

STRATEGIC AND CRITICAL MINERAL DEVELOPMENT POTENTIAL
OF THE CHUGACH NATIONAL FOREST, SOUTHCENTRAL ALASKA

by Robert B. Hoekzema, Alaska Field Operations Center, Anchorage Field
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UNIT OF MEASURE ABBREVIATIONS USED
IN THIS REPORT

yd ³	cubic yard(s)
ft	foot, feet
in.	inch(es)
lb	pound(s)
oz	ounce(s)
%	per cent
ppm	parts per million
mi ²	square mile(s)
yr	year(s)

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Robert B. Hoekzema^{1/}

ABSTRACT

A mineral investigation of the Chugach National Forest, Alaska was conducted jointly by the U.S. Geological Survey and the U.S. Bureau of Mines from 1979 to 1983 as part of the RARE II program. The Geological Survey mapped geology and compiled and evaluated geochemical and geophysical data. The Bureau of Mines investigated mines, prospects, and mineral occurrences.

This report is one of several Bureau reports concerning mineral development potential of the Chugach National Forest. Anomalous data for selected strategic and critical commodities including antimony, chromium, cobalt, fluorspar, gallium, manganese, nickel, quartz crystals, tin, and tungsten have been compiled from previously published Bureau reports and unpublished Bureau data. Deposits containing anomalous quantities of the above commodities have been identified and given mineral development potential ratings.

Moderate mineral development potential exists for two manganese, three nickel, and one cobalt deposit. Cobalt, gallium, and nickel could be produced as by-products should copper deposits such as those on Latouche and Knight Island be developed. Low mineral development potential exists for antimony, chromium, fluorspar, and tungsten and

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other cobalt, manganese, and nickel deposits. The mineral development potential for tin and quartz is unknown.

INTRODUCTION

A mineral resource investigation of the Chugach National Forest (CNF) was conducted by an interagency team made up of members of the U.S. Geological Survey (USGS) and the Bureau of Mines (Bureau). This investigation, initiated under the RARE II program, started in 1979 and was completed in 1983. The USGS compiled and evaluated data on the regional geology, geochemistry, and geophysics. The Bureau compiled and evaluated data on mines, prospects, and mineral occurrences, and areas of mineralization, which are summarized in MLA 5-84 (13)^{2/}. A joint USGS/Bureau summary report, to be published by the USGS as MF-1645A (20), will describe the geology, geophysics, geochemistry, and the overall mineral resource potential of the study area. This report evaluates the mineral development potential for selected strategic and critical minerals in the CNF.

STUDY AREA AND LAND STATUS

The CNF is located in southcentral Alaska (fig. 1). Federal, state, city, and private land holdings (including native regional corporation selections) are present within the area studied. The surface area of

^{2/}Underlined numbers in parentheses refer to items in the list of references preceding the appendix.

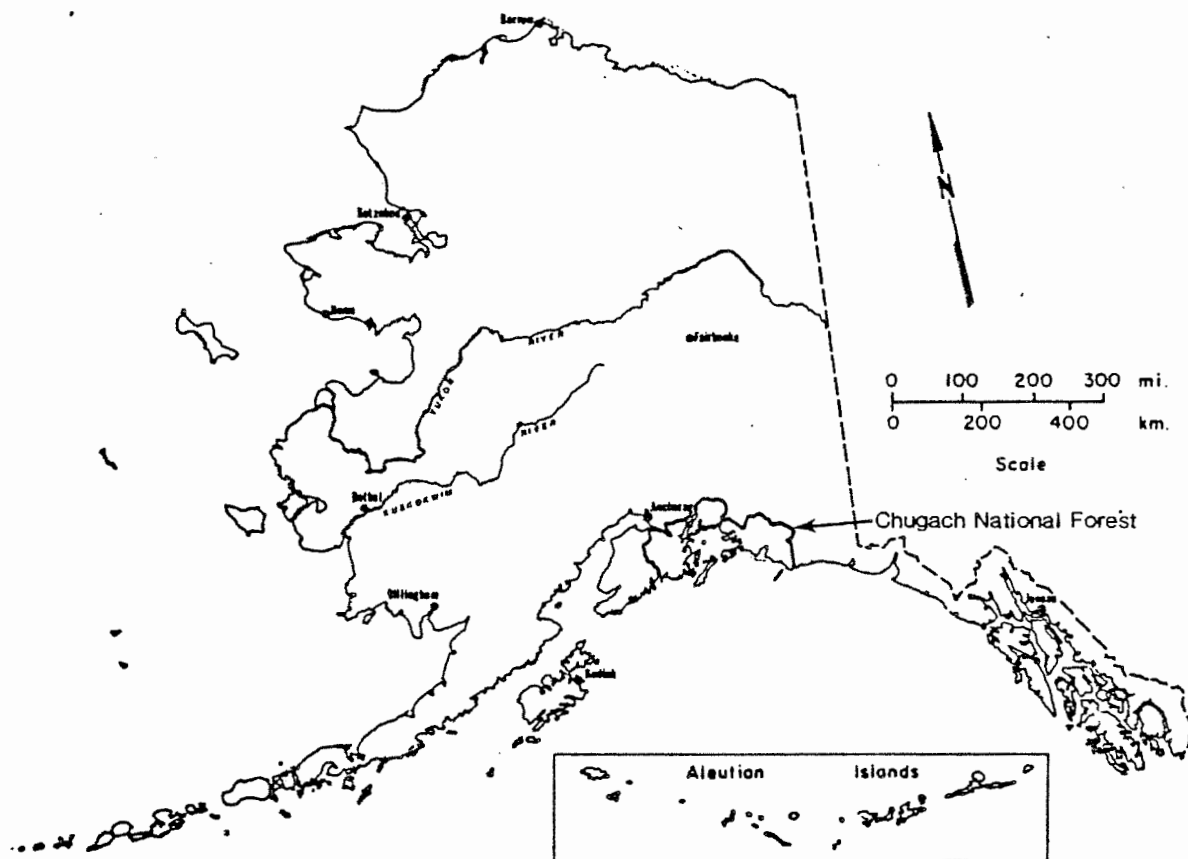


FIGURE 1. - Location of Chugach National Forest area, Southcentral Alaska

the CNF is more than 5.9 million acres. The CNF boundaries and land status are shown on figure 2.

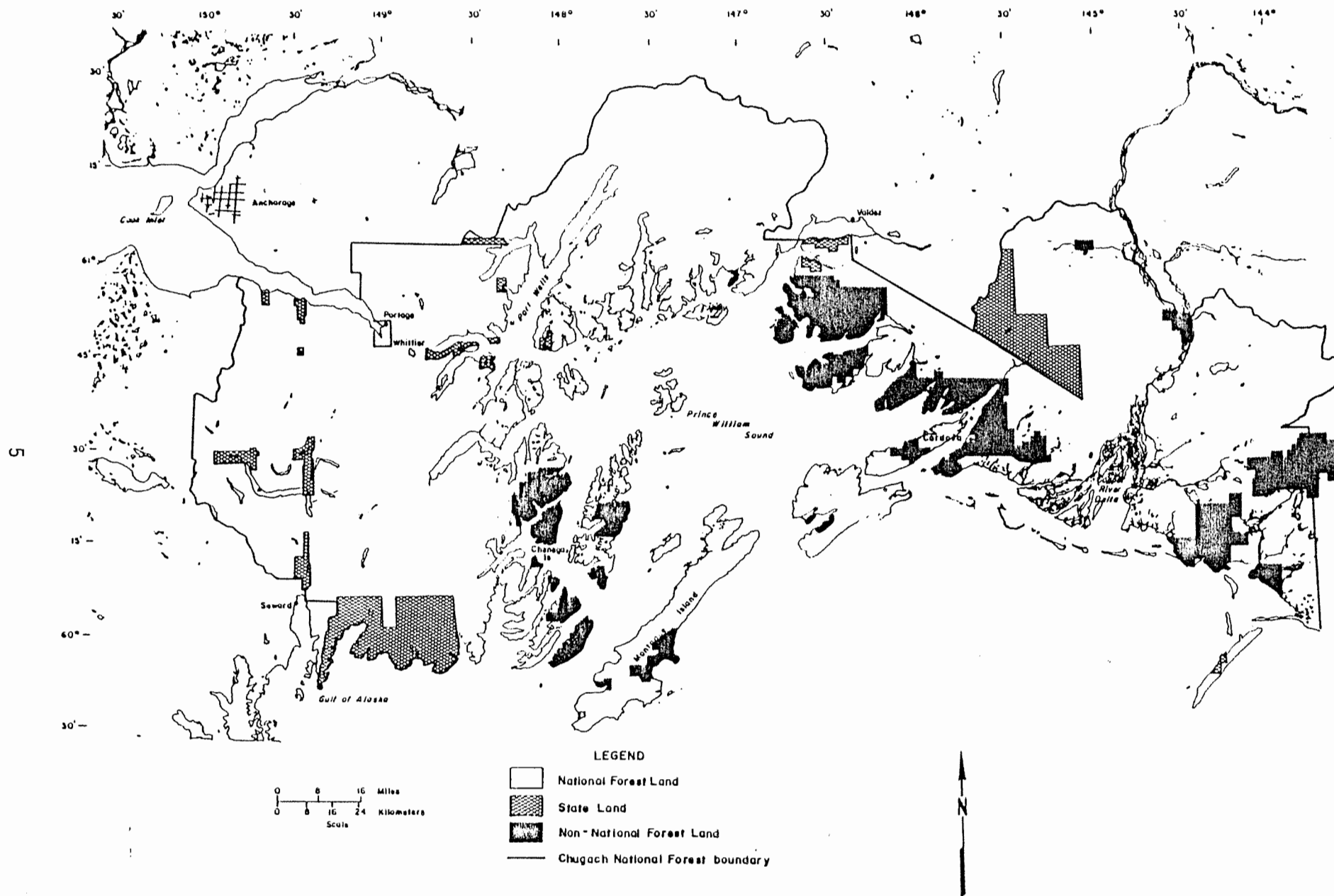
ACKNOWLEDGEMENTS

The authors thank Steve Nelson of the USGS for sharing information concerning several mineral occurrences in the CNF and Dr. S. A. Naidu of the Institute of Marine Sciences, University of Alaska, Fairbanks for supplying bottom sample data collected in the vicinity of Chenega Island.

BUREAU OF MINES STUDIES

The Bureau initiated pre-field office work and a literature search in 1979. Data compilation on mineralization, production, and mining history included the review of commonly available literature, company files, files at the Technical Data Section of the USGS at Menlo Park, California, records of the Assay Office of the U.S. Mint at Seattle, Washington, and the Bureau's Minerals Availability System (MAS) files in Juneau, Alaska. Requests for information were made to individuals familiar with the area or having historical data. All data were reviewed and evaluated to obtain an historical overview.

Fieldwork in 1979 consisted mostly of regional reconnaissance of the CNF with more detailed follow-up work in 1980, 1981, and 1982. Field work during this project focused primarily on metallic deposits and included locating mineralized deposits, mapping accessible workings, identifying the geologic setting, and evaluating the extent of mineralization. Standard Bureau sampling procedures were used at the



lode deposits. Stream sediment and pan concentrate samples were collected near mineralized areas. Placers were sampled either by sluicing and panning 0.1 yd³ samples or by running a suction dredge for a determined period of time. In addition to locating mines, prospects, and occurrences the Bureau investigated geochemically anomalous areas to determine if unreported zones of mineralization were present.

The degree of the mineral assessment is not uniform across the study area. Differences are due to the amount of historic data available, access, topography, surface cover, and revision of study area boundaries. The evaluation is most complete in areas of historic mining activity and weakest for the eastern part of the study area, especially for the 1980 College Fiord and Rude-Copper River additions (fig. 2). These additions to the CNF included large areas of relatively inaccessible land, mostly ice covered or with few reported mineral occurrences and have received the least amount of geologic field work. Mineralization in these areas may have been by-passed or overlooked at the time of peak exploration activity because of surface cover, location, and access problems.

RESULTS

This report compiles anomalous data for selected strategic and critical minerals identified in the CNF. The term "minerals" as used here includes ores, metals, materials processed from ores, and other naturally occurring inorganic substances. Anomalous values were obtained by visually inspecting previously published (4, 10, 12-13,

17) and unpublished Bureau sample data. Threshold (anomalous) values used in this report for each commodity discussed are listed in table 1.

The appendix contains descriptions of individual deposits and rates the mineral development potential of their major contained commodity(s) using one of four levels: "high," "moderate," "low," or "unknown." These ratings are estimates based on an evaluation of grades and extent of mineralization as well as geological and geochemical factors. Mineral deposit locations are shown on figure 3.

A deposit of high mineral development potential would, by definition, have high grades and probable continuity of mineralization. A deposit of moderate mineral development potential would have either a high metal content or continuous mineralization identified but not both. A deposit with low mineral development potential would contain uneconomic grades and/or show little evidence of continuity of mineralization. For example, a base metal deposit with grades below 0.1% would rank as low. Similarly, mineralized narrow fractures of a few in. in width and/or with lateral extent of up to several tens of ft with no evidence of becoming larger would rank as low. Unknown mineral development potential has been assigned to occurrences having little or no available geologic data and to isolated geochemical anomalies.

STRATEGIC AND CRITICAL MINERAL COMMODITIES

Under provisions of the Strategic and Critical Mineral Stock Piling Revision Act of 1979 (P. L. 96-41) strategic and critical minerals are defined as those: (1) necessary to supply military, industrial, and essential civilian needs during a national defense emergency; and (2)

TABLE 1. - Threshold and ranges of anomalous values for selected strategic and critical mineral commodities identified in the Chugach National Forest area, Alaska

Element	Threshold (ppm)	Range (ppm)
Antimony.....	200	200-3400
Chromium.....	700	700-5000
Cobalt.....	100	100-2,000
Fluorine.....	175,000	175,000
Gallium.....	50	50-100
Manganese.....	7,000	7,000-370,000
Nickel.....	300	300-8,300
Tin.....	10	10-5,000
Tungsten.....	40	40-3,900

not found or produced in the United States in sufficient quantities to meet emergency needs. Some factors which indicate criticality are:

- (1) adequacy of production capacity and supporting domestic reserves;
- (2) substitution and recycling possibilities; and (3) degree of import dependence and wartime vulnerability (26).

