

MINERAL APPRAISAL OF THE PROPOSED
KOBUK VALLEY NATIONAL PARK, ALASKA:
A PRELIMINARY COMMENT

By Staff, Alaska Field Operations Center

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BUREAU OF MINES

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ABSTRACT

Geologic mapping and mineral exploration in the proposed Kobuk Valley National Park have been superficial. Large parts of the area lack even the most preliminary and basic types of surveys. Nevertheless, at least three types of metallic mineralization and one of coal are known or can be inferred to occur: (1) zinc-copper sulfide deposits similar to the Arctic Camp deposit, (2) copper deposits similar to the Bornite (Ruby Creek) deposit, (3) placer gold deposits similar to those mined at Klery Creek, and (4) coal, probably of bituminous rank in deposits that may be valuable for local use.

INTRODUCTION

The Bureau of Mines made limited field and office studies of mineralization in the Western Brooks Range started in 1975. This report concerns the proposed Kobuk Valley National Park, a 1.67 million acre tract as outlined on a Department of Interior map dated February 24, 1978 (figure 1). The study region, however, was the previously proposed Kobuk Valley National Monument (1.85 million acres) as outlined on the Bureau of Land Management map of Alaska dated 1974. The study region boundaries and the boundaries of the proposed national park are shown on figure 2 and succeeding figures. The Bureau of Mines studies were made to provide specific mineral information requested by Congressional Committees and the Joint Federal-State Land Use Planning Commission for Alaska and were funded by special Congressional

