102	20	5 N	20 L	7	30	10	10 N	100 L	30	70	200 N	1000	.05 N	10	20	50
2103	50	5 N	20 L	7	30	10	10 N	100 L	30	50	200 N	1000 G	.05 N	5	20	50
2104	30	5 N	20 L	7	30	10	10 N	100 L	50	30	200 N	1000	.05 N	10	30	60
2105	30	5 N	20 L	5 L	15	10	10 N	100 L	30	50	200 N	1000 G	.05 N	10	15	35
2107	50	5 N	20 L	10	30	10	10 N	100 L	50	50	200 N	1000	.05 N	15	35	80
2111	150	5 N	20 L	7	15	10	10 N	100 L	50	50	200 N	1000	.05 N	10	20	55
2118	150	5 N	20	7	30	15	10 N	100 L	50	70	200 N	1000 G	.05 N	10	20	60

TABLE 2.—*Geochemical analyses of stream sediments from Yellow Creek, Fontana-Hazel Creek area, and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Cont.

SAMPLE	X-COORD.	Y-COORD.	S-FE %	S-MG %	S-CA %	S-TI %	S-MN	S-AG	S-B	S-BA	S-BE	S-CO	S-CR	S-CU
2121	230135	926455	3	.50	.10	.70	3000	.5 N	150	300	1	20	70	15
2124	230235	926495	5	1.00	.15	.70	2000	.5 N	150	700	1	15	70	20
2130	230570	926380	5	.70	.15	1.00	3000	.5 N	200	500	1	20	70	30
2131	231725	926100	5	1.00	.30	1.00	3000	.5 N	150	1000	1	15	70	20
2134	771880	927740	5	.70	.20	.70	3000	.5 N	100	500	2	30	100	20
2141	227820	927490	7	.70	.15	.50	5000 G	.5 N	70	700	1	70	70	50
2142	228225	927175	7	.70	.15	1.00	5000	.5 N	150	700	1	50	70	70
2147	231745	926060	3	.50	.15	.70	1500	.5 N	50	700	1	7	30	7
2152	229070	926620	5	.70	.30	1.00	3000	.5 N	150	500	2	20	70	30
2172	772170	926105	5	.70	.15	.70	2000	.5 N	150	500	2	30	70	20
2175	228145	925485	7	.70	.15	.50	1500	.5 N	150	700	2	30	70	30
2190	772220	925375	5	.70	.10	.50	1500	.5 N	70	500	1	20	70	15
2193	772195	925375	5	.50	.15	.50	2000	.5 N	100	300	1	50	70	15
2201	227955	925235	5	.70	.07	.50	1500	.5 N	70	300	2	15	70	15
2207	227765	924205	5	.70	.07	.50	1500	.5 N	100	300	1	20	70	10
2211	227820	924620	5	.50	.10	.70	1500	.5 N	150	500	1	20	50	20
2227	228055	922040	3	.50	.15	.70	1500	.5 N	50	700	1	10	30	10
2229	772190	921550	3	.50	.10	.70	1500	.5 N	70	500	1	15	30	20
2235	227995	921515	3	.30	.15	.70	1500	.5 N	30	500	1	7	15	10
2238	772310	921080	3	.50	.15	.70	1500	.5 N	30	700	1	15	20	15
2246	228965	917210	3	.30	.15	.50	700	.5 N	30	300	1	7	20	5
2247	227755	916955	7	1.00	.15	.70	700	.5 N	30	500	1	10	50	20
2248	228240	915300	5	.70	.15	.50	1000	.5 N	50	500	1	10	30	30
2249	771450	916040	5	.70	.15	.70	1500	.5 N	50	300	1	15	50	20
2250	772200	916520	3	.30	.07	.50	700	.5 N	10	300	1	7	30	7
2251	229470	915540	5	.70	.20	.50	700	.5 N	30	500	1	7	50	30
2252	230000	915390	3	.70	.30	.50	700	.5 N	30	300	1	7	30	20
2253	231150	914870	3	.70	.30	.70	700	.5 N	50	300	1	7	30	20
2254	231520	914840	5	.70	.20	.50	1500	.5 N	70	500	1	10	30	10
2255	232760	914760	3	.50	.15	.50	700	.5 N	50	500	1	10	30	5
2256	234015	914835	3	.70	.20	.30	700	.5 N	30	500	1	7	30	7
2257	233080	914540	3	.70	.15	.50	700	.5 N	70	300	1	7	20	30
2258	234280	915075	3	.70	.07	.30	300	.5 N	30	700	1 L	7	30	20
2273	234510	917230	3	.70	.15	.50	1000	.5 N	50	300	1	7	20	10
2274	231730	919885	3	.70	.10	.70	1000	.5 N	20	300	1	10	30	15
2275	231730	919830	3	.70	.15	.70	1500	.5 N	50	300	1	7	30	7
2277	231775	919830	3	.70	.15	.70	1500	.5 N	30	300	1	10	30	10
2278	231825	919930	3	.70	.07	1.00	1500	.5 N	15	300	1 L	7	30	10
2279	232280	920160	3	.50	.15	.70	1500	.5 N	10	300	1	10	30	10
2280	232490	920200	3	.30	.10	1.00	1500	.5 N	10	300	1 L	10	20	7
2281	232990	920170	3	.70	.15	.70	1500	.5 N	70	300	1	10	30	15

TABLE 2.—*Geochemical analyses of stream sediments from Yellow Creek, Fontana-Hazel Creek area, and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Cont.

SAMPLE	S-LA	S-MO	S-NB	S-NI	S-PB	S-SC	S-SN	S-SR	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	AA-CU-P	AA-PB-P	AA-ZN-P
2121	70	5 N	20	20	30	15	10 N	100 L	70	150	200 N	1000	.10 N	15	20	100
2124	70	5 L	20 L	20	30	15	10 N	100 L	100	30	200 N	500	.05 N	10	20	80
2130	150	5 L	20	30	50	15	10 N	100 L	100	100	200 N	1000	.10 N	10	20	80
2131	150	5 L	20	20	70	20	10 N	100 L	100	70	200 N	1000 G	.05 N	10	20	60
2134	70	5 L	20 L	30	50	15	10 N	100 L	100	70	200 L	300	.05 N	15	30	80
2141	300	5 L	20 L	70	100	15	10 N	100 L	100	70	200 N	300	.10 N	20	40	160
2142	100	5 L	20	30	50	15	10 N	100 L	70	70	200 N	700	.05 N	10	20	110
2147	30	5 N	20	7	20	15	10 N	100 L	50	70	200 N	1000	.05 N	5	20	40
2152	70	5 N	20	30	30	15	10 N	100 L	100	70	200 N	500	.10 N	10	20	80
2172	70	5 N	20 L	30	30	15	10 N	150	100	70	200 N	500	.10 N	15	30	70
2175	70	5 L	20 L	30	50	20	10 N	100 L	100	50	200 N	300	.05 N	15	20	70
2190	50	5 N	20 L	20	30	15	10 N	100 L	70	150	200 N	700	.05 N	20	20	80
2193	70	5 N	20 L	30	30	15	10 N	100 L	50	50	200 N	500	.05 N	20	50	80
2201	50	5 N	20 L	15	30	15	10 N	100	50	70	200 N	300	.05 N	10	20	60
2207	30	5 N	20 L	20	20	15	10 N	100 L	70	30	200 N	300	.05 N	10	20	80
2211	30	5 N	20 L	15	30	15	10 N	100 L	70	50	200 N	700	.05 N	10	20	80
2227	30	5 N	20 L	10	30	15	10 N	100 L	50	70	200 N	700	.05 N	10	20	80
2229	30	5 N	20 L	10	30	15	10 N	100 L	50	100	200 N	700	.05 N	10	20	70
2235	20	5 N	20 L	7	15	7	10 N	100 L	30	70	200 N	1000 G	.05 N	10	20	70
2238	30	5 N	20 L	10	30	7	10 N	100 L	50	50	200 N	1000	.05 N	10	30	100
2246	20 L	5 N	20 L	5	15	10	10 N	100	50	100	200 N	700	.05 N	15	20	80
2247	30	5 L	20 L	15	30	15	10 N	100	100	30	200 N	300	.05 N	15	35	80
2248	20	5 L	20 L	10	20	15	10 N	100	70	30	200 N	500	.05 N	10	30	70
2249	30	5 L	20 L	10	20	15	10 N	100	70	30	200 N	500	.05 N	15	40	80
2250	20 L	5 N	20 L	7	15	10	10 N	100 L	30	30	200 N	1000	.05 N	5	20	55
2251	20	5 N	20 L	10	20	15	10 N	100	70	30	200 N	700	.05 N	10	30	75
2252	20	5 N	20 L	7	15	10	10 N	100	50	30	200 N	1000	.05 N	5	20	60
2253	30	5 N	20 L	10	20	10	10 N	100 L	70	30	200 N	300	.05 N	10	20	75
2254	30	5 L	20 L	10	15	15	10 N	100 L	70	50	200 N	1000	.05 N	10	40	85
2255	30	5 N	20 L	7	10	10	10 N	100 L	70	30	200 N	1000	.05 N	10	25	65
2256	20	5 N	20 L	10	15	10	10 N	100 L	70	30	200 N	700	.05 N	10	30	80
2257	30	5 N	20 L	7	15	15	10 N	100 L	50	30	200 N	700	.05 N	10	25	80
2258	20	5 N	20 L	7	10	10	10 N	100 L	70	50	200 N	700	.05 N	10	20	45
2273	20	5 N	20 L	10	15	10	10 N	100 L	70	30	200 N	1000	.05 N	10	40	65
2274	20	5 N	20 L	7	20	10	10 N	100	30	30	200 N	500	.05 N	10	35	60
2275	20	5 N	20 L	7	20	15	10 N	100	50	30	200 N	1000	.05 N	5	30	55
2277	20	5 N	20 L	7	15	15	10 N	100	50	30	200 N	700	.05 N	10	40	65
2278	30	5 N	20 L	7	15	15	10 N	100	50	100	200 N	700	.05 N	10	35	60
2279	20 L	5 N	20 L	7	15	15	10 N	100	50	50	200 N	1000	.05 N	5	30	40
2280	20 L	5 N	20 L	7	20	15	10 N	100	30	70	200 N	1000	.05 N	5	35	35
2281	20	5 N	20 L	7	20	15	10 N	100	50	70	200 N	1000 G	.05 N	10	35	65

TABLE 2.—*Geochemical analyses of stream sediments from Yellow Creek, Fontana-Hazel Creek area, and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Cont.

SAMPLE	X-COORD.	Y-COORD.	S-FE %	S-MG %	S-CA %	S-TI %	S-MN	S-AG	S-B	S-BA	S-BE	S-CO	S-CR	S-CU
2282	233440	920630	3	,70	,10	,70	1500	,5 N	15	300	1	7	20	7
2283	233440	920630	3	,50	,15	,50	1500	,5 N	30	300	1	7	15	5
2284	233685	920650	3	,50	,10	,70	1000	,5 N	20	300	1 L	7	20	15
2285	233660	920700	3	,30	,07	,50	1500	,5 N	15	700	1 L	7	20	7
2286	233740	921010	3	,70	,15	,70	1500	,5 N	30	500	1	10	30	15
2287	234120	920995	3	,50	,07	,50	1000	,5 N	10 L	500	1 L	7	15	15
2288	234595	922090	2	,30	,07	,50	1500	,5 N	10	700	1 L	7	20	20
2289	235090	923245	3	,30	,07	,70	1500	,5 N	10 L	700	1 L	7	30	15
2290	233260	916860	3	,50	,15	,70	1500	,5 N	70	300	1	7	30	10
2291	233080	917040	3	,70	,15	1,00	1500	,5 N	70	300	1	10	30	30
2292	232800	917095	3	,50	,15	,70	1000	,5 N	70	300	1	7	30	5
2295	232540	917160	3	,50	,15	,70	1500	,5 N	70	300	1	7	20	7
2296	231810	917450	3	,50	,15	,50	700	,5 N	50	300	1	7	15	7
2297	231790	917480	3	,50	,15	,70	1000	,5 N	50	300	1	7	15	15
2300	230660	918035	3	,30	,15	1,00	1500	,5 N	70	300	1 L	5 L	15	15
2301	230450	918160	3	,30	,15	,50	1000	,5 N	50	300	1	7	20	7
2302	230305	918270	3	,50	,15	,50	1000	,5 N	20	300	1	5	15	7
2303	229855	918565	3	,50	,20	,70	1500	,5 N	20	300	1	7	30	7
2304	229835	918525	3	,50	,15	,70	1000	,5 N	50	300	1	7	20	5
2305	229840	918430	3	,70	,20	,50	1500	,5 N	50	300	1	7	30	7
2327	229205	918880	3	,50	,20	,70	1500	,5 N	20	300	1	7	20	10
2329	230300	918125	3	,50	,20	,50	1000	,5 N	30	300	1	7	30	10
2331	230830	917865	3	,50	,20	,50	1500	,5 N	70	300	1	7	30	7
2332	231100	917680	3	,30	,15	,50	1000	,5 N	30	300	1	7	15	7
2333	231790	917400	2	,30	,15	,30	700	,5 N	30	300	1	5	15	7
2355	771490	918615	3	,50	,15	,70	1500	,5 N	70	200	1	15	20	15
2356	771040	918385	3	,50	,20	,70	1500	,5 N	50	300	1	10	30	15
2368	235800	918040	3	,70	,15	,70	1500	,5 N	70	300	1	15	30	15
2369	236940	918680	3	1,00	,15	,70	1000	,5 N	70	300	1	10	30	15
3030	235015	928445	5	,70	,07	,70	700	,5 N	50	700	1	15	30	20
3031	234485	927265	3	,30	,10	,70	1500	,5 N	30	500	1	7	15	7
3036	230340	927110	10	,70	,30	1,00 G	5000	,5 N	200	700	1	15	70	50
3037	230830	927270	7	,70	,50	1,00 G	3000	,5 N	150	700	1	15	70	30
3041	231450	927150	3	,30	,15	1,00 G	700	,5 N	150	700	1	5	30	15
3042	231470	927070	3	,50	,20	1,00 G	1500	,5 N	200	700	1	7	50	50
3046	771710	927870	10	,70	,20	,70	3000	,5 N	150	700	2	30	70	30
3048	772170	927560	5	1,00	,15	1,00	2000	,5 N	200	700	1	20	70	30
3050	228170	927350	10	1,00	,20	,70	5000 G	,5 N	100	700	2	70	100	50
3051	228330	927250	10	,70	,30	,70	5000 G	,5 N	100	700	2	70	100	70
3052	228820	926880	10	,70	,20	,70	5000	,5 N	100	700	3	50	70	20
3053	228990	926730	5	,50	,30	1,00	3000	,5 N	150	700	2	30	70	30

Table 2.—*Geochemical analyses of stream sediments from Yellow Creek, Fontana-Hazel Creek area, and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Cont.

SAMPLE	S-LA	S-MO	S-NB	S-NI	S-PB	S-SC	S-SN	S-SR	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	AA-CU-P	AA-PB-P	AA-ZN-P
2282	20	5 N	20 L	5	20	10	10 N	100 L	50	30	200 N	700	.05 N	5	30	60
2283	20 L	5 N	20 L	5	15	7	10 N	100	30	20	200 N	500	.05 N	5	25	55
2284	20 L	5 N	20 L	5	20	10	10 N	100	30	30	200 N	1000	.05 N	10	30	60
2285	30	5 N	20 L	7	30	10	10 N	100	30	50	200 N	1000 G	.05 N	5	40	40
2286	20 L	5 N	20 L	5	20	15	10 N	100	50	30	200 N	1000	.05 N	10	30	60
2287	50	5 N	20 L	5	15	7	10 N	100 L	30	30	200 N	1000	.05 N	30	40	70
2288	20	5 N	20 L	5	20	7	10 N	100 L	30	50	200 N	500	.05 N	35	35	80
2289	20	5 N	20	7	30	10	10 N	100 L	30	50	200 N	1000 G	.05 N	10	45	50
2290	20 L	5 N	20 L	15	10 L	7	10 N	100 L	30	30	200 N	1000	.05 N	10	30	60
2291	30	5 N	30	7	15	15	10 N	100 L	70	30	200 N	500	.05 N	15	25	60
2292	20 L	5 N	20 L	7	10 L	10	10 N	100 L	50	30	200 N	700	.05 N	10	20	60
2295	20 L	5 N	20 L	7	15	7	10 N	100 L	50	30	200 N	700	.05 N	10	30	65
2296	20 L	5 N	20 L	7	15	7	10 N	100 L	50	30	200 N	700	.05 N	5	20	50
2297	20 N	5 N	20 L	7	10	7	10 N	100	30	20	200 N	1000	.05 N	5	20	55
2300	20 N	5 N	20 L	5 L	10	15	10 N	100 L	30	30	200 N	1000 G	.05 N	5	20	40
2301	20 L	5 N	20 L	5	10	10	10 N	100	30	30	200 N	700	.05 N	5	30	50
2302	20 N	5 N	20 L	5	15	7	10 N	100	30	15	200 N	500	.05 N	5	30	50
2303	20 L	5 N	20 L	7	15	10	10 N	100	50	30	200 N	700	.05 N	10	40	80
2304	20 N	5 N	20 L	7	10	7	10 N	100	30	20	200 N	700	.05 N	5	30	70
2305	20 L	5 N	20 L	7	15	7	10 N	100	30	20	200 N	700	.05 N	10	35	80
2327	20 L	5 N	20 L	10	20	10	10 N	100	30	20	200 N	1000	.05 N	10	40	90
2329	20 N	5 N	20 L	7	15	7	10 N	100	50	20	200 N	700	.05 N	5	25	65
2331	20 L	5 N	20 L	5	15	7	10 N	100	50	30	200 N	1000 G	.05 N	10	30	70
2332	20 N	5 N	20 L	5	10	7	10 N	100	30	20	200 N	1000 G	.05 N	5	20	50
2333	20 N	5 N	20 L	10	10	7	10 N	100 L	30	30	200 N	1000 G	.05 N	5	20	50
2355	30	5 N	20 L	5	20	7	10 N	150	30	30	200 N	500	.05 L	25	180	100
2356	30	5 N	20 L	7	20	10	10 N	150	30	30	200 N	700	.05 L	10	20	75
2368	50	5 N	20 L	10	15	10	10 N	100	50	50	200 N	1000	4.00	15	20	95
2369	30	5 N	20 L	15	15	10	10 N	100 L	50	50	200 N	700	.05 N	15	20	95
3030	50	5 N	20 L	15	30	15	10 N	100 L	70	70	200 N	1000	.05 N	15	45	100
3031	20	5 N	20 L	7	15	10	10 N	100 L	50	70	200 N	1000 G	.05 N	10	20	50
3036	70	5 L	20	20	70	20	10 N	100 L	100	150	200 N	1000 G	.10 N	5	20	100
3037	50	5 N	20	20	50	20	10 N	100 L	100	100	200 N	1000 G	.05 N	5	20	40
3041	150	5 N	20	10	20	20	10 N	100 L	70	100	200 N	1000 G	.05 N	5	10	20
3042	70	5 N	20	10	70	15	10 N	100 L	70	100	200 N	1000 G	.05 N	5	30	20
3046	150	5 L	20 L	30	70	15	10 N	100 L	70	100	200 N	700	.10 N	20	20	100
3048	300	5 N	20	15	30	15	10 N	100 L	100	150	200 N	1000 G	.05 N	5	10	30
3050	300	5 L	20	70	100	20	10 N	100 L	150	100	200 N	300	.05 N	30	50	120
3051	150	5 L	20	70	150	20	10 N	100 L	150	70	200 N	300	.10 N	25	40	90
3052	150	5 L	20	30	70	20	10 N	100 L	150	70	200 N	500	.05 N	15	30	100
3053	150	5 N	20	30	70	15	10 N	100 L	100	70	200 N	1000	.05 N	10	20	80

TABLE 2.—*Geochemical analyses of stream sediments from Yellow Creek, Fontana-Hazel Creek area, and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Cont.

SAMPLE	X-COORD.	Y-COORD.	S-FE %	S-MG %	S-CA %	S-TI %	S-MN	S-AG	S-B	S-BA	S-BE	S-CO	S-CR	S-CU
3054	229390	926710	5	.70	.15	1.00 G	1500	.5 N	300	700	1	10	70	50
3058	229720	927790	7	1.50	.15	1.00 G	2000	.5 N	70	1500	1	15	70	15
3065	228600	926800	10	.70	.15	1.00	2000	.5 N	150	1000	2	20	100	30
3066	228450	926890	7	.70	.30	1.00 G	2000	.5 N	150	700	1	15	70	30
3069	771160	928020	5	.70	.20	1.00	5000	.5 N	200	700	3	50	70	30
3070	771170	928010	5	1.00	.20	1.00	2000	.5 N	200	700	2	30	100	20
3077	770960	928060	5	1.50	.15	1.00 G	2000	.5 N	150	700	1	30	70	30
3078	770980	928090	7	1.00	.15	.70	2000	.5 N	150	1000	3	15	100	30
3088	228310	923020	5	.70	.15	1.00	3000	.5 N	70	1500	2	15	70	15
3089	228190	922870	3	.70	.20	1.00	3000	.5 N	30	1500	1	15	70	20
3091	227950	922490	7	.70	.07	.50	3000	.5 N	30	700	1	20	30	30
3092	228110	922240	3	.30	.07	.70	1500	.5 N	50	300	1	10	15	7
3106	228210	923430	3	.70	.10	.70	2000	.5 N	30	700	1	7	30	15
3107	228820	923300	3	.20	.07	1.00	1500	.5 N	50	300	1	5 N	15	7
3108	229680	923250	3	.70	.10	.70	1500	.5 N	30	700	1	15	30	10
3109	229660	923230	3	.70	.07	.70	2000	.5 N	30	700	1	7	30	15
3111	229550	923290	2	.30	.10	.50	1000	.5 N	30	500	1	7	15	7
3112	229180	923310	3	.70	.07	.70	2000	.5 N	30	500	1	7	30	15
3115	228810	923270	3	.30	.10	.70	1500	.5 N	50	500	1	7	15	7
3116	229190	923220	3	.30	.07	.70	1000	.5 N	50	700	1	5	15	10
3117	228150	922170	3	.50	.10	.70	1000	.5 N	10	300	1	7	15	10
3118	228420	921790	3	.70	.07	1.00	1500	.5 N	10	700	1	7	30	7
3119	228610	921700	3	.50	.10	.70	1000	.5 N	20	300	1	7	15	7
3124	229050	920690	5	.70	.10	.70	1500	.5 N	15	500	1	15	30	10
3125	229100	920690	5	.70	.10	.70	2000	.5 N	10	500	1	15	30	10
3126	228880	921350	5	.70	.30	.70	1500	.5 N	30	700	1	15	30	30
3127	228220	922070	5	.50	.15	.70	2000	.5 N	50	500	1	15	30	15
3128	229200	921610	3	.50	.15	.70	1000	.5 N	30	500	1	7	15	7
3131	229620	921330	3	.50	.20	.70	1500	.5 N	30	500	1	15	20	20
3132	229630	921310	3	.50	.10	.70	1500	.5 N	20	500	1	15	15	10
3143	766940	924600	3	.30	.15	.50	1000	.5 N	100	300	1	10	30	5
3144	767820	925600	3	.30	.05	.50	500	.5 N	100	300	1 L	5	30	10
3145	768810	925900	3	.50	.07	.50	1000	.5 N	100	300	1	15	70	7
3146	769130	926460	5	.50	.15	.30	1500	.5 N	100	300	1	50	70	20
3147	769130	926500	3	.30	.15	.50	1000	.5 N	100	300	1	15	50	10
3148	233680	916560	3	.50	.20	.30	1000	.5 N	50	300	1	7	30	7
3152	233000	916760	3	.50	.30	.30	1500	.5 N	70	300	1	7	20	5
3153	232290	917040	3	.50	.20	.50	1000	.5 N	50	300	1	7	20	7
3154	232200	917100	3	.30	.20	.30	1500	.5 N	50	300	1	7	15	5
3178	232640	924430	2	.30	.15	.30	1000	.5 N	50	500	1	7	15	5
515131	238550	923290	1	.20	.05 L	1.00	500	.5 N	10 N	300	1 L	5 L	10 L	5 N

TABLE 2.—*Geochemical analyses of stream sediments from Yellow Creek, Fontana-Hazel Creek area, and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Cont.