Table 2 lists seventy-five commodities stockpiled by the U.S. Government because they are considered strategic and critical. Underlined commodities will be discussed in this report. Commodities present in the CNF such as copper, lead, silver, and zinc are not discussed here as they are covered in MLA 5-84 (13).

Anomalous concentrations of antimony, chromium, cobalt, fluorine, gallium, manganese, nickel, quartz crystals, tin, and tungsten have been identified in samples collected from mines, prospects, and occurrences located in the CNF (table 3). Each of these commodities is discussed in more detail below. Deposit locations are shown on figure 3 and individual deposit summaries are included in the appendix.

TABLE 2. - Seventy-five Strategic and Critical
Mineral Commodities Stockpiled by the
U.S. Government(26)

Aluminum	Manganese dioxide, battery-grade, natural
Aluminum oxide, abrasive	Manganese dioxide, battery-grade, synthetic
Aluminum oxide, fused, crude	<u>Manganese ore, chemical</u>
<u>Antimony</u> ^{1/}	<u>Manganese ore, metallurgical</u>
Asbestos, amosite	Manganese, ferro, high-carbon
Asbestos, chrysotile	Manganese, ferro, medium-carbon
Bauxite, abrasive	Manganese, ferro, silicon
Bauxite, metal-grade, Jamaica	Manganese, metal, electrolytic
Bauxite, metal-grade, Suriname	Mercury
Bauxite, refractory	Mica, muscovite, block
Beryl ore	Mica, muscovite, film
Beryllium copper master alloy	Mica, muscovite splittings
Beryllium metal	Mica, phlogopite block
Bismuth	Mica, phlogopite splittings
Cadmium	<u>Nickel</u>
Chromite, chemical	Platinum group, iridium
Chromite, metallurgical	Platinum group, palladium
Chromite, refractory	Platinum group, platinum
Chromium, ferro, high-carbon	<u>Quartz crystals</u>
Chromium, ferro, low-carbon	<u>Rutile</u>
Chromium, ferro, silicon	Sapphire and ruby
<u>Chromium, metal</u>	Silicon carbide
<u>Cobalt</u>	Silver
Columbium carbide powder	Talc, steatite, block and lump
Columbium concentrates	Tantalum carbide powder
Columbium, ferro	Tantalum metal
Columbium, metal	Tantalum minerals
Copper	Thorium nitrate
Diamond dies, small	<u>Tin</u>
Diamond crushing bort	Titanium sponge
Diamond industrial stones	Tungsten carbide powder
Fluorspar, acid-grade	Tungsten, ferro
Fluorspar, metallurgical	Tungsten, metal powder
Graphite, natural, Ceylon	<u>Tungsten ores and concentrates</u>
Graphite, natural, Malagasy	<u>Vanadium, ferro</u>
Graphite, natural, other	Vanadium, pentoxide
Iodine	Zinc
Lead	

^{1/}Underlined commodities are discussed in this report.

TABLE 3. - Anomalous localities of selected Critical and Strategic Minerals, Chugach National Forest area, Alaska

Commodities	Map numbers 1/
Antimony	74, 75, 85, 87, 88, 89
Chromium	3, 7, 10, 18, 20, 21, 25, 26, 28, 29, 32, 35, 36, 37, 39, 40, 42, 45, 46, 48, 50, 52, 54, 55, 64, 66, 67, 77, 82, 83, 90, 91, 92, 93
Cobalt	8, 12, 13, 15, 16, 17, 18, 19, 21, 22, 28, 31, 33, 34, 36, 37, 39, 40, 41, 44, 45, 50, 51, 52, 53, 59, 60, 62, 63, 65, 73, 86
Fluorspar	71
Gallium	13, 15, 18, 19, 23, 34, 37, 38, 61, 86
Manganese	1, 3, 4, 5, 6, 14, 58, 65, 66, 68, 80, 84
Nickel	30, 43, 44, 45, 47, 49, 50, 52, 64, 66, 67, 72, 73, 90, 91, 92
Quartz crystals	79
Tin	2, 9, 15, 19, 27, 38, 56, 57, 76, 80, 81
Tungsten	11, 24, 69, 70, 78, 79, 80

1/Numbers refer to locations shown on figure 3.

ANTIMONY

Antimony has been identified in concentrations exceeding 200 ppm from the occurrences listed on table 3. Antimony is also present in trace amounts (<20 ppm) in several gold-bearing quartz veins located in the Valdez, Port Wells, and Kenai Peninsula areas. Two areas having low mineral development potential for antimony on the CNF are the Barry Arm-College Fiord and Kenai Lake areas (fig. 4). The Barry Arm prospect (74)^{3/} is reported to have shipped 1,000 lb of antimony ore in 1913 (15). This prospect was not located during the recent study. The K and T Antimony prospect (88) on Kenai Lake has reportedly yielded samples containing up to 4.38% antimony (29). Five Bureau samples contained from 0.015 to 0.34% antimony.

CHROMIUM

Chromium has been identified in concentrations exceeding 700 ppm in samples collected from numerous occurrences throughout the central portions of the CNF (table 3). Anomalous chromium values are associated with mafic rocks exposed on the Resurrection Peninsula, Knight-Evans-Chenega Islands area, Naked Island, Glacier Island, Copper Mountain, Snyder Mountain, and Hinchinbrook Island (fig. 5). Several anomalies were also identified from stream sediment samples collected in the Passage Canal-Port Wells area (fig. 5).

^{3/}Numbers in parentheses not underlined refer to map locations shown on figure 3.

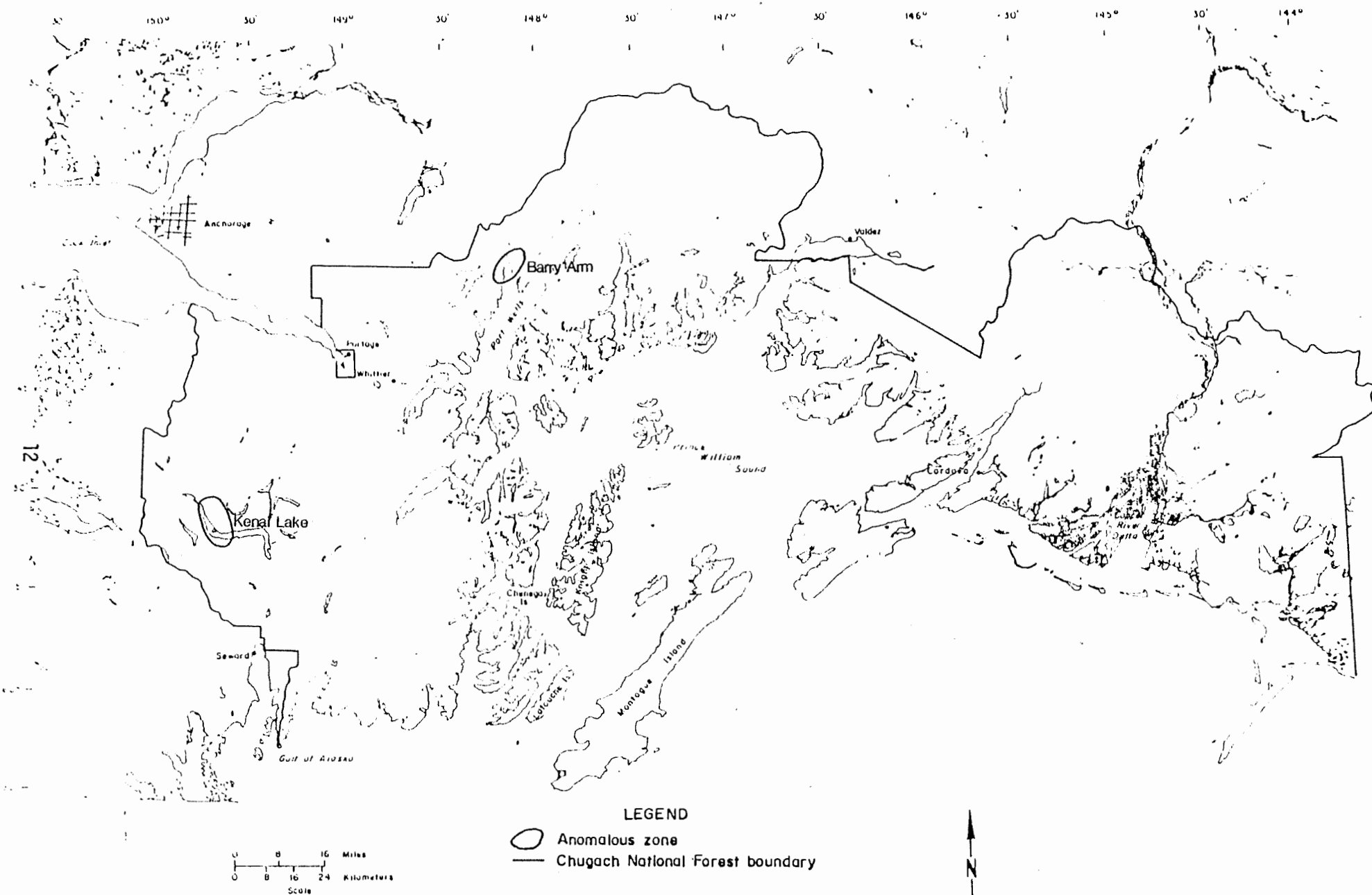


FIGURE 4. - Antimony Anomalies, Chugach National Forest, Alaska

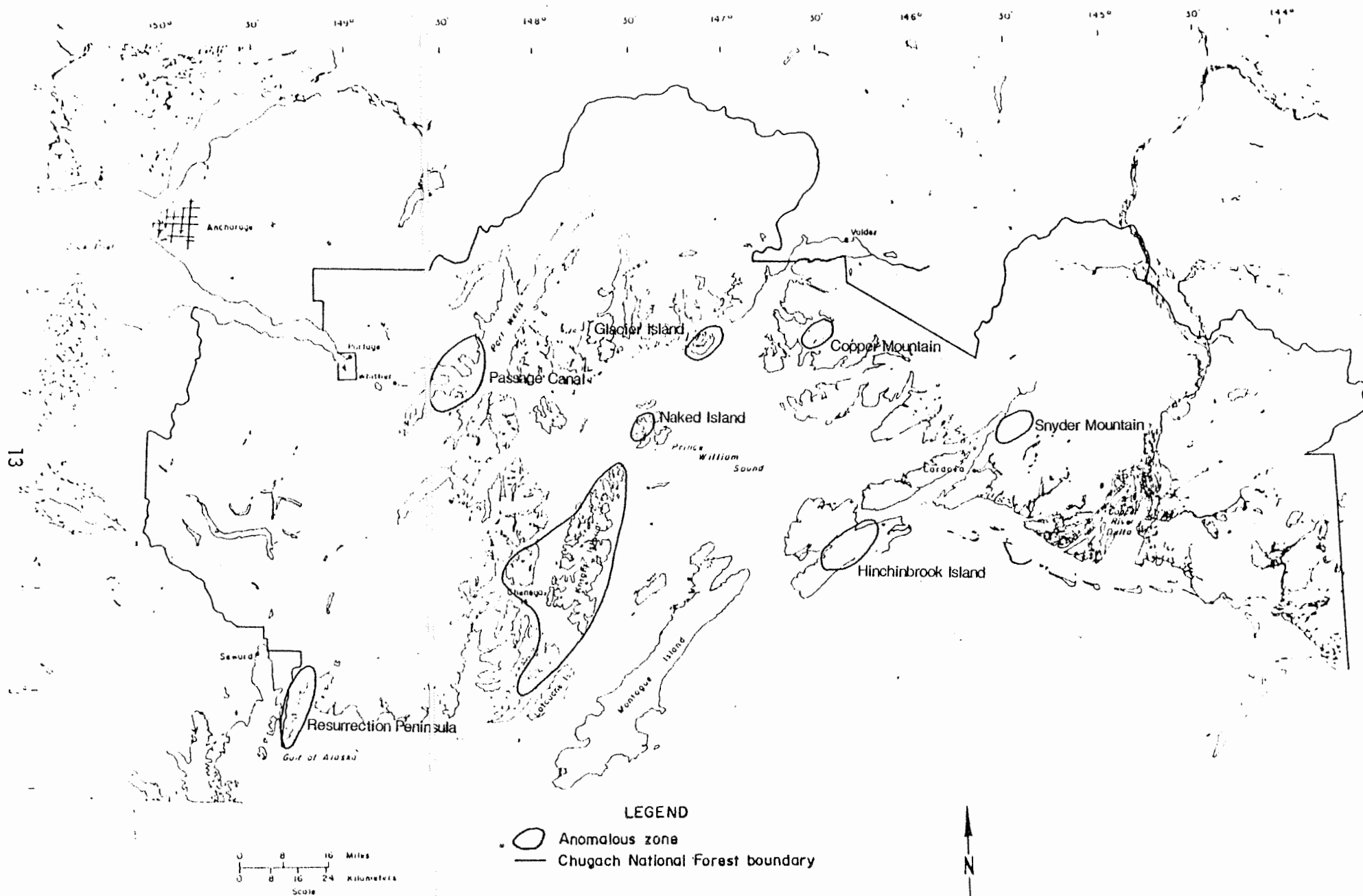


FIGURE 5. - Chromium Anomalies, Chugach National Forest, Alaska

The highest chromium values (0.1 to 0.5%) were obtained from several unnamed occurrences located near Day Harbor (90-93) and from the H. J. Harvey Prospect (52). All chromium occurrences in the CNF have been identified as having low or unknown mineral development potential.

COBALT

Cobalt has been identified in concentrations exceeding 100 ppm in samples collected from numerous occurrences in the CNF (table 3). Anomalous cobalt values are mostly associated with volcanic-hosted massive and semi-massive sulfide deposits on Knight and Glacier Islands, and in the Port Fidalgo-Copper Mountain area (fig. 6). Some cobalt anomalies occur in sediment-hosted sulfide deposits on Latouche Island (59, 60, 62-63) and at Lynx Creek (86) on the Kenai Peninsula. Cobalt is also associated with nickel in a quartz diorite host at Miners River (73).

