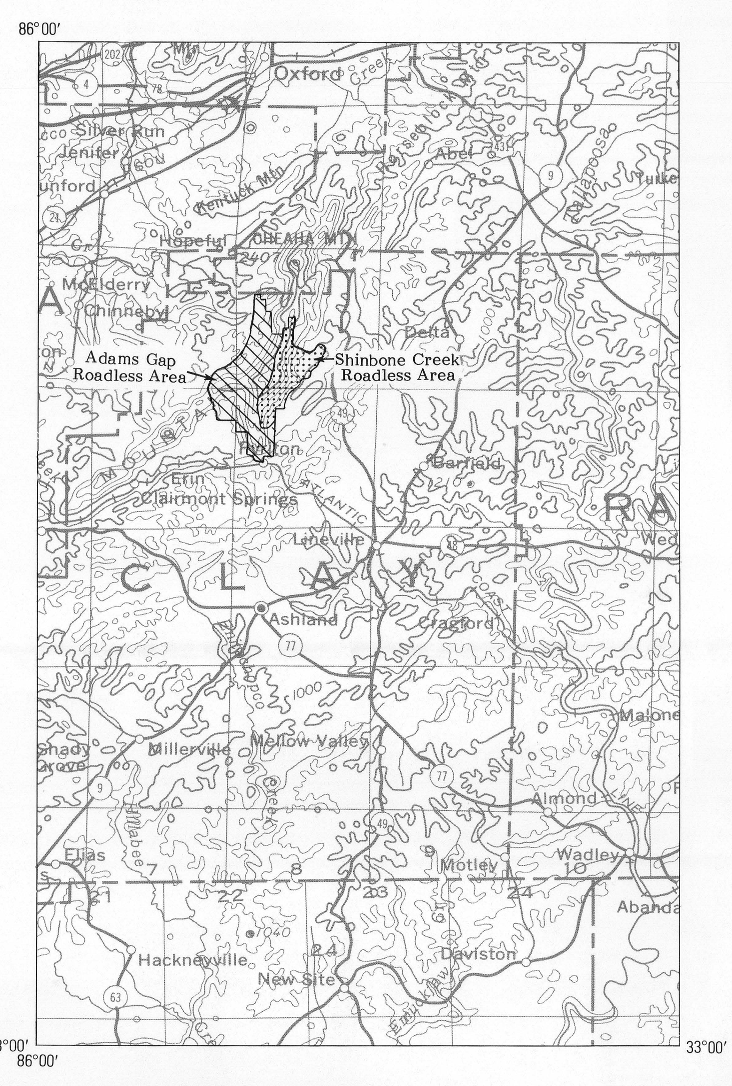

Figure 1.--Index map showing location of the Adams Gap and Shinbone Creek Roadless Areas.

