UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Analytical results and sample locality map of heavy-mineral-concentrate and rock samples from the Weepah Springs Wilderness Study Area (NV-040-246), Lincoln County, Nevada

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Open-File Report 86-415

1986

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STUDIES RELATED TO WILDERNESS

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 Weepah Springs Wilderness Study Area, Lincoln County, Nevada.

INTRODUCTION

In the spring of 1984, the U.S. Geological Survey conducted a reconnaissance geochemical survey of the Weepah Springs Wilderness Study Area (NV-040-246), Lincoln County, Nevada.

The U.S. Geological Survey studied 53,317 acres, about 83 mi^2 (215 km^2) of the Weepah Springs Wilderness Study Area in north-central Lincoln County, Nevada. Although the entire wilderness study area covers 61,137 acres, throughout this report "wilderness study area" and "study area" refer only to the 53,317 acres on which geochemical surveys were conducted. The study area is 64 mi (103 km) by highways northwest of Caliente, Nevada and can be reached from Caliente by traveling U.S. Highway 73 west for 45 mi, then driving north on Nevada State Highway 38 for 19 mi (fig. 1). Access to the boundaries of the study area is provided by roads and jeep trails that connect with Nevada State Highway 38.

The study area is composed of Paleozoic marine sediments consisting of dolomite, limestone, shale, siltstone, and quartzite that are overlain by Tertiary volcanics in the south-central part of the study area. Cretaceous through mid-Tertiary volcanics are grouped together in one unit. At the center of the volcanic cone is an andesite plug of Miocene age. In the northwest and west edges of the study area are some jasperoid bodies which outcrop in limestone.

The topographic relief in the study area is about 3,470 ft (1,058 m), with a maximum elevation of 8,650 ft (2,636.5 m). The northern two-thirds of the study area has steep topography; the southern one-third is less steep. Generally, the streams have a steep gradient and are intermittent. There are conifers at the higher elevations and sage brush at the lower elevations of the study area. The climate is arid to semiarid.

METHODS OF STUDY

Sample Media

Heavy-mineral-concentrate samples 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, many of which may be ore related, permits determination of some elements that are not easily detected in stream-sediment samples.

Analyses of unaltered or unmineralized rock samples provide background geochemical data for individual rock units. On the other hand, analyses of altered or mineralized rocks, where present, may provide useful geochemical

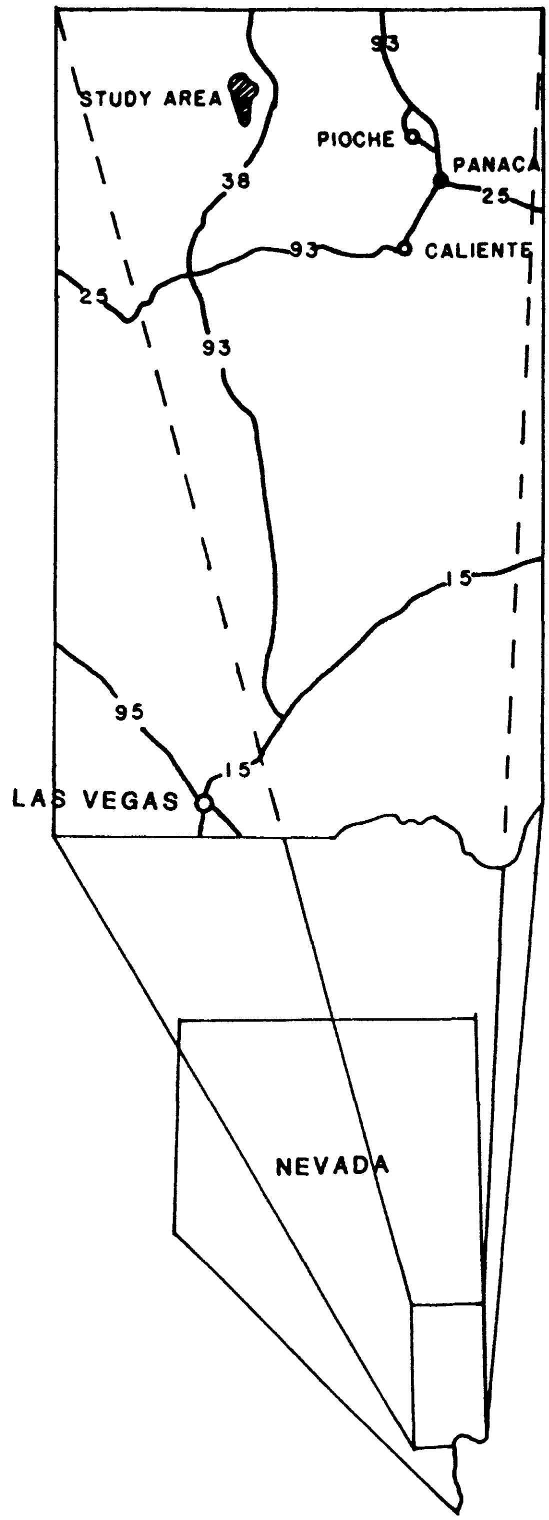

Figure 1. Location of Weepah Springs Wilderness Study Area (NV-040-246), Lincoln County, Nevada.

information about the major- and trace-element assemblages associated with a mineralizing system.