The highest cobalt values (0.2%) were obtained in copper sulfide mineralization collected from the Chamberlain Bay occurrence (28) on Glacier Island and from sheared quartz diorite at Miners River (73). Several other occurrences yielded samples containing 700 ppm cobalt (18-19, 22, 41, 53). Sulfide deposits within the CNF with moderate mineral development potential for copper could produce by-product cobalt if the cobalt is economically feasible to separate from its sulfide host. The best prospects include the Threeman Mine (18), the Reynolds-Alaska Development Co. (19), and the Chamberlain Bay prospect (28). The Chamberlain Bay (28) prospect has moderate development potential because of its high cobalt content. The Miners River

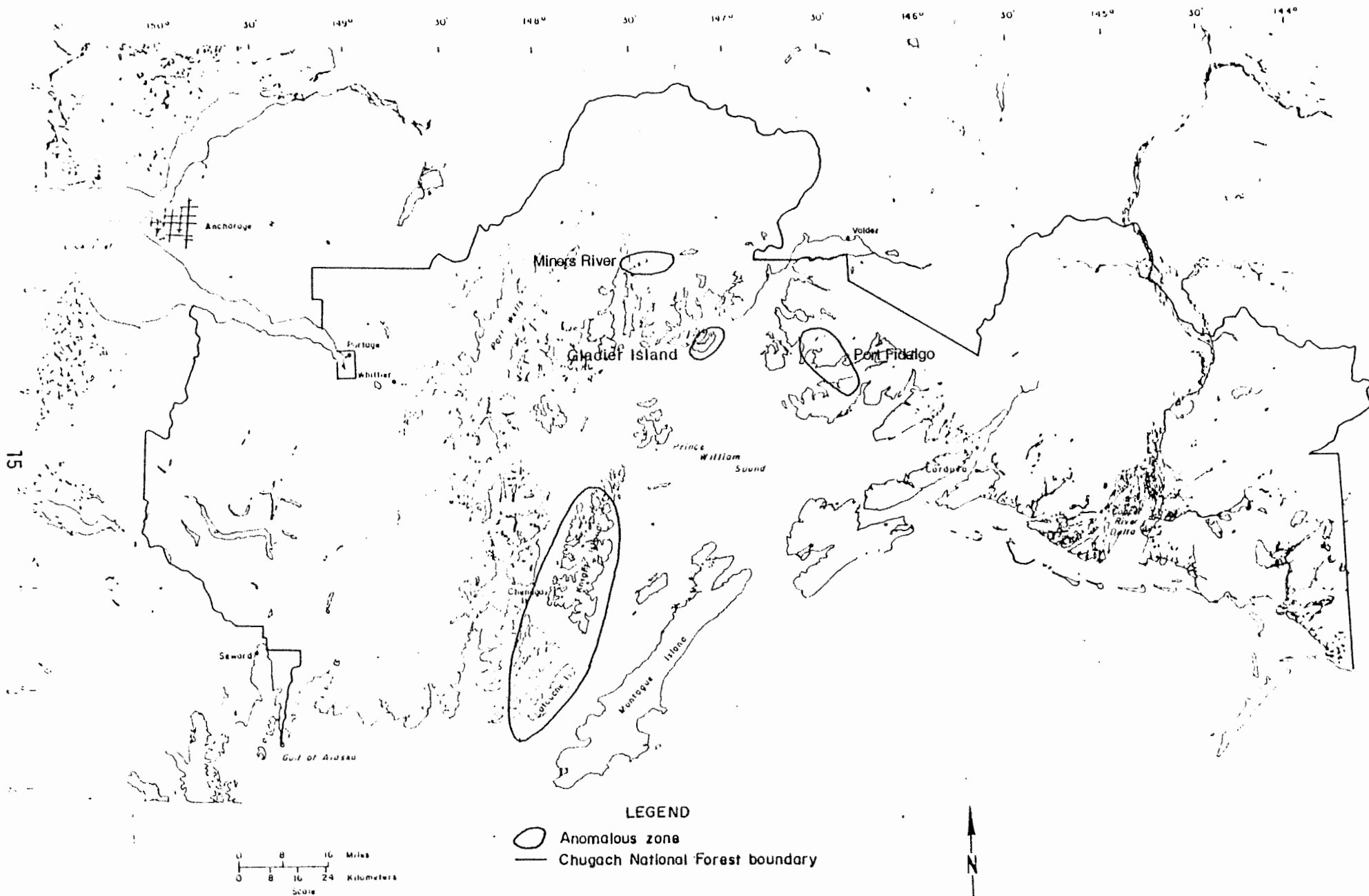


FIGURE 6. - Cobalt Anomalies, Chugach National Forest, Alaska

deposit is considered to have low mineral development potential for cobalt, nickel, and copper because of its low grade. However, this deposit has potential for large reserves.

FLUORSPAR

Fluorite was discovered at the Wells Bay No. 1 occurrence (71) by the Bureau in 1981 (fig. 3). One sample collected across a 100-ft-long by 3- to 12-ft-wide zone contained 17.5% fluorine. This occurrence has low mineral development potential. Similar deposits may occur in the Wells Bay area.

GALLIUM

Selected samples collected from several of the massive and semi-massive copper-iron sulfide deposits in the CNF were assayed for their gallium content as part of a Bureau gallium research project begun in Alaska in 1984. Gallium is not currently stockpiled by the U.S. Government. However, its increasing use in high-tech industries warrant its being considered as a strategic and critical commodity. Several copper deposits (15, 18-19, 34, 37-38) in the Port Fidalgo, Solomon Gulch, Lynx Creek, and Knight Island areas (fig. 7) were found to contain detectable gallium in quantities ranging from 50 to 100 ppm (table 3). A preliminary report concerning gallium in Alaska will be published as a Bureau OFR in 1985.

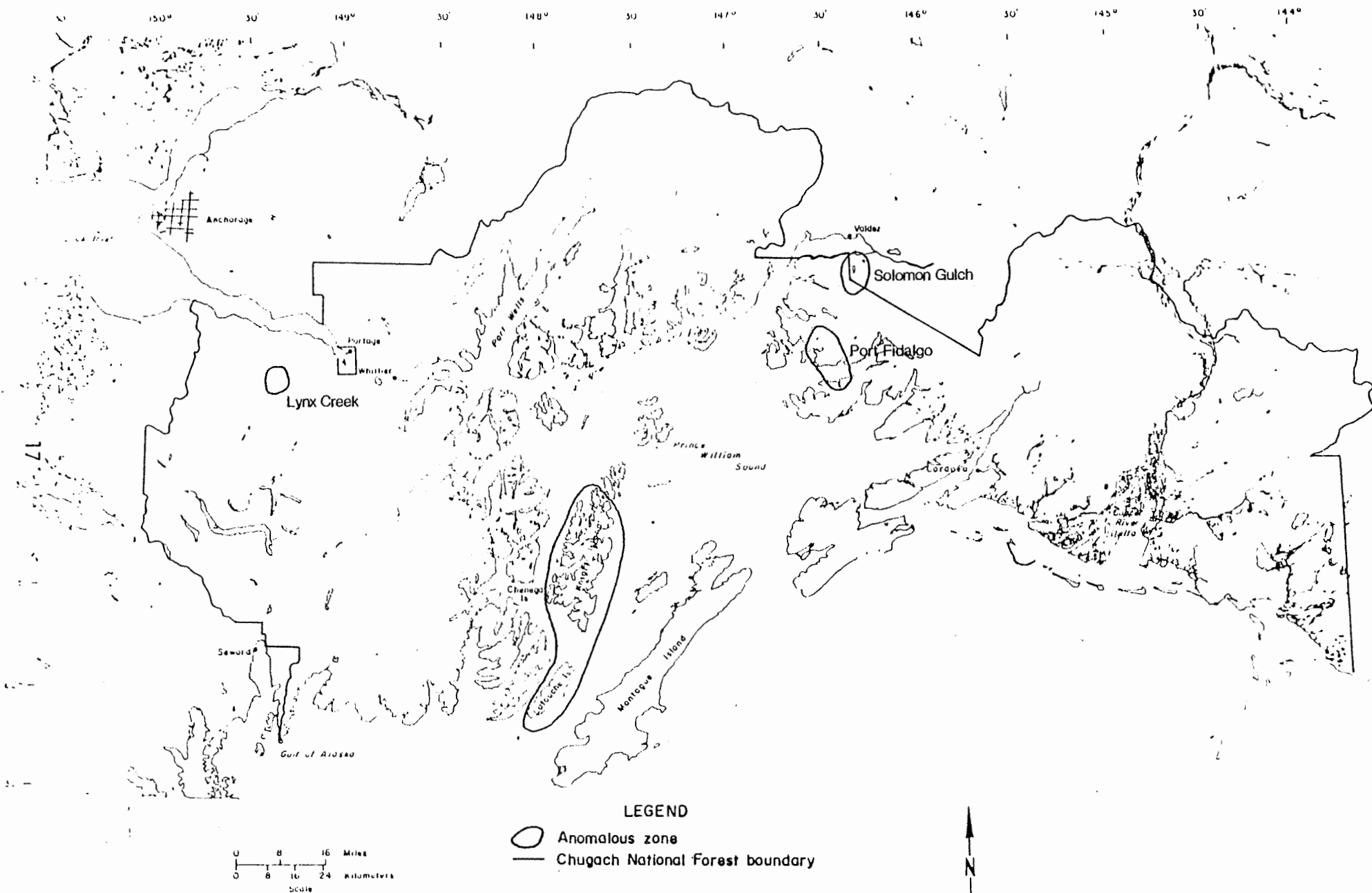


FIGURE 7. - Gallium Anomalies, Chugach National Forest, Alaska

MANGANESE

Manganese has been detected in concentrations exceeding 0.7% in samples collected from the northern end of Montague Island, the Hinchinbrook-Hawkins Island area, the Bainbridge and Chenega Island area, and Blackstone Bay (table 3, figs. 3 and 8).

Two potentially significant manganese occurrences were identified in the CNF during the RARE II study. One deposit was located on Chenega Island (68) by the Bureau in 1981. A description of this deposit was published as MLA 124-82 (17). Mineralization consists of rhodochrosite, pyroxmangite, and magnetite in a calcareous chert interbedded with calcareous shales and phyllites. Two samples were collected which assayed 17 and 37% manganese. Potential for an offshore extension of this deposit is suggested by bottom sampling results. The second deposit (3) was located on Hinchinbrook Island by the USGS. Grab samples of nodular masses from a 30- x 90-ft rubble area assayed 29 to 35% manganese. The Chenega Island and Hinchinbrook Island areas have moderate mineral development potential for manganese.

NICKEL

Nickel has been detected in concentrations exceeding 300 ppm in samples collected from mafic rocks exposed on the Resurrection Peninsula, the Elrington-Chenega-Knight Islands area, and at Miners River (table 3, figs. 3 and 9).

Nickel values are highest (up to 0.83%) in semi-massive to massive copper-iron sulfide mineralization on Knight Island. On Chenega Island, anomalous (up to 200 ppm) nickel values are reportedly

