UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Analytical results and sample locality map for stream-sediment, panned-concentrate, and rock samples from the Ragged Top Wilderness Study Area, Pima County, Arizona

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Open-File Report 88-587

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1988

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Bureau of Land Management Wilderness Study Areas

The Federal Land Policy and Management Act (Public Law 94-579, October 21, 1976) requires the U.S. Geological Survey and the U.S. Bureau of Mines to conduct mineral surveys on certain areas to determine their mineral values, if any. 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 Ragged Top Wilderness Study Area (AZ-020-197), Pima County, Arizona.

INTRODUCTION

In March 1987, the U.S. Geological Survey conducted a reconnaissance geochemical survey of the Ragged Top Wilderness Study Area, Pima County, Arizona. Additional samples were collected in December 1987. The wilderness study area and nearby sampled terrain are termed the "study area."

The Ragged Top Wilderness Study Area comprises 4,460 acres (about 7 mi^2) in the north central part of Pima County, Arizona, and lies about 35 mi northwest of Tucson, Arizona (see fig. 1). Access to the study area is provided by the Silver Bell, Avra Valley, and Red Rock roads.

Topography of the study area is dominated by the rugged mass of Ragged Top Peak, elevation 3,907 ft, and a shorter subsidiary peak called Wolcott Peak which rise abruptly to a maximum of 1,700 ft above the surrounding bajada. The two peaks, which are collectively known as Ragged Top, are the northeastern peaks of the Silver Bell Mountains. Ragged Top is separated from the main mass of the Silver Bell Mountains by a mile-wide valley.

Vegetation is characteristic of the Sonoran Desert. Common species include saguaro and other cacti, paloverde, acacia, ironwood, mesquite, and creosote bush.

The southwest part of the study area lies within the Silver Bell mining district (Richard and Courtright, 1966; Graybeal, 1982). The first recorded mining activity in the district was in 1865 about 2 miles south-southwest of the wilderness study area; silver and copper were recovered from skarn. Exploitation of porphyry copper deposits at the El Tiro and Oxide pits began in 1954 and continued until 1985. The El Tiro pit is about 2 miles southwest of the wilderness study area and the Oxide pit is about 3 miles south. A third, unexploited, porphyry copper deposit, the North Silver Bell deposit, lies about 1 mile from the southwest corner of the wilderness study area. Production from the El Tiro and Oxide deposits from 1954 to 1977 totaled 75,655,000 tons averaging 0.80 percent copper, 0.07 oz/ton silver, and 0.022 percent molybdenum sulfide (Graybeal, 1982). Copper has been the predominant commodity produced in the Silver Bell district but two mines about 2 miles southwest of the wilderness study area produced about 150,000 tons of ore averaging 16 percent zinc, 1.3 percent copper, 0.6 oz/ton silver, and minor lead and gold (Keith, 1974). Total production of base and precious metals in the Silver Bell district from 1885 to 1981 amounted to 90,351,000 tons (Keith and others, 1983).

Geology of the study area is included in reports by Sawyer (1986, 1987). A major structural feature in the study area is the Ragged Top fault, a probable strike-slip fault that runs from near the southeast tip of the wilderness study area west-northwest across the wilderness study area. Precambrian Oracle-type granite predominates on the north side of the fault

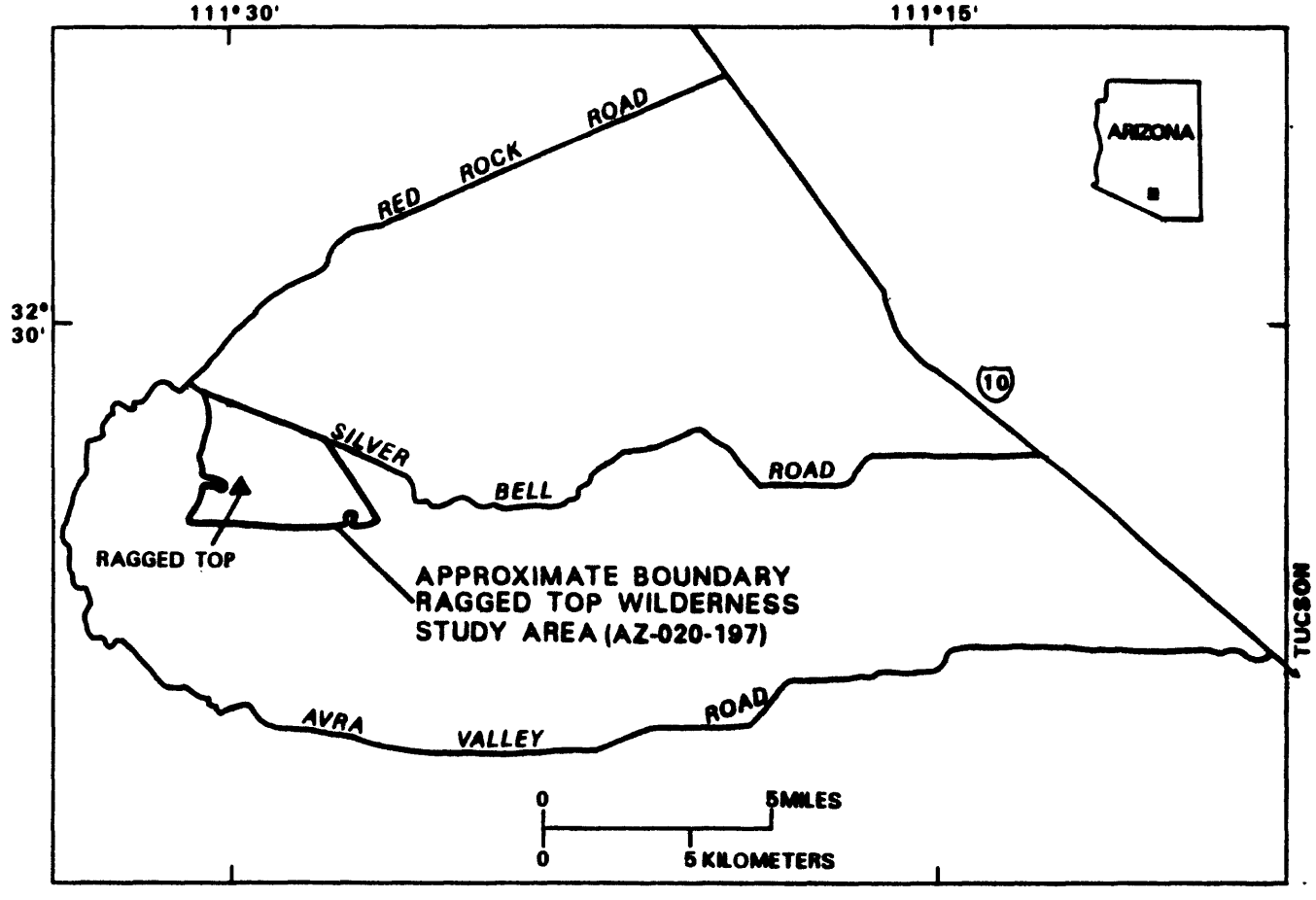

Figure 1. Index map, Ragged Top Wilderness Study Area, Pima County, Arizona.

although Middle Proterozoic Apache Group sedimentary rocks crop out east of Ragged Top. Upper Cretaceous volcanic rocks predominate south of the Ragged Top fault. The volcanic rocks consist of andesite-to-dacite extrusive rocks and rhyolite tuffs. Upper Cretaceous sedimentary rocks southwest of Ragged Top contain clasts that include Precambrian schist, Paleozoic sedimentary rocks, probable Lower Cretaceous sandstone, Cretaceous algal limestone, and volcanic rocks. An Upper Cretaceous granodiorite porphyry laccolith underlies part of the southwestern section of the wilderness study area. Ragged Top is an Oligocene rhyolite dome that was extruded along the trace of the Ragged Top fault. Quaternary sediments that are mostly unconsolidated cover the flatter sections of the study area.