Sample Collection

Heavy-mineral concentrates were collected at 74 sites and rocks were collected at 18 sites (plate 1). The average sampling density was about one sample site per 1.1 mi^2 for the heavy-mineral concentrates, and about one sample site per 4.6 mi^2 for the rocks.

Heavy-mineral-concentrate samples

Heavy-mineral-concentrate samples were collected from active alluvium primarily from first-order (unbranched) and second-order (below the junction of two first-order) streams as shown on USGS topographic maps (scale = 1:50,000). Each sample was composited from several localities within an area that may extend as much as 100 ft from the site plotted on the map. Each bulk sample was sieved with a 2.0-mm (10-mesh) screen to remove the coarse material. The less than 2.0-mm fraction was panned until most of the quartz, feldspar, organic material, and clay-sized material were removed.

Rock samples

Rock samples were collected from outcrops or exposures in the vicinity of the plotted site location. Samples were collected from unaltered, altered, and mineralized rocks (table 5).

Sample Preparation

After air drying, bromoform (specific gravity 2.8) was used to remove the remaining quartz and feldspar from the heavy-mineral-concentrate samples that had been panned in the field. The resultant heavy-mineral sample was 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 analysis/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 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 0.1 ampere to remove the magnetite and ilmenite, and a current of 1.0 ampere to split the remainder of the sample into paramagnetic and nonmagnetic fractions.

Rock samples were crushed and then pulverized to minus 0.15 mm with ceramic plates.

Sample Analysis

Spectrographic method

The heavy-mineral-concentrate samples were analyzed for 31 elements using a semiquantitative, direct-current arc emission spectrographic method (Grimes and Marranzino, 1968). The rock samples were analyzed for 31 elements using a semiquantitative, direct-current arc emission spectrographic method (Myers and others, 1961). The elements analyzed in rock and heavy-mineral-concentrate samples and their lower limits of determination are listed in table 1. 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 for rocks 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, and titanium) are given in weight percent; all others are given in parts per million (micrograms/gram). Analytical data for heavy-mineral-concentrate and rock samples from the Weepah Springs Wilderness Study Area are listed in tables 3 and 4, respectively.

Chemical methods

Other methods of analysis used on samples from the Weepah Springs Wilderness Study Area are summarized in table 2 (Crock and others, 1983; O'Leary and Viets, 1986).

Analytical results for rock samples are listed in table 4.

ROCK ANALYSIS STORAGE SYSTEM

Upon completion of all analytical work, the analytical results were entered into a computer-based file called Rock Analysis Storage System (RASS). 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

Tables 3 and 4 list the analyses for the heavy-mineral concentrate and rock samples, respectively. For the two tables, the data are arranged so that column 1 contains the USGS-assigned sample numbers. These numbers correspond to the numbers shown on the site location map (plate 1). Columns in which the element headings show the letter "s" below the element symbol are emission spectrographic analyses; "icp" indicates inductively coupled plasma. A letter "N" in table 3 indicates that a given element was looked for but not detected at the lower limit of determination shown for that element in table 1. If an element was observed but was below the lowest reporting value, a "less than" symbol (<) was entered in table 3 in front of the lower limit of determination. For table 4, the letter N is not used and a "less than" symbol (<) indicates that an element, observed or not observed, is below the detection limit in table 1A. A letter H indicates that the value of an element could not be determined because of interference from another element. If an element was observed but was above the highest reporting value, a "greater than" symbol (>) was entered in the tables in front of the upper limit of determination. Because of the formatting used in the computer program that produced tables 3 and 4, some of the elements listed in these tables (Fe, Mg, Ca, Ti, Ag, and Be) carry one or more nonsignificant digits to the right of the significant digits. The analysts did not determine these elements to the accuracy suggested by the extra zeros.

REFERENCES CITED

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O'Leary, R. M., and Viets, J. G., 1986, Determination of antimony, arsenic, bismuth, cadmium, copper, lead, molybdenum, silver, and zinc in geological materials by atomic absorption spectrometry using a hydrochloric acid-hydrogen peroxide digestion: Atomic Spectroscopy, 7, p. 4-8.

VanTrump, George, Jr., and Miesch, A. T., 1977, The U.S. Geological Survey RASS-STATPAC system for management and statistical reduction of geochemical data: Computers and Geosciences, v. 3, p. 475-488.

