MINERAL APPRAISAL OF THE PROPOSED GATES OF THE ARCTIC WILDERNESS NATIONAL PARK, ALASKA: A PRELIMINARY COMMENT

By: Staff, Alaska Field Operations Center

* Open File Report No. 109-78

UNITED STATES DEPARTMENT OF THE INTERIOR

Cecil D. Andrus, Secretary

BUREAU OF MINES

FOREWORD

This is one of a series of reports that describe mineral assessments of certain lands in Alaska. This report is a preliminary comment that summarizes and interprets data compiled as the basis for a planned Bureau of Mines field investigation. As such, this report is based principally on data developed during a contract study for the Bureau of Mines although it does include some information developed by the Bureau of Mines. Some of the details have been omitted or condensed but the pertinent basic data is unchanged. All data sources are identified. It is intended that these preliminary comments will be followed by a field investigation which will be reported first in a summary report and later in a detailed report of investigation.

It is important to remember that Alaska has not been seriously explored for minerals other than gold--except in a few limited areas. 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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MINERAL APPRAISAL OF THE PROPOSED GATES OF THE ARCTIC WILDERNESS NATIONAL PARK, ALASKA: A PRELIMINARY COMMENT

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ABSTRACT

The Bureau of Mines compiled available data on mineralization in the proposed Gates of the Arctic Wilderness National Park. At least six eastward trending rock type areas with associated mineralization were identified, but all remain essentially unexplored. From north to south they are:

(1) Paleozoic and younger rocks on the north slope with known coal and phosphate deposits that probably also contain oil shale and base metal sulfide (lead-zinc-copper) deposits.

(2) Copper and gold deposits in Paleozoic sediments extending eastward from Lucky Six Creek 35 miles to Pingaluk Creek.

(3) Placer gold is found in creeks that drain the above belt and also in the North Fork of the Koyukuk and its tributaries from Eroded Mountain southward to Ipnek Mountain.

(4) Tungsten, tin, zinc, lead, silver, copper, molybdenum, uranium, and fluorine have been found in and near large bodies of granitic rock that occur intermittently in an east-southeast trend in the western half of the study region.

(5) The Arctic schist belt extends through the study region from west to east. A series of large stratiform zinc-copper deposits have been found along the belt west of the study region. Evidences of similar mineralization are reported along the belt within the study region.

(6) Carbonate rocks near Nutuvukti Lake at the south end of the study region appear similar in age and geologic setting to rocks west of the study region at Bornite which contain high grade copper deposits.

INTRODUCTION

The Bureau of Mines made very limited studies of mineralization in the proposed Gates of the Arctic Wilderness National Park (figure 1). The study region included the proposed park and adjacent areas. A three-phase program to (1) compile a list of known mineral occurrences and prospects; (2) sample, map and evaluate prospects as time and funding permitted; (3) summarize the results and identify deposits and occurrences that warrant additional Bureau investigation. The program was performed, in part, under contract by a private firm (WGM, Inc.). The area studied by the contractor had to be limited to lands withdrawn from mineral entry and not included in overlapping or dual withdrawals (figure 2). The Bureau of Mines undertook to gather data on these and other nearby areas not included in the contract study. Bureau personnel made no field investigations. Contract personnel could only visit a few of the prospects.

MINERAL EXPLORATION HISTORY

The study region has been of interest to prospectors since the late 1800's. Prior to the 1950's mineral exploration was limited to individual prospectors and small groups interested almost exclusively in placer gold deposits amenable to small scale mining techniques. Since the 1950's exploration has also been oriented towards finding base metal and other commodities. However, only two groups are known to have done any modern regional exploration; a major mining company in the early 1960's and an exploration syndicate in 1969. Most of their efforts were directed toward areas westward of the study region. Since 1971 no systematic regional mineral exploration is known to have been undertaken in the study region. The Geologic Survey has been mapping the regional geology, but this work is not specificaly minerals discovery oriented. Bureau of Mines work has been limited to the location and cursory assessment of some of the reported deposits.

