# MINERAL RESOURCE POTENTIAL OF THE SELKIRK ROADLESS AREA, BOUNDARY COUNTY, IDAHO

## SUMMARY REPORT

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## STUDIES RELATED TO WILDERNESS

Under the provisions of the Wilderness Act (Public Law 88-577, September 3, 1964) and related acts, the U.S. Geological Survey and the U.S. Bureau of Mines have been conducting mineral surveys of wilderness and primitive areas. Areas officially designated as "wilderness," "wild," or "canoe" when the act was passed were incorporated into the National Wilderness Preservation System, and some of them are presently being studied. The act provided that areas under consideration for wilderness designation should be studied for suitability for incorporation into the Wilderness System. The mineral surveys constitute one aspect of the suitability studies. The act directs that the results of such surveys are to be made available to the public and be submitted to the President and the Congress. This report discusses the results of a mineral survey of the Selkirk Roadless Area in the Kaniksu National Forest, Boundary County, Idaho. Area A1-125 was classified as a recommended wilderness, and B1-125, C1-125, and D1-125 as further planning areas during the Second Roadless Area Review and Evaluation (RARE II) by the U.S. Forest Service, January 1979.

## SUMMARY

The Selkirk Roadless Area has a low mineral resource potential and no known mines or workings. The study area has a low potential for resources of molybdenum, lead, uranium, chromium, tungsten, and rare-earth metals. These elements were detected in panned-concentrate stream-sediment samples, but no minerals in which the elements occur as major constituents were found in place, nor were any geologic conditions found conducive to their concentration. No evidence of potential was found for other metals nor for nonmetallic materials except for stone in the study area. Stone is unlikely to be quarried within the area, however, because better, more accessible deposits outside the area are closer to existing and anticipated markets. Except for the low uranium potential, there is no indication of energy resources in the area.

## INTRODUCTION

The Selkirk Roadless Area is made up of four contiguous areas (A1-125, B1-125, C1-125, and D1-125), and comprises 69,864 acres in the Kaniksu National Forest, Boundary County, Idaho. It lies about 70 mi north-northeast of Spokane, Wash., in the high mountainous terrane between the Priest River and Kootenai River drainages (fig. 1). Bonners Ferry, Idaho, 15 mi to the east, is the nearest town (fig. 2). All of the area is glaciated and much of it is near or above timberline. The stream canyons and lower elevations are heavily forested, and although most forest is second growth, much is mature or near mature. Elevations range from 2,000 to 7,600 ft; much of the area forms a high divide that averages about 7,000 ft in elevation. Access to the area is provided by logging and Forest Service roads off of Idaho Highway 57 on the west and U.S. Highway 95 on the east. Numerous U.S. Forest Service trails in various states of maintenance provide access from the secondary roads.

## GEOLOGY AND GEOCHEMISTRY PERTAINING TO MINERAL RESOURCE ASSESSMENT

### Geology

Most of the Selkirk Roadless Area is underlain by the igneous complex of Selkirk Crest, a group of related two-mica granitic rocks with a fair amount of included metamorphic rock. The complex intrudes Archean or Proterozoic, Proterozoic, and Triassic(?) rocks, and appears to be bounded by large faults on its east (fig. 2) and west (fig. 1) sides. Unconsolidated Quaternary deposits are the only units younger than the granitic rocks of the complex. A more detailed account of the geology may be found in Miller (1983a).

Porphyroblastic granitic gneiss appears to be the oldest rock unit in the study area. Metamorphosed Prichard Formation of the Proterozoic Y Belt Supergroup structurally overlies the porphyroblastic granitic gneiss, but owing to intense deformation in rocks above and below the contact, it is not possible to ascertain if the contact originally was depositional or intrusive. The Prichard Formation (in areas where it is unmetamorphosed) is made up of about equal parts argillite, siltite, and quartzite, and is intruded by numerous diabase sills. Almost everywhere in the study area dynamothermal metamorphism has converted these protolithic rocks to schist, quartzite, and amphibolite. The Prichard Formation is over 15,000 ft thick in nearby unmetamorphosed sections (Miller, 1974), but isoclinal folding does not permit estimate of its thickness within the study area. Highly alkalic monzonite intrudes the porphyroblastic gneiss and is, in turn, intruded by two-mica granitic rocks of the Selkirk Crest complex. The monzonite strongly resembles dated Triassic alkalic rocks that occur sporadically throughout the western United States (Miller, 1977).

