

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Analytical results and sample locality map of
stream-sediment and heavy-mineral-concentrate samples
from the Bluebell Wilderness Study Area, Elko County, Nevada

By

C. N. Gerlitz¹, D. E. Detra¹, and J. M. Motooka¹

Open-File Report 87-0088

1987

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.

¹Denver, Colorado

CONTENTS

	Page
Studies related to wilderness.....	1
Introduction.....	1
Methods of study.....	1
Sample media.....	1
Sample collection.....	3
Sample preparation.....	3
Sample analysis.....	4
Inductively coupled plasma-atomic emission spectroscopy.....	4
Direct-current arc emission spectrographic method.....	4
Rock Analysis Storage System.....	4
References cited.....	5

ILLUSTRATIONS

Plate 1. Map showing geochemical sample sites from Bluebell Wilderness Study Area, Elko County, Nevada.....	In pocket
Figure 1. Location map of the Bluebell Wilderness Study Area, Area, Elko County, Nevada.....	2

TABLES

Table 1. Limits of determination for the analysis of minus-80-mesh stream-sediment samples by inductively coupled plasma-atomic emission spectroscopy.....	6
2. Spectrographic results from the analysis of minus-80-mesh stream-sediment samples from the Bluebell Wilderness Study Area, Elko County, Nevada.....	7
3. Limits of determination for the spectrographic analysis of the non-magnetic fraction of heavy-mineral-concentrate samples.....	10
4. Spectrographic results from the analysis of the non-magnetic fraction of heavy-mineral-concentrate samples from the Bluebell Wilderness Study Area, Elko County, Nevada.....	11

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, that may be present. Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a geochemical survey of the Bluebell Wilderness Study Area (NV-010-027), Elko County, Nevada.

INTRODUCTION

In June and July of 1985 the U.S. Geological Survey conducted a reconnaissance geochemical survey of the Bluebell Wilderness Study Area, Elko County, Nevada; this survey was part of an investigation to assess the potential for undiscovered mineral resources. In this report the investigated area is referred to as the "wilderness study area" or simply as the "study area."

The Bluebell Wilderness Study Area comprises 41,324 acres in the southeast corner of Elko County, Nevada, and lies about 7.5 mi (12 km) west of Wendover, Utah (see fig. 1). Access to the study area is provided by dirt roads from U.S. Highway 50, south of Wendover, and from Interstate 80, northeast and north of the study area.

The study area occupies most of the Toano Range, which together with the the Goshute Mountains to the south constitutes a north-trending, uplifted, elongate fault block. Exposed within the study area are a thick sequence of marine Paleozoic rocks ranging in age from Cambrian to Permian, igneous rocks of Tertiary age, and terrestrial sedimentary rocks of Tertiary and Quaternary age. The individual formations have been mapped and described by Day and others (in press).

Topographic relief in the study area is about 3,560 ft (1,085 m), with a maximum elevation of 8,698 ft (2,651 m). The mountainous terrain is cut by intermittent streams and flanked by alluvial fans of Quaternary age. The arid climate is reflected in the vast salt flats that extend eastward from the range.

METHODS OF STUDY

Sample Media

A geochemical survey to evaluate the mineral resource potential of the Bluebell Wilderness Study Area included the collection and analysis of stream-sediment samples in and adjacent to the study area (pl. 1). 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.

Soil samples were collected in the Morgan Pass area at the south end of the study area by H. N. Barton during October of 1984 as a followup to the stream-sediment survey of the Goshute Peak Wilderness Study Area immediately to the south of the Bluebell Wilderness Study Area. These samples, taken from both the Bluebell and the Goshute Peak Wilderness Study Areas, provide

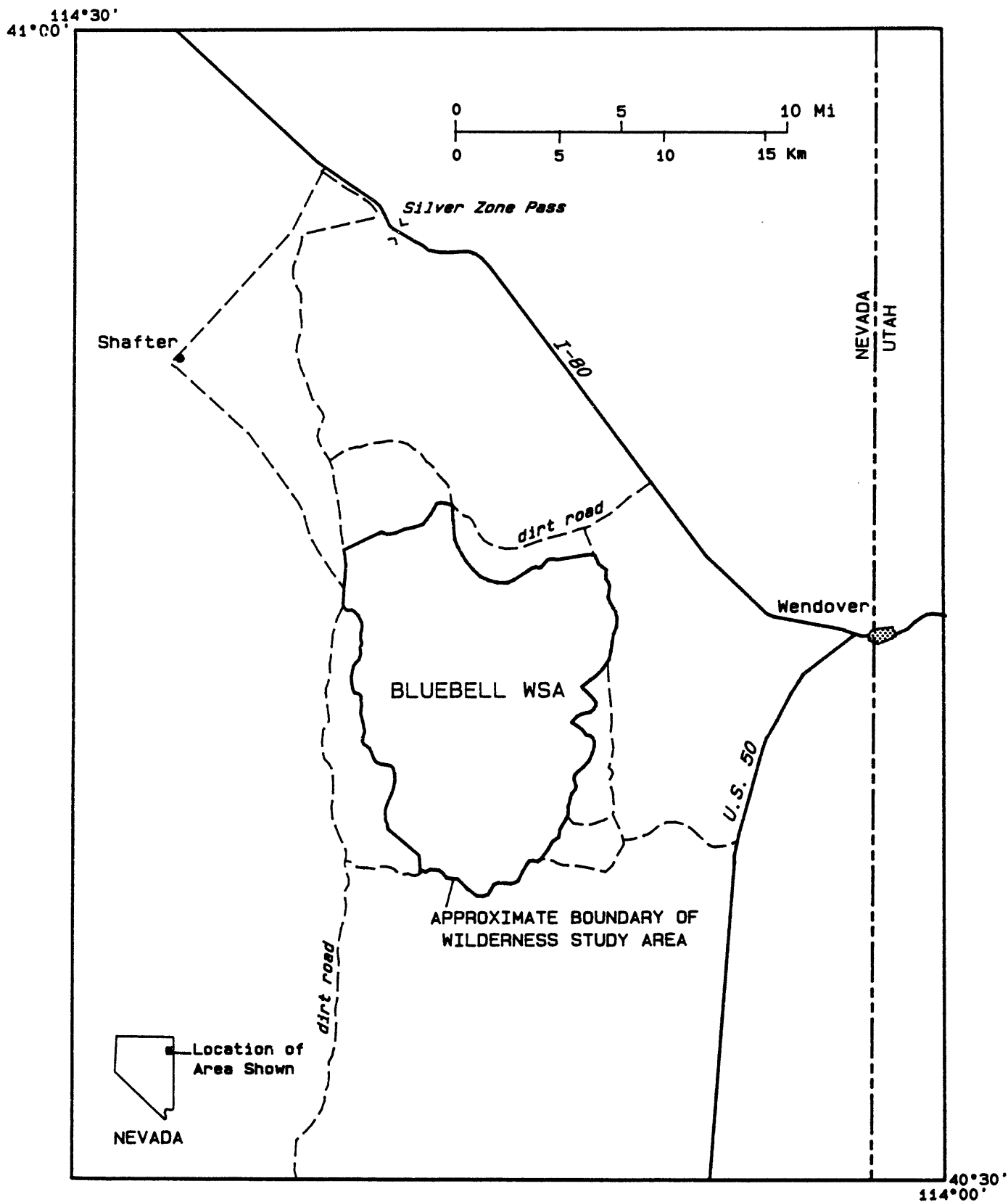


Figure 1. Location map of the Bluebell Wilderness Study Area, Elko County, Nevada.

additional information on concentrations of elements related to mineral deposits. Details on sample preparation and analysis, a listing of the data, and sample site locations are given in Day and Barton (in press).