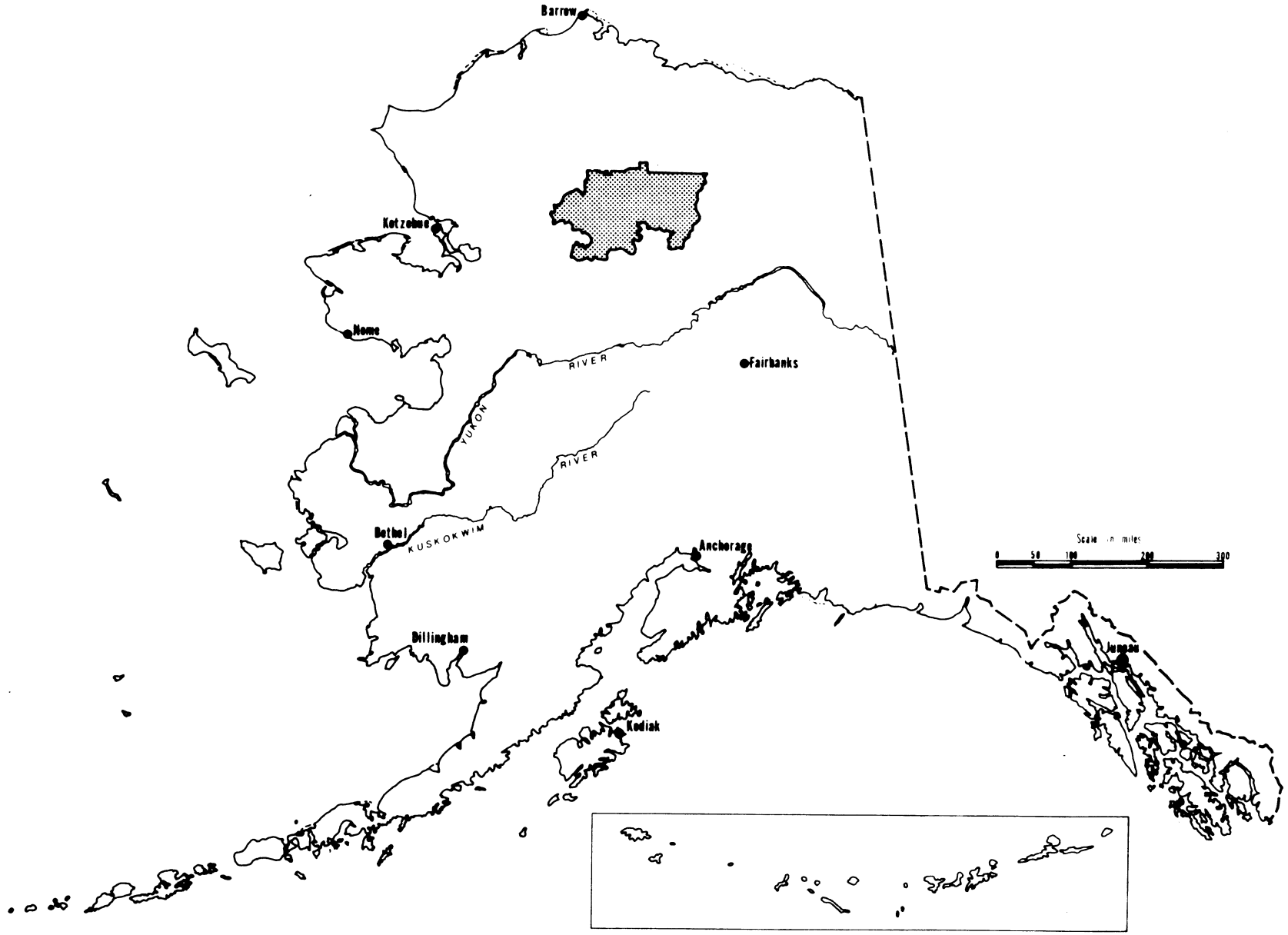

FIGURE 1.- Index map of the proposed Gates of the Arctic Wilderness National Park

ROCK TYPE AREAS AND ASSOCIATED MINERALIZATION

The regional rock structure of the Brooks Range is superficially known (1) 1/, but mapping of quadrangles at a scale of four miles to the inch was initiated only recently (3). Consequently, the rock structure relationships relevant to mineral deposits in the study region are not well known. In spite of the lack of detailed knowledge, the general relationships between rock types and mineral deposits can be discerned in part of the study region. By study of the mineral deposits and zones where metallic elements are found in relation to the known rock structures, broad generalizations can be made concerning the mineral deposits associated with certain rock units. Rock structures and known mineral deposits are shown on figure 3. Figure 4 shows the mineral deposits in the study region in relation to geographic features. Additional information on some of the mineral occurrences, such as common name and location, are in the appendix. Figure 5 shows the recognized trends of mineralization. The trends could not be mapped in the east central part of the study region due to lack of data.

