UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Analyses and descriptions of geochemical samples, Worley Ridge Roadless Area, Rabun County, Georgia

by

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1 Denver, Colo.
2 Reston, Va.

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STUDIES RELATED TO WILDERNESS

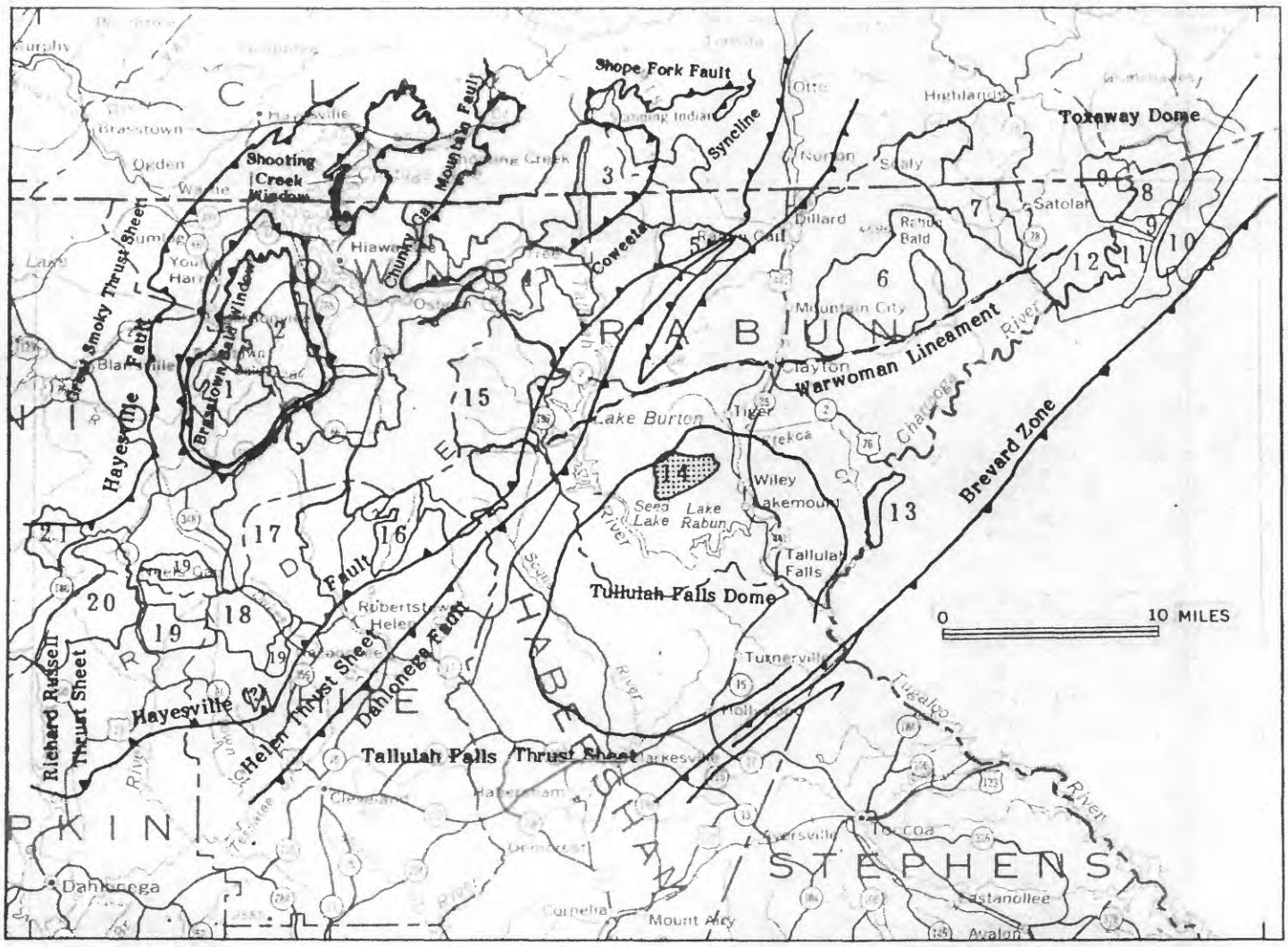
The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts require the U.S. Geological Survey (USGS) and the U.S. Bureau of Mines to survey certain areas on Federal lands in order to determine the mineral values, if any, that may be present. Results must be made available to the public and be submitted to the President and the Congress. This report presents the analytical results of a geochemical survey of the Worley Ridge Roadless Area (08-224) in the Chattahoochee National Forest, Rabun County, Ga. The area was classified as nonwilderness during the Second Roadless Area Review and Evaluation (RARE II) by the U.S. Forest Service, January, 1979.

Abstract

Semiquantitative spectrographic analyses for 31 elements on 19 stream-sediment, 15 panned-concentrate, 42 soil, and 39 rock samples from the Worley Ridge Roadless Area, Rabun County, Ga., are reported here in detail. Atomic-absorption analyses for zinc in most samples are also reported. Brief descriptions are given of rock samples analyzed, which include metamorphic and igneous rocks.