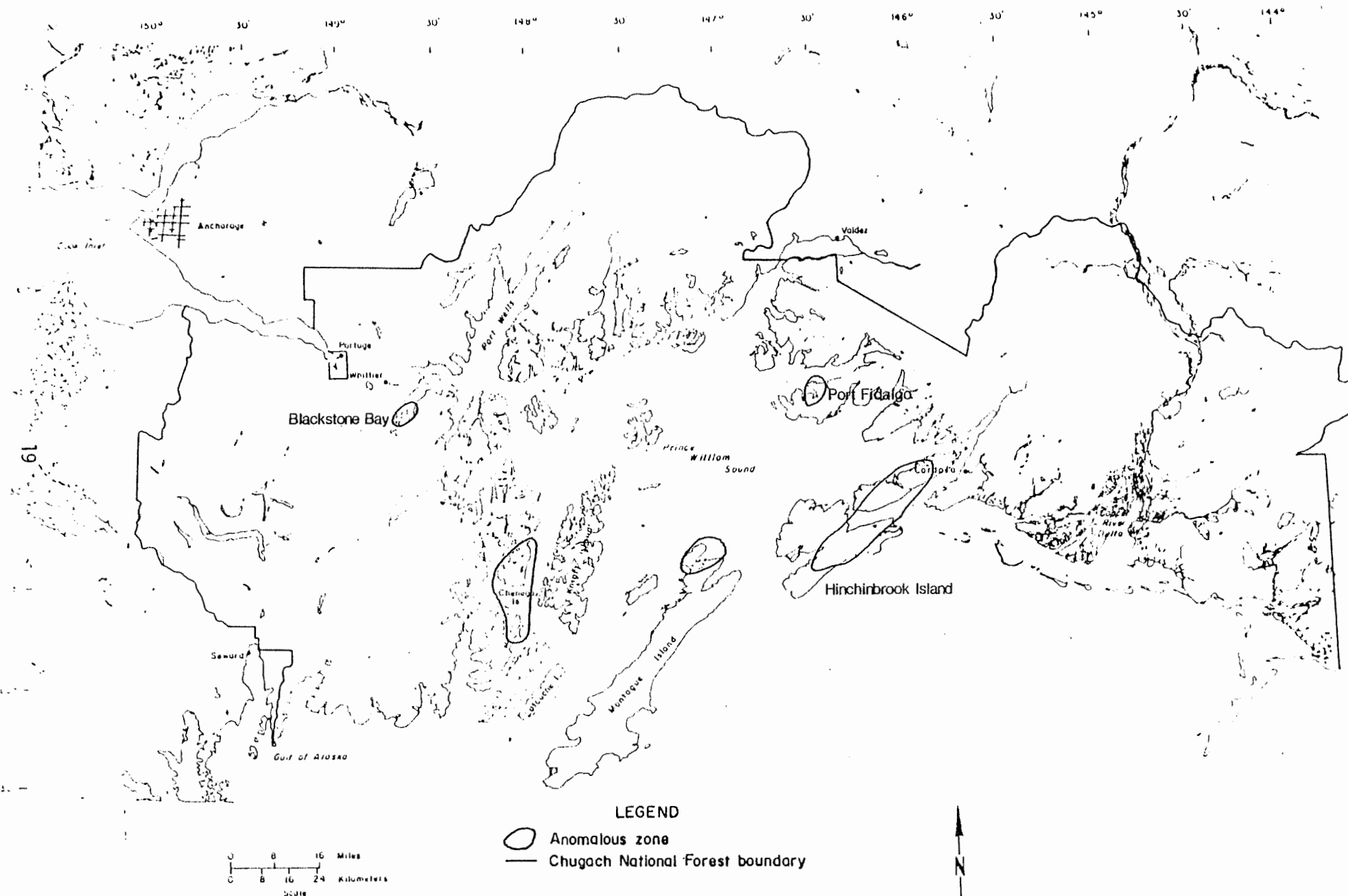


FIGURE 8. - Manganese Anomalies, Chugach National Forest, Alaska

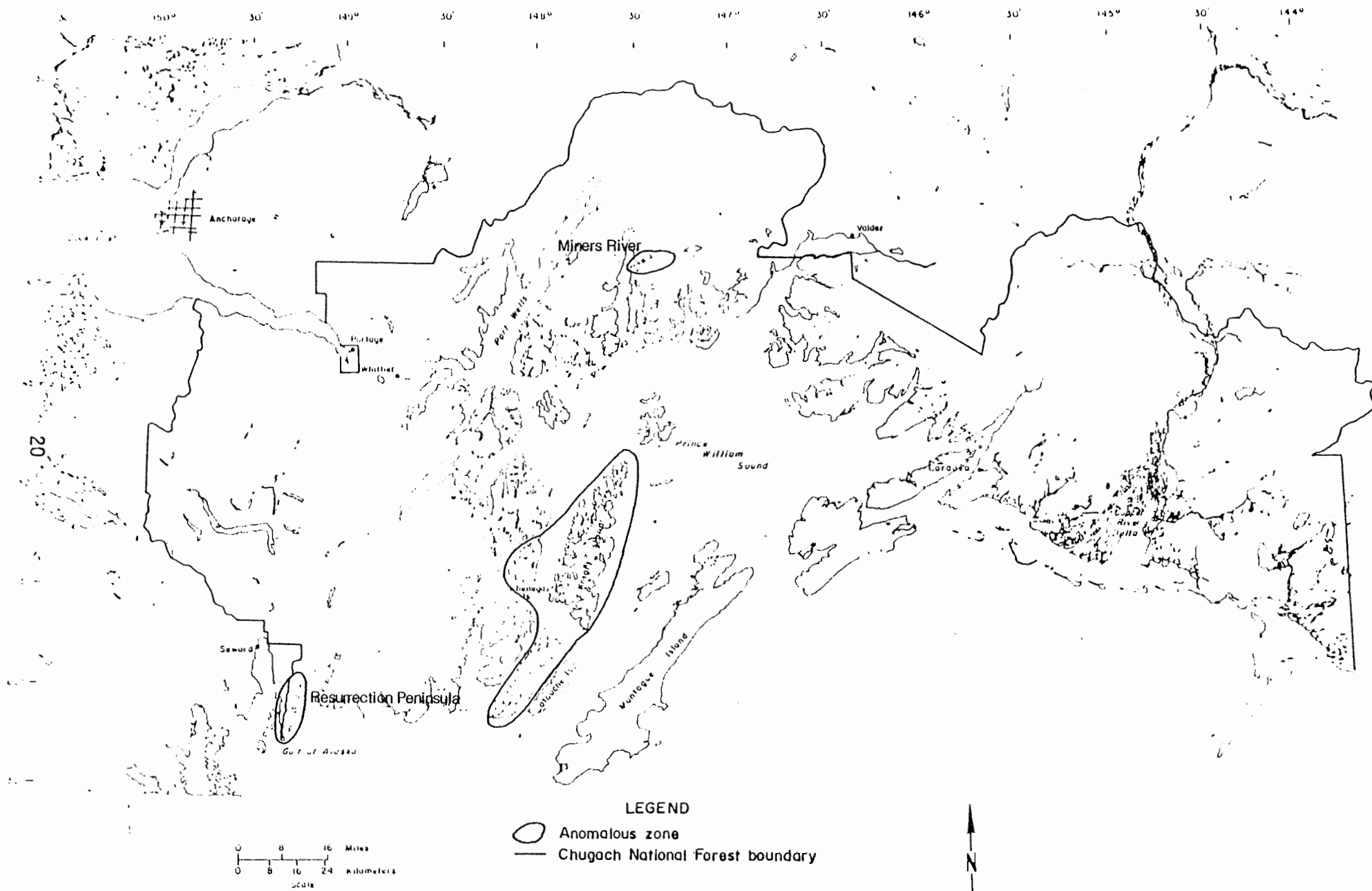


FIGURE 9. - Nickel Anomalies, Chugach National Forest, Alaska

associated with chromium in sheared greenstones and pillow basalts containing pyritiferous quartz stringers (25). Pentlandite, an iron-nickel sulfide, is reported in the Miners River deposit (73).

The highest nickel values ($>0.2\%$) were obtained from the Four-in-One prospect (72), the Miners River prospect (73), and three prospects on Knight Island: H. J. Harvey (52); Hubbard and Elliot (47); and Knight Island Copper Mining Co. (44). The Four-in-One prospect (72) and Miners River deposit (73) have low mineral development potential but contain a potentially significant tonnage of copper-nickel-silver and copper-nickel-cobalt mineralization, respectively. Grades indicated by bulk sampling at both deposits are subeconomic at the present time. The Hubbard and Elliot, Knight Island Copper Mining Co., and H. J. Harvey prospects have moderate mineral development potential for copper and for nickel based upon high nickel (up to 0.83%) assays. By-product nickel could be produced if the nickel can be economically separated from the sulfide ore.

QUARTZ CRYSTALS

Well-formed quartz crystals associated with vuggy quartz veins emplaced at relatively shallow depths have been identified at several localities in the CNF. Generally these crystals do not exceed 1- or 2-in. in length and are found in limited quantities associated with small vugs. A notable exception is the occurrence of well-shaped, doubly terminated quartz crystals up to 18-in.-long on the west side of the Billings Glacier pluton (79). The quartz crystals occur in a large clay-filled pocket developed in a 12-ft-wide vein and are coated with muscovite. Several hundred pounds of specimen grade crystals

have been removed since their discovery in 1981. However, no radio or electronic grade quartz has been noted.

TIN

Tin has been detected in concentrations exceeding 10 ppm in several widely scattered localities in the CNF (table 3, figs. 3 and 10).

Tin is associated with sulfide mineralization in mafic volcanic rocks on Knight and Glacier Islands, and near Port Fidalgo and with more felsic intrusive rocks west of Port Wells at Billings Glacier and Bettles Bay.

The highest assay for tin (0.5%) was acquired from a breccia located west of the Reynolds Alaska Development Co. prospect on Landlocked Bay (19). Another high tin assay (0.17%) was obtained from sheared pyritiferous slate float collected on the Rude River (9). Most other tin anomalies ranged from 10 to 20 ppm in stream sediments with up to 70 ppm identified in massive sulfide samples. One sample collected from the arrastre mill located on Culross Island (81) contained 200 ppm tin. However, this relatively high tin value is likely due to contamination.

TUNGSTEN

Tungsten has been detected in concentrations exceeding 40 ppm in four general areas of the CNF: Gravina River; Clear Creek; Perry Island; and Billings Glacier (table 3, figs. 3 and 11).

Tungsten anomalies are spatially associated with felsic intrusive rocks. Samples containing tungsten were collected from quartz veins

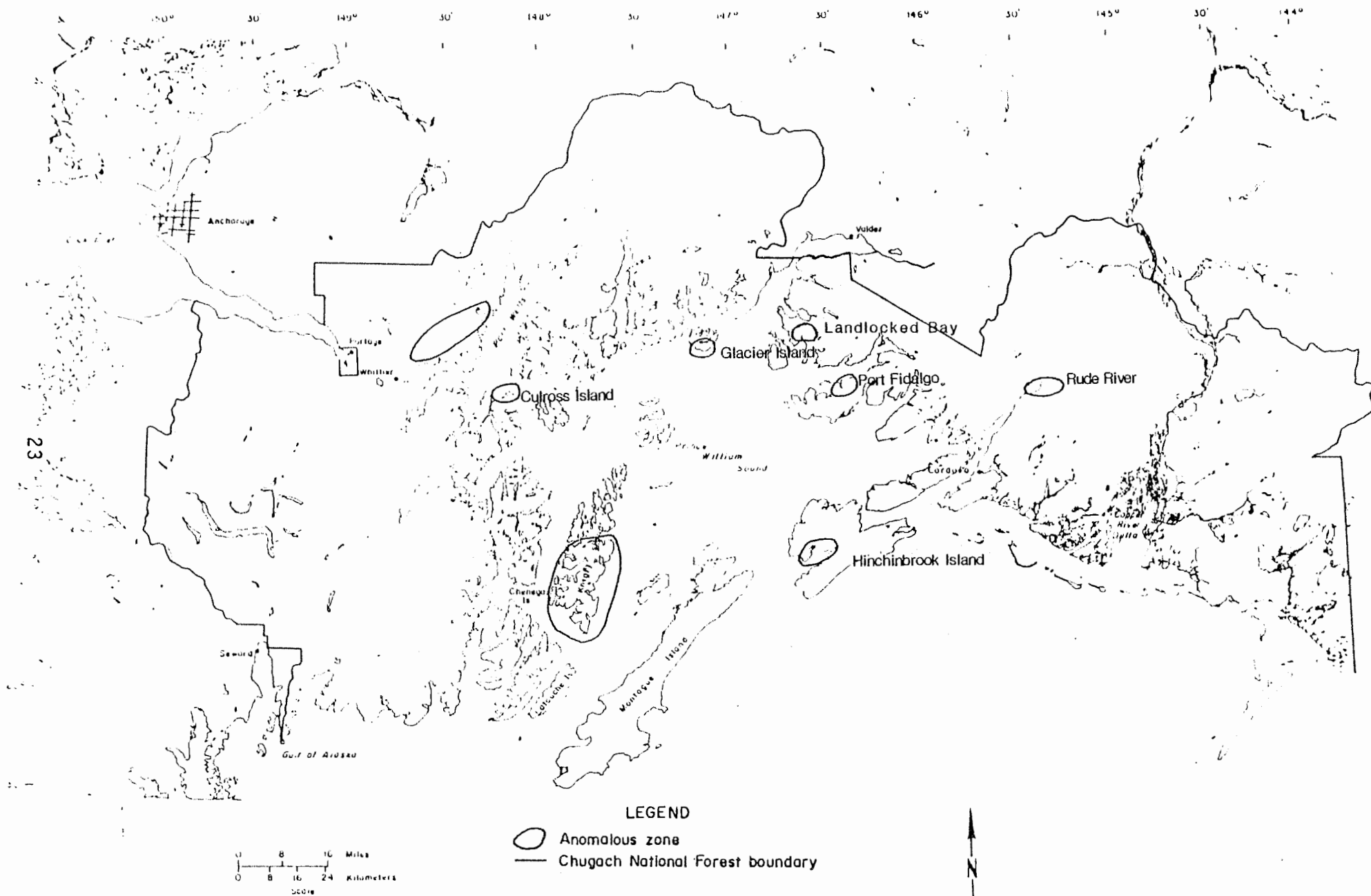


FIGURE 10. - Tin Anomalies, Chugach National Forest, Alaska

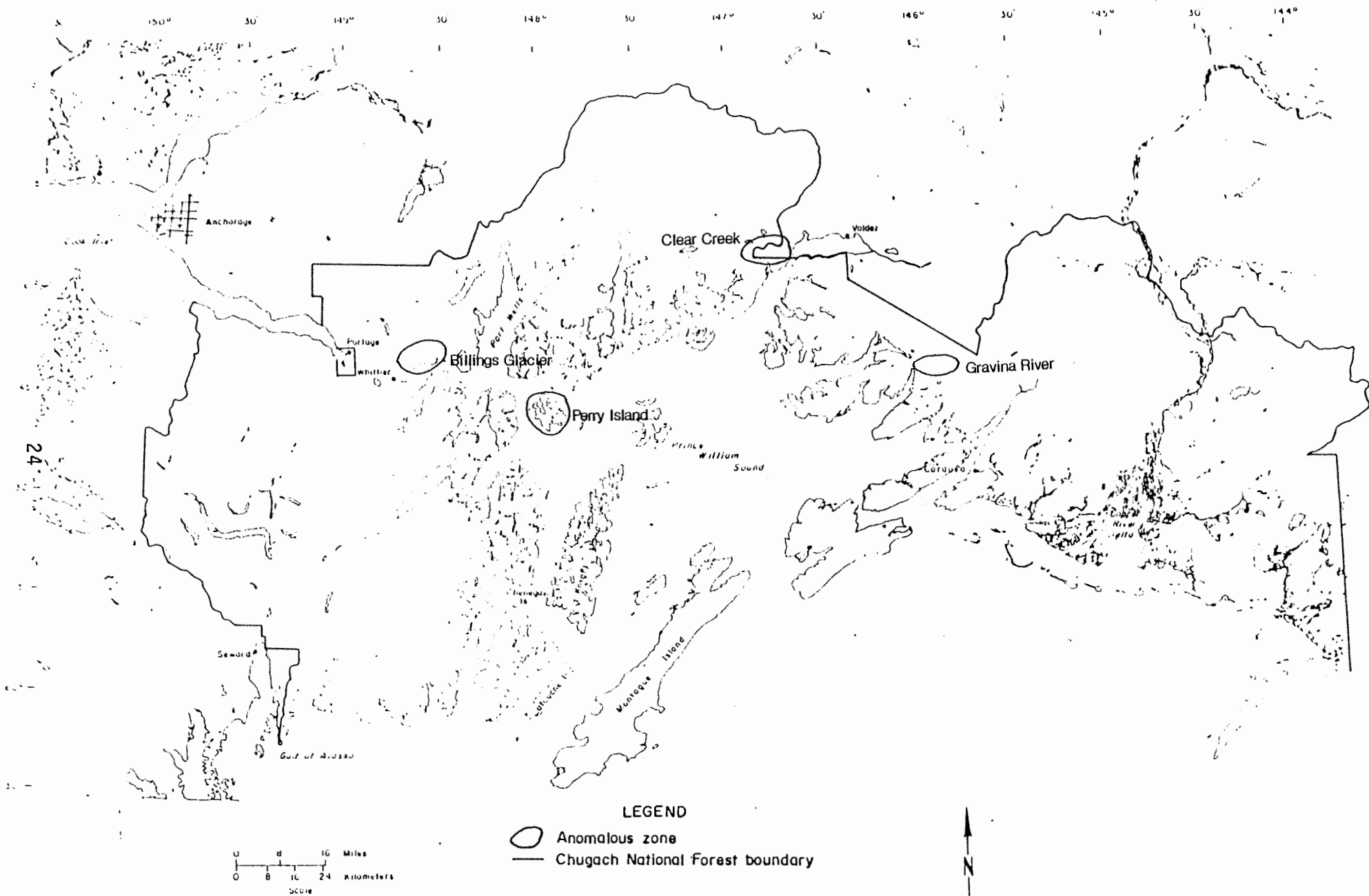


FIGURE 11. - Tungsten Anomalies, Chugach National Forest, Alaska

near Billings Glacier (78-80) and Clear Creek (24) and from silicified felsic intrusive rocks at Gravina River and Perry Island. The highest grade assay (0.39%) was obtained from a quartz sample collected near Port Valdez at Clear Creek. Assays ranging from 0.07 to 0.14% tungsten were obtained from quartz veins peripheral to the Billings Glacier intrusive (78-80). Occurrences containing tungsten have low or unknown mineral development potentials. The Billings Glacier occurrences (79-80) and the Portage Bay Mine (78) could be developed for molybdenum or gold with tungsten produced as a by-product.

