UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

# Analytical results and sample locality maps of rock samples from the northwestern Idaho Falls and the northeastern Hailey 1 x 2 degree quadrangles, Idaho

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## STUDIES RELATED TO CUSMAP

This report presents the results of a partial geochemical survey of a part of the Idaho Falls and the Hailey 1 x 2 degree quadrangles, Idaho. Samples for geochemical analyses were collected as one of several multidisciplinary studies associated with a U.S. Geological Survey Conterminous United States Mineral Appraisal Program (CUSMAP) to evaluate the mineral resources of the Hailey 1 x 2 degree quadrangle and part of the Idaho Falls 1 x 2 degree quadrangle, Idaho.

## INTRODUCTION

In 1987, the U.S. Geological Survey conducted a reconnaissance geochemical survey of rock-chip and stream-sediment samples from the northwestern Idaho Falls 1 x 2 degree quadrangle and the northeastern part of the Hailey 1 x 2 degree quadrangle, Idaho (fig. 1). Sixty-five rock-chip samples and two stream-sediment samples were collected from five areas within the Idaho Falls and the Hailey 1 x 2 degree quadrangles: Mackay, Copper Basin, Muldoon Canyon, and Grouse 15-minute quadrangles, and Phi Kappa Mountain 7.5-minute quadrangles (figs. 2-6). This report presents the results of the geochemical analyses.

Geochemical sampling was concentrated on known mineral deposits from five mining districts: Alder Creek, Copper Basin, Little Wood River, Lava Creek, and Alto (fig. 1). Three types of mineral deposits have been exploited intermittently from these districts since their discovery in the late 1800's: skarn deposits, polymetallic veins in Paleozoic sedimentary rocks, and polymetallic veins in volcanic rocks (Worl and others, 1989). These deposits produced copper, lead, zinc, silver, gold, tungsten, molybdenum, barite, iron, and fluorspar (Nelson and Ross, 1969a). Current exploration in the region is focused on disseminated gold deposits in volcanic and sedimentary terranes and on gold skarns. There does not appear to be an interest in base metals at the present time.

Geology was previously mapped and described by Nelson and Ross (1968, 1969a and b), Skipp (1988, 1989) and Skipp and others (1990). Geologic units are Paleozoic rocks, mainly carbonates and clastics, intruded by Tertiary granitic stocks and hypabyssal bodies and overlain by Eocene volcanic rocks. Several north- and northeast-striking faults cut all rock types. A more complete discussion of these strata and their structural relations is discussed in Link and others (1988) and Worl and others (1989).

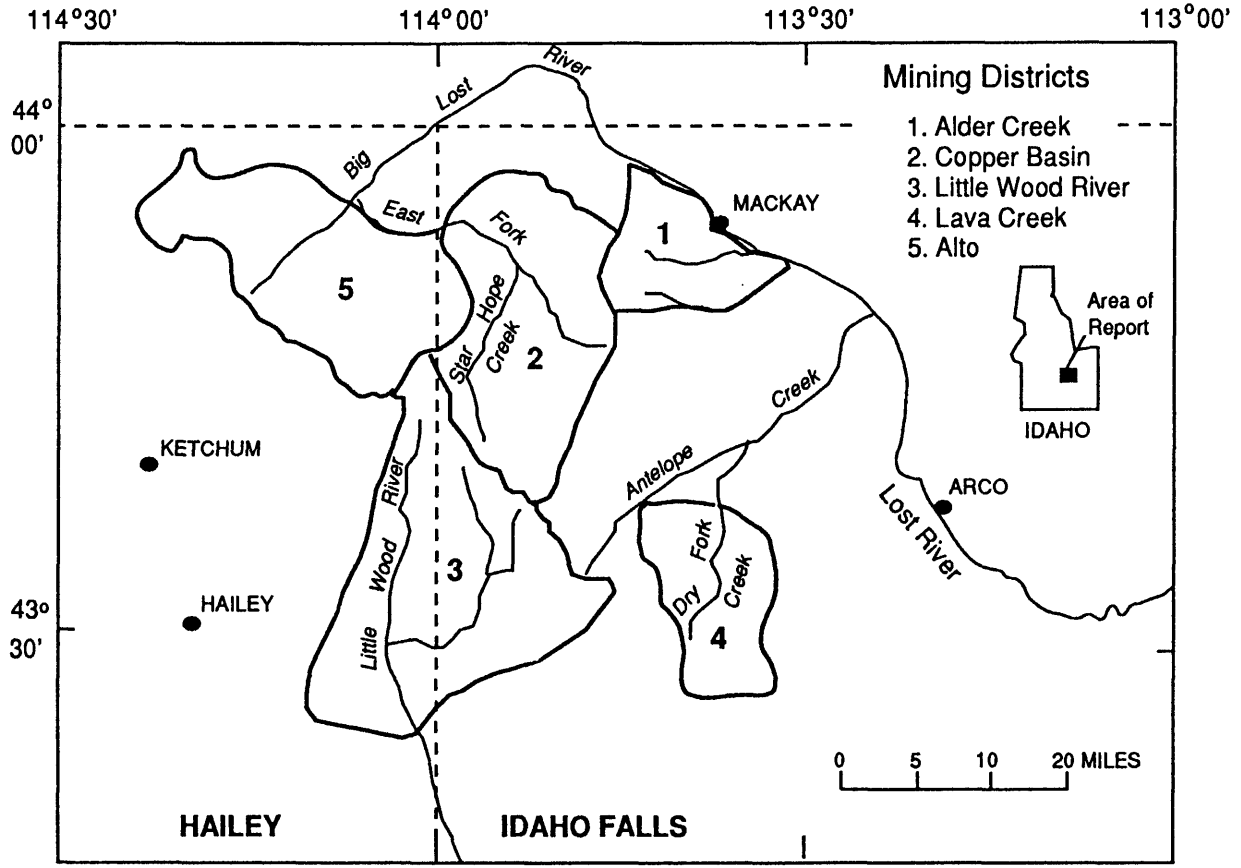



Figure 1. Location of the northwestern Idaho Falls and northeastern Hailey 1 x 2 degree quadrangles, including mining districts.

