DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

U.S. GEOLOGICAL SURVEY
OPEN FILE MAP
77-169-A

Boundary of Southern Alaska Regional Mineral Resource Assessment Program (RAMRAP) as used in this study.

Approximate route of Alyeska pipeline.

Outline of area selected under sec. 17(d)(2) of the Alaska Native Claims Settlement Act. Numbers refer to the Four National Systems proposal of the Department of the Interior, Dec. 18, 1973. Compiled from maps prepared by the U.S. Bureau of Land Management, December, 1973 and March, 1974.

6. Harding Icefield-Kenai Fjords National Monument
7. Lake Clark National Park
8. Mt. McKinley National Park Additions
9. Wrangell-St. Elias National Park
23. Wrangell Mountain National Forest
24. Chugach National Forest Additions

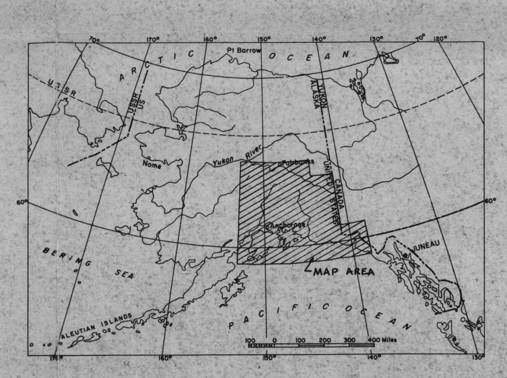
Base map from the National Atlas of the United States of America, U.S. Geological Survey, 1970

Geology from U.S. Geol. Survey open-file map 77-169-B, 1977

SCALE 1:1 000 000

25 0 25 50 75 100 MILES

25 0 25 50 75 100 KILOMETERS



MAP SHOWING METALLIFEROUS AND SELECTED NONMETALLIFEROUS MINERAL DEPOSITS IN THE EASTERN PART OF SOUTHERN ALASKA

BY

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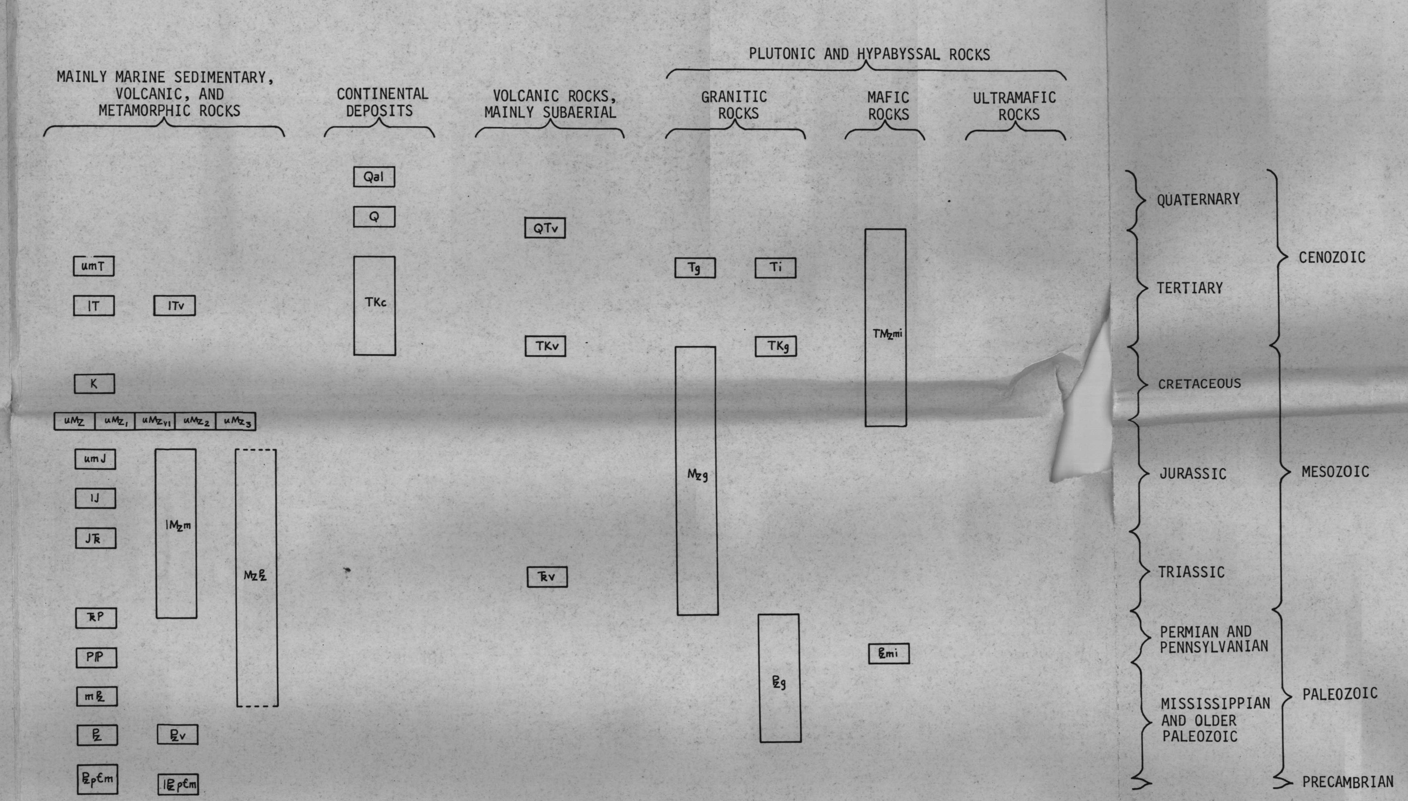
1977

