

UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

Analytical results and sample locality map  
of stream-sediment, heavy-mineral-concentrate, and rock samples  
from the Gold Creek (OR-003-033) and the Sperry Creek (OR-003-035)  
Wilderness Study Areas, Malheur County, Oregon

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This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature. Any use of trade names is for descriptive purposes only and does not imply endorsement by the USGS.

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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 Gold Creek (OR-003-033) and the Sperry Creek (OR-003-035) Wilderness Study Areas (WSAs), Malheur County, Oregon.

### INTRODUCTION

In August 1988, the U.S. Geological Survey conducted a reconnaissance geochemical survey of the Gold Creek and the Sperry Creek WSAs, Malheur County, Oregon. The Gold Creek WSA comprises 24.6 mi<sup>2</sup> (63.8 km<sup>2</sup>) (15,780 acres), and the adjacent Sperry Creek WSA covers 8.7 mi<sup>2</sup> (22.7 km<sup>2</sup>) (5,600 acres). The study areas are located about 35 mi (56.3 km) southwest of Vale, Oregon along U.S. Highway 20 and lie immediately south of the highway and the Malheur River. Access is by a good ranch road up South Trail Creek and a poor ranch road between Spring and Sperry Creeks. The south side of the area is accessed by jeep trails over rough ground or from a dirt road connecting Harpers Junction and Crawley via Cottonwood Canyon. Upper Simmons Gulch can be reached via a jeep trail that branches off the Squaw Creek road where it connects with Highway 20.

The topographic relief in the study area is about 2,680 ft (817 m), with a maximum elevation of 5,322 ft (1,622 m) in the southwest corner of the Gold Creek WSA and a minimum elevation of 2,640 ft (805 m) along the Malheur River at the northeast corner of the Gold Creek WSA. Except in the gently sloping uplands of the southwest corner of the Gold Creek study area, the topography is rugged with deep canyons. This is a semi-arid region with sparse vegetation on the hillsides and uplands, but with dense vegetation along the streams. Stream flow is intermittent within the WSAs but pools were noted along most stream courses in August.

The WSAs lie in a tertiary volcanic terrain dominated by basalt flows along the northern and south-central parts of the study area and by outcrops of Littlefield Rhyolite along the central and eastern portions. Miocene basalt, tuff, and rhyolite underlie Pliocene basalt and Quaternary fanglomerate, landslide deposits, and alluvium. Faulting is quite extensive in the study area and diatomite beds are common along the east boundary of the Gold Creek area. Opal, chalcedony, and crystalline quartz were fairly common in the stream gravels and were seen as thin veins in basalt in the northern portion of the Gold Creek WSA. An active hot spring depositing silica and carbonate sinter is located at the base of a hillside south of Highway 20 about two thirds of a mile (1.1 km) west of the mouth of Gold Creek. To the south of the spring lies a vertical, hydrothermally brecciated and recemented quartz vein. This northwest-trending vein is 2 ft (0.6 m) to 3 ft (0.9 m) in thickness.

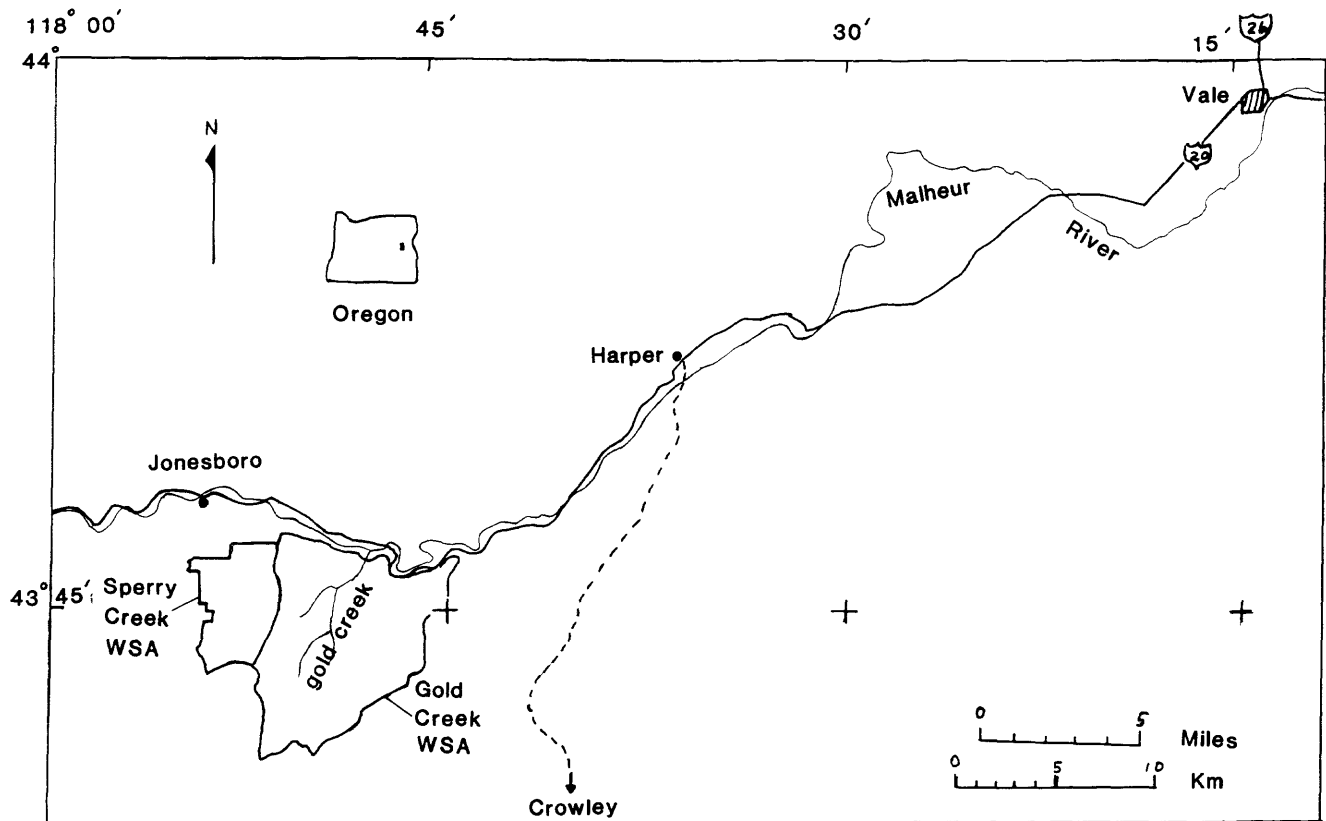


Figure 1. Location map of the Gold Creek (OR-003-033) and the Sperry Creek (OR-003-035) Wilderness Study Area, Malheur County, Oregon.

## **METHODS OF STUDY**

### **Sample Media**

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

### **Sample Collection**

Stream-sediment samples were collected at 42 sites and heavy-mineral-concentrate samples at 37 sites (plate 1). Rock samples were collected at 37 sites. Sampling density was about one sample site per 1 mi<sup>2</sup> (2.6 km<sup>2</sup>) for the stream sediments and heavy-mineral concentrates. The area of the drainage basins sampled ranged from .25 mi<sup>2</sup> (0.65 km<sup>2</sup>) to 5 mi<sup>2</sup> (13 km<sup>2</sup>).

#### **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 USGS topographic map (plate 1). Some samples were composited from several localities within an area that may extend as much as 20 ft (6 m) from the site plotted on the map.

#### **Heavy-mineral-concentrate samples**

Heavy-mineral-concentrate samples were collected from the same active alluvium as the stream-sediment samples. Each bulk sample was screened 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, streambeds, or float in the vicinity of the plotted site location. Descriptions of rock samples are in table 6.

### **Sample Preparation**

The stream-sediment samples were air dried, then sieved using 80-mesh (0.17-mm) stainless-steel sieves. The portion of the sediment passing through the sieve was saved for analysis.

Samples panned in the laboratory were air dried and sieved to minus-35 mesh; bromoform (specific gravity 2.85) was used to remove the remaining quartz and feldspar. The resultant heavy-mineral sample was separated into three fractions using a large electromagnet by placing the sample in contact with the face of the magnet (in this case a modified Frantz Isodynamic Separator). The most magnetic fraction (removed at a setting of 0.25 ampere), primarily magnetite, was not analyzed. The second fraction (removed at a setting of 1.75 ampere), largely ferromagnesian silicates and iron oxides, was saved for archival storage. The third fraction (the nonmagnetic 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 0.32 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.)

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

## Sample Analysis

### Spectrographic method

The stream-sediment, heavy-mineral-concentrate, and rock samples were analyzed for 35 elements using semiquantitative, direct-current arc emission spectrographic methods. In addition, heavy-mineral-concentrate samples were also scanned for platinum (Pt) and palladium (Pd). The analyses were performed using a modification of the methods of Grimes and Marranzino (1968), and of Myers and others (1961). 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 (micrograms/gram). Analytical data for samples from the Gold Creek and Sperry Creek WSA's are listed in tables 3, 4, and 5 for stream-sediment, heavy-mineral-concentrate, and rock samples, respectively.

### Chemical methods

Samples from these wilderness study areas were also analyzed by other methods. Stream sediments were analyzed for uranium (U) using fluorometry. Rock, and stream-sediments were analyzed for gold (Au) using flameless atomic absorption; for mercury (Hg) using atomic absorption and for silver (Ag), arsenic (As), gold (Au), Bismuth (Bi), Cadmium (Cd), Copper (Cu), molybdenum (Mo), lead (Pb), antimony (Sb), and zinc (Zn), using inductively coupled

plasma-atomic emission spectroscopy. Selected rock samples were analyzed for gold (Au) using atomic absorption. For a more detailed summary of these chemical methods see table 2.