The following six mineralized rock type areas known within the study region are listed in order from north to south:

(1) Mineralized Upper Paleozoic and Younger Rocks

This series of rocks form a belt along the entire length of the north slope of the Brooks Range. Phosphate and coal are known to occur in these rocks in the study region. Oil shale, which often occurs near phosphate deposits is known in this rock series both east and west of the study region (2, 6, 7). Lead and zinc minerals associated with volcanic rocks of this series have been discovered recently at several places west of the study region (8). Continuations

1/ Figures underlined and in parentheses refer to a list of references at the end of the text.

of the rock structures associated with the zone of known mineralization appear to cross the study region. No systematic search for mineral deposits in this rock series is known to have been made within the study region.

(2) Paleozoic Clastic Sediments with Copper and Gold Mineralization

Copper minerals in phyllites have been reported along a 35-mile trend from Lucky Six Creek (No. 66) in the west to Pingaluk Creek (No. 77). The trend of copper minerals also has been reported to continue west of Lucky Six Creek. Scattered rock samples (Nos. 53, 67) from this trend have yielded higher-than-average gold values. Very little exploration work has been done to evaluate the extent and significance of either the copper or the gold occurrences.

(3) Placer Gold Deposits

Placer gold occurs in the creeks that transect the above mentioned trend of copper deposits associated with phyllites in Paleozoic sediments. Sparce and scattered data suggest possible correlation between the placer gold deposits and the bedrock mineralization. If proven, a zone for gold prospecting on a regional scale would be established.

Placer gold also occurs in the North Fork of the Koyukuk River and in the tributary streams roughly from Eroded Mountain southward to Ipnek Mountain (figure 3).

(4) Granitic and Associated Rocks

In the western half of the study region large granitic plutons outcrop in an approximately east-southeast trend which essentially parallels the regional rock structure. The trend may continue eastward across the study region, but data are lacking. The known exposures occur intermittently. The largest pluton has dimensions on the order of 25 miles by 25 miles and

is well exposed in some of the highest peaks in the central Brooks Range including Mount Igikpak (figure 4). The granites and the surrounding rocks are very poorly known but are reported to be, at least in part, mineralized. Elements of interest that have been found include tungsten, tin, zinc, lead, silver, copper, molybdenum, uranium and fluorine.

(5) Mineralized Schist Belt Rocks

Schist rocks correlated with the Arctic schist belt extend across the southern extensions of the study region. Zinc-copper-lead stratiform sulfide deposits occur in schistose volcanic rocks of this belt both east and west of the study region. To the west the upper horizons of the Arctic schist belt contain a series of large deposits including the Arctic Camp deposit (No. 221) with more than 35 million tons containing 4 percent copper with associated zinc-lead-silver and gold. Several similar but less explored occurrences extend along a 60 mile trend west of the study region. The Arctic schist belt crosses the study region in the Walker Lake area and south of Ipnek Mountain (figures 3, 4, and 5). The few bedrock samples available suggest that the schist belt rocks in these areas contain zinc, copper and lead, but there are no data on possible grade or extent.

(6) Copper Deposits in Lower Paleozoic Carbonate and Related Rocks

West of the study region the Bornite (Ruby Creek) deposit (No. 196) containing fifty to one hundred million tons of 1 percent copper occurs in rocks of this series (5). Rock structure environments, apparently similar, occur along the southern edge of the Brooks Range. The carbonate rocks near Nutuvukti Lake may be an extension of this carbonate environment.

ZONES FAVORABLE FOR DISCOVERY OF ADDITIONAL MINERAL DEPOSITS

Mineralized trends are shown on figure 5. No attempt has been made to differentiate between favorable and highly favorable, because of the lack of data. With two exceptions the trends could not be mapped in the

in the eastern half of the study region for the same reason.

The identified trends are necessarily based on scanty data. Other zones of mineral potential may remain to be identified. Metallic mineral deposits generally are neither extensive nor obvious. Discovery requires diligent exploration. West of the study region in the National Petroleum Reserve-Alaska in 1977 a reconnaissance investigation led to the discovery of base-metal and silver mineralization in an area where rock structures had been previously mapped on two different occasions without the mineralization being noticed.

