DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

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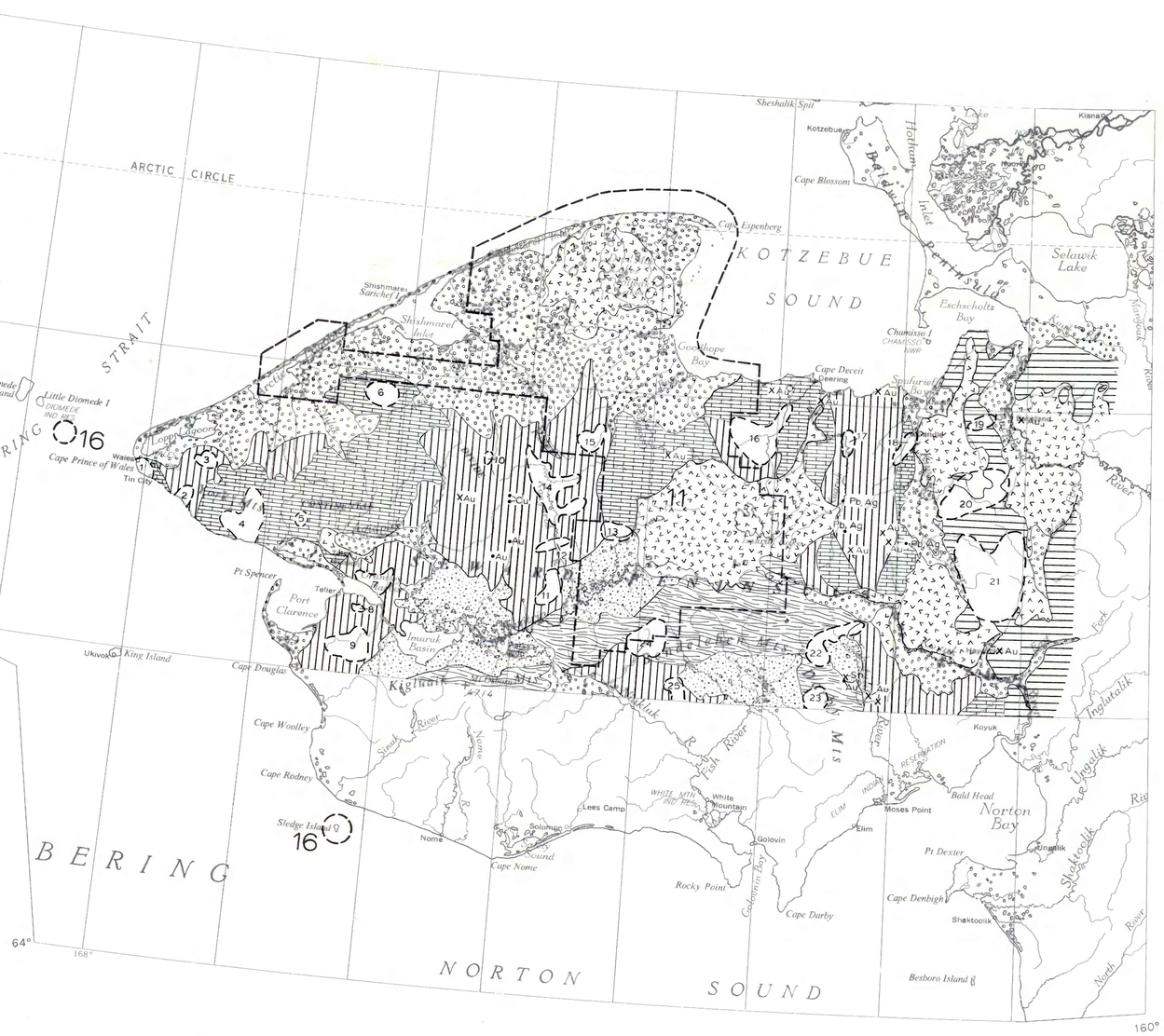
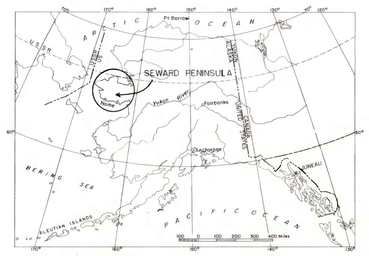
OF 77-167-B



Base from National Atlas 1:2,000,000 series:
NORTHERN ALASKA, SHEET #40, 1970.



