UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Mineral resource potential of National Forest RARE II and Wilderness areas in Idaho

Compiled by

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This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature.

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ILLUSTRATIONS

INTRODUCTION

Information on the mineral and energy resource potential has been compiled for National Forest lands in Idaho that are in or are being considered for inclusion in the National Wilderness Preservation System. Data from all sources was included in the compilation. Where available, the primary source has been the published reports by the U.S. Geological Survey (USGS) and U.S. Bureau of Mines (USBM) that were prepared in response to a provision of the Wilderness Act (PL88-577) of 1964 requiring surveys of the mineral resources and evaluation of the mineral resource potential of lands to be included in the wilderness system.

For areas that lack mandated wilderness surveys, information from other published and unpublished reports was used, as well as information supplied verbally by numerous geologists, not all of whom have had an opportunity to review the data and conclusions presented here. Any errors are the responsibility of the compilers.

The areas discussed are those listed in a report by the U.S. Forest Service (USFS) dated January 1979, and entitled "Final Environmental Statement, Roadless Area Review and Evaluation (RARE II)". Since 1979, either parts or all of many RARE II areas have been converted to wilderness status. These changes, current through 1985, are noted both in the text and on plate 1. Other changes that may have been made to this list or the boundaries of the areas since the 1979 publication were not considered here. The text is arranged alphabetically by National Forest and within each National Forest the specific RARE II areas are listed numerically; designated wilderness areas are listed at the end of their respective National Forests. The numbers used for the RARE II areas and designated wilderness areas both in the text and on plate 1 are those assigned by the USFS.

This report includes a text that presents the kind and amount of available data for each area, a brief description of the mineral resources and commodities present, the mineral and energy resource potential, and pertinent references. The commodities are neither listed nor discussed in any particular order and the order should not be construed as having any significance. A number of references were used in evaluating all of the areas; all references are listed at the end of the report. The outlines and mineral and/or energy potential of individual areas are shown on a 1:1,000,000 scale map (pl. 1). As shown on the map explanation, the areas have been divided into two groups: 1) Areas that have had a mineral survey as mandated by the Wilderness Act, and 2) Areas whose mineral potential has been determined from other geologic studies. Those persons who need more detailed information are encouraged to refer to the listed reports and noted references, as plate 1 necessarily provides only generalized information.

Assignments of mineral and/or energy resource potential--both in the text and on the map--are stated as high, moderate, low, or unknown, after Goudarzi (1984). Terranes can be classified as either favorable or unfavorable for the occurrence of mineral and/or energy resources based on geologic environments, defined in terms of geological, geochemical, and geophysical characteristics. Geologic terranes that are considered unfavorable are classified as having low potential for the occurrence of resources. Terranes that are regarded as favorable have either moderate or high potential for the occurrence of resources. Resources or deposits do not necessarily have to be identified for an area to be assigned a high resource potential; however, evidence is required that indicates that mineral-forming processes were active in at least part of the area. The areas are shown on plate 1 according to their highest assigned rating and category; for example, an area with moderate mineral resource potential and unknown energy resource potential will be classified on plate 1 as having moderate resource potential. An unknown potential is considered to have a higher rating than low potential; for example, an area with unknown mineral resource potential and low energy resource potential will be classified on plate 1 as having an unknown resource potential. This is to ensure that it is not assumed, for any decision making, that these areas have a low potential, but rather that these areas need further study. The text will then differentiate between the mineral and energy resource potentials. For the purposes of this report, "energy resources" pertains to coal, oil, gas, and geothermal resources; all thermal temperatures are reported in degrees Celcius (C).

BITTERROOT NATIONAL FOREST

MEADOW CREEK (1-845)
25% in Montana

Kind and amount of data

The geology of the Meadow Creek area has been mapped at a reconnaissance scale (Greenwood and Morrison, 1973) and portions have been mapped in more detail by Karen Lund (U.S. Geological Survey, unpub. mapping). Information on geology and mineral deposits is adequate for inferences to be made regarding resource potential because adjacent areas to the north, east, and south have been well studied; however, information is not adequate for a preliminary mineral resource evaluation within the area, and is not sufficient for the mineral survey as required by the Wilderness Act (PL88-577) and related acts.

This report covers only the Idaho portion of the Meadow Creek area. The eastern half of the Idaho portion of the area was included in the Selway-Bitterroot Wilderness in 1980.

Mining districts, mines, and mineral occurrences

The Meadow Creek area is underlain by complex Precambrian metaigneous and metasedimentary rocks cut by Cretaceous-Tertiary plutons collectively mapped as the Idaho batholith.

The Green Mountain (copper, silver) mining district extends into the area from the south and the Elk City gold mining district borders the area to the west. Numerous mines and prospects are located throughout the region and several prospect pits are located within the Meadow Creek area. Most mining activity, which began in the 1860's, centered around gold placer and lode mining. Prospects in the Meadow Creek area show evidence of copper mineralization along joints and fractures.

Two thermal springs are located in the Meadow Creek area. Running Springs (41° C.) is along Running Creek in the center of the area, and the Red River Hot Springs (55° C.) is along the southwestern edge of the area (Mitchell and others, 1980).

Commodities

Cobalt, copper, silver, lead, zinc, gold, molybdenum.

Mineral and energy resource potential

Based on the geology and mineral deposits elsewhere in the region, the Meadow Creek area may have a moderate mineral resource potential for either stratabound cobalt-copper or stratabound silver, lead, zinc deposits and either disseminated and vein molybdenum and gold, or gold vein deposits (Karen Lund, 1984, oral commun.). Inference on mineral resource potential is based on the correlation of the metasedimentary units and the age of intrusives within the Meadow Creek area. These correlations are uncertain and require further study. The potential for oil, gas, coal, or geothermal resources within the Meadow Creek area is low.

MAGRUDER CORRIDOR (1-941)

Kind and amount of data

Study of the area included reconnaissance geologic mapping, geochemical sampling, and investigation of known mines, prospects, and claims (Lindgren, 1904; Mosier and others, 1982; Pawlowski, 1982; Esparza, 1985a). Additional geochemical, aerial radiometric, and magnetic survey studies were conducted as part of the National Uranium Resource Evaluation (NURE) program (Broxton and Beyth, 1980; EG G geoMetrics, 1980; Leinart and Salisbury, 1981; U.S. Department of Energy, 1982). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts. The Magruder Corridor area was included in the Frank Church-River of No Return Wilderness in 1980.

Mining districts, mines, and mineral occurrences

The Magruder Corridor area is underlain by rocks of an early Tertiary plutonic complex which intruded Precambrian metasediments and Cretaceous intrusive rocks of the Idaho batholith; the intruded rocks now form scattered roof pendants.

The Green Mountain (copper, silver) mining district is west of the Magruder Corridor area, and the Mineral Hill (gold, silver, copper, lead) mining district is southeast of the area; the study area itself is not part of any mining districts.

Placer claims located along Deep Creek, the northern boundary of the area, have yielded only traces of gold. A few lode claims located in the western third of the area in granite and quartz monzonite show traces of molybdenum, zinc, fluorite, and bismuth (Esparza, 1985).

Four scattered areas within the study area contain small discontinuous occurrences of mineralized rock, consisting of veins of copper, silver, zinc, or molybdenum minerals and (or) disseminated copper, silver, zinc, bismuth minerals: the Steep Creek-Selway River area along the northwestern boundary (copper, silver, zinc); the Catus Creek-Deep Creek area along the central northern boundary (molybdenum, tin); near Buck Knob along the west central border (copper, silver, zinc, tungsten); and around Hells Half Acre Ridge in the center of the area (copper, silver, zinc, bismuth, boron). Stream-sediment anomalies of copper, silver, molybdenum, zinc, tin, tungsten, thorium, niobium, and lead occur within the Magruder Corridor area, and locally high values of molybdenum, tin, uranium, fluorine, and niobium occur in association with specific lithologies (Pawlowski, 1982).

Commodities

None known.

Mineral and energy resource potential

Based on geologic and geochemical criteria, the mineral and energy resource potential of the Magruder Corridor area is low.

SELWAY-BITTERROOT WILDERNESS (NF-074)
20% in Montana

Kind and amount of data

The mandated mineral survey of the area, conducted by the USGS and USBM, included geologic mapping, geochemical and geophysical studies (Koesterer and others, 1982b; Coxe and others, 1982; Coxe and Toth, 1983; Toth, 1983; Toth and others, 1983; and M. D. Kleinkopf and Vicky Bankey, unpub. data), and investigation of mines, prospects, and mineralized areas (Zilka and Hamilton, 1982). Previous studies included those by Leiberg (1898), Shenon and Reed (1934), Lorain (1938), Lorain and Metzger (1938), Sahinen (1957), and Mutschler and others (1981). The mineral survey is completed for the Selway-Bitterroot Wilderness as required by the Wilderness Act (PL88-577) and related acts. This summary covers only the Idaho portion of the area.

Mining districts, mines, and mineral occurrences

The Selway-Bitterroot Wilderness is underlain primarily by Cretaceous and Tertiary intrusive rocks which compose the Bitterroot lobe of the Idaho batholith. These rocks both intruded Precambrian metasedimentary rocks, which now occur as small isolated bodies between the plutons, and were intruded by Eocene granitic plutons.

Several mining districts, including the Blacklead (copper, lead), Moose Creek (gold), Lowell (gold), Elk City (gold), and Green Mountain (copper, silver) mining districts surround but do not extend into the Idaho portion of the Selway-Bitterroot Wilderness. There is no known mineral production from within the wilderness area.

Gold has been produced from fissure veins and associated placer deposits south and west of the area and mines along copper-silver-bearing fissure veins are located south of the wilderness. On the north side of the wilderness, base-metal-bearing quartz veins occur, and 4 miles northwest of the wilderness boundary a lead-zinc-silver mine was being developed in 1986.

Stream-sediment samples associated with three Eocene granitic plutons on the south and southwest sides of the wilderness show enrichment in molybdenum and associated tin, niobium, beryllium, yttrium, lead, and zinc. However, evidence of mineralization in the rocks is rare. Field geologic, petrologic, and whole-rock trace element data indicate that a granite-molybdenite deposit is not present.

Commodities

None.

Mineral and energy resource potential

Based on geologic, geochemical, and geophysical criteria, the mineral and energy resource potential of the Selway-Bitterroot Wilderness is low.

IDAHO PRIMITIVE AREA/
FRANK CHURCH-RIVER OF NO RETURN WILDERNESS (NF-913)
Includes IPA 4-913 of the Payette National Forest

Kind and amount of data

The mandated mineral survey conducted by the USGS and the USBM included geologic mapping, geochemical and geophysical studies, and investigation of all known mines and prospects (Cater and others, 1973, 1975; Cater and Weldin, 1984). The mineral survey has been completed, as required by the Wilderness Act (PL88-577) and related acts. The area was included in the Frank Church-River of No Return Wilderness in 1980.

Mining districts, mines, and mineral occurrences

The primitive area is underlain by Cretaceous granitic rocks of the Idaho batholith and Eocene granitic rocks which intruded Precambrian gneiss and schist. The Precambrian rocks crop out around the perimeter of the area and Tertiary volcanic rocks overlie older rocks in the central part of the area.

Ten mining districts lie within or extend into the wilderness area, including the Chamberlain Basin (gold, copper); Big Creek (gold, copper); Edwardsburg (gold, copper, lead); Ramey Ridge (gold, copper, lead); Blackbird (copper, gold, cobalt, nickel, silver); Wilson Creek (gold, silver); Thunder

Mountain (gold); Loon Creek (gold, copper, lead); Sheep Mountain (gold, silver, lead); and Seafoam (gold, silver, lead) mining districts.

About 5,400 mining claims and numerous mines are located in the area; to date, metals valued at about $1,671,500, including gold, silver, copper, lead, zinc, and tungsten, have been extracted from within the wilderness.

In the southern half of the Idaho Primitive Area part of Indian Creek and the Middle Fork of the Salmon River lie within an "area of significant lateral extent favorable for discovery and development of local sources of low-temperature (<90^{o} C.) water" (Mitchell and others, 1980). Numerous hot springs are located within this area, including two along Indian Creek which have surface temperatures of 72-88^{o} C. Aquifer temperatures of up to 150^{o} C. are indicated by quartz and sodium-potassium-calcium chemical geothermometers.

Commodities

Gold, silver, copper, lead, zinc, tungsten, opal, mercury, antimony, fluorine, rare-earth elements, platinum group metals, geothermal energy.

Mineral and energy resource potential

Twenty-two areas within the wilderness area have moderate or high resource potential for one or more of the commodities listed above. The rest of the area has low mineral resource potential. One west-central area (A) has moderate and high potential for gold and silver resources disseminated in Tertiary volcanic rocks; (B) includes two areas; the northwestern area has high potential for gold and silver resources in both lode and placer deposits, and the southeastern area has moderate potential for the same commodities and deposits; two northern areas (C) have moderate and high resource potential for gold, silver, copper, lead, and zinc in base- and precious-metal vein deposits; two southwestern areas (D) have high resource potential for tungsten and associated gold, silver, copper, and lead in skarn deposits along the contact between the Idaho batholith and carbonate roof pendants; one central area (E) has demonstrated resources of 200,000 to 300,000 tons of material which contains 0.6 percent copper in Precambrian gneiss and schist and the overlying Eocene Challis volcanics (Cater and Weldin, 1984); two central areas (F) have moderate resource potential for platinum group metals in gabbroic Precambrian rocks; and the remaining twelve unlabelled areas have moderate resource potential for various combinations of opal, mercury, rare-earth elements, gold, silver, molybdenum, antimony, tungsten, fluorine, copper, and lead related to late intrusive activity along structures at the margins of the Van Horn Peak and Thunder Mountain cauldron complexes (Fisher and others, 1983; Cater and Weldin, 1984).

The areas along Indian Creek and the southern part of the Middle Fork of the Salmon River have moderate potential for geothermal resources. The potential for other energy resources within the wilderness is low.

SALMON RIVER BREAKS PRIMITIVE AREA/ FRANK CHURCH-RIVER OF NO RETURN WILDERNESS (NF-914)

Includes Dixie Tail (1-913)

Kind and amount of data

The mineral survey conducted by the USGS and USBM included geologic mapping, geochemical and geophysical studies, and investigation of placer deposits and bedrock mines and prospects (Weis and others, 1972). The mineral survey is completed as required by the Wilderness Act (PL88-577) and related acts. The Salmon River Breaks Primitive Area was included in the Frank Church-River of No Return Wilderness in 1980.

Mining districts, mines, and mineral occurrences

A complex of igneous and metamorphic rocks underlies the primitive area. Cretaceous plutons of the Idaho batholith, composed of quartz monzonite and granodiorite, intruded Precambrian metaigneous and metasedimentary rocks. Igneous dikes, ranging in composition from dacite to rhyolite, are the youngest rocks in the area and intrude the metamorphic rocks and the Cretaceous plutons.

The Green Mountain (copper, silver) mining district extends into the northwestern part of the area. More than 200 mining claims and a few mines are located within the wilderness.

More than one-third of Idaho's total gold output has been produced from a sharply defined northeast-trending belt which lies just west of the study area. Despite a large number of claims and prospects, total gold production from within the study area has been small. The Painter mine, located in the southwesternmost corner of the area has produced small tonnages of gold from a lode deposit. Numerous low-lying gravel bars, river bars, and alluvial terraces along the Snake River contain gold, several of which have been worked intermittently as placer deposits. However, these sediment deposits are discontinuous, often contain only a few cubic yards of material, and contain very irregular gold values.

Along the south-central border, the Big Squaw Creek fluorspar deposit occurs in association with quartz veins within Precambrian gneissic sedimnetary rocks. Outcrops on Prospect Ridge directly north of the fluorspar deposits are weakly mineralized with copper, lead, zinc, silver, and tin.

Commodities

Gold.

Mineral and energy resource potential

The Salmon River Breaks Primitive Area has high potential for gold resources in placer deposits along the Salmon River. The potential for energy or other mineral resources is regarded as low.

BOISE NATIONAL FOREST

STEEL MOUNTAIN (4-BAA)

Kind and amount of data

Reconnaissance geologic mapping and a reconnaissance geochemical study cover part of the Steel Mountain area (Bennett, 1980). Uranium resources were evaluated separately as part of the National Uranium Resource Evaluation (NURE) program (EG G geoMetrics, 1979). Information on geology and mineral deposits is adequate for a preliminary energy resource evaluation and for inferences to be made regarding mineral resource potential; however, information is not adequate for a preliminary mineral resource evaluation, and is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The Steel Mountain area is underlain by a Tertiary granitic plutonic complex which intruded older rocks of the Cretaceous Idaho batholith; the rocks were subsequently cut by a set of northeast-trending and a set of northwest-trending faults. Stream-sediment samples indicate that the Tertiary rocks have a higher background in uranium, thorium, beryllium, molybdenum, and copper than the older rocks.

The southern half of the Steel Mountain area is part of the Bear Creek gold and silver mining district. The Black Warrior, Yuba, and Red Warrior gold and silver mining districts extend into the northern, northeastern, and southern edges, respectively. Several mines and claims for both placer and lode gold deposits are located along the southern boundary and near the Steel Mountain area. A few of the mines have a history of production. There are several molybdenum occurrences along the Roaring River, west of the study area. Mineralized rock occurs in or along faults and in association with porphyry dikes of probable Tertiary age.

Numerous hot springs are along the Middle Fork of the Boise River, near and adjacent to the northern boundary of the study area. A section of this river has been marked as an "area of significant lateral extent favorable for discovery and development of local sources of low-temperature (<90° C.) water" (Mitchell and others, 1980).

Commodities

Gold, uranium, molybdenum, copper, geothermal energy.

Mineral and energy resource potential

The mineral resource potential for the Steel Mountain area cannot be fully evaluated because of the limited data. However, limited stream-sediment sampling indicates that the Tertiary plutonic rocks in the Steel Mountain area have anomalously high background values for a suite of metallic elements. These high values suggest that the plutons would be good source areas for reconcentration-type deposits, such as placer gold or sediment-hosted uranium. The suite of metallic elements may also indicate a porphyry molybdenum-copper system associated with the Tertiary plutons at depth. Epithermal gold deposits associated with the Tertiary dikes are known in the region and may also be present in the study area. On the basis of this data, the area is considered to have a moderate potential for mineral resources.

The northwestern corner of the Steel Mountain area has moderate potential for geothermal resources. The potential for other energy resources is low.

TEN MILE (4-061)

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies, conducted both as part of the CUSMAP study of the Challis $1^{\circ}x2^{\circ}$ quadrangle (Webring and Mabey, 1981; Fisher, McIntyre, and Johnson, 1983; McDanal and others, 1984; Mabey and Webring, 1985), and as a separate roadless area mineral survey of the southwestern part of the area (Kiilsgaard and others, 1970, 1983; Benham and Avery, 1983; Kiilsgaard, 1982; 1983a; 1983b). The southwestern part of the area, which is called Ten Mile West, has had a mineral survey completed, as required by the Wilderness Act (PL88-577) and related acts. For the rest of the area, information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral survey as required by the Wilderness Act (PL88-577) and related acts. The Ten Mile area adjoins the western and northwestern sides of the Sawtooth Wilderness.

Mining districts, mines, and mineral occurrences

Most of the Ten Mile study area is underlain by rocks of the Cretaceous Idaho batholith, ranging in composition from granite to granodiorite. Metamorphic roof pendants are scattered throughout the area. The older rocks were subsequently intruded by Tertiary dioritic and granitic rocks, rhyolite stocks, and numerous diabase to rhyolite dikes. Rhyolite flows of the Challis Volcanics and Quaternary alluvial and glacial deposits overlie older rocks throughout the area and several steep faults cut all rocks in the area.

The Ten Mile study area is composed of three separate areas (pl. 1). The Stanley gold mining district extends into the two northern areas from the east, and numerous mines and prospects are located throughout the areas. The southwestern area, Ten Mile West, is part of the Banner (silver, gold), Gambrinus (gold, silver, lead), and Graham (gold, silver) mining districts. Stream-sediment samples with anomalously high gold, silver, and molybdenum values occur along a northwest-trending mineralized belt which extends across the southwestern area. There are known gold placer and silver-gold-lead-zinc lode deposits in the area and over 1,100 lode and placer claims.

Thermal springs with surface temperatures of more than 50° C. are present along the South Fork of the Payette River. These springs are part of an "area of significant lateral extent favorable for discovery and development of local sources of low-temperature (<90° C.) water" (Mitchell and others, 1980), which extends into the Ten Mile area. The northern end of the Ten Mile West area was under geothermal lease application as of 1983 (Kiilsgaard and others, 1983).

Commodities

Silver, gold, molybdenum, copper, lead, zinc, tungsten, geothermal energy.

Mineral and energy resource potential

A small area along the northwestern border of the northwesternmost area has high resource potential for tungsten, copper, lead, gold, silver, and molybdenum in polymetallic skarn deposits, and copper, lead, gold, and silver resources in base- and precious-metal veins. The area directly southeast has two areas, in the northwest and southeast, that have high resource potential for gold, silver, copper, lead, and zinc in base- and precious-metal vein deposits.

Hydrothermally altered and faulted rocks form a northwest-trending belt which cuts the lower half of the southwestern area. Within the belt are two areas with moderate resource potential for placer gold deposits, along the Crooked River and North Fork of the Boise River, and six areas with moderate resource potential for lode deposits of one or more of the metals gold, silver, lead, molybdenum, and zinc.

The southern edge of the two northern areas and the northern tip of the southern area have a moderate potential for geothermal resources. The potential for other energy and mineral resources is regarded as low.

SULPHUR (4-066)

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Challis 1°x2° quadrangle (Webring and Mabey, 1981; Fisher, McIntyre, and Johnson, 1983; McDanal and others, 1984; Mabey and Webring, 1985). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts. Much of the study area was included in the Frank Church-River of No Return Wilderness in 1980.

Mining districts, mines, and mineral occurrences

The Sulphur study area is composed of three separate areas. The western and central areas are predominantly underlain by granitic rocks of the Cretaceous Idaho batholith. Numerous small roof pendants of metamorphic rocks and Ordovician sedimentary rocks are located throughout the areas. Eocene intrusive and extrusive rocks of the Challis Volcanics, which range in composition from felsic to intermediate, both intruded and covered the Cretaceous plutonic complex. Numerous dikes cut all of the intrusive rocks; the dikes are related to the Tertiary intrusive rocks and range in composition from rhyolite to diabase. The eastern area is mostly underlain by the Eocene intrusive complexes. Tuffs of the Eocene Challis Volcanics cover much of this area.

The Seafoam (gold, silver, lead) and Sheep Mountain (gold, silver) mining districts border and extend into the northeastern part of the western area; the Loon Creek (gold, copper, lead), Sheep Mountain (gold, silver), and Stanley (gold) mining districts extend into the central area; and four mining districts--the Parker Mountain (silver, gold), Bayhorse (silver, lead, copper, fluorspar), Yankee Fork (gold, silver, lead, copper), and Loon Creek (gold, sliver, copper, lead)--border and extend into the eastern area. Numerous mines and prospects are located throughout all three portions of the area.

An "area of significant lateral extent favorable for discovery and development of local sources of low-temperature (<90° C.) water" (Mitchell and others, 1980) is found in the western area along the Middle Fork of the Salmon River. Thermal springs with surface temperatures greater than 50° C. occur along Farm Spring Creek, in the eastern area.

Commodities

Gold, silver, copper, lead, zinc, tungsten, molybdenum, zeolites, geothermal energy.

Mineral and energy resource potential

The geology of the areas is favorable for mineral deposits of several types. The northwestern and northeastern portions of the western area, and the northeastern tip, small central part, and a southern section of the central area have high mineral resource potential for gold, silver, lead, and zinc in base- and precious-metal vein deposits, and copper, lead, zinc, tungsten, and molybdenum resources in polymetallic skarn deposits. Three separate areas in the eastern portion of the Sulphur area, including a central northeast-trending strip, a southwestern area, and a northern salient area, have high potential for rhyolite-hosted gold and silver deposits; copper, lead, gold, and silver resources in base- and precious-metal vein deposits; stratabound gold and silver deposits; zeolite replacement deposits; and placer gold deposits. Other mineral resources within the areas are unknown and their potential is regarded as low.

The areas along the Middle Fork of the Salmon River, in the western area, and Farm Spring Creek, in the eastern area, have a moderate potential for geothermal resources. There is no known geologic evidence for oil, gas, or coal within the areas, and the resource potential is low.

NEEDLES (4-451)

Kind and amount of data

Mineral resource evaluation of the area south of 45° N. latitude included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Challis 1°x2° quadrangle (Webring and Mabey, 1981; Fisher, McIntyre, and Johnson, 1983; McDanal and others, 1984; Mabey and Webring, 1985). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

North of 45° N. latitude the area is unstudied. Information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

Intrusive rocks of the Cretaceous Idaho batholith, ranging in composition from granite to biotite-muscovite granodiorite, underlie the Needles area. Several small metamorphic roof pendants are located in the northern part of the area.

No mining districts, mines, or prospects are known within or adjacent to the area. Polymetallic skarn deposits are known to occur in carbonate roof pendants elsewhere in the region, but there is no evidence of similar deposits in the Needles area.

Commodities

None known.

Mineral and energy resource potential

Based on overall geologic, geochemical, and geophysical criteria, the mineral and energy resource potential is low for the Needles area south of 45° N. latitude.

The portion of the area north of 45° N. latitude has unknown mineral and energy resource potential.

SAWTOOTH WILDERNESS (NF-072)

Kind and amount of data

The mineral survey conducted by the USGS and USBM included geologic mapping, geochemical, and geophysical studies, and examination of known mines and prospects (Kiilsgaard and others, 1970; Tschanz and others, 1974). The mineral survey is completed as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines and mineral occurrences

The wilderness is bounded to the northeast and southwest by major faults and is underlain by granitic rocks of the Cretaceous Idaho and Tertiary Sawtooth batholiths. Metamorphic rocks of probable Precambrian age crop out in the northern part of the area; Tertiary igneous dikes intrude all of these rocks.

Three mining districts, the Stanley (gold), Black Warrior (gold), and Yuba (gold, silver), extend into the wilderness, which is located in a highly mineralized region of central Idaho. Almost 700 mining claims are located in the study area; one property, the Little Queens mine located along the southwestern boundary, has produced about $10,000 worth of gold-silver ore.

Mineralized quartz veins and altered granitic rocks are prevalent in the wilderness along or near the Tertiary dikes. Stream-sediment samples showed anomalous values of molybdenum, beryllium, silver, lead, and zinc. Samples of the altered rock were enriched in silver, molybdenum, tin, lead, zinc, bismuth, and tungsten, and rock samples from the veins were enriched in gold, silver, lead, zinc, and bismuth. Although mineralized rock is abundant, the commodities do not appear to occur in significant concentrations. A gold placer deposit along the South Fork of the Payette River, in the northern part of the wilderness also contains anomalous amounts of niobium, tantalum, uranium, yttrium, cerium, and lanthanum. The ability to recover some of these elements could enhance the potential for the placer gold resources.

Several thermal springs and wells are located outside of and adjacent to the wilderness area. An area along the South Fork of the Payette River which has been designated as "favorable for discovery and development of local sources of low-temperature ($<90^{\circ}$ C.) water" (Mitchell and others, 1980) extends to near the northwestern edge of the wilderness area; adjacent parts of the Ten Mile West area (see description for Ten Mine, 4-061) are under geothermal lease application (Kiilsgaard and others, 1983).

Commodities

None known.

Mineral and energy resource potential

Based on geologic, geochemical, and geophysical criteria, the mineral and energy resource potential of the Sawtooth Wilderness is low.

IDAHO PRIMITIVE AREA/
FRANK CHURCH-RIVER OF NO RETURN WILDERNESS (NF-913)
(See description under Bitterroot National Forest)

CARIBOU NATIONAL FOREST

GANNETT SPRING CREEK (4-111)
60% in Wyoming

Kind and amount of data

Study of the area included both geologic mapping (Oriel and Platt, 1980) and a geophysical survey (Mabey and Oriel, 1970). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts. This report covers only the Idaho portion of the Gannett Spring Creek area.

Mining districts, mines, and mineral occurrences

The Gannett Spring Creek area is underlain by Jurassic and Cretaceous sedimentary rocks. No mining districts, mines, or prospects are known in the Gannett Spring Creek area, and the geologic setting is unfavorable for phosphate resources similar to those found in adjacent RARE II areas.

Commodities

Oil and gas.

Mineral and energy resource potential

The Gannett Spring Creek area has a high potential for petroleum resources because of the presence of favorable source beds, potential reservoirs, structural and stratigraphic traps, and thermal maturities comparable to those in the southern extension of the Idaho-Utah-Wyoming overthrust belt (Powers, 1978). The potential for other mineral and energy resources is regarded as low.