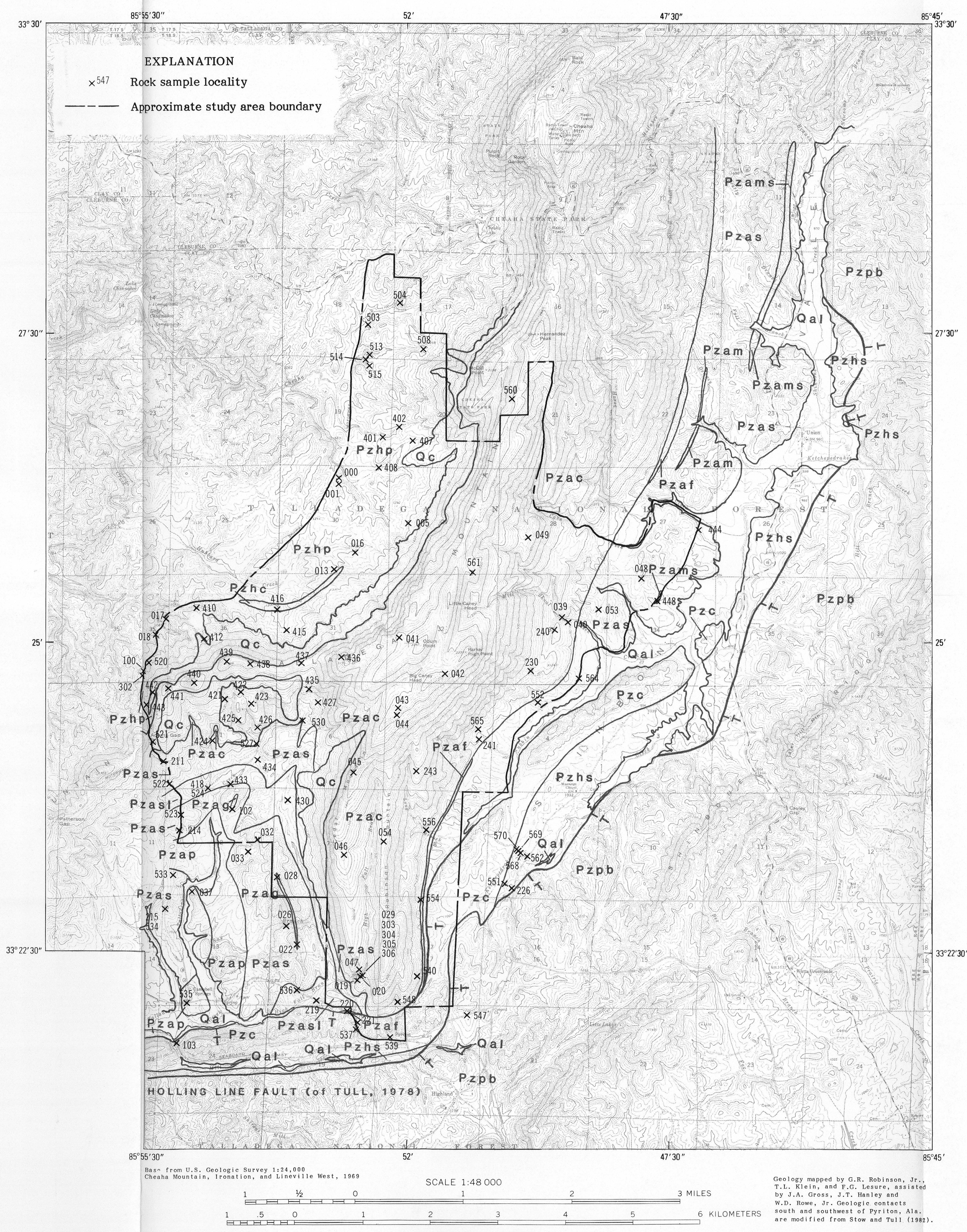

Figure 2.—Rock sample localities.

DESCRIPTION OF MAP UNITS

QUATERNARY

Qal Alluvium—Unconsolidated clay, silt, sand, and gravel deposited by running water.

Qc Colluvium—Unconsolidated heterogeneous mixture of rock fragments and soil deposited chiefly by mass-wasting.

PALEOZOIC

Pzhs Hillabee Chlorite Schist--Dark green schist consisting of chlorite + albite + epidote ± quartz ± pyrite ± calcite. Contains isolated thin pyrite-rich intervals

Pzc Chulafinnee schist of Bearce (1973)—Gray to tan quartzose schist consisting of layers or lenses of quartz with minor muscovite, epidote, and chlorite surrounded by complexly deformed bands of muscovite and minor chlorite