TABLE 1.--Limits of determination for the spectrographic analysis of rocks based on a 10-mg sample

[The values shown are the lower limits of determination assigned by the Grimes and Marranzino method, except for those values in parentheses, which are the lower values assigned by the Myers and others method. The spectrographic limits of determination for heavy-mineral-concentrate samples (Grimes and Marranzino are based on a 5-mg sample, and are therefore two reporting intervals higher than the limits given for rocks and stream sediment. Analyst: Nancy M. Conklin (rocks); Gordon W. Day (heavy-mineral concentrates)]

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	(700)	10,000
Gold (Au)	10	(15)	500
Boron (B)	10		2,000
Barium (Ba)	20		5,000
Beryllium (Be)	1		1,000
Bismuth (Bi)	10		1,000
Cadmium (Cd)	20	(30)	500
Cobalt (Co)	5		2,000
Chromium (Cr)	10		5,000
Copper (Cu)	5		20,000
Lanthanum (La)	20	(30)	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	(200)	2,000

TABLE 2.--Commonly used chemical methods

[ICP = Inductively coupled plasma]

Element or constituent determined	Sample Type	Method	Determination limit (micrograms/ gram or ppm)	Analyst	Reference
Arsenic (As)	Rock	ICP	5	Briggs, Paul H.	Crock and others, 1983.
Bismuth (Bi)	Rock	ICP	2		Modification of O'Leary and Viets, 1986.
Cadmium (Cd)	Rock	ICP	0.1		
Antimony (Sb)	Rock	ICP	2		
Zinc (Zn)	Rock	ICP	2		

TABLE 3. ANALYSIS OF THE NONMAGNETIC FRACTION OF HEAVY MINERAL CONCENTRATE SAMPLES FROM WEEPAH SPRINGS WILDERNESS STUDY AREA, LINCOLN COUNTY, NEVADA.

[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	Ag-ppm s	As-ppm s	Au-ppm s	B-ppm s	Ba-ppm s
WS001H	37 55 4	115 3 9	.20	.10	2.0	.200	50	N	N	N	20	1,000
WS002H	37 53 30	115 3 21	.20	.10	2.0	.100	50	N	N	N	20	1,000
WS004H	37 56 50	115 0 37	.50	1.00	50.0	.050	150	N	N	N	20	500
WS005H	37 56 52	115 0 30	.20	1.00	20.0	.020	150	N	N	N	20	>10,000
WS007H	37 55 58	115 0 17	.20	2.00	10.0	.020	100	N	N	N	20	1,500
WS008H	37 52 57	115 0 45	.30	.50	10.0	.100	150	N	N	N	20	1,500
WS009H	37 58 10	114 59 12	.20	10.00	20.0	.020	100	N	N	N	20	200
WS010H	37 59 9	115 1 48	.20	10.00	20.0	.010	100	N	N	N	20	700
WS011H	38 0 7	115 0 13	.20	15.00	20.0	.050	100	N	N	N	20	N
WS012H	38 0 53	115 1 34	.20	20.00	50.0	.050	100	N	N	N	20	2,000
WS013H	38 1 15	115 0 32	.20	20.00	20.0	.070	150	N	N	N	20	N
WS014H	38 2 32	115 1 13	.50	20.00	20.0	.050	150	N	N	N	20	N
WS015H	38 2 35	115 3 16	.30	20.00	30.0	.020	150	N	N	N	20	N
WS016H	38 2 32	115 3 11	.30	10.00	50.0	.050	150	N	N	N	20	N
WS018H	38 4 17	115 3 50	.50	20.00	50.0	.050	150	N	N	N	20	N
WS019H	38 4 55	115 4 18	.20	20.00	20.0	.020	150	N	N	N	20	N
WS020H	38 4 44	115 7 2	.20	20.00	20.0	.050	100	N	N	N	20	2,000
WS021H	37 59 14	115 8 29	.30	.50	20.0	.050	150	N	N	N	20	3,000
WS022H	37 57 20	115 9 28	.30	.20	2.0	.100	50	N	N	N	20	1,000
WS026H	37 55 58	115 4 53	.20	.10	2.0	.020	50	N	N	N	20	1,500
WS027H	37 55 51	115 4 46	.30	.20	2.0	.100	70	N	N	N	20	1,000
WS028H	37 54 41	115 4 27	.10	.10	1.0	.020	20	N	N	N	20	1,000
WS030H	37 51 18	115 3 1	.10	.20	1.0	.050	20	N	N	N	20	700
WS031H	37 51 52	115 2 23	.20	.20	5.0	.050	50	N	N	N	20	1,000
WS032H	37 50 38	115 2 18	.15	.20	5.0	.020	100	N	N	N	20	1,500
WS033H	37 50 42	115 2 26	.10	.10	1.0	.020	50	N	N	N	20	700
WS034H	37 54 44	114 59 48	.15	5.00	20.0	.020	100	N	N	N	20	7,000
WS035H	37 52 21	115 1 3	.15	.50	5.0	.020	70	N	N	N	20	2,000
WS036H	37 57 59	114 59 24	.10	10.00	20.0	.020	100	N	N	N	20	N
WS037H	37 59 12	115 1 50	.10	10.00	20.0	.010	150	N	N	N	20	500
WS038H	38 0 29	115 0 47	.10	10.00	50.0	.020	150	N	N	N	20	N
WS039H	38 0 59	115 1 30	.20	20.00	20.0	.010	150	N	N	N	20	N
WS040H	38 1 45	115 0 49	.20	20.00	20.0	.015	100	N	N	N	20	N
WS041H	38 2 43	115 1 51	.30	20.00	50.0	.020	150	N	N	N	20	N
WS042H	38 3 26	115 3 24	.15	20.00	50.0	.010	150	15	N	N	20	N
WS043H	38 3 56	115 3 38	.15	20.00	20.0	.010	150	N	N	N	20	700
WS044H	38 4 44	115 4 2	.20	20.00	20.0	.010	150	N	N	N	20	N
WS045H	38 5 18	115 4 49	.15	20.00	20.0	.010	150	N	N	N	20	500
WS046H	38 4 59	115 5 47	.15	20.00	30.0	.020	150	N	N	N	20	N
WS047H	37 58 59	115 8 28	.15	.10	5.0	.010	50	N	N	N	20	1,500
WS051H	37 54 24	115 3 21	.15	.05	2.0	.010	50	N	N	N	20	1,500
WS052H	37 53 10	115 3 26	.20	.20	2.0	.050	50	N	N	N	20	1,500
WS053H	37 52 46	115 3 17	.20	1.00	2.0	.200	50	N	N	N	20	700
WS054H	37 58 0	115 0 38	.15	10.00	20.0	.020	100	N	N	N	20	N
WS055H	37 57 34	115 0 40	.20	5.00	10.0	.020	100	N	N	N	20	3,000