INTRODUCTION

The analyses presented in this report (Table 1) are of 19 stream-sediment, 15 panned-concentrates, 42 soil, and 39 rock samples from the Worley Ridge Roadless Area, Ga. (Fig. 1). These were collected by F. G. Lesure, J. P. D'Agostino, J. D. Peper and J. A. Goss in April 1985. Stream sediment samples were collected from most of the small drainage basins in the study area.



EXPLANATION

3 Southern Nantahala Wilderness

8 Ellicott Rock Wilderness

Roadless Areas

1 Wolf Pen 8-149
2 Brasstown 8-146
4 Buzzard Knob 8-223
5 Southern Nantahala B8-025
6 Rabun Bald 8-147
7 Overflow 8-026
9 Ellicott Rock Extension A8-031
10 Persimmon Mountain L8-116
11 Ellicott Rock Expansion 8-112
12 Rand Mountain 8-148
13 Long Creek 8-113
14 Worley Ridge 8-224
15 Tray Mountain 8-030
16 Anna Ruby 8-225
17 Chattahoochee River 8-029
18 Raven Cliff A8-028
19 Raven Cliff B8-028
20 Blood Mountain 8-027
21 Board Camp 8-145

Figure 1.-- Index map showing locations of wilderness and roadless areas and major structural features in northeastern Georgia and adjacent North and South Carolina. The Worley Ridge area is stippled. Number after roadless name is Forest Service identification number.

These represent several handfuls, randomly collected, of the finest sediment available at the sample site in the stream. A heavy mineral sample from coarser sediment was taken at 15 sites by panning one or more panfuls of gravel using a 14 in. standard gold pan. After air drying at room temperature, the remaining light minerals, mostly quartz and feldspar, were removed from the panned concentrate using bromoform (specific gravity 2.8). Magnetite was removed using a hand-held magnet and discarded. The remaining concentrate was analyzed without further preparation. Rock samples analyzed are described briefly in a separate section of this report. All are chip samples taken across bedding or layering over a measured thickness of representative material from outcrops or road cuts. The samples are representative of the major rock types exposed in the area. Some of the rock is partly weathered, but generally the freshest material available was sampled. The soil samples are grab samples from the A_2 or upper B soil zone, just below the dark, organic-rich surface soil (A_1 zone). Soils were dried, sieved to minus 80-mesh (0.007 in. or 0.177 mm), and then pulverized to minus 140-mesh (0.004 in. or 0.105 mm). Maps showing sample localities and discussion of the results of the analytical work are given by Lesure and others (in press).

ANALYTICAL TECHNIQUES

Each sample was analyzed semiquantitatively for 31 elements by means of a six-step, D.C. (direct-current) arc, optical-emission spectrographic method (Grimes and Marranzino, 1968) by R. T. Hopkins and M. S. Erickson in the USGS laboratories, Denver, Colo. In addition, most of the samples were analyzed for zinc by an atomic-absorption technique (Ward and others, 1969, p. 20) by M. A. Pokorny, USGS laboratories, Denver, Colo. Twelve of the panned-concentrate and ten of the rock samples were analyzed for gold by atomic absorption methods by T. A. Roemer and D. L. Kelley (Thompson and others, 1968). The semiquantitative spectrographic values are reported as six steps per order of magnitude (1, 0.7, 0.5, 0.3, 0.2, 0.15 or multiples of ten of these numbers) and are approximate midpoints of geometric brackets whose boundaries are 1.2, 0.83, 0.56, 0.38, 0.26, 0.18, 0.12, etc. The expected precision is within one adjoining reporting interval on each side of the reported value 83 percent of the time and within two adjoining intervals 96 percent of the time (Motooka and Grimes, 1976).

The visual lower limits of determination for the 31 elements that were determined spectrographically are as follows:

For those given in percent:

Calcium	0.05	Magnesium	0.02
Iron	0.05	Titanium	0.002

For those given in ppm:

Antimony	100	Molybdenum	5
Arsenic	200	Nickel	5
Barium	20	Niobium	20
Beryllium	1	Scandium	5
Bismuth	10	Silver	0.5
Boron	10	Strontium	100
Cadmium	20	Thorium	100

Chromium	10	Tin	10
Cobalt	5	Tungsten	50
Copper	5	Vanadium	10
Gold	10	Yttrium	10
Lanthanum	20	Zinc	200
Lead	10	Zirconium	10
Manganese	10		