SUMMARY

Anomalous quantities of selected strategic and critical minerals including antimony, chromium, cobalt, fluorspar, gallium, manganese, nickel, quartz, tin, and tungsten have been identified in Bureau samples collected from the CNF. Two manganese, three nickel-bearing copper, and one cobalt-bearing copper deposits have moderate mineral development potential based upon available data. Other commodities have low or unknown mineral development potential. Cobalt, gallium, nickel, and tungsten could be produced as by-products from the development of known copper, gold, and molybdenum deposits.

Data indicate that additional work is warranted to further evaluate the mineral development potential of cobalt, manganese, nickel, tin, and tungsten occurrences in the CNF.

Copper-iron massive sulfide deposits in the Prince William Sound area require more detailed and systematic mapping, sampling, and mineralogy studies to ascertain the distribution, grades, and quantities of cobalt and/or nickel present. Bulk sampling for

metallurgical purposes is needed to determine the recoverability of cobalt and nickel. Deposits especially deserving of additional work include the Threeman (18), Reynolds-Alaska (19), Chamberlain Bay (28), Knight Island Copper (44), Hubbard and Elliot (47), H. J. Harvey (52), Four-in-One (72), and Miners River (73).

Two potentially significant manganese deposits on Chenega and Hinchinbrook Islands were identified in the CNF during the RARE II studies. The presence of several additional manganese anomalies further suggest that Prince William Sound should be considered as a potential target for manganese exploration.

Two tin occurrences merit additional work. The breccia sampled near the Reynolds-Alaska (19) prospect which assayed 0.5% tin should be resampled and mapped in detail to determine its mineral development potential. The upper Rude River area (9) should be examined to identify the source of the pyritiferous float found to contain 0.17% tin and determine whether the area has mineral development potential.

Tungsten occurrences at Clear Creek (24) and Billings Glacier (78-80) should be reexamined, mapped, and sampled to better evaluate the geologic setting, distribution, and grades of tungsten and other commodities present.

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APPENDIX

SUMMARY OF DEPOSITS HAVING ANOMALOUS
QUANTITIES OF STRATEGIC AND CRITICAL MINERAL
COMMODITIES IN THE CHUGACH NATIONAL FOREST AREA, ALASKA

APPENDIX - Summary of Deposits having Anomalous Quantities of
Strategic and Critical Mineral Commodities in the
Chugach National Forest area, Alaska

Sampling and evaluations of mineral development potential of mineral localities, if not referenced otherwise, were done by the Bureau of Mines.

Explanation of listings:

1. Localities are shown on figure 3.
2. a) Names of the locality show the generally most commonly used name first, followed by other names that have been used to refer to the property.
b) Double lines under the name designate past mines having recorded production over a period of years.
c) Asterisk by name indicates newly named and/or identified occurrence.

CRM - refers to Copper River Meridian
SM - refers to Seward Meridian

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
1	Rocky Bay* (manganese) sec. 24, T. 03N., R. 13E. SM Montague Island	No data.	None.	One stream sediment sample contained 7000 ppm manganese. Mineral development potential unknown.
2	Port Etches* (tin) sec. 36, T. 17S., R. 08W. CRM Hinchinbrook Island	No data.	None.	One grab sample of mafic volcanics contained 10 ppm tin. Mineral development potential unknown.
3	Unnamed occurrence* (chromium, manganese) sec. 34, T. 17S., R. 07W. CRM Hinchinbrook Island	Manganese-rich rock forms a 30 x 90-ft rubble area. Minerals present include bementite, quartz, chalcedony, calcite, hematite, barite, rancieite, todorokite, and birnessite.	None.	USGS grab samples contained 29 and 35% manganese. A nearby stream sediment sample contained 1000 ppm chromium. Mineral development potential unknown.
4	Kelly & MacCormac (copper, manganese) sec. 03, T. 16S., R. 05W. CRM Hawkins Island	3-ft-wide shear zone cuts slate. No mineralization noted.	15-ft-long open cut. No reported production.	Three samples contained 24 to 140 ppm copper. A nearby stream sediment sample contained 7000 ppm manganese. Low mineral development potential.
5	Canoe Passage* (manganese) sec. 34, T. 15S., R. 05W. CRM	No data.	None.	One stream sediment sample contained 7000 ppm manganese. Mineral development potential unknown.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
6	Unnamed occurrence* (manganese) sec. 19, T. 15S., R. 04W. CRM Hawkins Island	No data.	None.	One stream sediment sample contained 10,000 ppm manganese. Mineral development potential unknown.
7	Snyder Falls Creek* (copper, chromium) sec. 21, T. 14S., R. 02W. CRM Snyder Mountain	Veinlets of chalcopyrite and disseminated pyrite and pyrrhotite occur in greenstone pods.	None.	Ten grab samples contained from 29 ppm to 3.35% copper. A nearby stream sediment sample contained 700 ppm chromium. Low mineral development potential.
8	Ibeck Creek (copper, zinc, lead, silver, cobalt) sec. 15, T. 14S., R. 01W. CRM Scott Glacier	14-ft-wide shear zone in greenstone contains small lenses and disseminations of pyrrhotite, pyrite, chalcopyrite, and sphalerite.	80-ft-long adit. No reported production.	Five chip samples contained from 4 ppm to 3.4% copper, 40 ppm to 1.95% zinc, 10 ppm to 0.26% lead, and 3.6 to 11 ppm silver. Four grab samples contained from 0.52 to 5.5% copper, 215 ppm to 2.4% zinc, 30 ppm to 0.2% lead, and 0.4 to 14 ppm silver. One grab sample contained 200 ppm cobalt. Inferred reserves: 3,800 tons at 2.8% copper, 2.2% zinc, and 10 ppm silver (7) ^{1/} . Moderate mineral development potential.
9	Rude River* (tin) sec. 13, T. 13S., R. 01W. CRM Rude River	Pyrite in sheared slate float rocks.	None.	Grab sample contained 0.17% tin. Mineral development potential unknown.

