



United States Department of the Interior

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March 2, 1992

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Dear Dr. Bartlett:

Enclosed is one copy of the following MLA Open-File Report:

MLA 3-92 Mineral Resource Investigation of the Black
Warrior Study Area Adjacent to the Sawtooth
Wilderness, Elmore County, Idaho

If I may be of further assistance, please let me know.

Sincerely,

Robert B. Hoekzema, Chief
Branch of Resource Evaluation

Enclosure

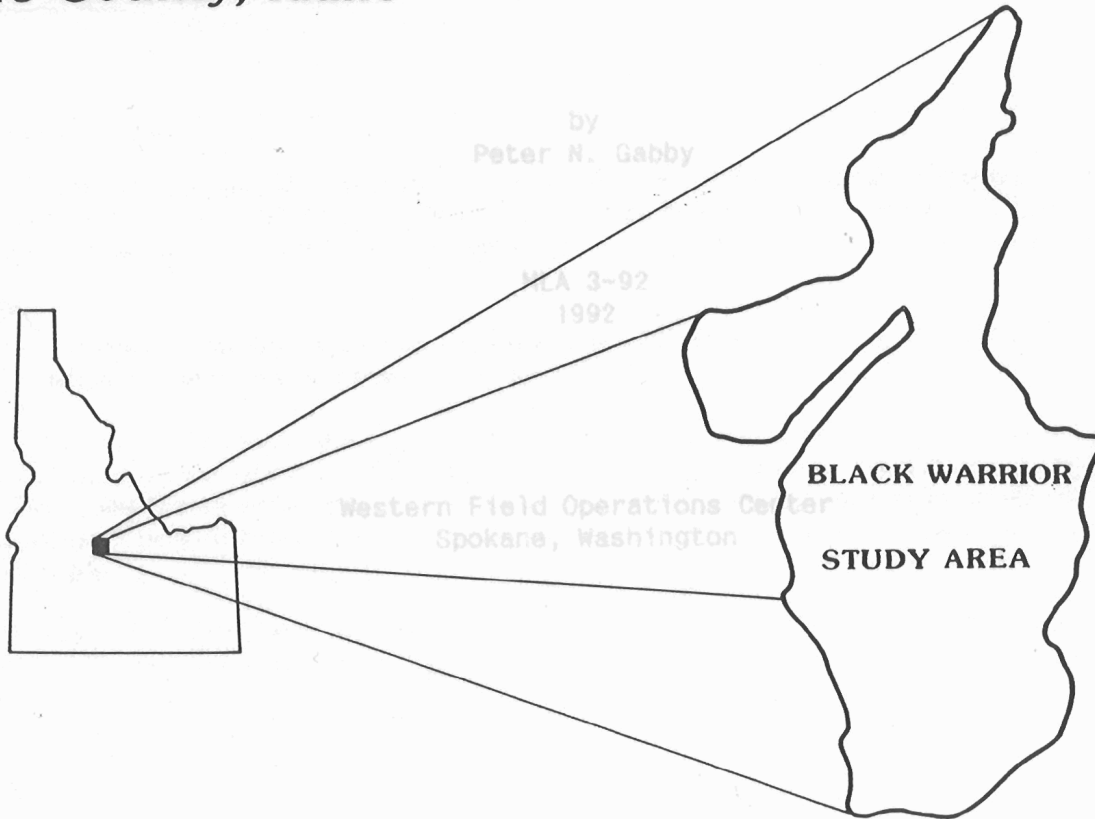
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**Bureau of Mines Mineral Land Assessment/1992
Open-File Report**

Mineral Resource Investigation of the Black Warrior Study Area Adjacent to the Sawtooth Wilderness, Elmore County, Idaho



UNITED STATES DEPARTMENT OF THE
Manuel Lujan, Jr., Secretary

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UNITED STATES DEPARTMENT OF THE INTERIOR

MINERAL RESOURCE INVESTIGATION OF THE BLACK WARRIOR STUDY AREA
ADJACENT TO THE SAWTOOTH WILDERNESS, ELMORE COUNTY, IDAHO

by
Peter N. Gabby

MLA 3-92
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Western Field Operations Center
Spokane, Washington