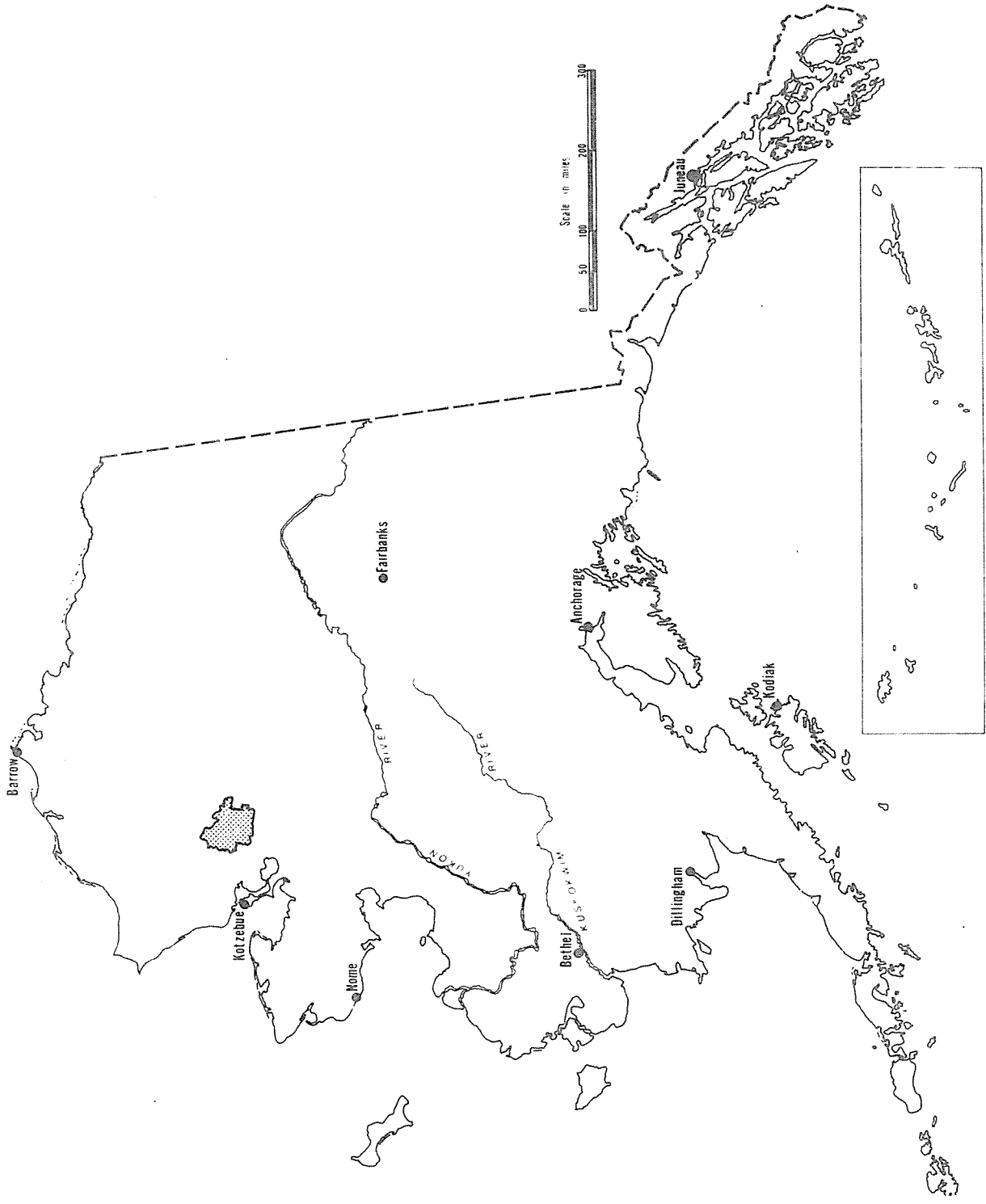


FIGURE 1.- Index map of the proposed Kobuk Valley National Monument

appropriations.

A three-phase program was undertaken to (1) compile a list of known mineral occurrences and prospects within the withdrawal lands; (2) sample, map and evaluate as many of the more promising prospects as possible with the funds and time available; and (3) summarized the results of the field work and identify areas favorable for future mineral exploration. Phases 1 to 3 of the program were contracted to a private firm (WGM, Inc.) that had minerals exploration and evaluation experience in this area. The Bureau of Mines undertook to search for additional data that might not be available to the contractors and to identify areas where additional field investigations were essential.

EXPLORATION HISTORY

Starting in the late 1890's and continuing up to the 1950's, mineral exploration in the study region and nearby areas was limited to individual prospectors or small groups interested almost exclusively in placer gold deposits, although they did discover some base metal deposits. Since the 1950's exploration has been oriented towards finding lode deposits of gold, uranium, lead, zinc, copper, and other commodities. Modern exploration on a regional basis was carried out by only two groups, a major mining company in the early 1960's and an exploration syndicate in 1969. In the study region systematic minerals exploration ceased in 1971.

In addition to the work of private industry, State and Federal government agencies have been active intermittently, on a relatively limited basis. The work by the Federal groups has been primarily regional geologic mapping that is not minerals discovery oriented. The State projects focused more directly

on areas of mineralization and their possible extensions. Consequently, the regional rock structure of the Brooks Range is superficially known (4) 1/. Mapping on a quadrangle basis at a scale of four miles to the inch was initiated recently (5). However, the rock structure relationships relevant to mineral deposit evaluation within this study region remain essentially unknown except near the eastern and northwestern margins where a little is known or can be inferred.

ROCK TYPE AREAS AND ASSOCIATED MINERALIZATION

General relationships between the rock types and commodities can be discerned in spite of the lack of detailed knowledge. Major rock units and mineral trends persist across the western Brooks Range. By plotting mineral deposits and zones where metallic elements occur on rock structure maps, the association of mineral deposits with certain rock types becomes apparent. Broad rock type areas, known mineral deposits and areas where metallic elements occur in higher than average amounts are shown on figure 3. Figure 4 shows mineral locations in relation to geographic features. Details on some of the mineral occurrences, such as common name, location, and descriptive notes are appended to this report. Figure 5 shows zones favorable for the discovery of metallic and related non-metallic deposits.