SAMPLE	S-LA	S-MO	S-NB	S-NI	S-PB	S-SC	S-SN	S-SR	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	AA-CU-P	AA-PB-P	AA-ZN-P
3054	20	5 N	30	10	20	20	10 N	100 L	100	200	200 N	1000 G	.05 N	5	10	40
3058	500	5 N	30	10	100	20	10 N	100 L	100	100	200 N	1000 G	.05 N	5	20	60
3065	70	5 L	20	30	70	30	10 N	100 L	150	70	200 N	700	.05 N	15	20	80
3066	100	5 N	20	30	70	20	10 N	100 L	100	150	200 N	1000 G	.10 N	10	20	60
3069	150	5 L	20	30	70	20	10 N	100 L	150	100	200 N	1000	.10 N	15	20	110
3070	30	5 L	20 L	30	50	15	10 N	100 L	150	50	200 N	1000 G	.10 N	10	20	60
3077	300	5 L	20	20	70	30	10 N	100 L	150	100	200 N	1000 G	.05 N	10	20	70
3078	150	5	20	30	70	20	10 N	100 L	150	70	200 N	500	.05 N	10	20	40
3088	30	5 L	20	15	20	20	10 N	100 L	100	100	200 N	1000	.05 N	5	10	70
3089	100	5 N	20	15	50	15	10 N	100 L	100	70	200 N	1000	.16	10	20	50
3091	100	5 L	20 L	30	50	15	10 N	100	70	50	200 N	700	.05 N	20	30	90
3092	30	5 N	20 L	7	15	10	10 N	100 L	30	30	200 N	700	.05 N	10	20	70
3106	70	5 N	20 L	7	30	10	10 N	100 L	50	30	200 N	700	.05 N	10	20	50
3107	20 L	5 N	20 L	5	10 L	10	10 N	100 L	30	50	200 N	1000 G	.05 N	10	20	50
3108	50	5 N	20 L	15	30	15	10 N	100 L	70	30	200 N	700	.05 N	10	20	50
3109	20	5 N	20 L	7	30	15	10 N	100 L	50	30	200 N	700	.05 N	10	20	60
3111	20 L	5 N	20 L	7	15	7	10 N	100 L	30	20	200 N	1000	.05 N	10	20	50
3112	20 L	5 N	20 L	10	20	10	10 N	100 L	50	50	200 N	500	.05 N	10	20	70
3115	20 L	5 N	20 L	7	15	10	10 N	100 L	30	70	200 N	1000	.05 N	10	20	60
3116	20	5 N	20 L	5	15	10	10 N	100 L	50	30	200 N	1000 G	.05 N	10	20	50
3117	30	5 N	20 L	7	30	10	10 N	100 L	30	30	200 N	700	.05 N	10	20	70
3118	30	5 N	20 L	7	15	10	10 N	100 L	50	30	200 N	1000	.05 N	10	20	70
3119	20	5 N	20 L	7	20	7	10 N	100 L	30	30	200 N	700	.05 N	10	20	80
3124	50	5 N	20 L	10	50	10	10 N	100 L	70	30	200 N	300	.05 N	10	20	60
3125	30	5 N	20 L	7	30	10	10 N	100 L	50	30	200 N	300	.05 N	10	20	80
3126	30	5 N	20 L	10	30	10	10 N	100 L	70	30	200 N	1000	.05 N	10	20	60
3127	30	5 N	20 L	10	30	10	10 N	100 L	50	30	200 N	700	.05 N	10	20	60
3128	20	5 N	20 L	7	20	10	10 N	100 L	50	30	200 N	1000	.05 N	10	30	70
3131	20	5 N	20 L	7	30	7	10 N	100	50	50	200 N	1000	.05 N	10	20	80
3132	30	5 N	20 L	10	30	10	10 N	100	50	30	200 N	700	.05 N	10	20	80
3143	70	5 N	20	7	15	15	10 N	100 L	70	70	200 N	1000	.05 N	10	50	60
3144	30	5 N	20	7	10	15	10 N	100 L	50	50	200 N	1000	.05 N	5	25	30
3145	100	5 N	20	15	20	15	10 N	100 L	50	70	200 N	1000	.05 N	15	45	90
3146	70	5 N	20 L	50	30	15	10 N	150	100	70	200 N	700	.05 N	30	55	130
3147	50	5 N	20	5	20	15	10 N	100 L	70	50	200 N	700	.05 N	15	45	90
3148	20	5 N	20 L	7	15	7	10 N	100 L	50	20	200 N	700	.05 N	10	25	70
3152	20	5 N	20 L	7	15	7	10 N	100 L	50	20	200 N	700	.05 N	10	25	70
3153	20 N	5 N	20 L	5	10	7	10 N	100 L	50	30	200 N	1000 G	.05 N	10	25	65
3154	20 N	5 N	20 L	5	15	7	10 N	100 L	30	30	200 N	1000	.05 N	5	25	55
3178	70	5 N	20 L	5	15	7	10 N	100 L	30	30	200 N	1000	.05 N	5	35	50
515131	20 N	5 N	20 L	5 L	10 L	5 N	10 N	100 L	30	50	200 N	1000 G	.05 N	5	5	25

TABLE 2.—*Geochemical analyses of stream sediments from Yellow Creek, Fontana-Hazel Creek area, and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Cont.

SAMPLE	X-COORD.	Y-COORD.	S-FE %	S-MG %	S-CA %	S-TI %	S-MN	S-AG	S-B	S-BA	S-BE	S-CO	S-CR	S-CU
515211	247940	922010	1	.50	.15	.70	700	.5 N	50	500	1 L	7	15	5 L
5152110	244170	922120	2	.50	.10	.70	700	.5 N	150	500	1 L	7	15	5 L
5152111	243050	922420	2	.50	.10	1.00 G	700	.5 N	70	300	1 L	7	15	5 L
5152112	242960	922480	2	.50	.10	.70	700	.5 N	70	200	1 L	7	15	5
5152113	241840	922530	2	.50	.10	1.00	1000	.5 N	50	300	1	7	20	7
5152114	241570	922670	1	.30	.10	.70	700	.5 N	50	200	1 L	7	15	5
5152115	241130	922800	1	.50	.07	1.00 G	1000	.5 N	30	200	1 L	7	10	5 L
5152116	240370	923130	1	.20	.05	1.00 G	700	.5 N	10 L	300	1 L	5	10	5 L
5152117	239940	922960	1	.10	.05 L	.70	300	.5 N	10 L	200	1 L	5 L	10 N	5 L
5152118	239360	922940	1	.10	.05	.70	500	.5 N	15	300	1 L	5 L	10 N	5 L
5152119	239030	922990	1	.15	.05	1.00	500	.5 N	50	100	1 L	5 L	10 N	5 L
515212	247910	922080	2	.50	.07	.70	700	.5 N	70	300	1 L	7	15	5
515213	247490	921930	3	.70	.07	1.00	700	.5 N	100	500	1	10	20	7
515214	247290	921820	2	.70	.20	.70	700	.5 N	50	500	1	7	20	5
515215	246190	922100	2	.50	.07	1.00	1000	.5 N	70	300	1 L	7	10	5 L
515216	245870	921770	2	.70	.20	1.00	700	.5 N	30	500	1	7	15	5 L
515217	245890	921590	3	.70	.20	1.00	1000	.5 N	30	700	1	7	30	5
515218	245820	921550	2	.70	.15	1.00 G	1000	.5 N	70	300	1	7	15	5 L
515219	244820	922070	1	.20	.07	.70	700	.5 N	10	500	1 L	5 L	10	5 L

TABLE 2.—*Geochemical analyses of stream sediments from Yellow Creek, Fontana-Hazel Creek area, and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Cont.

SAMPLE	S-LA	S-MO	S-NB	S-NI	S-PB	S-SC	S-SN	S-SR	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	AA-CU-P	AA-PB-P	AA-ZN-P
515211	20 N	5 N	20 L	7	10 L	5	10 N	100 N	70	30	200 N	1000 G	,00 B	15	10	40
5152110	20 L	5 N	20 L	5	10	10	10 N	100 N	70	30	200 N	1000	,05 N	5	10	40
5152111	20 L	5 N	20 L	5	10	7	10 N	100 N	50	30	200 N	1000 G	,05 N	5	10	40
5152112	20	5 N	20 L	5	10	7	10 N	100 N	70	30	200 N	500	,25 N	10	10	50
5152113	20	5 N	20 L	7	10	7	10 N	100 N	70	30	200 N	1000	,10 N	10	10	65
5152114	20 L	5 N	20 L	5	10 L	7	10 N	100 N	50	30	200 N	500	,05 N	10	10	45
5152115	20 N	5 N	20 L	5 L	10 L	5 N	10 N	100 N	50	30	200 N	1000 G	,05 N	5	10	40
5152116	20	5 N	20 L	5 L	10 L	5 N	10 N	100 N	50	300	200 N	1000 G	,10 N	5	10	20
5152117	20 L	5 N	20 N	5 L	10	5 N	10 N	100 N	20	70	200 N	1000	,05 N	5	10	20
5152118	20	5 N	20 N	5 L	15	5 N	10 N	100 N	30	30	200 N	1000	,10 N	5	10	25
5152119	20 L	5 N	20 N	5 L	10 L	5	10 N	100 N	30	20	200 N	700	,05 N	5	10	35
515212	20 N	5 N	20 L	7	10	7	10 N	100 N	100	30	200 N	700	,05 N	5	10	50
515213	20	5 N	20 L	10	10 L	10	10 N	100 N	100	30	200 N	700	,10 N	10	10	60
515214	20 L	5 N	20 L	10	15	15	15	100	100	30	200 N	700	,05 N	10	10	60
515215	20 N	5 N	20 L	5	10 L	5	10 N	100 N	70	30	200 N	1000	,05 N	5	5	40
515216	20 N	5 N	20 L	10	10	10	10 N	100	100	20	200 N	500	,05 N	5	15	50
515217	20	5 N	20 L	10	15	10	10 N	100	100	20	200 N	500	,25 N	5	10	50
515218	20 N	5 N	20 L	5	10 L	10	10 N	100 L	70	30	200 N	1000 G	,05 N	10	10	45
515219	70	5 N	20 L	5 L	10 L	5	10 N	100 L	30	50	200 N	1000 G	,25 N	5	10	20

TABLE 3.—*Geochemical analyses of soil from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*

[Sample localities shown on plates 2 and 3. Chemical analyses (AA, atomic absorption; Inst., instrumental) were made by C. A. Curtis, J. G. Frisken, A. L. Meier, and A. J. Toevs, U.S. Geological Survey. Percent ash was determined by J. B. McHugh, U.S. Geological Survey. Semiquantitative spectrographic analyses (S) were made by E. F. Cooley, K. J. Curry, G. W. Day, and R. T. Hopkins, U.S. Geological Survey. Letter symbols: L, detected but below limit of determination; N, not detected; G, greater than; B, not looked for. Values in parts per million (ppm) except where indicated as percent. X and Y coordinates are Universal Transverse Mercator grid. Elements looked for spectrographically but not found and their lower limits of determination: As (200), Au (10), Bi (10), Cd (20), Sb (100), and W (50)]

SAMPLE	X-COORD.	Y-COORD.	S-FE %	S-MG %	S-CA %	S-TI %	S-MN	S-AG	S-B	S-BA	S-BE	S-CO	S-CR	S-CU	S-LA
						SOIL									
1002	248885	929505	5	1,00	,15	,5	1500	,5 N	15	500	2	20	50	150	50
1004	248900	929320	7	,70	,05 L	,7	700	,5 N	10	300	1	15	50	200	20 L
1009	249160	929235	5	1,00	,10	,5	2000	,5 L	30	500	3	20	70	30	50
1013	249160	929235	7	3,00	,30	,5	700	,5 L	10 L	70	1 L	15	300	30	20 L
1016	249460	929480	7	,70	,15	,3	3000	,5 N	30	500	2	50	70	70	150
1020	249790	929565	10	3,00	,15	,7	2000	,5 N	10 L	150	1	70	150	100	30
1023	249740	929410	3	,30	,05	,5	700	,5 L	30	500	1	15	50	7	30
1026	248790	928860	7	3,00	,10	,7	1500	,5 N	10	300	1	70	200	50	30
1029	230350	926610	3	,30	,05	,7	700	,5 N	100	500	1	7	70	10	30
1053	231470	927980	5	,50	,07	,5	200	,5 N	15	500	1	5	30	7	100
1057	231720	927310	3	,70	,05 L	,7	70	,5 N	30	500	1	5 N	30	7	150
1065	230490	925800	2	,50	,05 L	1,0	1000	,5 N	30	700	1	10	70	7	50
1070	230020	925220	3	,50	,05 L	,7	300	,5 N	100	500	1	7	70	20	70
1074	229550	924770	5	,50	,05 L	,7	300	,5 N	150	300	1	5	70	20	150
1080	229390	925210	5	,70	,05 L	,7	700	,5 N	150	500	1	20	100	30	70
1103	231250	927250	3	,70	,05 L	1,0	100	,5 N	100	700	1	5 N	50	5	70
1109	231150	926560	5	,30	,05 L	,7	150	,5 N	150	500	1	5	70	20	70
1111	230970	926290	5	,50	,05 L	,7	150	,5 N	150	700	1	7	100	30	70
1115	230830	925780	3	,30	,07	,7	1500	,5 N	30	700	1	7	70	10	30
1120	230600	925070	3	,30	,05 L	,7	150	,5 N	30	300	1	5 L	70	15	50
1130	230670	928110	3	,30	,05 L	,7	100	,5 N	20	300	1 L	5 N	50	7	150
1133	230000	928110	3	,30	,05 L	1,0	150	,5 N	20	300	1 L	5 N	50	15	300
1152	228690	925310	3	,20	,07	,7	100	,5 N	70	300	1	5 L	100	20	20
1156	228410	924590	3	,50	,07	,7	1500	,5 N	150	300	1	15	70	20	50
1170	230010	925220	3	,30	,05	,5	200	,5 N	20	500	1 L	5	50	10	70
1174	228690	923830	3	1,00	,05 L	,7	70	,5 N	30	700	1	5 L	70	15	100
1179	228710	924450	3	,70	,05 L	,7	150	,5 N	150	700	1	5 L	100	20	50
1188	230080	923700	5	1,00	,07	,7	1500	,5 N	50	700	1	7	70	20	100
1193	230360	924020	5	,70	,07	,5	700	,5 N	15	700	1	5	50	20	70
1205	229410	924760	5	,70	1,00	,5	3000	,5 N	70	700	1	7	50	20	70
1207	228610	923620	5	,70	,05	,5	200	,5 N	30	300	1	7	70	20	70
1238	771580	923790	1	,15	,07	,7	30	,5 N	70	200	1	5 N	30	7	20 N
1243	771480	923490	5	,20	,20	,7	500	,5 N	70	300	1	5	50	15	50
1246	772180	923630	7	,20	,05	,7	300	,5 N	70	300	1	5	50	7	30
1258	772350	922020	3	,50	,15	,5	500	,5 N	70	500	1	5 L	50	15	50
1263	227770	923100	2	,30	,15	,5	50	,5 N	30	300	1 L	5 N	30	20	70
1268	228180	921570	10	1,00	,05	,5	1500	,5 N	30	700	1	20	70	30	100
1289	228230	920090	7	1,00	,10	,7	1500	,5 N	15	700	1	7	70	15	30
1326	229000	918090	1	1,50	,07	,7	200	,5 N	15	300	1 L	7	15	5 L	20 N
1332	227810	918280	3	,70	,07	,7	1000	,5 N	10 L	500	1	5 N	50	7	20 L

TABLE 3.—*Geochemical analyses of soil from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	S-MO	S-NB	S-NI	S-PB	S-SC	S-SN	S-SR	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	INST-HG	AA-CU-P	AA-PB-P	AA-ZN-P	ASH %
									SOIL								
1002	5 N	20 L	20	30	15	10 N	100 L	100	50	300	300	.05 N	.40	170	35	200	87
1004	5 L	20 L	20	20	20	10 N	100 L	100	15	200 N	300	.05 N	.24	50	20	30	90
1009	5 N	20 L	70	30	15	10 N	100 L	150	70	200 L	500	.05 N	.35	30	35	150	82
1013	5 L	20 L	100	30	20	10 N	150	200	15	200 N	100	.05 N	.40	35	35	40	72
1016	5 L	20 L	70	30	15	10 N	100 L	150	100	200 L	300	.05 N	.60	50	35	120	81
1020	5 L	20 L	70	30	30	10 N	100 L	200	50	200 L	150	.05 N	.35	65	30	100	79
1023	5 N	20 L	15	20	15	10 N	100 L	100	30	200 N	500	.05 N	.30	10	20	40	85
1026	5 N	20 L	100	30	30	10 N	100 L	200	30	200 N	150	.05 N	.22	40	30	70	0 B
1029	5 N	20	15	30	15	10 N	100 L	100	50	200 N	500	.05 N	.22	20	30	10	87
1053	5 L	20 L	15	70	10	10 N	100	70	20	200 N	300	.05 N	1.50	20	30	10	70
1057	5 N	20	5	30	15	10 N	100 L	70	50	200 N	700	.05 N	.65	20	100	10	83
1065	5 N	20	15	30	15	10 N	100 L	100	30	200 N	700	.05 N	.30	20	40	10	88
1070	5 L	20 L	30	30	20	10 N	100 L	100	70	200 N	500	.10 N	.02	20	40	10	93
1074	5 L	20 L	15	70	20	10 N	100	100	50	200 N	300	.05 N	.06	20	40	10	75
1080	5 L	20	20	30	20	10 N	100	100	100	200 N	300	.05 N	.24	20	40	10	91
1103	5 N	20	5	30	20	10 N	100	70	30	200 N	700	.05 N	.55	20	40	10	87
1109	5 L	20	15	30	20	10 N	100 L	100	50	200 N	300	.05 N	.45	20	40	10	77
1111	5 L	20 L	20	50	30	10 N	100 L	100	70	200 N	300	.05	.40	20	70	10	88
1115	5 N	20 L	15	30	10	10 N	100 L	70	50	200 N	700	.05 N	.55	20	30	10	83
1120	5 N	20	5	50	15	10 N	100 L	100	50	200 N	700	.05 N	2.00	30	40	10	79
1130	5 L	30	7	70	15	10 N	100 L	70	50	200 N	700	.05 N	.55	30	40	10	84
1133	5 N	30	7	50	15	10 N	100 L	70	70	200 N	1000 G	.05 N	.30	20	40	10	86
1152	5 N	20	7	30	20	10 N	150	100	50	200 N	300	.05 N	.16	20	40	10	89
1156	5 N	20	15	50	15	10 N	100 L	100	50	200 N	500	.25 N	.70	20	40	10	0 B
1170	5 L	20	15	50	10	10 N	100 L	100	30	200 N	500	.05 N	.45	20	30	10	75
1174	5 L	20 L	10	70	20	10 N	100 L	100	70	200 N	300	.05 N	.60	20	40	10	78
1179	5 L	20 L	10	70	20	10 N	150	150	70	200 N	300	.05 N	.30	20	40	10	86
1188	5 L	20	20	70	20	10 N	100 L	100	70	200 N	500	.05 N	.40	20	40	10	76
1193	5 L	20 L	10	50	10	10 N	100 L	100	30	200 N	700	.05 N	.55	20	30	50	80
1205	5 N	20 L	15	50	10	10 N	100	100	30	200 N	300	.25 N	.60	20	20	40	69
1207	5 L	20 L	20	30	15	10 N	100 L	100	30	200 N	300	.05 N	.35	20	30	30	80
1238	5 N	20 L	7	15	10	10 N	100 L	100	30	200 N	500	.10 N	3.00	20	30	40	43
1243	5 L	20 L	15	30	15	10 N	100 L	100	30	200 N	300	.05 N	.50	20	20	40	0 B
1246	5 N	20 L	15	20	15	10 N	100 L	150	30	200 N	700	.05 N	.35	30	40	60	80
1258	5 N	20 L	7	30	15	10 N	100 L	100	50	200 N	700	.05 N	.70	20	20	30	73
1263	5 N	20	20	30	10	10 N	100 L	70	30	200 N	300	.05 N	.55	10	20	30	60
1268	5 L	20	30	50	15	10 N	100 L	100	100	200 N	500	.05 N	.30	10	20	30	88
1289	5 L	20	15	50	15	10 N	100 L	150	30	200 N	700	.10 N	.35	10	20	30	80
1326	5 N	20 L	5 L	10 N	7	10 N	100 L	30	30	200 N	700	.05 N	.06	5	20	25	0 B
1332	5 N	20 L	7	50	10	10 N	100 L	70	50	200 N	500	.05 N	.60	10	40	55	80

TABLE 3.—*Geochemical analyses of soil from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	X-COORD.	Y-COORD.	S-FE %	S-MG %	S-CA %	S-TI %	S-MN	S-AG	S-B	S-BA	S-BE	S-CO	S-CR	S-CU	S-LA
1338	771740	918520	3	.30	.10	.5	300	.5 N	50	300	1	7	30	10	150
1345	233730	917180	3	.50	.05 L	.5	300	.5 N	70	700	1	7	30	15	50
1351	233270	917690	3	.70	.05 L	.5	500	.5 N	30	500	2	7	30	15	70
1358	232440	918710	5	.50	.10	.5	500	.5 N	30	500	1	5	50	10	20
1364	231750	919200	5	1.00	.10	.5	1000	.5 N	70	300	1	7	70	30	30
1391	769800	928010	7	.70	.05 L	.7	100	.5	100	700	3	7	30	200	100
1394	770490	927690	3	.50	.05 L	.5	150	.5 N	100	500	3	10	30	50	70
1399	770750	927220	5	.50	.05 L	.7	150	.5 N	100	300	2	10	30	15	50
1405	770780	926620	5	1.00	.05 L	.5	500	.5 N	70	500	3	15	50	50	200
1409	770650	925980	5	.50	.05 L	.2	500	.5 N	70	300	2	15	30	30	50
1414	770710	925290	3	.50	.05 L	.5	100	.5 N	50	300	1	5	30	30	20
1419	770900	924440	5	.70	.05 L	.7	1500	.5 N	50	300	2	10	30	30	70
1427	770510	922020	3	.70	.05	.5	700	.5 N	100	300	3	15	30	30	70
1432	770600	921600	3	.70	.05	.3	200	.5 N	150	500	2	5 N	30	30	100
1436	771020	921090	5	.70	.05	.5	2000	.5 N	70	300	2	15	30	30	70
1443	228270	918690	3	.50	.10	.7	500	.5 N	50	300	2	5	30	10	20
1454	230870	919300	5	.70	.10	.7	1000	.5 N	70	500	3	7	30	30	20
1467	232380	918050	3	.70	.05 L	.5	700	.5 N	30	700	2	15	30	20	70
1478	231430	918130	3	.70	2.00	.3	2000	.5 N	30	700	3	15	30	30	70
2003	254200	932640	15	3.00	.15	1.0	2000	.5 N	15	300	1	70	150	70	70
2007	254190	932710	7	1.00	.05 L	.5	1500	.5 N	10	300	2	30	50	70	100
2010	254170	932780	7	.70	.05	.5	1500	.5 N	15	500	2	70	70	30	100
2023	254235	932565	5	1.50	.10	.5	2000	.5 L	15	700	1	50	70	1000	70
2026	254250	932415	7	2.00	.05	.3	2000	.5 N	10	500	2	30	70	150	70
2030	254290	932335	5	1.00	.50	.5	1500	.5 N	50	500	2	30	70	30	70
2033	254340	932170	7	1.00	.05 L	.7	700	.5 N	50	500	1	50	70	30	70
2037	254310	931975	10	.70	.05 L	.5	700	.5 N	50	500	2	70	70	70	100
2040	254305	931930	10	.70	.10	.5	1500	.5 L	30	700	2	70	70	70	100
2044	254910	932040	7	.70	.05	.5	1000	.5 N	15	700	1	15	70	7	30
2047	254950	932065	7	1.50	.05	.7	700	.5 N	15	700	1	15	70	20	50
2060	255100	931780	5	.70	.10	.7	1000	.5 N	30	500	1	10	50	7	30
2063	255540	931560	3	.50	.07	.5	700	.5 N	50	700	1	15	30	15	30
2066	255610	931560	10	1.50	.05 L	.7	700	.5 N	70	1000	2	20	70	50	100
2070	248880	929460	5	1.50	.05 L	.5	1500	.5 L	20	500	1	50	70	150	50
2072	248920	929620	10	1.50	.07	.5	3000	.5 N	10	500	2	70	70	70	70
2075	249140	929950	5	.50	.05 L	.2	300	.5 N	15	500	2	15	50	30	150
2078	249325	930080	10	5.00	3.00	.5	1000	.5 N	10 L	70	1 N	70	300	50	20 N
2082	248960	929860	3	.70	.15	.3	3000	.5 N	50	700	1	70	70	70	70
2085	248700	929755	5	.70	.07	.3	2000	.5 N	50	500	1	50	70	30	70
2088	248470	929535	7	.70	.05	.3	1000	.5 N	50	500	1	15	70	30	50
2093	248430	929235	5	1.50	.07	.3	2000	.5 N	15	300	2	30	150	50	70

