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Mineral Investigations in the Stikine Area, Central Southeast Alaska, 1997-1998

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Cover Photograph

Sampling iron-stained rock in a roof pendent of the Coast Mountains Batholith, Stikine Area, central Southeast Alaska.

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ABSTRACT

The U.S. Department of the Interior, Bureau of Land Management (BLM) is conducting a 4-year mineral resource assessment of the Stikine area in central Southeast Alaska that began in 1997. The 5.7 million-acre study area encompasses the mainland bordering Frederick Sound and Kupreanof, Kuiu, Zarembo, Wrangell, Etolin, and nearby islands. The study area covers the Stikine Mining District and additional lands not included in adjacent mining district studies. As the main land manager in the area, the U.S. Department of Agriculture, Forest Service, requested that the BLM assess the mineral potential in the Stikine area for the purpose of generating information that will aid the agency in future judgements regarding land management.

This report details information gathered during the 1997 and 1998 field seasons. Subsequent reports will include results from the years 1999 and 2000. Descriptions and assessments of over 90 mines, prospects, and anomalous mineral occurrences are included herein.

The Stikine area hosts a variety of mineral deposit types, including volcanogenic massive sulfide (VMS), replacement, polymetallic vein, vein gold, skarn, porphyry molybdenum, magmatic segregation, and veins of barite. In addition, there are minor deposits of placer gold, uranium, and coal. The Castle Island Mine produced 787,000 tons of barite between 1966 and 1980 (Carnes, 1980). Minor gold production came from the Maid of Mexico (Chapin, 1918) and Helen S (Wright and Wright, 1908) mines in the early part of the twentieth century, and from the Cascade Mine in 1948 (U.S. Bureau of Mines, Mine Production Records).

The Duncan Canal-Zarembo Island-Etolin Island, Groundhog Basin, and Cornwallis Peninsula areas have the most significant mineral potential in the study area. There are 18 sites with known or suspected VMS mineralization along Duncan Canal, and on Woewodski and Zarembo islands. These occurrences share Triassic host rocks of the Alexander terrane with deposits of known significance to the north, the Greens Creek Mine on Admiralty Island and the massive Windy Craggy deposit in northwestern British Columbia.

Thirteen prospects containing replacement and polymetallic vein mineralization occur in the Groundhog Basin area on the mainland near Wrangell. There is also some potential in that area for porphyry molybdenum deposits, in addition to the zones of silver, lead, and zinc that have encouraged significant exploration over the years.

The Cornwallis Peninsula, on the northern end of Kuiu Island, is host to several small deposits of barite and witherite, and there are two well-known deposits of lead and zinc. As presently understood, these occurrences are small and discontinuous, but share the same Triassic Alexander terrane host rocks as the VMS deposits in the area.

Acknowledgments

The authors would like to thank the people who graciously shared minerals information from the Stikine area. These include Dr. Phil Beardslee, Paul Piper, Ken Eichner, and Cliff Taylor. We are grateful for the historic and current mineral exploration industry information that Cyprus Amax Minerals and Boliden, Inc., shared with us. We thank numerous personnel from the Forest Services's Wrangell and Petersburg Ranger Districts for the information and logistical support they provided. Thanks go to the helicopter and charter boat services of Temsco Helicopters, Alpine Helicopters, and Gary McWilliams and the M/V Hyak. The figures in this report were created by Shirley Mercer, BLM Information Specialist, Juneau, Alaska. We are also grateful to Shirley for the support she provided in the field.

INTRODUCTION

This interim report contains information generated in the first two years of an on-going, 4-year mineral assessment being conducted by the U.S. Department of the Interior, Bureau of Land Management (BLM). The mineral potential within the Stikine area of central Southeast Alaska is the focus of this study (Figure 1).

Under Section 1010 of the Alaska National Interest Lands Conservation Act, 1980, the BLM is responsible for assessing the mineral potential of Federal lands throughout Alaska. This study is being done in accordance with Section 1010 at the request of the U.S. Department of Agriculture, Forest Service. Information gained from the assessment is of primary importance to that agency. As the major land manager in the area, the Forest Service requires a thorough understanding of the mineral endowment and its development potential in order to accomplish the agency's multiple-use management objective.

The BLM intends to define the mineral potential of the Stikine area by:

1. Identifying the number, type, and distribution of mineral deposits.
2. Determining resource estimates whenever possible.
3. Conducting economic feasibility studies for selected deposits.
4. Addressing land use and resource issues related to mining activity.

To accomplish this, BLM personnel began locating, sampling, surveying, and mapping mineral deposits at historic mines and prospects, in addition to performing reconnaissance investigations to identify new resources.

Preliminary results of field work done in 1997 were published in 1998 (McDonald and others, 1998). This interim report contains information gathered during both the 1997 and 1998 field seasons and includes individual property descriptions. A subsequent comprehensive report is scheduled for release in 2001, which will include results from the years 1999 and 2000, as well as prospect maps.

More than 90 mines, prospects, and mineral occurrences are individually described herein, with sections on the location and access, history, and mineral assessment of each. These site descriptions are organized within the text according to their locations--beginning in the west with those on the most outboard islands within the study area and moving eastward to include those found on the mainland (Plate 1). Appendix B provides the latitude and longitude of each site and is organized by map number as shown on Plate 1. Appendix B also lists all the sites alphabetically. Further delineations in the Appendices include analytical results for rock and stream sediment samples presented in Appendix A. These are then subdivided into two tables:

Table A-1 contains results from samples taken from known mines, prospects, and mineral occurrences; and Table A-2 contains results of reconnaissance investigation samples.

The area under examination encompasses a variety of mineral deposit types, including volcanogenic massive sulfide (VMS), replacement, polymetallic vein, vein gold, skarn, porphyry molybdenum, magmatic segregation, and veins of barite. In addition, there are minor deposits of placer gold, uranium, and coal.

There has only been limited mineral production from the Stikine area. The major producer, the Castle Island Mine, produced 787,000 tons of barite between 1966 and 1980 (Carnes, 1980). The Maid of Mexico and Helen S mines on Woewodski Island apparently produced minor amounts of gold between about 1902 and 1933, but specific production numbers are unknown (Chapin, 1918; Wright and Wright, 1908). The Cascade Mine on Thomas Bay made a small test shipment of gold-bearing ore in 1948 (U.S. Bureau of Mines, Mine Production Records).

In an effort to better assess the mineral potential of the study area, an airborne geophysical survey was carried out under a joint agreement between the BLM, Alaska Division of Geological and Geophysical Surveys (ADGGS) and the City of Wrangell. The U.S. Geological Survey (USGS) contributed to the project with the publication of 1:63,360-scale geological maps (Brew, 1997a-m) and the re-analysis of existing geochemical samples (Smith, 1998). Additionally, the USGS has completed geologic mapping (Karl and others, 1999), structural analysis (Haeussler and others, in press), predictive geophysical modeling (McCafferty and others, in press), and detailed, ground-based geophysical follow-up (Wynn and others, in press).

The geophysical survey covers a belt of Triassic rocks that crops out on Kupreanof Island (along Duncan Canal), on Woewodski and Zarembo Islands, and on western Etolin Island that is of significant interest. These Triassic rocks have been correlated with those that host the VMS deposits to the north at the Greens Creek Mine on Admiralty Island and at the world-class Windy Craggy deposit in northwestern British Columbia, Canada. The extent of this Triassic belt within the Stikine area is better defined as a result of the geophysical survey.

The Groundhog Basin area (Figure 4) is also included in the geophysical survey because it hosts numerous replacement and polymetallic vein deposits. In addition, there is some potential for porphyry molybdenum. High silver, lead, and zinc values along significant strike lengths have encouraged exploration by many private companies and individuals over the years; however, no production has come from the Groundhog Basin area.

LOCATION, ACCESS, LAND STATUS

The Southeast region of Alaska stretches 560 miles from south of Ketchikan to Icy Bay northwest of Yakutat. The lands involved in this mineral assessment are located in central Southeast Alaska and are referred to here as the Stikine study area (Figure 1). "Stikine" is derived from a Tlingit

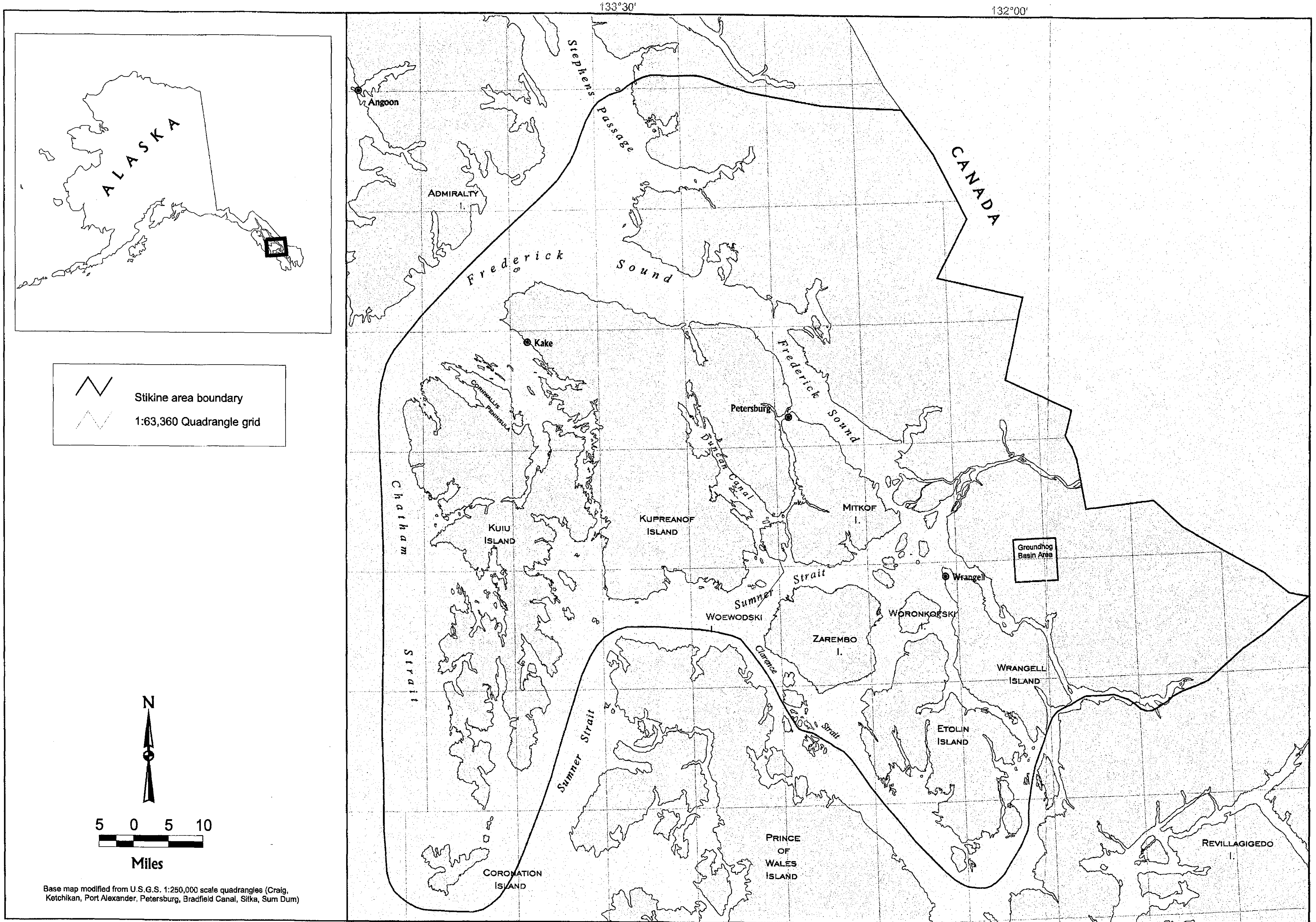


Figure 1. - Location map of the Stikine area, Central Southeast Alaska

name meaning "Great River." The Stikine River, the mouth of which is in the study area, is an historically important transportation route from the coast, through the Coast Mountains to the interior. Encompassing 5.7 million acres, the Stikine study area extends throughout all of the Forest Service's Petersburg and Wrangell Ranger Districts and parts of the Juneau and Thorne Bay Ranger Districts. It includes the Kupreanof and most of the Petersburg historic mining districts (Ransome and Kerns, 1954). From east to west, it stretches from the U.S.-Canadian border to the outboard islands of the Alexander Archipelago–including the islands of Wrangell, Etolin, Zarembo, Mitkof, Kupreanof, Kuiu, and Coronation, as well as the interspersed smaller islets. From north to south, it stretches approximately 100 miles on the mainland, from its northern boundary at the head of Endicott Arm, south to Bradfield Canal.

The geography of the Stikine area is diverse. To the east on the mainland, peaks reach altitudes of 10,000 feet. Ice fields and alpine glaciers predominate; the LeConte Glacier is the southernmost in North America to flow directly into salt water. Although the topography of the islands is generally subdued compared to elsewhere in southeastern Alaska (much of Kupreanof Island consists of extensive, flat, low-lying regions), peaks do reach altitudes of approximately 3,700 feet on both Kupreanof and Etolin Islands. The entire study area was glaciated in the geologically recent past.

Southeast Alaska is famous for its lush rainforest. The islands of the Alexander Archipelago are typical of this rainforest. Vegetation includes muskegs in poorly drained areas and thick conifer forests of primarily western hemlock, Sitka spruce, and scattered red and yellow cedar. The tree line is variable, but is generally found around an altitude of 2,000 to 2,500 feet.

The towns of Petersburg and Wrangell have the largest populations in the area–approximately 3,600 and 3,100 respectively. Each is served by daily scheduled jet service from the major Southeast cities of Juneau and Ketchikan (connecting to Seattle), scheduled Alaska Marine Highway System ferries, commercial barge companies, and local chartered air service. Smaller air taxi services also provide access between Petersburg and Wrangell, along with scheduled daily flights to other southeastern Alaska communities and charter services to remote areas. Helicopter service is available from Petersburg and on a prearranged basis from elsewhere in the study area. The two municipalities are the main supply centers in the area. Lodging is available from numerous establishments. Car rental is also available to access the network of roads extending from both cities. There are approximately 200 miles of roads extending from Petersburg and 140 from Wrangell; these include municipal, state, and Forest Service roads, both paved and unpaved.

Kake (population: 700) is located on western Kupreanof Island approximately 40 miles northwest of Petersburg. It is served daily by scheduled flights from air taxi services and twice weekly by scheduled state ferry and barge service. Overnight accommodations are available. Car rental is negotiable. Generally to the north and east of Kake, an extensive logging road network includes Forest Service and Kake Tribal Corporation roads (the area's Native village corporation as established by the Alaska Native Claims Settlement Act of 1971).

The climate of the Stikine area is moderated by maritime influences; summers are cool and winters are mild. Snow is common during the winter and at higher elevations, but rain falls at all times of the year. Wrangell and Petersburg experience similar average temperatures–30.5°F in January and 58.1°F in July. The average annual rainfall is higher in Petersburg, at 110 inches per year, as opposed to 82.4 inches in Wrangell. Snowfall in Wrangell is 64 inches. About half of the precipitation in the area falls in October, November, and December (www.wrangell.com and www.petersburg.org/visitors/climate.html).

About 90 percent of the land in the Stikine study area is managed by the Forest Service. Much of that land is open to mineral entry, however the Stikine-Leconte, Petersburg Creek-Duncan Salt Chuck, and Kuiu wilderness areas are closed to mineral development. Native lands are those that were withdrawn from mineral entry in 1971 by the Alaska Native Claims Settlement Act for selection by the area's Native regional and village corporations. The Sealaska regional Native corporation holds the mineral rights to all Native lands. The largest block of Native land in the study area is on the northwest end of Kupreanof Island, owned by the Kake Tribal Corporation. State lands in the area are concentrated near the towns of Petersburg and Wrangell as well as near Cape Fanshaw, Thomas Bay, the south end of Mitkof Island, on the northeast side of Zimovia Strait, and at the head of Bradfield Canal. Small private land parcels and active mining claims are scattered throughout the study area. One should consult the Forest Service, BLM, or State of Alaska to get more precise information on the land status in the Stikine area before commencing mineral development activities.

GENERAL GEOLOGY AND DEPOSIT TYPES

Eight tectonic assemblages are present within the Stikine area (Figure 2). They represent a diverse array of rock types ranging in age from Paleozoic to Holocene (Gehrels and Berg, 1994; Brew and others, 1984). The eight assemblages include five lithic and three tectonostratigraphic terranes. Some of the mineral deposits found in the Stikine area are restricted to certain tectonic assemblages. From west to east, the terranes are the Alexander, Taku, and Stikinia. The lithic assemblages include the Gravina Belt overlap sequence, metamorphic rocks within the Coast Range Batholith, plutonic rocks of the Coast Range Batholith, plutonic rocks west of the batholith, and Quaternary and Tertiary volcanic and sedimentary rocks. The assemblages generally form elongate, northwest-trending belts (Gehrels and Berg, 1994).

Volcanogenic massive sulfide (VMS) deposits are the most significant in the Stikine area. They occur in Triassic rocks on the inboard margin of the Alexander terrane and are part of a 375-mile-long belt that stretches the entire length of Southeast Alaska. The belt includes the Greens Creek deposit on northern Admiralty Island, about 100 miles to the northwest of the Stikine area, and the Windy Craggy deposit, about 250 miles to the northwest, in British Columbia, Canada.

Within the Stikine area, the VMS deposits in the Alexander terrane extend along both sides of Duncan Canal on Kupreanof Island, south across Zarembo Island, and onto the western side of

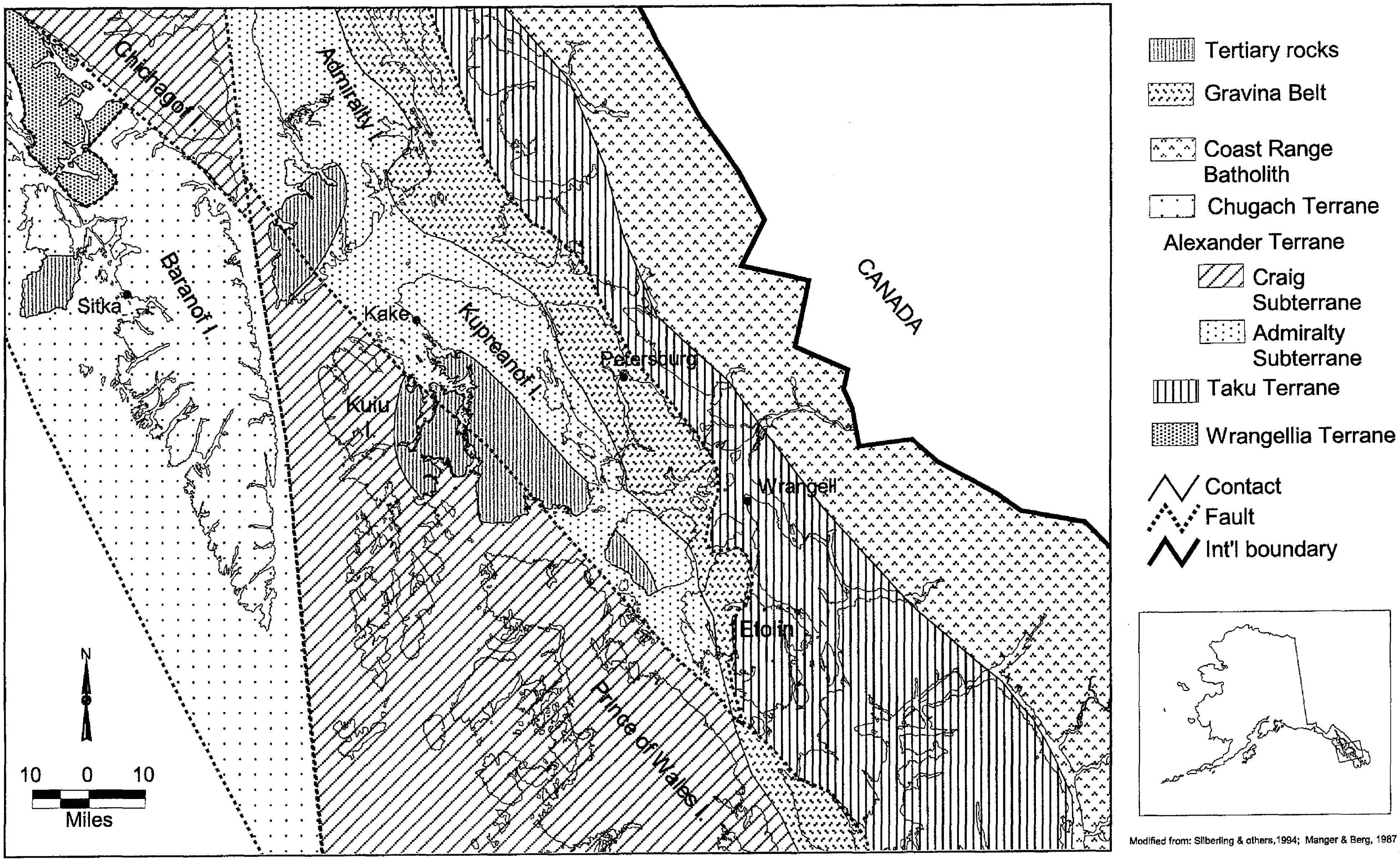


Figure 2. - Tectonstratigraphic terranes and physiographic provinces in the Stikine area

Etolin Island. (See Plate 1 for geographic references.) They are hosted in volcanic and sedimentary rocks of the Hyd Group as mapped by Karl and others (1999). Triassic carbonates in the area contain replacement-type minerals that may also be related to the VMS deposits, e.g., the lead-zinc-barite deposits on Cornwallis Peninsula on northern Kuiu Island (C.D. Taylor, oral commun., 1998).

Two subterranes of the Alexander, known as the Craig and Admiralty, date from Paleozoic to Cenozoic and make up the western part of the Stikine area. These subterranes are interpreted as distinct crustal fragments only until Permian time; from that point, their depositional and tectonic histories appear similar (Gehrels and Berg, 1994). Triassic VMS and related deposits in the Stikine area are, therefore, not affected by the distinction in the subterranes.

Rocks of the Jurassic to Cretaceous Gravina Belt overlie the eastern margin of the Alexander terrane. In light of information generated by the recent airborne geophysical survey, work by Karl and others (1999) suggests that the Gravina Belt rocks do not extend as far to the west on Kupreanof Island as earlier maps have depicted. This means that the Alexander terrane is exposed farther to the east than previously thought, and therefore the potential for Triassic VMS deposits is also extended eastward.

Within the study area, the Taku terrane is exposed to the east of the Gravina Belt and consists of deformed and metamorphosed rocks of pre-Permian (?) to Late Triassic age (Gehrels and Berg, 1994). To the southwest, Taku rocks are thrust over the Gravina Belt. To the northeast, they have been intruded by the Coast Range Batholith, and the terrane boundary has been obscured. Metamorphic pendants and inliers in the batholith are indistinguishable from Taku terrane rocks to the west (Gehrels and Berg, 1994). Although the mineralized rocks of Groundhog Basin are hosted in the Taku terrane, they are secondary deposits related to the much later intrusion of rocks of the Coast Range Batholith (Newberry and Brew, 1989).

The Coast Range Batholith makes up the eastern side of the Stikine study area. It consists mainly of two belts of plutonic rocks: the Great Tonalite Sill Belt (L. Cretaceous to Early Eocene) and the Coast Mountains Belt (Early Eocene to Middle Eocene) (Brew and Morrell, 1983; Brew, 1994). Younger plutons (Late Oligocene to Miocene) are also found within the batholith, specifically around Groundhog Basin and in the Cone Mountain area (Brew, 1994). Mineral occurrences in the batholith include polymetallic skarn deposits and small, structure-controlled polymetallic veins. The area also holds the potential for resources of porphyry molybdenum, uranium, and rare-earth elements.

Rocks of the Stikinia terrane are mapped in only a few places within the study area (Gehrels and Berg, 1994). However, the terrane hosts numerous mineral deposits in Canada–of particular interest are the precious-metal deposits of the Iskut Camp and the precious- and base-metal-rich deposits to the south in the Stewart Mining Camp. The potential exists for related deposits in the Stikine area.

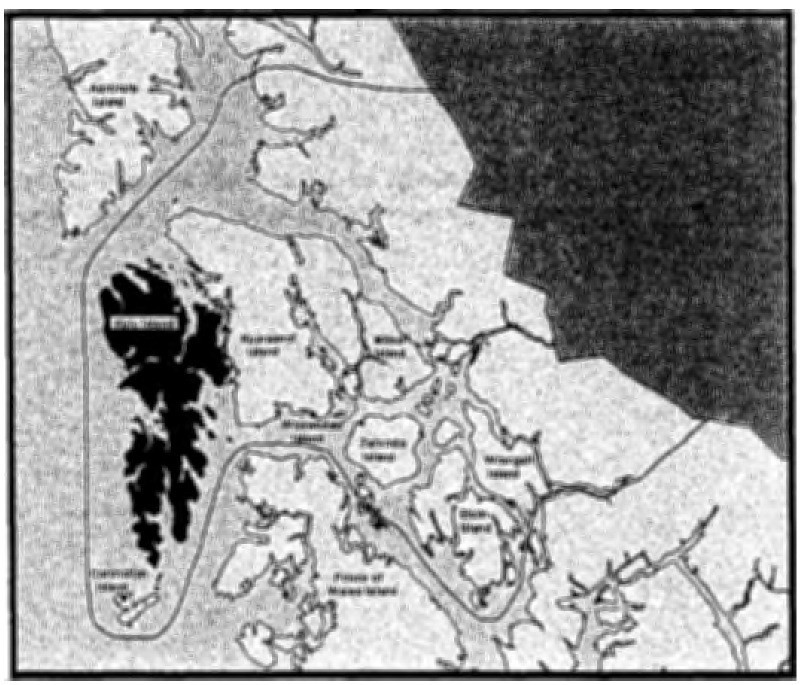
Cenozoic rocks west of the Coast Range Batholith are found in a belt of Late Oligocene to Miocene plutons that extends the length of Southeast Alaska (Brew, 1994). As it appears in the study area, it is referred to as the Kuiu-Etolin Volcanic-Plutonic Belt and mainly consists of granitic rocks with some diorites to gabbros. It is exposed on northern Kuiu Island, southwestern Kupreanof Island, Zarembo Island, and Etolin Island (Brew and Morrell, 1983; Brew and others, 1984).

Tertiary volcanic rocks in the study area are related to the intrusives of the Kuiu-Etolin Volcanic-Plutonic Belt. They are made up of basalt and andesite flows; rhyolite flows and tuffs; and volcanic breccias (Brew and others, 1984). A field of Holocene volcanics of mainly olivine basalt lies on southern Kupreanof Island (Brew, 1994). Although color anomalies in the young volcanics attracted the attention of investigators, no significant deposits have been found to date. Analysis of geochemical samples from the area has revealed the potential for rare-earth elements (Smith, 1998).

PROSPECTS IN THE STIKINE AREA
(PLATE 1)

KUIU ISLAND

Property name	Plate 1, Map no.
Allied Mine Group E	1
Cornwallis Peninsula	2.1-2.4
Keku Islet	3
Little Creek	4
Kuiu Lead-Zinc	5.1-5.2
Katherine	6.1-6.2
Saginaw Bay	7
Hungerford	8.1-8.2
Corn	9
Saginaw Bay Barite	10
Kadake Bay	11
Kuiu	12.1-12.4
Point Saint Albans	13.1-13.3



ALLIED MINE GROUP E

(Plate 1, Map no. 1)

Location/Access

The Allied Mine Group E is located on northwest Kuiu Island at the mouth of Saginaw Bay. It lies 14 miles from Kake. Barite veins are exposed along a rocky, wave-worn point on the southwest side of the bay near the high-tide line. The site can be reached by boat, float plane, or helicopter during low tide.

History

The Allied Mine Group E was originally staked for barite in 1955 by Roy and Rachel Strong (Alaska Kardex, 1982). No development work or additional activity is reported.

Mineral Assessment

The deposit lies within a narrow exposure of Silurian or Devonian volcanic breccia (Muffler, 1967). A few pillow structures are also distinguishable in the volcanics. The barite is present as a series of pods and irregular veins that strike 000° to 033° and dip 40° to 46° to the southeast. Veins range in width from 0.1 to 1.4 feet and in length from a few feet to 80 feet. The barite is pinkish white, fine- to coarse-grained, and is commonly found in association with carbonate minerals, which may include witherite. No sulfides were found associated with this deposit. Field relations show the barite veins are crosscut by younger faults in the volcanics.

BLM personnel took three samples of different barite veins cropping out intermittently across the property (Map no. 1, samples 9604-06). In each sample, the barium values were greater than 2.0 percent.

Conclusions

This site is characterized by narrow, discontinuous, and scattered veins of barite in subeconomic concentrations. No attempt was made to trace these veins inland due to the extensive cover.

CORNWALLIS PENINSULA

(Plate 1, Map nos. 2.1-2.4)

Location/Access

The Cornwallis Peninsula occurrence includes approximately 2 miles of beach on the northeast shore of Kuiu Island, approximately 10 miles southwest of Kake. The beach is a broad expanse of gravels and outcrop exposed during low tide. Access to this area is via boat, float plane, or helicopter at low tide.

History

Barite, witherite, and calcite were first discovered at this site by Hungerford, who staked three claims in 1923. Additional claims were staked by Barrows later in 1923 (Buddington, 1925); George Comstock, in 1931; and Jack Whitfield, Lueria Jordan, and Pete Hooper, in 1949 (Alaska Kardex, 1982). No development work has been reported.

Mineral Assessment

The Cornwallis Peninsula occurrence is hosted almost entirely within the Triassic Keku Volcanics. However, at the northwestern edge, the Keku Volcanics are in contact with the overlying Triassic Cornwallis Limestone (Muffler, 1967). Fracture-filling veins of barite and witherite, as well as fine-grained, disseminated pyrite, sphalerite, and a trace of chalcopyrite make up the occurrence.

Barite stringers and veins occur in felsic volcanics, volcanic breccia, and limestone. The stringers and veins trend generally northwest to northeast with steep to near-vertical dips. Veins vary in width from 0.1 to 2.3 feet and can be traced along strike for up to 200 feet. A 2-foot-wide barite vein, hosted in felsic volcanics and traceable for approximately 200 feet, contained greater than 2.0 percent barium (Map no. 2.3, sample 155). A 300-foot-wide zone of barite stringers and veins is hosted in limestone, conglomerate, and fossiliferous mudstone. A sample of a 2.3-foot-wide vein in this zone contained 44.46 percent barium (Map no. 2.3, sample 9612).

Disseminated pyrite, sphalerite, and chalcopyrite are contained in conglomerate and iron-stained volcanics. A sample from a conglomerate with disseminated sulfides in the matrix contained 660 ppm copper and 553 ppm zinc (Map no. 2.3, sample 156). A sample of iron-stained volcanics with disseminated sphalerite and pyrite contained 8,382 ppm zinc (Map no. 2.2, sample 167).

While investigating the southwest shoreline of one of the islets just offshore of the main deposit, BLM personnel observed disseminated pyrite, sphalerite, and galena in a Carboniferous crinoidal limestone (Muffler, 1967). A sample from this location contained 2.0 percent zinc and 660 ppm lead (Map no. 2.4, sample 9611).

Conclusion

This occurrence is characterized by scattered veins and stringers of barite and low-grade, disseminated sulfides–including sphalerite, plus minor chalcopyrite and galena. The low grades and scattered character of the mineralization at Cornwallis Peninsula do not encourage exploration.

KEKU ISLET

(Plate 1, Map nos. 3.1-3.3)

Location/Access

The Keku Islet occurrence lies less than a mile offshore of Kuiu Island, on one of the many islets that dot Keku Strait. It is 7.5 miles southwest of Kake. The deposit is located along the northwest shoreline of the island and is covered at high tide. Access to the island is best accomplished by boat or float plane. Helicopter access is possible during low tide.

History

The zinc occurrence at Keku Islet was first described by Buddington (1925) during a visit to the area in 1923. The Bureau of Mines examined the property in 1949. At that time, three claims were held by Jack Whitfield, Lueria Jordan, and Pete Hooper called the Spallright 1, 2, and 3. The Bureau of Mines concluded that the quantity of mineralized rock was insufficient to warrant further development (Jermain and Rutledge, 1949).

Mineral Assessment

The larger island of the Keku Islands has been mapped as Permian Halleck Formation that has been intruded by numerous gabbro dikes (Muffler, 1967). The country rock can be divided into three major types: a tan, well-bedded, bioturbated (scattered burrows) limestone that strikes 010° to 050° and dips between 18° and 20° to the southeast; a thinly interbedded sandstone and mudstone; and a poorly sorted, pebble conglomerate. These units are cut by a system of subparallel, Triassic or Tertiary mafic dikes that strike 286° to 292° and dip 81° to 84° to the northeast. The dikes are aphanitic, black to mottled brown, and have altered, tan margins.

The Keku Islet occurrence is associated with one of the mafic dikes, which is cut at nearly right angles by several small veinlets of sphalerite to form ladder veins. The dike extends 240 feet from tide water across the intertidal zone to vegetative cover and has an average width of 10 feet. The sphalerite veinlets range from 0.1 to 2.0 inches in width and strike 005° to 030° with nearly vertical dips. A few sphalerite veinlets also trend parallel to the dike. Pyrite is associated with some of the sphalerite veinlets. Calcite veinlets also crosscut the dikes.

BLM personnel mapped and sampled the two most heavily mineralized outcrops of the ladder-veined dike. They took six continuous chip samples across several sphalerite veinlets cutting the dike (Map no. 3.1, samples 161, 9617-21). All the samples contained high zinc and most had anomalous amounts of tungsten. Zinc values ranged from 7,773 ppm to 13.6 percent and tungsten values from less than 20 to 149 ppm. The tungsten values are directly proportional to zinc values in all six samples. However, in samples with zinc concentrations over 1.0 percent, analytical interference will cause tungsten values to be enhanced.

Field personnel mapped and sampled another similarly mineralized dike approximately 0.75 miles (straight-line distance) southeast of the one at the Keku Islet deposit. Discontinuous outcrops of the dike extend northwest along the beach for approximately 350 feet with an average width of 8 feet. Investigators collected five continuous chip samples at different points along the dike (Map no. 3.3, samples 162-166). All samples contained high zinc values and anomalous tungsten values. Zinc values ranged from 6.1 to 31.2 percent; and tungsten, from 58 to 254 ppm. Again, it is important to note that zinc values greater than 1.0 percent will enhance tungsten values.

Conclusions

Sphalerite mineralization at the Keku Islet deposit is characterized by fracture-filling veins in mafic dikes. These very small, widely spaced veinlets are found in a small percentage of the dikes on the island. The zinc values across the dikes range from 7,773 ppm to 13.5 percent. Each of the samples collected showed anomalous tungsten values, which are possibly lab artifacts caused by high zinc values. The limited extent of mineralized veinlets at the Keku Islet deposit discourages further exploration.

LITTLE CREEK

(Plate 1, Map no. 4)

Location/Access

The Little Creek deposit is located on the north shore of Cornwallis Peninsula on Kuiu Island, 8.5 miles southwest of Kake. Reports indicate it lies approximately 0.25 miles inland, at an elevation of 200 feet (Bureau of Land Management, MAS). Access to this area is via boat, float plane, or helicopter to the beach and then overland by foot. The occurrence is on land that was withdrawn from mineral entry in 1971 by the Alaska Native Claims Settlement Act for selection by the Sealaska and Kake Tribal Corporations (the area's Native regional and village corporations) and is currently listed as interim conveyed, pending patent.

History

Little Creek was staked in 1969 by G. Fennimore, H.W. Coleman, A.J. Tanner, and L. Strong. It consists of only one claim, listed as a lode gold deposit. There has been no activity recorded since the original staking (Alaska Kardex, 1982).

Mineral Assessment

The Little Creek area consists of Triassic Keku Volcanics (Muffler, 1967). Limited outcrop appears to be mostly rhyolite flows with scattered jasper veinlets. Above an elevation of 180 feet, the country rock is more altered and outcrops of coarse volcanic breccia are present.

Because little information about this property exists, mineralized targets are poorly defined. BLM personnel collected two samples along a very small creek, presumably Little Creek, which ends in a 10-foot-high waterfall at the beach. A stream sediment sample contained 401 ppm lead and 176 ppm barium (Map no. 4, sample 159). This lead value corroborates an anomalous lead value previously reported by Cathrall and others (1983) of 300 ppm. A sample of altered volcanics contained 1,359 ppm barium (Map no. 4, sample 160).

Conclusions

Although the Little Creek area was originally staked for gold, only trace amounts of gold were obtained from a stream sediment sample taken in the vicinity of the deposit. However, anomalous lead values were obtained. Altered rhyolites contain veinlets of jasper along with barium and traces of zinc. Continued exploration might reveal more limestone, which could be the host for replacement deposits similar to those at the Kuiu Lead-Zinc prospect (Map nos. 5.1-5.2).

KUIU LEAD-ZINC

(Plate 1, Map nos. 5.1-5.2)

Location/Access

The Kuiu Lead-Zinc prospect is located along the northeastern shore of Cornwallis Peninsula, on the north end of Kuiu Island, 8 miles southwest of Kake. The workings are located approximately 800 feet inland. They lie at an elevation of 80 feet, on the east bank of a small north-flowing stream. The area is thickly wooded, and the stream contains abundant dead fall. The topography is gently sloping from the beach to the workings, but steepens inland from there. The beach is accessible by boat, float plane, or helicopter at low tide. Travel inland is by foot along the creek. The deposit is on land that was withdrawn from mineral entry in 1971 by the Alaska Native Claims Settlement Act for selection by the Sealaska and Kake Tribal Corporations (the area's Native regional and village corporations) and is currently listed as interim conveyed, pending patent.

History

Mineralized rock was first discovered at the Kuiu Lead-Zinc prospect by Ted Hungerford prior to 1937. By 1937 a group of 32 lode claims, called the Keku Group, had been staked by I.M. Holfsted, L. Dyrdahl, and H. Hawks (Roehm, 1937). Dyrdahl continued to hold these claims, with various partners, at least until 1951 (Williams, 1951b).

Between 1937 and 1938, 150 to 200 tons of high-grade zinc and lead ore were removed from an opencut at the Kuiu Lead-Zinc prospect and piled in the creek approximately 600 feet inland from the beach (Roehm, 1938b). This rock was reported by the owners to contain 4 to 18 percent zinc, 5 to 6 percent lead, trace to 0.07 oz/ton gold, and 0.6 to 5.9 oz/ton silver (Thorne 1948). However, channel samples taken from the opencut by Roehm (1938b) contained only 0.18 to 0.29 percent zinc across 5 feet. A select grab sample from the ore pile in the creek ran only 2.75 percent zinc (Roehm, 1938b). The BLM found no reports of what was done with the stockpiled lead-zinc ore.

A 55-foot adit, with a winze and 25-foot sublevel, was completed on the Kuiu Lead-Zinc prospect sometime prior to Roehm's visit in 1946. No specific information detailing who did the work or when it was done could be found. Reports indicate that the lead-zinc ore was not intersected in the workings. By 1946 the winze and sublevel were reportedly flooded (Roehm, 1946).

The owners of the Kuiu Lead-Zinc prospect carried out a drilling program sometime around 1946. The Alaska Territorial Department of Mines assisted this project with geologic mapping, logging drill core, and locating drill targets (Roehm, 1946). Approximately 14 diamond drill holes were completed, although the exact number and total feet is uncertain. No significant intercepts or resources were defined by the drilling program.

Mineral Assessment

The Kuiu Lead-Zinc prospect is located in the Triassic Keku Volcanics (Muffler, 1967). A detailed geologic map of the prospect, produced by Roehm (1946), depicts a sequence of felsic lavas and agglomerates that are overlain by dolomitic limestone with localized replacement-type mineralized rock. The dolomitic limestone is, in turn, overlain by slightly mineralized agglomerates and capped by a unit of intermediate lavas. This rock package has been gently folded along a northwest to southeast fold axis and faulted (Roehm, 1946).

The mineralized rock at the Kuiu Lead-Zinc prospect is hosted primarily by dolomitic limestone that is locally replaced by small irregular bodies and pods of sphalerite and galena. The original showing on the property was located approximately 600 feet inland on the south bank of the creek, apparently where the creek makes a sharp bend. This showing was mined out (Roehm, 1938b) and not observed during the BLM's visit. However, a detailed petrographic examination of the ore revealed very fine-grained sphalerite in small, rounded masses. Galena was described as subordinate (Roehm, 1937). This irregular ore body was depicted as 30 feet long, 40 feet wide, and exposed along its dip for 200 feet (Roehm, 1938b).

A small adit, driven into the dolomitic limestone, is located approximately 200 feet upstream from the original showing. No mineralization is intercepted by these upper workings, which confirms earlier reports (Roehm, 1946). The winze and sublevel are flooded. A surface cut, located on a steep face of the stream bank just upstream from the adit, does contain small pods of galena and sphalerite replacing dolomite. The pods are irregularly spaced and 2 to 3 inches in scale. Conspicuous, black manganese oxide coats the outcrop. High-grade samples from this cut contained 313.6 ppm to 21.72 oz/ton silver, 10.31 to 20.54 percent lead, and 7.7 to 13.4 percent zinc (Map no. 5.2, samples 9578, 9615).

A third exposure of mineralized dolomite was described in a small creek, parallel to and east of the original mined-out showing. Here a 15-foot width of dolomitic limestone with disseminated galena reportedly crops out in the creek bed, roughly on strike with the other two showings (Roehm, 1937).

The BLM surveyed for radioactivity near the Kuiu Lead-Zinc workings using a hand-held scintillometer. Background readings are 60 counts per second, with readings inside the adit ranging between 100 and 150 counts per second.

Conclusions

Previously reported high lead and zinc values, as well as those obtained in this study, encourage additional investigation of the Kuiu Lead-Zinc prospect. Because of the irregular nature of the replacement-type mineralization and reports of minor mineralized areas in the vicinity, care should be taken to investigate all exposures of the dolomitic limestone; for instance, the small parallel stream to the east may have mineralized rock along strike from the adit. Sampling of the adit would be useful to verify whether minerals of interest are present, especially the very fine-grained sphalerite described by Roehm (1937), which might not show up readily in hand specimens. The agglomerate units noted here should be compared to the green volcanic breccias seen at the Hungerford prospect (Map no. 81-8.2), located approximately 1.4 miles southeast along the beach. If the two units correlate, the potential exists for a replacement-type deposit structurally below the Hungerford prospect.

KATHERINE

(Plate 1, Map nos. 6.1-6.2)

Location/Access

The Katherine occurrence is located on one of the Keku Islets off the northeastern end of Kuiu Island, approximately 7 miles southwest of Kake. The occurrence lies along the shoreline, on the northeast and northwest ends of the islet. These locations can be observed during low to medium tides. Access is via boat, float plane, or helicopter at low tide.

History

Discoveries of barite and witherite at this location were first discussed by Buddington (1925). He described fissure-filling veins of barite at the northeast end of the island. In 1949 Jack Whitfield, Lueria Jordan, and Pete Hooper staked the Acme No. 1 and No. 2 claims (Rutledge, 1949). The Acme No. 2 was staked over the discovery mentioned earlier by Buddington (1925). The Acme No. 1 was staked on a similar zone at the northwest end of the island. These were later restaked in 1953 as the Katherine claims (Alaska Kardex, 1982). The only reported development is a "test pit" at the Acme No.1 claim (Rutledge, 1949).

Mineral Assessment

The island is made up of Silurian Kuiu Limestone, which has been locally faulted and intruded by gabbro dikes (Muffler, 1967). The limestone contains short veins, stringers, and small pods of barite and witherite.

At the northwest end of the island, BLM personnel sampled a barite stringer zone 1.5 feet wide, striking 338° and dipping 70° to 90° to the east (Map no. 6.1, sample 9613). The zone contains both irregular stringers and small pods of coarse-grained, bladed barite along with scattered sphalerite and galena. Sample 9613 contained 3.2 percent zinc, 2,355 ppm lead, and greater than 2.0 percent barium. A large stringer of witherite, extending 46 feet and having a strike of 004° to 025° and a dip of 75° to 85° to the southeast, was reported by Twenhofel and others (1949) at this location.

At the northeast end of the island, the limestone contains a zone of vuggy quartz veins and stringers, with drusy quartz lining the vugs. The zone is approximately 50 feet wide and extends 50 feet to tide water. It contains stringers of barite and pyrite with trace galena and pods of massive pyrite up to 0.6 feet wide and 1.0 foot long. The orientations of the veins, stringers, and pods are highly variable. Two samples were collected at this location. Pods of barite with pyrite, oriented north-south, contained 1,602 ppm arsenic and 7,107 ppm barium (Map no. 6.2, sample 9614). A sample of a pyrite lens contained 2,725 ppm arsenic and 8,498 ppm barium (Map no. 6.2, sample 157).