The igneous complex of Selkirk Crest extends in all directions from the study area except in the northeastern parts of areas C1-125 and D1-125 where the complex is in contact with the porphyroblastic granitic gneiss. About two dozen mappable two-mica units make up the complex, of which 10 occur in the study area. Both the complex as a whole and the constituent masses that comprise it are extremely heterogeneous with respect to composition and texture, and include abundant pegmatite, ophite, and alaskite dikes. All appear to be related to one another in age, composition, and origin. The entire complex was probably emplaced as a single mass derived from anatectic melting of Belt and (or) pre-Belt Supergroup rocks. Textural and mineralogical features that distinguish the individual bodies comprising the complex resulted from varied physical conditions and compositional inhomogeneities in the melt.

Glacial and fluvial-glacial materials mantle all older units. Holocene alluvium occupies flood plains of most modern stream drainages; much of this material is derived from glacial deposits. Glacial lake beds were deposited in the Kootenai River valley, but none of these beds are found within the borders of the proposed roadless area.

The Newport fault west of the area and a concealed fault outside the study area in the Purcell Trench (Kootenai River valley) bound the igneous complex of Selkirk Crest, but no faults occur in the area. Considerable movement, distributed across zones between individual units of the Selkirk Crest complex, probably occurred during emplacement of the complex, but these zones do not constitute discrete faults. Cataclasis and secondary penetrative structures probably related to emplacement of the complex and the fault in the Purcell Trench are well developed along the northeast edge of areas D1-125 and C1-125.

### Geochemistry

Both bulk stream-sediment and panned heavy-mineral concentrate samples were taken at 52 sites chosen along streams and tributaries in order to obtain maximum areal coverage per sample. Analytical results and discussion of the data are presented in Miller (1983b). For most samples, analyses of all elements fall well within the expected limits for the rock types underlying areas drained by the respective streams. A few sample sets, however, define areas of anomalous molybdenum, lead, chromium, uranium, and rare-earth metals, and individual samples show anomalous silver, copper, and tungsten.

Most detectable molybdenum is restricted to samples taken from streams draining the alkalic monzonite (monzonite of Long Canyon) of Triassic(?) age. Although virtually all samples from streams draining this body have small amounts of molybdenum, no molybdenite was observed in this rock unit during the geologic mapping. Also, the pluton does not contain the stockwork of quartz veins that characterizes the large, low-grade molybdenum deposits of the western United States. For these two reasons, the pluton is considered to have a low potential for possible molybdenum resources.

Anomalous lead values occur in five samples, and may reflect localized areas of mineralization or they may define a belt of mineralization with roughly the limits shown on the accompanying mineral resource map. The streams from which the samples with anomalous lead were collected drain four different rock units; of these units, none appear to be the type with which lead mineralization is normally associated. No lead-bearing minerals or anomalous concentration of veins were observed during the stream-sediment sampling or geologic mapping of this area.

Uranium appears to be associated almost exclusively with two granitic bodies, the alkalic monzonite of Triassic(?) age and the granodiorite of Hunt Creek, one of the units of the Selkirk Crest complex. Panned-concentrate samples from streams draining these two bodies show 3 to 8 times as much uranium as samples from streams draining other granitic rocks in the region. Both bodies exhibit higher than normal radioactivity as shown by scintillometer examination, more than double that of most rock types in the study area. Because both of these plutons contain large amounts of allanite and possibly monazite, at least part of the radioactivity is due to thorium. A scintillometer with an audio alarm was carried on all traverses through both bodies during geologic mapping, and although background is higher in these two units than in surrounding rocks, no readings indicative of significant uranium or thorium concentrations were found. The Hunt Creek body has the highest background radioactivity of any granitic rock unit in the study area. South of Harrison Peak, this unit consistently yielded scintillometer readings of 300 to 400 counts per second (cps), about 3 or 4 times the average for granitic rocks in the region. Most of the uranium and thorium, however, is probably in accessory minerals in trace amounts, especially zircon and allanite, both of which are very abundant in both units. Monazite may or may not be present.

Anomalous amounts of chromium occur in eight of the stream-sediment samples; all occurrences appear to be related to diabase sills that are common in the metamorphosed Prichard Formation or to xenoliths of these sills in the granitic rocks. Chromium is concentrated in the heavy minerals in the diabase, but nowhere even approaches amounts indicating mineral resource potential.

