U.S. DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

ADDITIONAL MINERAL RESOURCE ASSESSMENT OF THE HONEYCOMBS WILDERNESS STUDY AREA, MALHEUR COUNTY, OREGON

By

MICHAEL F. DIGGLES[1]

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[1]Menlo Park, CA 94025

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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 Honeycombs Wilderness Study Area, (OR003077A), Malheur County, Oregon.

Contents

Introduction

In 1984 and 1985, studies were conducted to assess the potential for undiscovered mineral resources in the Honeycombs Wilderness Study Area in southeastern Oregon (fig. 1). The results of these studies have been published in a series of U.S. Geological Survey and U.S. Bureau of Mines publications (Erickson and others, 1986; Scott, 1986; Vander Meulen 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 near the wilderness study area (Rytuba, 1991). The recognition that this mineral-deposit model is applicable in the region, coupled with new data that have 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), and known-deposit data (Scott, 1986) suggest that similar deposits may be present elsewhere in the region. This report is an additional assessment of the Honeycombs Wilderness Study Area in Oregon in light of those new data. This additional assessment is also summarized in Diggles (1991).

Geology

Rhyolitic air-fall and ash-flow tuffs of late Miocene and younger age are the dominant rocks of the study area, associated and interbedded with substantial amounts of volcaniclastic and sedimentary rocks (see appendixes for geologic time chart). Two major eruptive centers, the Honeycombs volcanic center in the north-central part of the study area, and the Mahogany Mountain caldera, the north rim of which crosses the study area about 2 1/2 mi north of the southern boundary. Scattered rhyolite dikes, domes, and irregular intrusive bodies intrude the pyroclastic rocks from both centers. Dikes and sills of pyroxene andesite--some of the latter 2 to 3 mi long, intrude volcanic and sedimentary rocks in the north-central part of the study area, and flows, dikes, and sills of basalt cover and (or) intrude the entire sequence of sedimentary rocks in the northern part. North- to northwest-trending high-angle normal faults with associated horst and graben dominate the local structure, although deviations toward a more east-west pattern occur locally, especially in the southern part of the study area where they are associated with the east-west segment of the Mahogany caldera margin.

Mining Activity and Identified Mineral Resources

This section is a summary from Scott (1986) as well as contributions from the U.S. Bureau of Mines in Diggles (1991).

No mineral resources are identified within the wilderness study area, although jasper suitable for lapidary work is present throughout the east part of the area. Zeolite occurrences of mineable grade are present within the study area, but are too erratic and discontinuous to constitute resources. Mineable zeolite deposits might be identified with further detailed mapping.

A large block of current (July 1990) mining claims is centered east of the wilderness study area. These claims, the Goldfinger Group held by Euro Nevada (Reno, NV), extend into the east-central part of the study area. Several mining exploration companies are actively prospecting in and near the study area for disseminated silver and gold deposits.

The most significant past mining activity has been the collecting of jasper for lapidary use (picture jasper) in the eastern part of the study area. Picture jasper is present in small quantities at six prospects, ten claim