LOCATION OF SEWARD PENINSULA, ALASKA

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.

11. Chukchi Imuruk National Reserve
16. Coastal National Wildlife Refuge

SCALE 1:1 000 000

25 0 25 50 75 100 MILES

25 0 25 50 75 100 KILOMETERS

MAP SHOWING PRELIMINARY FRAMEWORK DATA FOR EVALUATION OF THE METALLIC MINERAL RESOURCE POTENTIAL OF NORTHERN SEWARD PENINSULA, ALASKA

by

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1977

EXPLANATORY NOTE

Introduction

This preliminary map is one of several data compilations being prepared as a foundation for evaluation of the mineral resource potential of Seward Peninsula. The map has been compiled from a preliminary geologic map of Seward Peninsula (Hudson, 1977a) and an unpublished and preliminary compilation of specific mineral deposit data. The purpose of the map and accompanying data are; (1) to show the distribution of geologic terranes with similar exposure and host-rock (for mineral deposits) characteristics, and (2) to locate and briefly describe the principal mineralized areas. The following discussion outlines some general considerations necessary to an evaluation of the mineral resource potential of Seward Peninsula and some preliminary conclusions regarding the distribution of mineral deposits on Seward Peninsula.

General Considerations

The principal known metallic mineral resources of northern Seward Peninsula include deposits of tin, tungsten, beryllium, fluorite, gold, lead, and silver. Uranium, thorium, molybdenum, copper, zinc, and antimony occurrences are also known. The potential for these resources depends upon the nature of known deposits, the likelihood of finding undiscovered deposits similar to those presently known, and the likelihood of finding new types of deposits. The evaluation of this potential is limited by the uncertainties present in the available geologic data.

Most of the available geologic data is reconnaissance in scope and only in part pertinent to evaluating important characteristics of specific mineral deposits. Reconnaissance geologic mapping has recently been completed but detailed studies of ore deposits and mineralized areas are dominantly restricted to the tin-bearing region of northwestern Seward Peninsula. The natural handicaps to obtaining reconnaissance and detailed geologic data throughout large parts of northern Seward Peninsula are imposing. Large areas are covered by surficial materials, especially tundra, and by young volcanic rocks. The presence of tundra is probably the major handicap but even where tundra is not present the bedrock is commonly mantled by a layer of frost-riven rubble. Northern Seward Peninsula is a region with discontinuous permafrost and the surficial materials are commonly frozen at a shallow depth.

Preliminary Conclusions

Much additional data compilation and analysis should be completed before estimates of the mineral resource potential of Seward Peninsula are made but the available data do allow some preliminary conclusions:

(1) Northwestern Seward Peninsula contains a belt of tin, and locally, related tungsten, beryllium, and fluorite mineralization, that extends from Cape Prince of Wales northeast to the headwaters of the Serpentine River. Tin reserves in one mineralized area (no. 4 on map) are about a half years supply of current U.S. needs. Additional tin and related deposits are probably present and the actual amount of these resources in the tin-mineralized belt could be several times that presently known.

(2) The major gold-bearing regions have been extensively placer mined but most of this mining was prior to World War II. Bedrock is poorly exposed in these regions and the potential for lode as well as placer deposits is not exhausted. Local placer mining has continued to recent years in parts of these regions.

(3) Lead-silver mineralization is widespread in eastern Seward Peninsula and some of the deposits have been the focus of recent exploration activity. The region has significant potential for these resources.

(4) Large areas of altered and mineralized rocks are associated with granitic and alkalic plutonic rocks along the eastern margin of Seward Peninsula and in the northern Darby Mountains. These areas have not been studied in detail but they have been the focus of recent exploration activity by private interests. As presently known they have potential for base-metal, silver, molybdenum, and uranium deposits.

