MINERAL RESOURCE POTENTIAL OF THE YOLLA BOLLY-MIDDLE EEL WILDERNESS AND ADJACENT ROADLESS AREAS, NORTHERN CALIFORNIA

SUMMARY REPORT

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STUDIES RELATED TO WILDERNESS

Mineral resources in the Yolla Bolly-Middle Eel Wilderness consist of two prospects containing 10,000 tons of inferred subeconomic manganese resources and 2.4 million tons of inferred subeconomic nickel resources. Twenty-one other prospects were investigated, but no resources potential was demonstrated.

All known resources within the four roadless areas adjacent to the Yolla Bolly-Middle Eel Wilderness in northern California occur in the Big Butte-Shinbone Roadless Area; they consist of an estimated 2,400 tons of subeconomic manganese resources averaging 9.5 percent Mn, and 9,700 tons of subeconomic chromium (1.25 percent Cr), nickel (0.45 percent Ni), and cobalt (0.03 percent Co) resources. Within the four additions, 62 mining claims have been located since 1910; none were patented. There are no Federal mineral leases within these areas. Potential for oil and gas, geothermal, and other mineral resources is low.

INTRODUCTION

The Yolla Bolly-Middle Eel Wilderness encompasses approximately 111,830 acres in Tehama and Trinity Counties in north-central California (fig. 1). The Big Butte-Shinbone (5145), East Fork (5226), Murphy Glade (5298), and Wilderness Contiguous (5137) Roadless Areas totaling 53,100 acres are within Shasta-Trinity, Six Rivers, and Mendocino National Forests. The areas lie in parts of Trinity, Tehama, and Mendocino Counties, California. The Yolla Bolly-Middle Eel Wilderness was established by Public Law 88-577, September 3, 1964. The roadless areas were classified as further planning areas during the Second Roadless Area Review and Evaluation (RARE II) by the U.S. Forest Service, January 1979.

SUMMARY

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GEOLGY, GEOCHEMISTRY, AND GEOPHYSICS PERTAINING TO MINERAL RESOURCE ASSESSMENT

All of the rocks in the study area are assigned to the Franciscan assemblage of Mesozoic age. We have subdivided this assemblage into three teetonostratigraphic terranes based on lithology, age, structure, and metamorphic history; the Pickett Peak, Central, and Yolla Bolly. The Pickett Peak terrane consists of quartz-mica...
schist, metagraywacke and minor basalt. The Central terrane is a tectonic melange characterized by large blocks of resist-
ent basalt, chert, and sandstone in a highly sheared shale
matrix. Geologic mapping and geochemical sampling within the
study area suggest that there are no mineralized zones in these
terranes.

Geologic mapping and geochemical sampling (Blake and
Jayko, 1983a, b) have established that all the mineralized areas
are within the Yolla Bolly terrane of the Franciscan
assemblage. The Yolla Bolly terrane is characterized by
remarkably continuous interbeds of radiolarian chert in
graywacke and shale. Most of the deposits are pods and
lenses containing manganese minerals within the chert. Our
field observations and geochemical analyses suggest that the
manganese deposits were formed by hydrothermal alteration
of the chert during intrusion of diabase-gabbro sills. The
hydrothermal solutions apparently remobilized and concen-
trated the primary manganese in the unaltered chert (typi-
cally 400-2,000 ppm Mn) to values as high as 43 percent Mn in
mineralized zones adjacent to the intrusive sills.

A second group of deposits is associated with serpen-
tinized ultramafic rocks tectonically injected into sediment-
ary rocks of the Yolla Bolly terrane. These deposits include
primary chromite lenses in the least altered bodies, such as
Red Mountain, and lateritic chromium, nickel, and cobalt
concentrations (due to weathering) in serpentine. The latter
group is visible as the small positive anomalies on the aero-

A third group of deposits consists of quartz segrega-
tions and minor pyrite in metagraywacke and mica schist.
None of the analyses of these rocks showed any anomalous
values.