ON-GOING STUDIES

Only the most preliminary type of modern mineral exploration has been conducted in the study region, and this in only a very limited portion of the area. The data available on adjacent lands suggest that several mineral trends extend into or completely through the study region, but much of the map included with this report must be left blank because of a lack of data. Large areas, particularly in the eastern half of the region lack even the most preliminary surveys. However, sufficient data are available to select some areas for follow-up site-specific studies that will permit a more reliable minerals resource evaluation of part of the region.

Field work will include the location and sampling of bedrock in areas of reported deposits and in rock type zones apparently favorable for mineralization.

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APPENDIX*

MINERAL OCCURRENCES AND GEOCHEMICAL ANOMALIES IN NORTHWESTERN ALASKA**

**Indicates localities in the proposed Gates of the Arctic National Park

*DATA TAKEN FROM: U. S. G. S. Open File Report 77-166D, 77-166E; Bureau of Mines Unpublished Data; and Private Reports

Map #	Name	Location	Notes
1	Red Dog	T 31N R 18W	Zinc, lead, silver, barite extensive mineralization over large area
2-5	Color Anomalies	T 31N R 19W	Geologic setting similar to Red Dog, high grade zinc, lead at one site drilled in 1977
6	Maiyumerak Mtns.	Tps 27, 28N R 15, 16W	Volcanic, ultramafic, mafic complex reported copper mineralization, anomalous chrome geochemistry
7	Sour's Chrome	T 24N R 17W	Mafic/ultramafic rocks identified bands of chromite bearing rocks
8	Eli River Tin		Placer tin confirmed in 1940's
9	Lean Creek		Lode and placer gold reported in literature
10	Avan	T 31, 32, 33, 34N R 13, 14, 15W	Mafic, ultramafic rocks, chromite identified platinum found in placer
11	Kugururok	T 30N R 14W	High grade boulder of chromite found in river gravels
12	Misheguk Mountain	T 33N R 10,11W	Ultramafic pluton, reported copper, asbestos, chromite mineralization
13	Amaktukvik Pass	T 33N R 7W	One claim staked; commodity unknown
14	Loesche	T 24N R 14W	Copper in carbonates, possibly similar to Bornite

Map #	Name	Location	Notes
15	Agashashok River	T 26N R 12W	Copper, 18 claims
16	Agashashok River	T 26N R 12W	Copper with vein quartz to 1% Cu
17	Agashashok River	T 26N R 12W	Iron oxide stained zone, no mineralization noted in place
18	Agashashok River	T 26N R 12W	Iron oxide zone, no mineralization noted in place
19	Agashashok River Zinc	T 25N R 14W	100'+ thick section of zinc bearing pyritiferous schists
20	Nakolikurok Creek	T 26N R 8W	Copper in quartz vein in greenstone sill
21	Omar	T 24N R 10W	High grade copper sulfides in large fracture zones in carbonate rocks
22	Frost	T 24N R 9W	Extensive barite mineralization with zinc, lead, copper, and fluorite
23	Klery Creek	T 19-24N R 7-9W	Old placer gold district, gold still pannable in areas of previous placering
24	Timber Creek	T 24, 25N R 7-9W	Old placer district
25	Chevron	T 29N R 5W	Copper in quartz vein system, grades 0.02 oz. Au, 2.08% Cu over 4.3 feet or 0.5% over 10 feet
26	Hub	T 27N R 4W	Copper bearing quartz-calcite vein
27	Temby	T 25N R 4W	Copper bearing quartz vein. 1.5% Cu reported
28	Tundra	T 25N R 4, 5W	Reported claims nature of mineralization not known

Map #	Name	Location	Notes
29	Salmon River	T 26, 27, 28N R 5W	Placer gold
30	Salmon River	T 26N R 5W	Copper bearing quartz veins
31	Copper Creek (Cu)	T 27N R 5W	Copper bearing quartz veins
32	Copper Creek (Pb-Zn)	T 27N R 4, 5W	Lead, zinc in quartz veins
33	Lena Creek	T 29N R 8W (?)	Barite reported in stream float, source unknown
34	Tutuksuk River	T 23N R 4W	Lead reported in slate
35	Kallarichuk River	T 20, 21N R 5, 6W (?)	Reported placer gold
36**	Eskimo Venture	T 34, 35N R 1, 2, 3E	Chromite in ultramafic rocks
37	Kingsavik Mtns	T 32N R 5, 6W	Reported gold
38	Malfiatti	T 25N R 1W	Reported copper mineralization in limestone-schists(?)
39	Atongarak Creek	T 29, 30N R 6, 7E	Placer gold reported
40	Hunt River	T 20N R 1W	One placer claim on Kobuk River
41	Aniuk River	T 31N R 7E	Reported placer gold
42	Aniuk River	T 31N R 7, 8E	Reported oil shale
43	Redstone River	Vague location	Reported placer gold
44	Kaluich	T 25N R 6E	Lead, zinc, copper over extensive area, also fluorite and minor uranium with granitic intrusive