Analytical results for stream-sediment, heavy-mineral concentrate, and rock samples are listed in table 3, 4, and 5 respectively.

### 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 3-5 list the results of analyses for the samples of stream sediment, heavy-mineral concentrate, and rock, respectively. For the three 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" beside the element symbol are emission spectrographic analyses; "aa" indicates atomic absorption analyses; "icp" indicates inductively coupled plasma-atomic emission spectroscopy; "faa" indicates flameless atomic absorption analysis; and "f" indicates fluorometric analyses. A letter "N" in the tables indicates that a given element was looked for but not detected at the lower limit of determination shown for that element in tables 1 and 2. For emission spectrographic analyses, a "less than" symbol (<) entered in the tables in front of the lower limit of determination indicates that an element was observed but was below the lowest reporting value. For AA and ICP analyses, a "less than" symbol (<) entered in the tables in front of the lower limit of determination indicates that an element was below the lowest reporting value. 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. If an element was not looked for in a sample, two dashes (--) are entered in tables 3-5 in place of an analytical value. Because of the formatting used in the computer program that produced table 5, some of the elements listed (Fe, Mg, Ca, Ti, Ag, Na, 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.

### ACKNOWLEDGMENTS

Several of our colleagues also participated in sample collection, preparation, analysis, and data retrieval: collection, Jim Evans; preparation, Craig Motooka and Wilfrid Sadler; analyses, John Bullock; data retrieval, Shirley Ford and Mary Lou Tompkins.

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**TABLE 1.--Limits of determination for the spectrographic analysis of rocks and stream sediments, based on a 10-mg sample**

[The values shown are the lower limits of determination assigned by the Grimes and Marranzino method. The spectrographic limits of determination for heavy-mineral-concentrate samples are based on a 5-mg sample, and are therefore two reporting intervals higher than the limits given for rocks.]

Elements	Lower determination limit	Upper determination limit
Percent		
Calcium (Ca)	.05	20
Iron (Fe)	0.05	20
Magnesium (Mg)	.02	10
Sodium (Na)	.2	5
Phosphorus (P)	.2	10
Titanium (Ti)	.002	1
Parts per million		
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)	10	2,000
Chromium (Cr)	10	5,000
Copper (Cu)	5	20,000
Gallium (Ga)	5	500
Germanium (Ge)	10	100
Lanthanum (La)	50	1,000
Manganese (Mn)	10	5,000
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
Thorium (Th)	100	2,000
Vanadium (V)	10	10,000
Tungsten (W)	20	10,000
Yttrium (Y)	10	2,000
Zinc (Zn)	200	10,000
Zirconium (Zr)	10	1,000
Palladium (Pd)*	5	1,000
Platinum (Pt)*	20	1,000

\*Determined in heavy-mineral-concentrate samples only. Limits are for heavy-mineral-concentrate samples. Reported only if detected.

TABLE 2.--Chemical methods used

[AA = atomic absorption and ICP = inductively coupled plasma-atomic emission spectroscopy; FAA = flameless atomic absorption; F = fluorometry]

Element or constituent determined	Sample type	Method	Determination limit (micrograms/gram or ppm)	Analyst	Reference
Gold (Au)	rock, and stream sediment	FAA	0.002	R. Hill	Meier, 1980.
Mercury (Hg)	rock, and stream sediment	AA	0.02	P. Hageman T. Floyd	Kennedy and Crock, 1987.
Gold (Au)	rock	AA	0.05	B. Roushey	<u>Modification of Thompson and others, 1968.</u>
Uranium (U)	stream sediment	F	0.05	T. Roemer	<u>Modification of Centanni and others, 1956.</u>
Silver (Ag)	rock, and stream sediment	ICP	0.075	J. Motooka	Motooka, 1988.
Arsenic (As)	"	ICP	1		
Gold (Au)	"	ICP	0.25		
Bismuth (Bi)	"	ICP	1		
Cadmium (Cd)	"	ICP	0.05		
Copper (Cu)	"	ICP	0.05		
Molybdenum (Mo)	"	ICP	0.15		
Lead (Pb)	"	ICP	1		
Antimony (Sb)	"	ICP	1		
Zinc (Zn)	"	ICP	0.05		

Table 3. Results Of Analyses Of Stream-Sediment Samples From The Gold Creek and Sperry Creek Wilderness Study Areas, Malheur County, Oregon.

Sample	Latitude	Longitude	Ca	%-s	Fe	%-s	Mg	%-s	Na	%-s	P	%-s	Ti	%-s	Ag ppm-s
GS001S	43 45 24	117 49 16	3.0		10.0		1.5		2.0		N		1.00		N
GS002S	43 45 35	117 49 10	3.0		10.0		1.5		1.5		N		1.00		N
GS004S	43 45 49	117 48 46	7.0		10.0		3.0		1.5		N		1.00		N
GS005S	43 45 56	117 48 32	5.0		10.0		3.0		1.5		N		1.00		N
GS006S	43 45 52	117 48 26	5.0		7.0		2.0		1.5		N		1.00		N
GS007S	43 46 22	117 48 13	5.0		7.0		3.0		2.0		N		1.00		N
GS008S	43 46 20	117 48 8	3.0		7.0		1.5		1.5		<.2		1.00		N
GS009S	43 47 42	117 51 34	5.0		10.0		2.0		1.5		N		1.00		.7
GS010S	43 47 10	117 51 10	1.5		7.0		1.0		1.5		N		.70		N
GS011S	43 47 11	117 51 8	2.0		7.0		.7		1.5		N		1.00		N
GS012S	43 47 8	117 50 32	7.0		10.0		3.0		2.0		N		>1.00		N
GS013S	43 47 0	117 50 10	5.0		10.0		3.0		2.0		N		>1.00		N
GS014S	43 46 37	117 48 55	>20.0		2.0		.7		1.5		N		.10		N
GS015S	43 46 38	117 49 8	5.0		10.0		3.0		1.5		N		1.00		N
GS016S	43 46 35	117 48 40	5.0		10.0		3.0		2.0		N		1.00		N
GS017S	43 46 23	117 48 53	.7		1.5		1.0		.3		N		.07		2.0
GS018S	43 45 43	117 47 13	5.0		15.0		3.0		2.0		N		>1.00		N
GS019S	43 45 50	117 46 37	3.0		10.0		2.0		1.5		N		1.00		N
GS020S	43 45 35	117 45 16	3.0		7.0		1.0		3.0		N		.50		N
GS021S	43 45 32	117 45 14	3.0		10.0		1.0		3.0		N		1.00		N
GS022S	43 46 10	117 45 12	2.0		7.0		1.0		2.0		N		1.00		N
GS023S	43 46 9	117 45 18	2.0		7.0		1.0		3.0		N		.70		N
GS024S	43 46 37	117 45 2	2.0		10.0		1.0		3.0		N		.70		N
GS025S	43 44 51	117 46 4	1.0		7.0		.7		2.0		N		.70		N
GS026S	43 44 50	117 45 58	1.0		7.0		.7		2.0		N		.50		N
GS028S	43 45 52	117 50 33	1.0		7.0		.7		1.5		N		.70		N
GS029S	43 45 55	117 51 45	1.0		7.0		.7		2.0		N		.70		N
GS030S	43 45 56	117 51 42	1.0		7.0		1.5		2.0		N		.70		N
GS031S	43 46 32	117 48 24	3.0		10.0		2.0		1.5		N		>1.00		N
GS032S	43 46 32	117 54 30	1.5		7.0		.7		1.5		N		.70		N
GS033S	43 44 43	117 53 31	2.0		7.0		1.5		2.0		N		.70		N
GS034S	43 44 0	117 51 52	2.0		5.0		1.0		2.0		N		.70		N
GS035S	43 42 59	117 48 15	2.0		7.0		1.5		2.0		N		.70		N
GS036S	43 42 52	117 48 10	2.0		10.0		1.5		2.0		N		1.00		N
GS037S	43 43 16	117 47 54	2.0		7.0		1.5		2.0		N		.70		N
GS038S	43 46 36	117 52 58	2.0		7.0		1.0		2.0		N		1.00		N
GS039S	43 46 34	117 52 54	2.0		7.0		1.5		1.5		N		1.00		N
GS040S	43 46 45	117 52 50	1.5		7.0		1.0		2.0		N		.70		N
GS041S	43 46 57	117 52 50	1.5		7.0		1.0		2.0		N		.70		N
GS043S	43 44 30	117 49 27	1.5		7.0		1.0		1.5		N		.70		N
GS044S	43 57 4	117 53 0	2.0		7.0		1.0		2.0		N		1.00		N
GS045S	43 45 46	117 52 47	2.0		7.0		1.0		1.5		N		.70		N

Table 3. Results Of Analyses Of Stream-Sediment Samples From The Gold Creek and Sperry Creek Wilderness Study Areas, Malheur County, Oregon.--Continued