TABLE 3.—*Geochemical analyses of soil from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	S-MO	S-NB	S-NI	S-PB	S-SC	S-SN	S-SR	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	INST-HG	AA-CU-P	AA-PB-P	AA-ZN-P	ASH %
1338	5 N	20 L	5 L	70	10	10 N	100 L	70	30	200 N	500	.10 N	1.00	10	40	30	65
1345	5 N	20 L	15	30	10	10 N	100 L	50	20	200 N	300	.05 N	.14	10	20	50	92
1351	5 N	20 L	15	50	15	10 N	100 L	50	30	200 N	300	.05 N	.12	20	30	140	90
1358	5 N	20 L	15	30	10	10 N	100 L	70	15	200 N	500	.05 N	.30	10	40	65	80
1364	5 N	20 L	15	50	15	10 N	100 L	70	30	200 N	500	.05 N	.28	20	30	85	82
1391	5 N	20	30	30	15	10 N	100	100	100	200 N	150	.05 N	.40	410	300	130	82
1394	5 N	20 N	15	30	15	10 N	300	100	70	200 N	100	.05 N	.20	65	55	110	88
1399	5 N	20	30	30	15	10 N	100 N	100	50	200 N	500	.05 N	.35	15	50	100	84
1405	5 N	20	30	30	30	10 N	200	100	50	200 N	150	.05 N	.65	45	50	170	77
1409	5 N	20 N	20	30	10	10 N	150	70	50	200 N	150	.05 N	.45	25	75	150	78
1414	5 N	20	20	30	7	10 N	100 N	70	15	200 N	300	.10 L	.50	25	55	120	81
1419	5 N	20	20	30	15	10 N	100 N	70	30	200 N	700	.05 N	.55	20	45	130	76
1427	5 N	20	30	30	20	10 N	100	100	30	200 N	150	.05 N	.55	20	65	150	79
1432	5 N	20	10	70	15	10 N	100	70	30	200 N	200	.05 N	.70	0 B	0 B	0 B	58
1436	5 N	30	30	30	15	10 N	100	100	30	200 N	300	.05 N	.65	20	55	170	70
1443	5 N	20	5	30	15	10 N	100	70	30	200 N	500	.10 N	.65	15	35	100	80
1454	5 N	20	10	70	20	10 N	100	70	20	200 N	300	.05 N	.45	25	40	120	80
1467	5 N	30	30	30	15	10 N	100 N	100	30	200 N	300	.05 N	.45	20	40	130	83
1478	5 N	20	30	50	15	10 N	150	70	30	200 N	150	.05 N	.70	0 B	0 B	0 B	64
2003	5 L	20 L	70	30	30	10 N	100 L	300	70	200 N	200	.05 N	.26	55	30	100	89
2007	5 N	20 L	50	30	20	10 N	100 L	100	100	200 L	300	.05 N	.20	50	40	120	88
2010	5 N	20 L	50	30	15	10 N	100 L	100	70	200 L	500	.05 N	.28	35	30	150	88
2023	5 L	20 L	20	300	15	10 N	100 L	150	50	500	300	.05 N	.26	900	280	560	88
2026	5 L	20 L	50	30	20	10 N	100 L	100	70	300	500	.05 N	.35	140	30	180	84
2030	5 L	20 L	30	30	15	10 N	100 L	100	100	200 L	500	.05 N	.26	30	30	130	83
2033	5 L	20 L	50	30	20	10 N	100 L	150	70	200 N	500	.05 N	.24	30	25	100	86
2037	5 L	20 L	70	30	20	10 N	100 L	150	100	200	300	.05 N	.16	40	30	160	88
2040	5 L	20 L	50	50	20	10 N	100 L	100	100	200 L	300	.05 N	.60	40	25	140	84
2044	5 L	20 L	20	30	20	10 N	100	150	50	200 N	500	.05 N	.65	15	25	50	84
2047	5 L	20 L	30	30	20	10 N	100 L	150	70	200 N	500	.05 N	.30	20	25	70	89
2060	5 N	20 L	15	30	15	10 N	100 L	150	30	200 N	500	.05 N	.55	10	25	60	81
2063	5 L	20 L	15	50	15	10 N	100 L	100	20	200 N	500	.05 N	.35	30	35	60	84
2066	5 L	20 L	30	30	30	10 N	100 L	150	70	200 N	300	.05 N	.24	60	20	120	92
2070	5 L	20 L	70	50	30	10 N	100 L	150	50	200 L	500	.05 N	.35	140	40	140	90
2072	5 L	20 L	70	30	20	10 N	100 L	100	70	200 N	300	.05 N	.35	50	30	140	87
2075	5 N	20 L	50	50	15	10	100 L	100	30	200 N	200	.05 N	.22	35	20	60	89
2078	5 L	20 L	150	10 N	30	10 N	150	200	20	200 N	70	.05 N	.10	30	10	60	91
2082	5 N	20 L	30	70	15	10 N	100 L	100	50	200 N	300	.05 N	.24	30	35	90	86
2085	5 N	20 L	30	50	20	10 N	100 L	100	50	200 N	300	.05 N	.22	20	20	70	90
2088	5 N	20 L	30	50	20	10 N	100 L	150	50	200 N	300	.05 N	.28	20	25	70	87
2093	5 L	20 L	70	30	20	10 N	100 L	100	70	200 N	300	.05 N	.18	35	30	100	89

TABLE 3.—*Geochemical analyses of soil from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	X-COORD.	Y-COORD.	S-FE %	S-MG %	S-CA %	S-TI %	S-MN	S-AG	S-B	S-BA	S-BE	S-CD	S-CR	S-CU	S-LA
2115	230520	927190	3	1.00	.05 L	.7	100	.5 N	100	700	1	5 N	70	20	100
2120	230070	927115	5	.70	.05	1.0	200	.5 N	70	500	1 L	5 L	70	15	100
2123	230085	926445	5	.70	.07	.7	500	.5 N	100	500	1	7	70	10	50
2126	230235	926495	5	.70	.07	.7	700	.5 N	150	500	1	7	70	7	50
2133	231725	926100	7	1.50	.07	.7	1500	.5 N	50	1000	1	20	70	30	70
2136	771880	927740	5	.70	.07	.7	1500	.5 N	70	700	1	15	70	15	100
2143	228225	927175	5	.70	.07	.7	2000	.5 N	100	700	1	30	70	20	150
2148	229380	927435	3	.50	.05 L	1.0	100	.5 N	70	500	1	5	70	7	70
2153	229070	926620	5	.50	.15	.7	300	.5 N	70	700	1	7	50	7	100
2161	228120	926410	5	.30	.05 L	1.0	500	.5 N	100	500	1	7	70	20	30
2164	771850	926825	3	.20	.05 L	.5	150	.5 N	100	300	1	5	70	10	30
2166	771585	926960	5	.50	.07	.5	200	.5 N	70	300	1	5	70	15	70
2168	771250	926905	3	.30	.05 L	.5	150	.5 N	100	500	2	7	70	7	30
2173	772170	926105	7	.20	.05 L	.7	100	.5 N	100	300	1	7	70	30	70
2177	228460	924750	7	.70	.05 L	.7	700	.5 L	100	700	1	15	100	20	70
2179	228335	924825	3	.20	.05 L	.7	50	.5 N	150	150	1 L	5 N	50	5 L	20 L
2181	228305	924845	5	.30	.05 L	1.0	150	.5 N	150	300	1 L	5 N	70	5 L	30
2191	772220	925375	7	.70	.15	.7	3000	.5 N	70	500	1	30	100	20	100
2197	771785	925990	3	.15	.05 L	.7	150	.5 N	150	200	1 L	5 N	30	7	20 L
2199	227745	925735	3	.20	.07	.7	100	.5 N	100	300	1	5 N	30	10	20
2213	771710	925370	7	.30	.05 L	.5	100	.5 N	100	500	1	5 L	70	20	30
2216	771155	925180	7	.30	.05 L	.7	100	.5 N	100	300	1	5 L	100	7	70
2218	771200	924915	5	.50	.05 L	.7	200	.5 N	30	500	1 L	5 L	100	10	70
2220	771365	924570	7	.30	.05 L	.7	150	.5 N	70	300	1	5 L	70	15	50
2223	771885	924900	3	.20	.07	.7	100	.5 N	70	300	1	7	70	10	70
2226	772220	925220	5	.30	.05 L	.7	100	.5 N	100	500	1	5	100	10	70
2231	772030	921260	10	2.00	.05 L	.7	300	.5 N	15	1500	2	10	70	20	150
2233	772380	921490	10	1.00	.05 L	.7	150	.5 N	20	1000	1	5	100	7	100
2241	772220	920615	3	.50	.05	.7	300	.5 N	15	1000	1	5 N	50	10	30
2243	227665	920855	5	.70	.05 L	.7	500	.5 N	100	700	2	5 N	70	7	30
2306	229600	917370	5	.70	.07	.7	1500	.5 N	30	500	1	7	70	10	30
2310	229950	917020	3	.50	.07	.5	500	.5 N	70	300	1	5	70	10	50
2313	230300	916350	5	.50	.07	.5	1500	.5 N	50	300	1	7	70	15	70
2316	231570	915695	5	.70	.07	.7	700	.5 N	100	500	1	7	70	7	30
2318	231210	915980	5	.50	.05 L	.7	300	.5 N	15	500	1	7	70	15	70
2322	232170	915380	7	.70	.05 L	.7	700	.5 N	50	500	1	10	70	10	20
2338	770460	924020	3	.70	.05 L	.5	200	.5 N	30	300	1	5	30	20	20
2347	771495	926110	5	.50	.05 L	.7	100	.5 N	100	300	3	5	30	20	100
2351	771755	920265	3	.70	.05 L	.7	300	.5 N	30	300	2	7	30	30	70
2353	771315	920500	5	.70	.05 L	.7	3000	.5 N	50	500	3	50	50	50	70
2357	234520	916485	5	1.00	.05 L	.7	500	.5 N	70	700	1	15	30	15	70

TABLE 3.—*Geochemical analyses of soil from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	S-MO	S-NB	S-NI	S-PB	S-SC	S-SN	S-SR	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	INST-HG	AA-CU-P	AA-PB-P	AA-ZN-P	ASH %
2115	5 L	20	5	70	20	10 N	100 L	100	70	200 N	500	.05 N	.25	30	60	10	88
2120	5 L	30	5	50	20	10 N	100 L	100	70	200 N	1000 G	.05 N	.20	20	40	10	86
2123	5 L	20 L	15	50	20	10 N	100 L	150	50	200 N	300	.05 N	.75	20	40	10	70
2126	5 L	20 L	15	30	15	10 N	100 L	100	70	200 N	300	.05 N	.30	20	30	10	0 B
2133	5 L	20 L	30	50	20	10 N	100 L	100	70	200 N	300	.05 N	.14	20	60	15	86
2136	5 L	20	20	70	20	10 N	100 L	100	70	200 N	500	.05 N	.35	20	30	10	80
2143	5 L	20	30	70	20	10 N	100 L	100	70	200 N	300	.05 N	.20	20	30	10	0 B
2148	5 N	20	10	30	20	10 N	100 L	100	50	200 N	700	.05 N	.35	20	30	10	87
2153	5 L	20 L	10	30	15	10 N	100 L	100	50	200 N	500	.10 N	.45	20	30	10	0 B
2161	5 L	20	20	30	20	10 N	100 L	150	70	200 N	700	.05 N	.26	20	30	10	87
2164	5 L	20 L	15	50	15	10 N	150	100	70	200 N	500	.05 N	.40	40	30	10	79
2166	5 L	20 L	15	70	15	10 N	150	100	70	200 N	300	.05 N	.50	30	40	10	75
2168	5 L	20 L	10	30	15	10 N	150	100	70	200 N	300	.05 N	.14	20	60	20	0 B
2173	5 L	20 L	30	30	15	10 N	100 L	150	50	200 N	300	.05 N	.26	20	60	10	86
2177	5 L	20	20	30	20	10 N	100 L	150	50	200 N	300	.05 N	.25	10	20	40	87
2179	5 N	20	7	10 N	15	10 N	100 L	70	50	200 N	1000 G	.05 N	.16	10	20	30	89
2181	5 L	30	7	30	15	10 N	100 L	150	50	200 N	1000	.05 N	.18	10	20	30	90
2191	5 L	20	50	30	15	10 N	100 L	150	50	200 N	300	.05 N	.35	10	20	30	80
2197	5 N	20	10	20	15	10 N	100 L	70	70	200 N	1000 G	.05 N	.08	10	20	30	91
2199	5 N	20	10	30	15	10 N	100	100	30	200 N	300	.05 N	.16	10	20	30	87
2213	5 L	20 L	20	30	20	10 N	100	100	50	200 N	150	.05 N	.10	20	30	30	89
2216	5 L	20	15	50	15	10 N	100 L	150	70	200 N	500	.05 N	.08	10	20	40	87
2218	5 L	20	10	30	20	10 N	100 L	100	70	200 N	700	.05 N	.08	10	20	30	87
2220	5 L	20	15	30	15	10 N	100 L	100	50	200 N	500	.05 N	.40	20	20	40	87
2223	5 N	20 L	15	30	15	10 N	150	100	50	200 N	300	.05 N	.35	30	30	40	90
2226	5 L	20 L	15	30	20	10 N	100	150	50	200 N	300	.05 N	.50	20	30	40	89
2231	5 L	20 L	30	50	20	10 N	100	100	100	200 L	300	.05 N	.25	10	20	40	87
2233	5 L	20 L	15	20	20	10 N	100 L	100	30	200 N	500	.05 N	.75	20	30	40	84
2241	5 N	20	7	30	15	10 N	150	100	50	200 N	700	.05 N	.80	20	30	40	74
2243	5 L	20 L	15	30	20	10 N	100 L	100	70	200 N	300	.05 N	.50	10	30	40	85
2306	5 L	20 L	15	30	15	10 N	100 L	100	30	200 N	500	.05 N	.28	10	25	75	85
2310	5 N	20 L	15	30	15	10 N	100 L	100	30	200 N	500	.05 N	.35	10	25	65	74
2313	5 L	20 L	15	30	15	10 N	100 L	100	30	200 N	700	.05 N	.30	10	25	55	80
2316	5 L	20 L	15	15	15	10 N	100 L	100	50	200 N	1000	.05 N	.20	10	20	75	91
2318	5 N	20 L	15	20	15	10 N	100 L	70	50	200 N	700	.05 N	.18	10	20	50	90
2322	5 N	20 L	15	20	15	10 N	100 N	100	30	200 N	700	.05 N	.14	10	20	70	93
2338	5 N	20	30	30	15	10 N	100 N	70	30	200 N	500	.05 N	.50	15	45	130	82
2347	5 N	50	20	30	20	10 N	100 N	100	50	200 N	500	.05 N	.40	15	40	110	85
2351	5 N	20	30	20	15	10 N	100 N	70	30	200 N	500	.05 N	.60	15	30	140	73
2353	5 N	30	30	70	30	10 N	100	100	50	200 N	300	.05 N	.70	35	50	120	78
2357	5 N	20	30	20	20	10 N	100 N	100	30	200 N	300	.05 N	.30	20	35	150	90

TABLE 3.—*Geochemical analyses of soil from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	X-COORD.	Y-COORD.	S-FE %	S-MG %	S-CA %	S-TI %	S-MN	S-AG	S-B	S-BA	S-BE	S-CO	S-CR	S-CU	S-LA
2362	233615	915450	5	1.00	.10	.7	500	.5 N	30	700	2	10	30	20	70
2370	771660	919295	5	.70	.05 L	.7	500	.5 N	30	500	2	7	30	15	70
3009	248745	939485	5	.50	.05 L	.5	1500	.5 N	15	500	2	70	70	50	50
3011	248759	939480	5	.50	.05 L	.5	1000	.5 N	15	500	3	70	70	70	100
3013	248773	939476	7	.70	.05 L	.7	1500	.5 N	15	500	2	70	70	70	100
3015	248787	939471	5	.70	.05	.7	1500	.5 N	15	500	2	70	50	70	70
3017	248801	939467	5	.70	.07	.5	1500	.5 N	30	500	2	50	70	70	70
3019	248815	939462	5	1.00	.05 L	.5	1500	.5 N	20	500	1	30	70	70	50
3021	248829	939458	5	1.50	.05 L	.5	1500	.5 N	20	500	1	70	100	70	50
3023	248843	939453	5	.50	.05 L	.5	1000	.5 N	30	500	1	70	50	50	70
3025	248857	939449	5	.30	.05 L	.7	700	.5 N	20	300	1	50	50	30	70
3027	248871	939444	5	.30	.05 L	.5	700	.5 N	20	300	1	15	30	30	70
3029	248885	939440	7	.30	.05 L	.7	700	.5 N	15	300	1	10	30	30	50
3033	230590	926660	5	.30	.05 L	.7	150	.5 N	70	300	1	5 L	50	7	30
3044	771510	927840	3	.50	.07	.5	500	.5 N	100	300	1	7	70	7	70
3057	230030	927590	7	.70	.05 L	1.0 G	500	.5 N	30	300	1	20	50	50	70
3062	228960	928340	7	.70	.05 L	.7	150	.5 N	300	700	1	5	70	20	70
3064	229170	927630	3	.30	.05 L	.7	150	.5 N	50	500	1	5 L	30	7	100
3076	770750	928210	5	.70	.05 L	.7	700	.5 N	100	500	2	15	70	20	70
3080	771300	928980	3	.70	.05 L	.7	150	.5 N	50	300	1	5 N	30	7	50
3095	229860	922590	5	.30	.05 L	.7	300	.5 N	70	300	1	5	70	7	30
3098	230230	921290	5	1.00	.05 L	.7	500	.5 N	30	700	1	7	70	7	70
3100	228950	922090	5	.70	.05 L	.7	1500	.5 N	70	700	2	15	100	30	50
3103	229150	922710	5	.70	.05 L	.7	200	.5 N	30	700	1	7	70	10	70
3105	228630	923130	3	.70	.05 L	.7	150	.5 N	50	700	1	5 L	70	10	70
3135	230230	921290	7	1.00	.05 L	.7	300	.5 N	15	500	1	7	70	10	70
3136	230130	924180	3	.30	.05 L	.5	150	.5 N	10	200	1 L	5	30	15	20
3159	228940	919170	7	.70	.07	.7	2000	.5 N	70	500	1	7	70	20	70
3162	229860	919660	7	.70	.05	.7	1500	.5 N	10	500	1	7	70	15	20
3164	230230	919660	5	.70	.07	.7	1000	.5 N	20	700	1	5 L	70	10	20
3166	230130	919340	7	.70	.07	.7	700	.5 N	70	500	1	7	70	10	70
3171	228960	919620	3	1.00	.05 L	.7	700	.5 N	50	1000	1	5 N	70	30	20 L
3176	230300	920450	3	.70	.10	.7	300	.5 N	10	500	1	5 N	30	20	20 N
3182	770130	923500	5	.70	.05	.7	5000 G	.5 N	30	300	3	20	30	30	100
3185	769170	922850	3	.50	.05	.5	2000	.5 N	10	300	2	15	30	30	70
3189	770960	922560	5	.50	.05	.7	70	.5 N	100	300	3	5 N	50	30	70
3191	769690	928430	7	.70	.05 L	.5	200	.5 N	100	300	3	15	50	30	100
3199	231710	916320	5	.70	.05 L	.7	500	.5 N	50	300	3	15	30	30	70

TABLE 3.—*Geochemical analyses of soil from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	S-MO	S-NB	S-NI	S-PB	S-SC	S-SN	S-SR	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	INST-HG	AA-CU-P	AA-PB-P	AA-ZN-P	ASH %
2362	5 N	30	30	30	30	10 N	100	100	30	200 N	150	.05 N	.55	20	40	120	84
2370	5 N	30	20	30	15	10 N	100	100	30	200 N	500	.05 N	.45	15	30	110	78
3009	5 N	20 L	15	30	15	10 N	100 L	100	30	200 N	300	.05 N	.26	50	20	60	88
3011	5 L	20 L	30	20	15	10 N	100 L	100	70	200 L	200	.05 N	.08	80	20	100	88
3013	5 L	20 L	30	50	20	10 N	100 L	100	70	200 L	500	.05 N	.10	80	25	140	90
3015	5 N	20 L	30	20	15	10 N	100 L	100	70	200	500	.05 N	.16	90	20	150	88
3017	5 L	20 L	30	30	15	10 N	100 L	100	70	200	300	.05 N	.20	85	20	150	88
3019	5 L	20 L	30	30	15	10 N	100 L	150	30	200	300	.05 N	.10	100	25	160	91
3021	5 L	20 L	70	30	20	10 N	100 L	100	50	200	300	.05 N	.08	85	30	170	89
3023	5 L	20 L	30	30	15	10 N	100 L	100	50	200 N	300	.05 N	.10	55	25	50	89
3025	5 L	20 L	30	30	15	10 N	100 L	100	30	200 N	300	.05 N	.10	30	20	70	88
3027	5 N	20 L	15	15	15	10 N	100 L	100	30	200 N	300	.05 N	.06	40	20	45	91
3029	5 L	20 L	30	20	15	10 N	100 L	100	15	200 N	500	.05 N	.12	35	20	30	91
3033	5 N	20	10	30	15	10 N	100 L	100	50	200 N	700	.05 N	.12	20	40	15	88
3044	5 L	20 L	15	20	15	10 N	100 L	100	70	200 N	500	.05 N	.18	20	40	15	88
3057	5 L	20	30	30	20	10 N	100 L	200	70	200 N	700	.05 N	.16	30	60	10	92
3062	5 L	20	15	30	20	10 N	100 L	150	70	200 N	300	.05 N	.16	20	40	10	85
3064	5 N	20 L	7	50	15	10 N	100 L	70	70	200 N	700	.05 N	.20	10	40	10	85
3076	5 L	20 L	30	30	20	10 N	100 L	150	50	200 N	500	.05 N	.16	20	30	15	87
3080	5 N	20 L	7	30	15	10 N	100 L	70	50	200 N	500	.05 N	.10	20	30	10	91
3095	5 L	20	15	30	15	10 N	100 L	150	30	200 N	700	.05 N	.60	30	30	40	85
3098	5 L	20	15	30	15	10 N	100 L	150	30	200 N	300	.05 N	.70	20	30	50	86
3100	5 L	20 L	15	100	30	10 N	100	150	50	200 N	300	.05 N	.70	20	30	30	84
3103	5 N	20 L	15	30	15	10 N	100 L	100	70	200 N	1000	.05 N	.20	20	30	40	90
3105	5 L	20	10	70	15	10 N	100 L	100	50	200 N	500	.05 N	.50	20	30	40	86
3135	5 L	20 L	20	30	15	10 N	100 L	150	30	200 N	500	.05 N	.45	20	30	40	89
3136	5 N	20 N	15	15	20	10 N	100 N	70	15	200 N	200	.10	.04	10	10	100	0 B
3159	5 L	20	15	30	15	10 N	100 L	150	30	200 N	300	.05 N	.35	15	20	55	89
3162	5 L	20 L	15	20	15	10 N	100	150	30	200 N	300	.05 N	.30	10	20	100	83
3164	5 L	20 L	7	20	15	10 N	100	100	30	200 N	300	.05 N	.24	10	20	50	86
3166	5 L	20 L	15	30	15	10 N	100 L	150	50	200 N	300	.05 N	.24	10	20	65	83
3171	5 N	20	5 L	20	20	10 N	100 L	100	30	200 N	500	.05 N	.08	5	10	5	96
3176	5 N	20 L	5 L	20	10	10 N	150	70	50	200 N	1000	.05 N	.28	5	15	15	88
3182	5 N	20	50	30	20	10 N	100 N	100	50	200 N	200	.05 N	.50	30	40	150	72
3185	5 N	20 N	20	10	15	10 N	100 N	70	30	200 N	200	.05 N	.40	35	40	180	78
3189	5 N	70	5	30	30	10 N	200	150	30	200 N	200	.05 N	.70	25	20	80	86
3191	5 N	30	30	30	30	10 N	100	100	50	200 N	150	.05 N	.35	35	25	120	92
3199	5 N	30	30	20	20	10 N	100	100	50	200 N	150	.05 N	.22	25	25	150	86

TABLE 4.—*Geochemical analyses of the ash of forest litter from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*

[Sample localities shown on plates 2 and 3. Chemical analyses (AA, atomic absorption, were made by J. G. Viets; ash content was determined by J. B. McHugh, both U.S. Geological Survey. Semiquantitative spectrographic analyses (S) were made by E. F. Cooley and K. J. Curry, U.S. Geological Survey. Letter symbols: L, detected but below limit of determination; N, not detected; G, greater than. Values in parts per million (ppm) except where indicated as percent. X and Y coordinates are Universal Transverse Mercator grid. Elements looked for spectrographically but not found and their lower limits of determination: As (200), Au (2), Sb (10), and W (50)]