WEST MINK (4-151)

Kind and amount of data

The geology of the West Mink area has been mapped (Rember and Bennett, 1979). Information on geology and mineral deposits is adequate for a preliminary energy resource evaluation; however, information is not adequate for a preliminary mineral resource evaluation, and is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The West Mink area is underlain by faulted Precambrian and lower Paleozoic rocks, and Quaternary gravel deposits unconformably overlie older rocks throughout the area. The Fort Hall (copper, gold) mining district extends into the eastern part of the study area. Several abandoned mines and prospects are located near but outside of the study area. Copper, silver, and gold have been produced outside of the study area from small vein occurrences along fractures in the conglomeratic section of the Precambrian Pocatello Formation, but known production has been very small (Weeks and Heikes, 1908; Trimble, 1976). The Pocatello Formation does not extend into the West Mink area.

Numerous thermal wells are located along the Snake River west of the West Mink area and north of Pocatello north of the area. These wells are part of an "area of significant lateral extent favorable for the discovery and development of local sources of low-temperature ($<90^\circ$ C.) water" (Mitchell and others, 1980).

Commodities

Unknown.

Mineral and energy resource potential

The West Mink area has an unknown mineral resource potential due to lack of data. There is no geologic evidence in the area for oil, gas, coal, or geothermal energy, and the potential is regarded as low.

SCOUT MOUNTAIN (4-152)

Kind and amount of data

The geology of the Scout Mountain area has been mapped (Rember and Bennett, 1979). Information on geology and mineral deposits is adequate for a preliminary energy resource evaluation; however, information is not adequate for a preliminary mineral resource evaluation, and is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The Scout Mountain area is underlain by Precambrian and lower Paleozoic strata; Quaternary deposits unconformably overlie older rocks throughout the area. The Fort Hall (copper, gold) mining district includes most of the Scout Mountain area. Several abandoned mines and prospects are located in the region, but none are known in the study area. Copper, silver, and gold have been produced in the region from replacement deposits along fractures in the conglomeratic section of the Precambrian Pocatello Formation, but both the deposits and production have been small (Trimble, 1976). The favorable horizon of the Pocatello Formation does not extend into the Scout Mountain area.

Commodities

Unknown.

Mineral and energy resource potential

The Scout Mountain area has an unknown mineral resource potential due to lack of data. There is no geologic evidence in the area for oil, gas, coal, or geothermal energy and the potential is regarded as low.

TOPONCE (4-153)

BONNEVILLE PEAK (4-154)

NORTH PEBBLE (4-155)

Kind and amount of data

The geology of the Toponce, Bonneville Peak, and North Pebble areas has been mapped (Rember and Bennett, 1979). Information on geology and mineral deposits is adequate for a preliminary energy resource evaluation; however, information is not adequate for a preliminary mineral resource evaluation, and is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The study areas are mostly underlain by faulted Paleozoic strata. Precambrian sedimentary units crop out along the western border of the areas. Tertiary tuffaceous sedimentary rocks and Quaternary alluvial deposits unconformably overlie older rocks throughout the areas.

The Fort Hall (copper, gold) mining district is adjacent to the Toponce and Bonneville Peak areas, and extends into the northwestern tip of the Toponce area. Several abandoned mines and prospects are located throughout the region where copper, gold, and silver have been mined from the Precambrian Pocatello Formation; both the deposits and production have been small (Trimble, 1976). Prospects are located within the study areas, but the geology is unfavorable for copper, silver, and gold vein replacement deposits similar to those found nearby.

The Toponce, Bonneville Peak, and North Pebble areas lie west of the Idaho Phosphate Reserve, and along the eastern edge of the eastern Basin and Range province. This province is west of the Idaho-Wyoming-Utah overthrust belt which is known for its petroleum productivity.

Commodities

Oil and gas.

Mineral and energy resource potential

The Toponce, Bonneville Peak, and North Pebble areas have an unknown potential for mineral resources due to lack of data. The petroleum resource potential for the areas, however, is regarded as moderate by Sandberg (1982, 1983) and high by Powers (1978). Sandberg has not specifically evaluated the study areas, but other areas along trend are rated as moderate potential. Although most of the highly rated petroleum lands in Idaho are located within the overthrust belt, the Toponce, Bonneville Peak, and North Pebble areas are rated high both because of a favorable geologic environment and their location on trend with established productive areas to the southeast. The potential for other energy resources is regarded as low.

ELKHORN MOUNTAIN (4-156)

Kind and amount of data

The geology of this area has been mapped (Rember and Bennett, 1979; S. S. Oriel, unpub. mapping). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The area is composed of highly faulted Paleozoic sedimentary rocks which are unconformably overlain by Tertiary volcanic and Quaternary alluvial deposits. The study area is part of the eastern Basin and Range Province and is located just west of the Idaho-Wyoming-Utah overthrust belt.

No mining districts, mines, or mineral occurrences are located within or adjacent to the study area, and the geology is unfavorable for stratabound lead, zinc, and copper deposits similar to those found elsewhere in the region. Northwest of the study area there is active mining of obsidian, rhyolitic ash, and perlite deposits. Although similar volcanic rock types occur within the study area, similar minable deposits are not known within the boundaries of the study area.

Commodities

Oil and gas.

Mineral and energy resource potential

The petroleum resource potential of the Elkhorn Mountain area is regarded as high (Powers, 1978). Although most of the highly rated petroleum lands in Idaho are located within the overthrust belt, the Elkhorn Mountain area is rated high because of a favorable geologic environment and because of its location near or on trend with established productive areas. The potential for mineral and other energy resources is regarded as low.

OXFORD MOUNTAIN (4-157)

Kind and amount of data

The geology of this area has been partially mapped (Rember and Bennett, 1979; S. S. Oriel, unpub. mapping). Information on geology and mineral deposits is adequate for a preliminary energy resource evaluation and for inferences to be made regarding mineral resource potential; however, information is not adequate for a preliminary mineral resource evaluation, and is not sufficient for the mineral survey as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Cambrian and Precambrian sedimentary rocks underlie the Oxford Mountain area and are unconformably overlain by Tertiary tuffaceous sedimentary and Quaternary glacial and alluvial deposits. The study area is part of the eastern Basin and Range Province, just west of the Idaho-Wyoming-Utah overthrust belt.

The northeastern boundary of the Oxford Mountain area is adjacent to the Swan Lake lead mining district. Scattered stratabound mineral occurrences of lead, zinc, and copper associated with Cambrian limestones are found elsewhere in the region, such as at the Lead Bell, Gayman, and Hill mines to the east of the study area. No mining districts, mines, or mineral occurrences are known within the study area.

An "area of significant lateral extent favorable for the discovery and development of local sources of low-temperature (<90° C.) water" is located just southeast of the study area. The favorable area includes the Preston Geothermal area (Mitchell and others, 1980).

Commodities

Lead, zinc, copper, oil and gas.

Mineral and energy resource potential

The mineral resource potential of the Oxford Mountain area is unknown, because of lack of data. However, on the basis of nearby mines and the extrapolation of a generally favorable geologic environment, there is probably a moderate potential for stratabound lead, zinc, and copper resources; the area needs further study.

The petroleum resource potential of the Oxford Mountain area is regarded as high (Powers, 1978). Although most of the highly rated petroleum lands in Idaho are located within the overthrust belt, the Oxford Mountain area is rated high both because of a favorable geologic environment and because of its location near or on trend with established productive areas.

The potential for other energy resources is regarded as low.

DEEP CREEK (4-158)

CLARKSTON MOUNTAIN (4-159)

Kind and amount of data

The geology of the areas has been mapped (Rember and Bennett, 1979). Information on geology and mineral deposits is adequate for a preliminary energy resource evaluation and for inferences to be made regarding mineral resource potential; however, information is not adequate for a preliminary mineral resource evaluation, and is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Paleozoic sedimentary rocks crop out throughout most of the two areas and are unconformably overlain by Tertiary volcanic and Quaternary alluvial deposits. The study areas are part of the eastern Basin and Range Province, just west of the Idaho-Wyoming-Utah overthrust belt.

No mining districts, mines, or mineral occurrences are known within the study areas. East of the Deep Creek and Clarkston Mountain areas stratabound mineral occurrences of lead, zinc, and copper are associated with Cambrian limestones.

An "area of significant lateral extent favorable for the discovery and development of local sources of low-temperature (<90° C.) water" is located adjacent to the western boundary of the Deep Creek and Clarkston Mountain areas and extends into the southwestern part of the Clarkston Mountain area (Mitchell and others, 1980).

Commodities

Lead, zinc, copper, geothermal energy, oil and gas.

Mineral and energy resource potential

The mineral resource potential of the Deep Creek and Clarkston Mountain areas is unknown because of the lack of data. However, based on the extrapolation of a generally favorable geologic environment, there is a moderate potential for stratabound lead, zinc, and copper resources, particularly in the southern part of the Clarkston Mountain area, which needs further study.

The petroleum resource potential of the Deep Creek and Clarkston Mountain areas is regarded as high (Powers, 1978). Although most of the highly rated petroleum lands in Idaho are located within the overthrust belt, the Deep Creek and Clarkston Mountain areas are rated high because of a favorable geologic environment and because of their location near or on trend with established productive areas. The western edge of the Clarkston Mountain area has moderate potential for geothermal resources. The potential for other energy resources is regarded as low.

POLE CREEK (4-160)

Kind and amount of data

Gardner (1961) has mapped the geology of the area. Information on geology and mineral deposits is adequate for a preliminary energy resource evaluation and for inferences to be made regarding mineral resource potential; however, information is not adequate for a preliminary mineral resource evaluation, and is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Folded and faulted sedimentary rocks of Cretaceous age underlie the Pole Creek area. The Permian phosphate-bearing Phosphoria Formation crops out to the north and east of the Pole Creek area, but does not extend into the study area. The study area is part of the Idaho-Wyoming-Utah overthrust belt.

The Pole Creek area is part of the Mount Pisgah gold mining district, but there are no mines or mineral occurrences known in the area.

Most of the western half of the area is within an area designated by Mitchell and others (1980) as "favorable for discovery and development of local sources of low-temperature ($<90^{\circ}$ C.) water."

Commodities

Geothermal energy, oil and gas.

Mineral and energy resource potential

The Pole Creek area has moderate potential for geothermal energy and high potential for oil and gas resources (Powers, 1978). The potential for mineral and other energy resources is unknown.

CARIBOU CITY (4-161)

Kind and amount of data

Study of the area included both geologic mapping at various scales (Schultz, 1918; Gardner, 1961; Albee and Cullins, 1965; Huntsman, 1978) and a geophysical survey (Mabey and Oriel, 1970). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The Caribou City area is underlain by folded and faulted Mesozoic sedimentary rocks which were intruded by Tertiary calc-alkaline igneous rocks. Quaternary glacial and alluvial deposits unconformably overlie older rocks throughout the area. The study area is part of the Idaho-Wyoming-Utah overthrust belt.

The Mount Pisgah gold mining district extends into the Caribou City area from the northwest and the Willow Creek-Caribou coal mining district extends in from the north-northeast. Activity within the Caribou Mountain general area included mining of placer gold deposits which yielded $2.5 million in gold between 1890 and 1900. The gold was derived from the weathering of auriferous pyrite. Huntsman (1978) suggested that glacial processes concentrated low grade rock into placers near moraines and in cirques and related valleys on the north and east faces of Caribou Mountain. Mining of hard rock at Caribou Mountain has also produced gold, silver, and copper. The Caribou Mountain porphyry copper deposit is located along the western boundary and extends into the Caribou City study area.

There are several coal prospects in the Willow Creek-Caribou district, which is part of the Teton Basin coal field, but none have any recorded production. The coaly material occurs in the carbonaceous shales of the Bear River Formation, but the seams are thin, irregular, and of poor quality (Trumbull, 1960; Kiilsgaard, 1964).

There are no thermal springs or wells known within the Caribou City area, but an "area of significant lateral extent favorable for discovery and development of local sources of low-temperature (<90° C.) water" lies just to the west. This area, outlined by Mitchell and others (1980), is suggested to be one of the most favorable geothermal prospects in Idaho.

Commodities

Copper, iron, zinc, gold, silver, oil and gas.

Mineral and energy resource potential

The western border of the Caribou City study area, immediately adjacent to the Caribou Mountain porphyry copper deposit, has a high resource potential for copper, iron, and zinc and a moderate resource potential for gold and silver. Huntsman (1984) has suggested the possibility that additional porphyry copper deposits may occur within the Caribou Range. Further evaluation of resource potential is warranted. Areas on the north and east side of Caribou Mountain, in the northwestern part of the study area, have a high resource potential for gold in placer deposits.

The potential for petroleum resources is regarded as high because of the presence of favorable source beds, potential reservoirs, structural and stratigraphic traps, and thermal maturities comparable to those in the productive southern part of the Idaho-Utah-Wyoming overthrust belt (Powers, 1978). The potential for other mineral and energy resources is regarded as low.

STUMP CREEK (4-162)

Kind and amount of data

Study of the area included both geologic mapping (Schultz and Richards, 1913; Kirkham, 1924; Oriel and Platt, 1980) and a geophysical survey (Mabey and Oriel, 1970). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The Stump Creek area is underlain by folded and faulted Paleozoic and Mesozoic sedimentary rocks. Quaternary glacial and alluvial deposits unconformably overlie older rocks throughout the area. No mines or prospects are known in the area. The Permian Phosphoria Formation, which contains phosphate rock, crops out in isolated patches along the southern boundary of the area, and the Idaho Phosphate Reserve (Ross, 1941) extends into the southern part of the Stump Creek area. The study area is part of the Idaho-Wyoming-Utah overthrust belt.

Although there are not any thermal springs or wells known in the Stump Creek area, an "area of significant lateral extent favorable for discovery and development of local sources of low-temperature (<90° C.) water" lies just to the west of the study area (Mitchell and others, 1980); it is suggested that the outlined area is one of the most favorable geothermal prospects in Idaho.

Commodities

Phosphate, oil and gas.

Mineral and energy resource potential

The southern quarter and a small area on the western arm of the Stump Creek area have a high potential for phosphate resources in the Permian Phosphoria Formation. The potential for oil and gas resources is regarded as high for the entire area because of the presence of favorable source beds, potential reservoirs, structural and stratigraphic traps, and thermal maturities comparable to those in the productive southern part of the Idaho-Utah-Wyoming overthrust belt (Powers, 1978). The potential for other mineral and energy resources is regarded as low.

SCHMID PEAK (4-163)

Kind and amount of data

Study of the area included both geologic mapping (Oriel and Platt, 1980) and a geophysical survey (Mabey and Oriel, 1970). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The Schmid Peak area is underlain by Paleozoic and Mesozoic sedimentary rocks. Quaternary alluvial deposits unconformably overlie the older rocks in the central part of the area. The study area is directly south of the Teton Basin Coal Field, directly east of one of the most favorable geothermal prospects in Idaho (Mitchell and others, 1980), and is part of both the Idaho-Wyoming-Utah overthrust belt and the Idaho Phosphate Reserve (Ross, 1941). The phosphate occurs as bedded sedimentary deposits within the Permian Phosphoria Formation, which crops out along north- and northwest-trending belts in the area. No mines, prospects, or thermal springs are known in the area.

Commodities

Phosphate, oil and gas.

Mineral and energy resource potential

The Schmid Peak area has high potential for phosphate resources in the Permian Phosphoria Formation. The potential for oil and gas resources is also regarded as high, because favorable source beds, potential reservoirs, structural and stratigraphic traps, and thermal maturities comparable to those in the productive southern part of the Idaho-Wyoming-Utah overthrust belt are present (Powers, 1978). The potential for other mineral and energy resources is regarded as low.

DRY RIDGE (4-164)

Kind and amount of data

Study of the area included both geologic mapping (Oriel and Platt, 1980) and a geophysical survey (Mabey and Oriel, 1970). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The Dry Ridge area is underlain by folded and faulted Paleozoic and Mesozoic sedimentary rocks. Tertiary sedimentary and Quaternary alluvial deposits unconformably overlie older rocks throughout the area. The study area is part of the Idaho-Wyoming-Utah overthrust belt, and the Idaho Phosphate Reserve (Ross, 1941) extends into the eastern half and northwestern tip of the study area; the phosphate occurs as bedded sedimentary deposits within the Permian Phosphoria Formation. No mines or prospects are known in the area.

Commodities

Phosphate, oil and gas.

Mineral and energy resource potential

The eastern half and northwestern tip of the Dry Ridge area have a high potential for phosphate resources in the Permian Phosphoria Formation. The entire study area also has a high potential for oil and gas resources, because favorable source beds, potential reservoirs, structural and stratigraphic traps, and thermal maturities are thought to be comparable to those in the productive southern part of the Idaho-Wyoming-Utah overthrust belt (Powers, 1978). The potential for other mineral and energy resources is regarded as low.

HUCKLEBERRY BASIN (4-165)

Kind and amount of data

Study of the area included both geologic mapping (Oriel and Platt, 1980) and a geophysical survey (Mabey and Oriel, 1970). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The Huckleberry Basin area is underlain by folded and faulted Paleozoic and Mesozoic sedimentary rocks. Tertiary sedimentary and Quaternary alluvial deposits unconformably overlie older rocks throughout the area. The Idaho Phosphate Reserve (Ross, 1941) extends into both the northwestern and northeastern parts of the Huckleberry Basin area; the phosphate occurs as bedded sedimentary deposits within the Permian Phosphoria Formation. No mines or prospects are known in the area. The study area is also part of the Idaho-Wyoming-Utah overthrust belt and is located less than 10 miles east of one of the most favorable geothermal prospects in Idaho (Mitchell and others, 1980).

Commodities

Phosphate, oil and gas.

Mineral and energy resource potential

The northwestern and northeastern parts of the Huckleberry Basin area have a high potential for phosphate resources in the Permian Phosphoria Formation. The potential for oil and gas resources for the entire area is also regarded as high, because favorable source beds, potential reservoirs, structural and stratigraphic traps, and thermal maturities comparable to those in the productive southern part of the Idaho-Wyoming-Utah overthrust belt are present (Powers, 1978). The potential for other mineral and energy resources is regarded as low.

SAGE CREEK (4-166)

Kind and amount of data

Study of the area included both geologic mapping (Oriel and Platt, 1980) and a geophysical survey (Mabey and Oriel, 1970). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The Sage Creek area is underlain by folded and faulted Paleozoic and Mesozoic sedimentary rocks and is part of the Idaho-Wyoming-Utah overthrust belt. The Idaho Phosphate Reserve extends through most of the Sage Creek area (Ross, 1941); the phosphate occurs as bedded sedimentary deposits within the Permian Phosphoria Formation. No mines or prospects are known in the area.

Commodities

Phosphate, oil and gas.

Mineral and energy resource potential

The Sage Creek area has high potential for phosphate resources in the Permian Phosphoria Formation. The potential for oil and gas resources is also regarded as high, because favorable source beds, potential reservoirs, structural and stratigraphic traps, and thermal maturities comparable to those in the productive southern part of the Idaho-Wyoming-Utah overthrust belt are present (Powers, 1978). The potential for other mineral and energy resources is regarded as low.

MEADE PEAK (4-167)

Kind and amount of data

Study of the area included both geologic mapping (Oriel and Platt, 1980) and a geophysical survey of the northern half of the area (Mabey and Oriel, 1970). Information on geology and mineral deposits is adequate for a preliminary energy resource evaluation and a mineral resource evaluation for phosphate; however, information is not adequate for a preliminary mineral resource evaluation for other minerals, and is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Folded and faulted Paleozoic and Mesozoic sedimentary rocks underlie the Meade Peak area, which is part of the Idaho-Wyoming-Utah overthrust belt. The Idaho Phosphate Reserve (Ross, 1941) extends into the northern half and southernmost tip of the area; the phosphate occurs as bedded sedimentary deposits within the Permian Phosphoria Formation. Copper, silver, and zinc occurrences have been described from the upper part of the Triassic-Jurassic Nugget Sandstone in the overthrust belt in western Wyoming (Love and Antweiler, 1973). The Nugget Sandstone crops out in parts of the southern two-thirds of the Meade Peak area, and may contain mineralized rock in this area as well. No mines or prospects are known in the study area.

Commodities

Phosphate, oil and gas.

Mineral and energy resource potential

The northern half and southern tip of the Meade Peak area have high potential for phosphate resources from the Permian Phosphoria Formation. The potential for oil and gas resources for the entire study area is also regarded as high because favorable source beds, potential reservoirs, structural and stratigraphic traps, and thermal maturities comparable to those in the productive southern part of the Idaho-Wyoming-Utah overthrust belt are present (Powers, 1978). The potential for other energy resources is low and the potential for other mineral resources is unknown.

HELL HOLE (4-168)

Kind and amount of data

The geology of the Hell Hole area has been mapped (Oriel and Platt, 1980). Information on geology and mineral deposits is adequate for a preliminary energy resource evaluation and a mineral resource evaluation for phosphate; however, information is not adequate for a preliminary mineral resource evaluation for other minerals, and is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Faulted and folded upper Paleozoic and Mesozoic sedimentary rocks underlie the Hell Hole area, which is part of the Idaho-Wyoming-Utah overthrust belt. Tertiary tuffaceous and sedimentary deposits unconformably overlie older rocks in the central part of the study area.

The Hell Hole area is part of the Montpelier copper mining district, and the Idaho Phosphate Reserve (Ross, 1941) extends into the western third of the study area; the phosphate occurs as bedded sedimentary deposits within the Permian Phosphoria Formation. Copper, silver, and zinc occurrences have been described from the upper part of the Triassic-Jurassic Nugget Sandstone in the overthrust belt in western Wyoming (Love and Antweiler, 1973). The Nugget Sandstone crops out in the southern part of the Hell Hole area, and may contain mineralized rock in this area as well. No mines or prospects are known within the area.

Commodities

Phosphate, oil and gas.

Mineral and energy resource potential

The western third of the Hell Hole area has high potential for phosphate resources from the Permian Phosphoria Formation. The potential for oil and gas resources for the entire study area is also regarded as high, because favorable source beds, potential reservoirs, structural and stratigraphic traps, and thermal maturities comparable to those in the productive southern part of the Idaho-Wyoming-Utah overthrust belt are present (Powers, 1978). The potential for other energy resources is low and the potential for other mineral resources is unknown.

TELEPHONE DRAW (4-169)

Kind and amount of data

The geology of the Telephone Draw area has been mapped (Oriel and Platt, 1980). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Faulted Mesozoic sedimentary rocks underlie the Telephone Draw area, which is part of the Idaho-Wyoming-Utah overthrust belt. No mining districts, mines, or prospects are located in the Telephone Draw area, but the Montpelier copper mining district is adjacent to the area on the southwest. Small discontinuous copper occurrences have been described from the Triassic red beds in the Montpelier district (Gale, 1910). The Triassic Preuss Redbeds crop out in the Telephone Draw area and may contain mineralized rock in this area as well.

Commodities

Oil and gas.

Mineral and energy resource potential

The potential for oil and gas resources within the Telephone Draw area is regarded as high because favorable source beds, potential reservoirs, structural and stratigraphic traps, and thermal maturities comparable to those in the productive southern part of the Idaho-Wyoming-Utah overthrust belt are present (Powers, 1978). The potential for mineral and other energy resources is regarded as low.

RED MOUNTAIN (4-170)

Kind and amount of data

Study of the area included both geologic mapping (Oriel and Platt, 1980) and a geophysical survey (Mabey and Oriel, 1970). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The Red Mountain area is mostly underlain by Mesozoic sedimentary rocks and is part of the Idaho-Wyoming-Utah overthrust belt. No mining districts, mines, or prospects are located within the area.

Commodities

Oil and gas.

Mineral and energy resource potential

The potential for oil and gas resources within the Red Mountain area is regarded as high, because favorable source beds, potential reservoirs, structural and stratigraphic traps, and thermal maturities comparable to those in the productive southern part of the Idaho-Wyoming-Utah overthrust belt are present (Powers, 1978). The potential for mineral and other energy resources is regarded as low.

SODA POINT (4-171)

Kind and amount of data

Study of the area included both geologic mapping (Oriel and Platt, 1980) and a geophysical survey for part of the area (Mabey and Oriel, 1970). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The Soda Point area is underlain by Precambrian and lower Paleozoic rocks that are folded into northward-trending flexures and cut by high-angle faults. Tertiary and Quaternary tuffaceous and alluvial deposits unconformably overlie older rocks in the northeastern part of the area.

Small discontinuous lead, zinc, and copper occurrences are associated with Middle Cambrian limestone units elsewhere in the region. Although there are numerous prospects and a few abandoned mines in the general area, there has never been any significant mineral production from the region (Mansfield, 1927).

Two thermal springs are located along Bear River just north of the Soda Point area (Mitchell and others, 1980). The study area is also part of the Idaho-Wyoming-Utah overthrust belt, which is known for its petroleum productivity.

Commodities

Oil and gas.

Mineral and energy resource potential

The resource potential for oil and gas in the Soda Point area is regarded as at least moderate. Powers (1978) gives the area a high potential rating, but Sandberg (1982, 1983) has rated nearby areas both to the northwest and southeast as having moderate petroleum potential. The area contains favorable source beds, potential reservoirs, structural and stratigraphic traps, and thermal maturities comparable to those in the productive southern part of the overthrust belt. The potential for mineral and other energy resources in the area is regarded as low.

SHERMAN PEAK (4-172)

Kind and amount of data

Study of the area included both geologic mapping (Oriel and Platt, 1980) and a geophysical survey for part of the area (Mabey and Oriel, 1970). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The Sherman Peak area is underlain by upper Precambrian and lower Paleozoic rocks that are folded into northward-trending flexures and cut by high-angle faults. Tertiary tuffaceous sedimentary rocks unconformably overlie older rocks in the northeastern part of the area.

The Nounan copper mining district extends into the southeastern part of the Sherman Peak area. Small discontinuous lead, zinc, and copper occurrences are associated with Cambrian limestone units in the mining district and elsewhere in the region. Although there are numerous prospects and a few abandoned mines in the general area, there has never been any significant mineral production from the region (Mansfield, 1927). The study area is part of the Idaho-Wyoming-Utah overthrust belt, which is known for its petroleum productivity.

Commodities

Oil and gas.

Mineral and energy resource potential

The resource potential for oil and gas in the Sherman Peak area is regarded as at least moderate. Powers (1978) gives the area a high potential rating, but Sandberg (1982, 1983) has rated nearby areas both to the northwest and southeast as having moderate petroleum potential. The area contains favorable source beds, potential reservoirs, structural and stratigraphic traps, and thermal maturities comparable to those in the productive southern part of the overthrust belt. The potential for mineral and other energy resources in the area is regarded as low.

STAUFFER CREEK (4-173)

Kind and amount of data

The geology of the area has been mapped (Oriel and Platt, 1980). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The Stauffer Creek area is underlain by upper Precambrian and lower Paleozoic rocks that are folded into northward-trending flexures and cut by high-angle faults.

The Nounan copper mining district extends into the eastern part of the study area, and the Bear Lake (lead, copper) mining district is adjacent to the south. The study area is located along the western boundary of the Idaho-Wyoming-Utah overthrust belt, which is known for its petroleum productivity.

Small discontinuous lead, zinc, and copper occurrences are associated with Middle Cambrian limestone units in the region. Although there are numerous prospect pits and a few abandoned mines in the general area, there has never been any significant mineral production recorded (Mansfield, 1927).

Commodities

Oil and gas.

Mineral and energy resource potential

The resource potential for oil and gas in the Stauffer Creek area is regarded as at least moderate. Powers (1978) gives the areas a high potential rating, but Sandberg (1982, 1983) has rated nearby areas both to the northwest and southeast as having moderate petroleum potential. The area contains favorable source beds, potential reservoirs, structural and stratigraphic traps, and thermal maturities comparable to those in the productive southern part of the overthrust belt. The potential for mineral and other energy resources in the area is regarded as low.

WILLIAMS CREEK (4-174)

LIBERTY CREEK (4-175)

MINK CREEK (4-176)

Kind and amount of data

The geology of the areas has been mapped (Oriel and Platt, 1980). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The Williams Creek, Liberty Creek, and Mink Creek areas are underlain by upper Precambrian and lower Paleozoic rocks that are folded into northward-trending flexures and cut by high-angle faults. Quaternary alluvial deposits unconformably overlie older rocks throughout the area.