TABLE 3.--Continued

Sample	Be-ppm s	Bi-ppm s	Cd-ppm s	Co-ppm s	Cr-ppm s	Cu-ppm s	La-ppm s	Mo-ppm s	Nb-ppm s	Ni-ppm s	Pb-ppm s
WS001H	N	N	N	N	N	<10	50	20	N	N	N
WS002H	N	N	N	N	N	<10	<50	N	N	N	20
WS004H	N	N	N	N	150	10	100	N	N	N	N
WS005H	N	N	N	N	50	<10	50	N	N	N	N
WS007H	N	N	N	N	70	<10	50	N	N	N	N
WS008H	N	N	N	N	N	<10	50	N	N	N	20
WS009H	N	N	N	N	N	<10	<50	N	N	N	N
WS010H	N	N	N	N	N	<10	<50	N	N	N	N
WS011H	N	N	N	N	N	<10	50	N	N	N	N
WS012H	N	N	N	N	N	<10	50	N	N	N	N
WS013H	N	N	N	N	N	<10	<50	N	N	N	N
WS014H	N	N	N	N	N	<10	<50	N	N	N	N
WS015H	N	N	N	N	N	<10	50	N	N	N	20
WS016H	N	N	N	N	N	<10	50	N	N	N	N
WS018H	N	N	N	N	N	<10	<50	N	N	N	20
WS019H	N	N	N	N	N	<10	<50	N	N	N	N
WS020H	N	N	N	N	N	<10	<50	N	N	N	N
WS021H	N	N	N	N	50	<10	100	N	N	N	<20
WS022H	N	N	N	N	N	<10	<50	N	N	N	N
WS026H	N	N	N	N	N	<10	<50	N	N	N	N
WS027H	N	N	N	N	N	<10	<50	N	N	N	30
WS028H	N	N	N	N	N	<10	<50	N	N	N	N
WS030H	N	N	N	N	N	<10	<50	N	N	N	N
WS031H	N	N	N	N	N	<10	<50	N	N	N	N
WS032H	N	N	N	N	N	<10	50	N	N	N	20
WS033H	N	N	N	N	N	<10	50	N	N	N	N
WS034H	N	N	N	N	N	<10	50	N	N	N	N
WS035H	N	N	N	N	N	<10	50	N	N	N	N
WS036H	N	N	N	N	N	<10	<50	N	N	N	N
WS037H	N	N	N	N	N	15	<50	N	N	N	N
WS038H	N	N	N	N	N	<10	<50	N	N	N	N
WS039H	N	N	N	N	N	N	<50	N	N	N	N
WS040H	N	N	N	N	N	N	<50	N	N	N	N
WS041H	N	N	N	N	N	N	<50	N	N	N	N
WS042H	N	N	N	N	N	N	<50	N	N	N	500
WS043H	N	N	N	N	N	N	<50	N	N	N	20
WS044H	N	N	N	N	N	N	<50	N	N	N	N
WS045H	N	N	N	N	N	N	<50	N	N	N	20
WS046H	N	N	N	N	N	N	<50	N	N	N	N
WS047H	N	N	N	N	N	N	<50	N	N	N	N
WS051H	N	N	N	N	N	N	<50	N	N	N	20
WS052H	N	N	N	N	N	N	<50	N	N	N	N
WS053H	N	N	N	N	N	N	<50	N	N	N	N
WS054H	N	N	N	N	N	N	<50	N	N	N	N
WS055H	N	N	N	N	N	N	<50	N	N	N	N