SAMPLE	X-COORD.	Y-COORD.	S-FE %	S-MG %	S-TI %	S-MN	S-AG	S-B	S-BA	S-BE	S-BI	S-CD	S-CO
						FOREST LITTER							
1003	248885	929505	5	1,50	,7	3000	0,10 N	50	3000	3	1 N	1 N	30
1005	248900	929320	5 G	,70	1,0 G	3000	0,10 N	70	1500	3	1 N	1 N	30
1010	249160	929235	5 G	3,00	,7	7000	0,10 N	70	2000	3	1 N	1 N	30
1014	249160	929235	5 G	7,00	,7	10000 G	0,10 N	150	1500	2	1 N	5	30
1017	249460	929480	5 G	1,50	,7	10000	0,10 N	70	3000	3	1 N	1 L	50
1021	249790	929565	5 G	5,00	,7	10000 G	0,10 N	150	2000	3	1 N	2	150
1024	249740	929410	5	1,00	,7	10000 G	0,10 N	70	3000	3	1 N	1 N	20
1027	248790	928860	5 G	5,00	,7	3000	0,10 N	70	1500	3	1 N	1 L	70
1030	230350	926610	2	1,00	,3	10000 G	0,10 N	200	3000	3	10 N	7	10
1054	231470	927980	3	1,00	,7	10000 G	0,10 N	150	5000	3	10 N	7	10
1058	231720	927310	3	1,00	,7	1000	0,50	150	3000	3	10 L	7	15
1066	230490	925800	2	1,00	,7	10000 G	0,10 N	100	5000	7	10 N	7	15
1071	230020	925220	3	1,00	,7	10000 G	0,10 N	150	3000	5	10 N	7	15
1075	229550	924770	5	,70	1,0	3000	0,70	200	3000	5	10 L	5	15
1081	229390	925210	5	,70	,7	10000	0,10	150	3000	5	10 N	3	30
1104	231250	927250	2	,70	1,0 G	7000	0,10 N	150	3000	3	10 N	2	10 L
1110	231150	926560	3	1,00	1,0	5000	0,70	150	3000	5	10 N	7	10
1112	230970	926290	3	,70	,7	10000	0,10 L	300	3000	5	10 N	5	15
1116	230830	925780	3	,70	,7	10000 G	0,10 N	100	3000	3	10 N	5	15
1121	230600	925070	3	,70	,7	3000	0,15	150	2000	3	10 N	7	10
1131	230670	928110	3	1,00	,7	7000	0,50	150	3000	2	10 N	7	10
1134	230000	928110	3	,30	1,0	1500	0,10 L	70	1500	3	10 N	5	10 L
1153	228690	925310	2	,70	,7	3000	0,30	150	3000	5	10 N	3	10
1157	228410	924590	3	2,00	,7	10000 G	0,10 N	200	3000	3	10 N	5	100
1171	230010	925220	3	2,00	,3	10000 G	0,10 N	300	5000	2	10 N	20	200
1175	228690	923830	3	2,00	,5	10000 G	0,10 L	300	3000	3	10 L	20	200
1180	228710	924450	3	,70	,7	1500	0,10	200	3000	5	10 N	3	30
1189	230080	923700	3	1,00	,7	10000 G	0,10 L	150	5000	5	10 N	7	20
1194	230360	924020	3	,70	,5	10000 G	0,10 L	200	3000	3	10 N	7	10
1208	228610	923620	3	1,00	,7	7000	0,50	200	3000	3	10 N	7	50
1239	771580	923790	5	2,00	,7	7000	3,00	300	3000	5	5	70	30
1247	772180	923630	3	,70	,7	10000 G	0,10 N	200	3000	5	10 N	7	30
1259	772350	922020	3	1,50	,5	10000	0,10 L	300	3000	3	10 N	15	15
1264	227770	923100	3	3,00	,5	10000	0,10 L	700	3000	3	2	50	15
1269	228180	921570	3	2,00	,7	10000 G	0,10 L	150	3000	5	10 L	50	20
1288	228230	920090	5	,70	,7	5000	0,10 L	70	1500	5	10 N	2 L	15
1327	229000	918090	3	2,00	,5	10000	3,00	300	3000	3	10 N	15	5
1333	227810	918280	5	,70	,1	7000	0,70	150	3000	3	10 N	7	15
1339	771740	918520	3	1,00	,7	10000	1,50	300	2000	3	2	30	15
1346	233730	917180	3	1,00	,7	10000 G	0,70	150	3000	3	10 N	7	30

TABLE 4.—*Geochemical analyses of the ash of forest litter from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	S-CR	S-CU	S-LA	S-MO	S-NB	S-NI	S-PB	S-SC	S-SN	S-SR	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	ASH %
FOREST LITTER																
1003	30	300	70	2 N	20 L	50	150	15	7	300	150	50	700	500	,12 N	54,0
1005	70	150	70	2 L	150	150	150	70	5 N	150	500	70	300	1000 G	,16 N	40,5
1010	70	100	30	2 N	20 L	100	70	30	5	150	150	50	500	300	,10 N	62,0
1014	150	200	20 N	2 N	20 L	200	200	20	7	700	200	15	700	150	,28 N	22,5
1017	50	100	150	2 N	20	150	70	20	5 L	300	150	100	500	300	,11 N	58,3
1021	150	300	50	2 N	20 L	200	300	50	7	700	700	100	1000	300	,22 N	28,5
1024	30	70	70	2 N	20 L	50	200	20	7	500	150	50	700	500	,16 N	39,8
1027	70	100	30	2 N	20 L	150	70	30	5 N	200	200	30	300	200	,12 N	53,5
1030	30	100	30	2 N	50 L	30	150	15	20	1000	100	70	700	300	,40 N	21,3
1054	50	150	50	2 N	50 L	100	300	10	20	700	150	50	1500	300	,45 N	18,7
1058	70	150	100	2 L	50 L	100	500	20	15	700	150	70	700	700	,85 N	10,3
1066	20	100	150	2 N	50 L	100	150	10	15	1000	150	70	700	300	,49 N	17,3
1071	30	70	70	2 N	50 L	50	150	10	10	1000	150	70	700	700	,21 N	40,0
1075	50	150	150	5	20	70	200	30	15	300	200	70	700	500	,49 N	17,3
1081	50	70	100	2 L	20	50	150	20	7	300	200	70	500	300	,15 N	56,0
1104	20	70	100	2 N	50 L	20	100	15	7	700	150	50	500	700	,28 N	30,7
1110	50	200	50	2 L	50 L	70	300	15	15	500	150	70	1000	300	,90 N	10,0
1112	50	150	50	2 N	50 L	70	200	20	15	700	150	70	500	300	,50 N	16,7
1116	30	100	100	2 N	50 L	70	200	15	15	700	150	70	700	700	,35 N	24,3
1121	50	100	150	2 N	50 L	70	300	15	15	500	150	70	700	300	,55 N	16,0
1131	70	150	50	2 N	50 L	100	300	10	15	700	150	30	1500	300	,86 N	10,0
1134	30	50	100	2 N	20	30	150	15	5	200	100	50	700	500	,45 N	19,0
1153	70	150	50	2 L	50 L	100	300	20	15	700	150	70	700	300	,49 N	17,0
1157	50	150	150	2 N	50 L	150	200	15	15	700	150	70	700	300	,49 N	19,0
1171	70	200	70	2 N	50 L	150	700	7	50	1500	150	30	1500	200	1,20 N	7,3
1175	100	200	50	2 N	50 L	150	700	10	50	1500	150	30	2000	300	1,70 N	5,3
1180	50	70	50	2 N	50 L	30	150	15	7	700	150	70	300	300	,30 N	29,0
1189	50	150	150	2 N	50 L	70	200	15	15	700	150	70	1500	300	,37 N	23,0
1194	20	150	70	2 L	50 L	70	200	7	7	700	150	50	1000	300	,10 N	18,3
1208	30	150	70	3	50 L	100	200	15	7	700	150	50	500	700	,10 N	15,8
1239	70	500	50	7	50 L	150	700	20	30	1500	200	70	3000	500	,40 N	4,3
1247	30	150	50	2 N	50 L	100	150	15	7	1000	150	70	1000	300	,10 N	19,3
1259	50	200	50	2 N	50 L	70	300	10	15	1500	150	50	1000	200	,20 N	8,0
1264	70	300	30	5	50 L	150	700	10	20	2000	150	30	2000	200	,25 N	6,0
1269	30	150	100	2 N	50 L	100	300	15	10	1500	150	70	3000	700	,12 N	15,5
1288	30	70	70	2 N	50 L	30	70	15	5 L	200	200	150	300	700	,05 N	67,0
1327	50	500	20	2 N	50 L	50	500	7	20	1500	100	15	2000	200	,20 N	8,5
1333	30	150	30	2 L	50 L	50	500	20	15	200	200	20	700	700	,05 N	23,5
1339	70	300	30	2 L	50 L	100	1000	15	30	700	200	30	3000	300	,20 N	10,8
1346	50	100	150	2 N	50 L	70	150	15	15	700	150	70	1000	300	,12 N	17,3

TABLE 4.—*Geochemical analyses of the ash of forest litter from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	X-COORD.	Y-COORD.	S-FE %	S-MG %	S-TI %	S-MN	S-AG	S-B	S-BA	S-BE	S-BI	S-CD	S-CO
1352	233270	917690	5	2,00	,5	10000 G	0,70	150	3000	5	10 N	7	100
1359	232440	918710	5	2,00	,7	10000 G	1,00	150	3000	3	10 N	10	20
1365	231750	919200	5	,70	,5	10000	0,20	150	2000	3	10 N	7	20
1392	769800	928010	3	1,50	,7	10000 G	0,70	200	1500	3	10 N	10	15
1395	770490	927690	3	,70	,7	10000 G	0,50 N	200	1500	3	10 N	10	70
1400	770750	927220	3	,70	,7	10000	0,20	200	1000	2	10 N	7	10
1406	770780	926620	5	,70	,7	5000	0,20	150	1500	3	10 N	10	15
1410	770650	925980	3	1,00	,3	10000 G	0,70	200	1500	3	2	20	20
1415	770710	925290	3	1,50	,5	10000 G	0,50	300	2000	3	10 L	20	15
1420	770900	924440	3	,50	,7	7000	0,50 L	70	1000	3	10 N	7	10
1428	770510	922020	3	,70	,7	7000	0,50 L	150	1000	3	10 N	7	15
1433	770600	921600	3	2,00	,3	10000 G	1,50	300	1500	1	10 L	15	10
1437	771020	921090	3	1,50	,5	10000 G	0,50 N	500	1000	2	10 N	10	15
1444	228270	918690	3	,70	,7	7000	0,30	100	1500	3	10 N	15	10 L
1455A	230870	919300	5	1,00	,7	10000 G	0,50 L	300	1000	2	10 N	15	15
1468	232380	918050	2	1,50	,3	10000 G	0,50 N	200	3000	3	10 N	7	150
1479	231430	918130	3	1,50	,5	10000 G	0,50 N	200	3000	2	10 N	7	20
2002	254200	932640	5 G	5,00	1,0 G	10000 G	0,10 N	70	2000	3	1 N	1 L	70
2006	254190	932710	5	1,00	,7	10000	0,10 N	70	2000	5	1 N	1 L	50
2009	254170	932780	5	1,00	,7	10000 G	0,10 N	70	3000	7	1 N	5	70
2024	254235	932565	3	5,00	,3	10000 G	1,50	200	3000	2	2	15	20
2027	254250	932415	5 G	2,00	,7	5000	0,15	70	1500	3	1 L	1 L	30
2031	254290	932335	3	1,50	,7	10000 G	0,10 N	100	3000	5	1 N	1 L	30
2034	254340	932170	3	1,50	,7	5000	0,15	200	3000	5	1 N	1 L	70
2038	254310	931975	5 G	1,50	,7	7000	0,10 N	150	1500	5	1 N	5	70
2041	254305	931930	5	3,00	,7	10000 G	1,50	150	3000	5	1 L	10	150
2045	254910	932040	5	2,00	1,0	5000	1,00	100	3000	3	1 L	5	30
2048	254950	932065	5	1,50	,7	5000	0,10	70	3000	3	1 N	3	30
2061	255100	931780	5	3,00	,7	10000	1,00	200	7000	3	1 L	70	30
2064	255540	931560	5	,70	1,0	2000	0,10 L	100	2000	3	1 N	5	15
2067	255610	931560	5 G	1,00	,7	10000	0,30	200	5000	3	1 L	7	30
2069	249880	929460	5 G	2,00	1,0	10000 G	0,70	100	3000	3	1 N	5	100
2073	248920	929620	5 G	1,50	,7	10000 G	0,10 N	70	3000	7	1 N	1 L	70
2074	249140	929950	3	1,00	,7	10000 G	0,10 N	150	3000	7	1 N	5	500
2077	249325	930080	5 G	7,00	1,0	10000 G	0,10 N	70	1000	0 L	1 N	1 L	70
2081	248960	929860	5	2,00	1,0	10000 G	0,10 N	200	3000	7	1 N	7	150
2086	248700	929755	5	2,00	,7	10000 G	0,10 N	200	3000	7	1 N	5	150
2089	248470	929535	5 G	3,00	,7	10000	1,50	300	5000	5	3	15	100
2094	248430	929235	3	2,00	,5	10000 G	0,10 N	150	5000	10	1 N	1 N	30
2114	230520	927190	5	1,00	,7	7000	1,00	200	3000	3	10 N	10	10
2119	230070	927115	2	1,50	,5	10000 G	0,10 N	300	3000	3	10 N	10	20

TABLE 4.—*Geochemical analyses of the ash of forest litter from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	S-CR	S-CU	S-LA	S-MO	S-NB	S-NI	S-PB	S-SC	S-SN	S-SP	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	ASH %
1352	50	200	150	2 N	50 L	100	200	20	15	700	150	100	1500	300	,20 N	11,5
1359	70	150	100	2 L	50 L	150	200	20	20	1000	200	70	1000	300	,20 N	11,5
1365	30	100	70	2 N	50 L	70	150	15	10	300	150	50	700	300	,05 N	29,5
1392	70	150	70	2 N	50 L	100	300	10	30	500	150	50	2000	100	,50 N	12,8
1395	30	100	100	2 N	50 L	50	200	15	15	700	150	70	1000	200	,25 N	25,0
1400	30	70	30	2 N	50 L	50	150	10	15	300	150	50	700	300	,20 N	31,3
1406	50	150	150	2 L	50 L	70	300	20	20	300	150	50	700	300	,27 N	23,0
1410	50	200	50	2 L	50 L	70	300	7	30	700	100	15	1500	70	,85 N	7,5
1415	70	200	70	2 L	50 L	100	500	7	20	1000	150	30	1500	200	,55 N	11,8
1420	30	50	70	2 N	50 L	30	70	10	5	300	150	50	500	300	,16 N	39,8
1428	20	50	50	2 N	50 L	30	100	15	7	300	150	30	700	300	,14 N	45,3
1433	70	200	20	2 L	50 L	100	300	5	20	1500	150	20	1500	150	,16 N	4,3
1437	30	70	70	2 L	50 L	50	200	7	10	500	150	30	1500	300	,27 N	23,3
1444	30	70	20	2 L	50 L	30	300	15	15	300	150	20	1500	300	,25 N	26,0
1455A	50	100	20	2 L	50 L	50	200	15	10	500	150	20	1000	200	,47 N	14,0
1468	30	150	150	2 L	50 L	100	200	5	5	1000	70	150	1000	70	,42 N	15,0
1479	30	150	70	2 N	50 L	70	200	15	5	1500	100	70	700	300	,42 N	15,0
2002	70	150	70	2 N	20	150	150	30	5	300	300	70	700	300	,11 N	56,0
2006	20	70	70	2 N	20 L	70	150	15	5 L	300	150	70	500	300	,15 N	42,5
2009	50	100	150	2 N	20 L	100	150	15	7	500	150	100	1000	300	,11 N	58,3
2024	80	1500	70	2 N	20 L	70	500	10	15	1500	150	50	5000	200	,39 N	16,8
2027	70	300	70	2 L	20	150	150	15	7	200	150	70	1500	500	,25 N	26,3
2031	30	70	150	2 N	20 L	100	150	15	5 L	700	150	150	700	700	,21 N	39,7
2034	30	100	150	2 N	20 L	100	150	15	7	200	150	150	700	700	,33 N	25,7
2038	30	150	100	2 N	20	100	100	15	5 L	100	150	70	1000	300	,22 N	38,0
2041	50	200	70	2 N	20 L	100	200	15	15	700	150	70	1500	300	,28 N	31,0
2045	70	150	30	2 L	20 L	100	300	20	15	700	200	30	1000	300	,32 N	26,7
2048	50	70	150	2 N	20 L	100	150	20	5	700	150	70	500	700	,23 N	35,7
2061	100	200	70	2 L	20 L	150	500	15	20	3000	150	70	1500	300	1,00 N	8,3
2064	30	50	30	2 N	20 L	30	70	15	5 L	150	150	50	300	300	,15 N	55,7
2067	100	150	100	5	20 L	150	500	20	15	700	200	70	1000	500	,60 N	15,7
2069	70	700	100	2 N	20 L	150	300	30	15	500	200	70	1500	300	,30 N	29,3
2073	50	150	150	2 N	20 L	150	150	15	10	300	150	150	700	1000	,18 N	45,7
2074	30	200	200	2 N	20 L	150	200	15	15	700	150	200	1000	500	,40 N	22,0
2077	300	150	20 L	2 N	20 L	150	150	30	7	700	300	50	700	300	,21 N	40,0
2081	50	150	150	2 N	20 L	150	200	15	20	1500	150	70	1500	100	,32 N	26,3
2086	70	100	150	2 N	20 L	150	150	15	15	1000	150	100	700	300	,25 N	34,0
2089	100	300	150	5	20 L	200	500	20	30	2000	200	100	3000	500	1,70 N	5,3
2094	50	100	200	2 N	20 L	150	100	15	10	2000	150	200	300	300	,38 N	22,0
2114	70	200	70	2 L	50 L	100	500	15	15	700	150	70	1000	500	1,00 N	8,3
2119	70	150	30	2 N	50 L	70	500	7	30	1500	100	30	1000	300	1,10 N	7,7

TABLE 4.—*Geochemical analyses of the ash of forest litter from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	X-COORD.	Y-COORD.	S-FE %	S-MG %	S-TI %	S-MN	S-AG	S-B	S-BA	S-BE	S-BI	S-CD	S-CO
2122	230085	926445	3	1,50	,7	10000 G	0,10 N	200	3000	3	10 N	10	15
2125	230235	926495	3	1,50	,7	10000 G	0,10 N	300	3000	2	10 N	3	10 L
2132	231725	926100	3	2,00	,7	10000 G	0,10 N	150	5000	7	10 N	10	30
2135	771880	927740	3	2,00	,7	10000 G	0,10 N	200	2000	3	10 N	15	50
2144	228225	927175	3	2,00	,7	10000 G	0,10 N	300	1500	3	10 N	5	30
2149	229380	927435	3	,50	,7	7000	0,10 N	150	1000	3	10 N	3	10
2154	229070	926620	2	1,50	,7	10000 G	0,10 N	150	1500	1	10 N	7	7
2162	228120	926410	3	,20	1,0	3000	0,10	200	700	3	10 N	2 L	10
2165	771850	926825	3	,50	,7	7000	0,30	200	700	3	10 N	3	10
2167	771585	926960	5	,70	1,0	1500	0,70	150	500	3	10 N	7	10
2169	771250	926905	3	,20	1,0	1000	0,15	300	700	5	10 N	2 L	30
2174	228020	925910	3	,15	,7	1000	0,10 N	150	300	3	10 N	2 L	20
2178	228460	924750	3	1,00	,7	10000 G	0,30	200	2000	5	10 N	10	30
2180	228335	924825	3	,10	1,0	1000	0,10 L	150	700	2	10 N	7	10 L
2182	228305	924845	3	,10	1,0 G	1500	0,10 L	150	1000	3	10 N	2 L	10 L
2192	772220	925375	3	,15	,7	10000 G	0,10 L	200	3000	3	10 N	10	30
2198	771785	925990	3	,15	1,0	7000	0,10 N	150	1000	3	10 N	5	7
2200	227745	925735	3	,50	1,0	50000	0,10 L	300	1500	5	10 N	7	7
2214	771710	925370	5	,50	1,0	2000	0,20	200	1500	5	10 N	7	20
2217	771155	925180	3	,30	1,0 G	2000	0,10	150	1000	5	10 N	7	20
2219	771200	924915	3	,50	1,0	1000	0,20	150	1500	3	10 N	2 L	10 L
2221	771365	924570	5	,20	,7	2000	0,10 L	150	1000	5	10 N	5	10
2224	771885	924900	3	,15	,7	3000	0,20	200	1500	5	10 N	7	10
2232	772030	921260	5 G	1,50	1,0	7000	0,20	100	3000	7	10 N	7	15
2234	772380	921490	3	,20	,7	700	0,10 L	30	1500	3	10 N	3	10 L
2242	772220	920615	2	,50	,7	3000	0,20	70	3000	3	10 N	7	5
2244	227665	920855	5	2,00	1,0	3000	0,70	300	3000	5	3	50	20
2307	229600	917370	5	,70	,7	10000	0,20	100	1500	3	10 N	5	20
2311	229950	917020	5	,70	,7	10000	0,30	150	1500	3	10 N	10	15
2314	230300	916350	5	,70	,7	7000	0,10 L	100	1500	2	10 N	5	15
2317	231570	915695	5 G	1,00	,7	10000	0,10 L	200	3000	3	10 N	7	30
2319	231210	915980	5	,70	1,0	7000	0,70	150	1500	3	10 N	7	20
2323	232170	915380	5	1,00	1,0	10000 G	0,10 N	200	3000	3	10 N	5	30
2339	770460	924020	2	,70	,5	10000 G	0,50 N	150	2000	2	10 N	15	10
2346	771495	926110	5	,70	,7	7000	0,50	200	1500	3	10 N	10	10
2348	771660	919295	5	,70	,7	10000	0,50	150	1500	3	2	15	15
2352	771755	920265	5	,70	,7	2000	0,20	70	1500	3	10 N	7	10 L
2354	771315	920500	5	,70	,7	10000	0,50 N	150	1000	2	10 N	7	20
2358	234520	916485	3	1,00	,7	5000	0,50 N	150	2000	2	10 N	5	15
2363	233615	915450	3	2,00	,7	10000	0,20	150	2000	3	10 L	7	15
3008	248745	939485	5 G	,70	,7	10000	0,10 L	70	3000	7	1 L	5	150

TABLE 4.—*Geochemical analyses of the ash of forest litter from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	S-CR	S-CU	S-LA	S-MO	S-NB	S-NI	S-PB	S-SC	S-SN	S-SR	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	ASH %
2122	70	150	70	2 N	50 L	70	200	10	15	1500	150	70	1500	300	,50 N	16,3
2125	30	70	50	2 N	50 L	30	150	10	7	700	100	30	700	200	,33 N	25,7
2132	30	150	200	2 N	50 L	70	200	10	15	1500	100	70	1000	150	,33 N	25,7
2135	70	150	100	2 N	50 L	150	500	10	20	1500	100	50	2000	200	,67 N	13,7
2144	30	100	70	2 N	50 L	70	150	15	15	1000	150	70	700	200	,42 N	20,3
2149	30	70	70	2 N	50 L	50	150	15	7	500	150	70	300	500	,55 N	16,0
2154	30	100	20 L	2 N	50 L	50	150	7	10	1000	70	30	1000	500	,70 N	11,0
2162	30	70	30	2 N	50 L	50	150	15	7	300	150	70	500	700	,43 N	19,7
2165	50	70	50	2 N	50 L	70	200	15	10	500	150	30	700	300	,33 N	26,0
2167	70	100	70	2 L	50 L	70	300	15	15	300	150	70	700	300	,38 N	22,7
2169	70	70	50	2 L	50 L	50	150	30	7	500	200	70	300	300	,21 N	40,0
2174	3	50	70	2 L	50 L	70	100	15	5	300	150	70	300	300	,55 N	16,0
2178	30	150	70	2 N	50 L	100	200	15	15	500	200	70	1000	300	,06 N	16,8
2180	10	100	20	2 N	50 L	20	100	10	5 N	100	150	70	300	1000 G	,05 N	30,5
2182	20	50	50	2 N	50 L	30	100	15	5 L	150	150	70	300	700	,05 N	35,0
2192	30	150	100	2 N	50 L	70	150	15	7	700	150	50	1000	300	,06 N	20,3
2198	15	70	50	2 L	50 L	30	100	15	5	150	150	100	300	1000	,05 N	42,3
2200	30	100	70	2 L	50 L	30	200	20	15	300	200	70	700	500	,05 N	19,3
2214	70	150	100	2	50 L	70	200	30	15	300	200	150	700	300	,06 N	17,3
2217	30	150	70	2	50 L	50	150	20	10	200	200	70	700	700	,05 N	17,0
2219	30	70	70	2 N	50 L	30	150	15	7	100	150	50	500	700	,05 N	36,3
2221	30	100	70	2 L	50 L	30	70	20	7	150	150	70	300	700	,05 N	43,5
2224	30	70	70	2 N	50 L	30	200	20	15	300	150	70	700	500	,05 N	21,5
2232	50	150	100	7	50 L	100	300	30	15	700	200	150	700	700	,05 N	19,5
2234	7	50	30	2 N	50 L	20	30	10	5 N	100 L	150	50	100 L	500	,05 N	49,3
2242	10	70	50	2 N	50 L	30	100	10	7	500	150	20	500	700	,05 N	23,8
2244	70	500	50	7	50 L	150	700	15	70	1000	200	70	3000	300	,12 L	6,5
2307	30	100	50	2 N	50 L	70	100	20	7	300	200	50	700	300	,05 N	36,3
2311	30	150	50	2 N	50 L	50	150	20	5	500	200	50	1000	500	,06 N	17,5
2314	30	100	70	2 N	50 L	50	100	15	5 L	300	200	70	700	500	,05 N	28,3
2317	50	100	100	2 L	50 L	100	150	20	5	500	200	300	700	300	,05 N	39,3
2319	30	100	70	2 N	50 L	70	200	15	7	300	150	70	700	700	,05 N	30,3
2323	30	70	70	2 N	50 L	50	150	20	15	300	200	70	700	500	,05 N	43,3
2339	15	100	30	2 N	50 L	50	200	5	7	700	100	20	1500	300	,42 N	15,0
2346	30	150	70	2 L	50 L	70	300	15	15	700	150	70	1500	300	,67 N	9,5
2348	50	200	50	7	50 L	100	500	15	30	700	150	30	2000	300	,64 N	10,0
2352	30	70	70	2 L	50 L	30	150	15	10	300	150	30	700	700	,25 N	24,8
2354	30	150	50	5	50 L	30	150	15	10	200	150	20	700	500	,43 N	27,3
2358	30	70	30	2 N	50 L	30	150	15	10	300	100	15	500	500	,28 N	22,5
2363	50	150	70	2 N	50 L	70	300	15	15	700	150	70	1000	300	,50 N	12,8
3008	30	300	150	2 L	20 L	100	150	30	10	150	150	70	500	300	,19 N	45,3

