

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUMMARIES OF DATA ON AND LISTS OF REFERENCES TO
METALLIC AND SELECTED NONMETALLIC MINERAL OCCURRENCES
IN THE ILIAMNA, LAKE CLARK, LIME HILLS, AND McGRATH
QUADRANGLES, ALASKA
SUPPLEMENT TO OPEN-FILE REPORT 76-485
PART A -- SUMMARIES TO JANUARY 1, 1981

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This report is preliminary and has not been
reviewed for conformity with U.S. Geological
Survey editorial standards.

Introduction

This report was prepared as a supplement to a 1976 report which summarized data on mineral occurrences in part of southwestern and west-central Alaska (Cobb, E. H., 1976, Summary of references to mineral occurrences (other than mineral fuels and construction materials) in the Iliamna, Lake Clark, Lime Hills, and McGrath quadrangles, Alaska: U.S. Geological Survey Open-File Report 76-485, 101 p.). As a result of suggestions from users of the series of which the 1976 report is a part, this supplement is released in two parts; Part A, which presents summaries of data to January 1, 1981, and Part B, which consists of reference lists for each occurrence.

In Part A data from most reports released between the cut-off date (January 1, 1976) for the original report and January 1, 1981, have been incorporated in new or rewritten summaries. Some of the original summaries have also been expanded. For each occurrence described in Part A, the name, U.S. Bureau of Mines mining district, reference (if any) that has the occurrence plotted on a map at a scale of 1:250,000, list of mineral commodities, and location data are in the same format as in the 1976 report. Also included at the end of Part A are updated lists of synonyms, owners, operators, and claim names.

In both parts citations are in standard bibliographic format with the exception that references to reports and maps in numbered publication series also show, in parentheses, an abbreviation for the report or map series and the number of the report or map. Abbreviations used are:

AOF	Alaska Division of Geological and Geophysical Surveys Open-File Report
B	U.S. Geological Survey Bulletin
BMB	U.S. Bureau of Mines Bulletin
C	U.S. Geological Survey Circular
GC	Alaska Division of Geological and Geophysical Surveys (and predecessor State agencies) Geochemical Report
GR	Alaska Division of Geological and Geophysical Surveys (and predecessor State agencies) Geologic Report
I	U.S. Geological Survey Miscellaneous Geologic Investigations Map
IC	U.S. Bureau of Mines Information Circular
OF	U.S. Geological Survey Open-File Report
MF	U.S. Geological Survey Miscellaneous Field Studies Map
P	U.S. Geological Survey Professional Paper
RI	U.S. Bureau of Mines Report of Investigations
TDM	Alaska Territorial Department of Mines Pamphlet

In Part B each citation to the principal references used in preparing summaries in Part A is preceded by an asterisk. The form of citation used in the reference list for each occurrence is considered sufficient identification for each numbered report or map to be found easily in most libraries. Complete references to reports without identifying numbers are listed at the end of Part B.



Index Map

ILIAMNA QUADRANGLE

(Augustine I.)

Pumice

Redoubt district

Iliamna (22.9, 6.4)
59°20'N, 153°27'W

Volcanic cone mainly of fragmental material with subordinate trachitic and andesitic lavas. A deposit of pumice at an altitude of 1,250 ft is about 10 ft thick, 300 ft long, and probably about 50 ft wide and was partly mined, as were other thinner (up to 3 ft) deposits in lower part of island, between 1946 and 1949. Material barged to Anchorage and used for making building blocks. Coordinates above are for the large deposit. Eruptions since 1949 have caused considerable local changes, cut off road to large deposit, and destroyed several buildings.

Aukney

Gold(?)

Bristol Bay region

Iliamna (6.6, 7.25)
59°25'N, 155°16'W

Claim, presumably staked for gold, on cliff of pyritiferous quartz latite tuff. Only work was a little blasting on cliff face at shore of Lake Iliamna.

(Battle Lake)

Copper, Gold, Silver

Bristol Bay region
MF-364, loc. 18

Iliamna (10.15, 1.95)
59°06'N, 154°53'W

Quartz vein cutting Tertiary locally propylitized interbedded volcanic breccia and dacitic flows contains visible gold, chalcopyrite, pyrite, malachite, and unidentified silver-sulfosalt mineral(s). Vein is from a few cm to 2 m wide and exposed for a discontinuous strike length of at least 300 m. Selected samples contained as much as 1,247 g/ton Au, 5,783 g/ton Ag, and several percent Cu. Mineralization is sporadic and the results of a drilling program in 1965 were not encouraging.

(Chenik Mtn.)

Iron

Redoubt district
MF-364, loc. 22

Iliamna (15.6, 4.4)
59°15'N, 154°16'W

Magnetite-rich segregations in Jurassic mafic plutonic rocks. Deposit probably of contact-metamorphic origin and low grade.

Copper King

Copper, Iron

Redoubt district
MF-364, loc. 7

Iliamna (20.8, 12.15)
59°41'N, 153°39'W

Chalcopyrite- and magnetite-bearing skarns in Lower Jurassic? marble and

greenstone near contact with Jurassic? granitic plutons. Prospective ore said to be rich, but in small bodies. Prospect located in 1905, but has been inactive for many years. Includes references to Keyes.

(Diamond Point)	Gold(?)
Redoubt district	Iliamna (21.05, 11.7)
MF-364, loc. 8	59°39'N, 153°38'W

Jurassic quartz monzonite intruded Triassic limestone and greenstone and Lower Jurassic volcanic rocks. Both granitic and country rocks shattered and impregnated with veins and stringers of pyrite. Rocks highly stained from oxidation of pyrite, but no other mineralization noted. Assays of about 0.1 oz/ton Au rumored.

Durand	Copper, Iron
Bristol Bay region	Iliamna (17.65, 12.65)
MF-364, loc. 4	59°43'N, 154°00'W

A quartz vein 10 ft wide in Lower Jurassic schistose greenstone was explored by 2 pits before 1909. Vein contains pyrite, chalcopyrite, malachite, and azurite. In same area a magnetite occurrence has been staked as an iron prospect; probably similar to that at Chenik Mtn.

