DEPARTMENT OF THE INTERIOR

UNITED STATES GEOLOGICAL SURVEY

ADDITIONAL MINERAL RESOURCE ASSESSMENT OF THE BATTLE CREEK, BRUNEAU RIVER, DEEP CREEK-OWYHEE RIVER, JARBIDGE RIVER, JUNIPER CREEK, LITTLE OWYHEE RIVER, NORTH FORK OWYHEE RIVER, OWYHEE RIVER CANYON, SOUTH FORK OWYHEE RIVER, UPPER DEEP CREEK, AND YATAHONEY CREEK WILDERNESS STUDY AREAS, OWYHEE COUNTY, IDAHO

By

MICHAEL F. DIGGLES[1], BYRON R. BERGER[2], DEAN B. VANDER MEULEN[1], SCOTT A. MINOR[3], JAY A. ACH[4], AND MICHAEL G. SAWLAN[1]

U.S. Geological Survey
Open-File Report 89-531

Prepared by the U.S. Geological Survey

for the U.S. Bureau of Land Management

[1]Menlo Park, CA 94025
[2]Spokane, WA 99201
[3]Denver, CO 80225
[4]San Francisco, CA 94112

1989

STUDIES RELATED TO WILDERNESS

Bureau of Land Management Wilderness Study Area

The Federal Land Policy and Management Act (Public Law 94-579, October 21, 1976) requires the U.S. Geological Survey and U.S. Bureau of Mines to conduct mineral surveys on certain areas 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 mineral survey of the Battle Creek (ID-016-049E), Bruneau River (ID-111-017), Deep Creek-Owyhee River (ID-016-049A), Jarbidge River (ID-017-011), Juniper Creek (ID-016-052), Little Owyhee River (ID-016-048C), North Fork Owyhee River (ID-016-040), Owyhee River Canyon (ID-016-048B), South Fork Owyhee River (ID-016-053), Upper Deep Creek (ID-016-044), and Yatahoney Creek (ID-016-049D) Wilderness Study Areas, Owyhee County, Idaho.

BACKGROUND

From 1984 to 1986, studies were conducted to assess the potential for undiscovered mineral resources in wilderness study areas on the Owyhee Plateau. The results of these studies have been published in a series of U.S. Geological Survey Bulletins (Ach and others, 1986; Foord and others, 1987; Goeldner and others, 1986; Lawrence and others, 1988; Minor and others, 1986; 1987; Sawlan and others, 1987). Since that time, low-grade, high-tonnage epithermal hot-spring gold-silver deposits of the type defined by Berger (1985; 1986) and Berger and Singer (1987) have been recognized in the region north of the wilderness study areas (Rytuba, 1989). The recognition that this mineral-deposit model is applicable in the region, coupled with new data that has become available to the U.S. Geological Survey (R.J. Shepard, FMC Gold Company, written commun., 1989; E.J., Demeter, Bond Gold Corp., written commun., 1989), reinterpretation of existing geochemical data (Bennett, 1976; Erickson and others, 1986; Erickson and others, 1988a, b), and known-deposit data (Buehler and Capstick, 1985; Capstick, 1986; Capstick, and Buehler, 1985; Gabby, 1985; Graham, 1985; Leszcykowski, 1986a; 1986b; Mayerle, and Gabby, 1986; Moyle, and Buehler, 1987; Winters, 1985) suggest that similar deposits may be present elsewhere on the Owyhee Plateau. This report is an additional assessment of the Battle Creek (Goeldner and others, 1986), Bruneau River (ID-111-017), (Lawrence and others, 1988), Deep Creek-Owyhee River (Sawlan and others, 1987), Jarbidge River (ID-017-011), (Lawrence and others (1988), Juniper Creek (Goeldner and others, 1986), Little Owyhee River (Ach and others, 1986), North Fork Owyhee River (Minor and others, 1986), Owyhee River Canyon (Sawlan and others, 1987), South Fork Owyhee River (ID-016-053), (Foord and others, 1987), Upper Deep Creek (Minor and others, 1987), and Yatahoney Creek (Goeldner and others, 1986) Wilderness Study Areas in Idaho in light of those new data. See the appendixes for the definition of levels of mineral resource potential and certainty of assessment.

GEOLOGY

The study areas are situated south of the DeLamar-Silver City mining districts, which have yielded considerable quantities of gold and silver from epithermal-type vein deposits. The mineralization in these districts occurred along a regionally extensive northwest-trending fracture zone along the southwestern margin of the Snake River Plain. DeLamar-Silver City mineralization was related to about 15 to 16 million-year-old (Ma) basalt-rhyolite volcanic activity along the zone (Rytuba, 1989). The ore-controlling fault zone projects southeastward towards the study areas, and hydrothermal activity is known to have occurred along the southeastern extension of this fault zone in the Triangle Ranch area northeast of the study areas.