CORRELATION OF MAP UNITS



GEOLOGIC MAP SYMBOLS

Fault, approximately located
Dotted where concealed or inferred

Contact, approximately located
Dashed where concealed or inferred

* Volcanic cone or vent

MAP SYMBOLS

PLACER DEPOSITS

PRECIOUS METALS

□ Gold, platinum group [illegible], silver, tellurium
Generalized extent of placer workings

The few placer deposits of nonprecious metals are shown by the superscript p adjacent to the appropriate commodity symbol

LODE DEPOSITS

PRECIOUS METALS

- • Gold, platinum group elements, tellurium
- ⊕ Silver

IRON AND FERROALLOY METALS

- ● Iron, manganese, titanium
- ■ Nickel, chromium, cobalt
- + Molybdenum, tungsten

BASE AND MISCELLANEOUS METALS

- ⊙ Antimony, arsenic, mercury
- ○ Copper
- △ Lead, zinc, cadmium
- △ Tin
- ▲ Beryllium, bismuth, rare earths, and other miscellaneous metals

NUCLEAR FUELS

- ▼ Uranium, thorium

SELECTED NONMETALS

- ▽ Asbestos, talc (soapstone), corundum, zeolites, gypsum

MINERAL DEPOSITS

The deposits are shown by symbols that reflect their most valuable or potentially most valuable commodity; that is, the commodity that has yielded the most revenue from mining or the commodity with the greatest potential value in an unexploited deposit. Information regarding the deposit type and associated commodities that may constitute coproducts or byproducts is given in the table.

Generalized production data are indicated by the following symbols that are superposed on the map symbols:

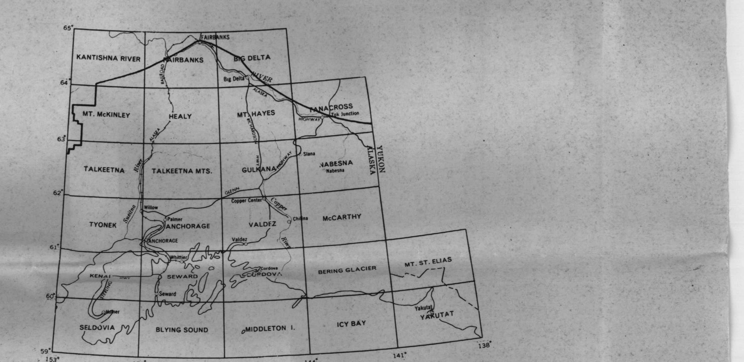
- X Minor production -- valued at less than \$100,000[1]
- X Intermediate production -- valued between \$100,000 and \$1,000,000[1]
- X Major production -- valued at more than \$1,000,000[1]

[1] Metal prices used in deriving generalized production figures: gold at \$130 per troy ounce; silver at \$4 per troy ounce; copper at \$0.60 per pound; antimony at \$1.25 per pound; chromite at \$30 per long ton of ore.