Map #	Name	Location	Notes
45	Otter Bar	T 29N R 9E	Copper in sedimentary rocks
46**	Imelyak River	T 25N R 8E	Reported gold mineralization and claims
47	Kav	T 28N R 9E	Copper, silver, antimony mineralization in quartz-calcite filled veinlets over extensive area
48	Tunukuchiak Creek	T 27, 28N R 10E	Reported placer gold similar to Midas Creek
49	Douglas Creek	T 29, 30N R 10, 11E	Geology similar to Midas Creek
50	Ningyoyak Creek	T 29N R 11E	Copper mineralization in quartz calcite vein
51	Midas Creek	T 28, 29N R 12E	Placer gold deposit
52**	Shishakshinovik Pass	T23, 24N R 11, 12E	Lead, zinc, silver, molybdenum. beryllium, tin, uranium in contact zone and float rock
53**	Gull Pass	T 25N R 18E	0.32 oz. gold reported
54	Kutarlak Creek	T 23, 24N R 12, 13E	Geochemically anomalous zone reported, mineralization not located
55**	Nigikpalvgururvrak	T 27N R 13E	Active placer gold mine
56**	Igning River	T 24, 25, 26N R 13W	Geochemically anomalous zones for zinc and copper
57**	Ladanan Creek	T 26N R 20E	Copper reported
58**	Iyahuna Creek	T 24,25N R 15, 16E	Reported geochemically anomalous zone for lead and zinc

Map #	Name	Location	Notes
59**	Angunelechak Pass	T 26N R 16E	Reported silver mineralization; also geochemically anomalous lead and zinc
60**	Killik River	T 29N R 17E	Reported copper and antimony
61**	Twelvemile Creek	T 25, 26N R 17E	Geochemically anomalous zone for lead and zinc
62**	Tupik Creek	T 24, 25N R 17E	Granite contact zone geochemically anomalous for lead, zinc, copper, silver
63**	Angiak Pass	T 24N R 17E	Granite, granite contact zone, geochemically anomalous in lead and copper
64**	Glacier Creek	T 24N R 17, 18E	Granite, granite contact zone geochemically anomalous in lead, zinc, copper, silver
65**	Mount Papiok	T 25N R 17E	Geochemically highly anomalous for lead, zinc, silver
66**	Lucky Six Creek	T 25, 26N R 17, 18E	Quartz veins containing copper, antimony, gold; placer gold
67**	Walker Lake West	T 20N R 20E	Schist belt rocks containing anomalous copper and 0.1 oz. gold
68**	Walker Lake West	T 20N R 20E	Schist belt rocks high in geochemical lead values
69**	Walker Lake East	T 21N R 21E	Schist belt rocks with geochemically high zinc values
70**	Arrigetch Peaks	T 23, 24N R 21, 22E	Tactite zone to 450 feet long containing anomalous copper, zinc, tungsten

Map #	Name	Location	Notes
71	Helpmejack Creek	T 19N R 24E(?)	Placer gold reported
72	Malamute	T 19N R 25E(?)	Placer gold reported
73	Alatna South	T 20N R 25E(?)	Placer gold reported
74	Quartz Hill		Placer gold, copper
75**	Igikpak	T 23N R 17E	Reported placer gold in small drainages
76**	Walker Lake South	T 20N R 21E	Placer gold on lake shore reported
77**	Pingaluk River	T 24, 27N R 23, 24E	Placer gold along 8 mile length of river reported
78	Alatna North	T 24, 25N R 20, 22E	Placer gold along 10 mile drainage
79**	Lake Selby	T 17N R 14E	Copper bearing quartz vein in conglomerate
80**	Angeta	T 17N R 15E	Gold
81**	Sheep Creek	T 32N R 20W	Fault controlled copper mineralization in carbonates
82**	Tobin	T 33N R 18W	Pyritiferous phyllite float with reported high zinc geochemical
83**	Kinnorutin	T 36N R 13W	Volcanics with reported high geochemical values
84**	St. Patricks Creek	T 35N R 13W	High copper in volcanics
85	Rabbit Creek	T 26N R 21W	Zinc, lead, silver reported

