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 Beaver Creek Wilderness Study Area (CO-050-016), El Paso, Fremont, and Teller Counties, Colorado

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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 Beaver Creek Wilderness Study Area, El Paso, Fremont, and Teller Counties, Colorado.

## INTRODUCTION

In 1984, the U.S. Geological Survey conducted a reconnaissance geochemical survey of the Beaver Creek Wilderness Study Area, El Paso, Fremont, and Teller Counties, Colorado.

The Beaver Creek Wilderness Study Area comprises about 32 $mi^2$ (20,480 acres), and lies about 8 mi northeast of Canyon City (fig. 1). Access to the study area is provided on foot trails from the gravel road in Phantom Canyon and by trails that extend from the ends of gravel roads in the larger drainages. These roads, which generally pass through private property, connect with the Phantom Canyon Road on the west, with the gravel Gold Camp Road to the north, with U.S. Highway 50 to the south, and with Colorado State Highway 115 to the east.

The wilderness study area covers a rugged terrain that ranges from 5,920 ft in the southwest corner to 9,922 ft at the summit of Crown Point in the northern part. The area covers the summits and the steep, southeast-facing dissected escarpment of a mountain range extending southwest from Cheyenne Mountain just west of Colorado Springs. The area is heavily timbered with pine, spruce, and fir trees, locally interspersed with aspen. The high-gradient streams flow in steep-sided narrow gorges. The geologic description of the Beaver Creek area has been extracted from Lindsey (1985, written comm.).

The Beaver Creek Wilderness Study Area is located in the southern most part of the Front Range, a geologic terrane that has been uplifted repeatedly in the geologic past. Faults that traverse the wilderness study area from southwest to northeast and north to south probably formed in Precambrian time. These faults probably moved during uplift of the Ancestral Rocky Mountains about 280-320 million years ago, during the Laramide uplift about 50-70 million years ago, and during uplift about 30 million years ago to the present. During the last period of uplift, the Arkansas River eroded a broad embayment from soft sedimentary rocks south of the wilderness study area. Rocks in the wilderness study area consist of Precambrian igneous rocks (1,400-1,700 million years old) intruded into Precambrian gneiss (1,700-1,800 million years old) and Palezoic sedimentary rocks (250-500 million years old).

Precambrian igneous rocks are exposed over much of the wilderness study area. They include a batholith of Early Proterozoic granodiorite assigned to the Routt Plutonic Suite, which has intruded slightly older quartzite and gneiss of Early Proterozoic age, and a stock of Middle Proterozoic quartz monzonite of the Berthoud Plutonic Suite, which has intruded both granodiorite and gneiss. The marginal zone of the granodiorite batholith contains small, sparse dikes of pegmatite that have been prospected for mica and fluorspar.

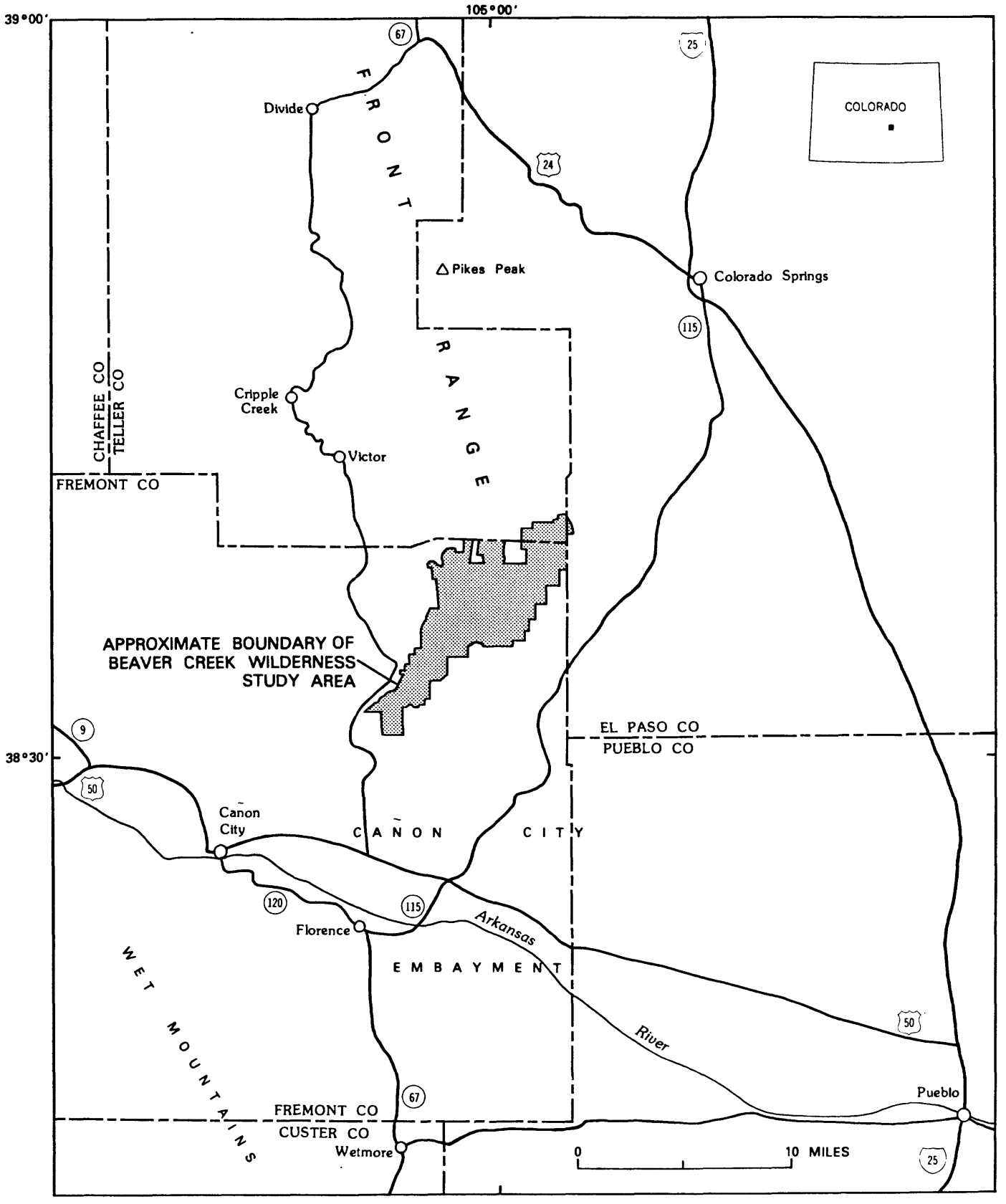


Figure 1. Index map showing location of Beaver Creek Wilderness Study Area, Colorado.

Paleozoic sedimentary rocks are exposed in remnants of synclines located north of major faults, and in an east-dipping sequence that extends along the southeastern margin of the wilderness study area. Paleozoic sedimentary rocks consist of the Ordovician Manitou Limestone, the Ordovician Harding Sandstone, the Ordovician Fremont Dolomite, and the Pennsylvanian and Permian Fountain Formation.

## 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 and heavy-mineral-concentrate samples were collected at 50 sites (plate 1). Sampling density was about 1 sample site per square mile. The area of the drainage basins sampled ranged from 1/2 $mi^2$ to 2 $mi^2$.

#### 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 plate 1.

#### Heavy-mineral-concentrate samples

Heavy-mineral-concentrate samples were collected from the same active alluvium as the stream-sediment samples. Each bulk sample was panned until most of the quartz, feldspar, organic material, and clay-sized material were removed.

