U.S. DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

Bibliography of Geologic References (1872-1992) to the Absaroka-Beartooth Study Area in the Custer and Gallatin National Forests, South-Central Montana

compiled by

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ILLUSTRATION

INTRODUCTION

This bibliography lists more than 800 geologic references pertaining to National Forest lands in the Beartooth Mountains and Absaroka Range in south-central Montana. It was compiled during an evaluation of the mineral resources of the Custer and Gallatin National Forests within the Absaroka-Beartooth study area (ABSA) (fig. 1). The study was conducted by a team of U.S. Geological Survey (USGS) scientists in 1990-92. The ABSA encompasses approximately 1.4 million acres (5,700 km^2) north and northeast of Yellowstone National Park in the southeastern parts of the Gallatin National Forest and the most westerly part of the Custer National Forest. The references cited in this document are restricted to geologic papers or maps that discuss or illustrate features within the boundaries of the ABSA. Hammarstrom and others (1993) report the results and methods employed for the USGS mineral resource assessment of the ABSA.

The bibliography is also provided on an enclosed 5¼-inch, high-density (1.2 megabyte) diskette in two IBM-compatible formats: (1) a WordPerfect (version 5.1) file entitled "ABSA.WP" (used to produce this document), and (2) an ASCII data file entitled "ABSA.ASC." The user can thus readily reference this listing or reassemble it to meet specific needs. The "ABSA.ASC" data file should be amenable to transport into most IBM-compatible word-processing programs. The explanatory text is included as a data file entitled "README.ASC."

BIBLIOGRAPHIC CATEGORIES

The bibliography is divided into the 12 categories summarized below. Obviously, significant overlap between categories exists. The bibliography focuses on documents that provide geologic descriptions and interpretations of the ABSA. No effort was placed on compiling historical accounts regarding exploration and mining history of the ABSA. The 12 categories are:

I. **Stillwater Complex.** The Stillwater Complex (fig. 1) is a geologically rare ultramafic to mafic intrusion of Archean origin composed almost entirely of layered cumulate igneous rocks. An 18,000-ft-thick (about 5,500-m-thick) section of the complex is exposed in the northern part of the ABSA for a distance of 30 miles (48 km). The Stillwater Complex is of significant economic importance because it hosts most of the known resources of platinum-group elements in the United States and approximately 80 percent of the identified chromium. The Stillwater Mine near Nye (fig. 1) currently (1993) exploits specific horizons of the complex to extract platinum, palladium, gold, rhodium, copper, and nickel. The large number of references in this section (387 documents) reflects the economic significance and geologic curiosity for this unusual layered igneous complex.

II. **New World (Cooke City) mining district.** The New World district (fig. 1), surrounding Cooke City, has been host to small mining operations for more than 125 years and the site of numerous mineral discoveries. Discovery of the Fisher Mountain, Miller Creek, and Homestake deposits between 1987 and 1990 by Crown Butte Mines and Noranda Exploration has revived interest in the district (Elliott and others, 1992). This district is one of the intrusive centers in the Absaroka-Gallatin volcanic province (category IV below).

III. **Goose Lake intrusive complex.** The Goose Lake complex (fig. 1) is a Late Cretaceous alkalic intrusive center located about 7 miles (11 km) north-northeast of Cooke City. Copper, platinum, and palladium concentrations occur within the igneous complex, apparently as magmatic segregation deposits.

IV. **Absaroka-Gallatin volcanic province.** A province of considerable Tertiary volcanism and igneous intrusion, the Absaroka-Gallatin volcanic province transects the southwestern part of the ABSA. The Absaroka Range within the ABSA is a northwest-trending chain of peaks composed mainly of intrusive, volcanic, and volcaniclastic rocks of this Tertiary volcanic field. The Independence, New World, and Emigrant districts are intrusive centers in this province.

V. **Independence mineral district.** Historic mining within the Independence (Boulder) district (fig. 1) exploited Au-Ag-Pb-Cu-Mo mineralization associated with an Eocene intrusive complex at Independence Peak. The Independence complex appears to represent an incised stratovolcano that was a major eruptive center during the Eocene. The Independence volcano is one of numerous mineralized intrusive-eruptive centers in the Tertiary Absaroka-Gallatin volcanic province.

VI. **Jardine-Mineral Hill-Crevice Mountain mineral district.** The Jardine district (fig. 1), which includes the Mineral Hill and Crevice Mountain prospects, is located in the southwestern part of the ABSA and hosts lode Au-As-W quartz-vein deposits. The deposits occur within a multifolded metasedimentary terrane of Archean origin. The Mineral Hill Mine near Gardiner is currently extracting gold and silver ores.

VII. **Emigrant mineral district.** An Eocene intrusive complex forms Emigrant Peak and the surrounding area, comprising the Emigrant district (fig. 1) in the western ABSA. The Emigrant stock and associated rocks form one of the numerous intrusive centers for the Absaroka-Gallatin volcanic province (IV). Pyritic mineralization and intense hydrothermal alteration are prevalent within the Emigrant complex.

VIII. **Chromite deposits of the Red Lodge district.** Small, podlike concentrations of chromium occur in Precambrian serpentinites west of Red Lodge in the Red Lodge chromite district (fig. 1). Small-scale mining of these deposits occurred in the 1940's.