Tungsten was detected in a small area in the upper reaches of Long Canyon. One sample contained 200 ppm and in two others was detected, but in quantities too small to measure. No tungsten minerals were observed in outcrops during stream-sediment sampling or geologic mapping, and the source of the tungsten in the panned concentrates is unknown. The most likely source is pegmatite dikes or metamorphic inclusions in the mixed granitic and metamorphic rocks of Lookout Mountain unit.

Lanthanum, yttrium, and thorium are abundant in almost all samples. The high values for these elements are undoubtedly due to the high concentration of allanite in almost all the granitic rocks in the region. Because of the high specific gravity of this mineral, 3.4 to 4.2, it is greatly concentrated in the panned-concentrate samples. Zirconium values are also high for the same reason—the high specific gravity and abundance of zircon. Nowhere in the area, however, do any of these elements occur even marginally in concentrations significant enough to constitute a potential resource.

All other stream-sediment analyses appear to be well within the range of values expected for samples from streams draining unmineralized rocks of the types present.

No geophysical surveys of the study area were scheduled until the geochemical sampling program was completed so that the geochemical information could be used to construct the most productive geophysical survey. Since the geochemical program was essentially negative, plans for geophysical work were considered unnecessary and dropped.

## MINING DISTRICTS AND MINERALIZATION

The U.S. Bureau of Mines examined the Selkirk Roadless Area during the summer of 1982. There are no organized mining districts in the study area. Records of mining claims located in the area refer to the informally designated Priest Lake, Kootenai, Moyie-Yahk, and Boundary districts. There has been no mining in the Selkirk Roadless Area. The nearest mine with a history of production is the

Continental mine, 6 mi to the northwest. Lead and silver mineralization at the Continental mine occurs in the lower part of the Wallace Formation of the Proterozoic Y Belt Supergroup. This formation does not occur in the study area.

In 1903, the earliest record of prospecting or mining activity in the Selkirk study area, eight claimants located fourteen 160-acre placer claims along Smith Creek near the junction with Cow Creek. In 1906 and 1914, twenty-three 160-acre placer claims were located in the same general area, but some of these were relocations of the earlier claims. Although this part of Smith Creek is outside of the roadless area, some of the claims extend into the area. Fifteen panned-concentrate samples were taken along Smith Creek and Cow Creek in the area of the claims, but no gold was found.

The first lode claims were recorded in 1923 when 52 claims were located between Parker Creek and Long Canyon. In 1929 and 1935, 39 of the claims were relocated. The names of the claims—Magnetite, Garnet, Tourmaline—suggest that they have been associated with skarn or pegmatite dikes. Air and ground search revealed no skarn deposits or workings. However, pegmatite dikes are ubiquitous in the region, and although the above-mentioned minerals occur only in trace amounts in the dikes, they may be the source of the claim names.

Between 1954 and 1960, 53 uranium claims were located in the roadless area. Examination of the claims showed that most rock types have normal background radiation for granitic rocks in the region, between 60 and 120 cps. Localized readings of as much as 450 cps were recorded at one of the claims just outside the area in a roadcut along the West Side Road, about 1,300 ft northwest of where Parker Creek intersects the road. The rock unit exposed there is metamorphosed Prichard Formation. There was evidence of digging at the site, but analysis of a sample taken revealed no uranium. According to claimants contacted, no development work was done on any of the uranium claims in the study area.

In 1974, four claims were located at the headwaters of Trout Creek, and an additional four located near West Fork of Smith Creek. Neither area has any workings or radioactivity anomalies, nor did examination of samples collected at the properties reveal any minerals to indicate resource potential.

## ASSESSMENT OF MINERAL RESOURCE POTENTIAL

On the basis of geologic and geochemical studies, and examination of mining claims in the area, the mineral resource potential of the Selkirk Roadless Area is low.

Several metals have been detected in slightly to moderately anomalous amounts in panned-concentrate stream-sediment samples, but no minerals containing these elements as the major constituents were found in place, nor were any conditions indicative of their natural concentration found.

Analyses of the panned concentrates indicate most molybdenum anomalies are associated with an alkalic monzonite pluton. No molybdenum minerals or quartz stockwork were observed in this rock unit during geologic mapping, nor were any indications of molybdenum concentration found in the pluton or surrounding rocks. The resource potential for molybdenum is low in the roadless area.

Anomalous lead values from panned concentrates appear to be associated more with a particular area than a specific rock unit. However, none of the rock units in this area appear to be the type with which lead mineralization is normally associated, and no lead-bearing minerals or anomalous concentrations of veins were observed in the area of stream-sediment anomalies. The resource potential for lead is low in the roadless area.