^{1/}Underlined numbers in parentheses refer to items in the list of references preceding the appendix.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
10	Simpson Creek* (zinc, copper, chromium) sec. 21, T. 13S., R. 03W. CRM Sheep Bay	Pyrrhotite, chalcopyrite, sphalerite, and pyrite in slate found as stream float. Source not located.	None.	Two grab samples contained 140 ppm and 1.6% zinc, and 35 ppm and 0.16% copper. A nearby stream sediment sample contained 700 ppm chromium. Mineral development potential unknown.
11	Gravina River* (tungsten) sec. 23, T. 12S., R. 04W. CRM Gravina Bay	Altered, silicified felsic intrusive rocks found on gravel bars contained pyrite, chalcopyrite, and scheelite. Source area not identified.	None.	Float from river contained 245 ppm tungsten. Mineral development potential unknown.
12	<u>Fidalgo Mining Co.</u> Blackney's Prospect (copper, cobalt) sec. 28, T. 12S., R. 06W. CRM Port Fidalgo	Three main shear zones, up to 30-ft-wide, are traceable for 4,000 ft. Zones are sub-parallel with trend of inter-bedded slate, graywacke, greenstone. Massive chalcopyrite, pyrrhotite, and pyrite in 1- to 5-ft-wide veins.	Four adits, 735-ft, 1200-ft, 175-ft, and 350-ft-long. Reported production 360,376 lbs of copper, and 12 oz of silver from 2,747 tons of ore (5).	Four chip samples of shear zones in 735-ft-long adit contained from 175 ppm to 0.23% copper. Nine chip samples across the main shear zone in 1,200-ft-long adit contained 0.12 to 1.25% copper. Fifteen chip samples from the rest of the adit contained 9 ppm to 0.29% copper. Three chip samples from the 175-ft-long adit contained 300 ppm to 0.73% copper. Grab samples from dump contained 1 to 6.3% copper. A nearby stream sediment sample contained 150 ppm cobalt. Inferred reserves: 45,500 tons at 0.3% copper. Moderate mineral development potential.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
13	<u>Dickey Copper Co.</u> Mason & Gleason Irish Cove Copper Co. (copper, zinc, gold, silver, lead, cobalt, gallium) sec. 02, T. 13S., R. 07W. CRM Port Fidalgo	Mineralized shear zones cutting slate and graywacke have been traced for 300 ft. Chalcopyrite, pyrite, sphalerite, and pyrrhotite occur in 6- to 8-ft-wide shear zones.	4 adits reported; 500-ft, 125-ft, 35-ft (caved), and 10-ft-long. Reported production 29,346 lbs copper (5).	Five grab samples from 500-ft-long adit contained 0.01 to 1.23% copper, 0.02 to 1.5% zinc, <0.03 to 12.5 ppm gold, <0.1 to 28 ppm silver, and 0.01 to 0.13% lead. Selected grab sample contained 15.5 ppm gold. Five grab samples from 125-ft-long adit contained 0.3 to 4.3% copper, 1.43 to 14% zinc, <0.03 to 5.25 ppm gold, 25 to 26 ppm silver, 80 ppm to 0.13% lead, 14 to 740 ppm cobalt. Grab sample from the crosscut contained 1.6% copper, 3.1% zinc, 2.8 ppm gold and 10 ppm silver. A 262 lb bulk sample from the ore bunkers contained 8.65% copper, 9.6% zinc, 0.072 oz gold/ton, 0.62 oz silver/ton, and 0.04% cobalt. Up to 50 ppm gallium present. Moderate mineral development potential.
14	Irish Cove (manganese) sec. 10, T. 13S., R. 07W. CRM Port Fidalgo	No data.	None.	One stream sediment sample contained greater than 10,000 ppm manganese. Mineral development potential unknown.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
15	<u>Schlosser</u> ; Fidalgo-Alaska Copper Mines, Inc. Alaska Copper Corp. (copper, zinc, gold, silver, cobalt, gallium, tin) sec. 03, T. 13S., R. 07W. CRM Port Fidalgo	150- to 300-ft-wide mineralized shear zone in slate and gray-wacke. Chalcopyrite, pyrite, sphalerite, and pyrrhotite occur in massive lenses, 3.5- to 10-ft-wide and 20- to 80-ft-long, and in stockworks.	5 adits, 1800-ft, 540-ft, 410-ft, 250-ft, 50-ft-long. Reported production, 4,160,820 lbs of copper and 1,384 oz of silver from 21,434 tons of ore (6).	Grab samples from various adit levels and of surface materials contained 0.02 to 19.5% copper, 150 ppm to 29% zinc, 2 to 150 ppm silver, and <.02 to 5.8 ppm ppm gold. Up to 50 ppm gallium present. 2 samples of massive sulfide contain 300 ppm tin. One nearby stream sediment sample contained 10 ppm tin. Two samples contained 100 and 150 ppm cobalt. Indicated reserves: 25,625 tons at 3% copper. Inferred reserves: 224,000 tons at 3.18% copper (11). Moderate mineral development potential.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
16	<u>South Landlocked Bay Mining Co.</u> Dolan and Rystrom (copper, zinc, silver, cobalt) sec. 07, T. 12S., R. 07W. CRM Landlocked Bay	1-ft-wide lenses of chalcopyrite, pyrite, and pyrrhotite in a 4- to 15-ft-wide shear zone in greenstones.	Four adits reported with over 900 ft of workings (3). One caved adit located. Reported production 74,240 lbs of copper (18).	Grab sample contained 7.35% copper, 0.79% zinc, and 20.5 ppm silver. Chip samples taken in 1955 (18) contained from 1.3 to 6.8% copper, 0.8 to 3.5% zinc, and trace to 0.2 oz silver/ton. One grab sample of massive sulfide contained 200 ppm cobalt. Inferred reserves: 600 tons at 4.7% copper, and 2.6% zinc. Moderate mineral development potential.
17	Hoodoo; Threeman Mining Co. (copper, zinc, gold, silver, cobalt) sec. 01, T. 12S., R. 08W. CRM Landlocked Bay	Four 1.5- to 3-ft-wide shear zones which cut greenstone, contain lenses of chalcopyrite, pyrrhotite, and sphalerite.	Four adits reported (3) 180-ft, 45-ft, 15-ft (inaccessible) and 50-ft-long (sampled). No reported production.	Five chip samples from 50-ft-long adit contained from 0.11 to 2.9% copper, 680 ppm to 0.95% zinc, <0.03 to 0.03 ppm gold, and 0.2 to 13.9 ppm silver. Three selected grab samples contained 1.14 to 19.3% copper, 0.95 to 2.25% zinc, 0.15 to 44 ppm gold, and 0.23 to 34 ppm silver. Two grab samples of massive sulfide contained 100 and 300 ppm cobalt. Inferred reserves: 300 tons at 1.29% copper, 0.34% zinc, and 7.97 ppm silver. Moderate mineral development potential.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
18	<u>Threeman Mine</u> (copper, zinc, gold, silver, chromium, cobalt, gallium) sec. 06, T. 12S., R. 07W. CRM Landlocked Bay	Pyrite, pyrrhotite, chalcopyrite occur as massive lenses, 1- to 9.5-ft-wide, in two shear zones in greenstones. Zones have been mined over a 350-ft dip length.	Six adits reported (24), four located: 60-ft, 500-ft, and 250-ft-long; three are caved. Reported production; 1,159,660 lbs of copper, 101 oz of gold, and 5,309 oz of silver from 6,196.5 tons of ore. (5, 18).	Chip and grab samples contained 53 ppm to 5.25% copper, 40 ppm to 2.85% zinc, <0.02 to 0.20 ppm gold, <1 to 22 ppm silver, and 5 to 700 ppm cobalt. Sixteen chip samples taken in 1955 contained from 0.3 to 8.6% copper, 0.05 to 0.64% zinc, trace to 0.07 oz gold/ton, and trace to 0.78 oz silver/ton (18). Up to 50 ppm gallium present. Four grab samples of mafic volcanics contained 700-1500 ppm chromium. Inferred reserves: 1,902,000 tons at 1.05% copper (24). Moderate mineral development potential.
19	Reynolds-Alaska Development Co.; Landlocked Bay Property (copper, zinc, silver, cobalt, gallium, tin) sec. 31, T. 11S., R. 07W. CRM Landlocked Bay	1- to 20-ft-wide shear zones cut greenstone. One zone is traceable for 400 ft. 2-in.-4-ft-wide massive sulfide lenses of chalcopyrite and pyrrhotite occur along shear zones.	Four adits present, 170-ft, 600-ft, 30-ft, 18-ft-long; 3 caved open cuts, flooded shaft (3). No reported production.	Chip samples from open cuts contain from 0.18 to 8.4% copper, 170 ppm to 0.25% zinc, and 0.8 to 28 ppm silver. Grab samples from the workings contained from 100 ppm to 9.75% copper, 100 ppm to 1.05% zinc, and 0.8 to 9.5 ppm silver. Up to 50 ppm gallium present. Two grab samples of massive sulfide contained 200 ppm cobalt and two others contained 700 ppm cobalt. A grab sample of breccia taken west of the property contained 0.5% tin. Inferred reserves 3,000 tons at 4.6% copper 0.14% zinc, and 15.65 ppm silver. Moderate mineral development potential.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
20	Tibbit (copper, silver, zinc, chromium) sec. 36, T. 11S., R. 08W. CRM Copper Mountain	1- to 8-ft-wide shear zones in greenstones, minor slate and graywacke contain chalcopyrite, pyrite, and pyrrhotite.	Four adits reported (27), 45-ft, and ?-ft long; open cuts. One 20-ft adit located. No reported production.	Two grab samples contained 0.59% and 2% copper, 1.8 ppm and 6.4 ppm silver. Two chip samples from the 45-ft-long adit contained 430 ppm and 0.93% copper, 3.4 and 12.7 ppm silver, and 240 ppm and 0.13% zinc. One grab sample of mafic volcanics contained 700 ppm chromium. Inferred reserves: 500 tons at 0.72% copper. Low mineral development potential.
21	Threeman Mining Co. Prospect (copper, zinc, silver, chromium, cobalt) sec. 36, T. 11S., R. 08W. CRM Copper Mountain	2- to 15-ft-wide shear zone, parallels trend of the slate. Chalcopyrite and pyrrhotite lenses, 1- to 1.17-ft-wide, occur along the shear.	One adit, 41-ft-long. No reported production.	Three chip samples contained 200 ppm to 1% copper, 145 to 0.8% zinc, and <0.2 to 6 ppm silver. Grab sample from the dump contained 4.9% copper, 0.49% zinc, and 50 ppm silver. Nearby grab samples of mafic volcanics contained up to 1000 ppm chromium and 300 ppm cobalt.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
22	Copper Mountain Prospect (copper, zinc, silver, cobalt) sec. 23, T. 11S., R. 08W. CRM Ellamar	6-in.-wide shear zone cutting greenstone, contains chalcopyrite and quartz veinlets.	20-ft-long adit. No reported production.	Chip sample contained 1.87% copper, 800 ppm zinc, and 10.9 ppm silver. A selected grab sample contained 11.7% copper, 0.35% zinc, 43.5 ppm silver, and 770 ppm cobalt. Inferred reserves: 300 tons at 1.87% copper. Low mineral development potential.
23	<u>Midas Mine</u> ; All-American Lode; Jumbo; Alaska Development and Mineral Co.; Granby Mining, Smelting, and Power Co., (LTD) (copper, zinc, gold, silver, gallium) sec. 10, T. 10S., R. 06W. CRM Solomon Gulch	Two mineralized shear zones cut slates. Shear zones range from a few inches to 20-ft-wide but average between 3- to 4-ft-wide; these are traceable for at least 800 ft along strike. Sulfide mineralization includes pyrite, chalcopyrite, pyrrhotite, and sphalerite.	Four adits. - Level 1 - caved. - Level 2 - 700-ft-long caved. - Level 3 - 600-ft-long. - Level 4 - caved. - Also shafts and open cuts. Cumulative production greater than 3,385,680 lbs copper, 2,569 oz gold, 15,157 oz silver, from 49,350 tons of ore (23).	Four chip samples contained 0.11 to 6.3% copper, 0.26 to 3.1% zinc, 0.005 to 0.066 oz gold/ton, and 0.2 to 0.6 oz silver/ton. Two grab samples contained from 20 ppm to 3.9% copper, 4.0% zinc, 10.1 ppm gold, and 20 ppm silver. Up to 50 ppm gallium present. Inferred reserves are 62,000 tons at 1.6% copper. Moderate mineral development potential.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
24	Clear Creek* (gold, arsenic, tungsten) sec. 10, T. 09S., R. 09W. CRM Port Valdez	Mineralized quartz stringers contain pyrite, chalcopyrite, and arsenopyrite.	No workings. No reported production.	Five grab samples contained from 0.03 ppm to 2.34 ppm gold, 17 ppm to 0.39% tungsten, and 10 ppm to 4.95% arsenic. Low mineral development potential.
25	Jensen, Wallace, Kilbourn (copper, chromium) sec. 30, T. 11S., R. 10W. CRM Glacier Island	Quartz veinlets and disseminated pyrite, chalcopyrite, and pyrrhotite in sheared pillow basalts and greenstones.	12-ft-long trench, adit (caved). No reported production.	Six grab samples contained from 2 ppm to 0.88% copper. A chip sample contained 420 ppm copper. One grab sample of mafic volcanics contained 700 ppm chromium. Low mineral development potential.
26	Glacier Island* (chromium) sec. 35, T. 11S., R. 11W. CRM	No data.	None.	One grab sample of mafic volcanics contained 700 ppm chromium.
27	Unnamed occurrence* (copper, tin) sec. 03, T. 12S., R. 11W. CRM Glacier Island	Quartz veinlets, up to 0.3-ft-wide, in mafic sheeted dikes, contain pyrite and chalcopyrite.	None.	Five grab samples contained from 10 ppm to 0.5% copper. A nearby stream sediment sample contained 10 ppm tin. Mineral development potential unknown.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
28	Chamberlain Bay (copper, chromium cobalt) sec. 33, T. 11S., R. 11W. CRM Glacier Island	Quartz veins, from a few inches to 2-ft-wide, cut mafic sheeted dikes. Pyrite, pyrrhotite, and chalcopyrite are present as solid streaks and lenses 1/2- to 14-in.-wide in the quartz veins.	Seven trenches, total length 150 ft. No reported production.	Four chip samples contained from 650 ppm to 1.25% copper and 70 ppm to 0.2% cobalt. Ten grab samples contained from 60 ppm to 0.5% copper and 50 ppm to 0.2% cobalt. A bulk sample contained 0.85% copper and 0.11% cobalt. One grab sample of mafic volcanics contained 1000 ppm chromium. Inferred reserves: 400 tons at 0.72% copper. Moderate mineral development potential.
29	Unnamed occurrence* (chromium) sec. 13, T. 07N., R. 11E. SM Naked Island	No data.	None.	One stream sediment sample contained 700 ppm chromium. Mineral development potential unknown.
30	Passage Point* (nickel) sec. 21, T. 05N., R. 10E. SM Knight Island	No data.	None.	One stream sediment sample contained 300 ppm nickel. Mineral development potential unknown.
31	Unnamed prospect (copper, cobalt) sec. 26, T. 05N., R. 10E. SM Disk Island	2.5-ft-wide, 10-ft-long greenstone breccia zone contains quartz, epidote, pyrite, and chalcopyrite.	10-ft-wide adit. No production.	3-ft-long chip sample of brecciated greenstone contained 0.43% copper. One grab sample contained 300 ppm cobalt. Low mineral development potential.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
32	Singletary Prospect (copper, chromium) sec. 03, T. 04N., R. 10E. SM Knight Island	Mineralization not found.	None located. No recorded production.	Reported prospect (8) not located. A nearby stream sediment sample contained 1500 ppm chromium. Mineral development potential unknown.
33	Von Gunther or Malack (?) Prospect (copper, cobalt) sec. 02, T. 04N., R. 10E. SM Knight Island	2-in.- to 2-ft-wide quartz-breccia sulfide veins in porphyritic greenstone, contain up to 10% pyrite, <1% chalcopyrite, some pyrrhotite, malachite, epidote, and trace of sphalerite.	Two 10-ft-long adits and a 14-ft open cut. No recorded production.	Three random chip samples contained 0.98%, 1.0%, and 1.9% copper. Two grab samples contained 150 and 500 ppm cobalt. Low mineral development potential.
34	Knight Island Mining and Development Co. Prospect (copper, zinc, lead, cobalt, gallium) sec. 15, T. 04N., R. 10E. SM Knight Island	Shear zones, up to 4-ft-wide, in pillow basalts contain pyrrhotite and, locally, up to 20% chalcopyrite. Pyrite, sphalerite, quartz, epidote, and chlorite occur in minor amounts. One shear zone contains trace amounts of native copper.	Four adits, 28-ft, and 6-ft-long, one reported to be 75-ft-long (16) is flooded and one reported to be 160-ft-long (16) is caved. No reported production.	0.8-ft-wide chip sample across massive sulfide lens contained 3.25% copper. 1-ft-wide chip sample across shear zone contained 0.48% copper, 0.97% zinc, and 0.83% lead. Up to 380 ppm cobalt recovered from samples of massive sulfide. 50-100 ppm gallium present. Moderate mineral development potential.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
35	Knight Island Consolidated Copper Co. Prospect (copper, chromium) sec. 18, T. 03N., R. 10E. SM Knight Island	5.5-ft-wide shear zone of unknown length contains chlorite schist and massive quartz. Pyrite and a trace of chalcopyrite present in quartz.	10-ft-deep shaft. Small shipment made (5).	5.5-ft-wide sample across shear zone contained 470 ppm copper. A nearby stream sediment sample contained 700 ppm chromium. Low mineral development potential.