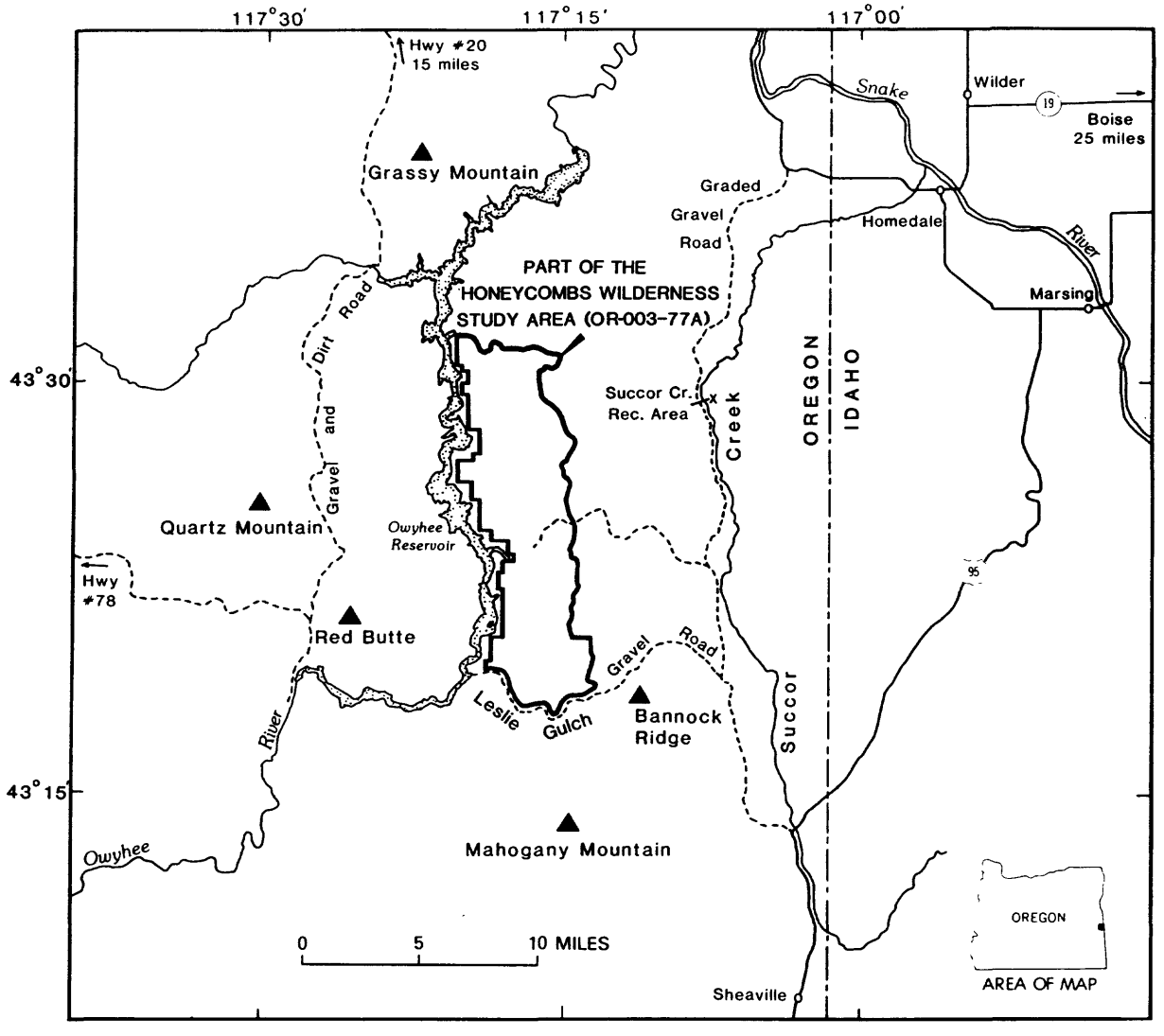

Figure 1.--Index map showing location of the Honeycombs Wilderness Study Area, Malheur County, Oregon

groups, and one mine in or just outside the study area boundary . Some of these sites are worked on a seasonal basis. No energy leases (October 1987) exist within the study area.

Mineral Resource Potential

Summary of Earlier Interpretation

North-central and southern parts of the study area have moderate potential for uranium and thorium, based on both aerial gamma-ray surveys, and anomalous concentrations of these elements in rock samples. (See appendixes for the definition of levels of mineral resource potential and certainty of assessment) North-central and southern parts of the study area have moderate potential for strata-bound lithium resources. Adjacent to the topographic expression of the Mahogany Mountain caldera margin, a wide zone of locally altered and silicified rock has moderate potential for resources of mercury, arsenic, lead, and zinc. Except for lead, these same elements are present in sufficiently anomalous amounts in rhyolite intrusions in the central and southern parts of the study area, that their assigned resource potential is moderate. The entire area is assigned moderate potential for copper, tin, and fluorite resources; copper appears to be associated with fracture fillings in mafic and intermediate intrusions; tin is related to rhyolite intrusions, and anomalous fluorite probably reflects diagenetic concentrations in lacustrine deposits.

The entire area has moderate potential for zeolite resources in tuff, and geothermal resources. Tertiary sedimentary rocks in the northern and central parts of the study area have low potential for resources of oil and gas. Low potential for resources of picture jasper is assigned to a narrow zone along the east boundary, explored by several mines and prospects.

Additional Assessment

The study area is situated 10 mi south of Grassy Mountain, the site of new mining properties with gold mineralization. The study area is also northwest 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 Ma basalt-rhyolite volcanic activity along the zone (Rytuba, 1989). The ore-controlling fault zone projects southeastward towards the study area.