Sample Collection

One hundred fourteen samples were collected from intermittent streams at 111 sites throughout the study area and the region immediately to the north (pl. 1). Three replicate samples were taken at site number 2. Sample density averaged 1.3 sample sites per square mile, and the areas of the drainage basins sampled ranged from 0.1 mi² to 3 mi².

Most stream-sediment samples were collected from first-order (unbranched) and second-order (below the junction of two first-order) streams. A few samples were collected from third-order (below the junction of two or more second-order) streams as shown on USGS topographic maps (scale = 1:24,000). Each bulk sample represented a composite collection from several localities along the stream bed as much as 200 ft from the site plotted on the map.

At each site, stream sediment was collected for two types of sample. A "fine-grained" sample was collected to analyze for the presence of fine-grained "ore" minerals and metals that may have been absorbed onto clay minerals; the sample was obtained by screening stream sediment with a 2.0-mm (10-mesh) screen to remove the coarse material. A "heavy-mineral-concentrate" sample was collected because the selective concentration of minerals, many of which are ore-related, permits determination of some elements that are not easily detected in fine-grained stream-sediment samples. To obtain the heavy-mineral concentrate sample, stream sediment was collected and screened with a 2.0-mm (10-mesh) screen. The less-than-2.0-mm fraction was then panned until most of the calcite, quartz, feldspar, organic material, and clay-sized material were removed.

Sample Preparation

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

After air drying, the heavy-mineral-concentrate samples were processed through bromoform (specific gravity 2.8) to remove the remaining calcite, quartz, and feldspar. The resultant heavy-mineral sample was separated into three fractions using a large electromagnet (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), including 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. Because 59 samples contained insufficient third fraction for splitting, a cursory mineralogical study of this material was done prior to hand-grinding of the entire nonmagnetic fraction. These magnetic separates are the same separates that would be produced by using a Frantz Isodynamic Separator set at a slope of 15 degrees and a tilt of 10 degrees 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.

Sample Analysis

Inductively coupled plasma-atomic emission spectroscopy

Fine-grained stream-sediment samples (minus-80-mesh fraction) were analyzed by inductively coupled plasma-atomic emission spectroscopy for ten elements (analytical procedure modified from Motooka and others, 1979). These elements and their lower limits of determination are listed in table 1. Analytical data for minus-80-mesh stream-sediment samples from the Bluebell Wilderness Study Area are listed in table 2.

Direct-current arc emission 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). A list of the elements and their lower limits of determination is given in table 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, and titanium) are given in weight percent; all others are given in parts per million (micrograms/gram). Analytical data for heavy-mineral-concentrate samples from the Bluebell Wilderness Study Area are listed in table 4.

Two extremely high analytical values were removed from the data set because of contamination. The very high value for lead (50,000 ppm) found in sample 0023H resulted from a piece of lead shot; when this sample was ground, a dark gray streak was left on the mortar. Sample 0050H, taken from Erickson Canyon, contained >20,000 ppm zinc. None of the zinc values in the other 113 samples were greater than 1,000 ppm, and other samples from Erickson Canyon contained no detectable zinc. This zinc value was therefore assumed to be the result of contamination, probably from galvanized metal associated with the old corral just below this sample site. In the data set that was statistically evaluated and plotted, the 50,000-ppm value for lead was replaced by 70 ppm, and the >20,000-ppm value for zinc was replaced by <500 ppm, which were the means of the heavy-mineral concentrate lead and zinc values for the study area.

ROCK ANALYSIS STORAGE SYSTEM

Upon completion of all analytical work, the analytical results for the heavy-mineral-concentrate samples were entered into a computer-based file called Rock Analysis Storage System (RASS). This data base contains both descriptive geological information and analytical data. This information was then retrieved and converted to a binary form (STATPAC) for computerized statistical analysis and publication (VanTrump and Miesch, 1976). Analytical results for the minus-80-mesh stream-sediment samples were entered directly into STATPAC for statistical analysis.

REFERENCES CITED

- Day, G. W., and Barton, H. N., in press, Geochemical data for the Morgan Pass area, Goshute Peak and Bluebell Wilderness Study Areas, Elko County, Nevada: U.S. Geological Survey Open-File Report 87-0051.
- Day, W. C., Ketner, K. B., Elrick, Maya, and Vaag, M. K., in press, Geologic map of the Bluebell and Goshute Peak Wilderness Study Areas, Elko County, Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-1932, scale 1:50,000.
- Grimes, D. J., and Marranzino, A. P., 1968, Direct-current arc and alternating-current spark emission spectrographic field methods for the semiquantitative analysis of geologic materials: U.S. Geological Survey Circular 591, 6 p.
- Motooka, J. M., and Grimes, D. J., 1976, Analytical precision of one-sixth order semiquantitative spectrographic analyses: U.S. Geological Survey Circular 738, 25 p.
- Motooka, J. M., Mosier, E. L., Sutley, S. J., and Viets, J. G., 1979, Induction-coupled plasma determination of Ag, Au, Bi, Cd, Cu, Pb, and Zn in geologic materials using a selective extraction technique: Applied Spectroscopy, v. 33, p. 456-460.
- VanTrump, George, Jr., and Miesch, A. T., 1976, 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.—Lower limits of determination for the analysis of
minus-80-mesh stream-sediment samples by inductively
coupled plasma-atomic emission spectroscopy.
Results are reported in ppm (parts per million;
micrograms/gram) of solid sample.

Element	Lower determination limit
Silver (Ag)	0.120
Arsenic (As)	2.400
Gold (Au)	0.400
Bismuth (Bi)	0.520
Cadmium (Cd)	0.120
Copper (Cu)	0.080
Molybdenum (Mo)	0.120
Lead (Pb)	1.000
Antimony (Sb)	1.000
Zinc (Zn)	0.120

Table 2.--Spectrographic results from the analysis of minus-80-mesh stream-sediment samples from the Bluebell Wilderness Study Area, Elko County, Nevada. Results are reported in ppm (micrograms/gram of solid sample). [N, not detected.]