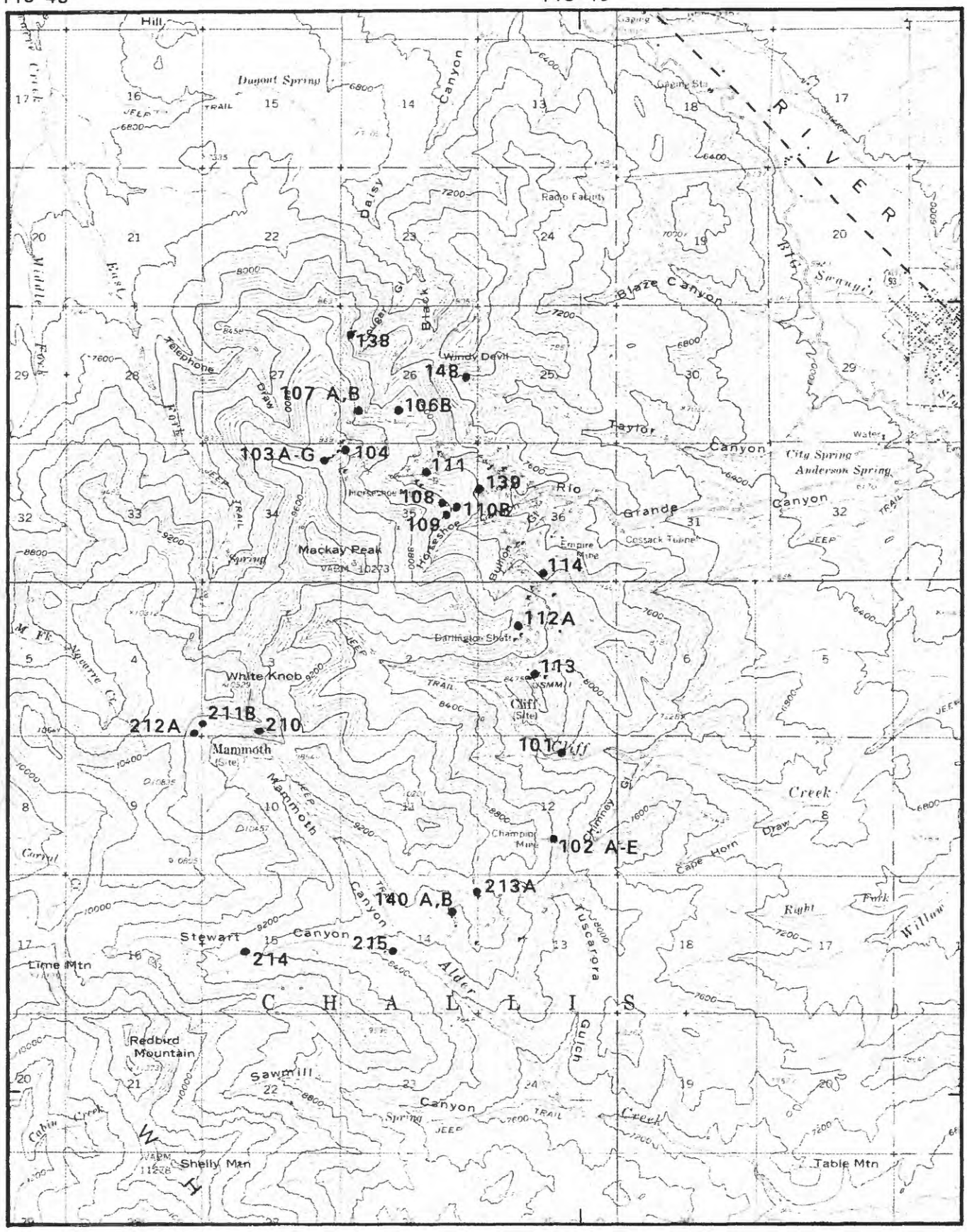



Figure 2. Localities of rock samples from the Mackay 15-minute quadrangle.

Base from the USGS; 1:62,500
Mackay, Idaho, 1960

1 ½ 0 1 2 3 4 MILES

1 .5 0 1 2 3 4 KILOMETERS

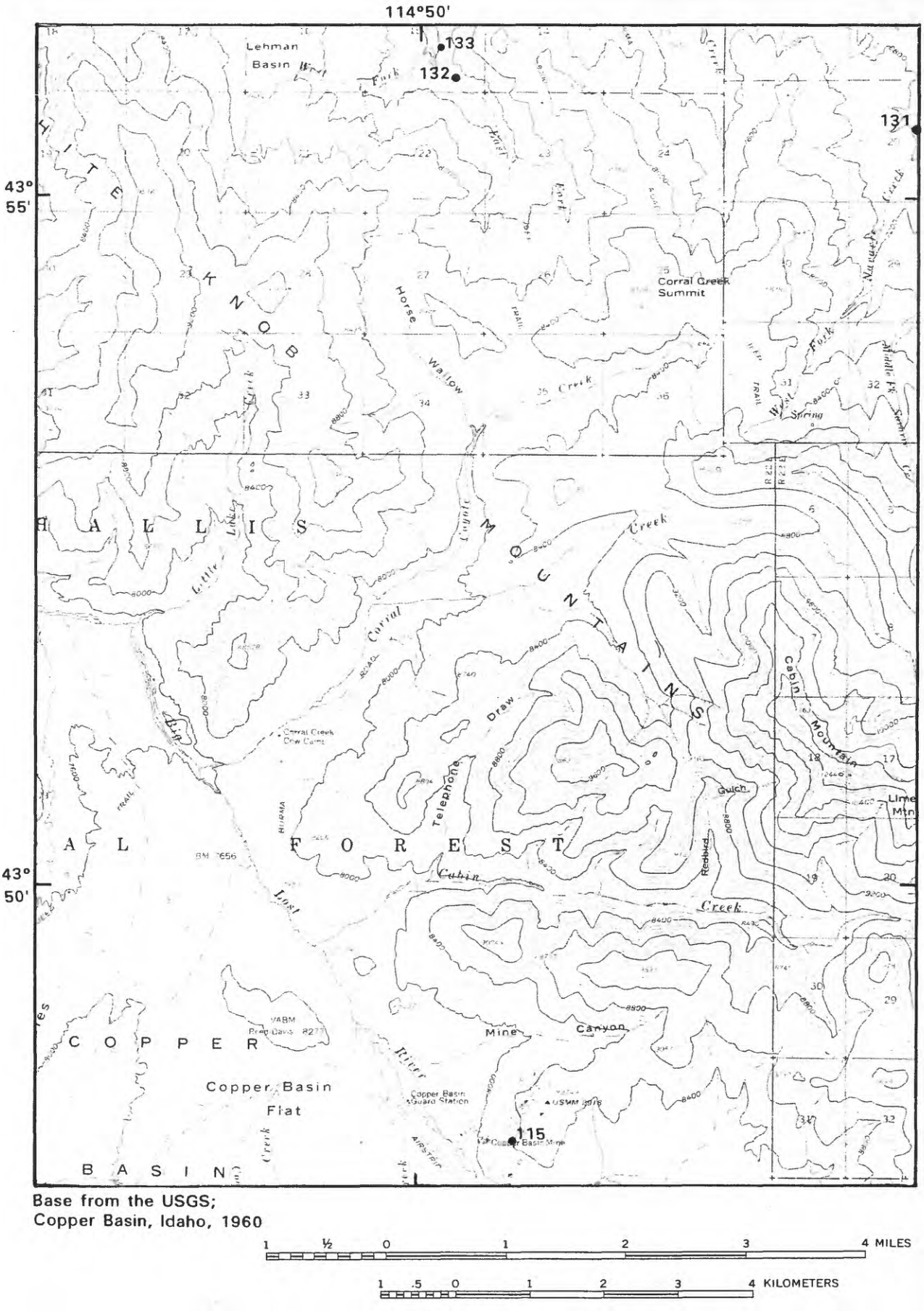



Figure 3. Localities of rock samples from the Copper Basin 15-minute quadrangle.