TABLE 3.--Continued

Sample	Sb-ppm s	Sc-ppm s	Sn-ppm s	Sr-ppm s	V-ppm s	W-ppm s	Y-ppm s	Zn-ppm s	Zr-ppm s	Th-ppm s
WS001H	N	50	N	500	20	N	200	N	>2,000	N
WS002H	N	10	N	500	20	N	100	N	>2,000	N
WS004H	N	20	N	1,000	50	N	500	N	>2,000	N
WS005H	N	20	N	700	20	N	200	N	>2,000	N
WS007H	N	50	N	700	20	N	300	N	>2,000	N
WS008H	N	10	N	700	20	N	150	N	>2,000	N
WS009H	N	15	N	200	20	N	20	N	>2,000	N
WS010H	N	15	N	200	20	N	30	N	>2,000	N
WS011H	N	10	N	N	20	N	100	N	>2,000	N
WS012H	N	10	N	N	20	N	50	N	>2,000	N
WS013H	N	10	N	N	20	N	70	N	>2,000	N
WS014H	N	10	N	N	20	N	100	N	>2,000	N
WS015H	N	<10	N	N	20	N	<20	N	>2,000	N
WS016H	N	10	N	N	20	N	150	N	>2,000	N
WS018H	N	20	N	N	20	N	30	N	>2,000	N
WS019H	N	10	N	N	20	N	30	N	>2,000	N
WS020H	N	10	N	N	20	N	70	N	>2,000	N
WS021H	N	10	N	700	20	N	200	N	>2,000	N
WS022H	N	20	N	300	20	N	200	N	>2,000	N
WS026H	N	10	N	500	20	N	100	N	>2,000	N
WS027H	N	15	N	500	20	N	50	N	>2,000	N
WS028H	N	20	N	200	20	N	200	N	>2,000	N
WS030H	N	50	N	N	20	N	500	N	>2,000	N
WS031H	N	10	N	500	20	N	100	N	>2,000	N
WS032H	N	10	N	700	20	N	150	N	>2,000	N
WS033H	N	70	N	200	20	N	500	N	>2,000	N
WS034H	N	10	N	300	20	N	100	N	>2,000	N
WS035H	N	50	N	200	20	N	200	N	>2,000	N
WS036H	N	10	N	N	20	N	100	N	>2,000	N
WS037H	N	10	N	200	20	N	70	N	>2,000	N
WS038H	N	10	N	N	20	N	100	N	>2,000	N
WS039H	N	10	N	N	<20	N	<20	N	>2,000	N
WS040H	N	20	N	N	<20	N	50	N	>2,000	N
WS041H	N	20	N	N	<20	N	70	N	>2,000	N
WS042H	N	10	N	N	<20	N	20	N	>2,000	N
WS043H	N	10	N	N	<20	N	<20	N	>2,000	N
WS044H	N	20	N	N	<20	N	20	N	>2,000	N
WS045H	N	20	N	N	<20	N	70	N	>2,000	N
WS046H	N	20	N	N	<20	N	50	N	>2,000	N
WS047H	N	20	N	500	<20	N	100	N	>2,000	N
WS051H	N	10	N	500	<20	N	20	N	>2,000	N
WS052H	N	10	N	500	<20	N	150	N	>2,000	N
WS053H	N	10	N	500	<20	N	100	N	>2,000	N
WS054H	N	10	N	N	<20	N	100	500	>2,000	N
WS055H	N	20	N	200	<20	N	70	N	>2,000	N