Sawyer (1986, 1987) and Lipman and Sawyer (1985) present evidence to support the concept that the Upper Cretaceous sedimentary rocks, the Upper Cretaceous andesite-to-dacite extrusive rocks, and certain of the Upper Cretaceous rhyolite tuffs are the results of the formation and later collapse of a caldera during Late Cretaceous time.

METHODS OF STUDY

Sample Media

Analyses of stream-sediment samples represent the chemistry of the rock material eroded from the drainage basin upstream from each sample site. Such information is useful in identifying those basins which contain concentrations of elements that may be related to mineral deposits. Panned-concentrate samples derived from stream sediment provide information about the chemistry of certain minerals in rock material eroded from the drainage basin upstream from each sample site. The selective concentration of minerals in panned-concentrate samples, many of which may be ore related, permits determination of some elements that are not easily detected in stream-sediment samples. Analyses of unmineralized or unaltered rock samples provide background geochemical data for individual rock units. Analyses of mineralized or altered rocks may provide useful geochemical information about the major- and trace-element assemblages associated with a mineralizing system.

Sample Collection and Preparation

Sampling sites are represented on plate 1. During the initial reconnaissance sampling in March 1987, a stream-sediment sample and two panned-concentrate samples derived from stream sediment were collected at each of the 11 sites (numbers 105-108, 113-118, 126). The two panned-concentrate samples from each site were treated differently, as described below, and after preparation were respectively termed a "nonmagnetic heavy-mineral-concentrate sample" and a "raw panned-concentrate sample." Average sampling density during the reconnaissance sampling was about one sample site per 0.7 mi^2 and the drainage basins ranged from 0.2 mi^2 to 1.5 mi^2 in area. During the follow-up sampling in December 1987, nonmagnetic heavy-mineral-concentrate and raw panned-concentrate samples were collected at 15 localities (numbers 7301-7305, 7312-7314, 7317-7323) except that no nonmagnetic heavy-mineral-concentrate sample was collected at site 7321. Samples were collected by Gary A. Nowlan and David A. Sawyer.

Stream-sediment samples

The stream-sediment samples consisted of active alluvium collected primarily from first-order (unbranched) and second-order (below the junction of two first-order) streams as shown on U.S. Geological Survey topographic maps (scale = 1:24,000). The stream-sediment samples were dried, then sieved using 30-mesh (0.595-mm) stainless-steel sieves. The portion of the sediment passing through the sieve was pulverized to approximately minus-100 mesh (minus-0.15 mm) for analysis.

Nonmagnetic heavy-mineral-concentrate samples

Ten to twenty pounds of stream sediment were collected from the active alluvium. Most of the samples were panned without screening. However, samples from sites 105-108 and 113-114 were screened with a 2.0-mm (10-mesh) screen to obtain about 20 lb after removal of the coarse material. The samples were panned to remove most of the quartz, feldspar, organic matter, and clay-sized material. The resulting concentrates were estimated to weigh between 1 and 4 oz.

After drying, bromoform (specific gravity 2.8) was used to remove the remaining quartz and feldspar from the samples that had been panned. Each heavy-mineral sample was then separated into three fractions using a large electromagnet (in this case a modified Frantz Isodynamic Separator). The most magnetic material, primarily magnetite, was not analyzed. The second fraction, largely ferromagnesian silicates and iron oxides, was saved for archival storage. The third fraction (the least magnetic material which may include the nonmagnetic ore minerals, zircon, sphene, etc.) was split using a Jones splitter. One split was hand ground for spectrographic analysis; the other split was saved for mineralogical analysis. These magnetic separates are approximately the same separates that would be produced by using a Frantz Isodynamic Separator set at a slope of 15° and a tilt of 10° with a current of 0.2 ampere to remove the magnetite and ilmenite, and a current of 0.6 ampere to split the remainder of the sample into paramagnetic and nonmagnetic fractions.

Raw panned-concentrate samples

Raw panned-concentrate samples were collected and panned in the same manner as the heavy-mineral-concentrate samples except that the samples were panned to a smaller amount. The raw panned-concentrate samples were dried and then were analyzed for gold without further preparation.

Rock samples

Sixty-four samples of bedrock were collected (table 1). The 28 samples from the RTR130 series were collected from outcrops at generally 100-ft intervals along a traverse crossing an area of altered bedrock along the west side of the wilderness study area. Sample RTR106A is from a shear zone. The seven samples from the 82S series were collected in 1982 and are representative of bedrock units where mineralization is absent and alteration is slight. The 28 samples from the RT7300 series are samples of mineralized rock, altered rock, and vein material. Descriptions of the rock samples are in table 1. Rock samples were crushed and then pulverized to approximately minus-100 mesh (minus-0.15 mm) with ceramic plates.

Sample Analysis

Spectrographic method

The stream-sediment samples were analyzed for 31 elements and the nonmagnetic heavy-mineral-concentrate and rock samples for 35-37 elements using a semiquantitative, direct-current arc emission spectrographic method (Grimes and Marranzino, 1968). The elements analyzed and their lower limits of determination are listed in tables 2 and 3. Spectrographic results were obtained by visual comparison of spectra derived from the sample against spectra obtained from standards made from pure oxides and carbonates. Standard concentrations are geometrically spaced over any given order of magnitude of concentration as follows: 100, 50, 20, 10, and so forth. Samples whose concentrations are estimated to fall between those values are assigned values of 70, 30, 15, and so forth. The precision of the analytical method is approximately plus or minus one reporting interval at the 83 percent confidence level and plus or minus two reporting intervals at the 96 percent confidence level (Motooka and Grimes, 1976). Values determined for the major elements (iron, magnesium, calcium, titanium, sodium, and phosphorus) are given in weight percent; all others are given in parts per million (ppm). Emission spectrographic analyses were performed by John H. Bullock, Jr.

Other methods

Table 4 lists other methods of analysis used on samples from the Ragged Top Wilderness Study Area and lists limits of determination, precision, and references for the methods. Rock and stream-sediment samples were analyzed for gold by graphite furnace atomic absorption spectroscopy and for antimony, arsenic, bismuth, cadmium, and zinc by inductively coupled plasma emission spectrometry. Rock samples were analyzed for mercury by cold vapor atomic absorption spectroscopy, for tellurium and thallium by flame atomic absorption spectroscopy, for fluorine by ion selective electrode, and for tungsten by visible spectrophotometry. Stream-sediment samples were analyzed for uranium by ultraviolet fluorimetry. Raw panned-concentrate samples were analyzed for gold by flame atomic absorption spectroscopy. Analysts were Paul H. Briggs, Alonza H. Love, John B. McHugh, Richard M. O'Leary, Theodore A. Roemer, John D. Sharkey, and Eric P. Welsch.

Analytical results for stream-sediment, nonmagnetic heavy-mineral-concentrate, raw panned-concentrate, and rock samples are listed in tables 5, 6, 7, and 8, respectively.

DATA STORAGE SYSTEM

Upon completion of analytical work, the results were entered into a U.S. Geological Survey computer data base called PLUTO. This data base contains both descriptive geological information and analytical data. Any or all of this information may be retrieved and converted to a binary form (STATPAC) for computerized statistical analysis or publication (VanTrump and Miesch, 1977).