Rock sample descriptions

GB05-103 R	Composite sample of 6 boulders, barren vein quartz, white.
105 R	Composite sample 5 boulders, meta-arkose, conglomeratic, light-gray, medium- to very coarse-grained.
113 R	1 m chip sample, meta-arkose, light gray, medium- to very coarse-grained.
118 R	2 m chip sample, meta-arkose, light-gray, medium- to coarse-grained.
122 R	1 m chip sample, meta-arkose, light-gray, medium- to very coarse-grained.
126 R	Composite sample, quartz vein, 5-20 cm thick.
127 R	1 m chip sample, mica-garnet-kyanite schist, weathered, kyanite porphyroblasts as much as 2 cm long.
203 R	Composite sample, vein quartz.
205 R	Composite sample, 10 boulders of vein quartz.
206 R	1.5 m chip sample, meta-arkose, light-gray, fine- to medium-grained.
207 R	Composite sample, 8 pieces of vein quartz float.
210 R	Composite sample, vein quartz.
211 R	Composite sample, vein quartz, minor garnet, and meta-arkose.
215 R	Composite sample of three boulders of vein quartz.
216 R	1 m chip sample, meta-arkose.
217 R	1 m chip sample, meta-arkose, yellow- to red-stained, medium- to coarse-grained.
224 R	1 m chip sample, mica-garnet schist, crinkled, interlayered with mica gneiss. Only schist sampled.
225 R	1 m chip sample, hornblende-feldspar gneiss, fine- to medium-grained.

302 R 1 m chip sample, meta-arkose, light-gray, weathers grayish-orange, quartz 46 percent, k-feldspar 42 percent, biotite 8 percent, muscovite 2 percent, coarse-grained, conglomeratic.

303 R 2 m chip sample, meta-arkose, light-yellow to white, medium- to coarse-grained.

GB05-
305 R 2 m chip sample, meta-arkose, light-gray, fine- to medium-grained.

306 R 3 m chip sample, vein quartz, white.

310 R Composite sample, vein quartz.

313 R 2 m chip sample, meta-arkose, light-gray, coarse-grained, conglomeratic.

315 R 1 m chip sample, meta-arkose, light-gray, weathers yellow, medium- to coarse-grained.

316 R 1 m chip sample, meta-arkose, light-gray, weathers yellowish-brown, medium- to coarse-grained.

317 R 1 m chip sample, meta-arkose, medium- to coarse-grained.

318 R 1 m chip sample, meta-arkose, brown-weathering, medium- to coarse-grained.

319 R 2 m chip sample, quartz-mica schist, light-gray, accessory garnet and graphite, medium- to coarse-grained.

320 R 1 m chip sample, meta-arkose, light-gray, medium- to coarse-grained.

321 R 1 m chip sample, metasandstone, light-gray, medium- to coarse-grained.

323 R 2 m chip sample, meta-arkose, yellow- to brown-weathering, fine- to medium-grained.

324 R 2 m chip sample, meta-arkose, light-gray, medium- to coarse-grained.

325 R 1 m chip sample, meta-arkose.

326 R 1 m chip sample, meta-arkose.

327 R 2 m chip sample, meta-arkose, light-gray, weathers light-brown, medium- to coarse-grained.

328 R 1 m chip sample, meta-arkose, coarse-grained.

329 R 1 m chip sample, meta-arkose, pale-reddish-brown to yellowish-brown, weathered, medium- to coarse-grained.

EXPLANATION OF TABLE 1

Table 1 lists the results of analyses of all sample media. The letters following the sample numbers designate the type of sample: "C" designates panned concentrates, "D" designates soils, "R" designates rocks, and "S" designates stream sediments.

Iron, magnesium, calcium, and titanium, concentrations are reported in percent (pct); all others are in parts per million (ppm). Letters below chemical symbols indicate the method of analysis: s, six-step semiquantitative spectrographic method; aa, atomic absorption. Other symbols on the table are: N, not detected; --, not determined; <, amount detected is below the lower limit of determination, which is number shown; >, amount detected is above the upper limit of determination, which is number shown.

Elements looked for spectrographically but not found, except as noted, are listed below. The lower limits of determination for these elements are in parentheses, the first number is for rock, and stream sediment; the second number is for panned-concentrate samples.

Ag (0.5; 1), As (200; 500), Au (20; 20), Bi (10; 20), Cd (20; 50), Mo (5; 10), Sb (100; 200), Sn (10, 20), Th (100; 200), W (50; 100), and Zn (200; 500). Exceptions: Zn was detected but below limit of determination (200 ppm) in rock sample 319R.

REFERENCES CITED

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Thompson, C. E., Nakagawa, H. M., and Van Sickle, G. H., 1968, Rapid analysis for gold in geologic materials, in Geological Survey Research 1968: U.S. Geological Survey Professional Paper 600-B, p. B130-B132.

Ward, F. N., Nakagawa, H. M., Harms, T. F., and Van Sickle, G. H., 1969, Atomic-absorption methods of analysis useful in geochemical exploration: U.S. Geological Survey Bulletin 1289, 45 p.

Worley Ridge, Georgia

[N, not detected; <, detected but below the limit of determination shown; >, determined to be greater than the value shown.]