North of the Kobuk River Valley three rock type areas are presently recognized in this study region as warranting further investigations of their potential mineralization. Within the Kobuk River Valley is a fourth zone. The rock type areas for mineral occurrence include (1) schist belt rocks, (2) Lower Paleozoic clastic and carbonates rocks, (3) gold in placer gravels and (4) coal in younger sediments along the Kobuk River Valley.

(1) Schist Belt Rocks - Schistose rocks are present in the central part

1/ Underlined numbers in parentheses refer to items in the references listed at the end of this report.

of the study region. To the east of the study region the upper horizons of this schist belt include a series of large zinc-copper-lead-silver mineral deposits (Nos. 177, 178, 179, 180, 221). More than 35 million tons with over 9 percent copper, 5 percent zinc, 1 percent lead and some silver have been discovered since 1965 at Arctic Camp (No. 221) (5). The schist belt rocks containing this mineralization trend into the east side of the study area (figure 5). Although the limited sample data available suggest that in the study region these rocks contain copper, lead, zinc, silver, and gold, the information is too scanty to either delineate the trend or locate deposits.

(2) Lower Paleozoic Clastic and Carbonate Rocks Bearing Copper Mineralization - Sulfide (primarily copper) mineralization is known to be associated with carbonate rocks in the western Brooks Range. Copper and zinc minerals occur in carbonate rocks in the Bornite (Ruby Creek) area (No. 196). The carbonate rocks that include these deposits trend into the study area from the east (figure 3). Similar rocks with similar minerals also occur in and near the northwest corner of the study region. The lack of reliable rock structure mapping makes it impossible to trace equivalent rocks in most of the study area or to indicate their possible location.

In the Bornite area (No. 196) east of the study region, the copper minerals in the carbonate environment occur in dolomite and associated rocks. Published data indicates a tonnage of 50 to 100 million tons or more with an average grade greater than 1 percent copper. Lower tonnages of much higher average grade material can be defined within the larger zone.

At the Omar Prospect (No. 21) west of the study region, mineralized fracture zones up to 100 feet wide occur in a zone at least 9,000 feet long and 3,500 feet wide. Although some samples range up to 15 percent copper, the

general range of values of mineralized samples along the fracture zones is from 0.1 percent to 2 percent copper.

The Frost prospect (No. 22) also west of the study region, contains barite and zinc, with minor amounts of lead, copper, and fluorite. There are two apparently unrelated types of mineralization present. Barite is present as discontinuous pods or lenses along an outcrop length of about 5,000 feet. Zinc and copper sulfide minerals are in quartz-calcite-barite veins, or lenses, that pinch and swell along strike. A sample from one of these "veins" assayed 13.2 percent zinc, 0.49 percent copper, and 20.7 percent barite.

In the northern and northwestern portion of the study area rocks of an age and type generally similar to those at the Omar (No. 21) and Frost (No. 22) (3) prospects, and perhaps also equivalent to those at the Bornite (No. 196) prospect, contain copper occurrences (Nos. 26, 29, 30, 31) and one recognized lead-zinc (No. 32) occurrence. Zones of mineralization similar to those noted above may be present in correlative rock units along the upper reaches of the Salmon River and its tributaries where several areas of copper and others of lead-zinc mineralization were reported in the 1940's (1). The regional survey conducted in the early 1960's which led to the discovery of the Omar and Frost prospects, reportedly indicated numerous other areas and other heavy metals in the study area (2). A very brief field reconnaissance of the Salmon River drainage by the Bureau of Mines confirmed the presence of copper occurrences in these rock units, but these have not been investigated.

(3) Placer Gold - Placer gold has been mined in many parts of the Brooks Range. The principal gold placer operations in the western Brooks Range were west of the study region at Klery Creek (No. 23) and Timber Creek (No. 24). Similar placer deposits are known in the Salmon River, the western tributaries

of Salmon River draining the Kallarichuk Hills and Kallarichuk River. Most have not been evaluated. A reconnaissance evaluation made by a mining company about 1950 in the Upper Salmon River reportedly indicated that a section of the valley contains 1 million cubic yards of placer gravel with an average value of 50 cents per cubic yard (gold at \$35/ounce). The average value of gravel dredged on Klery Creek (No. 23) was reported to be 60 cents per cubic yard (gold at \$35/ounce).

