DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-1476-B

CORRELATION OF MAP UNITS

Qal	QUATERNARY
Tf, Tm	TERTIARY(?)
Kd	CRETACEOUS(?)
Ks	CRETACEOUS
Kkb	CRETACEOUS AND CRETACEOUS(?)
KJf, KJm	CRETACEOUS OR JURASSIC
Trw	TRIASSIC(?)
Trg	
MzPzu	MESOZOIC AND PALEOZOIC(?)

LIST OF MAP UNITS

Qal	ALLUVIAL DEPOSITS, UNDIVIDED (QUATERNARY)
Tf	FELSIC PLUTONIC ROCKS (TERTIARY?)--Dominantly tonalite
Tm	MAFIC PLUTONIC ROCKS (TERTIARY?)--Dominantly gabbronorite
Kd	DIORITE SILL (CRETACEOUS?)--Extensively altered
Ks	SITKA GRAYWACKE (CRETACEOUS)
Kkb	KELP BAY GROUP (CRETACEOUS AND CRETACEOUS?)--Metasedimentary and metavolcanic rocks
KJf	FELSIC PLUTONIC ROCKS (CRETACEOUS OR JURASSIC)--Dominantly granodiorite
KJm	MAFIC PLUTONIC ROCKS (CRETACEOUS OR JURASSIC)--Dominantly quartz diorite and diorite
Trw	WHITESTRIPE MARBLE (TRIASSIC?)
Trg	GOON DIP GREENSTONE (TRIASSIC?)
MzPzu	UNDIVIDED MESOZOIC AND PALEOZOIC(?)--Metamorphic, metavolcanic, and metasedimentary rocks

STUDY AREA BOUNDARY

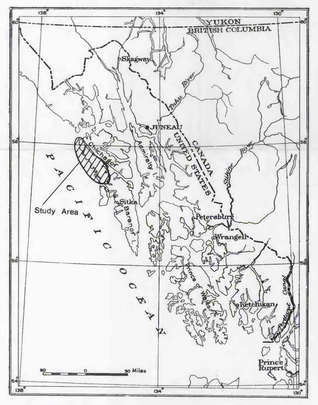
CONTACT--Approximately located; dotted where concealed

Doolth Mountain Area Au-Ag — AREA OF HIGH MINERAL POTENTIAL, SHOWING COMMODITY AND NAME OF AREA

A — AREA OF MODERATE MINERAL POTENTIAL--Letter indicates name of area as follows:
A, Lisianski gold area; B, Squid Bay nickel-copper-cobalt area; C, Mt. Baker copper area; D, West Coast gold area; E, Slocum Arm molybdenum area

a — AREA OF ANOMALOUS GEOCHEMICAL SAMPLES--Letter indicates area anomalous in elements as follows:
a, chromium, cobalt, nickel; b, chromium, cobalt, copper, gold, lead, molybdenum, nickel; c, copper, gold, lead; d, copper, lead, silver, zinc; e, chromium, copper, gold, lead, nickel, uranium; f, chromium, cobalt, copper, gold, lead, nickel; g, chromium, cobalt, copper, molybdenum, nickel

x^2 MINES AND PROSPECTS--Number indicates name of deposit as follows:
1, Bon Tara mine; 2, Goldwin mine; 3, Bohemia Basin prospect; 4, Apex mine; 5, El Nido mine; 6, Squid Bay prospect; 7, Lost Cove prospect; 8, Cobol-Mine Mountain mine; 9, Mt. Baker prospect; 10, Mirror Harbor prospect; 11, New Chichagof Mining Syndicate prospect; 12, Colden Hand Apex prospect; 13, McKallick Lode prospect; 14, Hirst-Chichagof mine; 15, Chichagoff mine; 16, Alaska Chichagof mine; 17, Jumbo mine; 18, American Gold Company prospect; 19, Baney prospect; 20, Falcon Arm prospect; 21, Cobol mine; 22, Slocum Arm area prospect



INDEX MAP SHOWING LOCATION OF STUDY AREA

STUDIES RELATED TO WILDERNESS

The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts require the U.S. Geological Survey and the U.S. Bureau of Mines to survey certain areas on Federal lands to determine their mineral resource potential. 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 resource potential survey of the Western Chichagof-Yakobi Islands Wilderness Study Area in the Tongass National Forest, Alaska. About 65 percent of the study area was established as a wilderness on December 2, 1980, under the Alaska National Interest Lands Conservation Act (P.L. 96-487).

MINERAL RESOURCE POTENTIAL
SUMMARY STATEMENT

The mineral resource potential of western Chichagof and Yakobi Islands, southeastern Alaska, has been assessed on the basis of geological and geochemical studies and examination of geochemical anomalies, known claims, prospects, and mines.

Four areas of high mineral potential and five areas of moderate mineral potential have been delineated on the basis of past production, claim and prospect density, known resources, deposit-type similarities, and geochemical anomalies. Areas with high mineral resource potential are:

1. Bohemia Basin area--Measured and inferred reserves total to 20.1 million tons containing 0.31 percent nickel, 0.18 percent copper, and 0.04 percent cobalt.
2. Mirror Harbor area--This area has smaller tonnage but similar grade to Bohemia Basin, and a nearby inferred reserve of 8,000 tons containing 1.57 percent nickel, 0.88 percent copper, and some cobalt.
3. Apex-El Nido area--This area has produced 17,000 oz of gold and 2,400 oz of silver and may have reserves of 25,000 oz of gold.
4. Doolth Mountain area--Past production has been 795,000 oz of gold and 233,000 oz of silver, and the area has inferred reserves and inferred marginal reserves of about 316,000 oz of gold and 88,000 oz of silver. Identified and undiscovered resources are probably about equal to past production.