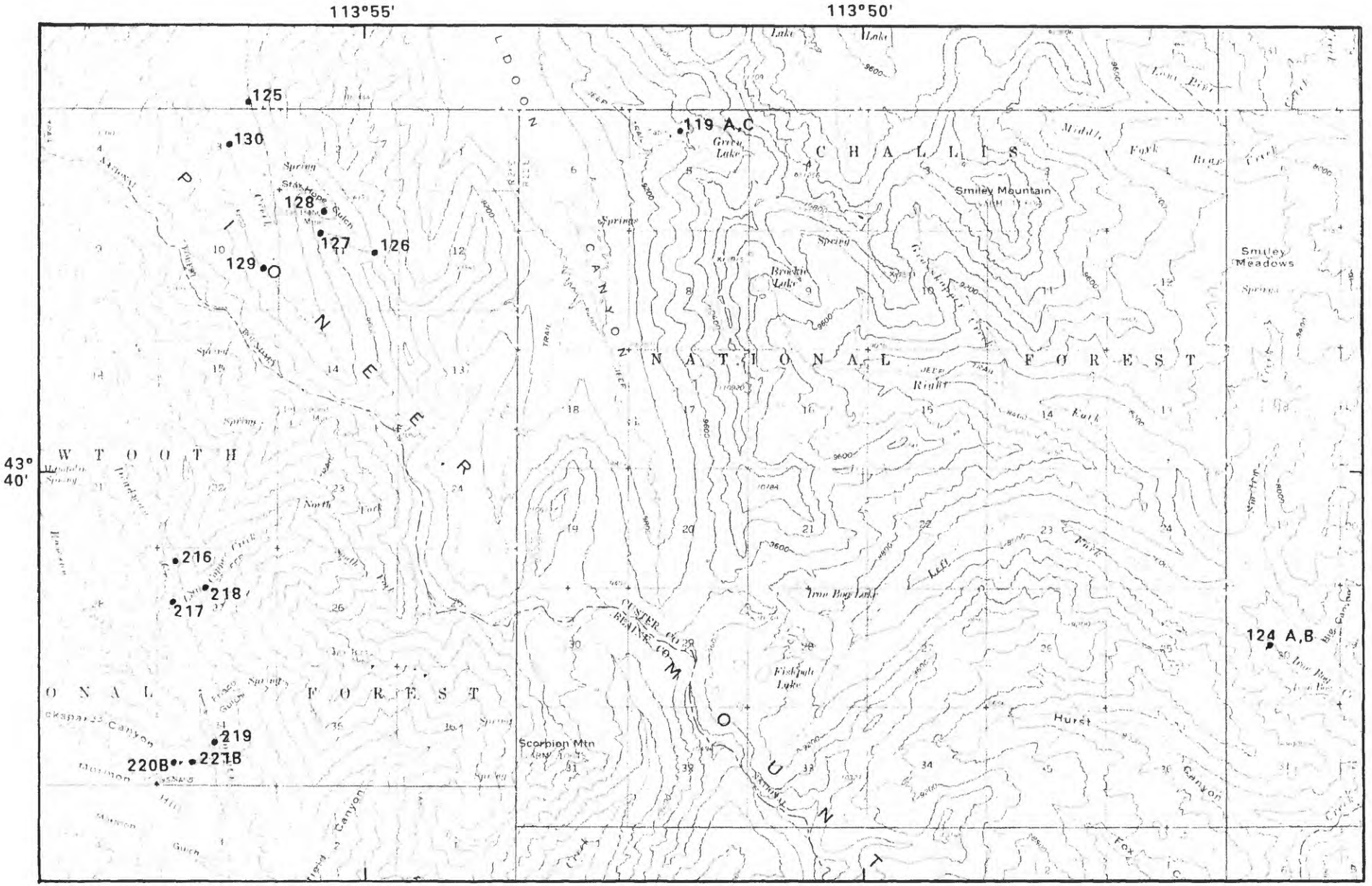
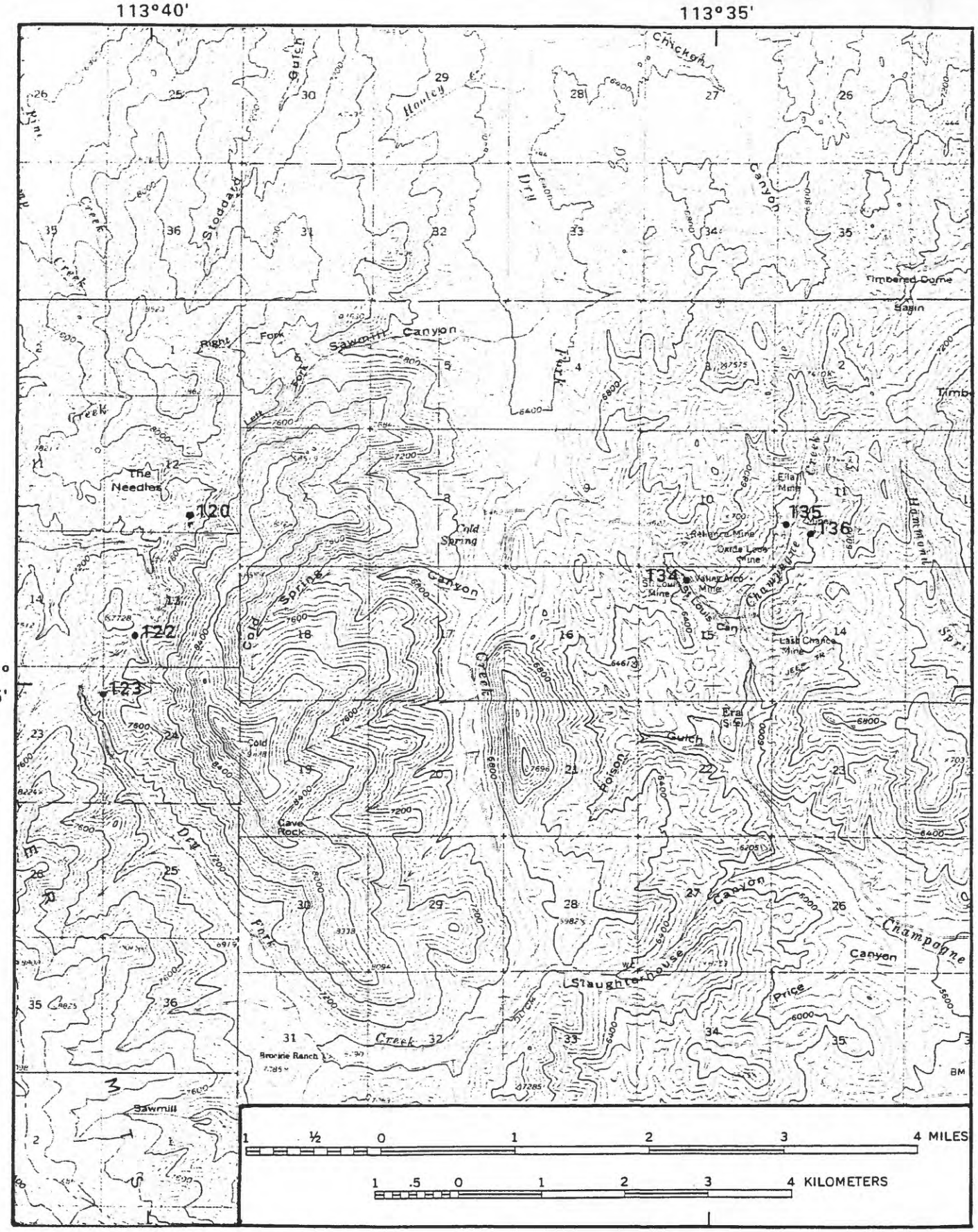



Figure 4. Localities of rock samples from the Muldoon Canyon 15-minute quadrangle.




Base from the USGS; 1:62,500
Grouse, Idaho, 1960

Figure 5. Localities of rock samples from the Grouse 15-minute quadrangle.