MINING DISTRICTS AND MINERALIZATION

Most mineralized areas and those with past mining
activity are within the Big Butte-Shinbone Roadless Area and
the Yolla Bolly Wilderness. No mineral resources are known in
the East Fork, Murphy Glade, or Wilderness Contiguous
Roadless Areas.

Although the study area was prospected and claims
staked in the region as early as 1899, no mining occurred until
World War I, when a few tons of chromite-bearing rock were
mined and stockpiled at the Grubstake prospect. Mining
activity was renewed during World War II with the discovery
of the Blue Jay manganese deposit in 1941; production from
the mine continued intermittently through the Korean
War period. Several other deposits outside the study area were
also discovered, mined in the 1950s and 1960s. Mining
activity took place during national emergencies, when pre-
mium prices were paid for such strategic minerals as manga-
nee and chromite. Manganese production from the region
cessated with the closing of the Blue Jay mine in 1956. There
has been no subsequent mining activity in the area.

The accompanying map shows the locations of mines and
prospects in and near the Yolla Bolly-Middle Eel
Wilderness and adjacent roadless areas. The U.S. Bureau of
Land Management master title plats indicate no patented
claims, Federal mineral leases, or mineral-material sites in
the study area.

Yolla Bolly-Middle Eel Wilderness

Two localities in the study area have a low mineral
resource potential—a manganese occurrence near Bearwallow
(Bertha group) and a nickel occurrence on Wrights Ridge.
Figure 2 shows the locations of the nickel- and manganese-
bearing areas in the study area.

Manganese at Bearwallow (Bertha group) occurs as
pods and lenses in chert beds of the Yolla Bolly terrane. The
manganese minerals were derived from hydrothermal
solutions associated with diabase intrusions along fractures.
The pods and host rocks trend N. 70° W. and dip 60° NE.
Pyrolusite—glaucophane—contains as
much as 39.2 percent Mn (avg. 21 percent) and 0.56 percent
Fe. The pods occur in two zones along strike: Pods in the
eastern zone average 1.5 ft in thickness and are 45 to 75 ft
long; one pod in the western zone is 10 ft thick and 40 ft
long. Approximately 10,000 tons of inferred subeconomic
resources is estimated in the pods exposed on the surface.

Nickel at Wrights Ridge occurs in serpentinized ultrama-
fic bodies that have been tectonically emplaced into
sedimentary rocks of the Yolla Bolly terrane. Two samples
from across an outcrop of serpentinized ultramafic rock,
visible on the surface for 400 ft, contained 0.38 and 1.00
percent Ni. Approximately 2.4 million tons of inferred sub-
economic resources is estimated in this area.

Two other areas of old claims were investigated during
the present study. The Tomhead mine, located outside the
wilderness near Tomhead Mountain (fig. 1), consists of pyrite
veins and pods in the South Fork Mountain Schist. Several
other similarly claims are in metamorphic quartz segregations
in mica schist. None of the samples analyzed from these
prospects gave anomalous values. The other group of claims,
located east of the South Yolla Bolly Mountains (fig. 1),
consists of metamorphic quartz veins in metagraywacke.
These samples were also devoid of any anomalous values.

Big Butte-Shinbone Roadless Area

The Big Butte-Shinbone Roadless Area, encompassing
35,300 acres, lies west and south of the Yolla Bolly-Middle
Eel Wilderness. Deposits of manganese, chromite, asbestos,
and jade represent the only minerals of potential resource.

The Blue Jay manganese mine (fig. 2) produced more
than 4,600 tons of ore averaging 50 percent Mn between 1942
The main ore mineral was hausmannite, a primary reddish-
brown manganese oxide, which occurred in two flat elliptical
lenses in chert about 4 ft thick and 15 ft apart; the upper lens
measured about 200 ft along strike, and the lower one 400
ft. Early production was from underground adits; later, the
lenses were stripped of overburden and mined by open pit.
The mine was abandoned in 1956 after exploration work
proved unsuccessful. About 2,400 tons of indicated and
inferred subeconomic resources averaging 9.5 percent Mn
remains at the mine. Additional manganese resources of
similar grade probably occur near downdip along chert beds.