Conclusions

This deposit includes relatively wide zones of fissure-filling veins of barite and small, discontinuous sulfide lenses in limestone. Mineralized rock was observed at both the northwest and northeast ends of the island, but the relationship between the two locations is unknown. Additional exploration inland might reveal larger replacement-type occurrences; however, any potential resource would be constrained by the size of the islet.

SAGINAW BAY

(Plate 1, Map no. 7)

Location/Access

At one time, the Saginaw Bay prospect included a block of claims covering sections 24, 25, and 36 of T. 57 S., R. 71 E. on the Port Alexander D-1 quadrangle. The block extended across the center of Cornwallis Peninsula on northern Kuiu Island, approximately 10 miles southwest of Kake. The occurrence can be reached by boat or helicopter, although on the north side of the peninsula, landing zones are scarce.

History

Between 1978 and 1979, Mapco Inc. staked 108 claims in the Saginaw Bay area and listed zinc and lead as target commodities (Bureau of Land Management, MAS). The company's drilling program was limited to one hole that was located in the west-central part of section 24, T. 57 S., R. 71 E. of the Port Alexander D-1 quadrangle (Hedderly-Smith, 1993).

Mineral Assessment

The Saginaw Bay prospect includes four stratigraphic units as mapped by Muffler (1967). The various rock types and orientations on the claim block are (1) Carboniferous crinoidal limestone, north-central; (2) the Permian Pybus Formation, southern; (3) the Triassic Keku volcanics, central (and structurally highest); and (4) the Triassic Cornwallis Limestone, extreme northwestern.

BLM personnel investigated the Pybus Formation along a small creek at the southern end of the claim block. The creek is located adjacent to the ruins of an old cannery on the northeast shore of Saginaw Bay. Field personnel collected one stream sediment and two rock chip samples (Map no. 7, samples 151-153). None of the these contained significant base- or precious-metal concentrations. The stream sediment sample, however, returned 1,079 ppm barium (Map no. 7, sample 153).

Conclusions

It is not known what the original discovery was at this prospect or what the drilling target was besides the general lead and zinc commodity description. However, it is possible that lead and zinc sulfides were found replacing limestones. If this could be verified, then the potential extent of these replacement minerals would stretch from this occurrence to the Hungerford (Map nos. 8.1-8.2), approximately 3.8 miles to the southeast.

HUNGERFORD

(Plate 1, Map nos. 8.1-8.2)

Location/Access

The Hungerford prospect is located along the beach on the northeast side of Kuiu Island, approximately 7.5 miles southwest of Kake. The occurrence extends inland from the beach along a medium-size creek, locally called Hungerford Creek, that flows to the northwest. The shoreline southeast of the mouth of Hungerford Creek is steep, with bluffs adjacent to the intertidal zone. To the northwest, the shoreline is made up of moderately sloping gravel beaches. The area can be accessed by boat, float plane, or helicopter at low tide. This area was withdrawn from mineral entry in 1971 by the Alaska Native Claims Settlement Act for selection by Sealaska and Kake Tribal Corporation (the area's Native regional and village corporations) and is currently listed as interim conveyed, pending patent.

History

Mineralized rock at the Hungerford prospect was first discovered by E.S.'Ted' Hungerford in 1937 (Thorne, 1948), and in 1938 he staked the Children group of claims, presumably at the location of his discovery the year before. These included six placer and two lode claims (Alaska Kardex, 1982). The lode claims were reported by Roehm (1938a) to contain mineralized dolomites and conglomerate and to extend 3,000 feet inland from the mouth of Hungerford Creek. The placer claims, also described by Roehm (1938a), covered the area between the coast and the first mountain ridge inland. These contained considerable amounts of manganese. There is no report of how long these claims were held.

Conflicting reports indicate that in 1948 the Hungerford prospect was restaked. Thorne (1950a) states that six claims, the Hope 1 to 6, were staked by F.M. Hungerford and D.M. Hungerford in July 1948. However, Thorne (1948) also reports that E.S. Hungerford staked four claims in the same area–the White Hope, Bantam, Winner, and Heavyweight–in June of 1948. Regardless, by October 1948, the property was deeded to the Q-U Mining and Milling Co. by F.M. and D.M. Hungerford. Development on the property included a small cabin, several opencuts, blasting, and drilling (Thorne, 1950a).

At the request of the owner, the Bureau of Mines carried out a limited drilling program in January and February of 1949. The program consisted of drilling, sampling, and mapping the property and resulted in 982 total feet of diamond drilling in five holes (Thorne, 1950b).

Mineral Assessment

The Hungerford prospect is located in the Triassic Keku Volcanics, very near an inferred fault contact with the lower volcanic member of the Carboniferous Saginaw Bay Formation and Silurian Kuiu Limestone (Muffler, 1967). During its investigation of the property in 1949, detailed mapping by the Bureau of Mines delineated six distinct units and three different types of lead-zinc mineralization. These units include (1) a slightly mineralized, poorly sorted, green, white, and red conglomerate exposed in the bed of Hungerford Creek, (2) an interbedded basalt and metamorphosed shale, (3) a dolomitic limestone with replacement mineralization along fractures, (4) a graywacke, (5) a gray to green amygdaloidal basalt with disseminated galena and sphalerite, and (6) a massive basalt with galena in narrow veins of quartz and calcite (Thorne, 1950a). These units seem to roughly correlate with those reported at the top of the Keku Volcanics by Muffler (1967). However, it should be noted that the unit mapped by the Bureau of Mines as a conglomerate appears to more closely resemble a sequence of green volcanics that has been fractured, with emplacement of pinkish barite, jasper, and disseminated galena in the fractures.

At the Hungerford prospect, lead and zinc mineralization appears in amygdaloidal basalt as disseminated galena and sphalerite. This can be seen in outcrop along a small bluff approximately 100 to 200 feet southeast of the mouth of Hungerford Creek. A sample of very fine-grained, disseminated galena and sphalerite from this outcrop assayed 84.7 ppm silver, 2.23 percent lead, and 7,028 ppm zinc (Map no. 8.2, sample 154). The Bureau of Mines drilling program defined this unit as the "ore body" and estimated a resource of "...63,000 tons of submarginal ore assaying 2.4 oz/ton silver, 1.35 percent lead, and 0.45 percent zinc" (Thorne, 1950b, p.1). The mineralized rock delineated by the diamond drilling and eight surface channel samples has an approximate thickness of 78 to 93 feet, trends northwest to southeast along a strike length of 280 feet, and dips 34° to the northeast. This mineralized unit runs into Keku Strait, both along the strike to the northwest, and down dip to the northeast. It is open along strike to the southeast, and similar mineralization was reported by F.M. Hungerford approximately 1,000 feet to the southeast of the delineated deposit. The diamond drilling indicates that the grade of the mineralized rock tends to decrease with depth (Thorne 1950a, 1950b).

Galena and sphalerite also appear as a stockwork of veins within a very conspicuous unit of fractured green volcanics in the bed of Hungerford Creek. This unit was previously mapped as a conglomerate (Thorne, 1950a). The sulfides are disseminated in a gangue of barite and jasper. A sample from this location yielded 16.4 ppm silver, 5,625 ppm lead, 6,019 ppm zinc, and greater than 2.0 percent barite (Map no. 8.2, sample 158). A similar unit crops out along the beach 1,400 feet to the northwest and has been described in earlier reports as the Hungerford "beach deposit" (Thorne 1950a). The outcrop displays textural evidence of open-space filling by pink barite and galena and subsequent brecciation. A sample from this outcrop contained 5.82 oz/ton silver, 2.84 percent lead, 2,228 ppm zinc, and 70 ppm barium (Map no. 8.1, sample 9577). Similarly mineralized rock was reportedly located on the beach 500 feet to the southeast of Hungerford Creek (Thorne 1950b).

Sphalerite and galena have also been reported to replace dolomite, where the dolomite is cut by fractures (Thorne, 1948). Thorne (1948) describes this replacement-type mineralization as cropping out in the "Bluff Deposit" located in the bluffs along the beach, presumably near the mouth of Hungerford creek.

Conclusions

Lead and zinc are found disseminated in amygdaloidal basalt, as fracture- and open-space-filling veins in volcanics and volcanic breccia, and as replacing dolomite where it is cut by fractures. A BLM sample of mineralized amygdaloidal basalt, though not representative of the ore body, compared well with the grades reported by the Bureau of Mines (Thorne, 1950b). Further investigation of this property is warranted to characterize the prospect more completely and attempt to better define the extent of the mineralized rock to the southeast. Additionally, the sulfide replacement of dolomite at the "Bluff Deposit" should be looked at more carefully and compared to the sulfide replacement in dolomites at the Kuiu Lead-Zinc prospect (Map nos. 5.1-5.2) located approximately 1.4 miles to the northwest.

CORN

(Plate 1, Map no. 9)

Location/Access

The Corn group of claims is located on the east shore of the Cornwallis Peninsula on northern Kuiu Island. The claims cover almost 1.8 miles of bluffy shoreline from the Hungerford prospect (Map nos. 8.1-8.2) southeast to a pronounced point, or nose, of the main ridge line on Cornwallis Peninsula. Mixed forest and muskeg cover the landscape inland from the beaches, and rock exposure is confined mostly to creeks. The beaches are accessible by small boat, float plane, or helicopter at low tide. Access inland must be by foot or helicopter, since the northeasternmost extent of the Kuiu Island logging roads ends short of the southern boundary of the claims. Much of the area was withdrawn from mineral entry in 1971 by the Alaska Native Claims Settlement Act for selection by Sealaska and Kake Tribal Corporation (the area's Native regional and village corporations). The land status is currently a mixture of selected Native and patented Native, including interim conveyances.

History

From 1973 to 1974, two men, presumably working for Resource Associates of Alaska (RAA), staked the Corn group of claims, which consisted of 121 adjoining placer and lode claims (Alaska Kardex, 1982). These were leased to Cominco America in the mid-1970's, which then carried out detailed sampling, geophysical surveying, and a limited drilling program consisting of only two to three diamond drill holes. Mapco Inc. also leased the Corn claims from RAA sometime in the late 1970's and drilled at least one diamond drill hole in the area (but the description of its location is not on the Corn group of claims). RAA allowed the claims to lapse sometime in the 1980's (Hedderly-Smith, 1990).

Mineral Assessment

The Triassic Keku Volcanics crop out across most of the Corn claims. However, in the southeastern and northeastern corners of the claim block, Triassic Cornwallis Limestone is exposed. The north-central part of the claims includes an uplifted block of Carboniferous volcanic rocks (Muffler, 1967).

BLM personnel accompanied by a USGS geologist investigated the northern part of the claim block; this included starting in the area of Hungerford Creek, going upstream to an upper tributary, and continuing up this northeast-flowing tributary to an elevation of 420 feet. Throughout the examination, field personnel observed mottled, light-brown-weathering rhyolite (maroon on fresh surfaces). In places, the rhyolite is brecciated. Barite was found in the upper tributary at elevations of 280 feet, 290 feet, and 400 or 420 feet. The lower exposure is a series of small pods, veins, and stringers of coarse-grained barite hosted in rhyolite. These outcrops are exposed intermittently across 200 feet of the creek bed. A barite boulder 1.3 feet long, 0.8 feet wide, and 0.6 feet thick was encountered at 290 feet elevation in the main creek. A sample of this boulder ran greater than 2.0 percent barite and 1.5 percent zinc with traces of copper and lead (Map no. 9, sample 9610). At an elevation of approximately 400 or 420 feet, small veins of barite are found in rhyolite with disseminated pyrite.

Conclusions

The examination up Hungerford Creek revealed a thick section of rhyolite volcanics without significant sulfide concentrations and only a few barite veins. Sulfide mineralization appears to be confined to the vicinity of the Hungerford prospect along the faulted contact with older Carboniferous volcanics and Silurian marine clastic rocks. An examination of the shoreline to the east and up the small creek that empties into Keku Strait in the southeastern corner of section 34, T. 57 S., R. 72 E. would allow a comparison of the upper rhyolite section to that observed in Hungerford Creek. Additional mineralization might be expected along the beach to the east where Muffler (1967) has mapped a fault.

SAGINAW BAY BARITE

(Plate 1, Map no. 10)

Location/Access

The Saginaw Bay Barite occurrence is located on northwest Kuiu Island, midway along the southwest shoreline of Saginaw Bay, 12.5 miles southwest of Kake. The property lies along a narrow, rocky beach that drops steeply to the water. Access is via boat or float plane.

History

The discovery of barite at the Saginaw Bay prospect is first mentioned by Buddington while describing his field work in 1923 (Buddington, 1925). No staking or development work is mentioned by him, nor are there any other subsequent references.

Mineral Assessment

Barite at the Saginaw Bay occurrence is hosted in vuggy, black-weathered, thinly bedded limestone that strikes 320° and dips 50° to the northeast. The unit has been mapped as Silurian Kuiu Limestone by Muffler (1967). The barite crops out in a series of irregularly spaced, subparallel veins exposed along approximately 200 feet of shoreline. The veins strike 355° to 025° and dip 60° to 80° to the west. They pinch and swell along strike and have widths ranging from stringers to 2.5 feet. The most extensive vein is traceable along strike for 20 feet before being obscured by vegetative cover and tide water. The veins are composed of pinkish white, coarse-grained blades of barite with subordinate calcite stringers and, likely, witherite.

Two samples were taken of the barite veins exposed along the shoreline. Results show barium values greater than 2.0 percent (Map no. 10, samples 148, 9607).

Conclusions

The presence of barite here is restricted to relatively small veins that are widely spaced. Similar to others on Cornwallis Peninsula, this occurrence, as exposed, is subeconomic.

KADAKE BAY

(Plate 1, Map no. 11)

Location/Access

The Kadake Bay occurrence is located on northeastern Kuiu Island along a small peninsula bounded to the west by Kadake Bay and to the east by Port Camden. It is approximately 12 miles south of Kake. The occurrence is exposed near the low-tide line and can be reached by boat, float plane, or helicopter.

History

Uranium anomalies were first reported in the area by Eakins (1975) during an investigation of uranium locations in Southeast Alaska. His work included reconnaissance mapping, geochemical sampling, and a ground-based radiometric survey of approximately 5 miles of beach–from the mouth of Kadake Bay, south along the west side of Port Camden. In addition, Dickinson (1979) collected a series of samples that returned anomalous uranium values along the intertidal zone at the north end of the peninsula.

Mineral Assessment

The rocks in the Kadake Bay area have been described in detail by Wright and Wright (1908), Buddington and Chapin (1929), and Muffler (1967). They consist of nonmarine sandstone, conglomerate, and lesser shale of the Lower Tertiary Kootznahoo Formation (Muffler, 1967). These sediments are thought to have been deposited in lakes or shallow basins with some areas of marsh land (Wright and Wright, 1908). The Kadake Bay occurrence lies mostly within medium-grained, angular quartz arenite. Thin beds (1 to 4 inches thick) of black carbonaceous shale with plant fossils are found in the sandstone; these give scintillometer readings slightly above background values.

The BLM collected samples from different fossiliferous shale beds that yielded values up to 46 ppm uranium, 23 ppm lanthanum, and 41 ppm cerium (Map no. 11, samples 174-175; Table A-3). These results, though anomalous, represent only a limited extent of the exposed rock.

Conclusions

Anomalous rare-earth values were obtained in both sandstone (Dickinson, 1979) and black carbonaceous shale from the Kadake Bay area. However, the values are well below those required for an economically viable deposit. Based on the BLM's investigation, there seems to be little potential here for a rare-earth resource.

KUIU

(Plate 1, Map nos. 12.1-12.4)

Location/Access

The Kuiu occurrence is located on the east side of Kuiu Island, between Kadake Bay and Port Camden, approximately 12 miles south of Kake. It can be reached by small boat, float plane, or helicopter at low tide. Boat access into Kadake Bay is limited to medium and high tides due to the large tidal flats exposed at low tide.

History

T.F. Schorn staked the Kuiu 1-9 claims for gold at this location in 1976. Mapco Inc. staked the Krista claims at the same location in 1979. The Krista block of 21 claims may have overlapped the Kuiu claims or may have been located adjacent to them. There is no record of development work beyond the initial staking of both blocks (Alaska Kardex, 1982). This area was also investigated for uranium by Eakins (1975) and Dickinson (1979).

Mineral Assessment

The Kuiu occurrence lies within a section of the Tertiary Kootznahoo Formation that has been intruded by Tertiary gabbro (Muffler, 1967). Nonmarine Kootznahoo sediments crop out just inside the tree line along the beach.

BLM personnel collected one pan concentrate and eight stream sediment samples from several very small streams along the northwest side of Port Camden. The pan concentrate sample was taken from fine-grained sand found in a wooden box lying just above the high-tide line. This sample contained 2,255 ppb gold (Map no. 12.3, sample 170). Stream sediment samples contained up to 24 ppb gold and 37 to 130 ppm zinc (Map nos. 12.1-12.4, samples 168-169, 171-173, and 9624-26).

Conclusions

Stream sediment samples from the numerous small creeks draining into the northwest side of Port Camden revealed low gold and base-metal concentrations.

POINT SAINT ALBANS

(Plate 1, Map nos. 13.1-13.3)

Location/Access

The Point Saint Albans occurrence is located 1.5 miles north of Point Saint Albans on the southeast tip of Kuiu Island, 60 miles south of Kake. Access is by boat or helicopter at low tide.

History

The earliest recorded activity at the Point Saint Albans occurrence is credited to Fred Magill sometime prior to 1952. At that time, J.R. Houston visited Magill's zinc property to evaluate it for uranium potential (Houston and others, 1958). Claim records for Magill's Hot Spot claim appear in 1954 (Alaska Kardex, 1982), but there is no record of subsequent activity.

Mineral Assessment

The country rock in the general vicinity of the Point Saint Albans occurrence has been mapped as Silurian sedimentary rocks (Gehrels and Berg, 1992). Locally these fine-grained, medium-bedded rocks have been intruded by hornblende diorite and hornfelsed, cut by basaltic dikes, and faulted. The occurrence consists of shear zones containing sulfide minerals and small, sulfide-rich veins along dike margins. These zones are typically iron-stained, contain irregular quartz-calcite lenses, and range in width from 0.1 to 2.4 feet. They generally strike 280° to 325° and dip 20° to 56° to the southwest, but one shear dips 15° to the north. The mineralization is characterized by coarse-grained, disseminated sphalerite; very fine-grained, disseminated galena; very fine-grained, disseminated arsenopyrite; and fine-grained, disseminated pyrite. The sulfides commonly, although not exclusively, are found in the quartz-rich parts of the shear zones.

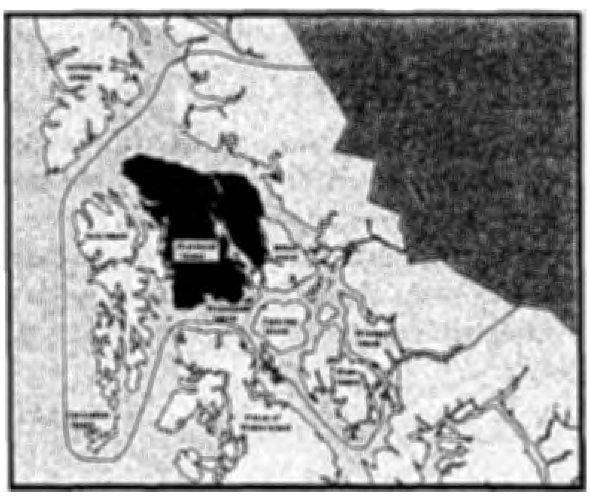
BLM personnel collected eight samples from different mineralized outcrops at the occurrence. Seven of the eight samples contained zinc values that ranged from 2,186 ppm to 2.4 percent (Map nos. 13.1-13.3, samples 177, 179-180, 9628-31). A sample from a 1-inch-wide band of pyrite, arsenopyrite, and sphalerite found along the margins of a hornblende diorite dike contained 5,535 ppb gold and 8,409 ppm zinc (Map no. 13.1, sample 9628). A sheared, sedimentary breccia with galena, sphalerite, and arsenopyrite contained 342.2 ppm silver, 8.15 percent lead, and 1.1 percent zinc (Map no. 13.2, sample 9631). A sample of a quartz vein containing galena, sphalerite, pyrite, and arsenopyrite returned 161.7 ppm silver, 9,834 ppm lead, and 2.4 percent zinc (Map no. 13.2, sample 180). During Houston's visit in 1952, a vein containing sphalerite was sampled and analyzed for uranium. The result is reported as 0.001 percent equivalent uranium (Houston and others, 1958).

Conclusions

Samples from the Point Saint Albans occurrence contained high concentrations of silver, zinc, and lead. One sample contained a high concentration of gold. These samples also contained anomalous amounts of antimony, arsenic, and cadmium. Although precious- and base-metal concentrations are elevated, samples were collected from scattered, narrow zones across a relatively wide area along the shoreline. The zones are too narrow and widespread to make a large, low grade deposit, but their large aerial extent and high grade encourages further exploration. Further work to identify and more precisely characterize the mineralization at this occurrence is warranted.

KUPREANOF ISLAND

Property name	Plate 1, Map no.
Pinta Point	14
Kake Area Road System	15-16, 18
Gunnuk Creek	17.1-17.3
Kane Peak	19.1-19.3
Portage Bay Pit	20
Northern Copper	21.1-21.3
Towers Creek	22.1-22.3
Salt Chuck	23.1-23.2
Portage Creek	24.1-24.2
Taylor Creek	25.1-25.2
Indian Point	26
West Duncan	27
Kupreanof Pyrite	28
Castle Island Mine	29.1-29.3
East Duncan Pyrite	30
Spruce Creek	31.1-31.3
Nicirque	32
Southwest Duncan Canal	33
TB	34
Monongehela	35



PINTA POINT

(Plate 1, Map no. 14)

Location/Access

Pinta Point is situated at the northernmost tip of Kupreanof Island, 9 miles north-northeast of Kake. The occurrence at Pinta Point is exposed along the shoreline, in the intertidal zone and above the high-tide line. The area is accessible by boat and by helicopter. Land in the area is controlled by Kake Tribal and Sealaska Corporation (the area's Alaska Native Claims Settlement Act (ANCSA) Native village and regional corporations).

History

BLM personnel discovered anomalous mineral concentrations during a reconnaissance investigation along the north shore of Kupreanof Island. No mention of this prospect is known in published literature.

Mineral Assessment

The occurrence at Pinta Point is hosted in graphitic schist that is part of a unit mapped as metamorphosed, Upper Mesozoic, Stephens Passage Group (Brew and others, 1984). Near Pinta Point, the unit includes interlayered limestone, chert, felsic schist, and greenstone. The rocks are metamorphosed and have been multiply deformed.

The host graphitic schist is commonly silicious, dark gray, and well foliated. It has been penetratively and multiply deformed with tight to isoclinal folds, commonly on a scale of inches to a few feet. Foliation in the area trends generally northwest with steep dips. Near Pinta Point, the schist includes finely disseminated and massive sulfides, mainly pyrite and pyrrhotite, that can be found along approximately 500 feet of the shoreline. In places the sulfides make up 30 percent or more of the rock, in layers up to about 1 foot thick. One 15-foot-wide zone contains about 10 percent sulfides across its entire width. This zone is exposed for about 30 feet, between the boulder-strewn shoreline and brush inland. In another area, the graphitic schist with seams of pyrite is exposed in cliffs above the intertidal zone. Here the rock is poorly indurated, and its appearance is slaty. The sulfides at Pinta Point are mainly pyrite and pyrrhotite with small amounts of sphalerite and chalcopyrite.

BLM personnel sampled the mineralized rock; two samples were collected from the 15-foot-wide zone and one from the poorly indurated rock described above. Sample results indicate low precious- and base-metal values (Map no. 14, samples 2363-64, 2391). A representative sample across 11 feet of the zone contained 43 ppb gold, 143 ppm copper, and 624 ppm zinc (Map no. 14, sample 2363). A reconnaissance sample collected 1,000 feet west of Pinta Point from an isolated 1.5- by 2-foot lens of massive sulfide contained 661 ppm copper and 1,595 ppm zinc (Plate 2, Map no. R4, sample 2365).

Conclusions

Sample results indicate very low precious- and base-metal values associated with the sulfides at Pinta Point; however, the broad extent of the minerals encourages further investigation of the area. This area lies within a belt of rocks that elsewhere hosts prospective volcanogenic massive sulfides (VMS) deposits. Additional work in the area is warranted.

KAKE AREA ROAD SYSTEM

(Plate 1, Map nos. 15-16, 18)

Location/Access

The small village of Kake (population 700) on northwestern Kupreanof Island is accessible by scheduled air service and by Alaska Marine Highway System ferry. The Kake Area Road System refers to the network of logging roads surrounding the village. The system includes the roads generally north of Kake belonging to the Kake Village Corporation (the area's ANCSA Native village corporation), as well as those east and southeast of Kake on Forest Service land. Many of the logging roads are still accessible by truck. However, some are overgrown with alders and are impassible. Still others are washed out or the bridges have been removed. Consequently, much of the area is only accessible by foot. The occurrences discussed below are all situated on Native land holdings.

History

Only one occurrence is noted in the Kake area: Gunnuck Creek, located on Native Corporation land about 3 miles northeast of Kake. Four claims were staked in the area in 1968 that reportedly targeted lode gold (Alaska Kardex, 1982; Bureau of Land Management, MAS database). No production is known to have taken place on the property (see Gunnuck Creek, Map nos. 17.1-17.3).

BLM personnel discovered three anomalous mineral concentrations during reconnaissance of the Kake road system in 1998. There is no known mention of these in published literature.

Mineral Assessment

The Kake road system area is made up mainly of Mississippian and Devonian argillite and graywacke of the Cannery Formation and Mesozoic phyllite and slate of the "Duncan Canal/Zarembo Island/Screen Island" sub-belt of Brew and others (1984). Cretaceous hornblendite and hornblende gabbro crop out at Turn Mountain, and several units of the Triassic Hyd Group are exposed west of there (Brew and others, 1984). All of these units are within the Alexander terrane (Silberling and others, 1994). Rocks in the area are unmetamorphosed or metamorphosed only to prehnite-pumpellyite or lower greenschist facies (Dusel-Bacon and others, 1996). Structures in the area trend generally to the northwest.

BLM personnel examined numerous rock pits along the Kake logging road system, particularly those of Kake Tribal Logging to the north of town. They also collected many reconnaissance samples from the pits (Plate 2), mostly of pyrite seams and segregations hosted in the argillite of the Cannery Formation. Three occurrences of note were discovered during the logging road examination: one consists of narrow sulfide veins; another, a lens or layer of massive barite; and the third, a shear hosting a layer of pyrite with chalcopyrite.

One mile northwest of Kake, two to three veins of sulfide minerals hosted in silicious argillite with calcite gangue are exposed in a rock pit. The veins average about 1 inch thick and extend for about 20 feet where they are cut off by a fault in one direction and by cover in the other. Coarse, crystalline calcite is common adjacent to and within the sulfide veins as well as in veinlets in the silicious argillite. A representative sample of the sulfide-rich veins contained 1,135 ppb gold, 30.5 ppm silver, 7,327 ppm copper, and 5.4 percent zinc (Map no. 18, sample 3700).

About 3 miles southwest of Turn Mountain, BLM personnel sampled a lens of massive barite that also contains galena and sphalerite. The lens, about 2 feet thick and about 6 feet long, is exposed in unconsolidated soil above a logging road, so its relation to the country rock in the area is unknown. The country rock is mapped as Cannery Formation (Brew and others, 1984) and consists mainly of argillite. Clasts of argillite are common in the massive barite of the lens. A select sample of the lens contained 13.1 ppm silver, 1.02 percent lead, 3.0 percent zinc, and 48.37 percent barium (Map no. 16, sample 3705).

A small shear zone filled with quartz, potassium feldspar, epidote, and layers of pyrite and chalcopyrite was discovered about 1 mile south-southeast of Turn Mountain. The northeast-trending shear cuts hornblende diorite and is exposed in a rock pit. A layer of coarsely crystalline, weathered pyrite 1 to 3 inches thick with lenses of chalcopyrite is exposed for about 15 feet in a wall of the pit. A select high-grade sample of the sulfides contained 30.6 ppm silver, 11.2 percent copper, and 1,253 ppm molybdenum (Map no. 15, sample 3711).

Conclusions

The sulfide vein near Kake is too small to be considered a resource. Additional follow-up work in the area may reveal the presence of other mineral concentrations, but a precious-metal resource hosted in small veins is unlikely.

The massive barite prospect is worthy of additional investigation. Barite is associated with other volcanogenic massive sulfide deposits in the area, so determining the mineralizing process related to the barite deposition is worthwhile. Finding additional barite and examining its relationship to the surrounding country rock would be beneficial.

The shear hosting pyrite and chalcopyrite is very limited in extent. Additional investigation is probably unwarranted.

GUNNUK CREEK

(Plate 1, Map nos. 17.1-17.3)

Location/Access

The Gunnuk Creek prospect is located about 3 miles northeast of Kake along Gunnuk Creek, which flows into Keku Strait at Kake. At this location, the creek flows gently within relatively subdued topographical relief. The area is accessible from the Kake road system; one of the Kake logging roads crosses Gunnuk Creek just below the prospect. The land in the area is controlled by Kake Tribal and Sealaska (the area's ANCSA Native village and regional corporations).

History

Very little is known about the claims. They were originally staked in 1968 as the "ABC" claims in a 4-claim block. The target was apparently lode gold (Alaska Kardex, 1982).

Mineral Assessment

BLM personnel searched the Gunnuk Creek area where the prospect is reported to have been located (Alaska Kardex, 1982), but found no evidence of mineral activity. They collected five stream sediment samples from the area, but none of the samples revealed significant metal values (Map nos. 17.1-17.3, samples 3728-30, 8688-89).

Conclusions

There is not enough information available about the Gunnuk Creek claims to assess their significance. However, the lack of information itself suggests that any deposit, if one did exist, would be of little importance.

KANE PEAK

(Plate 1, Map nos. 19.1-19.3)

Location/Access

The Kane Peak prospect is 13 miles northwest of Petersburg, on the northeast side of Kupreanof Island. Kane Peak is the easternmost member of the Missionary Range on the north end of Lindenberg Peninsula. The mineralized intrusive at the prospect extends east from near the summit of Kane Peak to the vicinity of Cape Strait on Frederick Sound. The area around the peak is relatively steep and rugged, but the terrain slopes more gently closer to tidewater at Frederick Sound. The mineralized intrusive body is exposed from sea level to an elevation of over 3,000 feet near the summit.

Most of the area is covered with muskeg, brush, and timber; the best mineral outcrops are at the shoreline and above the tree line. The use of a boat or float plane is the best way to access the shoreline. But the higher-elevation exposures on Kane Peak are most easily accessed by helicopter.

History

A.F. Buddington's examination of the Kane Peak area in 1923 is the first record of activity at the site (Buddington and Chapin, 1929). Kennedy and Walton of the USGS investigated the area in August 1943 and described the geologic features of the intrusive complex. They did not collect any samples for analysis, however, because the sulfide-bearing pyroxenite was reported to contain only 1 to 2 percent sulfides (Kennedy and Walton, 1946).

Kennedy and Tolstoy made a topographic map of the area in 1946. They also produced a detailed geologic map, but their study of the area was confined mainly to the southwestern part of the complex (Walton, 1951).

In 1960 the first known mineral claims on the site were staked by Joe Bigelow for magnetite. These coincided with a low ridge, parallel and adjacent to tidewater, about 1,000 feet north-northwest of the mouth of Twelvemile Creek (Banister, 1962). In 1961 Joe and Esther Bigelow staked the Joyce Ann and Esther E. claims for iron. These were situated on the northwest side of Twelvemile Creek, south of Kane Peak (Alaska Kardex, 1982). No other claims or prospecting are known in the area.

In 1961 the Bureau of Mines, in connection with an iron resource study of Southeast Alaska, investigated the area for iron (Banister, 1962). There has been no production from the Kane Peak prospect.

Mineral Assessment

The occurrence at Kane Peak is associated with Cretaceous intrusive rocks of the Klukwan-Duke Plutonic Belt (Brew and Morrell, 1983). The ultramafic complex consists of wehrlite, dunite, and clinopyroxenite. Zone boundaries are poorly developed, and the major rock types are gradational (Brew, 1971). The ultramafic body has intruded graywacke and biotite-quartz gneiss and is in turn intruded on the northwest by monzodiorite. According to Kennedy (1946), the central part of the complex is composed of dunite, wehrlite, and diopside pyroxenite. This ultramafic part of the complex is exposed in most of the outcrops on the peak. A band of hornblendite borders the ultramafic body on the north and south sides. Looking northward from a small lake south of Kane Peak, one can see a conspicuous band of brick-red stained, sulfide-bearing pyroxenite on the peak's south slope. The staining is likely due to oxidation of sulfide minerals that make up only a small proportion of the ultramafic body (Kennedy, 1946).

Walton (1951) describes "appreciable" amounts of sulfide minerals "sporadically distributed" in the southwestern part of the complex–specifically pyrrhotite, pentlandite, and chalcopyrite. Although no economically significant masses of sulfides were discovered, Walton (1951) suggests that such masses may exist.

The Bureau of Mines examined an area north of Twelvemile Creek near tidewater, but nothing of economic significance was found. The work included a magnetometer survey that reportedly indicated subeconomic grades of iron (Banister, 1962). The iron-bearing magnetite bodies in hornblendite that were examined were too small and too low-grade to be of economic interest. A representative sample analyzed for titanium, vanadium, and copper also revealed low values (Banister, 1962).

In the summer of 1998, BLM personnel examined and collected 12 samples (Map nos. 19.1-19.3, samples 392-398, 2810-14) from the shoreline exposure of the ultramafic body at Kane Peak. They collected six stream sediment and six rock chip samples. Exposures higher on the peak, especially the stained pyroxenite on the south slope, were not examined in 1998 due to poor weather. Analytical results from samples of the shoreline outcrops and stream sediments showed generally low metal values. Some samples had slightly elevated nickel (Map no. 19.2, samples 393-396) and chromium (Map nos. 19.1-19.2, samples 2813-14, 392-394). The highest were 316 ppm nickel (Map no. 19.2, sample 394) and 390 ppm chromium (Map no. 19.1, sample 2814). BLM personnel analyzed the samples for platinum group metals as well, but detected no anomalous values.

Conclusions

The ultramafic body at Kane Peak is similar to others in Southeast Alaska that have been prospected for iron, chrome, and platinum group elements. To date, no significant quantities of these elements have been found at Kane Peak.

PORTAGE BAY PIT

(Plate 1, Map no. 20)

Location/Access

The Portage Bay Pit is located on northern Kupreanof Island, half a mile south of the head of Portage Bay. The site is 14 miles northwest of Petersburg. The occurrence is exposed in a borrow pit from which material was removed to construct part of the Portage Bay road system. The road system extends around the bay, connecting the borrow pit at the head of the bay with the log transfer facility and logging camp near its mouth. The bay is accessible by boat or float plane; and the pit, by road or helicopter.

History

In 1998 BLM personnel discovered copper and molybdenum in a borrow pit south of Portage Bay. No mention of this site is known to exist in published literature.

Mineral Assessment

The country rock exposed in the Portage Bay Pit is a fine- to medium-grained, dark gray to dark green diorite(?). Geologic maps of the area do not indicate the presence of an intrusive body in the immediate area; however, Cretaceous age quartz monzonite to diorite bodies have been mapped to the north and south of the pit (Brew and others, 1984; Brew, 1971).

Pyrrhotite is almost ubiquitous in the intrusive and makes up about 1 to 2 percent of the rock. Very fine-grained, disseminated chalcopyrite is also common across the pit, but makes up only a fraction of a percent of the rock. Pyrite is also common. The sulfides commonly occur as thin coatings on fracture surfaces. Rare coatings of molybdenite are also present on fracture surfaces.

Several faults cut the intrusive in the pit. Along the faults, sulfides are commonly concentrated in the sheared and altered rocks. One of the faults, oriented approximately 315°, 77 northeast, contains bands of sulfides that include mainly pyrrhotite with chalcopyrite, sphalerite, galena, arsenopyrite, and pyrite.

To the north of the pit, the hornfels that hosts the intrusive is exposed. The host rock is fine-grained and well indurated, with evidence of bedding planes in some places indicating that it is likely a metasediment. The rocks in the area have been mapped as Cretaceous phyllite, derived from sediments of the Jurassic to Cretaceous Seymour Canal Formation (Brew and others, 1984; Brew, 1971).

BLM personnel surveyed the Portage Bay rock pit and collected 12 samples. The average of four random, representative samples collected across the pit was 163 ppm copper (Map no. 20, samples 2803-06). These samples ranged in length from 8 to 20 feet. Higher-grade samples were collected from sulfide-rich, silicified zones that seem to be concentrated near faults. Examples of these altered zones were found in one place on the northwest side of the pit as well as in rubble on the pit floor. One select sample of sulfide-rich material contained 3,271 ppb gold, 13.9 ppm silver, 3,025 ppm copper, 4,708 ppm lead, 1.4 percent zinc, and 9,762 ppm arsenic (Map no. 20, sample 3674). Other samples contained up to 855 ppm molybdenum (Map no. 20, sample 3678), and 1,365 ppm nickel (Map no. 20, sample 3682).

Conclusions

The disseminated nature of the pyrrhotite and minor chalcopyrite in the intrusive rock exposed in the Portage Bay Pit suggests the potential for a porphyry-type deposit. However, there are no significant porphyry systems of Cretaceous age known in the area. The altered zones, which returned noteworthy analytical results, deserve additional investigation. An attempt could be made to determine the extent of the intrusive and any additional fault-related mineralized zones.

NORTHERN COPPER

(Plate 1, Map nos. 21.1-21.3)

Location/Access

The Northern Copper prospect is located at the north end of Duncan Canal on north-central Kupreanof Island, 17 miles west-northwest of Petersburg. The prospect sits at an elevation of approximately 1,300 feet on the south face of Kupreanof Mountain. The topography in the area is moderately steep. Dense conifer forest covers the ridge slopes, and muskegs are common on the ridge crest. Covering the prospect are four patented mining claims (MS 652) that at one time were an inholding within the Petersburg Creek-Duncan Salt Chuck Wilderness area (as defined by the Alaska Native Claims Settlement Act (ANILCA), 1980). The patented claim holders subsequently turned the property over to the Forest Service to manage as wilderness. Access is most easily accomplished by taking a helicopter to the ridge crest above the property (which marks the boundary of the wilderness area) and then descending to the prospect on foot.

History

The claims at Northern Copper were first staked in 1900 (Wright and Wright, 1908). They were active between 1900 and 1901 and between 1918 and 1921. Between 1900 and 1901, the claims were held by the Portage Mountain Mining Co., which also held claims about 6 miles to the east on Portage Mountain. This company prospected the claims with adits and shafts (Wright and Wright, 1908). Sometime after 1906, the property was acquired by the Kupreanof Mining Co., which began the construction of a plank road to tidewater in 1918. The road was intended to connect to an aerial tram, which, in turn, was to connect to the prospect on the mountainside above (Buddington, 1923). The tram was apparently never constructed, as no evidence or mention of its existence was found. In 1920 the claims were purchased by the Northern Copper Co., which began developing the prospect by extending adits as well as cutting trenches, opencuts, and pits (Buddington, 1923). Development ceased in 1921, and the property remained idle until it was restaked in 1944 (U.S. Bureau of Mines, 1945). Bureau of Mines and USGS personnel examined the property in the 1940's (U.S. Bureau of Mines, 1945; Twenhofel and others, 1949). The renewed interest was probably driven by demands of the war effort. After the 1940's, there is no published evidence of activity at the site until the late 1970's.

In 1978 Amoco Minerals Co. (Amoco) staked a large block of claims at the north end of Duncan Canal that covered the Northern Copper prospect. In 1978 and 1979, the company carried out airborne geophysical surveys; ground electromagnetic, magnetic, and gravity surveys; geologic mapping; soil and stream sediment geochemical sampling; and core drilling. In the Northern Copper area, weak airborne EM anomalies were further delineated by ground EM and soil geochemical surveys. Six diamond drill holes were subsequently drilled to evaluate the anomalies (Zelinski, 1979?; Amoco Minerals Company, 1979).

Four claims belonging to the Kupreanof Mining Co. were patented in 1907 (Bureau of Land Management, MAS) in the name of John Johnston (Patent No. 44523; Patent Plat), who may have been a representative of the Portage Mountain Mining Co., the likely claim holders at the time of patent. These four claims were acquired by Boochever, Dubuar, and Hansen, who then deeded the property to the Forest Service for inclusion in the Petersburg Creek-Duncan Salt Chuck Wilderness area in 1995.

Mineral Assessment

The Northern Copper prospect lies within an undifferentiated belt of volcanic rocks (Brew and others, 1984; Brew, 1997m) that elsewhere in the Duncan Canal area are associated with VMS deposits. New mapping in the area by Karl and others (1999) after the release of airborne geophysical data (ADGGS, 1997a-m) dates the Northern Copper host rocks as Devonian. The mineralized rock has been described as a replacement-type deposit by past investigators (Buddington, 1923; U.S. Bureau of Mines, 1945; Twenhofel and others, 1949) and, as such, may not be related to Triassic VMS deposits in the area.

Historic developments at Northern Copper include numerous workings, many of which are now caved and overgrown. Most of these are concentrated at an elevation of about 1,300 feet, where a shaft and at least eight trenches, opencuts, and pits have been developed. The shaft, when examined in 1998, was 28 feet deep, although two earlier reports give different descriptions–50 feet deep (U.S. Bureau of Mines, 1945) and 40 feet deep with a drift at the bottom (Twenhofel and others, 1949). Three adits were also developed on the property. One, at an elevation of about 1,200 feet, was driven to undercut the mineralized rock exposed in the shaft. It is presently caved, but was reportedly 354 to 375 feet long (U.S. Bureau of Mines, 1945, and Twenhofel and others, 1949, respectively). A second adit, 30 feet long, lies about 1,500 feet northeast of the shaft at an elevation of about 1,100 feet. It was cut to follow a band of mineralized rock exposed in a small, adjacent creek bed. BLM personnel located a third adit at an elevation of about 1,180 feet on the north side of a small creek that flows to the east, draining the area of the main workings. The adit extends for 285 feet and exposes bands or layers of mineralized rock from near its portal to its face.

The BLM's investigation included surveying the main workings; mapping and sampling the shaft and two open adits; and mapping and sampling where mineralized rock was easily exposed in the trenches, pits, and opencuts. Because much of the area is overgrown, the investigation was confined to discrete outcrops, which present an incomplete picture of the nature of mineralization in the area.

Mineralized rock is exposed in three main places in the Northern Copper area; (1) near the main workings, in the shaft and adjacent trenches (Map no. 21.3), (2) in the 285-foot adit (Map no. 21.2), and (3) in the 30-foot adit (Map no. 21.1).

Mineralized rock in the area of the main workings consists of sulfide-bearing greenstone and greenstone schist. The sulfides are mainly pyrrhotite with pyrite, chalcopyrite, and sphalerite. They occur in massive lenses, as well as patches and disseminations within the host rock. Two lenses of massive sulfide are partially exposed in the main trench. Their largest dimensions are only about 2-3 feet. The lenses are hosted by greenstone schist at the base of a massive greenstone bed. Disseminated sulfides are found concentrated in the greenstone along with skarn minerals. The massive lenses generally contain more chalcopyrite than sphalerite; whereas, the disseminated sulfides in the greenstone generally consist of more sphalerite than chalcopyrite.

Skarn minerals include garnet and radiating crystals of pyroxene, likely altered to amphibole. The skarn minerals are generally restricted to the massive greenstone units and are commonly accompanied by silicification of the greenstone. Pure, coarsely crystalline marble is found in layers and lenses that are commonly oriented parallel to the foliation/layering in the greenstone schist and greenstone. Nowhere were sulfides, particularly massive sulfides, found associated with the marble.

The second mineralized interval in the main workings area is described in an unpublished Amoco report on the Northern Copper area (Zelinski, 1979?). It occurs in gray argillites about 80 feet stratigraphically below the massive greenstone bed exposed in the main trench. The massive sulfides in this interval are mainly pyrrhotite with variable amounts of chalcopyrite. Samples as high as 22.4 percent copper were collected, but the massive sulfide layer was not found to exceed a thickness of 2 feet at any point. The zone is said to be relatively continuous, but the grades are variable (Zelinski, 1979?).

BLM personnel collected 36 samples form the shaft, trenches, pits, and dumps in the main workings area. Analytical results revealed elevated concentrations of copper and zinc, with minor silver and trace gold. The highest copper values were 1.7 percent copper over 1.5 feet (Map no. 21.3, sample 8684) 1.4 percent copper over 1.8 feet (Map no. 21.3, sample 3714), and 3.5 percent copper in a select sample from an outcrop (Map no. 21.3, sample 3666). Zinc values ranged up to 1.2 percent over 3 feet (Map no. 21.3, sample 108) and 2.4 percent over 1.5 feet (Map no. 21.3, sample 3715) in silicified greenstone. Silver and gold values ranged up to 32.6 ppm silver (Map no. 21.3, sample 3666) and 165 ppb gold in a massive sulfide lens (Map no. 21.3, sample 3725).