(4) Coal - Coal outcrops (Nos. 202, 203) in the Kobuk River Valley have been known for many years. An analysis made in 1910 indicated a bituminous rank (8). The thickness, extent and attitude of the coal beds are not known although small amounts have been mined in the past. These coals may eventually prove valuable for local use, but are not believed extensive enough to be a nationally important resource.

ZONES FAVORABLE FOR DISCOVERY OF ADDITIONAL MINERAL DEPOSITS

The distribution of areas of known mineralization within the study region and on adjacent lands and the trends of inferred favorable zones for mineral discovery are shown on figure 5. The identified trends could not be traced and defined in the study region except near the margins. Systematic regional rock structure mapping, detailed trace element and geophysical surveys followed by site specific mineral deposit investigations will be required before it is possible to delineate mineral trends and estimate the mineral potential of this study region.

ON-GOING STUDIES

Although large areas of the study region require the most preliminary types of surveys, sufficient data are available to select some areas for site-specific investigations. A very limited (several days) reconnaissance during 1978 is

planned within the Baird Mountains area, principally in the Salmon River drainage. The intent is to locate and evaluate mineral occurrences and indications of possibly extensive mineralization found during regional work by the mining industry during the 1960's. More detailed work will be undertaken if the results indicate that this is warranted.

SUMMARY

At least three trends of metallic mineralization and one of coal are known, or are likely to occur, within the study region. A brief description of these mineralized trends follows:

1. Zinc-copper sulfide deposits - these deposits occur in a trend of schist belt rocks which extends into the study region from the east. Well defined mineralization has been found in these rocks at the Arctic Camp, Picnic, and other deposits east of the study region. The presence of similar deposits in the study region is suggested by chemical anomalies but the detailed regional studies necessary to trace the trend have not been made.

2. Copper sulfide deposits - these deposits are associated with Paleozoic carbonate rocks. Well known copper deposits exist at Bornite (Ruby Creek) east of the study region and at Omar west of the study region in these rocks. At the Frost deposit also west of the study region barite, fluorite, lead, and zinc mineralization occur in carbonate rocks. While copper occurrences are known in the study region the exploration necessary to locate and evaluate deposits or to trace extensions of similar rock types has not been undertaken.

3. Gold placer deposits - these deposits occur in the Salmon River and tributaries draining the Kallarichuk Hills and in the Kallarichuk River. In a report of a reconnaissance evaluation made in 1950 on a section of the Upper Salmon River it is estimated that the placer deposits in that section consisted of 1 million cubic yards of gravel with an average value of 50 cents

per cubic yard (gold at \$35/ounce). The average value of gravel dredged from Klery Creek, which lies west of the study area, was 60 cents per cubic yard (gold at \$35/ounce).

4. Coal - coal outcrops at several sites near the Kobuk River. Analyses performed in 1910 indicate a bituminous rank. The extent and attitude of the coal beds have not been studied in detail, but the coal is thought to have value for local use.

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APPENDIX*

MINERAL OCCURRENCES AND GEOCHEMICAL ANOMALIES
IN NORTHWESTERN ALASKA**

**Indicates localities in the proposed Kobuk Valley National Monument

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

<u>Map #</u>	<u>Name</u>	<u>Location</u>	<u>Notes</u>
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
15	Agashashok River	T 26N R 12W	Copper, 18 claims

<u>Map #</u>	<u>Name</u>	<u>Location</u>	<u>Notes</u>
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

<u>Map #</u>	<u>Name</u>	<u>Location</u>	<u>Notes</u>
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

<u>Map #</u>	<u>Name</u>	<u>Location</u>	<u>Notes</u>
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