Pzas, Pzap, Pzag, Pzasl, Pzams, Pzam, Pzaf Able Gap formation of Bearce (1973), unnamed metasiltstone and phyllite member(Pzas)--Gray to buff, interlayered micaceous metasiltstone, sandstone, and silty phyllite. Compositional layering on order of a few inches to a few feet. Metasiltstones consist largely of quartz + albite + muscovite + chlorite ± epidote ± magnetite or quartz + albite + chlorite ∓ dolomite ∓ epidote ± calcite + magnetite. Phyllite and metasiltstone beds (Pzap), interlayered silty phyllite and micaceous metasiltstone and sandstone. Phyllites are dark-gray to green-gray and consist largely of muscovite + chlorite + quartz ± albite and contain minor epidote, magnetite, and(or) pyrite. Granule conglomerate beds (Pzag), lens of granule conglomerate containing rounded quartz and feldspar fragments and rare flattened siltstone clasts in a matrix of fine quartz sand, iron oxides, and minor muscovite or epidote. Slate beds (Pzasl), dark-gray slate, slightly graphitic. Compositional layering not apparent. Manganese siltstone beds (Pzams), dark-gray siltstone partly cemented with manganese and iron oxides. Prospected for manganese outside of study area. Marble bed (Pzam), lens of gray calcitic marble, weathers buff. Bed less than 20 ft thick. Ferruginous sandstone bed (Pzaf), dark red-brown quartzose sandstone containing iron oxide cement. This unit may be the weathered equivalent of a carbonate-cemented sandstone. Prospected for iron outside of study area. Bed less than 20 ft thick

Pzac Cheaha quartzite unit of the Able Gap formation of Bearce (1973)--200 to 2,000 ft. of interlayered quartzose sandstone and granule conglomerate at base of the Able Gap formation. Prominent ridge-former. Bedding on order of a few feet to tens of feet

Pzhp Heflin phyllite of Bearce (1973)--Dark gray, green-gray, to buff interlayered silty and sandy phyllites and micaceous siltstones and sandstones. Compositional layering on order of a few inches to a few feet. Phyllites consist largely of muscovite + chlorite + quartz ± magnetite. Siltstones and sandstones consist largely of quartz + chlorite + muscovite ± magnetite ± albite ± epidote, or quartz + albite + calcite ∓ chlorite ∓ epidote. Granule conglomerate bed (Pzhc), lens of granule conglomerate containing detrital plagioclase and quartz fragments in a quartz + albite + chlorite + muscovite matrix

Pzpb Poe Bridge Mountain Formation of Neathery (1975)—Interlayered, coarse-grained, graphitic and feldspathic mica schists, gneisses, quartzites, and amphibolites

Contact - approximately located.

Thrust fault. T on upper plate.

