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MINERAL RESOURCE POTENTIAL OF THE WINCHESTER ROADLESS AREA, COCHISE COUNTY, ARIZONA

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STUDIES RELATED TO WILDERNESS

Under the provisions of the Wilderness Act (Public Law 88-577, September 3, 1964) and the Joint Conference Report on Senate Bill 4, 88th Congress, the U.S. Geological Survey and the U.S. Bureau of Mines have been conducting mineral surveys of wilderness and primitive areas. Areas officially designated as "wilderness," "wild," or "canoe" when the act was passed were incorporated into the National Wilderness Preservation System, and some of them are presently being studied. The act provided that areas under consideration for wilderness designation should be studied for suitability for incorporation into the Wilderness System. The mineral surveys constitute one aspect of the suitability studies. The act directs that the results of such surveys are to be made available to the public and be submitted to the President and the Congress. This report discusses the results of a mineral survey of the Winchester Roadless Area in the Coronado National Forest, Cochise County, Arizona. Winchester Roadless Area (3122) was classified as a further planning area during the Second Roadless Area Review and Evaluation (RARE II) by the U.S. Forest Service, January 1979.

SUMMARY

Results of geologic, geochemical, geophysical, and mining activity and production surveys in the Winchester Roadless Area, Ariz., indicate low potential for metallic and nonmetallic resources in the area. Volcanic rocks cover the area to a thickness of 1,000 to 2,000 ft (305-610 m) and possibly more, thus preventing inspection and evaluation of the underlying rock.

INTRODUCTION

The Winchester Roadless Area, located in northwestern Cochise County, Ariz. (fig. 1), consists of 14,100 acres (5,706 ha) of Coronado National Forest in the Winchester Mountains. The area lies approximately 15 mi (24 km) northwest of Willcox, Ariz. Access to the boundary of the roadless area by county and ranch roads (with permission from the owners) is good on all but the west side, where roads generally end more than 1 mi (1.6 km) from the boundary. Within the area the terrain is steep and rugged, with many vertical cliffs. Elevations in the area range from about 5,000 ft (1,500 m) on the eastern flank of the mountains to 7,631 ft (2,326 m) at the summit of Reiley Peak. Heavy growth of manzanita inhibits accessibility at higher elevations. Intermittent streams have incised steep-walled canyons into the volcanic rocks.

This study consisted of (1) field checking and modification of the existing geologic maps of the area (Creasey and others, 1961, 1981), (2) field examination of all mines, prospects, and mineralized areas in and adjacent to the Winchester Roadless Area by the U.S. Bureau of Mines, (3) sampling of bedrock and stream sediments from drainage basins for geochemical analysis; and (4) examination and interpretation of available aeromagnetic and gravity data.