Numbers adjacent to the symbols on the map are map numbers that are keyed to the table for a given quadrangle

EXPLANATORY NOTE

This map and accompanying table (in pamphlet) provide information on the known metalliferous and selected nonmetalliferous mineral deposits of eastern southern Alaska. The term "mineral deposits" is used in a broad context to include deposits at mines and prospects or occurrences of possible significance, which may be unclaimed. Minor, apparently insignificant occurrences are excluded. Only a few nonmetallic commodities, including zeolites, soapstone (talc), corundum, and asbestos, are described in this report. Many nonmetallic commodities, such as sand, gravel, building stone, aggregate and crushed rock, and to some extent, limestone and dolomite, are not dealt with because, in general, southern Alaska is well endowed in them, and their utilization is dictated by their proximity to urban or industrial centers. Fossil fuel commodities are also excluded from this report.



Map showing locations of 1° x 3° quadrangles in eastern part of southern Alaska.

DESCRIPTION OF MAP UNITS

MAINLY MARINE SEDIMENTARY, VOLCANIC, AND METAMORPHIC ROCKS

umT — UPPER AND MIDDLE TERTIARY ROCKS -- Siltstone, sandstone, organic shale, locally abundant submarine volcanic rocks and conglomeratic sandy mudstone (marine tillite)

lT — LOWER TERTIARY ROCKS -- Marine and continental clastic rocks including some coal-bearing rocks

lTv — LOWER TERTIARY VOLCANIC ROCKS -- Mafic pillow lavas and pyroclastic rocks with minor chert, limestone, and shale

K — CRETACEOUS ROCKS -- Sandstone, slate, siltstone, shale, limestone, claystone, conglomerate, mudstone, and porcellanite; interlayered submarine and subaerial andesitic fragmental volcanic rocks, volcanic flows, lapilli tuffs, and volcaniclastic rocks

uMz — CRETACEOUS AND JURASSIC ROCKS -- Argillite, shale, graywacke, conglomerate, lava, tuff, and agglomerate. In places moderately to highly (amphibolite facies) metamorphosed

uMz1 — CRETACEOUS AND UPPER JURASSIC(?) ROCKS, IN PART METAMORPHOSED -- Graywacke, slate, argillite, with minor conglomerate, volcanic detritus, and interbedded mafic volcanic rocks

uMzv1 — CRETACEOUS AND UPPER JURASSIC(?) SEDIMENTARY AND VOLCANIC ROCKS, IN PART METAMORPHOSED -- Chiefly slate and graywacke, with local areas of basaltic flows, pillows and intrusives, tuff and tuffaceous sandstone; gabbro, sheeted dikes, and pillow basalts

uMz2 — CRETACEOUS AND UPPER JURASSIC(?) ROCKS, IN PART METAMORPHOSED -- Siltstone, graywacke, arkose, and conglomeratic sandstone chaotically juxtaposed with a sequence containing massive pillow basalts and associated radiolarian chert, argillite, and minor ultramafic rocks and marble. In part a melange

uMz3 — LOWER CRETACEOUS AND UPPER JURASSIC ROCKS -- Argillite and graywacke with interbedded massive lenses of extraformational conglomerate

umJ — UPPER AND MIDDLE JURASSIC ROCKS -- Siltstone, sandstone, shale, and conglomerate

lJ — LOWER JURASSIC ROCKS -- Sandstone and argillite interbedded with volcanic flows and pyroclastic rocks

JTr — JURASSIC AND TRIASSIC ROCKS, IN PART METAMORPHOSED -- Limestone with minor dolomite, shale, and chert; shale, tuff, tuffaceous conglomerate and breccias, and schistose tuff with sandstone and pillow basalt. Includes intercalated blueschist, greenschist, mica schist, impure marble, and subordinate metachert

lMzm — LOWER MESOZOIC METAMORPHIC ROCKS -- Sedimentary, volcanic, and plutonic rocks constituting small masses of metamorphosed country rock scattered throughout the Alaska Range batholith

TrP — TRIASSIC AND PERMIAN ROCKS, IN PART METAMORPHOSED -- Mafic volcanic rocks, red beds, limestone, and calcareous argillite; argillite and limestone with siltstone and conglomerate and abundant gabbroic sills. Includes minor amounts of marble, quartzite, schist, and gneiss