#### Rock samples

Rock samples were collected from outcrops or exposures in the vicinity of the plotted site location. Samples were collected from unaltered and altered rocks.

## Sample Preparation

The stream-sediment samples were air dried, then sieved using 100 mesh (0.15 mm) stainless steel sieves. The portion of the sediment passing through the sieve was saved for analysis.

After air drying, bromoform (specific gravity 2.8) was used to remove the remaining quartz and feldspar from the heavy-mineral-concentrate samples that had been panned in the field. The resultant heavy-mineral sample was separated into three fractions using a large electromagnet (in this case a modified Frantz Isodynamic Separator). The most magnetic material, primarily magnetite, was not analyzed. The second fraction, largely ferromagnesian silicates and iron oxides, was saved for archival storage. The third fraction (the least magnetic material which may include the nonmagnetic ore minerals, zircon, sphene, etc.) was split using a Jones splitter. One split was hand-ground for spectrographic analysis; the other split was saved for mineralogical analysis. These magnetic separates are the same separates that would be produced by using a Frantz Isodynamic Separator set at a slope of 15° and a tilt of 10° with a current of 0.1 ampere to remove the magnetite and ilmenite, and a current of 1.0 ampere to split the remainder of the sample into paramagnetic and nonmagnetic fractions.

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

## Sample Analysis

### Spectrographic method

The stream-sediment, heavy-mineral-concentrate, and rock samples were analyzed for 31 elements using a semiquantitative, direct-current arc emission spectrographic method (Grimes and Marranzino, 1968; Myers and others, 1961). The elements analyzed and their lower limits of determination are listed in Table 1. Spectrographic results were obtained by visual comparison of spectra derived from the sample against spectra obtained from standards made from pure oxides and carbonates. Standard concentrations are geometrically spaced over any given order of magnitude of concentration as follows: 100, 50, 20, 10, and so forth. Samples whose concentrations are estimated to fall between those values are assigned values of 70, 30, 15, and so forth. The precision of the analytical method 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 samples from the Beaver Creek Wilderness Study Area are listed in the tables.

### Chemical Methods

Other methods of analysis used on samples from the Beaver Creek Wilderness Study Area are summarized in table 2.

## 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, 1976).

## DESCRIPTION OF DATA TABLES

Tables 3-5 list the 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 maps (plate 1). Columns in which the element headings show the letter "s" below the element symbol are emission spectrographic analyses; "aa" indicates atomic absorption 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 table 1. If an element was observed but was below the lowest reporting value, a "less than" symbol (<) was entered in the tables in front of the lower limit of determination. 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 tables 3-5, some of the elements listed in these tables (Fe, Mg, Ca, Ti, and Ag) 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.

## ACKNOWLEDGEMENTS

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We would also like to thank the ranchers and landowners who allowed us access on and through their properties.

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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 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 and stream sediments]

| Elements | Lower determination limit | Upper determination limit |
|---|---|---|
| | Percent | |
| Iron (Fe) | 0.05 | 20 |
| Magnesium (Mg) | 0.02 | 10 |
| Calcium (Ca) | 0.05 | 20 |
| Titanium (Ti) | 0.002 | 1 |
| | Parts per million | |
| Manganese (Mn) | 10 | 5,000 |
| Silver (Ag) | 0.5 | 5,000 |
| Arsenic (As) | 200 | 10,000 |
| Gold (Au) | 10 | 500 |
| Boron (B) | 10 | 2,000 |
| Barium (Ba) | 20 | 5,000 |
| Beryllium (Be) | 1 | 1,000 |
| Bismuth (Bi) | 10 | 1,000 |
| Cadmium (Cd) | 20 | 500 |
| Cobalt (Co) | 5 | 2,000 |
| Chromium (Cr) | 10 | 5,000 |
| Copper (Cu) | 5 | 20,000 |
| Lanthanum (La) | 20 | 1,000 |
| Molybdenum (Mo) | 5 | 2,000 |
| Niobium (Nb) | 20 | 2,000 |
| Nickel (Ni) | 5 | 5,000 |
| Lead (Pb) | 10 | 20,000 |
| Antimony (Sb) | 100 | 10,000 |
| Scandium (Sc) | 5 | 100 |
| Tin (Sn) | 10 | 1,000 |
| Strontium (Sr) | 100 | 5,000 |
| Vanadium (V) | 10 | 10,000 |
| Tungsten (W) | 50 | 10,000 |
| Yttrium (Y) | 10 | 2,000 |
| Zinc (Zn) | 200 | 10,000 |
| Zirconium (Zr) | 10 | 1,000 |
| Thorium (Th) | 100 | 2,000 |

**Table 2.--Chemical methods used**

[AA = atomic absorption; AC = neutron activation]

| Element or constituent determined | Method | Determination limit (micrograms/ gram or ppm) | Reference |
|---|---|---|---|
| Gold (Au) | AA | 0.05 | Thompson and others, 1968. |
| Arsenic (As) | AA | 5 or 10 | Modification of Viets, 1978. |
| Antimony (Sb) | AA | 2 | do. |
| Zinc (Zn) | AA | 5 | do. |
| Bismuth (Bi) | AA | 1 | do. |
| Cadmium (Cd) | AA | 0.1 | do. |
| Uranium (U) | AC | 0.2 | Millard and Keaton, 1982. |
| Thorium (Th) | AC | 1 | do. |

TABLE 3.--Analyses of stream-sediment samples from the Beaver Creek Wilderness Study Area, El Paso, Fremont, and Teller Counties, Colorado.