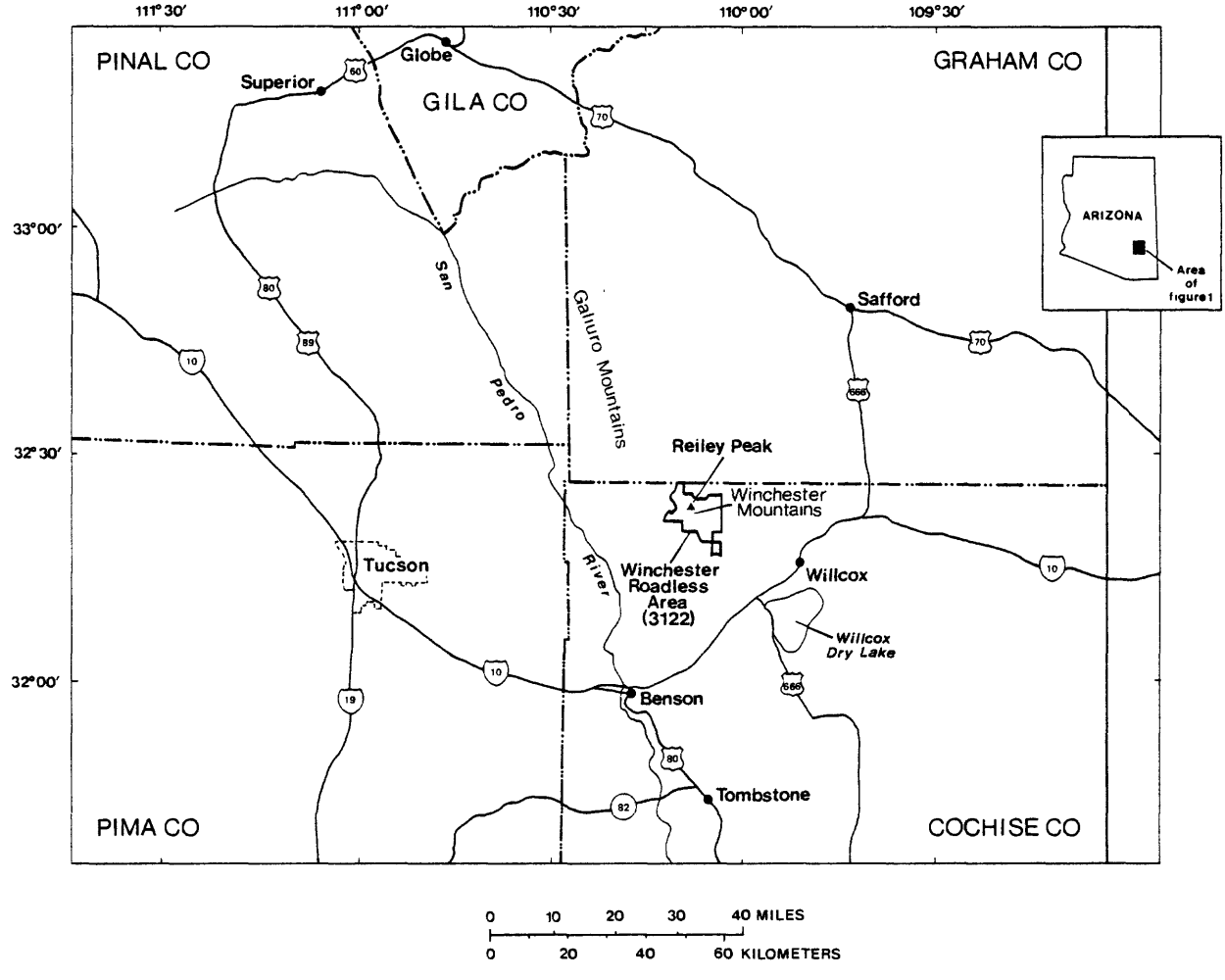


Figure 1.--Index map showing location of the Winchester Roadless Area, Ariz.

GEOLOGIC SETTING

Rocks of the Winchester Roadless Area (fig. 2) consist of a sequence approximately 1,000 to 2,000 ft (610 m) thick of silicic ash-flow tuffs and lava flows capped by basaltic lava flows. The silicic volcanic rocks are assigned to the Galiuro Volcanics of Cooper and Silver (1964). The Galiuro Volcanics is divided into four members, two of which occur in the Winchester Roadless Area. The lower unit corresponds to the latite member of the formation and consists of undifferentiated lava flows and tuffs that range from latite to rhyolite in composition. This member is limited to the central and eastern parts of the area and dips approximately 30° NW. The upper unit corresponds to the rhyolite member and consists of rhyolitic lava flows, dikes, and ash-flow tuffs. The rhyolite member is found in the central and western parts of the area and appears to thicken to the west. The Galiuro Volcanics, considered to be of Miocene age by Cooper and Silver (1964), is capped by younger basalt which consists of black vesicular lava flows and is confined to the central and western parts of the study area.

GEOCHEMISTRY

Twenty-eight sample sites were selected as representative of the drainage basins in and around the Winchester Roadless Area. The sites were sampled for rock, stream sediment, and panned concentrates. Samples were analyzed for 31 elements by six-step semiquantitative emission spectrography and for two additional elements (zinc and gold) using atomic absorption or colorimetry. The results of the analyses indicate a generally high concentration of lanthanum, niobium, lead, and tin in the panned concentrates. The lanthanum and niobium are derived from high concentrations of zircon, sphene, and other minerals that weather out of the Galiuro Volcanics. Although these relatively high concentrations are anomalous, the minerals are present only in trace amounts. The tin and lead anomalies, which are from drainage basins near the boundary of the roadless area, are probably related to human contamination in areas where springs have been developed and where there has been a large amount of human traffic (hunters, picnickers, or ranchers).