Sample	As ppm-s	Au ppm-s	B ppm-s	Ba ppm-s	Be ppm-s	Bi ppm-s	Cd ppm-s	Co ppm-s	Cr ppm-s	Cu ppm-s
GS001S	N	N	N	700	1.5	N	N	30	50	50
GS002S	N	N	N	700	1.5	N	N	30	70	70
GS004S	N	N	N	300	<1.0	N	N	70	300	70
GS005S	N	N	N	300	<1.0	N	N	70	200	70
GS006S	N	N	N	500	1.5	N	N	50	150	50
GS007S	N	N	N	500	1.5	N	N	50	150	70
GS008S	N	N	10	700	1.5	N	N	50	100	70
GS009S	N	N	<10	700	1.5	N	N	50	200	70
GS010S	N	N	<10	700	2.0	N	N	30	70	30
GS011S	N	N	<10	700	1.5	N	N	30	70	30
GS012S	N	N	N	700	1.0	N	N	50	200	70
GS013S	N	N	10	300	1.0	N	N	50	200	70
GS014S	N	N	200	300	1.5	N	N	<10	20	10
GS015S	N	N	N	200	1.0	N	N	50	150	70
GS016S	N	N	N	200	<1.0	N	N	50	200	70
GS017S	N	N	70	150	N	N	N	<10	10	15
GS018S	N	N	N	300	1.0	N	N	70	150	70
GS019S	N	N	10	700	1.5	N	N	50	100	50
GS020S	N	N	10	1,500	2.0	N	N	20	70	30
GS021S	N	N	15	1,500	2.0	N	N	20	30	20
GS022S	N	N	<10	700	1.5	N	N	30	50	30
GS023S	N	N	10	1,000	2.0	N	N	20	30	20
GS024S	N	N	10	1,000	2.0	N	N	30	70	20
GS025S	N	N	10	1,000	3.0	N	N	20	30	20
GS026S	N	N	10	1,000	2.0	N	N	15	30	20
GS028S	N	N	10	700	2.0	N	N	30	30	30
GS029S	N	N	10	700	2.0	N	N	20	70	30
GS030S	N	N	10	700	2.0	N	N	30	50	50
GS031S	N	N	N	300	1.0	N	N	50	200	70
GS032S	N	N	<10	700	1.5	N	N	30	70	30
GS033S	N	N	<10	1,000	1.5	N	N	30	70	50
GS034S	N	N	10	700	1.5	N	N	30	70	50
GS035S	N	N	10	700	1.5	N	N	30	70	50
GS036S	N	N	<10	1,000	2.0	N	N	50	50	30
GS037S	N	N	10	700	2.0	N	N	30	30	30
GS038S	N	N	<10	700	1.5	N	N	30	50	30
GS039S	N	N	N	1,000	1.5	N	N	30	50	50
GS040S	N	N	10	700	1.5	N	N	30	50	30
GS041S	N	N	10	700	2.0	N	N	30	30	30
GS043S	N	N	N	700	2.0	N	N	30	50	30
GS044S	N	N	N	1,000	1.5	N	N	30	30	30
GS045S	N	N	N	700	1.5	N	N	30	30	30

Table 3. Results Of Analyses Of Stream-Sediment Samples From The Gold Creek and Sperry Creek Wilderness Study Areas, Malheur County, Oregon.--Continued

Sample	Ga ppm-s	Ge ppm-s	La ppm-s	Mn ppm-s	Mo ppm-s	Nb ppm-s	Ni ppm-s	Pb ppm-s	Sb ppm-s
GS001S	20	N	50	2,000	5	<20	30	15	N
GS002S	20	N	N	2,000	N	<20	30	15	N
GS004S	20	N	N	2,000	N	<20	70	N	N
GS005S	20	N	N	2,000	N	<20	70	N	N
GS006S	20	N	N	1,500	N	<20	50	<10	N
GS007S	30	N	N	2,000	N	<20	70	10	N
GS008S	15	N	N	1,500	N	<20	50	10	N
GS009S	20	N	N	2,000	N	<20	50	10	N
GS010S	20	N	50	2,000	N	<20	30	15	N
GS011S	20	N	70	1,500	N	<20	30	15	N
GS012S	20	N	N	2,000	N	<20	70	<10	N
GS013S	20	N	N	1,500	N	<20	70	<10	N
GS014S	<5	20	N	3,000	N	N	10	N	N
GS015S	20	N	N	1,500	N	<20	70	N	N
GS016S	30	N	N	1,500	N	<20	70	N	N
GS017S	70	N	N	700	300	<20	10	<10	100
GS018S	30	N	N	1,500	N	<20	50	<10	N
GS019S	20	N	N	1,000	N	<20	30	10	N
GS020S	20	N	70	2,000	N	<20	20	15	N
GS021S	30	N	70	2,000	5	20	20	15	N
GS022S	20	N	50	2,000	N	<20	20	15	N
GS023S	30	N	70	2,000	N	<20	15	15	N
GS024S	30	N	70	2,000	N	<20	30	15	N
GS025S	20	N	70	2,000	N	20	30	15	N
GS026S	20	N	70	2,000	5	<20	20	15	N
GS028S	20	N	50	2,000	N	<20	20	15	N
GS029S	20	N	70	1,500	N	<20	20	15	N
GS030S	20	N	70	1,500	5	<20	50	15	N
GS031S	20	N	N	1,500	N	<20	50	10	N
GS032S	15	N	<50	1,000	N	<20	30	15	N
GS033S	20	N	50	1,500	N	<20	50	15	N
GS034S	20	N	<50	1,500	N	<20	50	15	N
GS035S	20	N	50	1,500	N	<20	70	15	N
GS036S	20	N	70	2,000	N	<20	50	15	N
GS037S	20	N	50	2,000	N	<20	30	15	N
GS038S	20	N	50	1,500	N	<20	20	15	N
GS039S	15	N	50	2,000	5	20	30	15	N
GS040S	15	N	50	1,000	N	<20	30	15	N
GS041S	20	N	<50	1,500	N	<20	20	15	N
GS043S	15	N	50	1,500	N	<20	50	15	N
GS044S	20	N	N	2,000	N	<20	20	15	N
GS045S	20	N	N	1,500	N	<20	20	15	N

Table 3. Results Of Analyses Of Stream-Sediment Samples From The Gold Creek and Sperry Creek Wilderness Study Areas, Malheur County, Oregon.--Continued

Sample	Sc ppm-s	Sn ppm-s	Sr ppm-s	Th ppm-s	V ppm-s	W ppm-s	Y ppm-s	Zn ppm-s	Zr ppm-s	Hg-ppm aa
GS001S	30	N	300	N	300	N	50	N	150	.02
GS002S	30	N	300	N	300	N	30	N	150	.02
GS004S	50	N	300	N	700	N	30	200	70	<.02
GS005S	50	N	300	N	700	N	30	N	70	<.02
GS006S	30	N	500	N	500	N	30	N	100	<.02
GS007S	30	N	500	N	500	N	30	N	100	.02
GS008S	30	N	500	N	500	N	30	N	150	.02
GS009S	30	N	500	N	700	N	30	N	100	<.02
GS010S	20	N	300	N	300	N	70	N	300	<.02
GS011S	20	N	700	N	300	N	30	N	150	.04
GS012S	30	N	700	N	700	N	30	200	150	<.02
GS013S	30	N	500	N	500	N	30	N	100	.02
GS014S	7	N	>5,000	N	70	N	10	N	50	.18
GS015S	30	N	300	N	500	N	20	N	70	3.20
GS016S	30	N	500	N	500	N	20	N	70	.42
GS017S	<5	N	<100	N	500	20	<10	N	15	8.40
GS018S	30	N	700	N	700	N	30	N	100	.26
GS019S	20	N	500	N	300	N	30	N	150	.17
GS020S	15	N	500	N	200	N	70	N	200	.08
GS021S	15	N	300	N	200	N	70	N	300	.02
GS022S	15	N	300	N	300	N	50	N	200	.04
GS023S	15	N	300	N	200	N	70	N	300	.02
GS024S	15	N	700	N	300	N	70	N	300	.04
GS025S	15	N	300	N	150	N	70	N	300	.24
GS026S	15	N	300	N	150	N	70	N	300	.02
GS028S	15	N	300	N	200	N	70	N	200	<.02
GS029S	15	N	500	N	200	N	70	N	200	.04
GS030S	15	N	300	N	150	N	70	N	200	.02
GS031S	30	N	500	N	700	N	30	200	100	1.44
GS032S	15	N	300	N	300	N	30	N	200	<.02
GS033S	15	N	300	N	150	N	30	N	150	.02
GS034S	15	N	300	N	150	N	30	N	150	.02
GS035S	20	N	300	N	200	N	30	N	200	.02
GS036S	30	N	300	N	300	N	50	N	200	<.02
GS037S	20	N	300	N	300	N	50	N	200	.02
GS038S	15	N	300	N	300	N	30	N	150	<.02
GS039S	20	N	300	N	300	N	50	N	200	<.02
GS040S	15	N	300	N	200	N	30	N	200	<.02
GS041S	15	N	300	N	150	N	30	N	200	<.02
GS043S	15	N	200	N	200	N	50	N	200	.02
GS044S	15	N	300	N	200	N	50	N	200	.04
GS045S	15	N	300	N	150	N	70	N	200	.04

Table 3. Results Of Analyses Of Stream-Sediment Samples From The Gold Creek and Sperry Creek Wilderness Study Areas, Malheur County, Oregon.--Continued