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

| Sample | Latitude | Longitude | Fe-pct. s | Mg-pct. s | Ca-pct. s | Ti-pct. s | Mn-ppm s | Ag-ppm s | As-ppm s | Au-ppm s | B-ppm s | Ba-ppm s |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 84BE001 | 38 34 49 | 105 4 48 | 2.0 | 1.0 | 1.5 | .20 | 1,000 | N | N | N | 50 | 700 |
| 84BE002 | 38 35 13 | 105 4 50 | 5.0 | .7 | 1.0 | .30 | 700 | N | N | N | 10 | 500 |
| 84BE003 | 38 35 43 | 105 4 50 | 3.0 | .7 | 1.0 | .30 | 1,000 | N | N | N | 10 | 500 |
| 84BE004 | 38 36 4 | 105 4 18 | 3.0 | .7 | 1.0 | .30 | 700 | N | N | N | 15 | 500 |
| 84BE005 | 38 38 36 | 104 56 6 | 15.0 | .5 | 1.5 | 1.00 | 1,500 | N | N | N | N | 500 |
| 84BE006 | 38 38 9 | 104 56 4 | 7.0 | .7 | 1.5 | .50 | 1,000 | N | N | N | N | 500 |
| 84BE007 | 38 38 17 | 104 55 55 | 3.0 | 1.0 | 1.0 | .30 | 1,500 | N | N | N | N | 500 |
| 84BE008 | 38 39 9 | 105 3 18 | 3.0 | .7 | 1.0 | .30 | 1,500 | N | N | N | N | 700 |
| 84BE009 | 38 37 25 | 105 2 23 | 5.0 | 1.0 | 1.5 | .50 | 1,500 | N | N | N | N | 500 |
| 84BE010 | 38 37 22 | 104 57 10 | 3.0 | 1.0 | 1.5 | .20 | 1,000 | N | N | N | N | 500 |
| 84BE011 | 38 37 22 | 104 57 4 | 5.0 | .7 | 1.0 | .30 | 1,500 | N | N | N | N | 500 |
| 84BE012 | 38 37 11 | 104 57 17 | 3.0 | 1.0 | 1.0 | .20 | 1,000 | N | N | N | N | 500 |
| 84BE013 | 38 36 56 | 104 56 54 | 5.0 | .7 | 1.0 | 1.00 | 1,500 | N | N | N | N | 700 |
| 84BE014 | 38 34 6 | 105 5 9 | 3.0 | 1.5 | 2.0 | .20 | 1,000 | N | N | N | 10 | 500 |
| 84BE015 | 38 33 34 | 105 5 13 | 3.0 | 1.0 | 3.0 | .20 | 500 | N | N | N | 50 | 500 |
| 84BE016 | 38 32 48 | 105 6 8 | 3.0 | 1.0 | 1.0 | .30 | 700 | N | N | N | 10 | 700 |
| 84BE018 | 38 37 45 | 105 2 31 | 5.0 | .7 | 1.5 | 1.00 | 700 | N | N | N | 10 | 700 |
| 84BE019 | 38 36 52 | 105 2 14 | 7.0 | 1.5 | 1.5 | 1.00 | 1,000 | N | N | N | 10 | 700 |
| 84BE020 | 38 36 58 | 105 2 12 | 3.0 | 1.0 | 2.0 | .50 | 1,000 | N | N | N | 10 | 700 |
| 84BE021 | 38 38 5 | 105 2 55 | 7.0 | 1.5 | 1.5 | 1.00 | 1,000 | N | N | N | 10 | 500 |
| 84BE022 | 38 38 9 | 105 2 51 | 7.0 | 1.0 | 1.5 | 1.00 | 1,000 | N | N | N | N | 500 |
| 84BE023 | 38 36 6 | 104 57 56 | 7.0 | 1.5 | 1.5 | 1.00 | 1,000 | N | N | N | N | 700 |
| 84BE024 | 38 36 4 | 104 58 4 | 10.0 | 2.0 | 3.0 | >1.00 | 1,500 | N | N | N | N | 700 |
| 84BE025 | 38 35 13 | 104 58 36 | 2.0 | .7 | .5 | .30 | 500 | N | N | N | 50 | 300 |
| 84BE026 | 38 34 47 | 104 59 29 | 3.0 | .7 | .5 | .20 | 300 | N | N | N | 50 | 300 |
| 84BE027 | 38 34 59 | 105 0 56 | 5.0 | 1.0 | .7 | .70 | 1,000 | N | N | N | N | 500 |
| 84BE028 | 38 37 41 | 105 1 17 | 3.0 | .7 | 1.0 | .50 | 700 | N | N | N | N | 500 |
| 84BE029 | 38 33 45 | 105 1 27 | 5.0 | 1.0 | 1.5 | .30 | 500 | N | N | N | 10 | 700 |
| 84BE030 | 38 37 40 | 105 1 22 | 2.0 | .7 | .7 | .30 | 500 | N | N | N | N | 500 |
| 84BE031 | 38 39 9 | 104 57 18 | 5.0 | .5 | 1.5 | .50 | 1,000 | N | N | N | N | 1,000 |
| 84BE032 | 38 33 31 | 105 2 11 | 5.0 | 1.0 | 1.0 | .30 | 300 | N | N | N | 100 | 300 |
| 84BE033 | 38 33 7 | 105 2 46 | 5.0 | 1.0 | 1.5 | .30 | 700 | N | N | N | 50 | 300 |
| 84BE034 | 38 32 1 | 105 4 22 | 3.0 | 1.0 | 1.5 | .30 | 1,000 | N | N | N | 20 | 700 |
| 84BE101 | 38 35 14 | 105 0 4 | 5.0 | .7 | 1.0 | .70 | 1,000 | N | N | N | N | 1,000 |
| 84BE102 | 38 35 11 | 105 0 0 | 7.0 | .7 | 1.0 | 1.00 | 700 | N | N | N | N | 1,000 |
| 84BE103 | 38 35 29 | 104 59 55 | 7.0 | .7 | 1.0 | 1.00 | 1,000 | N | N | N | N | 1,000 |
| 84BE107 | 38 35 38 | 105 1 28 | 3.0 | .7 | 1.5 | .30 | 700 | N | N | N | N | 700 |
| 84BE108 | 38 37 2 | 105 0 52 | 5.0 | .7 | 1.5 | .50 | 1,500 | N | N | N | N | 500 |
| 84BE109 | 38 38 5 | 104 59 43 | 7.0 | .5 | .5 | .50 | 700 | N | N | N | N | 500 |
| 84BE110 | 38 34 37 | 105 0 48 | 7.0 | 1.0 | .7 | .50 | 1,000 | N | N | N | 10 | 500 |
| 84BE111 | 38 38 56 | 104 57 28 | 7.0 | .7 | 1.5 | .70 | 1,000 | N | N | N | N | 700 |
| 84BE113 | 38 34 57 | 105 2 8 | 3.0 | .5 | .7 | .30 | 1,000 | N | N | N | N | 500 |
| 84BE114 | 38 35 37 | 104 57 37 | 1.5 | 2.0 | 3.0 | .15 | 500 | N | N | N | 15 | 300 |
| 84BE115 | 38 32 39 | 105 3 36 | 2.0 | 2.0 | 2.0 | .15 | 500 | N | N | N | 70 | 300 |
| 84BE116 | 38 31 20 | 105 4 54 | 3.0 | .5 | .7 | .30 | 700 | N | N | N | 50 | 700 |
| 84BE117 | 38 30 40 | 105 5 37 | 3.0 | .7 | .7 | .30 | 700 | N | N | N | 50 | 500 |
| 84BE035 | 38 40 38 | 104 55 4 | 7.0 | 2.0 | 1.5 | 1.00 | 700 | N | N | N | N | 700 |
| 84BE036 | 38 39 39 | 104 56 12 | 7.0 | 1.5 | 1.5 | >1.00 | 1,500 | N | N | N | N | 700 |
| 84BE037 | 38 39 38 | 104 23 8 | 15.0 | 1.5 | 1.5 | >1.00 | 1,500 | N | N | N | N | 500 |
| 84BE118 | 38 40 16 | 104 55 28 | 15.0 | 3.0 | 1.5 | >1.00 | 3,000 | N | N | N | N | 700 |

TABLE 3.--Analyses of stream-sediment samples from the Beaver Creek Wilderness Study Area, El Paso, Fremont, and Teller Counties, Colorado.--Continued