Sample	Latitude	Longitude	Ag	As	Au	Bi	Cd	Cu	Mo	Pb	Sb	Zn
0001S	40 40 24N	114 12 54W	N	9.19	N	N	0.42	19.61	0.94	14.28	1.11	70.79
0002S	40 39 55N	114 13 58W	N	16.26	N	N	0.12	14.66	0.86	13.21	1.67	47.80
0003S	40 40 11N	114 14 14W	N	14.63	N	N	0.27	15.44	1.66	13.90	1.20	47.34
0004S	40 40 12N	114 16 11W	N	20.62	N	N	0.28	27.17	0.86	24.60	3.17	70.22
0005S	40 40 17N	114 16 11W	N	18.93	N	N	0.13	18.60	0.74	15.86	2.11	50.41
0006S	40 40 10N	114 16 06W	N	23.15	N	N	0.26	25.35	1.08	21.40	3.32	74.32
0007S	40 40 11N	114 15 28W	0.15	39.90	N	N	0.24	24.68	2.10	19.28	5.93	62.52
0008S	40 50 24N	114 15 40W	N	6.93	N	N	0.24	21.78	1.02	14.28	N	61.87
0009S	40 50 26N	114 15 41W	N	7.58	N	N	0.20	17.76	0.86	13.40	N	57.13
0010S	40 49 20N	114 15 29W	N	5.00	N	N	0.21	20.02	0.72	16.62	1.02	52.18
0011S	40 48 58N	114 15 13W	0.37	4.86	N	N	0.26	22.77	0.80	20.09	N	49.71
0012S	40 48 55N	114 14 17W	N	5.85	N	N	0.13	12.90	0.92	9.38	N	45.38
0013S	40 48 28N	114 13 58W	N	5.04	N	N	N	13.24	0.79	10.46	N	37.04
0014S	40 38 36N	114 20 31W	N	6.08	N	N	0.22	21.98	0.62	15.08	N	53.44
0015S	40 38 14N	114 19 11W	N	10.97	N	N	0.21	25.89	0.82	17.48	1.93	59.04
0016S	40 38 01N	114 18 09W	N	15.14	N	N	0.17	29.46	1.33	20.18	3.31	63.99
0017S	40 38 41N	114 18 47W	N	12.15	N	N	N	23.20	1.08	15.75	1.81	50.33
0018S	40 38 58N	114 17 57W	N	41.94	N	N	0.31	30.60	1.10	24.22	7.10	68.48
0019S	40 38 44N	114 17 52W	N	29.77	N	N	0.37	30.21	1.89	25.71	5.91	77.41
0020S	40 38 31N	114 18 58W	N	9.68	N	N	N	22.89	1.54	15.94	1.12	54.92
0021S	40 37 32N	114 15 50W	0.24	5.64	N	N	N	6.08	0.53	10.46	N	21.73
0022S	40 37 17N	114 16 19W	N	13.14	N	N	N	14.76	0.86	12.98	2.31	38.78
0023S	40 38 40N	114 15 53W	N	4.88	N	N	0.64	21.18	1.47	17.52	N	82.51
0024S	40 38 05N	114 15 28W	N	7.90	N	N	0.18	19.11	0.96	14.74	1.79	66.65
0025S	40 37 59N	114 15 37W	N	5.39	N	N	N	17.40	1.35	18.99	1.12	65.11
0026S	40 37 56N	114 15 25W	N	6.10	N	N	0.36	27.08	1.00	22.40	1.23	78.87
0027S	40 37 53N	114 15 11W	N	5.02	N	N	0.18	19.68	1.26	16.78	N	56.67
0028S	40 42 22N	114 16 02W	N	7.38	N	N	1.00	25.09	1.00	23.46	N	91.22
0029S	40 42 18N	114 16 09W	N	9.31	N	N	1.04	19.29	1.20	16.80	1.05	96.31
0030S	40 42 24N	114 16 11W	N	7.64	N	N	0.82	22.43	1.62	19.36	N	88.46
0031S	40 42 40N	114 15 52W	N	9.12	N	N	0.68	19.04	1.07	13.73	N	67.01
0032S	40 43 09N	114 15 36W	N	7.06	N	N	0.50	17.31	0.80	14.10	N	69.30
0033S	40 43 01N	114 16 33W	N	12.29	N	N	0.67	16.91	1.24	16.20	1.39	64.26
0034S	40 43 31N	114 16 08W	N	6.72	N	N	0.81	19.45	1.20	17.60	N	71.91
0035S	40 43 31N	114 15 56W	N	6.72	N	N	0.59	21.32	1.16	19.54	N	70.00
0036S	40 42 27N	114 14 48W	N	5.49	N	N	0.25	17.80	0.99	14.62	N	57.62
0037S	40 42 19N	114 14 02W	N	8.63	N	N	0.50	16.68	1.51	10.88	N	65.62
0038S	40 42 08N	114 13 56W	N	5.36	N	N	0.18	15.26	0.87	11.73	N	46.15
0039S	40 42 02N	114 14 00W	N	7.52	N	N	0.27	13.22	1.58	10.92	1.39	43.38
0040S	40 50 28N	114 18 53W	N	7.67	N	N	0.30	19.61	0.80	14.72	N	68.14

Table 2.--Spectrographic results from the analysis of minus-80-mesh stream-sediment samples from the Bluebell Wilderness Study Area, Elko County, Nevada.--continued

Sample	Latitude	Longitude	Ag	As	Au	Bi	Cd	Cu	Mo	Pb	Sb	Zn
0041S	40 50 27N	114 18 20W	N	6.81	N	N	0.29	15.35	0.65	13.14	N	54.85
0042S	40 50 22N	114 18 18W	N	8.77	N	N	0.21	21.69	0.74	18.38	N	62.56
0043S	40 50 18N	114 18 30W	N	5.73	N	N	0.31	26.20	0.86	22.29	N	65.10
0044S	40 49 20N	114 18 50W	N	6.81	N	N	0.22	20.65	0.80	16.71	N	52.71
0045S	40 49 08N	114 18 23W	N	4.69	N	N	0.22	23.49	0.82	19.27	N	48.58
0046S	40 48 50N	114 18 07W	N	7.20	N	N	0.54	23.01	3.10	18.23	N	62.45
0047S	40 48 34N	114 17 42W	N	5.56	N	N	0.47	21.13	1.21	16.77	N	75.09
0048S	40 48 39N	114 17 40W	N	6.12	N	N	0.32	26.95	1.07	23.74	N	68.95
0049S	40 48 41N	114 19 51W	N	5.53	N	N	0.45	21.01	1.39	14.66	N	55.08
0050S	40 40 26N	114 14 56W	N	11.32	N	N	0.15	17.70	0.76	14.88	1.04	46.39
0051S	40 40 29N	114 15 18W	N	11.40	N	N	0.29	13.63	1.46	11.13	1.36	52.45
0052S	40 39 36N	114 13 59W	N	10.49	N	N	0.20	19.43	1.08	22.57	N	53.30
0053S	40 39 15N	114 13 17W	N	4.18	N	N	N	16.63	1.04	14.52	N	53.87
0054S	40 38 24N	114 14 29W	N	5.06	N	N	0.19	17.34	0.96	19.90	1.55	47.02
0055S	40 38 16N	114 13 39W	N	5.55	N	N	N	8.72	0.56	15.11	N	35.77
0056S	40 41 15N	114 13 02W	N	12.75	N	N	0.26	19.45	2.71	14.88	N	67.89
0057S	40 41 43N	114 12 57W	N	11.48	N	N	0.57	21.49	6.16	18.01	1.05	74.84
0058S	40 42 09N	114 12 44W	N	7.41	N	N	0.45	14.48	1.02	11.06	N	65.11
0059S	40 42 53N	114 12 45W	N	6.82	N	N	0.31	11.64	0.67	10.33	N	46.88
0060S	40 43 27N	114 12 17W	N	5.53	N	N	0.45	22.48	0.86	17.69	N	61.45
0061S	40 44 01N	114 11 58W	N	6.66	N	N	0.39	15.48	0.85	12.33	1.73	44.27
0062S	40 44 28N	114 12 45W	N	5.46	N	N	0.40	17.60	0.65	13.81	1.08	46.58
0063S	40 44 31N	114 11 47W	N	7.75	N	N	0.19	13.76	0.81	12.24	1.63	31.01
0064S	40 44 33N	114 13 18W	N	7.01	N	N	0.37	13.35	0.71	11.58	1.16	43.18
0065S	40 44 30N	114 13 20W	N	6.86	N	N	0.42	15.71	0.88	12.01	1.03	49.25
0066S	40 45 18N	114 11 48W	N	7.83	N	N	0.12	20.00	2.31	10.27	N	66.64
0067S	40 45 50N	114 12 46W	N	5.00	N	N	0.15	16.24	0.79	9.95	N	56.54
0068S	40 47 22N	114 14 05W	N	6.69	N	N	N	14.84	0.88	9.97	N	34.25
0069S	40 46 35N	114 14 29W	N	4.78	N	N	N	13.45	0.76	10.89	N	32.85
0070S	40 45 46N	114 14 28W	N	8.50	N	N	0.31	11.06	0.87	9.80	N	42.85
0071S	40 45 45N	114 14 35W	N	5.17	N	N	0.31	16.20	0.78	11.51	N	52.53
0072S	40 45 18N	114 15 13W	N	4.98	N	N	0.55	12.09	1.06	11.32	N	42.38
0073S	40 45 21N	114 15 22W	N	6.04	N	N	0.43	19.92	0.80	15.53	N	59.70
0074S	40 45 01N	114 15 31W	N	5.87	N	N	0.60	21.00	0.87	17.99	N	67.34
0074BS	40 45 02N	114 15 33W	N	4.77	N	N	0.56	21.74	0.98	17.28	N	73.88
0075S	40 44 59N	114 15 26W	N	6.49	N	N	0.44	19.10	0.85	15.55	N	62.08
0076S	40 45 06N	114 15 38W	N	5.85	N	N	0.73	19.61	1.60	17.01	N	68.02
0077S	40 45 46N	114 15 09W	N	5.99	N	N	0.50	20.23	0.81	15.21	N	51.46
0078S	40 46 42N	114 15 39W	N	4.82	N	N	0.13	12.81	1.04	11.81	N	27.54
0079S	40 46 48N	114 16 04W	N	5.52	N	N	0.53	20.63	1.08	15.74	N	60.45