Duryea (& Duryea)	Copper, Gold, Lead, Silver, Zinc
Bristol Bay region	Iliamna (18.4, 12.3)
MF-364, loc. 6	59°41'N, 153°56'W

Claims staked 1901 or 1902. Argentiferous galena-sphalerite vein in brecciated Triassic limestone. Minor chalcopyrite, pyrite, and limonite in weathered rock. Mineralized zone continues for about 2 km with average width of about 23 m; manganese gossan containing 2-6 oz/ton Ag near eastern end of mineralized zone. In 1909 claim owners reported that samples contained 80-196 oz/ton Ag, about 1 oz/ton Au, 35%-50% Pb, and 15%-20% Zn. Extensive underground workings (caved by 1949), but no record of production. Includes reference to Duryea & McNeil.

Dutton (Mining & Development Co.)	Copper, Gold(?), Molybdenum, Silver(?),
Bristol Bay region	Iliamna (18.1, 12.15)
MF-364, loc. 5	59°41'N, 153°58'W

Skarn in zone about 200 ft wide and 3,000 ft long in brecciated limestone (now largely marble) along contact with greenstone (both of Late Triassic age); both cut by small porphyritic andesite dikes. Skarn laced by inch-thick veinlets containing quartz, calcite, chalcopyrite, and pyrite; a little molybdenite and malachite also present. One old report, but no recent ones, mentions small amounts of gold and silver. Marble also con-

tains lenses and beds of magnetite-rich rock. Extensive development 1902-05, but no ore was shipped.

(Fog Pond)	Copper(?), Gold
Bristol Bay region	Iliamna (14.6, 9.1)
MF-364, loc. 14	59°31'N, 154°22'W

Mafic volcanic rocks intruded by felsic dikes(?) and possibly by quartz porphyry; all are now altered. Porphyry contains widespread pyrite and scattered grains that are probably chalcopyrite, though analyses of samples taken in a geochemical reconnaissance are low in copper. Selected specimens from shear zones contain pyrite stringers and as much as 37.7 ppm Au.

(Frying Pan Lake)	Iron, Vanadium
Bristol Bay region	Iliamna (5.95, 15.1)
MF-364, loc. 1	59°52'N, 155°20'W

Plutonic breccia is 50%-90% pyroxenite blocks made up largely of pyroxene and magnetite in a matrix of Late Cretaceous or Tertiary granodiorite. Analyses showed iron as FeO, 16%-24%; TiO₂, about 1.3%; P₂O₅, 0.1%-3.2%; vanadium, 0.1%-0.15%. Includes reference to (Iliamna Lake).

(Iliamna Lake)	Zeolites
Bristol Bay region	Iliamna (6.5-15.75, 7.25-13.75)
	59°22'-59°47'N, 154°14'-155°16'N

Clinoptilolite, mordenite, heulandite, and minor amounts of laumontite occur as alteration products of nonmarine Tertiary tuffs and other volcanic rocks and sedimentary rocks derived from them along the shores of Iliamna Lake and on islands in the lake. Zeolitized beds are as much as a few tens of feet thick and underlie areas with exposed lengths of as much as a few hundred feet. See also (Frying Pan Lake.)

(Iniskin Bay)	Iron
Redoubt district	Iliamna (22.95, 13.6)
MF-364, loc. 11	59°45'N, 153°24'W

Small occurrences of magnetite in metamorphosed volcanic rocks of the Lower Jurassic Talkeetna Fm. near younger Jurassic granitic rocks.

(Iniskin R.)	Copper
Redoubt district	Iliamna (22.6, 14.5)
MF-364, loc. 9	59°48'N, 153°27'W

Copper sulfide(s) near contact between Jurassic or older metamorphic rocks and Jurassic quartz monzonite and diorite.

Knutson
Bristol Bay region
MF-364, loc. 3

Copper, Gold, Silver(?)
Iliamna (15.2, 14.9)
59°50'N, 154°17'W

A quartz vein 3-8 ft thick that cuts Cretaceous or Tertiary granitic rock contains copper minerals, gold, and probably silver. A 40-ft tunnel was driven in 1912, but there has been no recorded production.

(Koktuli R.)
Bristol Bay region

Gold
Iliamna
NW¼ quad.

Fine flour gold on river bars.

(Lake Fork area)
Redoubt district
MF-364, loc. 17

Copper, Gold, Silver
Iliamna (13.65, 4.45)
59°15'N, 154°29'W

An igneous breccia zone about 45 m wide in Jurassic quartz diorite intruding hornblende gabbro contains many sulfide-rich veins; principal ore minerals are pyrite, chalcopyrite, and malachite. Selected samples contained as much as 6.5% Cu and more than 0.5 oz/ton of both Au and Ag. A partially caved adit in the breccia shows meager sulfide mineralization.

(Marsh Cr.)
Redoubt district
MF-364, loc. 10

Copper, Iron
Iliamna (23.25, 14.8)
59°49'N, 153°22'W

Small magnetite occurrence in Triassic metamorphosed sedimentary and volcanic rocks in a fault block. A vein of chalcopyrite with malachite and azurite 6-12 in. thick in marble. Includes reference to (Clearwater Cr.).

McNeil(-Cook)
Redoubt district
MF-364, loc. 20

Copper, Gold, Silver
Iliamna (12.3, 2.45)
59°08'N, 154°38'W

Series of small tectite skarn deposits formed by intrusion of Cretaceous or Tertiary granodiorite into volcanic and calcareous rocks of the Jurassic and Triassic Talkeetna and Kamishak Fms. Largest body extends for about 760 m along contact between volcanic and sedimentary rocks along Crevice Cr. Chalcopyrite and pyrite are most abundant sulfides; some chalcocite, malachite, and azurite present. Developed 1913-20, claims dropped in 1926, relocated in 1953. Developed by pits and a 60-ft tunnel. Test shipments of ore in 1914 and 1916 (about 12 tons) averaged 17.55% Cu, about 0.12 oz/ton Au, and 15 oz/ton Ag. Includes references to: Cook & Bornland, (Crevice Cr.), (Okchiak Cr.). See also (Paint R.).