36	Pandora Prospect (copper, chromium, cobalt) sec. 10, T. 03N., R. 10E. SM Knight Island	Massive and stringer sulfide zones in sheared greenstone. Zones up to 15-ft-wide with an aggregate width of 90 ft. They are intermittently exposed for 250 ft along strike and contain pyrrhotite, chalcopyrite, and pyrite.	95-ft-deep shaft; 150-ft of crosscuts, several open cuts. Reported small ore shipment (8).	5-ft-wide chip sample contained 4% copper. Inferred reserves: 85,000 tons at 1.30% copper. Up to 300 ppm cobalt in sheared greenstone with chalcopyrite. 0.13% chromium in gouge of sheared greenstone. Two grab samples contained 200 and 300 ppm cobalt. Two nearby stream sediment samples contained 1000 ppm chromium. Moderate mineral development potential.
37	Rua Cove Prospect; Copper Bullion (copper, zinc, iron, sulfur, chromium, cobalt, gallium) sec. 13, T. 03N., R. 10E. SM Knight Island	Parallel massive and stringer sulfide lenses in sheared greenstone. Thickest lens is up to 50-ft-wide, extends 200-ft vertically, and 400-ft along strike. Sulfides include pyrrhotite, chalcopyrite, and sphalerite.	Upper adit contains 2,420 ft of drift and crosscut; lower adit is 590-ft-long. Open cuts expose mineralization above adits. 1,000 lbs shipped for testing assayed 1.68% copper.	Reserves - Measured: 25,000 tons at 1.25% copper. Indicated: 1,100,000 tons at 1.25% copper. Total 1,325,000 tons of estimated reserves. Sulfide body also contains 42.4% iron, 25.8% sulfur, 0.005 oz gold/ton, and 0.1 oz silver/ton. Two random samples averaged 0.65% zinc. 50 to 70 ppm gallium present. Grab samples of massive sulfides contained up to 300 ppm cobalt. A nearby stream sediment sample contained 1000 ppm chromium. Moderate mineral development potential.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
38	Jonesy Claims Bald Eagle Claim (copper, gallium, tin) sec. 17, T. 03N., R. 10E. SM Knight Island	60-ft-wide set of shear zones in greenstone. Shear zones up to 16-ft-wide are exposed underground on strike for 150 ft. Shears contain pyrrhotite, and locally up to 5% chalcopyrite.	254-ft of workings in one adit; open cut nearby. Small ore shipments were made. A few tons of ore are stockpiled on the shore below the adit.	4-ft-long chip sample contained 3.3% copper. Up to 50 ppm gallium and 20 ppm tin present. Inferred reserves: 1300 tons. Moderate mineral development potential.
39	Nellie Group Claims (copper, chromium, cobalt) sec. 21, T. 03N., R. 10E. SM Knight Island	9-ft-wide shear zone in greenstone contains 2-in.-wide band of sulfides.	Reported workings consist of five open cuts, a 36-ft-long adit, and a 6-ft-deep shaft (16).	Prospect not located. Random chip sample of a pyrrhotite-bearing sheared greenstone contained 150 ppm copper. Two samples of sulfide-bearing mafic volcanics contained 100 and 500 ppm cobalt. Nearby stream sediment samples contained up to 2,000 ppm chromium. Low mineral development potential.
40	Marsha Bay Claims (copper, chromium, cobalt) sec. 14, T. 03N., R. 10E. SM Knight Island	Sheared chert layers cut by basaltic dikes. Dikes locally contain up to 5% disseminated pyrrhotite and traces of chalcopyrite.	Small prospect pit reported (22). No production.	Five chip samples from sheared greenstone and basaltic dikes contained up to 340 ppm copper. One sample of mafic volcanics contained 500 ppm cobalt. A nearby stream sediment sample contained 1500 ppm chromite. Low mineral development potential.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
41	Knight Island Alaska Copper Co. (copper, silver, zinc, cobalt) sec. 28, T. 03N., R. 10E. SM Knight Island	Northeast-trending shear zone, up to 20-ft-wide, in greenstone and porphyritic greenstone, is intermittently exposed for 200 ft along strike. Massive sulfide zone, 1-ft-wide, is enclosed within a 5-ft-wide disseminated sulfide zone. Sulfides: pyrrhotite, 5 to 20% chalcopyrite. Trace of native copper.	758-ft-long adit with several open cuts on the hill above. 200 tons of ore on dump.	5-ft-wide chip sample across an open cut contained 0.15% copper. 3-ft chip sample contained 0.20% copper. Selected grab samples of massive sulfides contained 1.3% copper, 11 ppm silver and 0.30% zinc. One grab sample of massive sulfide contained 700 ppm cobalt. Low mineral development potential.
42	Unnamed Prospect (copper, chromium) sec. 27, T. 03N., R. 10E. SM Knight Island	Several shear zones, locally silicified, and up to 12-in.-wide, cut greenstone, and contain disseminated pyrite and pyrrhotite. Chalcopyrite blebs occur in greenstone.	Superficial pits and trenches are reported (22). No production.	Random chip sample of mineralized greenstone contained 1.42% copper. A grab sample of mafic volcanics contained 700 ppm chromium. Low mineral development potential.
43	Unnamed Prospect; Alhambra, U & I, and Ura Claims (copper, nickel) sec. 28, T. 03N., R. 10E. SM Knight Island	Shale and slate locally sheared, limonite-stained and contain quartz veinlets. Trace amounts of pyrite noted.	Two small open cuts on east side of a stream at the 585 ft level. No production.	5-ft chip sample from an open cut contained 68 ppm copper. A nearby stream sediment sample contained 300 ppm nickel. Low mineral development potential.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
44	Knight Island Copper Mining Co. Prospect (copper, nickel, gold, silver, cobalt) sec. 32, T. 03N., R. 10E. SM Knight Island	Major shear zone cuts greenstone. Up to 10% disseminated pyrrhotite and 5% chalcopyrite localized in shear zones.	Three adits, 78-ft, 113-ft, and 117-ft-long. Small prospect pit. A reported 60-ft-deep shaft, 15-ft tunnel, and another long adit (2, 19) were not located. Production: one ton producing 240 lbs of copper, 3 oz silver, and 3 oz gold.	4-ft chip sample across shear zone contained 1.6% copper. Random chip sample contained 1.0% copper and 0.83% nickel. One nearby stream sediment sample contained 300 ppm nickel and 100 ppm cobalt. Moderate mineral development potential.
45	Copper Coin Group, Russell Ball Copper co. (copper, zinc, chromium, cobalt, nickel, zinc) sec. 31, T. 03N., R. 10E. SM Knight Island	Limonite-stained shear zone, averaging 4-ft-wide, contains massive and stringer sulfides grading 5 to 10% chalcopyrite, 1% sphalerite, and minor amounts of covellite. Quartz veins, from a few inches to 1/2-ft-wide, occur within the shears and contain most of the sulfides. Mineralization can be traced intermittently for 224 ft along strike.	Three adits, 60-ft, 6-ft and one reported to be 12- to 30-ft-long; small open cut and reportedly 12- to 30-ft-long. Some small ore shipments reported (9, 16).	4-ft, 2-ft and 1.2-ft-wide chip sample across shear zone contained 2.55%, 1.6% and 13% copper, respectively. Up to 630 ppm cobalt in massive sulfides. One nearby stream sediment sample contained 700 ppm chromium, 300 ppm nickel, and 100 ppm cobalt. Inferred and indicated reserves: 5,900 tons at 2.4% copper. Moderate mineral development potential.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
46	Unnamed occurrence* (chromium) sec. 06, T. 02N., R. 10E. SM Knight Island	No data.	None.	One stream sediment sample contained 2000 ppm chromium. Mineral development potential unknown.
47	Hubbard and Elliot Prospect ? (copper, nickel) sec. 06, T. 02N., R. 10E. SM Knight Island	Several shear zones, to 10-ft-wide, in greenstone contain traces of malachite; 1 to 2% pyrrhotite and <1% chalcopyrite.	Two adits, 63-ft and 10-ft-long. No recorded production.	Two random chip samples across the greenstone dike contained 0.24% and 0.16% copper, 0.70% and 0.50% nickel. One 2.4-ft-wide chip sample across the shear zone contained 0.14% copper. Moderate mineral development potential.
48	Harry Moore Prospect (copper, chromium) sec. 12, T. 02N., R. 09 E. SM Knight Island	Abundant greenstone float rock contains <1% pyrrhotite. Found no significant base metal mineralization.	None located. One 20-ton ore shipment reportedly yielded 1,452 lbs copper (5).	Prospect not located. A nearby stream sediment sample contained 700 ppm chromium. Mineral development potential unknown.
49	Unnamed occurrence* (nickel) sec. 11, T. 02N., R. 09E. SM Knight Island	No data.	None.	One stream sediment sample contained 300 ppm nickel and 500 ppm chromium. Mineral development potential unknown.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
50	Larsen Prospect (copper, chromium, cobalt, nickel) sec. 14, T. 02N., R. 09E. SM Knight Island	No data.	None located. No recorded production.	Reported prospect (8) not located. One nearby stream sediment sample contained 700 ppm chromium and 300 ppm nickel. Another contained 150 ppm cobalt. Mineral development potential unknown.
51	J. J. Bettles Prospect (copper, zinc, cobalt) sec. 16, T. 02N., R. 10E. SM Knight Island	3- to 5-ft-wide shear zone in graywacke and slate. Surface is limonite-stained. Sulfides mainly pyrrhotite with lesser amounts of chalcopyrite and sphalerite, with quartz in fractures and breccia zones.	70-ft-long adit. No recorded production.	8-ft-wide chip sample contained 0.37% copper and 0.82% zinc. Select grab sample of float rock contained 2.5% copper and 8.3% zinc. One grab sample of massive sulfide contained 200 ppm cobalt. Low mineral development potential.
52	H. J. Harvey Prospect (copper, chromium, cobalt, nickel) sec. 19, T. 02N., R. 10E. SM Knight Island	Diorite(?) surrounded by greenstone contains 2 to 3% disseminated pyrrhotite and chalcopyrite. Nickel-bearing mineral not identified.	Caved adit reportedly 150-ft-long with collapsed area or open cut on the slope above it (9). A second 150-ft adit is reported in the area.	Random chip samples from diorite (?) contained from 0.24 to 1.0% copper, 0.36 to 0.7% nickel, 0.2 to 0.5% chromium, and up to 300 ppm cobalt. Moderate mineral development potential for nickel.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
53	Kilbourn Prospect (copper, silver, cobalt) sec. 19, T. 02N., R. 10E. SM Knight Island	30-ft-wide shear zone in greenstone. Pyrrhotite, pyrite, chalcopyrite, and bornite in quartz-rich isolated lenses, a few inches wide, occur locally throughout the shear. Chalcopyrite content about 1%, up to 20% locally.	71-ft-long adit and 15-ft-long open cut. No production.	Grab sample from the dump contained 7.1% copper and 18 ppm silver. Two chip samples, 1.5- and 2.5-ft-wide across the shear zone, contained 0.16% copper. One grab sample contained 700 ppm cobalt. Low mineral development potential.
54	Unnamed occurrence (barium, copper, chromium) sec. 30, T. 02N., R. 10E. SM Knight Island	Limonite-stained sheared greenstone.	No signs of prospecting. No production.	Prospect not located. Reported analysis (25): 5,000 ppm barium, 500 ppm chromium, 500 ppm copper. Mineral development potential unknown.
55	Unnamed occurrence (copper, zinc, chromium) sec. 35, T. 02N., R. 09E. SM Knight Island	Reported limonite- and malachite-stained sheared greenstone.	None.	Prospect not located. Reported analysis (25); 100 ppm zinc, 300 ppm chromium, 500 ppm copper. Mineral development potential unknown.
56	Unnamed occurrence (copper, tin) sec. 36, T. 02N., R. 09E. SM Knight Island	Two 10-ft-wide shear zones in greenstone contain 5% pyrrhotite and trace chalcopyrite.	None.	Chip sample contained 49 ppm copper. A nearby stream sediment sample contained 20 ppm tin. Low mineral development potential.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
57.	Happy Jack Copper Mining & Dev. Co.; Copper Queen Prospect; Helena Claim; Ground Hog Claim. (copper, tin) sec. 17, T. 01N., R. 10E. SM Knight Island	1- to 4-ft-thick quartz, chalco- pyrite, sphalerite, and pyrrho- tite vein in slate, graywacke, and greenstone. An approxi- mately 2-ft-thick mineralized zone reported. A N25°W trending 3-in. to 1-ft-wide gouge and breccia zone locally contains massive pyrite, 5 to 10% chalcopyrite, and 1 to 2% covellite.	One of three reported adits (19) located. The only working found was a S25°E trending 40-ft adit. An adit at elevation of 40 ft is reportedly 1,000- to 1,200-ft-long. Adit at 240-ft elevation was driven 260 ft and con- tained several drifts and short raises. A short upper adit at 450-ft reported. Production: 57 lbs copper from 110 tons.	Chip sample over a 1-ft width contained 7.5% copper. Shear zone, <1-ft-wide, near the reported adits contained 2.0% copper. One sample contained 70 ppm tin. Low mineral devel- opment potential.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
58	<u>Beatson Mine</u> ; patented claims: Big Bonanza and Eagle (copper, zinc, gold, silver, manganese) sec. 33, T. 01S., R. 09S. SM Latouche Island	Massive and stringer zones of sulfides are concentrated on the footwall of the Beatson fault which cuts across graywackes with interbedded slate. Sulfides: pyrite, chalcopyrite, pyrrhotite, sphalerite, cubanite, and galena. Non-metallic gangue minerals: quartz, sericite, ankerite. Mined ore body dimensions: 400-ft-wide, 500-ft vertical, and approximately 1,000-ft along strike.	Major mine operated 1903 to 1930. By 1924 over 10 mi of underground workings on five main levels existed. Underground workings no longer accessible. Recorded production: 5,992,941 tons ore with 182,600,000 lbs copper, 484 oz gold, and 1,466,649 oz silver. Average grades: 1.65% copper, 0.27 oz silver/ton.	At shutdown ore averaged 0.9% copper. A nearby stream sediment sample contained greater than 10,000 ppm manganese. No ore reserve data. Moderate to high mineral development potential for low grade and concealed copper and zinc ore bodies at depth along strike.
59	Carlson Prospect; Latouche Island Copper Mining Co. (copper, zinc, silver, cobalt) sec. 36, T. 01S., R. 09E. SM Latouche Island	Mineralized fracture zone, up to 5-ft-wide, roughly parallels bedding of graywacke. Intense fracturing and brecciation locally. Massive sulfide zone, up to 1-ft-wide, and a surrounding stringer sulfide zone up to 5-ft-wide contains up to 5% chalcopyrite. Mineralization can be traced for 200 ft along strike.	A 100-ft-long adit mostly flooded at high tide (1). Evidence of blasting at one exposure. No reported production.	Workings not located. 2-ft-wide chip sample collected in the area contained 2.5% copper, 0.15% zinc, and 20 ppm silver. Another 8.5-ft-wide chip sample contained 0.70% copper. One grab sample contained 150 ppm cobalt. Previously reported reserves: 1,800 tons at 3.5% copper. Low mineral development potential.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
60	Latouche Island Copper Mining Co. Prospect; Alameda Claims? (copper, zinc, cobalt) sec. 11, T. 02S., R. 09E. SM Latouche Island	3.5- to 4.5-ft-wide sulfide-rich shear zone in silicified slate and graywacke. Massive pyrrhotite zones contain up to 15% chalcopyrite. Underground, mineralization is exposed intermittently for 80 ft along strike.	64-ft-long adit near shoreline. No reported production.	5-ft-wide chip sample contained 0.74% copper and 0.19% zinc. One grab sample contained 150 ppm cobalt. Inferred reserves: 100 tons. Low mineral development potential.
61	Unnamed occurrence* (copper, silver, zinc, gallium) sec. 28, T. 02S., R. 09E. SM Latouche Island	Landslide block of slate and graywacke contains 3 bedding-conformable chalcopyrite and pyrrhotite-bearing zones, up to 2-ft-thick and extending 500 ft along strike. Additional sulfides may be present. Limonite-stained parallel bedding of sedimentary rocks exposed on slope.	No signs of prospecting. No production.	20-ft-wide chip sample contained 2.5% copper, 18.5 ppm silver, and 0.14% zinc. Up to 50 ppm gallium present. Moderate mineral development potential.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