Just outside the western boundary of the North Fork Owyhee River Wilderness Study Area, the Swisher Mountain Tuff is underlain by an undated basalt. This basalt has a strong resemblance to the 15.5-Ma Steens Basalt (Baksi and others, 1967). If this basalt is of the same age as the volcanism in the DeLamar area, it may be part of the dome rift-related basalt-rhyolite (bimodal) volcanic suite related to mineralization at DeLamar. In any case, the occurrence of this basalt suggests that deep-seated rifting has taken place in the vicinity, possibly within one or more of the study areas.

The overlap of regional north-northwest trending fault zones with older caldera structures and silicic volcanic centers is emerging as one of the most viable means of locating gold-silver mineral deposits in the northern Basin and Range (Rytuba, 1988; 1989). In this part of the Basin and Range, precious-metal-bearing systems are associated with silicic domes and plugs that intruded these extensional north-northwest-trending fault zones (Rytuba, 1989). The DeLamar and Milestone gold-silver deposits, and the Mahogany, Katie, and Grassy Mountain gold prospects are situated along the northwest extension of the DeLamar-Duck Valley fault zone (Rytuba and others 1989). Similar northwest-trending fault zones extend across both study areas, following the general trend of the Owyhee River.

MINERAL RESOURCE ASSESSMENT

Geologic, geochemical, and mineral-deposit data as well as new use of a mineral-occurrence model suggest that there is moderate potential for undiscovered resources of low-grade, epithermal hot-spring gold and silver in the Battle Creek, Bruneau River, Deep Creek-Owyhee River, Jarbidge River, Juniper Creek, Little Owyhee River, North Fork Owyhee River, Owyhee River Canyon, South Fork Owyhee River, Upper Deep Creek, and Yatahoney Creek, Wilderness Study Areas with a certainty of B. There are insufficient data to reassess the Sheep Creek West (ID-111-036A) Wilderness Study Area from low (Lawrence and others, 1988) to moderate potential for gold and silver.

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APPENDIXES

DEFINITION OF LEVELS OF MINERAL RESOURCE POTENTIAL AND CERTAINTY OF ASSESSMENT

Definitions of Mineral Resource Potential

LOW mineral resource potential is assigned to areas where geologic, geochemical, and geophysical characteristics define a geologic environment in which the existence of resources is permissive. This broad category embraces areas with dispersed but insignificantly mineralized rock as well as areas with few or no indications of having been mineralized.

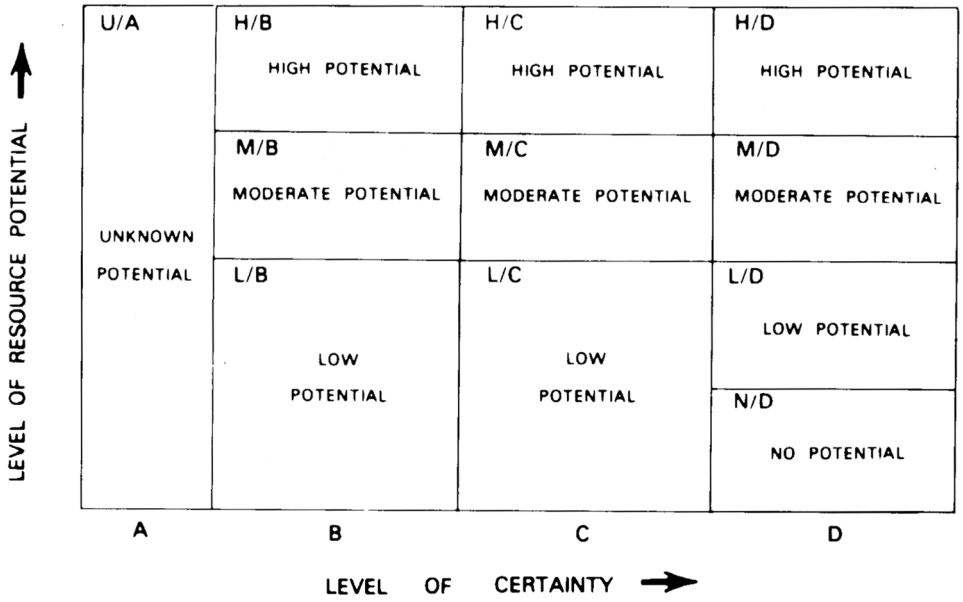
MODERATE mineral resource potential is assigned to areas where geologic, geochemical, and geophysical characteristics indicate a geologic environment favorable for resource occurrence, where interpretations of data indicate reasonable likelihood of resource accumulation, and (or) where an application of mineral-deposit models indicates favorable ground for the specified type(s) of deposits.

HIGH mineral resource potential is assigned to areas where geologic, geochemical, and geophysical characteristics indicate a geologic environment favorable for resource occurence, where interpretations of data indicate a high degree of likelihood for resource accumulation, where data supports mineral-deposit models indicating presence of resources, and where evidence indicates that mineral concentration has taken place. Assignment of high resource potential to an area requires some positive knowledge that mineral-forming processes have been active in at least part of the area.