Millet
Bristol Bay region
MF-364, loc. 2

Copper, Gold, Silver
Iliamna (13.2, 13.9)
59°47'N, 154°31'W

Mineralized Triassic limestone bordered on west by volcanic rocks of Jurassic Talkeetna Fm.; volcanic breccia to south is Tertiary. Mineralized dikes that cut limestone are probably offshoots of Cretaceous or Tertiary granodiorite body that lies along east side of deposit. Most of samples analyzed contained less than 1% Cu; a few contained 3%-4% Cu with minor amounts of Au and Ag. Mineralized zone is 6-12 m wide and has been traced on surface for about 1,000 m. Deposit was explored before 1915 by open cuts and a shallow shaft. Extensive U.S. Bureau of Mines drilling and trenching program in 1949-50. No record of any production.

(Mirror Lake)
Bristol Bay region

Copper
Iliamna (11.3, 4.2) approx.
56°15'N, 154°44'W approx.

Chalcopyrite and pyrite in quartz vein in shear zone in Tertiary volcanic rocks. Copper content low and volume of copper-bearing rock probably small.

(Paint R.)
Redoubt district
MF-364, loc. 19

Copper, Iron
Iliamna (12.2, 2.6)
59°08'N, 154°39'W

Contact-metamorphic deposits consisting of tactite bodies in Jurassic volcanic and Triassic sedimentary rocks at or near contacts with younger granodiorite. One large tactite body is epidote-garnet rock with abundant actinolite and lesser amounts of calcite, quartz, pyrite, and chalcopyrite. Other tactites are magnetite and quartz. Chalcopyrite is in sulfide lenses that may be as large as 3 ft by 10 ft and contain more than 7% Cu or is disseminated. Magnetite-quartz bodies are as large as 75 ft by 10 ft containing very little quartz or smaller bodies with 50% quartz. Magnetic data suggest the presence of other unexposed bodies. See also McNeil.

(Upper Copper Lake)
Bristol Bay region
MF-364, locs. 12, 13

Copper, Molybdenum, Silver
Iliamna (16.55-16.9, 10.5-10.9)
59°35'-59°37'N, 154°06'-154°08'W

Minor showings of molybdenite and chalcopyrite in pyritized and altered Tertiary(?) intrusive rocks. A little Ag in some samples.

(Ursus Cove)
Redoubt district
MF-364, loc. 15 approx.

Copper
Iliamna (19.85, 9.45)
59°31'N, 153°46'W

Bedrock occurrence of copper sulfide. Symbol for locality 15, MF-364 is 1.25 mi SW of actual location.

Unnamed prospect Iron
Redoubt district Iliamna (13.8, 4.55)
MF-364, loc. 21 59°15'N, 154°28'W
Magnetite-rich segregations in Jurassic mafic intrusive rocks.

Unnamed prospect Iron
Redoubt district Iliamna (18.95, 9.3)
MF-364, loc. 23 59°31'N, 153°52'W
Magnetite-bearing zones in Jurassic mafic plutonic rocks.

Unnamed prospect Iron
Bristol Bay region Iliamna (17.3, 11.75)
MF-364, loc. 24 59°39'N, 154°03'W
Average magnetite content of samples of Triassic greenstone within a few
tens of meters of a contact with Cretaceous or Tertiary granodiorite is
about 5%. Near Meadow Lake.

Unnamed prospect Iron
Redoubt district Iliamna (19.9, 12.1)
MF-364, loc. 25 59°41'N, 153°45'W
Magnetite-bearing Jurassic mafic plutonic rocks.

Unnamed prospect Iron
Redoubt district Iliamna (21.5, 12.6)
MF-364, loc. 26 59°42'N, 153°34'W
Magnetite-bearing Jurassic mafic plutonic rocks.

Unnamed prospect Iron
Bristol Bay region Iliamna (18.1, 13.2)
MF-364, loc. 27 59°44'N, 153°58'W
Magnetite-bearing Jurassic mafic plutonic rocks.

LAKE CLARK QUADRANGLE

(Bonanza Cr.) Lead, Gold
Bristol Bay region Lake Clark (9.2-11.5, 12.15-13.25)
MF-378, locs. 1, 6 60°42'-60°45'N, 154°40'-154°51'W

Principal site of prospecting and placer mining in Mulchatna basin. Small-scale exploitation since 1912; mining on Bonanza and Scynneva Creeks since 1957; total production from Bonanza Cr. and tributaries probably not more than 3,000 oz of gold. Valley has been glaciated; erratics reworked into creek gravels. Bedrock is Jurassic shale, argillite, siltstone, and minor amounts of fine conglomerate cut by fine-grained felsic dikes of Cretaceous or Tertiary age. A mineralized shear zone contains quartz veins with pyrite, arsenopyrite, and a little gold. Quartz-carbonate vein 0.5 m thick contains disseminated galena. Includes reference to (Big Bonanza Cr.).

(Bonanza Hills) Antimony, Copper, Gold, Lead, Silver
Bristol Bay region Lake Clark (12.1-13.5, 12.5-13.75)
60°43'-60°47'N, 154°26'-154°36'W

Jurassic, Cretaceous, and lower Tertiary volcanic and sedimentary rocks cut by many small Cretaceous-Tertiary quartz monzonite bodies and by dikes associated with volcanic rocks are hosts for quartz-sulfide vein deposits. Sulfides include tetrahedrite, arsenopyrite, galena, chalcopyrite, pyrite, and stibnite. Analyses of samples indicated as much as 1.25 oz/ton Au and 3 or more oz/ton Ag.

(Currant Cr.) Copper
Bristol Bay region Lake Clark (17.9, 6.1) approx.
60°20'N, 153°46'W approx.

