MINERAL APPRAISAL OF THE WRANGELL-ST. ELIAS REGION: A SUMMARY REPORT

By Staff, Alaska Field Operations Center,
Anchorage, Alaska

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BUREAU OF MINES

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FOREWORD

This is one of a series of summary reports that present the findings of reconnaissance-type mineral assessments of certain lands in Alaska. It is important to remember that Alaska has not been seriously prospected for minerals other than gold--except in a few relatively limited areas. These summary reports include data developed by both contract and Bureau studies; frequently a combination of both. As digests of more detailed reports that are still in preparation, these summaries omit the detailed findings that will be presented in the main reports, but the basic data and conclusions remain the same.

Assessing an area for its potential for buried mineral deposits is by far the most difficult of all natural resource assessments. This becomes more apparent when considering that no two deposits even of the same genesis and host rock conditions are identical. Moreover, judgments prior to drilling, the ultimate test, frequently vary among evaluators and continue to change as more detailed studies add to the understanding.

Included in these reports are estimates of the relative favorability for discovering metallic and related nonmetallic mineral deposits similar to those mined elsewhere. Favorability is estimated by evaluation of visible outcrops, and analyses of sampling data, including mineralogic characteristics and associated elements, in combination with an evaluation of the processes that have formed the rocks in which they occur. Essentially, it is a comparison of a related series of prospects and the environment in which they occur with the mineral deposits and environments in well-known mining districts. Recognition of a characteristic environment allows not only the delineation of a trend but also a rough estimate of the favorability of conditions in the trend for the formation of minable concentrations of mineral materials. This is a technique long used in the mineral industry to select areas for mineral exploration. Qualifying a trend or area as "highly favorable" for the discovery of mineral deposits indicates that the combination of outcrop samples, mineralogic data and geologic conditions that have been observed essentially duplicate the conditions in a recognized mining district elsewhere.

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ABSTRACT

A mineral and energy appraisal of the Wrangell-St. Elias area was made in 1977 and 1978 by the Bureau of Mines. The study region includes the Wrangell Mountains, the Chitina Valley, the Chugach Mountains, and the coastal area from the Canadian border and Yakutat Bay westward to Copper River Valley and Prince William Sound.

On the north side of the Wrangell Mountains, copper-molybdenum porphyries and several related types of deposits contain copper, gold, molybdenum, silver, and other metals. Production exceeded 75 thousand ounces of gold from lode mines and 45 thousand ounces of gold from placer mines. Although much of the area remains unexplored, several porphyry-type deposits are known and two have been investigated in some detail. The Nikolai Basalts found on both the north and south sides of the Wrangells contain copper segregations. The seeming low grade has discouraged development but minable segregations are possible and the great extent of the basalts suggests a large resource.

The south slopes of the Wrangell Mountains include the historic Kennecott copper mines that produced 1.2 billion pounds of copper and 9 million ounces of silver and the active Nizina placer district that has produced 140 thousand ounces of gold. From Barnard Glacier westward to Mt. Wrangell, the south slopes have been of perennial interest to prospectors and mining companies; numerous mineral occurrences are known, many prospects are actively held, and some have recently been under heavy exploration.

The northern slopes of the Chugach Mountains have some occurrences of gold, silver and copper and rocks that elsewhere contain lead, nickel, chromium, molybdenum, barite, and antimony. This area remains essentially unprospected although small amounts of gold were produced from a cluster of lode and placer mines near the head of the Bremner River.

The higher parts of the Chugach Range have no reported mining claims or evidences of metallic minerals except that copper minerals have been seen in basalts near the Bagley fault and in a group of rocks south of the Bagley fault.

The coastal area has many oil and gas seeps and coal outcroppings. Oil was produced and refined locally at Katalla from 1911 to 1932. In recent years, oil companies drilled onshore and offshore; no discoveries were announced but exploration continues. Coal of high rank is exposed near the Bering River but the beds are irregular and faulted and, consequently, difficult to mine. Substantial coal deposits may exist in less deformed areas but may be of lower rank. Gold occurs in the beach sands and small concentrations produced by wave actions are occasionally mined.

INTRODUCTION

The Wrangell-St. Elias area (see fig. 1 and fig. 2) produced important quantities of copper, gold and oil during the first few decades of the 1900's. All public and available private data on the rock types and mineral resources of the study area were reviewed. Approximately 150 man days of field work were devoted to the area in the summer of 1977. Reconnaissance sampling was done in some areas for which no information was available. Many of the known mines, prospects, and mineral occurrences of the region were examined. This report is a summary. A complete report including sampling and analytical data will be released at a later date.

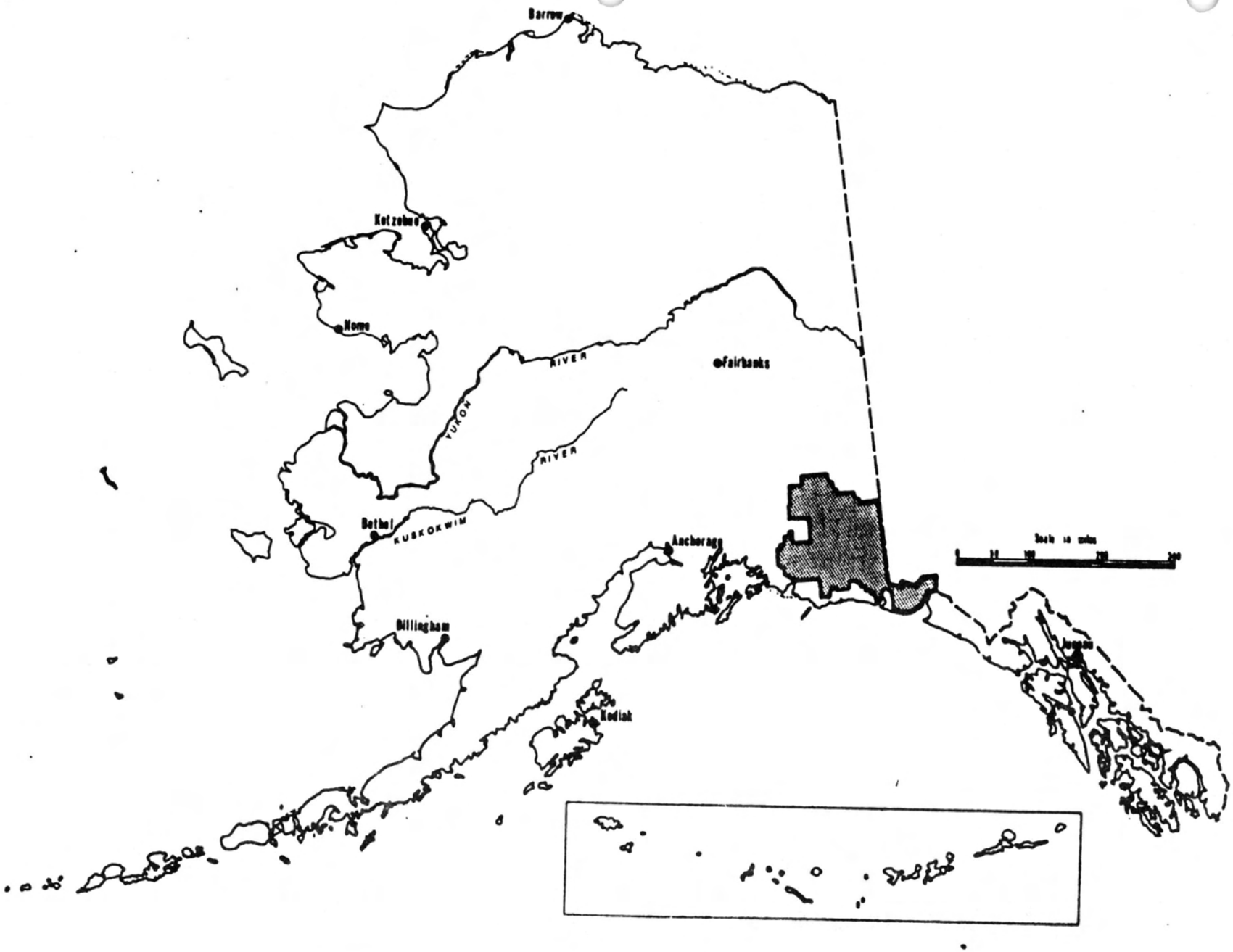

Figure 1- Index Map of the Wrangell-St.Elias Region

ACKNOWLEDGMENTS

Much of the background data for this report was the product of earth scientists of the U.S. Geological Survey, past and present. Of special help were D. H. Richter and E. M. MacKevett, whose reviews and comments are greatly appreciated. Considerable information was supplied by the Alaskan State Division of Geological and Geophysical Surveys. Compilations, professional advice, and summary reports for local regions were provided by consultants Wallace McGregor of Spokane, Washington, and G. A. Moerlein and A. L. Renshaw of Anchorage, Alaska. Their information has been integrated into this report.