(5) Previously unrecognized types of deposits may be found on Seward Peninsula. The potential for hardrock uranium deposits in eastern Seward Peninsula, for sedimentary-type uranium deposits in the restricted continental basins, for base-metal sulfide deposits in metavolcanic rocks, and for disseminated gold deposits in low-grade metasedimentary rocks should be considered.

Acknowledgements

The descriptive data on mineral deposits has been compiled from published reports and the principal sources are referenced in the description of mineralized areas below. Martha Miller has provided excellent assistance in all stages of data and map compilation.

DESCRIPTION OF MAP UNITS

Area with extensive surficial cover (tundra, silt, sand, gravel, and glacial drift) that obscures underlying bedrock geology and thereby seriously handicaps the discovery, evaluation, and development of lode mineral resources.

Area with extensive surficial cover (tundra, silt, sand, gravel, and glacial drift) that is probably underlain by upper Tertiary continental sedimentary rocks. The underlying sedimentary rocks may have potential for uranium deposits but data necessary to evaluate this possibility is not available.

Area covered by Late Cenozoic subaerial basaltic rocks; locally to a few hundred meters thick. These rocks are not associated with any known metallic mineral deposits. They obscure underlying geology, locally cover auriferous gravels, and are a serious handicap to the discovery, evaluation, and development of metallic mineral resources where they are present.

Area dominantly underlain by carbonate rocks. Known mineralized areas within these rocks are epigenetic and commonly irregular replacement bodies. Exposure is generally fair to good.

Area dominantly underlain by low-grade metavolcanic and metasedimentary rocks. These rocks have a complex structural history and are extensively faulted. Known mineralized areas within these rocks are epigenetic and commonly altered fault zones and vein-type deposits. Exposure is generally poor.

Area underlain by andesitic volcanic rocks and associated sedimentary rocks; intruded by granitic and alkalic plutonic rocks. Major mineralized area (no. 21) contains extensive altered zones and vein-type deposits that are spatially associated with plutonic rocks. Exposure is generally poor.

Area underlain by high-grade metamorphic rocks; intruded by many granitic plutons. Data on mineralized areas is limited. Several types of deposits could be present. Exposure is fair to excellent.