Mineralized rock exposed in the 285-foot adit consists of two types: massive sulfide layers and disseminated sulfides. A continuous layer of massive pyrrhotite with chalcopyrite and minor sphalerite, 0.2 to 1.7 feet thick, is exposed for about 100 feet near the face of the adit. The layer is offset in four or five places by apparent dip-slip movement on northeast-striking, southeast-dipping faults. The massive sulfide layer is hosted by greenstone schist and is commonly on or near the contact with dark gray to black, fine-grained phyllite, which it structurally overlies. Samples across the layer of massive sulfide ranged up to 3.1 percent copper and 1,427 ppm zinc over 0.6 feet (Map no. 21.2, 3685), and 2.5 percent copper over 1.4 feet (Map no. 21.2, sample 3806). Precious metal values in the massive sulfide are low; they range up to 29 ppb gold (Map no. 21.2, 3806) and 11.5 ppm silver (Map no. 21.2, 3685).

The second type of mineralized rock in the 285-foot adit consists of a silicious band of greenstone schist containing pyrrhotite (both disseminated and in veinlets) and very minor chalcopyrite. This band structurally underlies the layer of phyllite described above. Analytical results indicate little significance to this second type of mineralized rock. Results ranged up to 860 ppm copper and 369 ppm zinc over 2.2 feet (Map no. 21.2, samples 3810, 3687).

The 30-foot adit northeast of the main workings was driven to cut a band of massive sulfide exposed in a small creek. The band is concordant to foliation in the host rocks; it strikes 330° to 345° and dips about 10° to 30° to the southwest. The band is from 0.25 to 2 feet thick and is exposed for about 20 feet along strike, both in the adit and in the adjacent creek. It consists of pyrrhotite, pyrite, and chalcopyrite. Samples from the band of sulfides contained up to 12.4 percent copper over 2 feet (Map no. 21.1, sample 415). Precious metal values from samples of the sulfide band were higher than elsewhere in the Northern Copper area, but still were low. Gold values ranged up to 440 ppb (Map no. 21.1, sample 417) and silver to 37.7 ppm (Map no. 21.1, sample 415).

Conclusions

Since the Northern Copper property is now part of the Petersburg Creek-Duncan Salt Chuck Wilderness area, evaluation of the property is useful only to provide insight into other mineral prospects in the Duncan Canal area. Karl and others (1999) assign Devonian age to the rocks in the Northern Copper area, and as such, the rocks would not be associated with Triassic VMS deposits in the area. As a replacement deposit, the occurrence at Northern Copper is of less significance. The mineralized zones are relatively thin. And though they are exposed over a large area, they make up only a small percentage of the host rock. Precious-metal values are also low.

TOWERS CREEK

(Plate 1, Map nos. 22.1-22.3)

Location/Access

The Towers Creek prospect is located above a waterfall in Towers Creek, at an elevation of 140 feet. It is about 1.5 miles from the head of Towers Arm and 18 miles west-northwest of Petersburg. The topography of the area is gently sloping, with muskegs, dense brush, and thick timber stands. Short cliffs border the creek near the prospect, and access is most easily accomplished by helicopter. Investigators must land nearby and hike down a short cliff to the prospect in the creek.

History

In 1978 Amoco Minerals Co. staked a large block of claims covering the Towers Creek prospect at the north end of Duncan Canal. In 1978 and 1979, the company carried out airborne geophysical surveys; ground electromagnetic, magnetic, and gravity surveys; geologic mapping; soil and stream sediment geochemical sampling; and core drilling on their claims.

Mineral Assessment

The Towers Creek prospect is located near the contact between Devonian schists and phyllites, and Triassic Hyd Group argillite (Karl and others, 1999). The rocks trend west to northwest and dip 25° to the northeast.

The BLM's examination of this prospect revealed an outcrop/boulder in the middle of the creek that consists of iron-stained, limey, silicified schist containing disseminations and narrow bands of pyrite with sparse chalcopyrite. Six samples across the schist and pyrite bands contained from 175 to 713 ppm copper (Map no. 22.1, samples 111-113, 270-272). Two stream sediment and three rock chip samples collected in Towers Creek, downstream from the prospect, did not contain significant metal values (Map nos. 22.2-22.3, samples 2345-47, 9558-59).

Conclusions

The BLM's examination of the Towers Creek prospect did not reveal significant mineralized rock.

SALT CHUCK

(Plate 1, Map nos. 23.1-23.2)

Location/Access

The Salt Chuck prospect is located on the peninsula between Towers Arm and North Arm at the head of Duncan Canal on Kupreanof Island, 15 miles west of Petersburg. The topography of the area is gently sloping, with muskegs, dense brush, and thick timber stands. The area was temporarily withdrawn from mineral entry in 1978 until RARE II (Roadless Area Review and Evaluation) wilderness areas had been designated by Congress. In 1980 the prospect was included in the Petersburg Creek-Duncan Salt Chuck Wilderness area (defined by ANILCA, 1980). Access to the prospect is by boat, on foot, or by helicopter–if special permission is obtained to access the wilderness area.

History

In 1978 Amoco Minerals Co. (Amoco) staked a large block of claims covering the Salt Chuck prospect at the north end of Duncan Canal. The company's geologists were among the first to recognize the importance of volcanogenic massive sulfide deposits in the Duncan Canal area. In 1978 and 1979, the company carried out airborne geophysical surveys; ground electromagnetic, magnetic, and gravity surveys; geologic mapping; soil and stream sediment geochemical sampling; and core drilling. In the Salt Chuck area, airborne EM anomalies were further delineated by ground EM and soil geochemical surveys. Five diamond drill holes were subsequently drilled to evaluate these anomalies (Zelinski, 1979?); Amoco Minerals Company, 1979).

Mineral Assessment

The Salt Chuck prospect is hosted in Devonian phyllite, schist, and greenstone (Karl and others, 1999). The rocks trend northwest and dip steeply to the east.

The prospect is defined by an 8,000-foot-long, northwest-trending geophysical anomaly identified by airborne and ground geophysics. Three verified bedrock conductors are shown on an Amoco map. Five holes were drilled into the Salt Chuck anomaly. They range in length from 600 to 1,000 feet and explore the anomaly about 5,000 feet along strike. Amoco describes the massive sulfide bands on this prospect as thin, discontinuous, and generally low-grade. The best intersections occurred in one hole where 1.7 feet averaged 1.86 percent copper and another 10 feet averaged 0.877 percent copper (Zelinski, 1979?; Amoco Minerals Company, 1979).

Amoco geologists discovered two mineralized outcrops during their examination of the prospect. The westernmost is located on the peninsula between Towers and North Arms, 3 miles north of the peninsula's tip and 2,000 feet inland from North Arm. The outcrop is located midway along the length of the anomaly and is described as a 10-foot-long by 5-foot-wide band of chalcopyrite hosted in rhyolite. (There is an inconsistency between the text description given above and an

Amoco map that indicates a 16-foot sample/outcrop.) Amoco samples collected across the outcrop averaged 6.3 percent copper, 0.02 percent zinc, and 0.32 oz/ton silver. The other mineralized zone is located 2,000 feet to the east, on the west side of Towers Arm. Here, three sulfide bands are exposed along the beach; each is less than 6 inches wide and composed of chalcopyrite, sphalerite, and galena hosted in rhyolite. The bands contain from 0.01 to 0.13 percent copper, 0.10 to 25.3 percent lead, 0.15 to 7.8 percent zinc, and from 0.2 to 13.62 oz/ton silver (Zelinski, 1979?; Amoco Minerals Company, 1979).

The BLM's examination of the Salt Chuck prospect revealed bands of disseminated to massive sulfides at two locations, called the "Salt Chuck Copper" to the west and "Salt Chuck Zinc" to the east (Map nos. 23.1-23.2). These are at or near the two mineralized locations described above by Amoco geologists.

The Salt Chuck Copper occurrence consists of a band of sulfides exposed in three cuts. The cuts are up to 4 feet wide and are aligned along strike and separated by 84 feet and 30 feet of muskeg. The host rock is rusty yellow, iron-stained, silicified chlorite schist. It is more resistant to weathering than the surrounding rock, so it forms ridges that stand out above the surrounding muskeg. The mineralized band is conformably hosted in schist that strikes 320°, dips steeply to the northeast, and is coincident with the geophysical anomaly. The band contains disseminated to massive pyrite and chalcopyrite. Samples averaged across 3.8 feet at the northernmost outcrop contained 0.8 percent copper and 3.4 ppm silver (Map no. 23.1, samples 279-280). A 1.0-foot-long sample across the most mineralized part of the middle outcrop contained 3.0 percent copper and 3.4 ppm silver (Map no. 23.1, sample 269). A 1.3-foot-long sample across the southernmost outcrop contained 1.1 percent copper and 2.8 ppm silver (Map no. 23.1, sample 513). A 0.4-foot, high-grade sample from the northernmost outcrop contained 7.1 percent copper and 9.9 ppm silver (Map no. 23.1, sample 109).

At the Salt Chuck Zinc location, silicified schist hosts narrow, conformable quartz veins. One of these veins, 0.5 feet thick, contains blebs and bands of pyrite and sphalerite. A sample across it contained 5,898 ppm zinc (Map no. 23.2, sample 115). A 1.2-foot sample across adjacent pyritized, silicified schist did not contain significant metal values (Map no. 23.2, sample 114). A 0.075-foot-thick vein in the vicinity contained 2.3 percent zinc (Map no. 23.2, sample 9647).

Conclusions

The Salt Chuck prospect is hosted in Devonian rocks (Karl, and others, 1999) instead of the Triassic rocks that are known to contain numerous significant volcanogenic massive sulfide deposits in the Duncan Canal area. However, the conformable character and extent of the sulfide mineralization suggests volcanogenic massive sulfide origins. The prospect has been sufficiently explored by shallow drilling to preclude a significant near-surface deposit. It would be of interest to recheck the Amoco map where a 16-foot-wide zone averaging 6.3 percent copper is described (Amoco Minerals Company, 1979). The wilderness land designation covering the Salt Chuck prospect prohibits exploration and mining in the immediate area.

PORTAGE CREEK

(Plate 1, Map nos. 24.1-24.2)

Location/Access

The Portage Creek prospect is situated on Portage Mountain, east of the head of Duncan Canal on Kupreanof Island. It is about 12 miles northwest of Petersburg and lies within the Petersburg Creek-Duncan Salt Chuck Wilderness area. The prospect is located at an elevation of about 400 feet on the west side of Portage Mountain. Mineralized rock is found mainly on the north side of a small creek that flows west-southwest. The slopes of the mountain extend from sea level to an elevation of over 3,600 feet. The area is covered by conifer forest. Access is easiest by helicopter to a muskeg north of the creek exposure; however, helicopter access is restricted due to the area's wilderness designation. Overland access is possible from North Arm on Duncan Canal.

History

Several authors have written about prospects that were active in the early 1900's on the west side of Portage Mountain. Review of the early reports indicates that at least two different prospects are described, one now called "Portage Creek" and the other called "Portage Mountain Group." The Portage Creek prospect refers to sulfides in hornblendite; the Portage Mountain Group refers to gold in quartz veins. Two other names are associated with prospects in the area, the Portage Mountain Mining Co. and the Portage Bay Copper Co. (Wright, 1907; Roehm, 1945). Both of these are believed to be associated with the Portage Mountain Group prospect; however, this prospect was not examined by BLM personnel in 1997 or 1998, and it is not included in this interim report.

The date of discovery of Portage Creek is unknown. Buddington (1923) reports opencuts on the Silver Star claim in 1921, which along with the Silver King claim, made up the 2-claim block in the area. No other development has taken place at the prospect.

Mineral Assessment

The mineralized rock at Portage Creek consists of seams and disseminations of sulfides in hornblendite that appears to be a magmatic segregation from the dioritic country rock in the area. An Upper Cretaceous mafic intrusive has been mapped in the area and described as quartz monzodiorite to diorite (Brew and others, 1984).

Mafic segregations with sulfides are exposed in Portage Creek between about 360 and 480 feet in elevation. In this area, at least five outcrops of hornblendite or hornblende diorite with disseminated pyrrhotite, pyrite, and chalcopyrite can be found. Three are on the north side of the creek, and two are on the south side. The rock is commonly green-gray to black, coarsely crystalline with prominent phenocrysts of hornblende and biotite. Much of the hornblende-rich rock deteriorates upon weathering and crumbles easily.

The largest outcrop of mineralized rock is exposed along the north bank of the creek at an elevation of about 450 feet. Poorly indurated, hornblendite is bounded by hornblende diorite and exposed for about 60 feet along the creek bank. The hornblendite is cut by partially assimilated dikes of diorite and broken basalt dikes. Foliation in the hornblendite strikes west to northwest and dips steeply. Veinlets and stringers of pyrite and pyrrhotite up to 1 inch thick are common in the hornblendite and make up about 5 percent of the rock. Copper staining indicates the presence of copper minerals, but they likely make up less than 1 percent of the hornblendite.

BLM personnel collected 17 samples from the outcrops along Portage Creek (Map nos. 24.1-24.2). All of them indicate the presence of minor amounts of copper, and some contained a trace of platinum and palladium, but little else. Seven samples were collected from the main outcrop on the northwest side of Portage Creek, where the highest copper values were found (Map no. 24.1, samples 138-141, 2367-69). Samples ranged up to 4,666 ppm copper over 15 feet (Map no. 24.1, sample 139) and 2,597 ppm copper over 40 feet (Map no. 24.1, sample 2367). Ten samples collected from other sulfide-bearing outcrops below the main one on Portage Creek indicate lower copper values. Of these, a grab sample yielded the highest copper value of 925 ppm (Map no. 24.1, sample 62). The highest platinum value was 39 ppb (Map no. 24.1, sample 9600), and the highest palladium value was 59 ppb (Map no. 24.2, sample 136) over 18 and 27 feet respectively.

Conclusions

The deposit at Portage Creek appears to be a magmatic segregation of sulfides from the mafic portion of an intrusive mass. Although sulfide mineralization is exposed for a large distance along Portage Creek, the precious- and base-metal values are low. In addition, the area is covered by a wilderness designation, which prohibits mineral development.

TAYLOR CREEK

(Plate 1, Map nos. 25.1-25.2)

Location/Access

The Taylor Creek prospect is located near the head of Duncan Canal, 16 miles west of Petersburg. The prospect is exposed in Taylor Creek (about 1.5 miles upstream from tidewater) and on a small knoll to the north. The topography of the area consists of low hills covered by brush, timber, and muskeg flats. The outcrop in the creek lies at an elevation of about 160 feet; the outcrop on the knoll to the north, at about 400 feet. Access by helicopter is easiest; however, boat access to the mouth of Taylor Creek is possible at high tide.

History

Claims were first located at Taylor Creek in 1903 (Kerns, 1950) or 1904 (Wright and Wright, 1908). Early development to expose mineralized rock consisted of a 30-foot trench (Wright and Wright, 1908). Additional claims were staked in the area in 1912 (Alaska Kardex, 1982), but the trench remained the only development on the property until the 1940's (Kerns, 1950).

In 1946, six claims were staked over the property, and a few small pits were excavated (Kerns, 1950; Alaska Kardex, 1982). In 1948 the Bureau of Mines cut 280 feet of trenches and drilled 770 feet of core in four holes to evaluate the property (Kerns, 1950).

No published work has been accomplished at Taylor Creek since the 1940's. It has been investigated briefly by various workers, more as part of an inventory than an investigation of mineral potential (e.g., Grybeck and others, 1984; C.D.Taylor, written commun., 1998). In 1997 Kennecott Exploration, Inc., staked a block of claims that covered the Taylor Creek prospect, but results of its investigation have not been released to the public.

Mineral Assessment

The Taylor Creek prospect is hosted by dolomite that has been included in a unit of undifferentiated Hyd Group rocks of Triassic age (Karl and others, 1999). Units in the area strike to the northwest and dip to the northeast. Regional structures include broad, open folds with northwest-oriented axes and southwest-verging thrust faults (Karl and others, 1999).

Because of the detailed evaluation, including mapping, trenching, and drilling by the Bureau of Mines at Taylor Creek, BLM personnel restricted their investigation to corroborating the published geology and sample results. The following geologic description is taken from Kerns (1950, pp. 4-5):

> The deposit was found to occur as patches that appear to replace the dolomitic limestone. The patches of mineralization are small, irregularly shaped, and distributed and do not occur in any recognizable pattern. The mineralized sections of the dolomitic limestone are better cemented and more blocky than the

> surrounding broken and fractured dolomitic limestone. The patches of minerals range from 2 to 12 feet in width and 4 to 10 feet in length.
>
> The deposit consists of a dissemination of galena and sphalerite associated with much pyrite and some marcasite. Pyrite is the predominant mineral, and the greatest amount of galena and sphalerite occurs where there is an abundance of pyrite.
>
> Very little sulfide was found in the gray-banded limestone that appears to underlie the buff dolomitic limestone or in the greenstone that appears to underlie the gray-banded limestone.

The four Bureau of Mines drill holes at Taylor Creek ranged in length from 66 to 291 feet. The best intercept was 5 feet of 0.8 oz/ton silver, less than 0.1 percent lead, and 2.5 percent zinc. The highest lead value was in a 3-foot intercept of 0.6 percent lead, 0.5 oz/ton silver, and 0.35 percent zinc. Surface samples that were cut across patches of mineralized rock exposed in the trenches north of Taylor Creek had higher values. Results include: 9 feet of 0.5 oz/ton silver, 0.7 percent lead, and 4.3 percent zinc and 12 feet of 1.0 oz/ton silver, 0.45 percent lead, and 1.4 percent zinc (Kerns, 1950).

BLM personnel collected seven samples from outcrops, trenches, and dumps at Taylor Creek. The best samples include 0.7 feet at 25.9 ppm silver, 7.72 percent lead, and 6.9 percent zinc (Map no. 25.1, sample 53), a select sample with greater than 500 ppm silver, 7,217 ppm lead, and 2.1 percent zinc (Map no. 25.1, sample 54), and a grab sample of gossan that returned 903 ppb gold, 160 ppm silver, 9.69 percent lead, and 3.0 percent zinc (Map no. 25.1, sample 226). Several of the Taylor Creek samples also had elevated concentrations of arsenic, barium, and mercury.

The results of the Bureau of Mines drilling indicated the lack of an ore body at Taylor Creek, so no attempt was made to estimate tonnage and grade (Kerns, 1950). H.M. Fowler, a mining engineer with the Alaska Territorial Department of Mines, suggested that a lack of trenching prior to the drilling caused the Bureau of Mines to misplace their drill sites, which resulted in the agency's failure to adequately evaluate the mineralized zone (Fowler, 1948). No additional published work has been done at Taylor Creek, so the presence of an ore body is still in question.

Conclusions

The extensive work done by the Bureau of Mines at Taylor Creek, as well as the work of others, suggests only a minor potential for a significant deposit at the site. The replacement nature of the mineralized rock at Taylor Creek is similar to that in other places in the Stikine area, e.g., Cornwallis Peninsula. Although the replacement-type mineralization may be related to the VMS deposits in the area, it seems to have less mineral development potential than the bedded VMS deposits.

INDIAN POINT

(Plate 1, Map no. 26)

Location/Access

The Indian Point occurrence is located in the intertidal zone near Indian Point, about 14 miles west-southwest of Petersburg. Access to the prospect is by boat.

History

Four lode claims were staked at Indian Point in 1977 (Alaska Kardex, 1982). No other published reference to the site is known.

Mineral Assessment

The Indian Point prospect is hosted in Mesozoic phyllite and slate near its contact with Mesozoic gabbro (Brew, 1997j).

The BLM's examination revealed a 0.15-foot-thick, silicified pyrite band conformably hosted in sericite schist. Foliation in the schist strikes 350° and dips 32° to the east. The band is exposed through beach gravel in the intertidal zone for about 10 feet. Samples collected from the band contained up to 187 ppb gold (Map no. 26, samples 50, 224).

Conclusions

The sulfide occurrence at Indian Point is of very limited extent and contains low base- and precious-metal values. As a consequence, this area is unlikely to attract mineral exploration interest.

WEST DUNCAN

(Plate 1, Map no. 27)

Location/Access

The West Duncan prospect is located on the west side of Duncan Canal about 16 miles southwest of Petersburg. Situated near the intertidal zone at the mouth of a creek 2 miles north of Castle River, West Duncan is accessible by helicopter, float plane, or boat; however, float plane and boat access are inhibited by tidal mud flats that extend for over a mile.

History

Grybeck and others (1984) first described mineralized rock at the West Duncan prospect, but they called it the "Castle River." The same location was called the "Halobia" in 1998 (Grybeck and Berg, 1998). Pacific Alaska Resources Co. has a large block of claims covering the West Duncan prospect. This company had a plan of operations filed with the Forest Service to drill up to 12 holes during 1998 and again in 1999. To the authors' knowledge, these plans were never carried out.

Mineral Assessment

The West Duncan prospect is hosted in Mesozoic phyllite and slate (Brew, 1997). The rocks at this site are almost certainly Triassic Hyd Group strata (Grybeck and Berg, 1998).

USGS investigators describe upper Triassic phyllite hosting zones 9 to 12 feet wide by 90 to 120 feet long containing lenses of massive sulfides up to 0.75 feet wide and 3 feet long. Grab samples from these sulfide lenses contained up to 100 ppm copper, 100 ppm silver, and 1,000 ppm arsenic (Grybeck and others, 1984; Grybeck and Berg, 1998).

The BLM's examination of the West Duncan prospect revealed bands of disseminated to massive sulfides up to 1.5 feet thick hosted in carbonaceous and silicified phyllite. These bands strike about east-west; dip 50° to the south; conform to foliation in the phyllite; and contain pyrite, sphalerite, and galena. They are exposed across the creek bed for distances of up to 40 feet. Cover obscures the bands on either side of the creek. Samples across the bands contained up to 30.8 ppm silver, 5,400 ppm lead, and 5.4 percent zinc (Map no. 27, samples 2622, 9645).

Conclusions

The West Duncan prospect is likely Triassic in age and is characteristic of volcanogenic massive sulfide deposits in the Duncan Canal area. These factors make the area an attractive exploration target.

KUPREANOF PYRITE

(Plate 1, Map no. 28)

Location/Access

The Kupreanof Pyrite prospect is located in the intertidal zone on the west side of Duncan Canal, about 1.3 miles north of Castle River. It is about 16 miles southwest of Petersburg. The intertidal area is covered with beach grass and kelp. Farther inland, brush, timber, and second-growth timber cover the gently to moderately sloping topography. Access is possible by boat, float plane, or helicopter; however, over a mile of tidal mud flats can cause problems for access by boat and float plane.

History

In 1921 Buddington (1923) noted a 4-foot-thick by 50-foot-long pyrite zone exposed near the high-tide line at the Kupreanof Pyrite prospect. Grybeck and others (1984) describe a similar zone.

Pacific Alaska Resources Co. has a large block of claims covering the Kupreanof Pyrite area, and the company had a plan of operations filed with the Forest Service in which it proposed to drill up to 12 holes during 1998. A representative of Pacific Alaska Resources Co. indicated that mapping, soil sampling, geophysics, and trenching were done at a location about 1 mile west of the Kupreanof Pyrite prospect. Soil sampling revealed significant anomalies, and trenching revealed a large gossan (Barry Hoffman, oral commun., 1999).

Mineral Assessment

The Kupreanof Pyrite prospect is hosted in Mesozoic phyllite and slate (Brew, 1997j). The rocks at this site are almost certainly Triassic Hyd Group strata (Grybeck and Berg, 1998).

Grybeck and others (1984) describe a 1-mile-long zone of felsic metatuff that locally contains massive layers of pyrite at this location. Grab samples from massive sulfide zones up to several meters thick contained up to10 ppm silver, 700 ppm lead, and 350 ppm zinc (Grybeck and others, 1984).

The BLM's examination of the Kupreanof Pyrite prospect revealed two lenses of pyrite about 6 feet thick that are exposed through kelp and sea grass near the high-tide line. Both lenses are conformably hosted in silicified phyllite and schist, the foliation of which strikes 035° and dips 42° to 65° to the southeast. The lenses are separated by about 300 feet and align approximately along strike. A zone of disseminated pyrite extends between the lenses. Small amounts of sphalerite are found with the pyrite. Two 6-foot chip samples across the widest parts of the sulfide lenses contained up to 31.8 ppm silver, 1,304 ppm lead, 1.7 percent zinc, and 1,268 ppm arsenic (Map no. 28, samples 278, 9646).

Conclusions

The Kupreanof Pyrite occurrence is likely Triassic in age and is characteristic of volcanogenic massive sulfide deposits in the Duncan Canal area. These factors make the area an attractive exploration target.

CASTLE ISLAND MINE

(Plate 1, Map nos. 29.1-29.3)

Location/Access

The Castle Island Mine is located on a small island in Duncan Canal, 0.1 mile south of Big Castle Island and 14 miles southwest of Petersburg. The island is covered by a patented mining claim. The topography of the island is one of moderate relief, and the landscape is covered with thick brush. Access to the prospect is by boat, float plane, or helicopter.

History

The USGS noted the presence of barite on the Castle Islands in 1913 (Burchard, 1914). Recognizing the potential importance of associated base metals and gold, the Alaska Treadwell Gold Mining Co. staked the deposit in 1913. The claim was patented in 1929 (MS1452) as the Red Cliff Lode and subsequently sold to the Alaska Juneau Mining Co., which drilled the deposit for its barite and gold content in 1931. The gold and silver assays were low (Carnes, 1980; Williams and Decker, 1932).

In 1966 the Alaska Barite Co. acquired claims at Castle Island and started mining an outcrop on the northeast end of the island. Between 1966 and 1969, the company mined 234,000 tons of barite from above the high-tide line (Carnes, 1980). In 1969 Inlet Oil Corporation acquired the claims and proceeded to mine barite below tidewater. But in 1975 the company declared bankruptcy, and the mine was purchased by Chromalloy American. From 1970 to 1980, the companies mined 552,888 tons of barite from an underwater, openpit operation. Drilling and blasting liberated the ore, which was recovered by a clam shell crane (Carnes, 1980). In 1980, with economic reserves exhausted, the mine closed, and by the next year, the mill and most of the camp were removed (Carnes, R.D., oral commun., 1995). By 1996 all mining equipment and signs of habitation had been removed from the island. The site is now overgrown with alder and brush.

Mineral Assessment

The Castle Island Mine is located in Upper Triassic Hyd Group rocks that are in contact with Devonian limestone and Quaternary basalt (Karl and others, 1999). Berg and Grybeck (1980) describe the deposit as a dismembered volcanogenic massive sulfide deposit.

The Castle Island barite lens occupies a small syncline and has a strike of 330° and a dip of 60° to the northeast. Its hanging wall consists of limestone and gray schist. The limestone is mostly massive, with abundant veinlets of white calcite. The gray schist is finely foliated with scattered veinlets of white calcite and abundant lenses of black chert. In places there is an abundance of conformable, fine-grained sulfides in thin layers. The footwall consists of graphite-carbonate schist that contains abundant lenses of white calcite and quartz and conformable, thin sulfide layers. The sulfides are pyrite, sphalerite, galena, chalcopyrite, and tetrahedrite. The barite is intercalated with the host rocks along both the hanging wall and footwall (Wiese, 1977; Carnes, 1980; Williams and Decker, 1932; Burchard, 1914; Kazda, 1972; Berg and Grybeck, 1980).

R.D. Carnes (oral commun.,1999) estimates that the interbedded barite and schist constitute several million tons of mineralized, low-grade rock.

Most of the Castle Island barite lens has been mined. It was 300 feet long and 200 feet wide and extended from 35 feet above sea level to 130 feet below. The barite ore was massive, gray to white and 90 percent pure. It contained 5 percent silica and about 2 to 4 percent sulfides consisting of pyrite, pyrrhotite, sphalerite, galena, bornite, chalcopyrite, and tetrahedrite. Small amounts of magnetite, ilmenite, pyrolusite, and quartz were also present (Carnes, 1980; Williams and Decker, 1932; Burchard, 1914). Prior to mining, an analysis of the barite ore included 0.006 oz/ton gold, 1.2 oz/ton silver, 0.05 percent copper, 0.60 percent lead, and 1.80 percent zinc (Williams and Decker, 1932). A more recent analysis returned 0.01 ppm gold, 1.05 ppm silver, 0.04 percent copper, and 1.38 percent zinc (Carnes, 1980).

By 1980 the deposit had been mined to a depth of about 90 feet below sea level. Carnes (oral commun., 1999) estimates that several irregularly shaped barite lenses at a depth of 60 feet below sea level are located to the north of the main ore body and that detrital barite material is lying offshore of the main lodes. In 1977 he inferred 390,000 tons of low-grade barite resources at a grade of 85 percent $BaSO_4$ and 315,000 tons of higher-grade barite resources (Carnes, 1980). Holdsworth (1980) at the request of Chromalloy American, estimated 69,600 tons of ore-grade material in 1980. (From 1977 to 1980, 35,000 tons of barite were mined from the Castle Island Mine.)

The BLM's examination consisted of sampling waste dumps on the small island where the mill was located. The dumps consist of barite with disseminated sulfides, barite with bands of sulfides, and grey schist with bands of barite and sulfides. Samples from these rocks contained up to 347 ppb gold, 42.8 ppm silver, 518 ppm copper, 7,783 ppm lead, and 2.3 percent zinc, and greater than 2 percent barium (Map no. 29.1, samples 42-43, 46).

Conclusions

The Castle Island Mine was exhausted of economic reserves in 1980; although according to Carnes (1980) and Holdsworth (1980), some underwater barite resources remain.

East Duncan Pyrite

(Plate 1, Map no. 30)

Location/Access

The East Duncan Pyrite occurrence is exposed along a logging road on the east side of Duncan Canal, opposite Big Castle Island. The logging road is part of the Lindenberg Peninsula road network, which is accessed from a pier at a site called "Tonka," on the west side of Wrangell Narrows. The occurrence is located 12 miles southwest of Petersburg. The area has moderately steep topography and is covered for the most part by conifer forest, except in places where clear-cutting has occurred. The site can also be reached by helicopter or by taking a boat to Duncan Canal and then continuing on foot.

History

The location of a pyrite occurrence on the east side of Duncan Canal was mentioned to the BLM by USGS investigators. A petrographic report in the BLM files (Bureau Of Land Management, MAS) also contains a mention of pyrite-bearing rock exposed along a logging road on the east side of Duncan Canal. No other reference is known to exist in published literature.

Mineral Assessment

The East Duncan Pyrite occurrence is situated near the boundary between the Alexander terrane to the west and the Gravina Belt overlap sequence to the east (Silberling and others, 1994). Recent follow-up of airborne geophysical data (ADGGS, 1997a-m) from the Duncan Canal area by the USGS is likely to move the Alexander-Gravina contact farther to the east than previously thought (S.M. Karl, oral commun., 1998). Therefore, the East Duncan Pyrite prospect would lie in Alexander terrane rocks, within Brew and others' (1984) "Duncan Canal/Zarembo Island/Screen Island" sub-belt that hosts volcanogenic massive sulfide deposits in the area. The unit hosting the pyrite has been mapped as undifferentiated Mesozoic phyllite and slate (Brew and others, 1984; Brew, 1997).

Medium to dark gray slate hosts the pyrite at the East Duncan Pyrite occurrence. The pyrite is medium- to fine-grained and occurs in layers, knots, and lenses that are generally parallel to foliation in the hosting slate. No sulfides other than pyrite were noted. The pyrite-rich zone is about 3 feet thick and exposed for about 10 feet along strike, beyond which it is covered by dirt and vegetation. Foliation in the slate strikes north to northwest and dips moderately to the northeast. There is a sharp contact between the footwall slate and the pyrite-rich zone; foliation in the slate across this contact varies noticeably, indicating a possible fault. Above the footwall, the slate is more silicified, particularly where the pyrite is concentrated. The contact between the pyrite-rich zone and the hanging wall slate is gradational.

BLM personnel collected three measured samples from the East Duncan Pyrite occurrence. They contained low precious- and base-metal values. The highest gold value was 9 ppb, highest silver was 2 ppm, highest copper was 98 ppm, and highest zinc was 244 ppm. Each of the samples contained about half a percent barium and had elevated values of nickel (204 to 332 ppm) and chromium (113 to 122 ppm [Map no. 30, samples 2862, 3817-18]).

Conclusions

The mineralized rock at the East Duncan Pyrite prospect is limited in extent and has low metal concentrations. It is interesting, however, because it may be related to other VMS occurrences in the area. This would be the first indication of VMS-type mineralization on the east side of Duncan Canal. Alternatively, the possibility that a fault forms the footwall and that the pyrite is concentrated where silicification is most pronounced means that the mineralization may be secondary and not related to other VMS deposits in the area. Additional examination of the east side of Duncan Canal should be undertaken, while keeping in mind the potential for VMS mineralization.

SPRUCE CREEK

(Plate 1, Map nos. 31.1-31.3)

Location/Access

The Spruce Creek prospect is located on Lindenberg Peninsula near Forest Service road 6352, 10 miles south-southwest of Petersburg. The topography of the area ranges from gently sloping to moderately steep with elevations ranging from 400 to 1,000 feet. Vegetation consists of muskegs, dense brush, thick timber, and clear-cuts. Access to the prospect is by helicopter or by vehicle. (It is a 6-mile drive from the Tonka pier on the west side of Wrangell Narrows, which is about 6 miles south of Petersburg.)

History

Paul Pieper of Petersburg discovered and staked the Spruce Creek prospect in 1983. In 1992 Westmin Resources Limited (Westmin) optioned the property and performed geophysical surveys along with mapping and sampling. Westmin dropped the property in 1993. Results of their work have not been made public. Paul Pieper drilled several shallow, small-diameter holes on the property (oral commun., 1998). He currently holds 10 claims covering the prospect.

Mineral Assessment

The Spruce Creek prospect is hosted in Upper Cretaceous phyllite according to Brew (1997). Revised mapping in 1998 indicates the country rock in the area consists of Permian and Mississippian rocks of the Cannery Formation in fault contact with Triassic Hyd Group volcanic and sedimentary rocks (Karl and others, 1999). The rocks trend west to northwest and dip steeply to the east.

The BLM's examination revealed three areas of sulfide mineralization: one on the west side of Forest Service road 6352 near a borrow pit (elevation 580 feet [Map no. 31.1]), another 2,500 feet east-southeast of the borrow pit below a waterfall (elevation 480 feet [Map no. 31.2]), and the third 7,500 feet southeast of the borrow pit in a clear-cut (Map no. 31.3).

The mineralized rock near the borrow pit consists of a 0.3-foot-thick quartz vein with sericite and chlorite conformably hosted in greenstone schist. The vein is exposed for several feet in a road cut but beyond that is covered. It strikes to the northwest and dips steeply to the northeast. Pyrite, galena, and sphalerite are found in the quartz and along partings in the schist. A sample across the vein contained 213 ppb gold, 1,690 ppm lead, and 4,163 ppm zinc (Map no. 31.1, sample 351). A 19-foot diamond drill hole was collared at this location in 1996 (Paul Pieper, oral commun., 1998).

The mineralized rock near the waterfall is exposed on a steep face on the north side of the small creek that forms the waterfall. It consists of gray bands of fine sulfides hosted in limestone with bedding that trends northwest and dips steeply to the northeast. A 1.4-foot sample across the sulfide bands contained 416 ppb gold, 14.9 ppm silver, 820 ppm lead, and 5,221 ppm zinc (Map no. 31.2, sample 407). Thirteen additional samples in this area contained no significant metal values (Map no. 31.2, samples 408-412, 2823-30).

The mineralized rock in the clear-cut consists of a 4-foot-thick bed of marble hosted in greenstone that has been exposed by a cut. The marble strikes 300° and dips 55° to the north. A 0.4-foot band of the marble contains sphalerite and galena. A sample across this band contained 779 ppb gold, 59.1 ppm silver, 5.62 percent lead, and 2.1 percent zinc (Map no. 31.3, sample 421).

Conclusions

The three mineralized areas exposed on the Spruce Creek prospect are too small to attract development. Mapping in 1998 indicates that at least parts of the prospect are in Triassic rock (Karl and others, 1999), which hosts prospective deposits elsewhere in the Duncan Canal area. There is little rock exposed at the prospect, so much of it remains unexplored. Soil sampling and follow-up geophysics may point to more significant mineralized zones.

NICIRQUE

(Plate 1, Map no. 32)

Location/Access

The Nicirque prospect is located at an elevation of 2,300 feet, about 3 miles north-northeast of Pearl Island on the south side of Lindenberg Peninsula. It is about 11 miles south-southwest of Petersburg. The topographic relief in the area is moderate and covered with muskegs, dense brush, thick timber, and clear-cut areas. Access to the prospect is easiest by helicopter. Alternate access is by a combination of boat, vehicle, and foot (requiring a 6-mile drive from the Tonka pier, which is 6 miles south of Petersburg on Wrangell Narrows, and then a hike to the prospect).

History

Paul Pieper of Petersburg discovered, named, and staked this prospect in 1983 (oral commun., 1998). There is no known mention of it in published literature.

Mineral Assessment

The Nicirque prospect is hosted in Permian and Mississippian rocks of the Cannery Formation that are in fault contact with Triassic Hyd Group volcanic and sedimentary rocks (Karl and others, 1999). The owner reports a Triassic fossil location on this prospect (Paul Pieper, oral commun., 1998), so the mapped boundary between the Cannery and Hyd Group rocks may be subject to change.

The mineralized rock at the prospect is reportedly a massive pyrite vein in a breccia zone (Paul Pieper, written commun., 1998). The BLM's investigation was confined to collecting a 3.5-foot, representative chip sample of slate with pyrite bands near the reported location of the fossils. The sample contained 56 ppb gold, 2.6 ppm silver, and 333 ppm zinc (Map no. 32, sample 465).

Conclusions

The reported massive sulfide location (Paul Pieper, oral commun., 1998) on this prospect is worthy of examination.

SOUTHWEST DUNCAN

(Plate 1, Map no. 33)

Location/Access

The Southwest Duncan prospect is located at a borrow pit near sea level on the west side of Duncan Canal, south of Little Duncan Bay. It is about 18 miles south-southwest of Petersburg. Thick brush predominates in the area. Access to the prospect is by boat or helicopter.

History

Field maps generated during Amoco Minerals Co.'s 1978 to1979 investigation of the Duncan Canal area indicate copper in a borrow pit at the Southwest Duncan prospect (Zelinski, 1979?). There is no mention of this site in published literature.

Mineral Assessment

The prospect is hosted in Mesozoic greenstone and greenschist (Brew, 1997). Karl and others (1999) consider these rocks to be part of the Triassic Hyde Group.

The BLM's examination of the borrow pit and the shoreline in the Southwest Duncan area revealed greenstone containing small amounts of disseminated pyrite and chalcopyrite. Grab samples of rubblecrop from the more mineralized areas contained from 15 to 821 ppb gold, 954 to 1,189 ppm copper, and 21 to 1,906 ppm arsenic (Map no. 33, samples 188-189, 9634-35).

Conclusions

The Southwest Duncan prospect is hosted by Triassic Hyd Group rocks that elsewhere in the Duncan Canal area host prospective VMS deposits. The combination of gold, copper, and arsenic in the greenstone along with the Triassic age makes the property interesting for exploration.

TB

(Plate 1, Map no. 34)

Location/Access

The TB prospect is located 3 miles northwest of Totem Bay on the south side of Kupreanof Island. It is about 30 miles southwest of Petersburg. Timber, muskeg, and thick brush predominate in the area. Access to the prospect is by helicopter.

History

A large block of claims was staked in the area in 1973 (Alaska Kardex, 1982), presumably by Resource Associates of Alaska (Bureau of Land Management, MAS). The USGS reports vivid exposures of orange-yellow, altered rhyolite in the area, which is indicative of a large, felsic, hydrothermal system (Grybeck and Berg, 1998).

Mineral Assessment

The TB prospect is hosted in a thick sequence of Quaternary-Tertiary rhyolite (Brew, 1997). The USGS reports locally disseminated pyrite, but no evidence of other ore minerals (Grybeck and Berg, 1998).

The BLM's examination was confined to a few hours of walking along a creek bed examining rusty, red-yellow rhyolite that extends for many miles in the area. In places, the rhyolite contains numerous quartz vugs, chalcedony, and green and red jasper. A grab sample of silicified, brecciated, pyrite-bearing rhyolite contained 425 ppm zinc (Map no. 34, sample 2626).

Conclusion

There is insufficient information about the TB prospect to reach a definitive conclusion about its mineral potential. Although no evidence of ore minerals has been found yet, the extent of the altered zone encourages further examination of the area.

MONONGEHELA

(Plate 1, Map no. 35)

Location/Access

The Monongehela claims are located on the west side of Little Totem Bay on the south side of Kupreanof Island. They are about 31 miles southwest of Petersburg. Thick brush and heavy timber predominate in the area. Access to the prospect is by boat.

History

The Totem Bay area was examined in 1952 by Houston and others (1958) to determine if radioactive veins similar to those found on northern Prince of Wales Island extend farther north onto Kupreanof Island; no such veins were found. Nonetheless, nine claims were later staked in the Little Totem Bay area in 1955 that reportedly covered a radioactive mineral potential (Alaska Kardex, 1982), but no subsequent activity has been reported.

Mineral Assessment

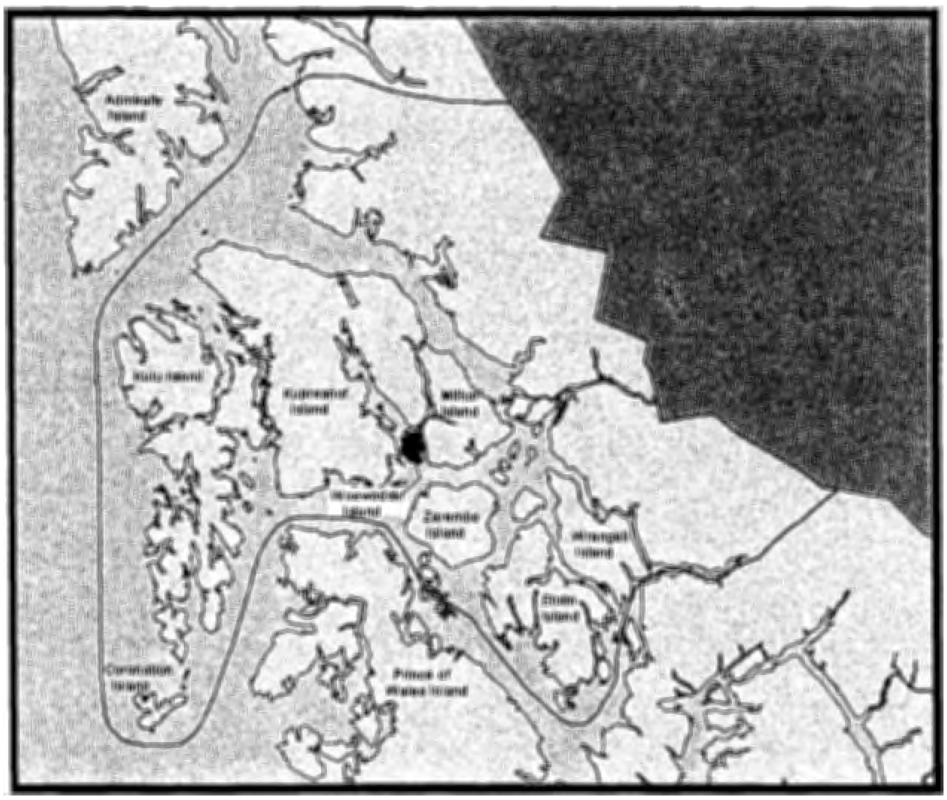
The Monongehela prospect is hosted in Quaternary-Tertiary rhyolite (Brew, 1997g). These volcanic rocks are part of a large package of Quaternary and Tertiary, predominantly extrusive, igneous rocks that cover the southwest part of Kupreanof Island (Brew and others, 1984).

Houston (1958) mentions finding 0.003 percent equivalent uranium in andesite on the west shore of Little Totem Bay in 1952. BLM scintillometer surveys of the same area revealed a 3-foot by 3-foot zone of rhyolite at the tide line that is about 60 percent above background radiation. A sample across this zone contained 7 ppm uranium, 17 ppm thorium, 43 ppm neodymium, 38 ppm lanthanum, and 110 ppm cerium (Map no. 35, sample 181).

Conclusions

The low uranium/rare-earth values at Little Totem Bay discourage exploration for such deposits in the area.