DESCRIPTION OF DATA TABLES

The numeric portion of each sample identification in tables 5-7 and of RT7300-series rock samples and sample RTR106A in table 8 corresponds to the site number on plate 1. However, only the last three numbers in sample identifications for 82S-series rock samples in table 8 correspond to site

numbers on plate 1. Sites A-Z on plate 1 show the sampling sites of RTR130-series rocks and correspond to the letter immediately following 130 in each sample identification in table 8.

A letter "N" in the tables indicates that a given element was looked for but not detected at the lower limit of determination. If an element determined by emission spectrography was observed but was below the lowest reporting value, a "less than" symbol (<) was entered in the tables in front of the lower limit of determination. No distinction was made between "not detected" and "less than" for samples analyzed by methods other than emission spectrography. If an element was above the highest reporting value, a "greater than" symbol (>) was entered in the tables in front of the upper limit of determination. The lower limit of determination for gold in raw panned-concentrate samples by atomic absorption spectroscopy is 0.05 ppm, based on a 10-g sample. Because the sample weight for raw panned-concentrate samples was variable, the lower limits of determination varied from 0.02 to 0.07 ppm. The weights of the raw panned-concentrate samples (table 7) are given in grams and are in the column headed by "weight".

Because of the formatting used in the computer program that produced tables 5-8, some of the elements listed in these tables (Ca, Fe, Mg, Na, P, Ti, Ag, Be, Cd-i, Au-a, Hg-a, Te-a, and Tl-a) carry one or more nonsignificant digits to the right of the significant digits. The spectrographic determinations for As, Au, Bi, Cd, Mo, Sb, Th, and W in stream-sediment samples; for As, Co, Ge, Nb, Pd, Pt, Sb, and Th in nonmagnetic heavy-mineral-concentrate samples; and for As, Au, Ge, Sb, Sn, and Th in rock samples were all below the lower limits of determinations shown in tables 2 and 3; consequently, the columns for these elements were omitted from tables 5, 6, and 8, respectively. The spectrographic determinations for Zr in nonmagnetic heavy-mineral-concentrate samples were all greater than the upper limit of determination and so that element was omitted from table 6.

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Table 1.--Descriptions of analyzed rock samples from the Ragged Top Wilderness Study Area, Pima County, Arizona.

Sample	Description
RTR130AA	Granodiorite porphyry
RTR130BA	Granodiorite porphyry
RTR130CA	Granodiorite porphyry, slightly altered
RTR130DA	Granodiorite porphyry, slightly altered
RTR130DB	Granodiorite porphyry, altered
RTR130EA	Granodiorite porphyry, altered
RTR130EB	Granodiorite porphyry, altered
RTR130FA	Granodiorite porphyry, altered
RTR130GA	Granodiorite porphyry, highly altered, brecciated
RTR130HA	Granodiorite porphyry, highly altered, brecciated
RTR130IA	Granodiorite porphyry, highly altered, brecciated
RTR130JA	Granodiorite porphyry, highly altered, brecciated
RTR130KA	Granodiorite porphyry, highly altered,
RTR130LA	Fine grained rock, highly altered
RTR130MA	Granodiorite porphyry, altered
RTR130NA	Potassium-rich rock
RTR130OA	Potassium-rich rock
RTR130PA	Granodiorite porphyry, slightly altered
RTR130QA	Granodiorite porphyry, slightly altered
RTR130RA	Granodiorite porphyry, slightly altered
RTR130SA	Granodiorite porphyry
RTR130TA	Granodiorite porphyry, slightly altered
RTR130UA	Granodiorite porphyry, slightly altered
RTR130VA	Granodiorite porphyry
RTR130WA	Diabase
RTR130XA	Oracle-type granite
RTR130YA	Diabase
RTR130ZA	Oracle-type granite
RTR106A	Oracle-type granite from shear zone
82S-023	Granodiorite porphyry
82S-044	Granodiorite porphyry
82S-122	Lithic tuff
82S-133	Rhyolite welded tuff
82S-135	Rhyodacite porphyry
82S-150	Rhyodacite porphyry
82S-382	Rhyolite
RT7306A	Barite-fluorite vein
RT7306BA	Barite vein
RT7306BB	Altered wall rock by barite vein
RT7307A	Granodiorite porphyry, altered
RT7308A	Granodiorite porphyry, altered
RT7309A	Sulfide minerals and calcite
RT7309B	Granodiorite porphyry with sulfide minerals
RT7309C	Granodiorite porphyry with sulfide minerals

Table 1.--Descriptions of analyzed rock samples from the Ragged Top Wilderness Study Area, Pima County, Arizona--Continued.

Sample	Description
RT7309D	Dolomite (?) vein with sulfide minerals
RT7309EA	Rhodochrosite (?) vein with sulfide minerals
RT7309EB	Granodiorite porphyry with rhodochrosite (?) and sulfide minerals
RT7309F	Granodiorite porphyry with sulfide minerals
RT7309G	Granodiorite porphyry with sulfide minerals
RT7310A	Granodiorite porphyry
RT7310B	Granodiorite porphyry with calcite and sulfide minerals
RT7311AA	Quartz vein
RT7311AB	Quartz vein
RT7315A	Quartz vein
RT7315B	Quartz vein
RT7315CA	Quartz vein
RT7315CB	Altered granite
RT7316A	Diabase
RT7324A	Barite vein
RT7324B	Barite vein
RT7324CA	Quartz vein
RT7324CB	Quartz vein
RT7325A	Quartz vein
RT7326A	Quartz vein with sulfide minerals

TABLE 2.--Limits of determination for the spectrographic analysis of stream-sediment samples, based on a 10-mg sample

Elements	Lower determination limit	Upper determination limit
	Percent	
Iron (Fe)	0.05	20
Magnesium (Mg)	.02	10
Calcium (Ca)	.05	20
Titanium (Ti)	.002	1
	Parts per million	
Manganese (Mn)	10	5,000
Silver (Ag)	0.5	5,000
Arsenic (As)	200	10,000
Gold (Au)	10	500
Boron (B)	10	2,000
Barium (Ba)	20	5,000
Beryllium (Be)	1	1,000
Bismuth (Bi)	10	1,000
Cadmium (Cd)	20	500
Cobalt (Co)	5	2,000
Chromium (Cr)	10	5,000
Copper (Cu)	5	20,000
Lanthanum (La)	20	1,000
Molybdenum (Mo)	5	2,000
Niobium (Nb)	20	2,000
Nickel (Ni)	5	5,000
Lead (Pb)	10	20,000
Antimony (Sb)	100	10,000
Scandium (Sc)	5	100
Tin (Sn)	10	1,000
Strontium (Sr)	100	5,000
Vanadium (V)	10	10,000
Tungsten (W)	50	10,000
Yttrium (Y)	10	2,000
Zinc (Zn)	200	10,000
Zirconium (Zr)	10	1,000
Thorium (Th)	100	2,000

TABLE 3.--Limits of determination for the spectrographic analysis of heavy-mineral-concentrate samples based on a 5-mg sample

[The spectrographic limits of determination for rock samples are based on a 10-mg sample and are therefore two reporting intervals lower than the limits listed in this table]

Elements	Lower determination limit	Upper determination limit
	Percent	
Iron (Fe)	0.1	50
Magnesium (Mg)	.05	20
Calcium (Ca)	.1	50
Titanium (Ti)	.005	2
Sodium (Na)	.5	10
Phosphorus (P)	.5	20
	Parts per million	
Manganese (Mn)	20	10,000
Silver (Ag)	1	10,000
Arsenic (As)	500	20,000
Gold (Au)	20	1,000
Boron (B)	20	5,000
Barium (Ba)	50	10,000
Beryllium (Be)	2	2,000
Bismuth (Bi)	20	2,000
Cadmium (Cd)	50	1,000
Cobalt (Co)	20	5,000
Chromium (Cr)	20	10,000
Copper (Cu)	10	50,000
Lanthanum (La)	100	2,000
Molybdenum (Mo)	10	5,000
Niobium (Nb)	50	5,000
Nickel (Ni)	10	10,000
Lead (Pb)	20	50,000
Antimony (Sb)	200	20,000
Scandium (Sc)	10	2,000
Tin (Sn)	20	2,000
Strontium (Sr)	200	10,000
Vanadium (V)	20	20,000
Tungsten (W)	50	20,000
Yttrium (Y)	20	5,000
Zinc (Zn)	500	20,000
Zirconium (Zr)	20	2,000
Thorium (Th)	200	5,000
Gallium (Ga)	10	1,000
Germanium (Ge)	20	200
Platinum (Pt)	20	1,000
Palladium (Pd)	5	1,000