PP — PERMIAN AND PENNSYLVANIAN ROCKS -- Basaltic and andesitic lavas and their derivative volcaniclastic rocks, tuffs, minor gabbro, and local shallow-water sedimentary rocks. Metamorphosed locally to greenschist, amphibolite, and prehnite pumpellyite facies

mPz — MIDDLE PALEOZOIC ROCKS -- Pyroclastic rocks and ash flows interbedded with thin layers of sedimentary rocks metamorphosed to quartz-orthoclase- sericite schist and gneiss

Pz — PALEOZOIC ROCKS -- Graywacke, argillite, slate, phyllite, quartzite, marble, limestone, chert, and conglomerate. In part metamorphosed, up to amphibolite facies

Pzv — PALEOZOIC VOLCANIC ROCKS -- Greenstone with some metadiorite, metagabbro, and interbedded phyllite

MzPz — MESOZOIC AND (OR) PALEOZOIC ROCKS, IN PART METAMORPHOSED -- Metaplutonic, metasedimentary, and metavolcanic rocks

PzpЄm — PALEOZOIC AND (OR) PRECAMBRIAN METAMORPHIC ROCKS -- Schist and gneiss of many different compositions, primarily of greenschist and amphibolite facies

lPzpЄm — LOWER PALEOZOIC AND (OR) PRECAMBRIAN METAMORPHIC ROCKS -- Undifferentiated metasedimentary and metaigneous rocks and highly metamorphosed clastic rocks

CONTINENTAL DEPOSITS

Qal — ALLUVIUM -- Quaternary alluvium; also includes minor glacial, lacustrine, swamp, landslide, and beach deposits

Q — OLDER ALLUVIUM -- Older Quaternary deposits of alluvium, alluvial fans, glacial material, sand, dune sand, loess, terrace and pediment gravel, and some marine clay

TKc — TERTIARY AND (OR) CRETACEOUS CONTINENTAL ROCKS -- Conglomerate, sandstone, siltstone, claystone, shale, coal beds, lignite; minor amounts of arkose, coaly shale, breccia, mudstone, tuff, tuffaceous rocks, chert, and coarse sandstone with interbedded mudflow deposits

VOLCANIC ROCKS, MAINLY SUBAERIAL

QTv — QUATERNARY AND TERTIARY VOLCANIC ROCKS -- Mainly andesite and basaltic andesite flows and associated pyroclastic rocks, some rhyolitic to andesitic hypabyssal to subaerial volcanic rocks

TKv — TERTIARY AND (OR) UPPER CRETACEOUS VOLCANIC ROCKS -- Mafic and felsic flows, ash, tuff, tuff breccia, flow breccia, pumice breccia, volcanic conglomerate, and tuffaceous sedimentary rocks

Trv — TRIASSIC VOLCANIC ROCKS -- Basaltic lava, commonly amygdaloidal, with local thin interbeds of volcaniclastic rocks, and local basal conglomerate

GRANITIC ROCKS

Tg — TERTIARY GRANITIC ROCKS -- Granodiorite, granite, quartz diorite, quartz monzonite, diorite, rhyodacite, rhyolite, and trachyte; some metamorphosed and migmatized county rocks

Ti — TERTIARY INTRUSIVE ROCKS -- Hypabyssal rocks of felsic to mafic composition

TKg — TERTIARY AND CRETACEOUS GRANITIC ROCKS -- Granodiorite, quartz monzonite, granite, diorite, and quartz diorite; includes some extensive migmatitic granodiorites

Mzg — MESOZOIC GRANITIC ROCKS -- Granodiorite, quartz diorite, diorite, quartz monzonite, quartz diorite, granite, and syenite. Some migmatitic granodiorite and metamorphic rocks of amphibolite grade

Pzg — PALEOZOIC GRANITIC ROCKS -- Quartz diorite, quartz diorite porphyry; monzonite and syenite

MAFIC ROCKS

TMzmi — TERTIARY AND (OR) MESOZOIC MAFIC ROCKS -- Basalt and basaltic breccia, in places highly altered; gabbro; and diabase sills

Pzmi — PALEOZOIC MAFIC ROCKS -- Gabbroic rocks

ULTRAMAFIC ROCKS

um — ULTRAMAFIC ROCKS -- Includes serpentinite, dunite, peridotite, and pyroxenite

For a more complete description of map units see U.S. Geol. Survey open-file map 77-169-B, 1977

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