TABLE 3.--Continued

Sample	Latitude	Longitude	Fe-pct. s	Mg-pct. s	Ca-pct. s	Ti-pct. s	Mn-ppm s	Ag-ppm s	As-ppm s	Au-ppm s	B-ppm s	Ba-ppm s
WS056H	37 55 17	114 59 54	.15	5.00	10.0	.020	100	N	N	N	20	N
WS057H	37 54 22	115 0 3	.30	1.00	10.0	.050	100	N	N	N	20	5,000
WS058H	37 53 31	115 0 40	.15	.05	2.0	.005	50	N	N	N	20	1,000
WS059H	37 56 53	115 5 15	.20	1.00	15.0	.050	100	N	N	N	20	500
WS060H	37 56 52	115 6 35	<.10	.05	.5	.010	20	N	N	N	<20	500
WS061H	37 56 21	115 7 8	.10	.10	.5	.010	20	N	N	N	<20	500
WS062H	38 3 45	115 8 27	.10	10.00	50.0	.010	150	N	N	N	<20	5,000
WS063H	38 2 21	115 8 49	.15	10.00	20.0	.050	100	N	N	N	<20	1,500
WS064H	38 1 5	115 7 22	.10	10.00	50.0	.007	100	N	N	N	<20	>10,000
WS065H	38 0 25	115 7 48	.30	2.00	10.0	.050	100	N	N	N	20	2,000
WS066H	37 56 46	115 7 32	.10	.05	2.0	.050	50	N	N	N	<20	700
WS067H	37 56 5	115 12 32	.20	.50	2.0	.050	50	N	N	N	<20	700
WS076H	37 54 7	115 2 40	.15	.05	2.0	.010	50	N	N	N	<20	700
WS077H	37 53 46	115 2 28	.30	.20	2.0	.100	100	N	N	N	<20	700
WS078H	37 52 26	115 2 4	.15	.10	2.0	.020	50	N	N	N	20	1,000
WS079H	37 58 2	115 0 34	<.10	20.00	50.0	.005	100	N	N	N	50	N
WS080H	37 57 17	115 0 58	.20	1.00	1.0	.050	50	N	N	N	20	N
WS081H	37 51 30	115 1 13	.20	.10	2.0	.010	20	N	N	N	20	1,500
WS082H	37 54 10	115 0 20	.10	.20	7.0	.010	70	N	N	N	<20	>10,000
WS083H	37 56 56	115 5 26	.20	.05	10.0	.010	100	N	N	N	<20	1,000
WS084H	37 56 54	115 6 43	.10	.05	1.0	.200	20	N	N	N	20	500
WS085H	37 55 55	115 7 12	.20	.20	2.0	.010	50	N	N	N	20	2,000
WS086H	38 4 15	115 8 0	.20	10.00	20.0	.050	70	N	N	N	20	>10,000
WS087H	38 3 11	115 9 0	.20	10.00	20.0	.050	70	N	N	N	20	>10,000
WS088H	38 1 26	115 8 42	.10	20.00	20.0	.010	150	N	N	N	<20	1,500
WS089H	38 1 1	115 7 20	.10	10.00	20.0	.010	150	N	N	N	<20	10,000
WS090H	38 0 5	115 7 53	.20	.10	5.0	.020	100	N	N	N	<20	3,000
WS093H	37 55 42	115 8 32	.20	1.00	2.0	.020	50	N	N	N	<20	700
WS094H	37 56 27	115 12 8	.20	2.00	5.0	.020	70	N	N	N	<20	700

TABLE 3.--Continued

Sample	Be-ppm s	Bi-ppm s	Cd-ppm s	Co-ppm s	Cr-ppm s	Cu-ppm s	La-ppm s	Mo-ppm s	Nb-ppm s	Ni-ppm s	Pb-pp s
WS056H	N	N	N	N	N	N	<50	N	N	N	N
WS057H	N	N	N	N	N	N	<50	N	N	N	N
WS058H	N	N	N	N	N	N	<50	N	N	N	N
WS059H	N	N	N	N	N	<10	70	N	N	N	N
WS060H	N	N	N	N	N	<10	<50	N	N	N	N
WS061H	N	N	N	N	N	<10	<50	N	N	N	N
WS062H	N	N	N	N	N	<10	<50	N	N	N	N
WS063H	N	N	N	N	N	<10	<50	N	N	N	N
WS064H	N	N	N	N	N	<10	<50	N	N	N	N
WS065H	N	N	N	N	N	<10	50	N	N	N	N
WS066H	N	N	N	N	N	<10	<50	N	N	N	N
WS067H	N	N	N	N	N	<10	<50	N	N	N	N
WS076H	N	N	N	N	N	<10	<50	N	N	N	N
WS077H	N	N	N	N	N	<10	<50	N	N	N	N
WS078H	N	N	N	N	N	<10	<50	N	N	N	N
WS079H	N	N	N	N	N	<10	<50	N	N	N	N
WS080H	N	N	N	N	N	<10	<50	N	N	N	N
WS081H	N	N	N	N	N	<10	<50	N	N	N	N
WS082H	N	N	N	N	N	<10	<50	N	N	N	N
WS083H	N	N	N	N	N	<10	70	N	N	N	N
WS084H	N	N	N	N	N	<10	<50	N	N	N	N
WS085H	N	N	N	N	N	<10	<50	N	N	N	N
WS086H	N	N	N	N	N	<10	70	N	N	N	N
WS087H	N	N	N	N	70	<10	100	N	N	N	N
WS088H	N	N	N	N	N	<10	<50	N	N	N	N
WS089H	N	N	N	N	50	<10	100	N	N	N	N
WS090H	N	N	N	N	70	<10	50	N	N	N	50
WS093H	N	N	N	N	N	<10	50	N	N	N	N
WS094H	N	N	N	N	N	<10	50	N	N	N	N