Sample	Latitude	Longitude	Fe-pct. s	Mg-pct. s	Ca-pct. s	Ti-pct. s	Mn-ppm s	B-ppm s	Ba-ppm s	Be-ppm s	Co-ppm s	Cr-ppm s	Cu-ppm s
GB05004C	34 47 47	83 28 12	.30	.07	<.10	>2.000	200	50	200	N	N	20	10
GB05006C	34 47 45	83 28 15	.50	.07	.10	>2.000	300	100	200	N	N	20	20
GB05008C	34 47 42	83 27 58	.50	.07	.20	>2.000	300	300	200	N	N	30	20
GB05010C	34 49 11	83 27 0	.20	.10	.30	>2.000	30	500	50	N	N	100	15
GB05012C	34 49 13	83 26 59	.20	.07	.30	>2.000	50	100	50	N	N	200	50
GB05014C	35 7 6	83 27 31	.30	.10	.10	2.000	50	200	200	N	N	50	<10
GB05015C	34 48 10	83 29 41	.15	.07	<.10	2.000	100	20	150	N	N	<20	<10
GB05016C	34 48 7	83 29 38	.15	.07	<.10	2.000	70	20	50	N	N	<20	N
GB05018C	34 49 28	83 29 15	.20	.05	.30	>2.000	50	50	100	N	N	100	30
GB05020C	34 49 18	83 28 49	.30	.20	.20	>2.000	70	1,000	150	N	N	300	30
GB05022C	34 49 17	83 28 37	.50	.20	.20	>2.000	100	500	200	N	N	200	20
GB05024C	34 49 8	83 28 31	.50	.05	<.10	>2.000	150	70	150	N	N	20	<10
GB05025C	34 49 11	83 28 30	.50	.30	.20	>2.000	150	2,000	70	N	N	100	20
GB05029C	34 49 8	83 27 47	.20	.10	<.10	>2.000	50	200	50	N	N	100	10
GB05227C	34 47 23	83 29 46	.30	.15	.15	>2.000	70	700	100	N	N	100	30
GB05101D	34 48 19	83 29 8	2.00	.07	<.05	.500	150	15	300	1.0	N	30	7
GB05102D	34 48 22	83 29 40	3.00	.15	<.05	.500	200	15	500	1.5	<5	30	7
GB05104D	34 48 27	83 29 22	2.00	.15	<.05	.500	150	15	500	1.0	<5	30	5
GB05106D	34 48 27	83 28 34	2.00	.15	<.05	.500	200	20	500	1.0	<5	30	7
GB05107D	34 48 7	83 28 29	3.00	.30	<.05	.500	150	30	500	1.5	<5	50	20
GB05108D	34 48 11	83 28 17	2.00	.15	<.05	.700	200	50	300	<1.0	N	30	7
GB05109D	34 48 19	83 28 14	3.00	.10	<.05	.500	150	30	300	<1.0	N	50	15
GB05110D	34 48 28	83 27 50	1.50	.10	<.05	.500	150	30	500	1.5	N	30	7
GB05111D	34 48 36	83 27 44	2.00	.15	<.05	.500	200	30	500	1.5	N	30	7
GB05112D	34 48 47	83 27 37	3.00	.30	<.05	.500	150	30	300	1.5	5	50	15
GB05114D	34 48 53	83 27 26	2.00	.15	<.05	.700	300	20	700	1.0	<5	30	5
GB05115D	34 48 54	83 27 12	2.00	.15	<.05	.300	100	15	200	1.5	N	30	15
GB05116D	34 49 1	83 27 7	3.00	.20	<.05	.700	150	20	500	1.0	<5	50	10
GB05117D	34 49 4	83 26 54	2.00	.10	<.05	.700	200	20	500	<1.0	N	30	5
GB05119D	34 48 0	83 29 8	2.00	.30	<.05	.700	100	50	300	2.0	<5	50	7
GB05120D	34 47 54	83 29 26	2.00	.10	<.05	.700	200	30	500	<1.0	N	30	5
GB05123D	34 47 37	83 29 34	1.50	.10	<.05	.500	200	30	500	<1.0	N	30	5
GB05124D	34 47 23	83 29 46	2.00	.15	<.05	.700	200	30	300	1.0	<5	30	7
GB05125D	34 47 27	83 29 34	3.00	.20	<.05	.500	100	50	200	1.5	<5	50	15
GB05128D	34 48 52	83 29 35	2.00	.15	<.05	.500	150	100	200	1.5	N	50	20
GB05201D	34 48 18	83 29 27	2.00	.20	<.05	.500	150	10	500	1.0	<5	30	10
GB05202D	34 48 27	83 28 52	2.00	.15	<.05	.500	150	15	500	<1.0	<5	20	<5
GB05204D	34 48 28	83 28 17	3.00	.15	<.05	.500	200	15	500	<1.0	N	30	10
GB05208D	34 48 22	83 27 50	2.00	.10	<.05	.700	300	20	300	<1.0	N	30	5
GB05209D	34 48 7	83 27 50	1.50	.07	<.05	.500	200	30	300	<1.0	N	30	5
GB05213D	34 48 10	83 27 37	2.00	.20	<.05	.500	150	20	500	1.5	N	30	7
GB05214D	34 48 9	83 27 28	1.50	.10	<.05	.300	200	20	500	1.0	N	30	5
GB05218D	34 48 17	83 27 0	2.00	.15	<.05	.500	300	15	500	<1.0	N	30	7
GB05219D	34 48 27	83 26 48	1.50	.07	<.05	.500	100	20	300	<1.0	N	50	5
GB05220D	34 48 40	83 26 43	2.00	.10	<.05	.500	150	50	500	<1.0	N	50	7
GB05223D	34 49 9	83 29 24	2.00	.20	<.05	.300	150	15	300	<1.0	N	50	20
GB05226D	34 48 45	83 29 41	1.00	.07	<.05	.150	50	50	150	7.0	N	15	10
GB05228D	34 49 1	83 29 5	3.00	.20	<.05	.500	200	100	200	2.0	7	50	30
GB05304D	34 48 42	83 28 10	2.00	.15	<.05	.500	150	30	500	<1.0	N	20	7
GB05307D	34 48 17	83 27 43	2.00	.10	<.05	.700	300	30	500	<1.0	N	30	5