WOEWODSKI ISLAND



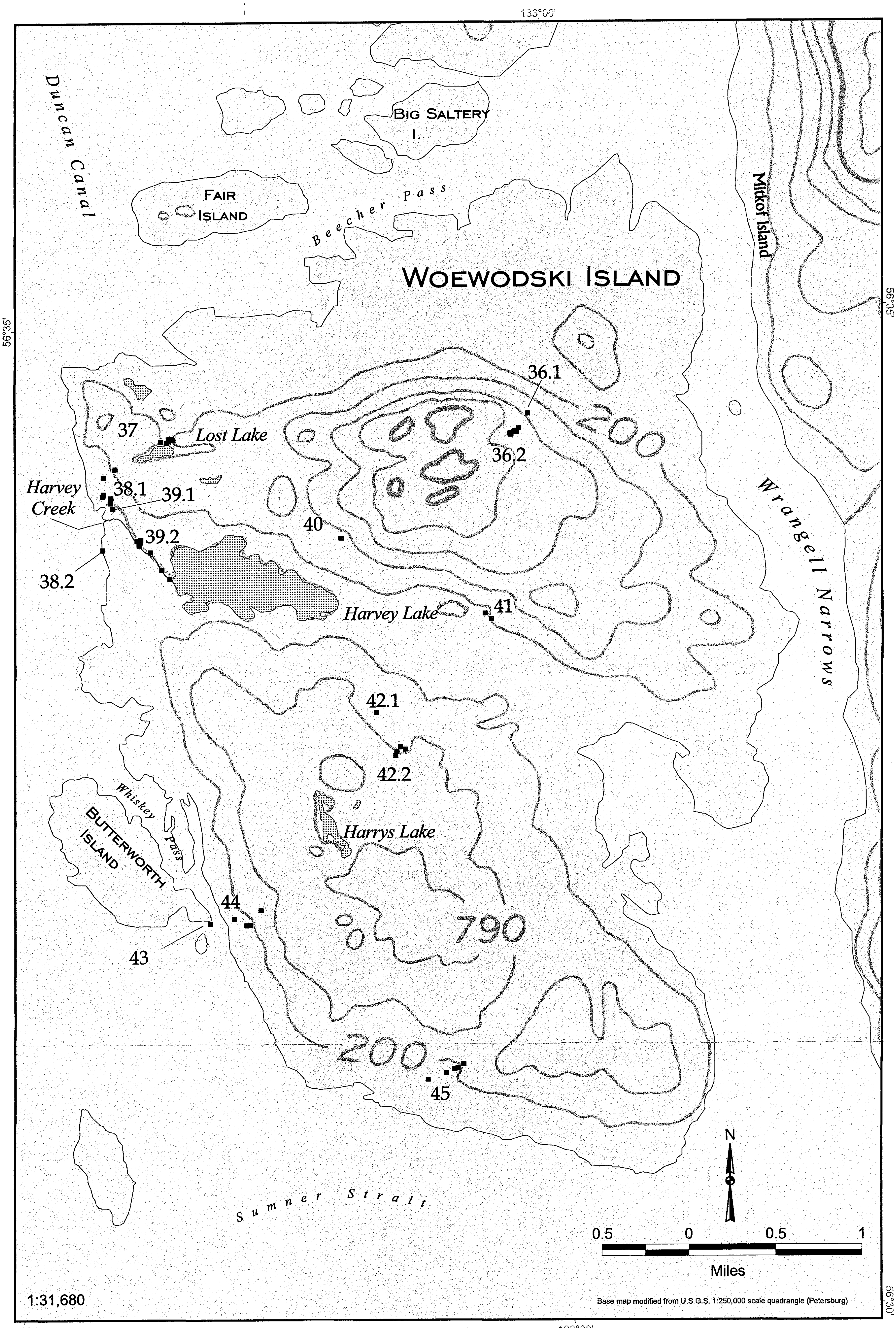


Figure 3. - Map of Woewodski Island showing prospects and sample locations

SCOTT

(Figure 3, Map nos. 36.1-36.2)

Location/Access

The Scott prospect is located at an elevation of 700 feet in the north-central part of Woewodski Island. It is about 16 miles south of Petersburg in an area of the island that is moderately steep, with brush and timber cover. The prospect is located in a steep gulch on the east side of the highest point on Woewodski Island and can be accessed by helicopter using a muskeg to the northwest as a landing site.

History

The Scott prospect was staked during the 1970's and early 1980's, as was most of the northern part of Woewodski Island. Cominco, Colony Pacific, Amselco, Kennecott, Houston International Minerals, and Westmin Resources were all active in the area sometime between 1978 and 1998. During the late 1980's and early 1990's, soil sampling and diamond drilling (about 3 holes) were used to evaluate the Scott prospect (J. McLaughlin, C. Rockingham, oral commun., 1998). The claims are currently active.

Mineral Assessment

The Scott prospect is located in semischist and phyllite (Brew 1997j). According to Karl and others (1999), these are Triassic Hyd Group rocks. Maps by Houston International Minerals indicate that the area bedrock consists predominately of rhyodacite with some andesite and basalt (Houston International Minerals, 1980).

The BLM's investigation of the Scott prospect revealed a steep-walled gulch that contains massive bands/lenses and disseminations of sulfides. The gulch, formed by a shear zone that appears to conform to the grain of the country rock, trends 075°. The banding and schistosity trend in a similar direction and dip from 65° to 90° to the southeast. The BLM identified base-metal sulfides and barite at scattered locations from elevations of 710 to 755 feet over a strike distance of 300 feet. Examination of the gulch to the east (down the gulch) failed to reveal additional mineralized rock. Muskeg, heavy brush, and timber cover the mineralized rock to the west and provide few outcrops.

The most significant mineralized rock is confined to massive barite, pyrite, galena, and sphalerite bands from 0.1 to 2.0 feet thick. These sulfide bands are found at scattered locations in lengths up to 30 feet. They occur in about 60 linear feet of the 300 feet mapped. Twenty-two samples were collected from these bands. They contained up to 1,122 ppb gold, 47.3 ppm silver, 2.63 percent lead, and 40.9 percent zinc (Map no. 36.2, samples 329, 336, 9679). Sphalerite is the predominate sulfide. The highest zinc value, 40.9 percent, was confined to a 0.3-foot width in the hanging wall of a 1.0-foot-thick lens (Map no. 36.2, sample 329). A 0.7-foot-long sample at the same location contained only 14.2 percent zinc (Map no. 36.2, sample 326). Samples from the bands/lenses also contained up to 56.35 percent barium (Map no. 36.2, sample 331), greater than 2,000 ppm cadmium, and greater than 50 ppm mercury (Map no. 36.2, sample 329). Samples of the schist hosting disseminated sulfides contained from 214 ppm to 1.5 percent zinc (Map no. 36.2, samples 327, 333, 338-339, 341, 343, 9672, 9680).

Reconnaissance investigations 1,000 feet north of the Scott prospect revealed rubblecrop of pale gray, silicified volcanics with sphalerite. A representative chip sample of the rubblecrop contained 1,449 ppb gold, 12.6 ppm silver, 2,559 ppm lead, 1.3 percent zinc, and 13.6 percent barium (Map no. 36.1, sample 9682).

Conclusions

The apparent conformity of the bands and lenses of sulfides with the grain of the country rock is permissive of a volcanogenic origin for the Scott deposit. Later shearing resulted in the truncation of some mineralized bands. Although the bands are too scattered, narrow, and low-grade to be considered for development, sufficient mineralized rock is exposed to warrant further exploration in the vicinity.

LOST SHOW

(Figure 3, Map no. 37)

Location Access

The Lost Show prospect is located on the northwest side of Woewodski Island, about 16 miles south-southwest of Petersburg. The topography is gently sloping, with brush, timber, and muskeg covering the area. Access to the property can be gained by float plane or boat to the Helen S Mine (Map no. 38), and from there, a trail leads across private property to the northeast side of Lost Lake and the Lost Show prospect. Alternate access is by helicopter.

History

Most of the northwestern part of Woewodski Island was staked during the late 1970's and early 1980's. Cominco, Colony Pacific, Amselco, Kennecott, and Westmin Resources were all active in the area sometime between 1978 and 1998. A number of area prospects were examined through soil sampling, geophysical surveying, and diamond drilling (J. McLaughlin, oral commun., 1998).

The Lost Show prospect was discovered by Cominco geologists in 1985. Between 1986 and 1988, Amselco, in partnership with Cominco, drilled 16 shallow holes there. In 1993 Westmin entered into a partnership with Amselco and in 1996 carried out a program of mapping, soil sampling, IP geophysical surveying, and prospecting of both the Lost Show site and the area between it and the Scott prospect (Map no. 36). The IP survey failed to detect the Lost Show mineralization. In 1998 Westmin announced a "geological reserve" for the Lost Show prospect (Terry, 1998). Boliden Ltd. acquired the property in its take-over of Westmin and continues to maintain active claims at the site.

Mineral Assessment

The Lost Show prospect is located in the Upper Triassic Hyd Group (Karl and others, 1999) that consists of felsic and intermediate volcanic flows and breccia, limestone, and argillite (Brew, 1997j). Rocks exposed at the prospect consist of tan schists that have been identified by Westmin geologists as meta-andesite (Terry, 1998). Studies and analysis by Newberry and Brew (1997) indicate that the "andesite" is actually an altered, more mafic rock, likely a metabasalt.

Based on 16 shallow drill holes and surface outcrops, Westmin published a "geological reserve" (resource) for the Lost Show prospect of approximately 500,000 tons grading 8.1 percent zinc, 0.6 percent lead, and 2.5 oz/ton silver (Terry, 1998). Information on the drilling was not made available for this study.

The BLM's investigation revealed three mineralized outcrops or cuts, roughly aligned along a strike of 072°. The mineralized rock is approximately conformable to the grain of the host metabasalt and dips steeply. The first (No. 1) outcrop/cut is located at the edge of Lost Lake, the second (No. 2) is located 90 feet (at 072°) from the first, and the third (No. 3) is located 200 feet (at 072°) from the first. The area surrounding the outcrops/cuts is covered with muskeg, brush, and timber.

The No. 1 outcrop or cut exposes a 5-foot-thick, steeply dipping, massive sulfide band hosted in tan-weathering schist. The sulfides are pyrite, galena, and sphalerite. A 4.4-foot chip sample across part of the zone contained 153.8 ppm silver, 5,519 ppm lead, and 11.5 percent zinc (Map no. 37, sample 198). A 0.6-foot sample across the remainder of the zone gave similar results (Map no. 37, sample 197). At outcrop No. 2, two narrow sulfide bands dip 64° to the south and contain pyrite, galena, and sphalerite. They are hosted in the same tan-weathering schist as outcrop No. 1. A 7.5-foot sample across this outcrop assayed 83.9 ppm silver, 5,180 ppm lead, and 4.5 percent zinc (Map no. 37, sample 9639). The No. 3 outcrop or cut exposes brown-weathering schist that hosts a steeply dipping, 1.1-foot-thick band of sulfides. This band assayed 282 ppm silver, 2.79 percent lead, and 24.2 percent zinc (Map no. 37, sample 9697). These sample results correlate well with Westmin's reserve (resource) grades of 2.5 oz/ton silver, 0.6 percent lead, and 8.1 percent zinc (Terry, 1998).

Conclusions

The Lost Show has sufficient indications of grade and extent to be a prospective target for exploration, both down dip and along strike. The general vicinity, particularly the area between the Lost Show and the Scott (Map no. 36), is also a prospective exploration area.

HELEN S MINE

(Figure 3, Map nos. 38.1-38.2)

Location/Access

The Helen S Mine is located on the northwest side of Woewodski Island, about 17 miles south-southwest of Petersburg. The mine is located on patented mining claims (MS 614) that extend from tidewater to an elevation of 300 feet. The topography is gently sloping. Brush, old-growth, and second-growth timber cover the claims. Access to the property can be gained by boat, float plane, or helicopter. Trails lead from the beach to the mine workings. A private cabin is located on the beach in the southwest corner of the claims.

History

The Helen S claim group was first staked in 1902 by the Olympic Mining Co (Wright and Wright, 1908). These claims, staked on gold-bearing quartz veins 5 to 15 feet thick, were surveyed for patent in 1904 (Wright and Wright, 1905). By 1907 improvements to the claims included a twenty-stamp mill, a 100-foot shaft, another shaft located 400 feet to the north, 650 feet of drifts and crosscuts, and several opencuts. A small test run had also been processed in the mill, and the gold values were reported as principally confined in the concentrate (Wright and Wright, 1908). Shortly after 1915, the surface improvements were dismantled, and the property abandoned (Berg and Cobb, 1967). In 1945 J.C. Roehm examined the property for the Alaska Territorial Department of Mines. He reported vegetation covering most of the mineralized areas. He also reported the ore that was milled averaged $3.66 per ton (gold at $35/oz). A sample collected from pyritized schist assayed 0.06 oz/ton gold and 0.2 oz/ton silver (Roehm, 1945).

Mineral Assessment

The Helen S Mine is located in the Upper Triassic Hyd Group (Karl and others, 1999) and consists of felsic and intermediate volcanic flows and breccias, limestone, and argillite. On the northwestern part of the property, hornblende diorite intrudes the volcanic flows (Brew, 1997j).

The gold-bearing veins at the Helen S Mine are hosted in greenstone schist. The schistosity of the metavolcanic rocks strikes north-south and dips 70° to the east. The quartz veins strike northeast, dip vertically, and contain galena, pyrite, and sphalerite (Wright and Wright, 1905). A disseminated lode about 40 feet wide and at least 1,000 feet long (Berg and Cobb, 1967) strikes north-south and dips 50° to the east. This is described as the principal deposit. It consists of a belt of schist that is mineralized with quartz-calcite stringers and small masses and disseminations of pyrite, galena, and sphalerite. A shaft was reportedly sunk on this zone (Wright and Wright, 1908; Berg and Cobb, 1967). Historic references regarding the development and production from the Helen S Mine are confused with the nearby Maid of Mexico Mine (Figure 3, Map no. 40) and Hattie prospect (Figure 3, Map no. 44) and are not completely clear.

A lineament occupied by a creek extends north-south across the Helen S Mine patented claims. Some parts of the lineament may be man-made as the result of excavation. The location of each working is described according to its position along this south-flowing creek, i.e., the distance from the mouth of the creek at the beach to each location.

The BLM's examination of the Helen S Mine was confined to exposures in trenches, pits, and the tops of caved or flooded shafts. The examinations revealed mill ruins 150 feet from the beach, and two shafts located 400 feet (the southern shaft) and 640 feet (the northern shaft) up the creek. There are tailings in the intertidal zone, and a 120- by 150-foot dump is located north of the mill. The southern shaft is caved about 10 feet from the collar and does not expose bedrock. The northern shaft is flooded, with the water level about 10 feet below the collar. Pits and trenches are located at distances of 150, 470, 750, and 1,100 feet up the creek.

BLM personnel collected 28 samples from the workings at the Helen S Mine. Twenty-five of these contained below 152 ppb gold. Three contained from 4,248 ppb to 0.328 oz/ton (11,246 ppb) gold (Map no. 38.1, samples 30, 36, 213). The lowest-grade of the three, which contained 4,248 ppb gold, was a grab sample of slightly iron-stained, silicified schist collected from the trench located 1,100 feet up the creek (Map. no. 38.1, sample 36). Another sample from the same location contained only 11 ppb gold (Map. no.38.1, sample 381). At the shaft 640 feet up the creek, a 1.5-foot-thick quartz vein contained 0.328 oz/ton gold (Map no. 38.1, sample 30). The 1.5-foot vein is exposed in the east and west walls of the shaft, but is covered along strike. A grab sample of quartz from the shaft's dump assayed 4,536 ppb gold (Map no. 38.1, sample 213). Additional elements found in the three highest-grade gold samples include silver up to 22.7 ppm, copper up to 570 ppm, lead up to 795 ppm, zinc up to 1,042 ppm, and arsenic up to 1,471 ppm. Mill tailings samples did not contain detectable gold, but did contain up to 16.5 ppm silver, 1,888 ppm lead, 1.4 percent zinc, and 371 ppm arsenic (Map no. 38.1, samples 40-41).

A sample collected from a 0.1-foot-thick quartz vein, located about 1,000 feet south of the Helen S Mine, contained 3,878 ppb gold and 3,494 ppm arsenic (Map no. 38.2, sample 281). This vein is located on the beach and can only be traced for a few feet.

The highest silver, lead, and zinc values were found in the pit located 470 feet up the creek and in a trench and adjacent cut located 750 feet up the creek. The lower pit exposes a massive sulfide lens hosted in greenstone/greenstone schist in its south wall. The lens, or zone, strikes about 340° and dips 30° to the southeast. It is exposed for about 10 feet and grades from massive sulfides to silicified schist with about 10 percent sulfides. The sulfides consist of pyrite, galena, and sphalerite. A 1.6-foot sample across the massive sulfide zone contained 65 ppm silver, 9,560 ppm lead, and 2,540 ppm zinc (Map no. 38.1, sample 382). A sample across a 0.7-foot-thick part of the lens contained 3,078 ppm lead and 3.0 percent zinc (Map no. 38.1, sample 383). Select samples from the dump and of flyrock in the vicinity contained from 38.9 to 113.5 ppm silver, from 7,539 ppm to 2.5 percent lead, and from 4.0 to 5.4 percent zinc (Map no. 38.1, samples 32, 215, 9642).

The trench and cut located 750 feet up the creek exposes silicified zones containing pyrite, galena, and sphalerite hosted in brecciated schist and slate. The silicified zones trend 004°, 64° east and

015°, 54° east. A sample 0.9 feet long taken across one zone contained 1.78 oz/ton silver, 1.09 percent lead, and 12.8 percent zinc (Map no. 38.1, sample 9565). Dump and rubblecrop samples collected in the vicinity contained up to 2.13 oz/ton silver, 1.74 percent lead, and 8.5 percent zinc (samples 38-39, 2359, 9700).

The BLM's sampling indicates that gold is not associated with the base-metal, massive sulfide zones exposed at the Helen S Mine. Gold is confined to narrow quartz veins. Arsenic is more directly associated with the gold-bearing veins than the base-metal sulfide zones.

Conclusions

Surface sampling is insufficient to evaluate reports of gold and base-metal mineralized rock at the Helen S Mine. Early reports were apparently based on owner reports and underground exposure of the mineralized rock. The BLM's surface examination failed to identify the 40-foot-wide by 1,000-foot-long zone of base-metal or gold mineralization referred to by Berg and Cobb (1967).

HARVEY CREEK

(Figure 3, Map no. 39.1-39.2)

Location/Access

The Harvey Creek prospect is located on the northwest side of Woewodski Island, 19 miles south-southwest of Petersburg. It is situated along the 0.5-mile-long creek that drains Harvey Lake to the west. Although the banks of the creek are steep in places, the area topography is gently sloping, with thick brush and timber cover. A Forest Service trail crosses the Harvey Creek prospect. The trail leads from Duncan Canal along the north bank of the creek to a Forest Service cabin on the west side of Harvey Lake. Access is via float plane or boat.

History

There is no reference to the Harvey Creek prospect in published literature, but some development work was accomplished at the site in the past. Just below the trail, 0.35 miles from Duncan Canal, the portal of an old caved adit is located on the north side of the creek.

During 1997 a Petersburg resident drilled two core holes to evaluate the mineralized rock at the prospect. One hole is located east of the caved adit at an elevation of 140 feet and is 189 feet deep. The other is located on a bank overlooking the creek west of the adit at an elevation of 60 feet and is 94 feet deep. Both holes were drilled vertically (P. Beardslee, oral commun., 1997). Active claims cover the Harvey Creek prospect and are held by the Petersburg resident who accomplished the core drilling.

Mineral Assessment

Rocks in the Harvey Creek prospect area are mapped as Upper Triassic (Karl and others, 1999) felsic and intermediate volcanics of the Hyd Group (Brew, 1997j). Outcrops along the creek include phyllite that is locally silicified and pyritized. The phyllite strikes 315° to 010° with a shallow dip. Both core holes drilled at Harvey Creek contained gray phyllite and greenschist with up to 5 percent pyrite. No base-metal sulfides were observed in the core of either hole.

Samples of quartz below the adit and of silicified, iron-stained phyllite from along and to the north of the creek contained up to 340 ppm copper and 365 ppm zinc (Map no. 39.2, samples 9591, 9643). A soil sample collected at the western end of the Harvey Lake trail contained 1,208 ppb gold (Map no. 39.1, sample 9569).

Conclusions

Sampling and shallow drilling failed to reveal significant mineralized rock at the Harvey Creek prospect.

MAID OF MEXICO MINE

(Figure 3, Map no. 40)

Location Access

The Maid of Mexico Mine is in the north-central part of Woewodski Island, about 17 miles south of Petersburg. It is located 1½ miles east of the Helen S Mine (Map no. 38), on the northeast side of Harvey Lake, at an elevation of 340 feet. The area topography is gently sloping to moderately steep, with brush and timber covering the property. Access to the mine can be gained by float plane to Harvey Lake and then by a short trail from the northeast side of the lake. Alternatively, a trail leads to the mine from tidewater on the Helen S property.

History

The Maid of Mexico Mine was first staked in 1906 on a gold-bearing quartz vein (Nelson, 1931). By 1908 a 40-foot adit had been driven (Wright, 1909). By 1916 workings consisted of a 130-foot crosscut, 170 feet of drift, a short adit, and pits and trenches. A test shipment was made by 1916 (Chapin, 1918). Buddington (1923) reports that the vein averaged 4½ feet thick at $20 per ton (1 oz/ton) and had been traced for 2,000 feet.

A report by Nelson (1931) indicates that the Maid of Mexico vein could be traced for 750 feet on the surface. He reported a small stope had been started on the vein, and a 10-stamp Straube Mill was being installed. A partly legible assay plan is attached to the Nelson report. Seven samples, collected from the drift or raise with vein widths varying from 6 to 15 inches, range in value from $2.64/ton to $98.81/ton and average $40.62/ton (gold at $20.67/oz). Eight samples were collected down the shaft with widths ranging from 6 to 20 inches. Although values are not all readable on the Nelson map, six are below $1.00/ton and two are above, at $9.30 and $23.98/ton (Nelson, 1931). By 1939 over 1,000 feet of underground workings are reported (Smith, 1941).

In 1953 mining engineer James A. Williams examined the property for the Alaska Territorial Department of Mines (Williams, 1954). He reported a 130-foot crosscut and 260 feet of drift along the vein, with a flooded winze and a raise to the surface. He collected eight samples at five locations along the vein. Williams' sample results are markedly lower than those reported by Nelson in 1931. Adjacent to a sample reported by the prospect owner to assay $98/ton (2.8 oz/ton at $35/oz gold), Williams obtained 0.06 oz/ton. At another location, Williams' samples across the vein averaged less than 0.02 oz/ton across 44.5 inches. Samples across stringers from 2 to 3 inches thick contained from 0.47 to 0.64 oz/ton. Williams attributes the disparity in sample values to spotty gold occurrence in the vein (Williams, 1954).

No activity was reported on the property from 1953 to 1998. The Maid of Mexico Mine claims are currently held by a Petersburg resident.

Mineral Assessment

The Maid of Mexico Mine is located near the contact between units mapped as Mesozoic semischist and phyllite, Mesozoic phyllite and slate, and Triassic felsic and intermediate volcanics

(Brew, 1997j). At the mine scale, the vein is located near the contact between slate and siliceous dolomite (Berg and Cobb, 1967), with slate in the hanging wall and dolomite in the footwall (Nelson, 1931). An underground map shows the vein striking east to northeast and dipping 65° to the south (Williams, 1954). Williams (1954) reports that the 2- to 7-foot-thick quartz vein contains small amounts of pyrite, galena, sphalerite, and free gold.

The BLM's investigation revealed the remains of a sheet metal and wood cabin, a wood cabin with a tarp top, and the remains of a Straube mill. Investigators located and examined three adits: the No.1, or main adit, is caved at the portal (elevation 340 feet), the No. 2 is 30 feet long (elevation 385 feet), and the No. 3 is 45 feet long (elevation 404 feet). A shaft (elevation 453 feet) that connects to the No.1 adit is caved near its collar. Several trenches or cuts expose the vein on the surface above the adits.

The three adits are collared in slate near a northeast-trending contact between carbonate and slate. The Nos. 2 and 3 adits expose slate, dolomite, and narrow, discontinuous quartz stringer zones. Samples collected from the Nos. 2 and 3 adits contained from 11 to 1,462 ppb gold (Map no. 40, samples 2381-85, 2620).

Surface cuts and trenches expose a quartz vein up to 1.8 feet thick above the Nos. 2 and 3 adits for a distance of about 160 feet. This vein strikes east to northeast and dips 73° to 80° to the south. Personnel collected two samples from the vein and a third from quartz rubble. They contained from less than 5 ppb to 546 ppb gold (Map no. 40, samples 2386-87, 9575).

The old Straube mill, located below the No. 1 adit, contained remnant mill feed and concentrate. A sample of the feed contained 2,098 ppb gold, 1,358 ppm lead, 693 ppm zinc, and 425 ppm arsenic (Map no. 40, sample 2388). Samples of the sulfide-rich concentrate contained up to 1.076 oz/ton gold, 3.17 oz/ton silver, 1,224 ppm copper, 2.05 percent lead, 746 ppm zinc, and 4,297 ppm arsenic (Map no. 40, samples 2389-90).

Conclusions

The gold values in samples collected by the BLM and by mining engineer James A. Williams (1954) are markedly lower than those reported on the assay map attached to Nelson's (1931) report or the average mined grade of 1 oz/ton reported by Buddington (1923). This disparity in values could be the result of higher-grade ore having been mined out prior to sampling, the spotty occurrence of gold in the vein, or selective sampling and reporting.

EAST OF HARVEY LAKE

(Figure 3, Map no. 41)

Location Access

The East of Harvey Lake prospect is located on the north-central part of Woewodski Island, about 17 miles south of Petersburg. The topography is gently sloping, with brush, muskeg, and timber covering the area. Access to the prospect is gained by taking a helicopter to a nearby muskeg landing site and then following a narrow stream to a cut in the stream's western bank.

History

The area surrounding Harvey Lake was staked during the late 1970's and early 1980's. Cominco, Colony Pacific, Amselco, Kennecott, and Westmin Resources were all active in the area sometime between 1978 and 1998. Diamond drilling, soil sampling, and geophysical surveying were carried out east of Harvey Lake (J. McLaughlin, oral commun., 1998). A "discovery diamond drill hole" containing significant zinc values is reported in the vicinity of the east end of Harvey Lake (P. Beardslee, oral commun.,1998). The drill logs of the hole were not available for this study.

Mineral Assessment

The East of Harvey Lake prospect is located in Mesozoic semischist and phyllite (Brew 1997j). According to Karl and others (1999) these are Triassic Hyd Group rocks.

BLM investigators found a 5-foot-high by 17-foot-long outcrop in the western bank of a small stream in an area with extensive brush, timber, and muskeg cover. The outcrop consists of iron-stained, silicified schist with 10 percent pyrite that is disseminated and in conformable bands. The schist strikes about 315° and dips 27° to 43° to the southwest. Four samples collected from the outcrop did not contain significant metal values (Map no. 41, samples 384, 8650, 9571, 9699).

Conclusions

The East of Harvey Lake prospect lacks significant metal values and is not an important exploration target; however, the Triassic rocks in the general area are. Soil sampling or drilling in the vicinity might reveal more significantly mineralized rock.

MAD DOG 2

(Figure 3, Map nos. 42.1-42.2)

Location/Access

The Mad Dog 2 prospect is located on Woewodski Island, about 18 miles south of Petersburg. It is located southeast of Harvey Lake, along a small, stream-formed gulch at an elevation of 400 feet. The area is moderately steep, with muskeg, brush, and timber covering the site. Access is via float plane to Harvey Lake and bush wacking to the site or by helicopter.

History

The Mad Dog 2 prospect (and most of the northwestern part of Woewodski Island) was staked during the late 1970's and early 1980's. Cominco, Colony Pacific, Amselco, Kennecott, and Westmin Resources were all active in the area sometime between 1978 and 1998 (J. McLaughlin, C. Rockingham, oral commun., 1998). A Petersburg resident now holds the claims covering the Mad Dog 2 prospect. The claimant drilled two shallow diamond drill holes on the claims in 1998.

Mineral Assessment

The Mad Dog 2 prospect is located in Triassic Hyd Group volcanic flows and breccia (Karl and others, 1999).

The BLM's investigation of the Mad Dog 2 prospect revealed a sulfide band conformably hosted in iron-stained schist at an elevation of 360 feet. It is exposed in the northwest bank of a small creek. The sulfide band ranges in thickness from 0.3 to 0.8 feet, strikes 035°, and dips 45° to the southeast. It contains pyrite, chalcopyrite, and sphalerite. A small excavation for a drill platform and a cut in the bank of the creek expose this band for about 25 feet along strike.

BLM personnel collected six samples from the sulfide band. They contained from 67 to 2,867 ppb gold, from 2.4 to 27.1 ppm silver, from 240 to 1,512 ppm copper, and from 732 ppm to 2.9 percent zinc (Map nos. 42.1-42.2, samples 344-347, 9570, 9702). The diamond drill hole was collared just below this sulfide band and failed to encounter significant mineralized rock. Another drill hole, collared 260 feet at 030° from this hole, also failed to encounter significant mineralized rock. Investigation and sampling up the small creek to an elevation of 450 feet revealed no notable mineralized rock (Map no. 42.2, samples 348-350).

Conclusions

The Mad Dog 2 prospect contains interesting values in gold, silver, copper, and zinc. However, the two drill holes failed to encounter significant mineralized rock. The Triassic rocks in the area are worthy of additional examination.

FORTUNE

(Figure 3, Map no. 43)

Location Access

The Fortune prospect is located on the south end of Butterworth Island, off the west coast of Woewodski Island. It is about 20 miles south-southwest of Petersburg. The mineral occurrence is located in the intertidal zone. The topography of Butterworth Island is gently sloping, with brush and timber cover. Access is by boat or helicopter.

History

The Fortune claims were staked for gold, silver, and pyrite in 1955. Starting in 1978, the area was the site of activity by Cominco, Colony Pacific, Amselco, Kennecott and Westmin Resources. The Fortune area was staked around the same time as most of the northwestern part of Woewodski Island (J. McLaughlin, oral commun., 1998). It is currently part of the Mad Dog group of active claims.

Mineral Assessment

The southern tip of Butterworth Island consists of Mesozoic greenschist and greenstone (Brew, 1997j) that have been identified as Triassic (Karl and others, 1999). The remainder of the island is mapped as Upper Cretaceous hornblende diorite (Brew, 1997j).

The BLM's examination of the Fortune prospect revealed mineralized rock that is largely covered with silt and kelp in the intertidal zone. Exposures reveal silicified, iron-stained, greenschist with conformable bands of sulfides from 0.075 to 1.0 feet thick. These bands consist of pyrite, black sphalerite, galena, and, based on high silver content, tetrahedrite. The area of silicified volcanic rock containing the bands of sulfides is about 15 feet wide and extends for 160 feet along strike. The bands strike 280° and dip 40° to the south. The mineralized exposure is covered by beach gravel immediately to the west and is not found farther to the west where hornblende diorite crops out. To the east, the mineralized zone is covered by tidewater. It is not found on Woewodski Island farther east, nor on the small island to the south of Butterworth Island.

BLM personnel collected four samples from the more highly mineralized parts of the 15-foot-wide zone. Values ranged from 255 to 1,590 ppb gold, 54 to 630.4 ppm silver, 341 ppm to 9.76 percent lead, and from 3,951 ppm to 20.1 percent zinc (Map no. 43, samples 28-29, 211-212).

Conclusions

The relatively wide mineralized zone and the substantial values in silver, lead, and zinc make the Fortune prospect an attractive exploration target. It is the only massive sulfide in the Duncan Canal area to contain significant silver. However, the limited extent of mineralized rock to the northeast and the likelihood that further exploring and, potentially, mining would be carried out under tidewater discourages exploration of the prospect.

HATTIE

(Figure 3, Map no. 44)

Location/Access

The Hattie prospect is located about 20 miles south of Petersburg on the southwest side of Woewodski Island. It is about 2½ miles south of the Helen S Mine (Map no. 38). The prospect workings are located 500 feet from tidewater at an elevation of 60 feet. The area topography is gently sloping, with brush, old-growth, and second-growth timber covering the area. Access can be gained by boat, helicopter, or float plane to the beach, although rough seas can preclude float plane access. A trail leads to the mine from the beach.

History

The Hattie prospect was first staked in 1900 as the property of the Olympic Mining Co. It originally consisted of 60 claims (Alaska Kardex ,1982). Wright and Wright (1908) show the claim group extending from near sea level to over 560 feet elevation at Harrys Lake. They refer to the Hattie as the Lower Smith camp. According to Wright and Wright (1908), active development first started on the claims in 1901. A gold-bearing quartz breccia zone was explored by a 360-foot adit and a 135-foot winze with levels at 62 and 134 feet. Surface developments at the property consisted of a 1,000-foot tram, a wharf, and various buildings. By 1907 the mine winze was flooded (Wright and Wright, 1908). No additional development was reported on the property, but the claims were active in 1937 (Alaska Kardex, 1982). The Hattie area is included in the currently active Mad Dog claim group.

Mineral Assessment

The Hattie prospect is located in Triassic Hyd Group greenstone and greenschist (Karl and others, 1999). In the immediate prospect area, the quartz veins are hosted in greenschist that has been identified as metarhyolite by the USGS (D.J. Grybeck, oral commun., 1996). Wright and Wright (1908) report a quartz and breccia zone or vein 5 to 20 feet thick that is hosted in greenstone. The zone or vein can be traced for several hundred feet and reportedly strikes northeast and dips steeply. Pyrite, chalcopyrite, galena, and sphalerite constitute 1 to 3 percent of the vein (Wright and Wright, 1908).

The BLM's investigation of the Hattie prospect revealed an adit with an unstable, partly caved portal at an elevation of 60 feet and an inclined raise at an elevation of 140 feet, which intersects the adit at a distance of about 130 feet from the adit portal. The portal is cut in a 6-foot-thick quartz vein that strikes 070° and dips 68° to the south. The raise is collared in a 5-foot-thick quartz vein that also strikes 070° to the east, but with vertical dip. The vein at the adit level is covered along strike. The vein at the top of the raise can be traced for about 60 feet to the northeast; from there it is covered.

BLM personnel collected five samples from the vein at the top of the raise and one sample each from the vein at the adit portal and from the dump (Map no. 44, samples 27, 2630-34, 2636). All the samples contained 10 ppb or less gold. The silver, copper, lead, and zinc values were all very low as well.

Conclusion

The historic description of the mineral occurrence at the Hattie prospect sounds very similar to that of the Helen S Mine (Map no. 38). Previous investigators have expressed confusion between the descriptions of the Helen S Mine and Hattie prospect (Grybeck and others, 1984).

The BLM's examination of the surface exposures and dump at the Hattie failed to reveal significant metal values. Underground access is necessary to better determine the nature of the prospect's mineral occurrence; however, the adit portal is collared in an unstable shear zone that prevents safe access to the underground workings.

BRUSHY CREEK

(Figure 3, Map no. 45)

Location/Access

The Brushy Creek prospect is located on the south end of Woewodski Island, about 21 miles south of Petersburg. The topography is moderately sloping, with brush and timber covering the area. Access to the prospect can be gained by boat to the south side of Woewodski Island and then on foot, 0.25 miles to the first outcrops, or by helicopter to muskegs near the eastern end of the prospect.

History

Westmin Resources was active in the Brushy Creek area during 1996 (Chris Rockingham, oral commun., 1998). Recently flagged surveying grids on the prospect indicate detailed work in the area (possibly soil sampling or geophysical surveying).

Mineral Assessment

The Brushy Creek prospect is located in Mesozoic greenschist and greenstone near its contact with Upper Cetaceous hornblende diorite (Brew, 1997j). According to Karl and others (1999), the greenstone and greenschist are Triassic Hyd Group volcanic rocks.

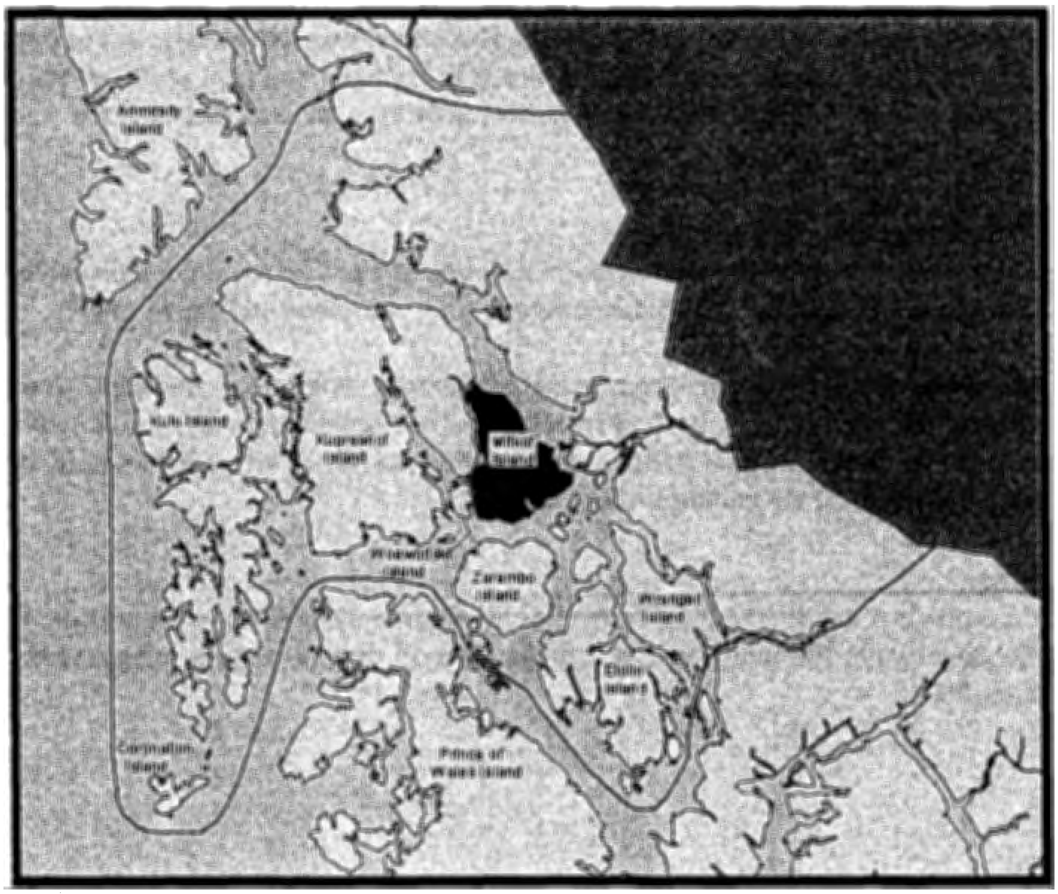
The BLM's investigation revealed a series of cuts in bluffs on the south side of a narrow creek. The creek, which follows a shear zone, trends about 075° to 085°. The foliation in the hosting greenstone schist trends about 055° to 085° and dips from 15° to 40° to the south. Five cuts that expose iron-stained, mineralized rock were examined and sampled. The cuts range in elevation from 90 feet to 170 feet and are scattered along 3,000 feet. The continuity of units between the cuts was not determined. Mineralized rock consists of disseminated, thinly banded sulfides hosted in silicified, limey volcanics. The sulfides are pyrite, sphalerite, and galena.

BLM personnel collected nine samples. The most prominent sample was a 2-foot chip that contained 423 ppb gold, 27.9 ppm silver, 7,380 ppm lead, and 2.6 percent zinc (Map no. 45, sample 195). Seven of the remaining samples contained from 1,735 ppm to 2.2 percent zinc (Map no. 45, samples 190, 192-195, 9636-37).

Conclusions

Mineralized rock at the Brushy Creek prospect is scattered over a distance of 3,000 feet and contains interesting silver, lead, and zinc values. These factors make the Brushy Creek prospect a potential exploration target.

MITKOF ISLAND



FREEL & DURHAM

(Plate 1, Map no. 46)

Location/Access

The Freel & Durham prospect is located on the east side of Mitkof Island, 9 miles southeast of Petersburg. The site is in an unnamed drainage 1½ miles west of Frederick Sound and a mile northeast of the head of Falls Creek. The drainage bottom is covered by large, mature timber, but the drainage passes through a 3-square-mile area predominated by muskeg. The prospect's location averages 170 feet in elevation. Access to the property can be gained by driving Forest Service road 6204 and then walking about a mile downhill to the southeast, across muskeg, to the drainage containing the claim.

History

The earliest known record of activity in the Freel & Durham area is the staking of a mining claim for lode gold in 1957 (Alaska Kardex, 1982). Investigators found no other record of activity in published literature, nor did they find signs of mining activity in the area during a site visit in 1998.

Mineral Assessment

The Freel & Durham prospect lies within metamorphosed Upper Cretaceous, Stephens Passage Group rocks. The rocks associated with this unit are schist and hornfels (Brew, 1997i).

BLM personnel searched the location described in the records (Alaska Kardex, 1982), but could find no outcrop in the area. They collected six samples from stream branches draining the area–three stream sediment and three quartz float samples (Map no. 46, samples 399-400, 2815-18). The samples had low precious- and base-metal values.

Conclusions

Not enough is known about the Freel & Durham prospect to make definitive conclusions. However, the paucity of information and lack of evidence of mineral activity suggest the prospect is of little significance.

ROAD SHOW

(Plate 1, Map no. 47)

Location/Access

The Road Show prospect is located on the east side of Mitkof Island, 14 miles southeast of Petersburg. Located on a southeastern tributary of Big Creek, which empties into Frederick Sound, the site is immediately upstream from where Forest Service road 6235 crosses the tributary.

History

The Road Show prospect was staked for placer gold by Steve Homer and Annie Taylor in 1972 and held through 1973 (Alaska Kardex, 1982). No other record of activity is known in published literature, nor was there any sign of mining activity found during the BLM's site examination.

Mineral Assessment

The Road Show prospect lies within Upper Cretaceous intrusive rocks of the Admiralty-Revillagigedo Plutonic Belt of Brew and Morrell (1983). The rocks associated with this unit in the Mitkof Island area are hornblende-biotite tonalite, granodiorite, quartz monzodiorite, and quartz diorite (Brew, 1997i).

BLM personnel examined the Road Show prospect area in 1998 and collected one pan concentrate, one grab sample of quartz vein float, and two stream sediment samples (Map no. 47, samples 401-402, 2819-20). Investigators found no outcrops in the area of the prospect. Float consists of metamorphosed sediments, metamorphosed volcanics, and quartz diorite. The float did not contain metallic minerals. The samples contained insignificant values for any elements of economic interest.

Conclusions

The insignificant metal values, the absence of evidence of prospecting activity, and the lack of published information about the Road Show prospect suggest the site is of little economic importance.

Mitkof Island, FS Rd 6245

(Plate 1, Map no. 48)

Location/Access

The Mitkof Island, FS Road 6245 occurrence is situated in a borrow pit, 20 miles south-southeast of Petersburg. The pit is on Forest Service road 6245, at an elevation of about 120 feet and within a quarter of a mile of the shoreline of Blind Slough on Sumner Strait. Access is by road.

History

While doing a reconnaissance examination of the road cuts and borrow pits on Mitkof Island, BLM personnel discovered iron-stained rubble containing massive pyrrhotite in a borrow pit. The pit had been used for fill and road surfacing of logging roads in the area, and as such, all production was for that purpose (Forest Service, oral commun., 1998). There is no published reference to this site, other than as a source for rock.