| Sample | Be-ppm s | Bi-ppm s | Cd-ppm s | Co-ppm s | Cr-ppm s | Cu-ppm s | La-ppm s | Mo-ppm s | Nb-ppm s | Ni-ppm s | Pb-ppm s | Sb-ppm s |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 84BE001 | 2.0 | N | N | 10 | 50 | 50 | 150 | N | N | 15 | 30 | N |
| 84BE002 | 2.0 | N | N | 10 | 70 | 70 | 150 | N | 20 | 30 | 50 | N |
| 84BE003 | 1.5 | N | N | 7 | 70 | 50 | 500 | N | 20 | 30 | 70 | N |
| 84BE004 | 1.5 | N | N | 7 | 30 | 50 | 300 | N | 20 | 10 | 70 | N |
| 84BE005 | 1.5 | N | N | 10 | 50 | 30 | 700 | N | 30 | 15 | 50 | N |
| 84BE006 | 1.5 | N | N | 10 | 50 | 50 | 500 | N | 20 | 15 | 50 | N |
| 84BE007 | 1.5 | N | N | 10 | 30 | 50 | 70 | N | 20 | 10 | 50 | N |
| 84BE008 | 1.5 | N | N | 7 | 30 | 30 | 70 | N | 20 | 10 | 50 | N |
| 84BE009 | 1.5 | N | N | 10 | 20 | 50 | 150 | N | 30 | 10 | 100 | N |
| 84BE010 | 1.0 | N | N | 7 | 30 | 70 | 70 | N | N | 20 | 50 | N |
| 84BE011 | 1.0 | N | N | 7 | 30 | 70 | 150 | N | N | 10 | 70 | N |
| 84BE012 | 1.0 | N | N | 7 | 70 | 70 | 150 | N | N | 30 | 70 | N |
| 84BE013 | 1.5 | N | N | 10 | 30 | 50 | 150 | N | 30 | 10 | 70 | N |
| 84BE014 | 1.0 | N | N | 7 | 50 | 20 | 50 | N | N | 10 | 50 | N |
| 84BE015 | 1.0 | N | N | 7 | 70 | 30 | 50 | N | N | 15 | 50 | N |
| 84BE016 | 1.5 | N | N | 7 | 30 | 30 | 50 | N | N | 20 | 50 | N |
| 84BE018 | 1.5 | N | N | 7 | 30 | 30 | 200 | N | 50 | 15 | 30 | N |
| 84BE019 | 1.5 | N | N | 15 | 30 | 70 | 150 | N | 50 | 10 | 70 | N |
| 84BE020 | 1.5 | N | N | 7 | 30 | 50 | 300 | N | 30 | 15 | 70 | N |
| 84BE021 | 1.5 | N | N | 15 | 100 | 70 | 200 | N | 30 | 30 | 70 | N |
| 84BE022 | 1.5 | N | N | 10 | 20 | 30 | 300 | N | 30 | 10 | 50 | N |
| 84BE023 | 1.5 | N | N | 15 | 70 | 50 | 100 | N | 20 | 30 | 50 | N |
| 84BE024 | 1.5 | N | N | 20 | 20 | 70 | 150 | N | 30 | 7 | 30 | N |
| 84BE025 | 1.5 | N | N | 5 | 30 | 10 | 30 | N | 20 | 7 | 20 | N |
| 84BE026 | 2.0 | N | N | 7 | 50 | 20 | 150 | N | N | 20 | 30 | N |
| 84BE027 | 2.0 | N | N | 10 | 70 | 30 | 300 | N | 30 | 15 | 50 | N |
| 84BE028 | 1.5 | N | N | 10 | 20 | 30 | 100 | N | N | 10 | 30 | N |
| 84BE029 | 1.0 | N | N | 10 | 70 | 15 | 100 | N | N | 15 | 50 | N |
| 84BE030 | 1.0 | N | N | 7 | 20 | 20 | 150 | N | N | 10 | 30 | N |
| 84BE031 | 1.0 | N | N | 15 | 15 | 20 | 150 | N | 20 | 5 | 30 | N |
| 84BE032 | 1.5 | N | N | 10 | 70 | 20 | 200 | N | N | 20 | 30 | N |
| 84BE033 | 1.0 | N | N | 15 | 70 | 20 | 100 | N | N | 15 | 50 | N |
| 84BE034 | 1.5 | N | N | 10 | 30 | 30 | 150 | N | N | 20 | 30 | N |
| 84BE101 | 1.5 | N | N | 10 | 30 | 15 | 500 | N | 20 | 7 | 30 | N |
| 84BE102 | 1.5 | N | N | 10 | 70 | 15 | 150 | N | 20 | 10 | 20 | N |
| 84BE103 | 1.5 | N | N | 10 | 70 | 20 | 150 | N | 20 | 10 | 30 | N |
| 84BE107 | 2.0 | N | N | 10 | 30 | 30 | 70 | N | N | 10 | 30 | N |
| 84BE108 | 1.5 | N | N | 10 | 50 | 20 | 150 | N | 20 | 15 | 30 | N |
| 84BE109 | 1.5 | N | N | 10 | 100 | 15 | 200 | N | 20 | 20 | 50 | N |
| 84BE110 | 1.5 | N | N | 15 | 70 | 50 | 200 | N | N | 30 | 30 | N |
| 84BE111 | 1.5 | N | N | 7 | 50 | 15 | 500 | N | 30 | 10 | 30 | N |
| 84BE113 | 1.5 | N | N | 5 | 70 | 20 | 200 | N | 20 | 10 | 30 | N |
| 84BE114 | N | N | N | 5 | 20 | 10 | 50 | N | N | 7 | 30 | N |
| 84BE115 | N | N | N | 7 | 50 | 20 | <30 | N | N | 15 | 30 | N |
| 84BE116 | 1.0 | N | N | 10 | 50 | 20 | 200 | N | N | 20 | 50 | N |
| 84BE117 | 1.0 | N | N | 7 | 50 | 20 | 300 | N | N | 15 | 30 | N |
| 84BE035 | 1.0 | N | N | 7 | 150 | 150 | 700 | N | N | 30 | 30 | N |
| 84BE036 | 1.0 | N | N | 7 | 70 | 70 | 300 | N | 20 | 15 | 30 | N |
| 84BE037 | 1.0 | N | N | 15 | 150 | 70 | 2,000 | N | 20 | 15 | 30 | N |
| 84BE118 | 1.5 | N | N | 10 | 150 | 70 | 300 | N | 30 | 10 | 20 | N |

TABLE 3.--Analyses of stream-sediment samples from the Beaver Creek Wilderness Study Area, El Paso, Fremont, and Teller Counties, Colorado.--Continued