Sample	Au-ppm faa	Ag-ppm icp	As-ppm icp	Au-ppm icp	Bi-ppm icp	Cd-ppm icp	Cu-ppm icp	Mo-ppm icp	Pb-ppm icp	Sb-ppm icp	Zn-ppm icp	U-ppm f
GS001S	N	N	3.3	N	N	.210	42	1.70	6.6	N	130	.55
GS002S	N	N	2.2	N	N	.170	56	1.00	7.2	2.0	110	.60
GS004S	N	N	N	N	N	N	98	.27	1.2	N	82	.20
GS005S	N	N	N	N	N	N	98	.24	1.4	N	78	.20
GS006S	N	N	N	N	N	.086	55	.56	3.4	N	81	.60
GS007S	N	N	1.4	N	N	.097	79	.59	3.3	N	86	.40
GS008S	N	N	1.3	N	N	.150	64	.78	5.8	1.4	86	.35
GS009S	N	N	N	N	N	.100	73	.59	3.9	N	92	.30
GS010S	N	N	1.8	N	N	.240	27	1.40	9.5	N	110	.70
GS011S	N	N	3.4	N	N	.240	32	.78	10.0	N	79	.35
GS012S	N	N	2.1	N	N	.110	89	.72	3.9	N	100	.30
GS013S	N	N	12.0	N	N	.110	100	.62	3.3	1.3	89	.35
GS014S	N	N	300.0	N	N	.091	12	3.50	2.8	7.7	12	.15
GS015S	N	N	15.0	N	N	.082	130	1.40	1.6	5.3	120	.25
GS016S	N	N	4.5	N	N	.058	110	.86	1.9	2.0	82	.20
GS017S	N	.970	63.0	N	N	.053	11	240.00	3.7	59.0	12	.20
GS018S	N	N	1.0	N	N	.090	94	.75	3.2	1.1	92	.35
GS019S	.090	N	8.0	N	N	.100	53	.59	4.6	1.0	74	.60
GS020S	.006	N	15.0	N	N	.630	31	1.20	12.0	N	100	1.10
GS021S	N	N	8.3	N	N	.340	17	1.80	9.1	1.5	120	.65
GS022S	N	N	6.8	N	N	.410	24	1.10	10.0	N	99	.55
GS023S	N	N	8.4	N	N	.320	16	1.30	8.1	1.0	97	.75
GS024S	N	N	14.0	N	N	.380	22	1.10	11.0	N	110	.95
GS025S	N	N	9.2	N	N	.410	20	1.80	11.0	N	130	1.10
GS026S	N	N	3.7	N	N	.400	16	1.10	10.0	N	87	.95
GS028S	N	N	2.2	N	N	.410	21	1.40	12.0	N	110	1.10
GS029S	N	N	1.8	N	N	.410	22	1.00	11.0	N	80	1.10
GS030S	N	N	2.2	N	N	.360	33	2.20	12.0	N	140	1.10
GS031S	N	N	18.0	N	N	.100	95	.81	3.7	2.3	130	.50
GS032S	N	N	2.5	N	N	.230	25	.84	9.8	N	69	1.30
GS033S	N	N	2.3	N	N	.320	33	1.40	11.0	N	100	1.60
GS034S	N	N	2.8	N	N	.230	44	.64	11.0	N	44	1.50
GS035S	N	N	1.9	N	N	.230	51	.85	8.4	N	84	1.00
GS036S	N	N	4.5	N	N	.350	32	1.40	9.5	N	120	1.00
GS037S	N	N	2.7	N	N	.300	32	1.20	8.4	N	100	1.30
GS038S	N	N	1.1	N	N	.210	33	.79	9.5	N	87	.70
GS039S	N	N	N	N	N	.270	48	2.10	8.8	N	150	1.10
GS040S	N	N	N	N	N	.220	32	.75	9.5	N	78	1.10
GS041S	N	N	1.5	N	N	.240	28	.92	10.0	N	84	1.30
GS043S	N	N	2.3	N	N	.370	32	1.20	9.3	N	100	1.90
GS044S	N	.053	3.1	N	N	.240	31	1.40	8.2	N	110	--
GS045S	N	N	3.1	N	N	.240	38	1.50	7.8	N	120	--

Table 4. Results Of Analyses Of Heavy-Mineral-Concentrate Samples From The Gold Creek And Sperry Creek Wilderness Study Areas, Malheur County, Oregon.

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

Sample	Latitude	Longitude	Ca %s	Fe %s	Mg %s	Na %s	P %s	Ti %s	Ag ppm-s
GS001C	43 45 24	117 49 16	7	5	3.0	1.0	2.0	.7	100
GS002C	43 45 35	117 49 10	10	7	3.0	.7	7.0	.7	N
GS004C	43 45 49	117 48 46	10	7	5.0	1.0	1.5	.5	N
GS005C	43 45 56	117 48 32	7	10	3.0	1.5	.5	2.0	N
GS006C	43 45 52	117 48 26	7	3	1.0	1.0	5.0	.7	N
GS007C	43 46 22	117 48 13	15	10	7.0	1.0	<.5	1.5	N
GS009C	43 47 42	117 51 34	20	10	7.0	2.0	.7	1.5	N
GS010C	43 47 10	117 51 10	20	15	3.0	.7	7.0	1.5	N
GS011C	43 47 11	117 51 8	20	15	5.0	1.0	5.0	2.0	N
GS012C	43 47 8	117 50 32	20	7	5.0	1.5	1.5	1.5	N
GS014C	43 46 37	117 48 55	>50	15	1.5	<1.0	1.5	1.0	10
GS015C	43 46 38	117 49 8	15	7	7.0	.7	<.5	1.0	N
GS016C	43 46 35	117 48 40	15	10	7.0	.7	<.5	1.5	N
GS018C	43 45 43	117 47 13	15	7	5.0	1.0	1.0	1.5	N
GS019C	43 45 50	117 46 37	15	7	5.0	1.5	1.0	1.5	N
GS020C	43 45 35	117 45 16	15	7	1.0	.5	10.0	1.0	5
GS021C	43 45 32	117 45 14	7	7	1.5	.5	5.0	1.0	N
GS022C	43 46 10	117 45 12	10	15	2.0	<1.0	5.0	1.5	N
GS023C	43 46 9	117 45 18	20	7	2.0	.7	10.0	1.0	N
GS024C	43 46 37	117 45 2	15	15	3.0	.5	7.0	1.5	N
GS025C	43 44 51	117 46 4	3	20	3.0	.5	1.5	2.0	N
GS026C	43 44 50	117 45 58	5	20	3.0	.7	1.5	2.0	N
GS028C	43 45 52	117 50 33	20	15	3.0	1.5	1.0	1.5	N
GS030C	43 45 56	117 51 42	10	15	7.0	.7	2.0	2.0	N
GS031C	43 46 32	117 48 24	20	10	7.0	1.0	1.5	1.5	N
GS032C	43 46 32	117 54 30	20	7	2.0	.7	5.0	2.0	N
GS033C	43 44 43	117 53 31	20	10	7.0	1.0	3.0	1.5	N
GS034C	43 44 0	117 51 52	20	7	5.0	1.0	7.0	2.0	N
GS035C	43 42 59	117 48 15	15	10	10.0	1.0	.7	1.0	N
GS036C	43 42 52	117 48 10	10	15	7.0	1.0	1.5	1.0	N
GS037C	43 43 16	117 47 54	10	15	5.0	.7	2.0	1.5	N
GS038C	43 46 36	117 52 58	20	20	5.0	1.0	5.0	1.5	N
GS039C	43 46 34	117 52 54	10	30	5.0	1.0	1.5	1.5	N
GS040C	43 46 45	117 52 50	20	10	7.0	1.0	10.0	2.0	N
GS043C	43 44 30	117 49 27	15	15	7.0	1.0	1.0	1.5	N
GS044C	43 57 4	117 53 0	10	7	1.5	<.5	5.0	.3	N
GS045C	43 45 46	117 52 47	5	15	3.0	<1.0	1.0	1.5	N



Table 4. Results Of Analyses Of Heavy-Mineral-Concentrate Samples From The Gold Creek And Sperry Creek Wilderness Study Areas, Malheur County, Oregon.--Continued

Sample	As ppm-s	Au ppm-s	B ppm-s	Ba ppm-s	Be ppm-s	Bi ppm-s	Cd ppm-s	Co ppm-s	Cr ppm-s
GS001C	N	N	N	2,000	20	N	N	20	150
GS002C	2,000	N	30	300	20	N	N	50	200
GS004C	N	N	N	500	N	N	N	<50	300
GS005C	N	N	700	300	N	N	N	30	500
GS006C	N	N	N	2,000	10	N	N	N	150
GS007C	N	N	N	2,000	3	N	N	50	1,000
GS009C	N	N	N	300	N	N	N	50	1,000
GS010C	N	N	N	7,000	15	N	N	20	100
GS011C	N	N	N	1,500	3	N	N	50	300
GS012C	N	N	N	3,000	3	N	N	30	700
GS014C	N	N	N	150	5	N	100	<50	150
GS015C	N	N	N	>10,000	N	N	N	50	1,000
GS016C	N	N	N	3,000	N	N	N	50	1,500
GS018C	N	N	20	150	N	N	N	30	700
GS019C	N	N	N	300	N	N	N	50	700
GS020C	N	N	N	700	50	N	N	<20	100
GS021C	N	N	N	2,000	30	N	N	20	150
GS022C	N	N	N	2,000	15	N	N	<50	150
GS023C	N	N	N	1,000	20	N	N	20	500
GS024C	N	N	N	1,500	20	N	N	30	500
GS025C	N	N	N	5,000	30	N	N	50	150
GS026C	N	N	N	3,000	15	N	N	30	500
GS028C	N	N	N	700	7	N	N	30	100
GS030C	N	N	N	700	10	N	N	70	200
GS031C	N	N	N	150	N	N	N	50	1,500
GS032C	N	N	20	300	3	N	N	20	700
GS033C	N	N	N	300	2	N	N	70	700
GS034C	N	N	N	300	3	N	N	50	700
GS035C	N	N	20	700	3	N	N	70	500
GS036C	N	N	20	5,000	7	N	N	70	300
GS037C	N	N	N	10,000	20	N	N	70	200
GS038C	N	N	N	1,500	3	N	N	50	300
GS039C	N	N	N	3,000	7	N	N	70	150
GS040C	N	N	100	700	5	N	N	50	200
GS043C	N	N	N	1,500	7	N	N	70	200
GS044C	N	N	N	300	5	N	N	<20	150
GS045C	N	N	N	2,000	10	N	N	20	100