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<p>In 1990, the Bureau of Mines conducted a mineral resource investigation of the 12,320 acre Black Warrior study area, one of several proposed additions to the Sawtooth Wilderness. No identified mineral resources were delineated. There were 123 lode and placer claims in or adjacent to the study area. There is a known hot spring adjacent to the study area, but presently no geothermal leases are pending.</p> <p>Lode mines in or adjacent to the Black Warrior study area have produced 4,022 tons of ore from which 1,981 oz of gold and 811 oz of silver were recovered. None of the mines are currently active.</p> <p>During the field study 125 rock samples were taken. Significant gold assays and favorable geologic characteristics at seven properties indicate that gold occurrences and resources with byproduct metals may exist in the study area. Two other sites yielded anomalous gold assays; however, some favorable geologic characteristics are lacking. Presently, identified gold resources are being delineated by drilling programs in the nearby Atlanta and Rocky Bar mining districts. These districts have geologic characteristics similar to the Black Warrior area.</p> <p>During the field study 22 placer samples were taken. In most places where an anomalous concentration of gold was found, the stream channels are too narrow for operations other than recreational suction dredges. However, one area is estimated to contain over 2 million yd³ of gold-bearing gravels.</p>				
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PREFACE

The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts require the U.S. Bureau of Mines and U.S. Geological Survey to survey certain areas of Federal lands ". . . to determine the mineral values, if any, that may be present . . ." Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a Bureau of Mines mineral investigation of the Black Warrior study area, Elmore County, ID. Lands in the area studied for this report have been recommended by legislative proposals to be classified as Wilderness. Mining-related activity in the study area would be restricted under this designation.

This open-file report contains data gathered and interpreted by personnel of the U.S. Bureau of Mines, Western Field Operations Center, Branch of Resource Evaluation, East 360 Third Avenue, Spokane, WA 99202. This report has been approved by the Branch of Mineral Land Assessment, Washington, D.C.

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UNIT OF MEASURE ABBREVIATIONS
USED IN THIS REPORT

yd ³	cubic yard
ft	foot
gm	gram
<	less than
mi	mile
mg	milligram
ppb	part per billion
ppm	part per million
%	percent
oz	troy ounce
oz/ton	troy ounce per ton

SUMMARY

In 1990, the U.S. Bureau of Mines (USBM) conducted a mineral resource investigation of the 12,320 acre Black Warrior study area, one of several proposed additions to the Sawtooth Wilderness. The study area is located in Elmore County, ID, and by road is about 75 mi northeast of Boise and about 6 mi northwest of Atlanta.

Geologically, the study area lies within the Atlanta lobe of the Cretaceous-age Idaho batholith and encompasses most of the Black Warrior mining district. The character of mineralization and alteration in the district is similar to that observed in the nearby Atlanta mining district. Mineralization in both areas is associated with zones of alteration in granitic rocks of the batholith. Tertiary-age dikes in the Black Warrior district are also common in the vicinity of alteration but appear to be post-mineralization.

At least five lode mines in or adjacent to the Black Warrior study area have produced a recorded 4,022 tons of ore from which 1,981 oz of gold and 811 oz of silver were recovered. As of April 1990, there were 76 lode, 4 millsite, and 47 placer claims in or adjacent to the study area.

The study area has no identified mineral resources. Seven properties, Overlook, Rico-Mammoth, White Ribbon, Browns Creek, Little Queen, Lone Cabin, and Magnolia show strong evidence of vein type or disseminated gold resources with possible silver, copper, lead, or zinc byproducts. Outcrops of altered granitic rock with anomalous gold assays also show evidence of gold resources with possible byproduct metals. An area in and adjacent to the study area, the confluence of the Little Queens and Queens Rivers, may have significant grade and yardage of gold-bearing gravels. There is a known hot spring on the Little Queens River, adjacent to the study area, but presently there are no geothermal leases or pending leases in the area.