The Bear Lake (lead, copper) mining district includes most of the Liberty Creek area and extends into the eastern tip of the Williams Creek area and the southeastern part of the Mink Creek area. The study areas are located along the boundary between the Idaho-Wyoming-Utah overthrust belt, known for its petroleum productivity, and the eastern Basin and Range province.

The study areas are on trend with the Mount Naomi Roadless area to the south, which contains discontinuous and disseminated lead-zinc and copper mineral occurrences in Middle Cambrian limestones and shales (Dover and Bigsby, 1983). Although the rock units crop out in the study areas, no mineral occurrences are known.

Commodities

Oil and gas.

Mineral and energy resource potential

The resource potential for oil and gas in the Williams Creek, Liberty Creek, and Mink Creek areas is regarded as at least moderate. Powers (1978) gives the areas a high potential rating, but Sandberg (1982, 1983) has rated nearby areas to the south as having moderate petroleum potential. The areas contain favorable source beds, potential reservoirs, structural and stratigraphic traps, and thermal maturities comparable to those in the productive southern part of the overthrust belt. The potential for mineral and other energy resources in the area is regarded as low.

PARIS PEAK (4-177)

Kind and amount of data

The geology of the area has been mapped (Oriel and Platt, 1980). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The Paris Peak area is underlain by lower Paleozoic rocks that are folded into northward-trending flexures and cut by high-angle faults. Quaternary alluvial deposits unconformably overlie older rocks throughout the area.

The study area is located directly west of the Paris-Bloomington phosphate and vanadium area and along the western edge of the Idaho-Wyoming-Utah overthrust belt, a province known for its petroleum productivity. The Paris Peak area is included in the Bear Lake (lead, copper) mining district, but the geology is unfavorable for lead, zinc, and copper mineral occurrences similar to those found elsewhere in the region. No mines or mineral occurrences are known within the area.

Commodities

Oil and gas.

Mineral and energy resource potential

The resource potential for oil and gas in the Paris Peak area is regarded as moderate by Sandberg (1982, 1983) and high by Powers (1978), due to the presence of favorable source beds, potential reservoirs, structural and stratigraphic traps, and thermal maturities comparable to those in the productive southern part of the Idaho-Wyoming-Utah overthrust belt. The potential for mineral and other energy resources in the area is regarded as low.

STATION CREEK (4-178)

Kind and amount of data

The geology of the area has been mapped (Oriel and Platt, 1980). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The Station Creek area is underlain by upper Precambrian and lower Paleozoic rocks that are folded into northward-trending flexures and cut by high-angle faults. The Mount Naomi RARE II area to the south contains discontinuous stratabound lead-zinc and copper mineral occurrences in Middle Cambrian limestones and shales (Dover and Bigsby, 1983). These units extend into the eastern half of the Station Creek study area, but no mining districts, mines, or mineral occurrences are known within the study area. The area is located along the boundary between the Idaho-Wyoming-Utah overthrust belt, known for its petroleum productivity, and the eastern Basin and Range province.

Although there are no thermal springs known in the area, an "area of significant lateral extent favorable for discovery and development of local sources of low-temperature (<90^{o} C.) water" (Mitchell and others, 1980) is located just to the west of the Station Creek area; this includes the Preston Geothermal area.

Commodities

Oil and gas.

Mineral and energy resource potential

The resource potential for oil and gas in the Station Creek area is regarded as at least moderate. Powers (1978) rates the area as high potential, but Sandberg (1982, 1983) has rated adjacent areas to the south and east as having moderate petroleum potential. The area contains favorable source beds, potential reservoirs, structural and stratigraphic traps, and thermal maturities comparable to those in the productive southern part of the overthrust belt. The potential for mineral and other energy resources in the area is regarded as low.

WORM CREEK (4-179)

Kind and amount of data

The geology of the area has been mapped (Coulter, 1956; Oriel and Platt, 1980). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Paleozoic rocks folded into northward-trending flexures and cut by high-angle faults underlie the Worm Creek area. Quaternary glacial and alluvial units unconformably overlie older rocks throughout the area. The Worm Creek area is located along the western edge of the Idaho-Wyoming-Utah overthrust belt, a region known for its petroleum productivity.

The northern tip of the Worm Creek area is part of the Bear Lake (lead, copper) mining district. However, the geologic environment of the study area is different from, and probably unfavorable for lead, zinc, and copper occurrences similar to those found nearby (Oriel and Platt, 1980). Several old mines and prospects are located east of the study area, but none are known within the area boundaries.

Commodities

Oil and gas.

Mineral and energy resource potential

The resource potential for oil and gas in the Worm Creek area is regarded as moderate (Sandberg, 1982, 1983) to high (Powers, 1978), due to the presence of favorable source beds, potential reservoirs, structural and stratigraphic traps, and thermal maturities comparable to those in the productive southern part of the Idaho-Wyoming-Utah overthrust belt. The potential for mineral and other energy resources in the area is regarded as low.

SWAN CREEK MOUNTAIN (4-180)

GIBSON (4-181)

Kind and amount of data

The geology of the areas has been mapped (Oriel and Platt, 1980). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Paleozoic rocks folded into northward-trending flexures and cut by high-angle faults underlie the Swan Creek Mountain and Gibson areas. Quaternary glacial and alluvial units unconformably overlie older rocks throughout the areas.

The areas are not included in any mining districts, and no prospects or mineral occurrences are known in the study areas. The geologic environment of the study areas is different from, and probably unfavorable for lead, zinc, and copper occurrences similar to those found nearby (Oriel and Platt, 1980). The areas are located along the boundary between the Idaho-Wyoming-Utah overthrust belt, known for its petroleum productivity, and the eastern Basin and Range province.

Commodities

Oil and gas.

Mineral and energy resource potential

The resource potential for oil and gas in the Swan Creek Mountain and Gibson areas is regarded as at least moderate. Powers (1978) rates the areas as high potential, but Sandberg (1982, 1983), although not evaluating the specific study areas, rated two adjacent and bounding areas as having moderate petroleum potential. The areas contain favorable source beds, potential reservoirs, structural and stratigraphic traps, and thermal maturities comparable to those in the productive southern part of the overthrust belt. The potential for mineral and other energy resources in the areas is regarded as low.

BEAR CREEK (4-615)
(See description under Targhee National Forest)

MOUNT NAOMI (4-758)
60% in Utah

Kind and amount of data

The mineral survey conducted by the USGS and USBM included geologic mapping, geochemical, and geophysical studies, and examination of known mines and prospects (Bigsby, 1982; Dover and Bigsby, 1983; Dover, 1987; Dover and others, 1987; Mabey, 1985). A separate petroleum resource evaluation was also completed (Sandberg, 1982, 1983). The mineral survey is completed, as required by the Wilderness Act (PL88-577) and related acts. This report covers only the Idaho portion of the area.

Mining districts, mines, and mineral occurrences

Folded and faulted upper Precambrian and Paleozoic sedimentary rocks underlie the Mount Naomi area. Tertiary and younger sedimentary deposits unconformably overlie older rocks near the borders of the area. The study area is located along the eastern edge of the eastern Basin and Range province. The Idaho-Wyoming-Utah overthrust, known for its petroleum productivity, borders the Basin and Range Province to the east.

The Bear Lake (lead, copper) mining district borders the Mount Naomi study area on the northeast. There are a few abandoned mines and prospects in the study area, including the Gayman and Hill mines, which contain stratabound disseminated lead-zinc and copper minerals with associated barite. These mineral occurrences follow a north-northeast-trending belt of Middle Cambrian limestone and shale which crops out in the western part of the study area. The distribution of mineralized rock within this belt is discontinuous and disseminated, the metals are not concentrated, and the production from known mines and prospects was small.

Although there are no thermal springs known in the study area, an "area of significant lateral extent favorable for discovery and development of local sources of low-temperature (<90° C.) water" (Mitchell and others, 1980) is adjacent to the Mount Naomi area on the west; this includes the Preston Geothermal area.

Commodities

Oil and gas.

Mineral and energy resource potential

The resource potential for oil and gas in the Mount Naomi area is regarded as moderate; the area contains favorable source beds, potential reservoirs, and optimum thermal maturities, but the presence of structural or stratigraphic traps at depth is unknown (Sandberg, 1982, 1983). The potential for mineral or other energy resources is low.

CHALLIS NATIONAL FOREST

TEN MILE (4-061)

(See description under Boise National Forest)

RED MOUNTAIN (4-063)

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Challis $1^{o}x2^{o}$ quadrangle (Webring and Mabey, 1981; Fisher, McIntyre, and Johnson, 1983; McDanal and others, 1984; Mabey and Webring, 1985). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral survey as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The northern half of the Red Mountain area is underlain by porphyritic granite and granodiorite of the Cretaceous Idaho batholith. Granitic rocks of Eocene age intruded the older rocks and underlie the southern half of the study area. The area lies outside of any mining districts; there are no known mines or mineral occurrences within the area.

Commodities

None known.

Mineral and energy resource potential

Based on geological, geochemical, and geophysical criteria, the mineral and energy resource potential of the Red Mountain area is low.

SULPHUR (4-066)

(See description under Boise National Forest)

PIONEER MOUNTAINS (4-201)

Kind and amount of data

The mineral survey included geologic mapping, geochemical and geophysical studies, and examination of known mines (U.S. Geological Survey and U.S. Bureau of Mines, 1981). The mineral survey is completed as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Precambrian gneissic and metasedimentary rocks and Paleozoic sedimentary rocks underlie the Pioneer Mountains study area. The Paleozoic rocks are folded and imbricated along westerly-dipping thrust faults. Granitic igneous rocks of latest Mesozoic to early Tertiary age intrude the older rocks, and Eocene volcanic rocks unconformably overlie older rocks near the perimeter of the area. Quaternary age glacial and lake deposits, alluvium, and talus locally cover bedrock.

The Warm Spring (silver, lead, gold, copper, iron), Alta (lead, zinc, copper), Little Wood River (lead, zinc, silver, copper), and Copper Basin (lead, silver) mining districts surround and extend into the area; the Mineral Hill, Alder Creek, and Lava Creek mining districts lie just outside the area. Several major mines such as the Phi Kappa, Homestead, Eagle Bird, and

Star of Hope are located in the area, as well as more than 2,600 lode claims and 11 placer claims. These major mines have demonstrated resources of about 1.7 million tons of lead-zinc-silver ore, ranging from 1.6 to 9.96 percent lead, 1.62 to 6.63 percent zinc, and 3.2 to 13.06 oz silver per ton. The following resource figures are for the entire mining districts; the study area comrpises only a small portion of each district. Resources in the Alta district, located in the northwestern part of the area, consist of more than 1.4 million tons of 0.32 percent WO_3 tungsten-bearing tactite; 106,000 tons of 2.42 to 4.40 percent lead, 1.80 to 8.75 percent zinc, and 1.0 to 6.3 oz silver per ton; and small amounts of molybdenum and fluorite. The Warm Springs district, in the southwest, contains about 885,000 tons of 1.0 to 8.22 percent lead, a trace to 42 percent zinc, and 0.4 to 3.5 oz silver per ton. Resources in the Little Wood River district, in the southeast, consist of 90,000 tons of 2.83 to 27.4 percent lead, a trace to 6.4 percent zinc, and 3.3 to 4.4 oz silver per ton (U.S. Geological Survey and U.S. Bureau of Mines, 1981).

Commodities

Lead, zinc, silver, tungsten, molybdenum, copper, barite, gold.

Mineral and energy resource potential

The geologic environment of the Pioneer Mountains area is favorable for both vein and replacement-type mineral deposits. The Pioneer Mountains area is divided into two areas, east and west of a highly mineralized region. The southwestern quarter of the eastern area has a moderate potential for copper, lead, zinc, silver, and barite resources. This area of moderate resource potential extends to the west and into the southeastern corner of the western area.

The north-central part of the western area has an area of high potential for tungsten resources and an area of moderate resource potential for molybdenum. The south-central part of the western area has four areas of moderate resource potential for zinc and molybdenum. The northeasternmost area within this group of four also has moderate potential for copper, lead, and silver resources. The northwestern corner of the western area has moderate resource potential for zinc and molybdenum and high potential for lead and silver resources.

There is no known geologic evidence for oil, gas, coal, geothermal or other mineral resources within the area, and their potential is regarded as low.

CAMAS CREEK (4-202)

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies, conducted during the CUSMAP study of the Challis $1^{o}x2^{o}$ quadrangle (Webring and Mabey, 1981; Fisher, McIntyre, and Johnson, 1983; McDanal and others, 1984; Mabey and Webring, 1985). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts. Part of the area was included in the Frank Church-River of No Return Wilderness in 1980.

Mining districts, mines, and mineral occurrences

Rocks of the Eocene Challis Volcanics and related intrusive rocks cover and underlie the Camas Creek area. Numerous dikes related to the intrusive rocks and several high-angle faults cut the area.

The Gravel Range (gold, silver, opal) mining district extends into the northern part of the Camas Creek area, and the Parker Mountain (silver, gold) mining district borders and extends into the southwestern part of the study area . Several mines and prospects are located within the area.

Commodities

Gold, silver, copper, lead, molybdenum, fluorspar, antimony, zeolites.

Mineral and energy resource potential

The geology of the area is favorable for mineral deposits of several types. A north-trending swatch through the center of the area, and a small area farther west along the northern border of the area have high mineral resource potential for the commodities listed above. These areas contain geologic environments favorable for fluorspar and antimony veins; rhyolite-hosted gold and silver deposits; copper-lead and gold-silver base- and precious-metal vein deposits; zeolite replacement deposits; and stratabound gold and silver precious-metal deposits.

The rest of the Camas Creek area has low mineral resource potential. There is no known geologic evidence for oil, gas, coal, or geothermal resources within the area, and the potential is regarded as low.

GROUSE PEAK (4-204)

Kind and amount of data

Mineral resource evaluation of the area has included geologic mapping, and geochemical and geophysical surveys conducted as part of the CUSMAP study of the Challis $1^{o}x2^{o}$ quadrangle (Webring and Mabey, 1981; Fisher, McIntyre, and Johnson, 1983; McDanal and others, 1984; Mabey and Webring, 1985). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Quartzitic strata with minor dolomite and argillitic interbeds of Precambrian or Paleozoic age underlie the Grouse Peak area. Eocene tuffs and lava flows of intermediate to mafic composition cover almost half of the study area. The area lies outside of any mining districts; there are no known mines or mineral occurrences in the area.

Commodities

None known.

Mineral and energy resource potential

Based on geologic, geochemical, and geophysical criteria, the mineral and energy resource potential for the Grouse Peak area is low.

LOON CREEK (4-207)

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Challis $1^{o}x2^{o}$ quadrangle (Webring and Mabey, 1981; Fisher, McIntyre, and Johnson, 1983; McDanal and others, 1984; Mabey and Webring, 1985). Information on geology and mineral deposits is adequate for preliminary resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts. Part of the area was included in the Frank Church-River of No Return Wilderness in 1980.

Mining districts, mines, and mineral occurrences

Cretaceous intrusive rocks of the Idaho batholith, ranging in composition from granite to porphyritic biotite granodiorite, underlie most of the western half of the Loon Creek area. These rocks intruded metasediments of Paleozoic and Precambrian age which now form scattered roof pendants. The eastern half of the area is covered by Eocene felsic tuffs and lavas of intermediate composition and the intrusive equivalents of both. Volcaniclastic and sedimentary rocks of Tertiary age also cover older rocks in the eastern part of the area. Quaternary alluvial and glacial deposits are located along major drainages in the area. Tertiary dikes of intermediate composition cut older rocks throughout the area and high-angle faults are concentrated in the eastern part of the area.

The Stanley (gold), Yankee Fork (gold, silver, lead, copper), Sheep Mountain (gold, silver), and Loon Creek (gold, copper, lead) mining districts extend into the area. Numerous mines and prospects are scattered throughout the study area.

Commodities

Gold, silver, copper, lead, molybdenum, uranium.

Mineral and energy resource potential

Patches in the central, southern, and along the eastern border of the area have high mineral resource potential for the commodities listed above. These areas contain geologic environments favorable for numerous types of deposits, including: rhyolite-hosted gold and silver deposits; copper, lead, gold, and silver base- and precious-metal vein deposits; stratabound precious metal deposits; stockwork molybdenum deposits; placer gold deposits; stratabound uranium deposits; and vein uranium deposits.

The rest of the Loon Creek area has low mineral resource potential. There is no known geologic evidence for oil, gas, coal, or geothermal resources within the area and the potential is regarded as low.

PAHSIMEROI (4-209)

Kind and amount of data

Study of the area included geologic mapping and regional aeromagnetics (Ross, 1947; Mapel and others, 1965; Fisher, McIntyre, and Johnson (1983). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Complexly folded Paleozoic sedimentary rocks underlie the Pahsimeroi area. Tertiary basaltic and andesitic volcanic rocks unconformably overlie older rocks, predominantly in the northern part of the area. Quaternary glacial and alluvial deposits overlie older rocks throughout the area.

The Pahsimeroi area is not part of any mining district. A few prospects are located near Grouse Creek, in the central part of the study area. A few occurrences of lead, zinc, and silver are known throughout the region, but they are small and discontinuous.

Commodities

None known.

Mineral and energy resource potential

Based on geologic and geophysical criteria, the mineral and energy resource potential of the Pahsimeroi area is low.

BORAH PEAK (4-210)

Kind and amount of data

Study of the area included geologic mapping and regional aeromagnetics (Ross, 1947; Nelson and Ross, 1969). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Paleozoic sedimentary rocks underlie most of the Borah Peak area, and Tertiary volcanics overlie older rocks in the eastern part of the area. The study area is bordered on the west by the Big Lost River Valley, which may represent a major structural break between the Lost River Range (including the Borah Peak area) on the east and areas to the west.

The Borah Peak area is bordered to the southwest by the Alder Creek (copper, zinc) mining district which extends into the area. There are a few mines and prospects scattered in the western part of the area from which minor amounts of lead, silver, and iron has been produced. The Empire mine (copper, tungsten) is located several miles south of the area, and was a major copper producer in Idaho until the early 1900's.

Commodities

None known.

Mineral and energy resource potential

Based on geologic criteria, the mineral and energy resource potential of the Borah Peak area is low.

KING MOUNTAIN (4-211)

Kind and amount of data

Study of the King Mountain area included geologic mapping and regional aeromagnetics (Mapel and Shropshire, 1973). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Faulted and folded sedimentary rocks of Paleozoic age underlie the King Mountain area. Tertiary volcanics unconformably overlie the Paleozoic rocks in the western part of the area. There are no mining districts in or adjacent to the area, and no mines or mineral occurrences are known.

Commodities

None known.

Mineral and energy resource potential

Based on geologic and geophysical criteria, the mineral and energy resource potential of the King Mountain area is low.

JUMPOFF MOUNTAIN (4-212)

Kind and amount of data

Study of the area included geologic mapping and regional aeromagnetics (Ross, 1961). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Most of the Jumpoff Mountain area is underlain by strongly folded Paleozoic sedimentary rocks; Quaternary alluvial deposits unconformably overlie the older rocks. The area lies outside of any mining districts; there are no mines or mineral occurrences known in the area.

Commodities

None known.

Mineral and energy resource potential

Based on geologic and geophysical criteria, the mineral and energy resource potential of the Jumpoff Mountain area is low.

SQUAW CREEK (4-217)

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Challis 1°x2° quadrangle (Webring and Mabey, 1981; Fisher, McIntyre, and Johnson, 1983; McDanal and others, 1984; Mabey and Webring, 1985). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Granitic rocks of the Cretaceous Idaho batholith crop out discontinuously around the western perimeter of the Squaw Creek area. These rocks intruded Paleozoic sedimentary rocks which now form scattered roof pendants. Eocene plugs and domes, which range in composition from andesite to rhyodacite, and related tuffs and lavas underlie most of the Squaw Creek area. Numerous normal and reverse faults cut the area.

The Bayhorse (silver, lead, copper, fluorspar) and Yankee Fork (gold, silver, lead, copper) mining districts border and extend into the area; the Robinson Bar gold mining district borders the area to the south. Numerous mines and prospects are located throughout the area.

The Salmon River, along the southern boundary of the area, is part of an "area of significant lateral extent favorable for discovery and development of local sources of low-temperature ($<90^\circ$ C.) water" (Mitchell and others, 1980).

Commodities

Gold, silver, copper, lead, zinc, molybdenum, fluorspar, barite, vanadium, tungsten, geothermal energy.

Mineral and energy resource potential

Areas along the eastern, southern, and western borders of the Squaw Creek area have high mineral resource potential for the commodities listed above. These areas contain geologic environments favorable for several types of mineral deposits, including: copper, lead, zinc, silver, and gold base- and precious-metal vein deposits; rhyolite-hosted gold and silver deposits; stratabound vanadium-silver deposits; replacement lead-silver deposits in carbonate rocks; fluorspar vein deposits; fluorspar replacement deposits in carbonate rocks; placer gold deposits; stockwork molybdenum deposits; barite vein deposits; and tungsten vein and contact metamorphic (tactite) deposits. The rest of the Squaw Creek area has low mineral resource potential.

The area along the Salmon River on the southern boundary of the area has a moderate resource potential for geothermal energy. There is no known geologic evidence for oil, gas, or coal resources within the area and the potential is regarded as low.

GREYLOCK (4-218)

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Challis 1°x2° quadrangle (Webring and Mabey, 1981; Fisher, McIntyre, and Johnson, 1983; McDanal and others, 1984; Mabey and Webring, 1985). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Faulted Eocene rhyolite intrusives and related tuffs and lavas underlie the Greylock area. Quaternary glacial and alluvial deposits unconformably overlie older rocks throughout the area. The area lies within the Yankee Fork (gold, silver, lead, copper) mining district. Numerous mines and prospects are located throughout the area.

Commodities

Gold, silver, copper, lead.

Mineral and energy resource potential

The entire Greylock area has high mineral resource potential for the commodities listed above. This area contains a geologic environment favorable for several types of mineral deposits, including: copper, lead, gold, and silver base- and precious-metal vein deposits; rhyolite-hosted gold and silver deposits; and placer gold deposits. There is no known geologic evidence for oil, gas, coal, geothermal, or other mineral resources within the area, and their potential is regarded as low.

SPRING BASIN (4-219)

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Challis $1^{o}x2^{o}$ quadrangle (Webring and Mabey, 1981; Fisher, McIntyre, and Johnson, 1983; McDanal and others, 1984; Mabey and Webring, 1985). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Eocene lavas of intermediate composition and volcaniclastic sedimentary rocks are the predominant rock types in the Spring Basin area. These rocks cover Paleozoic sedimentary rocks, which crop out sporadically throughout the area. Normal faults cut the area. The Spring Basin area lies within the Bayhorse (silver, lead, copper, fluorspar) mining district; a few prospects are located in the area.

Commodities

None known.

Mineral and energy resource potential

Based on geologic, geochemical, and geophysical criteria, the mineral and energy resource potential of the Spring Basin area is low.

TAYLOR MOUNTAIN (4-502)

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Challis $1^{o}x2^{o}$ quadrangle (Webring and Mabey, 1981; Fisher, McIntyre, and Johnson, 1983; McDanal and others, 1984; Mabey and Webring, 1985; B. E. Ekren and P. J. Modreski, unpub. mapping). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral districts

Folded and faulted metasedimentary rocks of the Precambrian Yellowjacket Formation and Hoodoo Quartzite underlie most of the northern half of the Taylor Mountain area. Eocene tuffs, lavas of intermediate composition, and mafic intrusive rocks compose the southern half of the area. Quaternary alluvial and glacial deposits unconformably overlie older rocks in the northern part of the area.

The Blackbird (nickel, silver, gold, copper, cobalt) and Gravel Range (gold, silver, opal) mining districts extend into the northwestern part of the area. Several mines and prospects are located within the area.

Commodities

Gold, silver, copper, lead, cobalt, nickel, opal.

Mineral and energy resource potential

The northern and northwestern parts of the Taylor Mountain area have high mineral resource potential for the commodities listed above. These areas contain geologic environments favorable for several types of deposits, including: lead, copper, silver, and gold base- and precious-metal vein deposits; stratabound cobalt, nickel, and copper deposits in the Precambrian Yellowjacket Formation; opal in scattered amorphous pods within the volcanic rocks; and placer gold deposits.

There is no known geologic evidence for oil, gas, coal, geothermal or other mineral resources within the area, and their potential is regarded as low.

LEMHI RANGE (4-503)

Kind and amount of data

Study of the area included geologic mapping and regional aeromagnetics (Ruppel, 1980, 1982). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts, except for the northwestern corner of the area. For this part of the area, information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

Precambrian and Paleozoic sedimentary rocks that have been complexly folded and faulted along both normal and reverse faults underlie the Lemhi Range area. Subsequent to folding these rocks were intruded by Eocene porphyritic intrusive rocks, ranging in composition from quartz monzonite and granodiorite to granite. Quaternary glacial and alluvial deposits unconformably overlie older rocks throughout the area.

The McDevitt (copper), Junction (lead, gold, silver, manganese), Blue Wing (tungsten, silver, zinc, lead, molybdenum), and Texas (lead, silver, copper, gold, zinc) mining districts extend into the area. Several mines and prospects are scattered throughout the region in geologic settings similar to that of the study area. Several of these have a history of production, including the lead-zinc mines at Gilmore in the Texas district, which also produced silver, gold, and copper; the Copper Queen and Harmony mines in the McDevitt district which produced copper and gold; the Leadville mine in the Junction district which produced lead and precious metals; and the tungsten-producing Ima mine at Patterson in the Blue Wing district. Mining activity in these districts was most active prior to 1930 (Ross, 1941).

The Precambrian Applecreek Formation, a known ore host in the region for stratabound copper deposits, occurs in the area, but the stratigraphic facies favorable for ore deposition is not present within the study area.

Commodities

Copper, silver, lead, molybdenum, tungsten, gold.

Mineral and energy resource potential

The southeastern part of the Lemhi Range area has a moderate mineral resource potential for lead, silver, and gold in vein deposits related to nearby granodiorite or quartz monzonite intrusives. Patches in the central and eastern part of the area have moderate potential for disseminated molybdenum and copper resources, and copper-silver-tungsten veins associated with nearby granitic intrusives. A large area on the west-central boundary has moderate potential for similar disseminated molybdenum and copper resources and copper-silver-tungsten veins. The northwestern corner of the area has unknown mineral resource potential because of lack of data.

The Lemhi Range area has a low potential for petroleum resources (Sandberg, 1982, 1983). There is no known geologic evidence for other mineral or energy resources within the area, and their potential is regarded as low.

WHITE CLOUD-BOULDER (4-551)

Kind and amount of data

The mineral survey was conducted by the USGS and USBM as two separate studies, one for the eastern and another for the western part of the area (Tschanz and others, 1974; Dover, 1981; Tucheck and Ridenour, 1981; U.S. Geological Survey and U.S. Bureau of Mines, 1981; Fisher, McIntyre, and Johnson, 1983; Johnson, 1983). The mineral survey included an aeromagnetic survey, reconnaissance geologic mapping, extensive sampling, studies of known mineral deposits, and detailed geochemistry. A mineral evaluation of the eastern area was also included in the CUSMAP study of the Challis $1^{o}x2^{o}$ quadrangle; this study included geologic mapping, and geochemical and geophysical studies (Webring and Mabey, 1981; Fisher, McIntyre, and Johnson, 1983; McDanal and others, 1984; Mabey and Webring, 1985).

All of the White Cloud-Boulder area, except a small tract on the east side, was incorporated into the Sawtooth National Recreation Area in 1972. The mineral survey has been completed for the entire White Cloud-Boulder area as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Complexly folded and thrust-faulted Paleozoic sedimentary rocks underlie the White Cloud-Boulder area. Porphyritic quartz monzonite and quartz diorite of the Cretaceous Idaho batholith intruded the older sedimentary rocks in the northern portion of the study area. Volcanic rocks of Eocene age unconformably cover most of the eastern half of the area and range from pyroclastic rocks, porphyritic lava, and breccia of intermediate composition to volcaniclastic rocks and potassium-rich andesite and latite. Eocene plutons, dikes, and sills of intermediate and felsic composition subsequently intruded both the sedimentary and volcanic rocks. Quaternary glacial and alluvial deposits unconformably overlie older rocks throughout the area.

The Alta (lead, zinc, copper), Warm Spring (silver, lead, gold, copper, iron), Galena (lead, silver), East Fork (lead, zinc, silver, tin), Boulder Creek (silver, lead, zinc), and Stanley (gold) mining districts surround and extend into the area. Several hundred mines, prospects, placer deposits, and thermal springs are located throughout the study area. Silver, gold, lead, zinc, antimony, and copper have been produced from the study area, with a total past production value of more than $5 million. Occurrences of bismuth, mercury, selenium, tellurium, niobium, uranium, thorium, rare earths, and titanium are present in the White Cloud-Boulder area in association with the commodities listed below.

