



MAP A-METALLIC MINERAL RESOURCES

EXPLANATION

1 Prospect-See table 1
2 Lode claim-See table 2
3 Placer claim-See table 2
4 Mineral resource tract-Boundary, dotted where covered by water, topography of tract A1 separated by dashed line (See table 4)

5 Drainage basin containing anomalous concentrations of copper, polymetallic, lead, zinc, silver, gold, arsenic, bismuth, cadmium, and tin in stream sediments or nonmetallic heavy-mineral concentrates-See accompanying table for anomalous concentrations

6 Drainage basin containing anomalous concentrations of copper, polymetallic, lead, zinc, silver, gold, arsenic, bismuth, cadmium, and tin in stream sediments or nonmetallic heavy-mineral concentrates-See accompanying table for anomalous concentrations

7 Outline of area containing more than a percent pyrite (FeS₂) and (or) barite (BaSO₄) in the nonmetallic heavy-mineral concentrates-See accompanying table for anomalous concentrations

Geochemical concentrations of ranges (in ppm) used to define drainage basins containing anomalous concentrations of metals for porphyry and related mineral deposits

Element	Threshold value or concentration range (ppm)	Nonmetallic heavy-mineral concentrates (FeS ₂ -BaSO ₄)
Cu	15.0	300
Pb	2.0	10,000
Zn	20	100
Ag	0.5	500
Au	1.0	10,000
As	1.0	10,000
Bi	1.0	10,000
Cd	1.0	10,000
Sn	1.0	10,000
Tl	1.0	10,000
Fe	1.0	10,000
Mn	1.0	10,000
Co	1.0	10,000
Ni	1.0	10,000
Mo	1.0	10,000
W	1.0	10,000
Sb	1.0	10,000
Se	1.0	10,000
Te	1.0	10,000
U	1.0	10,000
Th	1.0	10,000
Pu	1.0	10,000
Si	1.0	10,000
Al	1.0	10,000
Ca	1.0	10,000
Mg	1.0	10,000
K	1.0	10,000
Na	1.0	10,000
H	1.0	10,000
O	1.0	10,000

DESCRIPTION OF MAP UNITS

UNIT	DESCRIPTION OF MAP UNITS
Qa	SURFICIAL DEPOSITS (HOLOCENE AND PLEISTOCENE) - Unconsolidated alluvium, alluvial fans, and glacial marine, lake, silt, sand, and sandstone deposits; mainly silt, sand, gravel, siltstone, and clay
Qv	BEAR LAKE FORMATION (HOLOCENE) - Sandstone, siltstone, shale, minor coal and conglomerate, nonmetallic heavy-mineral concentrates
Tu	TULOSTO FORMATION (COLOCENE AND PLEISTOCENE) - Sandstone, conglomerate, siltstone, shale, coal, and tuff
Km	HOLOCENE AND COLOCENE FORMATIONS (HOLOCENE AND PLEISTOCENE) - Holocene and Colocene formations: banded siltstone and shale, minor coal, and nonmetallic heavy-mineral concentrates
Ju	STANIKULIK AND MANNA FORMATIONS (JURASSIC) - Stanikulik Formation: Late Jurassic and Early Cretaceous age; thin-bedded to blocky sandstone, commonly laminated; minor siltstone and shale. Manna Formation: Late Jurassic age; thin-bedded sandstone and conglomerate in lower part; abundant granitic and metamorphic clasts in conglomerate; siltstone and shale in upper part
Tr	SHELFOV FORMATION (TRIASSIC) - Dark shale and shale with limestone concretions, sandstone, and conglomerate; minor to near-surface and deep-water turbidite
Al	KALAZHIV FORMATION (MIDDLE JURASSIC) - Sandstone, siltstone, mudstone, and shale; mainly thin-bedded
Pl	TALKEITNA FORMATION (LOWER JURASSIC) - Tuffaceous sandstone, siltstone, and limestone; minor bedded tuff
U	LIMESTONE (UPPER PERMIAN) - Light-gray massive crystalline limestone
Qv	VOLCANIC ROCKS (HOLOCENE AND PLEISTOCENE) - Block and ash flow, debris flow, volcanic ash flows, cinder cones, and subvolcanic and diatritic lava flows; include steeply hypsophal rock
Tu	VOLCANIC ROCKS (COLOCENE TO OLIGOCENE) - Basalt, andesite, and diatrite lava flows, volcanic breccias, and rubble flows; locally include igneous rocks
Tr	MESHK FORMATION (OLIGOCENE AND EOCENE) - Basalt flow, volcanic rubble flows, and lavas; locally other volcanic sedimentary rocks
U	QUARTZ DIORITE (PLEISTOCENE TO OLIGOCENE) - Aphyritic gray to brown; hornblende-biotite and pyroxene; locally quartz diorite, andesite, and diatrite
Tu	INTRUSIVE ROCKS (PLEISTOCENE TO OLIGOCENE) - Diorite, quartz diorite, gabbro, and diatrite
U	QUARTZ DIORITE (MIDDLE AND LOWER JURASSIC) - Similar to coarse grained, hornblende and biotite bearing; part of the Alaska-Rainier Range belt