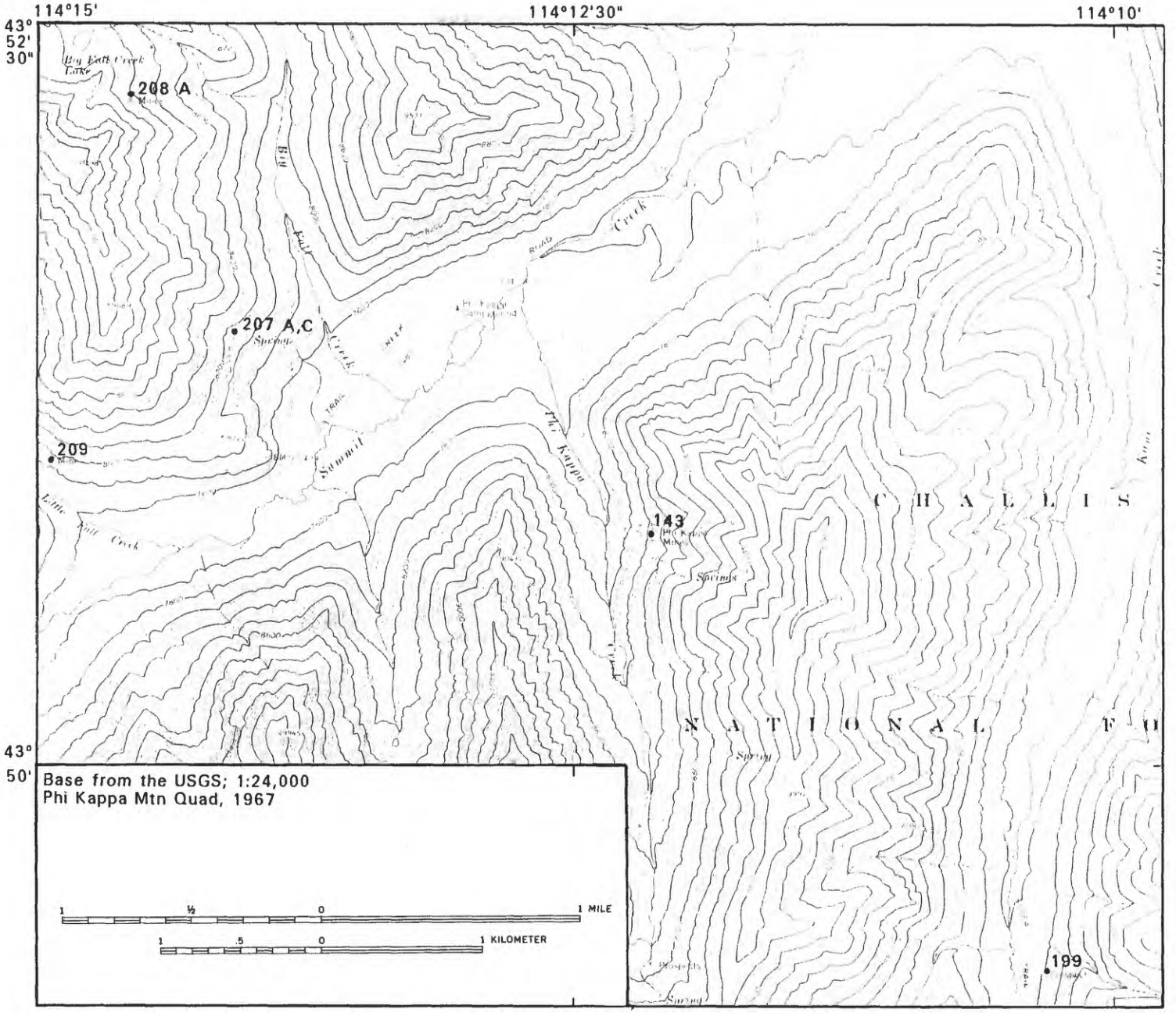



Figure 6. Localities of rock samples from the Phi Kappa Mountain 7.5-minute quadrangle.

## METHODS OF STUDY

### Sample Media

Analyses of unmineralized or unaltered rock samples provide background geochemical data for individual rock units. Analyses of mineralized or altered rocks may provide useful goechemical information about the major and trace-element assemblages associated with a possible mineralizing system.

### Sample Collection and Preparation

Samples were collected from 65 sites (figs. 2-6). At each site, a 5-lb bag of rock chips and one or more hand samples were collected. In addition, two stream-sediment samples were collected from the Stewert Canyon drainage. Sample descriptions are located in table 1.

The samples were crushed and then pulverized to approximately minus-100 mesh (minus-0.15 mm) with ceramic plates.

### Sample Analysis

All samples were analyzed for 35 elements using a semiquantitative, direct-current arc emission spectrographic method (Grimes and Marranzino, 1968). The elements analyzed and their limits of determination are listed in table 2.

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, phosphorus, sodium, and titanium) are given in weight percent; all others are given in parts per million (micrograms/gram). Analytical results are listed in table 3.

## DATA STORAGE SYSTEM

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

## DESCRIPTION OF DATA TABLES

Table 3 lists the results of analyses of rock samples from the study area. The data are arranged so that column 1 contains the sample field numbers. These numbers correspond to the numbers shown on the site location maps (figs. 2-6). The letter "s" underneath the column headings indicates emission spectrographic 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 2. A "less than" symbol (<) entered in the tables in front of the lower limit of determination indicates that the element was observed but 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 front of the upper limit of determination. Because of the formatting used in the computer program that produced table 3, some of the elements listed in these tables (Fe, Mg, Ca, Ti, Ag, and Be) may carry one or more nonsignificant digits to the right of the significant digits. The analyst did not determine these elements to the accuracy suggested by the extra zeros.

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**Table 1. Sample Descriptions**

| Sample | Description |
|---|---|
| **MACKAY QUADRANGLE (35)** | |
| 87M-101 | Cliff Creek adit, dump sample |
| 87M-102A | Champion mine, gray limestone, outcrop sample |
| 87M-102B | Champion mine, gray shale, noncalcareous, outcrop sample |
| 87M-102C | Champion mine, calc-silicate, outcrop sample |
| 87M-102D | Champion mine, dump sample |
| 87M-102E | Champion mine, breccia, outcrop sample |
| 87M-103A | Tip Top claims, outcrop sample, granodiorite |
| 87M-103B | Tip Top claims, outcrop sample, altered granodiorite |
| 87M-103C | Tip Top claims, outcrop sample, altered White Knob Limestone |
| 87M-103D | Tip Top claims, dump sample |
| 87M-103E | Tip Top claims, outcrop sample, White Knob Limestone |
| 87M-103F | Tip Top claims, outcrop sample, calc-silicate skarn |
| 87M-103G | Tip Top claims, outcrop sample, recrystallized White Knob Limestone |
| 87M-104 | Tip Top claims, dump sample with visible galena |
| 87M-106B | Nicor claims, grab sample from waste pile |
| 87M-107A | Unnamed adits at head of Black Daisy Canyon, rock chip sample from adit, dike rock |
| 87M-107B | Do |
| 87M-108 | Horseshoe mine area, dump sample |
| 87M-109 | Horseshoe mine area, rock-chip sample across face of unnamed adit |
| 87M-110B | Horseshoe mine area, dump sample, copper oxide staining |
| 87M-111 | Horseshoe mine area, dump sample, visible pyrite and galena, sulphurus aroma |
| 87M-112A | Empire mine, open pit, granodiorite |
| 87M-113 | Grand Prize mine, dump sample |
| 87M-114 | Empire mine, Alberta Tunnel, dump sample |
| 87M-138 | Veteran mine, dump sample |
| 87M-139 | Bluebird mine, dump sample |
| 87M-140A | Lower Harryaune prospect, dump sample |
| 87M-140B | Lower Harryaune prospect, rock chips across shear zone in adit, limestone |
| 87M-148 | Black Queen claims, dump sample |
| 87M-210 | Mammoth mine, dump sample |
| 87M-211B | Silver Lead Bell group, dump sample |
| 87M-212A | Do |
| 87M-213A | Upper Harryaune prospect, dump sample |

**Table 1. Sample Descriptions--Continued**

| Sample | Description |
|---|---|
| 87M-214 | Stewart Canyon stream-sediment sample |
| 87M-215 | Do |
| **COPPER BASIN QUADRANGLE (4)** | |
| 87M-115 | Copperhead claims, trench wall sample |
| 87M-131 | Navarre Creek prospects, dump sample |
| 87M-132 | Upper Lehman Creek adit, dump sample |
| 87M-133 | Lower Lehman Creek adit, grab sample |
| **MULDOON CANYON QUADRANGLE (16)** | |
| 87M-119A | Candy Cane group, vein sample from adit |
| 87M-119C | Candy Cane group, black shale on dump |
| 87M-124A | Iron Bog mine, black shale and conglomerate |
| 87M-124B | Iron Bog mine,limonite stained conglomerate |
| 87M-125 | Adit along Star Hope Creek, dump sample |
| 87M-126 | Plumbo claims, ridge at head of Star Hope Gulch, black shale, Copper Basin Formation |
| 87M-127 | Star Hope mine, upper adit, dump sample, visible copper oxides |
| 87M-128 | Star Hope mine, lower adit, dump sample, visible galena, quartzite |
| 87M-129 | Bent Pine Tree group, dump sample |
| 87M-130 | Mackinaw group, dump sample, chalcopyrite, galina in calc-silicate |
| 87M-216 | Deadman Creek, outcrop sample, quartzite with visible pyrite |
| 87M-217 | Caved adit, dump sample |
| 87M-218 | Adit along Little Copper Creek, outcrop sample across shear zone in black shale |
| 87M-219 | Blackspar mine, dump sample |
| 87M-220B | Do |
| 87M-221B | Do |
| **GROUSE QUADRANGLE (6)** | |
| 87M-120 | Leadbelt mine, dump sample |
| 87M-122 | Outcrop sample, McGowan Creek Formation |
| 87M-123 | Caved adit south of Leadbelt mine, dump sample |
| 87M-134 | St. Louis mine, dump sample |
| 87M-135 | Ella mine, dump sample |
| 87M-136 | Honsilver mine, silicified Challis Volcanics |