The study area contains a wide variety of mineralized areas and mineral deposits, including several types of precious, base, and ferroalloy metal deposits, including some unusual tin-bearing silver-lead veins and veins containing bismuth, selenium, and tellurium. Most of the mineral deposits occur in a structurally controlled north-trending belt of Paleozoic rocks in the central part of the area. Important silver vein deposits are found in association with the Idaho batholith in the northern part of the area, and tungsten and molybdenum occur in replacement deposits and tactites in carbonate-rich sedimentary rocks near the margins of the intrusive bodies. Many placer deposits are developed in the streams and low-lying areas.

Numerous hot springs are located along the Salmon River, at the northern boundary of the study area. This stretch of the Salmon River has been designated as an "area of significant lateral extent favorable for discovery and development of local sources of low-temperature (<90° C.) water" (Mitchell and others, 1980). Two hot springs are also located along Slate Creek (Mitchell and others, 1980) on the northeastern border of the area.

Commodities

Molybdenum, zinc, silver, gold, lead, fluorite, antimony, cadmium, tungsten, tin, copper, arsenic, geothermal energy.

Mineral and energy resource potential

The northern part of the eastern portion of the White Cloud-Boulder area has a moderate resource potential for copper, molybdenum, gold, arsenic, lead, silver, tin, and zinc associated with porphyry, vein-, or replacement-type deposits. The southern part of the area has a moderate resource potential for tungsten in skarn deposits. The rest of the eastern portion area has low mineral resource potential. All of the eastern portion of the White Cloud-Boulder area has low potential for energy resources.

Within the western portion of the White Cloud-Boulder area there is a high mineral resource potential for molybdenum, zinc, silver, gold, lead, fluorite, antimony, cadmium, tin and tungsten. Tschanz and others (1974) refer to this area as one of the most highly mineralized, productive, and promising mining regions in Idaho. Two areas in the southeastern portion have high resource potential for copper, lead, zinc, molybdenum, silver, and gold, and the western side of the southeastern portion of the area has a high potential for lead, silver, tin, and zinc resources. A high potential for zinc, silver, gold, lead, antimony, and cadmium resources exists throughout a central north-south-trending strip; the center of this strip has high potential for molybdenum, tin, and tungsten resources. An area of high resource potential for gold and fluorite extends into the northwestern corner of the area. The rest of the western portion has a low potential for mineral resources.

There is a moderate potential for geothermal resources along the East Fork of the Salmon River on the northern boundary of the western area and also just outside the study area boundary. A third area of moderate geothermal resource potential is located along Slate Creek on the northeastern boundary of the area. The potential for other energy resources within the area is regarded as low.

DIAMOND PEAK (4-601)

Kind and amount of data

The Diamond Peak study area is composed of a small northern portion and a separate, larger southern portion. Study of both portions of the area included geologic mapping and regional aeromagnetics (Ross, 1933, 1961; Anderson, 1948; Ruppel and Lopez, 1981). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Complexly folded and faulted Precambrian and Paleozoic sedimentary rocks underlie the Diamond Peak area. Patches of volcanic rocks of Tertiary-Quaternary age cover older rocks near the eastern border of the area.

Porphyritic intrusive rocks of Eocene age, ranging in composition from quartz monzonite to granodiorite, crop out both to the northeast and northwest of the study area.

The Dome (lead, zinc, silver), Hamilton (lead, silver), and Spring Mountain (lead, silver, copper) mining districts extend into the southern area. Several small mines and prospects are scattered throughout the study areas, and a few mines have a history of small-scale production. The Wilbert mine in the southwestern part of the southern area has produced lead, silver, gold, copper, and zinc (Anderson, 1948), and was the chief producer of the Dome mining district. The Badger Creek mine, located just outside the western border of the southern area has produced lead and silver, and was the principal producer of the Hamilton mining district (Ross, 1961). From 1901 to 1955 the Dome mining district produced 365,702 oz silver, 50 oz gold, 54,358 lbs copper, 39,390,189 lbs lead, 142,000 lbs zinc, and the Hamilton mining district produced 59 oz gold, 11,825 oz silver, 38,852 lbs copper, and 599,339 lbs lead (Ross, 1961). The Lemhi Range iron deposit is located along the western boundary of the southern area (Mitchell and others, 1981). Commodities produced from mines in the northern area include: lead, silver, gold, and magnesium (Mitchell and others, 1981).

Commodities

Lead, silver, copper, zinc, gold, magnesium.

Mineral and energy resource potential

Mineral deposits in the southern area are replacement-type in carbonate-bearing rocks within zones of fracture, including thrust faults. Based on past production from the Dome mining district, the southwestern corner of the southern area has a moderate mineral resource potential for lead, silver, copper, and zinc. The rest of the southern area has a low mineral resource potential. The northern area has a moderate potential for lead, silver, zinc, gold, and magnesium resources in vein deposits associated with an intrusive located to the northeast. The potential for energy or other mineral resources within either area is low.

SAWTOOTH WILDERNESS (NF-074)

(See description under Boise National Forest)

CLEARWATER NATIONAL FOREST

MALLARD LARKINS/SMITH RIDGE/WINTER RANGE/POT (1-300)

Kind and amount of data

Mineral resource evaluation of the area north of 47° N. latitude included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Wallace $1^{\circ}x2^{\circ}$ quadrangle (Harrison, Leach, and Kleinkopf, 1986). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

South of 47° N. latitude the geology of the area has been mapped (Anderson, 1930; Hietanen, 1963a, 1968); information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

Precambrian metasedimentary rocks underlie most of the Mallard Larkins area. Cretacous plutonic rocks of the Idaho batholith both intruded the older rocks and were subsequently intruded by Tertiary granite porphyry and gabbro.

Three mining districts border and extend into the Mallard Larkins area: from the northeast, the St. Joe (copper, gold) mining district; from the southeast, the Moose Creek (gold) mining district; and from the northwest, the

Sliderock (copper) mining district. There are no known mines or prospects in the area.

The Proterozoic Prichard and Revett formations underlie parts of the study area. Although these units are known ore hosts in the region for stratabound deposits, the stratigraphic facies favorable for ore deposition does not appear to be present within the study area.

Commodities

Lead, zinc, silver, gold.

Mineral and energy resource potential

An area in the eastern part of the Mallard Larkins area has moderate resource potential for lead, zinc, silver, and gold associated with mesothermal base- and precious-metal veins along fracture zones. The rest of the area north of 47° N. latitude has low mineral resource potential. South of 47° N. latitude the area has unknown mineral resource potential, due to lack of data. There is no geologic evidence for oil, gas, coal, or geothermal resources in the Mallard Larkins area, and the potential is regarded as low.

HOODOO/KELLY/FOX (1-301)

40% in Montana

Kind and amount of data

The geology of the area has been mapped at a reconnaissance scale (Anderson, 1930). Part of the Hoodoo area has also been mapped in greater detail (Stephen Simpson, unpub. mapping). Information on geology and mineral deposits is adequate for inferences to be made regarding resource potential; however, information is not adequate for a preliminary mineral resource evaluation, and is not sufficient for the mineral survey as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Precambrian metasedimentary rocks underlie the study area. Granodioritic rocks of the Cretaceous Idaho batholith intruded the older rocks in the southwestern part of the area. Farther east the metasedimentary rocks are overlain by Tertiary volcanics. These rocks were then intruded by granitic intrusives of the Lolo batholith (Stephen Simpson, oral commun., 1985).

The Moose Creek (gold) and Blacklead (copper, iron) mining districts extend into the Hoodoo/Kelly/Fox area. A few old prospects are located in the limestone strata in the area (Ross, 1941). The Snowbird fluorite mine is located in Montana east of the study area. The fluorite occurs as veins and open-space fillings in both collapse breccias and breccia dikes within the Proterozoic Wallace Formation; disseminated yttrium occurs in the calcite within the collapse breccias (Metz and others, 1985; Metz, 1971). Tertiary intrusives in the southern part of the Hoodoo/Kelly/Fox appear to be similar to those in the Blue Joint and Selway-Bitterroot regions, which show enrichment in molybdenum and associated metals.

Commodities

Yttrium, fluorite, copper, iron, molybdenum, gold, silver.

Mineral and energy resource potential

The entire Hoodoo/Kelly/Fox area is inferred to have a moderate potential for various mineral resources. The southwestern part of the study area is inferred to have moderate potential for copper and iron resources from skarn deposits in limestone units enclosed in the intrusive rocks, and to the east, the area has an inferred moderate potential for molybdenum resources from the Tertiary intrusive rocks. The eastern border of the area has an inferred moderate potential for yttrium and fluorite resources in collapse breccias and breccia dikes within the Wallace Formation, either in similar geologic environments or in extensions of the several breccias located in Montana to the east. The volcanic rocks may contain some potential for gold and silver epithermal deposits.

Sandberg (1982, 1983) assessed the petroleum potential of the area to be low to zero, and the potential for other energy resources is inferred to be low.

MEADOW CREEK-UPPER NORTH (1-302)
15% in Montana

Kind and amount of data

Mineral resource evaluation of the area north of 47^{o} N. latitude included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Wallace $1^{o}x2^{o}$ quadrangle (Harrison, Leach, and Kleinkopf, 1986). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

The area south of 47^{o} N. latitude has been covered by reconnaissance mapping (Anderson, 1930). Information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

This report covers only the Idaho portion of the Meadow Creek-Upper North area.

Mining districts, mines, and mineral occurrences

Faulted metasediments of Proterozoic age underlie the Meadow Creek-Upper North area. Cenozoic alluvial and glacial deposits are located along stream valleys.

The northern tip of the area is part of the St. Joe (copper, gold) mining district. The rest of the area is within the Moose Creek gold mining district. Numerous prospects are located along the northern border; little is known about the rest of the area.

Commodities

Lead, zinc, silver, gold.

Mineral and energy resource potential

Part of the northern tip of the Meadow Creek-Upper North area has moderate potential for lead, zinc, silver, and gold resources associated with mesothermal base- and precious-metal vein deposits. There is no known geologic evidence for oil, gas, coal, geothermal or other mineral resources within the northern part of the area, and the potential is regarded as low. South of 47^{o} N. latitude the area has an unknown mineral and energy resource potential.

SIWASH (1-303)

POT MOUNTAIN (1-304)

BIG HORN WEITAS (1-306)

Kind and amount of data

The geology of the areas has been mapped (Anderson, 1930; Hietanen, 1963a, 1963b, 1968). Information on geology and mineral deposits is adequate for inferences to be made regarding resource potential; however, information is not adequate for a preliminary mineral resource evaluation, and is not sufficient for the mineral survey as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Cretaceous rocks of the Bitterroot lobe of the Idaho batholith primarily underlie the Siwash, Pot Mountain, and Big Horn Weitas areas. These rocks both intruded Precambrian metasedimentary rocks and were intruded by Eocene granitic intrusives.

The Moose Creek (gold), Oxford (copper), and Blacklead (copper, iron), and Musselshell (gold, monazite) mining districts extend into the areas. There are no mines or prospects known within the study areas.

Tertiary intrusives in the Siwash, Pot Mountain, and Big Horn Weitas areas appear to be similar to those in the Blue Joint and Selway-Bitterroot regions, which show enrichment in molybdenum and associated metals.

Commodities

Molybdenum.

Mineral and energy resource potential

The Siwash, Pot Mountain, and Big Horn Weitas areas have a moderate potential for molybdenum resources related to the Tertiary intrusive rocks, but further study is required for confirmation. The potential for energy resources within the study areas is inferred to be low.

MOOSE MOUNTAIN/DEADWOOD (1-305)

Kind and amount of data

The area is unstudied and information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

Precambrian metasediments underlie the Moose Mountain study area. The area lies within the Moose Creek placer gold mining district; no mines or mineral occurrences are known within the area.

Commodities

Unknown.

Mineral and energy resource potential

The mineral resource potential of the Moose Mountain/Deadwood area is unknown. Sandberg (1982, 1983) assessed the petroleum potential of the study area as low to zero, and the potential for coal and geothermal resources is regarded as low.

NORTH LOCHSA SLOPE (1-307)

WEIR + POST OFFICE CREEK (1-308)

Kind and amount of data

Study of the areas included geologic mapping, regional aeromagnetics, and limited geochemical studies (Greenwood and Morrison, 1973; Williams, 1977; M. I. Toth, unpub. mapping). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral survey as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Cretaceous granitic rocks of the Bitterroot lobe of the Idaho batholith underlie the study areas. The areas are south of the Moose Creek gold mining district and there are no mines or mineral occurrences known in the areas.

Commodities

None known.

Mineral and energy resource potential

Based on geologic, geochemical, and geophysical criteria, the mineral and energy resource potential of the North Lochsa Slope and Weir + Post Office Creek areas is low.

WILDERNESS BORDER/BEAVER CREEK/NF SPRUCE/LAKES (1-309)

SEC. 16 WILDERNESS BOUNDARY (1-310)

Kind and amount of data

The Selway-Bitterroot Wilderness bounds the study areas to the south and east. Although the wilderness has been covered by a mineral survey (Coxe and others, 1982; Koesterer and others, 1982b; Zilka and Hamilton, 1982; Coxe and Toth, 1983; Toth, 1983; Toth and others, 1983), the study areas themselves are virtually unstudied. Information on geology and deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

Precambrian metaigneous and metasedimentary rocks primarily underlie the study areas and were intruded by Cretaceous intrusive rocks of the Idaho batholith. No mining districts, mines, or mineral occurrences are known in the area.

Commodities

Unknown.

Mineral and energy resource potential

These areas have an unknown mineral resource potential due to lack of data; the adjacent wilderness land has low potential for both mineral and energy resources. Sandberg (1982, 1983) assessed the petroleum potential of area 1-309 as low to zero, and the petroleum potential of area 1-310 is inferred to be low also. The potential for other energy resources is inferred to be low.

LOCHSA FACE (1-311)

Kind and amount of data

Study of the area included geologic mapping, regional aeromagnetics, and limited geochemical studies (Greenwood and Morrison, 1973; Williams, 1977; M. I. Toth, unpub. mapping). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral survey as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Granitic rocks of the Bitterroot lobe of the Cretaceous Idaho batholith underlie the Lochsa Face area. The study area lies south of the Moose Creek gold mining district and no mines or mineral occurrences are known in the area. The northeastern part of the Lochsa Face area is part of an "area of significant lateral extent favorable for discovery and development of local sources of low-temperature ($<90^{\circ}$ C.) water" (Mitchell and others, 1980).

Commodities

Geothermal energy.

Mineral and energy resource potential

The northeastern part of the Lochsa Face area has a moderate potential for geothermal resources. Based on geologic, geochemical, and geophysical criteria, the potential for mineral or other energy resources in the Lochsa Face area is low.

ELDORADO CREEK (1-312)

Kind and amount of data

The geology of the Eldorado Creek area has been mapped (Anderson, 1930; Hietanen, 1963b). Information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

Cretaceous granitic rocks of the Bitterroot lobe of the Idaho batholith underlie the Eldorado Creek area. The area lies east of the Musselshell (gold, monazite) mining district; no mines or prospects are known in the area.

Commodities

Unknown.

Mineral and energy resource potential

The Eldorado Creek area has an unknown mineral resource potential because of the lack of data. Based on geological criteria, the potential for energy resources is regarded as low.

RAWHIDE (1-313)

Kind and amount of data

The geology of the area has been mapped at a reconnaissance scale (Anderson, 1930). Information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

Precambrian metasedimentary rocks underlie the Rawhide area. The area lies within the Moose Creek gold mining district, but no mines or mineral occurrences are known in the study area.

Commodities

Unknown.

Mineral and energy resource potential

The Rawhide area has unknown mineral resource potential, because of the lack of data. Based on geological criteria, the potential for energy resources is regarded as low.

LOLO CREEK (1-805)
99% in Montana

Kind and amount of data

The Montana portion of the Selway-Bitterroot Wilderness bounds the Montana part of the Lolo Creek area to the south. Although the wilderness area has been covered by a mineral survey (Coxe and others, 1982; Koesterer and others, 1982a; Zilka and Hamilton, 1982; Coxe and Toth, 1983; Toth, 1983; and Toth and others, 1983), the Lolo Creek area itself is unstudied, and information on geology and deposits is not adequate for a preliminary resource evaluation. This summary covers only the Idaho portion of the study area, which is not contiguous with any other study areas.

Mining districts, mines, and mineral occurrences

The Lolo Creek area is predominantly underlain by Cretaceous intrusive rocks of the Idaho batholith. These rocks intruded Precambrian metasedimentary rocks, which crop out in the southeastern part of the area.

No mining districts, mines, or mineral occurrences are known in the area. Small, randomly distributed silver-lead-zinc-copper occurrences, including the Cliff mine deposit, are found in breccia zones along a fault in Montana, southeast of the study area.

Commodities

Unknown.

Mineral and energy resource potential

The Lolo Creek area has an unknown potential for mineral and energy resources.

RACKCLIFF GEDNEY (1-841)

Kind and amount of data

Study of the area included reconnaissance geologic mapping, regional aeromagnetics, and limited geochemical studies (Greenwood and Morrison, 1973). Information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

Precambrian metasedimentary and possibly metaigneous rocks underlie the Rackcliff Gedney area. The Lowell placer gold mining district extends into the Rackcliff Gedney area from the west, but no mines or prospects are known within the area.

Commodities

Unknown.

Mineral and energy resource potential

The area has an unknown mineral and energy resource potential.

SELWAY-BITTERROOT WILDERNESS (NF-074)
(See description under Bitterroot National Forest)

IDAHO PANHANDLE NATIONAL FOREST

LITTLE GRASS MOUNTAIN (1-121)
45% in Washington

Kind and amount of data

Study of the area included geologic mapping and limited geochemical studies (Miller and Theodore, 1982; Miller, 1983a). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The Little Grass Mountain area is underlain mainly by Cretaceous granitic rocks. These rocks intruded metasedimentary rocks of the Proterozoic Belt Supergroup, which crop out as roof pendants. Quaternary glacial and alluvial deposits overlie older rocks throughout the area.

The area is part of the Priest Lake (lead, silver, copper) mining district. Occurrences of tungsten and molybdenum are known in and around the study area in association with several non-contiguous Cretaceous plutons of granodioritic composition. Silver and gold anomalies found in stream-sediment samples are probably also related to the intrusive rocks. No mines or prospects are known in the area.

Commodities

Tungsten, molybdenum, silver, gold.

Mineral and energy resource potential

The geology of the Little Grass Mountain area is favorable for skarn-type tungsten deposits, and disseminated and vein-type molybdenum deposits related to nearby Cretaceous intrusives; the entire study area has moderate potential for tungsten, molybdenum, silver, and gold resources. There is no known geologic evidence for oil, gas, coal, or geothermal resources within the area, and the potential is regarded as low.

BLACKTAIL MOUNTAIN (1-122)

Kind and amount of data

Study of the area included geologic mapping and limited geochemical studies (Miller, 1982a). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral survey as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Cretaceous granitic rocks of the Tango Creek pluton (Miller, 1982) dominantly underlie the Blacktail Mountain area. This pluton contains higher background uranium levels than other granitic rocks in the region. The pluton intruded metasedimentary rocks of the Proterozoic Belt Supergroup, which crop out in the northwestern part of the area. Quaternary glacial and alluvial deposits overlie older rocks throughout the area.

The Blacktail Mountain area lies within the Priest Lake (lead, silver, copper) mining district. Although there are numerous mining claims in the area, there are no known mines.

Commodities

None known.

Mineral and energy resource potential

Based on geologic and geochemical criteria, the mineral and energy resource potential of the Blacktail Mountain area is low.

UPPER PRIEST (1-123)

Kind and amount of data

The mineral survey made by the USGS and USBM included geologic mapping and geochemical studies (Miller, 1983b; Miller and Denton, 1983). The mineral survey has been completed as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The Upper Priest area is mostly underlain by the Precambrian Prichard Formation of the Belt Supergroup. Two Cretaceous granitic plutons intrude the Prichard Formation, as do several diabase sills, and another pluton of Cretacous or Tertiary age is faulted against the Prichard Formation in the eastern part of the area.

The area lies within the Priest Lake (lead, silver, copper) mining district. Several mines, prospects, and mineral occurrences are found within the Upper Priest area. One shipment of lead-silver ore was made from the Mountain Chief mine located in the northern part of the area; no production figures are on record. Small amounts of zinc, lead, silver, tin, and tungsten were detected in panned-concentrates of stream-sediment samples, but these metals were probably derived from the weathering of scattered, sparsely mineralized quartz veins common to the region.

Commodities

None.

Mineral and energy resource potential

Based on geologic, geochemical, and geophysical criteria, the mineral and energy resource potential of the Upper Priest area is low.

SELKIRK (1-125)

Kind and amount of data

The mineral survey done by the USGS and USBM included geologic mapping, geochemical studies, and examination of known claims and prospects (Miller, 1983c, 1983d; Miller and Benham, 1983). The mineral survey has been completed as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The Selkirk area is mostly underlain by the Selkirk Crest igneous complex, which is composed of two-mica granites with abundant metamorphic inclusions. The complex intruded Precambrian metamorphic rocks and a Mesozoic(?) intrusive. Quaternary glacial and alluvial deposits unconformably overlie older rocks throughout the area.

The area is part of the Porthill (lead, silver) and Priest Lake (lead, silver, copper) mining districts. There are no identified mineral deposits within the Selkirk area. Molybdenum, lead, uranium, thorium, chromium, tungsten, silver, copper, and rare-earth elements were detected in panned-concentrate stream-sediment samples, but no minerals in which the elements occur as major constituents were found in place, and the geologic environments present are not conducive to their concentration. The Idaho-Continental silver-lead mine, located about 6 miles northwest of the area, is developed in the Wallace Formation, which does not occur within the roadless study area.

Commodities

None.

Mineral and energy resource potential

Based on geologic, geochemical, and geophysical criteria, the mineral and energy resource potential of the Selkirk area is low.

KOOTENAI PEAK (1-126)

WHITE MOUNTAIN (1-127)

Kind and amount of data

The geology of the areas has been mapped at a reconnaissance scale only, and is part of an unfinished, unpublished field project (F. K. Miller, oral commun., 1984). Information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

Cretaceous granitic rocks underlie most of the study areas. These rocks intruded Precambrian metasedimentary rocks which crop out within the areas. Quaternary glacial deposits unconformably overlie older rocks.

The Porthill (lead, silver) mining district extends into the northern end of the Kootenai Peak area; the White Mountain area lies outside of any mining districts. No mines or mineral occurrences are known in either area.

Commodities

Unknown.

Mineral and energy resource potential

The potential for mineral and energy resources is unknown for the Kootenai Peak and White Mountain areas due to the lack of data; however, preliminary studies suggest that the areas have a generally unfavorable geologic environment for any resource potential.

HELLROARING (1-128)

Kind and amount of data

The area has been covered by reconnaissance studies only (Kirkham and Ellis, 1926; Anderson and Wagner, 1945). Information on geology and mineral deposits is adequate for inferences to be made regarding resource potential; however, information is not adequate for a preliminary mineral resource evaluation, and is not sufficient for the mineral survey as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The Hellroaring area is underlain by Precambrian metasedimentary units which have been intruded by younger Precambrian sills of dioritic to amphibolitic composition.

The area lies within the Moyie Yaak (gold, lead, silver, molybdenum, tungsten) mining district; there are several small mines and tungsten and thorium prospects in the area. Several mines, including the Queen and Regal lead-zinc and gold mines, are located nearby but outside of the study area. The deposits occur mostly in veins, which appear to be structurally controlled (Anderson and Wagner, 1945; Kirkham and Ellis, 1926).

Commodities

Lead, zinc, gold, tungsten, thorium.

Mineral and energy resource potential

On the basis of known mines and prospects in and around the area, the Hellroaring area is inferred to have a moderate potential for lead, zinc, gold, tungsten, and thorium. The potential for energy resources is inferred to be low. Further study of the area is needed.

TRESTLE PEAK (1-129)

BEE TOP (1-130)

Kind and amount of data

The geology of the Trestle Peak and Bee Top areas has been mapped (Harrison and Jobin, 1963, 1965; Harrison and Schmidt, 1971), and parts of the areas have been covered by an aeromagnetic survey (King and others, 1970). Information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

The Trestle Peak and Bee Top areas are underlain by Precambrian metasediments of the Prichard Formation, which have been folded, faulted, and intruded by Precambrian gabbro and Cretaceous granodiorite. Quaternary glacial and alluvial deposits unconformably overlie older rocks throughout the area.

The Clark Fork (silver, lead, copper) mining district includes both the Trestle Peak and Bee Top areas. Several small mines and prospects are scattered throughout the district, but significant lead-silver production has been restricted to four areas (near Clark Fork, Talache, Granite, and Lakeview) south of the study areas. Silver, lead, copper, zinc and minor copper occur in vein deposits associated with faults in the Precambrian Striped Peak and Wallace formations (Belt Supergroup) (Anderson, 1947; King and others, 1970), and stratabound lead-zinc-silver deposits occur within the Precambrian Prichard Formation (Belt Supergroup) elsewhere in the region; however, no such deposits are known within the Trestle Peak or Bee Top areas. The Prichard Formation occurs in the study areas, but further study is needed to determine whether the stratigraphic horizon favorable for ore deposition is present.

Commodities

Unknown.

Mineral and energy resource potential

The Trestle Peak and Bee Top areas have an unknown mineral resource potential due to lack of data. There is no geologic evidence for oil, gas, coal, or geothermal resources in the areas, and the potential is regarded as low.

EAST CATHEDRAL PEAK (1-131)

Kind and amount of data

Study of the East Cathedral Peak area included geologic mapping (Griggs, 1968, 1969) and an aeromagnetic survey (King and others, 1970). Information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

Metasedimentary rocks of the upper part of the Precambrian Belt Supergroup underlie the study area. Elsewhere in the region these units host base- and precious-metal vein deposits along extensive fracture systems.

The Clark Fork (silver, lead, copper) mining district borders the study area on the north. No mines or prospects are known within or adjacent to the area.

Commodities

Unknown.

Mineral and energy resource potential

The East Cathedral Peak area has an unknown mineral resource potential due to lack of data. There is no known geologic evidence for oil, gas, coal, or geothermal resources and the potential is regarded as low.

MAGEE (1-132)

Kind and amount of data

Study of the Magee area included geologic mapping (Griggs, 1968, 1969) and an aeromagnetic survey (King and others, 1970). Information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

Metasedimentary rocks of the Precambrian Belt Supergroup underlie the Magee area. Elsewhere in the region certain stratigraphic horizons of these units host both base- and precious-metal vein deposits along fracture systems and base- and precious-metal stratabound deposits.

The Lakeview (silver, lead, copper) and Little North Fork (copper, lead, silver) mining districts border the study area on the west. Prospects are located throughout the area.

Commodities

Unknown.

Mineral and energy resource potential

The Magee area has an unknown potential for mineral resources because of lack of data. There is no known geologic evidence for oil, gas, coal, or geothermal resources and the potential is regarded as low.

TEPEE CREEK (1-133)

SPY GLASS (1-134)

Kind and amount of data

Study of the Tepee Creek and Spy Glass areas included geologic mapping (Griggs, 1968, 1969) and an aeromagnetic survey (King and others, 1970). Information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

Metasedimentary rocks of the upper part of the Precambrian Belt Supergroup underlie the study areas. Elsewhere in the region these units host base- and precious-metal vein deposits along extensive fracture systems.

No mining districts, mines, or prospects are known within or adjacent to the areas.

Commodities

Unknown.

Mineral and energy resource potential

The Tepee Creek and Spy Glass areas have an unknown mineral resource potential because of the lack of data. There is no known geologic evidence for oil, gas, coal, or geothermal resources and the potential is regarded as low.

SKITWISH RIDGE (1-135)

Kind and amount of data

The geology of the Skitwish Ridge area has been mapped (Griggs, 1968, 1969). Information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

Metasedimentary rocks of the Precambrian Belt Supergroup underlie the Skitwish Ridge area. Elsewhere in the region certain stratigraphic horizons of these units host both base- and precious-metal vein deposits along extensive fracture systems and base- and precious-metal stratabound deposits.

The study area is part of The Wolf Lodge (lead, silver) mining district and contains a few prospects.

Commodities

Unknown.

Mineral and energy resource potential

The Skitwish Ridge area has an unknown mineral resource potential because of the lack of data. There is no known geologic evidence for oil, gas, coal, or geothermal resources and the potential is inferred to be low.