Mineral Assessment

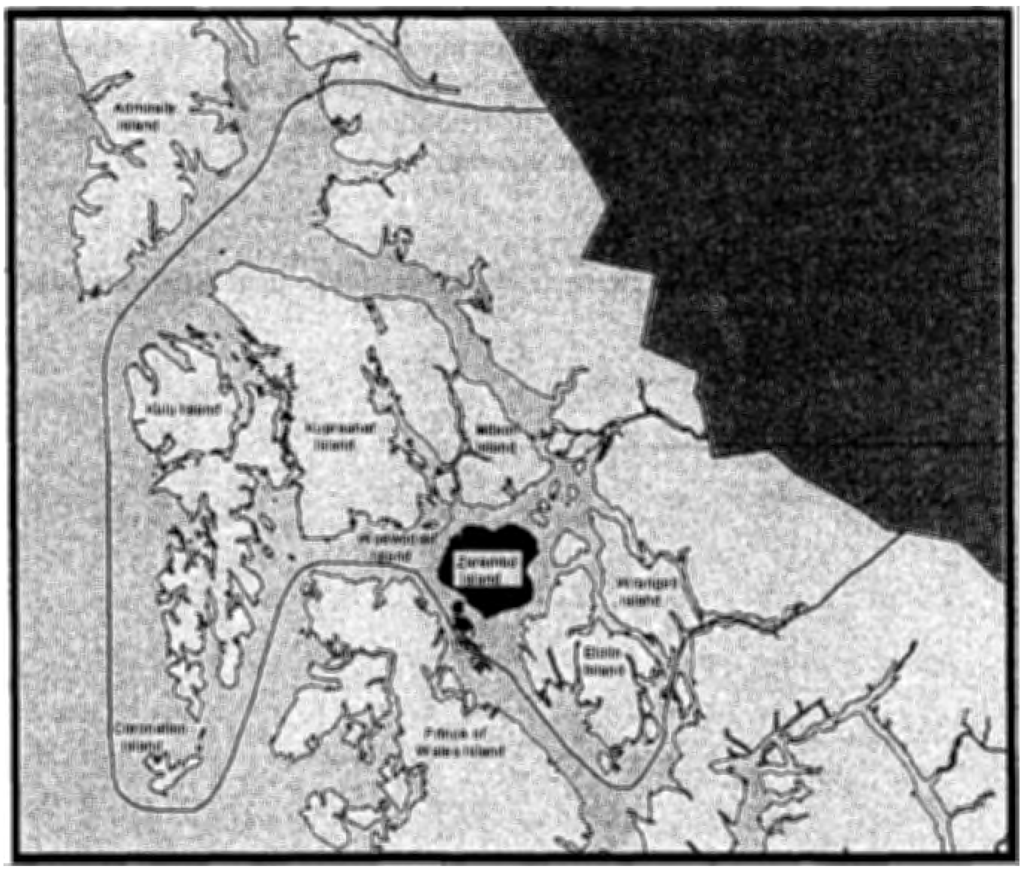
The FS Road 6245 pit occurrence lies within a belt of Upper Cretaceous intrusive rocks. The rocks associated with this belt are hornblende-biotite tonalite, granodiorite, quartz monzodiorite, and quartz diorite (Brew, 1997i).

BLM personnel collected one sample of iron- and copper-stained rubble containing massive pyrrhotite in hornblendite. The sample contained 1,007 ppm copper, 303 ppm lead, and 395 ppm zinc (Map 48, sample 391).

Conclusions

The BLM's examination of the FS Road 6245 pit indicates a small, low-grade occurrence. Mineralized rock was only found in rubble, and the analytical result showed low metal values.

ZAREMBO ISLAND



Zarembo Island, FS Rd 52009

(Plate 1, Map no. 49)

Location/Access

The Zarembo Island, FS Road 52009 occurrence is located on the northwest side of Zarembo Island on Forest Service road 52009, about half a mile southwest of St. John Harbor. It is about 24 miles west of Wrangell. The area topography is gently sloping and covered with second-growth timber and thick brush. Access to the site is by boat and on foot or by helicopter.

History

BLM personnel discovered the Zarembo Island, FS Road 52009 occurrence during this study.

Mineral Assessment

The Zarembo Island, FS Rd 52009 occurrence is located in an area of Quaternary and Tertiary rhyolite (Karl and others, 1999).

The BLM's investigators found vuggy and drusy quartz and purple fluorite scattered in road fill. The rocks are similar to the Zarembo Island Fluorite occurrence (Map no. 53), which is located 11 miles to the south. A grab sample of sulfides in the road fill contained 546 ppb gold and 826 ppm arsenic (Map no. 49, sample 9651). The road fill appears to be near its place of origin; however, mineralized rocks were not found in outcrop.

Conclusions

The Zarembo Island, FS Rd 52009 occurrence is worthy of follow-up to locate the source of the gold- and arsenic-bearing road fill.

FRENCHIE

(Plate 1, Map no. 50)

Location/Access

The Frenchie prospect is located on Zarembo Island about half a mile south of the head of St. John Harbor. It is about 22 miles west of Wrangell. The area topography is gently sloping and is covered with second-growth timber and thick brush; however, the prospect itself is located between 15-foot-high creek banks. It can be reached by following up the northern branch of the creek that flows into the southwest side of St. John Harbor. Access is by boat to St. John Harbor and then by foot up the creek. Alternate access is by helicopter, which may be able to make a difficult landing in the creek upstream from the occurrence.

History

The Frenchie prospect was first described by Buddington (1923) who visited it in 1921. He describes it as a 7.5-foot-thick, shallow-dipping, conformable, tabular layer of pyrite hosted in siliceous schist. The pyrite layer is exposed along the creek for a length of 130 feet and is explored by an adit 100 feet long and a shaft located about 100 yards north of the adit (Buddington, 1923).

In 1978 BP Alaska Exploration staked 34 claims, mapped and sampled the prospect, and recognized its importance as a strata-bound, massive sulfide deposit. In 1979 the company conducted a helicopter EM and magnetic survey, stream sediment and soil sampling, and follow-up ground geophysics over the 10 square miles of ground that contained the deposit and its host rocks (Brewer, 1979).

By the early 1980's, the USGS considered the Frenchie prospect "largely forgotten" and unrecognized as a volcanogenic massive sulfide deposit, but they later became the first to "relocate its prominent outcrop along the creek bank" and to rediscover it as a volcanogenic massive sulfide deposit (Grybeck and Berg, 1998).

In 1984 three holes were drilled on the Frenchie prospect. In 1996 Westmin Resources drilled another five holes (Rockingham, 1996).

Mineral Assessment

The Frenchie claim block occupies an 8- by 3-mile area in the central valley of Zarembo Island, which consists of Triassic Hyd Group and Permian and Mississippian Cannery Formation rocks (Karl and others, 1999). "Throughout the area, fine-grained, weakly metamorphosed, argillaceous sediments and minor argillaceous limestone predominate. Tuffaceous interbeds, tuffs, and massive to weakly foliated hornblende andesites are common locally (Brewer, 1979)."

The massive sulfide mineralized band at the Frenchie prospect is conformably hosted in silicified graphitic phyllite, argillite, and lesser slate, chert, and argillaceous limestone. These units strike west-northwest and dip 15° to 20° to the southwest. Where exposed, the footwall consists of siliceous, pale green quartz-muscovite phyllite. The hanging wall consists of a thin layer of black phyllite and up to 18 inches of pale, siliceous argillite and chert with up to 10 percent pyrite and sphalerite. Above this hanging wall, pyritized argillite and schist predominate to the top of the cliff, a distance of about 15 feet (Brewer, 1979).

The massive sulfide mineralized band is exposed near the base of cliffs on either side of the creek that follows the strike of the band. The band is up to 6.5 feet thick and is exposed for 460 feet along the creek. The western limit is obscured by cover, and the eastern limit is defined by a fault. "The massive sulfide band consists of 20 to 35 percent fine-banded pyrite, subordinate pyrrhotite, and minor sphalerite, galena, and chalcopyrite in a quartz-barite gangue. Barite varies between 5 and 20 percent (Brewer, 1979)." Thirteen samples were collected across the sulfide band at locations along its 460-foot length. They averaged 0.047 oz/ton gold, 0.42 oz/ton silver, 0.55 percent copper, 0.08 percent lead, and 1.48 percent zinc (Brewer, 1979).

BP Alaska Exploration conducted a helicopter EM and magnetic survey with a spacing of $^1/_5$ mile over the Frenchie deposit and its host rocks. One line, specifically flown over the Frenchie massive sulfide band to determine its signature, gave a weak electromagnetic response. The remaining area gave a number of low-ranking responses. Soil and stream sediment sampling, and in some cases ground geophysics, were used to follow up these anomalies. The results were negative (Brewer, 1979).

The BLM's investigation of the Frenchie prospect was confined to examining the massive sulfide band. The results of the examination verified the work and descriptions done by BP Alaska Exploration. A shallow-dipping, sulfide band that averages 5 feet thick is exposed along a creek for a distance of 460 feet. A 35-foot-long, partly flooded adit is driven into the sulfide zone. The shaft described by Buddington (1923) was not found. Chip samples from the sulfide band and from within the general vicinity contained up to 1,204 ppb gold, 16.1 ppm silver, 5,453 ppm copper, 3,973 ppm lead, 4.9 percent zinc, and 2,406 ppm arsenic (Map no. 50, samples 17-18, 305, 9660, 9662). The average of eight chip sample lines across the massive sulfide band was 0.019 oz/ton gold, 0.32 oz/ton silver, 0.25 percent copper, 0.16 percent lead, 2.4 percent zinc, and 0.08 percent arsenic (Map no. 50, samples 17-18, 207, 305, 308, 2616-17, 9662). These results compare well with the numbers obtained by BP Alaska Exploration (Brewer, 1979).

Conclusions

The Frenchie deposit, as it is now known, is too small and too low-grade to be considered for development. Further exploration down dip, along the massive sulfide band, or of the Triassic rocks in the vicinity might reveal a larger, higher-grade deposit. However, the lack of a distinctive geophysical signature will hamper further exploration.

ZAREMBO ISLAND HORNBLENDITE

(Plate 1, Map nos. 51.1-51.4)

Location/Access

The Zarembo Island Hornblendite prospect is located on the northeast side of the island, north of Deep Bay. It is 10 miles west-southwest of Wrangell. The area topography is of moderate relief and covered with second-growth timber and thick brush. Access to the prospect is by boat.

History

The Gallavantin claims were staked for iron and copper in the area of the Zarembo Island Hornblendite prospect in 1974 (Alaska Kardex, 1982). However, other than the Kardex reference, a literature search revealed no mention of a prospect in the area. This study is the first to describe the copper mineralization at the Zarembo Island Hornblendite prospect.

Mineral Assessment

The Zarembo Island Hornblendite prospect is located in what has been mapped as Cretaceous gabbro (Karl and others, 1999). In places it consists predominantly of coarse- to fine-grained hornblende and could be considered a hornblendite. It has a 0.8- by 0.4-mile outcrop pattern. It is exposed along the beach for 1,900 feet, in a road cut at an elevation of 100 feet, and along an overgrown road to an elevation of 200 feet.

The BLM's examination revealed blebs and disseminations of chalcopyrite along with pyrite and magnetite hosted in hornblendite. Vegetative cover prevented determining the true extent of the chalcopyrite-rich zones. Where exposed on the beach and in the road cut, the hornblendite with visible chalcopyrite extends up to tens of feet.

A sample of the best copper mineralization found on the beach contained 2,760 ppm copper, 10 ppb platinum, and 28 ppb palladium (Map no. 51.1, sample 9666). A 0.2-foot grab sample of the best copper mineralization found in the road cut contained 1,172 ppm copper, 10 ppb platinum, and 7 ppb palladium (Map no. 51.3, sample 301). A 0.4-foot grab sample collected at an elevation of 200 feet contained 1,291 ppm copper, 6 ppb platinum, and 3 ppb palladium (Map no. 51.4, sample 298).

BLM investigators collected three stream sediment samples from drainages in the hornblendite. One was slightly anomalous in platinum at 11 ppb (Map no. 51.1, sample 311). The other two did not contain significant metal values (Map nos. 51.1-51.2, samples 313, 9665).

Conclusions

Where exposed, the Zarembo Island Hornblendite prospect contains anomalous values in copper, platinum, and palladium. Detailed examination of the area may reveal more extensive, higher-grade mineralized rock.

LOST ZAREMBO

(Plate 1, Map no. 52)

Location/Access

The Lost Zarembo prospect is located on Zarembo Island, in a borrow pit 6 miles from St. John Harbor along Forest Service road 6590. It is 21 miles west-southwest of Wrangell. The area is covered with second-growth timber and thick brush. Access to the prospect is by boat and foot or by helicopter.

History

The Lost Zarembo prospect was first described by Grybeck and others in 1984 as a Triassic volcanogenic massive sulfide deposit that consists of three massive sulfide layers hosted in orange-weathering, greenish gray metarhyolite. The most prominent sulfide layer is 3.5 feet thick and extends for 45 feet (Grybeck and others, 1984).

Mineral Assessment

The Lost Zarembo prospect is located in an area mapped as Quaternary and Tertiary rhyolite (Karl and others, 1999). The occurrence itself is hosted in a small fault block of Triassic volcanic rocks (Grybeck and others, 1984).

The BLM's examination of the Lost Zarembo prospect revealed a block of banded, iron-stained, silicified greenstone that strikes 270° to 310° and dips 30° to 50° to the north. It is exposed in the northwest wall of a borrow pit. The block extends about 50 feet along strike and is bounded on the southwest by a fault contact with rhyolite and on the northeast by cover and a basalt dike. Within this block, three conformable bands of massive sulfides, 0.4, 0.8, and 2.6 feet thick, are separated by 1.2 to 3.0 feet of less silicified greenstone. The massive bands extend for about 45 feet. To the northeast, they are bounded by cover and a basalt dike; to the southwest, they pinch out. They contain pyrite, pyrrhotite, chalcopyrite, galena, sphalerite, and barite.

Samples across the sulfide bands at Lost Zarembo contained from 8.3 to 27.6 ppm silver, 966 to 3,781 ppm copper, 818 to 3,567 ppm lead, 1.9 to 4.6 percent zinc, and from 1.53 to 10.10 percent barium (Map no. 52, samples 316, 318, 321). Samples across the greenstone between the sulfide bands contained from 331 to 2,038 ppm zinc (Map no. 52, samples 317, 319). A grab sample of higher-grade sulfides contained 5.5 percent zinc (Map no. 52, sample 2625). A representative sample across barite- and sphalerite-bearing rubblecrop contained 4.9 percent zinc and 29.3 percent barium (Map no. 52, sample 9667).

Conclusions

The massive sulfide-barite bands at the Lost Zarembo prospect are too small and dismembered to be significant exploration targets in themselves. Other Triassic rocks in the area, however, particularly the banded silicified greenstones, are likely to attract mineral industry exploration attention.

ZAREMBO ISLAND FLUORITE

(Plate 1, Map nos. 53.1-53.4)

Location/Access

The Zarembo Island Fluorite occurrence is located on the southwest side of Zarembo Island, between Macnamara Point and Point Nesbitt. It is about 25 miles southwest of Wrangell. Rocks in the intertidal zone and along the shoreline are well exposed; however, inland, the area is covered with second-growth trees and thick brush. Access to the prospect is by boat or helicopter.

History

The Zarembo Island Fluorite occurrence was first recognized by Buddington in 1923 (Buddington, 1923). In 1962 the Bureau of Mines examined 10 miles of beach between Macnamara Point and Point Nesbitt and collected petrographic, pan concentrate, stream sediment, and rock chip samples (Van Alstine and Berryhill, 1963). In 1991 the USGS visited the site and studied its geodes for rare-earth elements (Philpots and Evens, 1992).

Mineral Assessment

The Zarembo Island Fluorite occurrence is located in an area of Quaternary and Tertiary rhyolite and andesite (Karl and others, 1999). The fluorite mineralization is hosted in rhyolite (Grybeck and others, 1984).

The Bureau of Mines examination of the area in 1962 revealed fluorite as fracture fillings with drusy quartz in vuggy breccia zones and in geodes for 1,200 feet along the shoreline. The fluorite fracture fillings are up to 1 inch thick, widely scattered, and predominately hosted in banded volcanic rocks. The geodes are 0.25 to 12 inches in diameter. A few brecciated shear zones up to 3 feet thick and 100 feet long are filled with cream-colored chalcedony. Samples failed to reveal significant concentrations of fluorite, radioactive elements, or other economic minerals (Van Alstine and Berryhill, 1963).

In 1991 the USGS examined the geodes in the Zarembo Island Fluorite vicinity. Only trace amounts of rare-earth elements were identified (Philpots and Evens, 1992).

The BLM's work at the prospect included checking the geodes and quartz-fluorite veins for minerals of economic interest. A scintillometer survey revealed slightly elevated radiation levels in the geodes. Samples collected from geodes, silicified zones, and fluorite contained up to 291 ppb gold, 1,768 ppm barium, and 38 ppm lanthanum (Map no. 53.4, samples 19, 21).

Conclusions

The Zarembo Island Fluorite occurrence does not contain significant concentrations of fluorite, radioactive elements, or other minerals of economic interest. The mineralized rock is scattered and low-grade. The occurrence is unlikely to attract mineral exploration.

ZF

(Plate 1, Map no. 54)

Location/Access

The ZF prospect was originally covered by a large block of claims located on the southeast quarter of Zarembo Island, approximately 21 miles southwest of Wrangell. The site examined by the BLM is located at an elevation of 1,700 feet on the rounded top of a mountain in the center of sec. 29, T. 64 S, R. 81 E. This area of Zarembo Island has a well-developed, subparallel, northeast-southwest drainage pattern between Meter Bight to the northeast and Stikine Strait to the southwest. The vegetation is mixed muskeg and small timber. Access is via helicopter or by foot from the nearby logging road system.

History

The ZF block of 242 lode claims was staked in 1978 by NERCO Exploration Co. An option on the claim block was granted to Resource Associates of Alaska in 1979 (Bureau of Land Management, MAS) and in 1981 to Houston Oil and Minerals (Bundtzen and others, 1982). The claim block was dropped by NERCO in 1986 (Bureau of Land Management, ALIS).

Mineral Assessment

The ZF prospect lies within a unit of Quaternary and Tertiary rhyolites, rhyodacites, and related siliceous intrusive and extrusive rocks (Brew, 1997e). This unit is part of a belt of Quaternary to Tertiary felsic to intermediate igneous rocks that crops out along the southwestern half of Zarembo Island. The igneous belt is in contact with Paleozoic and Mesozoic metamorphic rocks to the northeast and is bounded by the Clarence Strait Fault to the southwest (Brew, 1997e; Brew and others, 1984).

Rocks in the vicinity of the prospect are mostly rhyolites with a bleached white appearance. They are massive to thinly bedded and commonly sheared, with milky quartz deposited along the shear surfaces. No sulfides were observed in any of the outcrops examined by BLM investigators. One sample collected from the site contained only trace amounts of precious- and base-metals (Map no. 54, sample 293).

Conclusion

Further work is needed to define the occurrence at the ZF prospect. No information was found regarding the deposit type or commodity targeted by the NERCO claim block.

ROUND POINT

(Plate 1, Map no. 55)

Location/Access

The Round Point occurrence is located in the southeastern quarter of Zarembo Island, approximately 18 miles southwest of Wrangell. The main body of the claim block covers the ridge complex west of Round Point and southeast of the major drainage flowing into Meter Bight. The steep flanks of the mountains are well timbered, and the rounded peaks are covered with mixed muskeg and scrub timber. Peaks rise to elevations of 2,457 feet and are incised by steep river valleys that descend to sea level within a few miles. Access to this area is via helicopter.

History

In 1978 Mapco Inc. staked three claim blocks in the Round Point area: the Hazel, with 344 claims; the Erica, with 36 claims; and the Frances, with 6 claims (Bureau of Land Management, ALIS). The commodities listed include molybdenum, fluorine, and uranium, although no information was found describing the discovery locations of the commodities (Interagency Minerals Coordinating Group, 1999). The Hazel claims cover all or part of sections 22 to 28, 33 to 36 of T. 64 S, R. 81 E; sec. 3, T. 65 S, R. 82 E; and sec. 31, T. 64 S, R. 82 E. The Erica claims cover part of sec. 30 of T. 64 S, R. 82 E, and part of sec. 25 of T. 64 S, R. 81 E. The Frances claims are in sec. 28, T. 64 S, R. 81 E (Bureau of Land Management, MAS).

Mineral Assessment

The Round Point prospect lies within a belt of Quaternary to Tertiary intrusive and extrusive igneous rocks. In the southeastern part of the prospect, a unit of Mesozoic greenschist and greenstone crops out (Brew, 1997e) that has been defined as Triassic Hyd Group (Karl and others, 1999).

After observing a prominent iron-stained zone during aerial reconnaissance of the area, BLM personnel traversed along a creek that flows southeast across sec. 36, T. 64 S, R. 81 E. The rocks exposed in the creek are mapped as Upper Mesozoic greenschist and greenstone (Brew, 1997e). Approximately 0.3 miles downstream from a small lake that feeds the creek, between 1,500 and 1,600 feet elevation, investigators found an outcrop of iron-stained schist with sulfides, both in the creek and in sparse outcrops to the east of the creek. The sulfides appear to be concentrated along a contact with a basalt sill. BLM personnel found a 1-inch-diameter drill hole at this location. As they continued down the creek to an elevation of 1,120 feet, they found no other mineralized rock.

The schist contains chalcopyrite and sphalerite, both as disseminations and in conformable fine-grained, wispy bands. A conformable mineralized band 0.1 to 0.9 feet thick that strikes 007° and dips 15° east is exposed above a waterfall in the creek. It is hosted in the iron-stained schist and is exposed for 15 feet in the creek bed. It is covered to the north and south. Chip samples across this band contained from 17.2 to 55 ppm silver, from 5,588 ppm to 2.1 percent copper, and from 3,827 ppm to 1.1 percent zinc (Map no 55, samples 354, 356).

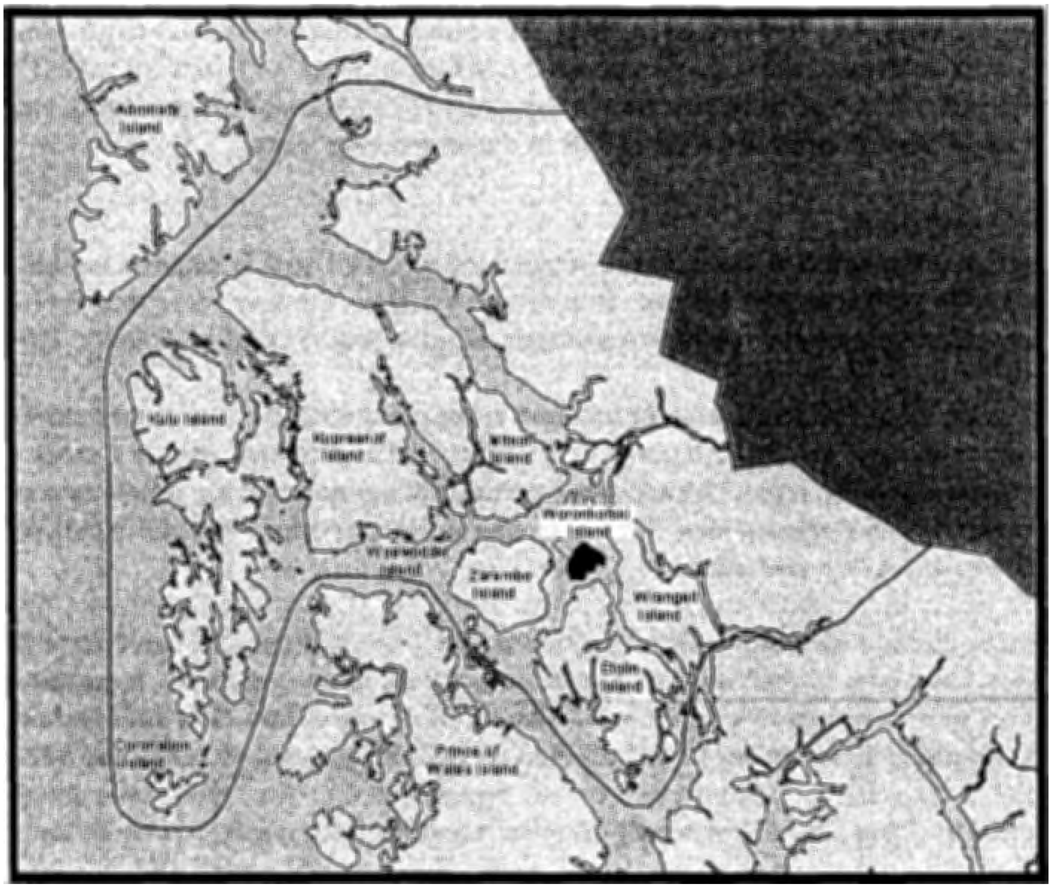
Other chip samples collected from the iron-stained schist at locations downstream, upstream, and to the east of the mineralized band contained up to 2,521 ppm copper and 7,000 ppm zinc. A select sample contained 1.5 percent zinc (Map no. 55, sample 9687).

Conclusions

The BLM's investigation of the Round Point area located a small occurrence of copper and zinc. Although minor, this occurrence encourages additional reconnaissance in the area for bedded massive sulfide deposits.

WORONKOFSKI ISLAND

Property name	Plate 1, Map no.
Exchange	56
Sunrise	57



EXCHANGE

(Plate 1, Map no. 56)

Location/Access

The Exchange prospect is located on the northwest side of Woronkofski Island, near Wedge Point, about 7 miles southwest of Wrangell. The topography in the area is gently sloping and covered with second-growth timber and thick brush. The prospect is located on the shoreline, and access is by boat or helicopter.

History

The Exchange claims were first staked in 1900. The prospect consists of a 12- to 15-foot-wide quartz vein with moderate gold values, exposed by surface cuts and a 45-foot-long adit (Wright and Wright, 1908). The claims were active in the mid-1970's (Alaska Kardex, 1982), but there is little evidence of what transpired on the claims in the intervening years.

Mineral Assessment

The prospect area is mapped as Jurassic to Cretaceous Seymour Canal Formation turbidites (Karl and others, 1999). However, the prospect is underlain by felsic intrusive rocks that are likely a continuation of the Cretaceous quartz monzodiorite mapped nearby (Karl and others, 1999).

The BLM's examination of the Exchange prospect revealed an irregular quartz vein up to 16 feet thick, intermittently exposed through cover for 250 feet, in the intertidal zone, in a creek bed, and in a 45-foot-long adit. The vein is hosted in a granite porphyry and contains small amounts of galena. It strikes north-south and dips 30° to the west in the intertidal zone, and it strikes 310° and dips 20° to the south in the adit.

Investigators collected nine samples from the quartz vein. The highest gold value came from a sample across 5 feet of a 16-foot-wide part of the quartz vein in the creek bed. It contained 923 ppb gold, 26.6 ppm silver, and 944 ppm lead (Map no. 56, sample 206). The next highest value was from a sample collected underground across 3 feet of a larger vein. It contained 532 ppb gold, 58 ppm silver, and 2,660 ppm lead (Map no. 56, sample 10). The other seven samples contained from less than 5 to 131 ppb gold. A stream sediment sample from a creek that crosses the quartz vein did not contain significant metal values (Map no. 56, sample 14).

Conclusions

The gold values found at the Exchange prospect are too low to attract further exploration of this deposit. However, the existence of the relatively large quartz vein with low but anomalous gold values encourages additional exploration in the area.

SUNRISE

(Plate 1, Map no. 57)

Location/Access

The Sunrise placer prospect is located on the northwest side of Woronkofski Island, at the mouth of the creek that drains Sunrise Lake. It is about 7 miles southwest of Wrangell. The topography in the area is gently sloping and is covered with second-growth timber and thick brush. Access to the prospect is by boat or helicopter.

History

The Sunrise 1 and 2 placer claims were staked for gold in 1974 (Alaska Kardex, 1982). A literature search revealed no additional mention of this prospect.

Mineral Assessment

The 2-mile-long creek that drains Sunrise Lake cuts Cretaceous quartz monzodiorite and Jurassic to Cretaceous Seymour Canal Formation slate (Karl and others, 1999). Gravels from the creek consist of slate and diorite fragments.

The BLM's examination of the Sunrise placer claims consisted of collecting a pan concentrate and two stream sediment samples. The samples did not contain gold or any other significant metal values (Map no. 57, samples 63-65).

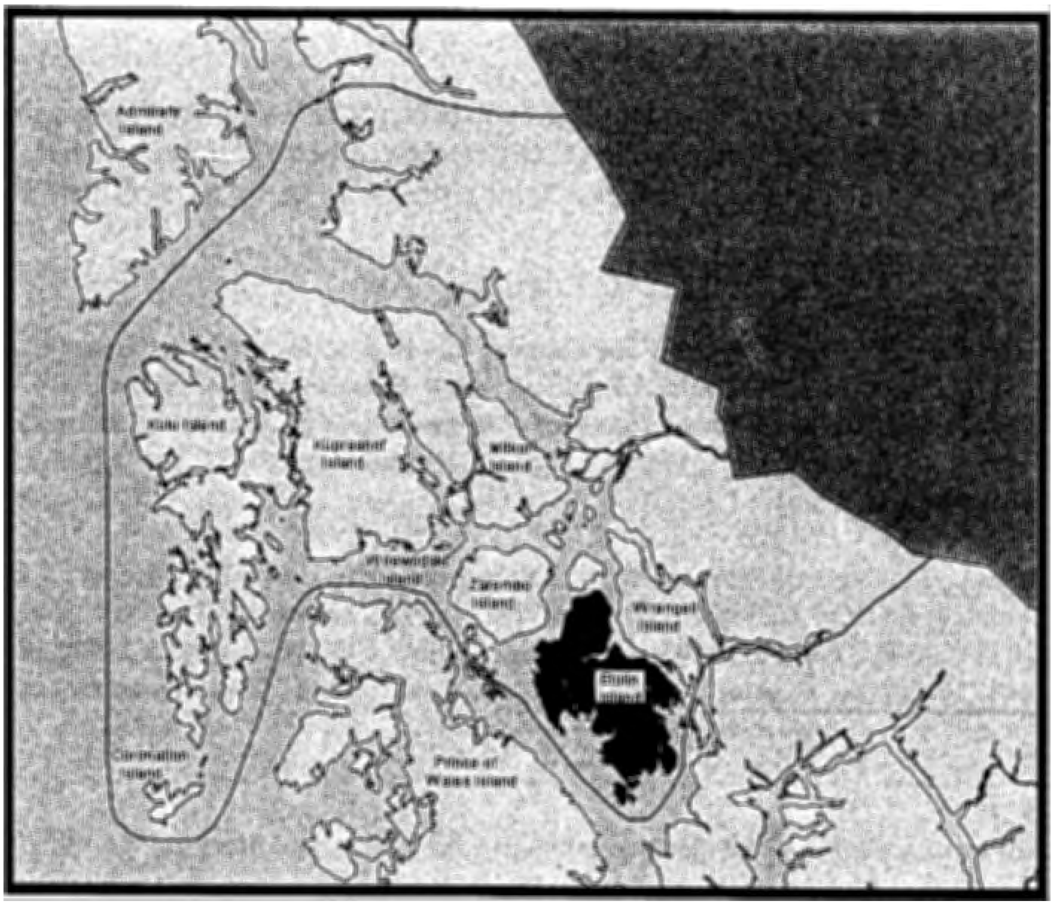
Conclusions

The area has little potential for placer gold.

ETOLIN ISLAND

Property name .... Plate 1, Map no.

Steamer Bay 58.1-58.2



STEAMER BAY

(Plate 1, Map nos. 58.1-58.2)

Location/Access

The Steamer Bay occurrence is located at the head of Steamer Bay on the west side of Etolin Island, just south of the confluence of Stikine Strait and Clarence Strait. It is approximately 26 miles south-southwest of Wrangell. The site encompasses five streams that drain the Keating Range to the northeast. Steamer Bay can be reached by boat from Wrangell, float plane, or helicopter. The inland creeks are accessible by foot only. A Forest Service cabin is located at the mouth of Steamer Bay on the northeastern shore.

History

The Steamer Bay occurrence was staked for lead by Paul Pieper in 1972 and held through 1973. It consisted of the Plumb 1-22 claims and the Plumb fractions 23-26. The only activity mentioned took place on the Plumb 1-5; however the type of activity was not described (Alaska Kardex, 1982).

Mineral Assessment

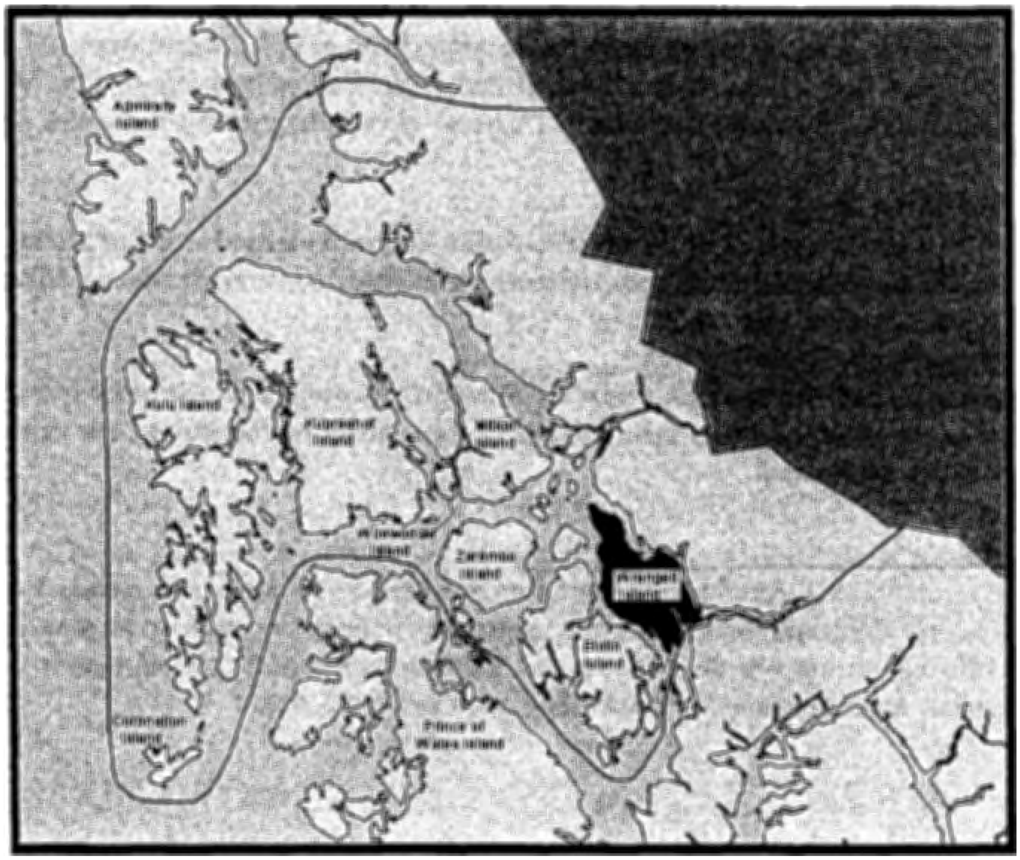
The occurrence lies along the margins of the Steamer Bay Fault, which cuts the Jurassic to Cretaceous Brothers Volcanics/Douglas Island Volcanics. Steamer Bay and Porcupine Creek are the surface expressions of this northwest- to southeast-trending fault. The rocks associated with this unit are andesite to basalt flows, volcanic breccias, volcanic graywacke, tuff, phyllite, and slate (Brew, 1997a, 1997b).

BLM personnel made short traverses up the two streams that drain into Steamer Bay. They collected two samples from float in the streams (Map no. 58.1, samples 467, 8719). Sample 467, from a piece of silicified breccia, contained 10.9 ppm silver, 1,407 ppm copper, 1.01 percent lead, and 1.9 percent zinc. Because of time and weather constraints, BLM personnel were unable to make a complete examination of the area.

Conclusions

Of the five streams included in this prospect, only two have been examined briefly. It is necessary to examine the other three streams to determine the nature and extent of mineralization in the area.

WRANGELL ISLAND AND NEARBY ISLANDS



WRANGELL AIRPORT PIT

(Plate 1, Map no. 59)

Location/Access

The Wrangell Airport Pit is located adjacent to the northwest end of the Wrangell airport. It is accessible by road; however, the entrance to the pit itself is blocked by a locked gate that prevents vehicular access, but does not prevent access by foot. The pit belongs to the State of Alaska and has been used by the State Department of Transportation for construction projects.

History

Reference to granites near the town of Wrangell was made in a report published in 1891 by Frank Adams of McGill University in Montreal, Quebec, Canada (Adams, 1891). Adams, while on the staff of the Geological Survey of Canada, was given samples collected in 1887 by participants of an expedition to the Yukon and northern British Columbia and asked to make an examination. Of the rocks received, three, including a granite specimen from near Wrangell, were extraordinary enough that Adams made a detailed study. His findings indicate that the Wrangell granite contains epidote and associated allanite (Adams, 1891). Allanite is a rare-earth silicate.

Mineral Assessment

The Wrangell Airport Pit exposes an intrusive rock that has been mapped as a Cretaceous hornblende-biotite tonalite. Similarly mapped units are exposed to the northwest on Mitkof and Kupreanof Islands (Brew and others, 1984).

BLM personnel collected three samples from the Wrangell Airport Pit to assess the potential for a rare-earth resource (Map no 59, samples 3821-23). Analytical results indicate low rare-earth values in the samples collected.

Conclusions

This property should probably not be considered an occurrence. Allanite, though a cerium-bearing epidote that in places contains yttrium, apparently is fairly common in the area. In addition, cerium and yttrium silicate minerals don't appear to be significant sources for these elements. Instead, these elements are more likely produced from oxides.

SALAMANDER CREEK PIT

(Plate 1, Map no. 60)

Location/Access

The Salamander Creek borrow pit is located near the Salamander Creek picnic area, which is 7.5 miles from the beginning of Forest Service road 6265 on Wrangell Island. It is about 14 miles south-southeast of Wrangell. The topography in the area is moderately steep with second-growth timber and brush cover. Access to the prospect is by vehicle.

History

The Salamander Creek borrow pit is spectacularly iron-stained with orange, red, and yellow. It was reported by a helicopter pilot as well as by USGS geologist Dave Brew. Brew was the first to map this pit in detail, and he reported its potential importance to the BLM via electronic mail in 1998.

Mineral Assessment

The Salamander Creek borrow pit is located in Upper Cretaceous, metamorphosed, Stephens Passage Group rocks near their contact with Upper Cretaceous biotite granodiorite (Brew, 1997c).

The BLM's examination revealed a contact zone between biotite granodiorite, and schist and slate. The contact zone is irregular, locally brecciated, silicified, and contains disseminations and blebs of pyrite and pyrrhotite in biotite and muscovite schist. Locally the zone contains green and red garnets. Investigators collected seven samples from various parts of the contact zone. The two highest-grade samples contained 227 ppm copper and 17 ppm molybdenum (Map no. 60, samples 76, 78).

Conclusions

Limited BLM sampling indicates that the Salamander Creek borrow pit does not contain significant metal values. However, the contact zone is sufficiently interesting to encourage examination of the area for additional occurrences.

BRUISER

(Plate 1, Map no. 61)

Location/Access

The Bruiser property is located on the west side of Found Island, which is off the southern tip of Wrangell Island. It is approximately 28 miles south-southeast of Wrangell. The rocks of interest lie in the short cliffs along the high-tide line and are best seen at medium to low tide. Inland, the vegetation is very dense. The island can be reached by boat from Wrangell. Alternatively, float plane and helicopter access is possible at low tide.

History

The Bruiser No. 1 claim was first staked on Found Island by Clint Payne in 1961. Besides the fact that the claim was staked for gold, information regarding the property is vague. It appears as though the claim was active through 1967 and again between 1970 and 1977 (Alaska Kardex, 1982).

Mineral Assessment

Found Island has been mapped as Jurassic to Cretaceous sediments (Gehrels and Berg, 1992). Along the west-central shoreline, a network of concordant quartz veins is hosted in black sandy slates and staurolite schist. The veins vary in width from stringers to 3.0 feet, strike 020°, and dip 31° to the southeast. The quartz veins appear to be nearly barren, with only minor amounts of pyrrhotite present.

BLM personnel conducted a brief reconnaissance along the western shoreline of Found Island. The quartz veins described above were the only rocks observed with any associated sulfides. Samples of the quartz veins contained up to 417 ppm tungsten, but no other significant metal values (Map no. 61, samples 468-469, 8720-21).

Conclusion

The Bruiser property consists of a network of barren quartz veins with no apparent mineral value.

NIBLACK ISLAND

(Plate 1, Map no. 62)

Location/Access

The Niblack Island occurrence is located 31 miles south-southeast of Wrangell on a small group of islands in Ernest Sound. The claims associated with the occurrence are on the two largest islands. Access to the islands is best by boat, although float plane access is possible in fair weather, and helicopter access is possible at low and medium tide.

History

In 1956 as many as ten claims were staked by six different people at various locations on the Niblack Islands. All the claims were staked for copper; however, there is no information of development work (Alaska Kardex, 1982).

Mineral Assessment

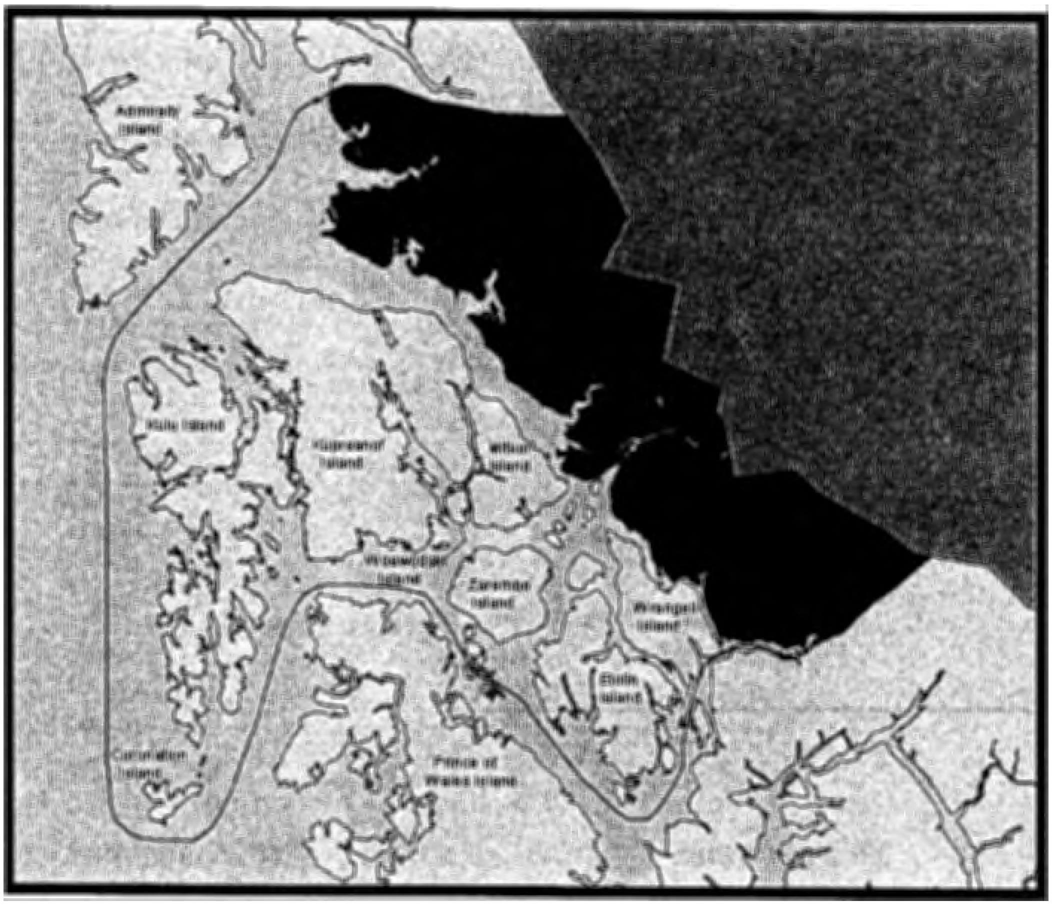
The rocks on the Niblack Islands are mapped as Tertiary granites (Gehrels and Berg, 1992). In at least one area, these granites were observed to contain small amounts of chalcopyrite.

The BLM's investigation of the Niblack Island occurrence consisted of three short traverses: one around the northern tip of the large central island, the second around the northern tip of the small island to the north of the long Niblack Island, and the third around the northern tip of the long island.. A sample of granite, collected from the north side of the small island on the second traverse, contained 1,725 ppm copper (Map no. 62, sample 8716).

Conclusions

The large number of claims staked in the Niblack Island area by six different people in the same year make this prospect interesting. However, the BLM's investigation did not reveal significant sulfide mineralization.

MAINLAND



K & D MINE

(Plate 1, Map no. 63)

Location/Access

The K & D Mine is on the north side of Libby Creek, which is on the mainland east of Stephens Passage, between Hobart Bay and Windham Bay. It is about 51 miles north-northwest of Petersburg. The prospect workings are about 1.5 miles from the shoreline of Stephens Passage and are within 50 feet of the stream embankment. The references that describe the location of the K & D as 2.5 miles from the beach, as it is shown on the USGS Sumdum B-5 quadrangle map, are in error. The site may be accessed by helicopter or on foot by walking about 0.25 miles upstream from a logging road that crosses over Libby Creek. The logging road is part of the Hobart Bay logging road system of Sealaska Regional Native Corporation. The Libby Creek drainage is Sealaska land and the entire area around the prospect has been logged.

History

The K & D Mine is named after Herman Kloss and Jack Davis, the earliest recorded claimants of the property (U.S. Bureau of Mines, Mine Production Records). The exact date of discovery is unknown. In 1939 the property was listed in Bureau of Mines records as the "Marie." The same records show that a 2-ton Gibson mill was on the site and that there was 90 feet of drift. In 1939 to 1940, a total of 42 tons of ore was processed by amalgamation treatment that recovered 15 ounces of gold and 6 ounces of silver. In 1947 to1948, the only other years of recorded production, a total of 16 tons of ore was processed by amalgamation, and 10 ounces of gold and 4 ounces of silver were recovered (U.S. Bureau of Mines, Mine Production Records). By the summer of 1948, the operation included a 145-foot-long adit with an associated 38-foot inclined shaft (Stewart, 1949). Aside from annual maintenance, no further extension of underground workings were reported after that time (Alaska Kardex, 1982).