Table 2.--Spectrographic results from the analysis of minus-80-mesh stream-sediment samples from the Bluebell Wilderness Study Area, Elko County, Nevada.--continued

Sample	Latitude	Longitude	Ag	As	Au	Bi	Cd	Cu	Mo	Pb	Sb	Zn
0080S	40 46 52N	114 16 08W	N	14.03	N	N	0.59	18.51	1.33	12.90	N	46.16
0081S	40 45 49N	114 16 20W	N	9.77	N	N	0.62	24.59	0.82	18.80	N	59.96
0082S	40 46 16N	114 15 40W	N	10.64	N	N	0.49	16.91	0.76	13.77	N	49.69
0083S	40 47 01N	114 16 05W	N	2.74	N	N	N	12.50	1.05	11.13	N	21.12
0084S	40 47 10N	114 16 23W	N	4.59	N	N	0.41	16.55	1.14	13.07	N	46.09
0085S	40 47 29N	114 16 52W	N	6.57	N	N	0.78	26.86	1.92	21.59	N	80.97
0086S	40 47 42N	114 20 39W	N	4.83	N	N	0.22	18.30	0.66	12.98	N	53.89
0087S	40 47 27N	114 19 10W	N	4.93	N	N	0.60	26.65	2.06	17.75	N	72.14
0088S	40 47 32N	114 19 12W	N	5.57	N	N	0.58	29.06	1.56	21.91	N	76.37
0089S	40 44 06N	114 19 14W	N	4.71	N	N	0.70	29.73	1.97	22.89	N	82.35
0090S	40 44 10N	114 19 13W	N	5.53	N	N	0.49	27.72	1.42	19.95	N	74.07
0091S	40 45 03N	114 18 09W	0.18	7.65	N	N	0.94	30.20	2.89	18.93	N	95.51
0092S	40 44 49N	114 17 56W	N	8.73	N	N	0.77	23.16	3.40	17.70	1.31	98.31
0093S	40 45 42N	114 18 36W	N	5.30	N	N	0.59	22.50	1.57	15.90	N	84.57
0094S	40 46 26N	114 19 36W	N	5.44	N	N	0.46	23.26	1.29	17.00	N	76.61
0095S	40 46 49N	114 19 20W	N	6.63	N	N	0.84	33.69	2.48	25.58	N	90.31
0096S	40 43 13N	114 20 03W	N	5.43	N	N	0.43	26.45	1.37	18.46	1.25	76.43
0097S	40 43 22N	114 20 03W	N	5.22	N	N	0.25	22.84	0.99	16.78	N	60.12
0098S	40 42 06N	114 19 50W	N	4.20	N	N	0.13	13.15	0.66	10.97	N	36.67
0099S	40 40 06N	114 18 33W	N	21.78	N	N	0.27	30.79	0.89	23.78	2.26	66.16
0100S	40 40 11N	114 18 29W	N	9.04	N	N	0.17	17.30	0.62	15.13	3.17	39.50
0101S	40 40 17N	114 19 02W	N	9.76	N	N	0.20	20.07	0.88	14.96	2.17	46.56
0102S	40 40 22N	114 19 44W	N	7.35	N	N	0.16	21.20	1.05	13.19	1.54	38.70
0103S	40 41 43N	114 17 56W	0.12	8.33	N	N	0.58	35.34	1.97	27.92	1.97	93.54
0104S	40 41 40N	114 17 50W	N	6.88	N	N	0.46	25.68	1.60	22.17	1.17	78.65
0105S	40 41 27N	114 18 07W	N	6.05	N	N	0.25	23.30	0.79	20.17	1.79	54.05
0106S	40 41 25N	114 18 50W	N	6.05	N	N	0.29	19.61	1.29	14.05	1.51	49.45
0107S	40 41 12N	114 19 08W	N	6.99	N	N	0.21	23.14	0.78	17.06	1.70	49.89
0108S	40 39 45N	114 20 04W	N	11.42	N	N	0.19	16.89	0.95	12.85	N	37.86
0109S	40 40 41N	114 15 59W	N	19.14	N	N	N	15.56	0.67	13.24	1.51	32.94
0110S	40 40 44N	114 15 56W	N	11.24	N	N	0.36	18.03	1.10	14.87	1.18	55.57

Table 3.—Limits of determination for the spectrographic analysis
of the non-magnetic fraction of heavy-mineral-concentrate
samples

Element	Limits of determination (based on 5-mg sample)	
	Lower	Upper
Percent		
Iron (Fe)	0.1	50
Magnesium (Mg)	.05	20
Calcium (Ca)	.1	50
Titanium (Ti)	.005	2
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)	10	5,000
Chromium (Cr)	20	10,000
Copper (Cu)	10	50,000
Lanthanum (La)	50	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	200
Tin (Sn)	20	2,000
Strontium (Sr)	200	10,000
Vanadium (V)	20	20,000
Tungsten (W)	100	20,000
Yttrium (Y)	20	5,000
Zinc (Zn)	500	20,000
Zirconium (Zr)	20	2,000
Thorium (Th)	200	5,000