SPION KOP (1-136)

Kind and amount of data

Study of Spion Kop area included geologic mapping (Griggs, 1968, 1969) and an aeromagnetic survey (King and others, 1970). Information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

Metasedimentary rocks of the Precambrian Belt Supergroup underlie the Spion Kop area. Elsewhere in the region certain stratigraphic horizons of these units host both base- and precious-metal vein deposits along extensive fracture systems and base- and precious-metal stratabound deposits.

No mining district, mines, or prospects are known within or adjacent to the area.

Commodities

Unknown.

Mineral and energy resource potential

The Spion Kop area has an unknown potential for mineral resources due to lack of data. There is no known geologic evidence for oil, gas, coal, or geothermal resources and the potential is regarded as low.

LOST CREEK (1-137)

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Wallace $1^{o}x2^{o}$ quadrangle (Harrison, Domenico, and Leach, 1986; Harrison, Leach, and Kleinkopf, 1986). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Faulted metasedimentary rocks of the Precambrian Belt Supergroup underlie the Lost Creek area. The area lies within the Eagle (lead, silver, gold, tungsten) mining district, and small mines and prospects are located throughout the area.

Commodities

Gold, copper, lead, silver, zinc.

Mineral and energy resource potential

The northern tip of the Lost Creek area has a moderate resource potential for copper and silver in stratabound deposits within a favorable stratigraphic zone of the Proterozoic Revett Formation. All of the area except the western border has at least a moderate potential for lead, zinc, silver, and gold resources associated with mesothermal base and precious metal vein deposits; the western area has a low mineral resource potential. There is no known geologic evidence for oil, gas, coal, or geothermal resources within the area and the potential is regarded as low.

TROUBLE CREEK (1-138)

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Wallace $1^{o}x2^{o}$ quadrangle (Harrison, Domenico, and Leach, 1986; Harrison, Leach, and Kleinkopf, 1986). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Metasedimentary rocks of the Precambrian Belt Supergroup underlie the Trouble Creek area. The area lies within the Union (lead, silver) mining district, and numerous prospects are located throughout the area, especially along the eastern border.

Commodities

Lead, zinc, silver, gold, copper.

Mineral and energy resource potential

The eastern and southeastern border areas of the Trouble Creek area have a moderate potential for copper and silver resources in stratabound deposits within a favorable stratigraphic zone of the Proterozoic Revett Formation. Just west of the eastern border, the area has a moderate resource potential for lead, zinc, silver, and gold deposits associated with mesothermal base and precious metal veins. The remainder of the area has a low mineral resource potential. There is no known geologic evidence for oil, gas, coal, or geothermal resources within the area and the potential is regarded as low.

GRAHAM COAL (1-139)

Kind and amount of data

The geology of the Graham Coal area has been mapped (Griggs, 1968, 1969). Information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

Metasedimentary rocks of the Precambrian Belt Supergroup underlie the Graham Coal area. Fissure veins containing base- and precious-metals are prevalent in these units east of the study area.

The study area is bordered to the south by the Yreka (lead, silver, zinc) and to the east by the Beaver (lead, silver) mining districts. Several small prospects are located within the area.

Commodities

Unknown.

Mineral and energy resource potential

The Graham Coal area has an unknown potential for mineral resources because of the lack of data. There is no geologic evidence for oil, gas, coal or geothermal resources and the potential is regarded as low.

PONY PEAK (1-140)

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Wallace $1^{o}x2^{o}$ quadrangle (Harrison, Long, and Leach, 1986; Harrison, Domenico, and Leach, 1986; Harrison, Leach, and Kleinkopf, 1986; Harrison, Leach, Kleinkopf, and Long, 1986). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Metasedimentary rocks of the Precambrian Belt Supergroup underlie the Pony Peak area. These rocks have been faulted and intruded by Cretaceous and Tertiary granitic intrusive rocks. The Proterozoic Prichard Formation, a known ore host in the region for stratabound lead, zinc, and silver deposits, occurs throughout the area, but the stratigraphic facies favorable for ore deposition is not present within the study area.

The Summitt (lead, silver, zinc, gold, tungsten) and Beaver (lead, silver, zinc, gold, tungsten) mining districts extend into the area, and the Coeur d'Alene (lead, silver) mining district borders the area to the northwest.

Commodities

Gold, lead, silver, zinc, molybdenum, tungsten.

Mineral and energy resource potential

The geology of the Pony Peak area is favorable for mineral deposits of several types. High mineral resource potential for gold in both placer and lode deposits is present along drainages near Prichard Creek in the northeastern part of the area. Along the north-central border there is a moderate potential for molybdenum and tungsten resources in stockwork deposits associated with porphyritic intrusives. All of the Pony Peak area except the northwestern corner has moderate resource potential for metals in mesothermal base- and precious-metal veins along fracture zones; the northwestern portion of the area has low mineral resource potential. There is no known geologic evidence for oil, gas, coal, or geothermal resources within the area and the potential is regarded as low.

MAPLE PEAK (1-141)
5% in Montana

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Wallace $1^{o}x2^{o}$ quadrangle (Harrison, Cressman, Long, Leach, and Domenico, 1986; Harrison, Domenico, and Leach, 1986; Harrison, Leach, and Kleinkopf, 1986). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts. This report covers only the Idaho portion of the area.

Mining districts, mines, and mineral occurrences

Faulted metasedimentary rocks of the Precambrian Belt Supergroup underlie the Maple Peak area. The Maple Peak area lies within the Summitt (gold, tungsten) mining district, and is bordered to the north by the Eagle (lead, silver, gold, tungsten) mining district. There are no known mines or prospects within the area.

Commodities

Lead, zinc, silver, gold.

Mineral and energy resource potential

The western half of the Maple Peak area has a moderate resource potential for lead, zinc, and silver in stratabound deposits within a favorable stratigraphic zone of the Proterozoic Prichard Formation. Although the formation occurs throughout the study area, the stratigraphic horizon favorable for ore deposition extends only into the western half of the area. The southeastern tip of the area has moderate resource potential for stratabound copper-silver deposits in a favorable stratigraphic zone of the Proterozoic Revett Formation. The northern tip of the area has high resource potential for metals in mesothermal base- and precious-metal vein deposits. The remainder of the Maple Peak area has low mineral resource potential. There is no known geologic evidence for oil, gas, coal, or geothermal resources within the area and the potential is regarded as low.

STEVENS PEAK (1-142)
10% in Montana

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Wallace $1^{o}x2^{o}$ quadrangle (Harrison, Domenico, and Leach, 1986; Harrison, Leach, and Kleinkopf, 1986; Harrison, Leach, Kleinkopf, and Long, 1986). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts. This report covers only the Idaho portion of the area.

Mining districts, mines, and mineral occurrences

The Stevens Peak area is underlain by faulted metasedimentary rocks of the Precambrian Belt Supergroup. These rocks were cut by Proterozoic dikes and sills ranging in composition from diorite to gabbro. Granitic and dioritic intrusive rocks of Cretaceous to Tertiary age crop out nearby but outside of the study area. Cenozoic glacial and alluvial deposits are located along stream valleys.

Three mining districts border and extend into the Stevens Peak area. The Slate Creek (copper, lead) mining district extends into the southern part of the area; the Hunter (copper, gold) mining district extends into the northern part of the area; and the St. Joe (copper, gold) mining district extends into the eastern part of the area. Several mines and prospects are located nearby but outside of the study area, including the Ward mine, which is located on the state boundary, and has a history of some production of copper from vein-deposits and disseminations along a shear zone.

Commodities

Gold, silver, lead, zinc, molybdenum, tungsten.

Mineral and energy resource potential

The southern two-thirds of the area has moderate potential for lead, zinc, silver, and gold resources in mesothermal base- and precious-metal vein deposits. Small drainages in the southwestern corner of the Stevens Peak area have moderate resource potential for placer gold deposits. The northeastern tip of the area contains a moderate resource potential for molybdenum and tungsten resources in stockwork deposits associated with porphyritic intrusives. The rest of the area has low mineral resource potential. There is no known geologic evidence for oil, gas, coal, or geothermal resources within the area and the potential is regarded as low.

BIG CREEK (1-143)

Kind and amount of data

Mineral resource evaluation of the area east of 116° W. longitude included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Wallace 1°x2° quadrangle (Harrison, Domenico, and Leach, 1986; Harrison, Leach, and Kleinfopf, 1986). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577).

The area west of 116° W. longitude is unstudied; information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

Metasedimentary rocks of the Precambrian Belt Supergroup underlie the Big Creek area. These rocks have been folded, faulted, and intruded by Cretaceous/Tertiary granitic intrusive rocks, which crop out along the southern border of the area.

Four mining districts border and extend into the area: from the north, the Yreka (lead, silver, zinc) and Evolution (silver, lead) mining districts; from the south, the Black Prince (copper) mining district; and from the east the Placer Center (lead, silver, zinc) mining district. The Star Antimony mine is located just north of the Big Creek area; only a few small prospects and mines are located within the study area.

Commodities

Lead, zinc, silver, gold.

Mineral and energy resource potential

A small area in the east-central part of the Big Creek area has moderate mineral resource potential for lead, zinc, silver, and gold deposits associated with mesothermal base- and precious-metal veins, and along drainages extending southward to the southern border there is a moderate potential for placer gold deposits. The rest of the area east of 116° W. longitude has low mineral resource potential. There is no known geologic evidence for oil, gas, coal, or geothermal resources within the area and the potential is regarded as low. The energy and mineral resource potential is unknown for the area west of 116° W. longitude, because of the lack of data.

STORM CREEK (1-144)

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Wallace 1°x2° quadrangle (Harrison, Leach, and Kleinkopf, 1986). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Faulted metasedimentary rocks of the Precambrian Belt Supergroup underlie the Storm Creek area. The area lies within the Slate Creek (copper, lead) mining district, and numerous prospects and small mines are located throughout the area.

Commodities

Gold, silver, lead, zinc.

Mineral and energy resource potential

A small area within the central part of the Storm Creek area has a moderate potential for lead, zinc, silver, and gold resources associated with mesothermal base- and precious-metal vein deposits. The remainder of the Storm Creek area has low mineral resource potential. There is no known geologic evidence for oil, gas, coal, or geothermal resources within the study area and the potential is regarded as low.

HAMMOND CREEK (1-145)

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Wallace $1^{o}x2^{o}$ quadrangle (Harrison and others, 1981). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Metasedimentary rocks of the Precambrian Belt Supergroup underlie the Hammond Creek area. The area lies within the Slate Creek (copper, lead) mining district and is bordered to the east by the St. Joe (copper, gold) mining district. Numerous prospects are located throughout the area.

Commodities

None known.

Mineral and energy resource potential

Based on geological, geochemical, and geophysical criteria, the mineral and energy resource potential of the Hammond Creek area is low.

ROLAND POINT (1-146)
10% in Montana

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Wallace $1^{o}x2^{o}$ quadrangle (Harrison, Domenico, and Leach, 1986; Harrison, Leach, and Kleinkopf, 1986). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts. This report covers only the Idaho portion of the area.

Mining districts, mines, and mineral occurrences

Metasedimentary rocks of the Precambrian Belt Supergroup underlie the Roland Point area. These rocks have been faulted and intruded by Proterozoic dikes and sills ranging in composition from diorite to gabbro.

The study area lies within the St. Joe (copper, gold) and Slate Creek (copper, lead) mining districts. Several small gold placer prospects and lode mines are located throughout the area.

Commodities

Gold, silver, lead, zinc.

Mineral and energy resource potential

The Roland Point area has moderate resource potential for lead, zinc, silver, and gold deposits associated with mesothermal base- and precious-metal veins. Drainages along the southern border have moderate resource potential for gold placer deposits. There is no known geologic evidence for oil, gas, coal, or geothermal resources within the area and the potential is regarded as low.

NORTH FORK (1-147)

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Wallace $1^{o}x2^{o}$ quadrangle (Harrison and others, 1981). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Faulted metasedimentary rocks of the Precambrian Belt Supergroup underlie the North Fork area. The area lies mostly within the St. Joe (copper, gold) mining district. The St. Regis (copper, gold) mining district extends into the northeastern corner of the area and the Slate Creek (copper, lead) mining district borders the area on the west. Numerous prospects are located throughout the area.

Commodities

None known.

Mineral and energy resource potential

Based on geologic, geochemical, and geophysical criteria, the mineral and energy resource potential of the North Fork area is low.

GRANDMOTHER MOUNTAIN (1-148)

Kind and amount of data

Mineral resource evaluation of the area east of 116^{o} W. longitude included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Wallace $1^{o}x2^{o}$ quadrangle (Harrison, Leach, and Kleinkopf, 1986). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

West of 116^{o} W. longitude, the area is virtually unstudied; part of the area has been geologically mapped (Hietenan, 1963c). Information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

The Grandmother Mountain area is predominantly underlain by faulted metasedimentary rocks of the Precambrian Belt Supergroup and Proterozoic rocks composed of anorthosite, schist, and gneiss. Granitic intrusive rocks of Cretaceous/Tertiary age crop out in the eastern third of the area.

The Sliderock copper mining district extends into the eastern portion of the Grandmother Mountain area; a few prospects are located in the northeastern corner of the area.

Commodities

Lead, zinc, silver, gold.

Mineral and energy resource potential

Part of the eastern third of the Grandmother Mountain area has moderate resource potential for lead, zinc, silver, and gold associated with mesothermal base- and precious-metal veins along fracture zones. The rest of the area east of 116^{o} W. longitude has low mineral resource potential. West of 116^{o} W. longitude the area has an unknown mineral resource potential due to lack of data. There is no known geologic evidence for oil, gas, coal, or geothermal resources within the area, and the potential is regarded as low.

PINCHOT BUTTE (1-149)

Kind and amount of data

Mineral resource evaluation of the area east of 116° W. longitude and north of 47° N. latitude included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Wallace 1°x2° quadrangle (Harrison and others, 1981). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

The rest of the area, west of 116° W. longitude and (or) south of 47° N. latitude, is virtually unstudied; part of the area has been geologically mapped (Hietenan, 1963c). Information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

Proterozoic rocks of anorthosite, schist, and gneiss underlie the Pinchot Butte area. Granitic intrusive rocks of Cretaceous and Tertiary age crop out in the eastern part of the area. The area is part of the Sliderock copper mining district; there are no known prospects or mines within the area.

Commodities

None known.

Mineral and energy resource potential

Based on geological, geochemical, and geophysical criteria, the energy and mineral resource potential is low for the Pinchot Butte area east of 116° W. longitude and north of 47° N. latitude. The rest of the area has an unknown mineral and energy resource potential.

MOSQUITO FLY (1-150)

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Wallace 1°x2° quadrangle (Harrison and others, 1981). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Metamorphic rocks of the Precambrian Belt Supergroup underlie the Mosquito Fly area. Dioritic intrusive rocks of Cretaceous/Tertiary age crop out near the northern border of the area.

The St. Joe (copper, gold) mining district extends into the study area from the east. There are no known mines or prospects in the area.

Commodities

None known.

Mineral and energy resource potential

Based on geological, geochemical and geophysical criteria, the mineral and energy resource potential of the Mosquito Fly area is low.

MIDGET PEAK (1-151)

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Wallace 1°x2° quadrangle (Harrison, Domenico, and Leach, 1986). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Metamorphic rocks of the Precambrian Belt Supergroup underlie the Midget Peak area. Dioritic intrusive rocks of Cretaceous/Tertiary age crop out in the northern part of the area. The Midget Peak area lies within the St. Joe (copper, gold) mining district. There are no known mines or prospects within the area.

Commodities

Gold.

Mineral and energy resource potential

The Midget Peak area has a moderate resource potential for placer gold deposits in Quaternary sediments along the Simmons Creek drainage in the central part of the area. The remainder of the area has low mineral resource potential. There is no known geologic evidence for oil, gas, coal, or geothermal resources within the area, and the potential is regarded as low.

WONDERFUL PEAK (1-152)
50% in Montana

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Wallace $1^{o}x2^{o}$ quadrangle (Harrison, Leach, and Kleinkopf, 1986). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts. This report covers only the Idaho portion of the area.

Mining districts, mines, and mineral occurrences

The Wonderful Peak area is underlain by metasedimentary rocks of the Precambrian Belt Supergroup which were intruded by younger Proterozoic dikes and sills of dioritic to gabbroic composition. The area lies within the St. Joe (copper, gold) mining district; a few prospects and mines are located throughout the area.

Commodities

Gold, silver, lead, zinc.

Mineral and energy resource potential

The Wonderful Peak area has high mineral potential for lead, zinc, silver, and gold resources associated with mesothermal base- and precious-metal vein deposits. The potential for energy or other mineral resources is regarded as low.

MALLARD LARKINS/SMITH RIDGE/WINTER RANGE/POT (1-300)
(See description under Clearwater National Forest)

MEADOW CREEK-UPPER NORTH (1-302)
(See description under Clearwater National Forest)

BUCKHORN RIDGE (1-661)
60% in Montana

Kind and amount of data

Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation (Kirkham and Ellis, 1926; Anderson and Wagner, 1945; and Johns, 1970), but is not sufficient for the mineral survey as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The Buckhorn Ridge area is part of the Moyie Yaak (gold, lead, silver, molybdenum, tungsten) mining district. Metasedimentary rocks of the

Precambrian Belt Supergroup and younger Proterozoic dioritic to gabbroic dikes and sills underlie the Buckhorn Ridge area. The Belt rocks include the Prichard Formation, a known ore host in the region, but the stratigraphic zone favorable for the occurrence of stratabound copper and silver deposits does not occur within the study area.

Commodities

None known.

Mineral and energy resource potential

The Buckhorn Ridge area has low potential for both mineral and energy resources.

SCOTCHMAN PEAKS (1-662)
60% in Montana

Kind and amount of data

The mineral survey conducted by the USGS and USBM included geologic mapping, geochemical and geophysical studies, and examination of mining claims and prospects (Earhart and others, 1981). The mineral survey has been completed, as required by the Wilderness Act (PL88-577) and related acts. This resource evaluation summary covers only the Idaho portion of the Scotchman Peak area.

Mining districts, mines, and mineral occurrences

The Scotchman Peak area is part of the Clark Fork (silver, lead, copper) mining district. The study area is underlain by Precambrian metasedimentary rocks of the Belt Supergroup which are locally intruded by granodioritic plutons and diabase dikes and sills of probable Cretaceous and Tertiary age. Rocks in the Idaho portion of the area are mostly unfaulted and dip gently to moderately eastward; in the Montana portion, the rocks are highly faulted and folded. Mineral occurrences and mining activity in the region are concentrated on or near either faults or the Precambrian Revett Formation.

Over 400 mining claims are in or adjacent to the study area, predominantly in the Montana portion; no production has been recorded. The Blue Creek and Broken Hill mines, located south of the Montana portion of the study area, have produced zinc-lead-silver ore from north- to northwest-trending shear zones within the Blue Creek fault zone set. The stratabound copper-silver Spar Lake deposit, near Mount Vernon, is located in the Proterozoic Revett Formation east of the Montana part of the study area and was being mined in 1985.

Commodities

None.

Mineral and energy resource potential

Based on geological, geochemical, and geophysical criteria, the mineral and energy resource potential of the Idaho portion of the Scotchman Peak area is low.

TROUT CREEK (1-664)
80% in Montana

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Wallace $1^{o}x2^{o}$ quadrangle (Harrison, Cressman, Long, Leach, and Domenico, 1986; Harrison, Domenico, and Leach 1986; Harrison, Leach, and Kleinhopf, 1986). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts. This report covers only the Idaho portion of the area.

Mining districts, mines, and mineral occurrences

The Trout Creek area lies within the Eagle (lead, silver, gold, tungsten) mining district. The study area is underlain by faulted metasedimentary rocks of the Precambrian Belt Supergroup. Numerous prospects and small mines are located throughout the area.

Commodities

Copper, silver, lead, zinc, gold.

Mineral and energy resource potential

A northwest-trending strip through the center of the Trout Creek area has high resource potential for lead, zinc, silver, and gold in mesothermal base- and precious-metal vein deposits. A moderate potential exists for stratabound copper and silver resources in the northwestern corner of the area within a favorable stratigraphic horizon of the Proterozoic Revett Formation. Along the southern border of the area there is a moderate potential for lead, zinc, and silver resources in stratabound deposits within the Proterozoic Prichard Formation. Although the Prichard Formation is present throughout much of the southern Trout Creek area, the favorable ore-bearing horizon is present only in a small area along the border. The remainder of the area has a low mineral resource potential. There is no known geologic evidence for oil, gas, coal, or geothermal resources within the area and the potential is regarded as low.

GILT EDGE SILVER CREEK (1-792)
99% in Montana

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Wallace $1^{o}x2^{o}$ quadrangle (Harrison, Leach, and Kleinhopf, 1986). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts. This report covers only the Idaho portion of the area.

Mining districts, mines, and mineral occurrences

The Gilt Edge Silver Creek area is part of the St. Regis (copper, gold) mining district. The study area is underlain by Precambrian metasedimentary rocks of the Belt Supergroup which are locally faulted and intruded by dioritic to gabbroic dikes and sills of Proterozoic age. Several mines and prospects are located near or adjacent to the area.

Commodities

Lead, zinc, gold, silver.

Mineral and energy resource potential

The Gilt Edge Silver Creek area has moderate resource potential for base- and precious-metals in mesothermal vein deposits along highly faulted and fractured zones. There is no geologic evidence for oil, gas, coal, or geothermal resources within the area and the potential is regarded as low.

SHEEP MOUNTAIN STATE LINE (1-799)
50% in Montana

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Wallace $1^{o}x2^{o}$ quadrangle (Harrison, Cressman, Long, Leach, and Domenico 1986; Harrison, Domenico, and Leach, 1986; Harrison, Leach, and Kleiniopf, 1986; Harrison, Leach, Kleinkopf, and Long, 1986). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts. This report covers only the Idaho portion of the area.

Mining districts, mines, and mineral occurrences

The Sheep Mountain State Line area is underlain by faulted metasedimentary rocks of the Precambrian Belt Supergroup. Granitic and dioritic intrusive rocks of Cretaceous to Tertiary age crop out in nearby. Cenozoic glacial and alluvial deposits are located along drainages throughout the area. The Prichard Formation, a known host rock for stratabound lead-zinc-silver deposits, occurs along the northwestern border of the study area, but the stratigraphic horizon favorable for ore deposits is not present within the Sheep Mountain State Line area. The study area lies within the St. Joe (copper, gold) mining district and few prospects are located within the area.

Commodities

Gold, silver, lead, zinc, molybdenum, tungsten.

Mineral and energy resource potential

The geology of the Sheep Mountain State Line area is favorable for mineral deposits of several types. Small drainages extending from both the north- and south-central borders have moderate resource potential for gold in placer deposits. A small area along the south-central border has moderate potential for molybdenum and tungsten resources in stockwork deposits associated with porphyritic intrusives, and the southeastern corner of the area has moderate resource potential for metals in mesothermal base- and precious-metal vein deposits; the remainder of the area has low mineral resource potential. There is no known geologic evidence for oil, gas, coal, or geothermal resources within the area, and the potential is regarded as low.

SALMO-PRIEST (1-981)
75% in Washington

Kind and amount of data

The mineral survey, conducted by the USGS and USBM, included geologic mapping, geochemical and geophysical studies, and examination of known mines and prospects (Miller, 1982b; Miller and Theodore, 1982; Miller and others, 1982). The mineral survey is completed as required by the Wilderness Act (PL88-577) and related acts. A separate petroleum resource evaluation was also completed (Sandberg, 1982, 1983). This report covers only the Idaho portion of Salmo-Priest area.

Mining districts, mines, and mineral occurrences

Metasedimentary rocks of Proterozoic age underlie most of the Salmo-Priest area. Proterozoic metavolcanic rocks crop out along the western edge of the area, and tonalitic intrusive rocks of Mesozoic age crop out in the northeastern part of the area. Quaternary glacial and alluvial deposits overlie older rocks throughout the area.

The Priest Lake (lead, silver, copper) mining district extends through the Idaho portion of the Salmo-Priest area and the Porthill (lead, silver) mining district covers the northeastern tip of the area. The area is bordered on the west, in the state of Washington, by the Metaline (zinc-lead) mining district. The Idaho-Continental mine, located a few miles east of the area, produced significant amounts of lead from the Proterozoic Wallace Formation until the 1930's; the mineralized rock does not appear to extend into the study area. Molybdenum and tungsten anomalies occur south of the Salmo-Priest area, but there is no evidence that the mineralized rock extends into the area. Gold anomalies, as much as 0.5 parts per million, have been detected in scattered stream-sediment concentrates within the area; however, these appear to be derived from small discontinuous quartz veins. One placer and several lode claims are located within the Washington part of the study area, but none are located in the Idaho portion of the area. Except for prospecting, there has been no known mining development in the Salmo-Priest area.

Commodities

None.

Mineral and energy resource potential

Based on geologic, geochemical, and geophysical criteria, the mineral and energy resource potential of the Salmo-Priest area is low. Although mineralized regions border the area on three sides, the study area itself contains geologic environments unfavorable for any similar type mineral deposits.

KOOTENAI NATIONAL FOREST

BUCKHORN RIDGE (1-661)

(See description under Idaho Panhandle National Forest)

SCOTCHMAN PEAKS (1-662)

(See description under Idaho Panhandle National Forest)

NEZPERCE NATIONAL FOREST

RACKCLIFF GEDNEY (1-841)

(See description under Clearwater National Forest)

MIDDLE FORK FACE (1-842)

GODDARD CREEK (1-843)

CLEAR CREEK (1-844)

Kind and amount of data

The geology of these areas has been mapped at a reconnaissance scale (Anderson, 1930), and information on geology and mineral deposits is adequate for inferences to be made regarding resource potential; however, information is not adequate for a preliminary mineral resource evaluation, and is not sufficient for the mineral survey as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The study areas are underlain by Precambrian metasedimentary rocks of the Belt Supergroup that have been intruded by Cretaceous intrusive rocks of the Idaho batholith.

The Lowell (gold) and Newsome (gold) mining districts extend into parts of the areas, and the Harpster (gold, copper) mining district borders the areas on the west. Numerous mines and prospects are scattered both within and surrounding the study areas. These study areas lie between the large gold-producing Buffalo Hump district to the south-southeast and the gold-producing Orofino district to the northwest; the study areas appear to contain similar geologic environments.

Commodities

Gold.

Mineral and energy resource potential

All three areas are inferred to have a moderate potential for gold resources related to both precious-metal vein and associated placer deposits. The potential for energy resources is inferred to be low.

MEADOW CREEK (1-845)
(See description under Bitterroot National Forest)

MIDDLE BARGAMIN (1-846)

Kind and amount of data

Study of the Middle Bargamin area included geologic mapping, geochemical and geophysical studies, and investigation of known prospects (Lindgren, 1904; Greenwood and Morrison, 1973; Karen Lund, written and oral commun.; Esparza, 1985b). Uranium resources were evaluated separately as part of the National Uranium Resource Evaluation (NURE) program (Broxton and Beyth, 1980; EG G geoMetrics, 1980; Leinart and Salisbury, 1981; U.S. Department of Energy, 1982). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

The Middle Bargamin area was included in the Frank Church-River of No Return Wilderness in 1980.

Mining districts, mines, and mineral occurrences

Faulted Eocene granite of the Poet Camp pluton underlies most of the Middle Bargamin area. The Eocene granite both intruded Precambrian granite and were intruded by rhyolite and dacite dikes of Eocene age.

The Green Mountain (copper, silver) mining district extends into the area from the west. There are no mines, prospects, or mineral occurrences known in the area. A copper-silver prospect is located on Green Mountain, northwest of the Middle Bargamin area; copper, cobalt, and nickel occurrences are found nearby, but the zones of mineralized rock do not appear to extend into the study area.

The Red River hot springs (55° C.) are located directly west of the study area, and the Barth hot springs (60° C.) are on the Salmon River south of the area (Mitchell and others, 1980).

Commodities

Gold.

Mineral and energy resource potential

The Middle Bargamin area has moderate potential for gold resources related to fossil hot springs along faults in the Poet Camp pluton. There is no geologic evidence for energy or other mineral resources, and their potential is regarded as low.

MALLARD (1-847)

Kind and amount of data

The geology of the Mallard study area has been mapped for both regional and reconnaissance studies (Lindgren, 1904; Greenwood and Morrison, 1973). Uranium resource evaluation was conducted as part of the National Uranium Resource Evaluation (NURE) program (Broxton and Beyth, 1980; EG G geoMetrics, 1980; Leinert and Salisbury, 1981; U.S. Department of Energy, 1982). Information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Study of the southern tip of the area, known as the Big Mallard Creek unit, included geologic mapping, geochemical and geophysical studies, and investigation of known mining claims (Karen Lund, written and oral commun.; Esparza, 1985b). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts. The Big Mallard Creek unit was included in the Frank Church-River of No Return Wilderness in 1980.