| Sample | Sc-ppm s | Sn-ppm s | Sr-ppm s | V-ppm s | W-ppm s | Y-ppm s | Zn-ppm s | Zr-ppm s | Th-ppm s | Th-ppm ac | U-ppm ac |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 84BE001 | 10 | N | 200 | 70 | N | 50 | N | 200 | N | 33.2 | 10.90 |
| 84BE002 | 15 | N | 150 | 100 | N | 150 | N | 150 | N | 73.0 | 43.60 |
| 84BE003 | 15 | N | 200 | 70 | N | 200 | N | 300 | N | 106.0 | 43.50 |
| 84BE004 | 15 | N | 150 | 70 | N | 150 | N | 500 | N | 82.5 | 30.40 |
| 84BE005 | 30 | N | 150 | 200 | N | 150 | N | 1,500 | N | 87.4 | 24.40 |
| 84BE006 | 15 | N | 150 | 150 | N | 150 | N | 500 | N | 105.0 | 27.90 |
| 84BE007 | 15 | N | 150 | 70 | N | 50 | N | 200 | N | <7.0 | 21.70 |
| 84BE008 | 7 | N | 300 | 70 | N | 30 | N | 300 | N | 52.8 | 11.50 |
| 84BE009 | 20 | N | 150 | 70 | N | 100 | N | 1,500 | N | 45.0 | 25.70 |
| 84BE010 | 7 | N | 150 | 50 | N | 30 | N | 150 | N | 51.2 | 24.10 |
| 84BE011 | 7 | N | 150 | 70 | N | 50 | N | 300 | N | 34.5 | 30.70 |
| 84BE012 | 10 | N | 150 | 70 | N | 70 | N | 200 | N | 46.7 | 38.00 |
| 84BE013 | 10 | N | 150 | 70 | N | 50 | N | 200 | N | 28.1 | 17.00 |
| 84BE014 | 7 | N | 150 | 70 | N | 50 | N | 300 | N | 22.3 | 9.51 |
| 84BE015 | 7 | N | 150 | 70 | N | 30 | N | 300 | N | 22.8 | 10.50 |
| 84BE016 | 7 | N | 150 | 70 | N | 30 | N | 200 | N | 20.7 | 12.30 |
| 84BE018 | 15 | N | 200 | 70 | N | 150 | N | 1,500 | N | 91.1 | 31.50 |
| 84BE019 | 20 | N | 200 | 70 | N | 100 | N | 700 | N | 48.5 | 28.00 |
| 84BE020 | 15 | N | 200 | 70 | N | 200 | N | 300 | N | 36.8 | 19.00 |
| 84BE021 | 20 | N | 200 | 100 | N | 150 | N | 300 | N | 62.1 | 25.20 |
| 84BE022 | 15 | N | 200 | 100 | N | 100 | N | 300 | N | 103.0 | 23.90 |
| 84BE023 | 15 | N | 200 | 100 | N | 50 | N | 200 | N | 65.7 | 34.00 |
| 84BE024 | 20 | N | 300 | 100 | N | 100 | N | 300 | N | 38.8 | 21.70 |
| 84BE025 | 5 | N | <100 | 30 | N | 30 | N | 700 | N | 34.4 | 9.15 |
| 84BE026 | 7 | N | 100 | 70 | N | 50 | N | 200 | N | 39.3 | 9.84 |
| 84BE027 | 20 | N | 150 | 70 | N | 200 | N | 300 | N | 99.8 | 27.70 |
| 84BE028 | 10 | N | 150 | 70 | N | 70 | N | 300 | N | 33.3 | 16.90 |
| 84BE029 | 7 | N | 100 | 100 | N | 200 | N | 200 | N | 68.3 | 12.70 |
| 84BE030 | 10 | N | 150 | 70 | N | 70 | N | 200 | N | 28.1 | 23.30 |
| 84BE031 | 10 | N | 300 | 70 | N | 70 | N | 500 | N | 20.4 | 6.49 |
| 84BE032 | 10 | N | 150 | 70 | N | 50 | N | 300 | N | 41.1 | 9.58 |
| 84BE033 | 7 | N | 150 | 100 | N | 30 | N | 300 | N | 46.5 | 9.94 |
| 84BE034 | 10 | N | 150 | 70 | N | 100 | N | 200 | N | 17.6 | 4.87 |
| 84BE101 | 10 | N | 300 | 70 | N | 70 | N | 300 | N | 42.2 | 11.00 |
| 84BE102 | 10 | N | 200 | 150 | N | 70 | N | 300 | N | 34.9 | 9.65 |
| 84BE103 | 10 | N | 200 | 100 | N | 70 | N | 300 | N | 42.8 | 11.20 |
| 84BE107 | 10 | N | 200 | 50 | N | 30 | N | 200 | N | 25.1 | 8.34 |
| 84BE108 | 10 | N | 150 | 70 | N | 70 | N | 500 | N | 58.5 | 28.70 |
| 84BE109 | 7 | N | 150 | 150 | N | 200 | N | 300 | N | 95.7 | 17.40 |
| 84BE110 | 15 | N | 150 | 150 | N | 70 | N | 200 | N | 76.1 | 17.30 |
| 84BE111 | 15 | 20 | 300 | 150 | N | 100 | N | 1,500 | N | 54.1 | 23.70 |
| 84BE113 | 7 | N | 150 | 70 | N | 200 | N | 300 | N | 63.7 | 19.60 |
| 84BE114 | 5 | 15 | 150 | 30 | N | 70 | N | 300 | N | 22.3 | 6.58 |
| 84BE115 | 7 | N | 150 | 70 | N | 15 | N | 200 | N | 19.6 | 5.43 |
| 84BE116 | 10 | N | 150 | 70 | N | 50 | N | 300 | N | 44.0 | 8.90 |
| 84BE117 | 7 | N | 100 | 70 | N | 50 | N | 300 | N | 37.5 | 7.43 |
| 84BE035 | 15 | N | 200 | 70 | N | 70 | N | 1,000 | N | 32.0 | 13.80 |
| 84BE036 | 15 | N | 200 | 70 | N | 100 | N | 1,500 | N | 61.9 | 10.80 |
| 84BE037 | -- | -- | 150 | 150 | N | 300 | N | 3,000 | N | 176.0 | 25.10 |
| 84BE118 | 15 | N | 300 | 100 | N | 70 | N | 5,000 | N | 90.5 | 14.00 |

TABLE 4.--Analyses of heavy-mineral-concentrate samples from the Beaver Creek Wilderness Study Area, El Paso, Fremont, and Teller Counties, Colorado.