Pyrite and chalcopyrite in a Tertiary volcanic-intrusive complex.

(Franklin Gulch) Gold
Bristol Bay region Lake Clark
S½NE¼ quad.

Gold prospects have been found in this and other headwaters of the Kijik R.

(Ingersol Gulch) Gold
Bristol Bay region Lake Clark
S½NE¼ quad.

Gold prospects have been found on this and other headwaters of the Kijik R.

(Kasna Cr.) Copper, Iron, Zinc
Bristol Bay region Lake Clark (17.0, 3.0)
MF-378, loc. 5 60°09'N, 154°03'W

Lenticular body (possibly discontinuous) of Triassic limestone and dolomite between volcanic rocks and cut off on south end by Tertiary granodiorite is cut by dikes and sills of porphyritic basalt. Parallel zones as much as

250 ft wide and 1,050 ft long were contact metamorphosed to skarn consisting of specular hematite, chalcopyrite (that contains fine grains of sphalerite), magnetite, pyrite, amphibole, chlorite, calcite, garnet, and quartz. Deposit discovered in 1906. Has been considerable drilling and trenching, which proved the existence of a deposit of several million tons of material containing slightly less than 1% Cu and about 27% Fe; there has been no production. Includes references to: Hardenberg and to claims near Kontrashibuna Lake.

(Kellet Cr.) Gold
Bristol Bay region Lake Clark
S½NE¼ quad.

Gold prospects have been found on this and other headwaters of the Kijik R.

(Kijik Lake) Copper, Silver
Bristol Bay region Lake Clark (13.75, 5.9) approx.
60°20'N, 154°25'W approx.

Silicified zones in porphyritic and brecciated Tertiary? dacite contain pyrite and some chalcopyrite and silver.

(Kijik R.) Copper, Gold, Lead, Manganese, Molybdenum, Silver, Zinc
Bristol Bay region Lake Clark (13.75-14.6, 6.25-6.5) approx.
MF-378, locs. 2-4 (in part) 60°21'-60°22'N, 154°19'-154°25'W approx.

A shear zone in Tertiary granitic rocks that cut Lower Jurassic rocks (MF-378, locs. 3, 4) contains arsenopyrite with a little argentiferous galena, chalcopyrite, sphalerite, and pyrite in a gangue of calcite and rhodochrosite. Granitic float (MF-378, loc. 2) contains some molybdenite and possibly a little gold. Placer gold present in alluvium of some headwater tributaries. Includes references to: Gleason, (Keejik R.), (Kijak R.), Thompson. See also: (Franklin Gulch), (Ingersol Gulch), (Kellet Cr.), (Lincoln Gulch).

(Koksetna R.) Gold
Bristol Bay region Lake Clark
SW¼ quad.

Fine gold has been found. No mention of placer mining. Includes references to (Caribou Cr.)

(Kontrashibuna Lake) Copper, Lead, Molybdenum, Silver, Zinc
Bristol Bay region Lake Clark (17.3-17.7, 2.9)
MF-378, loc. 10 60°09'N, 153°59'-154°01'W

Two modes of mineral occurrence; (1) quartz veins and pegmatites that contain molybdenite and pyrite and cut basalt and granite; and (2) silicified shear zones that contain lead, copper, and zinc minerals and silver. See also (Kasna Cr.).

(Lincoln Gulch) Gold
Bristol Bay region Lake Clark
S $\frac{1}{2}$ NE $\frac{1}{4}$ quad.

Gold prospects have been found on this and other headwaters of the Kijik R.

(Little Tazimina) Copper
Bristol Bay region Lake Clark (17.6, 1.25) approx.
60°04'N, 153°59'W approx.

Contact-metamorphic deposits that contain disseminated chalcopyrite and its alteration products and minor amounts of other ore minerals; near contact between Cretaceous or Tertiary granitic rocks and older metavolcanic rocks.

(Mulchatna R.) Gold
Bristol Bay region Lake Clark
NW $\frac{1}{4}$ quad.

Gold, not in paying quantities, in most river bars. Some gold on bedrock on some of smaller tributaries. Most prospecting in 1890's and, possibly, early 1900's. See also (Bonanza Cr.).

(Neacola R.) Copper, Molybdenum
Redoubt district Lake Clark (25.1, 17.4) approx.
60°58'N, 153°03'W approx.

Copper minerals associated with pyrite and some molybdenite in Tertiary granitic rocks.

(Otter Lake) Copper, Zinc
Bristol Bay region Lake Clark (19.0, 8.75) approx.
60°29'N, 153°48'W approx.

Pyrite-rich deposits that contain some chalcopyrite and sphalerite; in schists largely of volcanic derivation; both mafic and felsic volcanic rocks involved.

Pass
Copper, Lead, Silver, Zinc
Bristol Bay region
Lake Clark (13.2, 6.6)
60°22'N, 154°29'W

Brecciated zone in Tertiary dacite porphyry; mineralized with pyrite, pyrrhotite, chalcopyrite, galena, and sphalerite; silver reported.

(Pass Cr.) Gold
Bristol Bay region
Lake Clark (11.2, 13.2)
MF-378, loc. 8 60°45'N, 154°41'W

Has been some ground sluicing. Coarse gold reported. Tributary of Bonanza Cr. See also (Bonanza Cr.)

(Portage Cr.) Gold
Bristol Bay region
Lake Clark (17.0, 6.55-6.7)
MF-378, loc. 9 60°22'N, 154°03'W

Phyllite, slate, argillite, and greenschist intruded by granitic pluton, which formed contact aureole a few meters wide. Creek is actively down-cutting; all gravel deposits postglacial. Most placer mining in canyon upstream from a fan being rapidly built into Lake Clark. All deposits above fan contain many large boulders. Both low bench and stream-bar placers. Considerable barite in some pan-concentrate samples. Intermittent mining above fan since before 1909. Total production not known, but probably not more than 1,000 fine oz of gold.