DESCRIPTION OF MINERALIZED AREAS

map no.	
1	Area contains cassiterite-bearing tactite in limestone adjacent to biotite granite and cassiterite-bearing veins in granite and country rocks. Placer cassiterite deposits are spatially associated with areas of bedrock mineralization. (Mulligan, 1966).
2,7,8,9,11 14,17,25	Areas contain several placer gold deposits; dominantly in stream gravels of the present drainages. Placer concentrates commonly contain minor amounts of one or more of the following minerals; cassiterite, scheelite, platinum, cinnabar, or other sulfides. Known lode deposits dominantly consist of discontinuous gold- and sulfide-bearing (mostly pyrite) quartz and/or carbonate veins and veinlets in low-grade metamorphic rocks. (Cobb, 1973).
3	Area contains placer cassiterite deposits, stockworks of cassiterite-bearing quartz veins in low-grade metasedimentary rocks, and tourmalinized metasedimentary rocks with disseminated cassiterite. Some granitic dikes present. (Mulligan, 1965b).
4	Area contains cassiterite- and wolframite-bearing veins, stockworks, and greisens, cassiterite-bearing tactite, uranium-bearing altered zones in granite, many areas of base-metal sulfide mineralization in altered limestone, and extensive replacements of limestone by beryllium and fluorite-rich rock. (Sainsbury, 1964, 1969, West and White, 1952, White and West, 1953).
5	Area contains veins in altered limestone with anomalous concentrations of tin, lead, zinc, and silver. Spatially associated with a small stock of biotite granite. Some placer gold prospects in the area. (Sainsbury and Hamilton, 1967).
6	Area contains cassiterite-bearing tactite in limestone adjacent to biotite granite and cassiterite-bearing veins in granite and country rocks. Placer cassiterite deposits are associated with areas of bedrock mineralization. Uranium-bearing altered zones are present in the granite. This area is adjacent to d-2 lands in the Teller D-3 quadrangle. The available data does not suggest that the mineralized area extends to the north. (Killeen and Ordway, 1957, Mulligan, 1959).
10	Area contains copper minerals in silicified limestone and cassiterite-bearing quartz-tourmaline rock in stream gravels. Panned concentrates from stream gravels have high tin contents. (Marsh and others, 1972).
12,13	These areas are near or within d-2 lands in the western Bendeleben quadrangle. They contain small placer gold mines with principal production prior to World War II. Total production is probably small and mostly from area 13. Some relatively recent (1957) mining has been reported from area 13. No important lode deposits are known. (Cobb, 1973).
15	Area is totally within d-2 lands and straddles the Bendeleben D-5 and D-6 quadrangle boundary at the eastern end of the know tin-mineralized belt. It contains gold and cassiterite placer deposits in stream gravels. Bedrock mineralized areas are in low-grade metasedimentary rocks and are defined by anomalous concentrations of tin, lead, zinc, arsenic, antimony, and silver in altered fault zones. One argentiferous galena and quartz vein identified. The altered fault zones have significant potential for tin-mineralization at depth. (Sainsbury and others 1968, 1970, Hudson, 1977b).
16	Area contains several placer gold deposits in stream gravels of major drainages as well as in gravels of old stream channels now covered by young basalt flows. Some cinnabar and cassiterite in placer concentrates. Important lode deposits consist of argentiferous galena in massive segregations and with quartz in elongate oxidized zones in calcareous sediments. As presently known, the area lies immediately adjacent to d-2 lands in the Bendeleben D-3 quadrangle. It is an area of poor to fair exposure and complex geology. Similar host rock geology extends into nearby d-2 lands. Detailed bedrock geologic data is limited. (Cobb, 1973, Mulligan, 1965a, and Herreid, 1966).
18	Area contains several placer gold deposits in gravels of present drainages. Placer concentrates contain some galena, arsenopyrite, pyrite, and chalcopyrite; known lode deposits consist of galena-bearing veins at two localities. (Cobb, 1973).
19,20	Areas in which uranium-bearing minerals have been identified in concentrates from gravels of several streams. (West and Matzko, 1953).
21	Area contains large altered zones with galena, sphalerite, pyrite, and arsenopyrite-bearing tourmaline-quartz-carbonate veins and replacement bodies, local sulfide-bearing quartz-carbonate veins, and other localities with anomalous copper, molybdenum, bismuth, silver, and lead concentrations in stream sediments, soils, and altered rocks. Uranium-bearing minerals are present in concentrates from some stream gravels. Mineralized areas are spatially associated with felsic and, in part, alkalic rocks that are intrusive into andesitic volcanic rocks. (Herreid, 1965a, Miller and Elliott, 1969).
22	Area contains isolated occurrences of copper minerals and altered zones in epizonal, composite monzonitic stocks that carry fluorite and anomalous concentrations of molybdenum, lead, zinc, and silver. (Miller and others, 1971).
23	Area contains several deeply weathered, apparently discontinuous, lead-silver replacement bodies in metalimestone. Stibnite concentrations and tin values to a few tenths of a percent are present locally. (Mulligan, 1962, Herreid, 1965b).
24	This area straddles the d-2 land boundary in the western Bendeleben Mountains. It, and nearby areas to the north and west, are characterized by poorly known, complex igneous and metamorphic geology. This part of the Kiglualik-Bendeleben Mountain system has been uplifted less than other parts to both the east and west. Consequently, igneous and metamorphic environments shallower than elsewhere in the mountain belt are presently exposed in and near area 24. Only reconnaissance geologic and geochemical data are available. The area contains many altered zones and local anomalous concentrations of base-metals but the significance of these has not been determined. (Asher, 1970, Bundtzen, 1974).

MAP SYMBOLS

Generalized boundary between map units.

(5) Known mineralized area; contains several lode and/or placer deposits. Description summarized above. Boundary approximate.

• Pb, Ag Isolated lode deposit; principal commodity indicated. (Pb = lead, Ag = silver, Au = gold, Cu = copper).

X Au Isolated placer deposit; principal commodity indicated. (Au = gold, Sn = tin).

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