Mining districts, mines, and mineral occurrences

The Mallard area is predominantly underlain by Cretaceous intrusive rocks of the Idaho batholith which both intruded Precambrian metasedimentary rocks and was heavily intruded by granite porphyry and dacite dike swarms of Eocene age.

The Green Mountain (copper, silver) mining district extends into the northeastern part of the study area. The Dixie (gold) and the Chamberlain Basin (gold, copper) mining districts lie west and south of the area, respectively. No mines or prospects are known in the area.

The Red River hot springs (55^{o} C.) are located north of the study area, and the Barth hot springs (60^{o} C.) are on the Salmon River southeast of the area (Mitchell and others, 1980).

Commodities

Gold.

Mineral and energy resource potential

The Big Mallard Creek unit has moderate potential for epithermal gold resources related to fossil hot springs in the southwest tip of the area. The potential for energy and other mineral resources is regarded as low. The rest of the Mallard area has an unknown mineral resource potential and a low potential for energy resources.

DIXIE SUMMIT-NUT HILL (1-848)

Kind and amount of data

The geology of the Dixie Summit-Nut Hill area has been mapped (K. Lund, unpub. mapping), and the mining districts have been studied (Thompson and Ballard, 1924; Shenon and Reed, 1934). Additional geochemical, aerial radiometric, and magnetic survey studies were conducted as part of the National Uranium Resource Evaluation (NURE) program (Broxton and Beyth, 1980; EG G geoMetrics, 1980; Leinart and Salisbury, 1981; U.S. Department of Energy, 1982). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The Dixie Summit-Nut Hill area is in the northern part of the Atlanta lobe of the Idaho batholith. The area is underlain by Cretaceous tonalite and granite plutons that intruded folded and faulted metasedimentary rocks. The metasedimentary rocks, which have been correlated with strata of the Precambrian Belt Supergroup, crop out as roof pendants. Quaternary glacial and alluvial deposits unconformably overlie older rocks along the major stream valleys.

The area is part of the Orogrande (gold, copper) and Dixie (gold) mining districts. Numerous placer and lode prospects are located in and around the area, many of which have a history of production.

Commodities

Gold, silver.

Mineral and energy resource potential

The Dixie Summit-Nut Hill area has moderate potential for gold and silver resources in quartz fissure-vein deposits along north-south-trending fault and fracture zones. There is no known geologic evidence for oil, gas, coal, or geothermal resources within the area, and the potential is regarded as low.

SILVER CREEK-PILOT KNOB (1-849)

Kind and amount of data

The geology of this area has been mapped at a reconnaissance scale (Anderson, 1930; Shenon and Reed, 1934), and information on geology and mineral deposits is adequate for inferences to be made regarding resource potential; however, information is not adequate for a preliminary mineral resource evaluation, and is not sufficient for the mineral survey as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Precambrian metasedimentary rocks of the Belt Supergroup, which have been intruded by Cretaceous intrusive rocks of the Idaho batholith, underlie the Silver Creek-Pilot Knob area.

The Newsome (gold) and Tenmile (gold, copper) mining districts extend into the eastern two-thirds of the study area. Several mines and prospects are located in and around the area. This area lies between the large gold-producing Buffalo Hump and Orofino districts and appears to have a similar geologic environment.

Commodities

Gold.

Mineral and energy resource potential

The Silver Creek-Pilot Knob area is inferred to have a moderate potential for gold resources related to both precious-metal vein and associated placer deposits. The potential for energy resources is inferred to be low.

NORTH FORK SLATE CREEK (1-850)

LITTLE SLATE CREEK (1-851)

Kind and amount of data

The geology of the areas has been mapped (Hamilton, 1963; Lund, 1984), and information on geology and mineral deposits is adequate for inferences to be made regarding resource potential; however, information is not adequate for a preliminary mineral resource evaluation, and is not sufficient for the mineral survey as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The North Fork Slate Creek and Little Slate Creek areas are underlain by Mesozoic submarine metavolcanic and metasedimentary rocks that were intruded by granodioritic to dioritic intrusive rocks of Mesozoic age. Miocene Columbia River basalts unconformably overlie older rocks in the western and northern parts of the North Fork Slate Creek area.

Gold placer mining districts surround but do not extend into the areas. Volcanogenic and quartz vein deposits occur in a similar geologic environment elsewhere in the region (Simmons and others, 1983).

Commodities

Gold, silver, copper, lead, zinc, asbestos.

Mineral and energy resource potential

The North Fork Slate Creek and Little Slate Creek areas are inferred to have a moderate potential for asbestos, gold, copper, lead, and zinc resources associated with vein and volcanogenic massive sulfide deposits. The potential for energy resources is inferred to be low.

JOHN DAY (1-852)

KELLY MOUNTAIN (1-857)

Kind and amount of data

The geology of the areas has been mapped at a reconnaissance scale only (Hamilton, 1969). Information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

The John Day and Kelly Mountain areas are underlain by foliated intrusive rocks of Mesozoic age. The Bungalow and Simpson gold placer mining districts extend along the borders of the study areas.

Commodities

Unknown.

Mineral and energy resource potential

These areas have an unknown mineral and energy resource potential due to lack of data.

BIG CANYON A (1-853)

KLOPTON CREEK-CORRAL CREEK (1-854)

RAPID RIVER (1-922)

HELLS CANYON WILDERNESS (NF-034)
50% in Oregon

Kind and amount of data

Evaluation of the mineral resource potential of the Hells Canyon Wilderness and the Big Canyon A, Klopton Creek-Corral Creek, and Rapid River area, consisted of geological, geochemical, geophysical, and mine and prospect investigations by the USGS and USBM (Gualtieri and Simmons, 1978; Close and others, 1982; Simmons and others, 1983). Previous work includes that by Livingston and Laney (1920) and Cook (1954). The mineral survey is completed as required by the Wilderness Act (PL88-577) and related acts. This summary covers mineral and energy resource potential for the Idaho portion of the Hells Canyon Wilderness and for all of the listed RARE II areas.

Mining districts, mines, and mineral occurrences

The Permian and Triassic Seven Devils Group and contemporaneous gabbro and quartz diorite plutons underlie the study area. The Seven Devils Group is composed of basaltic and andesitic flows, volcaniclastic rocks, and interbedded limestone. All of these rocks were subsequently folded, metamorphosed, faulted, and, in the southern part of the area, intruded by granitic plutons of Cretaceous age. Flows of the Miocene Columbia River Basalt Group and Quaternary glacial deposits overlie older rocks throughout the areas.

The Crooks Corral (copper), Mountain View (gold), and Seven Devils (copper) mining districts extend into the study areas. Numerous mines and prospects are located within the areas. Mines, including the Blue Jacket, Bald Eagle, Maid of Erin, Summit, South Peacock, White Monument, Lockwood, Tussel, Lime Peak, Crackerjack, River Queen, Antz Creek, and Azurite have produced silver, gold, copper, zinc, lead, and tungsten from within the areas.

About 2,510 lode and 190 placer claims are located in the areas, of which 17 lode and several placer claims have recorded production. Although much of the mining activity occurred before records were kept, these 17 mines recorded production of 9,355 troy oz of gold, 225,530 troy oz of silver, 6,109 tons of copper, 1 ton of lead, 40 tons of zinc, and 180 lbs of tungsten trioxide.

Snake River placer claims have a recorded production of 605 oz of gold (Simmons and others, 1983).

Commodities

Silver, copper, lead, zinc, gold, molybdenum, tungsten.

Mineral and energy resource potential

Twelve areas within the Hells Canyon Wilderness, and Klopton Creek-Corral Creek study areas have moderate or high resource potential for one to several of the commodities listed above. The remainder of the study areas has low mineral resource potential. The important types of mineral deposits in these areas include copper-, silver- and zinc-bearing volcanogenic deposits with lesser amounts of gold, lead, and molybdenum; contact replacement zones in limestone (tactites) containing copper and silver; gold-, silver-, and copper-bearing, siliceous fissure veins and shear zones associated with plutonic rocks; and gold placers. The Big Canyon A and Rapid River areas have low mineral resource potential. All of the areas have low potential for energy resources.

One area which extends into the Hells Canyon Wilderness, on the southwestern border from the Rapid River 4-922 area (see under Payette National Forest), has high mineral resource potential for copper-silver-zinc-lead and gold in volcanogenic deposits. Nine other areas that occur within the Hells Canyon Wilderness have moderate resource potential for, from north to south: copper-silver-molybdenum-lead-zinc; gold; lead; lead-silver; gold-silver-copper-zinc-molybdenum; silver-lead; molybdenum; gold-silver-lead-copper; lead-zinc.

The Klopton Creek-Corral Creek (1-854) study area has an area of high mineral resource potential for zinc-silver-gold and an area of moderate potential for silver-zinc-molybdenum-copper resources.

SALMON FACE (1-855)

Kind and amount of data

Information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

The Salmon Face area is underlain by Mesozoic volcanic, volcaniclastic, and carbonate rocks. Tertiary basalt flows unconformably overlie older rocks near the eastern boundary of the area.

The Crook Corral copper mining district includes the Salmon Face area. Numerous lode and placer claims are located in the mining district, but none are known within the study area. Adjacent areas to the west and south have low mineral and energy resource potential.

Commodities

Unknown.

Mineral and energy resource potential

The Salmon Face area has unknown mineral and energy resource potential due to lack of data.

DIXIE TAIL (1-913)

(See description under Salmon River Breaks Primitive Area/Frank Church-River of No Return Wilderness, Bitterroot National Forest)

The Dixie Tail area was originally part of the Salmon River Breaks Primitive Area, and was included in the resource evaluation study done of the primitive area. Dixie Tail was included in the Frank Church-River of No Return Wilderness in 1980.

GOSPEL-HUMP (1-921)

Kind and amount of data

Mineral resource evaluation of three of the five Gospel-Hump areas listed as (1-921) included geologic mapping and geochemical studies (Karen Lund, unpub. mapping). Additional geochemical, aerial radiometric, and magnetic survey studies were conducted as part of the National Uranium Resource Evaluation (NURE) program (Broxton and Beyth, 1980; EG G geoMetrics, 1980; Leinart and Salisbury, 1981; U.S. Department of Energy, 1982). Study of the southeastern corner of the easternmost study area included geologic mapping and examination of known mines and prospects (K. V. Evans, unpub. mapping; Esparza, 1985c; Horn and others, 1985); this small tract, known as the Cove Mountain unit, was included in the Frank Church-River of No Return Wilderness in 1980. Information on geology and mineral deposits for all but the easternmost area (1-921) is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

The two eastern Gospel-Hump areas (1-921), except for the Cove Mountain unit, are unstudied. Information on geology and mineral deposits of the southern part of the easternmost area is adequate for inferences to be made regarding resource potential; however, information is not adequate for a preliminary mineral resource evaluation, and is not sufficient for the mineral survey as required by the Wilderness Act (PL88-577) and related acts. Information on geology and mineral deposits is not adequate for either a preliminary resource evaluation or inferences to be made regarding resource potential in the northern part of the easternmost Gospel-Hump area (1-921). The Gospel-Hump area listed as (4-921) is discussed under the Payette National Forest.

Mining districts, mines, and mineral occurrences

Cretaceous granitic and tonalitic rocks of the Atlanta lobe of the Idaho batholith underlie the Gospel-Hump areas. These rocks intruded folded and faulted metasedimentary rocks of Precambrian and presumed Paleozoic age which now form roof pendants; the Precambrian metasediments crop out in the northeastern and eastern areas, and the presumed Paleozoic metasedimentary rocks are restricted to the northern and western areas.

Five mining districts, the Tenmile (gold), Buffalo Hump (gold, silver, copper), Dixie (gold), Orogrande (gold, copper), and Florence (gold), include most of the study areas which ring the Gospel-Hump Wilderness.

Numerous mines and prospects are present in or near the study areas. Gold and silver commonly occur in precious-metal quartz fissure-vein deposits filling shear zones and fractures, disseminated in granitic or tonalitic country rock, or in alluvial placer deposits. Anomalously high values for silver, copper, nickel, cobalt, barium, and arsenic occur in the westernmost study areas associated with replacement deposits within calcareous lithologies along thrust contacts in roof pendants; these occurrences are similar to those in the adjacent western portion of the Gospel-Hump Wilderness area.

Commodities

Gold, silver, copper, nickel.

Mineral and energy resource potential

The westernmost area has moderate potential for silver, copper, and nickel resources associated with replacement deposits in calcareous roof pendants. The northern and northeastern areas have at least moderate resource potential for gold and silver in precious-metal quartz fissure veins. The southernmost area has at least moderate resource potential for gold and silver in precious-metal, quartz fissure veins, and for gold in placer deposits along the Salmon River; although itself unstudied, this southernmost (1-921) area is located between two well-studied areas, and appears to contain a similar geologic environment. The Cove Mountain unit, in the easternmost area, has at least moderate potential for gold and silver resources in lode fissure veins and for placer deposits along the Salmon River. The southern half of the easternmost area is inferred, on the basis of a similar geologic environment, to have a at least moderate potential for gold and silver resources in deposits similar to those in adjacent, better-studied areas. The northern half of the area has an unknown mineral potential. There is no known geologic evidence for oil, gas, coal, or geothermal resources within the areas and the potential is regarded as low.

GOSPEL-HUMP WILDERNESS (NF-095)

Kind and amount of data

The mineral survey, conducted by the USGS and USBM, included geologic mapping, geochemical and geophysical studies, and investigation of known mines and prospects (Karen Lund and K. V. Evans, unpub. mapping; Geer, 1983; Esparza and others, 1984). Additional geochemical, aerial radiometric, and magnetic survey studies were conducted as part of the National Uranium Resource Evaluation (NURE) program (Broxton and Beyth, 1980; EG G geoMetrics, 1980; Leinart and Salisbury, 1981; U.S. Department of Energy, 1982). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The Gospel-Hump Wilderness is underlain by part of the northern Atlanta lobe of the Idaho batholith, which is composed of Cretaceous granitic and tonalitic rocks. These rocks intruded folded and faulted metasedimentary rocks of Precambrian and Paleozoic age which now form roof pendants. Quaternary glacial and alluvial deposits are located along the major stream valleys.

Five mining districts border and extend into the wilderness: the Buffalo Hump (gold, silver, copper), Tenmile (gold), Florence (gold), Dixie (gold), and Orogrande (gold, copper) districts. Numerous mines and prospects are located in and near the wilderness; a total of 23 are located within the wilderness area, including the abandoned Blue Jay and War Eagle mines, in the southeastern part of the area. Although production records are incomplete, it is estimated that at least 1 million troy ounces of gold were produced from placers and lodes in these districts (Thompson and Ballard, 1924; Shenon and Reed, 1934). Mining activity began in the area around 1861 (Thompson and Ballard, 1924), but subsided by about 1910; mining has continued intermittently until the present. Historically placer deposits have been more important in the region than lode deposits. However, within the wilderness area there has been more production from precious-metal vein lode deposits.

Commodities

Gold, silver, copper, nickel.

Mineral and energy resource potential

A central north-trending strip through the eastern half of the Gospel-Hump Wilderness has high resource potential for gold and silver, and the rest of the eastern half of the area, except along the southern boundary, has moderate potential for gold-silver resources in precious-metal quartz fissure-veins along north-south-trending fault zones. Roof pendants in the western third of the area have moderate potential for silver-copper-nickel resources in replacement deposits along thrust contacts. The rest of the area has low mineral resource potential.

The Gospel-Hump Wilderness has low resource potential for oil, gas, coal, or geothermal energy.

SALMON RIVER BREAKS-PRIMITIVE AREA/
FRANK CHURCH-RIVER OF NO RETURN WILDERNESS (NF914)
(See description under Bitterroot National Forest)

PAYETTE NATIONAL FOREST

SNOWBANK (4-062)

Kind and amount of data

The geology of the Snowbank area was mapped by Mackin and Schmidt (1953) with revision by Schmidt and Mackin (1970) as part of a placer deposit study in west-central Idaho. This area was also mapped by Mitchell and Bennett (1979). Information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

Flows of the Tertiary Columbia River Basalt cover the Snowbank area and overlie crystalline rocks of the Cretaceous Idaho batholith. There are no mining districts near the area; two abandoned prospects are located along the eastern boundary (Strowd and others, 1981).

Commodities

Unknown.

Mineral and energy resource potential

The Snowbank area has unknown mineral and energy resource potential.

NEEDLES (4-451)

(See description under Boise National Forest)

MEADOW CREEK (4-453)

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Challis $1^{o}x2^{o}$ quadrangle (Webring and Mabey, 1981; Fisher, McIntyre, and Johnson, 1983; McDanal and others, 1984; Mabey and Webring, 1985). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The Meadow Creek area is underlain by granitic rocks of the Cretaceous Idaho batholith and the Precambrian metasedimentary rocks which they intrude. The area lies within the Yellow Pine (gold, antimony, mercury) mining district; several mines and prospects are located throughout the area, including the Meadow Creek Extension (gold, antimony, silver, tungsten) mine.

Commodities

Tungsten, gold, silver, antimony.

Mineral and energy resource potential

The northwestern, southeastern, and eastern parts of the Meadow Creek area have high potential for tungsten, antimony, gold, and silver resources in both tungsten and precious-metal vein deposits, and tungsten stockwork deposits. The rest of the area has low mineral resource potential. There is no known geologic evidence for oil, gas, coal, or geothermal resources within the area and the potential is regarded as low.

PINNACLE PEAK (4-454)

Kind and amount of data

Mineral resource evaluation of the area south of 45° N. latitude included geologic mapping, and geochemical and geophysical studies, conducted as part of the CUSMAP study of the Challis 1°x2° quadrangle (Webring and Mabey, 1981; Fisher, McIntyre, and Johnson, 1983; McDanal and others, 1984; Mabey and Webring, 1985). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

The northern two-thirds of the area was included in the Frank Church-River of No Return Wilderness in 1980. Study of this area included geologic mapping, geochemical and geophysical studies, and investigation of known mines, prospects, and claims (B. F. Leonard, oral commun., 1985; B. F. Leonard, M. D. Kleinkopf, G. A. Nowlan, and D. I. Jayne, unpub. data).

Mining districts, mines, and mineral occurrences

Metasedimentary rocks of the Precambrian Yellowjacket Formation and Hoodoo Quartzite underlie the Pinnacle Peak area. These rocks were intruded by granitic rocks of the Cretaceous Idaho batholith, which have limited exposure within the area. A north-striking silicified shear zone cuts along the western edge of the area, and rocks of the Eocene Challis Volcanics cover the eastern part of the area. Tertiary dikes and stocks composed of rhyolite and latite crop out throughout the area.

The Profile (gold, copper, lead), Edwardsburg (gold, copper, lead), and the Thunder Mountain (gold) mining districts border and extend into the Pinnacle Peak area. More than 90 abandoned prospects and mines are located in the area.

Numerous thermal springs are located along the Salmon River southeast of the study area. These springs are part of an "area of significant lateral extent favorable for discovery and development of local sources of low-temperature (<90° C.) water" (Mitchell and others, 1980).

Commodities

Gold, silver, tungsten, antimony, mercury, molybdenum, niobium, tin, zinc, talc, bismuth, uranium.

Mineral and energy resource potential

The geologic environments present in the Pinnacle Peaks area are primarily favorable for replacement-type deposits in silicified zones and metamorphic carbonate rocks of the Yellowjacket Formation, and for vein-type deposits.

The northern two-thirds of the Pinnacle Peak area has high potential for gold and silver, except in a small section at the northern end. The western part of this area has a high mineral resource potential for antimony, mercury, tungsten, and molybdenum associated with the silicified zone, and the rest has a moderate resource potential for antimony, mercury, and molybdenum. The area of metamorphic rocks near the head of Tamarack Creek has high resource potential for tungsten and moderate resource potential for uranium. The belt of Precambrian rocks near Spring Creek-Missouri Creek has high resource potential for zinc and moderate potential for tungsten. The Jacobs Ladder Creek area of Challis Volcanics has high resource potential for tin and moderate potential for zinc, bismuth, and uranium; the rest of the Challis Volcanic rocks have moderate resource potential for tin. The southern part of the northern two-thirds has high mineral resource potential for niobium.

The central portion of the southern third of the Pinnacle Peak area has high potential for tungsten, silver, and gold resources in tungsten and precious-metal vein deposits, but the rest of the area has low potential for all metallic resources. There is no known geologic evidence for oil, gas, coal, or geothermal resources within the Pinnacle Peak area and the potential is low.

LICK CREEK (4-455)

Kind and amount of data

Lick Creek has two widely separated areas refered to as the east area and the west area. The geology of part of the Lick Creek area has been mapped by B. F. Leonard (unpub. mapping) and Leonard and Erdman (1983). Mineral resource evaluation of the east area and that portion of the west area south of 45° N. latitude and east of 116° W. longitude included geologic mapping, and geochemical and geophysical studies, conducted during the CUSMAP study of the Challis 1°x2° quadrangle (Webring and Mabey, 1981; Fisher, McIntyre, and Johnson, 1983; McDanal and others, 1984; Mabey and Webring, 1985). Information on geology and mineral deposits of the east area and that portion of the west area south of 45° N. latitude and east of 116° W. longitude is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

The west area north of 45° N. latitude and (or) west of 116° W. longitude is virtually unstudied. Information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

Granitic rocks of the Cretaceous Idaho batholith underlie most of the Lick Creek areas. These rocks intruded Precambrian metasediments of the Yellowjacket Formation and Hoodoo Quartzite, which now crop out as roof pendants in the eastern part of the eastern area. Rocks of the Eocene Challis Volcanics cover parts of this same area, and a major swarm of Tertiary dikes also cuts the eastern edge of the eastern area.

The Profile and Edwardsburg (gold, copper, lead) mining districts extend into the eastern part of the eastern area and the Resort (gold, silver) mining district borders the western area on the north. Numerous mines and prospects are located throughout both areas, but particularly in the eastern area.

Commodities

Gold, silver, tungsten, molybdenum.

Mineral and energy resource potential

One area in the south-central part of the eastern Lick Creek area has high mineral resource potential for gold, silver, tungsten, and molybdenum. This area contains geology favorable for tungsten veins, gold and silver precious-metal veins, and stockwork molybdenum deposits. The remainder of the entire study area has a low or unknown mineral resource potential. There is no known geologic evidence for oil, gas, coal, or geothermal resources within the Lick Creek area, and the potential is regarded as low.

PLACER CREEK (4-456)

SMITH CREEK (4-457)

Kind and amount of data

Study of the Placer Creek and northern part of the Smith Creek areas included geologic mapping, geochemical and geophysical studies, and investigation of all known mines and prospects (Cater and others, 1973, 1975; Cater and Weldin, 1984). The geology of the southern part of Smith Creek has been mapped (B. F. Leonard, unpub. mapping), and the known mines and prospects studied. Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Metasedimentary rocks of the Precambrian Yellowjacket Formation and Hoodoo Quartzite underlie the Placer Creek and Smith Creek areas. Granitic rocks of the Cretaceous Idaho batholith intruded the metasedimentary rocks and crop out near the perimeters of the areas.

The Placer Creek and Smith Creek areas are part of the Edwardsburg (gold, copper, lead) mining district. Numerous tungsten, gold, and copper prospects and mines surround the areas, and several very old prospects in the Yellowjacket Formation for gold and silver are located within the areas. Placer deposits along Smith Creek follow the boundary between the two areas (Shenon and Ross, 1936).

Commodities

Silver.

Mineral and energy resource potential

The northern tip of the Placer Creek and the northwestern edge of the Smith Creek areas have moderate potential for silver resources in quartz vein deposits. The rest of the areas have low mineral resource potential. There is no known geologic evidence for oil, gas, coal, or geothermal resources within the areas, and the potential is regarded as low.

CHIMNEY ROCK (4-458)

CRYSTAL MOUNTAIN (4-459)

CAREY CREEK (4-460)

Kind and amount of data

The stream deposits of the area have been mapped and evaluated for their placer gold potential (Capps, 1940; Reed, 1957); otherwise the areas are unstudied. Information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

Cretaceous granitic rocks of the Idaho batholith underlie the study areas. These rocks intruded Precambrian metasedimentary rocks which now form sporadic roof pendants. Quaternary glacial and alluvial deposits are located along the stream valleys both between the Chimney Rock and Crystal Mountain areas and along the southern border of the Crystal Mountain area.

Chimney Rock is part of the Warren (gold) mining district; the Marshall Lake (gold, silver) mining district extends into the eastern Carey Creek and northern Crystal Mountain areas, and the Resort (gold, silver) mining district extends into the southern part of Crystal Mountain. No mines or mineral occurrences are known in the study areas.

Nearby streams, outside of the areas, contain numerous gold placer deposits. Gold- and silver-bearing quartz veins of the "Warren vein system" occur east of the Chimney Rock area, but the veins do not appear to extend westward into the study area.

Commodities

Unknown.

Mineral and energy resource potential

The southeastern border of the Crystal Mountain area and the southwestern boundary of the Carey Creek area may have potential for gold resources in placer deposits similar to those found in nearby areas. Otherwise, these areas have unknown mineral and energy resource potential due to lack of data.

FRENCH CREEK (4-461)

Kind and amount of data

The geology of the southern part of the area has been mapped (M. A. Kuntz, unpub. mapping). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

The northern part of the area is virtually unstudied. Information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

The French Creek study area is divided into two separate areas. The easternmost is located near the western boundary of the Cretaceous Idaho batholith and is underlain by rocks of tonalite-granodiorite-granite composition. The eastern part of the western area is also underlain by rocks of the Idaho batholith; older igneous intrusives, metavolcanics, and Tertiary basalt flows compose the western part of the western area. Quaternary glacial and alluvial deposits are located both within and between the two areas.

The Meadows gold placer district is located between the two areas and the Resort (gold, silver) mining district extends into the eastern part of the eastern area. A few prospects are scattered throughout both areas, and placer deposits of the Secesh Basin are located along the eastern border of the eastern area (Capps, 1940).

Commodities

None known.

Mineral and energy resource potential

Based on geologic criteria, the mineral and energy resource potential is low for the southern part of both French Creek areas. Due to lack of data, the northern parts of both areas have unknown mineral and energy resource potential, but it is thought to be low potential.

INDIAN CREEK (4-462)

Kind and amount of data

The geology of the area has been mapped (Livingston and Laney, 1920). Information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

Flows of the Tertiary Columbia River Basalt cover most of the Indian Creek area. Metasedimentary, metavolcaniclastic, and metaigneous rocks of Mesozoic age crop out near the western edge of the area. The study area is part of the Seven Devils (copper) mining district. Numerous mines and prospects (silver, copper, lead, zinc) are located near and adjacent to the western boundary of the Indian Creek area, but none are known within the area (Strowd and others, 1981).

Commodities

Unknown.

Mineral and energy resource potential

The Indian Creek area has unknown mineral and energy resource potential, due to lack of data.

FLAT CREEK (4-463)

Kind and amount of data

The geology of the Flat Creek area has been mapped (Mitchell and Bennett, 1979). Information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

Flows of the Tertiary Columbia River Basalt cover the Flat Creek area. The Seven Devils (copper) mining district extends into the northern tip of the study area. No mines or prospects are located within the area.

Commodities

Unknown.

Mineral and energy resource potential

The Flat Creek area has unknown mineral and energy resource potential due to lack of data.

CUDDY MOUNTAIN (4-464)

Kind and amount of data

The geology of the Cuddy Mountain area has been mapped (Mitchell and Bennett, 1979) and information on geology and mineral deposits is adequate for inferences to be made regarding resource potential; however, information is not adequate for a preliminary mineral resource evaluation, and is not sufficient for the mineral survey as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

A complex assemblage of metavolcanic, metavolcaniclastic, and metasedimentary rocks of Mesozoic age, and roughly contemporaneous intrusive rocks underlie the Cuddy Mountain area. These rocks have been strongly folded, faulted, and subsequently covered by flows of the Tertiary Columbia River Basalt.

The Cuddy Mountain (gold, silver, copper, lead) mining district extends into part of the southern half of the area. Numerous mines and prospects (gold, silver, copper, lead, zinc, molybdenum, manganese) are located within and adjacent to the area (Strowd and others, 1981).

Commodities

Gold, silver, copper, lead, zinc, molybdenum.

Mineral and energy resource potential

The Cuddy Mountain area is inadequately studied. Based on a favorable geologic environment and known mines and prospects, the area is inferred to have at least a moderate potential for gold, silver, copper, lead, zinc, and molybdenum resources related to volcanogenic, replacement and (or) vein deposits similar to those found elsewhere in the region. The Cuddy Mountain area has unknown energy resource potential due to lack of data.