This is a brief summary of a forthcoming comprehensive report on the Wrangell-St. Elias area by Toni K. Hinderman, mining geologist, Alaska Field Operations Center.

HISTORY

A rich vein of copper sulfide was discovered in 1900 near the Chitina River. This lode and three other nearby deposits became known as the Kennecott Mines. They began production in 1911 after the completion of a railroad along a difficult route following the Copper River. The success of the Kennecott mines and the availability of railroad transportation contributed to a surge of mineral activity which lasted several decades. During this period copper, gold and silver were being recovered from many lode and placer mines in the region's various mineral districts and oil was being produced from the Katalla field on the Gulf of Alaska. The coal deposits of the Bering River field were actively explored in the early 1900's but the prospects were not brought to production.

The Kennecott operations, essentially mined out, closed in 1938 and the railroad was unable to continue to run economically. The loss of this transportation system, plus rising wartime wages and the termination of gold mining under the L-208 order caused a rapid decline in mineral activity. Since World War II, production from the region has been limited to small placer gold mines, minor underground copper operations, and surface clean up around the Kennecott Copper Mines. There have been intermittent spurts of exploration in the region by private individuals and by larger mining companies during times of favorable metal prices, resulting in the discovery of large, low grade, or porphyry, copper deposits in the northern Wrangell Mountains in the 1960's and early 1970's and the location of a few other significant mineral deposits elsewhere. None of these have been economically viable to date, although most are being held in hopes of future production. In recent years large scale land withdrawals and low metal prices have provided a strong deterrent to private industry interest in the area.

GENERAL ROCK TYPES

The rock units of the Wrangell-St. Elias area are divided in this report into four major rock type areas (fig. 3). From north to south these are:

1. The Wrangell Mountain Group
2. The Valdez Group
3. The Orca Group
4. The Gulf of Alaska Group

These areas are separated from each other by major faults. In general they decrease progressively in age from north to south.

The Wrangell Mountain Group

The basement rocks of the Wrangell Mountain group consist of deformed and metamorphosed rocks of mid to late Paleozoic age which appear to be the vestiges of an anciant volcanic island chain. The copper rich Nikolai Basalt was laid down in early Mesozoic time upon this basement complex after deformation and uplift, and the basalt was in turn succeeded by various sedimentary units for the remainder of the Mesozoic Era. The Wrangell Volcanism began building the summits of the Wrangell Mountains in the early Tertiary period and has continued to the present. Intrusive bodies ranging in composition from ultramafic to granitic and in age from Pennsylvania to Tertiary intrude the bedded rocks in many locations.

Certain formations of the Wrangell Mountain Group have yielded substantial amounts of copper, gold and silver in the past and the region has numerous occurrences of these metals as well as molybdenum. Chromium, nickel, manganese and antimony also are known. The Wrangell Lavas have no known concentrations of mineral commodities but the volcanoes themselves have been included in listings of possible geothermal evergy sites.

The Valdez Group

The region between the Border Ranges and Bagley Faults (fig. 3), is underlain primarily by the rocks of the Cretaceous Valdez Group, a deep water marine assemblage consisting mostly of black shale and sandstone. In the eastern part of the Chugach Mountains the group includes undifferentiated metamorphic rocks whose geologic relationships have received little study. The rocks of the area are intruded by igneous bodies ranging in size from dikes to large batholiths.

Valdez Group rocks lie in a 500 mile arc along the Chugach Mountains and are the host for several clusters of lode and placer gold mines and prospects. One such cluster is located in the Bremner area and another and richer one occurs in the Valdez area to the west.

The Orca Group

The narrow band of rocks that lie between the Bagley Fault and the Chugach-St. Elias Fault (fig. 3) has been mapped only in reconnaissance fashion. These rocks and isolated fault slivers to the south are currently correlated with rocks of the early Tertiary Orca Group, whose marine sediments and volcanics are the host for sizable copper deposits that were mined at Ellamar and Latouche in Prince William Sound. No mines or prospects are reported in the Orca Group rocks east of the Copper River, but the area has not been heavily prospected. Copper mineralization has been observed in basalts of the Bagley ice field area by both the U.S. Geological Survey and the Bureau of Mines.

The Gulf of Alaska Group

The Gulf of Alaska Group, extending from the Chugach-St. Elias Fault south to the edge of the continental shelf (fig. 3), consists primarily of Tertiary through Miocene marine and non-marine sediments with a lesser volume of volcanics. Also included are undifferentiated metamorphic and plutonic rocks of probable Mesozoic age that occur along the crest of the Chugach Mountains in the eastern part of the area.

Oil production from a small field at Katalla sustained a small local refinery from 1911 to 1932. The non-marine portions of the rock sequence contain beds of coal, some of which is of high rank or of good coking quality.

METALLIC MINERALS

A summary table of mineral data listed by map locations on figure 4 is given in the appendix.

Copper

A number of large tonnage, low grade copper deposits related to igneous intrusions occur in the Wrangell Mountain Area on the north side of the Wrangell Mountains (fig. 4 and Appendix, numbers 19, 22, 36, 37, 40, 41, 42). Resources in the known deposits have been estimated at 1.2 billion tons with an approximate total copper content of about 7.2 billion pounds (49) 1/. They also contain molybdenum, silver and gold in amounts sufficient to recover as a byproduct. Copper mineralization of the porphyry type has also been recognized at several locations in the Chitina River Valley south of the Wrangells (fig. 4, numbers 90, 109, 151). These occurrences are smaller and of a lower grade than those of the Northern Wrangell belt. Undiscovered porphyry deposits may exist, most likely associated with the trend of porphyry prospects north of the Wrangells.

Historically, the most important economic contribution from the study area was that of the Kennecott Mines on the south side of the Wrangell Mountains study region (fig. 4, numbers 119, 120, 121, 122). The total production of these four deposits amounted to 4,627,000 tons of ore containing about 1.2 billion pounds of copper and about 9,000,000 oz. of silver (19). The ore occurs in veins and is restricted to limestone beds just above the contact between the limestone and the underlying Nikolai Basalt.

1/ Underlined numbers in parentheses refer to items in the list of references before the appendix.

A number of similar prospects in the limestone both east and west of McCarthy (fig. 4, numbers 118, 123, 126, 128, 129, 130, 135) have been developed to varying degrees, but none to date has demonstrated significant reserves. With present knowledge and exploration techniques, Kennecott-type deposits are very difficult to find unless they outcrop, so undiscovered mineralization may well exist. The Nikolai Basalt--limestone contact, both exposed and buried, is of continuing interest to mining companies looking for Kennecott-type deposits.

The Nikolai Basalt itself has a high intrinsic copper content and copper mineralization has been found nearly everywhere it outcrops. None have been economic to date. Reports of very limited sampling suggest that the Nikolai Basalt may contain very substantial tonnages at grades equal to or higher than those of the porphyry deposits.

Copper is inferred in the volcanics of the Orca Group east of the Copper River because of their correlation with the host rocks for the Latouche and Ellamar deposits (fig. 4, numbers 191 and 229) in Prince William Sound, and because of copper mineralization in the Bagley Ice Field Area (fig. 4, number 160).