In 1950 the Bureau of Mines collected and analyzed five samples from the K & D Mine. Three of the samples had notable gold values: 1.95, 0.71, and 0.50 oz/ton gold (Peterson, 1950). Also noteworthy is the presence of native antimony, which is found near the face of the underground workings (Stewart, 1949).

Mineral Assessment

The K & D Mine area is covered by metamorphosed, Permian to Cretaceous sedimentary and volcanic rocks (Gehrels and Berg, 1992). The mineralized vein at the prospect is conformable with the structure in a graphitic, gray schist (Williams, 1951a).

The mineralized rock at the K & D consists of a large quartz vein up to 25 feet thick. The vein is exposed by an adit and trenches, as well as in the bed of Libby Creek near the workings. The creek generally follows the strike of the vein. The vein strikes from 022° to 050° and dips from 20° to 44° to the northwest. The vein is traceable in the adit and stream bank for 200 feet.

There were probably several periods of shearing during vein formation at the K & D, which allowed for multiple mineralizing episodes and the development of a complex mineral suite. The main quartz vein is locally thick and massive, but much of the vein is highly fractured and ribboned with 1- to 6-inch-thick, parallel quartz layers that make up the full width of the vein. The vein contains stibnite, galena, sphalerite, arsenopyrite, jamesonite, native antimony, and gold, which are primarily found in shoots, or in shears or fractures, within wide quartz bands. The strike and dip of the shoots varies somewhat from that of the main vein (Williams, 1951a).

In 1998 BLM personnel mapped and sampled the surface features and outcrops at the K & D site. At the time of examination, the adit portal was partly caved and the workings flooded, so the underground features were not examined or sampled.

Five of the BLM's 12 samples collected from the K & D Mine had gold concentrations at or above 800 ppb. The highest-grade sample contained 0.757 oz/ton gold, 50 ppm silver, 1.27 percent arsenic, and anomalously high lead, zinc, and cadmium over 2.3 feet (Map no. 63, sample 3693). This sample was taken from the northeast side of a small, shallow, inclined shaft located southwest of the main adit. Field observations and chemical analyses indicate that the gold in this sample was probably associated with arsenopyrite. The sample with the next highest grade was collected from the same location. It contained 7,447 ppb gold, 169 ppm silver, 1.06 percent lead, over 10,000 ppm arsenic, and anomalously high levels of zinc, cadmium, mercury, and antimony (Map no. 63, sample 3694). All of the samples with high gold values also had anomalously high arsenic values.

Conclusions

Although the quartz vein at the K & D Mine is relatively large and continuous, elevated precious-metal contents are restricted to isolated parts of the vein. The mineralized parts of the vein are generally thin and discontinuous. As now known, the K & D Mine is unlikely to become a significant precious- or base-metal resource.

SUN

(Plate 1, Map nos. 64.1-64.2)

Location/Access

The Sun prospect is located on the south side of Glory Lake, east of Port Houghton and about 36 miles north of Petersburg. The prospect is located near the mouth of the longest drainage that flows into the south side of Glory Lake, near its eastern end. The easiest access to the site is by helicopter or float plane. In the past, access was available by a trail that lead from Farragut Bay, along the Farragut River, across Farragut Lake, and on to Glory Lake. The prospect is situated at an elevation of 500 feet in steep topography. Vegetation in the area is re-establishing itself following recent glaciation.

History

Glenn Reid of Petersburg, Alaska, held the Sun claims in 1974 (Alaska Kardex, 1982). There is no other published record of activity at the site. Except for a single exploratory drill hole, BLM investigators found no evidence of mining activity.

Mineral Assessment

Detailed geologic maps are not available for the Sun prospect area, but a regional map describes a tonalite of Paleocene or Cretaceous age in the vicinity (Gehrels and Berg, 1992). In the immediate area of the prospect, the host rock is a gneiss. The foliation in the gneiss strikes 311° and dips 82° to the northeast.

The Sun prospect consists of a band of galena and sphalerite, 0.1 feet wide by 11 feet long, that is conformably hosted in gneiss. Located on the western side of the drainage, the band is exposed at the base of a small cliff only a few hundred yards from the lakeshore. The exposure measures approximately 3 feet horizontally and 10 feet vertically.

BLM personnel collected two samples from the Sun prospect. One sample from the sulfide band contained 1,411 ppb gold, 1,245.5 ppm silver, 9.99 percent lead, 7.1 percent zinc, 726.3 ppm cadmium, and 3.54 ppm mercury (Map no. 64.2, sample 389). Investigators took a select sample from a boulder they found in the stream adjacent to the Sun occurrence. The boulder contained pyrite and a small amount of chalcopyrite. It had an elevated copper content of 1,888 ppm (Map no. 64.2, sample 8656). They also took a stream sediment sample from a drainage to the west of the Sun occurrence. The sample contained 71 ppb gold (Map no. 64.1, sample 2807).

Conclusions

Although the assay of the vein at the Sun occurrence is quite high, the vein is only 0.1 foot wide. Additional examination of the area might be warranted, but as now known, the prospect is of little economic significance.

The Islander

(Plate 1, Map no. 65)

Location/Access

The Islander prospect lies on the east side of Steamboat Bay, 0.3 miles southeast of Foot Island and 6 miles north of Cape Fanshaw. It is 39 miles northwest of Petersburg and is accessible by boat, float plane, or helicopter. The property occupies a small, low-elevation peninsula that extends westerly a few hundred feet into Steamboat Bay from the mainland. At high tide, the peninsula becomes an island, with its highest point no more than 10 feet above sea level. Some grass and a few small trees grow on the highest part of the island.

History

The first record of mineral exploration activity at The Islander prospect is a claim filed by S.A. Wilson in 1952 (Alaska Kardex, 1982). An examination of the property was made by James A. Williams of the Alaska Territorial Department of Mines also in 1952 (Williams, 1952). The BLM's examination of the prospect in 1998 revealed no evidence of mining activity.

Additional prospecting in the area has occurred on the northeast side of Foot Island, half a mile to the northwest of The Islander. Mineralized rock, similar to that at the prospect, was reported by H.T. Olson on Foot Island (Williams, 1952). In 1953 there was also a prospect listed as "Discovery Zinc" in the southeastern corner of Steamboat Bay. The reported location would place it about a quarter of a mile east of The Islander prospect (Alaska Kardex, 1982).

Mineral Assessment

The country rock at The Islander prospect is a fractured graywacke, which has zones or stringers of dark, bluish gray calcium carbonate cutting through it (Williams, 1952). The carbonate stringers include zones heavily mineralized with sulfides, particularly pyrite and sphalerite. Williams took five samples from the carbonate zones, which measured from 3 to 12 inches in width. The assays of the samples showed from 0.16 to 0.48 oz/ton gold and 1.91 to 7.5 percent zinc (Williams, 1952).

BLM personnel examined the Islander property in 1998. The veins at the site strike from 055° to 095°, with most from 085° to 095°. Dips are as little as 24°, but most are more than 50° to the south. The veins with the highest gold values tend to dip very steeply (greater than 79°) to the south or east. As Williams (1952) noted, the veins tend to be short, discontinuous, and narrow (no greater than 1 to 12 inches in width).

BLM personnel collected five samples of mineralized veins at the prospect. A sample from an 11-foot-long vein on the western side of the island contained 7,352 ppb gold, 2.5 percent zinc, and anomalously high levels of copper, cadmium, and mercury (Map no. 65, sample 385). A sample from a 19-foot-long vein on the southern side of the island contained 1.077 oz/ton gold, 9.7 percent zinc, over 10,000 ppm arsenic, and anomalously high levels of silver, copper, cadmium, and mercury (Map no. 65, sample 387). Sample 8654 (Map no. 65) had 0.669 oz/ton gold, 8.2

percent zinc, over 10,000 ppm arsenic, and anonymously high levels of silver, copper, cadmium, and mercury. Most of the samples that had anonymously high gold values also had anonymously high arsenic, silver, copper, cadmium, and mercury values.

BLM investigators collected several samples from sulfide-bearing graywacke that hosts the mineralized veins. Sample 8653 across 7.5 feet contained 1,645 ppb gold and 1.5 percent zinc; sample 8652 across 0.45 feet contained 7,584 ppb gold and 8.6 percent zinc.

Conclusions

Although the precious-metal content of the veins at The Islander prospect is relatively high, there is insufficient tonnage to make them a likely exploration or development target. However, the veins at the prospect strike generally east-west. So the mainland east of The Islander might provide an opportunity for finding additional occurrences. S.A. Wilson, the original claimant, reportedly examined that area, but to no avail (Williams, 1952).

Cascade Mine

(Plate 1, Map no. 66)

Location/Access

The Cascade Mine is located on the east side of Thomas Bay, a quarter of a mile southeast of Spray Island and half a mile south of the mouth of Cascade Creek. The property is 14 miles northeast of Petersburg and is accessible by boat, float plane, or helicopter. There is a trench located adjacent to the shoreline just above high-tide level. There are also two adits less than 200 feet inland at elevations of 20 and 36 feet. The topography within half a mile of the beach is moderately steep and is covered by vegetation of thick brush and timber typical of Southeast Alaska's rainforest.

History

The original discovery date of the Cascade Mine is not known, but records show that the property was held by Colp and Lee of Petersburg in 1920 and for a few years thereafter (Wright, 1945). Sometime before 1921, a vein–reportedly carrying pyrite, arsenopyrite, and minor chalcopyrite, pyrrhotite, and argentiferous galena–was explored by a short tunnel (Berg and Cobb, 1967). The property was restaked by Harry D. Colp, F.R. Porter, and Fred H. McGill in 1944 (Wright, 1945). In 1948 the production of 4 tons of ore yielding 6 ounces of gold and 1 ounce of silver was reported by Don Thomas to the Bureau of Mines (U.S. Bureau of Mines, Mine Production Records).

Mineral Assessment

The rock units in the Cascade Mine area are mapped as Cretaceous to Tertiary, metamorphosed, bedded, and intrusive rocks. Units include biotite schist, biotite gneiss, and gneissic biotite granodiorite and quartz monzodiorite (Brew and others, 1984). Buddington (1923) describes the rocks hosting the gold-bearing veins at the prospect as hornblende and quartz-mica schists.

The Bureau of Mines made its first examination of the Cascade Mine in 1944 and took two samples for analysis. The Bureau of Mines returned in 1989 to map and sample the claim again. During this examination, investigators observed that the mineralized rock is associated with two individual fault zones that strike 280° and dip 65° to the northeast. An isolated high-grade sample from an opencut yielded 0.22 oz/ton gold (Maas and Redman, 1989).

The rocks hosting the mineralization at the Cascade Mine are predominantly felsic schists. They include garnet-biotite-chlorite schist, quartz-biotite schist, and more silicified schist. The fault zones that concentrate the mineralization are more strongly silicified than the surrounding host rocks and include numerous quartz stringers. Sulfides in the fault zones include pyrite and arsenopyrite. In places the silicified schist also contains bands of fine-grained sulfides, mainly pyrite, that are parallel to the foliation in the schist as well as in crosscutting stringers.

The mineralized rock at the Cascade Mine is controlled by faults, where silicification is accompanied by the introduction of sulfides including pyrite, galena, and arsenopyrite. BLM investigators collected eight samples from the surface and underground workings at the Cascade Mine. The sample with the highest grade contained 589 ppb gold over 3.5 feet (Map no. 66, sample 2801). The series of eight samples showed a correlation between elevated gold and arsenic values.

Conclusions

The BLM's examination of the Cascade Mine reaffirmed the conclusions of earlier investigators that there are insufficient grades and tonnages at the property to consider development. To date, similar mineralization is unknown in the Cascade area, so the potential for discovery of an economically significant deposit is considered to be low.

BUCK BAR

(Plate 1, Map nos. 67.1-67.6)

Location/Access

The Buck Bar prospect is 20 miles northeast of Wrangell, on the north side of the Stikine River. References do not give an exact location, but descriptions suggest it is between Shakes Slough and the mouth of the Ketili River. In that area, the northern side of the Stikine River is flat and brushy for about a mile north of the river. Access to the area is by boat or float plane. Helicopter access is restricted because the site is within the Stikine-Leconte Wilderness area.

History

In 1863 W.P. Blake observed that the Buck Bar area contained fine gold in "coarse river drift" and that some miners had staked claims in the vicinity. The Buck Bar occurrence was supposed to have been discovered in 1861 and to have been the first gold to be profitably mined in Alaska (Brooks, 1923). It is not known how much gold may have been recovered. After 1923 there apparently are no additional references to the Buck Bar prospect in published literature.

Mineral Assessment

Brooks (1923) specifically refers to the Buck Bar prospect on the lower Stikine River in his description of bar deposits. He goes on to describe bar deposits as a special type of fluviatile placer deposit in which gold is deposited on stream bottoms as a result of eddy currents. These deposits, usually of small volume, consist of very fine gold (Brooks, 1923). Although typically low-grade, some flood deposits can be profitably worked for a short time every year following the annual river flood.

The BLM collected 12 samples at the Buck Bar prospect, 10 of which were within the flood plain of the Stikine River (Map nos. 67.1-67.6, samples 86-89, 249-253, and 2856-58). Three samples were pan concentrates and nine were stream sediment samples. None of the 12 samples had significant gold contents. The highest gold value was 80 ppb (Map no. 67.4, sample 251).

Conclusions

The BLM's examination of the Buck Bar area failed to reveal even modest amounts of gold in the river deposits. In explanation, either the water level was too high to expose the bar deposits, the wrong locations were sampled, or the published records are in error. It is also possible that the river's flow patterns have changed over the years and that the bar deposits exploited in 1861 are occurring elsewhere in the river. If the historic Buck Bar occurrence was truly a bar deposit as described by Brooks (1923), its potential for hosting a sizeable deposit is small. The wilderness land status around the Buck Bar prospect also limits the potential for development of occurrences in the area.

MARY MOOSE

(Plate 1, Map no. 68)

Location/Access

The Mary Moose placer prospect is 14 miles north-northeast of Wrangell. It is located near the mouth of Andrew Creek, about half a mile upstream of its confluence with the Stikine River. The area is relatively flat river flood plain with thick brush. It is only about 20 feet above sea level. Access is by boat or float plane. Helicopter access is restricted because the site is within the Stikine-Leconte Wilderness area.

History

Little is known about the Mary Moose prospect. A Mine Safety and Health Administration (MSHA) file is the only reference. On August 30, 1979, the prospect was classified by MSHA as permanently abandoned, and all information regarding it was removed from their files (W. W. Wilson, MSHA, written commun., 1999). There has been no known production from the prospect.

Mineral Assessment

The BLM carried out an aerial reconnaissance of the Mary Moose placer looking for any evidence of past mining activity. Nothing was detected. Investigators collected four stream sediment samples from the area reported to be the prospect site (Map 68, samples 84-85, 247-248). None of the samples contained significant metal values. The highest gold value was 29 ppb (Map no. 68, sample 248).

Conclusions

Because the Mary Moose placer prospect is within the Stikine-LeConte Wilderness, further exploration is not permitted and none seems warranted. There is no obvious physical evidence of previous mining activity in the prospect area.

ANDREW CREEK

(Plate 1, Map nos. 69.1-69.9)

Location/Access

Andrew Creek flows into the Stikine River from the south, about 14 miles north-northeast of Wrangell. The Andrew Creek occurrence is located near the head of the South Fork of Andrew Creek, about 8 miles from its mouth, and 12.5 miles northeast of Wrangell. The broad, U-shaped valley of the South Fork of Andrew Creek is typical of many Southeast Alaska valleys; the floor is gently sloping along its length, but steepens at its sides where the surrounding ridges rise to about 3,000 to 4,000 feet. The valley floor is covered with alder brush, stunted conifers, and muskeg grasses. The occurrence is situated within the Stikine-LeConte Wilderness. It is accessible by helicopter, although helicopter access is restricted due to the wilderness status in the area. An alternate means of access would be an arduous hike from the mouth of Andrew Creek on the Stikine River.

History

BLM personnel discovered visible gold in a piece of quartz float on the South Fork of Andrew Creek in 1997. They did a follow-up investigation in the area in 1998. The Mary Moose placer claims (Map no. 68) were staked at the mouth of Andrew Creek sometime prior to 1979. However, there is no mention of a lode occurrence farther up the drainage.

Mineral Assessment

The Coast Range megalineament of Brew and Ford (1978) runs along the South Fork of Andrew Creek (Brew, 1997H). The area is marked by Cretaceous intrusions southwest of the megalineament and Tertiary intrusions to the northeast. Hosting the intrusions are schists and gneisses, which have commonly been migmatized by the intrusions. Metamorphic grade increases to the northeast and reaches amphibolite to upper amphibolite facies in the South Fork area (Brew, 1997H).

The South Fork of Andrew Creek is along strike with the mineralized rocks of Groundhog Basin to the southeast. However, gold in quartz veins is not known in the Groundhog Basin area.

A general reconnaissance examination of the South Fork of Andrew Creek area in 1997 led to the discovery of a small amount of visible gold in quartz from stream float on the southeast side of the creek (0.822 oz/ton gold; Map no. 69.3, sample 146). BLM investigators collected 21 stream sediment samples and 1 pan concentrate sample in 1998 in an attempt to locate the source of the gold. The stream sediment samples contained up to 493 ppb gold (Map no. 69.3, sample 363) and the pan concentrate sample had 1,058 ppb gold (Map no. 69.1, sample 2859). The sample results did not indicate a source area for the gold. In addition to the stream samples, investigators examined drainages above the visible gold sample site. They did not discover any more visible gold nor obviously prospective outcrops. However, they did sample additional quartz float. One sample contained 1,992 ppb gold (Map no. 69.5, sample 2850). Other float samples contained from 137 to 693 ppb gold (Map nos. 69.3-69.5, samples 2849-51, 3750, 3800, 9688-90).

Conclusions

The potential exists for a lode gold resource in the upper Andrew Creek valley. Not only was visible gold found in a piece of quartz float, but historic placer claims were located near the mouth of the creek. So far, BLM samples have indicated elevated gold values only in a restricted area on the floor of the Andrew Creek valley. This area is within the Stikine-LeConte Wilderness. Additional work in the area might include examination of the margins of the valley, above the area where elevated gold samples were collected–outside the wilderness.

GROUNDHOG BASIN AREA

North Silver

(Figure 4, Map nos. 70.1-70.5)

Location/Access

The North Silver prospect is located at the northern end of the Groundhog Basin area (Figure 4), about 13 miles east of Wrangell. The topography and vegetation in the area are alpine with glaciers and permanent snowfields to the south and east. Elevations range from 3,000 feet to 4,300 feet. Access is by helicopter.

History

During the late 1950's, the Moneta Porcupine Company staked claims and explored in the Groundhog Basin area, but subsequently dropped its claims. With the permission of Moneta Porcupine, two former company prospectors, William Huff and James Fucas, continued work in the area and staked new claims (Berryhill, 1964). William Huff discovered the North Silver prospect in 1963. In 1965 the claims were optioned by the Bunker Hill Mining Co., which drilled 7 holes, ranging in length from 85 to 224 feet, and blasted several pits. The property was dropped at the end of the field season (Bunker Hill Company, 1965). From 1968 to 1970, Humble Oil and Refining Co. optioned the property (Humble Oil and Refining Company, 1970a). Later, El Paso Natural Gas Co. optioned the property from 1971 to 1973 and conducted geophysics and sampling on the western side of the prospect (George and Wyckoff, 1973). AMAX Exploration Inc. optioned the property from 1976 to 1981 (AMAX Exploration Inc., 1981). Five claims were active in the North Silver area in 1999.

Mineral Assessment

The Groundhog Basin area consists of a belt of metamorphosed, Paleozoic sediments and volcanics about 1.5 miles wide that strikes about 330° and dips about 50° to the northeast. The belt is bounded on the east by the 60- to 70-million-year-old great tonalite sill (Brew and Morrell, 1983; Brew, 1997h) and on the west by 90-million-year-old granodiorite (AMAX Exploration Inc., 1981). On the northern side of Groundhog Basin, a 16.3-million-year-old biotite granite stock intrudes the metamorphic rocks. Sills and dikes of rhyolite composition extend from the stock to form predominately concordant quartz porphyry. The rhyolite sills predominate in the western third of the metamorphic belt (George and Wyckoff, 1973; AMAX Exploration Inc., 1981). Studies by Newberry and Brew (1989) indicate that the biotite granite stock is a zinnwaldite "tin" granite and that several base-metal deposits in the area are related to this tin granite.

The belt of sedimentary and volcanic rocks in the Groundhog Basin area has been metamorphosed to upper greenschist or lower amphibolite facies to form quartz-mica schists and hornblende-biotite-pyroxene-feldspar gneiss. Metamorphism has also produced granulite (calc-silicate gneiss) along layers in the metamorphic rocks (George and Wyckoff, 1973).

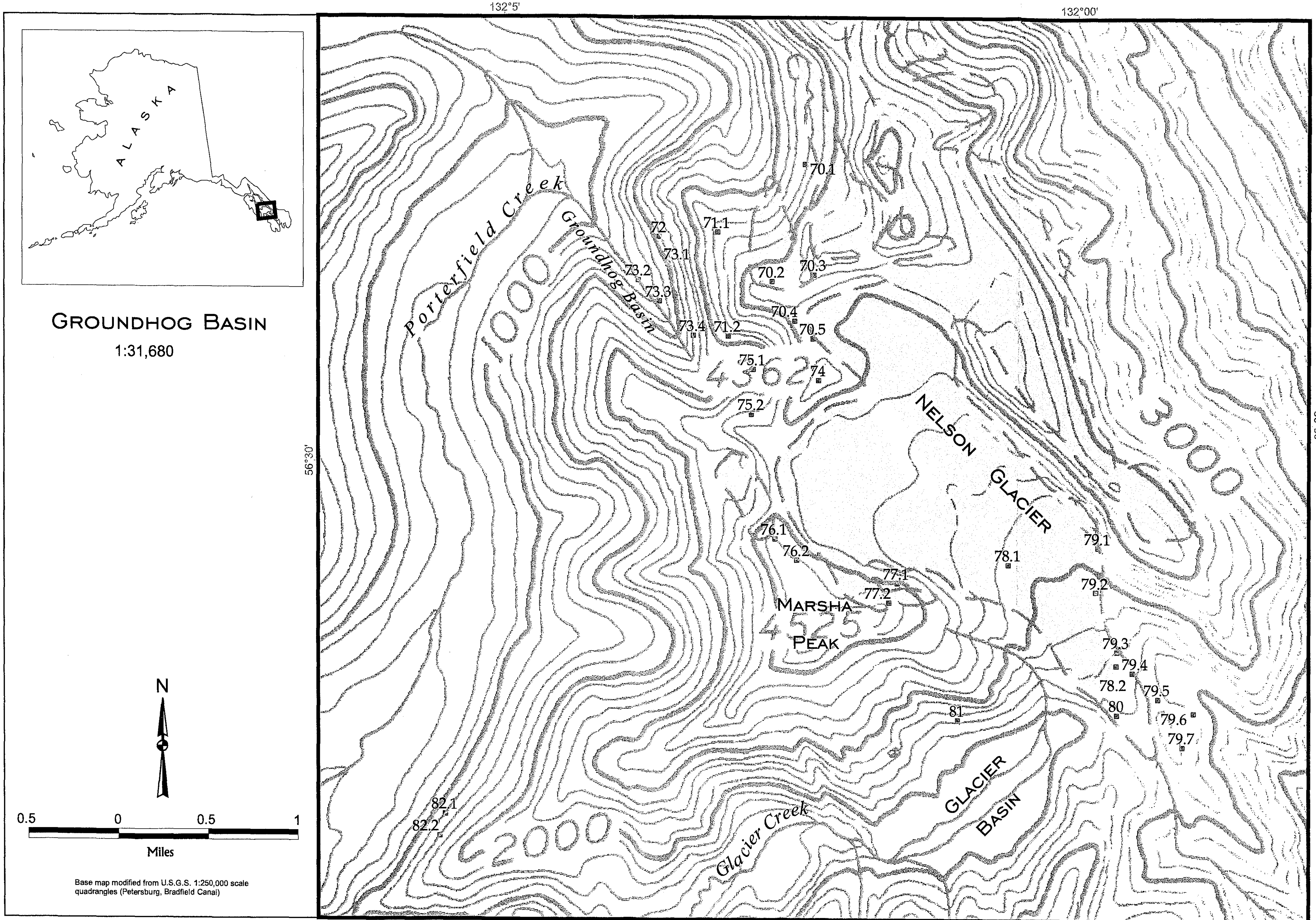


Figure 4. - Map of the Groundhog Basin area showing prospects

Studies by El Paso indicate two major fault trends in the belt of metamorphic rocks (George and Wyckoff, 1973). One trend is parallel to foliation and bedding; the rhyolite sills intrude along this trend. A crosscutting trend strikes about 025° (range 005° to 030°) and dips 45° east to vertical.

Polymetallic veins and mineralized zones follow this crosscutting trend and replace small parts of marble beds in the North Silver area.

The BLM's investigation of the North Silver prospect revealed three areas of mineralization. The southernmost is called the Whistlepig adit area. The other two are referred to simply as the west and north areas: the west area is located about 1,000 feet northwest of the Whistlepig adit; and the north area is located 4,000 feet north of the Whistlepig adit.

Whistlepig adit area (Figure 4, Map nos. 70.4-70.5):
The Whistlepig adit is located on a southwest-facing cliff at an elevation of 4,050 feet, just below the pass between Nelson Glacier and Groundhog Basin. The adit was likely started during the 1970's to intersect narrow, silver-bearing, galena-quartz veins that are exposed in the cliff above and to the north of the adit. The adit was started, but never completed, and consists of only 20 feet of trench that exposes sheared, iron-stained, silicified gneiss with small vugs of quartz and fluorite. A 3.6-foot sample across the gneiss contained 954 ppm lead, 399 ppm zinc, and 11.9 ppm silver (Map no. 70.4, sample 8694).

The narrow, quartz-sulfide veins exposed in the cliff (above and north of the adit at elevations of 4,150 to 4,200 feet) strike northeasterly and dip steeply. The veins pinch and swell and may extend for up to 50 feet along strike. They are mineralized irregularly and are from 0.2 to 1.0 foot thick. Samples from the veins contained from less than 5 to 4,345 ppb gold, 11.5 ppm to 517.62 oz/ton silver, from 778 ppm to 39.75 percent lead, and from 377 ppm to 11.0 percent zinc (Map nos. 70.4-70.5, samples 438-439, 120-121, 430). These samples were collected near the top and bottom of the cliff. BLM investigators observed old, deteriorated, fixed ropes hanging in the middle of the cliff face where previous workers had presumably sampled the veins. The adit and veins exposed in the vicinity are not mentioned in previous company reports.

West area (Figure 4, Map nos. 70.2-70.3):
The westernmost area of mineralization is located on a bench about 1,000 feet northwest of the Whistlepig adit at elevations ranging from 4,000 to 4,300 feet. It consists of a crosscutting shear zone up to 10 feet thick that strikes 020° to 040° and dips from 50° to 89° to the southeast. This shear zone has a 0.5- to 4-foot-thick mineralized section in its footwall that consists of massive and disseminated sulfides. It is irregular, pinches and swells, and is hosted in schist and gneiss.

Four pits, or cuts, expose the mineralization through soil and turf cover in the west area. The northernmost pit exposes the mineralization where it drops down the northern edge of the bench under a permanent snowfield. In the southernmost pit, located 185 feet from the northernmost, both the mineralization and shear are markedly dissipated. Examination of bedrock exposures farther to the south failed to reveal the mineralized shear zone. Measured samples across 0.5 to 4.9 feet collected from the three northernmost pits contained from 31.3 ppm to 79.46 oz/ton silver, from 1,795 ppm to 33.47 percent lead, and from 2,734 ppm to 9.8 percent zinc (Map no. 70.2, samples 122, 431-432, 8693, 9584-85). A 4.0-foot sample across the southernmost pit contained 19.7 ppm silver, 1,678 ppm lead, and 1,286 ppm zinc (Map no. 70.2, sample 435).

North area (Figure 4, Map no. 70.1):
The north area of mineralization is located 4,000 feet north of the Whistlepig adit at elevations of 3,500 to 3,900 feet. Here crosscutting, northeasterly trending, steeply dipping shears in gneiss and schist host irregular, pinch-and-swell, quartz-sulfide lenses and veins. The veins are up to 0.8 feet thick, and systems of veins can be traced for hundreds of feet. Less than 10 percent of the length of the vein system contains significant mineralization.

Samples collected across the more mineralized parts of the most prominent vein system were 0.2 to 0.8 feet long and contained from 7.45 to 119.32 oz/ton silver, from 4.69 to 48.61 percent lead, and from 2.4 to 3.6 percent zinc (Map no. 70.1, samples 124, 126, 9586-87). A 3.3-foot-long sample across a less mineralized part of the vein system contained 46.6 ppm silver, 2,451 ppm lead, and 5,245 ppm zinc (Map no. 70.1, sample 125).

The vein system described above was drilled by the Bunker Hill Mining Co. in the early 1960's (diamond drill hole [DDH] 23). Assays from the drilling for veins up to 1.0 foot thick revealed from 0.36 to 2.9 oz/ton silver, from 0.0 to 6.71 percent lead, and from 0.4 to 2.2 percent zinc (Bunker Hill Company, 1965).

Two limestone beds, 50 feet apart and up to 20 and 30 feet thick, are located to the east of the veins described above. These beds strike 330°, dip 45° to the east, and can be traced for thousands of feet. The Bunker Hill Co. DDH's 17 to 22 penetrate either one or both of these limestone beds along a strike length of about 1,500 feet (Bunker Hill Company, 1965). Apparently, only a small part of the limestone beds is mineralized. The best mineralized zone in DDH 18 was an 8.5-foot intercept that contained 2.34 oz/ton silver and 0.51 percent lead. In DDH 19, a 0.5-foot section assayed 1.2 oz/ton silver, 0.9 percent lead, and 3.1 percent zinc. In DDH 22, a 0.5-foot section assayed 3.16 oz/ton silver, 10.66 percent lead, and 1.4 percent zinc. DDH's 21 and 17 did not contain significant mineralized intervals (Bunker Hill Company, 1965). The crosscutting shears in the area were probably the conduit for mineralization in the limestone beds.

Conclusions

Only small areas within the veins and limestone beds examined by the BLM and private companies at the North Silver prospect are mineralized. The mineralized veins pinch and swell and have irregular values, so are not good candidates for mineral development. The mineralized limestone, as indicated by drilling, is low-grade and discontinuous. However, vein sample values up to 4,345 ppb gold, 517.62 oz/ton silver, 48.61 percent lead, and 11.0 percent zinc (at higher-grade locations) encourage exploration of the area for more continuous mineralization. Whereas the veins appear to be too narrow to encourage exploration, the size and extent of the limestone beds present an attractive exploration target. The limestone is apparently very reactive to the mineralizing solutions that deposited silver, lead, and zinc along the veins. This has been demonstrated by the mineralized rock intersected by drilling. Areas where the limestone is sufficiently sheared to form a conduit for mineralizing solutions may prove to be fruitful exploration targets.

NORTHEAST CLIFFS

(Figure 4, Map nos. 71.1-71.2)

Location/Access

The Northeast Cliffs prospect is located near the northern end of the Groundhog Basin area, about 13 miles east of Wrangell. The area is alpine and cliffy and ranges in elevation from 3,100 to 4,200 feet. Access is by helicopter to the north or south of the prospect and then by foot to the mineralized outcrops.

History

The Northeast Cliffs prospect was investigated by AMAX Exploration Inc. between 1976 and 1981 (AMAX Exploration Inc., 1981). The claims are currently inactive.

Mineral Assessment

The Groundhog Basin area consists of a belt of metamorphosed Paleozoic sediments and volcanics about 1.5 miles wide that strikes about 330° and dips about 50° to the northeast. The belt is bounded on the east by the 60- to 70-million-year-old great tonalite sill (Brew and Morrell, 1983; Brew, 1997h) and on the west by 90-million-year-old granodiorite (AMAX Exploration Inc., 1981). On the northern side of Groundhog Basin, a 16.3-million-year-old biotite granite stock intrudes the metamorphic rocks. Sills and dikes of rhyolite composition extend from the stock to form predominately concordant quartz porphyry. The rhyolite sills predominate in the western third of the metamorphic belt (George and Wyckoff, 1973; AMAX Exploration Inc., 1981). Studies by Newberry and Brew (1989) indicate that the biotite granite stock is a zinnwaldite "tin" granite and that several base-metal deposits in the area are related to this tin granite.

The belt of sedimentary and volcanic rocks has been metamorphosed to upper greenschist or lower amphibolite facies to form quartz-mica schists and hornblende-biotite-pyroxene-feldspar gneiss. Metamorphism has also produced granulite (calc-silicate gneiss) along layers in the metamorphic rocks (George and Wyckoff, 1973).

Studies by El Paso Natural Gas Co. indicate two major fault trends in the belt of metamorphic rocks (George and Wyckoff, 1973). One trend is parallel to foliation and bedding. The rhyolite sills intrude along this trend. A crosscutting trend strikes about 025° (range 005° to 030°) and dips 45° east to vertical. The mineralization at the Northeast Cliffs is situated along the bedding plane shears.

The Northeast Cliffs prospect consists of a 0.5-mile-long, west-facing cliff made up of gneiss, schist, and rhyolite. Old, frayed, fixed ropes attest to previous examinations in the area. The BLM's investigation of the prospect was confined to the northern and southern ends of the cliff. Investigators found iron-stained, silicified gneiss and rhyolite that contained disseminated pyrite, chalcopyrite, galena, and sphalerite. They collected four samples up to 2 feet long from the most mineralized areas. The samples contained from 112 to 980 ppm copper and from 1,569 to 9,559 ppm zinc (Map nos. 71.1-71.2, samples 419, 427, 418, 2834).

AMAX collected 40 samples from the Northeast Cliffs area. They contained up to 840 ppm zinc and 13 ppm silver (AMAX Exploration Inc., 1981; Hamilton, 1982a)

Conclusions

The BLM and AMAX's sampling of the Northeast Cliffs prospect failed to reveal significant mineralization.

AMAX MOLYBDENUM

(Figure 4, Map no. 72)

Location/Access

The AMAX Molybdenum prospect is located on the northern side of Groundhog Basin, about 13 miles east of Wrangell. The area is predominated by steep cliffs and alpine vegetation; however, the lower elevations are brushy. Elevations range from 2,000 to 4,000 feet. Access is by helicopter and by climbing steep, loose rock. The prospect is centered on a granite stock. A small part of the western side of the stock and adjacent rocks is covered by patented mining claims (MS1580). The remainder of the area is Federal land that is open to mineral entry. The claims that were staked to cover the molybdenum occurrence are not currently active.

History

Molybdenum in the Groundhog Basin area was first reported by Smith (1930) and briefly described by Gault (1953). AMAX Exploration Inc. (AMAX) was the first company to drill the Groundhog Basin vicinity for porphyry molybdenum deposits. Between 1976 and 1981, AMAX drilled four holes, ranging in length from 506 to 2,727 feet, in the vicinity of a biotite granite stock (AMAX Exploration Inc., 1979[?], 1981).

Mineral Assessment

The Groundhog Basin area consists of a belt of metamorphosed Paleozoic sediments and volcanics about 1.5 miles wide that strikes about 330° and dips about 50° to the northeast. The belt is bounded on the east by the 60- to 70-million-year-old great tonalite sill (Brew and Morrell, 1983; Brew, 1997h) and on the west by 90-million-year-old granodiorite (AMAX Exploration Inc., 1981). On the northern side of Groundhog Basin, a 16.3-million-year-old biotite granite stock intrudes the metamorphic rocks. Sills and dikes of rhyolite composition extend from the stock to form predominately concordant quartz porphyry. The rhyolite sills predominate in the western third of the metamorphic belt (George and Wyckoff, 1973; AMAX Exploration Inc., 1981). Studies by Newberry and Brew (1989) indicate that the biotite granite stock is a zinnwaldite "tin" granite and that several base-metal deposits in the area are related to this tin granite.

The belt of sedimentary and volcanic rocks has been metamorphosed to upper greenschist or lower amphibolite facies to form quartz-mica schists and hornblende-biotite-pyroxene-feldspar gneiss. Metamorphism has also produced granulite (calc-silicate gneiss) along layers in the metamorphic rocks (George and Wyckoff, 1973).

The BLM's investigation of the AMAX Molybdenum prospect revealed coatings of quartz and molybdenite along fractures in biotite granite and gneiss (Map no. 72, sample 144). Mapping by AMAX indicates the biotite granite stock forms a 1,000- by 2,000-foot outcrop. Drill logs indicate that the molybdenite is found along fractures in granite (up to two fractures per foot) and to a lesser extent along bedding plane fractures in gneiss and schist. The molybdenite is associated with quartz and fluorite stringers and vugs, sericite, and chlorite alteration and small amounts of tungsten (Hamilton, 1982b). Sixteen AMAX surface samples collected from the northwest corner of the stock and from 1,000 feet into the surrounding volcanic and sedimentary rocks contained from 6 to 190 ppm molybdenum. Three AMAX samples collected south of the northwest corner of the stock contained from 250 to 5,000 ppm molybdenum (details regarding sample type and length were not available). Six AMAX samples collected over a distance of 600 feet from the southeast part of the stock and from adjacent volcanic and sedimentary rocks contained from 6 to 65 ppm molybdenum (AMAX Exploration Inc., 1981; Hamilton, 1982a).

The four AMAX drill holes were collared to the northwest, west, and south of the granite stock. All were angled toward the stock. The northwest hole reached a depth of 2,454 feet and bottomed in the stock. The best 100 feet from this hole averaged 25 ppm molybdenum. The west hole reached a depth of 2,072 feet, bottomed in the stock, and had a best 100 feet that averaged 28 ppm molybdenum. Two holes were drilled from the south. One, in gneiss its entire length, reached a depth of 506 feet and contained no significant molybdenum values. The other reached a depth of 2,727 feet, bottomed in the stock and contained from 55 to 60 ppm molybdenum from a depth of 2,500 to 2,727 feet (AMAX Exploration Inc., 1981; Hamilton, 1982b).

Conclusions

The molybdenum mineralization revealed by surface sampling and drilling in the intrusive and adjacent metamorphic rock is too low-grade to be of economic significance. Similar zinnwaldite "tin" granite intrusives may exist elsewhere in the Groundhog Basin area. They would be considered exploration targets for porphyry molybdenum deposits.

GROUNDHOG BASIN

(Figure 4, Map nos. 73.1-73.4)

Location/Access

The Groundhog Basin deposit is located at the northwest end of the Groundhog Basin area, about 13 miles east of Wrangell. The area consists of a deep gorge that trends north-northwest, with steep, loose rock cliffs to the east and west and a cirque at its southern end. Elevations range from 1,450 to 3,600 feet, with thick brush predominating at the lower elevations and bare rock at the top. Avalanche snow accumulates in the floor of the gorge and commonly covers the rocks until late in the season. Access to the prospect is via helicopter to a landing spot in the gorge. The area is covered by four patented claims.

History

The Groundhog Basin deposit was discovered in 1904. Between 1915 and 1917, Don Alaska explored the deposit, which by 1917, had four adits started on the prospect (Buddington, 1921). In 1918 the Alaska Treadwell Gold Co. examined the property (Wernecke, 1918). Buddington investigated it in 1921 for the USGS (Buddington, 1923). In 1930 a patent (MS 1580) was issued for four claims on the property.

In 1942 Ventures Ltd. optioned the property and by 1943 had sampled it and drilled 3 holes with depths of 107 to 335 feet. A resource estimate of 116,000 tons at an average grade of 8.3 percent zinc, 2.5 percent lead, and 2 oz/ton silver for a 4-foot average width was determined (Smith, 1943). In 1943 the USGS mapped the area and estimated several hundred thousand tons of solid ore at an average grade of 8 percent zinc, 1.5 percent lead, and 1.5 oz/ton silver and several hundred thousand tons of disseminated ore at an average grade of 2.5 percent zinc and 1.0 percent lead (Gault, 1953). The Bureau of Mines also examined the property in 1943 and estimated 120,000 indicated tons and 350,000 inferred tons. Both of these estimates were based on an average grade of 8.3 percent zinc, 2.5 percent lead, and 2.0 oz/ton silver with an average width of 4 feet (Muir, 1943). A 1944 War Minerals report estimated the indicated tonnage at 124,000 tons with an average grade of 8 percent zinc, 2 percent lead, and 2 oz/ton silver at an average width of 4 feet (U.S. Bureau of Mines, 1944).

In 1965 the Bunker Hill Mining Co. optioned the Groundhog Basin property. The area optioned included 294 claims, known as the Whistlepig claims that cover areas to the north, east, and south of the Groundhog Basin deposit. The company collected surface samples and drilled 24 holes with lengths of 25 to 350 feet. No new reserves were reported as a result of this work, and the property was dropped at the end of the 1965 field season (Bunker Hill Company, 1965).

Between 1968 and 1981, Humble Oil and Refining Co., El Paso Natural Gas Co., and AMAX Exploration Inc. optioned the Whistlepig-Groundhog Basin area. These companies concentrated their mapping, sampling, and drilling to the north, east, and south of the Groundhog Basin deposit. (Humble Oil and Refining Company, 1970a; George and Wyckoff, 1973; Hamilton, 1982).

In 1983 Houston Oil collected 19 channel samples of massive sulfide ore from the Groundhog Basin deposit. The 19 samples averaged 7.3 percent zinc, 2.2 percent lead, 0.17 percent copper, 0.39 percent tin, and 1.91 oz/ton silver with an average width of 3.25 feet (Oliver, 1994). This is the only reported tin average from the Groundhog Basin deposit.

In 1988 Newberry and Brew (1989) examined core and previously published company data and reported on the classification of the Groundhog Basin deposit. In 1992 Kennecott Exploration Co. briefly examined the property and evaluated earlier company reports (Wakeman, 1992).

Mineral Assessment

The Groundhog Basin area consists of a belt of metamorphosed Paleozoic sediments and volcanics about 1.5 miles wide that strikes about 330° and dips about 50° northeast. The belt is bounded on the east by the 60- to 70-million-year-old great tonalite sill (Brew and Morrell, 1983; Brew, 1997h) and on the west by 90-million-year-old granodiorite (AMAX Exploration Inc., 1981). On the northern side of Groundhog Basin, a 16.3-million-year-old biotite granite stock intrudes the metamorphic rocks. Sills and dikes of rhyolite composition extend from the stock to form predominately concordant quartz porphyry. The rhyolite sills predominate in the western third of the metamorphic belt (George and Wyckoff, 1973; AMAX Exploration Inc., 1981). Studies by Newberry and Brew (1989) indicate that the biotite granite stock is a zinnwaldite "tin" granite and that several base-metal deposits in the area are related to this tin granite.

The belt of sedimentary and volcanic rocks has been metamorphosed to upper greenschist or lower amphibolite facies to form quartz-mica schists and hornblende-biotite-pyroxene-feldspar gneiss. Metamorphism has also produced granulite (calc-silicate gneiss) along layers in the metamorphic rocks (George and Wyckoff, 1973).

Studies by El Paso indicate two major fault trends in the belt of metamorphic rocks (George and Wyckoff, 1973). One trend is parallel to foliation and bedding; the rhyolite sills intrude along this trend. A crosscutting trend strikes about 025° (range 005° to 030°) and dips 45° east to vertical.

The Groundhog Basin deposit is situated in the western part of the belt of metamorphic rocks, adjacent to the granodiorite, which has an eastern contact that approximately follows the regional north-northwest grain of the regional rocks. Immediately north of the Groundhog Basin deposit, the 16.3-million-year-old biotite granite stock intrudes the metamorphic belt. In places sulfides replace the metamorphic rocks where they have been metamorphosed to pyroxene granulite. These sulfide zones are tabular, follow the original bedding in the rocks (330°), and have been called "ore beds" by previous workers (e.g., Gault, 1953). Rhyolite sills occur adjacent to the ore beds.

Four ore beds have been delineated in Groundhog Basin. They are separated by 15 to 80 feet, with rhyolite sills, schist, and gneiss in between. The rhyolite sills become dikes and cross the ore beds at one point. Disseminated and solid ore have been identified in the beds. The solid ore, mainly confined to the northern (lower-elevation) parts of the beds, consists predominately of massive bands of sulfides. The disseminated ore, mainly found in the southern (higher-elevation) parts of the beds, consists of disseminations, pods, and discontinuous bands of sulfides. The sulfides are pyrrhotite, pyrite, sphalerite, galena, and chalcopyrite with a gangue of quartz, hornblende, pyroxene, epidote, and garnet. Cassiterite is also found in the ore beds (Smith, 1943; U.S. Bureau of Mines, 1944; Berryhill,1964).