Sample	La-ppm s	Nb-ppm s	Ni-ppm s	Pb-ppm s	Sc-ppm s	Sr-ppm s	V-ppm s	Y-ppm s	Zr-ppm s	Au-ppm aa	Zn-ppm aa
GB05004C	N	<50	50	N	<10	200	50	700	>2,000	N	10
GB05005C	N	<50	30	N	<10	200	50	700	>2,000	--	--
GB05008C	N	<50	20	N	<10	<200	70	1,000	>2,000	--	<10
GB05010C	100	50	15	N	N	N	70	100	>2,000	N	<10
GB05012C	300	50	30	N	N	300	100	700	>2,000	N	<10
GB05014C	500	50	10	N	N	<200	50	50	>2,000	N	<10
GB05015C	700	N	30	N	N	300	20	700	>2,000	N	N
GB05016C	N	N	50	N	N	300	70	1,000	>2,000	--	140
GB05018C	500	50	20	N	N	<200	100	500	>2,000	N	<10
GB05020C	500	100	20	N	N	N	100	100	>2,000	N	10
GB05022C	200	70	20	N	N	<200	100	200	>2,000	N	--
GB05024C	1,500	<50	30	N	N	200	50	1,000	>2,000	N	10
GB05025C	1,500	50	10	20	N	N	100	200	>2,000	N	10
GB05029C	100	<50	30	<20	N	200	100	300	>2,000	N	<10
GB05227C	1,000	50	30	<20	N	200	150	300	>2,000	N	10
GB05101D	30	N	7	30	7	N	70	15	700	--	15
GB05102D	30	<20	7	30	7	<100	50	20	700	--	20
GB05104D	30	<20	7	50	7	N	50	20	700	--	20
GB05106D	50	N	7	50	7	N	50	20	1,000	--	25
GB05107D	50	<20	10	50	10	N	70	50	700	--	20
GB05108D	30	<20	10	50	7	N	70	15	700	--	10
GB05109D	30	<20	10	70	7	N	70	15	700	--	10
GB05110D	20	<20	15	70	5	N	50	30	500	--	20
GB05111D	20	<20	10	50	7	N	50	20	500	--	25
GB05112D	50	<20	15	30	10	N	70	50	500	--	60
GB05114D	30	<20	10	50	<5	<100	50	30	1,000	--	25
GB05115D	30	N	15	70	7	N	50	30	500	--	30
GB05116D	50	<20	20	30	7	<100	70	30	500	--	40
GB05117D	30	<20	10	30	5	<100	50	10	500	--	20
GB05119D	100	<20	7	30	7	N	50	30	700	--	15
GB05120D	20	<20	15	50	5	N	50	30	500	--	15
GB05123D	20	<20	10	50	<5	<100	50	15	700	--	15
GB05124D	30	<20	7	50	7	N	50	20	700	--	25
GB05125D	30	<20	10	50	7	N	50	15	700	--	15
GB05128D	100	<20	10	50	7	N	70	30	300	--	20
GB05201D	30	<20	10	30	7	<100	70	20	150	--	60
GB05202D	30	<20	5	30	5	N	50	15	500	--	30
GB05204D	50	<20	15	50	5	N	50	20	700	--	35
GB05208D	20	<20	5	50	5	N	50	20	700	--	15
GB05209D	20	<20	<5	50	5	N	50	15	700	--	10
GB05213D	30	<20	10	50	5	<100	50	15	700	--	20
GB05214D	30	N	5	70	5	<100	50	15	200	--	20
GB05218D	30	<20	7	50	5	N	70	20	1,000	--	30
GB05219D	20	<20	<5	30	5	N	50	20	1,000	--	20
GB05220D	30	<20	7	30	7	N	70	20	500	--	15
GB05223D	150	<20	7	30	7	N	70	300	700	--	40
GB05226D	20	N	10	100	5	N	30	15	100	--	10
GB05228D	20	<20	20	30	7	N	70	50	700	--	55
GB05304D	30	<20	<5	50	5	<100	50	10	700	--	30
GB05307D	20	<20	<5	50	<5	N	50	15	700	--	10