SHEEP GULCH (4-465)

Kind and amount of data

The geology of the Sheep Gulch area has been mapped (Mitchell and Bennett, 1979), but information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

The Sheep Gulch area is covered by Tertiary flows of the Columbia River Basalt. Metasedimentary rocks of Paleozoic age crop out locally near the western border of the area. No mining districts, mines, or prospects are known within the area.

Commodities

Unknown.

Mineral and energy resource potential

The Sheep Gulch area has unknown mineral and energy resource potential due to lack of data.

COUNCIL MOUNTAIN (4-466)

Kind and amount of data

The geology of the Council Mountain area has been mapped (Schmidt and Mackin, 1970; Mitchell and Bennett, 1979), but information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

Igneous and metamorphic rocks related to the Cretaceous Idaho batholith crop out in the eastern part of the area, and Tertiary flows of the Columbia River Basalt cover the rest of the Council Mountain area. A small area of Quaternary morainal deposits is located along the eastern edge of the area (Schmidt and Mackin, 1970). No mining districts, mines, or prospects are known within the area. The Council Mountain and White Lick hot springs, with surface temperatures greater than 60° C., are located along the southern edge of the study area. Quartz and sodium-potassium-calcium geothermometers suggest aquifer temperatures of about 145° C. (Mitchell and others, 1980).

Commodities

Unknown.

Mineral and energy resource potential

The Council Mountain area has unknown mineral and energy resource potential due to lack of data.

IPA (PARTS) (4-913)

(See description under Idaho Primitive Area/Frank Church-River of No Return Wilderness, Bitterroot National Forest)

These areas were part of the original Idaho Primitive Area, and their resource potential evaluations were included in the study of the Idaho Primitive Area. The study areas were included in the Frank Church-River of No Return Wilderness in 1980.

GOSPEL HUMP (4-921)

Kind and amount of data

This discussion refers only to (4-921). The other five Gospel-Hump (1-921) areas are covered under the Nezperce National Forest. The mineral resource evaluation of the Gospel-Hump area included geochemical, aerial radiometric, and magnetic survey studies that were conducted as part of the National Uranium Resource Evaluation (NURE) program (Broxton and Beyth, 1980; EG G geoMetrics, 1980; Leinart and Salisbury, 1981); U.S. Department of Energy, 1982). Study of a narrow strip along the northern boundary of the area included geologic mapping and examination of known prospects and mineral occurrences (K. V. Evans, unpub. mapping; Esparza, 1985c; Horn and others, 1985). For this strip, information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts; the rest of the area is not well studied and information on geology and mineral deposits is not adequate for a preliminary resource evaluation. A narrow strip along the northern and eastern boundaries of the area was included in the Frank Church-River of No Return Wilderness in 1980.

Mining districts, mines and mineral occurrences

Cretaceous intrusive rocks of the Idaho batholith underlie the Gospel-Hump area. These rocks intruded faulted and folded metasedimentary rocks of Precambrian and Paleozoic(?) age, which now form roof pendants. Quaternary alluvial deposits are located along the stream and river valleys.

The Warren (gold) and Marshall Lake (gold, silver) mining districts extend into the Gospel-Hump area; both placer gold and lode gold and silver deposits have been mined from these districts, but most of the production has been from the placer deposits.

Several mines and prospects are present near and adjacent to the study area, and 14 lode claims and 59 placer claims are known within the Gospel-Hump area. Gold and silver commonly occur in precious-metal quartz fissure-vein deposits filling shear zones and fractures, disseminated in the intrusive country rock, or in placer deposits. An isolated tungsten occurrence, with associated molybdenum and copper, is located at the Marygold claims in the northwestern corner of the study area within a schist roof pendant at a schist-granite contact. Several small, thin gravel bars are located along the South Fork of the Salmon River and, based on sampling, contain approximately 0.000075 to 0.0033 oz gold/yd^3 (Esparza, 1985c).

Commodities

Gold, silver.

Mineral and energy resource potential

The eastern two-thirds of the mapped northern strip of the Gospel-Hump area has a high potential for gold resources in placer deposits along the Salmon River and a moderate potential for gold and silver resources in precious-metal quartz veins. The western third of the northern mapped area has low mineral resource potential, and the rest of the area has unknown mineral resource potential. The energy resource potential for the entire Gospel Hump area is low.

RAPID RIVER (4-922)

Kind and amount of data

Evaluation of the mineral resource potential of the Rapid River area consisted of geological, geochemical, geophysical, and mine and prospect investigations by the USGS and USBM (Gualtieri and Simmons, 1978; Close and others, 1982; Simmons and others, 1983), and studies by previous workers (Livingston and Laney, 1920; Cook, 1954). The mineral survey is completed as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines and mineral occurrences

The Permian and Triassic Seven Devils Group, composed of basaltic and andesitic flows, volcaniclastic rocks, and interbedded limestone, and contemporaneous gabbro and quartz diorite plutons underlie the study area. These rocks were subsequently folded, metamorphosed, faulted, and intruded by granitic plutons of Cretaceous age. Quaternary glacial deposits overlie older rocks throughout the area.

The Mountain View (gold) and Seven Devils (copper) mining districts extend into the Rapid River area. Numerous mines and prospects are located throughout the area.

Commodities

Silver, copper, lead, zinc, gold, molybdenum, tungsten.

Mineral and energy resource potential

Nine areas within the Rapid River area have moderate or high resource potential for one to several of the commodities listed above. The rest of the study area has low mineral resource potential. The important types of mineral deposits in this area include copper-, silver-, zinc-, gold-, and lead-bearing volcanogenic deposits; contact replacement zones (tactites) with copper and silver in limestone; gold-, silver-, and copper-bearing siliceous fissure veins and shear zones associated with plutonic rocks; and gold placers. The Rapid River area has low potential for energy resources.

Two areas within the Rapid River area have high mineral resource potential. The area farthest north has high resource potential for copper-silver-zinc-lead and gold and the southern area has high resource potential for copper-silver and moderate resource potential for tungsten. In the eastern half of Rapid River an area with moderate resource potential for gold-silver-lead-copper extends in from the Hells Canyon Wilderness. Three other areas have moderate resource potential for, from north to south: gold-silver-molybdenum; silver; zinc. In the western half of the Rapid River three more areas have moderate resource potential for, from north to south: silver; copper; copper-silver-zinc-lead-gold.

HELLS CANYON WILDERNESS (NF-034)

(See description under Nezperce National Forest)

IDAHO PRIMITIVE AREA/ FRANK CHURCH-RIVER OF NO RETURN WILDERNESS (NF-913)

(See description under Bitterroot National Forest)

SALMON NATIONAL FOREST

CAMAS CREEK (4-202)

(See description under Challis National Forest)

NAPOLEON RIDGE (4-501)

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies as part of the CUSMAP study of the Dillon $1^{\circ}x2^{\circ}$ quadrangle (Ruppel and others, 1983). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Metasedimentary rocks of the Proterozoic Yellowjacket Formation underlie the Napoleon Ridge area. Cretaceous and Tertiary granitic intrusives crop out within the northeastern part of the area and are related to a large intrusive farther to the east. The Aurora (gold) and Eureka (gold, copper) mining districts extend into the area.

Commodities

Copper, gold.

Mineral and energy resource potential

The Napoleon Ridge area has at least a moderate resource potential for copper in disseminated deposits and a moderate resource potential for gold in vein deposits related to a nearby porphyritic intrusive. There is no known geologic evidence for oil, gas, or geothermal resources within the area and the potential is regarded as low.

TAYLOR MOUNTAIN (4-502)

(See description under Challis National Forest)

LEMHI RANGE (4-503)

(See description under Challis National Forest)

PANTHER CREEK (4-504)

Kind and amount of data

A mineral survey of the northwestern part of the area, known as the Special Mining Management Zone, was conducted by the USGS and USBM, and included geologic mapping, geochemical and geophysical studies, and investigation of known mines and prospects (Lund and others, 1983). The mineral survey is completed as required by the Wilderness Act (PL88-577) and related acts. The Special Mining Management Zone was included in the Frank Church-River of No Return Wilderness in 1980.

Study of the eastern part of the area included both reconnaissance geologic mapping and geochemical studies (Bennett, 1977, 1980; Hughes, 1983; Lund, Evans, and Esparza, 1983). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The Panther Creek area is underlain by Proterozoic metasedimentary rocks which were intruded by Precambrian, Cretaceous, and Tertiary age felsic plutons. These rocks are cut by both thrust and steeply dipping normal faults, and are locally covered by Quaternary alluvial and glacial deposits.

The Blackbird (nickel, silver, gold, copper, cobalt) and Mackinaw (gold, silver) mining districts extend into the Panther Creek area. The Blackbird mine, the largest cobalt mine in the United States, is located just south of the area; the stratabound ore occurs in the Proterozoic Yellowjacket Formation. A northwest stratigraphic and structural trend coincident with a northwest-trending belt of cobalt-copper prospects suggests that the ore-bearing horizon present at the Blackbird mine extends into the study area (Lund, Evans, and Esparza, 1983). Ross (1941) reported that nickel occurs with the cobalt deposits in the area. Anomalous amounts of antimony have been detected in soil samples in the northeastern part of the area associated with molybdenum, lead, zinc, silver, and gold mineralization, which may be related to the nearby Tertiary(?) Leesburg stock.

Commodities

Cobalt, copper.

Mineral and energy resource potential

The Special Mining Management Zone, the northwestern part of the Panther Creek area, has two areas of high and two areas of moderate mineral resource potential for stratabound cobalt and copper deposits hosted in the Yellowjacket Formation, similar to deposits at the Blackbird Mine. The remaining part of the Management Zone has low mineral resource potential.

Two areas, southwestern and southeastern, in that part of the Panther Creek area outside (southeast) of the Special Mining Management Zone, also have high potential for stratabound cobalt and copper mineral resources in the Yellowjacket Formation. The northeastern part of the area has moderate resource potential for molybdenum and copper in stockwork deposits associated with a nearby granitic intrusive. The rest of the eastern portion of the Panther Creek area has low mineral resource potential. There is no known geologic evidence for oil, gas, coal or geothermal resources within the entire Panther Creek area, and the potential is regarded as low.

MCELENY (4-505)

Kind and amount of data

A mineral survey is currently being conducted by the USGS and the USBM and includes geologic mapping, geochemical studies, and investigation of mines and prospects (K. V. Evans, oral commun.; James Ridenour, oral commun.). At this time the information on geology and mineral deposits is not adequate for a preliminary resource evaluation. Most of the McEleny area was included in the Frank Church-River of No Return Wilderness in 1980.

Mining districts, mines, and mineral occurrences

Granitic rocks of the Tertiary Bighorn Crags pluton underlie the McEleny area and intrude the metasedimentary Hoodoo Quartzite and Yellowjacket Formations of Proterozoic age.

The McEleny area is part of the Yellowjacket (gold, copper, lead) mining district and adjacent to the Musgrove (gold, silver), Gravel Range (gold, silver, opal), and Wilson Creek (gold, silver) mining districts.

Several prospects and one mine, the Black Eagle mine, for which no production is recorded, are located within the study area. Numerous mines and prospects are near or adjacent to the McEleny area, including the Yellowjacket gold mine.

Several low-temperature (<20° C.) thermal springs are located near the western and southern perimeter of the study area. An area along the Middle Fork of the Salmon River, southwest of the area, is "favorable for discovery and development of local sources of low-temperature (<90° C.) water" (Mitchell and others, 1980).

Commodities

Unknown.

Mineral and energy resource potential

The McEleny area currently has an unknown potential for mineral resources, because of the incomplete status of the mineral survey. There is no known geologic evidence for oil, gas, coal, or geothermal resources within the area and the potential is regarded as low.

JUREANO (4-506)

Kind and amount of data

Study of the area included geologic mapping and limited geochemical studies (Bennett, 1977; Evans, 1981). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Metasedimentary rocks of the Proterozoic Yellowjacket and Big Creek Formations in faulted juxtaposition underlie much of the Jureano area. Porphyritic granite of Middle Proterozoic age intruded the Yellowjacket Formation in the southern part of the area. Lower Paleozoic syenite lies in fault contact with the granite near the southern border of the area.

The Jureano area is part of the Mackinaw (gold, silver) and Blackbird (nickel, silver, gold, copper, cobalt) mining districts; a few mines and prospects are scattered throughout the area. The Yellowjacket Formation, a known host rock in the region for stratabound cobalt and copper deposits, underlies part of the study area, but the geological and geochemical indicators in this area are unfavorable for the presence of ore deposits. The known cobalt occurrences are restricted to a northwest-trending belt west of the Jureano study area.

The Big Creek hot springs are located just northwest of the area. Many of these springs deposit both carbonate and siliceous material. The springs have surface temperatures of 93° C. and aquifer temperatures as high as 175° C. are indicated by both quartz and sodium-potassium-calcium chemical geothermometers (Mitchell and others, 1980).

Commodities

Molybdenum, geothermal energy.

Mineral and energy resource potential

The northern border of the Jureano area has a moderate resource potential for molybdenum; anomalous molybdenum values in stream-sediment samples and the presence of a nearby gossan (Lund and Esparza, 1984) may suggest the presence of a buried pluton similar to the porphyritic intrusives located to the northeast near Napoleon Ridge. The rest of the area has low mineral resource potential.

The northwestern corner of the area has a high resource potential for geothermal energy, based on the proximity of the Big Creek hot springs to the northwest (Mitchell and others, 1980). There is no known geologic evidence for other energy resources within the area and the potential is regarded as low.

HAYSTACK MOUNTAIN (4-507)

Kind and amount of data

Study of the area included geologic mapping by Evans (1981). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The metasedimentary Yellowjacket Formation of Proterozoic age underlies most of the Haystack Mountain area and is composed of dirty quartzites with minor siltite and argillite beds. Ordovician alkali-feldspar granite and syenite intrudes the Yellowjacket Formation along the southern boundary of the area.

The Mackinaw (gold, silver) mining district surrounds the Haystack Mountain study area and extends into the southwestern part of the area; mines and prospects are scattered throughout the study area. Although the Yellowjacket Formation is a known ore host for stratabound cobalt-copper deposits, the sedimentary facies of the Yellowjacket present here is not favorable for ore deposition.

Commodities

Gold.

Mineral and energy resource potential

The southern part of the Haystack Mountain area has a high mineral resource potential for disseminated gold deposits related to a nearby intrusive. The rest of the area has a low mineral resource potential. There is no known geologic evidence for oil, gas, coal, or geothermal resources within the area and the potential is regarded as low.

PHELAN (4-508)

Kind and amount of data

The geology of the area has been mapped (Shockey, 1957; Evans, 1981). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Metasedimentary rocks of the Proterozoic Yellowjacket and Big Creek Formations predominantly underlie the Phelan area. These units have been faulted into juxtaposition and are unconformably overlain by the Eocene Challis Volcanics in Napias Creek basin, in the northwestern part of the area. Porphyritic granitic rocks of Middle Proterozoic age intruded the Yellowjacket Formation along the northern boundary of the area.

The northern half of the area lies within the Mackinaw (gold, silver) mining district; numerous prospects are located in the area. The Yellowjacket Formation, a known ore host in the region for stratabound cobalt-copper deposits, underlies much of the study area. However, the sedimentary facies present in the Phelan area is not favorable for ore deposition.

Commodities

Gold.

Mineral and energy resource potential

Streams along the northern and northwestern boundaries of the Phelan area, which drain granitic terrane, have a moderate resource potential for placer gold deposits. The rest of the area has low potential for mineral resources. There is no known geologic evidence for oil, gas, coal, or geothermal resources within the area, and the potential is regarded as low.

DEEP CREEK (4-509)

Kind and amount of data

The geology of the area has been mapped at a reconnaissance scale (Shockey, 1957; P. J. Modreski, 1985). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Proterozoic metasedimentary rocks of the Yellowjacket Formation underlie the Deep Creek area. In this area these rocks are composed of a western fine-grained facies and an eastern cleaner, coarser-grained quartzite facies. The Eocene Challis Volcanics unconformably overlie the older rocks near the eastern border of the area.

The Deep Creek area is part of the Blackbird (copper, gold, cobalt, nickel, silver) mining district. A northwest-southeast trend of known mines and prospects passes through the western half of the area. Ross (1941) has noted that the southern part of the Blackbird mining district (sometimes called the Musgrove district), which includes the Deep Creek area, contains selenium-bearing gold-silver ore.

Commodities

Cobalt, copper.

Mineral and energy resource potential

The western half of the Deep Creek area has a moderate potential for cobalt and copper resources in stratabound deposits within the Yellowjacket Formation. Although the Yellowjacket Formation underlies most of the study area, the favorable ore-bearing facies is present only in the western half of the area, and the eastern half of the area has a low mineral resource potential (P. J. Modreski, 1984, oral commun.). There is no known geologic evidence for oil, gas, coal, or geothermal resources within the area and the potential is regarded as low.

JEESE CREEK (4-510)

Kind and amount of data

The geology of the area has been mapped (Anderson, 1956; Shockey, 1957; Evans, 1981). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The metasedimentary Yellowjacket Formation of Proterozoic age underlies most of the Jeese Creek area and is composed of dirty quartzites with minor siltite and argillite beds. Coarsely porphyritic granitic rocks of Middle Proterozoic age intruded the metasedimentary rocks in the northeastern part of the area. The Jeese Creek area is part of the Eureka (gold, copper) mining district; a few old mines and prospects are scattered throughout the area.

Gold vein occurrences are found in the northern part of the area associated with nearby Proterozoic intrusives and the occurrence of copper has been reported in the southern part of the area along shear zones. The only notable mineral production in the region was from the Queen of the Hills mine, located north of the study area. The Yellowjacket Formation, a known cobalt-copper ore host, underlies much of the study area, but the stratigraphic facies present in the study area is unfavorable for ore concentration (Evans, 1981).

Commodities

None known.

Mineral and energy resource potential

The Jeese Creek area has low mineral and energy resource potential.

PERREAU CREEK (4-511)

Kind and amount of data

The geology of the area has been mapped (Anderson, 1956; Shockey, 1957; Evans, 1981). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Metasedimentary rocks of the Proterozoic Yellowjacket and Big Creek Formations underlie the Perreau Creek area. Eocene rocks of the Challis Volcanics unconformably overlie the older rocks in the southern part of the area.

The Eureka (gold, copper) mining district extends into the eastern half of the area. A few mines and prospects exist within the mining district but outside of the study area around small localized occurrences of copper as replacement deposits along shear zones, and gold in quartz veins along faults (Ross, 1941). Although the Yellowjacket Formation is a known host rock in the region for stratabound cobalt-copper deposits, the sedimentary facies favorable for ore concentration is not present in the study area.

Commodities

None known.

Mineral and energy resource potential

The geologic environment of the Perreau Creek area is unfavorable for the occurrence of mineral and energy resources and the potential is regarded as low.

AGENCY CREEK (4-512)

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies conducted during the CUSMAP study of the Dillon $1^{o}x2^{o}$ quadrangle (Ruppel and others, 1983). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The McDevitt copper mining district and the Lemhi Pass thorium district extend into the southern part of the area. The thorium district contains thorium, copper, and iron veins, and has the largest known resources of thorium veins in the United States (Staatz, 1972, 1979). However, no mineral occurrences or mines are known within the Agency Creek area.

The Agency Creek area is underlain by metasedimentary rocks of Proterozoic age. These units have been moved along thrust faults within the area.

Commodities

None known.

Mineral and energy resource potential

The geologic environment of the Agency Creek area is unfavorable for the presence of thorium-bearing veins similar to those found south of the study area. The potential for mineral and energy resources is regarded as low.

BLUE JOINT MOUNTAIN (4-941)
40% in Montana

Kind and amount of data

The mineral survey conducted by the USGS and USBM included geologic mapping, geochemical and geophysical investigations (Millard and others, 1981; Mosier and others, 1981; Arbogast and others, 1982; Lund, Rehn, and Benham, 1983; Lund, Rehn, and Holloway, 1983; Kleinkopf and others, 1984). The mineral survey is completed as required by the Wilderness Act (PL88-577) and related acts. This summary covers only the Idaho portion of the Blue Joint Mountain area, which was included in the Frank Church-River of No Return Wilderness in 1980.

Mining districts, mines, and mineral occurrences

The Blue Joint area is underlain by quartz monzonitic and granitic rocks of the Eocene Painted Rocks pluton. The Idaho portion of the area lies outside of any mining districts. There are no mines or prospects known within the area, but stream-sediment samples revealed several areas with anomalous uranium and base- and precious-metal values, and an area of high molybdenum values with associated tin, tungsten, uranium, and fluorine.

Commodities

Gold, silver, molybdenum, uranium.

Mineral and energy resource potential

Part of the middle and eastern thirds of the Blue Joint Mountain area has moderate potential for uranium resources associated with an Eocene granitic pluton. The west-central part of the study area has moderate potential for molybdenum resources in a stockwork deposit also related to the Eocene pluton. The western and eastern thirds of the Blue Joint area have moderate potential for gold and silver resources which are associated with both the uranium and molybdenum. The potential for energy and other mineral resources is regarded as low.

ANDERSON MOUNTAIN (4-942)

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies conducted during the CUSMAP study of the Dillon $1^{o}x2^{o}$ quadrangle (Ruppel and others, 1983). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Several metasedimentary units of Proterozoic age underlie the Anderson Mountain area. Granitic intrusives of Cretaceous and Tertiary age occur adjacent to the area, to the east. Quaternary alluvial deposits are located along stream valleys throughout the area.

The Anderson Mountain area is part of the Gibbonsville gold mining district. Both lode prospects in quartzite and placer prospects are present around the perimeter of the study area; several of the prospects have a history of production (Loen and Pearson, 1984).

Commodities

Gold, silver.

Mineral and energy resource potential

The Anderson Mountain area has moderate potential for gold and silver resources in vein deposits related to nearby granitic intrusives. There is no known geologic evidence for oil, gas, coal, or geothermal resources within the area, and the potential is regarded as low.

WEST BIG HOLE (4-943)
50% in Montana

Kind and amount of data

Mineral resource evaluation of the area included geologic mapping, and geochemical and geophysical studies as part of the CUSMAP study of the Dillon $1^{o}x2^{o}$ quadrangle (Ruppel and others, 1983). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Several metasedimentary units of Proterozoic age underlie the West Big Hole area. These units have been strongly folded and thrust-faulted, and intruded by granitic rocks of Cretaceous and Tertiary age. Quaternary glacial and alluvial deposits occur throughout the area.

Six gold mining districts, the Gibbonsville, Carmen Creek, Kirtley Creek, Eldorado, Sandy Creek, and Pratt Creek, extend into the area. Numerous small lode deposits in quartzite and placer prospects are located in the area. Two major gold producing mines are located within the West Big Hole area: the Oro Cache mine, at the southeastern end of the northern section, and the Goldstone mine, at the central-eastern border of the southern section (Loen and Pearson, 1984).

The Proterozoic Applecreek Formation underlies much of the study area and is a known host rock for stratabound copper deposits elsewhere in the region. However, the stratigraphic horizon favorable for these deposits is not present in the West Big Hole area.

Commodities

Gold, silver, lead, copper, zinc.

Mineral and energy resource potential

The West Big Hole area is divided into northern and southern sections. The southern section and the southern half of the northern section have moderate potential for gold and silver resources, with associated lead, copper, and zinc in vein deposits associated with nearby intrusives. The rest of the area has low mineral resource potential. There is no known geologic evidence for oil, gas, coal, or geothermal resources within the area, and the potential is regarded as low.

GOAT MOUNTAIN (4-944)

Kind and amount of data

The geology of the Goat Mountain and adjacent areas has been mapped (Ruppel, 1968; Staatz, 1973, 1979). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Proterozoic metasedimentary rocks and Paleozoic sedimentary rocks underlie the Goat Mountain area. Porphyritic flow rocks and rhyolitic tuffs of the Eocene Challis Volcanics unconformably overlie older rocks in the central part of the area, and Tertiary intrusive rocks of quartz diorite and quartz monzonite intrude the pre-volcanic rocks. All of these rocks have been juxtaposed along numerous thrust and normal faults.

The Goat Mountain area is part of the Junction (lead, gold, silver, manganese) mining district. Numerous old lead and silver mines are located west of the study area, and several prospects are within the area. The Lemhi Pass thorium district, which has the largest known resources of thorium in veins in the United States, lies just north of the study area. The veins intrude Precambrian rocks along shear zones north of the Peterson Creek thrust fault; this northeast-trending fault cuts through the northwestern tip of the Goat Mountain area (Staatz, 1979).

Commodities

Lead, silver, gold, antimony, copper.

Mineral and energy resource potential

The Goat Mountain area has moderate potential for lead, silver, gold, and antimony resources in vein deposits associated with two granitic intrusives; the antimony is associated only with the intrusive on the western border of the area. The Precambrian Applecreek Formation lies within the southwestern part of the study area and contains a stratigraphic zone favorable for the occurrence of stratabound copper deposits. There is no known geologic evidence for oil, gas, coal, or geothermal resources within the area, and the potential is regarded as low.

ITALIAN PEAK (4-945)
15% in Montana

Kind and amount of data

Three separate areas, southern, central, and northern, make up the Italian Peak study area. The USGS and USBM evaluated the mineral resource potential for the northern half of the southern Italian Peak area using geological, geochemical, and geophysical techniques (Lambeth and Mayerle, 1983; Skipp and others, 1983; Skipp, 1984; J. C. Antweiler, W. L. Campbell, and J. P. Fox, unpub. data; D. M. Kulik, unpub. data). The mineral survey is completed as required by the Wilderness Act (PL88-577) and related acts.

Information on geology and mineral deposits for the other parts of the Italian Peak study area is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral survey as required by the Wilderness Act (PL88-577) and related acts. Geologic mapping at various scales and studies of all or parts of the areas include work by Umpleby (1913a), Kirkham (1927), Shenon (1928), Anderson and Wagner (1944), Scholten and others (1955), Staatz and others (1972), and Skipp and others (1979). The petroleum resource potential was evaluated separately for the northern half of the southern Italian Peak area (Sandberg, 1982, 1983).

Mining districts, mines, and mineral occurrences

Proterozoic and Paleozoic sedimentary rocks compose the three major thrust plates which comprise the Italian Peak area. The Ordovician Beaverhead Mountains pluton, which consists of granite and leucosyenite, underlies much of the northwestern part of the southern area and is present in all three thrust plates. Tertiary volcanic rocks, freshwater limestone or travertine, and Quaternary alluvial and glacial deposits unconformably overlie older rocks throughout the area. The Tertiary volcanics are composed of intermediate volcanic rocks, rhyolite ash-flow tuffs, and andesitic dikes.

The Nicholia (lead-silver) and Birch Creek (copper, lead) mining districts extend into the southern Italian Peak area. The Viola (silver-lead-zinc) mine just west of the northern part of the southern area, is in a stratabound deposit hosted in dolomite of the Devonian Jefferson Formation which extends into the Italian Peak area. The Worthing-Kaufman (lead-silver-zinc-gold-copper) mine and the Weimer (copper-gold-silver-lead) mine are located just outside the southwestern boundary of the southern Italian Peak area. Numerous prospects are scattered throughout the southern part of the southern study area. The Junction (lead, gold, silver, manganese) mining district extends into the northern area; the central area is not part of any mining district.

The suite of metals occurring in anomalous concentrations in the northern part of the southern Italian Peak area include silver, lead, zinc, barium, molybdenum, copper, vanadium, arsenic, tin, and niobium. Anomalous concentrations of yttrium and niobium have been reported in heavy mineral concentrates from stream-sediment samples collected in the northwestern part of the southern Italian Peak area; the anomalies appear to be associated with the biotite granite of the Ordovician Beaverhead Mountains pluton (J. McAleer, U.S. Moly Corp., written commun., 1985). A ferrodolomite occurrence with anomalous lead, chromium, and nickel is located along the northeastern boundary of the southern area. Anomalous uranium, vanadium, zinc, lead, molybdenum, silver, and arsenic occur in prospect pits near the east-central part of the southern area.

Occurrences of thorium, rare earths, zirconium, titanium, monazite, copper, phosphorous, and phosphate have been reported from the northern area. Near the eastern edge of the area a thrust fault separates granite and the Permian Park City Formation, which contains thin and discontinuous phosphatic units.

Commodities

Lead, zinc, silver, uranium, vanadium, gold, copper, thorium.