Uranium is slightly anomalous in sediment from streams draining the alkalic monzonite body and the granodiorite of Hunt Creek. The uranium appears to be in accessory minerals, and although carefully seached for, no concentrations of uranium of even marginal significance were found in either plutonic body or in the surrounding rocks. The uranium resource potential is low for the roadless area.

Chromium anomalies in several stream-sediment samples appear to be related to diabase sills common in the metamorphosed Prichard Formation. Nowhere does the chromium approach more than trace amounts in these sills. The potential for occurrence of chromium resources in the roadless area is low.

Tungsten was marginally detected in a localized area in stream-sediment panned concentrates, but no favorable host rocks for tungsten exist in that area and no tungsten minerals were identified in place. The potential for tungsten resources in the area is low.

Relatively high values for several rare-earth elements, zirconium, and thorium in panned-concentrate samples are probably due to the relative abundances of the accessory minerals allanite and zircon, both of which are heavy and are concentrated in the panning process. No natural concentrations of these metals were found in place or as placer deposits; the potential of the area for these mineral resources is low.

Examination of all recorded claims and prospects indicate that there are no identified mineral deposits in the study area. There are no current claims, or oil and gas, mineral, or geothermal leases in the study area; the resource potential of the study areas for these categories is low.

## REFERENCES CITED

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______, 1983a, Geologic map of the Selkirk Roadless Area, Boundary County, Idaho: U.S. Geological Survey Miscellaneous Field Studies Map MF-1447-A, scale 1:48,000.

______, 1983b, Geochemical map of the Selkirk Roadless Area, Boundary County, Idaho: U.S. Geological Survey Miscellaneous Field Studies Map MF-1447-B, scale 1:48,000.

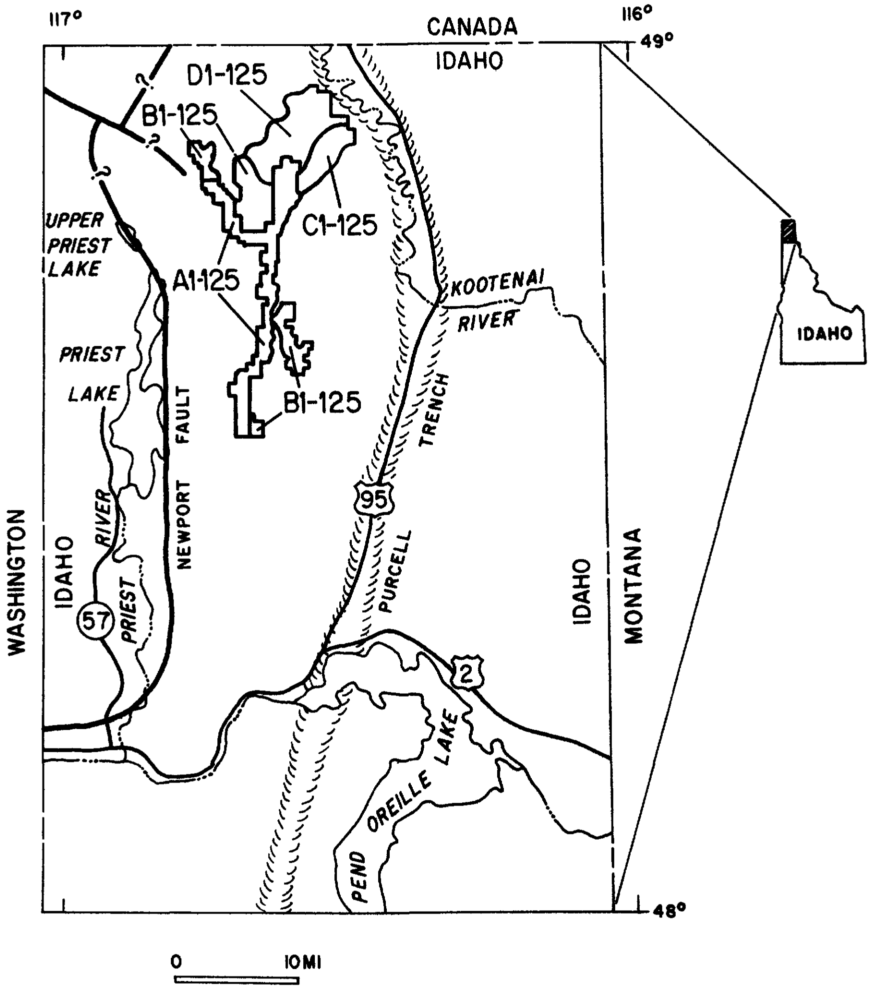


Figure 1. - Index map showing location of Selkirk Roadless Area (A1-125, B1-125 , C1-125, and D1-125) and regional features referred to in text.