GEOPHYSICS

Geophysical data (gravity, magnetic, and audio-magnetotelluric) indicate no significant features that can be confidently interpreted as being directly related to mineral deposits. The Galiuro Volcanics have generally lower magnetic susceptibilities than the overlying basalt. A magnetic high along the southern border of the roadless area possibly reflects an underlying extension of the Precambrian intrusive rocks exposed to the south that have high magnetic susceptibility but are not known to be mineralized. A broad magnetic low in the northwest corner of the roadless area probably reflects a thin basaltic cover over a thick section of rocks with low magnetic susceptibility (probably an extension of the Galiuro Volcanics). Therefore, these magnetic anomalies do not in themselves indicate the presence of significant mineralization. Reconnaissance gravity data show a broad gravity low over the central roadless area, which probably indicates the area where ash-flow tuffs and lava flows are at their maximum thickness. Resistivity contrasts between audio-magnetotelluric soundings just south of the roadless area suggest the possibility of a northwest-trending fault along the west face of the Winchester Mountains. Low resistivities at depth for two soundings and

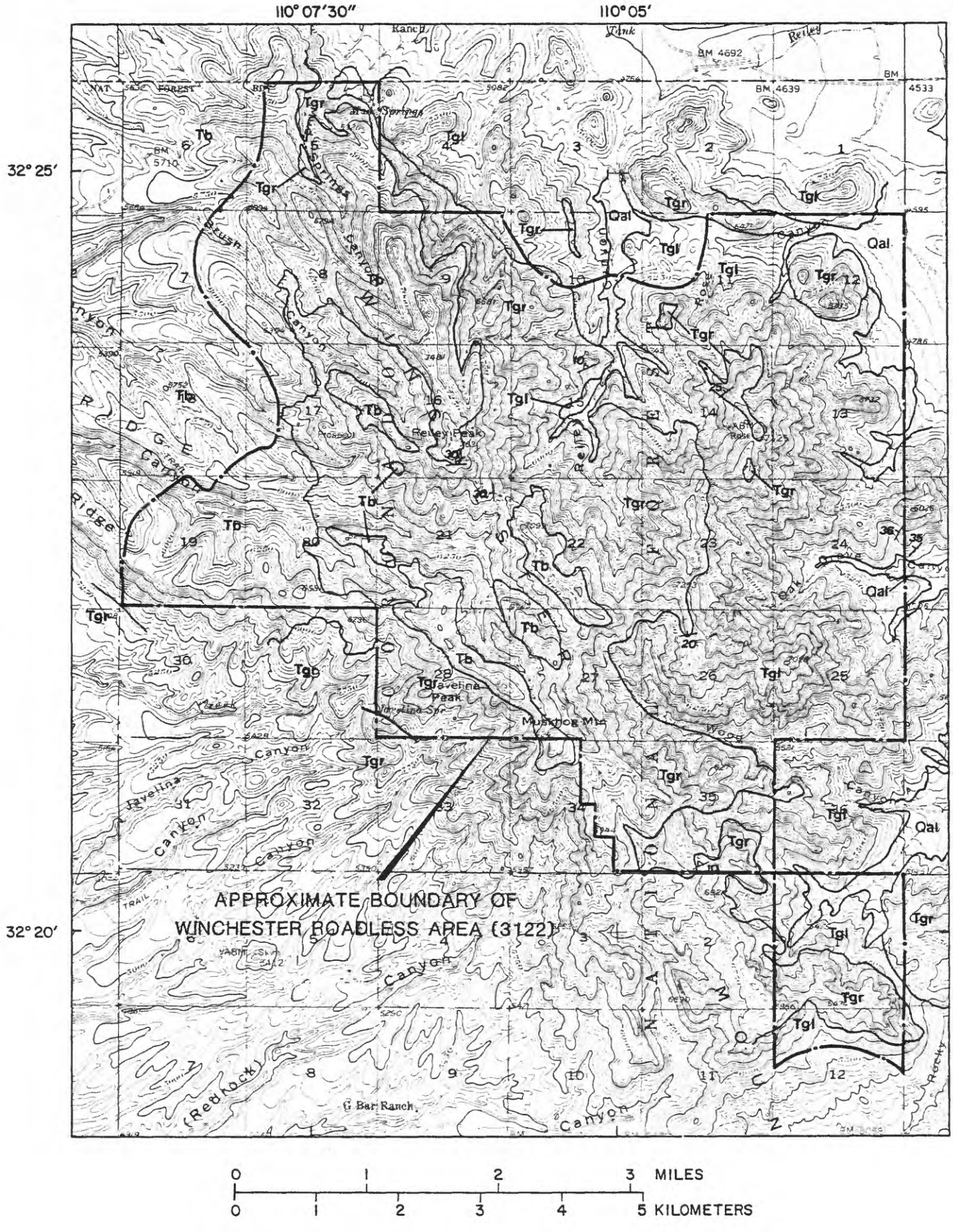
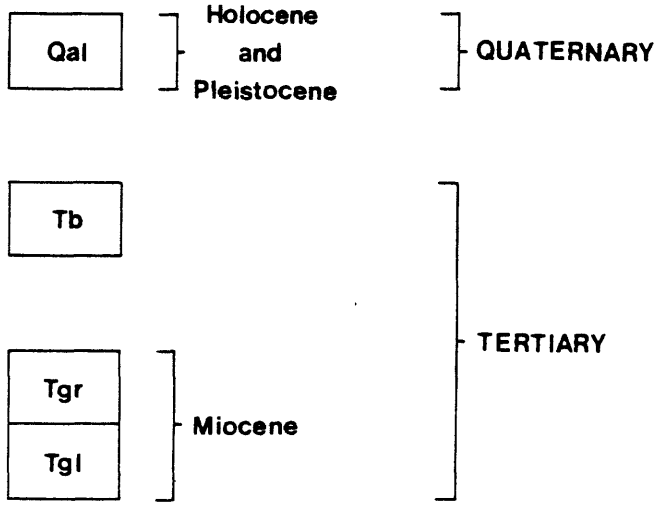