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 region, 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 the study area.

Geologic, geochemical, and mineral-deposit data as well as new use of a mineral-occurrence model suggest that there is moderate potential, certainty level B, for undiscovered resources of low-grade, epithermal hot-spring gold and silver in the Honeycombs Wilderness Study Area.

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APPENDIXES

DEFINITION OF LEVELS OF MINERAL RESOURCE POTENTIAL AND CERTAINTY OF ASSESSMENT

LEVELS OF RESOURCE POTENTIAL

H **HIGH** 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 a high degree of likelihood for resource accumulation, where data support 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.

M **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 for resource accumulation, and (or) where an application of mineral-deposit models indicates favorable ground for the specified type(s) of deposits.

L **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 little or no indication of having been mineralized.

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

U **UNKNOWN** mineral resource potential is assigned to areas where information is inadequate to assign a low, moderate, or high level of resource potential.

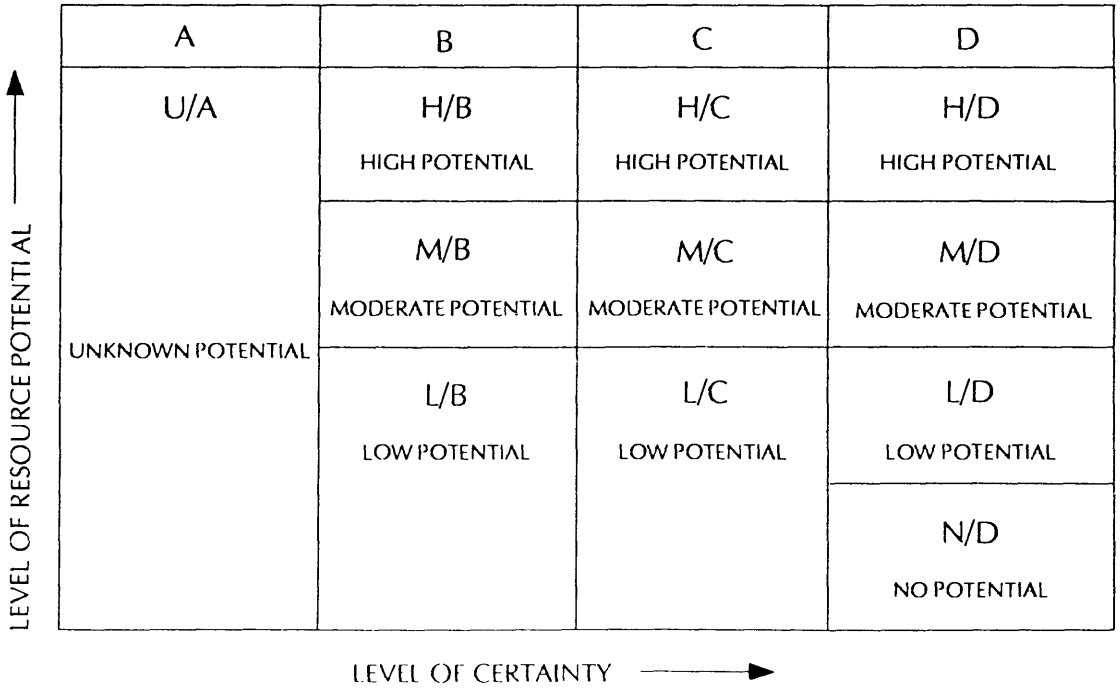
LEVELS OF CERTAINTY

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

B Available information only 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.



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RESOURCE/RESERVE CLASSIFICATION

	IDENTIFIED RESOURCES			UNDISCOVERED RESOURCES	
	Demonstrated		Inferred	Probability Range	
	Measured	Indicated		Hypothetical	Speculative
ECONOMIC	Reserves		Inferred Reserves		
MARGINALLY ECONOMIC	Marginal Reserves		Inferred Marginal Reserves		
SUB-ECONOMIC	Demonstrated Subeconomic Resources		Inferred Subeconomic Resources		

Major elements of mineral resource classification, excluding reserve base and inferred reserve base. Modified from McKelvey, V.E., 1972, Mineral resource estimates and public policy: American Scientist, v. 60, p. 32-40; and 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 MILLION YEARS (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	[1]~570
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.