(Ptarmigan Cr.) Gold
Bristol Bay region
Lake Clark (13.5, 12.75) approx.
60°43'N, 154°25'W approx.

Encouraging results from prospecting for placer gold reported. Deposits probably have lower potential than those of Bonanza Cr.

(Scynneva Cr.) Gold
Bristol Bay region
Lake Clark (11.15, 12.45)
MF-378, loc. 7 60°42'N, 154°42'W

Tributary of Bonanza Cr. from which one man mined gold worth about \$1,200 from 800-900 yd³ of gravel. Large boulders; claims were abandoned. Includes reference to (Scenneva Cr.). See also (Bonanza Cr.).

(Tazimina) Copper(?)
Bristol Bay region
Lake Clark (18.3, 1.7) approx.
60°05'N, 153°55'W approx.

Probably a contact-metamorphic deposit that contains disseminated chalcopyrite.

(Telaquana Pass)

Molybdenum

Aniak district

Lake Clark (21.75, 16.6) approx.
60°56'N, 153°27'W approx.

Molybdenite associated with quartz, pyrite, and magnetite in a Tertiary composite granitic pluton.

(Telaquana R.)

Molybdenum

Aniak district

Lake Clark (20.7, 16.3) approx.
60°55'N, 153°34'W approx.

Molybdenite in pyritized zones in Tertiary quartz diorite; schistose roof pendants.

(Twin Lakes, east)

Copper

Bristol Bay region

Lake Clark (19.6, 12.8) approx.
60°43'N, 153°43'W approx.

Chalcopyrite and bornite, generally with pyrrhotite, in andesitic volcanic rocks near Tertiary granite.

(Twin Lakes, west)

Copper, Lead, Zinc

Bristol Bay region

Lake Clark (18.7, 11.9) approx.
50°40'N, 153°50'W approx.

Pyrite, sphalerite, chalcopyrite, and galena in silicified Tertiary felsic volcanic rocks; mainly in volcanic breccia.

(Upper Tazimina)

Copper

Bristol Bay region

Lake Clark (18.1, 2.1) approx.
60°06'N, 153°55'W approx.

Apparently small contact-metamorphic deposits near contact between Cretaceous or Tertiary granitic rocks and older metavolcanic rocks. Nearby deposit said to be similar contains disseminated chalcopyrite, its alteration products, and minor amounts of other ore minerals.

(West Ospook)

Copper, Molybdenum

Bristol Bay region

Lake Clark (18.25, 2.4) approx.
60°07'N, 153°55'W approx.

Probably a porphyry-type deposit; contains pyrite with some chalcopyrite, magnetite, and molybdenite; mainly localized near contact between Creta-

ceous or Tertiary granite and older metavolcanic rocks.

Unnamed occurrence	Copper, Zinc
Aniak district	Lake Clark (21.2, 16.75) approx. 60°56'N, 158°31'W approx.

Pyrite, pyrrhotite, and minor amounts of chalcopyrite and sphalerite in Tertiary granite and in metasedimentary roof pendants.

LIME HILLS QUADRANGLE

(Another R.)	Lead, Molybdenum, Zinc
Redoubt district	Lime Hills (23.35, 3.25) approx. 61°09'N, 153°15'W approx.

Molybdenite- and pyrite-bearing disseminations and quartz veins in Tertiary granitic rocks; local galena- and sphalerite-bearing veins nearby.

Chill	Copper, Gold, Lead, Silver, Zinc
Redoubt district MF-412, loc. 16	Lime Hills (24.75, 9.0) 61°29'N, 153°03'W

Boulder of mafic rock contains 30% massive chalcopyrite and pyrite; cobble of tourmaline-quartz rock with 20% disseminated arsenopyrite, pyrite, and chalcopyrite; cobble of altered felsic rock with 3% disseminated pyrite and galena and limonite and malachite on fracture surfaces. One sample contained 0.2 ppm Au and 200 ppm Ag; others contained 30-100 ppm Ag. In vicinity claims have been staked on porphyry-type copper deposits related to Tertiary granitic rocks, on sulfide-rich float that contains sphalerite and pyrite, and on a quartz-tourmaline-sulfide vein. Name used only in MacKevett and Holloway, 1977 (OF 77-169F) of references listed in Part B.

(Chilligan R.)	Lead, Zinc
Redoubt district MF-412, loc. 15	Lime Hills (23.35, 8.45) 61°27'N, 153°13'W

Galena and sphalerite, mainly in shear zones in metamorphic rocks near complex Tertiary and Cretaceous granitic plutons; local porphyry-type mineralized zones in plutons. Float of altered quartz monzonite on a medial moraine contains 5%-10% galena, sphalerite, and pyrite.

(Jimmy Lake)	Copper, Fluorite, Lead, Molybdenum, Zinc
McGrath district MF-412, loc. 11	Lime Hills (23.3, 13.45) 61°44'N, 153°12'W

Mineralized rock in altered parts of a biotite granite stock that intruded sedimentary rocks and possibly overlying Tertiary volcanic rocks. Stock

contains accessory fluorite. A float boulder of altered granite consisted chiefly of quartz, sericite, kaolinite, albite, and less than 5% disseminated galena and sphalerite. Other pieces of float contained thin veinlets of quartz, galena, sphalerite, arsenopyrite, and chalcopyrite and a 1-in-wide quartz-molybdenite vein. Sediment samples from streams draining the area contain high contents of Ag, As, Cu, Pb, and Zn.

(Necons R.) Gold
Aniak district Lime Hills (17.0, 1.7) approx.
61°02'N, 154°00'W approx.

Has been recent placer gold activity along and near the Necons R.

(Pass Lake) Copper, Molybdenum, Zinc
Redoubt district Lime Hills (23.2, 17.5) approx.
61°24'N, 153°14'W approx.

Low-grade mineral deposits associated with Tertiary granite contain molybdenite, pyrite, pyrrhotite, and some chalcopyrite and sphalerite.

(Styx R.) Gold, Lead, Zinc
McGrath district Lime Hills
MF-412, loc. 14 (in part) E½NE¼ quad.