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

| Sample | Latitude | Longitude | Fe-pct. s | Mg-pct. s | Ca-pct. s | Ti-pct. s | Mn-ppm s | Ag-ppm s | As-ppm s | Au-ppm s | B-ppm s | Ba-ppm s |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 84BE001 | 38 34 49 | 105 4 48 | 1.50 | .70 | 30 | .50 | 5,000 | N | N | N | 70 | 1,000 |
| 84BE002 | 38 35 13 | 105 4 50 | .50 | .10 | 20 | .70 | 3,000 | N | N | N | 70 | 500 |
| 84BE003 | 38 35 43 | 105 4 50 | .50 | .10 | 50 | 1.00 | 7,000 | N | N | N | 20 | 150 |
| 84BE004 | 38 36 4 | 105 4 18 | .30 | .07 | 20 | .50 | 3,000 | N | N | N | 50 | 3,000 |
| 84BE005 | 38 38 36 | 104 56 6 | .30 | .10 | 10 | 1.00 | 500 | N | N | N | 20 | 2,000 |
| 84BE006 | 38 38 9 | 104 56 4 | .50 | .15 | 10 | .50 | 1,000 | N | N | N | 20 | 1,500 |
| 84BE007 | 38 38 17 | 104 55 55 | .50 | .07 | 30 | 1.50 | 5,000 | N | N | N | <20 | 500 |
| 84BE008 | 38 39 9 | 105 3 18 | .70 | .10 | 50 | 1.00 | 5,000 | N | N | N | 20 | 300 |
| 84BE009 | 38 37 25 | 105 2 23 | .30 | .10 | 30 | 2.00 | 2,000 | N | N | N | 20 | 300 |
| 84BE010 | 38 37 22 | 104 57 10 | .30 | .10 | 30 | .70 | 3,000 | N | N | N | 20 | 700 |
| 84BE011 | 38 37 22 | 104 57 4 | .70 | .10 | 30 | .50 | 7,000 | N | N | N | 20 | 500 |
| 84BE012 | 38 37 11 | 104 57 17 | .70 | .10 | 20 | .50 | 5,000 | N | N | N | 20 | 1,500 |
| 84BE013 | 38 36 56 | 104 56 54 | .30 | .07 | 30 | .30 | 7,000 | N | N | N | 20 | 10,000 |
| 84BE014 | 38 34 6 | 105 5 9 | .70 | 2.00 | 20 | >2.00 | 5,000 | N | N | N | 50 | 5,000 |
| 84BE015 | 38 33 34 | 105 5 13 | 1.00 | .20 | 20 | .70 | 10,000 | N | N | N | 70 | 2,000 |
| 84BE016 | 38 32 48 | 105 5 8 | .50 | .10 | 15 | >2.00 | 2,000 | N | N | N | 30 | 700 |
| 84BE018 | 38 37 45 | 105 2 31 | .50 | .10 | 50 | 2.00 | 2,000 | N | N | N | 20 | 150 |
| 84BE019 | 38 36 52 | 105 2 14 | .50 | .15 | 30 | .70 | 2,000 | N | N | N | 20 | 500 |
| 84BE020 | 38 36 58 | 105 2 12 | .20 | .07 | 50 | .20 | 7,000 | N | N | N | <20 | 2,000 |
| 84BE021 | 38 38 5 | 105 2 55 | .30 | .20 | 20 | 1.00 | 2,000 | N | N | N | 20 | 1,000 |
| 84BE022 | 38 38 9 | 105 2 51 | .50 | .10 | 20 | .50 | 2,000 | N | N | N | 30 | 700 |
| 84BE023 | 38 36 6 | 104 57 56 | .30 | .10 | 20 | >2.00 | 2,000 | N | N | N | 20 | 2,000 |
| 84BE024 | 38 36 4 | 104 58 4 | 1.00 | .20 | 7 | .15 | 700 | N | N | N | 30 | 2,000 |
| 84BE025 | 38 35 13 | 104 58 36 | .50 | .30 | 15 | >2.00 | 3,000 | N | N | N | 150 | 5,000 |
| 84BE026 | 38 34 47 | 104 59 29 | .70 | .50 | 30 | 1.00 | 7,000 | N | N | N | 50 | >10,000 |
| 84BE027 | 38 34 59 | 105 0 56 | .30 | .05 | 10 | >2.00 | 2,000 | N | N | N | 20 | >10,000 |
| 84BE028 | 38 37 41 | 105 1 17 | .50 | .10 | 15 | 2.00 | 1,000 | N | N | N | 70 | 1,000 |
| 84BE029 | 38 33 45 | 105 1 27 | .30 | .50 | 7 | .50 | 1,000 | N | N | N | 50 | >10,000 |
| 84BE030 | 38 37 40 | 105 1 22 | .20 | .05 | 30 | .15 | 1,500 | N | N | N | 20 | 700 |
| 84BE031 | 38 39 9 | 104 57 18 | .30 | .05 | 15 | .30 | 500 | N | N | N | 20 | 500 |
| 84BE032 | 38 33 31 | 105 2 11 | .70 | .30 | 20 | .15 | 3,000 | N | N | N | 50 | >10,000 |
| 84BE033 | 38 33 7 | 105 2 46 | .70 | .30 | 10 | .50 | 2,000 | N | N | N | 50 | 7,000 |
| 84BE034 | 38 32 1 | 105 4 22 | .30 | .07 | 50 | 2.00 | 5,000 | N | N | N | 20 | 5,000 |
| 84BE101 | 38 35 14 | 105 0 4 | .20 | .05 | 20 | >2.00 | 2,000 | N | N | N | 20 | 5,000 |
| 84BE102 | 38 35 11 | 105 0 0 | .70 | .07 | 5 | .30 | 1,000 | N | N | N | 30 | 3,000 |
| 84BE103 | 38 35 29 | 104 59 55 | .70 | .20 | 30 | .70 | 2,000 | N | N | N | 20 | 1,500 |
| 84BE107 | 38 35 38 | 105 1 28 | .70 | .20 | 50 | 2.00 | 7,000 | N | N | N | 20 | 2,000 |
| 84BE108 | 38 37 2 | 105 0 52 | .30 | .05 | 30 | .50 | 3,000 | 10 | N | N | 30 | 150 |
| 84BE109 | 38 38 5 | 104 59 43 | .50 | .05 | 7 | .30 | 1,000 | N | N | N | 30 | 1,000 |
| 84BE110 | 38 34 37 | 105 0 48 | .50 | .10 | 10 | .20 | 2,000 | N | N | N | 50 | >10,000 |
| 84BE111 | 38 38 56 | 104 57 28 | .50 | .10 | 10 | >2.00 | 1,000 | N | N | N | 20 | 2,000 |
| 84BE113 | 38 34 57 | 105 2 8 | .30 | .07 | 50 | 1.50 | 10,000 | N | N | N | 20 | >10,000 |
| 84BE114 | 38 35 37 | 104 57 37 | 2.00 | 1.00 | 50 | 2.00 | 5,000 | N | N | N | 70 | 1,000 |
| 84BE115 | 38 32 39 | 105 3 36 | 1.00 | 2.00 | 20 | 1.50 | 3,000 | N | N | N | 100 | 2,000 |
| 84BE116 | 38 31 20 | 105 4 54 | 1.50 | .50 | 10 | 2.00 | 2,000 | N | N | N | 100 | >10,000 |
| 84BE117 | 38 30 40 | 105 5 37 | 1.50 | .50 | 15 | 2.00 | 1,500 | N | N | N | 70 | >10,000 |
| 84BE035 | 38 40 38 | 104 55 4 | .30 | .07 | 15 | 2.00 | 1,500 | N | N | N | 20 | 3,000 |
| 84BE036 | 38 39 39 | 104 56 12 | .20 | <.05 | 20 | .10 | 2,000 | N | N | N | N | 150 |
| 84BE037 | 38 39 38 | 104 56 8 | .50 | <.05 | 20 | .15 | 2,000 | N | N | N | <20 | 150 |
| 84BE118 | 38 40 16 | 104 55 28 | .15 | <.05 | 10 | .07 | 1,500 | N | N | N | 20 | 500 |

TABLE 4.--Analyses of heavy-mineral-concentrate samples from the Beaver Creek Wilderness Study Area, El Paso, Fremont, and Teller Counties, Colorado.--Continued