INTRODUCTION

In 1990 the USBM investigated the mineral resources of the Black Warrior portion of the Black Warrior Ten Mile West proposed addition to the Sawtooth Wilderness (101st Congress). Since the Ten Mile West portion had been studied as part of the USBM RARE II program (Benham and Avery, 1983), only the Black Warrior part was investigated. This investigation was conducted by USBM personnel who examined individual mines, prospects, zones of mineralization, and zones of alteration. Although the immediate goal of this and other USBM surveys is to provide data for the President, Congress, government agencies, and the public for land-use decisions, the long-term objective is to ensure our Nation has an adequate and dependable supply of minerals at a reasonable cost.

Setting

The Black Warrior study area is in the Boise National Forest and encompasses approximately 12,320 acres of the sprawling, non-linear Boise Mountains of central Idaho (fig. 1). The southern half of the study area is bounded by roads, trails, and the Sawtooth Wilderness boundary along parts of the Middle Fork Boise River, Queens River, Little Queens River, Eagle Creek, and Black Warrior Creek (fig. 2). The Sawtooth Wilderness is the eastern boundary, and a 7,400 to 8,550-ft ridge on the northwest bounds the remainder of the study area. The Ten Mile West RARE II study area is on the northwest. East Warrior Peak, at 8,758 ft, is the highest point in the study area; the lowest point, at 4,880 ft, is near the mouth of Eagle Creek.

From Boise, the Black Warrior study area is 75 mi northeast by State Highway 21 and Forest Service (FS) Road 268. From there, it is another 7.5 mi on FS Road 268 to the historic mining town of Atlanta. The old Silver City Trail (FS Road 206 up Queens River, and FS Trails 054 and 053 up Little Queens River and over the divide to Grouse Creek) provides access to the eastern and northern parts of the study area. The Black Warrior Creek-Eagle Creek trail (FS Trail 053) provides access to the northern half of study area.

Previous Studies

Fifty-eight rock, 46 stream sediment, and 3 soil samples taken in and adjacent to the study area are reported on by Kiilsgaard and others (1970); 30 rock samples taken in and adjacent to the study area are reported on by Benham and Avery (1983); the data in that report are also summarized by Kiilsgaard and others (1983); and 13 rock geochemical samples in and adjacent to the study area are reported on by Kiilsgaard (1983). The first three reports also contain written descriptions of mineral properties in and adjacent to the study area.

The earliest information on mining-related activities in the study area appears on a map entitled "Atlanta and Rocky Bar" (U.S. Treasury Department, 1883, p. 197). The map shows lodes just west of the Little Queens River, but the map is inaccurately drawn. Ballard (1928) describes lode and placer deposits in the Black Warrior mining district and a specific description of the Overlook property. Mention of properties in the Black Warrior mining district appear in the Inspector of Mine's Fifth to Seventy-First Annual Report(s) of the Mining Industry of Idaho for the years 1903 to 1971 (this series is cited hereafter as Idaho Inspector of Mines) and in the Mineral Resources of the United States annual reports 1905 to 1934 (U.S. Geological Survey and U.S. Bureau of Mines, Mineral Resources of the United States). Hustedde and others (1981) list locations of lode and placer properties in and adjacent to the study area. Additional information on the Rico-Mammoth property appears in Stevens (1906-1910); additional information on the Overlook property appears in Weed (1920-1931); additional information on the Black Warrior placers is reported by Rand and Sturgis (1931, p. 916-917), and Zimmerman (1940, p. 137).