Table 4.--Spectrographic results from the analysis of the non-magnetic fraction of heavy-mineral-concentrate samples from the Bluebell Wilderness Study Area, Elko 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 (%)	Mg (%)	Ca (%)	Ti (%)	Mn (ppm)	Ag (ppm)	As (ppm)	Au (ppm)
0001H	40 40 24N	114 12 54W	10	1	10	0.7	1000	N	700	N
0002H	40 39 55N	114 13 58W	3	10	15	0.5	1000	N	N	N
0002HT1	40 39 55N	114 13 58W	5	7	15	1	700	N	N	N
0002HT2	40 39 55N	114 13 58W	7	2	10	1	700	N	N	N
0002HT3	40 39 55N	114 13 58W	10	5	10	>2	700	N	500	N
0003H	40 40 11N	114 14 14W	7	5	10	0.7	1500	N	<500	N
0004H	40 40 12N	114 16 11W	20	2	7	1	1500	N	500	N
0005H	40 40 17N	114 16 11W	20	5	15	0.5	1500	N	500	N
0006H	40 40 10N	114 16 06W	30	1.5	5	1	2000	N	1500	N
0007H	40 40 11N	114 15 28W	15	1.5	7	1	2000	N	500	N
0008H	40 50 24N	114 15 40W	5	1	3	0.3	500	N	N	N
0009H	40 50 26N	114 15 41W	10	3	15	2	2000	N	N	N
0010H	40 49 20N	114 15 29W	5	5	7	0.7	500	N	N	N
0011H	40 48 58N	114 15 13W	15	2	10	0.5	1000	N	N	N
0012H	40 48 55N	114 14 17W	5	5	7	0.7	300	N	N	N
0013H	40 48 28N	114 13 58W	20	3	7	1.5	700	N	N	N
0014H	40 38 36N	114 20 31W	7	3	10	2	1000	N	N	N
0015H	40 38 14N	114 19 11W	15	2	10	2	1000	N	500	N
0016H	40 38 01N	114 18 09W	10	1	30	1	10000	N	<500	N
0017H	40 38 41N	114 18 47W	10	7	20	1	1000	N	N	N
0018H	40 38 58N	114 17 57W	15	10	20	0.5	1000	<1	1000	N
0019H	40 38 44N	114 17 52W	10	5	15	0.3	1000	<1	700	N
0020H	40 38 31N	114 18 58W	10	1.5	20	1	1500	N	N	N
0021H	40 37 32N	114 15 50W	3	15	20	1	500	N	N	N
0022H	40 37 17N	114 16 19W	1.5	5	10	0.15	300	N	N	N
0023H	40 38 40N	114 15 53W	5	0.5	5	1	700	N	N	N
0024H	40 38 05N	114 15 28W	10	3	10	1	1500	N	N	N
0025H	40 37 59N	114 15 37W	7	1.5	5	2	1000	N	N	N
0026H	40 37 56N	114 15 25W	15	1.5	5	>2	1500	N	N	N
0027H	40 37 53N	114 15 11W	20	0.7	2	>2	5000	N	N	N
0028H	40 42 22N	114 16 02W	10	0.7	15	0.5	700	N	<500	N
0029H	40 42 18N	114 16 09W	10	1.5	20	1	1000	N	1000	N
0030H	40 42 24N	114 16 11W	15	1	10	2	1000	N	N	N
0031H	40 42 40N	114 15 52W	20	0.7	5	0.5	1000	N	<500	N
0032H	40 43 09N	114 15 36W	15	2	10	2	1000	N	N	N
0033H	40 43 01N	114 16 33W	7	1	15	2	700	N	N	N
0034H	40 43 31N	114 16 08W	10	1	5	>2	1000	N	N	N
0035H	40 43 31N	114 15 56W	7	0.7	3	1.5	1000	N	N	N
0036H	40 42 27N	114 14 48W	20	1.5	5	>2	1500	N	N	N
0037H	40 42 19N	114 14 02W	10	0.7	30	0.2	700	N	N	N

Table 4.--Spectrographic results from the analysis of the non-magnetic fraction of heavy-mineral-concentrate samples from the Bluebell Wilderness Study Area, Elko County, Nevada.
[N, not detected; <, detected but below the limit of determination shown; >, determined to be greater than the value shown.]

Sample	B (ppm)	Ba (ppm)	Be (ppm)	Bi (ppm)	Cd (ppm)	Co (ppm)	Cr (ppm)	Cu (ppm)	La (ppm)	Mo (ppm)
0001H	150	700	10	N	N	30	300	70	500	70
0002H	70	>10000	2	N	N	20	50	50	200	N
0002HT1	70	>10000	3	N	N	20	150	50	1000	N
0002HT2	100	>10000	3	N	N	20	70	30	500	10
0002HT3	70	>10000	3	N	N	20	50	50	500	<10
0003H	100	10000	5	N	N	20	150	50	1000	15
0004H	200	1500	5	N	N	50	500	100	500	15
0005H	200	7000	3	N	N	30	150	70	300	10
0006H	200	2000	3	N	N	30	150	100	300	30
0007H	150	1000	30	N	N	30	70	50	2000	50
0008H	100	>10000	2	N	N	20	50	50	200	<10
0009H	500	10000	3	N	N	50	200	150	300	30
0010H	300	>10000	3	N	N	20	150	50	100	20
0011H	200	7000	7	N	N	50	100	100	200	30
0012H	200	10000	2	N	N	20	100	50	100	30
0013H	1000	>10000	3	N	N	30	200	150	200	30
0014H	200	1000	2	N	N	30	300	50	1000	N
0015H	300	1000	3	N	N	50	500	50	2000	20
0016H	100	7000	3	N	N	50	100	70	>2000	30
0017H	100	3000	3	N	N	30	100	30	1000	20
0018H	300	1500	5	N	N	30	200	70	200	20
0019H	100	>10000	5	N	N	30	100	50	2000	30
0020H	200	1500	3	N	N	30	70	50	>2000	30
0021H	70	5000	<2	N	N	10	50	15	200	N
0022H	30	1500	2	N	N	10	<20	<10	150	N
0023H	50	1500	2	N	N	10	100	50	700	N
0024H	100	10000	2	N	N	20	70	30	500	N
0025H	70	2000	2	N	N	15	30	10	500	N
0026H	70	5000	2	N	N	20	100	20	1000	10
0027H	70	3000	2	N	N	20	50	50	>2000	15
0028H	100	200	5	N	N	15	150	30	500	50
0029H	200	500	5	N	N	20	150	50	1000	50
0030H	200	500	2	N	N	30	200	200	700	30
0031H	100	1000	5	N	N	50	300	200	200	30
0032H	200	700	3	N	N	30	300	200	700	20
0033H	100	5000	2	N	N	20	150	50	200	10
0034H	300	700	2	N	N	30	200	50	500	20
0035H	150	1000	2	N	N	30	200	50	500	N
0036H	100	>10000	3	N	N	30	200	50	700	10
0037H	100	>10000	3	N	N	30	150	50	500	30

Table 4.--Spectrographic results from the analysis of the non-magnetic fraction of heavy-mineral-concentrate samples from the Bluebell Wilderness Study Area, Elko County, Nevada.
[N, not detected; <, detected but below the limit of determination shown; >, determined to be greater than the value shown.]

Sample	Nb (ppm)	Ni (ppm)	Pb (ppm)	Sb (ppm)	Sc (ppm)	Sn (ppm)	Sr (ppm)	V (ppm)	W (ppm)	Y (ppm)
0001H	70	200	100	N	15	N	700	300	N	500
0002H	<50	20	100	N	10	100	1000	100	N	300
0002HT1	50	20	70	N	10	70	1000	150	N	500
0002HT2	50	50	70	500	15	<20	700	150	N	700
0002HT3	50	50	100	<200	10	20	700	200	N	300
0003H	50	100	150	N	10	N	500	150	N	500
0004H	<50	150	70	700	30	N	1000	300	N	200
0005H	<50	70	100	<200	15	N	700	200	N	300
0006H	<50	150	150	1000	20	N	500	300	N	200
0007H	70	50	100	5000	15	50	300	150	N	700
0008H	N	70	20	N	<10	N	1500	100	N	100
0009H	50	200	200	N	20	20	500	200	N	300
0010H	<50	100	70	N	10	N	700	150	N	70
0011H	<50	150	100	N	<10	N	200	150	N	100
0012H	<50	70	50	N	10	N	200	150	N	70
0013H	<50	200	200	N	15	<20	500	200	N	100
0014H	100	50	50	N	20	<20	700	200	N	500
0015H	70	100	70	N	20	<20	700	200	<100	200
0016H	<50	100	200	5000	10	N	5000	150	N	100
0017H	50	70	100	N	10	<20	1500	100	N	150
0018H	<50	100	100	5000	10	N	300	200	N	100
0019H	<50	100	700	1500	<10	70	700	150	200	100
0020H	<50	50	20	N	<10	N	1000	150	N	150
0021H	50	20	70	<200	10	70	200	100	N	300
0022H	<50	15	<20	N	N	N	200	100	N	50
0023H	N	20	50000	N	50	100	N	100	N	1000
0024H	<50	50	70	N	20	30	200	150	N	500
0025H	50	30	30	N	30	N	N	100	N	500
0026H	50	30	100	N	20	N	N	200	N	700
0027H	50	20	100	N	30	300	N	150	N	700
0028H	<50	200	500	N	<10	N	700	300	N	500
0029H	<50	300	300	N	10	70	700	300	N	300
0030H	50	300	100	N	20	N	500	200	N	300
0031H	<50	500	50	N	20	N	300	300	N	200
0032H	70	300	200	N	20	N	500	300	N	500
0033H	<50	150	50	N	15	N	700	150	N	300
0034H	50	200	50	N	20	N	500	200	N	500
0035H	N	100	50	N	30	70	500	150	N	1000
0036H	100	100	50	N	20	70	500	200	N	500
0037H	<50	150	300	N	15	N	1000	150	N	500

¹Spurious data--see text, p. 6.