TABLE 3.--Continued

Sample	Sb-ppm s	Sc-ppm s	Sn-ppm s	Sr-ppm s	V-ppm s	W-ppm s	Y-ppm s	Zn-ppm s	Zr-ppm s	Th-ppm s
WS056H	N	10	N	200	<20	N	100	N	>2,000	N
WS057H	N	10	N	700	<20	N	100	N	>2,000	N
WS058H	N	10	N	500	<20	N	100	N	>2,000	N
WS059H	N	10	N	500	<20	N	100	N	>2,000	N
WS060H	N	50	N	200	<20	N	300	N	>2,000	N
WS061H	N	50	N	200	<20	N	200	N	>2,000	N
WS062H	N	10	N	N	<20	N	150	N	>2,000	N
WS063H	N	20	N	N	<20	N	150	N	>2,000	N
WS064H	N	20	N	200	<20	N	30	N	>2,000	N
WS065H	N	10	N	500	<20	N	100	N	>2,000	N
WS066H	N	50	N	500	<20	N	500	N	>2,000	N
WS067H	N	20	N	500	<20	N	200	N	>2,000	N
WS076H	N	20	N	500	<20	N	200	N	>2,000	N
WS077H	N	20	N	500	<20	N	70	N	>2,000	N
WS078H	N	10	N	500	<20	N	150	N	>2,000	N
WS079H	N	10	N	N	<20	N	50	N	>2,000	N
WS080H	N	10	N	N	<20	N	150	N	>2,000	N
WS081H	N	20	N	500	<20	N	50	N	>2,000	N
WS082H	N	30	N	1,000	<20	N	200	N	>2,000	N
WS083H	N	20	N	700	<20	N	150	N	>2,000	N
WS084H	N	10	N	N	<20	N	500	N	>2,000	N
WS085H	N	10	N	500	<20	N	150	N	>2,000	N
WS086H	N	10	N	200	<20	N	150	N	>2,000	N
WS087H	N	30	N	1,000	50	N	150	N	>2,000	N
WS088H	N	20	N	N	<20	N	30	N	>2,000	N
WS089H	N	10	N	500	<20	N	200	N	>2,000	N
WS090H	N	20	N	1,000	<20	N	100	N	>2,000	N
WS093H	N	10	N	700	<20	N	150	N	>2,000	N
WS094H	N	10	N	700	<20	N	150	N	>2,000	N

TABLE 4. ANALYSIS OF THE ROCK SAMPLES FROM WEEPAH SPRINGS WILDERNESS STUDY AREA, LINCOLN COUNTY, NEVADA

[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	Ag-ppm s	As-ppm s	Au-ppm s	B-ppm s	Ba-ppm s	Be-ppm s
WS010R	37 59 9	115 1 48	10.00	.15	.15	.070	300	.7	<700	<15	20	150	1.5
WS017R	38 3 49	115 3 32	.70	.07	.30	.030	>5,000	300.0	<700	<15	<10	20	<1.0
WS023P	38 4 24	115 7 58	.15	.05	.30	.030	150	1.5	<700	<15	10	150	<1.0
WS024R	38 2 31	115 7 58	3.00	.15	1.50	.070	200	1.5	<700	<15	20	700	2.0
WS036R	37 57 51	114 59 24	1.50	3.00	3.00	.015	70	.7	700	<15	10	70	<1.0
WS037R	37 59 12	115 1 49	1.50	.15	3.00	.030	100	<.5	<700	<15	15	70	1.0
WS042R	38 3 26	115 3 24	2.00	.30	20.00	.030	150	.5	<700	<15	<10	20	<1.0
WS046R	38 4 57	115 5 48	.30	.50	3.00	.030	700	<.5	<700	<15	<10	30	7.0
WS058R	37 53 31	115 0 40	20.00	.15	.30	.070	3,000	<.5	1,500	<15	H	700	10.0
WS062R	38 3 45	115 8 28	.30	7.00	15.00	.015	70	<.5	<700	<15	<10	15	<1.0
WS063R	38 2 22	115 8 49	7.00	3.00	3.00	.070	700	1.0	1,500	<15	20	300	<1.0
WS065P	38 0 25	115 7 48	15.00	.20	1.50	.030	300	<.5	<700	<15	H	300	1.5
WS086R	38 4 16	115 8 0	15.00	.30	.30	.070	30	<.5	<700	<15	15	3,000	<1.0
WS087R	38 3 1	115 9 2	5.00	.30	2.00	.030	700	.5	<700	<15	50	500	3.0
WS088R1	38 1 27	115 8 42	<.05	7.00	10.00	<.002	30	<.5	<700	<15	<10	<20	<1.0
WS088R2	38 1 27	115 8 42	7.00	.30	.70	.070	30	<.5	<700	<15	20	150	<1.0
WS089R	38 1 1	115 7 20	3.00	1.50	7.00	.030	300	.5	700	<15	<10	150	1.5
WS091R	38 0 38	115 8 10	15.00	.15	1.50	.050	150	<.5	<700	<15	H	100	<1.0