The Trout Creek mine (fig. 2), about half a mile out-
side the study-area boundary, produced more than 1,000 tons
of manganese ore (Trengove, 1960, p. 18). The lucky Sunday
mine (fig. 2), several miles to the north, produced 260 tons of
manganese ore (O'Brien, 1955, p. 16). Other deposits in the
vicinity have been prospected, some of which may have
produced small unrecorded amounts.

During World War I, about 30 tons of chromite-rich
ultramafic rock was mined and stockpiled at the Grubstake
prospect (fig. 2). Subsequent exploration exposed a narrow
zone, about 80 ft long, containing sporadic pods of chromite-
bearing rock. To the west is a flat area, about 400 ft wide and
600 ft long, covered with red laterite soil derived from
serpentine; the soil averages about 0.7 ft thick. About 40 tons
of indicated subeconomic resources containing about
0.5 percent chromium oxide (Cr₂O₃) 0.25 percent Ni and 0.01
troy oz Au per ton is exposed at the Grubstake prospect; 5
tons of nearby stockpiled rock averages about 31 percent
Cr₂O₃. In addition, the laterite soil contains about 9,700 tons
of subeconomic resources averaging 1.25 percent Cr₂O₃, 0.45
percent Ni, and 0.03 percent Co.

Chrysotile asbestos veinslets occur in widely scattered
zones throughout the ultramafic sill-like mass south of Red
Mountain. No resources were identified.

Several small jade occurrences lie within the roadless
area. However, prospecting appears to have been unsucce-
sful.

East Fork Roadless Area

The East Fork Roadless Area, which lies at the north
end of the Yolla Bolly-Middle Eel Wilderness, encompasses
6,200 acres. There has been no production of minerals within
the area. The only claim was a group of five claims
located along a zone of sporadic pods of metachert within the
Franciscan rocks east of Black Rock Mountain (fig. 1). Some
of these pods contain minor amounts of manganese. Prospect
workings consist of one shallow pit. The East Fork Roadless Area is considered to have a very low mineral resource potential.

Murphy Glade Roadless Area

The Murphy Glade Roadless Area, encompassing 900 acres lies just to the east of the East Fork Roadless Area. There has been no mineral production within the area, and no claims or mineralized areas were found. Mineral resource potential is low.

Wilderness Contiguous Roadless Area

The Wilderness Contiguous Roadless Area consists of two separate parcels, totaling 10,700 acres in area, at the south end of the Yolla Bolly-Middle Eel Wilderness. No mineralized areas, mines, or prospects were found, and no mineral resources are known to occur in the roadless area.

ASSESSMENT OF MINERAL RESOURCE POTENTIAL

The mineral resource potential (fig. 2) for manganese and nickel in the Yolla Bolly-Middle Eel Wilderness is low. Although resources were calculated for both commodities, these resources are submarginal because of limited tonnages, remoteness, absence of water, and distance from processing facilities.

No localities with mineral resource potential are known in the East Fork, Murphy Glade, or Wilderness Contiguous Roadless Areas. All known and potential resources within the roadless areas occur in the Big Butte-Shinbone Roadless Area. Resources within this roadless area include manganese at the Blue Jay mine and chromite at the Grubstake prospect. Although there may be additional occur

references of similar grade nearby, the mineral resource potential is low because of small tonnages and low grades. Extension of known deposits would probably be deeper with greater thickness of overburden.

REFERENCES CITED

Blake, M. C., Jr., and Jayko, A. S., 1983a, Geochemical map of the Yolla Bolly-Middle Eel Wilderness and adjacent roadless areas, northern California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1595-C [in press].


O'Brien, J. C., 1985, Mines and mineral resources of Trinity County, California: California Division of Mines and Geology County Report 4, 125 p.


Figure 1.—Index map of study area, showing locations of Yolla Bolly-Middle Eel Wilderness and adjacent roadless areas, northern California.
Figure 2.—Areas of mineral resource potential in the study area.