Placer gold present in lower basin, but not found in minable quantities. Altered Tertiary granite at 61°32'N, 153°09'W (MF-412, loc. 14) contains small amounts (generally less than 1%) sulfide minerals (pyrite, sphalerite, and galena) as disseminations, in thin veinlets, and in thin quartz veins.

(Two Lakes) Copper, Molybdenum
Redoubt district Lime Hills (21.9, 1.9) approx.
61°05'N, 153°25'W approx.

Molybdenite and copper minerals associated with Tertiary rhyolite plugs and flows.

(West Chilligan) Copper, Lead, Molybdenum, Zinc
Redoubt district Lime Hills (23.0, 8.7) approx.
61°28'N, 153°15'W approx.

Mainly porphyry-type deposits related to Tertiary plutons that intruded older granitic rocks. Deposits contain pyrite, chalcopyrite, molybdenite, and some galena and sphalerite.

Unnamed occurrence

Antimony

McGrath district
MF-412, loc. 4

Lime Hills (20.2, 11.75)
61°39'N, 153°35'W

Massive stibnite blocks up to a foot across in frost-heaved rubble near top of a ridge and in talus. Area underlain by upper Mesozoic argillite and graywacke near Cretaceous? granitic pluton. Float samples probably very close to source. Deposits probably localized along faults or shear zones.

Unnamed occurrence

Copper

Aniak district

Lime Hills (19.65, 5.6) approx.
61°18'N, 153°40'W approx.

Chalcopyrite, pyrite, and pyrrhotite as blebs and disseminations in meta-sedimentary rocks near Tertiary granite.

Unnamed occurrence

Copper

McGrath district
MF-412, loc. 8

Lime Hills (21.05, 9.5)
61°31'N, 153°29'W

Boulders of brecciated Tertiary quartz diorite and diorite gneiss contain tourmaline and 15% chalcopyrite. One sample contained 5% pyrite.

Unnamed occurrence

Copper

McGrath district
MF-412, loc. 10

Lime Hills (22.45, 10.45)
61°34'N, 153°19'W

A small body of Tertiary quartz monzonite cuts upper Mesozoic slates and graywacke and a probably Cretaceous monzonite stock. The quartz monzonite contains traces of disseminated chalcopyrite and sparse fractures locally contain quartz, chalcopyrite, and minor amounts of other sulfide minerals.

Unnamed occurrence

Copper

McGrath district
MF-412, loc. 5

Lime Hills (20.2, 10.8)
61°36'N, 153°35'W

Float and quartz veins in faulted or sheared relatively unmetamorphosed upper Mesozoic sedimentary rocks about a mile from a small intrusive body of probably Tertiary granitic rock contain sulfide minerals, including pyrite, arsenopyrite, chalcopyrite, and pyrrhotite.

Unnamed occurrences

Copper

McGrath district
MF-412, loc. 12

Lime Hills (24.6, 12.5)
61°41'N, 153°03'W

Shear zone in Tertiary granodiorite contains chalcopyrite and other sulfides; malachite and azurite stains and traces of chalcopyrite in grano-

of radioactive hornblende granite contained as much as 882 ppm U. Uranium is enriched along iron-stained joint surfaces, which also contain galena, arsenopyrite, and sphalerite(?). Purple fluorite is an abundant accessory mineral of the granite.

Unnamed occurrence	Fluorite, Thorium, Uranium
McGrath district	Lime Hills (23.3, 13.4) 61°44'N, 153°12'W

Sample of Tertiary biotite granite porphyry of the Jimmy Lake stock contained 35.4 ppm U and 42.3 ppm Th. The low Th/U ratio of 1.20 suggests uranium enrichment. Another sample contained 15.1 ppm U and 45.8 ppm Th. Accessory minerals include fluorite and rare allanite.

Unnamed occurrence	Lead, Silver, Zinc
McGrath district	Lime Hills (24.15, 9.2) approx. 61°30'N, 153°07'W approx.

Float of silver-bearing veins that contain abundant galena and sphalerite.

Unnamed occurrence	Molybdenum
McGrath district MF-412, loc. 3	Lime Hills (19.3, 13.05) 61°44'N, 153°41'W

A quartz vein 2 in wide in upper Mesozoic quartz diorite contains less than 2% finely disseminated molybdenite.

Unnamed occurrence	Monazite(?), Rare-earth elements
McGrath district MF-412, loc. 2	Lime Hills (15.85, 8/2) 61°27'N, 154°07'W

Sample of Tertiary biotite granite of Tired Pup batholith contained abundant accessory allanite and also monazite and/or xenotime, which are characteristic accessory minerals of the main batholithic mass.

Unnamed occurrence	Monazite(?), Rare-earth elements
McGrath district MF-412, loc. 1	Lime Hills (14.8, 9.8) 61°33'N, 154°14'W

Sample of Tertiary biotite granite of Tired Pup batholith contained abundant accessory allanite and also monazite and/or xenotime, which are characteristic accessory minerals of the main batholithic mass.

McGRATH QUADRANGLE

(Alder Gulch) (Cr.)	Antimony, Bismuth, Gold, Tungsten
McGrath district	McGrath (2.35, 12.15)
MF-379, loc. 21	62°42'N, 155°43'W

Geologically similar to Candle Cr. Between 1929 and 1933 about 65 oz of gold was recovered from a cut of about 13,600 ft². Large boulders hampered the hand operation. Concentrates contained considerable scheelite, some magnetite, stibnite, and bismuth, and no cinnabar. See also (Candle Cr.).

(Black Cr.)	Gold
McGrath district(?)	McGrath(?)

Placer mining in 1930 reported. Location of creek not known; may not be in McGrath quadrangle.