TABLE 4.--Analytical methods used other than emission spectrography

[AAC, cold vapor atomic absorption; AAF, flame atomic absorption; AAG, graphite furnace atomic absorption; F, ultraviolet fluorimetry; ICP, inductively coupled plasma spectrometry; ISE, ion selective electrode; VS, visible spectrophotometry; <, less than value shown]

Element determined	Sample type	Method	Lower limit of determination, ppm	Precision, percent relative standard deviation	References
Mercury (Hg)	rocks	AAC	0.02	<5	Crock and others, 1987.
Tellurium (Te)	rocks	AAF	0.1	4.5-7.3	Hubert and Chao, 1985.
Thallium (Tl)	rocks	AAF	0.05	1.6-12.5	Hubert and Chao, 1985.
Gold (Au)	raw panned concentrates	AAF	0.05[a]	9.3-42.5	Thompson and others, 1968; O'Leary and Meier, 1986.
Gold (Au)	rocks, stream sediments	AAG	0.001	3.7-21.1	Meier, 1980; O'Leary, and Meier, 1986.
Uranium (U)	stream sediments	F	0.1	6.9-14.2	Centanni and others, 1956; O'Leary and Meier, 1986.
Antimony (Sb)	rocks, stream sediments	ICP	2	6.4-11	Crock and others, 1987.
Arsenic (As)	rocks, stream sediments	ICP	5	3.5-20	Crock and others, 1987.
Bismuth (Bi)	rocks, stream sediments	ICP	2	2.2-11.9	Crock and others, 1987.
Cadmium (Cd)	rocks, stream sediments	ICP	0.1	2.8-8.8	Crock and others, 1987.
Zinc (Zn)	rocks, stream sediments	ICP	2	1.4-11.9	Crock and others, 1987.
Fluorine (F)	rocks	ISE[b]	100	0.98-5.51	Hopkins, 1977; O'Leary and Meier, 1986.
Tungsten (W)	rocks	VS	1	2.9-6.9	Welsch, 1983; O'Leary and Meier, 1986.

[a]Based on 10-g sample

[b]Hot nitric acid digestion

Table 5.--Results of analyses of stream-sediment samples collected from the Ragged Top Wilderness Study Area, Pima County, Arizona

[N, not detected; <, detected below limit of determination shown for emission spectrographic analyses, less than value shown for other methods; >, greater than value shown; ---, not determined. Methods: Au-a, atomic absorption; As-i, Bi-i, Cd-i, Sb-i, Zn-i, inductively coupled plasma spectroscopy; U-f, ultraviolet fluorimetry; others, emission spectrography. Element values in ppm except Ca, Fe, Mg, and Ti, which are weight percent]

Sample	Latitude	Longitude	Ca	Fe	Mg	Ti	Ag	Au-a	As-i	B	Ba	Be	Bi-i	Cd-i	Co
RTA105	32 26 34	111 27 28	1.5	5	1.5	.7	N	---	7	50	700	3.0	<2	.8	30
RTA106	32 27 5	111 27 18	1.0	10	1.5	.7	N	.001	6	20	300	2.0	<2	2.3	70
RTA107	32 27 16	111 27 29	1.0	7	1.0	1.0	N	<.001	<5	30	500	3.0	<2	1.4	30
RTA108	32 27 46	111 27 54	.3	15	.3	.5	N	---	7	70	300	3.0	<2	2.5	70
RTA113	32 27 2	111 27 17	.5	7	.7	1.0	N	<.001	9	70	300	2.0	<2	1.9	30
RTA114	32 28 8	111 28 50	.7	7	1.0	1.0	N	---	6	15	500	3.0	<2	1.3	15
RTA115	32 28 31	111 30 4	.7	10	1.5	.7	N	<.001	<5	30	500	3.0	<2	1.3	20
RTA116	32 28 19	111 30 30	.7	10	.7	.7	N	.002	9	50	1,500	3.0	2	1.4	30
RTA117	32 27 43	111 30 39	1.0	5	1.5	.5	.5	.005	8	50	1,000	2.0	<2	1.3	15
RTA118	32 26 57	111 30 35	.5	5	1.0	.3	N	.010	<5	10	500	1.0	<2	.7	5
RTA126	32 26 14	111 29 4	.7	7	1.0	.5	N	.001	7	10	300	1.5	<2	.8	10

Sample	Cr	Cu	La	Mn	Nb	Ni	Pb	Sb-i	Sc	Sn	Sr	U-f	V	Y	Zn	Zn-i	Zr
RTA105	30	30	30	500	<20	30	50	2	15	N	200	1.1	150	20	N	68	500
RTA106	50	70	<20	1,000	N	50	50	11	15	<10	<100	2.2	200	50	200	88	200
RTA107	30	50	20	1,500	N	20	50	<2	20	N	<100	3.0	200	70	200	71	300
RTA108	200	30	N	700	<20	50	30	<2	10	N	N	7.5	500	500	N	31	300
RTA113	30	50	<20	300	<20	30	30	14	15	<10	N	1.9	200	50	N	89	300
RTA114	20	50	70	700	<20	15	30	<2	20	<10	<100	3.7	150	100	N	75	1,000
RTA115	30	30	50	2,000	<20	15	50	<2	15	N	100	2.8	200	100	N	81	500
RTA116	50	50	50	1,000	<20	30	150	<2	20	<10	100	2.9	300	70	N	77	1,000
RTA117	30	70	30	2,000	N	20	300	<2	15	N	150	1.1	100	20	200	150	200
RTA118	20	30	<20	500	N	7	70	<2	<5	N	100	1.2	70	<10	<200	68	70
RTA126	20	20	<20	500	N	15	50	<2	5	N	100	1.1	100	10	N	80	100

Table 6.--Results of analyses of nonmagnetic heavy-mineral-concentrate samples from the Ragged Top Wilderness Study Area, Pima County, Arizona

[N, not detected; <, detected below limit of determination shown; >, greater than value shown. Analyses by emission spectrography. Element values are ppm except Ca, Fe, Mg, Na, P, and Ti, which are weight percent]

