

**EXPLANATION**

**AREA OF MINERAL RESOURCE POTENTIAL**

Area of high potential  
Area of moderate potential  
Area of low potential

Commodities for which areas have potential are gold (Au), silver (Ag), molybdenum (Mo), and tungsten (W). Areas are described in table 1

**MINES AND PROSPECTS**

- Mountain Top prospect
- Nellis prospect
- Altona Beauty prospect
- New York prospect
- BM-COR prospect
- Hawkeye, Florence, and Josephine prospects
- Blue Streak No. 2 prospect
- Nevermore prospect
- John G. Carlisle mine
- Lost One (Clear Grit) prospect
- Mudhole prospect
- September Snow prospect
- Snow Bunny (Majestic) prospect
- Lantern prospect
- Comet prospect
- Queen (Pikes Peak) prospect
- Showing relative direction of movement; showing relative direction of movement; tentatively interpreted as thrust faults having east dip and west-to-east displacement, based on regional structural and stratigraphic relations
- Glitt Edge prospect
- Blushard prospect
- Independence mine
- Blue Diamond prospect
- Blushard prospect
- Edwin E. Crapner prospect
- Big Bill prospect
- Comopolitan prospect
- Deceit prospect
- Rock prospect
- Schram prospect

**CORRELATION OF MAP UNITS**

Qty	QUATERNARY
Kbmg	Unconformity
Kgd	CRETACEOUS
Kb	Unconformity
Kk	Unconformity
Je	JURASSIC
Fu	Unconformity
Pa	PERMIAN
Pq	Unconformity
Mmc	MISSISSIPPIAN
Ch	Unconformity
Csh	CAMBRIAN
Cf	Unconformity
Ygr	PROTEROZOIC Y
Yms	Unconformity
Yh	Unconformity

**STUDIES RELATED TO WILDERNESS**

The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts require the U.S. Geological Survey and the U.S. Bureau of Mines to survey certain areas on Federal lands to determine their mineral resource potential. Results must be made available to the public and be submitted to the President and the Congress. This report reflects the results of a mineral survey of the Dolus Lakes Roadless Area (01429) in the Deer Lodge National Forest, Powell and Granite Counties, Mont. The Dolus Lakes Roadless Area was classified as a further planning area during the Second Roadless Area Review and Evaluation (SARE II) by the U.S. Forest Service, January 1979.

**MINERAL RESOURCE POTENTIAL**

**QUATERNARY DEPOSITS**

The Dolus Lakes Roadless Area is in a mountainous terrain of southwestern Montana, about 12 mi west of Deer Lodge and about 35 mi northwest of Butte (see index map). The area of about 14 mi<sup>2</sup> (about 9,000 acres) is part of the Deer Lodge National Forest, and is bounded to the north and east by the Pioneer and the northeastern part of the Flint Creek Range and adjoins the Flint Creek Range Wilderness Study Area, a national monument established in 1981. The topography of the roadless area is dominated by a horseshoe-shaped mountain mass, open to the east, that includes the highest point in the roadless area, with an elevation of 9,359 ft. Previous work in and adjacent to the Dolus Lakes Roadless Area includes geologic mapping and studies of mineral resources and various aspects of the geology by Emmons and Calkins (1913), Lyden (1948), Pardee (1951), Erickson and others (1981), and the present study. Reports by Allen (1965), Benoit (1974), and Baty (1976) discussed the structure, petrology, geology, and ages of intrusive rocks that are exposed over most of the roadless area. No new geophysical studies were conducted for this study.

**PROTEROZOIC ROCKS**

The Helena, Mount Shields, and Garnet Range Formations, of the Belt Supergroup of Proterozoic age, crop out on the ridge southeast of the roadless area and along the south shore of Rock Creek Lake. The Mount Shields Formation is part of the Missoula Group, which overlies the Helena Formation. The Mount Shields Formation consists of three members, but only the middle member is present in the roadless area.