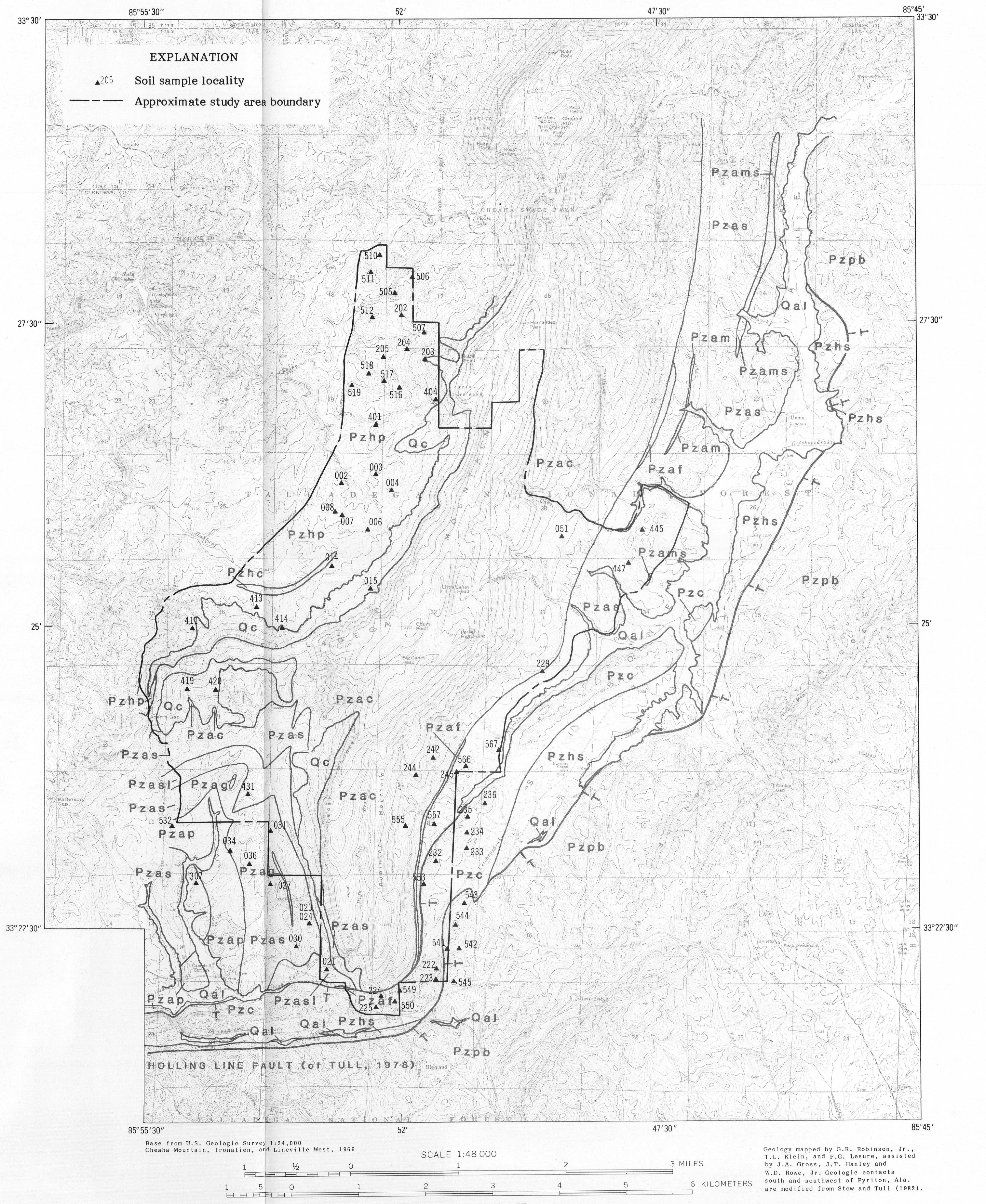

Figure 3.--Soil sample localities.