(Bowser Cr.)	Copper, Gold, Lead, Silver, Zinc
McGrath district	McGrath (18.75-18.9, 3.45-3.7)
MF-379, locs. 11-13	62°11'-62°12'N, 153°42'-153°43'W

Argentiferous galena, sphalerite, pyrrhotite, and minor chalcopyrite in replacement bodies and fissure veins in Paleozoic limestone cut by intrusive breccia, a small body of granodiorite porphyry, and felsic and mafic dikes, all of probable Tertiary age. Sulfides also as fracture fillings in breccia. Hornfels developed in limestone and pelitic rocks around some intrusive bodies. Samples contained as much as 3.4 ppm Au and 309.8 ppm Ag.

(Candle Cr.)	Gold, Mercury, Monazite(?), Silver, Tungsten
McGrath district	McGrath (1.55-1.85, 15.3-15.75)
MF-379, loc. 20	62°53'-62°54'N, 155°46'-155°49'W

Small quartz monzonite pluton of Late Cretaceous-early Tertiary age intruded Cretaceous shale and sandstone. Basalt at extreme head of creek. Gold in placers probably derived from quartz veins in quartz monzonite and mineralized sandstone and shale near contact. Gold, some in nuggets of as much as 2 oz, accompanied by much cinnabar (some recovered, retorted, and the mercury sold for local use) and magnetite; smaller amounts of scheelite and monazite(?). Placer deposits probably represent residual accumulations that are nearly in place and have been forming since late Tertiary. Gold discovered in 1913. Dredge operated 1918-26. Recorded production through 1950 was 129,500 oz gold and 12,210 oz silver.

Chip Loy

Nickel

McGrath district
MF-379, loc. 18

McGrath (13.35, 3.05)
62°10'N, 154°23'W

Nickel-bearing pyrrhotite in an irregular zone of massive bodies as much as 11 ft wide and disseminated bodies as much as 150 ft wide along the side of a diabase pipe(?) in silicified and folded lower Paleozoic limestone and slate. Mineralized zone has a strike length of more than 1,100 ft. No data on Ni content of pyrrhotite; little if any high-grade ore. A few other pyrrhotite occurrences in vicinity.

(Fluorite Cr.)

Fluorite, Gold, Silver

McGrath district
MF-479, loc. 25

McGrath (14.3-15.05, 2.9-3.35)
62°09'-62°11'N, 154°10'-154°15'W

Float of gossan material scattered along creek; apparently representative sample contained 0.06 oz/ton Au and 0.16 oz/ton Ag. One 5-in cobble of green fluorite was found.

(Hippie Cr.)

Lead, Silver

McGrath district
MF-379, loc. 9

McGrath (19.1, 5.0)
62°16'N, 153°40'W

Dike swarms and small stocklike bodies of Tertiary porphyritic felsic rocks in Paleozoic limestone with small amounts of argillite and siltstone. Calcite vein (apparently along a fault) 6 in to 6 ft wide in limestone contains pyrite and argentiferous galena in scattered grains and discontinuous bands 1-10 in wide; minor arsenopyrite. As determined by fire assay of one sample Au is less than 0.02 ppm and Ag is 2.2 oz/ton.

(Hippie Cr., South Fork)

Lead, Silver

McGrath district
MF-379, loc. 10

McGrath (18.7, 4.15)
62°13'N, 153°43'W

Narrow shear zone in Paleozoic massive gray limestone 2 ft from contact with and parallel to a 20-ft-thick pyrite-bearing Tertiary felsite porphyry sill. Shear zone is discontinuously mineralized; chiefly calcite, pyrite, and galena. Sample contained more than 1,000 ppm (about 30 oz/ton) Ag.

(Ozzna Cr.)

Lead, Zinc

McGrath district
MF-379, loc. 23

McGrath (17.0, 5.7)
62°19'N, 153°55'W

Stream heads in small, probably quartz diorite, intrusive body. Boulders of pyrrhotite and sphalerite, pyrite-pyrrhotite-galena-sphalerite-arseno-

pyrite, or pyrite and magnetite in stream bed and in talus slopes.

(Ozzna Cr. tributary)	Lead, Silver, Zinc
McGrath district	McGrath (16.8, 5.4)
MF-379, loc. 3	62°18'N, 153°57'W

Stream drains part of a circular Tertiary igneous body 2 mi in diameter (may be a breccia pipe) that is surrounded by complexly folded Paleozoic argillite, limestone, and siltstone. Talus chiefly coarse igneous breccia. Felsic and mafic dikes (relations to main breccia body not known) cut sedimentary rocks. Sulfide minerals exposed in valley wall along shear zones in a felsic dike; small pods and lenses of pyrrhotite (containing euhedral pyrite crystals), sphalerite, and argentiferous galena; selected sample contained 52.2 oz/ton Ag; a 10-ft chip sample across 2 pods contained less than $\frac{1}{2}$ oz/ton Ag. Another lens along a fault zone that shows intensive hydrothermal alteration contains pyrrhotite, sphalerite, and argentiferous galena; selected sample contained 70.4 oz/ton Ag.

(Post R., West Fork)	Copper, Zinc
McGrath district	McGrath (17.45, 0.55)
MF-379, loc. 19	62°01'N, 153°53'W

Minor chalcopryrite and sphalerite in small lenses and disseminations of pyrrhotite in mafic dikes in Paleozoic argillite adjacent to a small Tertiary stock. Lithology of stock not reported.

(Roundabout Mtn.)	Copper, Nickel
McGrath district	McGrath (3.25, 15.7) approx.
MF-379, loc. 1	62°54'N, 155°35'W approx.

Sample sent to U.S. Geological Survey in about 1919 contained pyrite, chalcopryrite, and a trace of nickel. Country rock is lower Paleozoic (Devonian) limestone and shale.

(Sheep Cr.)	Zinc
McGrath district	McGrath (18.0-18.15, 5.65-5.9)
MF-379, locs. 6, 7	62°19'N, 153°47'-153°48'W

Small stock of Tertiary quartz monzonite or granodiorite porphyry cuts Paleozoic limestone, siltstone, and argillite. Shear zones in altered felsite porphyry dikes in sedimentary rocks near north side of stock contain small lenses of sphalerite and pyrrhotite. Discontinuous veins and pods of pyrrhotite in sedimentary rocks near dikes in vicinity.