Map #	Name	Location	Notes
86	Nauyoaruk	T 22N R 19, 20W	Placer gold, tin claims
87	Shiliak Creek	T 21N R 14, 15W	Cupriferous pyritiferous schists
88	Mt Kaksurok	T 21N R 21W	Ultramafics with chromite and nickel geochemistry
89**	Redstone Pluton	T 24N R 8E	Iron and lead in granite contact zone
90**	Ambler River	T 25N R 9, 10E	Copper mineral locality
91**	Ambler River	T 25N R 10E	Copper mineral locality
92**	Igning River	T 24, 25N R 13, 14E	Magnetite occurrence
93**	East Oyukak Mtn.	T 25N R 16E	Copper mineralization and anomaly
94**	East Oyukak Mtn.	T 25N R 16E	Iron in granite contact zone
95**	Portage Creek	T 26N R 16E	Copper, silver mineralization
96**	Reed River	T 22N R 17E	Pyrite in skarn zone
97**	South Mt. Chitiok	T 23N R 15E	Chalcocite reported
98**	Pass Hematite	T 23N R 16E	Hematite in granite contact zone
99**	Divide Copper	T 25N R 18E	Copper iron mineralizaiton
100**	Awlinyak Creek	T 23, 24N R 20E	Lead copper occurrence

Map #	Name	Location	Notes
101	Kugururok	T 33,34N R 12,13W	Black Siltstone, Shublik(?) Fm, <5% P_2O_5
102		T 8S R 8W	Black Siltstone, strat. position unknown, 0.2% P_2O_5
103	Drenchwater Creek	T 9S R 29W	Black to gray siltstone. Lisburne Group, <5% P_2O_5; <.001% eU
104	Kiligwa River	T 10S R 28W	Shale, possibly Alapah Limestone of Lisburne Group, <5% P_2O_5; to 0.002% eU
105	Mount Bupto	T 11S R 24W	Phosphatic calcareous mudstone, probably Alapah Limestone of Lisburne Group, 13.7% P_2O_5; .004% U
106		T 10S R 21W	Shale. <5% P_2O_5; .001% U
107		T 9,10S R 20,21W	Phosphate rock, 8 foot zone, 24.8% P_2O_5, 0.17% V_2O_5, .008% U
108		T 10S R 21W	Black limestone, <5% P_2O_5; 0.001% eU
109		T 34N R 9E	Limestone to calcareous silty shale, <5% P_2O_5; <.001% eU
110	Nigu River	T 11S R 19W	Calcareous mudstone, 5±% P_2O_5%; .004% eU
111**	Oolamnagavik River	T 10S R 12W	Black siltstone, 1.4% P_2O_5; .005% eU
112**	Killik River	T 12S R 10W	Phosphatic limestone, 0.4% P_2O_5; 0.004% eU
113**	Kiruktagiak	T 12S R 10W	Phosphatic limestone, 0.4% P_2O_5; 0.004% eU
114**		T 12S R 3W	Oolitic phosphate rock, 25.6% P_2O_5; 0.02% V_2O_5; 0.009% eU
115**	Tiglukpuk Creek	T 13S R 1E	Phosphatic zone, 36 foot thick zone averages 8% P_2O_5. Small samples contain to 30% P_2O_5

Map #	Name	Location	Notes
116**		T 13S R 1E	Black shaly limestone, <5% P_2O_5; 0.008% eU
117**		T 13S R 2E	Phosphate rock, 27.9% P_2O_5; 0.020% eU
118**		T 13S R 2E	Phosphate rock, 15±% P_2O_5; 0.009% eU
119**		T 13S R 3E	Phosphate rock, 21.4% P_2O_5; 0.014% eU
120		T 12S R 5E	Dark limestone, <5% P_2O_5; <0.001% eU
121**		T 33N R 24W	Copper sulfides and malachite in Devonian slate and phyllite
122**	Hunt Fork	T 35N R 22W	Lead bearing quartz veins in Devonian slate and phyllite
123**	John River		Antimony lode. Chalcopyrite and bornite reported in river gravels, source not known
124**		T 27N R 24W	Copper and zinc, possibly stratiform deposits. Geology and geochemistry apparently similar to Arctic schist belt deposits
125		T 27N R 24W	Copper and zinc, possibly stratiform deposits similar to Arctic schist belt deposits
126		T 27N R 23W	Copper and zinc, possibly stratiform deposits similar to Arctic schist belt deposits
127	Ann Claims	T 30N R 24W	Zinc and lead mineralization in carbonate rocks

