DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

OPEN-FILE REPORT
78-972
RARE II AREAS, MONT.
WEST HALF
SHEET 1 OF 2

NO RARE II AREAS
MAPPED

EXPLANATION

MINERAL-RESOURCE POTENTIAL

- High--Geologic environment highly favorable for the occurrence of mineral resources. Includes some areas known to contain potentially economic mineral deposits
- Moderate--Geologic environment interpreted to be favorable for the occurrence of mineral resources
- Low--Geologic environment interpreted to be less favorable for the occurrence of mineral resources
- POTENTIAL UNKNOWN

1-781 U.S. Forest Service RARE II AREA NUMBER

1-985 RARE II AREA WITH POTENTIAL FOR HYDROCARBONS

Discussion

This map was compiled and drafted November 28-December 5, 1977, in response to a request by the U.S. Forest Service for an immediate evaluation of the mineral-resource potential of Roadless Areas in the National Forests in Montana. The Roadless reas, defined by the Forest Service for purposes of the RARE II (Roadless Area Review and Evaluation) inventory are shown on a 1:500,000 scale published map (U.S. Forest Service, 1977) prepared as a base for mineral resource and other inventories. For ease of comparison, this mineral resource map was prepared at the same scale as the 1:500,000 topographic map of Montana (U.S. Geological Survey, 1966). The areas classified on the mineral resource map are generalized, but include the proposed Roadless Areas and adjacent land, as well as the corridors and enclaves that have not been proposed as "roadless."

The basis for classification of the potential for metallic mineral deposits is primarily geologic. Major factors considered in this assessment of Roadless Areas are the mineral deposit types and the geologic settings of known mineral occurrences in Montana with present or future economic potential. Knowledge of these factors is well enough advanced to permit interpretation of the mineral potential of an area based on its regional geologic setting even where detailed geologic studies are lacking. Geochemical and geophysical data, where available, provide a broader base for the interpretations. In this classification of resource potential it is justifiably inferred that new types of demands, improved technology, and changing market conditions will eventually result in the mining of mineral deposits which are, at present, economically submarginal.

The mineral deposit types in Montana are highly varied, and the deposits are in a wide variety of geologic settings. Most notable are copper and polymetallic deposits spatially associated with the Boulder Batholith and younger igneous rocks at and near Butte in the southwestern part of the state. Not only does this region produce major amounts of metals, but a high level of exploration activities by private industry will probably enlarge the productive region and the number of metals produced. For example, recent exploration in this region has suggested the presence of stratabound base metal deposits in Precambrian metasedimentary rocks and molybdenum-tungsten deposits in Tertiary intrusive rocks.

The eastern extension of the Coeur d'Alene mining district, which has a long history of metal production, extends into the western part of Montana. This area is currently being explored for extensions of known mineralized structures and for stratabound base and precious metal deposits in the Precambrian rocks, and has a high potential for new deposits.

In some areas, such as in the eastern portion of the Little Belt Mountains, past mining activity was restricted to relatively small mineralized zones. The results of recent mineral exploration by major mining companies demonstrates a potential for large mineral deposits.

Recent exploration based on new geologic concepts has resulted in the discovery of a variety of types of deposits in regions with very little or no past mineral production. Examples of these types of deposits include disseminated base and precious metal deposits in Precambrian quartzites and in Precambrian "green beds," and in mid-Tertiary intrusive and extrusive rocks. Exploration in several roadless areas east and south of White Sulfur Springs in central Montana have resulted in the discovery of disseminated deposits of copper, lead, and zinc in Precambrian rocks.

The potential for metallic minerals is classified low in several areas including parts of the Big Snowy Mountains, Highwood Mountains, and portions of the Big Belt and Absaroka Mountains, because the geologic environment is considered unfavorable and the areas have no record of past mineral production. The geologic data from tracts shown as having unknown mineral potential are inadequate to estimate the potential of these areas.

The geologic environment of some Roadless Areas in the National Forest is favorable for the accumulation of hydrocarbons. Those areas with potential mainly for hydrocarbons are so indicated on the map. The areas classified as of high potential have either been considered in published modern hydrocarbon evaluations, or their potential has been interpreted as high from their favorable geologic environment. Exploration by the petroleum industry is being conducted in or adjacent to all these areas. In addition, areas 1-485 and 1-724 are discussed in recent reports by Mudge, Earhart and Claypool (1977), and the U.S. Geological Survey and U.S. Bureau of Mines (1978). Their studies indicate that these areas have a high potential for hydrocarbons, mainly gas; other nearby Roadless Areas have a similar geologic environment. Recent discoveries of hydrocarbon accumulations in the disturbed belt of Idaho and Wyoming indicates a high potential for similar discoveries in Montana in northern extensions of this belt.

The compilation was delivered and its results presented orally to members of the U.S. Forest Service on December 6, 1977. It is being made available as an open-file report in response to public request.

Selected References

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SCALE 1:500 000
10 0 10 20 MILES
10 0 10 20 KILOMETERS

Compiled December 1977 by M. R. Mudge and R. L. Earhart, U.S. Geological Survey, from data of M. W. Reynolds, C. A. Wallace, M. K. Klepper, D. A. Lindsey, E. T. Ruppel, K. Segerstrom, contributed by G. Erickson, W. R. Greenwood, J. W. Whipple, K. L. Wier, and J. E. Harrison.

WEST HALF OF MONTANA

MAP SHOWING APPRAISAL OF MINERAL RESOURCE POTENTIAL OF RARE II PROPOSED ROADLESS AREAS IN NATIONAL FORESTS, MONTANA (EXCLUSIVE OF COAL, OIL, GAS, AND CONSTRUCTION MATERIALS)

Compiled by
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1978