**Table 1. Sample Descriptions--Continued**

| Sample | Description |
|---|---|
| **PHI KAPPA MTN QUADRANGLE (6)** | |
| 87M-143 | Phi Kappa mine, dump sample |
| 87M-199 | Kane Creek prospect pit sample |
| 87M-207A | White Elephant mine, adit wall sample |
| 87M-207C | White Elephant mine, prospect pit samples |
| 87M-208A | Black Rock claims, dump sample |
| 87M-209 | Little Falls Creek prospect, dump sample |

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

| Elements | Lower determination limit | Upper determination limit |
|---|---|---|
| | Weight percent | |
| Calcium (Ca) | 0.05 | 20 |
| Iron (Fe) | .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 |

TABLE 3--RESULTS OF ANALYSES OF ROCK SAMPLES FROM THE NORTHWESTERN IDAHO FALLS AND THE NORTHEASTERN HAILEY 1 X 2 DEGREE QUADRANGLES, IDAHO.

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

MACKAY QUADRANGLE

| Sample | Latitude | Longitude | Ca-pct. s | Fe-pct. s | Mg-pct. s | Na-pct. s | P-pct. s | Ti-pct. s | Ag-ppm s | As-ppm s | Au-ppm s |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 87M101 | 43 52 10 | 113 40 9 | .50 | 20.00 | .20 | N | N | .005 | 3.0 | N | N |
| 87M102A | 43 51 38 | 113 40 16 | 10.00 | 1.00 | 3.00 | N | N | .030 | <.5 | N | N |
| 87M102B | 43 51 38 | 113 40 16 | .05 | 1.50 | 1.00 | <.2 | N | .200 | N | N | N |
| 87M102C | 43 51 38 | 113 40 16 | 1.50 | 1.00 | 1.50 | 2.0 | N | .300 | N | N | N |
| 87M102D | 43 51 38 | 113 40 16 | 2.00 | 15.00 | .10 | N | N | .007 | 5.0 | N | N |
| 87M102E | 43 51 38 | 113 40 16 | .10 | 1.50 | .20 | N | N | .100 | <.5 | <200 | N |
| 87M103A | 43 54 2 | 113 42 11 | .10 | 1.00 | .30 | 3.0 | N | .050 | N | N | N |
| 87M103B | 43 54 2 | 113 42 11 | N | 1.00 | .02 | 1.0 | N | .030 | 3.0 | N | N |
| 87M103C | 43 54 2 | 113 42 11 | .20 | 10.00 | .15 | N | N | .015 | 50.0 | 1,000 | N |
| 87M103D | 43 54 2 | 113 42 11 | 2.00 | 20.00 | .50 | N | N | .010 | 100.0 | 1,000 | N |
| 87M103E | 43 54 2 | 113 42 11 | 20.00 | .15 | 1.50 | N | N | .007 | N | N | N |
| 87M103F | 43 54 2 | 113 42 11 | 10.00 | 20.00 | 1.00 | N | N | .010 | N | N | N |
| 87M103G | 43 54 2 | 113 42 11 | 20.00 | <.05 | .30 | N | N | N | N | N | N |
| 87M104 | 43 54 4 | 113 42 3 | 7.00 | 7.00 | .05 | N | N | .020 | 150.0 | 3,000 | N |
| 87M106B | 43 54 21 | 113 41 33 | 5.00 | 10.00 | .20 | N | <.2 | .020 | 100.0 | N | N |
| 87M107A | 43 54 19 | 113 41 55 | .70 | 1.00 | .50 | 3.0 | N | .070 | N | N | N |
| 87M107B | 43 54 19 | 113 41 55 | .70 | 2.00 | 1.00 | 2.0 | N | .200 | N | N | N |
| 87M108 | 43 53 45 | 113 41 11 | 10.00 | 3.00 | 1.00 | N | N | .030 | 100.0 | 500 | N |
| 87M109 | 43 53 45 | 113 41 7 | 7.00 | 10.00 | 1.50 | N | N | .050 | 50.0 | N | N |
| 87M110B | 43 53 44 | 113 41 4 | 7.00 | 7.00 | 1.50 | N | N | .070 | 5.0 | N | N |
| 87M111 | 43 53 55 | 113 41 19 | 1.00 | 15.00 | .30 | N | N | .050 | 200.0 | N | N |
| 87M112A | 43 52 58 | 113 40 31 | .30 | 1.00 | .30 | 1.5 | N | .150 | 7.0 | N | N |
| 87M113 | 43 52 40 | 113 40 21 | 10.00 | 15.00 | .70 | N | N | .200 | N | N | N |
| 87M114 | 43 53 19 | 113 40 19 | 5.00 | 10.00 | 1.00 | N | N | .015 | 200.0 | 200 | N |
| 87M138 | 43 54 49 | 113 41 58 | 1.00 | 1.00 | .02 | N | N | .002 | 100.0 | <200 | N |
| 87M139 | 43 53 50 | 113 40 51 | 3.00 | 20.00 | .50 | N | N | .007 | 20.0 | 300 | N |
| 87M140A | 43 51 7 | 113 41 5 | 5.00 | 10.00 | .70 | N | N | .070 | 100.0 | >10,000 | N |
| 87M140B | 43 51 7 | 113 41 5 | 20.00 | .20 | 5.00 | N | N | .030 | N | N | N |
| 87M148 | 43 54 32 | 113 40 59 | 5.00 | 1.00 | 1.50 | 1.5 | N | .100 | <.5 | N | N |
| 87M210 | 43 52 19 | 113 42 45 | 2.00 | 20.00 | 1.00 | N | N | .010 | 70.0 | N | N |
| 87M211B | 43 52 21 | 113 43 18 | 3.00 | 5.00 | 1.50 | .5 | N | .020 | N | N | N |
| 87M212A | 43 52 20 | 113 43 19 | .30 | 1.00 | .50 | 2.0 | N | .070 | N | N | N |
| 87M213A | 43 51 17 | 113 40 55 | 1.00 | 10.00 | .30 | N | N | .020 | 100.0 | N | N |
| 87M214 | 43 50 55 | 113 42 56 | 5.00 | 1.00 | 7.00 | N | N | .200 | N | N | N |
| 87M215 | 43 50 56 | 113 41 38 | 7.00 | 1.50 | 3.00 | N | N | 1.000 | N | N | N |

COPPER BASIN QUADRANGLE

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 87M115 | 43 48 9 | 113 49 2 | .30 | 2.00 | 1.50 | 2.0 | N | .300 | 10.0 | N | N |
| 87M131 | 43 55 32 | 113 45 2 | <.05 | 20.00 | .07 | N | N | .100 | N | N | N |
| 87M132 | 43 55 51 | 113 49 39 | N | .70 | .10 | .3 | N | .200 | 1.0 | N | N |
| 87M133 | 43 56 5 | 113 49 47 | .20 | 1.00 | .20 | .5 | N | .300 | N | N | N |