Sample	Latitude	Longitude	Ca	Fe	Mg	Na	P	Ti	Ag	Au	B	Ba	Be	Bi	Cd
RTH105	32 26 34	111 27 28	5	1.00	.30	1.5	2.0	2.0	N	N	20	>10,000	3	N	N
RTH106	32 27 5	111 27 18	3	1.50	.30	.7	2.0	2.0	N	N	20	5,000	7	50	N
RTH107	32 27 16	111 27 29	5	.70	.20	.5	5.0	1.0	N	N	30	3,000	10	70	N
RTH108	32 27 46	111 27 54	5	1.00	.20	5.0	1.5	.2	N	N	20	1,000	5	N	N
RTH113	32 27 2	111 27 17	5	1.00	.50	2.0	1.5	1.5	N	N	30	>10,000	5	N	N
RTH114	32 28 8	111 28 50	10	.50	.20	1.5	10.0	.7	N	N	<20	700	5	N	N
RTH115	32 28 31	111 30 4	10	1.00	.30	2.0	5.0	1.5	N	N	20	3,000	7	N	N
RTH116	32 28 19	111 30 30	5	.70	.30	1.0	1.0	.7	N	N	<20	>10,000	7	N	N
RTH117	32 27 43	111 30 39	10	1.50	.50	3.0	2.0	1.5	<1	N	30	>10,000	2	N	N
RTH118	32 26 57	111 30 35	2	.30	.10	1.0	1.0	.5	1,000	>1,000	N	>10,000	N	30	N
RTH126	32 26 14	111 29 4	7	.70	.15	2.0	1.5	1.5	2	N	<20	10,000	3	N	<50
RTH7301B	32 26 56	111 30 34	7	.10	.10	N	2.0	.3	2	N	N	>10,000	N	N	N
RTH7302	32 26 53	111 30 31	20	.20	.10	N	7.0	.7	2	N	N	>10,000	N	N	N
RTH7303	32 26 55	111 30 27	30	.30	.10	N	7.0	.5	<1	N	N	>10,000	N	N	N
RTH7304B	32 26 50	111 30 16	20	.20	.15	N	1.5	.5	300	N	N	>10,000	N	300	70
RTH7305B	32 27 1	111 30 43	10	.10	.07	N	.5	.1	30	N	N	>10,000	N	N	N
RTH7312	32 27 9	111 27 44	15	.70	.15	.5	2.0	1.5	N	N	20	3,000	5	30	N
RTH7313	32 27 8	111 27 43	15	.70	.30	1.0	.7	1.0	N	N	20	>10,000	3	N	N
RTH7314	32 27 5	111 27 21	20	1.50	1.00	2.0	1.0	2.0	N	N	30	10,000	2	30	N
RTH7317	32 26 31	111 29 57	20	1.00	.15	N	7.0	1.5	N	N	N	>10,000	<2	N	N
RTH7318	32 26 39	111 30 3	5	.20	.10	<.5	.7	.3	N	N	N	>10,000	<2	N	N
RTH7319B	32 26 42	111 30 13	10	.20	.10	<.5	2.0	1.0	15	70	<20	>10,000	N	N	N
RTH7320B	32 26 40	111 30 14	2	.10	.07	N	<.5	.2	N	N	N	>10,000	N	N	N
RTH7322	32 26 9	111 30 16	3	<.10	.07	N	<.5	.2	N	N	N	>10,000	N	N	N
RTH7323	32 26 15	111 30 18	3	.15	.10	N	.5	.2	1	N	N	>10,000	N	N	N

Sample	Cr	Cu	Ga	La	Mn	Mo	Ni	Pb	Sc	Sn	Sr	V	W	Y	Zn
RTH105	<20	70	20	N	300	N	<10	70	50	N	700	50	N	500	N
RTH106	20	20	15	<100	500	N	<10	1,000	200	N	N	200	N	1,500	N
RTH107	N	15	10	<100	700	N	<10	70	200	N	N	100	N	1,500	N
RTH108	N	<10	30	N	700	N	<10	50	70	N	N	50	50	1,000	N
RTH113	<20	50	70	N	700	N	<10	2,000	100	N	200	100	N	1,500	N
RTH114	N	N	15	100	1,000	N	N	70	150	N	N	50	N	1,500	N
RTH115	N	10	30	100	700	N	N	100	100	N	N	50	N	1,000	N
RTH116	N	<10	15	N	700	N	N	200	150	N	700	30	N	1,000	N
RTH117	20	50	50	150	700	<10	<10	3,000	50	N	700	100	N	500	N
RTH118	N	150	<10	<100	200	150	N	>50,000	30	N	1,500	15,000	N	150	<500
RTH126	N	<10	10	100	300	N	N	1,000	50	N	N	700	N	300	N
RTH7301B	N	70	N	100	500	10	N	15,000	20	N	>10,000	1,500	N	300	500
RTH7302	N	30	N	150	700	100	N	3,000	20	N	10,000	150	N	500	N
RTH7303	N	<10	N	300	1,000	N	N	1,500	20	N	10,000	150	N	300	N
RTH7304B	<20	1,000	N	150	1,000	500	N	>50,000	30	N	10,000	5,000	N	200	700
RTH7305B	N	20	N	<100	200	20	N	500	N	N	>10,000	500	N	70	<500
RTH7312	N	50	<10	100	1,000	N	N	50	200	N	<200	200	N	1,500	N
RTH7313	<20	10	10	100	500	N	N	<20	200	N	500	150	N	1,500	N
RTH7314	<20	20	30	100	1,000	N	N	<20	100	50	500	150	N	1,000	N
RTH7317	N	<10	N	200	1,000	N	N	30	100	N	700	300	N	700	N
RTH7318	50	50	N	N	500	N	N	50	15	N	>10,000	700	N	200	N
RTH7319B	20	20	N	150	700	<10	N	>50,000	70	N	7,000	10,000	N	700	N
RTH7320B	N	15	N	N	150	30	N	3,000	<10	N	>10,000	300	N	100	N
RTH7322	N	N	N	N	300	200	N	1,500	N	N	>10,000	50	N	70	N
RTH7323	N	<10	N	N	500	<10	N	10,000	20	N	10,000	3,000	N	150	N

Table 7.--Results of analyses of raw panned-concentrate samples collected from the Ragged Top Wilderness Study Area, Pima County, Arizona

[<, less than value shown. Au-a in ppm. Weight, grams of raw panned-concentrate sample. Analyses by atomic absorption]

Sample	Latitude	Longitude	Au-a	Weight
RTG105	32 26 34	111 27 28	<.05	11.01
RTG106	32 27 5	111 27 18	<.04	13.09
RTG107	32 27 16	111 27 29	<.05	11.02
RTG108	32 27 46	111 27 54	<.05	9.97
RTG113	32 27 2	111 27 17	<.06	7.95
RTG114	32 28 8	111 28 50	<.04	14.45
RTG115	32 28 31	111 30 4	<.05	10.04
RTG116	32 28 19	111 30 30	<.05	11.35
RTG117	32 27 43	111 30 39	<.07	6.55
RTG118	32 26 57	111 30 35	150.00	7.44
RTG126	32 26 14	111 29 4	<.05	11.55
RTG7301	32 26 56	111 30 34	2.30	21.57
RTG7302	32 26 53	111 30 31	.20	15.18
RTG7303	32 26 55	111 30 27	.03	19.68
RTG7304	32 26 50	111 30 16	3.40	13.13
RTG7305	32 27 1	111 30 43	.03	17.80
RTG7312	32 27 9	111 27 44	<.03	21.45
RTG7313	32 27 8	111 27 43	.03	19.83
RTG7314	32 27 5	111 27 21	<.03	16.69
RTG7317	32 26 31	111 29 57	.06	15.89
RTG7318	32 26 39	111 30 3	<.02	26.66
RTG7319	32 26 42	111 30 13	.11	16.62
RTG7320	32 26 40	111 30 14	.23	25.10
RTG7321	32 26 30	111 30 15	.03	18.29
RTG7322	32 26 9	111 30 16	.04	13.32
RTG7323	32 26 15	111 30 18	.99	20.00

Table 8.--Results of analyses of rock samples collected from the Ragged Top Wilderness Study Area, Pima County, Arizona

[N, not detected; <, detected below limit of determination shown for emission spectrographic analyses, less than value shown for other methods: >, greater than value shown; ---, not determined. Methods: As-i, Bi-i, Cd-i, Sb-i, Zn-i, inductively coupled spectroscopy; Au-a, Hg-a, Te-a, Tl-a, atomic absorption; W-v, visible spectrophotometry; F-is, ion selective electrode; others, emission spectrography. Values in ppm except Ca, Fe, Mg, Na, P, Ti, and F-is, which are weight percent]