Table 4. Results Of Analyses Of Heavy-Mineral-Concentrate Samples From The Gold Creek And Sperry Creek Wilderness Study Areas, Malheur County, Oregon.--Continued

Sample	Cu ppm-s	Ga ppm-s	Ge ppm-s	La ppm-s	Mn ppm-s	Mo ppm-s	Nb ppm-s	Ni ppm-s	Pb ppm-s	Sb ppm-s
GS001C	70	<10	N	150	1,500	N	<50	70	2,000	N
GS002C	30	<10	N	150	2,000	N	<50	70	N	N
GS004C	200	N	N	N	2,000	N	<100	30	N	N
GS005C	70	15	N	N	2,000	<10	50	50	10,000	300
GS006C	15	<10	N	1,500	1,000	N	<50	20	7,000	300
GS007C	100	10	N	N	3,000	N	<50	150	30	N
GS009C	50	20	N	N	5,000	N	<50	100	<20	N
GS010C	50	10	N	150	10,000	N	<50	100	700	N
GS011C	70	15	N	150	7,000	N	<50	100	1,500	N
GS012C	100	15	N	N	2,000	N	<50	70	1,500	N
GS014C	150	N	N	N	700	20	<100	30	N	<500
GS015C	100	<10	N	N	3,000	300	<50	100	30	3,000
GS016C	70	<10	N	N	3,000	300	<50	100	N	N
GS018C	50	<10	N	N	2,000	N	<50	70	700	N
GS019C	70	10	N	N	2,000	N	<50	70	<20	N
GS020C	50	N	N	200	3,000	3,000	<50	20	50	N
GS021C	20	N	N	300	7,000	700	50	30	N	N
GS022C	100	N	N	200	7,000	20	<100	50	5,000	N
GS023C	20	<10	N	700	5,000	N	<50	30	1,500	N
GS024C	70	10	N	300	7,000	N	<50	50	30	N
GS025C	70	10	N	150	>10,000	N	70	150	30	N
GS026C	30	10	N	200	>10,000	N	50	70	50	N
GS028C	15	<10	N	300	5,000	N	<50	100	<20	N
GS030C	50	10	N	150	7,000	N	50	500	50	N
GS031C	50	10	N	N	2,000	N	<50	100	N	N
GS032C	15	10	N	300	2,000	N	<50	50	N	N
GS033C	50	10	N	100	3,000	N	<50	300	20	N
GS034C	30	10	N	150	3,000	N	<50	150	20	N
GS035C	50	<10	N	N	5,000	N	<50	300	30	N
GS036C	50	10	N	150	>10,000	N	<50	500	100	N
GS037C	70	10	N	200	>10,000	N	<50	200	30	N
GS038C	70	15	N	200	7,000	N	<50	100	20	N
GS039C	70	15	N	200	>10,000	N	50	150	30	N
GS040C	70	10	N	300	5,000	N	<50	100	700	N
GS043C	70	<10	N	150	7,000	N	<50	300	20	N
GS044C	20	N	N	150	10,000	N	<50	50	N	N
GS045C	50	N	N	N	>10,000	N	<100	150	N	N

Table 4. Results Of Analyses Of Heavy-Mineral-Concentrate Samples From The Gold Creek And Sperry Creek Wilderness Study Areas, Malheur County, Oregon.--Continued

Sample	Sc ppm-s	Sn ppm-s	Sr ppm-s	Th ppm-s	V ppm-s	W ppm-s	Y ppm-s	Zn ppm-s	Zr ppm-s
GS001C	100	100	<200	<200	150	N	700	N	>2,000
GS002C	70	150	<200	N	150	N	700	N	>2,000
GS004C	70	N	N	N	150	N	100	N	>2,000
GS005C	70	N	300	N	700	N	200	N	>2,000
GS006C	150	700	200	<200	150	N	700	N	>2,000
GS007C	100	N	<200	N	700	N	200	N	>2,000
GS009C	100	N	300	N	700	N	200	N	>2,000
GS010C	70	1,500	200	N	150	N	700	N	>2,000
GS011C	70	20	300	N	500	N	300	N	>2,000
GS012C	100	N	300	N	500	N	300	N	>2,000
GS014C	30	N	N	N	300	100	200	N	700
GS015C	100	N	500	N	700	N	50	500	>2,000
GS016C	150	N	<200	N	700	N	70	N	>2,000
GS018C	100	700	N	N	500	N	300	N	>2,000
GS019C	100	100	<200	N	700	N	150	N	>2,000
GS020C	150	150	300	300	150	N	1,500	N	>2,000
GS021C	150	1,000	N	300	150	N	1,500	N	>2,000
GS022C	70	N	N	N	300	N	700	N	>2,000
GS023C	100	70	200	200	200	N	1,500	N	>2,000
GS024C	100	50	<200	N	300	N	700	N	>2,000
GS025C	100	1,500	N	N	300	N	700	N	>2,000
GS026C	70	500	N	N	300	N	700	N	>2,000
GS028C	70	100	200	N	300	N	700	N	>2,000
GS030C	100	700	<200	N	300	N	700	N	>2,000
GS031C	150	N	<200	N	700	N	200	N	>2,000
GS032C	70	30	200	N	300	N	500	N	>2,000
GS033C	70	N	200	N	300	N	500	N	>2,000
GS034C	70	100	300	N	300	N	500	N	>2,000
GS035C	100	N	<200	N	500	N	200	N	>2,000
GS036C	100	N	200	N	500	N	300	N	>2,000
GS037C	100	700	<200	N	300	N	700	N	>2,000
GS038C	70	N	200	N	500	N	300	N	>2,000
GS039C	70	100	200	N	500	N	500	N	>2,000
GS040C	70	N	300	N	300	N	500	N	>2,000
GS043C	70	30	<200	N	300	N	500	N	>2,000
GS044C	30	N	N	N	150	N	300	N	>2,000
GS045C	50	700	N	N	300	N	300	N	>2,000

Table 5. Results Of Analyses Of Rock Samples From The Gold Creek And Sperry Creek Wilderness Study Areas, Malheur County, Oregon.

Sample	Latitude	Longitude	Ca %s	Fe %s	Mg %s	Na %s	P %s	Ti %s	Ag ppm-s
GS 001A	43 45 24	117 49 16	<.05	1.50	.02	<.2	N	.002	N
GS 001B	43 45 24	117 49 16	.10	2.00	.05	1.5	N	.070	N
GS 003	43 45 38	117 48 57	.10	1.00	.07	<.2	N	.050	N
GS 004A	43 45 49	117 48 46	7.00	10.00	3.00	1.5	N	1.000	N
GS 004B	43 45 49	117 48 46	7.00	10.00	3.00	1.5	<.2	>1.000	N
GS 005	43 45 56	117 48 32	7.00	10.00	3.00	1.5	N	>1.000	N
GS 006	43 45 52	117 48 26	>20.00	2.00	.50	<.2	N	.015	N
GS 009	43 47 42	117 51 34	.20	2.00	.10	3.0	N	.100	N
GS 010	43 47 10	117 51 10	.15	3.00	.10	3.0	N	.100	N
GS 013	43 47 0	117 50 10	.50	7.00	.10	3.0	N	.300	N
GS 014A	43 46 37	117 48 55	20.00	7.00	1.00	1.0	N	.500	N
GS 014B	43 46 37	117 48 55	.30	1.50	.20	<.2	N	.070	N
GS 014E	43 46 51	117 48 55	>20.00	3.00	1.00	.3	N	.003	N
GS 014D	43 46 37	117 48 55	>20.00	3.00	1.00	1.5	N	.100	N
GS 015A	43 46 38	117 49 8	.50	.70	.30	<.2	N	.100	N
GS 015B	43 46 38	117 49 8	15.00	5.00	3.00	1.5	N	.700	N
GS 015E	43 46 38	117 49 8	7.00	15.00	3.00	2.0	.2	>1.000	N
GS 016	43 46 35	117 48 40	.10	.50	.10	<.2	N	.030	3.0
GS 017A	43 46 23	117 48 53	10.00	10.00	3.00	1.5	<.2	>1.000	N
GS 017B	43 46 23	117 48 53	.15	.20	.07	<.2	N	.015	3.0
GS 018A	43 45 43	117 47 13	7.00	10.00	3.00	1.5	<.2	>1.000	N
GS 018B	43 45 43	117 47 13	.15	5.00	.10	1.5	N	.150	N
GS 019	43 45 50	117 46 37	7.00	15.00	3.00	2.0	.2	>1.000	N
GS 020	43 45 35	117 45 16	.50	3.00	.10	3.0	N	.300	N
GS 022	43 46 10	117 45 12	.50	3.00	.10	3.0	N	.200	N
GS 023A	43 46 9	117 45 18	1.00	3.00	.70	1.5	N	.300	N
GS 023B	43 46 9	117 45 18	.07	1.50	.07	<.2	N	.015	N
GS 025	43 44 51	117 46 4	.70	7.00	.15	3.0	N	.300	N
GS 026	43 44 50	117 45 58	.15	7.00	.20	.2	N	.030	N
GS 027	43 44 44	117 45 42	1.00	3.00	1.00	.3	N	.300	N
GS 030A	43 45 56	117 51 42	5.00	10.00	2.00	2.0	N	1.000	N
GS 030B	43 45 56	117 51 42	.70	3.00	.50	3.0	N	.150	N
GS 032	43 46 32	117 54 30	5.00	10.00	2.00	1.5	.2	>1.000	N
GS 033	43 44 43	117 53 31	5.00	15.00	2.00	2.0	.2	>1.000	N
GS 035	43 42 59	117 48 15	5.00	10.00	2.00	2.0	.2	>1.000	N
GS 038	43 46 36	117 52 58	5.00	10.00	2.00	2.0	.2	>1.000	N
GS 042	43 57 27	117 52 59	.15	2.00	.10	2.0	N	.100	N
G1C	43 46 37	117 45 7	.20	2.00	.30	2.0	N	.200	N
G2	43 45 57	117 49 13	.05	2.00	.10	N	N	.030	N
G7B	43 44 18	117 48 10	.05	1.50	.05	3.0	N	.150	N
G10	43 44 9	117 48 35	<.05	2.00	.07	N	N	<.002	N
G11	43 44 14	117 48 29	N	1.50	.02	N	N	<.002	N
G12	43 44 18	117 48 28	.05	5.00	.10	N	N	<.002	N
G13	43 44 23	117 48 27	N	1.00	<.02	N	N	N	N
G15	43 46 11	117 48 14	<.05	.70	.03	N	N	<.002	N