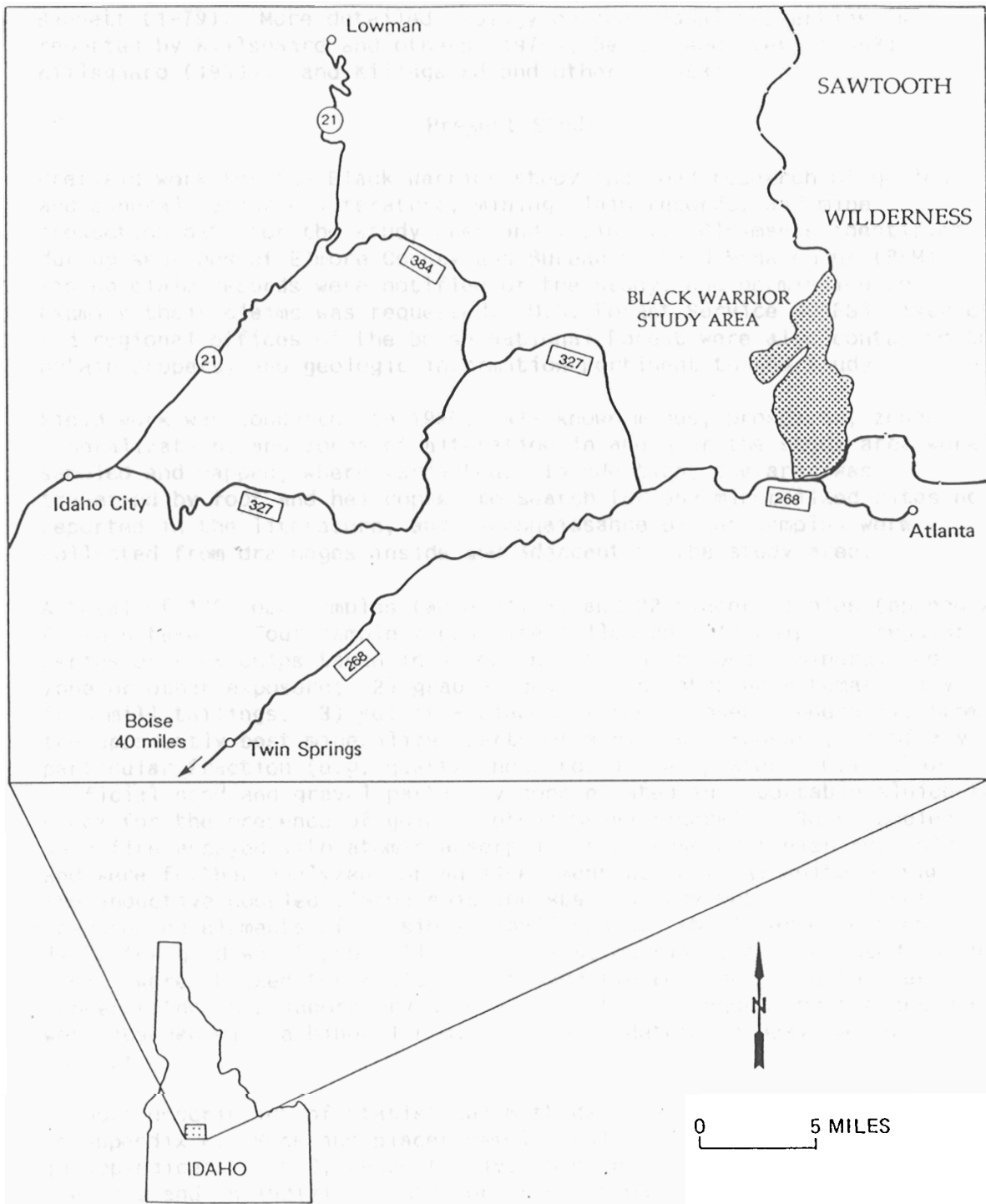

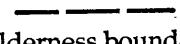
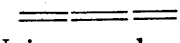
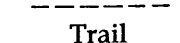