Copper is found associated with vein and contact deposits in or near granitic intrusives in most of the areas. Volcanogenic deposits in the deformed island arc deposits of the Wrangell Mountain Group's Paleozoic basement are possible.

Gold

Lode gold has been mined in the study region from the deposits at Nabesna (fig. 4, number 15), with a total production of about 75 thousand ounces (49), and from several of the deposits fo the Bremner District (fig. 4, numbers 163, 164, 167) which produced in the aggregate a few thousand ounces. About

143 thousand ounces of gold were recovered from the placers of the Nizina District (fig. 4, numbers 137, 138, 142, 143) prior to 1959 (25) and 45 to 50 thousand ounces were taken from the placers of the Chisana District (fig. 4, numbers 27, 28, 30, 33, 34, 35) (49). Beach placers along the Gulf of Alaska (fig. 4, numbers 156, 157, 158) accounted for a production of about 19 thousand ounces (43), and a few thousand ounces were taken from the placer deposits of the the Bremner District (fig. 4, number 169) (25). The major potential for lode gold in the study region lies with the undeveloped porphyry deposits of the northern Wrangell belt which are estimated (49) to contain about 9 million ounces of gold recoverable as a byproduct of copper mining. Undiscovered lode deposits of the types previously developed undoubtedly also exist. Their potential is probably comparable to the past production, which was in the neighborhood of 100 thousand ounces. The study region's remaining unmined stream placers are of small yardage and their gold potential is probably only a few tens of thousands of ounces. Associated bench gravels and stream mouth deltas probably contain considerable quantities of gold but grades may be low. Beach placer concentrations are formed by large storms so small amounts of gold can be mined from them on a continuing basis.

Molybdenum

Many of the porphyry copper deposits of the Northern Wrangell Belt contain molybdenum which could be recovered as a byproduct, and other nearby occurrences, such as the East Fork prospect on Bond Creek (fig. 4, number 21), may eventually be mined for molybdenum alone. Porphyry and vein type molybdenum deposits have also been found in different locations along the Chitina River Valley to the south of the Wrangells (fig. 4, numbers 117, 124, 141, 149, 150, 151). These deposits appear to be smaller and lower in grade

than those on the northern side of the mountains. Molybdenum mineralization apparently is associated with intrusive rocks of the Wrangell group.

Nickel and Chromium

Much of the world's nickel and chromium is mined from deposits associated with ultramafic intrusives. A belt of these bodies lies six to ten miles north of the Border Ranges Fault on the north side of the Chugach Mountains. A similar belt is associated with the Denali Fault. Subeconomic mineralization has been found in some of the ultramafics (fig. 4, numbers 60, 61, 76) and concentrations may well exist. The region has not been heavily prospected for nickel and chromium.

Other Metals

Lead, zinc, silver, antimony, barite, and tungsten occurrences have also been recognized in the study area.

ENERGY MINERALS

Coal

Deposits of coal of up to bituminous and anthracite rank (2) have long been recognized in the Tertiary non-marine sediments of the Bering River region in the Gulf of Alaska Group (fig. 4, numbers 173, 174, 175, 176, 177, 178). Little development work has been done, due in large part to extensive folding and faulting of the coalbeds which makes mining difficult. Rocks of the same geologic sequence but less deformed underlie large areas of the Robinson Mountains to the east of the Bering River field. Coalbeds have also been observed there, but their extent and rank are unknown.

Oil and Gas

Natural oil seeps are common in certain beds of the Tertiary section in the Gulf of Alaska Group (4). From 1911 to 1932 a number of wells in the Katalla area (fig. 4, number 179) produced enough oil to support a small refinery (44). Exploratory wells have since been drilled both on and offshore with little success, but there is continued interest in the region by the oil industry and it must still be considered to have potential for oil and gas. An organic rich shale, associated with many of the natural seeps, may have potential as an oil shale (44).

Geothermal Energy

Many of the volcanoes of the Wrangell Mountains have been active in historic or recent geologic times and some show rock type relationships which may indicate the presence of an appreciable heat source at a relatively shallow depth.

Uranium

Little is known about uranium in the Wrangell-St. Elias region. If intensive prospecting has been done, the results have not been made public. Areas where prospecting would seem justified include the Tertiary non-marine sediments in the Gulf of Alaska Group and in the Copper River Basin, some of the granitic intrusives and some of the metallic ore deposits.

MINERAL DEPOSITS

The relative favorability of various parts of the study area are shown on figure 5. To the north of the Wrangell Mountains, two areas have resources of copper, gold, molybdenum, silver, and other metals. On the south flank of the Wrangell Mountains, to the north of the Chitina River, is an area favorable

for copper, gold, silver, and other metals. The third region, on the Gulf of Alaska south of the Chugach Mountains, has coal deposits and possible oil potential.

Large portions of the study area have not been extensively studied or prospected, generally because they appear less favorable. These areas, which include the highest and most spectacular mountains of the Wrangell and Chugach Ranges and the lush lowlands of the Copper River Basin are largely covered with deep alluvial material, glaciers or apparently barren rock types such as the Wrangell lavas. Remoteness has limited studies in a few areas.

ON-GOING STUDIES

Work is currently underway on a more complete and rigorous version of this report for release at a later date. No further field work is planned for the region at this time by the Bureau of Mines.

CONCLUSIONS

The Wrangell-St. Elias region sustained a flourishing mineral industry during the first three decades of the 1900's. Gold deposits, Kennecott-type copper mineralization, and coal and oil are of current economic interest. Other metal concentrations such as the copper in the Nikolai Basalts, porphyry type copper-molybdenum deposits and the nickel and chromium mineralization may not be viable for several decades, depending on metal prices and the development of adequate surface bulk transportation. The favorable areas are fairly restricted. Much of the study area, including localities with widely varied topographic and geographic aspects, appears to have little mineral potential because of a thick cover of alluvium, ice or geologically young and barren lava flows.

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APPENDIX - MINERAL DEPOSIT AND OCCURRENCE DATA

Explanation

MAP NO. - refers to number on figure 4, underlined if more than one deposit or occurrence is indicated (within an approximate three mile radius)

CATEGORY - indicates approximate degree of development:

A - geochemical or geophysical anomaly

O - mineral occurrence with no known exploration, activity or development

P - prospect with no recorded past production and minor or unknown potential

P* - prospect with no recorded past production and recognized major production potential

M - mine with known minor or unidentified production

M* - lode mine with a production of worth more than $10,000 in dollars at the time or placer mine with a production of greater than $10,000 in dollars at the time

COMMODITY - Most important commodity is given first if more than one is associated with an occurrence or deposit, symbols used.

REFERENCES - Numbers refer to items in list of references preceeding the appendix

MAP NO.	CATEGORY	NAME	COMMODITY(IES)	DESCRIPTION	PRINCIPAL REFERENCES
1	P	Judy	Cu, Au	Prospect active in late 1960's	48
2	P		Cu	Prospect active in late 1960's	48
3	O		Cu	Traces of copper sulfide occuring through 400 ft thick zone of epidotized basalt	47
4	P	Ahtell Cr.(w. fork)	Pb, Ag, Cu	Short adit on quartz vein in altered diorite	46
5	P	Indian Group, Blue Ridge Lode	Ag, Pb, Cu	Small pits on sulfide bearing quartz veins in quartz monzonite	
6	M	Grubstake Creek	Au, Ag, Cu	Placer gold production of a few thousand dollars in the 1930's	36
7	P	Silver Shield	Ag, Pb	Lead and silver bearing quartz veins in fault zone, staked in 1960's	46
8	P	Silver Creek	Ag, Au, Pb, Zn, Cu	Minor workings on mineralized fractures in 100 ft wide fault zone in diorite	46
9	M	Slope Creek	Au, Ag	Placer gold production probably less than $10,000, minor wire silver present	46
10	M	Boulder Creek	Au	Minor production of coarse grained placer gold	49
11	P		Ag, Au	Old workings on quartz stringers with sulfides in altered volcanics	36
12	P	Rock Creek	Mo	Molybdenite in shattered granitic intrusive and pegmatite dikes	34