**PALEOZOIC ROCKS**

Rocks of Paleozoic age are exposed on Emery Ridge, north of the roadless area, and along the east side of the roadless area from Pikes Peak Creek to Rock Creek Lake. Cambrian, Mississippian, and Pennsylvanian formations crop out in the roadless area, and rocks of Permian age crop out on Emery Ridge. Cambrian rocks include the Flathead Quartzite and Silver Hill Formation of Middle Cambrian age and the Hansark Formation of Late Cambrian age. The Phosphoria Formation, part of the Madison Group, is Mississippian in age. Rocks of Pennsylvanian age include the Asnden and Quadrant Formations, and the Phosphoria Formation, exposed on Emery Ridge, is Permian in age.

The Phosphoria Formation is economically important in the region because it contains bedded phosphorite. Major amounts of phosphoric rock have been mined from the Phosphoria in the Douglas Creek district, about 6 mi northwest of the Dolus Lakes Roadless Area, and from the Garrison mining district, about 12 mi to the northeast. The Phosphoria Formation is not exposed in the roadless area but is exposed on Emery Ridge north of the roadless area.

**DESCRIPTION OF MAP UNITS**

**YOUNGER GLACIAL TILL (PLEISTOCENE)**—Predominantly unweathered clasts of granodiorite and granite in well-sorted, matrix-supported, and placer gold. The roadless area has low potential for the occurrence of sand, gravel, stone, and phosphate resources. On the basis of the geologic terrain, the potential for geothermal, coal, oil, or gas resources is determined to be low.

**OLDER GLACIAL TILL (PLEISTOCENE)**—Weathered deposits showing no preservation of normal topographic and sedimentary and metamorphic clasts dominant over highly weathered igneous clasts.

**BIOTITE GRANODIORITE (CRETACEOUS)**—Forms Mt. Powell batholith. Very light gray to pinkish gray, aphanitic to porphyritic, medium to coarse grained; composed of plagioclase (mostly oligoclase), potassium feldspar (common as large phenocrysts), quartz, biotite, and muscovite. This pluton is cut by, and probably genetically related to, abundant pegmatite and apatite dikes (see index map).

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**BLACKLEAF FORMATION (CRETACEOUS)**—Black, dark-gray, greenish-gray, grayish-green, and buff, massive to blocky, sandstone, siltstone, and tuff. Shown in cross section but not exposed in roadless area. About 3,700 ft thick.

**KOOTENAI FORMATION (CRETACEOUS)**—Reddish and greenish siltstone, shale, and sandstone; gastropod-rich limestone near top and a less fossiliferous limestone near base. About 900 ft thick.

**ELLIS GROUP, UNDIVIDED (JURASSIC)**—Calcareous shale and sandstone; siltstone, conglomerate, and minor limestone. About 300 ft thick.

**PHOSPHORIA FORMATION (PERMIAN)**—Interbedded sandstone, shale, shale, limestone, oolitic phosphorite, and phosphatic limestone. About 170 ft thick.

**QUADRANT FORMATION (PENNSYLVANIAN)**—Ridge-forming, angular to subangular, well-sorted, medium- to fine-grained quartzite. About 85 ft thick.

**ASNDEN FORMATION (PENNSYLVANIAN)**—Red, silty mudstone and shale, and red siltstone interbedded with sandstone and gray limestone. About 300 ft thick.

**MISSION CANYON LIMESTONE (MISSISSIPPIAN)**—Richly fossiliferous, well-bedded bioparite and bioparitic that locally contains black chert concretions. About 900 ft thick.

**HANSARK FORMATION (CAMBRIAN)**—Gray to brownish, fine-grained rock varying from dolomite to magnesium limestone. About 900 ft thick.

**SILVER HILL FORMATION (CAMBRIAN)**—Upper unit is green shale. About 15 ft thick. Middle unit is grayish-brown limestone containing lenticular ribbons and pods of silty and sandy dolomite. About 180 ft thick. Lower unit is blackish-gray to olive-tan shale and siltstone containing interbeds of sandstone. About 60 ft thick.

**FLATHEAD QUARTZITE (CAMBRIAN)**—Well-sorted, fine- to medium-grained quartzite containing rounded to subrounded grains. About 60 ft thick.