TABLE 4.—*Geochemical analyses of the ash of forest litter from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	X-COORD.	Y-COORD.	S-FE %	S-MG %	S-TI %	S-MN	S-AG	S-B	S-BA	S-BE	S-BI	S-CD	S-CO
3010	248759	939480	5	.70	1.0	2000	0.10	50	1500	5	1 N	1 N	100
3012	248773	939476	5	1.00	1.0	2000	0.10 L	50	1500	5	1 N	1 L	70
3014	248787	939471	5	1.00	.7	3000	0.15	50	3000	7	3	1 L	70
3016	248801	939467	3	.70	1.0	3000	0.15	50	1500	5	1 N	1 L	70
3018	248815	939462	3	.70	.7	1500	0.70	50	1000	3	2	1 L	30
3020	248829	939458	5 G	1.50	1.0	7000	1.50	70	2000	3	2	5	100
3022	248843	939453	3	.70	.7	3000	0.10	50	1500	3	1 N	1 N	70
3024	248857	939449	3	.50	1.0	2000	0.10	70	1500	3	1 N	1 L	70
3026	248871	939444	5	.30	1.0 G	1500	0.10 L	70	1500	5	1 L	1 N	30
3028	248885	939440	5	.20	1.0	1500	0.10 N	30	1500	3	1 L	1 N	10
3032	230590	926660	3	.30	1.0 G	3000	0.10 N	150	500	1	10 N	2 L	10 L
3045	771510	927840	3	.70	1.0	10000	0.10 N	200	700	3	10 N	2 L	15
3056	230030	927590	3	.70	.7	10000	0.10 L	150	1500	5	10 N	7	30
3061	228960	928340	5 G	.70	1.0	3000	0.30	700	700	5	10 N	2 L	10
3063	229170	927630	3	.70	.7	3000	0.10 L	150	1500	3	10 N	2 L	10
3075	770750	928210	5 G	.70	1.0	1000	0.10 L	150	700	5	10 N	2 L	20
3079	771300	928980	3	.70	1.0	3000	0.10 L	150	700	3	10 N	2 L	15
3094	229860	922590	3	.30	1.0	1500	0.30	150	1000	3	10 N	7	7
3097	230230	921290	3	.50	.7	1500	0.10 L	70	700	2	10 N	2 L	10 L
3099	228950	922090	3	.30	.7	7000	0.10 N	200	1500	7	10 N	2 L	15
3102	229150	922710	3	.70	1.0	1500	0.10	150	1500	3	10 N	2 L	30
3104	228630	923130	3	.50	.7	1500	0.10	150	1000	3	10 N	7	10 L
3134	230230	921290	3	.20	1.0	700	0.10 L	70	700	3	10 N	2 L	10 L
3158	228940	919170	5	.70	.7	5000	0.50	100	1500	3	10 N	5	15
3161	229860	919660	5 G	1.50	1.0	7000	0.70	100	3000	3	10 N	20	30
3163	230230	919660	3	.70	.7	3000	0.70	100	1500	3	10 N	7	10
3165	230130	919340	5	.70	.7	5000	0.10 L	100	1500	3	10 N	5	10
3170	228960	919620	5	5.00	.5	7000	2.00	300	2000	3	3	70	30
3175	230300	920450	5	5.00	.7	7000	2.00	200	3000	3	5	70	20
3181	770130	923500	5	1.00	.7	10000 G	0.50 L	100	2000	3	10 N	3	20
3184	769170	922850	5	.70	.7	10000	0.50 L	70	1500	3	10 N	3	20
3188	770960	922560	5	1.50	1.0	1500	10.00	150	1500	3	10 L	70	30
3190	769690	928430	5	1.00	1.0	5000	0.50 L	150	1500	3	10 N	2 N	30
3198	231710	916320	5	1.50	.7	3000	0.50 N	150	1500	3	10 N	2 L	15

TABLE 4.—*Geochemical analyses of the ash of forest litter from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	S-CR	S-CU	S-LA	S-MO	S-NB	S-NI	S-PB	S-SC	S-SN	S-SR	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	ASH %
3010	30	150	100	2 N	20	70	100	30	7	150	150	70	700	300	.17 N	50.7
3012	30	200	100	2 N	20	70	70	20	7	50 L	150	70	700	500	.11 N	75.7
3014	30	700	150	2 N	20	70	70	20	15	100	150	70	1000	500	.15 N	60.0
3016	30	700	150	2 N	20 L	70	70	15	7	100	150	100	1000	500	.18 N	47.0
3018	30	700	30	2 N	20 L	50	70	15	10	50 L	150	100	700	500	.15 N	55.0
3020	70	1500	150	2 L	20	150	150	30	20	50 L	150	20	1000	300	.15 N	53.3
3022	30	500	70	2 L	20 L	70	70	20	5	50 L	150	70	500	300	.11 N	72.3
3024	30	300	70	2 N	20 L	70	100	15	7	100	150	50	300	700	.17 N	49.3
3026	30	300	100	2 L	20	70	70	20	7	50 L	150	50	300	500	.14 N	60.7
3028	20	70	70	2 N	20	30	50	15	7	50 L	150	20	200	300	.14 N	66.3
3032	7	30	70	2 N	50 L	20	100	15	5	700	100	30	200	500	.21 N	40.3
3045	30	50	70	2 N	50 L	30	100	20	7	300	150	50	300	300	.17 N	50.0
3056	30	70	150	10	50 L	70	150	15	7	700	100	70	1000	500	.38 N	22.3
3061	70	70	150	5	50 L	70	200	30	15	300	200	70	300	300	.27 N	32.0
3063	30	70	100	2 L	50 L	50	200	15	10	300	150	70	500	500	.32 N	26.7
3075	50	70	100	2 L	50 L	100	150	20	10	100	150	150	700	500	.55 N	44.0
3079	70	50	150	2 N	50 L	30	200	20	10	100	150	100	300	700	.18 N	46.7
3094	70	20	50	2 L	50 L	30	150	15	10	100	150	50	500	700	.05 N	22.8
3097	70	20	50	2 L	50 L	30	50	10	5 L	100 L	200	50	100 L	500	.05 N	66.3
3099	70	15	50	2 N	50 L	30	70	20	5 L	150	150	70	300	300	.05 N	53.8
3102	70	30	70	2 L	50 L	30	150	15	7	100	150	70	300	700	.05 N	39.5
3104	70	15	50	2 N	50 L	30	150	15	7	150	100	30	700	700	.05 N	22.0
3134	70	15	150	2 L	50 L	15	50	15	5 N	100	200	50	100 L	700	.05 N	60.0
3158	30	70	70	2 L	50 L	30	150	20	7	200	200	20	300	300	.05 N	50.5
3161	70	150	50	5	50 L	70	700	30	30	300	200	70	1000	500	.05 N	34.5
3163	30	100	30	3	50 L	30	300	15	15	200	150	20	700	700	.05 N	31.8
3165	30	70	70	2	50 L	30	70	20	7	200	200	70	300	300	.05 N	53.0
3170	70	700	50	7	50 L	150	1000	15	50	1500	300	30	3000	200	.25 N	4.3
3175	70	500	50	7	50 L	150	1000	15	70	1500	300	50	3000	300	.20 N	7.3
3181	30	100	100	2 N	50 L	50	150	15	7	500	150	70	700	300	.17 N	36.5
3184	30	70	50	2 N	50 L	30	70	15	5 L	150	150	30	700	300	.25 N	51.0
3188	70	200	70	15	50 L	150	700	20	70	700	200	70	3000	500	1.40 N	4.8
3190	30	70	70	2 N	50 L	30	150	15	10	200	150	70	300	300	.14 N	46.3
3198	30	70	70	2 N	50 L	30	150	15	5 L	150	150	30	300	300	.16 N	38.8

TABLE 5.—*Geochemical analyses of rocks and minerals from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*

[Sample localities shown on figure 8 and plates 2 and 3. Chemical analyses (AA, atomic absorption; Inst, instrumental) were made by C. A. Curtis, J. G. Frisken, A. L. Meier, J. D. Sharkey, Z. C. Stephenson, and A. J. Toevs, U.S. Geological Survey. Semiquantitative spectrographic analyses (S) were made by E. F. Cooley, K. J. Curry, G. W. Day, and R. T. Hopkins, U.S. Geological Survey. Letter symbols: L, detected but below limit of determination; N, not detected; G, greater than; B, not looked for. Values in parts per million (ppm) except where indicated as percent. X and Y coordinates are Universal Transverse Mercator grid. Elements looked for spectrographically but not found and their lower limits of determination: As (200), Au (10), Sb (200), and W (50)]

SAMPLE	X-COORD.	Y-COORD.	S-FE %	S-MG %	S-CA %	S-TI %	S-MN	S-AG	S-B	S-BA	S-BE	S-BI	S-CD	S-CU	S-CR	S-CU
ARKOSE, CONGLOMERATE AND SANDSTONE: UNIT 0																
1096	232100	927340	2.00	.20	0.05 L	.300	100	0.5 N	10 L	700	1	10 N	20 N	5 N	10	5
2011	254200	932765	3.00	.50	0.50	.200	300	0.5 N	10 L	200	2	10 N	20 N	5	10 N	10
2020	254285	932480	3.00	1.00	0.20	.300	700	0.5 N	10 L	300	1 L	10 N	20 N	5 N	20	200
2109	234760	927775	5.00	1.00	0.05	.200	500	0.5 N	30	700	1	10 N	20 N	7	15	50
2110	234705	927820	3.00	.70	0.30	.300	500	0.5 N	15	700	1	10 N	20 N	5 L	20	7
2259	236475	919615	7.00	1.50	0.70	.500	700	0.5 N	30	300	1	10 N	20 N	7	50	7
2260	236475	919615	3.00	1.50	2.00	.300	1500	0.5 N	30	700	1	10 N	20 N	7	30	15
2261	236475	919615	3.00	1.00	2.00	.300	1000	0.5 N	15	500	1	10 N	20 N	7	30	7
2262	236475	919615	5.00	1.50	1.00	.300	1000	0.5 N	20	300	1	10 N	20 N	7	30	15
2270	236475	919615	3.00	1.50	2.00	.500	1500	0.5 N	50	500	1	10 N	20 N	7	70	15
2272	236475	919615	3.00	1.00	1.00	.300	1000	0.5 N	70	300	2	10 N	20 N	5	50	10
2276	231760	919830	5.00	.70	0.15	.500	700	0.5 N	15	1000	1	10 N	20 N	7	70	15
2334	233320	926040	3.00	.70	0.70	.300	700	0.5 N	10 L	700	1 L	10 N	20 N	5	30	5 L
2336	235620	924840	1.50	.30	0.30	.150	300	0.5 N	10 L	700	1 L	10 N	20 N	5 N	10 L	5
2337	235620	924840	3.00	.70	0.70	.300	500	0.5 N	10 L	700	1 L	10 N	20 N	5 L	15	5
3142	236280	918790	3.00	.70	2.00	.300	1000	0.5 N	20	300	1	10 N	20 N	5 L	15	5
UNIT 1																
1035	230140	927000	3.00	1.00	1.00	.200	700	0.5 N	10	700	2	10 N	20 N	5	15	15
1039	230450	927410	3.00	.30	0.20	.100	500	0.5 N	10	500	1 L	10 N	20 N	5	10	5
1045	230870	927520	2.00	.20	0.20	.500	700	0.5 N	10 L	300	1	10 N	20 N	7	10 N	15
1081	231370	928070	1.00	.20	0.05	.300	200	0.5 N	10 L	200	1	10 N	20 N	5 N	10	7
1137	230450	927720	3.00	.20	0.10	.200	700	0.5 N	10 L	1000	1	10 N	20 N	5	10	5 L
2116	230255	927320	2.00	.20	0.10	.500	500	0.5 N	10 L	1000	1	10 N	20 N	5	15	5
2117	230255	927305	1.00	.20	0.05	.500	30	0.5 N	10 L	1000	1	10 N	20 N	5 N	10	10
3089	229390	928110	3.00	.50	0.50	1.000 G	150	0.5 N	20	1000	2	10 N	20 N	5	30	5
UNIT 2																
1044	230830	927410	1.00	.10	0.07	.100	200	0.5 N	10 L	150	1	10 N	20 N	5	10 N	15
2138	771980	927835	3.00	.30	0.10	.300	200	0.5 N	10 L	200	1	10 N	20 N	5	10	15
2145	228720	926755	3.00	1.00	0.50	.300	500	0.5 N	30	150	1 L	10 N	20 N	5	15	10
2186	228740	927720	2.00	.50	0.30	.300	150	0.5 N	10	700	2	10 N	20 N	7	15	15
3081	771260	928520	1.00	.20	0.05 L	.300	15	0.5 N	10 L	500	1 N	10 N	20 N	5 N	10	5 L
UNIT 3																
1031	230290	926580	3.00	1.00	1.00	.500	500	0.5 N	30	200	1	10 N	20 N	7	30	10
1102	231250	927250	1.00	.30	0.10	.500	30	0.5 N	10	500	2	10 N	20 N	5 N	15	5 L
1144	229410	926460	2.00	.30	0.50	.700	500	0.5 N	30	700	1	10 N	20 N	5	20	5 L
1164	228620	925660	3.00	2.00	1.00	.300	500	0.5 N	30	150	1	10 N	20 N	7	30	20
2129	230380	926380	2.00	.30	0.07	.200	300	0.5 N	15	150	1 L	10 N	20 N	5	15	10

TABLE 5.—*Geochemical analyses of rocks and minerals from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	S-LA	S-MO	S-NB	S-NI	S-PB	S-SC	S-SN	S-SR	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	INST-HG	AA-CU-P	AA-PB-P	AA-ZN-P	T-C-C %
ARKOSE, CONGLOMERATE AND SANDSTONE: UNIT 0																		
1096	30	5 N	20 N	5 L	15	7	10 N	100	30	15	200 N	150	.05 N	.04	5	15	5	0 B
2011	20 L	5 N	20 L	15	20	7	10 N	100 L	30	15	200 N	300	.05 N	.04	30	35	35	0 B
2020	20	5 N	20 L	5	50	7	10 N	100 L	30	15	300	200	.05 N	.02 L	95	20	130	0 B
2109	30	5 L	20 L	10	10	7	10 N	100 N	50	15	200 N	150	.05 N	.02 N	50	15	80	0 B
2110	30	5 N	20 L	10	15	7	10 N	150	50	10	200 N	200	.05 N	.02 N	10	25	40	0 B
2259	20 L	5 N	20 L	15	15	15	10 N	150	70	30	200 N	150	.05 N	.02	15	5	150	0 B
2260	20	5 N	20 L	15	20	15	10 N	200	70	30	200 N	300	.05 N	.02 L	15	5	120	0 B
2261	20 L	5 N	20 L	15	10	10	10 N	150	50	20	200 N	300	.05 N	.02	10	10	110	0 B
2262	20	5 N	20 L	15	70	10	10 N	150	50	20	200 N	300	.05 N	.04	20	10	130	0 B
2270	50	5 N	20 L	10	20	15	10 N	300	70	50	200 N	300	.05 N	.02 L	10	10	170	0 B
2272	20	5 N	20 L	7	15	10	10 N	150	50	20	200 N	300	.05 N	.06	10	10	190	0 B
2276	20 L	5 N	20 L	10	15	15	10 N	150	100	30	200 N	700	.05 N	.06	30	10	150	0 B
2334	20	5 N	20 L	7	15	7	10 N	150	50	20	200 N	200	.05 N	.02 L	5 L	20	120	0 B
2336	30	5 N	20 N	5	30	5	10 N	150	15	15	200 N	150	.05 N	.02	10	25	110	0 B
2337	30	5 N	20 L	7	15	7	10 N	150	50	20	200 N	200	.05 N	.02 L	5	15	120	0 B
3142	20	5 N	20 L	7	15	7	10 N	200	50	15	200 N	100	.05 N	.04	10	10	120	0 B
UNIT 1																		
1035	70	5 N	20 L	5	100	10	10 N	200	50	50	200 N	150	.05 N	.08	10	30	110	0 B
1039	20 N	5 N	20 N	5	20	5 L	10 N	100	30	10	200 N	30	.05 N	.06	5	30	50	0 B
1045	70	5 N	20 L	5	20	10	10 N	100	30	20	200 N	300	.05 N	.06	10	20	35	0 B
1051	50	5 N	20 N	5 L	30	5	10 N	100	30	10	200 N	150	.05 N	.06	10	25	20	0 B
1137	50	5 N	20 L	5 L	30	7	10 N	150	20	15	200 N	70	.05 N	.06	5 L	25	30	0 B
2116	70	5 N	20 L	5 L	30	10	10 N	100	30	20	200 N	200	.05 N	.06	5	25	25	0 B
2117	20	5 N	20 L	5 L	50	5	10 N	100	20	20	200 N	200	.05 N	.04	15	45	10	0 B
3059	100	5 N	20	5 L	15	30	10 N	100	50	70	200 N	1000	.05 N	.04	5	15	40	0 B
UNIT 2																		
1044	30	5 N	20 N	5	50	5	10 N	300	10	20	200 N	100	.05 N	.18	15	15	30	0 B
2138	70	5 N	20 L	5 L	30	5	10 N	100 N	20	15	200 N	150	.05 N	.16	10	20	25	0 B
2145	20 N	5 N	20 N	10	15	5	10 N	100 N	30	10	200 N	100	.05 N	.04	10	15	50	0 B
2156	50	5 N	20 L	5 L	70	10	10 N	100	30	15	200 N	150	.05 N	.02	10	40	55	0 B
3081	20	5 N	20 N	5 L	20	5 L	10 N	100 N	10	10	200 N	200	.05 N	.04	5 L	15	10	0 B
UNIT 3																		
1031	30	5 N	20 L	15	15	15	10 N	100	70	50	200 N	200	.05 N	.10	5	20	40	0 B
1102	30	5 N	20 L	5 L	15	7	10 N	100 N	30	15	200 N	500	.05 N	.04	5	10	5 L	0 B
1144	50	5 N	20 L	5	15	10	10 N	100	50	20	200 N	500	.05 N	.04	5	10	35	0 B
1164	20 N	5 N	20 N	15	15	20	10 N	100 N	70	20	200 N	200	.05 N	.06	20	15	60	0 B
2129	20	5 N	20 N	5	15	5	10 N	100 N	30	10	200 N	300	.05 N	.02 N	5	10	40	0 B

TABLE 5.—*Geochemical analyses of rocks and minerals from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	X-COORD.	Y-COORD.	S-FE %	S-MG %	S-CA %	S-TI %	S-MN	S-AG	S-B	S-BA	S-BE	S-BI	S-CD	S-CO	S-CR	S-CU
2150	229370	927410	3.00	.50	0.05 L	.500	150	0.5 N	50	150	1	10 N	20 N	5	20	10
3034	230580	926690	3.00	.20	0.20	.200	300	0.5 N	30	200	1	10 N	20 N	5	15	5 L
3038	230830	927080	3.00	1.00	1.00	.500	300	0.5 N	10	500	1	10 N	20 N	7	30	15
3039	230930	926940	2.00	.20	0.05	.300	200	0.5 N	10 L	200	1	10 N	20 N	5	10	5 L
3071	770740	927690	3.00	.20	0.20	.300	500	0.5 N	20	200	1	10 N	20 N	5	20	7
3072	770700	927700	2.00	.10	0.05	.200	200	0.5 N	20	150	1	10 N	20 N	5 N	10	15
UNIT 4																
1083	229510	925430	1.00	.20	0.50	.200	200	0.5 N	10 L	200	1 N	10 N	20 N	5	15	15
1086	229570	925660	2.00	1.00	1.00	.300	700	0.5 N	50	150	1 L	10 N	20 N	5	15	7
1183	228210	924050	3.00	1.00	0.05 L	.100	500	0.5 N	20	150	1 L	10 N	20 N	7	10	15
1233	772140	923870	1.50	.20	0.15	.300	150	0.5 N	30	150	1 L	10 N	20 N	5	30	5
2202	228135	923570	3.00	.70	0.07	.200	200	0.5 N	70	150	1 L	10 N	20 N	7	30	5
2204	227930	923620	3.00	1.00	0.70	.200	700	0.5 N	50	200	1	10 N	20 N	5	30	5
3186	769830	922610	2.00	.50	5.00	.200	700	0.5 N	100	150	1	10 N	20 N	5	15	5 L
UNIT 5																
2209	227685	924400	2.00	.30	0.05	.300	150	0.5 N	30	150	1 L	10 N	20 N	5 N	15	5
2212	227625	924470	2.00	.30	1.50	.150	300	0.5 N	50	150	1 L	10 N	20 N	5 L	10	7
UNIT 6																
2345	771100	926240	2.00	.30	0.05 L	.300	150	0.5 N	50	200	1	10 N	20 N	5 N	15	5
UNIT 7																
1217	772270	923180	2.00	.30	0.05	.500	150	0.5 N	10 L	700	1 L	10 N	20 N	5 N	15	10
1222	771890	922600	3.00	1.00	0.10	.500	700	0.5 N	50	300	1 L	10 N	20 N	7	30	7
1429	770510	922020	2.00	.20	0.05 L	.300	150	0.5 N	10 L	500	1 L	10 N	20 N	5	15	5
1430	770480	921790	3.00	.50	0.07	.500	200	0.5 N	10 L	700	1 L	10 N	20 N	5	20	5 N
UNIT 9																
1255	772210	922460	1.50	.20	0.15	.200	70	0.5 N	10 L	700	1 L	10 N	20 N	5 N	10 L	7
1262	227770	923100	1.00	.30	0.70	.200	70	0.5 N	10 L	300	1 L	10 N	20 N	5 N	10 L	5
3085	228040	923330	1.00	.20	0.50	.300	20	0.5 N	10 L	200	1 L	10 N	20 N	5 N	10 N	10
UNIT 10																
1064	230490	925800	1.00	.10	0.05 L	.200	200	0.5 N	10 L	150	1	10 N	20 N	5	10	5 L
1114	230910	926090	1.00	.10	0.05 L	.300	100	0.5 N	10 L	700	1	10 N	20 N	5 N	10	5 N
1118	230630	925480	2.00	.20	0.05 L	.200	700	0.5 N	10 L	700	1	10 N	20 N	5	15	5 L
1166	229960	923280	2.00	.30	0.70	.200	200	0.5 N	10 L	200	1 L	10 N	20 N	5	15	5
1195	230360	924020	3.00	.70	0.15	.500	200	0.5 N	15	1500	1 L	10 N	20 N	5	30	7