Table 4.--Spectrographic results from the analysis of the non-magnetic fraction of heavy-mineral-concentrate samples from the Bluebell Wilderness Study Area, Elko County, Nevada.
[N, not detected; <, detected but below the limit of determination shown; >, determined to be greater than the value shown.]

Sample	Zn (ppm)	Zr (ppm)	Th (ppm)
0001H	700	>2000	N
0002H	N	>2000	N
0002HT1	N	>2000	N
0002HT2	N	>2000	N
0002HT3	N	>2000	N
0003H	N	>2000	N
0004H	N	2000	N
0005H	N	>2000	N
0006H	N	>2000	N
0007H	N	>2000	N
0008H	N	>2000	N
0009H	N	>2000	N
0010H	N	>2000	N
0011H	N	>2000	N
0012H	N	1500	N
0013H	N	>2000	N
0014H	N	>2000	N
0015H	N	>2000	N
0016H	500	>2000	N
0017H	<500	>2000	N
0018H	N	>2000	N
0019H	500	2000	N
0020H	N	>2000	N
0021H	N	>2000	<200
0022H	N	>2000	N
0023H	N	>2000	200
0024H	N	>2000	<200
0025H	N	>2000	N
0026H	N	>2000	<200
0027H	N	>2000	300
0028H	500	>2000	N
0029H	1000	>2000	N
0030H	500	>2000	N
0031H	<500	>2000	N
0032H	500	>2000	<200
0033H	N	>2000	N
0034H	500	>2000	N
0035H	N	>2000	200
0036H	N	>2000	N
0037H	<500	>2000	N

Table 4.--Spectrographic results from the analysis of the non-magnetic fraction of heavy-mineral-concentrate samples from the Bluebell Wilderness Study Area, Elko County, Nevada.--continued

Sample	Latitude	Longitude	Fe (%)	Mg (%)	Ca (%)	Ti (%)	Mn (ppm)	Ag (ppm)	As (ppm)	Au (ppm)
0038H	40 42 08N	114 13 56W	20	0.7	2	>2	1000	N	N	N
0039H	40 42 02N	114 14 00W	15	3	7	0.3	700	N	<500	N
0040H	40 50 28N	114 18 53W	10	2	15	0.7	700	N	N	N
0041H	40 50 27N	114 18 20W	15	1	15	0.3	700	N	500	N
0042H	40 50 22N	114 18 18W	20	1.5	5	1	2000	N	<500	N
0043H	40 50 18N	114 18 30W	7	1.5	3	1	500	N	N	N
0044H	40 49 20N	114 18 50W	10	7	10	1	700	N	<500	N
0045H	40 49 08N	114 18 23W	7	7	10	0.5	500	N	N	N
0046H	40 48 50N	114 18 07W	5	1.5	30	0.5	700	<1	N	N
0047H	40 48 34N	114 17 42W	5	2	10	0.7	1000	N	N	N
0048H	40 48 39N	114 17 40W	5	2	7	0.5	700	N	N	N
0049H	40 48 41N	114 19 51W	7	2	10	1	1000	N	N	N
0050H	40 40 26N	114 14 56W	15	5	15	0.3	1000	N	700	N
0051H	40 40 29N	114 15 18W	7	2	15	0.5	700	N	N	N
0052H	40 39 36N	114 13 59W	15	1	3	>2	3000	N	N	N
0053H	40 39 15N	114 13 17W	15	0.5	1	>2	2000	N	N	N
0054H	40 38 24N	114 14 29W	20	1	2	>2	2000	N	N	N
0055H	40 38 16N	114 13 39W	7	1	5	>2	1000	N	N	N
0056H	40 41 15N	114 13 02W	10	0.7	10	0.5	2000	N	N	N
0057H	40 41 43N	114 12 57W	10	0.2	5	0.3	2000	N	N	N
0058H	40 42 09N	114 12 44W	10	2	15	1	1000	N	N	N
0059H	40 42 53N	114 12 45W	7	1.5	7	1	1000	N	N	N
0060H	40 43 27N	114 12 17W	5	3	20	2	700	N	N	N
0061H	40 44 01N	114 11 58W	5	1	10	0.7	500	N	N	N
0062H	40 44 28N	114 12 45W	15	2	7	1.5	700	N	N	N
0063H	40 44 31N	114 11 47W	5	1.5	7	1	1000	N	N	N
0064H	40 44 33N	114 13 18W	20	1	5	1.5	700	N	<500	N
0065H	40 44 30N	114 13 20W	20	1	7	1	1000	N	<500	N
0066H	40 45 18N	114 11 48W	3	0.5	7	0.15	500	N	N	N
0067H	40 45 50N	114 12 46W	20	1	7	1	700	N	N	N
0068H	40 47 22N	114 14 05W	10	2	7	0.7	500	N	N	N
0069H	40 46 35N	114 14 29W	7	2	20	0.5	500	N	N	N
0070H	40 45 46N	114 14 28W	20	1	7	1	1500	N	<500	N
0071H	40 45 45N	114 14 35W	15	1.5	7	1	1500	N	<500	N
0072H	40 45 18N	114 15 13W	20	1.5	10	2	2000	N	N	N
0073H	40 45 21N	114 15 22W	10	0.7	5	1	700	N	N	N
0074H	40 45 01N	114 15 31W	20	1	7	2	1000	N	N	N
0074BH	40 45 02N	114 15 33W	7	0.5	5	0.7	1500	N	N	N
0075H	40 44 59N	114 15 26W	15	0.7	3	2	1000	N	N	N
0076H	40 45 06N	114 15 38W	10	1	10	0.7	1000	N	N	N

Table 4.--Spectrographic results from the analysis of the non-magnetic fraction of heavy-mineral-concentrate samples from the Bluebell Wilderness Study Area, Elko County, Nevada.--continued

Sample	B (ppm)	Ba (ppm)	Be (ppm)	Bi (ppm)	Cd (ppm)	Co (ppm)	Cr (ppm)	Cu (ppm)	La (ppm)	Mo (ppm)
0038H	100	>10000	2	N	N	50	150	30	300	20
0039H	200	>10000	5	N	N	20	150	100	150	30
0040H	200	2000	2	N	N	20	200	100	700	15
0041H	150	3000	3	N	N	30	200	70	500	15
0042H	200	3000	3	N	N	70	200	150	1000	10
0043H	500	>10000	3	N	N	30	100	50	150	10
0044H	100	2000	3	N	N	50	100	70	200	70
0045H	200	>10000	2	N	N	30	100	50	200	10
0046H	150	2000	2	N	N	20	300	30	700	50
0047H	200	>10000	3	N	N	30	300	50	300	20
0048H	150	>10000	3	N	N	30	150	100	150	15
0049H	300	700	2	N	N	30	200	50	500	50
0050H	70	2000	5	N	N	20	100	500	100	30
0051H	50	>10000	3	N	N	20	300	70	200	10
0052H	50	2000	5	N	N	30	30	30	>2000	20
0053H	50	700	3	N	N	20	30	20	500	<10
0054H	50	700	3	N	N	20	30	20	2000	10
0055H	70	700	3	N	N	15	70	20	1000	N
0056H	300	>10000	5	N	N	30	150	70	300	20
0057H	200	1000	5	N	N	20	150	20	200	70
0058H	200	500	3	N	N	30	300	300	200	30
0059H	200	700	5	N	N	20	100	70	150	20
0060H	500	500	3	N	N	15	150	70	1000	20
0061H	150	>10000	3	N	N	20	150	30	200	20
0062H	500	1000	3	N	N	20	100	50	200	20
0063H	100	>10000	<2	N	N	15	100	20	700	N
0064H	200	1000	3	N	N	30	200	70	300	15
0065H	500	700	5	N	N	30	300	70	500	20
0066H	50	>10000	2	N	N	15	50	20	200	N
0067H	300	>10000	3	N	N	20	70	100	500	15
0068H	500	>10000	3	N	N	20	70	30	150	20
0069H	200	1500	2	N	N	20	200	50	200	20
0070H	150	>10000	3	N	N	50	300	100	500	15
0071H	150	1500	5	N	N	30	150	200	500	15
0072H	200	500	3	N	N	30	200	70	500	20
0073H	100	500	2	N	N	20	150	30	200	10
0074H	150	500	5	N	N	30	200	50	500	20
00748H	50	700	2	N	N	10	70	30	500	N
0075H	100	1000	3	N	N	50	200	50	2000	10
0076H	100	500	<2	N	N	20	200	50	300	20