<u>Map #</u>	<u>Name</u>	<u>Location</u>	<u>Notes</u>
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

<u>Map #</u>	<u>Name</u>	<u>Location</u>	<u>Notes</u>
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

<u>Map #</u>	<u>Name</u>	<u>Location</u>	<u>Notes</u>
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 mineralization
100	Awlinyak Creek	T 23, 24N R 20E	Lead copper occurrence

<u>Map #</u>	<u>Name</u>	<u>Location</u>	<u>Notes</u>
101	Kugururok	T 33,34N R 12,13W	Black Siltstone, Shublik(?) Fm, <5% P ₂ O ₅
102		T 8S R 8W	Black Siltstone, strat. position unknown, 0.2% P ₂ O ₅
103	Drenchwater Creek	T 9S R 29W	Black to gray siltstone. Lisburne Group, <5% P ₂ O ₅ ; <.001% eU
104	Kiligwa River	T 10S R 28W	Shale, possibly Alapah Limestone of Lisburne Group, <5% P ₂ O ₅ ; to 0.002% eU
105	Mount Bupto	T 11S R 24W	Phosphatic calcareous mudstone, probably Alapah Limestone of Lisburne Group, 13.7% P ₂ O ₅ ; .004% U
106		T 10S R 21W	Shale. <5% P ₂ O ₅ ; .001% U
107		T 9,10S R 20,21W	Phosphate rock, 8 foot zone, 24.8% P ₂ O ₅ , 0.17% V ₂ O ₅ , .008
108		T 10S R 21W	Black limestone, <5% P ₂ O ₅ ; 0.001% eU
109		T 34N R 9E	Limestone to calcareous silty shale, <5% P ₂ O ₅ ; <.001% eU
110	Nigu River	T 11S R 19W	Calcareous mudstone, 5±% P ₂ O ₅ ; .004% eU
111	Oolamnagavik River	T 10S R 12W	Black siltstone, 1.4% P ₂ O ₅ ; .005% eU
112	Killik River	T 12S R 10W	Phosphatic limestone, 0.4% P ₂ O ₅ ; 0.004% eU
113	Kiruktagiak	T 12S R 10W	Phosphatic limestone, 0.4% P ₂ O ₅ ; 0.004% eU
114		T 12S R 3W	Oolitic phosphate rock, 25.6% P ₂ O ₅ ; 0.02% V ₂ O ₅ ; 0.009% eU
115	Tiglukpuk Creek	T 13S R 1E	Phosphatic zone, 36 foot thick zone averages 8% P ₂ O ₅ . Small samples contain to 30% P ₂ O ₅

<u>Map #</u>	<u>Name</u>	<u>Location</u>	<u>Notes</u>
116		T 13S R 1E	Black shaly limestone, <5% P ₂ O ₅ ; 0.008% eU
117		T 13S R 2E	Phosphate rock, 27.9% P ₂ O ₅ ; 0.020% eU
118		T 13S R 2E	Phosphate rock, 15+% P ₂ O ₅ ; 0.009% eU
119		T 13S R 3E	Phosphate rock, 21.4% P ₂ O ₅ ; 0.014% eU
120		T 12S R 5E	Dark limestone, <5% P ₂ O 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

<u>Map #</u>	<u>Name</u>	<u>Location</u>	<u>Notes</u>
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

<u>Map #</u>	<u>Name</u>	<u>Location</u>	<u>Notes</u>
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

<u>Map #</u>	<u>Name</u>	<u>Location</u>	<u>Notes</u>
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, previous 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 Devonian limestone and greenstone.

<u>Map #</u>	<u>Name</u>	<u>Location</u>	<u>Notes</u>
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.

<u>Map #</u>	<u>Name</u>	<u>Location</u>	<u>Notes</u>
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

<u>Map #</u>	<u>Name</u>	<u>Location</u>	<u>Notes</u>
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

<u>Map #</u>	<u>Name</u>	<u>Location</u>	<u>Notes</u>
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