Areas of moderate potential for development of mineral deposits are:

A. Lisianski gold area--gold, silver, and tungsten.
B. Squid Bay-Lost Cove area--nickel, copper, and cobalt.
C. Mt. Baker copper area--copper.
D. West Coast gold area--gold and silver.
E. Slocum Arm molybdenum area--molybdenum.

Gold and silver were produced at several mines from 1906 through the early 1940's from tabular ore bodies occurring in fault-controlled quartz fissure veins. Nickel-copper-cobalt magmatic-segregation deposits in noritic Tertiary(?) intrusives were discovered at Mirror Harbor in 1911 and at Bohemia Basin in 1920. These deposits are presently being explored.

GEOLOGIC SETTING

The sedimentary and metamorphic rocks of the Western Chichagof and Yakobi Islands Study Area can be divided into four roughly linear northwest-trending stratigraphic belts, which are progressively younger toward the southwest (Johnson and Karl, 1982). The oldest rocks form a discontinuous belt, along Hoonah Sound and Lisianski Inlet, of sedimentary and volcanic rocks metamorphosed to medium to high grade. Paleozoic(?) hornfels, schist, gneiss, and marble are found in the northeastern part of this belt, and Mesozoic and (or) Paleozoic(?) amphibolite, amphibole gneiss, metavolcanic rock, volcaniclastic metasedimentary rock, and siliceous metasedimentary rock are found in the southwestern part. The second belt of rocks, to the southwest, is composed of the Triassic(?) Goon Dip Greenstone and Whitestripe Marble. These two eastern belts have been intruded by Jurassic or Cretaceous diorite, quartz diorite, and tonalite plutons that exhibit a general northwest foliation.

A major fault that has been correlated with the Border Ranges fault to the northwest in south-central Alaska (Decker and Johnson, 1981) forms the boundary between the belts described above and the two younger belts to the southwest. This fault, representing a Late Cretaceous or early Tertiary subduction zone, juxtaposes rocks of the Cretaceous and Cretaceous(?) Kelp Bay Group, which constitute the third belt, against the Triassic(?) greenstone and marble.

The Kelp Bay Group consists of a complex assemblage of Cretaceous metasedimentary and metavolcanic rocks including greenschist, phyllite, greenstone, marble, chert, graywacke, metatuff, and argillite. Typically, these units are composed of highly deformed, generally irregular, fault-bounded blocks. The fourth and youngest belt, southwest of the Kelp Bay Group and in fault contact with it, is composed of sandstone, siltstone, mudstone, and massive graywacke of the Cretaceous Sitka Graywacke. This belt exhibits the effects of very weak regional metamorphism. All of the belts have been intruded by Tertiary(?) plutonic rocks following movement on the Border Ranges fault. These intrusives are dominantly equidimensional stocks composed of nonfoliated tonalite and quartz diorite; however, they also include lesser amounts of granite, granodiorite, diorite, and gabbronorite. Thermal metamorphic aureoles as high as hornblende hornfels facies surround many of these plutons.

GEOCHEMICAL ANOMALIES

As part of this mineral resource assessment, stream sediment, panned concentrate from stream sediment, water, and bedrock were sampled and analyzed in an attempt to define areas of anomalous metal concentration. Individual element anomaly maps were generated and the results combined to define geochemically anomalous areas. The important anomalous areas, along with the elements which are anomalous in each, are shown on this map. Gold resources and nickel-copper-cobalt resources are described in more detail in the accompanying pamphlet.

A number of the anomalous areas can be easily related to known mineralization. All areas designated as having high mineral potential are also areas of anomalous geochemical samples. Other anomalous areas include zones of known mineralization, but are much larger than the known mineralization. The remaining anomalous areas do not correlate with known mineralization. These areas range widely in size and geochemical intensity and in some places cross formation and terrane boundaries.

Anomalous areas not corresponding to known mineralization may indicate buried or otherwise undetected mineralization and may provide targets for future exploration. However, these areas may also be a result of analytical and sampling variance, and if so, provide little information about mineralization.

Although much of the area anomalous in copper is underlain by metavolcanic rock, bedrock composition does not seem to correlate well with copper content. Areas that are primarily anomalous in nickel, cobalt, chromium, and copper tend to be localized around mafic Tertiary(?) plutonic rocks and may be indicators of nickel-copper-cobalt mineralization similar to known mineralization. Other areas, which are mainly anomalous in copper, lead, zinc, molybdenum, silver, and gold, tend to be localized near major faults.

REFERENCES

Decker, J. E., and Johnson, B. R., 1981, The nature and position of the Border Ranges fault on Chichagof Island, in Albert, N.R.D., and Hudson, Travis, eds., The U.S. Geological Survey in Alaska; Accomplishments during 1979: U.S. Geological Survey Circular 823-B, p. B102-B104.

Johnson, B. R., and Karl, S. M., 1982, Reconnaissance geologic map of the Western Chichagof-Yakobi Islands Wilderness Study Area, southeastern Alaska: U.S. Geological Survey Miscellaneous Field Studies Map MF-1476-A, scale 1:125,000 (in press).

Base from U.S. Geological Survey 1:250,000,
Mt. Fairweather, 1961, Juneau, 1962, Sitka, 1951

SCALE 1:125 000
2 0 2 4 6 8 MILES
2 0 2 4 6 8 KILOMETERS

Geology generalized by B. R. Johnson and S. M. Karl, 1980

MINERAL RESOURCE POTENTIAL MAP OF THE WESTERN CHICHAGOF AND YAKOBI ISLANDS WILDERNESS STUDY AREA, SOUTHEASTERN ALASKA

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