Table 5. Results Of Analyses Of Rock Samples From The Gold Creek And Sperry Creek Wilderness Study Areas, Malheur County, Oregon.--Continued

Sample	As ppm-s	Au ppm-s	B ppm-s	Ba ppm-s	Be ppm-s	Bi ppm-s	Cd ppm-s	Co ppm-s	Cr ppm-s	Cu ppm-s
GS 001A	N	N	10	300	2.0	N	N	N	<10	5
GS 001B	N	N	10	700	1.5	N	N	N	<10	<5
GS 003	N	N	<10	50	1.5	N	N	N	<10	<5
GS 004A	N	N	N	300	<1.0	N	N	50	200	70
GS 004B	N	N	N	500	1.0	N	N	50	150	70
GS 005	N	N	N	500	1.0	N	N	50	150	100
GS 006	N	N	N	N	N	N	N	N	<10	<5
GS 009	N	N	<10	1,500	2.0	N	N	N	<10	5
GS 010	N	N	<10	1,500	2.0	N	N	N	<10	<5
GS 013	N	N	N	3,000	3.0	N	N	N	<10	<5
GS 014A	7,000	N	30	300	10.0	N	N	15	50	50
GS 014B	<200	N	15	200	1.0	N	N	<10	<10	15
GS 014E	3,000	N	10	300	7.0	N	N	N	<10	<5
GS 014D	1,500	N	500	200	3.0	N	N	<10	30	15
GS 015A	N	N	10	150	N	N	N	<10	<10	15
GS 015B	N	N	N	300	N	N	N	30	150	70
GS 015E	N	N	N	700	1.5	N	N	70	70	100
GS 016	N	N	15	150	1.0	N	N	N	<10	10
GS 017A	N	N	N	300	N	N	N	70	200	70
GS 017B	N	N	15	300	1.5	N	N	N	<10	5
GS 018A	N	N	N	500	1.0	N	N	70	200	70
GS 018B	N	N	10	1,000	5.0	N	N	N	<10	5
GS 019	N	N	N	700	1.5	N	N	70	15	70
GS 020	N	N	N	3,000	3.0	N	N	N	<10	<5
GS 022	N	N	N	1,500	3.0	N	N	N	<10	<5
GS 023A	N	N	15	700	2.0	N	N	15	20	20
GS 023B	N	N	10	300	3.0	N	N	N	<10	<5
GS 025	N	N	N	2,000	3.0	N	N	N	<10	<5
GS 026	N	N	10	700	5.0	N	N	N	<10	<5
GS 027	N	N	20	70	1.0	N	N	<10	15	20
GS 030A	N	N	N	1,000	1.5	N	N	50	30	30
GS 030B	N	N	15	1,500	3.0	N	N	N	<10	<5
GS 032	N	N	N	700	1.5	N	N	70	20	15
GS 033	N	N	N	1,000	1.5	N	N	70	15	10
GS 035	N	N	N	700	1.5	N	N	70	10	7
GS 038	N	N	N	700	1.5	N	N	70	<10	30
GS 042	N	N	<10	1,500	1.5	N	N	N	<10	<5
G1C	N	N	<10	2,000	1.5	N	N	N	N	N
G2	N	N	10	N	1.0	N	N	<10	N	10
G7B	N	N	N	1,000	<1.0	N	N	N	N	<5
G10	N	N	<10	30	2.0	N	N	N	N	N
G11	N	N	10	N	N	N	N	N	N	<5
G12	N	N	<10	100	3.0	N	N	N	N	5
G13	N	N	N	N	7.0	N	N	N	N	N
G15	N	N	N	100	5.0	N	N	N	N	<5

Table 5. Results Of Analyses Of Rock Samples From The Gold Creek And Sperry Creek Wilderness Study Areas, Malheur County, Oregon.--Continued

Sample	Ga ppm-s	Ge ppm-s	La ppm-s	Mn ppm-s	Mo ppm-s	Nb ppm-s	Ni ppm-s	Pb ppm-s	Sb ppm-s
GS 001A	N	N	70	3,000	N	N	<5	N	N
GS 001B	7	<10	50	500	N	<20	<5	15	N
GS 003	N	N	N	70	N	<20	<5	N	100
GS 004A	20	N	N	1,500	N	<20	70	N	N
GS 004B	20	N	N	2,000	N	<20	50	N	N
GS 005	30	N	N	1,500	N	<20	70	N	N
GS 006	N	N	N	>5,000	N	N	5	N	N
GS 009	30	N	50	500	N	<20	<5	15	N
GS 010	20	N	50	150	N	<20	<5	15	N
GS 013	30	N	70	3,000	<5	20	<5	20	N
GS 014A	15	30	N	1,500	<5	<20	20	N	200
GS 014B	<5	N	N	150	70	<20	10	N	<100
GS 014E	N	10	N	2,000	N	N	<5	N	<100
GS 014D	<5	10	N	1,000	7	N	10	N	300
GS 015A	<5	N	N	70	N	N	7	N	<100
GS 015B	15	N	N	3,000	N	<20	50	N	N
GS 015E	30	N	N	2,000	N	<20	50	<10	N
GS 016	<5	N	N	50	500	N	<5	N	100
GS 017A	20	N	N	1,000	7	<20	70	N	N
GS 017B	<5	N	N	70	1,000	N	<5	N	100
GS 018A	30	N	N	1,500	7	<20	70	<10	N
GS 018B	10	N	<50	1,000	N	<20	<5	10	<100
GS 019	20	N	N	1,500	N	<20	30	<10	N
GS 020	30	N	70	150	<5	30	<5	15	N
GS 022	30	N	50	700	N	20	<5	15	N
GS 023A	15	N	N	300	N	<20	20	10	N
GS 023B	<5	N	N	700	N	<20	<5	N	N
GS 025	20	N	70	1,000	5	30	<5	15	N
GS 026	<5	N	N	3,000	N	<20	<5	N	N
GS 027	7	30	N	70	N	<20	30	N	N
GS 030A	20	N	50	1,500	N	<20	70	15	N
GS 030B	30	N	70	300	7	20	<5	20	N
GS 032	30	N	50	2,000	N	<20	15	10	N
GS 033	30	N	70	2,000	N	<20	10	10	N
GS 035	30	N	50	1,500	N	<20	10	10	N
GS 038	30	N	N	1,500	N	<20	15	10	N
GS 042	15	N	<50	150	<5	<20	<5	10	N
G1C	70	N	50	70	<5	20	N	15	N
G2	N	N	N	10	N	N	7	N	<100
G7B	50	N	N	50	5	<20	N	10	N
G10	N	N	N	150	N	N	<5	N	N
G11	N	N	N	70	N	N	<5	N	N
G12	N	N	N	500	N	N	N	N	N
G13	N	N	N	150	N	N	<5	N	N
G15	5	N	N	50	N	N	N	N	150

Table 5. Results Of Analyses Of Rock Samples From The Gold Creek And Sperry Creek Wilderness Study Areas, Malheur County, Oregon.--Continued

Sample	Sc ppm-s	Sn ppm-s	Sr ppm-s	Th ppm-s	V ppm-s	W ppm-s	Y ppm-s	Zn ppm-s	Zr ppm-s	Hg-ppm aa
GS 001A	N	N	N	N	10	N	15	N	N	.22
GS 001B	N	N	N	N	<10	N	30	N	200	1.80
GS 003	N	N	N	N	20	20	N	N	N	>36.00
GS 004A	30	N	700	N	300	N	30	N	100	.20
GS 004B	30	N	500	N	500	N	30	N	150	.12
GS 005	50	N	500	N	500	N	50	N	200	.08
GS 006	N	N	N	N	15	N	30	N	10	.08
GS 009	5	N	<100	N	50	N	70	N	700	.40
GS 010	<5	N	<100	N	20	N	50	N	700	.14
GS 013	7	N	200	N	30	N	70	N	700	.10
GS 014A	15	N	1,500	N	100	50	15	N	70	>36.00
GS 014B	<5	N	N	N	70	20	N	N	15	2.40
GS 014E	N	N	>5,000	N	N	N	N	N	<10	.80
GS 014D	7	N	5,000	N	70	N	10	N	30	5.20
GS 015A	7	N	<100	N	20	N	10	N	15	1.80
GS 015B	20	N	1,500	N	200	N	15	N	70	.28
GS 015E	30	N	700	N	500	N	50	N	200	.14
GS 016	N	N	N	N	30	N	N	N	N	1.36
GS 017A	50	N	700	N	500	N	50	N	150	.52
GS 017B	N	N	N	N	15	N	N	N	N	>36.00
GS 018A	30	N	700	N	500	N	30	N	100	.12
GS 018B	<5	N	N	N	50	20	50	N	300	1.10
GS 019	30	N	700	N	500	N	50	N	200	.06
GS 020	7	N	150	N	N	N	70	N	700	.10
GS 022	5	10	100	N	<10	N	70	N	700	.16
GS 023A	7	N	150	N	70	N	50	N	300	.60
GS 023B	N	N	N	N	10	N	15	N	70	.12
GS 025	7	N	200	N	N	N	70	N	700	.32
GS 026	N	N	N	N	70	N	20	N	70	.12
GS 027	7	N	N	N	200	N	15	N	100	.06
GS 030A	30	N	300	N	300	N	50	N	300	N
GS 030B	5	N	<100	N	20	N	70	N	500	.02
GS 032	30	N	700	N	700	N	50	N	200	.06
GS 033	30	N	700	N	700	N	50	N	200	.04
GS 035	30	N	500	N	700	N	50	N	200	.12
GS 038	30	N	700	N	500	N	30	N	200	.04
GS 042	<5	N	N	N	10	N	70	N	300	.04
G1C	<5	N	<100	N	20	N	30	N	200	.02
G2	N	N	N	N	30	<20	N	N	N	2.70
G7B	N	N	N	N	50	N	N	N	100	.04
G10	N	N	N	N	70	N	N	N	N	.02
G11	N	N	N	N	50	N	N	N	N	N
G12	N	N	N	N	100	N	N	<200	N	.02
G13	N	N	N	N	N	N	N	N	N	N
G15	N	N	N	N	20	<20	N	N	N	8.10