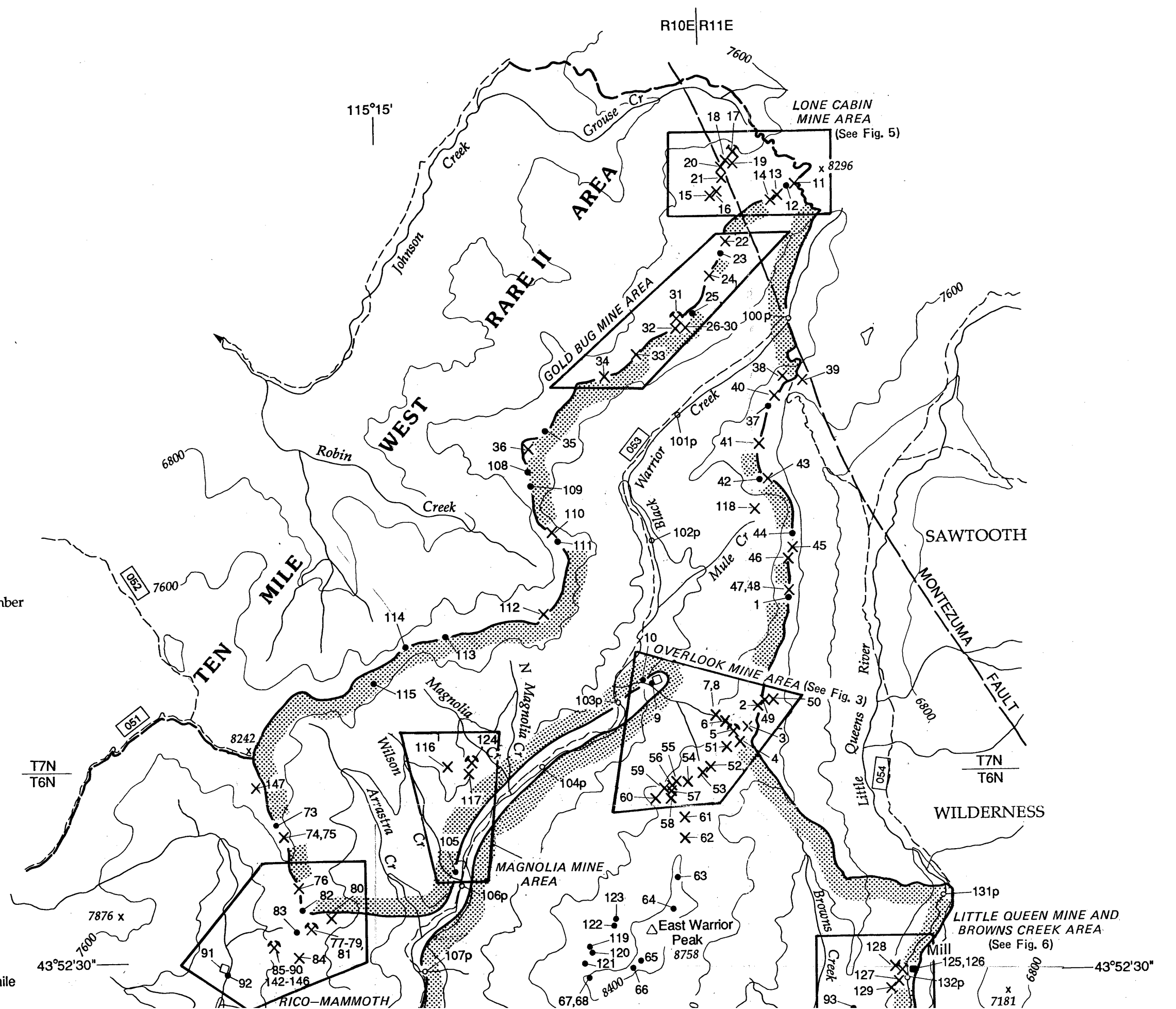
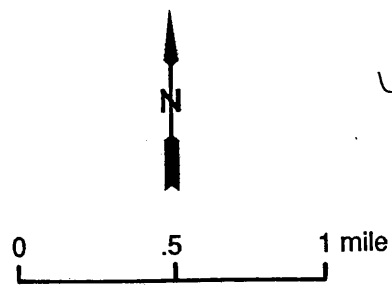


FIGURE 1.-Location of the Black Warrior study area, Elmore County, ID

- EXPLANATION**
-  Study area boundary
 -  Wilderness boundary
 -  Unimproved road
 -  Trail
 -  Mine (past producer) and sample number
 -  Prospect (short adit, trench, or pit) and sample number
 -  Mill ruins
 -  Rock sample locality
 -  Placer sample locality



ACKNOWLEDGEMENTS

The author wishes to thank Lorrie Fink and Ron Hohnstein of the Boise National Forest staff for providing logistic support; Lora Westover, University of Idaho Department of Engineering student, for providing excellent field assistance during the summer; and Lance Bacon and Frank Hingley of Atlanta Gold Corp. for a tour of the Atlanta property, and discussion of the regional economic geology. Also, the U.S. Geological Survey Spokane office personnel generously shared an unpublished geologic map.