(Sheep Cr., Rat Fork)

Copper, Lead, Silver, Zinc

McGrath district
MF-379, locs. 4, 5

McGrath (17.3-17.85, 5.8-6.3)
62°19'-62°20'N, 153°49'-153°53'W

Small intrusive body (probably Tertiary quartz diorite) near head of stream. Quartz diorite porphyry dikes cut Paleozoic limestone and argillite in nearly vertical cirque walls near head of creek (MF-379, loc. 4); skarn zones 2-10 ft wide contain pyrrhotite, sphalerite, and chalcopyrite. Boulders of pyrrhotite and sphalerite, pyrite-pyrrhotite-galena-sphalerite-arsenopyrite, or pyrite and magnetite near headwaters of creek and in talus slopes. Sample from one boulder assayed 9.6 oz/ton Ag, more than 10% Pb, and 7% Zn. Near mouth of creek (MF-379, loc. 5) a highly oxidized fault(?) zone between Paleozoic argillite and limestone is about 8-10 ft wide. Selected sample of oxidized material included pyrrhotite with subordinate sphalerite, galena, and chalcopyrite that replaced silicated limestone.

(Tin Cr. tributary)

Copper, Zinc

McGrath district
MF-379, locs. 2, 22

McGrath (18.95, 8.5)
62°28'N, 153°40'W

Paleozoic limestone within 2-5 ft of a narrow malachite-stained shear is altered to a yellowish gray color; sparse sulfides (chiefly chalcopyrite) are localized within a foot of the shear for about 20 ft along dip. Stream cobble contains pyrrhotite with subordinate sphalerite and chalcopyrite.

(White Mtn.)

Mercury

McGrath district
MF-379, locs. 14-16

McGrath (9.3-9.4, 2.95-3.3)
62°10'-62°11'N, 154°51'-154°52'W

Located in 1958; produced more than 400 flasks (14+ tons) of mercury between 1964 and 1974. Cinnabar, without significant Sb or As, localized in veinlets, breccia fillings, and as disseminations in dolomitized Middle? Ordovician limestone along southeast-dipping, mainly bedding-plane, faults that probably are part of the Farewell fault system. Some replacement of dolomite by cinnabar. Only igneous rock found in immediate vicinity is a basaltic dike altered to clay, carbonate minerals, and fine-grained silica that was uncovered in a prospect trench.

Unnamed occurrence

Copper

McGrath district
MF-379, loc. 18

McGrath (13.3, 3.05)
62°10'N, 154°23'W

Narrow, gossan-capped vein of pyrrhotite(?) and chalcopyrite in silicified lower Paleozoic limestone-slate bedrock. Malachite and azurite in gossan.

Synonyms, Owners, Operators, and Claim Names

Iliamna quadrangle

Alaska Katmalite Corp. -- see (Augustine I.)
Black Prince -- see Copper King
Cook & Bornland -- see McNeil
Copper King Ledge -- see Millet
(Crevice Cr.) -- see McNeil
Duryea & McNeil -- see Duryea
Dutton, Goodro & Thomas -- see Dutton
Dutton Mining (& Milling) Co. -- see Dutton
Ida G. -- see Duryea
Keyes -- see Copper King
Knudsen -- see Knutson
(Koktalee R.) -- see (Koktuli R.)
McNeil, Holly and others -- see McNeil
(Okchiak Cr.) -- see McNeil
Pan American Petroleum Corp. -- see (Chenik Mtn.), unnamed iron prospects
Plaff -- see (Battle Lake)
Reward-Ridgway -- see McNeil
St. Eugene Mining Corp., Ltd. -- see Millet
Sargent -- see McNeil
Silver Bell -- see Duryea
Success -- see Durand
War Eagle -- see Duryea

Lake Clark quadrangle

Barnes -- see (Kasna Cr.)
Belle -- see (Kasna Cr.)
(Big Bonanza Cr.) -- see (Bonanza Cr.)
Bowman -- see (Portage Cr.)
Brooks & von Hardenberg -- see (Kasna Cr.)
(Caribou Cr.) -- see (Koksetna R.)
Cook -- see (Kasna Cr.)
Cyanide -- see (Kasna Cr.)
Edwards -- see (Kasna Cr.)
Gill -- see (Bonanza Cr.), (Portage Cr.)
Gilt Edge -- see (Kasna Cr.)
Gleason -- see (Kijik R.)
Hardenberg -- see (Kasna Cr.)
(Keejik R.) -- see (Kijik R.)
Kendall -- see (Kasna Cr.)
(Kijak R.) -- see (Kijik R.)
King -- see (Kasna Cr.)
Melish, Walker & King -- see (Mulchatna R.)
Millett -- see (Bonanza Cr.), (Portage Cr.)
Morris -- see (Kasna Cr.)
Peary -- see (Kasna Cr.)
Platsburg -- see (Kasna Cr.)
Rabbit Foot Two -- see (Portage Cr.)
St. Eugene Mining Corp., Ltd. -- see (Kasna Cr.)
(Scenneva Cr.) -- see (Scynneva Cr.)
Shamrock Ledge -- see (Kasna Cr.)
Thompson -- see (Kijik R.)

McGrath quadrangle

Blackburn & Eldridge -- see (Candle Cr.)
Cordero Mining Co. -- see (White Mtn.)
Egnati -- see (White Mtn.)
Egnaty -- see (White Mtn.)
Ignaty -- see (White Mtn.)
Kuskokwim Dredging Co. -- see (Candle Cr.)
Lyman -- see (White Mtn.)
Mary Margaret -- see (White Mtn.)
Mary Margie -- see (White Mtn.)
Peggy Barbara -- see (White Mtn.)
Red Devil -- see (Candle Cr.)
Strandberg & Sons, Inc. -- see (Candle Cr.)
(Vinasale) -- see (Alder Gulch) (Cr.)