Table 4.--Spectrographic results from the analysis of the non-magnetic fraction of heavy-mineral-concentrate samples from the Bluebell Wilderness Study Area, Elko County, Nevada.--continued

Sample	Nb (ppm)	Ni (ppm)	Pb (ppm)	Sb (ppm)	Sc (ppm)	Sn (ppm)	Sr (ppm)	V (ppm)	W (ppm)	Y (ppm)
0038H	150	150	70	N	20	700	700	200	N	200
0039H	<50	150	100	N	<10	N	500	200	N	150
0040H	50	150	70	N	15	N	500	200	N	300
0041H	<50	150	70	N	10	N	500	200	N	200
0042H	50	150	200	N	15	N	200	200	N	100
0043H	<50	100	50	N	10	N	1000	150	N	100
0044H	<50	150	100	N	<10	N	N	200	N	100
0045H	<50	150	100	N	<10	N	500	150	N	100
0046H	<50	100	50	N	15	N	1000	150	N	300
0047H	<50	150	70	N	20	N	1000	150	N	150
0048H	<50	100	100	N	10	N	500	100	N	100
0049H	100	150	70	N	20	N	700	150	N	200
0050H	<50	100	100	N	<10	N	200	150	N	100
0051H	N	150	70	N	10	N	1500	150	N	200
0052H	500	N	300	N	20	2000	N	100	N	700
0053H	300	N	70	N	20	200	N	150	N	1000
0054H	300	N	100	N	20	500	N	100	N	1000
0055H	300	10	50	N	20	150	N	100	N	1000
0056H	<50	100	70	N	15	N	700	200	N	300
0057H	<50	70	30	N	20	N	300	200	N	200
0058H	50	200	70	N	20	N	200	200	N	150
0059H	50	100	300	N	15	70	300	150	N	150
0060H	70	70	70	N	30	30	500	150	N	300
0061H	50	100	50	N	10	N	700	100	N	200
0062H	50	150	100	N	20	N	200	300	<100	300
0063H	50	50	50	200	20	<20	1500	150	N	200
0064H	50	200	70	<200	20	N	300	300	N	200
0065H	<50	200	100	<200	20	N	300	200	N	300
0066H	N	50	20	N	N	N	2000	100	N	150
0067H	50	200	70	N	20	N	500	200	N	200
0068H	<50	100	50	N	10	N	1000	150	N	50
0069H	<50	100	70	N	10	N	500	200	N	200
0070H	50	300	50	N	15	N	700	300	N	200
0071H	50	200	100	N	15	N	500	200	N	500
0072H	50	200	200	N	15	>2000	1000	300	N	700
0073H	<50	150	20	N	15	<20	1000	200	N	300
0074H	50	200	70	N	15	>2000	500	300	N	700
0074BH	N	50	20	N	15	N	200	150	N	1000
0075H	<50	300	50	N	20	500	500	300	N	700
0076H	N	100	70	N	15	N	500	200	N	500

Table 4.--Spectrographic results from the analysis of the non-magnetic fraction of heavy-mineral-concentrate samples from the Bluebell Wilderness Study Area, Elko County, Nevada.--continued

Sample	Zn (ppm)	Zr (ppm)	Th (ppm)
0038H	N	>2000	N
0039H	500	>2000	N
0040H	500	>2000	N
0041H	500	>2000	N
0042H	<500	1500	N
0043H	N	2000	N
0044H	N	>2000	N
0045H	N	>2000	N
0046H	500	2000	N
0047H	N	2000	N
0048H	N	2000	N
0049H	N ¹	>2000	N
0050H	>20000	>2000	N
0051H	N	>2000	N
0052H	N	>2000	200
0053H	N	>2000	N
0054H	N	>2000	N
0055H	N	>2000	200
0056H	<500	>2000	N
0057H	N	1000	N
0058H	<500	>2000	N
0059H	N	>2000	N
0060H	N	>2000	<200
0061H	N	>2000	N
0062H	N	>2000	N
0063H	N	>2000	N
0064H	500	>2000	N
0065H	500	>2000	N
0066H	N	>2000	N
0067H	1000	>2000	N
0068H	N	2000	N
0069H	N	>2000	N
0070H	500	>2000	N
0071H	1000	>2000	N
0072H	500	>2000	N
0073H	N	>2000	N
0074H	700	>2000	N
0074BH	N	>2000	200
0075H	N	>2000	N
0076H	N	>2000	N

¹ Spurious data--see text, p. 6.

Table 4.--Spectrographic results from the analysis of the non-magnetic fraction of heavy-mineral-concentrate samples from the Bluebell Wilderness Study Area, Elko County, Nevada.--continued

Sample	Latitude	Longitude	Fe (%)	Mg (%)	Ca (%)	Ti (%)	Mn (ppm)	Ag (ppm)	As (ppm)	Au (ppm)
0077H	40 45 46N	114 15 09W	10	1	30	1	1000	N	N	N
0078H	40 46 42N	114 15 39W	15	7	20	0.3	700	N	N	N
0079H	40 46 48N	114 16 04W	10	1.5	5	0.5	1000	N	700	N
0080H	40 46 52N	114 16 08W	15	2	7	>2	1500	N	<500	N
0081H	40 45 49N	114 16 20W	7	2	20	1.5	700	N	N	N
0082H	40 46 16N	114 15 40W	5	1	10	1	700	N	N	N
0083H	40 47 01N	114 16 05W	7	7	10	0.2	500	N	N	N
0084H	40 47 10N	114 16 23W	5	10	20	0.15	500	N	N	N
0085H	40 47 29N	114 16 52W	3	0.7	30	0.2	500	N	N	N
0086H	40 47 42N	114 20 39W	10	3	7	>2	1500	N	N	N
0087H	40 47 27N	114 19 10W	5	5	10	0.5	1000	N	N	N
0088H	40 47 32N	114 19 12W	2	2	20	0.5	500	N	N	N
0089H	40 44 06N	114 19 14W	10	2	10	0.5	1000	N	N	N
0090H	40 44 10N	114 19 13W	1.5	1	20	0.3	700	N	N	N
0091H	40 45 03N	114 18 09W	5	1	20	1	700	N	N	N
0092H	40 44 49N	114 17 56W	7	0.7	15	0.3	1000	N	500	N
0093H	40 45 42N	114 18 36W	3	7	20	0.5	1000	N	N	N
0094H	40 46 26N	114 19 36W	5	2	10	2	700	N	N	N
0095H	40 46 49N	114 19 20W	5	1	7	1	500	N	N	N
0096H	40 43 13N	114 20 03W	5	3	20	0.2	500	<1	N	N
0097H	40 43 22N	114 20 03W	5	2	7	0.5	700	N	N	N
0098H	40 42 06N	114 19 50W	7	7	10	0.5	700	N	N	N
0099H	40 40 06N	114 18 33W	10	1	7	1	1000	N	<500	N
0100H	40 40 11N	114 18 29W	7	10	10	0.2	1000	N	N	N
0101H	40 40 17N	114 19 02W	10	7	10	0.5	1000	N	N	N
0102H	40 40 22N	114 19 44W	15	3	10	0.5	1500	N	N	N
0103H	40 41 43N	114 17 56W	3	0.5	30	0.2	300	1	N	N
0104H	40 41 40N	114 17 50W	7	5	10	0.15	500	N	N	N
0105H	40 41 27N	114 18 07W	3	3	7	0.15	200	N	N	N
0106H	40 41 25N	114 18 50W	3	10	3	0.15	200	N	N	N
0107H	40 41 12N	114 19 08W	15	2	10	0.5	1500	N	N	N
0108H	40 39 45N	114 20 04W	7	2	5	0.5	700	N	<500	N
0109H	40 40 41N	114 15 59W	5	15	30	0.1	300	N	N	N
0110H	40 40 44N	114 15 56W	10	3	20	0.2	700	N	N	N