Table 5. Results Of Analyses Of Rock Samples From The Gold Creek And Sperry Creek Wilderness Study Areas, Malheur County, Oregon.--Continued

Sample	Au-ppm faa	Au-ppm aa	Ag-ppm icp	As-ppm icp	Au-ppm icp	Bi-ppm icp	Cd-ppm icp	Cu-ppm icp	Mo-ppm icp	Pb-ppm icp	Sb-ppm icp	Zn-ppm icp
GS 001A	.002	--	N	N	N	N	.100	3.10	.60	8.0	N	9.100
GS 001B	N	--	N	73.0	N	N	N	1.20	.72	9.5	18.0	35.000
GS 003	N	--	N	28.0	N	N	N	2.70	N	N	16.0	5.100
GS 004A	.002	--	.075	N	N	N	N	110.00	N	N	1.2	62.000
GS 004B	N	--	N	15.0	N	N	N	130.00	.30	N	N	74.000
GS 005	.002	--	.083	3.7	N	N	N	180.00	.26	N	N	97.000
GS 006	N	--	N	N	N	N	.510	2.20	N	N	N	7.800
GS 009	N	--	N	1.9	N	N	.130	5.20	.63	3.1	1.2	82.000
GS 010	N	--	N	3.3	N	N	.051	1.80	1.40	2.7	1.1	95.000
GS 013	N	--	.051	10.0	N	N	.097	2.90	2.80	3.2	N	120.000
GS 014A	.002	--	.072	>2,000.0	N	N	N	58.00	3.70	1.7	370.0	55.000
GS 014B	.048	--	.150	110.0	N	N	N	11.00	53.00	N	17.0	16.000
GS 014E	.002	--	N	>2,000.0	N	N	N	.77	.42	N	120.0	5.700
GS 014D	N	--	.060	>2,000.0	N	N	N	15.00	7.00	N	520.0	16.000
GS 015A	N	--	.051	48.0	N	N	N	13.00	N	N	2.9	3.100
GS 015B	N	--	.079	10.0	N	N	.170	120.00	.35	N	2.1	61.000
GS 015E	N	--	.077	7.2	N	N	N	140.00	.43	N	1.3	82.000
GS 016	N	--	2.700	25.0	N	N	N	4.60	480.00	N	30.0	2.000
GS 017A	.100	--	.100	N	N	N	N	80.00	2.60	N	4.1	75.000
GS 017B	.006	--	3.600	N	N	N	.071	1.80	790.00	1.3	19.0	.069
GS 018A	.100	--	.120	N	N	N	N	130.00	3.00	N	1.1	93.000
GS 018B	.014	--	.065	110.0	N	N	.190	.57	1.90	4.8	57.0	72.000
GS 019	.002	--	.095	N	N	N	N	99.00	.99	N	1.3	92.000
GS 020	.002	--	.067	N	N	N	.051	.23	2.90	3.8	N	170.000
GS 022	N	--	.093	N	N	N	.095	.11	1.00	2.9	N	95.000
GS 023A	N	--	.065	N	N	N	.150	16.00	.19	3.6	1.4	44.000
GS 023B	N	--	.057	8.2	N	N	.054	.67	.27	N	N	18.000
GS 025	N	--	.092	N	N	N	.180	2.90	2.80	4.0	N	160.000
GS 026	N	--	.060	48.0	N	N	.460	2.60	.88	6.7	1.6	38.000
GS 027	N	--	.088	N	N	N	N	12.00	N	2.5	2.4	48.000
GS 030A	N	--	.073	N	N	N	.059	22.00	1.30	1.8	N	98.000
GS 030B	N	--	.063	N	N	N	N	2.60	.87	2.7	N	74.000
GS 032	N	--	.064	2.4	N	N	N	12.00	.96	N	N	81.000
GS 033	N	--	.068	N	N	N	.130	7.40	.90	1.0	N	85.000
GS 035	N	--	.071	N	N	N	N	5.60	1.10	N	N	100.000
GS 038	N	--	N	N	N	N	N	32.00	.51	N	N	68.000
GS 042	.002	--	N	N	N	N	N	2.90	2.80	1.5	N	95.000
G1C	--	N	--	--	--	--	--	--	--	--	--	--
G2	--	N	--	--	--	--	--	--	--	--	--	--
G7B	--	N	--	--	--	--	--	--	--	--	--	--
G10	--	N	--	--	--	--	--	--	--	--	--	--
G11	--	N	--	--	--	--	--	--	--	--	--	--
G12	--	N	--	--	--	--	--	--	--	--	--	--
G13	--	N	--	--	--	--	--	--	--	--	--	--
G15	--	N	--	--	--	--	--	--	--	--	--	--



Table 5. Results Of Analyses Of Rock Samples From The Gold Creek And Sperry Creek Wilderness Study Areas, Malheur County, Oregon.--Continued

Sample	Latitude	Longitude	Ca %s	Fe %s	Mg %s	Na %s	P %s	Ti %s	Ag ppm-s
G20	43 44 58	117 48 57	1.00	3.00	1.00	1.5	<.2	.300	N
G21	43 44 18	117 48 49	.10	1.00	.02	N	N	.005	N
G22	43 44 17	117 48 47	<.05	5.00	.10	N	N	<.002	N
G23	43 44 23	117 48 51	.20	3.00	.15	3.0	N	.200	N
G24	43 45 1	117 48 32	.05	1.00	.05	N	N	<.002	N
G25	43 45 2	117 48 31	.05	1.00	.03	.7	N	.030	N
G26C	43 46 26	117 48 52	.10	10.00	1.00	N	N	.700	<.5
G27	43 45 58	117 49 22	<.05	3.00	.05	N	N	.020	N
G28	43 45 58	117 49 53	.10	15.00	.15	2.0	N	.200	N
G29	43 45 37	117 51 14	<.05	3.00	.03	N	N	<.002	N
G32B	43 46 2	117 51 46	.05	1.00	.10	3.0	N	.100	N
G33	43 45 49	117 52 1	N	.70	<.02	N	N	N	N
G34	43 45 28	117 45 0	.07	5.00	.05	1.5	N	.100	N
G35	43 45 44	117 44 53	.07	1.50	.02	2.0	N	.150	N
G36	43 46 3	117 44 50	.07	1.50	.20	3.0	N	.100	N
G37	43 46 1	117 44 49	<.05	2.00	.30	N	N	.007	N
G39	43 45 52	117 45 0	.20	3.00	.10	2.0	N	.200	N
G40	43 45 2	117 45 21	.30	2.00	.30	2.0	N	.150	N
G41	43 45 12	117 45 54	.05	2.00	.10	N	N	<.002	<.5
G42	43 43 33	117 46 2	.20	5.00	.50	2.0	N	.200	N
G44	43 42 34	117 47 9	.20	2.00	2.00	1.0	N	.200	N
G46	43 43 57	117 54 1	1.00	10.00	1.00	.7	N	.500	N
G49	43 43 35	117 53 30	N	.70	<.02	N	N	N	N
G26A	43 46 26	117 48 52	<.05	N	<.02	N	N	N	N

Table 5. Results Of Analyses Of Rock Samples From The Gold Creek And Sperry Creek Wilderness Study Areas, Malheur County, Oregon.--Continued