TABLE 3--RESULTS OF ANALYSES OF ROCK SAMPLES FROM THE NORTHWESTERN IDAHO FALLS AND THE NORTHEASTERN HAILEY 1 X 2 DEGREE QUADRANGLES, IDAHO.--Continued

MACKAY QUADRANGLE

| Sample | B-ppm s | Ba-ppm s | Be-ppm s | Bi-ppm s | Cd-ppm s | Co-ppm s | Cr-ppm s | Cu-ppm s | Ga-ppm s | Ge-ppm s | La-ppm s | Mn-ppm s | Mo-ppm s |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 87M101 | N | 20 | 7.0 | N | N | 20 | N | 1,000 | 50 | N | N | 2,000 | 20 |
| 87M102A | 15 | 50 | N | N | N | N | 30 | 15 | 15 | N | N | 200 | N |
| 87M102B | 100 | 500 | 1.5 | N | N | <10 | 70 | 10 | 30 | N | N | 100 | N |
| 87M102C | <10 | 1,000 | 1.0 | N | N | 15 | 50 | 15 | 20 | N | 70 | 200 | <5 |
| 87M102D | <10 | 70 | N | 15 | 150 | N | <10 | 500 | <5 | N | N | 5,000 | 30 |
| 87M102E | 10 | 100 | N | N | N | <10 | 20 | 20 | 5 | N | N | 20 | 5 |
| 87M103A | <10 | 200 | 2.0 | N | N | N | N | 7 | 50 | N | <50 | 150 | <5 |
| 87M103B | N | 1,000 | N | N | N | N | N | 500 | 20 | N | N | 10 | 10 |
| 87M103C | N | <20 | 1.5 | N | <20 | 10 | <10 | 5,000 | 30 | N | N | 500 | 300 |
| 87M103D | N | 70 | 1.5 | 20 | N | N | 10 | 2,000 | <5 | N | N | 1,500 | 15 |
| 87M103E | <10 | 30 | N | N | N | N | <10 | <5 | N | N | N | 70 | <5 |
| 87M103F | N | <20 | 2.0 | N | N | N | N | 50 | 10 | N | N | 5,000 | N |
| 87M103G | N | N | N | N | N | N | N | <5 | N | N | N | 500 | N |
| 87M104 | <10 | 150 | N | 15 | N | N | N | 700 | 5 | N | N | 150 | 50 |
| 87M106B | N | 3,000 | N | N | N | N | <10 | 70 | 15 | N | N | 5,000 | 5 |
| 87M107A | 10 | 3,000 | N | N | N | N | N | 7 | 30 | N | 150 | 100 | N |
| 87M107B | 10 | 1,500 | <1.0 | N | N | <10 | 15 | 15 | 30 | N | 50 | 300 | N |
| 87M108 | <10 | 70 | N | <10 | N | <10 | 15 | 10,000 | <5 | N | N | 500 | N |
| 87M109 | <10 | N | N | <10 | 50 | 30 | 70 | 7,000 | 15 | N | N | 5,000 | 20 |
| 87M110B | <10 | N | N | N | N | 10 | 100 | 7,000 | 10 | N | N | 1,000 | N |
| 87M111 | N | 500 | N | 100 | 500 | 100 | N | 1,500 | 20 | N | N | 700 | N |
| 87M112A | N | 5,000 | N | N | N | N | N | 700 | 30 | N | <50 | 200 | 30 |
| 87M113 | <10 | N | N | N | N | <10 | 20 | 70 | 20 | N | 50 | >5,000 | 50 |
| 87M114 | <10 | N | N | 70 | <20 | 70 | <10 | >20,000 | N | N | N | 500 | N |
| 87M138 | <10 | 30 | N | N | N | N | N | 300 | N | N | N | 70 | N |
| 87M139 | N | 70 | 2.0 | 50 | <20 | 10 | 10 | 10,000 | 30 | N | N | 1,500 | 7 |
| 87M140A | <10 | 700 | N | 200 | N | 700 | 15 | 5,000 | 15 | N | N | 500 | 100 |
| 87M140B | 10 | 70 | N | N | N | N | 70 | 5 | N | N | N | <10 | N |
| 87M148 | N | 2,000 | <1.0 | N | N | <10 | 20 | 30 | 20 | N | <50 | 150 | 5 |
| 87M210 | N | N | 1.5 | <10 | N | 150 | 15 | >20,000 | 20 | N | N | 1,000 | <5 |
| 87M211B | <10 | 70 | 1.0 | N | N | <10 | 20 | 30 | 30 | N | N | 2,000 | <5 |
| 87M212A | N | 500 | 1.5 | N | N | N | N | 15 | 50 | N | <50 | 150 | N |
| 87M213A | <10 | 70 | 3.0 | 150 | 50 | 70 | N | 3,000 | 20 | N | N | >5,000 | 20 |
| 87M214 | 20 | 200 | N | N | N | N | 70 | N | N | N | N | 150 | N |
| 87M215 | 100 | 100 | <1.0 | 200 | N | N | 70 | <10 | 15 | N | 100 | 300 | N |

COPPER BASIN QUADRANGLE

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 87M115 | 10 | 200 | <1.0 | 70 | N | <10 | 70 | 2,000 | 20 | N | 70 | 30 | N |
| 87M131 | N | 1,000 | 1.0 | N | N | N | 70 | 50 | 50 | N | N | <10 | N |
| 87M132 | N | 1,000 | 3.0 | N | N | N | 30 | 5 | 30 | N | <50 | 15 | N |
| 87M133 | N | 5.000 | <1.0 | N | N | N | N | <5 | 30 | N | <50 | 20 | <5 |

TABLE 3--RESULTS OF ANALYSES OF ROCK SAMPLES FROM THE NORTHWESTERN IDAHO FALLS AND THE NORTHEASTERN HAILEY 1 X 2 DEGREE QUADRANGLES, IDAHO.--Continued