| Sample | Be-ppm s | Bi-ppm s | Cd-ppm s | Co-ppm s | Cr-ppm s | Cu-ppm s | La-ppm s | Mo-ppm s | Nb-ppm s | Ni-ppm s | Pb-ppm s |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 84BE001 | 7 | N | N | N | 20 | 10 | 300 | N | <50 | 10 | 50 |
| 84BE002 | 7 | N | N | N | 20 | N | 500 | 10 | <50 | N | 20 |
| 84BE003 | 7 | N | N | N | 30 | N | 500 | N | <50 | N | 30 |
| 84BE004 | 7 | N | N | N | <20 | N | 100 | N | <50 | N | 20 |
| 84BE005 | 5 | N | N | N | <20 | N | 50 | N | <50 | N | 20 |
| 84BE006 | 5 | N | N | N | 20 | N | 50 | N | N | N | N |
| 84BE007 | 3 | N | N | N | <20 | N | 200 | 100 | <50 | N | N |
| 84BE008 | 5 | N | N | N | <20 | N | 700 | N | N | N | 150 |
| 84BE009 | 7 | N | N | N | <20 | N | 300 | N | <50 | N | 50 |
| 84BE010 | 3 | N | N | N | <20 | N | 150 | 200 | <50 | N | 70 |
| 84BE011 | 3 | N | N | N | <20 | 10 | 300 | 200 | <50 | N | 3,000 |
| 84BE012 | 5 | N | N | N | 30 | <10 | 500 | 70 | N | N | 100 |
| 84BE013 | 3 | N | N | 20 | <20 | N | 700 | N | N | N | 20 |
| 84BE014 | 5 | N | N | N | 20 | N | 2,000 | 50 | 50 | N | 200 |
| 84BE015 | 10 | N | N | N | 20 | 10 | 500 | N | N | N | 300 |
| 84BE016 | 5 | N | N | N | 20 | N | 500 | 100 | <50 | 10 | 150 |
| 84BE018 | 5 | N | N | N | 20 | N | 700 | N | <50 | N | 30 |
| 84BE019 | 5 | N | N | N | <20 | N | 2,000 | N | N | N | 50 |
| 84BE020 | 3 | N | N | N | <20 | N | 300 | N | N | N | 30 |
| 84BE021 | 5 | N | N | N | 20 | N | 500 | N | N | 10 | 30 |
| 84BE022 | 5 | N | N | N | <20 | N | 1,500 | N | N | N | 30 |
| 84BE023 | 2 | N | N | N | 70 | N | 300 | N | 200 | N | 700 |
| 84BE024 | 7 | N | N | N | <20 | N | 200 | N | N | 10 | N |
| 84BE025 | 3 | N | N | N | 50 | N | 300 | N | 200 | 10 | 300 |
| 84BE026 | 5 | N | N | N | 30 | N | 500 | N | 50 | N | 50 |
| 84BE027 | 2 | N | N | N | 100 | N | 300 | 70 | 500 | N | 50 |
| 84BE028 | 7 | N | N | N | <20 | N | 150 | N | <50 | N | 50 |
| 84BE029 | 5 | N | N | N | 20 | N | 100 | N | N | N | 30 |
| 84BE030 | 5 | N | N | N | <20 | N | 200 | N | N | N | 30 |
| 84BE031 | 5 | N | N | N | <20 | N | 200 | N | N | N | 50 |
| 84BE032 | 5 | N | N | N | 30 | N | 200 | N | N | N | 30 |
| 84BE033 | 5 | N | N | N | 30 | N | 100 | N | N | N | 30 |
| 84BE034 | 3 | N | N | N | <20 | N | 200 | N | N | N | 20 |
| 84BE101 | 2 | N | N | N | 150 | 20 | 150 | N | 500 | N | 300 |
| 84BE102 | 3 | N | N | N | <20 | N | 100 | N | N | N | 20 |
| 84BE103 | 2 | N | N | N | <20 | N | 700 | N | <50 | N | 50 |
| 84BE107 | 3 | N | N | N | 20 | 10 | 700 | N | <50 | N | 30 |
| 84BE108 | 5 | N | N | N | <20 | N | 300 | N | N | N | 30 |
| 84BE109 | 5 | N | N | N | 20 | N | 500 | 70 | <50 | N | 50 |
| 84BE110 | 5 | N | N | N | <20 | 20 | 300 | N | N | N | 50 |
| 84BE111 | 5 | N | N | N | 20 | N | 100 | N | 50 | N | 70 |
| 84BE113 | 5 | N | N | N | 20 | 10 | 500 | N | <50 | N | 50 |
| 84BE114 | 7 | N | N | 10 | 50 | <10 | 700 | N | 70 | 15 | 2,000 |
| 84BE115 | 5 | N | N | N | 30 | N | 500 | N | <50 | N | 30 |
| 84BE116 | 10 | N | N | N | 50 | 10 | 700 | N | 50 | 10 | 70 |
| 84BE117 | 2 | N | N | N | 70 | N | 200 | 300 | N | 15 | 70 |
| 84BE035 | 3 | N | N | N | 20 | N | 150 | N | <50 | N | N |
| 84BE036 | <2 | N | N | N | <20 | N | 500 | N | N | N | N |
| 84BE037 | 2 | N | N | N | <20 | N | 200 | N | N | <10 | N |
| 84BE118 | 3 | N | N | N | <20 | N | 100 | N | N | N | N |

TABLE 4.--Analyses of heavy-mineral-concentrate samples from the Beaver Creek Wilderness Study Area, El Paso, Fremont, and Teller Counties, Colorado.--Continued

| Sample | Sb-ppm s | Sc-ppm s | Sn-ppm s | Sr-ppm s | V-ppm s | W-ppm s | Y-ppm s | Zn-ppm s | Zr-ppm s | Th-ppm s |
|---|---|---|---|---|---|---|---|---|---|---|
| 84BE001 | N | -- | 1,500 | 200 | 50 | 100 | 1,000 | N | 1,500 | N |
| 84BE002 | N | -- | N | N | 20 | 500 | 1,500 | N | >2,000 | N |
| 84BE003 | N | -- | N | N | 30 | N | 2,000 | N | >2,000 | N |
| 84BE004 | N | -- | N | 200 | 20 | N | 1,500 | N | >2,000 | N |
| 84BE005 | N | -- | N | 500 | 20 | N | 500 | N | >2,000 | N |
| 84BE006 | N | -- | N | 500 | <20 | <100 | 200 | N | 1,500 | N |
| 84BE007 | N | -- | N | 200 | 50 | 1,500 | 1,500 | N | >2,000 | N |
| 84BE008 | N | -- | N | 200 | 30 | N | 2,000 | N | >2,000 | N |
| 84BE009 | N | -- | N | N | 20 | N | 3,000 | N | >2,000 | N |
| 84BE010 | N | -- | N | 300 | 50 | 5,000 | 1,500 | N | >2,000 | N |
| 84BE011 | N | -- | N | 200 | 30 | 5,000 | 2,000 | N | 2,000 | N |
| 84BE012 | N | -- | N | 200 | 30 | 2,000 | 1,000 | N | 2,000 | N |
| 84BE013 | N | -- | N | 300 | <20 | <100 | 2,000 | N | >2,000 | N |
| 84BE014 | N | -- | N | 500 | 70 | <100 | 2,000 | N | >2,000 | <200 |
| 84BE015 | N | -- | N | 1,000 | 50 | 100 | 1,500 | N | >2,000 | N |
| 84BE016 | N | -- | N | 200 | 70 | 300 | 1,500 | N | >2,000 | N |
| 84BE018 | N | -- | N | 200 | 50 | N | 5,000 | N | >2,000 | N |
| 84BE019 | N | -- | N | 200 | 20 | N | 2,000 | N | >2,000 | N |
| 84BE020 | N | -- | N | 200 | <20 | N | 2,000 | N | >2,000 | N |
| 84BE021 | N | -- | N | 500 | 20 | N | 1,500 | N | >2,000 | N |
| 84BE022 | N | -- | N | 200 | <20 | N | 1,000 | N | >2,000 | N |
| 84BE023 | N | -- | N | 700 | 100 | N | 1,000 | N | >2,000 | N |
| 84BE024 | N | -- | N | 200 | 20 | N | 150 | N | 1,500 | N |
| 84BE025 | N | -- | 150 | 300 | 300 | N | 3,000 | N | >2,000 | 200 |
| 84BE026 | N | -- | N | 1,000 | 50 | N | 2,000 | N | >2,000 | N |
| 84BE027 | N | -- | 150 | 500 | 300 | 500 | 1,000 | N | >2,000 | N |
| 84BE028 | N | -- | N | 200 | 50 | N | 2,000 | N | >2,000 | N |
| 84BE029 | N | -- | N | 700 | 20 | N | 500 | N | >2,000 | N |
| 84BE030 | N | -- | N | 200 | <20 | N | 5,000 | N | >2,000 | N |
| 84BE031 | N | -- | N | 500 | <20 | N | 500 | N | >2,000 | N |
| 84BE032 | N | -- | N | 1,000 | 50 | N | 500 | N | 500 | N |
| 84BE033 | N | -- | N | 500 | 50 | N | 300 | N | 300 | N |
| 84BE034 | N | -- | N | 500 | 70 | N | 1,500 | N | 500 | N |
| 84BE101 | N | -- | 100 | 500 | 150 | <100 | 500 | N | 2,000 | N |
| 84BE102 | N | -- | N | 200 | <20 | N | 200 | N | 1,000 | N |
| 84BE103 | N | -- | N | 700 | 20 | N | 1,000 | N | >2,000 | N |
| 84BE107 | N | -- | N | 200 | 20 | <100 | 1,500 | N | >2,000 | N |
| 84BE108 | N | -- | N | N | <20 | <100 | 3,000 | N | >2,000 | N |
| 84BE109 | N | -- | N | 200 | 20 | 1,000 | 500 | N | >2,000 | <200 |
| 84BE110 | N | -- | N | 700 | <20 | N | 500 | N | 1,500 | N |
| 84BE111 | N | -- | N | 500 | 20 | N | 500 | N | >2,000 | N |
| 84BE113 | N | -- | N | 500 | 20 | 100 | 2,000 | N | >2,000 | N |
| 84BE114 | N | -- | 50 | 1,000 | 100 | N | 1,500 | N | >2,000 | N |
| 84BE115 | N | -- | N | 700 | 50 | 150 | 1,000 | N | >2,000 | N |
| 84BE116 | N | -- | N | 500 | 50 | N | 500 | N | >2,000 | N |
| 84BE117 | N | -- | N | 1,500 | 150 | 1,000 | 1,500 | N | >2,000 | N |
| 84BE035 | N | -- | N | 500 | 50 | <100 | 500 | N | >2,000 | N |
| 84BE036 | N | -- | N | 200 | <20 | N | 1,000 | N | >2,000 | N |
| 84BE037 | N | -- | N | 200 | <20 | N | 1,500 | N | >2,000 | N |
| 84BE118 | N | -- | N | 300 | <20 | 150 | 500 | N | >2,000 | N |