UNKNOWN mineral resource potential is assigned to areas where information is inadequate to assign low, moderate, or high levels of resource potential.

NO mineral resource potential is a category reserved for a specific type of resource in a well-defined area.

Levels of Certainty



A. Available information is not adequate for determination of the level of mineral resource potential.

B. Available information suggests the level of mineral resource potential.

C. Available information gives a good indication of the level of mineral resource potential.

D. Available information clearly defines the level of mineral resource potential.

Abstracted with minor modifications from:

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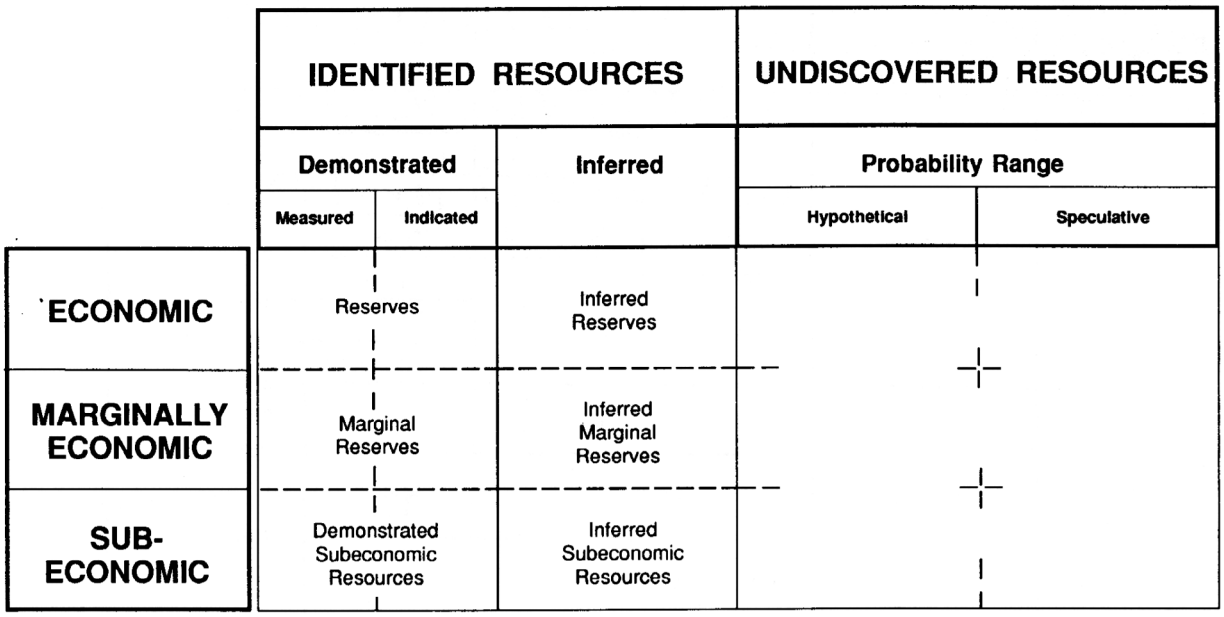
RESOURCE/RESERVE CLASSIFICATION



Major elements of mineral resource classification, excluding reserve base and inferred reserve base. Modified from U.S. Bureau of Mines and U.S. Geological Survey, 1980, Principles of a resource/reserve classification for minerals: U.S. Geological Survey Circular 831, p. 5.

GEOLOGIC TIME CHART

Terms and boundary ages used by the U.S. Geological Survey in this report

EON	ERA	PERIOD		EPOCH	AGE ESTIMATES OF BOUNDARIES (in Ma)
Phanerozoic	Cenozoic	Quaternary		Holocene	0.010
				Pleistocene	1.7
		Tertiary	Neogene Subperiod	Pliocene	5
				Miocene	24
			Paleogene Subperiod	Oligocene	38
				Eocene	55
				Paleocene	66
	Mesozoic	Cretaceous		Late Early	96 138
		Jurassic		Late Middle Early	205
		Triassic		Late Middle Early	~240
	Paleozoic	Permian		Late Early	290
		Carboniferous Periods	Pennsylvanian	Late Middle Early	~330
			Mississippian	Late Early	360
		Devonian		Late Middle Early	410
		Silurian		Late Middle Early	435
		Ordovician		Late Middle Early	500
		Cambrian		Late Middle Early	~570[1]
Proterozoic	Late Proterozoic				900
	Middle Proterozoic				1600
	Early Proterozoic				2500
Archean	Late Archean				3000
	Middle Archean				3400
	Early Archean				
pre-Archean[2]		(3800?)			4550

[1]Rocks older than 570 Ma also called Precambrian, a time term without specific rank.

[2]Informal time term without specific rank.