Figure 2.--Geologic map of the Winchester Roadless Area, Ariz., modified from Creasey and others (1961). Base from U.S. Geological Survey 15-minute quadrangle, Winchester Mountains, 1957.

EXPLANATION FOR FIGURE 2

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

Qal ALLUVIUM (HOLOCENE AND PLEISTOCENE)--Poorly sorted silt, sand, and gravel. Locally includes colluvial and fanglomerate deposits

Tb BASALT (TERTIARY)--Black vesicular basalt lava flows

GALIURO VOLCANICS (MIOCENE)--Divided into:

Tgr Rhyolite member--Rhyolitic ash-flow tuffs, lava flows, dikes, and sills

Tgl Latite member--Latitic and rhyolitic ash-flow tuffs and lava flows

CONTACT--Approximately located

FAULT

25 STRIKE AND DIP OF BEDDING

10 STRIKE AND DIP OF FLOW FOLIATION

APPROXIMATE BOUNDARY OF WINCHESTER ROADLESS AREA (3122)

an entire low-resistivity section for another sounding plus low magnetic intensity suggest that the rocks may have been altered along the postulated fault, although there is no surface evidence of mineralization.

MINING DISTRICTS AND MINERALIZED AREAS

The Winchester mining district lies approximately 3 to 4 mi (4.8-6.4 km) south of the southern boundary of the roadless area. The district was originally worked for silver in the 1870's, but has had little or no activity since the 1920's (Keith, 1973). Gold mineralization southeast of the roadless area occurs in a sliver of Paleozoic limestone in fault contact with Precambrian granite. No trace of this mineralization was detected in our investigation. If this geologic feature extended to the northwest and into the roadless area as suggested by the geophysical data, it would be buried under a thick pile of Tertiary volcanic rocks; however, geologic evidence does not indicate that this feature extends into the roadless area.

A search of the Cochise County records revealed that no mining claims have been located in or near the roadless area. The only prospect in the roadless area was a small pit near the center of sec. 17, T. 12 S., R. 22 E. No mineralization was evident in the pit, which had been dug into volcanic rock.

Eleven pan-concentrate samples of stream sediments in or near the Winchester Roadless Area assayed no significant gold and silver values.

ASSESSMENT OF MINERAL RESOURCE POTENTIAL

Geologic, geochemical, geophysical, and mines and prospects surveys of the Winchester Roadless Area have failed to indicate the presence of any undiscovered mineral deposits. The combined evidence indicates that the potential for the occurrence of any metallic or nonmetallic resources is low.

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