Table 4.--Spectrographic results from the analysis of the non-magnetic fraction of heavy-mineral-concentrate samples from the Bluebell Wilderness Study Area, Elko County, Nevada.--continued

Sample	B (ppm)	Ba (ppm)	Be (ppm)	Bi (ppm)	Cd (ppm)	Co (ppm)	Cr (ppm)	Cu (ppm)	La (ppm)	Mo (ppm)
0077H	150	1000	2	N	N	30	500	50	500	15
0078H	300	1500	3	N	N	30	100	100	500	50
0079H	100	3000	5	N	N	20	200	100	200	20
0080H	200	3000	3	N	N	70	700	200	2000	20
0081H	100	700	3	N	N	30	500	50	200	N
0082H	100	300	3	N	N	20	300	30	300	N
0083H	150	500	2	N	N	20	50	70	200	30
0084H	50	100	<2	N	N	20	50	20	N	30
0085H	70	200	<2	N	N	15	300	20	700	30
0086H	200	1000	2	N	N	50	500	100	200	20
0087H	70	700	2	N	N	20	1500	20	70	N
0088H	100	200	2	N	N	15	500	10	300	N
0089H	150	300	2	N	N	20	100	70	500	50
0090H	70	700	2	N	N	10	100	20	500	N
0091H	200	700	2	N	N	20	200	50	500	15
0092H	100	1000	3	N	N	30	200	70	500	200
0093H	150	1000	2	N	N	30	1500	20	200	<10
0094H	150	3000	2	N	N	20	300	50	500	20
0095H	200	>10000	2	N	N	20	200	50	300	30
0096H	70	>10000	2	N	N	15	100	20	300	15
0097H	150	>10000	3	N	N	20	100	50	200	30
0098H	70	>10000	2	N	N	20	700	50	100	20
0099H	100	700	5	N	N	30	200	50	150	<10
0100H	100	500	3	N	N	20	100	50	50	10
0101H	100	10000	3	N	N	30	100	50	200	10
0102H	300	>10000	5	N	N	30	100	100	300	10
0103H	70	>10000	<2	N	N	10	200	30	1000	N
0104H	70	>10000	2	N	N	20	100	50	100	20
0105H	50	>10000	<2	N	N	<10	20	20	N	N
0106H	30	>10000	<2	N	N	10	150	20	50	N
0107H	300	1000	3	N	N	30	100	50	700	<10
0108H	70	300	3	N	N	15	200	70	N	<10
0109H	20	1000	<2	N	N	15	50	20	<50	N
0110H	100	>10000	2	N	N	15	100	30	200	20

Table 4.--Spectrographic results from the analysis of the non-magnetic fraction of heavy-mineral-concentrate samples from the Bluebell Wilderness Study Area, Elko County, Nevada.--continued

Sample	Nb (ppm)	Ni (ppm)	Pb (ppm)	Sb (ppm)	Sc (ppm)	Sn (ppm)	Sr (ppm)	V (ppm)	W (ppm)	Y (ppm)
0077H	50	150	50	N	20	N	1500	200	N	500
0078H	N	100	200	N	10	N	500	150	N	200
0079H	N	150	70	N	15	N	500	300	N	150
0080H	50	200	70	N	30	50	1000	300	N	300
0081H	50	100	<20	N	30	N	700	200	N	200
0082H	<50	70	30	N	20	N	1000	200	N	200
0083H	N	70	150	300	N	N	N	150	N	200
0084H	<50	50	20	N	N	N	500	100	N	30
0085H	N	50	70	N	<10	N	700	100	N	500
0086H	50	150	50	N	30	20	500	200	N	200
0087H	<50	100	N	N	50	N	700	200	N	50
0088H	<50	70	N	N	15	N	700	150	N	200
0089H	<50	150	70	N	15	N	500	150	N	100
0090H	<50	50	<20	N	N	N	1000	100	N	200
0091H	50	150	20	N	15	N	700	150	N	300
0092H	N	200	50	N	10	<20	700	200	N	300
0093H	<50	100	20	N	50	30	700	200	N	200
0094H	50	100	30	N	15	<20	500	200	N	300
0095H	50	100	30	N	10	N	700	200	N	200
0096H	<50	70	70	N	<10	N	700	150	N	300
0097H	N	70	70	N	10	N	2000	200	N	200
0098H	<50	100	100	N	20	N	200	150	N	100
0099H	<50	70	50	500	20	N	1000	200	N	150
0100H	N	50	100	700	<10	N	300	150	N	50
0101H	N	70	70	N	<10	N	300	150	N	100
0102H	N	100	100	N	15	N	700	200	N	100
0103H	N	70	20	N	<10	N	1000	200	N	1000
0104H	N	70	50	N	<10	N	1500	200	N	200
0105H	N	30	<20	N	N	N	10000	50	N	30
0106H	N	50	150	<200	N	N	500	70	N	100
0107H	<50	70	50	N	15	20	300	150	N	200
0108H	<50	50	70	N	15	N	200	100	N	50
0109H	N	50	50	N	N	N	N	70	N	<20
0110H	N	100	70	N	10	N	500	200	N	200

Table 4.--Spectrographic results from the analysis of the non-magnetic fraction of heavy-mineral-concentrate samples from the Bluebell Wilderness Study Area, Elko County, Nevada.--continued

Sample	Zn (ppm)	Zr (ppm)	Th (ppm)
0077H	<500	>2000	N
0078H	N	2000	N
0079H	500	>2000	N
0080H	500	>2000	200
0081H	<500	>2000	N
0082H	N	>2000	N
0083H	N	>2000	N
0084H	N	300	N
0085H	N	>2000	N
0086H	<500	>2000	N
0087H	N	1500	N
0088H	N	>2000	N
0089H	700	>2000	N
0090H	N	>2000	N
0091H	500	>2000	<200
0092H	500	>2000	N
0093H	N	>2000	N
0094H	N	>2000	N
0095H	N	>2000	N
0096H	N	1000	N
0097H	N	2000	N
0098H	N	>2000	N
0099H	N	1500	N
0100H	N	2000	N
0101H	N	2000	N
0102H	700	500	N
0103H	N	1000	N
0104H	N	700	N
0105H	N	700	N
0106H	N	500	N
0107H	N	1000	N
0108H	N	>2000	N
0109H	N	300	N
0110H	N	2000	N