TABLE 5.--Analyses of rock samples from the Beaver Creek Wilderness Study Area, El Paso, Fremont, and Teller Counties, Colorado.

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

| Sample | Latitude | Longitude | Fe-pct. s | Mg-pct. s | Ca-pct. s | Ti-pct. s | Mn-ppm s | Ag-ppm s | As-ppm s | Au-ppm s | B-ppm s | Ba-ppm s | Be-ppm s |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 84BE007R | 38 38 17 | 104 55 55 | .30 | .03 | .30 | .030 | 50 | N | N | N | N | 1,000 | 1 |
| 84BE008R | 38 39 9 | 105 3 18 | 10.00 | 1.50 | 3.00 | 1.000 | 700 | N | N | N | N | 1,500 | 3 |
| 84BE014R | 38 34 6 | 105 5 9 | 2.00 | .05 | .05 | .030 | 150 | N | N | N | 10 | 70 | 1 |
| 84BE017R | 38 32 51 | 105 6 16 | 7.00 | 3.00 | 1.50 | 1.000 | 1,500 | N | N | N | N | 500 | 2 |
| 84BE025R | 38 35 13 | 104 58 36 | .70 | .50 | 1.00 | .100 | 300 | N | N | N | 50 | 200 | 2 |
| 84BE026R | 38 34 47 | 104 59 29 | .10 | N | N | .005 | 20 | N | N | N | N | 30 | N |
| 84BE104R | 38 35 3 | 105 0 8 | .07 | N | N | <.002 | 50 | N | N | N | N | 15 | N |
| 84BE105R1 | 38 34 57 | 105 0 11 | .30 | .10 | .70 | .007 | 200 | N | N | N | N | 100 | 10 |
| 84BE105R2 | 38 34 57 | 105 0 11 | .10 | N | N | .001 | 30 | N | N | N | N | 10 | N |
| 84BE106R | 38 34 29 | 105 0 36 | .50 | .07 | .30 | .050 | 300 | N | N | N | 20 | 150 | N |
| 84BE112R | 38 34 59 | 105 2 5 | .70 | .05 | .70 | .070 | 200 | N | N | N | 10 | 2,000 | N |
| 84BE115R | 38 32 39 | 105 3 36 | 1.50 | .15 | .05 | .150 | 100 | N | N | N | 20 | 50 | N |

TABLE 5.--Analyses of rock samples from the Beaver Creek Wilderness Study Area, El Paso, Fremont, and Teller Counties, Colorado.--Continued

| Sample | Bi-ppm s | Cd-ppm s | Co-ppm s | Cr-ppm s | Cu-ppm s | La-ppm s | Mo-ppm s | Nb-ppm s | Ni-ppm s | Pb-ppm s | Sb-ppm s | Sc-ppm s | Sn-ppm s |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 84BE007R | N | N | N | 15 | 15 | N | N | N | N | 70 | N | N | N |
| 84BE008R | N | N | 20 | 10 | 100 | 150 | N | 20 | 5 | 30 | N | 20 | N |
| 84BE014R | N | N | N | N | 15 | N | N | N | 7 | N | N | N | N |
| 84BE017R | N | N | 20 | 70 | 7 | 50 | N | N | 50 | 10 | N | 20 | 10 |
| 84BE025R | N | N | N | N | 7 | N | N | N | N | 10 | N | N | N |
| 84BE026R | N | N | N | N | 7 | N | N | N | N | N | N | N | N |
| 84BE104R | N | N | N | N | 5 | N | N | N | N | N | N | N | N |
| 84B105R1 | N | N | N | N | 7 | N | N | N | N | N | N | N | N |
| 84B105R2 | N | N | N | N | 7 | N | N | N | N | N | N | N | N |
| 84BE106R | N | N | N | N | 7 | N | N | N | 5 | N | N | N | N |
| 84BE112R | N | N | N | N | 30 | N | N | N | N | 20 | N | 5 | N |
| 84BE115R | N | N | N | N | 7 | N | N | N | 5 | N | N | N | N |

TABLE 5.--Analyses of rock samples from the Beaver Creek Wilderness Study Area, El Paso, Fremont, and Teller Counties, Colorado.--Continued

| Sample | Sr-ppm s | V-ppm s | W-ppm s | Y-ppm s | Zn-ppm s | Zr-ppm s | Th-ppm s | As-ppm aa | Bi-ppm aa | Cd-ppm aa | Sb-ppm aa | Zn-ppm aa |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 84BF007R | 150 | N | N | 10 | N | 30 | N | N | N | N | N | 4 |
| 84BE008R | 700 | 50 | N | 70 | N | 300 | N | N | N | 1.4 | N | 86 |
| 84BF014R | N | 10 | N | N | N | 100 | N | 6 | N | .2 | N | 7 |
| 84BE017R | 150 | 200 | N | 30 | 300 | 150 | N | N | N | .6 | N | 190 |
| 84BE025R | 300 | 15 | N | 10 | N | 30 | N | N | N | .1 | N | 15 |
| 84BE026R | N | N | N | N | N | N | N | N | N | N | N | N |
| 84BE104R | N | N | N | N | N | N | N | N | N | N | N | N |
| 84B105R1 | N | N | N | N | N | N | N | N | N | N | N | 3 |
| 84B105R2 | N | N | N | N | N | N | N | N | N | N | N | N |
| 84BE106R | 100 | N | N | N | N | 500 | N | N | N | .1 | N | 8 |
| 84BE112R | N | N | N | N | N | 100 | N | N | N | N | N | 3 |
| 84BE115R | N | 10 | N | 10 | N | 1,500 | N | 32 | N | N | N | 4 |

**TABLE 6.--Brief field description of rock samples listed in table 5**

| Sample number | Sample type | Sample Source |
|---|---|---|
| 84 BE 007R | Iron-stained granite | Float |
| 84 BE 008R | lamprophyre | Float |
| 84 BE 014R | jasperoid | Float |
| 84 BE 017R | Amphibolite dike | Outcrop |
| 84 BE 025R | Iron-stained granite | Float |
| 84 BE 026R | Iron-stained quartz | Float |
| 84 BE 104R | Iron-stained quartz | Float |
| 84 BE 105RI | Muscovite pegmatite | Prospect |
| 84 BE 105R2 | Iron-stained quartz | Prospect |
| 84 BE 106R2 | Limonitic sandstone | Float |
| 84 BE 112R2 | Greisenized quartz monzonite | Prospect |
| 84 BE 115R2 | Hematitic sandstone | Outcrop |