Mineral and energy resource potential

Part of the northwestern section of the southern Italian Peak area has moderate resource potential for silver, lead, and zinc in stratabound deposits concentrated in dolomite of the Devonian Jefferson Formation. An adjacent area to the east has moderate potential for silver, lead, and zinc in both stratabound deposits and fault controlled mineralized rock. The fault controlled mineralization may have resulted from remobilization and redeposition of metals derived from underlying stratabound deposits.

An area in the southcentral part of the southern Italian Peak area has moderate resource potential for uranium, vanadium, silver, lead, and zinc. The southwestern part of the southern area has a moderate potential for lead, silver, zinc, gold, and copper resources in either stratabound or vein deposits. The rest of the southern area has low mineral resource potential.

The central area of the Italian Peak study area has low mineral resource potential.

The west-central portion of the northern Italian Peak study area has a moderate resource potential for thorium. An arcuate ridge near the eastern edge of a granitic stock (of probable Silurian age) is abnormally radioactive; specific areas contain in excess of 100 ppm thorium, which occurs primarily as the mineral thorite. Late stage postmagmatic fluids are believed to have altered the original granite and deposited the thorite along favorable zones (Staatz and others, 1972). The rest of the northern area has low mineral resource potential.

There is no known geologic evidence for oil, gas, coal, or geothermal resources within the entire Italian Peak study area and the potential is regarded as low.

ALLAN MOUNTAIN (4-946)
60% in Montana

<u>Kind and amount of data</u>

The area has not been well studied; the geology of specific parts of the area have been mapped (Anderson, 1960; Staatz and others, 1980). Information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

<u>Mining districts, mines, and mineral occurrences</u>

Precambrian metamorphic rocks underlie the Allan Mountain area. Carbonatite dikes intruded the older rocks and form a northwest-trending belt which extends through the western part of the Allan Mountain area. Significant concentrations of thorium, titanium, columbium, barium, calcium, iron, phosphorus, sulfur, and the rare earths are contained within the carbonatite minerals, but the deposits are small and have an irregular distribution.

The Allan Mountain area is part of the Gibbonsville (gold), Indian Creek (gold, silver, copper, lead), and Mineral Hill (gold, silver, copper, lead) mining districts. There are a few placer prospects in the area.

<u>Commodities</u>

Unknown.

<u>Mineral and energy resource potential</u>

The Allan Mountain area has an unknown mineral resource potential because of the lack of data. There is no known geologic evidence for oil, gas, coal, or geothermal resources within the area, and the potential is regarded as low.

IDAHO PRIMITIVE AREA/ FRANK CHURCH-RIVER OF NO RETURN WILDERNESS (NF-913)
(See description under Bitterroot National Forest)

SALMON RIVER BREAKS PRIMITIVE AREA/FRANK CHURCH-RIVER OF NO RETURN WILDERNESS (NF-914)
(See description under Bitterroot National Forest)

SAWTOOTH NATIONAL FOREST

TEN MILE (4-061)
(See description under Boise National Forest)

PIONEER MOUNTAINS (4-201)
(See description under Challis National Forest)

WHITE CLOUD-BOULDER (4-551)
(See description under Challis National Forest)

LIME CREEK (4-552)

<u>Kind and amount of data</u>

The Lime Creek area is unstudied, but Umpleby (1913b) conducted a reconnaissance study of the area to the north. Information on geology and mineral deposits is not adequate for a preliminary resource evaluation.

Mining districts, mines, and mineral occurrences

The Skelton gold mining district borders the study area on the north, and the Soldier (lead, copper) mining district borders the area to the east. No mines or prospects are known in the area.

The Lime Creek area is underlain by granitic crystalline rocks of the Idaho batholith. Numerous mines, prospects, and mineral occurrences are located north of the area, primarily within granitic rocks of the Idaho batholith. The principal ore deposits, including silver-lead, silver, zinc, and gold, occur as fissure veins and replacements along shear zones (Umpleby, 1913b).

The study area lies south of several thermal springs located along the South Fork of the Boise River, and north of the Camas Prairie Geothermal Area (Mitchell and others, 1980).

Commodities

Unknown.

Mineral and energy resource potential

The mineral resource potential of the Lime Creek area is unknown due to lack of data. Based on geologic criteria, the potential is regarded as low for energy resources.

SOUTH BOISE-YUBA RIVER (4-553)

Kind and amount of data

The geology of the South Boise-Yuba River area has been mapped at a generalized reconnaissance scale as part of reconnaissance studies of the mining districts in the Sawtooth quadrangle (Umpleby, 1913b; Ross, 1927, 1930), and in more detail (Rember and Bennett, 1979). Information on geology and mineral deposits is adequate for inferences to be made regarding resource potential; however, information is not adequate for a preliminary mineral resource evaluation, and is not sufficient for the mineral survey as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Granitic rocks of the Cretaceous Idaho batholith underlie most of the South Boise-Yuba River area. These rocks intruded Paleozoic sedimentary units that crop out in the eastern part of the area. The older rocks have been both intruded and covered by Tertiary volcanics. Quaternary alluvial deposits are located along the major drainages.

Most of the study area is included in the Big Smoky (gold, lead, silver) and Skeleton Creek (gold) mining districts. The Vienna (silver, lead), Sawtooth (silver, lead), Warm Spring (silver, lead, gold, copper), Little Smoky (gold, lead, silver), and Yuba (gold, silver) mining districts are adjacent to and extend into part of the South Boise-Yuba River area. Numerous mines and prospects which have a history of production are located throughout the area. Although most of the mining activity in this area had ceased by 1900, there has been a recent renewal of interest in the area. The principal ore deposits are fissure veins and replacements along shear zones, which occur in both the granitic rocks of the Idaho batholith and the surrounding Paleozoic sedimentary units. The lode deposits were primarily silver-lead, silver, zinc, or gold, with the first two being the most common type.

Numerous thermal hot springs are near or adjacent to the study area (Mitchell and others, 1980).

Commodities

Silver, lead, zinc, gold.

Mineral and energy resource potential

Based on the number of historic producing mines and mineralized outcrops in the area, the South Boise-Yuba River area is inferred to have at least a moderate potential for silver, lead, zinc, and gold resources in vein and (or) replacement deposits. There is no known geologic evidence for oil, gas, coal, or geothermal resources in the area and the potential is regarded as low.

FIFTH FORK ROCK CREEK (4-571)

THIRD FORK ROCK CREEK (4-572)

COTTONWOOD (4-574)

LONE CEDAR (4-576)

MAHOGANY BUTTE (4-578)

THOROBRED (4-579)

Kind and amount of data

The geology of the areas has been mapped (Rember and Bennett, 1979; P. L. Williams, H. R. Covington, and J. M. Mytton, unpub. mapping, 1981; Mytton and others, 1983). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurences

Most of these areas are underlain by the rhyolitic and latitic Idavada volcanics and tuffaceous and asheous sedimentary deposits of Tertiary age. These deposits overlie sedimentary rocks of late Paleozoic and early Mesozoic age, which crop out locally. The Paleozoic sedimentary rocks include the Permian phosphate-bearing Phosphoria Formation; the unit is very thin throughout its limited exposure.

Five of the areas lie outside of any mining districts; the Lone Cedar area is part of the Goose Creek coal mining district. The Barrett coal and uranium mine is located just north of the Lone Cedar area and several coal prospects are located within the western half of this area. The Worthington coal and uranium mine is located just east of the Mahogany Butte area and several lignite deposits have been reported within this area (Strowd and others, 1981). Pumicite deposits occur just north of the Fifth Fork Rock Creek and west of the Lone Cedar area.

An "area of significant lateral extent favorable for discovery and development of local sources of low-temperature (<90° C.) water" includes all of 4-571, 4-572, and 4-574, and part of areas 4-576 and 4-579 (Mitchell and others, 1980). The northeastern corner of the Lone Cedar (4-576) area contains thermal wells with surface temperatures less than or equal to 50° C. and the south-central part of the Thorobred (4-579) area contains a thermal spring with surface temperatures less than or equal to 50° C.

Commodities

Geothermal energy, coal.

Mineral and energy resource potential

All of the areas except Mahogany Butte (4-578) have moderate geothermal resource potential; the Mahogany Butte area has a low potential for geothermal resources.

The Lone Cedar area (4-576) has a high energy resource potential for coal (Trumbull, 1960) and Mahogany Butte has a moderate potential for coal resources; lignite coal deposits have been reported within 4-578 (Strowd and others, 1981), but their extent is unknown. The potential for mineral or other energy resources in all areas is low.

CACHE PEAK (4-582)

Kind and amount of data

Study of the area included geologic mapping and limited regional gravity and aeromagnetic studies (Anderson, 1931; Armstrong and others, 1978). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Most of the Cache Peak area is underlain by Precambrian metasediment and metaintrusive rocks which were intruded by Tertiary granodiorite. Paleozoic sedimentary rocks crop out near the western boundary, and Quaternary alluvial deposits unconformably overlie older rocks along the eastern boundary.

The Stokes (lead, silver) mining district extends into the Cache Peak area from the southeast. Silver, gold, and lead have been produced in the region from quartz vein deposits. Several old mines and prospects are located in the Cache Peak area.

The Cache Peak area is located between the Goose Creek coal field to the west and the Raft River geothermal resource area to the east. Several low-temperature (20-50° C.) thermal springs and wells are located nearby. The Cache Peak area lies within a designated "area of significant lateral extent favorable for discovery and development of local sources of low-temperature (<90° C.) water" (Mitchell and others, 1980).

Commodities

Geothermal energy.

Mineral and energy resource potential

The Cache Peak area has moderate potential for geothermal resources. There is no geologic evidence for mineral or other energy resources within the area, and their potential is regarded as low.

MOUNT HARRISON (4-583)

Kind and amount of data

Study of the area included geologic mapping and limited regional gravity and aeromagnetic studies (Anderson, 1931; Armstrong and others, 1978). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Most of the Mount Harrison area is underlain by Precambrian metasedimentary and metaintrusive rocks, and Paleozoic sedimentary rocks. Tertiary lavas and ash-flow tuffs unconformably overlie older rocks near the southern boundary, and Quaternary alluvial deposits unconformably overlie older rocks near the eastern boundary.

The Mount Harrison area is not a part of any mining district, but silver, gold, and lead have been produced in the region from quartz vein deposits. Several abandoned mines and prospects, including the Big Bertha mine, are located within the study area.

The Mount Harrison area is located between the Goose Creek coal field to the west and the Raft River geothermal resource area to the east. Several low temperature (20-50° C.) thermal springs and wells are located nearby. The Mount Harrison area lies within a designated "area of significant lateral extent favorable for discovery and development of local sources of low-temperature (<90° C.) water" (Mitchell and others, 1980).

Commodities

Geothermal energy.

Mineral and energy resource potential

The Mount Harrison area has moderate potential for geothermal resources. There is no geologic evidence for mineral or other energy resources within the area, and their potential is regarded as low.

SUBLETT (4-588)

Kind and amount of data

Study of the area included geologic mapping and limited regional gravity and aeromagnetic studies (Armstrong and others, 1978; Kramer, 1971). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The Sublett area is underlain by Paleozoic sedimentary rocks and includes no known mining districts, mines, or prospects. Several low-temperature thermal springs and wells are located nearby and the Raft River geothermal resource is located to the southwest. Part of the Sublett area lies within a designated "area of significant lateral extent favorable for the discovery and development of local sources of low-temperature (<90° C.) water" (Mitchell and others, 1980).

Commodities

Geothermal energy.

Mineral and energy resource potential

The northern half of the Sublett area has moderate potential for geothermal resources. There is no geologic evidence for mineral or other energy resources, and their potential is regarded as low.

SAWTOOTH WILDERNESS (NF-072)
(See description under Challis National Forest)

TARGHEE NATIONAL FOREST

POLE CREEK (4-160)
(See description under Caribou National Forest)

CARIBOU CITY (4-161)
(See description under Caribou National Forest)

DIAMOND PEAK (4-601)
(See description under Challis National Forest)

RAYNOLDS PASS (4-603)

Kind and amount of data

Study of the area included geologic mapping and limited gravity survey coverage (Witkind, 1972). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Precambrian metasedimentary rocks underlie the Raynolds Pass area. Diabase dikes of younger Precambrian age cut the older rocks, and Quaternary felsic tuffs and alluvial deposits unconformably overlie older rocks in the eastern part of the area.

There are no mining districts in or adjacent to the study area; a few small abandoned talc mines and gold prospects are within the area. The phosphate-bearing Phosphoria Formation crops out to the southwest in Montana, but it does not appear to extend into the study area.

Commodities

Talc.

Mineral and energy resource potential

The Raynolds Pass area has moderate potential for talc resources in small veins associated with the Precambrian metamorphic rocks. There is no known geologic evidence for oil, gas, coal, geothermal energy or other mineral resources within the area, and their potential is regarded as low.

TWO TOP (4-604)

Kind and amount of data

The geology of the area has been mapped (Witkind, 1972; Waldrop, 1975). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Paleozoic and Mesozoic sedimentary rocks crop out along the western edge of the Two Top area and the rest of the area is underlain by Tertiary and Quaternary volcanic rocks. Quaternary glacial and alluvial deposits unconformably overlie older rocks throughout the area.

The Two Top area is not part of any mining districts and does not contain any known mines or mineral occurrences.

Commodities

None known.

Mineral and energy resource potential

Based on geologic criteria, the mineral and energy resource potential is low for the Two Top area.

HEADWATERS BUFFALO RIVER (4-605)

Kind and amount of data

The geology of the area has been mapped (Christiansen, 1982; unpub. data). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

No mining districts, mines or prospects are known in or adjacent to the area, which is covered by Quaternary volcanic deposits. The Island Park and Yellowstone Park Geothermal Resource Areas (Mitchell and others, 1980) are south and east, respectively, of the study area.

Commodities

None known.

Mineral and energy resource potential

Based on geologic criteria, the mineral and energy resource potential for the Headwaters Buffalo River area is low.

WARM RIVER NORTH (4-606)

WARM RIVER SOUTH (4-607)

WARM RIVER EAST (4-608)

SNAKE RIVER (4-609)

Kind and amount of data

The geology of the areas has been mapped (Christiansen, 1982; unpub. data). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

No mining districts, mines, or prospects are known in or adjacaent to the areas, which are covered by Quaternary volcanic deposits

The Warm River North, Warm River South, and Snake River areas are part of the Island Park Known Geothermal Resource Area and the Warm River East area is part of both the Island Park and the Yellowstone Known Geothermal Resource Areas (Mitchell and others, 1980).

Commodities

Geothermal energy.

Mineral and energy resource potential

All four of the areas have high potential for geothermal energy. There is no known geologic evidence for mineral or other energy resources within the areas, and the potential is regarded as low.

WEST SLOPE TETONS (4-610)
99% in Wyoming

Kind and amount of data

The geology of the area has been mapped by Gardner (1944) and Pampeyan and others (1967). Information on geology and mineral deposits is adequate for inferences to be made regarding resource potential; however, information is not adequate for a preliminary resource evaluation and is not sufficient for the mineral survey as required by the Wilderness Act (PL88-577) and related acts. This report covers only the Idaho portion of the West Slope Teton area.

Mining districts, mines, and mineral occurrences

Mesozoic sedimentary rocks underlie most of the West Slope Tetons area; Tertiary volcanic rocks and Quaternary alluvial deposits unconformably overlie older rocks throughout the area.

In the region, phosphate rock occurs in the Permian Phosphoria Formation, and small isolated coal seams occur in the Cretaceous Bear River Formation. Neither formation crops out in the study area and no mines or prospects are known.

Commodities

Oil and gas.

Mineral and energy resource potential

On the basis of a study conducted in the nearby Palisades area (Sandberg, 1982, 1983), the West Slope Teton area is inferred to have a high potential for oil and gas resources. The potential for other mineral and energy resources is unknown.

GARNS MOUNTAIN (4-611)

Kind and amount of data

Study of the area included geologic mapping and investigation of accessible mines and prospects (Staatz and Albee, 1966). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Folded and faulted sedimentary rocks of Paleozoic and Mesozoic age underlie most of the Garns Mountain area. Tertiary volcanic rocks cover much of the northwestern part of the area, and Tertiary conglomerates and Quaternary alluvial deposits unconformably overlie older rocks throughout the area.

The Garns Mountain area is part of the Pine Creek and Horseshoe Basin coal mining districts. The area contains several phosphate prospects, and a thermal spring in the southeastern corner of the area which has a surface temperature of 20^{o} C. (Mitchell and others, 1980); several abandoned coal mines are located just outside of the northeastern boundary of the area.

Coal seams and beds occur in the Cretaceous Frontier and Bear River Formations, which crop out in northwest-trending belts along several thrust faults. Exploitable coal beds appear to be restricted to the Frontier Formation northeast of the area, along the Jackson and Mount Manning thrust faults.

The phosphatic-shale members of the Permian Phosphoria Formation crop out in northwest-trending belts throughout the area. Although outcrops of the Phosphoria are fairly extensive, the thickness and continuity of this formation are disrupted by faulting.

Commodities

Phosphate, coal, oil, gas.

Mineral and energy resource potential

The Garns Mountain area is located at the northern end of the Idaho-Utah-Wyoming overthrust belt and has a high resource potential for oil and gas (Powers, 1978), a moderate resource potential for phosphate, and a moderate potential for coal resources in the northern part of the area. Although the coal beds in the Frontier Formation around the northern part of the area are regarded as having the greatest potential for economic development in the state (Staatz and Albee, 1966), the boundaries of the Garns Mountain area specifically exclude all areas containing known coal mines or favorable outcrops of the Frontier Formation. However, these known deposits may extend into the RARE II area beneath the Tertiary cover. The potential for other mineral and energy resources is regarded as low.

MOODY CREEK (4-612)

Kind and amount of data

The geology of the area has been mapped (Staatz and Albee, 1966). Information on geology is adequate for a preliminary energy resource evaluation, but is not sufficient for the mineral survey as required by the Wilderness Act (PL88-577) and related acts. Information is not adequate for a preliminary mineral resource evaluation.

Mining districts, mines, and mineral occurrences

Tertiary volcanics and conglomerates unconformably overlie folded and faulted Paleozoic sedimentary rocks. The sedimentary rocks crop out in the southeastern part of the study area. The Moody Creek area is located at the northern end of the Idaho-Utah-Wyoming overthrust belt, a region known for its petroleum productivity. No mining districts, mines, or prospects are located in the Moody Creek area. South and east of the area the phosphatic-shale members of the Permian Phosphoria Formation crop out in northwest-trending belts. The Phosphoria Formation does not crop out within the study area, but it may extend into the Moody Creek area at depth, beneath the volcanic cover. To the west lies a northeast-trending area of "significant lateral extent favorable for discovery and development of local sources of low-temperature (<90° C.) water" (Mitchell and others, 1980).

Commodities

Oil and gas.

Mineral and energy resource potential

The Moody Creek area has a high potential for oil and gas resources both because of favorable stratigraphy and structure and because the area is on trend with productive oil and gas fields to the southeast (Powers, 1978). The mineral resource potential is unknown.

PALISADES (4-613)
50% in Wyoming

Kind and amount of data

The mineral survey done by the USGS and USBM included geologic mapping, geochemical studies, trenching and sampling of phosphate beds, and gravity and aeromagnetic surveys (Benham, 1983; Oriel and Moore, 1984; Oriel and others, 1985). The mineral survey is completed as required by the Wilderness Act (PL88-577) and related acts. This summary covers only the Idaho portion of the Palisades area.

Mining districts, mines, and mineral occurrences

Folded sedimentary rocks of Paleozoic and Mesozoic age underlie the Palisades area. These rocks are locally unconformably overlain by Cenozoic felsic volcanic rocks and Quaternary alluvial and glacial deposits. The Mesozoic and Paleozoic sedimentary strata have been moved east-northeastward along large thrust faults.

The Palisades area is part of the Pine Creek coal mining district. Coal seams and beds occur in the Cretaceous Frontier and Bear River Formations, which crop out in a northwest-trending belt within the study area. Small amounts of coal have been mined along Pine Creek (Benham, 1983), but the seams and beds are thin, dip steeply, and pinch out within short distances.

Phosphate beds of the Permian Phosphoria Formation crop out extensively in the study area, but the continuity is disrupted by thrust faults. Fluorine, vanadium, and uranium occur with the phosphate, in addition to small concentrations of silver, chromium, lead, zinc, cadmium, copper, molybdenum, and nickel.

The Nugget Sandstone present elsewhere in the thrust belt hosts stratabound copper-silver deposits (Love and Antweiler, 1973). Malachite- and azurite-stained sandstone and quartzite occurs in the Nugget Sandstone at a few localities in the Palisades area, locally accompanied by gold, zinc, lead, and other base metals (Antweiler and others, 1984). Mineralized rock does not appear to be either extensive or continuous. Weakly anomalous amounts of copper, silver, and molybdenum were found in a few samples from Tertiary igneous intrusive rocks near Indian Peak; however, most samples of the intrusive body contained only traces of these elements.

The Yellowstone Park thermal anomaly and the Eastern Snake River Plain, which are characterized by high heat-flow (Blackwell, 1978, p. 190), are located north and east of the Idaho portion of the Palisades area. Two areas of "significant lateral extent favorable for the discovery and development of local sources of low-temperature (<90° C.) water" (Mitchell and others, 1980) are located west and southwest of the study area. Three warm springs with moderate temperatures occur adjacent to the study area.

The study area is located at the northern end of the Idaho-Utah-Wyoming overthrust belt. All of the Palisades area is under lease application for oil and gas, and the petroleum industry has conducted numerous seismic-reflection surveys on the area.

Commodities

Oil, gas, phosphate.

Mineral and energy resource potential

The Palisades area has high potential for oil and gas resources, because of the presence of favorable source beds, potential reservoirs, structural and stratigraphic traps, and thermal maturities comparable to those in the already proven highly productive southern part of the Idaho-Wyoming thrust belt (Sandberg, 1982; Powers, 1983).

The potential for phosphate resources is moderate. The resource potential for associated base and precious metals has not been determined, but recovery of these metals could enhance the value of the phosphate resources. Other energy and mineral resources are unknown in the Palisades area, and their potential is regarded as low.

BALD MOUNTAIN (4-614)

BEAR CREEK (4-615)

Kind and amount of data

The geology of the areas has been mapped at various scales (Vine, 1959; Gardner, 1961; Jobin and Schroeder, 1964a, 1964b; Albee and Cullins, 1965). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Faulted and strongly folded sedimentary rocks of upper Paleozoic and mostly Mesozoic age underlie the Bald Mountain and Bear Creek areas. Tertiary conglomerates and rhyolitic welded tuffs locally unconformably overlie older rocks in the northern part of the each area. Both study areas are located in the Idaho-Utah-Wyoming overthrust belt, a region known for its petroleum productivity.

The Willow Creek-Caribou coal mining district extends into both areas and the Mount Pisgah gold district extends into the Bear Creek area. The Teton Basin coal field extends along the western half of both areas; medium- and high-volatile bituminous coal occurs in a northwest-trending zone in Bonneville County which extends into a small area in the north-central part of the Bear Creek area (Trumbull, 1960).

Stratabound uranium deposits occurring in the Cretaceous Bear River Formation have been reported in the vicinity (Vine, 1959; Vine and Moore, 1952) and the Permian phosphate-bearing Phosphoria Formation crops out in a northwest-trending belt in the northern part of the areas. The Fall Creek Mineral Spring, which has a surface temperature of 25° C., is located between the Bald Mountain and Bear Creek areas, along Fall Creek (Mitchell and others, 1980).

Commodities

Oil and gas, coal, phosphate.

Mineral and energy resource potential

Both areas have high petroleum resource potential based on the presence of reservoir rocks, source rocks, and trapping structures similar to those in the productive southern part of the Idaho-Wyoming-Utah overthrust belt (Powers, 1978). An area on the northwestern border of the Bear Creek area has high resource potential for coal in the Cretaceous Bear River Formation (Ross, 1941). The northern portion of both areas has moderate potential for phosphate resources in the Permian Phosphoria Formation. The potential for other mineral and energy resources is low.

POKER PEAK (4-616)

Kind and amount of data

The geology of the area has been mapped (Gardner, 1961; Albee and Cullins, 1965). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

Folded sedimentary rocks of Mesozoic age underlie the Poker Peak area, and Pliocene lake and stream deposits unconformably overlie older rocks in the northeastern corner of the area. The Poker Peak area is part of both the Idaho-Utah-Wyoming overthrust belt and the Willow Creek-Caribou coal mining district; no mines or prospects are known within the area. Coal seams within the Cretaceous Bear River Formation occur in the Poker Peak area, but the units are strongly folded, faulted, and discontinuous.

Commodities

Oil and gas.

Mineral and energy resource potential

The Poker Peak area has high potential for oil and gas resources because of the presence of favorable geologic characteristics (Powers, 1978). These characteristics include the presence of reservoir rocks, source rocks, and trapping structures similar to those in the productive southern area of the Idaho-Wyoming-Utah overthrust belt. The potential for mineral and other energy resources is low.

ITALIAN PEAK (4-945)
(See description under Salmon National Forest)

GARFIELD MOUNTAIN (4-961)
60% in Montana

Kind and amount of data

The geology of the Garfield Mountain area has been mapped by Scholten and others (1955), Scholten and Ramspott (1968), and Betty Skipp (unpub. mapping). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts. This report covers only the Idaho portion of the area.

Mining districts, mines, and mineral occurrences

Paleozoic sedimentary rocks crop out locally in the Garfield Mountain area, particularly in the western part. The rest of the area is covered by Tertiary conglomeratic and fresh water sedimentary rocks, and rhyolitic volcanic rocks of Tertiary age. No mining districts, mines, or prospects are located in the area. The Big Springs thermal spring, with surface temperature of 23^{o} C., is located along Medicine Lodge Creek on the southwestern boundary of the area (Mitchell and others, 1980).

Commodities

None known.

Mineral and energy resource potential

The Garfield Mountain area has low potential for mineral and energy resources.

MOUNT JEFFERSON WEST (4-962)
25% in Montana

Kind and amount of data

The southwestern part of the Mount Jefferson West area was covered by a mineral survey conducted by the USGS and USBM, which included geological, geochemical, geophysical, and mine and prospect investigations (McDanal and others, 1980; Witkind and others, 1981; Martin, 1982; Witkind, 1982). The mineral survey is completed for this part as required by the Wilderness Act (PL88-577) and related acts.

Study of the northern and eastern perimeters of the area included geologic mapping and limited gravity studies (Witkind, 1972). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts. This report covers only the Idaho portion of the Mount Jefferson West area.

Mining districts, mines, and mineral occurrences

Precambrian crystalline rocks and overlying Paleozoic sedimentary rocks crop out in the northwestern part of the area. Tertiary and Quaternary volcanic rocks cover the remainder. There are no mining districts in or adjacent to the study area, nor any mines or prospects known within the area. Several abandoned phosphate mines are located in the southward-dipping Permian Phosphoria Formation where it crops out in Montana, west of the Idaho study area. In Idaho the correlative facies is virtually barren of phosphate. Petroliferous black shales and thin coal beds occur in Montana to the west (Condit, 1919; Mansfield, 1920; Kirkham, 1927), but do not extend into the Idaho study area.

Commodities

None known.

Mineral and energy resource potential

Based on geologic, geochemical, and geophysical criteria, the mineral and energy resource potential of the Mount Jefferson West area is low.

LIONHEAD (4-963)
50% in Montana (1-963)

Kind and amount of data

The geology of the area has been mapped (Witkind, 1972). Information on geology and mineral deposits is adequate for a preliminary mineral resource evaluation, but is not sufficient for the mineral surveys as required by the Wilderness Act (PL88-577) and related acts.

Mining districts, mines, and mineral occurrences

The western half of the Lionhead area is underlain primarily by Precambrian metamorphic rocks which are cut by Precambrian dikes. Folded Paleozoic sedimentary rocks crop out in the eastern part of the area and Quaternary volcanic rocks, glacial deposits, and alluvial deposits unconformably overlie older rocks throughout the area.

Southwest of the Lionhead area, talc has been mined from small vein deposits in altered Precambrian dolomites. The Permian Shedhorn Sandstone crops out in the southeastern corner of the area and contains a few discontinuous thin phosphatic interbeds; the Shedhorn unit is an eastern sandstone equivalent of the phosphate-bearing Phosphoria Formation. No mining districts, mines, or prospects are known within the Lionhead area.

Commodities

Talc.

Mineral and energy resource potential

The southwestern part of the area has moderate potential for talc resources in the Precambrian dolomite unit. The potential for energy and other mineral resources in the area is regarded as low.

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Study area code
(numerical list)

*Wilderness Mineral Survey completed
**Wilderness Mineral Survey partially completed

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Alphabetical study area code

*Wilderness Mineral Survey completed
**Wilderness Mineral Survey completed in part of area