MAP NO.	CATEGORY	NAME	COMMODITY(IES)	DESCRIPTION	PRINCIPAL REFERENCES
13	O		Cu	Native copper in fractures in basalt flows	49
14	P	Golden Eagle Group (Rambler)	Au	Massive sulfides in contact zone of granitic intrustive	35
15	M*	Nabesna Mine	Au, Cu, Ag	Gold production of $1.9 million, all before 1940, from skarn deposits at the contact of quartz diorite and limestone	35
16	M	Royal Development	Au	Disseminated sulfides and quartz-sulfide veins in quartz diorite; minor gold production in 1907	49
17	P	Monte Cristo Creek (Maria Nabesna)	Mo	Porphyry type molybdenum mineralization at granodiorite contact	49
18	P	Nabesna River	Cu, Ag	Veins and contact mineralization in dacite dike and volcanics	49
19	P*	Orange Hill	Cu, Mo, Au, Ag	Widespread porphyry type mineralization in granitic intrusive rocks; reserves estimated at 320 million tons containing 2.24 billion lbs. of copper, 128 million lbs. of molybdenum, and recoverable quantities of gold and silver.	49
20	P	Lemon Claims	Cu, Au, Zn, Ag	Skarn deposits at contact of granitic intrusive	63
21	P	East Fork	Mo	Porphyry type molybdenum mineralization in strongly altered instrusive	49

MAP NO.	CATEGORY	NAME	COMMODITY(IES)	DESCRIPTION	PRINCIPAL REFERENCES
22	P*	Bond Creek	Cu, Mo, Au, Ag	Porphyry mineralization in granitic intrusives and meta-volcanic country rock; estimated reserves of 500 million tons containing 3.0 billion lbs copper, 200 million lbs molybdenum and significant quantities of gold and silver	49
23	P		Cu	Stockwork quartz sulfide veinlets in felsic flows or shallow intrusive	49
24	P	Nabesna Glacier	Zn, Cu, Au	Quartz sulfide veins in altered quartz eye nypahyssal intrusive	49
25	O		Cu	Native copper and copper oxides in agglomerate in Nikolai Basalt	49, 62
26	P	Cross Creek	Cu, Zn, Pb, Ag	Strongly altered zone with breccia cemented by quartz and sulfides	49
27	M	Charolda (Wilson Creek)	Au	Minor placer gold production	35
28	M*	Glacier Creek	Au	Produced a significant fraction of the $1 million placer gold production in the Chisana region	14
29	P	Big Eldorado	Au, Cu	Quartz vein with sulfides in intrusive rock	49
30	M*	Bonanza Creek	Au	The major gold producer in Chisana district, it and glacier creek (# 28) accounted for the majority of the $1,000.000 production from the district; most of the activity was in 1913 and 1914 but mining continues to the present	35
31	P		Au	Old workings on gold bearing quartz veins in volcanic breccia	14

MAP NO.	CATEGORY	NAME	COMMODITY(IES)	DESCRIPTION	PRINCIPAL REFERENCES
32	P		Au	Old workings on gold bearing quartz sulfide veins in altered zone in volcanic breccia	14
33	M	Chathenda (Johnson) Creek	Au	Minor placer gold production	14
34	M	Chathenda (Johnson) Creek	Au	Minor placer gold production	14
35	M	Bryan Creek	Au, Cu	Minor placer gold production, abundant native copper	36
36	P	Carl Creek	Cu, Au, Ag, Mo	Prophyry mineralization in intrusive rocks; reserves estimated at 16 million tons containing 64 million lbs of copper and significant quantities of gold, silver, and molybdenum	49
37	P	Johnson Creek	Cu, Au, Ag, Mo	Porphyry mineralization in intrusive and country rocks; reserves estimated at 8 million tons containing 32 million lbs of copper and significant quantities of molybdenum, silver, and gold	49
38	P	O'Hara, Sulzer, Cosmopolitan Copper group	Cu	Old workings on copper minerals in Nikolai Basalt flows	35
39	P	Reynolds, Butte Creek Copper, Chisana Mines	Cu	Old open cuts on small copper veins in Nikolai Basalt	35
40	P*	Baultoff	Cu, Au, Ag	Porphyry type mineralization in intrusive rocks; reserves estimated at 160 million lbs of copper and significant quantities of gold and silver	49

MAP NO.	CATEGORY	NAME	COMMODITY(IES)	DESCRIPTION	PRINCIPAL REFERENCES
41	P		Cu	Porphyry type mineralization in small diorite stock and altered country rock; reserves estimated at 12 million tons containing 48 million lbs of copper and significant quantities other metals.	49
42	P*	Horsfeld	Cu, Au, Ag	Porphyry type mineralization in intrusive rocks; reserves estimated at 60 million tons containing 240 million lbs of copper and significant quantities of silver and gold	49
43	O		Cu	Sulfides in shears in granodiorite and altered country rocks	24
44	P	Colorado	Au, Cu	Short adit on apparent contact metamorphic sulfide deposit	24
45	O		Cu	Sulfides in gabbro and country rocks near fault intersection	24
46	P		Cu	Copper minerals in isolated outcrop of Nikolai Basalt	25
47	P		Cu	Old workings on copper minerals in 200 ft. long zone in Nikolai basalt	14
48	P	Skolai Mining Company	Cu	Old workings on copper minerals in sheared Nikolai basalt	24
49	P		Cu	Old surficial workings on copper bearing vein in Nikolai Basalt	40
50	P	Morraine Creek	Cu	Copper minerals along flow contacts in Nikolai Basalt	40
51	P	Verdi(Wiley) Creek	Cu	Copper minerals in shattered, altered Nikolai Basalt	14

MAP NO.	CATEGORY	NAME	COMMODITY(IES)	DESCRIPTION	PRINCIPAL REFERENCES
52	P	Sheep Creek	Cu	Old workings on copper minerals in Nikolai Basalt	14
53	A		Mo	Sample of altered granodiorite contained 70 ppm Mo; of significance considering nearby magnetic anomalies (54)	25
54	A			Magnetic anomalies in this region may indicate the presence of buried porphyry mineralization; a nearby outcrop (see 53) has an anomalous molybdenum content	27
55	O		Cu, Au, Ag	Copper bearing sulfide veinlets and disseminations in Permian metavolcanics; traces of gold and silver in samples	25
56	O		Cu	Copper minerals in a poorly exposed outcrop of Nikolai Basalt	25
57	O		Cu, Ag	Copper minerals in shear zone in Triassic sediments; traces of silver in samples	25
58	O		Cu	Native copper in agglomerate in Nikolai Basalt	25
59	P	Willow Mountain	Cu, Zn	Copper minerals and secondary zinc minerals sparsely but widely disseminated in altered limestone	3
60	P	Dust Mountain	Cr, Ni	Small body of massive chromite with traces of nickel in an ultramafic sill	3

MAP NO.	CATEGORY	NAME	COMMODITY(IES)	DESCRIPTION	PRINCIPAL REFERENCES
61	P	Red (Bernard) Mountain	Cr. Ni	Chromite in layers, lenses, and disseminations in an ultramafic sill; traces of Ni; activity as recently as 1966	23
62	M	Fall Creek	Au	Minor placer gold production	12
63	M	Fourth of July Creek	Au	Minor placer gold production	58
64	M	Quartz Creek	Au	Considerable mining activity and some gold produced around the turn of the century	12
65	P	Quartz Creek Gold Mining Co.	Au, Pb, Cu	Old workings on a large number of mineralized quartz veins in black schist greywacke	12
66	M	Wetzler (Quail)	Au, Pb, Zn, Cu	Four or more mineralized quartz veins in fault zone in grey slate; three tons of ore shipped in 1914	12
67	P	Knowles	Au, Pb	Mineralized quartz lenses in joints and shears in slate and greywacke	33
68	M	Bagle (Ellis, Meckem)	Au, Pb	Mineralized quartz veins up to 6 ft. thick in joints in slate and greywacke; produced between 10 and $20,000 in gold from high grade pocket	33
69	M	Boulder Creek	Au	Minor placer gold production	42
70	P	Ross	Au, Pb	Adit on quartz vein in black slate	12
71	P	Reis	Au	Old workings on gold bearing quartz vein	12