MACKAY QUADRANGLE

| Sample | Nb-ppm s | Ni-ppm s | Pb-ppm s | Sb-ppm s | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 87M101 | <20 | 5 | N | N | N | 150 | N | N | <10 | 1,000 | <10 | 1,000 | N |
| 87M102A | N | 20 | 20 | N | <5 | N | 150 | N | 30 | N | <10 | 500 | 15 |
| 87M102B | N | 7 | 10 | N | 5 | N | N | N | 100 | N | N | N | 50 |
| 87M102C | <20 | 30 | 10 | N | 5 | N | 150 | N | 70 | N | <10 | N | 150 |
| 87M102D | N | 10 | 2,000 | N | N | 15 | N | N | 15 | 150 | N | 7,000 | N |
| 87M102E | N | 20 | 15 | N | N | N | N | N | 70 | 20 | N | <200 | 50 |
| 87M103A | 20 | N | 70 | N | N | N | N | N | <10 | N | N | N | 50 |
| 87M103B | <20 | N | 1,000 | N | N | N | N | N | N | N | N | 2,000 | 150 |
| 87M103C | N | 15 | 15,000 | N | N | N | N | N | 50 | <20 | 20 | >10,000 | N |
| 87M103D | N | 15 | 10,000 | N | N | 100 | N | N | 20 | 30 | N | 10,000 | N |
| 87M103E | N | N | 30 | N | N | N | 500 | N | 30 | N | N | N | N |
| 87M103F | N | <5 | 20 | N | N | 500 | N | N | <10 | 30 | N | 500 | N |
| 87M103G | N | N | 15 | N | N | N | 300 | N | <10 | N | N | N | N |
| 87M104 | N | N | >20,000 | N | N | 10 | 100 | N | 10 | 150 | N | 5,000 | <10 |
| 87M106B | N | 15 | >20,000 | N | N | N | 100 | N | 100 | N | N | 1,000 | <10 |
| 87M107A | N | N | 100 | N | N | N | 200 | N | 10 | N | <10 | N | 50 |
| 87M107B | <20 | 10 | 70 | N | <5 | N | 150 | N | 50 | N | N | N | 70 |
| 87M108 | N | 20 | 5,000 | N | N | 10 | 200 | N | 20 | N | <10 | 1,000 | <10 |
| 87M109 | N | 30 | 100 | N | <5 | 30 | N | N | 20 | 20 | <10 | >10,000 | 10 |
| 87M110B | N | 30 | 30 | N | <5 | 30 | N | N | 30 | N | 15 | 3,000 | 15 |
| 87M111 | N | 20 | 15,000 | N | N | N | N | N | <10 | N | N | >10,000 | <10 |
| 87M112A | N | 7 | 100 | N | N | N | <100 | N | 15 | <20 | N | 300 | 70 |
| 87M113 | <20 | 15 | 100 | N | <5 | 100 | N | N | 50 | N | 10 | N | 70 |
| 87M114 | N | 100 | <10 | N | N | 70 | N | N | 10 | <20 | N | 7,000 | <10 |
| 87M138 | N | 5 | 20,000 | 200 | N | N | N | N | 20 | N | N | 1,500 | N |
| 87M139 | N | 7 | >20,000 | N | N | N | N | N | 10 | N | N | >10,000 | N |
| 87M140A | N | 10 | 20,000 | N | N | <10 | N | N | 30 | 30 | N | 3,000 | 50 |
| 87M140B | N | 15 | 30 | N | N | N | 300 | N | 15 | N | <10 | N | 10 |
| 87M148 | N | 10 | 50 | N | <5 | N | 300 | N | 20 | N | <10 | 300 | 20 |
| 87M210 | N | 70 | 70 | N | N | 200 | N | N | <10 | 100 | N | 1,000 | <10 |
| 87M211B | N | 10 | 50 | N | N | 100 | N | N | 15 | <20 | <10 | N | 15 |
| 87M212A | <20 | <5 | 70 | N | N | <10 | N | N | 10 | N | 10 | N | 50 |
| 87M213A | N | 7 | >20,000 | N | N | N | N | N | 20 | 50 | N | >10,000 | 10 |
| 87M214 | 50 | 30 | <20 | N | N | N | N | N | 50 | <50 | 70 | N | >2,000 |
| 87M215 | 100 | 20 | 20 | N | N | <20 | N | N | 100 | 100 | 100 | N | >2,000 |

COPPER BASIN QUADRANGLE

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 87M115 | <20 | 30 | 10 | N | 5 | N | N | N | 50 | N | N | N | 70 |
| 87M131 | N | <5 | 50 | N | <5 | N | 150 | N | 50 | N | N | N | 20 |
| 87M132 | N | 5 | 30 | N | <5 | N | N | N | 50 | N | N | N | 50 |
| 87M133 | <20 | N | 20 | N | <5 | N | N | N | 20 | N | <10 | N | 150 |

TABLE 2--RESULTS OF ANALYSES OF ROCK SAMPLES FROM THE NORTHWESTERN IDAHO FALLS AND THE NORTHEASTERN HAILEY 1 X 2 DEGREE QUADRANGLES, IDAHO.--Continued

MULDOON CANYON QUADRANGLE

| Sample | Latitude | Longitude | Ca-pct. s | Fe-pct. s | Mg-pct. s | Na-pct. s | P-pct. s | Ti-pct. s | Ag-ppm s | As-ppm s | Au-ppm s |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 87M119A | 43 42 29 | 113 51 49 | 10.00 | 10.00 | 2.00 | N | N | .150 | 7.0 | N | N |
| 87M119C | 43 42 29 | 113 51 49 | .05 | 1.00 | 1.00 | .5 | N | .200 | N | N | N |
| 87M124A | 43 38 44 | 113 45 58 | N | 1.00 | .50 | N | N | .030 | <.5 | N | N |
| 87M124B | 43 38 44 | 113 45 58 | <.05 | 20.00 | .05 | N | <.2 | .030 | N | N | N |
| 87M125 | 43 42 43 | 113 56 10 | 10.00 | 1.50 | 7.00 | .3 | N | .050 | 2.0 | N | N |
| 87M126 | 43 41 36 | 113 54 51 | .05 | 1.00 | .50 | 1.0 | N | .100 | .7 | N | N |
| 87M127 | 43 41 43 | 113 55 24 | 2.00 | 3.00 | 1.00 | N | N | .070 | 70.0 | N | N |
| 87M128 | 43 41 52 | 113 55 22 | N | .10 | .03 | N | N | .015 | 30.0 | N | N |
| 87M129 | 43 41 29 | 113 55 59 | 2.00 | 1.00 | 1.00 | 3.0 | N | .150 | N | N | N |
| 87M130 | 43 42 22 | 113 56 20 | 5.00 | 3.00 | 1.00 | N | N | .005 | 100.0 | N | N |
| 87M216 | 43 39 21 | 113 56 52 | <.05 | .70 | .30 | .2 | N | .030 | <.5 | N | N |
| 87M217 | 43 39 4 | 113 56 54 | 3.00 | 1.50 | 2.00 | N | N | .070 | .5 | N | N |
| 87M218 | 43 39 9 | 113 56 33 | .70 | 2.00 | 1.50 | N | N | .070 | 2.0 | 5,000 | N |
| 87M219 | 43 38 1 | 113 56 29 | 2.00 | 3.00 | 2.00 | 2.0 | N | .300 | .5 | N | N |
| 87M220B | 43 37 54 | 113 56 48 | 1.00 | 2.00 | 2.00 | 1.0 | N | .200 | .7 | N | N |
| 87M221B | 43 37 54 | 113 56 39 | 2.00 | 2.00 | 2.00 | 1.0 | N | .150 | 1.0 | N | N |

GROUSE QUADRANGLE

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 87M120 | 43 36 3 | 113 39 40 | 10.00 | 2.00 | .70 | .5 | N | .030 | 1.5 | 1,500 | N |
| 87M122 | 43 35 18 | 113 40 7 | <.05 | 1.50 | .50 | N | N | .200 | .7 | N | N |
| 87M123 | 43 34 56 | 113 40 24 | N | .50 | .30 | N | N | .150 | 1.0 | N | N |
| 87M134 | 43 35 41 | 113 35 15 | 1.50 | 5.00 | 1.50 | N | N | .300 | 15.0 | N | N |
| 87M135 | 43 36 3 | 113 34 20 | N | .50 | <.02 | N | N | .200 | 70.0 | N | N |
| 87M136 | 43 35 57 | 113 34 7 | <.05 | 5.00 | .02 | N | <.2 | .200 | 30.0 | 200 | N |

PHI KAPPA MOUNTAIN QUADRANGLE

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 87M143 | 43 50 48 | 114 12 10 | 5.00 | 5.00 | 5.00 | N | N | .100 | 100.0 | N | N |
| 87M199 | 43 49 18 | 114 10 19 | <.05 | 2.00 | .30 | N | N | .070 | 10.0 | N | N |
| 87M207A | 43 51 28 | 114 14 6 | N | .70 | <.02 | N | N | .003 | 1.0 | 1,000 | N |
| 87M207C | 43 51 28 | 114 14 6 | .05 | 1.00 | 1.00 | .7 | N | .150 | 5.0 | N | N |
| 87M208A | 43 52 13 | 114 14 34 | 2.00 | 1.50 | 1.50 | N | <.2 | .150 | 2.0 | 200 | N |
| 87M209 | 43 51 2 | 114 14 56 | 5.00 | 5.00 | 1.50 | .7 | .2 | .030 | N | N | N |

TABLE 3--RESULTS OF ANALYSES OF ROCK SAMPLES FROM THE NORTHWESTERN IDAHO FALLS AND THE NORTHEASTERN HAILEY 1 X 2 DEGREE QUADRANGLES, IDAHO.--Continued