TABLE 4.--Continued

Sample	Bi-ppm s	Cd-ppm s	Co-ppm s	Cr-ppm s	Cu-ppm s	La-ppm s	Mo-ppm s	Nb-ppm s	Ni-ppm s	Pb-ppm s	Sb-ppm s	Sc-ppm s	Sn-ppm s
WS010R	<10	<30	<5	30	30	70	7	<20	300	10	<100	7	<10
WS017R	<10	100	7	<10	>20,000	<30	<5	<20	5	500	300	<5	<10
WS023R	<10	<30	<5	<10	700	<30	<5	<20	<5	<10	<100	<5	<10
WS024R	<10	<30	5	70	300	150	<5	<20	100	<10	150	<5	<10
WS036R	<10	<30	<5	<10	300	<30	<5	<20	30	15	<100	<5	<10
WS037R	<10	<30	<5	15	30	<30	<5	<20	15	<10	<100	<5	<10
WS042R	<10	<30	<5	15	30	<30	5	<20	70	<10	<100	<5	<10
WS046R	<10	<30	<5	<10	7	<30	<5	30	<5	10	<100	<5	<10
WS058R	<10	<30	30	<10	20	30	<5	<20	15	10	<100	7	<10
WS062R	<10	<30	<5	<10	10	<30	5	<20	7	<10	<100	<5	<10
WS063R	<10	<30	7	30	30	<30	30	<20	30	15	<100	7	<10
WS065R	<10	<30	15	50	30	<30	15	<20	150	15	<100	7	<10
WS086R	<10	<30	<5	300	30	50	7	<20	50	50	<100	<5	<10
WS087R	<10	<30	<5	150	100	150	7	<20	70	15	150	15	<10
WS088R1	<10	<30	<5	<10	7	<30	<5	<20	<5	<10	<100	<5	<10
WS088R2	<10	<30	<5	150	30	<30	<5	<20	30	<10	<100	<5	<10
WS089R	<10	<30	30	30	30	<30	7	<20	70	<10	<100	<5	<10
WS091R	<10	<30	7	15	30	<30	<5	<20	300	<10	<100	<5	<10

TABLE 4.--Continued

Sample	Sr-ppm s	V-ppm s	W-ppm s	Y-ppm s	Zn-ppm s	Zr-ppm s	Th-ppm s	As-ppm icp	Zn-ppm icp	Cd-ppm icp	Bi-ppm icp	Sb-ppm icp
WS010R	<100	300	<50	30	2,000	50	<200	58	1,170	.8	<2	28
WS017R	<100	<10	<50	<10	>10,000	100	<200	230	19,600	43.4	<2	87
WS023R	<100	<10	<50	<10	200	30	<200	13	125	.3	<2	13
WS024R	700	30	<50	100	1,500	30	<200	194	928	2.6	<2	47
WS036R	<100	70	<50	<10	300	70	<200	456	164	.7	<2	40
WS037R	150	30	50	10	<200	20	<200	447	165	.7	<2	40
WS042R	150	30	<50	<10	200	30	<200	403	44	.5	<2	19
WS046R	<100	<10	<50	<10	<200	30	<200	35	24	.1	<2	5
WS058R	100	150	<50	70	1,500	70	<200	1,220	816	2.1	<2	19
WS062R	<100	<10	<50	<10	<200	15	<200	28	11	.5	<2	20
WS063R	500	70	<50	20	<200	70	<200	1,240	132	1.8	<2	75
WS065R	<100	70	<50	30	700	150	<200	205	321	1.5	<2	16
WS086R	150	1,000	<50	20	300	150	<200	210	149	1.6	<2	38
WS087R	3,000	100	<50	150	500	20	<200	358	228	3.0	<2	69
WS088R1	<100	<10	<50	<10	<200	<10	<200	<5	<2	.2	<2	13
WS088R2	200	100	<50	15	700	30	<200	263	270	.5	<2	27
WS089R	100	150	<50	15	300	70	<200	1,080	220	2.1	<2	44
WS091R	<100	50	<50	10	1,500	30	<200	132	774	1.4	<2	32

TABLE 5.--Description of rocks from Weepah Springs Wilderness Study Area, Lincoln County, Nevada

Sample number	Description
WS010R	Jasperoid
17R	Mine dump
23R	Jasperoid
24R	Jasperoid
36R	Jasperoid
37R	Jasperoid
42R	Breccia
46R	Breccia
58R	Limestone
62R	Limestone
63R	Limestone
65R	Limestone
86R	Iron-stained volcanic
87R	Limestone
88R1	Limestone
88R2	Limestone
89R	Limestone
91R	Jasperoid