Sample	Latitude	Longitude	Ca	Fe	Mg	Na	P	Ti	Ag	B	Ba	Be
RTR130AA	32 27 4	111 30 31	.70	5.0	1.0	3.0	N	.500	N	10	3,000	1.5
RTR130BA	32 27 5	111 30 31	1.00	5.0	2.0	3.0	N	.500	N	15	1,000	<1.0
RTR130CA	32 27 6	111 30 31	.30	7.0	2.0	2.0	N	.700	N	100	1,000	1.5
RTR130DA	32 27 7	111 30 31	.20	5.0	2.0	3.0	N	.500	<.5	20	1,000	1.0
RTR130DB	32 27 7	111 30 31	.20	5.0	1.5	3.0	N	.500	N	20	1,000	1.0
RTR130EA	32 27 8	111 30 30	.30	5.0	.5	1.0	N	.300	N	70	1,500	<1.0
RTR130EB	32 27 8	111 30 30	.15	3.0	.2	.5	N	.500	N	50	700	<1.0
RTR130FA	32 27 10	111 30 31	.20	3.0	1.5	3.0	N	.300	.5	30	200	1.0
RTR130GA	32 27 11	111 30 31	.07	7.0	.3	.5	N	.700	1.0	300	1,500	1.0
RTR130HA	32 27 12	111 30 31	.20	7.0	.7	1.5	<.2	.700	<.5	500	1,500	1.0
RTR130IA	32 27 13	111 30 30	.15	5.0	1.5	2.0	N	.300	N	150	1,000	1.5
RTR130JA	32 27 14	111 30 30	.20	7.0	1.5	3.0	N	.700	N	50	1,000	<1.0
RTR130KA	32 27 15	111 30 31	.30	7.0	2.0	2.0	N	.700	N	50	2,000	1.5
RTR130LA	32 27 15	111 30 32	.15	10.0	3.0	2.0	N	.700	N	300	1,000	1.5
RTR130MA	32 27 16	111 30 33	.30	3.0	1.0	<.2	N	.500	N	50	1,500	1.5
RTR130NA	32 27 17	111 30 33	.30	7.0	.7	3.0	N	.700	N	50	1,500	1.0
RTR130OA	32 27 18	111 30 34	.15	5.0	1.0	2.0	N	.700	N	100	2,000	1.0
RTR130PA	32 27 19	111 30 34	2.00	7.0	2.0	3.0	N	.700	N	70	1,500	1.5
RTR130QA	32 27 20	111 30 34	3.00	7.0	3.0	3.0	N	.700	N	10	700	<1.0
RTR130RA	32 27 21	111 30 34	2.00	7.0	3.0	2.0	N	.700	N	30	1,000	1.5
RTR130SA	32 27 22	111 30 34	1.50	7.0	3.0	3.0	N	.500	N	<10	1,000	<1.0
RTR130TA	32 27 25	111 30 35	1.00	7.0	1.5	3.0	N	.500	N	20	1,000	<1.0
RTR130UA	32 27 27	111 30 34	.30	5.0	1.5	3.0	N	.700	N	20	1,000	1.0
RTR130VA	32 27 29	111 30 33	.20	3.0	.5	3.0	N	.300	N	10	2,000	2.0
RTR130WA	32 27 30	111 30 33	3.00	10.0	3.0	2.0	.7	1.000	N	10	300	2.0
RTR130XA	32 27 31	111 30 34	.70	3.0	.7	2.0	N	.500	N	15	1,000	1.5
RTR130YA	32 27 32	111 30 34	3.00	20.0	5.0	2.0	.2	>1.000	N	15	500	2.0
RTR130ZA	32 27 34	111 30 35	.30	5.0	.3	3.0	N	.500	N	10	1,000	1.5
RTR106A	32 27 5	111 27 18	15.00	10.0	10.0	<.2	N	.200	N	<10	200	1.5
82S-023	32 27 29	111 30 48	.50	5.0	1.0	3.0	N	.200	N	<10	1,500	<1.0
82S-044	32 26 59	111 31 20	1.50	7.0	2.0	3.0	N	.500	N	10	1,000	N
82S-122	32 26 11	111 30 15	1.00	2.0	.5	2.0	N	.200	N	10	1,500	1.0
82S-133	32 25 32	111 30 25	.70	3.0	.3	3.0	N	.300	N	<10	2,000	<1.0
82S-135	32 25 29	111 30 23	1.50	5.0	1.5	3.0	N	.300	N	10	1,500	<1.0
82S-150	32 26 15	111 29 35	1.50	7.0	2.0	3.0	N	.300	N	<10	1,000	<1.0
82S-382	32 26 47	111 29 18	.30	2.0	.2	5.0	N	.200	N	N	1,000	1.5
RT7306A	32 26 54	111 30 39	2.00	3.0	.7	1.5	N	.200	.5	10	>5,000	<1.0
RT7306BA	32 26 54	111 30 39	5.00	.1	.1	N	N	.015	N	<10	>5,000	N
RT7306BB	32 26 54	111 30 39	3.00	2.0	.5	N	N	.070	N	70	>5,000	5.0
RT7307A	32 26 58	111 30 18	.50	2.0	.1	N	N	.500	<.5	20	1,000	N
RT7308A	32 26 58	111 30 5	.07	5.0	.5	3.0	N	.300	.5	<10	1,500	N
RT7309A	32 27 2	111 30 6	7.00	7.0	.3	>5.0	N	.150	150.0	10	150	N
RT7309B	32 27 2	111 30 6	1.00	5.0	1.5	2.0	N	.500	100.0	10	1,500	<1.0
RT7309C	32 27 2	111 30 6	.30	7.0	.5	1.5	N	.500	20.0	20	300	<1.0
RT7309D	32 27 2	111 30 6	20.00	5.0	1.5	.3	N	.200	1.0	30	2,000	1.0

Table 8.--Results of analyses of rock samples collected from the Ragged Top Wilderness Study Area, Pima County, Arizona--Continued