The westernmost (No. 1, lowest stratigraphically) ore bed has been traced for 4,300 feet horizontally and 1,900 feet vertically (Bunker Hill Company, 1965). Gault (1953) reports that it contains zinc along its entire length. The next highest ore bed stratigraphically (No. 2) can only be traced a short distance. Sampling and mapping indicate that these two beds (Nos. 1 and 2) contain mostly disseminated sulfides (where mineralized) and are not sufficiently mineralized to be considered important economically.

The two easternmost ore beds (Nos. 3 and 4) can be traced for 4,800 feet horizontally and 2,100 feet vertically (Bunker Hill Company, 1965). Surface sampling, three adits, and three diamond drill holes have defined a solid ore resource that is 250 feet by 705 feet in the No. 4 ore bed and 250 feet by 405 feet in the No. 3 over an average width of 4 feet. This deposit contains 116,000 indicated tons (Smith, 1943) at an average grade of 8 percent zinc, 2.5 percent lead, 2 oz/ton silver, and 0.39 percent tin (Muir, 1943; Oliver, 1984). Both Muir (1943) and Oliver (1984) report that the solid ore extends 1,200 feet farther to the northwest, where talus now covers the bedrock. If this is true, an additional 350,000 tons can be inferred at the same grade (Muir, 1943). These are indicated and inferred resources and do not constitute "ore" in the economic sense.

The Bunker Hill Co. sampled and drilled 23 shallow holes both in the four ore beds and in their general vicinity in 1965. This work tested the near surface of the ore beds through a horizontal distance of 4,800 feet and a vertical distance of 2,100 feet. Bunker Hill did not report new resource figures as a result of its efforts. Most of its work indicated grades well below the solid ore grades presented above (Bunker Hill Company, 1965).

The BLM's investigation of the Groundhog Basin deposit was mostly confined to taking grab samples from adits and dumps and tracing mineralized zones. Four prospect adits are located at elevations of 1,600 feet (No. 1), 1,850 feet (No. 2), 2,050 feet (No. 3), and 2,130 feet (No. 4). The No. 1 adit is 17 feet long and open. It exposes the No. 1 ore bed. The No. 2 adit is 246 feet long and open. It exposes the Nos. 2, 3, and 4 ore beds. The No. 3 adit is located in the middle of a cliff and was not examined because of the precipitous surrounding ground. Its portal appears to be open. The No. 4 adit is 14 feet long and is open. It exposes the No. 4 ore bed. Samples from the adits and dumps contained up to 6.4 oz/ton silver, 3,400 ppm copper, 10.57 percent lead, 9.1 percent zinc, and 6,115 ppm tin (Map nos. 73.2-73.4, samples 98-100, 264-265, 2610-11).

Conclusions

The Groundhog Basin deposit, as it is currently known, is too narrow and the tonnage is too small to be considered an attractive exploration target. The replacement nature of the ore beds, proximity of the intrusive to the mineralized zones, and mineralogy of the Groundhog Basin deposit indicate that the most suitable deposit classification is polymetallic replacement. Typical polymetallic replacement deposits contain about 1.8 million tons, and the largest deposits are between 14 and 90 million tons (Cox and Singer, 1986). To date, exploration of the Groundhog Basin deposit has been near the surface. Exploration of the deposit to a greater depth may reveal an attractive development target.

South Silver

(Figure 4, Map no. 74)

Location/Access

The South Silver prospect is located near the northern end of the Groundhog Basin area, about 13 miles east of Wrangell. The area is alpine. Elevations range from 3,900 feet to 4,362 feet at the summit of a peak in the area. Access is by helicopter.

History

The South Silver prospect was first drilled and sampled by El Paso Natural Gas Co. between 1971 and 1973. The claims are not currently active.

Mineral Assessment

The Groundhog Basin area consists of a belt of metamorphosed Paleozoic sediments and volcanics about 1.5 miles wide that strikes about 330° and dips about 50° to the northeast. The belt is bounded on the east by the 60- to 70-million-year-old great tonalite sill (Brew and Morrell, 1983; Brew, 1997h) and on the west by 90-million-year-old granodiorite (AMAX Exploration Inc., 1981). On the northern side of Groundhog Basin, a 16.3-million-year-old biotite granite stock intrudes the metamorphic rocks. Sills and dikes of rhyolite composition extend from the stock to form predominately concordant quartz porphyry. The rhyolite sills predominate in the western third of the metamorphic belt (George and Wyckoff, 1973; AMAX Exploration Inc., 1981). Studies by Newberry and Brew (1989) indicate that the biotite granite stock is a zinnwaldite "tin" granite and that several base-metal deposits in the area are related to this tin granite.

The belt of sedimentary and volcanic rocks has been metamorphosed to upper greenschist or lower amphibolite facies to form quartz-mica schists and hornblende-biotite-pyroxene-feldspar gneiss. Metamorphism has also produced granulite (calc-silicate gneiss) along layers in the metamorphic rocks (George and Wyckoff, 1973).

Studies by El Paso indicate two major fault trends in the belt of metamorphic rocks (George and Wyckoff, 1973). One trend is parallel to foliation and bedding; the rhyolite sills intrude along this trend. A crosscutting trend strikes about 025° (range 005° to 030°) and dips 45° east to vertical. The mineralized rock at the South Silver prospect follows both the bedding plane and crosscutting shears.

The BLM's investigation of the South Silver prospect revealed a quartz vein/stringer zone up to 10 feet thick located near the summit of a 4,362-foot peak. The vein/stringer zone follows shears in the gneiss that are approximately parallel to foliation. Rhyolite sills and schist along with the gneiss form the country rock in the area. BLM investigators collected four samples from the mineralized zone (Map no. 74, samples 428, 8690-92). Sample 8691 contained 63.9 ppm silver and 1,417 ppm zinc. Sample 8690 contained 1,089 ppm tin.

El Paso sampled along a line that extended from near the summit of the 4,362-foot peak in a south-southwesterly direction for 1,900 feet. The company collected over 200 samples along this line. The six best samples contained from 840 to 1,655 ppm zinc and from 320 to 2,720 ppm lead. These were from 5 to 10 feet long. El Paso collared a 149-foot-deep, inclined drill hole near the summit of the 4,362-foot peak that angled south-southwest. A 32-foot intercept consisted of rhyolite and granulite with sphalerite- and galena-bearing quartz stringers and averaged 0.7 percent zinc, 1.0 percent lead, and 0.3 oz/ton silver (George and Wyckoff, 1973).

Conclusions

Drilling and sampling of the South Silver prospect failed to reveal significant mineralized rock.

COPPER ZONE

(Figure 4, Map nos. 75.1-75.2)

Location/Access

The Copper Zone prospect is located on the north-facing wall of a cirque at the head of Groundhog Basin, about 13 miles east of Wrangell. The area, above tree line with permanent snowfields, ranges in elevation from 3,000 to 4,000 feet. Access is by helicopter via a helipad at 3,600 feet elevation. The land in the area is Federal land and open to mineral entry.

History

The first reported work on the Copper Zone was by El Paso Natural Gas Co. During 1972 the company carried out a geophysical survey (EM), drilled 9 holes, and collected 1,044 rock chip samples (George and Wyckoff, 1973). There are currently no active claims in the area.

Mineral Assessment

The Groundhog Basin area consists of a belt of metamorphosed Paleozoic sediments and volcanics about 1.5 miles wide that strikes about 330° and dips about 50° to the northeast. The belt is bounded on the east by the 60- to 70-million-year-old great tonalite sill (Brew and Morrell, 1983; Brew, 1997h) and on the west by 90-million-year-old granodiorite (AMAX Exploration Inc., 1981). On the northern side of Groundhog Basin, a 16.3-million-year-old biotite granite stock intrudes the metamorphic rocks. Sills and dikes of rhyolite composition extend from the stock to form predominately concordant quartz porphyry. The rhyolite sills predominate in the western third of the metamorphic belt (George and Wyckoff, 1973; AMAX Exploration Inc., 1981). Studies by Newberry and Brew (1989) indicate that the biotite granite stock is a zinnwaldite "tin" granite and that several base-metal deposits in the area are related to this tin granite.

The belt of sedimentary and volcanic rocks has been metamorphosed to upper greenschist or lower amphibolite facies to form quartz-mica schists and hornblende-biotite-pyroxene-feldspar gneiss. Metamorphism has also produced granulite (calc-silicate gneiss) along layers in the metamorphic rocks (George and Wyckoff, 1973).

The BLM's investigation of the Copper Zone revealed rhyolite sills up to 60 feet thick that generally follow the foliation in the gneiss and schist. Fractures that are parallel to and crosscut (trend to the northeast) the foliation host disseminated chalcopyrite. Rarely, lenses and bands of massive chalcopyrite and pyrrhotite up to 0.4 feet thick occupy the fractures. Chip samples up to 0.7 feet long across the better-mineralized lenses and bands contained up to 4,580 ppb gold, 19.65 oz/ton silver, 8.1 percent copper, 1.71 percent lead, 2.7 percent zinc, and 1,728 ppm tin (Map nos.75.1-75.2, samples 131, 133, 9596).

El Paso's 1,044 rock chip samples from the Copper Zone area delineate a 125- by 160-foot zone that averages 0.11 percent copper. Lower-grade samples define an anomalous strike length of about 500 feet. Sampling to the southwest of the known mineralized area indicate the zone is not continuous in that direction (George and Wyckoff, 1973).

The 9 holes that El Paso drilled range in length from 58 to 442 feet, in the Copper Zone area. One hole penetrated the northwestern corner of the 125- by 160-foot zone and averaged 0.11 percent copper over a length of 70 feet. This 70-foot intercept also contained from 135 to 6,650 ppm zinc, from 2 to 66 ppm silver, and from 19 to 53 ppm molybdenum. The remaining 8 holes were collared up to 400 feet north, 1,500 east, and 1,500 feet southeast of the above hole. All failed to intersect significantly mineralized rock (George and Wyckoff, 1973).

Conclusions

The copper mineralization revealed by surface sampling and drilling in the rhyolite, schist, and gneiss of the Copper Zone is too small and too low-grade to be an attractive development target. If areas down dip and along strike can be detected that are more fractured and that have a more reactive host rock, they may prove to be better exploration targets.

NORTH MARSHA PEAK

(Figure 4, Map nos. 76.1-76.2)

Location/Access

The North Marsha Peak prospect is located on the north ridge of Marsha Peak, about 13 miles east of Wrangell. The area is alpine and ranges in elevation from 4,000 to 4,400 feet. The Nelson Glacier is immediately to the east. Access is by helicopter.

History

In 1943 the USGS mapped the North Marsha Peak area (Gault, 1953). In 1965 this prospect was optioned by the Bunker Hill Mining Co. The property was dropped at the end of the field season in 1965 (Bunker Hill Company, 1965). Between 1968 and 1970, Humble Oil and Refining Co. optioned the property and drilled two holes to the east of it through the Nelson Glacier ice (Humble Oil and Refining Company, 1970a, 1970b). El Paso Natural Gas Co. optioned the property from 1971 to 1973 and conducted mapping and sampling. The company drilled three holes with lengths ranging from 116 to 230 feet (George and Wyckoff, 1973). AMAX Exploration Inc. optioned the property from 1976 to 1981 (Hamilton, 1982). In 1992 Kennecott Exploration briefly examined the property and the El Paso reports (Wakeman, 1992). No claims in the area are currently active.

Mineral Assessment

The Groundhog Basin area consists of a belt of metamorphosed Paleozoic sediments and volcanics about 1.5 miles wide that strikes about 330° and dips about 50° to the northeast. The belt is bounded on the east by the 60- to 70-million-year-old great tonalite sill (Brew and Morrell, 1983; Brew, 1997h) and on the west by 90-million-year-old granodiorite (AMAX Exploration Inc., 1981). On the northern side of Groundhog Basin, a 16.3-million-year-old biotite granite stock intrudes the metamorphic rocks. Sills and dikes of rhyolite composition extend from the stock to form predominately concordant quartz porphyry. The rhyolite sills predominate in the western third of the metamorphic belt (George and Wyckoff, 1973; AMAX Exploration Inc., 1981). Studies by Newberry and Brew (1989) indicate that the biotite granite stock is a zinnwaldite "tin" granite and that several base-metal deposits in the area are related to this tin granite.

The belt of sedimentary and volcanic rocks has been metamorphosed to upper greenschist or lower amphibolite facies to form quartz-mica schists and hornblende-biotite-pyroxene-feldspar gneiss. Metamorphism has also produced granulite (calc-silicate gneiss) along layers in the metamorphic rocks (George and Wyckoff, 1973).

Studies by El Paso indicate two major fault trends in the belt of metamorphic rocks (George and Wyckoff, 1973). One trend is parallel to foliation and bedding; the rhyolite sills intrude along this trend. A crosscutting trend strikes about 025° (range 005° to 030°) and dips 45° east to vertical. Polymetallic mineralized zones follow both the bedding plane and crosscutting trends in the North Marsha Peak area.

BLM work at the North Marsha Peak prospect was confined to a brief investigation of the ridge crest at elevations from 4,300 to 4,400 feet and did not include the eastern side of the ridge near the glacier. Samples up to 2.4 feet long of the more strongly mineralized rock from a 10-foot-wide, silicified shear zone contained up to 5,661 ppb gold, 8.8 oz/ton silver, 1.7 percent copper, 1,144 ppm lead, and 14.5 percent zinc (Map nos.76.1-76.2, samples 440, 2642-43, 8697-98).

El Paso collected 228 surface samples, blasted three trenches, and drilled three holes between the elevations of 4,000 feet at the western edge of the Nelson Glacier and 4,400 feet on the north side of Marsha peak. The exploration targeted two bedding plane shear zones that are separated by 750 feet of gneiss and rhyolite sills. These zones strike generally to the north and dip about 50° to the east (George and Wyckoff, 1973).

The westernmost shear is from 4 to 12 feet wide and can be traced for 1,100 feet along strike. It is covered to the north by the Nelson Glacier. Samples from this zone indicate an average grade of 1.5 oz/ton silver, 0.3 percent copper, 0.22 percent lead, and 0.58 percent zinc (George and Wyckoff, 1973).

The easternmost shear is about 4 feet thick and can be traced for 600 feet along strike to the north where it is covered by the Nelson Glacier. Sampling of select thin veinlets from more mineralized parts of the shear gave values up to 20.7 oz/ton silver, 70 percent lead, and 22 percent zinc (George and Wyckoff, 1973).

Samples collected in the vicinity of the shear zones indicate a 15-foot section of gneiss that averages 1.70 oz/ton silver, 0.22 percent copper, 0.76 percent lead, and 6.02 percent zinc (George and Wyckoff, 1973).

Three drill holes were collared in the North Marsha Peak vicinity. One hole, drilled parallel to fracturing in the country rock, averaged 1.1 percent zinc and 0.25 percent lead along its entire 116-foot length. The second cut a 13-foot zone that averaged 0.87 oz/ton silver, 0.08 percent copper, 0.6 percent lead, and 4.31 percent zinc. The third hole failed to cut significant mineralized rock (George and Wyckoff, 1973).

Conclusions

As exposed by sampling and drilling, the North Marsha Peak mineralized shear zones are too narrow and low-grade to constitute an exploration target.

EAST MARSHA PEAK

(Figure 4, Map nos. 77.1-77.2)

Location/Access

The East Marsha Peak prospect is located on the northeastern slope of Marsha Peak, about 13 miles east of Wrangell. The area is alpine with permanent snow fields, glaciers, and steep cliffs. Elevations range from 3,500 to 4,500 feet, and snow covers the prospect until late in the season. Access to the prospect is via helicopter to a rocky, uneven landing site east of the prospect's trenches at an elevation of about 4,000 feet.

History

The East Marsha Peak prospect was first mapped and sampled by El Paso Natural Gas Co. During 1972 three trenches, with lengths from 20 to 60 feet, were cut between the elevations of 3,975 and 4,100 feet. El Paso collected 48 samples from the trenches and at least 26 more from the vicinity of the prospect (George and Wyckoff, 1973). They also flew a multilevel, helium magnetometer survey over the Whistlepig claim area (which included the East Marsha Peak prospect) in December 1972 (Quigley, 1973). Watts, Griffis, and McOuatt (WGM) Inc. revised previous El Paso maps of the East Marsha Peak prospect area in 1976 (WGM, 1976). In 1992 Kennecott Exploration briefly examined the property and the El Paso reports (Wakeman, 1992). The claims are not currently active.

Mineral Assessment

The Groundhog Basin area consists of a belt of metamorphosed Paleozoic sediments and volcanics about 1.5 miles wide that strikes about 330° and dips about 50° to the northeast. The belt is bounded on the east by the 60- to 70-million-year-old great tonalite sill (Brew and Morrell, 1983; Brew, 1997h) and on the west by 90-million-year-old granodiorite (AMAX Exploration Inc., 1981). On the northern side of Groundhog Basin, a 16.3-million-year-old biotite granite stock intrudes the metamorphic rocks. Sills and dikes of rhyolite composition extend from the stock to form predominately concordant quartz porphyry. The rhyolite sills predominate in the western third of the metamorphic belt (George and Wyckoff, 1973; AMAX Exploration Inc., 1981). Studies by Newberry and Brew (1989) indicate that the biotite granite stock is a zinnwaldite "tin" granite and that several base-metal deposits in the area are related to this tin granite.

The belt of sedimentary and volcanic rocks has been metamorphosed to upper greenschist or lower amphibolite facies to form quartz-mica schists and hornblende-biotite-pyroxene-feldspar gneiss. Metamorphism has also produced granulite (calc-silicate gneiss) along layers in the metamorphic rocks (George and Wyckoff, 1973).

Studies by El Paso indicate two major fault trends in the belt of metamorphic rocks (George and Wyckoff, 1973). One trend is parallel to foliation and bedding; the rhyolite sills intrude along this trend. A crosscutting trend strikes about 025° (range 005° to 030°) and dips 45° east to vertical.

Mineralizing solutions that followed the crosscutting trend formed the East Marsha Peak deposit, which is made up of the "main" and "secondary" shear zones.

Main Shear Zone

The main East Marsha Peak shear consists of a crosscutting shear zone that strikes north-northeast to northeast, dips 50° to 75° southeast, and extends from near the 4,525-foot-elevation summit of East Marsha Peak down the northeastern slope of the peak and beneath the Nelson Glacier at an elevation of 3,500 feet. Between the summit of East Marsha Peak and Nelson Glacier, the shear zone extends for 2,000 feet along strike. The shear zone is hosted in northwest-trending gneiss and varies from a width of 30 feet near the summit to 40 feet at the El Paso trenches between 3,975 and 4,100 feet elevation. The hanging wall of the shear zone is highly silicified with vugs containing quartz and fluorite. Sphalerite, galena, chalcopyrite, and pyrrhotite form masses and disseminations within the gneiss breccia and gouge. Mineralized rock is found along a network of fractures that penetrate the gneiss for up to 40 feet from the main silicified shear (George and Wyckoff, 1973).

The BLM's examination of the main East Marsha Peak shear zone revealed three trenches at elevations of 3,975, 4,075, and 4,100 feet that test the shear zone for a distance of 162 feet along strike and through a vertical distance of 125 feet. The trenches are within the shear zone. They range in length from 20 to 60 feet. (These workings do not exactly conform to the El Paso map, dated September 26, 1972, of the two trenches at elevations of 4,075 and 4,100 feet. Additional work accomplished by El Paso in October 1972 is not shown on the map [George and Wyckoff, 1973].) The hanging wall and footwall limits of the mineralization are irregular and difficult to delineate.

The BLM collected 16 samples from the 4,100-foot and 4,075-foot-elevation trenches and the immediate vicinity (Map no. 77.1, samples 441-445, 451-453, 8699-702, 8704-07). The samples indicate pervasive zinc-lead mineralization. Samples from 0.5 to 11 feet long contained from 119 ppm to 2.42 percent lead and from 2,443 to 27.1 percent zinc. These samples also contained up to 78.7 ppm silver, 7,260 ppm copper, 288 ppm molybdenum, and 738 ppm tin. El Paso's sampling of the same trenches gave similar results. In the 4,075-foot-elevation trench, El Paso estimates a zone 20 to 30 feet thick that averages 3.19 percent zinc, 1.67 percent lead, and 1.99 oz/ton silver. In the 4,100-foot-elevation trench, El Paso estimates a zone 13 feet thick that averages 1.45 percent zinc, 2.75 percent lead, and 1.23 oz/ton silver with an additional 18 feet that averages 1.79 percent zinc and is only slightly anomalous in lead and silver (George and Wyckoff, 1973).

The BLM collected five samples from the 3,975-foot-elevation trench, located 140 feet northeast and along strike from the 4,075-foot-elevation trench (Map no. 77.1, samples 446-447, 449-450, 8703). The samples indicate a mineralized zone about 20 feet thick. A 6-foot sample across part of the more mineralized rock contained 2.4 percent zinc and 11.1 ppm silver (Map no.77.1, sample 450). A select sample from the trench contained 14.2 percent zinc, 7,169 ppm copper, 2,483 ppm tin, and 139.3 ppm silver (Map no. 77.1, sample 447). Steep cliffs and occasional rock fall precluded access to the zone between 3,975 feet and the glacier at 3,500 feet.

Above an elevation of 4,100 feet (i.e., to the southwest), the shear zone is covered by ice, but is exposed again near the summit of East Marsha Peak (4,525 feet elevation). Near the summit, the zone is about 30 feet thick and consists of vuggy, sheared quartz and brecciated gneiss. Sulfide mineralization is sparse. Two 0.3-feet-long samples collected after a brief examination of the zone for sulfides, contained from 6.8 to 12.9 ppm silver, from 518 to 655 ppm copper, from 932 to 3,980 ppm lead, and from 936 to 7,157 ppm zinc (Map no. 77.2, samples 134-135).

An aerial, multilevel, helium magnetometer survey was carried out across the East Marsha Peak shear zone for El Paso in December 1972. It traces the zone to the east-northeast, under and to the other side of the Nelson Glacier. Quigley (1973) suggests that the south side of the shear zone is anomalous and a target for mineral exploration.

Secondary Shear Zone

A secondary mineralized shear zone is located west of the main East Marsha Peak shear zone described above. The BLM's examination revealed a 30-foot trench at an elevation of 4,075 feet that exposes a 20-foot-wide shear zone, which trends to the north and dips 75° to the east. At 4,075 feet, it is located 70 feet west of the main shear and is similar to it. A 4-foot-thick basalt dike intrudes along the center of the shear. A 2-foot sample collected from the most mineralized part of the shear contained 49.6 ppm silver, 3.47 percent lead, and 16.1 percent zinc (Map no. 77.1, sample 448). El Paso's sampling of the 4,075-foot-elevation trench indicated a 13-foot zone that averaged 1.35 oz/ton silver, 1.60 percent lead, 3.83 percent zinc, and 0.08 percent copper (George and Wyckoff, 1973). To the south, the shear zone is covered by ice, and to the north, it is only intermittently mineralized. About 150 feet north of the trench, a 5-foot-long sample of the shear contained 2.6 percent zinc, and at a distance of 240 feet north of the trench, a 5-foot-long sample of the shear contained 4.24 percent zinc (George and Wyckoff, 1973).

El Paso sampled along two grid lines each about 300 feet long; one was aligned northwest-southeast, starting near the 4,100-foot-elevation trench, and the other was aligned northeast-southwest, starting at the northwest end of the first line. The grid lines are to the northwest of the East Marsha Peak shear zone. They cover the secondary shear zone described above. Over lengths of 10 to 35 feet, El Paso's samples averaged from 0.15 to 4.05 percent zinc. One 5-foot-long sample located between the two shear zones contained 23.1 percent zinc (WGM, 1976; George and Wyckoff, 1973).

Conclusions

The replacement nature of the East Marsha Peak shear zone mineralization suggests that the most suitable deposit classification is polymetallic replacement. Typical polymetallic replacement deposits contain about 1.8 million tons, and the largest deposits are between 14 and 90 million tons (Cox and Singer, 1986). The East Marsha Peak shear zone, as it is currently understood, has the width and potential extent to make it an attractive exploration target. To date, exploration of the East Marsha Peak shear zone has been limited to the surface. Exploration of this shear zone by drilling along strike to the southwest and to the northeast under the Nelson Glacier may reveal an attractive development target.

NELSON GLACIER

(Figure 4, Map nos. 78.1-78.2)

Location/Access

The Nelson Glacier is located about 14 miles east of Wrangell. It is flanked on the north by the North Silver prospect, on the west by the AMAX Molybdenum, Copper Zone, Groundhog Basin, North Marsha Peak, East Marsha Peak, and Glacier Basin prospects, and on the southeast by the Huff prospect (Figure 4). Ranging in elevation from 2,200 to over 4,000 feet, the glacier is 3 miles long and up to 1 mile wide. The area is alpine, with cliffs and mountains on the east and west sides of the glacier. Marsha Peak and East Marsha Peak dominate the west side of the glacier. Access is by helicopter.

History

During the late 1950's, Moneta Porcupine Company explored the Groundhog Basin area, but subsequently dropped its claims. With the permission of Moneta Porcupine, two former company prospectors, William Huff and James Fucas, continued work in the area and staked new claims (Berryhill, 1964). The Nelson Glacier was covered by a claim group that was optioned by a number of companies from 1965 to 1981. In 1965 the claims were optioned by the Bunker Hill Mining Co. The property was dropped at the end of the field season in 1965 (Bunker Hill Company, 1965). Between 1968 and 1970, Humble Oil and Refining Co. optioned the property and drilled two holes through the Nelson Glacier (Humble Oil and Refining Company, 1970a, 1970b). El Paso Natural Gas Co. optioned the claims from 1971 to 1973 and carried out geophysical surveys over the glacier (George and Wyckoff, 1973; Quigley, 1973). AMAX Exploration Inc. optioned the claims from 1976 to 1981 (Hamilton, 1982). In 1992 Kennecott Exploration reported on the mineral potential under the Nelson Glacier (Wakeman, 1992). In 1999 the block of claims that covered the Nelson Glacier were inactive except for five at the North Silver prospect.

Mineral Assessment

The Groundhog Basin area consists of a belt of metamorphosed Paleozoic sediments and volcanics about 1.5 miles wide that strikes about 330° and dips about 50° northeast. The belt is bounded on the east by the 60- to 70-million-year-old great tonalite sill (Brew and Morrell, 1983; Brew, 1997h) and on the west by 90-million-year-old granodiorite (AMAX Exploration Inc., 1981). On the northern side of Groundhog Basin, a 16.3-million-year-old biotite granite stock intrudes the metamorphic rocks. Sills and dikes of rhyolite composition extend from the stock to form predominately concordant quartz porphyry. The rhyolite sills predominate in the western third of the metamorphic belt (George and Wyckoff, 1973; AMAX Exploration Inc., 1981). Studies by Newberry and Brew (1989) indicate that the biotite granite stock is a zinnwaldite "tin" granite and that several base-metal deposits in the area are related to this tin granite.

The belt of sedimentary and volcanic rocks has been metamorphosed to upper greenschist or lower amphibolite facies to form quartz-mica schists and hornblende-biotite-pyroxene-feldspar gneiss. Metamorphism has also produced granulite (calc-silicate gneiss) along layers in the metamorphic rocks (George and Wyckoff, 1973).

Studies by El Paso indicate two major fault trends in the belt of metamorphic rocks (George and Wyckoff, 1973). One trend is parallel to foliation and bedding; the rhyolite sills intrude along this trend. A crosscutting trend strikes about 025° (range 005° to 030°) and dips 45° east to vertical. Polymetallic mineralized zones follow both the bedding plane and crosscutting trends. Both granulite and marble beds are replaced by polymetallic sulfides in the Groundhog Basin area.

A crude metal zonation is evident in the 1.5-mile-wide metamorphic belt of rocks in the Groundhog Basin area. Located immediately west of the glacier is the Copper Zone where copper predominates. Farther to the west, at the Groundhog Basin, North Marsha Peak, East Marsha Peak, and Glacier Basin prospects, zinc predominates. To the northeast, at the North Silver prospect, silver/lead predominates. And to the southwest, at the Huff prospect, lead predominates. Newberry and Brew (1989) report tin zonation centered around the 16.3-million-year-old biotite granite stock northeast of Groundhog Basin.

The Nelson Glacier covers up to two-thirds of the Groundhog Basin area. Mineralized zones from the North Marsha Peak, East Marsha Peak, and the Huff prospects can be traced under the glacier. Marble beds up to 30 feet thick trend under the toe of the glacier and are exposed 2.5 miles to the north-northwest at the head of the glacier. Farther to the north, these beds are mineralized at the North Silver prospect. Predominantly lead minerals replace the marble beds at the Huff and North Silver prospects. Crosscutting shears are the conduit for the lead-mineralizing fluids. Some of the shears have high-grade silver contents as well, with up to 228.4 oz/ton at the Huff prospect (Map no. 79.2, sample 96) and up to 517.62 oz/ton at the North Silver prospect (Map no. 70.4, sample 121).

To test the continuity of the North Marsha Peak mineralization under the Nelson Glacier to the northeast, Humble Oil drilled two holes through the ice. These holes were located 1,200 feet from the western edge of the glacier, northeast of the North Marsha Peak prospect. Both holes were vertical and over 1,700 feet deep. One penetrated 491 feet of ice and the other, 621 feet before encountering rock. Both holes were predominantly in gneiss, and neither encountered significant mineralized rock. The best mineralized zone averaged 1.7 percent zinc, 0.4 percent lead, and 0.5 oz/ton silver across 10 feet (Humble Oil and Refining Company, 1970a, 1970b).

BLM investigators found massive sulfide float at the toe of the Nelson Glacier, located at about 2,200 feet elevation, that was apparently coming from under the ice. Similar float was found at a nunatak, at an elevation of 3,200 feet. Samples from this float contained up to 8.43 oz/ton silver, 1.5 percent copper, 8.21 percent lead, 30.0 percent zinc, and 904 ppm tin (Map nos. 78.1-78.2, samples 117, 119, 129). Similar mineralized float was reported by a Kennecott geologist in 1991 (Wakeman, 1992).

An aerial, multilevel, helium magnetometer survey was carried out in the Groundhog Basin area in December 1972 for El Paso in order to evaluate the potential for mineralization under the Nelson Glacier. The magnetometer survey traced the East Marsha Peak shear zone east-northeast under the glacier and detected a north-south system of parallel shears intersecting the East Marsha Peak shear under the ice (Quigley, 1973).

Conclusions

The area under the Nelson Glacier is the least-explored part of the Groundhog Basin area. The intersection of mineralized east-northeast and north-south shear zones under the glacier and the presence of marble beds that also underlie the glacier make this an exploration target for zinc, lead, and silver replacement deposits.

HUFF

(Figure 4, Map nos. 79.1-79.7)

Location/Access

The Huff prospect is located on the east side of Nelson Glacier, near its toe, about 14 miles east of Wrangell. The area is alpine and is partly glaciated. Elevations range from 2,300 to 4,300 feet. Access is by helicopter.

History

During the late 1950's, Moneta Porcupine explored the Groundhog Basin area, but subsequently dropped its claims. With the permission of Moneta Porcupine, two former company prospectors, William Huff and James Fucas, continued work in the area and staked new claims (Berryhill, 1964). The Huff prospect was one of those claims. It was discovered in about 1963 by William Huff. In 1963 W.A. Race mapped and sampled the prospect for the Alaska Territorial Department of Mines (Race, 1963). In 1965 the Huff claims were optioned by the Bunker Hill Mining Co. During 1965 the company mapped and sampled the prospect, but dropped its option at the end of the field season (Bunker Hill Company, 1965). Between 1968 and 1970, Humble Oil and Refining Co. optioned the property (Humble Oil and Refining Company, 1970a). El Paso Natural Gas Co. optioned the property from 1971 to 1973, carried out geophysical surveys, mapping, and sampling and drilled two holes with lengths of 99 and 149 feet (George and Wyckoff, 1973). WGM revised previous El Paso maps of the Huff prospect in 1976 (WGM, 1976). AMAX Exploration Co. optioned the property from 1976 to 1981 (Hamilton, 1982). In 1992 Kennecott Exploration briefly examined the property and the El Paso reports (Wakeman, 1992). The claims are not currently active.

Mineral Assessment

The Groundhog Basin area consists of a belt of metamorphosed Paleozoic sediments and volcanics about 1.5 miles wide that strikes about 330° and dips about 50° to the northeast. The belt is bounded on the east by the 60- to 70-million-year-old great tonalite sill (Brew and Morrell, 1983; Brew, 1997h) and on the west by 90-million-year-old granodiorite (AMAX Exploration Inc., 1981). On the northern side of Groundhog Basin, a 16.3-million-year-old biotite granite stock intrudes the metamorphic rocks. Sills and dikes of rhyolite composition extend from the stock to form predominately concordant quartz porphyry. The rhyolite sills predominate in the western third of the metamorphic belt (George and Wyckoff, 1973; AMAX Exploration Inc., 1981). Studies by Newberry and Brew (1989) indicate that the biotite granite stock is a zinnwaldite "tin" granite and that several base-metal deposits in the area are related to this tin granite.

The belt of sedimentary and volcanic rocks has been metamorphosed to upper greenschist or lower amphibolite facies to form quartz-mica schists and hornblende-biotite-pyroxene-feldspar gneiss. Metamorphism has also produced granulite (calc-silicate gneiss) along layers in the metamorphic rocks (George and Wyckoff, 1973).

Studies by El Paso indicate two major fault trends in the belt of metamorphic rocks (George and Wyckoff, 1973). One trend is parallel to foliation and bedding; the rhyolite sills intrude along this trend. A crosscutting trend strikes about 025° (range 005° to 030°) and dips 45° east to vertical. Polymetallic mineralized zones follow this crosscutting trend and replace marble beds in the Huff prospect area.

Marble Bed

The BLM's investigation revealed a marble bed up to 30 feet thick located 1,500 feet from the eastern edge of the belt of metamorphosed Paleozoic rocks. The bed, hosted in schist and gneiss, strikes 325°, dips 40° to 55° to the northeast, and extends for a distance of about 4,500 feet. It is covered by rubble to the south and by the Nelson Glacier to the north. About 1,500 feet from its northern end, a 300-foot-long section of the marble bed is mineralized with sulfides. Polymetallic mineralizing fluids from crosscutting fractures and from along hanging wall fractures have replaced the marble to form a massive sulfide zone within the bed. Mineralized marble varying in width from 0.5 to 15 feet is confined to the hanging wall of the bed. Pyrrhotite, galena, sphalerite, and chalcopyrite replace the marble to form irregular lenses and bands of massive sulfides. The crosscutting shears that are the conduits for the replacement sulfides contain vugs with quartz and fluorite and are only locally mineralized with sulfides.

BLM personnel collected four samples from four locations over a distance of 110 feet along strike of the better hanging wall mineralization. The samples ranged in length from 1.4 to 7 feet and contained from 46.7 ppm to 4.6 oz/ton silver, 2,688 to 7,330 ppm copper, 3.28 to 20.08 percent lead, and from 6.8 to 9.1 percent zinc (Map no. 79.4, samples 90-91, 254-255). Three 4-foot-long samples collected by El Paso from the same area contained from 3.1 to 8.8 oz/ton silver, 0.7 to 1.2 percent copper, from 15.9 to 24.9 percent lead, and from 7.1 to 9.3 percent zinc (George and Wyckoff, 1973).

El Paso conducted ground geophysical surveys (EM) over the marble bed and, as a result, defined a sizeable zone of conductive material. In 1972 El Paso drilled two holes to intercept the marble bed and geophysical anomaly. One, 140 feet long, penetrated the massive sulfide zone 85 feet down dip. A 10-foot intercept averaged 1.55 oz/ton silver, 0.2 percent copper, 8.1 percent lead, and 4.55 percent zinc. The other hole, 99 feet long, failed to reach the mineralized zone (George and Wyckoff, 1973).

BLM personnel examined the marble bed that hosts the massive sulfide zone, both to the south and north of the sulfide zone, but did not find significant mineralization. Other thinner marble beds located in the area were also examined by the BLM, but these too lacked significant mineralization. El Paso's drilling discovered marble beds in the subsurface that are not exposed on the surface (George and Wyckoff, 1973). There remains some potential for buried mineralized marble beds.

Cross Fractures

BLM investigators examined numerous cross fractures to the north of the marble bed massive sulfide zone. Three of these, at distances of 500, 800, and 2,000 feet from the marble bed massive sulfide zone, contained significant metal values. They are irregularly mineralized with sulfides that pinch and swell. Druses and vugs of quartz and fluorite are common. The predominate sulfides are galena and sphalerite. Samples from the three cross fractures contained from 0.9 ppm to 228.4 oz/ton silver, 49 to 3,994 ppm copper, from 83 ppm to 6.24 percent lead, from 84 ppm to 5.1 percent zinc, and up to 1,295 ppm tin (Map nos.79.2-79.4, samples 92-93, 96-97, 420, 454).

Conclusions

The marble bed massive sulfide mineralization, as it is currently understood, is of sufficient grade to be of exploration interest. Deposition of sulfide minerals in the marble bed is dependent on cross fractures as a conduit for mineralizing fluids and fractures within the marble bed to allow for permeation and replacement. The high silver value of 228.4 oz/ton in a cross fracture may be indicative of the potential for high-grade silver deposits in the area. Ground geophysics indicate a sizable conductor in the vicinity of the bed's mineralized zone. These factors encourage exploration of the marble beds in the Huff prospect area along strike and down dip by geophysics and drilling. Marble beds with sufficient fracturing, such as in fault zones where deposition of significant base-metal and silver deposits are more likely, would be targets.

West Nelson Glacier

(Figure 4, Map no. 80)

Location/Access

The West Nelson Glacier prospect is located on the southwest side of Nelson Glacier, about 14 miles east of Wrangell. The area is alpine, ranging in elevation from 2,300 to 2,400 feet. Access is by helicopter.

History

The West Nelson Glacier prospect is located within a block of 120 claims that were optioned by the Bunker Hill Mining Co. in 1965. The property was dropped at the end of the field season that year (Bunker Hill Company, 1965). Between 1968 and 1970, Humble Oil and Refining Co. optioned the property (Humble Oil and Refining Company, 1970a). El Paso Natural Gas Co. optioned the block of claims from 1971 to 1973, which by then had been expanded to 295 claims. AMAX Exploration Co. optioned the property from 1976 to 1981. The claims are not currently active. The mineralized rock at the West Nelson Glacier prospect is described herein for the first time in published literature.

Mineral Assessment

The Groundhog Basin area consists of a belt of metamorphosed Paleozoic sediments and volcanics about 1.5 miles wide that strikes about 330° and dips about 50° to the northeast. The belt is bounded on the east by the 60- to 70-million-year-old great tonalite sill (Brew and Morrell, 1983; Brew, 1997h) and on the west by 90-million-year-old granodiorite (AMAX Exploration Inc., 1981). On the northern side of Groundhog Basin, a 16.3-million-year-old biotite granite stock intrudes the metamorphic rocks. Sills and dikes of rhyolite composition extend from the stock to form predominately concordant quartz porphyry. The rhyolite sills predominate in the western third of the metamorphic belt (George and Wyckoff, 1973; AMAX Exploration Inc., 1981). Studies by Newberry and Brew (1989) indicate that the biotite granite stock is a zinnwaldite "tin" granite and that several base-metal deposits in the area are related to this tin granite.

The belt of sedimentary and volcanic rocks has been metamorphosed to upper greenschist or lower amphibolite facies to form quartz-mica schists and hornblende-biotite-pyroxene-feldspar gneiss. Metamorphism has also produced granulite (calc-silicate gneiss) along layers in the metamorphic rocks (George and Wyckoff, 1973).

Studies by El Paso indicate two major fault trends in the belt of metamorphic rocks (George and Wyckoff, 1973). One trend is parallel to foliation and bedding; the rhyolite sills intrude along this trend. A crosscutting trend strikes about 025° (range 005° to 030°) and dips 45° east to vertical. Polymetallic veins follow the crosscutting trend in the West Nelson Glacier area..

BLM work at the West Nelson Glacier prospect was confined to a brief investigation of the ridge crest southwest of the glacier at elevations of 2,300 to 2,400 feet. A crosscutting, 2-foot-wide, vuggy, silicified shear zone that traces for 80 feet, locally contains pyrite, chalcopyrite, galena, and sphalerite. The zone is hosted in gneiss. A 0.2-foot-long chip sample across the best sulfide mineralization contained 4.39 oz/ton silver, 2.70 percent lead, 9,577 ppm zinc, and 8,363 ppm arsenic (Map no. 80, sample 9603).

Conclusions

While the extent of the West Nelson Glacier mineralized zone indicates that it is of no economic importance, it and the other area prospects indicate pervasive silver-lead-zinc mineralization across a large area.

GLACIER BASIN

(Figure 4, Map no. 81)

Location/Access

The Glacier Basin prospect is located at the southeastern end of the Groundhog Basin area, about 13 miles east of Wrangell. The area consists of a flat-bottomed valley trending east-northeast with steep slopes rising to the south. To the northwest, progressively steeper slopes rise from the valley floor (at 2,000 feet) to the summit of Marsha Peak (at 4,525 feet) over a distance of about 1 mile. Thick brush predominates at the lower elevations with bare rock higher up. Avalanche snow accumulates in the gullies and on the floor of the valley until mid-season. Access to the prospect is via helicopter, with landing sites on the valley floor.

History

The Glacier Basin prospect was discovered in 1898 (Roppel, 1987). The area was prospected with three adits and numerous pits and cuts between 1898 and 1943. In 1943 the USGS mapped the area and crudely estimated resources (Gault and others, 1953). In 1963 the Bureau of Mines examined the Glacier Basin area and discovered that trace amounts of tin are associated with granulite, and beryllium is associated with quartz-fluorite breccia veins in the area (Berryhill, 1964).

During 1964 and 1965, claims were staked covering most of the mineralized rock in the Groundhog Basin area including Glacier Basin. In 1965 the Bunker Hill Mining Co. optioned the property, but dropped it the same year (Bunker Hill Company, 1965). Between 1968 and 1981, Humble Oil and Refining Co., El Paso Natural Gas Co., and AMAX Exploration Co. optioned the area. These companies concentrated their mapping, sampling, and drilling to the north and east of Glacier Basin and did little or no work in the basin itself (Humble Oil and Refining Company, 1970b; George and Wyckoff, 1973; Hamilton, 1982a).

Mineral Assessment

The Groundhog Basin area consists of a belt of metamorphosed Paleozoic sediments and volcanics about 1.5 miles wide that strikes about 330° and dips about 50° to the northeast. The belt is bounded on the east by the 60- to 70-million-year-old great tonalite sill (Brew and Morrell, 1983; Brew, 1997h) and on the west by 90-million-year-old granodiorite (AMAX Exploration Inc., 1981). On the northern side of Groundhog Basin, a 16.3-million-year-old biotite granite stock intrudes the metamorphic rocks. Studies by Newberry and Brew (1989) indicate that the biotite granite stock is a zinnwaldite "tin" granite and that several base-metal deposits in the area are related to this tin granite. Sills and dikes of rhyolite composition extend from the stock to form predominately concordant quartz porphyry. The rhyolite sills predominate in the western third of the metamorphic belt (George and Wyckoff, 1973; AMAX Exploration Inc., 1981). The Glacier Basin prospect is situated in the western part of the belt, in the area with numerous rhyolite sills.

The belt of sedimentary and volcanic rocks has been metamorphosed to upper greenschist or lower amphibolite facies to form quartz-mica schists and hornblende-biotite-pyroxene-feldspar gneiss. Metamorphism has also produced granulite (calc-silicate gneiss) along layers in the metamorphic rocks (George and Wyckoff, 1973).

Studies by El Paso indicate two major fault trends in the belt of metamorphic rocks (George and Wyckoff, 1973). One trend is parallel to foliation and bedding; the rhyolite sills intrude along this trend. A crosscutting trend strikes about 025° (range 005° to 030°) and dips 45° east to vertical. In Glacier Basin, both bedding plane and crosscutting shears are occupied by quartz-fluorite veins with small amounts of galena, sphalerite, and more rarely beryllium.

Galena and sphalerite replace pyroxene granulite in the metamorphic belt of rocks in the Glacier Basin area. These sulfide zones are tabular, follow the original bedding in the rocks, and have been termed "ore beds" by Gault and others (1953).

The four ore beds that have been delineated in Glacier Basin are similar to those in Groundhog Basin (Map no. 73.1-73.4). They are confined to the north side of the basin and are found below 3,000 feet in elevation. The ore beds are separated by 200 to 1,000 feet of rhyolite sills, schist, and gneiss. They range in thickness from 0.3 to 20 feet and extend up to 2,000 feet along strike. They strike north-northwesterly and dip 50° to 60° to the northeast. The ore beds consist of granulite replaced by disseminations, pods, and discontinuous bands of sulfides. The sulfides are pyrrhotite, pyrite, sphalerite, and galena with a gangue of quartz, feldspar, hornblende, pyroxene, apatite, magnetite, and garnet. Trace amounts of cassiterite are also found in the ore beds (Berryhill, 1964). The USGS inferred a resource in the area of many hundreds of thousands of tons of pyroxene granulite that average 1.66 percent zinc and 1.09 percent lead. (Gault and others, 1953).