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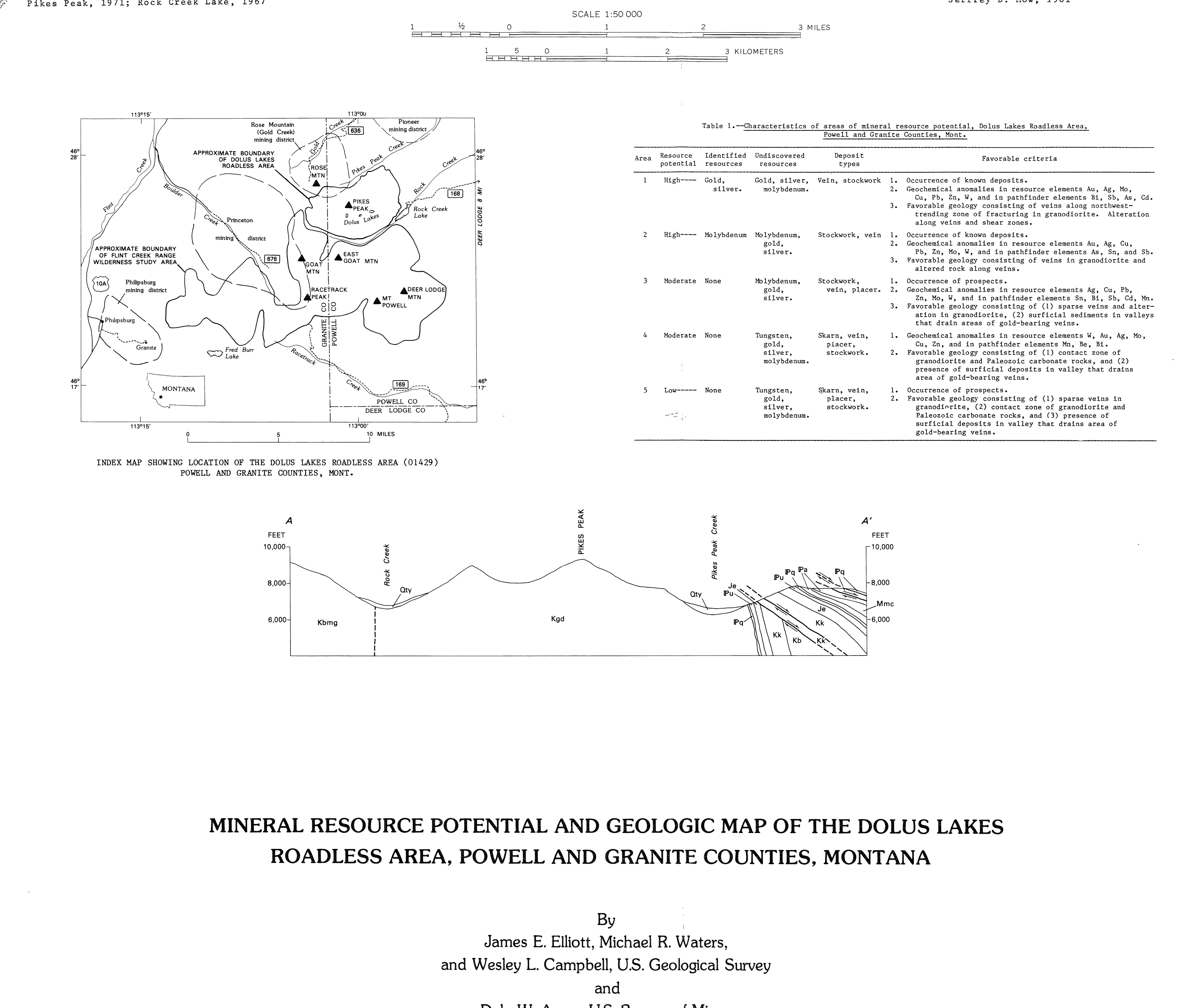
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### MINERAL RESOURCE POTENTIAL AND GEOLOGIC MAP OF THE DOLUS LAKES ROADLESS AREA, POWELL AND GRANITE COUNTIES, MONTANA

By  
James E. Elliott, Michael R. Waters,  
and Wesley L. Campbell, U.S. Geological Survey  
and  
Dale W. Avery, U.S. Bureau of Mines