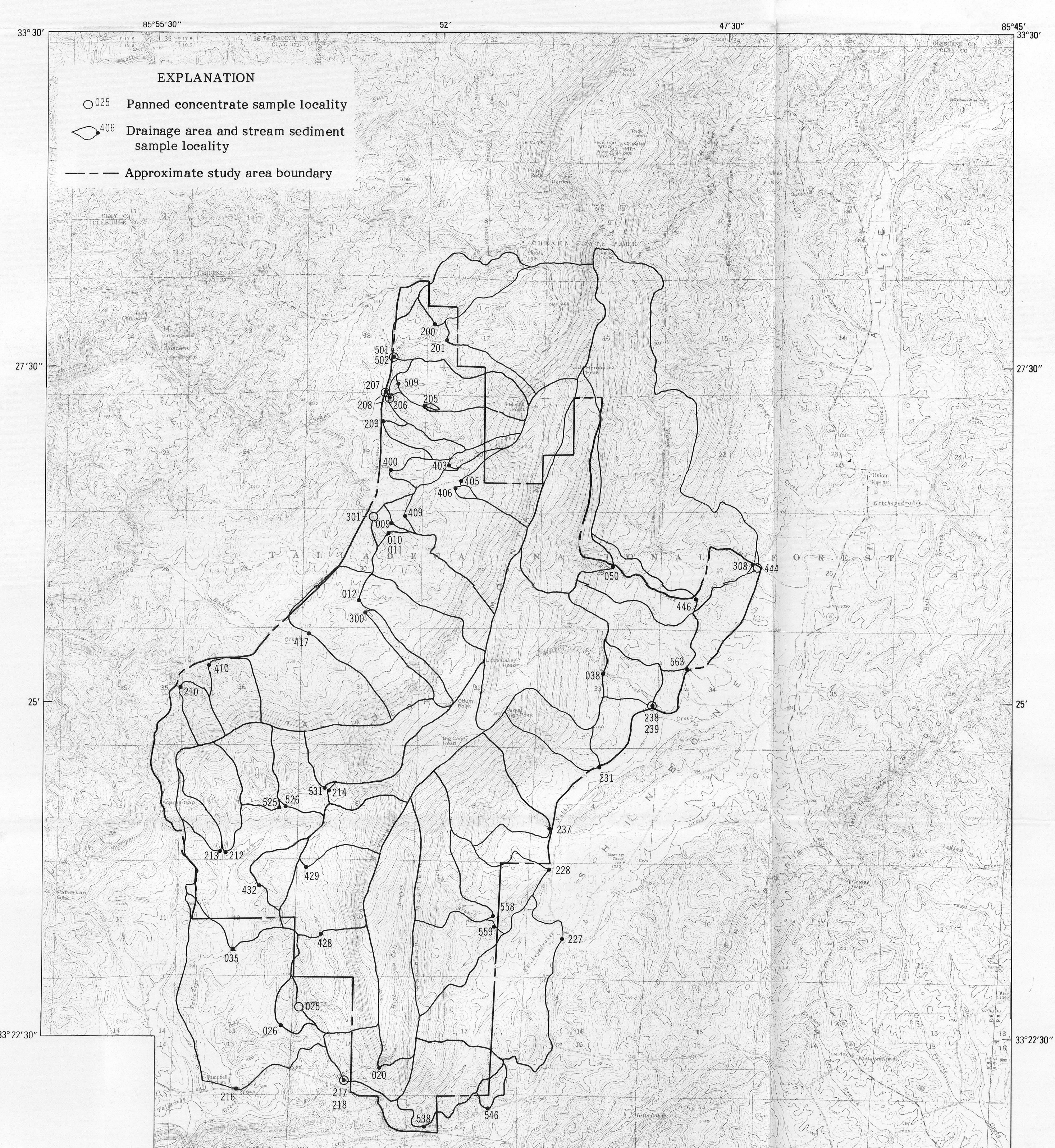

Figure 4.—Stream sediment and panned concentrate sample localities.

Studies Related To Wilderness

The Wilderness Act (Public Law 88-577), September 3, 1964) and related acts require the U.S. Geological Survey and the U.S. Bureau of Mines to survey certain areas on Federal lands to determine their mineral resource potential. Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a geochemical survey of the Adams Gap (08-215) and Shinbone Creek (08-067) Roadless Areas in the Talladega National Forest, Clay County, Ala. The areas were classified as further planning areas during the Second Roadless Area Review and Evaluation (RARE II) by the U.S. Forest Service, January 1979.

INTRODUCTION

The U.S. Geological Survey (USGS) made a reconnaissance geochemical survey of the Adams Gap and Shinbone Creek Roadless Areas (fig. 1) to test for unidentified, indistinct, or unexposed mineral deposits that might be recognized by their geochemical halos or patterns formed by the distribution of trace elements. Similar geochemical surveys based on trace element analyses have been credited with the discovery of many types of ore deposits (Rose and others, 1979). No metallic-mineral deposits are reported in the rocks of the study area, and none were found during the reconnaissance geologic mapping. However, in the vicinity of the study area, the same sequence of rocks contains abandoned prospects for manganese, iron, and pyrite.

Reports covering the mineral resources of Clay County and vicinity include Brewer (1896) and Adams (1930) on gold, Prouty (1923) on graphite, and Heinrich and Olson (1953) on mica. The mineral resources of the Talladega National Forest were evaluated by Gilbert and Smith (1973). The mineral resource potential of the two roadless areas is detailed in Robinson and others (1983) and an accompanying geologic report is given in Robinson and others (in press).

PROCEDURES

In April 1982, Robinson, Klein, Lesure, and Hanley, with the assistance of J.A. Goss and W.D. Rowe, Jr., collected samples for geochemical analysis from the study areas. These consisted of 47 bulk samples of stream sediments, eight panned concentrates of heavy minerals from stream sediments, 70 soil samples, and 105 rock samples.

The rock samples (fig. 2) consisted of a few small chips taken across the structure or compositional layering of one lithology at the sample locality. Only the freshest material available was sampled, but most is at least partly weathered. The samples are representative of the major rock types exposed in the study area. None are obviously mineralized, although one siltstone sample contained visible manganese cementation.