INTRODUCTION

The U.S. Geological Survey, in cooperation with the Alaska National Interest Lands Conservation Act (ANILCA, Public Law 96-487), is conducting a mineral resource assessment of the Ugashik, Bristol Bay, and Western Karluk quadrangles, Alaska. This report is the first of a series of reports that will describe the mineral resources of these areas. The purpose of this report is to provide a general overview of the mineral resources of the study area, including the distribution and characteristics of the various mineral resources. The report is based on a review of the available literature, field observations, and geochemical data. The study area is located in the western part of Alaska, and is bounded by the Ugashik River to the north, the Bristol Bay to the west, and the Karluk Mountains to the east. The study area is divided into several drainage basins, and the mineral resources are described for each basin. The report is intended for use by the U.S. Geological Survey, the State of Alaska, and the local community. The report is also available in a microfiche edition.

TERMINOLOGY AND ABBREVIATIONS

The following terms and abbreviations are used in this report:

- ANILCA: Alaska National Interest Lands Conservation Act
- ANILCA-96487: Alaska National Interest Lands Conservation Act, Public Law 96-487
- ANILCA-96487-1: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title I
- ANILCA-96487-2: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title II
- ANILCA-96487-3: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title III
- ANILCA-96487-4: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title IV
- ANILCA-96487-5: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title V
- ANILCA-96487-6: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title VI
- ANILCA-96487-7: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title VII
- ANILCA-96487-8: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title VIII
- ANILCA-96487-9: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title IX
- ANILCA-96487-10: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title X
- ANILCA-96487-11: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title XI
- ANILCA-96487-12: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title XII
- ANILCA-96487-13: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title XIII
- ANILCA-96487-14: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title XIV
- ANILCA-96487-15: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title XV
- ANILCA-96487-16: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title XVI
- ANILCA-96487-17: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title XVII
- ANILCA-96487-18: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title XVIII
- ANILCA-96487-19: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title XIX
- ANILCA-96487-20: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title XX
- ANILCA-96487-21: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title XXI
- ANILCA-96487-22: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title XXII
- ANILCA-96487-23: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title XXIII
- ANILCA-96487-24: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title XXIV
- ANILCA-96487-25: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title XXV
- ANILCA-96487-26: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title XXVI
- ANILCA-96487-27: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title XXVII
- ANILCA-96487-28: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title XXVIII
- ANILCA-96487-29: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title XXIX
- ANILCA-96487-30: Alaska National Interest Lands Conservation Act, Public Law 96-487, Title XXX

Geological background

The study area is located in the western part of Alaska, and is bounded by the Ugashik River to the north, the Bristol Bay to the west, and the Karluk Mountains to the east. The study area is divided into several drainage basins, and the mineral resources are described for each basin. The report is based on a review of the available literature, field observations, and geochemical data. The study area is located in the western part of Alaska, and is bounded by the Ugashik River to the north, the Bristol Bay to the west, and the Karluk Mountains to the east. The study area is divided into several drainage basins, and the mineral resources are described for each basin. The report is based on a review of the available literature, field observations, and geochemical data.

Mineral resources

The mineral resources of the study area are described in this section. The resources are divided into several categories, including copper, polymetallic, lead, zinc, silver, gold, arsenic, bismuth, cadmium, and tin. The resources are described in terms of their distribution and characteristics. The resources are described in terms of their distribution and characteristics. The resources are described in terms of their distribution and characteristics.

Geochemical data

The geochemical data for the study area are presented in this section. The data are presented in terms of the concentrations of various elements in the stream sediments and nonmetallic heavy-mineral concentrates. The data are presented in terms of the concentrations of various elements in the stream sediments and nonmetallic heavy-mineral concentrates. The data are presented in terms of the concentrations of various elements in the stream sediments and nonmetallic heavy-mineral concentrates.

Conclusions

The conclusions of the study are presented in this section. The conclusions are based on the results of the field observations and geochemical data. The conclusions are based on the results of the field observations and geochemical data. The conclusions are based on the results of the field observations and geochemical data.