TABLE 5.—*Geochemical analyses of rocks and minerals from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	S-LA	S-MO	S-NB	S-NI	S-PB	S-SC	S-SN	S-SR	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	INST-HG	AA-CU-P	AA-PB-P	AA-ZN-P	T-C-C %
2150	20 N	5 N	20 L	5	10	10	10 N	100 N	30	10	200 N	150	.05 N	.04	5	10	35	0 B
3034	30	5 N	20 N	10	15	5	10 N	100 N	50	10	200 N	70	.05 N	.02	5	5	30	0 B
3038	20	5 N	20 L	10	20	20	10 N	150	70	15	200 N	150	.05 N	.04	15	20	45	0 B
3039	30	5 N	20 L	5 L	30	5	10 N	100 N	30	15	200 N	200	.05 N	.04	5	30	25	0 B
3071	30	5 N	20 N	5	15	7	10 N	100 N	30	20	200 N	200	.05 N	.04	10	20	45	0 B
3072	20 N	5 N	20 N	5 L	15	5 L	10 N	100 N	30	20	200 N	70	.05 N	.04	10	15	20	0 B
										UNIT 4								
1083	20 N	5 N	20 N	5	15	5 L	10 N	100 N	30	10	200 N	100	.05 N	.04	15	30	40	0 B
1086	70	5 N	20 N	5	15	5	10 N	100	30	15	200 N	200	.05 N	.04	10	15	30	0 B
1183	20 N	5 N	20 N	15	15	5	10 N	100 N	20	15	200 N	100	.05 N	.02	15	15	40	0 B
1233	20 L	5 N	20 L	5	10	7	10 N	150	30	10	200 N	300	.05 N	.30	5	10	30	0 B
2202	20 L	5 N	20 L	10	10 L	7	10 N	100 L	70	15	200 N	300	.05 N	.04	10	15	60	0 B
2204	30	5 N	20 L	5	10 L	7	10 N	100	50	30	200 N	300	.05 N	.04	10	15	60	0 B
3186	30	5 N	20 N	5	15	7	10 N	200	30	30	200 N	150	.05 N	.04	5	20	30	0 B
										UNIT 5								
2209	20 L	5 N	20 L	5 L	10 L	5 L	10 N	100 L	30	10	200 N	300	.05 N	.06	5 L	10	25	0 B
2212	20 L	5 N	20 L	5	10 L	5 L	10 N	150	20	15	200 N	300	.05 N	.06	5	10	20	0 B
										UNIT 6								
2345	20	5 N	20 N	5	10 N	7	10 N	100 N	50	10	200 N	200	.05 N	.04	5	5	25	0 B
										UNIT 7								
1217	100	5 N	20 L	5	15	7	10 N	100 L	30	20	200 N	300	.05 N	.25	10	20	30	0 B
1222	20	5 N	20 L	10	10	7	10 N	100	50	20	200 N	200	.05 N	.16	15	10	55	0 B
1429	20 N	5 N	20 N	5	15	7	10 N	100 N	50	15	200 N	100	.05 N	.04	10	15	45	0 B
1430	30	5 N	20 L	5	15	7	10 N	100 N	50	20	200 N	500	.05 N	.16	5 L	5	30	0 B
										UNIT 9								
1255	30	5 N	20 L	5	20	5	10 N	150	10	10	200 N	150	.05 N	.40	5	25	15	0 B
1262	150	5 N	20 L	5 L	30	7	10 N	200	15	15	200 N	300	.05 N	.06	5	20	30	0
3085	30	5 N	20 L	5 L	20	5	10 N	100	20	10	200 N	100	.05 N	.08	10	35	75	0 B
										UNIT 10								
1064	20	5 N	20 N	5 L	10	5 L	10 N	100	30	10	200 N	150	.05 N	.02 N	5 L	10	15	0 B
1114	20	5 N	20 L	5 L	10	5 L	10 N	100	20	10	200 N	150	.05 N	.04	5 L	10	5	0 B
1118	30	5 N	20 L	5	15	7	10 N	100 N	30	15	200 N	150	.05 N	.02	5	25	25	0 B
1166	20	5 N	20 N	5	15	5	10 N	100	30	30	200 N	200	.05 N	.04	5	20	35	0 B
1195	20 L	5 N	20 L	7	15	7	10 N	100	50	20	200 N	300	.05 N	.08	10	35	25	0 B

TABLE 5.—*Geochemical analyses of rocks and minerals from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	X-COORD.	Y-COORD.	S-FE %	S-MG %	S-CA %	S-TI %	S-MN	S-AG	S-B	S-BA	S-BE	S-BI	S-CD	S-CO	S-CR	S-CU
1200	230040	924080	5.00	2.00	0.15	.700	500	0.5 N	30	1500	1	10 N	20 N	15	70	10
1201	229940	924150	3.00	.70	0.30	.500	150	0.5 N	70	700	1	10 N	20 N	7	50	20
1202	229790	924270	2.00	.30	0.30	.300	1000	0.5 N	10	500	1 L	10 N	20 N	5 L	15	7
1212	230450	923000	3.00	1.00	1.00	.500	1500	0.5 N	70	300	1	10 N	20 N	10	30	30
1267	228180	921570	7.00	1.00	0.05 L	.300	1000	0.5 N	15	1000	1	10 N	20 N	7	50	7
2228	772305	921585	3.00	.70	0.15	.300	300	0.5 N	15	700	1	10 N	20 N	5 L	15	7
2230	771940	921340	3.00	.70	0.15	.300	300	0.5 N	20	700	1	10 N	20 N	5	15	5
2236	227875	921560	3.00	1.00	0.07	.300	300	0.5 N	15	700	1	10 N	20 N	5	30	5
3110	229650	923260	3.00	1.00	0.30	.300	700	0.5 N	15	700	1 L	10 N	20 N	7	30	5 L
3180	230800	923310	5.00	.30	0.05 L	.300	200	0.5 N	50	300	1	10 N	20 N	7	20	7
						UNIT 11										
1275	227530	920260	3.00	.70	0.15	.300	700	0.5 N	10 L	500	1 L	10 N	20 N	5 L	20	5
1282	227960	920550	2.00	.30	0.07	.300	700	0.5 N	10 L	700	1 L	10 N	20 N	5 N	10	5
1284	228070	920370	5.00	1.50	1.00	.300	700	0.5 N	10 L	200	1 L	10 N	20 N	10	30	15
1287	228230	920090	3.00	.50	0.15	.300	200	0.5 N	10 N	700	1 L	10 N	20 N	5 N	15	5 L
2239	771965	920750	3.00	.70	1.50	.300	1000	0.5 N	10 L	700	1 L	10 N	20 N	5	15	5
2240	772110	920665	3.00	.70	0.15	.500	300	0.5 N	15	700	1	10 N	20 N	5	30	5
2245	227785	920960	3.00	.70	0.15	.300	1000	0.5 N	20	700	1 L	10 N	20 N	5	30	5
3096	229890	922000	3.00	.70	0.70	.300	500	0.5 N	10 L	700	1 L	10 N	20 N	5 L	20	5
3120	228910	921110	3.00	.70	0.20	.300	300	0.5 N	10 L	1000	1 L	10 N	20 N	5	30	5 L
3121	229020	920970	3.00	1.50	0.15	.300	500	0.5 N	30	1000	1	10 N	20 N	5	50	7
3122	229030	920810	3.00	1.00	1.50	.300	1500	0.5 N	10 L	700	1 L	10 N	20 N	5	30	5 L
3123	229040	920780	5.00	.70	0.30	.500	700	0.5 N	10 L	700	1 L	10 N	20 N	5	30	5
3129	229430	921470	3.00	.70	0.10	.300	700	0.5 N	10 L	700	1 L	10 N	20 N	5	15	15
3133	229680	921280	3.00	.70	0.70	.300	700	0.5 N	10 L	700	1	10 N	20 N	5	20	5 L
3174	230440	920240	2.00	.70	0.07	.200	150	0.5 N	15	700	1	10 N	20 N	5 N	10	5
3177	230280	920920	2.00	.70	0.30	.300	300	0.5 N	10	300	1 L	10 N	20 N	5 N	10	15
						UNIT 12										
1367	231910	919240	5.00	1.50	0.20	.500	500	0.5 N	10	700	1	10 N	20 N	7	30	5
1446	228560	919980	5.00	2.00	0.10	.500	500	0.5 N	20	500	2	10 N	20 N	7	50	15
1452	230470	919570	3.00	2.00	1.00	.700	700	0.5 N	10	700	1	10 N	20 N	7	50	5 L
1453	230860	919300	3.00	2.00	0.30	.700	700	0.5 N	50	500	2	10 N	20 N	5	50	15
1481	229850	919850	3.00	1.00	0.10	.500	300	0.5 N	10 L	500	1 L	10 N	20 N	5	30	5 L
2349	771485	919600	3.00	.50	0.20	.200	200	0.5 N	10 L	300	2	10 N	20 N	5	15	15
2350	771605	919915	1.00	.30	0.05 L	.100	50	0.5 N	10 L	150	1 N	10 N	20 N	5 N	20	5 L
3157	228690	918960	3.00	.70	0.15	.200	300	0.5 N	10	500	1	10 N	20 N	5 N	15	7
3160	229480	919540	3.00	1.00	0.70	.500	700	0.5 N	10	700	1	10 N	20 N	5	30	7
3167	230020	919200	3.00	1.00	7.00	.300	3000	0.5 N	30	300	1	10 N	20 N	5	50	10
3168	230070	918960	5.00	1.50	0.30	.500	700	0.5 N	30	700	1	10 N	20 N	10	70	7

TABLE 5.—*Geochemical analyses of rocks and minerals from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLF	S-LA	S-MO	S-NB	S-NI	S-PB	S-SC	S-SN	S-SR	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	INST-HG	AA-CU-P	AA-PB-P	AA-ZN-P	T-C-C %
1200	20	5 N	20 L	15	15	20	10 N	100 L	70	50	200 N	300	.05 N	.24	20	25	65	0 B
1201	30	5 N	20 L	15	15	15	10 N	150	70	70	200 N	200	.05 N	.35	40	10	40	0 B
1202	20	5 N	20 L	7	15	5	10 N	100	30	15	200 N	200	.05 N	.50	15	20	35	0 B
1212	30	5 N	20 L	20	30	15	10 N	150	50	30	200 N	300	.05 N	.50	35	20	70	0 B
1267	30	5 L	20 L	10	30	15	10 N	100	70	30	200 N	300	.05 N	.06	10	15	50	0 B
2228	70	5 N	20 L	5 L	30	10	10 N	150	30	30	200 N	300	.05 N	.04	5	20	35	0 B
2230	30	5 N	20 L	5	30	7	10 N	100 L	30	20	200 N	300	.10	.04	5	25	30	0 B
2236	30	5 N	20 L	5 L	30	7	10 N	100	50	20	200 N	300	.05 N	.06	5	20	55	0 B
3110	50	5 N	20 L	7	15	10	10 N	150	70	30	200 N	500	.05 N	.06	5	15	45	0 B
3180	150	5 N	20 L	30	15	10	10 N	100 L	70	15	200 N	300	.05 N	.10	20	10	110	0 B
								UNIT 11										
1275	30	5 N	20 L	5	15	7	10 N	100	50	20	200 N	500	.05 N	.04	5	15	45	0 B
1282	20 N	5 N	20 L	5	10	5	10 N	100 L	30	15	200 N	200	.05 N	.04	5	15	40	0 B
1284	150	5 N	20 L	15	20	10	10 N	200	70	30	200 N	200	.05 N	.06	25	25	90	0 B
1287	20	5 N	20 L	5 L	10 L	5	10 N	100	30	30	200 N	200	.05 N	.04	10	15	40	0 B
2239	50	5 N	20 L	5 L	30	7	10 N	200	30	30	200 N	300	.05 N	.04	5 L	25	50	0 B
2240	20 N	5 L	20 L	5	10 N	10	10 N	100 L	70	15	200 N	300	.10	.04	5	10	50	0 B
2245	20 L	5 N	20 L	7	15	7	10 N	100 L	50	20	200 N	300	.05 N	.04	5 L	15	50	0 B
3096	30	5 N	20 L	7	15	7	10 N	150	50	30	200 N	300	.20	.04	5	20	45	0 B
3120	20 L	5 N	20 L	7	15	10	10 N	100	50	20	200 N	150	.05 N	.04	5	15	25	0 B
3121	20	5 N	20 L	7	10	15	10 N	100	70	30	200 N	300	.05 N	.14	10	15	60	0 B
3122	70	5 N	20 L	7	30	7	10 N	200	30	30	200 N	200	.05 N	.06	5	25	55	0 B
3123	20	5 N	20 L	7	20	10	10 N	100 L	70	30	200 N	300	.05 L	.10	10	20	50	0 B
3129	30	5 N	20 L	7	15	7	10 N	100 L	50	20	200 N	150	.60	.06	5	20	40	0 B
3133	70	5 N	20 L	7	30	10	10 N	150	50	30	200 N	200	.05 N	.06	5	30	40	0 B
3174	20	5 N	20 L	5 L	20	7	10 N	100	30	10	200 N	100	.05 N	.02 N	5	25	90	0 B
3177	20	5 N	20 L	5 L	30	7	10 N	150	30	15	200 N	300	.05 N	.06	5	30	95	0 B
								UNIT 12										
1367	20 L	5 N	20 L	15	15	10	10 N	150	70	30	200 N	300	.05 N	.02 N	5 L	10	120	0 B
1446	30	5 N	20 L	20	20	20	10 N	100	100	20	200 N	150	.05 N	.16	10	15	75	0 B
1452	50	5 N	20 L	15	20	20	10 N	200	100	30	200 N	500	.05 N	.30	5	15	50	0 B
1453	20	5 N	20 L	5	15	20	10 N	150	100	10	200 N	200	.05 N	.04	10	10	50	0 B
1481	20 N	5 N	20 L	15	15	10	10 N	100	50	15	200 N	150	.05 N	.02 L	5 L	10	50	0 B
2349	30	5 N	20 N	10	30	7	10 N	100	30	15	200 N	70	.05 N	.10	10	20	40	0 B
2350	20 N	5 N	20 N	5	10 N	5	10 N	100 N	20	10 N	200 N	30	.05 N	.08	10	20	65	0 B
3157	20	5 N	20 L	5 L	30	7	10 N	150	30	15	200 N	150	.05 N	.02	10	30	110	0 B
3160	30	5 N	20 L	7	10	10	10 N	150	50	20	200 N	300	.05 N	.10	5	10	130	0 B
3167	30	5 N	20 L	7	30	10	10 N	200	50	30	200 N	300	.05 N	.04	5 L	15	90	0 B
3168	50	5 N	20 L	15	30	20	10 N	100	100	50	200 N	300	.05 N	.04	10	20	140	0 B

TABLE 5.—*Geochemical analyses of rocks and minerals from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	X-COORD.	Y-COORD.	S-FE %	S-MG %	S-CA %	S-TI %	S-MN	S-AG	S-B	S-BA	S-BE	S-BI	S-CD	S-CU	S-CR	S-CU
3169	228930	919660	1.50	.50	0.05 L	.150	150	0.5 N	15	500	1	10 N	20 N	5 N	15	7
							UNIT 13									
1323	229500	917500	7.00	1.50	0.20	.500	700	0.5 N	10 L	700	1 L	10 N	20 N	15	50	20
1331	228080	918360	3.00	.70	0.10	.300	500	0.5 N	10 L	700	1 L	10 N	20 N	7	15	5
1466	232230	917870	5.00	2.00	0.30	.500	700	0.5 N	10 L	700	2	10 N	20 N	7	50	50
1477	231430	918130	3.00	1.00	0.10	.500	300	0.5 N	10 L	500	1	10 N	20 N	5	20	5 L
2294	232610	917060	2.00	.50	0.30	.200	300	0.5 N	10 L	500	1 L	10 N	20 N	5 N	20	7
2299	232270	917200	3.00	.70	0.30	.300	500	0.5 N	10 L	700	1 L	10 N	20 N	5	30	7
2309	229615	917180	3.00	.70	0.10	.300	300	0.5 N	10 L	500	1 L	10 N	20 N	5 L	20	5
2312	230200	916620	7.00	2.00	0.20	.500	3000	0.5 N	70	1000	1	10 N	20 N	5	100	5
2365	232240	914520	3.00	1.00	0.70	.500	500	0.5 N	15	300	1	10 N	20 N	5	30	5 N
2366	232240	914520	3.00	1.00	0.20	.300	300	0.5 N	10 L	300	1	10 N	20 N	5	30	5 N
2367	236080	916120	2.00	.50	10.00	.300	2000	0.5 N	10 L	500	1 L	10 N	20 N	5	30	15
3192	232050	916920	3.00	1.00	0.30	.300	700	0.5 N	50	300	2	10 N	20 N	5	30	15
3193	231860	916690	3.00	1.00	0.50	.300	300	0.5 N	10	300	2	10 N	20 N	7	30	10
							UNIT 14									
3196	232010	916430	10.00	2.00	0.70	.300	700	0.5 N	20	200	3	10 N	20 N	5	50	15
							UNIT 15									
1291	234620	917080	5.00	1.50	0.70	.300	500	0.5 N	20	700	1	10 N	20 N	7	50	10
1293	234620	917080	5.00	1.50	1.00	.300	700	0.5 N	30	300	1	10 N	20 N	7	30	5
1295	234620	917080	5.00	1.50	0.20	.500	500	0.5 N	30	700	1	10 N	20 N	7	50	7
1300	235230	918310	3.00	.70	1.00	.200	1000	0.5 N	10 L	300	1	10 N	20 N	5 L	15	7
1307	234810	916820	3.00	.70	0.70	.500	300	0.5 N	10 L	300	1 L	10 N	20 N	7	30	7
2320	231900	915600	3.00	1.00	0.50	.500	700	0.5 N	10 L	500	1 L	10 N	20 N	7	30	7
2361	233665	915520	7.00	2.00	2.00	.500	500	0.5 N	20	500	1	10 N	20 N	7	70	15
3149	233650	916600	7.00	2.00	0.20	.500	500	0.5 N	70	1000	1	10 N	20 N	15	70	10
3151	233580	916640	5.00	1.50	0.20	.300	700	0.5 N	30	700	1 L	10 N	20 N	7	30	10
3194	232670	916520	2.00	.50	0.05	.200	150	0.5 N	10 L	300	1 L	10 N	20 N	5	15	5
					SLATE, PHYLLITE AND SCHIST: UNIT 0											
1006	249040	929180	7.00	5.00	3.00	.300	1000	0.5 N	10 N	20 L	1 L	10 N	20 N	50	300	50
1018	249575	929450	7.00	5.00	0.70	.500	1000	0.5 N	10 L	20 L	1 N	10 N	20 N	70	500	50
1315	235630	918660	7.00	1.50	0.30	.500	1000	0.5 N	70	700	1	10 N	20 N	20	70	70
2012	254200	932765	7.00	2.00	0.05	.500	1000	0.5 N	30	1500	1	10 N	20 N	10	150	30
2014	254210	932785	7.00	2.00	0.05 L	.300	700	0.5 N	20	700	1	10 N	20 N	5 L	70	20
2016	254300	932700	7.00	2.00	0.30	.300	1000	0.5 N	15	700	1	10 N	20 N	7	70	30
2018	254270	932530	5.00	3.00	0.30	.300	1000	0.5 N	10	700	1	10 N	20 N	5	70	300
2021	254290	932480	7.00	2.00	0.05	.500	1500	0.5 N	15	1000	2	10 N	20 N	5 L	100	150

TABLE 5.—*Geochemical analyses of rocks and minerals from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	S-LA	S-MO	S-NB	S-NI	S-PB	S-SC	S-SN	S-SR	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	INST-HG	AA-CU-P	AA-PB-P	AA-ZN-P	I-C-C %
3169	50	5 N	20 L	5 L	30	5	10 N	100	30	10	200 N	70	.05 N	.04	10	20	90	0 B
UNIT 13																		
1323	30	5 N	20	15	20	15	10 N	100	100	30	200 N	300	.05 N	.16	35	20	120	0 B
1331	30	5 N	20 L	7	15	7	10 N	100 L	30	15	200 N	300	.05 N	.12	5	10	150	0 B
1466	50	5 N	20 L	20	30	20	10 N	150	100	30	200 N	200	.05 N	.02	30	15	50	0 B
1477	20	5 N	20 L	10	15	10	10 N	100	50	15	200 N	200	.05 N	.02 L	5 L	10	30	0 B
2294	20 N	5 N	20 L	5 L	20	5 L	10 N	150	30	10	200 N	300	.05 N	.04	5 N	10	100	0 B
2299	20 N	5 N	20 L	7	15	7	10 N	150	50	15	200 N	300	.05 N	.02	5	10	120	0 B
2309	20 N	5 N	20 L	5	20	5	10 N	100	30	15	200 N	200	.05 N	.02 L	5	20	120	0 B
2312	20	5 L	20 L	5	30	20	10 N	100	150	50	200 L	200	.05 N	.02 L	10	10	180	0 B
2365	50	5 N	20 L	15	15	10	10 N	150	70	30	200 N	200	.05 N	.04	5 L	10	40	0 B
2366	50	5 N	20 L	15	15	10	10 N	100	50	30	200 N	300	.05 N	.02	5 L	15	50	0 B
2367	30	5 N	20 N	15	20	10	10 N	150	50	30	200 N	100	.05 N	.04	10	30	25	0 B
3192	30	5 N	20 L	5	20	20	10 N	100	70	15	200 N	150	.05 N	.06	10	20	70	0 B
3193	30	5 N	20 L	15	15	20	10 N	150	50	30	200 N	200	.05 N	.04	5	20	50	0 B
UNIT 14																		
3196	20	5 N	20 L	5	30	20	10 N	150	70	10	200 L	150	.05 N	.04	15	10	65	0 B
UNIT 15																		
1291	20	5 N	20 L	15	20	10	10 N	200	70	20	200 N	150	.05 N	.04	25	10	120	0 B
1293	20 L	5 N	20 L	15	15	10	10 N	200	50	30	200 N	200	.05 N	.04	5	5	120	0 B
1295	30	5 N	20 L	15	15	15	10 N	100 L	70	30	200 N	200	.05 N	.06	10	5	130	0 B
1300	30	5 N	20 L	5 L	30	7	10 N	150	20	15	200 N	150	.05 N	.02	10	10	150	0 B
1307	20	5 N	20 L	7	10 L	10	10 N	200	50	30	200 N	300	.05 N	.04	5	5	100	0 B
2320	20 L	5 N	20 L	7	15	10	10 N	150	70	30	200 N	150	.05 N	.02	5	10	120	0 B
2361	50	5 N	20 L	20	15	20	10 N	200	100	30	200 N	300	.05 N	.04	10	10	50	0 B
3149	30	5 L	20 L	15	15	20	10 N	100	100	30	200 N	300	.05 N	.40	25	190	150	0 B
3151	20 L	5 N	20 L	15	10	15	10 N	100	70	20	200 N	300	.05 N	.04	10	10	130	0 B
3194	20 N	5 N	20 N	5	15	7	10 N	100 N	30	10	200 N	100	.05 N	.04	5	15	35	0 B
SLATE, PHYLLITE AND SCHIST; UNIT 0																		
1006	20 N	5 N	20 L	100	30	20	10 N	300	150	15	200 N	30	.05 N	.04	30	35	20	0 B
1018	20 N	5 N	20 L	150	15	20	10 N	150	150	20	200 N	30	.05 N	.02 L	35	20	20	0 B
1315	70	5 L	20 L	30	30	20	10 N	100 L	100	30	200	200	.05 N	.14	85	20	1000	1
2012	50	5 N	20 L	7	70	30	10 N	100 N	150	30	200 N	200	.05 N	.02 L	45	20	50	0
2014	30	5 N	20 L	7	30	15	10 N	100 N	70	15	200 L	70	.05 N	.02 N	25	15	60	0
2016	70	5 N	20 L	7	30	15	10 N	100 L	70	20	200 L	70	.05 N	.02 N	40	15	110	0
2018	70	5 N	20 L	10	300	15	10 N	100 L	70	50	300	100	.05 N	.02 L	320	100	150	0
2021	100	5 N	20 L	5	70	20	10 N	100 L	100	70	200 L	150	.05 N	.02 L	120	20	110	0 B