62	Seattle-Alaska Prospect Owen Ore Co.; Alpha Claims (copper, silver, zinc, cobalt) sec. 36, T. 02S., R. 08E. SM Latouche Island	Series of parallel shear zones, up to 5-ft-wide, cut interbedded graywacke and shale. Siliceous zones, up to 4-ft-wide, within the shears contain pyrite, pyrrhotite, bornite, up to 5% chalcopyrite, and traces of native copper. Mineralization has been drifted on for 45 ft. Mineralization may extend for a total of 236 ft vertically between levels and for 4,300 ft along strike.	Four accessible adits: 1) adit with 424 ft of workings. 2) 58-ft-long adit. 3) 235-ft-long adit. 4) short adit driven in alluvium. One caved adit reported to be 400-ft-long (16) and another caved adit of unknown length. Three open cuts found. 12 tons of ore shipped in 1914, yielded 2,350 lbs of copper and 23 oz of silver.	Chip sample across a 4-ft-wide mineralized zone contained 6.5% copper, 14.2 ppm silver, and 0.12% zinc. 0.5-ft-wide chip sample contained 9.0% copper, 24.5 ppm silver, and 0.13% zinc. High-grade dump sample contained 0.53% zinc. Six grab samples of massive sulfides contained 150-200 ppm cobalt. Inferred reserves are 2,900 tons at 3% copper. Moderate mineral development potential.
63	Unnamed occurrence* (cobalt) sec. 36, T. 02S., R. 08E. SM Latouche Island	See Seattle-Alaska Prospect (62).	Sample collected near the Seattle-Alaska Prospect (62).	One sample of massive sulfides contained 200 ppm cobalt. Mineral development potential unknown.
64	Unnamed occurrence* (chromium, nickel) sec. 09, T. 02S., R. 08E. SM Elrington Island	No data.	None.	One stream sediment sample contained 1000 ppm chromium and 500 ppm nickel. Mineral development potential unknown.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
65	Unnamed occurrence* (cobalt, manganese) sec. 21, T. 01N., R. 08E. SM Bainbridge Passage	No data.	None.	One stream sediment sample contained 150 ppm cobalt and 10,000 ppm manganese. Mineral development potential unknown.
66	Unnamed occurrence (chromium, manganese, nickel) sec. 16, T. 03N., R. 08E. SM Chenega Island	Greenstone with relict pillow structure is interbedded with shale and contains quartz stringers, epidote blebs, and a trace of pyrite.	None.	Highest reported values from two random chip samples were 195 ppm chromium, 175 ppm nickel, and 1,100 ppm manganese (25). Low mineral development potential.
56 67	Unnamed occurrence (chromium, copper, nickel) sec. 16, T. 03N., R. 08E. SM Chenega Island	50-ft-wide area of slightly sheared and massive greenstone. Shale interbed contain disseminated pyrite and some quartz veins, approximately 1-in.-wide, parallel to bedding.	None.	Highest reported values from two random chip samples were 580 ppm chromium, 100 ppm copper, and 150 ppm nickel (25). Low mineral development potential.
68	Unnamed occurrence* (manganese) sec. 12, T. 03N., R. 08E. SM Chenega Island	Rhodochrosite, pyroxmangite, and magnetite occur within a 6 x 50-ft outcrop of calcareous chert interbedded with calcareous shales and phyllites.	None.	3.5-ft-wide chip sample contained 17% manganese. Select grab sample contained 37% manganese and 200 ppm zinc. Moderate mineral development potential.
69	Unnamed occurrence* (tungsten) sec. 15, T. 07N., R. 09E. SM Perry Island	Several granite and aplite dikes occur at the contact of granite with silicified mudstone/chert. Minor limonite-staining occurs locally along with some epidote and traces of fine-grained pyrite.	None.	2-ft chip sample from contact zone contained 43 ppm tungsten; random chip contained 5 ppm tungsten. Low mineral development potential.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
70	Unnamed occurrence* (tungsten) sec. 01, T. 07N., R. 08E. SM Perry Island	40-ft-wide quartz stockwork zone in granite contains aplite veins up to 1-in.-wide. Some veins have been brecciated and silicified.	None.	Random chip sample contained 99 ppm tungsten. Low mineral development potential.
71	Unnamed occurrence* (fluorite) sec. 28, T. 11N., R. 12E. SM Wells Bay	3- to 12-ft-wide fluorite-quartz-calcite vein, traced for 100 ft, cuts slate.	None.	Chip sample of mineralized zone contained 17.5% fluorine. Inferred reserve: 1,500 tons at 17.5% fluorine. Low mineral development potential.
72	Four-in-One (copper, silver, nickel) sec. 35, T. 12N., R. 12E. SM Miners River	Two mineralized shear zones, from 5- to 100-ft-wide, contain sulfide veinlets and pods of chalcopyrite and pyrite.	60-ft-long adit; open pits. No reported production.	Five chip samples contained from 20 ppm to 3% copper, and 2.6 to 46.0 ppm silver. Four grab samples contained from 195 ppm to 0.94% copper, 2.7 to 8.8 ppm silver, and 9 ppm to 0.18% nickel. Inferred reserves: 33,500 tons at 0.22% copper and 21.2 ppm silver. Low mineral development potential.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
73	Miners River Nickel (cobalt, nickel, copper) sec. 04, T. 11N., R. 11E. SM Unakwik Inlet	10- to 20-ft-wide fracture zone cuts quartz diorite. Pyrrhotite, chalcopyrite, and pentlandite occur as disseminations in quartz diorite and in fissures.	Two adits 8- and 218-ft-long. No reported production.	Four chip samples contained from 400 ppm to 0.2% nickel, 93 ppm to 0.2% cobalt, and 100 ppm to 0.2% copper. Twenty-four surface grab samples contained from 20 0.2% nickel, 36 to 800 ppm cobalt, and 20 ppm to 0.1% copper. A 260 lb bulk sample contained 0.25% nickel, 0.02% cobalt, and 0.31% copper. Inferred reserves 11,000 tons at 0.2% nickel and 0.2% copper (28). Low mineral development potential.
74	Barry Arm Antimony (antimony) sec. 36, T. 12N., R. 08E. SM Barry Arm	Stibnite reported in 6- to 8-ft-wide shear zone in metasandstones and black slates (9). The stibnite-bearing quartz lenses are up to 2-ft-wide.	Surface stripping and trenching. 1,000 lbs of antimony ore reportedly mined circa 1913 (9).	Not located. Mineral development potential unknown.
75	Point Doran; Reiter and Olson; Bruno 1-3 (antimony, lead, copper) sec. 02, T. 11N., R. 07E. SM Barry Arm	Reportedly a 8- to 36-in.-wide quartz vein is traceable for 200 ft (14). Other quartz veins occur nearby. Stibnite, galena, and chalcopyrite reported in veins.	None.	Not visited. Mineral development potential unknown.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
76	<u>Mineral King Mine</u> Merrill; Hermann & Eaton; Brook-Eaton (gold, silver, tin) sec. 14, T. 10N., R. 06E. SM Bettles Bay	2- to 6-ft-wide quartz vein pinches and swells, lenses are up to 25-ft-long. Vein is hosted in metasediments and granite. Calcite, sphalerite, pyrite, galena, chalcopryrite, gold, pyrrhotite, and arsenopyrite in vein.	1,488 ft of underground workings. 3 levels, 100, 150, 200 expose vein for 100, 90, and 50 ft, respectively. 3,500 tons mined 1928-1932, with 2,116.6 oz gold recovered. Total reported production 2,783 oz gold, 826 oz silver.	Nine grab and chip samples contained from a trace to 0.15 oz gold/ton and from 0.01 to 0.13 oz silver/ton. A sample of mill feed contained 20 ppm tin. High grade portions of the vein may have been mined out. Reserves: 496 tons. Moderate mineral development potential for a small mine.
77	Unnamed occurrence* (chromium) sec. 36, T. 10N., R. 06E. SM Hammer Bay	No data.	None.	One stream sediment sample contained 700 ppm chromium. Mineral development potential unknown.
78	<u>Portage Bay Mine</u> (gold, silver, tungsten) sec. 15, T. 09N., R. 05E. SM Passage Canal	Quartz lenses, up to 20-in.-wide and 20- to 25-ft-long occur in a strong shear zone in slate and metasiltstone. Quartz contains pyrite, pyrrhotite, galena, sphalerite, chalcopryrite, and gold.	278-ft crosscut, 345-ft drift with approximately 220 ft of stoping and 240 ft of raises. Recorded production is 490 oz gold and 60 oz silver.	Thirteen chip, grab, and channel samples contained from a trace to 0.6 oz gold/ton and from a trace to 0.16 oz silver/ton. A sample of quartz float contains 50 ppm tungsten. Reserves: 10,000 tons. Moderate mineral development potential for a small mine.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
79	Billings Glacier* Molybdenum (molybdenum, quartz, tungsten) sec. 28, 29, T. 09N., R. 05E. SM Passage Canal	Molybdenite occurs along margins of a quartz monzonite stock apparently mainly associated with fractures. Molybdenite rosettes to 1 1/2-in. diameter and minor amounts of disseminated chalcopryite and pyrite present.	Several hundred pounds of specimen grade quartz crystals have been removed since their discovery in 1981.	Ten of 11 chip samples contained only a trace of molybdenum. Selected sample contained 0.2% molybdenum. Doubly terminated specimen grade quartz crystals up to 18-in-long present. Up to 0.14% tungsten present in quartz veins peripheral to stock. Low mineral development potential.
80	Golden Giant Group Collins; Fish, and Barry (gold, manganese, silver, tin, tungsten) sec. 29, T. 09N., R. 05E. SM Passage Canal	1.5- to 5-ft-wide dike in contact with metamorphosed sedimentary rocks recemented by quartz-carbonate veins containing arsenopyrite, sphalerite, galena, and gold. Similar dikes occur on both sides of Billings Creek.	None.	Grab sample of quartz contained a trace of gold, 0.01 oz silver/ton, 0.07% tungsten, 50 ppm tin, and 7,000 ppm manganese. Placer gold in creek. Low mineral development potential.
81	<u>Culross Mine</u> (gold, silver, tin) sec. 35, T. 08N., R. 07E. SM Culross Island	4- to 8-ft-wide shear zone contains banded quartz veins from a few inches to 3-ft-wide. It was mined irregularly for 410 ft along strike. Quartz-chlorite semischist wallrock contains occasional pillow outlines. Quartz veins contain arsenopyrite, sphalerite, galena, chalcopryite, visible gold, and calcite.	665-ft-long adit has a 180-ft raise to the surface. Second adit is 50-ft-long. Workings were connected by a cable tramway to a 10-ft Lane mill at the shoreline. Reported production: 62 oz gold, 53 oz silver.	Bureau chip sampling indicated grades of 0.06 oz gold/ton and <0.2 oz silver/ton. Other samples contained up to 14.8 ppm gold and 6.5 ppm silver. Indicated reserves: 8,600 tons at 5.5 ppm gold and 3.4 ppm silver. One sample of crushed quartz from the mill contained 200 ppm tin. This sample could have been contaminated. Moderate mineral development potential.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
82	Unnamed occurrence* (silver, copper, lead, zinc, gold, arsenic, chromium) sec. 34, T. 08N., R. 06E. SM Surprise Cove	3- to 15-ft-wide shear zones, exposed along strike for up to 1,000 ft contain several quartz and quartz-calcite veins. Sheared metasediments and quartz veins contain disseminated and podiform masses of pyrite, pyrrhotite, chalcopyrite, sphalerite, and galena. Shear zone averages 1% sulfides.	None.	8-in. chip sample across quartz vein contained 130 ppm silver. Float rock sample contained 140 ppm silver, 4.25% copper, 3.5% arsenic, and 0.3% zinc. A stream sediment sample contained 1,000 ppm chromium. Moderate mineral development potential.
83	Unnamed occurrence* (chromium) sec. 34, T. 08N., R. 05E. SM Blackstone Bay	No data.	None.	One stream sediment sample contained 1000 ppm chromium. Mineral development potential unknown.
84	Unnamed occurrence* (manganese) sec. 08, T. 07N., R. 05E. SM Willard Island	No data.	None.	One stream sediment sample contained 10,000 ppm manganese. Mineral development potential unknown.
85	Gulch Creek No. 1* (silver, gold, antimony) sec. 20, T. 08N., R. 01E. SM Kenai Peninsula	At least two 2- to 5-in.wide quartz veins in interbedded graywacke pebble conglomerate, and minor slate. Veins contain galena, stibnite, sphalerite, chalcopyrite, and arsenopyrite.	None.	Twelve samples contained from a trace to 0.05 oz gold/ton, from 0.01 to 20.41 oz silver/ton and from a trace to 0.23% antimony. Moderate mineral development potential.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
86	Ready Bullion (copper, gold, silver, cobalt, gallium) sec. 20, T. 07N., R. 01E. SM Lynx Creek	Massive sulfide lenses and pods, 1- to 4-ft-wide, occupy a well-developed 3- to 10-ft-wide shear zone in carbonaceous, phyllitic host rocks along an exposed strike length of 110 ft. Mineralization appears to be terminated at both ends by transverse faults. Lenses and pods contain pyrrhotite, pyrite, chalcopyrite, + sphalerite, and arsenopyrite.	Two adits. Lower reportedly is 800-ft-long and caved (21). Upper consisting of 335-ft of crosscut and 110-ft of drifts, minor stope development and a flooded winze of unknown depth. Small prospect pit is present above the upper level. No recorded production.	Average grades of samples are 2.5% copper, 0.1% zinc, 0.01 oz gold/ton, and 0.3 oz silver/ton. Samples contained from 0.002 to 4.4% copper, trace to 0.41% zinc, trace to 0.116 oz gold/ton, and trace to 0.75 oz silver/ton. Samples also contained up to 70 ppm gallium, and 130 ppm cobalt. Reserves: 6,000 tons. Moderate mineral development potential.
87	Black Devil; Lyngholm (antimony) sec. 31, T. 05N., R. 02W. SM Kenai Lake	Highly fractured and altered dike, 6- to 9-ft-wide, cuts slate. Quartz recements dike rock and contains both disseminated acicular crystals and stringers of stibnite. Dike is probably a continuation of the mineralized dike at the K & T prospect (88).	None.	Not located. Similar to K & T (88) occurrence. Low mineral development potential.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
88	K & T; Victory (antimony) sec. 08, T. 04N., R. 02W. SM Kenai Lake	Fractured and altered felsic dike, averaging 2-ft-wide and traceable for at least 500 ft along strike, has been recemented by quartz containing disseminations and stringers of stibnite.	Small trench. No recorded production.	Five chip samples contained from 0.015 to 0.34% antimony, trace of gold, and from 0.01 to 0.10 oz silver/ton. Analyses of samples from a previous report (29) indicate 1.7 to 4.38% antimony. Low mineral development potential.
89	Unnamed occurrence* (antimony) sec. 27, T. 04N., R. 02W. SM Kenai Lake	Mineralization similar to that of K & T Prospect (88) is suspected. Stream sediment values are higher than those from streams draining the K & T Prospect.	None.	Stream sediment sample contained 0.0215% antimony. Mineral development potential unknown.
90	Unnamed occurrence (chromium, nickel) sec. 07, T. 02S., R. 02E. SM Day Harbor	Serpentinized dunite.	None.	USGS sample contained 0.3% chromium and 0.5% nickel (25). Low mineral development potential.
91	Unnamed occurrence (chromium, nickel) sec. 12, T. 02S., R. 01E. SM N. Talus Bay	Serpentinized dunite, possibly along a fault zone.	None.	USGS sample contained 0.5% chromium and 0.3% nickel (25). Low mineral development potential.
92	Unnamed occurrence (chromium, nickel) sec. 13, T. 02S., R. 01E. SM Talus Bay	Shear zone, several yards wide, in gabbro.	None.	USGS sample contained 0.15% chromium and 0.03% nickel (25). Low mineral development potential.

Locality no.	Name/owner (resource) location	Summary of mineralization	Workings and production	Sample data and resource assessment
93	Unnamed Occurrence (chromium) sec. 14, T. 02S., R. 01E. SM W. Talus Bay	Mineralization reported to occur in the marginal phase of gabbro near its contact with sheeted dikes (25).	None.	USGS sample contained 0.1% chromium (25). Low mineral development potential.