IX. **Investigations of wilderness (primitive) study areas.** Two wilderness (primitive) areas--the Absaroka Wilderness and the Beartooth Wilderness--compose much of the acreage of the ABSA. Studies of the geology and mineral occurrences specific to these lands were conducted by the USGS in the 1970's and 1980's.

X. **Directories of mineral occurrences and mining enterprises.** References in this category report known mineral and mining occurrences within the ABSA. The information is provided in a variety of formats.

XI. **Petroleum potential of the Absaroka-Beartooth study area.** The ABSA does not have a significant history of oil and gas production. These papers discuss the potential for undeveloped petroleum resources.

XII. **Various geologic studies within the Absaroka-Beartooth study area.** These references pertain to a wide variety of geologic investigations within the ABSA. A number of geologic studies have converged on the ABSA, including investigations of the Precambrian geology, Phanerozoic stratigraphy and paleontology, structural geology, geophysics, and geochronology of the region (a partial list). References listed in this section may be arranged into numerous sub-categories to accommodate a particular study.

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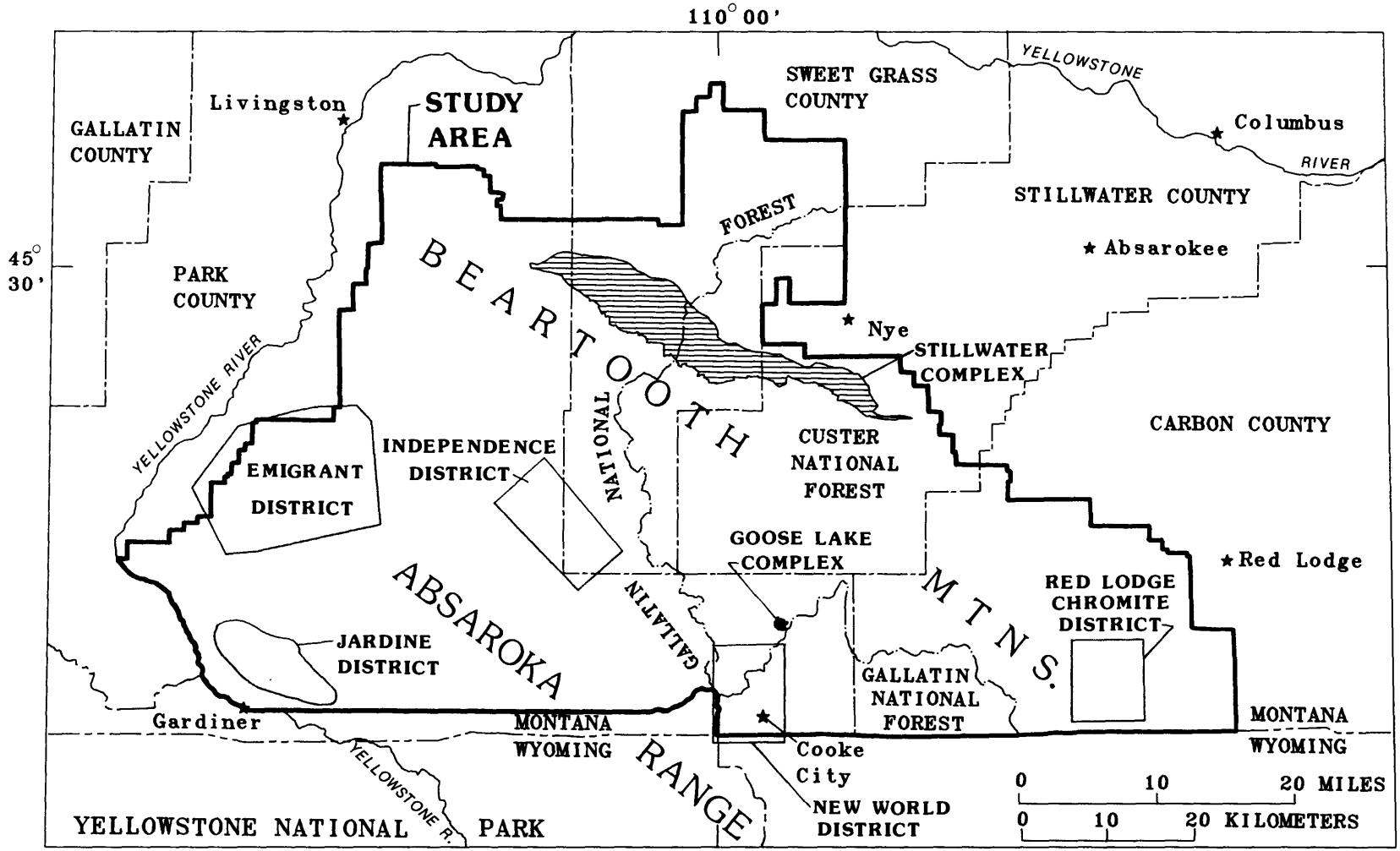

Figure 1. Map of the Absaroka-Beartooth study area in south-central Montana showing the locations of the geologic categories listed in the bibliography.

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