MAP NO.	CATEGORY	NAME	COMMODITY(IES)	DESCRIPTION	PRINCIPAL REFERENCES
72	P	Townsend and Holland	Au	Two adits under Richardson Highway on mineralized quartz veins in grey slate	33
73	M	Tiekel R.	Au	Minor gold production from bench placers	9
74	M	Little Bremner River	Au	Considerable mining activity and some production from gold placers in early 1900's	32
75	A		Zn	200 ppm Zn anomaly in stream sediments; several nearby samples have 150 ppm or more Zn, country rocks are black slate and greywacke	62
76	P	Spirit Mtn.	Ni, Cu, Co, Zn	Two nickel bearing sulfide lenses in ultramafic bodies in a thrust fault	21
77	P	Falls Creek	Cu	Old adits on disseminated copper minerals in greenstone	32
78	P	O'Hara	Pb, Zn, Ag	Sulfide veins in Permian marble	3
79	O		Pb, Zn	Scattered sulfides in Permian marble	25
80	P	Surprise Creek	Cu	Short adit on sulfides in shear zone in greenstone	32
81	P	Blackney	Cu	Parallel veins of sulfide minerals in 3 ft. wide fault zone in greenstone	32
82	P	Opal	Au	Gold lode prospect	18
83	P	Liberty falls	Mn	Small, high grade manganese deposits in chlorite schist	23

MAP NO.	CATEGORY	NAME	COMMODITY(IES)	DESCRIPTION	PRINCIPAL REFERENCES
84	P	Chickona Claims	Ba	Barite in rhyolite beds in Permian metavolcanics	62
85	P		Cu	Copper minerals in fault in Permian metavolcanics	62
86	P	Hidden Treasure	Cu	Old workings on copper mineralization in Nikolai Basalt	25
87	P		Cu	Adit in 75 ft. wide shear zone with copper sulfides in Nikolai Basalt	62
88	P	Good Enough	Cu	Two adits on copper mineralization in shears and disseminated in Nikolai Basalt near the base of the unit	41
89	P	Mineral Creek, Valdez Claim	Au, Ag	Several old workings on mineralized quartz veins in Permian argillite	41
90	O		Cu, Mo	Low grade porphyry type mineralization in granodiorite	25
91	P	Peacock Creek	Cu	Old workings on copper bearing veins in Nikolai Basalt	25
92	P	Skyscraper	Cu	Old workings on widespread veins and disseminations of copper minerals in a specific stratigraphic horizon	41, 62
93	P	Roaring Creek	Cu	Old workings on sulfide bearing veins and disseminations in felsic volcanics or volcanoclastics	41, 62
94	P	Great Northern Development Company	Cu	Old workings on primarily shear controlled copper mineralization in Nikolai Basalt and intrusive rocks	41, 62

MAP NO.	CATEGORY	NAME	COMMODITY(IES)	DESCRIPTION	PRINCIPAL REFERENCES
95	P	Silver Star	Ag, Cu	Adits on sulfide bearing quartz veins in Nikolai Basalt near the contact with a diorite intrusive	41
96	P	Lost Cabin Extension	Cu	Adits and open cuts on disseminated copper mineralization in the Nikolai Basalt just below the limestone contact	41
97	P	Guthrie, Albert Johnson	Cu	Several short adits on veins and veinlets in sheared and shattered Nikoali Basalt	41
98	P	Copper Creek	Cu	Copper mineralization in fault in limestone near Nikolai Basalt contact	28
99	P		Cu	Short adit on disseminated copper mineralization in Nikolai Basalt	62
100	P	Goodyear, Henry Prather	Cu	Old prospects on copper mineralization in faults and disseminated in Nikolai Basalt	41
101	P	Benito Creek	Au, Ag, Cu	Sulfide bearing quartz vein up to 3 ft. thick in diorite and Permian volcanics	41
102	P	Montana Boy, Mountain Boy, Middle Fork	Cu	Several old prospects on Copper mineralization in veins and disseminations in Nikolai Basalt near the limestone contact	41, 64
103	P	Mineral King	Cu	Open cuts on copper sulfides along joint and fracture surfaces	41
104	P	Strelna Creek	Cu	Old prospect pit on altered fault zone in Nikolai Basalt with sporadic copper mineralization	25

MAP NO.	CATEGORY	NAME	COMMODITY(IES)	DESCRIPTION	PRINCIPAL REFERENCES
105	P	Great Northern Development Co., Young and Bennet Blackbarn	Cu, Ag	Scattered old workings on several prospects on copper mineralization Nikolai Basalt and granodiorite intrusive some show gold values	25, 41
106	O		Cu, Ag	Copper bearing veins with silver values in altered fault zone in Nikolai Basalt	25
107	M	Midas, (Berg Creek)	Au, Cu	Skarn and quartz veins in contact zone between diorite and limestone minor gold production in 1919	41
108	P	War Eagle, Calcite, Copper Queen, Rarus	Cu	Old prospects in mineralized limestone-diorite contact	25
109	P	London and Cape (Trail Creek)	Cu, Mo, Ag	Low grade porphyry type mineralization in fractured, locally altered intrusive rocks	25
110	M	Valdez, (Nugget Creek)	Cu	4,000 ft of workings in calcite vein up to 24 ft. wide and the Nikolai Basalt it cuts; produced a small amount of copper prior to 1919	41
111	P	Big Horn (finch)	Cu	Old workings on sulfide veins and pods in faulted, fractured, locally altered Nikolai Basalt	41
112	P	Mayflower	Cu, Ag	Copper mineralization in shears in faulted and fractured Nikolai Basalt	41
113	P	Lakina	Cu, Ag	Shear zones and flow contacts have native copper and copper sulfides	25
114	P	North of Hidden Creek	Cu	Copper mineralization in narrow vein in fault in Nikolai Basalt	25

MAP NO.	CATEGORY	NAME	COMMODITY(IES)	DESCRIPTION	PRINCIPAL REFERENCES
115	P	South of Hidden Creek	Cu	Several prospects on faults in Nikolai Basalt or along Basalt-Limestone contact	25
116	P	Nebraska	Cu	Old workings in Nikolai Basalt on copper minerals in shear zones	25
117	O		Mo, Ag, Au	low grade porphyry Mo mineralization in tertiary granitic stock near by samples of altered granodiorite were geochemically anomalous for Ag, Au and As	25, 62
118	M, P	Regal	Cu	Kennecott type deposits in limestone; minor production from the Regal	25, 30
119	M*	Erie	Cu, Ag	Kennecott type deposit, one of the four Kennecott Mines; produced a significant proportion of the mines 1.2 billion pound aggregate copper output; inactive since 1938	19, 30
120	M*	Jumbo	Cu, Ag	Kennecott type deposit and the major producer of the Kennecott mines, whose total output amounted to 1.2 billion pounds of copper	19, 30
121	M*	Bonanza	Cu, Ag	First Kennecott type deposit to be discovered (1900) and one of the four Kennecott Mines; produced a significant proportion of the mines 1.2 billion pound aggregate copper output; inactive since 1938 except for minor production from surface rubble in the early 1960's	19, 30
122	M*	Mother Lode	Cu, Ag	Kennecott type deposit and one of the four Kennecott mines; produced a significant proportion of the mines' 1.2 billion pound aggregate copper output; recent explotation acitivity	19, 30