GEOLOGIC SETTING

The Black Warrior study area is underlain by biotite granodiorite, pegmatite dikes, and granite, part of the Atlanta lobe of the Cretaceous-age Idaho batholith (Rember and Bennett, 1979). According to Thornbury (1965 p. 385), "The lithologic homogeneity of the Idaho Batholith is well expressed in (the area's) ... sprawling mountains with dendritic drainage and little lineation of topography." There are also numerous east- to northeast-trending dacite and andesite Tertiary-age dikes. These dikes are more resistant to weathering, and form small knobs and minor ridges. In order to keep adits open in the deeply weathered, incompetent rocks of the batholith, several early prospectors tunneled along or just below these dikes.

Known mineralized material is found associated with or in zones of altered biotite granodiorite. These zones are commonly silicified by quartz enrichment, quartz veinlets, and nearly complete replacement by quartz with phantom inclusions of altered granodiorite, and drusy and comb quartz. The zones also have abundant sericite, and minor chlorite and epidote. A pervasive feature, easily recognized in the field, is the total (or near total) lack of biotite in or near these altered zones which can be confused with pegmatite dikes. In addition to the alteration assemblage, mineralized material contains iron oxide pseudomorphs after pyrite; pyrite; arsenopyrite; yellowish, oxidized arsenopyrite stain; galena; and minor siliceous iron oxide boxwork. Post-mineralization Tertiary dikes are found bordering, or in, some of the altered and/or mineralized zones.

The nearby (approximately 6 mi) Atlanta mining district lode deposits have similarities to the alteration and mineralization observed in the Black Warrior district. Anderson's report (1939, p. 30-31) on the Atlanta district describes the gangue minerals as dominated by massive fine-grained quartz containing numerous phantom inclusions of altered country rock, coarse comb and drusy quartz, and sericite. At Atlanta arsenopyrite is the most abundant metallic mineral, followed by pyrite, minor galena, and very minor sulfides of copper and zinc. Most gold probably is associated with metallic sulfides (Anderson, 1939, p. 23-28). A major difference with the Black Warrior district was Atlanta's abundance of silver, which exceeded gold by weight; however, Anderson reported mostly on near-surface bonanza ores. He mentioned that the gold to silver ratio increases with depth and that gold content declines

less abruptly than silver away from bonanza ores. Tertiary dikes found in the Atlanta district are post mineralization (Lance Bacon and Frank Hingley, Atlanta Gold Corp., oral commun., 1990).

The northwest-trending Montezuma fault crosses the north end of the study area. The fault does not appear to be mineralized.

The Sep
running
1921

MINING HISTORY

Wells (1964, p. 3) reports that a Hudson Bay Company trapper knew about gold in Boise Basin by 1844, but a rush wasn't started until the prospecting discoveries of the summer and fall of 1862. Rich placers in Boise Basin spurred the rapid advance of prospectors up the drainages of central Idaho's rugged mountains, which led to the following major placer discoveries in the Black Warrior region: 1863--South Boise River drainage in the Rocky Bar-Featherville area; 1864--Middle Fork Boise River in the Pfeiffer and Swanholm Creeks area (3.5 to 6 mi from the study area); and 1864--Middle Fork Boise and Yuba Rivers in the Atlanta area (3 mi or more from the study area). Placer discoveries commonly led to contemporaneous lode discoveries (Wells, 1964, p. 3-54).

The Atlanta (Yuba) mining district's major lode properties are approximately 6 mi southeast of the Black Warrior study area. High-grade silver ores were found in 1864, and in a short time most lodes in the district were located. The early production was hand sorted, sent by pack train to Rocky Bar, then hauled 230 mi by bull team to Kelton, Utah, where it was shipped by railroad to smelters and refiners in Nebraska and New Jersey (Anderson, 1939, p. 19-20).

Recently the Atlanta Gold Corp. identified two "ore bodies" in the district. The East Pit ore body contains 8.3 million tons grading 2.98 ppm (0.087 oz/ton) gold and 8.16 ppm (0.238 oz/ton) silver, and the West Pit ore body contains 6.2 million tons grading 1.68 ppm (0.049 oz/ton) gold and 3.02 ppm (0.088 oz/ton) silver (Atlanta Gold Corp., 1989 annual report). Newmont Exploration Ltd. is also drilling for gold in the Rocky Bar area, about 10 mi south of the study area.