Sample	Bi	Cd	Co	Cr	Cu	Ga	La	Mn	Mo	Nb	Ni	Pb	Sc	Sr	V	W
RTR130AA	N	N	10	N	50	70	50	500	N	N	N	30	5	500	100	N
RTR130BA	N	N	20	20	30	70	<50	700	N	N	20	20	10	500	150	N
RTR130CA	N	N	15	30	70	50	50	500	N	N	20	100	15	200	200	N
RTR130DA	N	N	15	15	70	50	<50	1,500	N	N	30	200	10	300	150	N
RTR130DB	N	N	N	N	70	70	50	300	N	N	15	30	10	200	200	N
RTR130EA	<10	N	<10	10	30	70	<50	70	N	N	<5	150	7	150	150	N
RTR130EB	<10	N	N	30	30	50	<50	50	N	N	<5	500	7	100	200	N
RTR130FA	N	N	<10	15	50	70	<50	500	N	N	5	300	7	200	100	N
RTR130GA	N	N	N	30	100	50	<50	50	5	N	N	15	10	150	200	N
RTR130HA	N	N	<10	20	30	70	50	200	<5	N	<5	30	10	100	200	N
RTR130IA	N	N	10	15	50	50	<50	300	N	N	20	15	7	200	150	N
RTR130JA	N	N	10	10	50	70	<50	200	N	N	5	20	15	300	200	N
RTR130KA	N	N	50	10	70	70	<50	1,000	<5	N	30	20	10	200	150	N
RTR130LA	N	N	30	20	50	50	<50	1,000	N	N	10	15	15	100	300	N
RTR130MA	N	N	N	15	15	50	<50	100	N	N	N	150	7	100	150	N
RTR130NA	N	N	N	20	50	70	50	150	5	N	N	30	10	150	200	N
RTR130OA	N	N	N	15	30	70	<50	70	<5	N	N	50	10	100	150	N
RTR130PA	N	N	30	10	50	100	50	2,000	<5	N	15	50	10	300	200	N
RTR130QA	N	N	50	10	70	70	<50	1,500	N	N	20	10	20	500	200	N
RTR130RA	N	N	30	15	70	100	50	1,500	N	N	20	10	10	200	150	N
RTR130SA	N	N	70	10	70	70	<50	1,500	N	N	15	15	15	700	150	N
RTR130TA	N	N	100	15	70	100	N	5,000	5	N	20	15	7	500	150	N
RTR130UA	N	N	15	15	70	100	<50	1,500	<5	N	10	30	10	500	200	N
RTR130VA	N	N	N	N	5	100	70	300	<5	<20	N	100	5	200	20	N
RTR130WA	N	N	30	<10	100	100	N	2,000	N	N	<5	100	15	150	150	N
RTR130XA	N	N	15	<10	10	30	<50	500	<5	N	5	10	7	100	50	N
RTR130YA	N	N	100	50	100	100	N	3,000	N	N	100	10	30	300	300	N
RTR130ZA	N	N	<10	<10	30	70	50	300	<5	N	<5	15	10	100	70	N
RTR106A	N	N	150	N	70	20	N	3,000	N	N	100	100	20	200	500	N
82S-023	N	N	15	N	15	70	N	500	N	N	N	30	<5	200	100	---
82S-044	N	N	20	15	70	100	N	700	N	N	10	30	10	500	200	N
82S-122	N	N	10	N	<5	30	N	500	N	N	N	30	<5	150	50	---
82S-133	N	N	N	N	<5	70	70	500	N	N	N	20	5	100	20	N
82S-135	N	N	20	30	5	100	N	500	N	N	20	30	7	300	150	N
82S-150	N	N	20	20	50	100	N	500	N	N	15	15	7	200	150	N
82S-382	N	N	N	N	<5	70	50	300	N	N	N	50	N	<100	15	N
RT7306A	N	N	<10	10	30	50	N	200	N	N	7	300	<5	3,000	100	N
RT7306BA	N	N	N	N	15	10	N	200	N	N	N	300	N	>5,000	150	N
RT7306BB	N	N	N	<10	50	10	50	1,000	N	N	10	500	<5	200	200	N
RT7307A	N	N	N	<10	5	20	N	10	N	N	N	N	<5	N	100	N
RT7308A	N	N	<10	10	7	100	N	300	N	N	<5	20	<5	<100	70	N
RT7309A	15	>500	<10	N	3,000	30	N	2,000	150	N	N	>20,000	<5	N	50	N
RT7309B	N	N	20	15	200	70	N	1,500	<5	N	20	150	5	<100	100	N
RT7309C	<10	70	15	20	200	50	N	300	20	N	15	5,000	5	N	150	N
RT7309D	N	N	10	N	100	30	50	3,000	<5	N	5	200	<5	150	70	N

Table 8.--Results of analyses of rock samples collected from the Ragged Top Wilderness Study Area, Pima County, Arizona--Continued

Sample	Y	Zn	Zr	As-i	Bi-i	Cd-i	Sb-i	Zn-i	Au-a	Hg-a	Te-a	Tl-a	W-v	F-is
RTR130AA	10	N	150	---	---	---	---	---	<.001	---	---	---	---	---
RTR130BA	15	<200	100	---	---	---	---	---	<.001	---	---	---	---	---
RTR130CA	15	<200	100	---	---	---	---	---	.004	---	---	---	---	---
RTR130DA	15	<200	100	---	---	---	---	---	.002	---	---	---	---	---
RTR130DB	20	<200	200	---	---	---	---	---	.004	---	---	---	---	---
RTR130EA	15	N	500	---	---	---	---	---	.002	---	---	---	---	---
RTR130EB	10	N	200	---	---	---	---	---	.002	---	---	---	---	---
RTR130FA	15	200	100	---	---	---	---	---	.005	---	---	---	---	---
RTR130GA	10	N	150	---	---	---	---	---	.008	---	---	---	---	---
RTR130HA	15	N	200	---	---	---	---	---	.002	---	---	---	---	---
RTR130IA	10	<200	100	---	---	---	---	---	.001	---	---	---	---	---
RTR130JA	15	N	300	---	---	---	---	---	.001	---	---	---	---	---
RTR130KA	20	<200	70	---	---	---	---	---	.004	---	---	---	---	---
RTR130LA	30	N	200	---	---	---	---	---	.002	---	---	---	---	---
RTR130MA	20	N	200	---	---	---	---	---	.002	---	---	---	---	---
RTR130NA	20	N	200	---	---	---	---	---	.002	---	---	---	---	---
RTR130OA	15	N	200	---	---	---	---	---	.001	---	---	---	---	---
RTR130PA	20	N	150	---	---	---	---	---	.003	---	---	---	---	---
RTR130QA	30	<200	150	---	---	---	---	---	<.001	---	---	---	---	---
RTR130RA	30	<200	200	---	---	---	---	---	<.001	---	---	---	---	---
RTR130SA	15	<200	100	---	---	---	---	---	<.001	---	---	---	---	---
RTR130TA	50	N	200	---	---	---	---	---	.001	---	---	---	---	---
RTR130UA	15	N	150	---	---	---	---	---	.001	---	---	---	---	---
RTR130VA	30	N	200	---	---	---	---	---	<.001	---	---	---	---	---
RTR130WA	50	<200	100	---	---	---	---	---	<.001	---	---	---	---	---
RTR130XA	70	N	100	---	---	---	---	---	<.001	---	---	---	---	---
RTR130YA	50	<200	150	---	---	---	---	---	<.001	---	---	---	---	---
RTR130ZA	50	N	200	---	---	---	---	---	<.001	---	---	---	---	---
RTR106A	70	<200	20	---	---	---	---	---	.001	---	---	---	---	---
82S-023	N	N	100	11	<2	.5	25	59	<.001	<.02	<.05	.35	---	.03
82S-044	10	N	70	<5	<2	.7	3	37	<.001	.04	<.05	.40	1.2	.03
82S-122	10	N	70	<5	<2	.2	9	19	<.001	<.02	<.05	.50	---	.02
82S-133	15	N	500	<5	<2	.3	3	37	<.001	.02	<.05	.70	1.2	.03
82S-135	<10	N	100	<5	<2	.8	5	54	<.001	.02	<.05	.45	1.5	.03
82S-150	10	N	150	<5	<2	.7	3	44	<.001	.02	<.05	.30	.9	.03
82S-382	10	N	150	<5	<2	<.1	<2	29	<.001	<.02	<.05	.70	1.0	.02
RT7306A	10	2,000	50	<5	<2	.8	<2	1,600	.006	.12	<.05	.50	2.0	1.70
RT7306BA	15	<200	N	12	<2	.3	<2	130	.002	.02	<.05	<.05	.6	1.30
RT7306BB	30	500	30	23	<2	6.1	6	370	.007	.04	<.05	.25	3.3	2.40
RT7307A	N	N	20	<5	<2	.1	<2	3	.003	<.02	<.05	1.10	3.4	.02
RT7308A	N	N	50	27	<2	.4	<2	35	.015	<.02	.55	.85	2.2	.02
RT7309A	10	>10,000	15	<5	2	1,600.0	<2	>40,000	---	2.90	7.30	.50	1.6	.90
RT7309B	10	300	100	17	<2	4.7	3	610	.015	<.02	.35	1.10	2.5	.03
RT7309C	10	>10,000	100	16	6	53.0	5	6,400	.090	.20	2.00	1.60	5.4	.04
RT7309D	15	200	100	13	<2	3.5	6	580	.020	.02	.10	.50	1.4	.07