TABLE 5.—*Geochemical analyses of rocks and minerals from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	X-COORD.	Y-COORD.	S-FE %	S-MG %	S-CA %	S-TI %	S-MN	S-AG	S-B	S-BA	S-BE	S-BI	S-CD	S-CO	S-CR	S-CU
2068	255490	931540	3.00	1.50	0.30	.500	1500	0.5 N	50	1000	1 N	10 N	20 N	5	70	50
2079	249240	930060	7.00	1.00	0.05 L	.500	300	0.5 N	20	700	2	10 N	20 N	7	100	20
2083	249960	929860	3.00	1.50	0.07	.300	5000 G	0.5 N	50	700	2	10 N	20 N	30	70	70
2090	248470	929535	7.00	2.00	0.50	.300	1500	0.5 N	70	700	2	10 N	20 N	15	70	70
2097	230510	932280	5.00	1.50	0.05	.300	150	0.5 N	30	700	3	10 N	20 N	5 L	30	30
2108	234760	927775	5.00	1.50	0.10	.300	300	0.5 N	30	1500	2	10 N	20 N	5	70	5 L
2263	236475	919615	5.00	1.50	0.70	.200	1000	0.5 N	30	700	2	10 N	20 N	15	30	30
2264	236475	919615	7.00	2.00	0.30	.300	1500	0.5 N	20	700	1	10 N	20 N	15	50	30
2266	236475	919615	5.00	2.00	3.00	.300	2000	0.5 N	15	700	1	10 N	20 N	10	50	20
2267	236475	919615	5.00	2.00	0.70	.300	1500	0.5 N	20	700	2	10 N	20 N	15	50	30
2268	236475	919615	5.00	2.00	2.00	.300	1500	0.5 N	50	700	1	10 N	20 N	15	70	20
2269	236475	919615	5.00	1.50	1.00	.300	1500	0.5 N	30	500	2	10 N	20 N	10	50	20
2271	236475	919615	7.00	3.00	0.70	.500	1500	0.5 N	70	1000	1	10 N	20 N	15	150	30
2335	233430	925735	5.00	1.50	0.30	.500	700	0.5 N	30	1000	2	10 N	20 N	7	70	7
3141	236280	918790	5.00	1.50	1.00	.300	500	0.5 N	10	700	1	10 N	20 N	10	30	20
							UNIT 1									
3055	230150	927560	15.00	2.00	1.00	1.000 G	500	0.5 N	10 L	200	1 N	10 N	20 N	50	30	100
							UNIT 2									
1033	230140	926730	3.00	2.00	0.10	.300	500	0.5 N	70	700	2	10 N	20 N	7	30	30
1040	230660	927370	3.00	.50	0.10	.300	150	0.5 N	30	700	2	10 N	20 N	5	30	15
1049	231130	927740	2.00	1.00	0.05	.300	100	0.5 N	30	300	1	10 N	20 N	5	30	5
2137	771980	927835	5.00	1.00	0.05	.500	700	0.5 N	100	700	3	10 N	20 N	15	30	10
2140	772135	927620	10.00	1.00	0.05 N	.300	500	0.5 N	100	500	3	10 N	20 N	7	30	50
2146	228720	926755	5.00	2.00	0.07	.300	200	0.5 N	50	500	2	10 N	20 N	7	30	15
2155	228855	927330	3.00	1.00	0.70	.500	150	0.5 N	20	1500	3	10 N	20 N	7	30	20
2157	228760	927690	3.00	1.00	0.05	.500	200	0.5 N	20	500	2	10 N	20 N	5 N	30	20
2158	228520	927700	10.00	2.00	0.20	.300	2000	0.5 N	20	500	2	10 N	20 N	7	30	50
3047	771620	927880	10.00	1.00	0.05 L	.300	200	0.5 N	30	300	2	10 N	20 N	5 N	30	100
3049	228130	927330	10.00	.50	0.10	.300	5000 G	0.5 N	30	500	2	10 N	20 N	20	20	30
3068	771380	928040	7.00	1.00	0.10	.300	200	0.5 N	20	300	3	10 N	20 N	5 N	30	20
3082	771750	928110	2.00	1.00	0.05 N	.300	150	0.5 N	10	200	1	10 N	20 N	5 N	20	10
							UNIT 3									
1162	228350	925770	3.00	2.00	0.10	.500	500	0.5 N	150	700	3	10 N	20 N	5	70	15
2113	230640	926815	10.00	1.50	0.05 N	.300	300	0.5 N	100	1000	3	10 N	20 N	7	50	50
2128	230380	926380	5.00	2.00	0.07	.300	200	0.5 N	100	500	2	10 N	20 N	5	30	15
2151	228900	926690	10.00	2.00	0.05 L	.300	150	0.5 N	100	500	2	10 N	20 N	7	50	30
2159	229460	926635	10.00	2.00	0.10	.500	300	0.5 N	50	700	3	10 N	20 N	7	50	50
2160	228500	926315	10.00	2.00	0.50	.500	500	0.5 N	50	700	2	10 N	20 N	7	70	20

TABLE 5.—*Geochemical analyses of rocks and minerals from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	S-LA	S-MO	S-NB	S-NI	S-PB	S-SC	S-SN	S-SR	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	INST-HG	AA-CU-P	AA-PB-P	AA-ZN-P	T-C-C %
2068	70	5 N	20 L	7	30	20	10 N	100 L	100	70	200 N	150	.05 N	.02 L	20	15	50	0 B
2079	50	5 N	20 L	20	20	20	10 N	100 L	150	30	200 N	200	.05 N	.02 L	20	10	70	0 B
2083	20	5 N	20 L	20	150	15	10 N	100	70	50	200 N	50	.05 N	.02 N	40	30	30	1
2090	70	5 N	20 L	30	30	15	10 N	150	100	50	200 N	150	.05 N	.06	55	20	80	0
2097	100	5 N	20 L	7	30	15	10 N	100 N	70	70	200 N	300	.05 N	.02 N	20	20	40	0 B
2108	30	5 L	20 L	15	15	20	10 N	100 N	100	50	200 N	200	.05 N	.02 N	5	25	30	0
2263	30	5 N	20 L	20	50	15	10 N	150	70	30	200 L	150	.05 N	.06	50	15	180	0
2264	70	5 N	20 L	20	30	15	10 N	100 L	70	30	200 L	200	.05 N	.06	60	10	200	1
2266	50	5 N	20 L	15	50	15	10 N	150	70	30	200 L	300	.05 N	.04	35	20	1100	1
2267	70	5 N	20 L	20	30	15	10 N	150	70	50	200 L	150	.05 N	.06	50	20	1200	0
2268	70	5 N	20 L	15	30	15	10 N	150	70	50	200 L	150	.05 N	.04	40	20	1000	1
2269	50	5 N	20 L	15	30	15	10 N	150	70	50	200 N	700	.05 N	.12	30	15	980	0
2271	100	5 N	20 L	20	20	20	10 N	100	100	100	200 L	300	.05 N	.06	35	10	980	0 B
2335	70	5 L	20 L	10	15	20	10 N	100	100	50	200 N	300	.05 N	.02	20	15	180	0
3141	70	5 L	20 L	15	15	15	10 N	100	70	70	200 N	100	.05 N	.02	35	15	180	1
UNIT 1																		
3055	20 N	5 N	20 L	20	10 N	30	10 N	150	200	15	200 L	70	.05 N	.04	70	15	130	1
UNIT 2																		
1033	50	5 N	20 N	15	20	20	10 N	100 N	70	15	200 N	70	.05 N	.06	35	20	70	0
1040	70	5 N	20 N	5	30	20	10 N	100	50	30	200 N	200	.05 N	.06	10	40	55	0
1049	30	5 N	20 N	5	15	15	10 N	100	50	20	200 N	150	.05 N	.08	10	15	50	1
2137	100	5 N	20 L	15	50	30	10 N	100 N	50	30	200 L	150	.05 N	.12	10	50	100	0
2140	100	5 N	20 L	15	30	30	10 N	100	50	50	200 L	70	.05 N	.04	30	25	40	0
2146	30	5 N	20 N	15	15	30	10 N	100 N	50	30	200 N	150	.05 N	.02	15	10	100	0
2155	70	5 N	20 L	5	70	30	10 N	100 N	70	30	200 N	200	.05 N	.04	20	50	90	0
2157	70	5 N	20 L	5 L	70	30	10 N	100	70	50	200 N	200	.05 N	.06	15	45	40	0
2158	50	5 N	20 L	10	30	30	10 N	100	70	30	200 L	150	.05 N	.06	40	25	120	0 B
3047	50	5 N	20 L	15	15	20	10 N	100 N	50	20	200 N	100	.05 N	.22	60	15	60	1
3049	70	5 N	20 L	10	70	20	10 N	150	50	50	200	100	.05 N	.12	30	65	170	1
3068	100	5 N	20 N	15	15	30	10 N	100 N	50	30	200 N	70	.05 N	.16	20	20	90	2
3082	30	5 N	20 N	5	20	10	10 N	100 N	30	15	200 N	200	.05 N	.10	10	30	60	0
UNIT 3																		
1162	70	5 N	20 N	10	20	30	10 N	100	100	30	200 L	150	.05 N	.02	10	30	75	0
2113	30	5 N	20 L	20	15	20	10 N	100 N	100	30	200 L	100	.05 N	.06	45	10	120	0
2128	50	5 N	20 L	15	15	30	10 N	100 N	70	50	200 L	100	.05 N	.02	25	15	85	0
2151	50	5 N	20 L	5	15	30	10 N	100 N	70	30	200 L	100	.05 N	.04	30	15	60	0
2159	70	5 N	20 L	20	20	30	10 N	100 N	100	50	200 L	150	.05 N	.02	35	15	110	0
2160	50	5 N	20 L	10	15	30	10 N	100	100	30	200 L	100	.05 N	.06	15	15	120	0

TABLE 5.—*Geochemical analyses of rocks and minerals from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	X-COORD.	Y-COORD.	S-FE %	S-MG %	S-CA %	S-TI %	S-MN	S-AG	S-B	S-BA	S-BE	S-BI	S-CD	S-CO	S-CR	S-CU
3035	230580	926690	10.00	2.00	0.10	.700	300	0.5 N	70	700	2	10 N	20 N	10	70	20
3040	231030	926860	10.00	2.00	0.05 L	.500	200	0.5 N	50	700	3	10 N	20 N	5 N	70	15
3043	229850	926460	10.00	2.00	0.10	.500	200	0.5 N	50	500	2	10 N	20 N	10	70	50
						UNIT 4										
1085	229570	925560	5.00	2.00	0.05 L	.300	500	0.5 N	30	500	3	10 N	20 N	10	50	50
1087	229560	925660	3.00	2.00	0.05	.500	500	0.5 N	300	700	3	10 N	20 N	5	50	15
1148	229180	925940	3.00	2.00	0.30	.500	1000	0.5 N	200	500	3	10 N	20 N	5	70	20
1213	227620	923600	3.00	.70	0.05 L	.300	300	0.5 N	100	300	1	10 N	20 N	5 N	30	10
1229	771810	923220	3.00	1.50	0.07	.300	500	0.5 N	100	700	2	10 N	20 N	10	70	30
1241	771230	923510	5.00	1.50	0.10	.300	700	0.5 N	70	500	2	10 N	20 N	5	70	5
1389	769800	928010	5.00	.30	0.05	.500	70	0.5 N	200	500	3	10 N	20 N	5	70	20
1390	769800	928010	5.00	1.00	0.05 L	.500	200	0.5 N	200	500	3	10 N	20 N	7	70	15
1403	770630	926870	10.00	2.00	0.05 L	.500	500	0.5 N	70	500	3	10 N	20 N	5	70	50
2163	772225	926630	10.00	2.00	0.05 L	.300	200	0.5 N	50	700	3	10 N	20 N	7	50	30
2170	771220	926800	5.00	2.00	0.05	.300	500	0.5 N	50	300	2	10 N	20 N	5	50	20
2171	771605	926425	10.00	2.00	0.10	.300	500	0.5 N	50	500	2	10 N	20 N	10	50	50
2176	228115	925295	10.00	2.00	0.10	.500	300	0.5 N	50	500	2	10 N	20 N	7	50	20
2183	227860	924745	7.00	1.50	0.05 L	.500	500	0.5 N	70	500	1	10 N	20 N	7	70	10
2185	227860	924745	7.00	1.50	0.05 L	.300	500	0.5 N	70	500	2	10 N	20 N	5	70	7
2187	227800	924770	5.00	.70	0.05 L	.200	1000	0.5 L	70	500	2	10 N	20 N	15	70	15
2189	227800	924770	5.00	1.50	0.05 L	.200	500	0.5 L	70	300	2	10 N	20 N	15	70	10
2194	772080	925460	3.00	.20	0.05 L	.200	700	0.5 N	70	300	2	10 N	20 N	15	70	15
2195	772080	925460	1.50	.15	0.05 L	.200	150	0.5 N	70	300	2	10 N	20 N	10	50	10
2196	771550	925855	7.00	2.00	0.15	.300	500	0.5 N	70	500	2	10 N	20 N	7	100	7
2203	228135	923570	7.00	2.00	0.07	.500	500	0.5 N	150	500	2	10 N	20 N	15	100	7
2205	227700	923780	5.00	2.00	0.07	.300	1000	0.5 N	100	500	1	10 N	20 N	5 N	70	5
2206	772380	924120	7.00	2.00	0.30	.500	300	0.5 N	70	500	1	10 N	20 N	10	70	50
2215	771575	925365	5.00	1.50	0.05 L	.300	700	0.5 N	70	700	2	10 N	20 N	5	70	10
2222	771625	924745	5.00	1.50	0.05 L	.300	1500	0.5 N	70	300	1	10 N	20 N	15	70	15
2344	770910	926270	10.00	2.00	0.05 L	.500	500	0.5 N	70	700	3	10 N	20 N	5	70	30
3073	770620	927710	10.00	2.00	0.10	.500	200	0.5 N	100	500	3	10 N	20 N	15	70	30
3074	770490	927730	5.00	1.00	0.05 L	.300	200	0.5 N	100	500	3	10 N	20 N	5 N	50	15
3183	769920	923110	3.00	2.00	0.05 L	.200	700	0.5 N	50	200	2	10 N	20 N	5	50	20
3187	770320	922560	10.00	3.00	0.10	.300	500	0.5 N	50	500	3	10 N	20 N	7	100	30
H1	772020	925465	1.00	.10	0.05 L	.100	100	0.5 N	30	300	1	10 N	20 N	5	20	10
H10	772170	923840	5.00	1.00	0.05	.500	500	0.5 N	150	1000	3	10 N	20 N	5	100	50
H11	771540	923800	10.00	3.00	0.10	.500	700	0.5 N	150	1000	3	10 N	20 N	20	100	30
H2	772020	925465	5.00	.50	0.05	.500	500	0.5 N	150	700	5	10 N	20 N	10	100	30
H3	772020	925465	5.00	.70	0.05	.500	700	0.5 N	150	700	5	10 N	20 N	15	100	30
H9	228400	924920	20.00	.70	0.05 L	.100	500	0.5 N	70	300	2	10 N	20 N	300	30	200

TABLE 5.—*Geochemical analyses of rocks and minerals from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	S-LA	S-MO	S-NB	S-NI	S-PB	S-SC	S-SN	S-SR	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	INST-HG	AA-CU-P	AA-PB-P	AA-ZN-P	T-C-C %
3035	30	5 N	20 L	20	20	30	10 N	100 N	100	30	200 L	150	.05 N	.02	20	20	100	0
3040	100	5 N	20 L	15	20	30	10 N	100 N	100	50	200 N	100	.05 N	.04	10	10	60	0
3043	20	5 N	20 L	15	15	30	10 N	100 N	100	30	200 L	100	.05 N	.06	35	20	100	0 B
									UNIT 4									
1085	30	5 N	20 N	20	15	30	10 N	100	70	20	200 L	100	.05 N	.02	50	15	120	0
1087	100	5 N	20 L	5	30	30	10 N	100	70	50	200 N	100	.05 N	.08	10	20	45	0
1148	30	5 N	20 N	5	15	30	10 N	100	100	30	200 L	150	.05 N	.04	60	10	75	0
1213	30	5 N	20 L	5 L	30	15	10 N	150	50	15	200 N	50	.05 N	.30	25	40	35	0
1229	100	5	20 L	15	50	20	10 N	100	70	70	200 N	70	.05 N	.10	35	35	80	0
1241	30	5 N	20 L	7	10 L	15	10 N	100	70	30	200 N	100	.05 N	.35	10	15	90	0
1389	30	5 N	20 L	50	30	30	10 N	100 N	100	50	200 N	200	.05 N	.08	5	10	20	0
1390	150	5 N	20 L	30	15	30	10 N	100 N	100	50	200 N	150	.05 N	.06	10	10	90	0
1403	70	5 N	20 N	20	15	30	10 N	150	100	50	200 N	70	.05 N	.16	25	10	90	0
2163	30	5 N	20 L	20	20	30	10 N	100	70	20	200 L	100	.05 N	.02	30	10	100	0
2170	30	5 N	20 L	5	15	20	10 N	150	70	30	200 N	70	.05 N	.02	35	20	85	0
2171	30	5 N	20 L	15	20	30	10 N	150	70	30	300	100	.05 N	.02	55	15	140	0 B
2176	50	5 N	20 L	15	30	30	10 N	150	70	30	200 L	100	.05 N	.02	20	30	120	0
2183	150	5 N	20 L	15	15	20	10 N	100 L	100	70	200 N	300	.05 N	.04	25	10	95	0
2185	70	5 N	20 L	10	15	20	10 N	100 L	150	50	200 N	200	.05 N	.04	15	20	85	0
2187	100	5 L	20 L	15	20	15	10 N	150	70	50	200 N	70	.05 N	.04	40	15	95	1
2189	20 N	5 L	20 L	5	100	15	10 N	150	70	30	200 N	50	.05 N	.06	15	65	55	1
2194	70	5 N	20 L	30	15	20	10 N	200	70	30	200 N	70	.05 N	.04	25	10	70	0
2195	100	5 N	20 L	15	30	15	10 N	200	70	30	200 N	70	.05 N	.08	30	10	40	0 B
2196	20	5 L	20 L	20	20	30	10 N	100	100	50	200 N	200	.05 N	.02 N	15	20	100	0
2203	30	5 L	20 L	20	15	20	10 N	100 L	150	50	200 N	200	.05 N	.04	15	20	120	0
2205	30	5 N	20 L	5 L	20	20	10 N	300	70	30	200 N	70	.05 N	.08	10	15	65	1
2206	50	5 L	20 L	15	15	20	10 N	100 L	100	70	200 N	150	.05 N	.04	30	15	95	0
2215	150	5 L	20 L	20	15	20	10 N	150	70	50	200 N	150	.05 N	.02 L	20	15	100	0
2222	70	5 L	20 L	10	30	15	10 N	150	70	50	200 N	150	.30	.06	20	10	75	0
2344	70	5 N	20 L	5	30	30	10 N	100 N	100	50	200 N	150	.05 N	.04	30	10	65	0
3073	50	5 N	20 N	20	30	30	10 N	100 N	100	30	200 N	70	.05 N	.02	30	30	110	0
3074	50	5 N	20 N	5 L	15	30	10 N	200	70	30	200 N	70	.05 N	.06	15	10	40	0
3183	30	5 N	20 N	5	15	20	10 N	100	50	20	200 N	50	.05 N	.02	15	10	60	0
3187	30	5 N	20 N	50	15	30	10 N	100 N	100	30	200 L	100	.05 N	.04	15	10	70	0
H1	20	5 N	20 N	5	30	10	10 N	100	30	20	200 N	30	.05 N	.00 B	15	10	5	0
H10	70	5 N	20	10	50	30	10 N	300	150	70	200 N	150	.05 N	.00 B	55	10	35	0
H11	30	5 N	20	70	20	30	10 N	150	150	30	200 N	150	.05 N	.00 B	15	10	100	0
H2	200	5 N	30	30	20	30	10 N	300	100	30	200 N	100	.05 N	.00 B	20	5	20	0
H3	100	5 N	20	100	20	30	10 N	300	100	30	200 N	100	.05 N	.00 B	20	5	30	0
H9	20	5 N	20 N	150	70	15	10 N	100	50	20	200 N	30	.05 N	.00 B	160	90	220	4

TABLE 5.—*Geochemical analyses of rocks and minerals from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	X-COORD.	Y-COORD.	S-FE %	S-MG %	S-CA %	S-TI %	S-MN	S-AG	S-B	S-BA	S-BE	S-BI	S-CD	S-CO	S-CR	S-CU
							UNIT 9									
3084	228040	923330	1.00	1.00	0.20	.500	30	0.5 N	20	1000	3	10 N	20 N	5 N	30	15
3087	228210	923090	3.00	.50	0.50	.300	1000	0.5 N	10 L	200	1 L	10 N	20 N	20	20	15
3137	228470	923370	3.00	1.50	1.50	.300	1000	0.5 N	30	500	1	10 N	20 N	10	30	15
							UNIT 10									
1063	230640	925980	3.00	2.00	0.05 L	1.000	150	0.5 N	300	700	3	10 N	20 N	5 L	50	15
1167	229790	923430	5.00	2.00	0.20	.300	200	0.5 N	10	1000	1	10 N	20 N	20	30	70
1173	228830	923840	3.00	2.00	0.05 L	.200	700	0.5 N	50	500	1	10 N	20 N	5	30	20
1266	228160	921720	5.00	1.50	0.15	.500	700	0.5 N	50	1000	2	10 N	20 N	5 N	70	5
2237	227875	921560	5.00	2.00	0.07	.500	300	0.5 N	30	2000	1	10 N	20 N	7	100	5
3093	229820	922740	1.50	.70	0.07	.300	150	0.5 N	30	500	1	10 N	20 N	5 N	30	7
3101	229620	922530	5.00	1.50	0.20	.300	500	0.5 N	50	700	2	10 N	20 N	7	30	7
3114	228830	923310	5.00	2.00	0.10	.300	1500	0.5 N	50	700	1	10 N	20 N	15	70	15
H13	227720	922440	5.00	1.50	0.10	.500	500	0.5 N	30	1500	3	10 N	20 N	70	50	150
							UNIT 11									
1271	228190	921190	5.00	1.50	0.05 L	.500	300	0.5 N	20	1500	1	10 N	20 N	10	70	10
3130	229450	921420	7.00	3.00	0.15	.700	700	0.5 N	20	1500	1	10 N	20 N	15	100	15
							UNIT 12									
2326	228960	919085	3.00	1.00	0.15	.500	700	0.5 N	20	1000	1	10 N	20 N	5 N	50	10
2328	229300	918710	7.00	2.00	0.20	.500	700	0.5 N	10	1000	1	10 N	20 N	10	70	10
3156	228450	918620	3.00	1.50	0.15	.300	700	0.5 N	20	700	1	10 N	20 N	5	30	10
3173	230360	920000	7.00	1.00	0.15	.500	500	0.5 N	15	700	1	10 N	20 N	5	70	15
							UNIT 13									
1329	228640	918260	5.00	2.00	0.20	.500	700	0.5 N	50	700	1	10 N	20 N	5 L	70	5
2330	230300	918125	5.00	1.50	0.30	.500	700	0.5 N	20	700	1	10 N	20 N	5	50	10
							UNIT 14									
1353	233170	917740	10.00	2.00	0.05 L	.500	700	0.5 N	30	700	1	10 N	20 N	10	100	20
1355	233040	918210	3.00	2.00	0.05 L	.700	1000	0.5 N	70	2000	1	10 N	20 N	5 L	150	5 L
1473	232800	917150	15.00	3.00	0.30	.500	1000	0.5 N	30	700	3	10 N	20 N	10	100	30
2298	232920	917000	10.00	1.50	0.05 L	.300	1000	0.5 N	70	700	2	10 N	20 N	10	100	50
2315	230930	915980	7.00	3.00	0.30	.500	1500	0.5 N	70	500	1	10 N	20 N	5	70	7
2359	234120	916150	7.00	2.00	0.05 L	.300	2000	0.5 N	10	700	3	10 N	20 N	70	70	150
2360	233800	915760	10.00	2.00	0.07	.300	700	0.5 N	30	500	3	10 N	20 N	20	70	100
3195	232100	916470	3.00	1.00	0.70	.300	300	0.5 N	15	500	3	10 N	20 N	10	30	50
3197	231870	916400	15.00	3.00	0.05	.300	1000	0.5 N	20	500	1	10 N	20 N	20	100	100
3200	231570	916340	5.00	2.00	0.70	.200	1000	0.5 N	30	200	1	10 N	20 N	20	70	50

TABLE 5.—*Geochemical analyses of rocks and minerals from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	S-LA	S-MO	S-NB	S-NI	S-PB	S-SC	S-SN	S-SR	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	INST-HG	AA-CU-P	AA-PB-P	AA-ZN-P	T-C-C %
UNIT 9																		
3084	50	5 N	20 N	5 L	15	30	10 N	100	50	20	200 N	100	.05 N	.06	5 L	10	5 L	1
3087	20	5 N	20 N	5	15	10	10 N	100	30	15	200 N	100	.05 N	.06	15	10	60	0 B
3137	70	5 L	20 L	20	30	15	10 N	150	30	20	200 N	70	.05 N	.14	20	35	90	1
UNIT 10																		
1063	70	5 N	20 L	5 L	15	30	10 N	100	100	50	200 N	200	.05 N	.04	15	10	35	0
1167	50	5 N	20 L	20	70	20	10 N	100 N	70	30	200 N	150	.05 N	.08	65	25	60	0
1173	30	5 N	20 N	5	15	20	10 N	100 N	50	30	200 N	100	.05 N	.10	35	5	20	0
1266	100	5 L	20 L	5	30	20	10 N	100	70	50	200 N	300	.05 N	.06	10	15	70	0 B
2237	70	5 N	20 L	10	10	30	10 N	100 L	150	70	200 N	300	.10	.04	15	10	45	0
3093	70	5 N	20 L	5 L	30	10	10 N	100	50	30	200 N	300	.05 N	.12	5	20	10	0
3101	70	5 N	20 L	10	15	15	10 N	150	70	30	200 N	300	.25	.12	10	15	85	0 B
3114	70	5 L	20 L	15	50	20	10 N	100	70	50	200 N	150	.10	.10	30	30	110	0
H13	100	5 N	20	70	30	30	10 N	100	100	700	200 N	200	.05 N	.00 B	90	20	140	2
UNIT 11																		
1271	100	5 N	20 L	15	10 L	20	10 N	100 L	70	30	200 N	200	.05 N	.04	20	10	50	0
3130	100	5 L	20 L	15	70	30	10 N	100 L	150	30	200 N	150	.05 N	.06	15	35	55	0
UNIT 12																		
2326	70	5 N	20 L	5 L	30	15	10 N	100	70	20	200 N	300	.05 N	.02 L	10	10	110	0
2328	100	5 N	20 L	20	15	20	10 N	150	100	50	200 N	300	.05 N	.04	15	10	160	0
3156	70	5 L	20 L	7	20	15	10 N	150	70	20	200 N	200	.05 N	.04	25	15	140	0
3173	100	5 N	20 L	5	20	15	10 N	150	70	30	200 N	200	.05 N	.04	15	15	120	0
UNIT 13																		
1329	20	5 L	20 L	5 L	30	15	10 N	150	70	10	200 L	200	.05 N	.10	5	20	200	0
2330	70	5 N	20 L	5 L	30	15	10 N	100	70	15	200 N	300	.05 N	.06	15	15	130	0
UNIT 14																		
1353	100	5 L	20	30	30	30	10 N	100	100	30	200 L	100	.05 N	.02 L	35	5	190	0
1355	200	5 N	20 L	5	15	30	10 L	100	150	30	200 N	150	.05 N	.04	5	5 L	120	0
1473	70	5 N	20 L	15	30	30	10 N	150	100	30	200	100	.05 N	.02 L	20	5	55	0 B
2298	50	5 L	20 L	15	30	20	10 N	100 L	70	30	200 L	150	.05 N	.04	55	5	140	0
2315	30	5 N	20 L	5	15	20	10 N	100	100	30	200 L	300	.05 N	.02	15	5	170	0
2359	70	5 N	20 N	30	70	30	10 N	100 N	70	30	200 L	70	.05 N	.06	75	20	95	0 B
2360	100	5 N	20 L	30	30	30	10 N	100 N	70	50	200 L	70	.05 N	.04	50	15	60	0 B
3195	100	5 N	20 L	30	30	20	10 N	150	70	50	200	150	.05 N	.06	25	10	120	0
3197	200	5 N	20	30	20	30	10 N	100 N	100	70	200 L	150	.05 N	.06	45	10	60	0 B
3200	20	5 N	20 N	30	20	15	10 N	100	70	15	200 N	100	.05 N	.08	35	10	60	0 B