Sample	Latitude	Longitude	Fe-pct. s	Mg-pct. s	Ca-pct. s	Ti-pct. s	Mn-ppm s	B-ppm s	Ba-ppm s	Be-ppm s	Co-ppm s	Cr-ppm s	Cu-ppm s
GB05308D	34 48 26	83 27 30	2.00	.15	<.05	.500	200	30	500	<1.0	N	30	5
GB05309D	34 48 38	83 27 13	3.00	.20	<.05	.700	150	30	300	<1.0	N	50	10
GB05314D	34 48 6	83 29 3	1.50	.10	<.05	.500	150	30	500	<1.0	N	20	5
GB05322D	34 49 9	83 28 42	2.00	.07	<.05	.700	200	20	500	<1.0	<5	20	5
GB05330D	34 47 40	83 29 7	3.00	.15	<.05	.500	150	20	300	1.5	N	50	10
GB05001D	34 47 49	83 29 10	2.00	.15	N	.500	300	<10	500	1.5	<5	20	7
GB05002D	34 47 26	83 29 1	2.00	.15	<.05	.700	200	20	700	<1.0	N	30	7
GB05103R	34 48 26	83 29 31	.20	.07	<.05	.015	150	N	<20	N	N	10	<5
GB05105R	34 48 26	83 29 18	1.50	.30	.07	.500	200	<10	500	1.0	<5	10	5
GB05113R	34 48 49	83 27 34	1.50	.20	<.05	.300	200	10	500	2.0	N	10	7
GB05118R	34 49 2	83 26 42	1.00	.20	.07	.300	300	15	500	1.0	N	10	<5
GB05122R	34 47 46	83 29 41	1.00	.20	.05	.300	200	15	500	1.0	N	10	<5
GB05126R	34 49 4	83 29 25	.07	<.02	<.05	.002	20	N	<20	N	N	10	<5
GB05127R	34 49 1	83 29 30	2.00	.30	.05	.500	500	100	500	3.0	10	50	30
GB05203R	34 48 27	83 28 34	<.05	<.02	N	.030	<10	N	N	N	N	15	N
GB05205R	34 48 25	83 28 11	<.05	<.02	N	.070	N	N	<20	N	N	<10	N
GB05206R	34 48 24	83 28 1	1.50	.20	.07	.300	200	15	500	1.0	N	15	5
GB05207R	34 48 25	83 28 2	<.05	<.02	N	.005	N	N	N	N	N	10	N
GB05210R	34 48 11	83 27 44	<.05	<.02	N	.007	<10	N	N	N	N	15	5
GB05211R	34 48 11	83 27 44	3.00	.30	.05	1.000	300	30	300	3.0	N	30	7
GB05215R	34 48 9	83 27 28	.30	<.02	N	.030	<10	N	70	<1.0	N	15	<5
GB05216R	34 48 7	83 27 25	2.00	.20	.07	.500	300	15	700	1.0	7	20	<5
GB05217R	34 48 6	83 27 14	1.50	.15	<.05	.300	150	10	700	1.0	N	20	<5
GB05225R	34 49 4	83 29 25	5.00	1.00	.50	.500	700	15	300	3.0	10	70	30
GB05225R	34 48 55	83 29 35	5.00	2.00	5.00	.500	1,000	N	70	<1.0	30	200	50
GB05301R	34 48 25	83 29 1	.70	.15	<.05	.500	15	20	150	1.0	N	20	7
GB05302R	34 48 25	83 29 1	1.00	.20	.10	.300	200	10	700	<1.0	N	15	10
GB05303R	34 48 24	83 28 28	.70	.07	<.05	.200	150	30	500	<1.0	N	<10	<5
GB05305R	34 48 40	83 28 11	1.50	.30	.15	.500	300	10	500	1.5	<5	20	<5
GB05306R	34 48 39	83 28 10	.05	<.02	<.05	.003	<10	N	<20	<1.0	N	10	<5
GB05310R	34 48 46	83 26 59	.15	<.02	<.05	.002	<10	N	N	<1.0	N	<10	5
GB05313R	34 49 4	83 26 38	1.50	.15	.50	.300	500	20	300	2.0	N	<10	<5
GB05315R	34 48 3	83 29 12	1.50	.20	<.05	.300	70	20	300	2.0	7	15	5
GB05316R	34 47 55	83 29 30	1.50	.20	.05	.300	200	N	700	<1.0	<5	15	<5
GB05317R	34 47 55	83 29 20	1.50	.20	<.05	.500	200	30	700	<1.0	N	15	5
GB05319R	34 49 29	83 29 16	3.00	1.00	.50	.500	700	15	500	2.0	10	50	30
GB05320R	34 49 26	83 29 10	3.00	.70	.70	.700	500	N	700	2.0	7	50	20
GB05321R	34 49 20	83 29 6	3.00	.50	.70	.500	500	10	300	2.0	7	30	7
GB05323R	34 49 11	83 28 26	2.00	.30	.15	.500	300	<10	700	1.0	5	15	<5
GB05324R	34 49 2	83 28 0	1.50	.20	.05	.500	200	15	500	1.0	N	N	<5
GB05325R	34 49 4	83 27 53	1.50	.30	.07	.300	300	15	700	1.0	7	<10	<5
GB05326R	34 49 6	83 27 43	2.00	.30	.15	.300	300	20	500	1.0	7	10	7
GB05327R	34 49 2	83 27 39	1.50	.15	<.05	.200	150	15	700	1.0	N	<10	<5
GB05328R	34 49 6	83 27 24	2.00	.30	.05	.300	300	20	700	1.0	7	15	5
GB05329R	34 49 10	83 27 13	1.50	.30	.15	.300	300	15	700	1.0	N	15	<5
GB05318R	34 47 33	83 29 9	1.50	.15	.07	.300	150	15	700	1.0	N	<10	<5
GC03001S	34 44 43	83 43 13	2.00	.20	.07	.500	300	<10	300	1.5	10	50	20
GC03003S	34 44 55	83 43 3	2.00	.30	.15	.300	200	<10	300	1.5	10	70	20
GB03003S	34 47 45	83 41 25	3.00	.70	.30	.500	700	N	500	2.0	10	50	20
GB03005S	34 47 43	83 41 27	2.00	.50	.15	.500	500	N	500	2.0	10	70	30