Table 8.--Results of analyses of rock samples collected from the Ragged Top Wilderness Study Area, Pima County, Arizona--Continued

Sample	Latitude	Longitude	Ca	Fe	Mg	Na	P	Ti	Ag	B	Ba	Be
RT7309EA	32 27 2	111 30 6	>20.00	10.0	.3	N	N	.002	50.0	15	1,500	N
RT7309EB	32 27 2	111 30 6	15.00	3.0	.3	N	N	.150	15.0	15	150	N
RT7309F	32 27 2	111 30 6	1.00	5.0	2.0	2.0	N	.700	<.5	10	200	<1.0
RT7309G	32 27 2	111 30 6	.70	7.0	1.5	3.0	N	.700	<.5	<10	2,000	<1.0
RT7310A	32 27 4	111 30 8	.70	5.0	1.5	1.5	N	.700	1.5	10	700	1.0
RT7310B	32 27 4	111 30 8	10.00	5.0	1.0	1.0	N	.300	30.0	10	500	<1.0
RT7311AA	32 27 8	111 27 26	20.00	7.0	3.0	.2	N	.030	N	<10	3,000	N
RT7311AB	32 27 8	111 27 26	20.00	3.0	1.0	N	N	.015	N	<10	150	N
RT7315A	32 27 1	111 27 56	5.00	5.0	2.0	<.2	N	.200	N	10	700	1.5
RT7315B	32 27 1	111 27 56	1.00	5.0	.1	N	N	.300	N	15	1,500	1.0
RT7315CA	32 27 1	111 27 56	1.50	2.0	.5	2.0	N	.200	N	10	300	N
RT7315CB	32 27 1	111 27 56	.50	5.0	.7	3.0	N	.200	<.5	10	200	N
RT7316A	32 27 7	111 27 28	7.00	10.0	5.0	3.0	N	1.000	N	<10	500	N
RT7324A	32 26 11	111 30 34	.07	1.0	.3	1.5	<.2	.100	2.0	<10	>5,000	N
RT7324B	32 26 11	111 30 34	.50	1.5	.1	N	<.2	.700	3.0	N	>5,000	N
RT7324CA	32 26 11	111 30 34	.10	.5	.1	N	N	.020	N	<10	700	<1.0
RT7324CB	32 26 11	111 30 34	.20	2.0	.2	.2	N	.100	2.0	<10	1,000	5.0
RT7325A	32 27 6	111 27 30	1.50	10.0	3.0	2.0	N	1.000	N	<10	150	<1.0
RT7326A	32 27 8	111 27 34	5.00	7.0	3.0	2.0	N	.050	N	<10	150	<1.0

Table 8.--Results of analyses of rock samples collected from the Ragged Top Wilderness Study Area, Pima County, Arizona--Continued

Sample	Bi	Cd	Co	Cr	Cu	Ga	La	Mn	Mo	Nb	Ni	Pb	Sc	Sr	V	W
RT7309EA	N	500	N	<10	15,000	30	<50	>5,000	10	N	<5	>20,000	20	500	10	N
RT7309EB	10	20	<10	<10	700	50	<50	2,000	10	N	<5	20,000	N	100	50	N
RT7309F	N	N	20	20	100	70	N	1,500	N	N	20	50	5	N	150	N
RT7309G	N	N	15	15	200	100	N	2,000	N	N	10	70	7	<100	100	N
RT7310A	N	N	20	20	70	30	N	1,500	N	N	15	50	7	<100	100	N
RT7310B	15	N	15	10	15	70	<50	2,000	<5	N	10	20,000	5	N	100	N
RT7311AA	N	N	20	30	30	N	N	3,000	N	N	30	20	15	100	50	N
RT7311AB	N	N	<10	10	10	<5	N	2,000	N	N	10	N	N	<100	30	N
RT7315A	N	N	10	N	15	30	<50	1,000	N	N	<5	10	<5	N	50	N
RT7315B	N	N	15	N	15	20	<50	700	N	<20	<5	<10	5	N	50	N
RT7315CA	N	N	N	N	7	50	<50	500	N	<20	<5	10	N	<100	30	N
RT7315CB	N	N	N	N	10	100	N	200	N	N	N	50	N	N	50	N
RT7316A	N	N	100	500	100	70	N	1,000	N	N	100	N	30	<100	300	N
RT7324A	N	N	N	N	20	15	N	200	300	N	N	1,000	N	>5,000	15	N
RT7324B	N	N	N	150	100	<5	N	100	200	N	5	500	<5	>5,000	70	<20
RT7324CA	N	N	N	N	5	10	N	300	N	N	N	N	N	N	10	N
RT7324CB	N	N	N	N	20	20	N	700	7	N	<5	30	N	N	20	N
RT7325A	N	N	70	300	50	70	N	1,500	N	N	150	50	30	N	300	N
RT7326A	N	N	70	<10	70	50	N	2,000	N	N	50	50	<5	N	150	N

Table 8.--Results of analyses of rock samples collected from the Ragged Top Wilderness Study Area, Pima County, Arizona--Continued

Sample	Y	Zn	Zr	As-i	Bi-i	Cd-i	Sb-i	Zn-i	Au-a	Hg-a	Te-a	Tl-a	W-v	F-is
RT7309EA	200	>10,000	N	<5	<2	410.0	4	34,000	.080	1.20	2.00	.10	<.5	<.01
RT7309EB	20	7,000	10	10	4	28.0	6	3,400	.100	.08	1.60	.90	2.7	.02
RT7309F	<10	<200	150	7	<2	.8	<2	110	.009	<.02	<.05	.70	2.9	.02
RT7309G	10	<200	30	8	<2	6.0	8	160	.005	<.02	<.05	.85	1.7	.02
RT7310A	<10	<200	100	13	<2	.7	<2	110	.026	<.02	.70	1.00	2.5	.03
RT7310B	15	700	30	14	9	6.4	6	770	.380	.02	4.00	.80	1.7	.03
RT7311AA	20	N	10	<5	<2	2.4	<2	36	.007	.38	<.05	.15	<.5	<.01
RT7311AB	<10	N	N	<5	<2	1.2	<2	13	.044	2.20	<.05	.15	<.5	<.01
RT7315A	50	N	100	<5	<2	1.1	3	34	.001	.40	<.05	.55	1.3	.01
RT7315B	30	N	70	<5	<2	.4	5	50	<.001	<.02	<.05	.30	1.2	.02
RT7315CA	10	N	50	<5	<2	.2	<2	23	.002	<.02	<.05	.50	.6	.01
RT7315CB	<10	N	30	<5	<2	.1	<2	26	.002	<.02	<.05	.50	.7	<.01
RT7316A	15	N	70	<5	<2	.4	<2	20	.006	.10	<.05	.10	.5	<.01
RT7324A	N	N	15	<5	<2	.2	4	69	.023	.12	<.05	.30	3.2	<.01
RT7324B	15	N	100	9	<2	.4	3	71	.023	.50	<.05	1.60	7.4	.01
RT7324CA	N	N	N	<5	<2	.3	<2	10	.021	.02	<.05	.25	.5	.04
RT7324CB	10	N	20	5	<2	1.0	3	46	.250	.02	<.05	.55	1.6	.03
RT7325A	10	300	20	<5	<2	1.8	<2	290	.004	.04	<.05	.05	4.3	.02
RT7326A	10	<200	100	<5	<2	1.6	<2	190	.002	.02	<.05	.05	.6	.01