TABLE 5.—*Geochemical analyses of rocks and minerals from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	X-COORD.	Y-COORD.	S-FE %	S-MG %	S-CA %	S-TI %	S-MN	S-AG	S-B	S-BA	S-BE	S-BI	S-CD	S-CU	S-CR	S-CU
							UNIT 15									
1292	234620	917080	7.00	2.00	0.30	.500	700	0.5 N	30	700	1	10 N	20 N	15	70	10
1294	234620	917080	7.00	2.00	0.30	.500	700	0.5 N	50	1500	1	10 N	20 N	15	100	30
1296	234490	917190	7.00	2.00	0.20	.300	1000	0.5 N	10	700	1	10 N	20 N	30	70	30
1299	235230	918310	7.00	2.00	0.30	.300	700	0.5 N	50	700	1	10 N	20 N	15	70	30
1311	234450	916980	7.00	1.50	0.50	.500	1000	0.5 N	30	700	1	10 N	20 N	30	70	30
1350	233520	917500	10.00	3.00	0.15	.700	1000	0.5 N	50	1500	1	10 N	20 N	10	100	5
2325	233780	916220	5.00	3.00	0.20	.500	700	0.5 N	70	1500	1	10 N	20 N	10	70	5
3150	233620	916610	7.00	2.00	0.30	.300	1500	0.5 N	70	500	1	10 N	20 N	15	70	30
							GRAYWACKE AND MYLONITE: UNIT 0									
2042	254885	932055	3.00	.70	0.30	.300	500	0.5 N	10 L	700	1 L	10 N	20 N	5	15	30
H14	235430	922880	5.00	1.50	0.10	.500	700	0.5 N	10	700	2	10 N	20 N	15	50	100
H15	235430	922880	10.00	2.00	0.10	.500	700	0.5 N	10	700	2	10 N	20 N	30	50	100
							UNIT 3									
1145	229350	926360	10.00	2.00	0.20	1.000	500	0.5 N	50	1000	2	10 N	20 N	20	70	50
							UNIT 4									
1214	772380	923480	3.00	1.50	0.70	.300	500	0.5 N	70	150	1 L	10 N	20 N	7	30	10
H5	229500	926200	10.00	2.00	0.10	.700	500	0.5 N	150	1000	3	10 N	20 N	15	100	30
							UNIT 9									
1206	228570	923720	0.70	.50	0.30	.200	20	0.5 N	15	500	1	10 N	20 N	5 N	15	7
1230	228050	923340	1.00	.50	0.30	.200	30	0.5 N	20	500	1	10 N	20 N	5 N	15	5
1257	772150	922060	3.00	.70	0.05 L	.300	200	0.5 N	20	700	1	10 N	20 N	5 N	30	20
1261	227900	923010	1.50	.70	0.10	.150	150	0.5 N	15	300	1	10 N	20 N	5 N	15	10
1431	770550	921670	1.00	1.00	0.05 L	.300	70	0.5 N	15	700	2	10 N	20 N	5	15	5 L
1434	770670	921410	2.00	.30	0.10	.300	150	0.5 N	10 L	500	1	10 N	20 N	5	10	5
							UNIT 10									
1251	227790	922440	3.00	1.50	0.07	.500	300	0.5 N	20	1500	1	10 N	20 N	7	70	10
1252	227790	922440	1.50	1.50	0.05 L	.500	300	0.5 N	30	1500	1	10 N	20 N	5 N	70	7
H12	227720	922440	3.00	.70	0.10	.300	200	0.5 N	30	300	1	10 N	20 N	5	30	50
							UNIT 12									
1337	771740	918520	3.00	1.50	0.15	.300	1000	0.5 N	20	700	1	10 N	20 N	5 N	50	15
1366	231510	919230	10.00	3.00	0.50	.500	1500	0.5 N	70	700	1	10 N	20 N	10	70	10
1483	230380	918280	10.00	2.00	0.10	.500	500	0.5 N	30	700	1	10 N	20 N	7	70	30

TABLE 5.—*Geochemical analyses of rocks and minerals from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	S-LA	S-MO	S-NB	S-NI	S-PB	S-SC	S-SN	S-SR	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	INST-HG	AA-CU-P	AA-PB-P	AA-ZN-P	T-C-C %
UNIT 15																		
1292	70	5 L	20 L	30	20	15	10 N	100	100	50	200 N	150	.05 N	.04	35	10	200	0
1294	70	5 L	20 L	20	15	20	10 L	100 L	100	50	200 N	200	.05 N	.06	35	5	140	0
1296	50	5 L	20 L	30	10	15	10 N	100 L	70	50	200 L	300	.05 N	.08	60	10	210	0
1299	50	5 L	20 L	15	15	15	10 N	100	70	30	200 L	200	.05 N	.04	50	10	1200	1
1311	100	5 L	20 L	30	30	30	10 N	100	100	50	200 N	200	.05 N	.02	55	10	160	0
1350	70	5 L	20 L	10	20	20	10 N	100	100	15	200 L	300	.05 N	.12	10	10	170	0
2325	70	5 N	20 L	15	20	30	10 N	100	100	15	200 N	200	.05 N	.02 L	10	10	130	0 B
3150	30	5 L	20 L	15	30	15	10 N	150	70	30	200 L	200	.05 N	.04	30	25	190	0
GRAYWACKE AND MYLONITE: UNIT 0																		
2042	20 L	5 N	20 L	7	15	7	10 N	100	30	15	200 N	300	.05 N	.02 N	10	15	30	0 B
H14	50	5 N	30	30	20	20	10 N	100	100	30	200	300	.05 N	.00 B	75	10	110	0 B
H15	100	5	30	30	10	30	10 N	100	100	70	200 N	200	.05 N	.00 B	40	10	80	0 B
UNIT 3																		
1145	30	5 N	20 L	30	30	30	10 N	100	100	30	200 L	200	.05 N	.04	35	20	90	0 B
UNIT 4																		
1214	20	5 N	20 L	15	15	7	10 N	150	30	15	200 N	200	.05 N	.90	20	25	80	0 B
H5	70	5 N	20	30	20	50	10 N	150	100	70	200 N	200	.05 L	.00 B	35	10	80	0 B
UNIT 9																		
1206	70	5 N	20 N	5	50	7	10 N	100 L	30	30	200 N	300	.05 N	.30	10	50	10	0 B
1230	70	5 N	20 L	7	20	7	10 N	100	30	10	200	70	.05 N	.25	15	20	130	0
1257	30	5 N	20 L	5 L	70	15	10 N	100	50	20	200 N	150	.05 N	.18	50	45	10	0
1261	30	5 N	20 L	5 L	50	7	10 N	100 L	30	20	200 N	200	.05 N	.14	25	30	10	0
1431	70	5 N	20 L	5 L	50	10	10 N	100 N	50	20	200 N	150	.05 N	.14	5 L	40	5	1
1434	20	5 N	20 L	5 L	20	5	10 N	100	30	10	200 N	150	.05 N	.06	5 L	15	5	0
UNIT 10																		
1251	70	5 L	20	10	30	15	10 N	100 L	70	30	200 N	300	.05 N	.30	20	20	35	0
1252	100	5 N	20	5 L	15	20	10 N	100	70	50	200 N	500	.05 N	.14	10	10	10	0
H12	50	5	20	15	50	10	10 N	150	20	15	200 N	150	.05 N	.00 B	55	35	60	0 B
UNIT 12																		
1337	30	5 L	20 L	5 L	30	15	10 N	100	70	10	200 N	300	.05 N	.08	30	5	110	0
1366	30	5 L	20 L	15	30	20	10 N	150	100	15	200 L	200	.05 N	.02	15	10	190	0
1483	70	5 N	20 L	15	15	30	10 N	100 N	100	15	200 N	100	.05 N	.06	20	10	60	0

TABLE 5.—*Geochemical analyses of rocks and minerals from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	X-COORD.	Y-COORD.	S-FE %	S-MG %	S-CA %	S-TI %	S-MN	S-AG	S-B	S-BA	S-BE	S-BI	S-CD	S-CO	S-CR	S-CU
VEIN QUARTZ; UNIT 0																
2013	254200	932765	0,15	.02 L	0,05 L	.010	10 L	0,5 N	10 N	20	1 N	10 N	20 N	5 N	10 N	15
2265	236475	919615	1,00	.20	0,30	.070	150	0,5 N	10 N	150	1	10 N	20 N	5 N	10 N	5
H16	235430	922880	1,00	.10	0,05 L	.050	200	0,5 N	70	50	1	10 N	20 N	5	20	30
UNIT 2																
2139	772135	927620	0,70	.02 L	0,05 L	.010	20	0,5 N	10 L	50	1 L	10 N	20 N	5 N	10 N	15
3060	228960	928340	2,00	.02 L	0,05 L	.005	50	0,5 N	10 L	20	1 N	10 N	20 N	5 N	10 N	5 L
UNIT 3																
2127	230380	926380	0,50	.02 L	0,05 L	.003	30	0,5 N	10 L	20	1 N	10 N	20 N	5 N	10 N	10
3083	227860	928320	0,50	.10	0,05 L	.003	150	0,5 N	10 L	20	1 N	10 N	20 N	5 N	10 N	5 L
UNIT 4																
1061	230780	926310	0,10	.02 L	0,05 L	.002	20	0,5 N	10 L	20	1 N	10 N	20 N	5 N	10 N	5 N
1396	770510	927600	2,00	.02	0,05 L	.020	200	0,5 N	10 L	20	1 N	10 N	20 N	7	10 N	15
2184	227860	924745	0,70	.03	0,05 L	.007	10	0,5 N	10 N	20 L	1 N	10 N	20 N	7	10 N	5
2188	227800	924770	2,00	.15	0,05 L	.070	150	0,5 N	20	150	1 L	10 N	20 N	5 N	10 L	10
2225	772190	925180	0,05	.02 L	0,05 L	.030	15	0,5 N	10 N	20 L	1 N	10 N	20 N	5 N	10 N	5 L
2343	770910	926270	5,00	.10	0,05 L	.050	200	0,5 N	10 L	100	1 L	10 N	20 N	5 N	10	10
H4	229500	926200	1,00	.02	0,05 L	.020	100	0,5 N	30	20	1 L	10 N	20 N	5	15	30
H6	229380	926280	1,00	.07	0,05 L	.010	100	0,5 N	10	20	1 N	10 N	20 N	5 N	20	30
H8	228400	924920	5,00	1,00	0,05	.300	500	0,5 N	70	500	3	10 N	20 N	15	15	50
UNIT 5																
2208	227704	924385	0,07	.02	0,05 L	.003	20	0,5 N	10 N	20 N	1 N	10 N	20 N	5 N	10 N	5 L
2210	227685	924400	0,10	.02 L	0,05 L	.003	70	0,5 N	10 N	20 N	1 N	10 N	20 N	5 N	10 N	5 L
UNIT 9																
3086	228040	923330	0,70	.05	0,05	.030	15	0,5 N	10 L	150	1 L	10 N	20 N	5 N	10 N	5 L
3090	228150	922910	0,70	.10	0,05 L	.050	50	0,5 N	10 L	150	1 N	10 N	20 N	5 N	10 N	5 L
UNIT 10																
1270	228210	921440	0,70	.20	0,05 L	.003	100	0,5 N	10 L	30	1 N	10 N	20 N	5 N	10 L	5 L
1438	771210	921020	1,00	.20	0,05 L	.100	100	0,5 N	10	500	2	10 N	20 N	5	15	15
3113	229190	923220	1,50	.10	0,05 L	.150	70	0,5 N	10 L	150	1 N	10 N	20 N	5 N	10 N	7
UNIT 12																
1340	771730	918650	1,00	.30	0,05 L	.150	200	0,5 N	10 L	300	1 L	10 N	20 N	5 N	10	5 L
3172	230280	919760	0,70	.20	0,05 L	.100	150	0,5 N	10	200	1 L	10 N	20 N	5 N	10 L	5

TABLE 5.—*Geochemical analyses of rocks and minerals from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	S-LA	S-MO	S-NB	S-NI	S-PB	S-SC	S-SN	S-SR	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	INST-HG	AA-CU-P	AA-PB-P	AA-ZN-P	T-C-C %
VEIN QUARTZ: UNIT 0																		
2013	20 N	5 N	20 N	5 L	10 L	5 N	10 N	100 N	10 L	10 N	200 N	10 N	.05 N	.02 L	5 L	25	10	0 B
2265	20 N	5 N	20 N	5 L	10 N	5 N	10 N	100 L	15	10 N	200 N	30	.05 N	.02	20	5	95	0 B
H16	20	5 N	20 N	15	10 N	5	10 N	100 N	10	20	200 N	20	.05 N	.00 B	75	10	10	0 B
UNIT 2																		
2139	20 N	5 N	20 N	5 L	15	5 N	10 N	100 N	10	10 N	200 L	10 N	.05 N	.08	40	45	5	0 B
3060	20 N	5 N	20 N	5 L	10 N	5 N	10 N	100 N	10 L	10 N	200 N	10 N	.05 N	.02	5 L	5	5 L	0 B
UNIT 3																		
2127	20 N	5 N	20 N	5	10	5 N	10 N	100 N	10 L	10 N	200 N	10 N	.05 N	.06	15	30	5 L	0 B
3083	20 N	5 N	20 N	5 L	10 N	5 N	10 N	100 N	10 L	10 N	200 N	10	.05 N	.16	5 L	5	10	0 B
UNIT 4																		
1061	20 N	5 N	20 N	5	10 N	5 N	10 N	100 N	10 L	10 N	200 N	10 N	.05 N	.02	5 L	10	5 L	0 B
1396	20 N	5 N	20 N	5	10	5	10 N	100 N	10	10 N	200 N	10	.05 N	.04	15	10	15	0 B
2184	20 N	5 L	20 N	5 L	10 N	5 N	10 N	100 N	10 L	10 N	200 N	10 N	.05 N	.04	10	5 L	5 L	0 B
2188	20 N	5 N	20 N	5 L	15	5 L	10 N	100 N	15	10 N	200 N	10 L	.05 N	.04	20	20	35	0 B
2225	20 N	5 N	20 N	5 L	10 N	5 N	10 N	100 N	10 L	10 N	200 N	10 L	.05 N	.08	5 L	5	5 L	0 B
2343	20 N	5 N	20 N	5	10 N	5	10 N	100 N	10	10	200 N	20	.05 N	.06	5 L	5	10	0 B
H4	20	5 N	20 N	10	10 N	5	10 N	100 N	10 L	10 N	200 N	10 N	.05 N	.00 B	55	5	5 L	0 B
H6	20	5 N	20 N	10	10 N	5	10 N	100 N	10 L	10 N	200 N	10 N	.05 N	.00 B	40	5	5 L	0 B
H8	150	5 N	20	30	70	30	10 N	200	100	50	200 N	100	.05 N	.00 B	30	50	140	0
UNIT 5																		
2208	20 N	5 N	20 N	5 N	10 N	5 N	10 N	100 N	10 L	10 N	200 N	10 N	.05 N	.04	5 L	5 L	5 L	0 B
2210	20 N	5 N	20 N	5 N	10 N	5 N	10 N	100 N	10 L	10 N	200 N	10 N	.05 N	.02	5 L	5	5 L	0 B
UNIT 9																		
3086	20 N	5 N	20 N	5 L	10 N	5 N	10 N	100 N	10 L	10 N	200 N	20	.05 N	.06	10	20	10	0 B
3090	20 N	5 N	20 N	5 L	10 N	5 N	10 N	100 N	10	10 N	200 N	70	.05 N	.04	5 L	5	5	0 B
UNIT 10																		
1270	20 N	5 N	20 N	5	10 N	5 N	10 N	100 N	10 L	10 N	200 N	10 N	.05 N	.06	10	5	25	0 B
1438	30	5 N	20 N	5 L	1000	5	10 N	100 N	30	10	200 N	70	.05 N	.16	5	550	5 L	0 B
3113	20	5 N	20 N	5 L	100	5 N	10 N	100 L	10 L	10 N	500	30	.15	.10	5	240	800	0 B
UNIT 12																		
1340	20 N	5 N	20 N	5 L	10 N	5	10 N	100 N	20	10	200 N	50	.05 N	.06	10	10	120	0 B
3172	20 N	5 N	20 L	5 L	20	5	10 N	100 N	15	10 N	200 N	30	.05 N	.02	5	30	90	0 B

TABLE 5.—*Geochemical analyses of rocks and minerals from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	X-COORD.	Y-COORD.	S-FE %	S-MG %	S-CA %	S-TI %	S-MN	S-AG	S-B	S-BA	S-BE	S-BI	S-CD	S-CO	S-CR	S-CU
							UNIT 13									
2293	232610	917060	0.50	.05	0.05 L	.100	700	0.5 N	10 N	70	1 N	10 N	20 N	5 N	10 L	5 L
2308	229615	917180	0.30	.07	0.05 L	.020	30	0.5 N	10 N	150	1 N	10 N	20 N	5 N	10 N	5
2364	232240	914520	0.10	.10	0.05 L	.020	30	0.5 N	10 L	50	1 N	10 N	20 N	5	10 N	5 N
							UNIT 15									
2321	231900	915600	0.30	.10	0.07	.050	70	0.5 N	10 N	70	1 N	10 N	20 N	5 N	10 N	5
2324	233700	916130	0.15	.02	0.05 L	.007	100	0.5 N	10 N	20 L	1 N	10 N	20 N	5 L	10 N	5 L
							METADIORITE: UNIT 0									
2004	254200	932640	10.00	5.00	7.00	.700	1500	0.5 N	10 L	70	1 L	10 N	20 N	70	200	70
2015	254280	932710	15.00	5.00	7.00	1.000	1500	0.5 N	10 L	30	1 L	10 N	20 N	50	150	70
2076	249325	930080	5.00	5.00	5.00	.500	1000	0.5 N	10 L	20 L	1	10 N	20 N	20	300	50
							CLAY, GOSSAN, PYRITE AND SULFIDES: UNIT 0									
2017	254310	932605	20.00	1.50	0.05 L	.100	300	20.0	10 N	20 L	1 L	30	20 N	7	15	15000
2019	254270	932530	20.00	3.00	7.00	.015	5000	30.0	10 N	30	1 N	10	150	70	10 L	20000 G
2091	248185	929140	10.00	1.00	0.05 L	.300	700	0.5 N	10 L	300	1	10 N	20 N	20	300	50
2095	248020	929040	10.00	5.00	1.00	.200	1500	0.5 N	10 L	150	1 N	10 N	20 N	70	300	70
2340	767760	925610	20.00 G	.02 L	0.05 L	.100	10	0.5 N	10 L	20 N	1 N	10 N	20 N	200	10 N	15
2341	767760	925610	20.00 G	.20	0.05 L	.100	100	1.0	10 L	200	1 N	10 N	20 N	700	10	700
							UNIT 2									
3067	771490	927950	20.00 G	.10	0.05 L	.050	20	0.5 N	10 L	150	1	10 N	20 N	5 N	10 N	100
							UNIT 4									
2186	227800	924770	20.00 G	.07	0.05 L	.030	5000 G	0.5 N	10 N	150	1 L	10 N	20 N	5 N	10 N	5 L
3202	770490	927730	20.00 G	.02	0.05 L	.100	15	1.0	70	150	1 N	10 N	20 N	300	20	50
H7	228400	924920	20.00	.10	0.05 L	.100	150	0.5 N	100	300	2	10 N	20 N	5 N	30	100
							UNIT 10									
3179	232040	923890	1.50	.15	0.05 L	.100	300	0.5 N	10 N	300	1 L	10 N	20 N	15	10 L	5 L

TABLE 5.—*Geochemical analyses of rocks and minerals from Fontana-Hazel Creek area and Joyce Kilmer-Slickrock Wilderness, Graham and Swain Counties, N.C., and Monroe County, Tenn.*—Continued

SAMPLE	S-LA	S-MO	S-NB	S-NI	S-PB	S-SC	S-SN	S-SR	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	INST-HG	AA-CU-P	AA-PB-P	AA-ZN-P	T-C-C %
										UNIT 13								
2293	20 N	5 N	20 N	5 L	10 N	5 N	10 N	100 N	10 L	10 N	200 N	20	.05 N	.04	5 N	10	95	0 B
2308	20 N	5 N	20 N	5 L	10 N	5 N	10 N	100 N	10 L	10 N	200 N	20	.05 N	.06	5	5	90	0 B
2364	20 N	5 N	20 N	5	10 N	5	10 N	100 N	10	10 N	200 N	20	.05 N	.04	5 L	5	5	0 B
										UNIT 15								
2321	20 N	5 N	20 N	5 L	10 N	5 N	10 N	100 N	10 L	10 N	200 N	10 L	.05 N	.02	5 L	5 L	90	0 B
2324	20 N	5 N	20 N	5 L	10 N	5 N	10 N	100 N	10 L	10 N	200 N	10 N	.05 N	.02	5 L	5 L	80	0 B
									METADIORITE:	UNIT 0								
2004	20 N	5 N	20 L	50	50	30	10 N	300	300	30	200 N	70	.05 N	.04	10	20	20	0 B
2015	20 N	5 L	20 L	30	10 N	30	10 N	300	300	50	200 N	150	.05 N	.02 N	45	10	10	0 B
2076	20 N	5 N	20 L	70	10 N	30	10 N	300	200	30	200 N	50	.05 N	.02 N	45	10	15	0 B
							CLAY, GOSSAN,	PYRITE AND	SULFIDES:	UNIT 0								
2017	20 L	5 L	20 L	5 L	1000	5	70	100 L	30	50	700	70	.70	.08	28000	2200	1000	0 B
2019	20 N	5 L	20 L	50	3000	5 N	70	150	10 L	10 L	10000 G	10 N	.25	.02 L	60000	7000	60000	0 B
2091	20 N	5 L	20 L	70	15	30	10 N	100 N	200	15	200 N	30	.05 N	.04	45	35	15	0 B
2095	20 N	5 N	20 L	150	10 N	30	10 N	150	200	15	200 N	30	.05 N	.02 N	70	10	15	0 B
2340	20	5 N	20 N	30	20	5 N	10 N	100 N	10	10 N	200 N	20	.05 N	.10	15	40	35	0 B
2341	70	5 N	20 N	150	100	10	10 N	100 N	20	200	200 N	50	.05 N	.10	200	75	65	0 B
										UNIT 2								
3067	50	5 N	20 N	5 L	10	5	10 N	100 N	20	15	200 N	50	.05 N	.06	80	20	40	0 B
										UNIT 4								
2186	20 N	5 N	20 L	5 L	10 L	5 N	10 N	100 L	10 L	10 N	200 N	10 L	.05 N	.10	5	20	25	0 B
3202	50	5 N	20 N	30	30	5	10 N	100 N	10	30	200 N	50	.30	.08	5	25	10	0 B
H7	20	5 N	20 N	5	15	15	10 N	100	50	30	200 N	50	.05 N	.00 B	55	15	130	0 B
										UNIT 10								
3179	50	5 N	20 N	15	15	5 L	10 N	100 L	15	30	200 N	70	.05 N	.02	5 L	5	95	0 B