The Boise King placer mine (fig. 2) on the Middle Fork Boise River (Pfeiffer and Swanholm Creeks area) is 3.5 to 6 mi west of the study area. In the years 1941, 1942, and 1946 this mine processed 2,801,894 yd³ of gravel from which 15,278 oz of gold and 5,170 oz of silver were recovered (USBM production records). The operation averaged \$0.19 in gold per yd³ at the 1940's price of gold (\$35.00 per troy ounce); at today's price (approximately \$400 per troy ounce) the average would be \$2.18.

About three dozen lode claims were located during the 1880's and 1890's in the Little Queens River and Browns Creek area, but there is no mention in the literature of early development or production from these claims. This area later became part of the Black Warrior mining district.

The study area covers most of the Black Warrior mining district where high-grade gold ores, valued as high as \$300 per ton (at \$20.67 per oz gold), were discovered in August of 1903 by Thomas Walter and Charles Birdwell (Idaho Inspector of Mines, 1904, p. 60). The exact location of this initial discovery, the Black Warrior No. 1 claim, is unknown but appears likely to have been near the White Ribbon and Rico-Mammoth claims (fig. 2). The September 13, 1903, Spokesmen Review reported: "Discovery of ore running \$1,200 a ton in Black Warrior camp starts stampede." In 1904, Bell (Idaho Inspector of Mines, 1905, p. 64) reported, "I visited the Warrior District during the past summer, and examined its salient features pretty thoroughly, and on the whole it impresses me favorably dozens of claims that show rich ore often containing visible native gold, carrying values of from \$25 to \$100." Bell also mentions "the future of the camp will have to be based on \$5 to \$15 milling ore." In 1903 about 60 lode claims and in 1904 about 180 lode claims were located in the district.

In 1904, the machinery for an Elspass quartz mill (similar to a Chilean mill) was hauled into the district for the Rico-Mammoth mine (Idaho Inspector of Mines, 1905, p. 66); on the Overlook property in 1915, a steam-driven, 10-stamp mill was built (Neale, 1927, p. 881); on the Little Queen property, a small water-powered, stamp mill was built (Idaho Inspector of Mines, 1927, p. 126); and during the USBM field work a water-powered, 3-stamp mill was found at the mouth of Wilson Creek (fig. 2). This mill also had an ore bin containing several tons of mineralized material from the Magnolia property. Illustrations of mill ruins in the study area appear in appendix D.

Several years ago Newcoast American, a small Canadian exploration company, did surface mapping and some sampling on contiguous claim blocks covering the Rico-Mammoth, White Ribbon, and Overlook properties. Newcoast later abandoned the project. A prefield check of the April 10, 1990, BLM claim recordation microfiche disclosed that 76 lode claims, 4 millsite claims, and 47 placers are located in or adjacent to the study area.

Table 1 is a summary of reported lode mine production from the Black Warrior mining district.

Table 1.--Lode mine production from the Black Warrior mining district
(Source: USBM production records, 1904 to 1947)

<u>Name</u>	<u>Ore (short ton)</u>	<u>Gold (troy oz)</u>	<u>Silver (troy oz)</u>
Gold Bug, et al	30	73.0	64
Little Queen	621	163.7	86
Overlook	2,879	1,161.7	440
Rico-Mammoth	181	39.7	6
White Ribbon	81	165.3	14
Miscellaneous ²	230	377.4	201
Total	4,022	1,980.8	811

MINES, PROSPECTS, AND MINERALIZED AREAS

The following pages describe the mines, prospects, mineralized areas, and zones of alteration in and adjacent to the study area. The locations of the properties are shown on figure 2. They are all underlain by biotite granodiorite of the Idaho batholith which has been intruded by pegmatites and by volcanic dikes ranging in composition from dacite to andesite. The mines and prospects are found in areas where the granodiorite has been hydrothermally altered. The alteration consists mainly of silicification, ranging from quartz veinlets to massive quartz; sericite and chlorite are present in varying amounts, plus occasional epidote.

²B & A Road, Boise River lode, Double Standard, Golden Beam, Imperial, Lesler and others, Little Boise, Lone Cabin, Magnolia, Orogrande, Pickereil, Red Bird, Riverside lode, and various unnamed lodes.