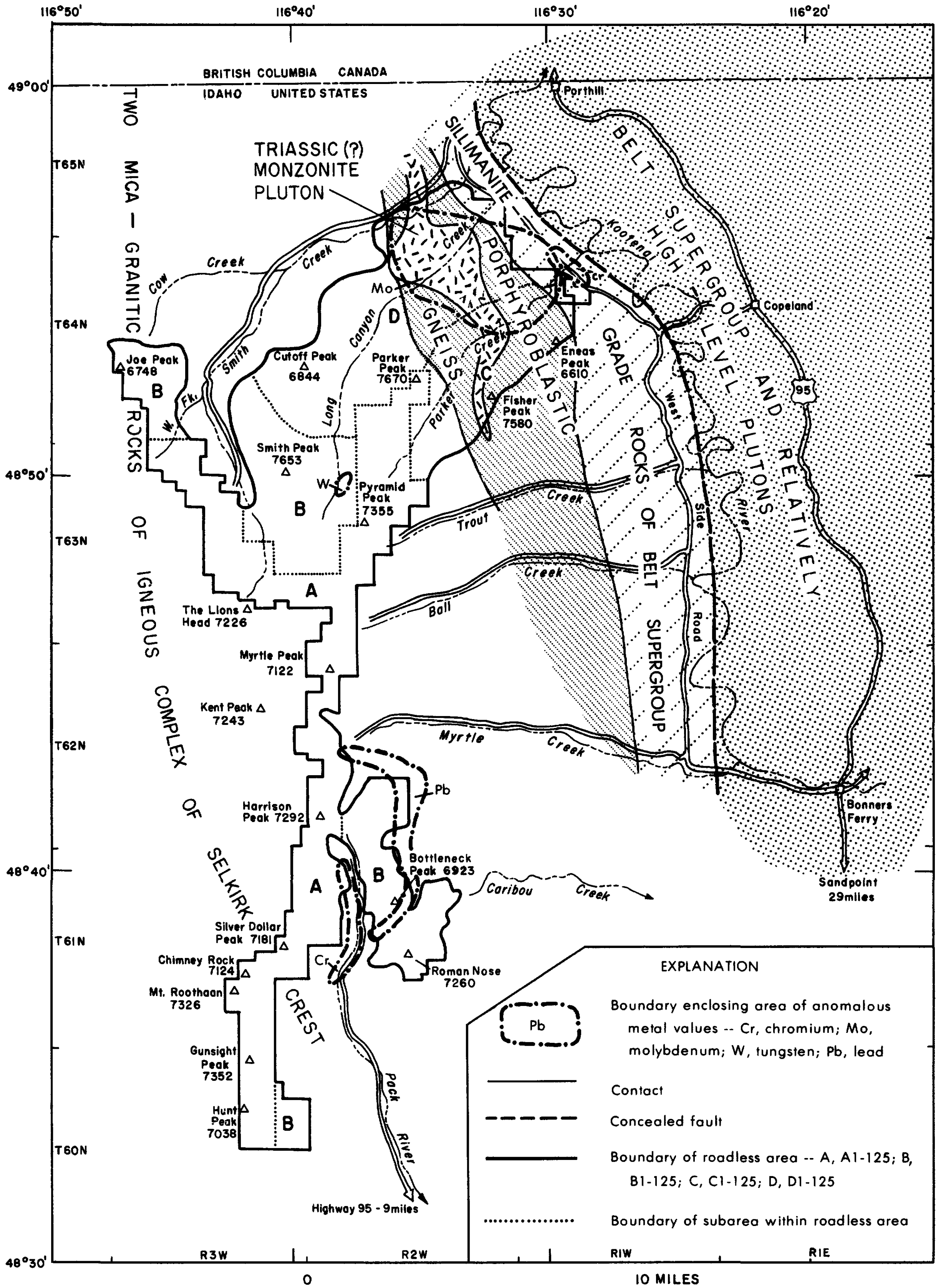


Figure 2. - Selkirk Roadless Area, showing areas of anomalous metal values and simplified geology (from Miller, 1983a).