Map #	Name	Location	Notes
128		T 30N R 23W	Zinc and lead mineralization in carbonate rocks
129		T 30N R 23W	Zinc and lead mineralization in carbonate rocks
130**		T 31N R 21W	Copper sulfides in Skajit Limestone
131**		T 31N R 20W	Copper sulfides at fault contact between Devonian limestone and phyllite and siltstone
132		T 32N R 19(29)W	Copper and lead sulfides along thrust fault
133		T 31N R 19W	Copper sulfides in Skajit Limestone
134		T 31N R 19W	Copper sulfides in Devonian phyllite and siltstone
135		T 31N R 18W	Copper sulfides in quartz vein
136		T 31N R 18W	Copper and lead mineralization in quartz stockworks
137		T 31N R 18W	Copper sulfides in vein quartz, at at least 3 locations
138		T 31N R 18W	Copper and lead mineralization in vein quartz
139	Spring Creek/ Lake Creek	T 31N R 18W	Placer gold, previous production
140	Matthews Dome	T 31N R 18W	Copper sulfides in calc-schist and vein quartz
141	Bird Creek	T 30N R 17W	Placer gold, previous production
142	Jay/Rye/Lucky Creek	T 30N R 17W	Placer gold, previous production

Map #	Name	Location	Notes
143	Kay Creek	T 30N R 16W	Placer gold, previous production
144	Bourbon Creek	T 28N R 16W	Placer gold, previous production
145		T 29N R 17W	Lode claims, commodity unknown
146	Galena Creek	T 29N R 17W	Lead sulfide (galena) found in creek, reported lode mineralization in area
147	Michigan Creek	T 28,29N R 17W	Argentiferous galena in quartz vein in sedimentary rocks
148	Allen River	T 30N R 20W	Copper sulfides in Devonian black phyllites and slates
149	Crevice Creek	T 20N R 19,20N	Lead and copper sulfides in Skajit Limestone
150		T 29N R 21W	Lead, zinc, copper and iron sulfides; stratiform, in interbedded schist, quartzite and limestone
151**		T 31N R 15W	Lead sulfide bearing quartz vein in Devonian slate, phyllite and siltstone
152	Vermont Dome	T 31N R 12W	Copper sulfides and vein quartz with minor copper and zinc in Devonian phyllite and siltstone
153	Vermont Creek/ Hammond Ridge/ Swift Gulch	T 31N R 12W	Placer gold, previous production
154	Nolan Creek etc.	T 31N R 12W	Placer gold, Nolan River and tributaries, previous production
155	Ferguson, etc.	T 30,31N R 12W	Numerous antimony, gold quartz veins; previous production

Map #	Name	Location	Notes
156	Union Gulch	T 30N R 11W	Placer gold, previous production
157	Mascot Creek	T 31N R 13 W	Placer gold, previous production
158	Cow Creek	T 30N R 12W	Copper sulfides in quartz vein in Devonian schists and marble
159	Emma Dome	T 29N R 13W	Gold and silver in quartz vein
160	Emma Creek	T 29N R 12W	Placer gold, previous production
161	Slate Creek	T 28N R 13W	Placer gold, previous production
162	Myrtle Creek	T 28N R 11W	Placer gold, previous production
163	Slate Creek	T 28N R 11W	Placer gold, prevous production
164		T 28N R 10W	Copper sulfides in Devonian (?) micaceous greywacke
165	Howard Creek	T 30N R 11W	Lead and copper sulfides in masses of iron sulfides in Devonian chloritic schists
166	Gold Creek/ Magnet Creek	T 31N R 10W	Placer gold, previous production
167		T 32N R 11W	Copper sulfides in Upper Devonian siltstone and grit unit
168	Big Jim Creek	T 35N R 11W	Lead and copper sulfides in Upper Devonian phyllite
169		T 36N R 10W	Copper sulfides in Skajit Formation
170	Snowden Creek	T 34N R 10W	Copper sulfides in vein quartz float near contact of Devonain limestone and greenstone