The soil samples (fig. 3) were collected mostly along ridges or in areas of few outcrops. The samples were taken from the gray-colored A_2 or upper B soil zones, just below the dark organic-rich surface soil (A_1 zone).

Small drainage basins within the study area were sampled by collecting at random a few handfuls of the finest-grained stream sediment available at the sample site (fig. 4). In addition, panned concentrates of heavier minerals in the sand-size fraction were collected at eight of the stream-sediment sample sites. These were further concentrated by heavy-liquid separation techniques, and the heavy-mineral fraction was studied microscopically to determine mineral content. The typical heavy-mineral suite consists almost completely of magnetite, zircon, and trace amounts of tourmaline and (or) anatase. The small amount of concentrated heavy-minerals fraction from each panned concentrate sample precluded its use as an analytical sample, and no panned concentrate samples were submitted for chemical analysis.

ANALYTICAL TECHNIQUES

Rock samples were crushed to approximately 0.25 in. and pulverized to minus 140 mesh (0.004 in.) in a vertical grinder having ceramic plates at USGS laboratories, Denver, Colo. Stream sediments and soils were dried and sieved to minus 80 mesh (0.006 in.) and then pulverized to minus 140 mesh (0.004 in.)

All rock, soil, and bulk stream-sediment samples were analyzed by semiquantitative emission spectrographic methods for 31 elements and chemically for zinc in the USGS laboratories, Denver, Colo. (Erickson and others, 1983).

DISCUSSION

The analytical data are summarized in table 1. The concentrations of the elements tested for in the study area compare closely with normal background values for these elements in shales, siltstones, and quartzites. No unusual concentrations of metallic elements were found in the samples analyzed.

RADIOMETRIC SURVEY

In addition to the geochemical survey, we collected data by means of a four-channel gamma-ray spectrometer at intervals along Forest Service road 600 bordering the west margin of the study area.

The spectrometer traverse crossed the strike of the geologic units and characterized lithologic types as a function of their spectral response. No unusual radioelement concentrations were found in the area traversed.

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Table 1.—*Range, median, and mean values for 31 elements in rock, soil, and stream-sediment samples from the Adams Gap and Shinbone Creek Roadless Areas and vicinity, Clay County, Ala.*

Values for average rock compositions are given for comparison. All analyses are by semiquantitative spectrographic methods except gold and zinc which are by atomic absorption methods. Analyses were performed by M. S. Erickson, D. L. Kelley, and L. J. Sherlock, USGS, Denver, Colo. Spectographic analyses are reported as six steps per order of magnitude (1, 0.7, 0.5, 0.3, 0.2, 0.15, or multiples of 10 of these numbers) and are approximate midpoints of the concentration ranges. The precision is expected to be within one adjoining reporting interval 83 percent of the time and within two adjoining intervals on each side of the reported value 96 percent of the time (Motooka and Grimes, 1976). Detection limits are values shown in parenthesis after element symbol. Symbols used: >greater than value shown; L detected but less than limit of determination; N not detected; — not analyzed