Sample	As ppm-s	Au ppm-s	B ppm-s	Ba ppm-s	Be ppm-s	Bi ppm-s	Cd ppm-s	Co ppm-s	Cr ppm-s	Cu ppm-s
G20	N	N	<10	500	<1.0	N	N	10	N	15
G21	N	N	N	<20	1.0	N	N	N	N	<5
G22	N	N	<10	100	2.0	N	N	N	N	<5
G23	N	N	<10	2,000	1.5	N	N	N	N	<5
G24	<200	N	N	500	1.0	N	N	N	N	N
G25	N	N	N	200	1.0	<10	N	N	N	N
G26C	N	N	<10	200	<1.0	N	N	20	N	50
G27	<200	N	10	<20	3.0	N	N	N	N	7
G28	N	N	N	1,000	10.0	N	N	N	N	5
G29	N	N	<10	100	3.0	N	N	N	N	N
G32B	N	N	<10	1,000	<1.0	N	N	N	N	<5
G33	N	N	N	N	5.0	N	N	N	N	N
G34	N	N	<10	1,500	1.5	N	N	N	N	5
G35	N	N	N	1,000	<1.0	N	N	N	N	N
G36	N	N	N	1,000	<1.0	N	N	N	N	N
G37	N	N	<10	50	<1.0	N	N	N	N	<5
G39	N	N	<10	1,500	1.0	N	N	N	N	5
G40	N	N	<10	2,000	1.0	N	N	N	N	N
G41	N	N	<10	50	<1.0	N	N	N	N	N
G42	N	N	<10	1,500	2.0	N	N	N	N	N
G44	N	N	N	300	N	N	N	20	10	50
G46	N	N	<10	300	<1.0	N	N	30	N	10
G49	N	N	<10	70	N	N	N	N	N	N
G26A	N	N	N	70	N	N	N	N	N	<5

Table 5. Results Of Analyses Of Rock Samples From The Gold Creek And Sperry Creek Wilderness Study Areas, Malheur County, Oregon.--Continued

Sample	Ga ppm-s	Ge ppm-s	La ppm-s	Mn ppm-s	Mo ppm-s	Nb ppm-s	Ni ppm-s	Pb ppm-s	Sb ppm-s
G20	30	N	N	200	N	N	5	10	N
G21	N	N	N	200	N	N	<5	N	N
G22	N	N	N	100	N	N	<5	N	N
G23	70	N	<50	300	N	<20	N	15	N
G24	N	N	N	5,000	N	N	<5	N	N
G25	5	N	N	20	N	N	<5	<10	N
G26C	70	N	N	1,000	200	N	30	N	N
G27	N	<10	N	30	N	N	5	N	200
G28	100	N	N	150	<5	<20	N	10	N
G29	N	N	N	1,000	N	N	<5	N	N
G32B	50	N	<50	30	<5	N	N	10	N
G33	N	N	N	10	N	N	<5	N	N
G34	10	N	N	5,000	<5	<20	N	N	N
G35	30	N	N	70	N	<20	N	<10	N
G36	70	N	N	50	N	N	N	10	N
G37	N	N	N	500	N	N	<5	N	N
G39	50	N	50	100	<5	<20	N	10	N
G40	70	N	<50	500	<5	<20	N	15	N
G41	N	N	N	15	N	N	<5	N	N
G42	70	N	<50	150	N	<20	N	<10	N
G44	5	N	N	200	N	N	70	N	N
G46	30	N	N	1,000	N	N	5	N	N
G49	N	N	N	300	N	N	<5	N	N
G26A	N	N	N	N	N	N	N	N	N

Table 5. Results Of Analyses Of Rock Samples From The Gold Creek And Sperry Creek Wilderness Study Areas, Malheur County, Oregon.--Continued

Sample	Sc ppm-s	Sn ppm-s	Sr ppm-s	Th ppm-s	V ppm-s	W ppm-s	Y ppm-s	Zn ppm-s	Zr ppm-s	Hg-ppm aa
G20	7	N	N	N	30	N	10	N	70	N
G21	N	N	N	N	20	N	N	N	N	.04
G22	N	N	N	N	70	N	N	N	N	.02
G23	<5	N	<100	N	10	N	20	N	200	.02
G24	N	N	N	N	15	N	N	N	N	.04
G25	N	N	N	N	<10	N	N	N	50	N
G26C	15	N	N	N	150	30	<10	<200	70	2.30
G27	N	N	N	N	30	50	N	N	N	4.80
G28	<5	N	N	N	70	N	20	<200	100	.04
G29	N	N	N	N	50	N	N	N	N	N
G32B	N	N	N	N	10	N	15	N	150	N
G33	N	N	N	N	10	N	N	N	N	N
G34	N	N	N	N	30	N	15	N	100	.02
G35	N	N	N	N	<10	N	10	N	100	N
G36	N	N	N	N	15	N	15	N	70	N
G37	N	N	N	N	10	N	N	N	<10	.08
G39	<5	N	<100	N	N	N	30	N	300	N
G40	<5	N	<100	N	150	N	20	N	200	.02
G41	N	N	N	N	<10	N	N	N	N	N
G42	<5	N	<100	N	100	N	30	N	150	N
G44	15	N	100	N	100	N	<10	N	<10	N
G46	10	N	<100	N	150	N	<10	<200	50	.02
G49	N	N	N	N	20	N	N	N	N	N
G26A	N	N	N	N	<10	N	N	N	N	.08

Table 5. Results Of Analyses Of Rock Samples From The Gold Creek And Sperry Creek Wilderness Study Areas, Malheur County, Oregon.--Continued

Sample	Au-ppm faa	Au-ppm aa	Ag-ppm icp	As-ppm icp	Au-ppm icp	Bi-ppm icp	Cd-ppm icp	Cu-ppm icp	Mo-ppm icp	Pb-ppm icp	Sb-ppm icp	Zn-ppm icp
G20	--	N	--	--	--	--	--	--	--	--	--	--
G21	--	N	--	--	--	--	--	--	--	--	--	--
G22	--	N	--	--	--	--	--	--	--	--	--	--
G23	--	N	--	--	--	--	--	--	--	--	--	--
G24	--	N	--	--	--	--	--	--	--	--	--	--
G25	--	N	--	--	--	--	--	--	--	--	--	--
G26C	--	.05	--	--	--	--	--	--	--	--	--	--
G27	--	N	--	--	--	--	--	--	--	--	--	--
G28	--	N	--	--	--	--	--	--	--	--	--	--
G29	--	N	--	--	--	--	--	--	--	--	--	--
G32B	--	N	--	--	--	--	--	--	--	--	--	--
G33	--	N	--	--	--	--	--	--	--	--	--	--
G34	--	N	--	--	--	--	--	--	--	--	--	--
G35	--	N	--	--	--	--	--	--	--	--	--	--
G36	--	N	--	--	--	--	--	--	--	--	--	--
G37	--	N	--	--	--	--	--	--	--	--	--	--
G39	--	N	--	--	--	--	--	--	--	--	--	--
G40	--	N	--	--	--	--	--	--	--	--	--	--
G41	--	N	--	--	--	--	--	--	--	--	--	--
G42	--	N	--	--	--	--	--	--	--	--	--	--
G44	--	N	--	--	--	--	--	--	--	--	--	--
G46	--	N	--	--	--	--	--	--	--	--	--	--
G49	--	N	--	--	--	--	--	--	--	--	--	--
G26A	--	1.30	--	--	--	--	--	--	--	--	--	--

**Table 6. Description of rock samples**

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GS001A	Silicified rock
GS001B	Silicified rock, chalcedony, opal
GS003	Silicified rock, chalcedony, opal
GS004A	Basalt (outcrop)
GS004B	Basalt (outcrop)
GS005	Basalt (outcrop)
GS006	Calcite (veins)
GS009	Iron stained tuff (composite)
GS010	Opal in vesicular tuff
GS013	Yellow coating on andesite
GS014A	Hot spring black mud
GS014B	Quartz vein (float from site GS017)
GS014E	Siliceous sinter
GS014D	Orange scum on surface of hot spring
GS015A	Quartz vein (float probably from vein at site GS017)
GS015B	Calcite veins in basalt
GS015E	Basalt (outcrop)
GS016	Quartz vein cobbles (probably source = vein at site GS017)
GS017A	Basalt in contact with quartz vein
GS017B	Quartz vein (3 ft thick brecciated and recemented)
GS018A	Basalt (outcrop)
GS018B	Jasper (vein float material common on hillside to east)
GS019	Basalt (outcrop sample) along highway east of site GS019)
GS020	Aphanitic volcanic rock
GS022	Opal in andesite breccia
GS023A	Diatomaceous earth (cobbles)
GS023B	Opal and jasper
GS025	Basalt (outcrop)
GS026	Opal in rhyolite breccia
GS027	Diatomaceous earth (outcrop)
GS030A	Basalt and andesite (composite)
GS030B	Tuff (composite)
GS032	Basalt (outcrop)
GS033	Basalt (outcrop)
GS035	Basalt (outcrop)
GS038	Basalt (outcrop)
GS042	Opal in andesite(?)
G-1C	Brecciated quartz vein
G-2	Brown and red welded tuff
G-7B	Rhyolite containing yellow and red oxide and brown, yellow and green opal veins
G-10	Silicified rhyolite
G-11	Silicified rhyolite
G-12	Silicified rhyolite (yellow)
G-13	Purple and gray chalcedony vein
G-15	White quartz containing oxidized basalt fragments
G-20	Red welded tuff
G-21	Siliceous sinter

G-22	Green and brown chalcedony
G-23	Brecciated rhyolite cemented by chalcedony and opal
G-24	Green chalcedonic replacement of rhyolite, cut by black jasper
G-25	Green chalcedony
G-26A	White quartz
G-26C	Black and brown oxide
G-27	Red and yellow welded tuff
G-28	Brown and yellow iron oxide
G-29	Yellow-brown jasper
G-32B	Lithophysal welded tuff
G-33	Yellow-brown jasper
G-34	Brecciated rhyolite cemented by quartz and cut by black and brown oxide veins
G-35	Silicified and quartz veined rhyolite
G-36	Brecciated rhyolite with yellow siliceous cement
G-37	Brown jasper
G-39	Dark gray siliceous sinter containing brown iron oxide
G-40	Brecciated and oxidized rhyolite
G-41	Yellow chalcedony
G-42	Brecciated rhyolite cemented with friable yellow and brown material
G-44	Palagonite breccia
G-46	Friable yellow cement in basalt breccia
G-49	Yellow-brown jasper