Map #	Name	Location	Notes
171		T 35N R 8,9W	Claim staked, commodity unknown
172		T 33N R 9W	Claims staked, commodity unknown
173	Matthews River	T 33N R 9W	Auriferous copper, lead, zinc sulfides in quartz veins in Devonian (?) greenstone and greenschists
174	Jade Mountains	T 21N R 3E	Copper and lead bearing vein in limestone
175	Jade Mountains(?)	T 21N R 4E	Jade and asbestos in ultramafic body
176	Jade Mountains	T 21N R 5E	Nickel, asbestos, jade with ultramafic body
177	Smucker	T 22N R 8E	Argentiferous zinc, copper sulfide mineralization with high reserve potential
178**	Horse Creek	T 22N R 10E	Argentiferous zinc, copper deposits; reportedly similar to Arctic Camp
179	Sunshine Creek	T 21N R 10E	Argentiferous zinc, copper deposits; reportedly similar to Arctic Camp
180	Dead Creek	T 21N R 11E	Argentiferous zinc, copper deposits; reportedly similar to Arctic Camp
181	Diane Creek	T 20N R 12E	Copper and zinc sulfide mineralization in calcareous schist and skarn
182	Que Creek	T 20N R 12E	Copper mineralization in muscovite quartz schist over large areas
183		T 21N R 13E	Lead and zinc sulfide in highly mineralized carbonate unit.

Map #	Name	Location	Notes
184	Sharp Creek	T 21N R 14E	Copper sulfide mineralization in chlorite-muscovite-quartz schist
185	Jerry Creek	T 20N R 13E	Zinc and copper sulfide mineralization along large area
186		T 20N R 14E	Mineralized rock containing geochemically anomalous gold, silver, copper, lead, zinc
187		T 20N R 14E	Copper in chlorite-quartz schist
188		T 20N R 16E	Copper in chlorite-quartz schist
189		T 19N R 16E	Claims staked, commodity unknown
190		T 20N R 17E	Auriferous rock samples
191		T 20N R 17E	Auriferous rock samples
192		T 20N R 18E	Auriferous rock samples
193	Picnic Creek	T 29N R 17,18E	Zinc, copper mineralization, proven reserves
194	Riley Creek	T 19N R 9,10E	Claims staked, commodity unknown
195	Asbestos Mountain	T 19N R 9E	Asbestos and jade in ultramafic rocks
196	Bornite	T 19N R 9E	Copper, zinc, uranium in carbonate rocks
197	Partner Hill	T 18N R 8E	Copper mineralization in carbonates
198	Cosmos Creek	T 19N R 8E	Asbestos, jade in ultramafic terrane
199	Aurora Mountain	T 19,20N R 8E	Copper in carbonate rocks
200	Bismark Mountain	T 19N R 7E	Asbestos in ultramafic rocks

Map #	Name	Location	Notes
201	Shungnak River	T 19N R 7E	Placer gold; jade and asbestos in ultramfic rocks
202		T 21N R 1E	Coal
203		T 20N R 6W	Coal
204		T 21N R 9E	Coal
205	Shovel Creek	T 11N R 5E	Placer gold, previous production
206	Hawk River	T 10N R 6E	Copper, lead, and silver veins in volcanic rocks
207		T 7,8N R 9,10W	Uranium with acid intrusives
208		T 8,9N R 9,10W	Uranium, disseminated and in veins, in acid intrusive rock
209		T 8,9N R 9,10W	Uranium, disseminated and in veins, in acid intrusive rock
210		T 9N R 9W	Fluorite, cementing brecciated intrusive rock
211		T 8,9N R 9,10W	Uranium, disseminated and in veins, in acid intrusive rock
212		T 7,8N R 9,10W	Uranium claims
213		T 7,8N R 9,10W	Uranium, disseminated and in veins, in acid intrusive rock
214		T 8,9N R 8W	Uranium claims
215		T 8,9N R 9,10W	Uranium, in veins and disseminated, in acid intrusive rock
216	Hunt Creek	T 9N R 5W	Lead and zinc, in veins, in intrusive rock

Map #	Name	Location	Notes
217	Cosmos Creek	T 18N R 8E	Jade placers, previous production
218	Wesley Creek	T 18N R 8E	Lead in carbonate rocks; asbestos and jade in mafic/ultramafic rocks
219	Dahl Creek	T 18N R 9E	Placer gold, previous production. Jade in float. Asbestos
220	California Creek	T 18N R 10E	Placer gold, previous production
221	Arctic Camp	T 21N R 11W	Proven reserves of zinc, copper, lead, silver, and gold mineralization
222	Nantuk Mtn.	T 24N R 26E	Reported zinc-silver mineralized float