MAP NO.	CATEGORY	NAME	COMMODITY(IES)	DESCRIPTION	PRINCIPAL REFERENCES
123	M, P	Green Butte, Tjosevin (Big Ben)	Cu, Ag	Kennecott type deposits; the Green Butte Mine produced 1.8 million pounds of copper in the 1930's; recent explanation activity; no production from Tjosevig prospect	30, 62
124	P	Porphyry Mtn.	Au, Mo	Molybdenite-quartz vein with minor gold values	25
125	P	Nikolai	Cu	Copper sulfide veins in shear zones in Nikolai Basalt; known to Natives before the white man arrived; nearby explanation activity in the early 1970's for Kennecott type deposits based on geochemical anomalies	25, 30
126	P		Cu	Generalized location of 1960's drilling for Kennecott type lodes based on geophysical anomalies	25
127	P	Houghton Alaska	Cu	Several old prospects on copper minerals along minor faults in Nikolai Basalt	30
128	M	Nelson	Cu	Kennecott type deposit with minor production in 1930's	30
129	M	Peavine	Cu	Kennecott type deposit in brecciated fault zone; small shipment made in early 1970's; recent exploration activity	25, 51
130	P	Binocular	Cu	Kennecott type Copper mineralization in brecciated Dolomite lens near Nikolai Basalt contact; recent exploration activity	30, 62
131	P	Radovan Greenstone	Cu, Ag	Small, high grade copper vein in fault zone in Nikolai Basalt	51
132	P	Radovan Low Contact	Cu	Sporadically distributed sulfides of iron, copper and arsenic in fault zone up to 100 ft. wide	51

MAP NO.	CATEGORY	NAME	COMMODITY(IES)	DESCRIPTION	PRINCIPAL REFERENCES
133	M	Erickson	Cu	Copper oxides and native copper in agglomerate lenses in Nikolai Basalt; minor production in 1917	25, 62
134	P	Snowbird	Cu, Ag	Copper bearing vein in shear zone in Nikolai Basalt	25
135	M	Westover	Cu	Kennecott-type deposit; copper in high grade lenses in faults and limestone bedding planes near the Nikolai Basalt contact; minor production in 1917-18	30, 62
136	P	Nikolai Butte	Cu, Ag, Pb, Zn	Old workings on narrow veins in limestone and Nikolai Basalt near the contact, recent exploration activity	25
137	M*	Copper Creek	Au	Placer gold mines on Copper and Dan Creeks and their tributaries accounted for about half of the Nizina Placer District's 145,000 ounce gold production	25, 38
138	M*	Dan Creek	Au	Along with Copper Creek produced about half of the Nizina Placer District's approximately 145,000 ounce gold production, mine is still in operation	25, 38, 62
139	P	Crumb Gulch (Gilbertson)	Au, Sb	Veins in shear zone near granite contact have gold values with antimony and arsenic minerals	25
140	P	Taylor	Au	Gold bearing veins and sulfide pods associated with tertiary felsic dikes and plutons	25
141	O		Mo	Traces of Mo in zone of quartz veining	31

MAP NO.	CATEGORY	NAME	COMMODITY(IES)	DESCRIPTION	PRINCIPAL REFERENCES
142	M*	Chititu Creek	Au	Placer gold mines, mostly on low grade deposits on Chittitu Creek, accounted for a significant proportion of the Nizina Placer Deposit's gold production of 145,000 ounces	25, 38
143	M	Calamity Claims KWSS Claims	Au	Placer deposits on Young Creek and Calamity Gulch produced a small amount of gold in the early 1900's	25, 38
144	M	Canyon Creek (Omega)	Au	Placer gold reported; probably minor production	11, 25
145	M	Horseshoe #2	Au	Placer deposit; traces of fine gold reported; probably minor production	31
146	P	Alpha Group	Cu, Ag, Au	Vein in altered zone in Nikolai Basalt has copper minerals, gold and silver values	25, 31
147	P		Cu	Old prospect on copper mineralization in breccia zone in Paleozoic volcanics	31
148	O		Au	Irregular alteration zone in Paleozoic volcaniclastic rocks has gold values	25
149	P		Mo	Molybdenite in quartz veins in tertiary granodiorite	25, 57
150	P	T. V. Moly	Mo, Cu	Disseminated Mo in quartz veins in granitic stock; intrusive nearby is copper stained	31
151	O		Mo, Cu, Ag	Several occurrences in this area of Cu and Mo mineralization in altered or quartz veined granodiorite; one sample had silver values.	25, 31

MAP NO.	CATEGORY	NAME	COMMODITY(IES)	DESCRIPTION	PRINCIPAL REFERENCES
152	O		Cu, Zn	Lens of massive sulfides, chert, and greenstone in limestone	31
153	P	Harrais (Huberts)	Cu, Zn, Ag, Pb	Patented claims on small, sporadically distributed pods and disseminations of sulfides in shears and dikes	25, 53, 62
154	A		Cu	130 ppm copper stream sediment anomaly in stream draining glacier; float is diorite gneiss, green schist, black schist and marble with fairly common quartz veining	62
155	A		Zn	150 ppm zinc in sediments from two streams draining a rhyolite lens in Paleozoic rocks.	62
156	M	Logan Beach	Au	Beach placers have produced a minor amount of gold since the 1880's	61
157	M	Khantaak Beach	Au	Minor gold production from beach placers since the 1880's	61
158	M	Yakataga Beach	Au, Cr, Cu	Placer gold production of about $200,000 prior to 1917, minor production since; copper, gold and chrome minerals also present	9, 43
159	M	White River	Au	Gold in placer deposits in stream gravels and older beach gravels; minor production from beaches	9
160	O	Natural Arch	Cu	Native copper in quartz veins and fractures in basalt	5, 62

MAP NO.	CATEGORY	NAME	COMMODITY(IES)	DESCRIPTION	PRINCIPAL REFERENCES
161	A		Cu	180 ppm copper in sample of slope wash from metavolcanics	62
162	A		Cu	130 ppm copper in sample of slope wash from metavolcanics	62
163	M, P	Grand Prize, Golconda, Mammoth	Au	Prospects in quartz veins in Valdez Group slate and greywacke, some associated with dikes; one had minor production	32
164	M	Lucky girl	Au	Minor production in 1935 from quartz vein in slate and greywacke of the Valdez Group	54, 62
165	P	La Tende	Au	Gold prospect in brecciated fault zone in Valdez Group rocks	25
166	P	Chick Nelson	Au	Gold values in quartz vein in slate and greywacke near dikes	54
167	M	Sherrif	Au	Best producer in Bremmer area; a thousand ounces or less of gold from quartz vein in Valdez Group rocks prior to WW II	56, 62
168	P	Yellow Band	Au	Gold values in quartz veins along dikes in Valdez Group rocks	54, 62
169	M*	Golconda Creek	Au	Between 2,000 and 3,000 ounces of gold produced from shallow stream placers in the early 1900's	25
170	M	Threemile Canyon	Au	Minor production of placer gold from river bars and beaches	32
171	P	Standard Mines	Au, Cu, Pb	Shallow shaft in quartz vein in schist with sulfide minerals and gold values	32
172	A		Zn	230 ppm zinc in sediment from stream draining black slate and greywacke	62

MAP NO.	CATEGORY	NAME	COMMODITY(IES)	DESCRIPTION	PRINCIPAL REFERENCES
173-178	P		Coal	Coal claims from the early 1900's: little development done; reserves not adequately determined but some of the deposits are known to contain high rank coals	1, 2, 44
179		Katalla Oil Field	Petroleum	Oil produced form about 25 wells and refined locally in the 1920's	4
180	A		Zn	210 ppm zinc in sediments from stream draining black argillite and greywacke	62
181	P	Bear Creek Mining Co.	Au	Prospect on gold bearing quartz vein in Orca Group sediments	8
182	M	Lucky Strike Mining Co.	Au	Minor production from gold bearing quartz in brecciated greywacke of the Orca Group	8
183	M	McKinley Lake Mining Co.	Au	Gold produced for several years from quartz veins in greywacke of the Orca Group	8
184	P	Ibach (Ibeck)	Cu	Prospects on native copper bearing veins	20
185	P	Cordova-Tacoma Copper Co.	Cu	Development work in early 1900's in copper prospect in black shale near diorite contact	20
186	O	Wilson Point	Au, Ag	Gold and silver values in quartz veins in shear zone	58
187	P	Cordova Copper Co. (Heming Spit)	Cu	Copper mineralization in fractures in basalt flows	20
188	P	Seattle-Alaska Copper Company	Cu, Au, Zn	Two adits in shear zone in slate and greywacke	39
189	M	Latouche Iland Copper Mining Company	Cu, Zn	Several shipments made from concordant sulfide lenses in black slate, greywacke, and chert of the Orca Group	12