Sample	La-ppm s	Nb-ppm s	Ni-ppm s	Pb-ppm s	Sc-ppm s	Sr-ppm s	V-ppm s	Y-ppm s	Zr-ppm s	Au-ppm aa	Zn-ppm aa
GB05308D	20	<20	5	50	5	<100	50	15	700	--	20
GB05309D	30	<20	5	70	7	N	70	30	500	--	25
GB05314D	30	N	<5	50	<5	N	30	20	500	--	15
GB05322D	20	<20	5	50	5	N	50	15	500	--	15
GB05330D	30	<20	15	30	7	N	70	20	300	--	35
GB05001D	30	N	5	70	5	N	30	20	700	--	30
GB05002D	20	<20	7	30	5	<100	50	20	500	--	25
GB05103R	<20	N	5	N	N	N	<10	N	<10	N	N
GB05105R	20	N	7	30	5	150	30	10	200	--	30
GB05113R	30	N	7	30	<5	<100	20	20	150	--	20
GB05118R	20	N	7	30	<5	100	20	10	50	--	30
GB05122R	20	N	7	30	<5	<100	20	<10	150	--	30
GB05126R	<20	N	7	N	N	N	<10	N	N	N	N
GB05127R	30	N	10	50	15	<100	100	15	30	--	40
GB05203R	<20	N	<5	N	N	N	<10	N	N	N	N
GB05205R	N	N	10	N	N	N	<10	N	N	N	N
GB05206R	20	N	10	30	5	200	30	10	200	--	30
GB05207R	<20	N	7	N	N	N	<10	N	N	N	N
GB05210R	<20	N	10	N	N	N	<10	N	<10	N	N
GB05211R	20	20	10	50	10	N	70	100	300	N	15
GB05215R	N	N	10	N	N	N	<10	N	N	N	N
GB05216R	20	N	10	30	<5	150	20	20	150	--	20
GB05217R	20	N	7	30	N	<100	20	<10	100	--	15
GB05225R	50	<20	30	30	10	<100	100	70	150	--	80
GB05225R	N	N	50	<10	20	100	150	20	50	--	5
GB05301R	30	<20	5	15	<5	N	50	15	500	--	N
GB05302R	30	N	5	30	<5	150	30	15	150	--	15
GB05303R	N	N	<5	30	<5	<100	15	N	150	--	<5
GB05305R	<20	N	7	30	5	100	30	10	700	--	30
GB05306R	N	N	5	N	N	N	N	N	<10	N	N
GB05310R	N	N	5	N	N	N	<10	N	N	N	N
GB05313R	20	N	5	20	<5	150	15	20	150	--	15
GB05315R	200	<20	10	30	5	N	30	50	200	--	5
GB05316R	20	N	5	30	<5	150	20	N	150	--	20
GB05317R	20	N	7	50	<5	150	30	15	500	--	35
GB05319R	50	N	15	30	10	150	70	50	200	--	110
GB05320R	20	N	10	30	7	100	70	30	300	--	45
GB05321R	30	N	15	20	5	150	70	20	150	--	20
GB05323R	20	N	7	30	5	150	30	15	200	--	30
GB05324R	20	N	5	30	<5	100	30	15	150	--	15
GB05325R	30	N	5	30	<5	150	30	15	150	--	35
GB05326R	20	N	7	30	5	150	30	20	150	--	20
GB05327R	20	N	5	30	<5	100	15	<10	100	--	20
GB05328R	30	N	7	30	5	100	30	20	200	--	30
GB05329R	20	N	5	30	<5	150	30	15	200	--	25
GB05318R	20	N	5	30	<5	100	20	15	150	--	20
GC03001S	20	<20	15	20	5	N	30	20	700	--	45
GC03003S	20	<20	15	30	5	N	50	30	500	--	45
GB03003S	100	<20	7	30	15	<100	50	70	1,000	--	50
GB03005S	70	<20	20	30	7	N	50	30	500	--	90