Element	Phyllite 36 samples				Average in Shale[1]	Quartzite 20 samples				Cheaha beds[4] 38 samples				Average in sandstone[1]	Hillabee 6 samples				Average tholeitic basalt[2]	Vein quartz 5 samples			Stream Sediments 47 samples			Soils 70 samples		
	Low	High	Median	Mean		Low	High	Median	Mean	Low	High	Median	Mean		Low	High	Median	Mean		Low	High	Median	Low	High	Median	Low	High	Median
Ca(0.05)	L	5	L	1.6	2.2	L	>20	L	.05	L	.15	L	.1	2.2	L	7	1	5.0	7.2	L	L	L	L	.05	L	L	.05	L
Fe(0.05)	.5	20	5	6.5	3.9	.2	20	1.5	2.9	L	2	.3	.5	2.9	3	15	10	9.7	8.5	.05	2	1	.5	5	1	.7	10	3
Mg(0.02)	.05	3	.7	.89	1.6	.02	.7	.2	.22	L	.07	.02	.03	0.8	.3	7	1	2.4	3.7	L	.1	.02	.05	.7	.15	.02	1	.3
Ti(0.002)	.15	1	1	.75	0.4	.03	1	.2	.29	.01	.3	.07	.08	0.2	.1	1	1	0.7	1.0	L	.1	.05	.2	1	.5	.3	1	.7
	Parts per million (ppm)																											
Au[3](.05)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	N	L	N	--	.004	--	--	--	--	--	--	--	--	--
B(10)	20	300	200	167.8	560	10	200	50	56	L	50	15	23	90	L	70	50	47	5.8	L	50	L	50	500	150	20	300	150
Ba(20)	50	2000	500	641.7	250	L	700	100	201.6	L	1000	30	167	193	L	100	50	58	246	L	150	20	20	500	200	20	700	200
Be(1)	L	5	2	2.8	2.1	N	7	1	1.9	N	1	N	1	0.3	N	1	1	1	0.7	N	1	N	L	2	1.5	N	5	1.5
Co(5)	N	50	L	16.8	8.1	N	5	N	5	N	L	N	N	0.3	N	30	30	25	48	N	20	N	N	30	N	N	20	N
Cr(10)	L	200	100	82.3	423	N	50	L	25	N	L	N	N	120	N	700	300	343	168	N	L	N	N	70	20	L	100	50
Cu(5)	L	200	20	33.2	44.7	N	50	L	15	N	15	N	10	15.4	15	200	150	128	90	N	5	L	L	20	7	L	100	15
La(20)	N	200	50	75.9	28	N	100	N	36	N	20	N	20	19	N	N	N	N	15	N	N	N	N	300	20	N	150	30
Mn(10)	20	>5000	200	449.4	575	10	1000	150	225	L	70	20	27	392	300	2000	1500	1300	1356	L	3000	15	20	1500	150	20	700	100
Nb(20)	N	50	20	22.5	20	N	N	N	--	N	L	N	N	0.1	N	L	N	N	13	N	N	N	N	30	L	N	20	L
Ni(5)	L	100	10	20.9	29	L	30	5	8.2	L	7	L	5	2.6	L	150	100	86	134	L	7	L	L	20	7	5	50	7
Pb(10)	N	100	20	35.3	80	N	100	L	32.5	N	15	L	11	13	L	20	L	15	3.7	N	10	L	L	100	15	L	150	20
Sc(5)	N	30	15	14.7	10	N	10	N	6.25	N	N	N	N	0.7	7	70	50	40	30	N	L	N	N	10	L	N	15	7
Sr(100)	N	150	N	112.5	290	N	500	N	500	N	N	N	N	28	N	200	N	150	328	N	N	N	N	N	N	N	N	N
V(10)	10	200	100	99.2	101	L	100	20	28.7	L	50	10	14	20	L	300	300	240	251	L	20	10	15	100	50	20	150	70
W(50)	N	N	N	--	1.9	N	L	N	--	N	L	N	N	1.6	N	N	N	N	0.7	N	N	N	N	N	N	N	N	N
Y(10)	L	150	50	49.7	20	N	70	20	26.4	N	20	N	12	16	L	50	15	28	28	N	10	N	10	200	30	10	200	30
Zn[3](5)	5	160	15	35.4	130	L	60	10	17.9	N	15	L	6	16	10	105	70	54	100	L	20	L	5	80	15	5	85	15
Zr(10)	100	>1000	500	500	142	50	1000	300	315.9	N	700	150	210	204	50	300	70	110	137	N	100	30	100	>1000	1000	200	>1000	1000

[1]Values for average shale and sandstone form Horn and Adams, 1966.
[2]Values for average tholeitic basalt from Wedepohl (1975, Table 2, column A).
[3]Analysis by atomic absorption.
[4]Strata equivalent to part of Able Gap formation of Bearce (1973).

GEOCHEMICAL SURVEY OF THE ADAMS GAP AND SHINBONE CREEK ROADLESS AREAS, CLAY COUNTY, ALABAMA

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