MAP NO.	CATEGORY	NAME	COMMODITY(IES)	DESCRIPTION	PRINCIPAL REFERENCES
190	M	Horseshoe Bay	Cu, Au, Pb, Ag, Zn	Minor production form concordant tabular lenses of massive and disseminated sulfides in Orca Group Sediments	60
191	M*	Latouche	Cu, Au	Production of 200 million pounds of copper in the first four decades of the 1900's from large conformable sulfide lenses in Orca Group sediments	39
192	M	Copper Queen, Happy Jack	Cu	Minor production form two deposits of sulfide minerals in Orca Group sediments	26, 39
193	P	Wilcox	Cu	Old workings on copper sulfides in veins and disseminated in Orca Group rocks	6
194	P	Hogan (Hample) and Egan)	Cu	Adit on copper sulfide vein	6
195	P	Minnie	Cu, Zn	Sulfides in shear zone cutting slate and greywacke	39
196	P	Home Camp	Cu, Zn	Sulfide lenses in shear or shears in Orca Group greenstone	39
197	P	Snug Harbor	Cu, Zn	Conformable sulfide lenses in black slate and greywacke	12
198	M	Mallard (Moore)	Cu	Minor production from sulfides in shear zones in Orca Group greenstone	12, 39
199	M	Copper Coin	Cu	Minor production from small lenses of copper sulfides in shear zone in greenstone	39
200	P	Marsha Bay (South)	Cu, Zn	Old surface workings in quartz cemented, brecciated chert and schist with irregular masses of copper and zinc sulfides	45

MAP NO.	CATEOGRY	NAME	COMMODITY(IES)	DESCRIPTION	PRINCIPAL REFERENCES
201	P	Knights Island	Cu, Zn	Small lenses of massive sulfides in shear zone in greenstone; mineralization appears to decrease with depth	39
202	P	Monarch	Cu	Sulfides in slightly mineralized shear zone in greenstone and on dump of adit	39
203	M, P	Nellie, Jonsey (Bald Eagle)	Cu	Two properties on copper bearing shear zones in Orca Group greenstone; minor production from one	12, 39
204	P	Pandora	Cu, Zn	Mineralized shear zone in Orca Group greenstone	39
205	P	Marsha Bay	Cu	Sulfide filled fractures in chert lens in pillow greenstones	45
206	P	Copper Bullion (Rua Cove)	Cu, Zn	Mineralization in and adjacent to faults and shears in Orca Group rocks; has indicated and inferred reserves of about 1.4 million tons containing about 34.6 million pounds of copper	45, 59
207	P	Lower Herring Bay	Cu	Short adit on small sulfide bearing stringer in greenstone	12
208	P	Crown Copper	Cu, Zn	Old workings on slightly shattered pillow greenstone with sulfide mineralization	39
209	P		Cu	Small patches of iron and copper sulfides in small gabbro intrusive	45
210	P	Louis Bay	Cu	Mineralized shears in pillow greenstone and slate of the Orca Group	39
211	P	Eldorado	Au	Gold bearing quartz vein in slate and greywacke	9

MAP NO.	CATEGORY	NAME	COMMODITY(IES)	DESCRIPTION	PRINCIPAL REFERENCES
212	P	Tolson and Stanton	Au, Zn	Gold and zinc bearing quartz lenses in shear zone in slate and greywacke	9
213	P	H. M. Carter (Ok #1, New York)	Au	Small parallel shear zones in slate and greywacke with stringers and lenses of gold bearing quartz	9
214	P, M	Golden Eagle, Arrowhead	Au	Minor gold production from quartz lenses in shear zones in slate and greywacke	9
215	M	Golden Wonder	Au, Pb, Cu, Zn	Minor gold production form sulfide bearing quartz veins and lenses in shear zones	9
216	P	Griset	Au	Fine gold reported from several claims on sulfide bearing quartz leads in slate and greywacke	9
217	M, P	Lucky Suede, Nugget	Au	Quartz veins in slate and greywacke; minor production from one	9
218	M, P	Conley and McChesney, Consolidated, Morning Star	Au	Gold bearing quartz veins to 8 ft. wide in slate and greywacke; minor production from Consolidated	9
219	M, P	North Star, Sweepstake	Au	Gold bearing quartz veins in slate and greywacke small amount shipped from one in 1912	9
220	P	Cann and Minor	Au	Gold bearing quartz vein associated with felsic dike in slate and massive greywacke	9
221	P	Siwash Bay	Cu	Sulfides of copper and other metals reported from prospect	39

MAP NO.	CATEGORY	NAME	COMMODITY(IES)	DESCRIPTION	PRINCIPAL REFERENCES
222	P	Miners R. (Bay)	Cu, Ni	Propsect reported	39
223	P	Wells Bay	Cu	Prospect reported	39
224	P	Cedar Bay	Cu, Zn	Quartz cemented breccia zone in granitic rocks with copper and zinc sulfides	39
225	P	Globe (Long Bay)	Cu	Claims on low grade mineralized zone several feet wide	26, 39
226	P	Jenson	Cu	Two adits on mineralized shear in greenstone	39
227	P	Cloudman Bay	Au, Cu, Zn	Stockwork of gold and sulfide bearing quartz veins in 20 to 30 ft. wide zone in black slate	15
228	M	Alaska Comerical Co. (Bligh Island)	Au	Minor production from small, very high grade quartz vein	15
229	M*	Ellamar	Cu, Au, Ag	16 million pounds of copper produced in the early 1900's from conformable sulfide lenses in Orca Group black slate, argillite and limestone	39
230	P	Mogul (Banta and Cameron	Cu, Zn	Sulfide mineraliztion in irregular masses and in quartz stockworks in greenstone	15
231	M, P	Reynolds Alaska Development Co. (Boulder Bay), Fielder and Hemple	Cu	Mineralized shears in greenstone and black slate; at least two small shipments made prior to 1909 from the Boulder Bay deposit	15, 39
232	P	Galena Bay Mining Co. (E. of Vesavius Creek), Sunny side	Au, Cu, Zn	Old workings in mineralized sheared and shattered zone in greywacke, slate, and greenstone near major fault	15, 39

MAP NO.	CATEGORY	NAME	COMMODITY(IES)	DESCRIPTION	PRINCIPAL REFERENCES
233	P	Falck	Cu, Zn	Several shear zones with sulfides in greenstone, black slate, and greywacke	15
234	M*, M	Alaska Commerical Co., Hemple Copper Co., Steinmetz (Alaska, Pioneer, Sourdough), Three Man Mining Co., Keystone (N. of Land Locked Bay)	Cu, Au, Ag, Pb, Zn	Several nearby properties on mineralization in sheared and brecciated greenstone, greywacke, and slate near major fault; 0.75 million pounds or more of copper produced from Keystone, minor production from some of the others; little activity in area since WW I	15, 29, 39
235	M, P	Montezuma Standard Copper Mines (Burke and Steele)	Cu, Au, Ag, Pb. Zn	Sulfides in lenses, shear zones, and shear intersections in Orca Group greenstone and black slate; minor production from Standard Copper Mines prior to 1911	15, 29, 39
236	M, P	Hoodoo, Land Locked Bay copper Mining Company (Nolan and Rystrom)	Cu, Au, Ag, Zn	Sulfide mineralization in shears and fault-shear intersections in greenstone, slate and limestone; about 75 thousand pounds of copper produced by the Landlocked Bay Mining Company in 1916	15, 29
237	P	Banzer	Au, Cu, Pb, Zn	Stringers and bunches of gold and sulfide bearing quartz in slate and greywacke	15
238	M*	Fidalgo-Alaska (Schlosser)	Cu, Zn	3.2 million pounds of copper produced prior to 1920 from apparently discordant sulfide mineralization in a beached crushed zone in argillite, chert, and black slate	39
239	M	Dickey Copper Co. (Mason and Gleason)	Cu, Au, Zn	Minor production from copper and gold bearing sulfides in shear zones in greywacke, argillite, and shale	39
240	M	Fidalgo Mining Co.	Cu, Au	Minor production in 1913 from shear zone in interbedded pillow lavas and sediments	39