Worley Ridge, Georgia--Continued

Sample	Latitude	Longitude	Fe-pct. s	Mg-pct. s	Ca-pct. s	Ti-pct. s	Mn-ppm s	B-ppm s	Ba-ppm s	Be-ppm s	Co-ppm s	Cr-ppm s	Cu-ppm s
GB03007S	34 47 41	83 41 24	3.00	.70	.30	.500	700	N	700	2.0	10	50	20
GB03009S	34 47 39	83 41 22	3.00	.70	.50	.500	1,000	<10	500	2.0	10	70	20
GB03011S	34 47 23	83 41 29	3.00	.70	.30	.500	700	N	500	2.0	10	50	20
GB03013S	34 47 12	83 41 25	3.00	.50	.30	.500	1,000	<10	500	2.0	10	70	20
GB03015S	34 47 14	83 41 28	3.00	.70	.30	.500	700	<10	500	2.0	10	70	30
GB03017S	34 46 25	83 41 27	3.00	.70	.30	.500	1,000	15	500	2.0	15	70	30
GB03018S	34 46 18	83 41 42	1.50	.50	.20	.300	500	N	300	2.0	10	50	20
GB03019S	34 46 7	83 41 54	2.00	.30	.30	.300	700	N	300	3.0	10	70	30
GB03020S	34 45 53	83 42 9	2.00	.50	.30	.300	500	N	500	3.0	10	50	20
GB03101S	34 45 55	83 42 38	2.00	.50	.30	.300	700	10	500	2.0	10	70	20
GB03209S	34 46 41	83 42 24	2.00	.30	.10	.300	500	N	500	2.0	10	50	20
GB03211S	34 46 41	83 42 27	2.00	.30	.15	.300	300	<10	500	1.5	10	50	20
GB03213S	34 46 0	83 42 47	3.00	.50	.05	.500	300	N	500	2.0	15	70	30
GB03215S	34 45 59	83 42 45	2.00	.50	.15	.300	300	<10	500	1.5	10	70	20
GB03202S	34 45 53	83 42 41	3.00	.70	.50	.300	1,000	10	500	2.0	10	70	20
GB05009S	34 49 11	83 27 0	2.00	.20	.07	>1.000	700	30	500	<1.0	7	30	7
GB05011S	34 49 13	83 26 59	3.00	.20	.10	>1.000	700	30	300	<1.0	10	50	10

Worley Ridge, Georgia--Continued

Sample	La-ppm s	Nb-ppm s	Ni-ppm s	Pb-ppm s	Sc-ppm s	Sr-ppm s	V-ppm s	Y-ppm s	Zr-ppm s	Au-ppm aa	Zn-ppm aa
GB03007S	200	<20	20	30	7	N	50	70	700	--	65
GB03009S	100	<20	20	50	10	<100	70	70	700	--	85
GB03011S	70	<20	20	50	7	N	70	50	700	--	70
GB03013S	150	<20	15	50	7	<100	50	70	700	--	35
GB03015S	50	<20	20	30	7	100	70	50	500	--	95
GB03017S	100	<20	20	50	10	<100	70	100	700	--	80
GB03018S	300	N	15	30	7	N	50	150	700	--	65
GB03019S	150	<20	20	30	7	N	50	50	500	--	85
GB03020S	150	<20	10	50	7	N	50	70	700	--	60
GB03101S	150	<20	10	50	10	N	70	100	700	--	75
GB03209S	70	N	10	30	7	N	50	30	700	--	45
GB03211S	20	<20	10	30	7	N	50	20	700	--	45
GB03213S	70	<20	30	30	10	N	70	100	500	--	110
GB03215S	100	<20	10	30	7	N	70	50	700	--	55
GB03202S	100	<20	15	30	15	N	70	70	1,000	--	55
GB05009S	50	20	7	30	5	N	30	150	>1,000	--	20
GB05011S	200	20	10	30	5	N	70	150	>1,000	--	20