MULDOON CANYON QUADRANGLE

| Sample | B-ppm s | Ba-ppm s | Be-ppm s | Bi-ppm s | Cd-ppm s | Co-ppm s | Cr-ppm s | Cu-ppm s | Ga-ppm s | Ge-ppm s | La-ppm s | Mn-ppm s | Mo-ppm s |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 87M119A | <10 | 50 | 1.0 | N | <20 | 10 | 30 | 1,000 | 30 | N | N | 2,000 | <5 |
| 87M119C | 30 | 3,000 | <1.0 | N | N | <10 | 30 | 50 | 10 | N | N | 150 | N |
| 87M124A | 15 | 500 | N | N | N | N | 10 | 15 | N | N | N | 50 | N |
| 87M124B | N | 100 | 1.0 | N | N | N | N | 50 | 30 | N | N | 10 | N |
| 87M125 | N | 3,000 | N | <10 | N | N | 20 | 100 | 15 | N | N | 500 | N |
| 87M126 | <10 | 500 | <1.0 | N | N | <10 | 30 | 10 | 20 | N | N | 1,000 | <5 |
| 87M127 | <10 | 700 | 2.0 | 100 | 50 | 10 | 20 | 15,000 | 30 | N | N | 5,000 | 100 |
| 87M128 | N | 700 | N | 100 | N | N | N | 500 | N | N | N | <10 | 20 |
| 87M129 | 20 | 1,500 | <1.0 | N | N | N | 50 | 20 | 70 | N | N | 150 | N |
| 87M130 | N | 100 | 1.5 | 70 | 500 | <10 | N | 7,000 | 5 | N | <50 | 3,000 | <5 |
| 87M216 | 15 | 2,000 | 1.0 | N | N | N | N | 50 | 30 | N | N | 50 | N |
| 87M217 | 30 | 1,500 | <1.0 | N | N | N | 20 | 30 | 5 | N | N | 200 | N |
| 87M218 | 70 | 300 | 5.0 | N | N | <10 | 30 | 50 | 15 | N | N | 300 | 15 |
| 87M219 | <10 | 2,000 | <1.0 | N | N | 20 | 300 | 30 | 30 | N | 50 | 700 | N |
| 87M220B | 10 | 1,000 | <1.0 | N | N | 15 | 200 | 50 | 20 | N | <50 | 500 | N |
| 87M221B | 15 | 2,000 | <1.0 | N | N | 15 | 200 | 30 | 30 | N | 50 | 1,000 | N |

GROUSE QUADRANGLE

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 87M120 | <10 | 200 | N | N | N | N | 10 | 15 | <5 | N | N | 300 | N |
| 87M122 | 70 | 2,000 | <1.0 | N | N | N | 70 | 30 | 5 | N | N | N | N |
| 87M123 | 30 | 700 | N | N | N | N | 20 | 10 | 5 | N | N | 15 | N |
| 87M134 | 10 | 500 | N | <10 | N | 15 | 200 | 100 | 20 | N | <50 | 700 | <5 |
| 87M135 | N | 50 | N | N | N | N | 10 | 20 | 30 | N | N | N | N |
| 87M136 | <10 | 700 | N | N | N | N | 20 | 150 | 70 | N | 50 | 10 | 10 |

PHI KAPPA MOUNTAIN QUADRANGLE

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 87M143 | <10 | 100 | <1.0 | 100 | 20 | 10 | 30 | 50 | N | N | N | 5,000 | <5 |
| 87M199 | 10 | 200 | N | 10 | N | N | 10 | 50 | <5 | N | N | 300 | 5 |
| 87M207A | N | 20 | N | 30 | N | N | N | 50 | N | N | N | <10 | 20 |
| 87M207C | 10 | 1,500 | 5.0 | 15 | N | N | 30 | 70 | 30 | N | <50 | 70 | <5 |
| 87M208A | <10 | 300 | 2.0 | N | <20 | 15 | 70 | 50 | 5 | N | N | 700 | 100 |
| 87M209 | <10 | 200 | 5.0 | N | N | <10 | 30 | 100 | N | 20 | 100 | >5,000 | 10 |

TABLE 1--RESULTS OF ANALYSES OF ROCK SAMPLES FROM THE NORTHWESTERN IDAHO FALLS AND THE NORTHEASTERN HAILEY 1 X 2 DEGREE QUADRANGLES, IDAHO.--Continued

MULDOON CANYON QUADRANGLE

| Sample | Nb-ppm s | Ni-ppm s | Pb-ppm s | Sb-ppm s | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 87M119A | N | 15 | 2,000 | N | 5 | <10 | 300 | N | 150 | N | <10 | 10,000 | 50 |
| 87M119C | N | 15 | 10 | N | <5 | N | N | N | 150 | N | N | <200 | 50 |
| 87M124A | N | 15 | N | N | N | N | N | N | 70 | N | N | N | 30 |
| 87M124B | N | 10 | N | N | N | N | N | N | 150 | N | N | 500 | 20 |
| 87M125 | N | 10 | 100 | N | <5 | N | 100 | N | 50 | N | N | N | 10 |
| 87M126 | N | 20 | 200 | N | N | N | N | N | 100 | N | N | 300 | 50 |
| 87M127 | N | 50 | 20,000 | N | <5 | 30 | 200 | N | 150 | 30 | <10 | >10,000 | 30 |
| 87M128 | N | N | 1,000 | N | N | N | N | N | 20 | N | N | 1,500 | <10 |
| 87M129 | N | 5 | 50 | N | <5 | N | <100 | N | 70 | N | N | N | 30 |
| 87M130 | N | N | >20,000 | N | N | 20 | 200 | N | 30 | <20 | 10 | >10,000 | N |
| 87M216 | N | 7 | 50 | N | N | N | N | N | <10 | N | N | N | 20 |
| 87M217 | N | 15 | 150 | N | <5 | N | N | N | 100 | N | <10 | 200 | 20 |
| 87M218 | N | 70 | 50 | N | <5 | N | N | N | 200 | N | N | 500 | 20 |
| 87M219 | <20 | 50 | 20 | N | 7 | N | 100 | N | 70 | N | <10 | N | 70 |
| 87M220B | N | 50 | 20 | N | 5 | N | <100 | N | 50 | N | <10 | N | 50 |
| 87M221B | N | 50 | 50 | N | 5 | N | 100 | N | 70 | N | <10 | N | 70 |

GROUSE QUADRANGLE

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 87M120 | N | 5 | 150 | N | N | N | 200 | N | 20 | N | N | 200 | 10 |
| 87M122 | N | 10 | N | N | <5 | N | N | N | 200 | N | N | N | 50 |
| 87M123 | <20 | 5 | 20 | N | N | N | N | N | 150 | N | N | N | 70 |
| 87M134 | N | 30 | 100 | N | 5 | N | <100 | N | 100 | N | <10 | <200 | 70 |
| 87M135 | N | <5 | 500 | N | <5 | N | 150 | N | 50 | N | N | N | 70 |
| 87M136 | N | <5 | 700 | N | 5 | N | 1,000 | N | 200 | N | N | N | 70 |

PHI KAPPA MOUNTAIN QUADRANGLE

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 87M143 | N | 20 | 5,000 | N | <5 | 30 | N | N | 70 | N | <10 | 2,000 | 50 |
| 87M199 | N | 10 | 1,000 | N | N | 10 | N | N | 70 | N | N | <200 | 50 |
| 87M207A | N | <5 | 10 | N | N | N | N | N | 15 | 300 | N | N | N |
| 87M207C | N | N | 1,000 | N | <5 | 70 | N | N | 50 | <20 | N | N | 70 |
| 87M208A | N | 300 | 200 | N | 5 | <10 | N | N | 1,500 | N | 15 | 1,000 | 30 |
| 87M209 | N | 50 | <10 | N | <5 | N | N | N | 200 | 30 | 10 | 300 | 10 |