MAP NO.	CATEGORY	NAME	COMMODITY(IES)	DESCRIPTION	PRINCIPAL REFERENCES
241	P	Whalen and Nelson	Cu	Apparently stratiform band of "hard... nonslaty rock" in greenish slate sequence has irregular stringers and disseminated grains of sulfide	20
242	M	Lowe River	Au, W	Minor production from early small scale placer mining; tungsten mineral reported in panned concentrates from the area	23, 37
243	P	Addison Powell (Sulfide Gulch)	Cu, Au	Widely distributed sulfides disseminated and in lenses in slate, greywacke, and greenstone	11, 50
244	M*	Midas	Cu, Au, Ag, Pb, Zn	Production of about 3.6 million pounds of copper prior to 1920 from sulfide ore body in a shear zone in black slate	37, 50
245	P	Jack Bay (N side)	Au, Cu, Pb, Zn	Sulfide bearing shear zone in greywacke	39
246	M*	Ramsey Rutherford	Au, Cu, Pb, Ag, Zn	Quartz veins up to several feet wide cut greywacke and argillite and contain gold values and sulfides, one of the major producers in the valdez district	
247	M	Rose Johnson	Au, Cu, Pb	Quartz veins in deformed black slate with gold and sulfide minerals; minor production prior to 1914	12
248	P	Pinochle	Au	Well defined quartz bearing fissure with with sulfides and gold values	12
249	M, P	Valdez, Ibex	Au	Quartz veins in black slate and greywacke; incidental production from Valdez in 1920	12, 13
250	P	Blue Ribbon	Au	Gold and sulfides in quartz vein in long, conformable shear zone	7

MAP NO.	CATEGORY	NAME	COMMODITY(IES)	DECRIPTION	PRINCIPAL REFERENCES
251	M	Ethel (William-Gentzler)	Au, Pb	Sulfide and gold bearing vein; minor production	12
252	M, P	Little Giant, Mountain King, Rose, Star, Rose Quartz, July	Au, Cu, Pb, Zn	Veins, stringers, and lenses of gold and sulfide bearing quartz in greywacke; minor production from all but the Rose Quartz and July; some were still in production in 1953	12, 54
253	P	Quitsh	Au, Pb	Sulfide and gold bearing quartz vein in greywacke	10
254	M, P	Chesna, Monte Carlo (Cook and Barrett), Sunshine	Au, Pb	Quartz veins with gold and sulfides in slate and greywacke; minor production from the Monte Carlo in 1913	7, 10
255	M	Hercules	Au, Pb, Zn	Sulfide bearing quartz vein to 20 in. wide; minor production	10
256	M	Big Four	Au, Pb, Zn	Sulfide bearing quartz vein; mill test in 1914; ore mined and milled in 1934; total production minor	10, 54
257	P	Fortyfive	Au, Cu, Pb, Zn	Sulfide and gold bearing quartz veins in greywacke	10
25	P	High Grade	Au, Pb	Two adits on sulfide and gold bearing quartz veins in a long shear zone in greywacke	10
259	P	Alaskan	Au, Cu, Pb, Zn	Sulfides and gold in quartz vein with a width of up to 5 ft that cuts sheared greywacke	10
260	M	Gold Creek	Au	Small amount of gold recovered in intermittent placer operation	10

MAP NO.	CATEGORY	NAME	COMMODITY(IES)	DESCRIPTION	PRINCIPAL REFERENCES
261	P	Alaska Gold Hill (Black Diamond)	Au	Lode gold prospect with several hundred feet of underground workings	26
262	M, P	Owl, Oregon and Washington, Thompson-Ford	Au, Cu, Pb, Zn	Quartz veins in sheared greywacke and argillite with sulfides and gold; minor production from Thompson-Ford	10, 12
263	P	Guthrie and Belloli	Au, Cu, Pb, Zn	Quartz-calcite vein in sheared greywacke and argillite with sulfides and gold values	10
264	M	Cube (3 in 1)	Au, Cu, Pb, Zn	Long quartz lenses to 8 ft thick with sulfides and gold values in shear zone in greywacke and argillite	10, 26
265	M*, M, P	Cliff, Sealey-Davis, Gold Bluff	Au, Cu, Pb, Zn	Quartz veins in greywacke with gold and sulfides; the Cliff Mine, on an anastomosing fault and vein system, was the Valdez District's largest producer during most of the years it operated prior to its closing in 1914; the Sealy Davis also had minor production	10, 37
266	M, P	Sea Coast Mining Co., Bunker Hill	Au, Cu, Pb, Zn	Gold and Sulfide bearing quartz in lenses and irregular masses in shear zones in schistose greywacke minor production from Sea Coast Mining Co.	10
267	M	Alice	Au, Cu, Pb, Ag, Zn	Long, well defined fissure in greywacke, slate, and green schist with quartz, sulfides and gold and silver values; minor production in 1913	10
268	P	Whistler, Bluebird	Au, Cu, Pb	Gold and sulfide bearing quartz veins in schistose greywacke, slate, and shattered mafic dike rock	7, 10

MAP NO.	CATEGORY	NAME	COMMODITY(IES)	DESCRIPTION	PRINCIPAL REFERENCES
269	P, M	Palmer, IXL, Spanish, Shou Bay Mining Co.	Au, Ag, Pb, Zn, Sb	Gold prospects on quartz veins in black slate; Shoup Bay and Silver Gem had appreciable silver values; minor production from Silver Gem	7, 10
270	P	Hecla, Big Four	Au, Ag, Pb	Shear zones in greywacke and slate with quartz, calcite, sulfides, and gold values; silver reported in Hecla	7
271	M	Mayfield, National	Au, Cu, Pb, Zn	Mineralized quartz veins in greywacke and argillite; minor production from both deposits	10, 11
272	M	Rough and Tough	Au, Ag	Fractures in slate, greywacke, and diorite filled with gold and silver bearing sulfides in quartz; minor production	55
273	M	Gold King	Au, Cu, Pb, Zn, Sb	Two sulfide and gold bearing quartz veins in greywacke and banded argillite; gold produced	10
274	M	Cameron Johnson (Valdez gold), Minnie, Olsen (Bald Mountain)	Au, Pb, Zn	Numerous sulfide and gold bearing quartz veins in greywacke and argillite; minor production from minnie, substantial production from the Cameron Johnson	10
275	M	Rambler	Au	Gold prospect, small test shipment in 1916	12
276	P	Rusaw Cr	Cu	Disseminated copper sulfides in more basic segregation in quartz diorite mass	22
277	P	Sheep Mtn	Cu	Several different areas of copper mineralization in volcanics intruded by mafic dikes	22

MAP NO.	CATEGORY	NAME	COMMODITY(IES)	DESCRIPTION	PRINCIPAL REFERENCES
278	M	Alfred Creek	Au, Pt	A few thousand dollars worth of placer gold produced; platinum reported in concentrates	9
279	M	Poorman Creek	Au	Small placer gold production reported	16
280	M	Albert Creek	Au, Pt	Significant placer gold production; platinum reported in concentrates	16
281	M	Crooked Creek	Au	Minor placer gold production	16
282	M	Mazuma Creek	Au	Minor placer gold production	9
283	M	Gold Creek	Au	Minor placer production; gold is coarse but mining is difficult	16
284	M	Yacko Creek	Au	Minor production of coarse, flat placer gold	16
285	M	Daisy Creek	Au	Minor production; grades are encouraging but ground water complicates mining	16