The BLM's examination of the Glacier Basin prospect was confined to the easternmost ore bed in the vicinity of two adits at elevations of 2,285 feet and 2,253 feet. At the time of the examination, the portal of the lower adit was covered with snow. The upper adit is 40 feet long. Small areas of disseminated and massive sulfides are located in a silicified zone at the contact between a quartz rhyolite sill and gneiss just above the adit. Select samples collected of the best mineralized rock contained from 3.97 to 7.98 oz/ton silver, 4.64 to 33.4 percent lead, and 4.3 to 7.9 percent zinc (Map no. 81, samples 2608-09).

USGS studies indicate that quartz-fluorite breccia veins are found on both the northwest and south sides of Glacier Basin, along both crosscutting and bedding plane shears. The veins pinch and swell, range in thickness from a few inches to 30 feet, and contain vugs of quartz and fluorite. Sulfides in the veins include disseminated galena, sphalerite, pyrrhotite, pyrite, and chalcopyrite. The gangue minerals are quartz, fluorite, and the silicate minerals of the metamorphic rocks (Gault and others, 1953).

The USGS estimates that at least six veins in Glacier Basin have a minimum thickness of 3 feet and a minimum strike length of 600 feet. An additional 6 veins are 5 feet or more thick and extend at least 1,000 feet along strike. These 12 veins were estimated to contain over 1,000,000 tons grading 0.14 percent zinc and 0.09 percent lead (Gault and others, 1953).

The Bureau of Mines' examination of quartz-fluorite breccia veins in Glacier Basin found that five contain beryllium. The veins are widely separated and were located by personnel using a beryllium meter on the northwest side of the basin at an elevation of 3,000 feet. The beryllium occurs as amorphous ½-inch blebs of pale blue beryl or as creamy white beryl, with an average grade of 0.1 percent beryllium oxide (Berryhill, 1964).

Conclusions

The Glacier Basin ore bed and vein deposits, as they are currently understood, are too low-grade to be considered an attractive exploration target. The discovery of beryllium by the Bureau of Mines in1963 added interest to the area, but did not result in the discovery of economic mineralization. However, the area is worthy of further examination for higher-grade beryllium deposits.

Lake

(Figure 4, Map nos. 82.1-82.2)

Location/Access

The Lake prospect is located southwest of the Groundhog Basin area, approximately 11 miles east of Wrangell. The prospect workings are between 1,420 and 1,550 feet in elevation along the steep, northwestern flank of the ridge separating Porterfield Creek from Glacier Creek, 2 miles east of Virginia Lake. The terrain is heavily timbered and very steep. Access is via helicopter to a muskeg directly above the prospect at an elevation of 2,030 feet and then by foot down to the workings. Historically, access to this property was via a route that led first by trail from tide water at Eastern Passage inland, across Virginia Lake by boat, and again by trail along Porterfield Creek for approximately two miles. The trail subsequently led from the creek up the steep slopes of the ridge to the northern end of the property.

History

The Lake prospect was first staked as the Margery claims and was described as having a 40-foot adit in 1905 (Wright and Wright, 1905) and several opencuts and short tunnels by 1908 (Wright and Wright, 1908). Unpublished field notes taken by Buddington in 1921 report that 1 ton of ore was shipped from the Lake deposit (Gault and others, 1953). In 1924 the prospect was the only one in the area being actively developed (Buddington, 1926). It was under the control of the Virginia Lake Mining Co. as early as 1925, when the claims were restaked as the Lake group (Alaska Kardex, 1982). Under this ownership, development of the underground workings continued at least until 1927 (Smith, 1930) and probably later. A claim post found during the BLM's examination of the prospect contained a staking notice dated 1965 posted by K. Eichner, A. Lillie, and Huff. In 1978 the Pacific Coast Molybdenum Co., a subsidiary of U.S. Borax and Chemical Corp., restaked the prospect as the Port claims. The claims were dropped in 1986 (Alaska Kardex, 1982; Bureau of Land Management, ALIS).

Mineral Assessment

A recent regional-scale map compilation describes the area of the Lake prospect as Cretaceous intrusives (Brew, 1997c). However, more detailed mapping done by the USGS prior to 1953, describes a package of metamorphic rocks including phyllite, schist, slate, and quartzite exposed in the workings of the prospect. These metamorphic rocks are inferred to be in contact with a unit of quartz diorite approximately 1,500 to 2,000 feet to the east of the workings (Gault and others, 1953). Mineralized rock at the prospect is found along a fault zone that strikes 025° to 035°and dips 70° to 90° to the southeast. Examination during this study indicates the fault zone is up to 5 feet wide; however it is reported as up to 12 feet wide in some locations (Gault and others, 1953). It has been exposed by 3 adits, numerous trenches, and surface stripping over a strike length of approximately 1,450 feet. The fault contains quartz breccia and, locally, seams of fault gouge up to 1 foot thick. Intruding the fault zone is a narrow mafic sill that does not appear to be related to the mineralization. Mineralized rock is predominantly enriched with galena, with lesser amounts of sphalerite, pyrite, and minor chalcopyrite. The sulfides occur in the quartz breccia that fills the fault zone and also as distinct massive bands up to 0.5 feet wide, as pods, and as veinlets, all within the fault zone. The zone is open along strike and at depth. One of the adits shows the fault to continue at least to a depth of 60 feet down dip.

Adit 1, as described by Gault and others (1953), is the southernmost adit at an elevation of 1,425 feet. The back of this 20-foot, L-shaped adit has caved onto the floor, but access is still possible. A select sample across a narrow vein of galena and sphalerite outside the portal, contained 161 ppm silver, 8.54 percent lead, and 2.1 percent zinc (Map no. 82.1, sample 376).

Adit 2, as described by Gault and others (1953), is located approximately 110 feet southwest of Adit 1, at an elevation of 1,420 feet. This T-shaped adit consists of a 100-foot crosscut and a 135-foot drift. The fault zone is exposed along the entire length of the drift. A 3.0-foot sample across the fault zone in the north face of the drift contained only traces of silver, lead, and zinc (Map no. 82.2, sample 9695). A sample across the fault zone in the south face of the drift ran 10.3 ppm silver, 1,058 ppm lead, and 1.3 percent zinc across 4.6 feet (Map no. 82.2, sample 9694). A high-grade dump sample contained 4.73 oz/ton silver, 10.50 percent lead, and 6.6 percent zinc (Map no. 82.2, sample 2613).

Adit 3 is located 350 feet southwest of Adit 2 at an elevation of 1,550 feet (Gault and others, 1953). Adit 3 was reported to be caved as early as 1943 and was not visited during this study.

In addition to the three adits, numerous surface trenches and pits have been dug along the fault zone. BLM personnel took two samples in a trench that exposes the surface trace of the fault zone above the drift in Adit 2. One contained 195 ppm silver, 2,049 ppm copper, 7.89 percent lead, and 5.7 percent zinc across 0.5 feet of quartz breccia in the fault zone (Map no. 82.1, sample 377). The other was taken across a high-grade vein of massive galena and sphalerite 0.25 feet wide. It contained 411 ppm silver, 3,266 ppm copper, 25.10 percent lead, and 3.6 percent zinc (Map no. 82.1, sample 378). A grab sample from a trench dump, just uphill from Adit 3, contained 178 ppm silver, 13.21 percent lead, and 16.4 percent zinc (Map no. 82.1, sample 380).

Conclusions

The Lake prospect is located 2 miles southwest of the contact between granodiorite and metamorphic rocks that forms the western boundary of the Groundhog Basin area. Host rocks, base-metal mineralization, and shear zone orientation at the Lake prospect are similar to many of the Groundhog Basin deposits, which suggests a relationship may exist between the ore-forming processes at both locations.

The mineralization at the Lake prospect is contained within a persistent, predictable fault zone that has been traced for over 1,450 feet. However, the base-metal values are highly variable, and they occur only within a narrow part of the fault zone. As it is now understood, the mineralization at the Lake prospect is too narrow and low-grade to be of exploration interest. However, the fault zone and the area in general still hold the potential for hosting higher-grade or more extensive mineralized zones.

Berg Basin

(Plate 1, Map no. 83)

Location/Access

The Berg Basin prospect is located at the southeastern end of the Groundhog Basin area, about 14 miles east of Wrangell. The prospect is located on the east wall of a steep-sided gulch that drains from the northern side of Berg basin. An adit portal on the property is located at an elevation of 1,780 feet at the top of a steep talus slope and a short cliff. Access to the prospect is difficult. Early in the season, the area may be covered with heavy snow packs, but helicopter landing sites are available. Late in the season, the area is choked with brush, and helicopter landing sites are hard to find.

History

The Berg Basin prospect was discovered in 1907. By 1947 it was explored by an 840-foot adit and several surface pits. During 1947 and 1948, two diamond drill holes, totaling 742 feet, explored the prospect (Ray, 1953). The claims are not currently active.

Mineral Assessment

The Berg Basin prospect is located in the same belt of metamorphosed Paleozoic sediments and volcanics that hosts the Groundhog Basin area deposits. The belt of sedimentary and volcanic rocks has been metamorphosed to upper greenschist or lower amphibolite facies to form quartz-mica schists and hornblende-biotite-pyroxene-feldspar gneiss (George and Wyckoff, 1973).

Studies by El Paso Natural Gas Co. indicate two major fault trends in the belt of metamorphic rocks (George and Wyckoff, 1973). One trend is parallel to foliation and bedding. A crosscutting trend strikes about 025° (range 005° to 030°) and dips 45° east to vertical. Basaltic and rhyolitic sills and dikes intrude along both trends. The sills predominate. At the Berg Basin prospect, sulfide mineralization is found within the basalt dikes and along the contacts of the basalt dikes with rhyolite, schist, and gneiss (Ray, 1953).

In 1923 Buddington reported that the Berg prospect consists of a 1-foot-thick quartz vein carrying moderate amounts of gold and silver hosted in a 12-foot-thick rhyolite sill. The sill is fractured with a network of narrow quartz veinlets containing pyrite, galena, and sphalerite. A 400-foot-long adit was driven to intersect the vein at depth (Buddington, 1923).

In 1947 Ray, of the USGS, mapped and sampled the prospect. He reported galena-sphalerite mineralization in lenses and pods within basalt dikes and along their contacts. Two samples, collected from blocks of galena from a discovery pit on the property, contained 29.9 and 28.7 oz/ton silver. Other analyses from these samples were not reported (Ray, 1953).

Ray (1953) writes that the 1-foot-thick quartz vein on the property is reported to contain $14 per ton in gold (0.4 oz/ton). The 840-foot adit was driven to intersect the vein and the galena-sphalerite mineralization at a depth of 170 feet below its surface exposure. Two diamond drill holes with lengths of 180 and 540 feet were collared within the adit. Neither the gold-bearing quartz vein nor the galena-sphalerite mineralization were found in the adit or drill holes (Ray, 1953). The BLM's examination of the Berg Basin prospect was confined to the bottom of a gulch below the adit. There was no sign of past activity in the area. In the creek, investigators found a single 0.4-foot-thick piece of quartz float, with blebs of sphalerite, galena and pyrite. Analysis of it indicated 10 ppb gold, 75 ppm silver, 2.12 percent lead, 5.0 percent zinc, and 1,060 ppm arsenic (Map no. 83, sample 2644). While leaving the area by helicopter, BLM personnel spotted the adit portal at the top of a steep talus slope in the face of a cliff.

Conclusions

Little is known about the grades of the Berg Basin base-metal and gold occurrence. Apparently a lot of development was accomplished on the property based only on a gold analysis from one vein. Resampling of the 1-foot-thick quartz vein is warranted if it can be found. As it is now understood, the Berg Basin mineralization is too discontinuous and low-grade to be an exploration target.

COPPER KING

(Plate 1, Map nos. 84.1-84.2)

Location/Access

The Copper King prospect is located at the southeast end of the Groundhog Basin area, about 16 miles east of Wrangell. The prospect is situated at an elevation of 1,300 feet, near a steep-sided creek that drains into Aaron creek. The area is covered with timber and brush. Access to the prospect is via helicopter to a landing site in a muskeg at an elevation of 1,500 feet.

History

The Copper King prospect was staked in 1906 and restaked in 1951 (Berg, 1967). It was developed by a 9-foot-deep shaft and cuts. During 1956 it was examined by James A. Williams of the Alaska Territorial Department of Mines (Williams, 1957). The claims are currently inactive.

Mineral Assessment

The Copper King prospect is located in the same belt of metamorphosed Paleozoic sediments and volcanics that hosts the Groundhog Basin deposits. The belt is about 1.5 miles wide, strikes 330°, and dips about 50° to the northeast. The belt of sedimentary and volcanic rocks has been metamorphosed to upper greenschist or lower amphibolite facies to form quartz-mica schists and hornblende-biotite-pyroxene-feldspar gneiss (George and Wyckoff, 1973).

Studies by El Paso Natural Gas Co. indicate two major fault trends in the belt of metamorphic rocks (George and Wyckoff, 1973). One trend is parallel to foliation and bedding; rhyolite sills intrude along this trend. A crosscutting trend strikes about 025° (range 005° to 030°) and dips 45° east to vertical. At the Copper King prospect, a quartz-sulfide mineralized zone is found within a rhyolite sill (Williams, 1957).

Examination of the Copper King prospect by Williams in 1956 revealed a 4.5-foot-thick quartz sulfide vein that strikes north-northwesterly and dips 80° to the east. The vein is exposed in the creek and by cuts on both sides for a distance of 45 feet. A 9-foot-deep shaft collared on the vein is located on the southeastern side of the creek. The shaft was flooded in 1956. Up dip, the vein grades into rhyolite. Down dip, the vein contains more quartz and sulfides. A sample collected from the upper part of the vein contained 0.15 percent zinc, whereas a sample collected from the shaft's dump contained 3.33 percent zinc and a trace of copper (Williams, 1957).

The BLM's examination of the Copper King prospect revealed the remains of an old cabin on the southeast side of the creek. Up the creek from the cabin, at an elevation of 1,320 feet, a banded, quartz-sulfide mineralized zone that strikes north-northwest and dips steeply is exposed in the creek. It is hosted in rhyolite. A trench, now sloughed, extends for a distance of about 30 feet from the northwestern side of the creek in a north-northwest direction along the trend of the mineralized zone. Overburden conceals outcrop between the creek and the flooded shaft, which is located on the southeastern side of the creek, opposite the trench. The quartz-sulfide mineralized zone is partly exposed for a distance of 4 feet along strike in the creek and contains sphalerite, chalcopyrite, and pyrite. A 0.7-foot sample across the most mineralized part of the zone exposed in the creek contained 18.9 ppm silver, 5,639 ppm copper, and 2.1 percent zinc (Map no. 84.1, sample 374). A shaft dump sample contained 12 ppm silver, 4,694 ppm copper, and 1.9 percent zinc (Map no. 84.1, sample 375).

A quartz vein is exposed in the creek on the Copper King prospect at an elevation of 1,200 feet, about 750 feet southwest of the shaft. The 1.6-foot-thick, northeast-striking, steeply dipping quartz vein contained 679 ppb gold (Map no. 84.2, sample 372).

Conclusions

As it in now understood, the Copper King occurrence is too low-grade and too narrow to be an attractive exploration target.

BERG

(Plate 1, Map no. 85)

Location/Access

The Berg claims are located on the north side of Berg Bay, near Berg and Aaron Creeks, about 18 miles southeast of Wrangell (Alaska Kardex 1982). The area topography is moderately steep, with thick timber and brush cover. Access to the prospect is by boat and foot.

History

Lester Berg held lode gold claims at the mouth of Aaron Creek as early as 1907. He had a camp in the area at the time, and that is when the gold claims are assumed to have been staked (Alaska Kardex, 1982). The authors have found no other mention of these claims in published literature. There are currently no active claims in the area.

Mineral Assessment

The Berg claims are located in the same belt of metamorphosed Paleozoic sediments and volcanics that host the Groundhog basin area deposits (Brew, 1997c; Brew and Koch, 1997).

The BLM's investigation of the Berg claims area was confined to sampling stream sediment and quartz float in a stream that flows across the reported claim location. The samples did not contain significant metal values.

Conclusions

The Berg prospect seems to be of little significance. There is no mention of it in published literature, and there has been no subsequent mineral exploration activity either at the reported claim site or in the general vicinity. The reported claim location is too vague to recommend further follow-up.

BLACK CRAG

(Plate 1, Map nos. 86.1-86.4)

Location/Access

The Black Crag prospect is located in a U-shaped valley 1 mile southeast of Black Crag Peak, about 27 miles east of Wrangell. The area topography is rugged alpine with cliffs, sharp peaks, glaciers, and ice falls on either side of the valley. Elevations in the area range from 1,400 to 5,000 feet. Access to the prospect is by helicopter.

History

The Black Crag prospect and vicinity is not mentioned in published literature. However, a prospector reports drilling for molybdenum in the Black Crag vicinity during the 1950's (Paul Pieper, oral commun., 1998). An old, weathered post–possibly a claim post–was found in the area during this study and may indicate past activity.

Mineral Assessment

The Black Crag prospect is located near the contact between Miocene alkali-feldspar granite with associated quartz-porphyritic rhyolite dikes and flows and Mesozoic and Paleozoic metasedimentary and metavolcanic rocks (Elliott and Koch, 1981).

A brief examination of the area during this study revealed copper- and molybdenum-bearing float on the east side of the valley at elevations between 1,400 and 2,300 feet. The float consists of quartz porphyritic rhyolite with molybdenum coatings along fractures; fine-grained, silicified felsite with a 0.01-foot-thick seam of molybdenum; and silicified, iron-stained intrusive with pyrite and chalcopyrite. Grab samples from the molybdenum-bearing rocks contained 735 and 1,348 ppm molybdenum (Map nos. 86.2-86.3, samples 476, 480). The chalcopyrite-bearing rock contained 1,508 ppm copper (Map no. 86.3, sample 8733). The float probably originated from cliffs of intrusive and volcanic rock on the east side of the valley. In the valley floor, at an elevation of 2,400 feet, a 0.3-foot-thick, iron-stained, silicified breccia cobble with a pyrrhotite matrix contained 93 ppb gold, 43.5 ppm silver, and 558 ppm zinc (Map no. 86.1, sample 466).

Conclusions

The Black Crag prospect has indications of copper, molybdenum, and silver mineralization. The vicinity is worthy of more detailed examination.

Craig River Area

(Plate 1, Map no. 87)

Location/Access

The Craig River area is located near the U.S.-Canada border, about 7 miles west of Mt. Pounder, a border peak near the head of the North Fork of the Bradfield River. The area is 40 miles east of Wrangell. The occurrence lies at about 3,100 feet elevation in a north-facing, glaciated cirque, south of the head of the Craig River. The general area is marked by rugged mountains with much of the area above tree line. Access is by helicopter.

History

There is no known published reference to the occurrence in the Craig River area. As part of the Alaska Mineral Resources Program, USGS sampling in the late 1970's revealed anomalous values of silver, gold, copper, and zinc in the upper Craig River area (Koch, 1997). During the current study, BLM personnel were directed to the immediate area by a helicopter pilot who had flown mineral industry geologists to the site in the 1990's.

Mineral Assessment

The occurrence in the Craig River area consists of skarn minerals with associated sulfides that are hosted in marble. Rocks in the area are mapped as Mesozoic or Paleozoic metasedimentary and lesser metavolcanic rocks with local marble. Two Eocene intrusive bodies are also mapped in the area. One is granodiorite and quartz diorite; the other is quartz monzonite and granodiorite (Elliot and Koch, 1981).

Rock units in the Craig River area trend toward the northeast and dip moderately to the southeast. A banded marble layer that is associated with the skarn is approximately 300 feet thick. It is structurally underlain by a layer of dark gray to dark green, well-foliated metasediments, approximately 500 feet thick, which in turn are in contact with a quartz monzonite and granodiorite. Structurally overlying the marble is another layer of metasediments. Based on mapped units, the expected contact between the marble and the intrusive is covered by an icefield to the southwest of the cirque skarn occurrences.

The 300-foot-thick layer of marble in the Craig River area is medium- to coarse-grained, commonly white, with bands of interlayered schist and quartzite that show evidence of intense deformation. Skarn minerals are mainly garnet and epidote with patches and seams of massive pyrite, pyrrhotite, and minor chalcopyrite. Gossan is common where the sulfides associated with the skarn have been oxidized.

BLM personnel collected four samples in the Craig River area; three of them were of skarn-related sulfides and associated gossan. One select sample contained 1,781 ppm copper (Map no. 87, sample 3747) and another contained 478 ppm molybdenum (Map no. 87, sample 3736). Neither of these samples represent significant extents of mineralization. Precious-metal values from the samples were low; the highest gold value was 41 ppb across 2.2 feet of gossan (Map no. 87, sample 3746).

Conclusions

The skarn occurrence in the Craig River area is very small and low-grade. The immediate contact between the mineralized marble layer and the quartz monzonite and granodiorite, with which the mineralization is likely associated, was not discovered. The contact is likely covered by ice sheets in the area. Based on the evidence gathered to date, the occurrence is of little significance.

CRAIG CLAIMS AREA

(Plate 1, Map nos. 88.1-88.2)

Location/Access

The Craig Claims area is located near the U.S.-Canada border, about 2.5 miles west of Mt. Pounder, a border peak near the head of the North Fork of the Bradfield River. The area is 45 miles east of Wrangell. The occurrence is reported to lie a few hundred feet below the foot of an icefield, at about 4,000 feet elevation (Grybeck and Berg, 1998). The area is marked by rugged mountains with sparse vegetation. Access is by helicopter.

History

Sixty claims, called the "Craig" claims, were staked by K. Eichner, B. Huff, W. Hawkins, and A. Lillie in 1977 (Alaska Kardex, 1982). By 1981 the claims were no longer active (Elliot and Koch, 1981). There is no known report of activity since the original claims were staked.

Mineral Assessment

BLM personnel examined the Craig Claims area, but were unable to locate the occurrence in outcrop. Instead, they sampled rubble from talus slopes that was similar to the described mineralized rock. Elliot and Koch (1981) reported disseminated chalcopyrite, pyrite, and pyrrhotite in metasedimentary rock and chalcopyrite in thin veinlets. Float with skarn minerals including magnetite and minor chalcopyrite is also reported. The host rocks in the area have been mapped as Mesozoic or Paleozoic metasedimentary and lesser metavolcanic rocks with local marble (Elliot and Koch, 1981).

BLM personnel collected seven samples in the Craig Claims area. Four of the samples were collected from rubblecrops at the foot of steep cliffs in the area of the reported occurrence. Two types of mineralization are evident–disseminated and layered sulfides in schist and gneiss, and skarn. A sample of hornblendite, which was likely formed as a skarn, contained about 25 percent sulfides, mostly pyrite and pyrrhotite, with 5,706 ppm copper and 3.1 percent zinc (Map no. 88.2, sample 3740). The skarn is more commonly evident as inch-scale seams of coarsely crystalline pyrite. The disseminated and layered sulfides consist mainly of pyrite. Sample results indicate low base-metal values. The highest gold value from the area was only 30 ppb (Map no. 88.2, sample 3740).

Investigators collected three samples from a ridge crest 0.7 miles west-southwest of the rubblecrops described above. Iron-stained, metasedimentary rocks and minor skarn were sampled from a roof pendent surrounded by quartz monzonite and granodiorite. The base- and precious-metal values of the samples were low. One skarn sample contained 1,277 ppm copper and 2,288 ppm zinc (Map no. 88.1, sample 3741).

Conclusions

BLM personnel did not find significant mineralization in the Craig Claims area. The fact that the claims were held for less than 2 years also suggests that the occurrence is of limited significance.

NORTH BRADFIELD RIVER SKARN

(Plate 1, Map nos. 89.1-89.7)

Location/Access

The North Bradfield River Skarn prospect is located 15 miles up the North Fork of the Bradfield River, about 39 miles east of Wrangell. An old, partly washed-out logging road extends from the head of Bradfield Canal up the North Fork of the Bradfield River to the prospect. The area topography is rugged, ranging in elevation from 400 to 4,000 feet. The lower elevations are brush- and timber-covered; the upper elevations are alpine. Access to the prospect is by helicopter.

History

Malachite-stained cliffs led pilot Ken Eichner to the discovery of the North Bradfield River Skarn iron-copper prospect in 1955. His partner, Paul Pieper, staked the area (Ken Eichner, oral commun., 1997), and by 1958 it was held with 41 claims (Alaska Kardex, 1982). Vancouver geologist Clive Ball examined and mapped it in 1956 (Ball, 1956). In 1957 it was examined by consultants for Takahashi C.T. & Co. and optioned until December 31, 1959. Takahashi mapped the prospect, conducted an aeromagnetic survey, and drilled 14 shallow holes (Roberts, 1958). From 1960 to 1962, Utah Construction optioned the property, mapped and sampled it in detail, drilled out at least 460 feet of core, and estimated resources (Utah Construction, 1960; 1962). In 1960 the USGS mapped the prospect (MacKevett and Blake, 1963). According to recording office records, an adit was driven on the prospect in 1967, and the prospect was drilled in 1968 and 1970 (Alaska Kardex, 1982). In 1977, 400 stream sediment and rock chip samples were collected from the prospect (Nieman and Ellison, 1977). There are no active claims in the area.

Mineral Assessment

The North Bradfield River Skarn prospect is located in the northwestern corner of a large, metamorphosed roof pendent surrounded by intrusive rocks of the Coast Range Batholith. The pendent is 2 miles wide in the area of the prospect. It consists of Mesozoic and Paleozoic metasedimentary and metavolcanic rocks that are altered to gneiss and schist and are intercalated with beds of marble. The metamorphic rocks are in contact with Eocene quartz monzonite and are cut by felsic to intermediate dikes (Utah Construction, 1960; Elliott and Koch 1981). The iron-copper deposits are found in skarn zones associated with beds of marble. According to MacKevett and Blake (1963), the marble beds form an overturned syncline; as interpreted by Sonnevil (1981), they form a homocline with northwest to northeast dips. Work by Utah Construction (1960) tends to support the homoclinal interpretation.

The iron-copper deposits of the North Bradfield River Skarn form a discontinuous series of pods and lenticular bands striking northwest and dipping 30° northeast to vertical. They form a belt 0.5 mile wide by 2 miles long with an upper area of iron-copper deposits at elevations of 2,000 to 3,600 feet and a lower area of deposits at elevations from 700 to 900 feet. Locally the marble is replaced by calc-silicate skarn, which contains lenses and pods of magnetite with minor pyrrhotite, chalcopyrite, and pyrite (Utah Construction, 1960).

Based on trenching and drilling, Utah Construction has identified nine magnetite-copper lenses in the upper area that range in width from 15 to 150 feet, in length from 150 to 650 feet, and in depth from 100 to 500 feet. In the lower area, Utah Construction has identified four magnetite-copper lenses or zones that range in width from 15 to 20 feet, in length from 320 to 1,200 feet, and in depth from 150 to 400 feet.

It is estimated that the upper area deposits contain 500,000 tons of proven and probable resources and 3,542,000 tons of possible resources, and the lower area deposits contain 500,000 tons of proven and probable resources and 939,000 tons of possible resources. Taken together, the lower and upper areas contain 1 million tons of proven and probable resources and 4,481,000 tons of possible resources. The grade is estimated to be 35 to 40 percent iron, 0.2 to 0.3 percent copper, and 3 to 4 percent sulfur (Utah Construction, 1960).

The BLM's examination of the North Bradfield River Skarn prospect was confined to (1) sampling rock exposures at elevations from 700 and 750 feet along the North Fork of the Bradfield River at the northern end of the prospect and (2) sampling magnetite-copper and associated mineralization in the lower (northwestern) and upper (southeastern) parts of the prospect. At the northern end of the prospect, samples collected from skarn mineralized zones found in iron-stained schist and gneiss (in cliffs on the east side of the North Fork of the Bradfield River) contained up to 164 ppb gold and 1.3 percent copper (Map nos. 89.1-89.2, samples 455-456, 473, 2860-61, 8726). In the lower part of the prospect, samples collected from magnetite and associated skarn mineralization contained up to 190 ppb gold, 6,629 ppm copper, and 168 ppm molybdenum (Map nos. 89.3-89.4, samples 471, 474-475, 8725, 8727-29). In the upper part of the prospect, samples collected from magnetite and associated skarn mineralization contained up to 289 ppb gold, 3,351 ppm copper and 229 ppm molybdenum (Map nos. 89.5-89.7, samples 472, 481-484, 487-488, 8735-38). In addition, two reconnaissance samples collected of magnetite, hematite, and quartz from the upper part of the prospect and analyzed by a different laboratory contained 1,360 and 3,600 ppb gold, 3.4 and 11.6 ppm silver, and 1,130 and 2,200 ppm copper (Map no 89.7, samples 2645-46). The BLM's sample results for copper compare roughly with the Utah Construction resource estimates of 0.2 to 0.3 percent copper. The gold values in samples 2645 and 2646 are anomalously high when compared with the other samples collected from the prospect and may be analytical artifacts.

Conclusions

The resource estimate for the North Bradfield River.Skarn prospect indicates a copper-iron deposit that is too small and too low-grade to be a development target. Exploration at greater depth and in the vicinity of the known deposit may reveal more significant mineralized rock. In addition, the high gold values in samples collected from the upper area are worthy of follow-up.

MT. LEWIS CASS

(Plate 1, Map nos. 90.1-90.3)

Location/Access

The Mt. Lewis Cass occurrence is located 1.5 miles southwest of Mt. Lewis Cass, 48 miles east of Wrangell. The area topography is alpine, with steep-walled, U-shaped valleys, glaciers, and sharp peaks. Elevations at the occurrence range from 2,400 to 4,100 feet. Access to the occurrence is by helicopter.

History

The Mt. Lewis Cass occurrence was discovered during this study. There is no mention of it in published literature.

Mineral Assessment

The Mt. Lewis Cass occurrence is located near the contact between Eocene granodiorite and Mesozoic and/or Paleozoic metasedimentary and metavolcanic rocks with some marble (Elliot and Koch, 1981). The granodiorite is exposed in a stream cut located at the bottom of a U-shaped valley (elevation 2,500 feet). The southern side of the valley consist of iron-stained, volcanic and sedimentary rocks.

The granodiorite includes narrow quartz stringers that contain knots and blebs of sulfides. A 5-foot-long by 0.3-foot-thick quartz stringer contains blebs of molybdenum. A 0.3-foot chip sample across it assayed 1,240 ppm molybdenum (Map no. 90.2, sample 8718). Other stringers examined did not contain metallic sulfides.

Iron-stained, silicified, metasedimentary and metavolcanic float, which is likely rubble from the cliffs on the southern side of the valley, contains pyrrhotite, magnetite, and chalcopyrite. The chalcopyrite is in blebs and narrow quartz stringers. Samples from the chalcopyrite-bearing float contain from 1,832 ppm to 1.3 percent copper, up to 289 ppb gold, and 17.6 ppm silver (Map nos. 90.1-90.2, samples 463, 8717).

BLM personnel examined an area of iron-stained, volcanic rocks exposed between elevations of 4,000 and 4,300 feet in a cliff on the southern side of the valley. In places, these rocks are silicified, contain small amounts of pyrite and pyrrhotite, and are intensely iron-stained. Metallic sulfide minerals were not found (Map no. 90.3, samples 470, 8723-24).

Conclusions

The Mt. Lewis Cass occurrence has indications of copper and molybdenum mineralization. The area is worthy of more detailed examination.

UPPER MARTEN LAKE

(Plate 1, Map no. 91)

Location/Access

The Upper Marten Lake area is located about 25 miles southeast of Wrangell on the mainland. The occurrence is in the saddle of a ridge at an elevation of about 2,600 feet, about 1 mile east-southeast of the eastern end of Upper Marten Lake. The site is above the local tree line where the sparse vegetation includes brush and grasses. Access is best by helicopter.

History

The Upper Marten Lake area was brought to the attention of BLM personnel by a USGS stream sediment sample from the area that was anomalous for gold (Koch and Elliot, 1981). No other reference to the site is known.

Mineral Assessment

The Upper Marten Lake occurrence consists of mineralized rock associated with a fault zone that is oriented 330° and dips about 75° to the northeast. The fault zone forms a topographic low in which a stream now flows and from which an anomalous stream sediment sample was collected by the USGS (Koch and Elliot, 1981). The fault is hosted in rocks mapped as Mesozoic and/or Paleozoic schist and paragneiss and is situated near the contact with a Cretaceous diorite or granodiorite (Elliot and Koch, 1981). The occurrence is also situated about 2 miles west of the Coast Range megalineament (Brew and Ford, 1978) and great tonalite sill (Brew and Morrell, 1983; Brew, 1997h) and, in a general way, is aligned along strike with the mineralized rock of Groundhog Basin and the gold occurrence at Andrew Creek, 15 to 20 miles to the northwest.

Quartz stringers and veins are common in the fault zone along with clay-like fault gouge. The quartz and gouge in places contains sulfides, mainly pyrite and pyrrhotite.

BLM personnel collected four samples of iron-stained quartz and fault gouge from the fault zone at Upper Marten Lake. One sample contained 475 ppb gold, 86.9 ppm silver, and 1,218 ppm lead (Map no. 91, sample 2847). The other samples had low precious- and base-metal values.

BLM personnel also collected one sample from an iron-stained quartz vein exposed along a ridge crest about 2 miles north of the Upper Marten Lake occurrence. The vein trends 335° and dips about 75° to the northeast. It is hosted in schist, and the vein and schist foliation are approximately conformable. The vein pinches and swells from about 3 inches to 1 foot in width. It is exposed for about 20 feet. It contains only minor pyrite. Analytical results revealed 517 ppb gold across 0.7 feet of the vein (Plate 2, Map no. R92, sample 3749).

Conclusions

The known mineralized rock at the Upper Marten Lake occurrence is insufficient in size and grade to be of significance by itself. The occurrence is noteworthy because of its similar relative position to the Coast Range megalineament and great tonalite sill as the mineralized rock at Groundhog Basin and Andrew Creek. If the similarity of position is related to genesis of the mineralized rock, the area may be considered more prospective for hosting mineral deposits than previously thought.

BRADFIELD RIVER

(Plate 1, Map nos. 92.1-92.3)

Location/Access

The Bradfield River prospect is located near the mouth of the Bradfield River near the head of Bradfield Canal, 37 miles southeast of Wrangell (Alaska Kardex, 1982). The area topography is moderately steep with timber and brush cover. Access to the prospect is by boat and foot.

History

In 1962, 57 placer claims were staked for iron at the head of Bradfield Canal. In 1974, three placer claims were also staked for iron at the mouth of the Bradfield River (Alaska Kardex, 1982). There is no other mention of these placer claims in published literature. Currently, there are no active claims in the area.

Mineral Assessment

The tide and river flats at the head of Bradfield Canal and at the mouth of the Bradfield River include extensive sediments that contain wisps of magnetite-rich black sands. The source of the magnetite is likely the iron-rich North Bradfield River Skarn deposit and the intrusives of the Coast Range Batholith.

The BLM's examination of the head of the Bradfield Canal was confined to collecting 12 stream sediment sample from magnetite-bearing sands exposed in river and tide flats. The samples averaged 9 percent iron. The two highest-grade iron samples contained 20.34 and 54.89 percent iron (Map no. 92.3, samples. 70, 238). None of the samples contained other significant metal concentrations.

Conclusions

The Bradfield River prospect does not contain sufficient iron or other metals to be an exploration target.

SUMMARY

The Stikine area includes diverse physical geography, several tectonostratigraphic terranes and lithic assemblages, and varied mineral potential. Historical information and the Bureau's preliminary mineral assessment of the study area indicate three areas with higher relative mineral potential: (1) Duncan Canal - Zarembo Island, (2) Groundhog Basin, and (3) Cornwallis Peninsula.

The greatest potential for hosting an economic mineral deposit in the Stikine area seems to be in the Duncan Canal - Zarembo Island area where the potential exists for Triassic-hosted volcanogenic massive sulfide (VMS) deposits. Currently there are 18 prospects or occurrences in this area with suspected VMS style of mineralization. They are situated along the eastern margin of the Alexander terrane, a similar tectonic position to the Greens Creek and Windy Craggy deposits of major significance, 100 and 250 miles respectively, to the northwest. The only significant mineral production in the Stikine area came from the Castle Island Mine, a VMS deposit that produced 787,000 tons of barite between 1966 and 1980 (Carnes, 1980).

The Groundhog Basin area has been the focus of mineral exploration for a variety of mineral exploration companies since the 1960's. The area hosts the potential for polymetallic replacement and polymetallic vein type deposits and porphyry molybdenum. Small, but high grade, mineralized intervals are widespread across the area. One of the most promising parts of the Groundhog Basin area is the intersection of a major shear zone that hosts base- and precious metals with a marble bed that also hosts mineralized rock. The projected intersection of the two units is covered by the Nelson Glacier.

The Cornwallis Peninsula area includes several replacement type deposits in Triassic host rocks. How these occurrences are related to the Duncan Canal - Zarembo Island area Triassic VMS deposits is not clearly understood. This relationship though, along with the widespread nature of the mineralized rocks, suggest the Cornwallis area has the potential for hosting an economic mineral deposit.

The Stikine area hosts a variety of other mineral deposit types and occurrences as well, but few have generated much exploration interest recently. These include vein gold, skarn, magmatic segregation, and veins of barite. In addition to the production from the Castle Island Mine, minor gold production came from the Maid of Mexico, Helen S, and Cascade mines.

This interim report presents the data collected by BLM personnel in the 5.7 million-acre Stikine area of Central Southeast Alaska during 1997 and 1998. It includes descriptions of over 90 mines, prospects, and anomalous mineral occurrences. A final report, which will present the results of the entire 1997 to 2000 mineral assessment study of the Stikine area, is proposed for publication in 2001.

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APPENDIX A - ANALYTICAL RESULTS

SAMPLING AND ANALYTICAL PROCEDURES

Sampling methods

Several types of rock samples were collected to evaluate mineral deposits in the Stikine area. **Channel** samples are rock fragments, chips, or dust from a continuous channel of uniform width and depth across an exposure. **Chip channel** samples are chips of rock taken in a continuous line across a relatively uniform width and depth of an exposure. **Continuous chip** samples are chips of rock taken in a continuous line across an exposure. **Representative chip** samples are discontinuous chips of rock taken across an exposure. **Spaced chip** samples are chips of rock taken at a specified interval across an exposure. **Random chip** samples are chips of rock taken randomly across an exposure. **Grab** samples are rock chips or fragments taken more or less at random from an outcrop, float, or mine dump. **Select** samples are rock chips collected from the highest grade parts of a mineralized zone.

Stream sediment and pan concentrate samples are collected in reconnaissance fashion to detect any anomalous metal values that may indicate the presence of mineralized rock in an area. **Stream sediment** samples are collections of silt- and clay-size particles taken from a stream bed. **Pan concentrate** samples consist of one pan full of gravel, sand, and/or fines reduced by standard panning methods. The resultant concentrate of fines is then analyzed.

Analytical Methods

All analyses were conducted by a commercial laboratory. Rock samples were dried, crushed to a minus 10 mesh, split and pulverized to minus 150 mesh. Stream sediment samples were dried and sieved to a minus 80 mesh. Pan concentrate samples were pulverized to minus 150 mesh. For samples analyzed by inductively coupled argon plasma (ICP) and atomic absorption spectrophotometry (AA), a 0.5-gram sample was dissolved in aqua regia for measurement. For samples analyzed by X-ray fluorescence (XRF), a 10 gram pressed pellet was prepared for measurement. For samples analyzed by instrumental neutron activation analysis (INAA), a 5-gram vial is measured.

Samples were analyzed for gold by fire assay pre-concentration of a 30-gram sample followed by an AA finish with results reported in parts per billion. For gold values exceeding the upper detection limit of 10,000 ppb, a gravimetric finish was performed and results reported in ounces per ton.

Silver, copper, lead, zinc, and molybdenum were analyzed by AA with results reported in parts per million. Those samples of copper, lead, zinc, and molybdenum that exceeded the upper detection limits were subjected to low-level assays consisting of a multiacid digestion and AA finish, with results reported in percent. Samples of silver that exceeded detection limits were reanalyzed with gravimetric determination by fire assay using lead as a collector and results reported in ounces per ton.

Platinum and palladium were analyzed by fire assay pre-concentration of a 30 gram sample and an ICP finish with results reported in parts per billion.

Barium was analyzed by XRF with results reported in ppm. Those samples exceeding the upper detection limits (20,000 ppm) were further analyzed by wet chemical high-grade assay methods utilizing carbonate fusion digestion and measured by AA. This pressed pellet method is preferred due to the incomplete dissolution of barite ($BaSO_4$) by standard aqua regia and multiacid digestion methods used for ICP and AA analysis. For selected samples, tin and tungsten were also analyzed by XRF to improve the accuracy of data in areas where the BLM presumed a higher potential for these elements exists.

Rare-earth elements (Ce, Eu, La, Lu, Nd, Sc, Sm, Tb, Th, U, Yb) were analyzed by INAA with values reported in parts per million.

Mercury was analyzed by cold vapor AA methods with results reported in parts per million.

The remaining 24 elements were analyzed by ICP with results reported as either parts per million or percent. In most circumstances, samples analyzed by this method that exceeded the upper detection limits were not reanalyzed, but were reported as greater than the corresponding upper detection limit. However, values above ICP detection limits were obtained for some samples using low-level assay methods consisting of a multiacid digestion and AA finish, with results reported in percent.

MINIMUM DETECTION LIMITS BY ANALYTICAL TECHNIQUE

Fire assay methods

Element	Minimum, ppm	Finish Method
Au	0.005	atomic absorption (AA)
Au	0.17	gravimetric
Ag	0.7	gravimetric
Pd	0.001	inductively coupled argon plasma (ICP)
Pt	0.005	inductively coupled argon plasma (ICP)

X-ray fluorescence spectroscopy (XRF)

Element	Minimum, ppm
Ba	10
Sn	4
W	4

Instrumental neutron activation analysis

Element	Minimum, ppm	Element	Minimum, ppm
Ce	2	Sm	0.1
Eu	0.5	Tb	0.5
La	2	Th	0.5
Lu	0.1	U	1
Nd	5	Yb	0.5
Sc	0.1		

Atomic absorption spectrophotometry (AA)

Element	Minimum, ppm
Ag	0.1
Cu	1
Hg (cold vapor)	0.01
Mo	1
Pb	2
Zn	1

Inductively coupled argon plasma (ICP) spectroscopy

Element	Minimum, ppm	Element	Minimum, ppm
Al	0.01 %	Mn	1
As	5	Na	0.01 %
Bi	5	Nb	1
Ca	0.01 %	Ni	1
Cd	0.2	Sb	5
Co	1	Sc	5
Cr	1	Sn	20
Fe	0.01 %	Sr	1
Ga	2	Te	10
K	0.01%	Ti	0.01 %
La	1	V	1
Mg	0.01 %	W	20

Analytical Results for Samples from Mines, Prospects, and Mineral Occurrences and from Reconnaissance Investigations

Analytical and sample data are presented in Tables A-1 to A-3. In addition to the analytical results, the following information is listed in the tables: prospect or reconnaissance map number, sample number, sample location, sample type, sample size, and a brief sample description. The results are organized by map number on the mines, prospects, and occurrences sample location map (Plate 1) and by reconnaissance map number on the reconnaissance investigation sample location map (Plate 2).

Units of measure

Results are recorded under the element's chemical symbol in the following units, except where noted by an asterisk (*). The results marked by asterisks were from samples whose concentrations of the corresponding element exceeded the limits of the analytical technique used for evaluation. These over-detection-limit samples were reanalyzed, commonly using a different analytical technique with different units of measurement.

Au, Pt, Pd - parts per billion (ppb)

Ag, Cu, Pd, Zn, Mo, Ni, Co, As, Ba, Bi, Cd, Cr, Ga, Hg, La, Mn, Nb, Sb, Sc, Sn, Sr, Te, V, W - parts per million (ppm)

Al, Ca, Fe, K, Mg, Na, Ti - percent (%)

If followed by an asterisk, Au and Ag values are recorded in ounces per ton (oz/ton) and Cu, Pb, and Zn, are recorded in percent (%). Asterisks in the Ba, Sn, and W columns indicate XRF analyses.

Abbreviations

Sample types:

<u>Rock Chip</u>

C	continuous chip
CC	chip channel
CH	channel
G	grab
RC	random chip
Rep	representative chip
S	select
SC	spaced chip

<u>Stream Sample</u>

SS	stream sediment
PC	pan concentrate

Sample sites:

FL	float	TP	trench, pit, or cut
MD	mine dump	UW	underground workings
MT	mine tailings	OC	outcrop
RC	rubblecrop		

Sample descriptions:

@	at	int	intrusive
alt	altered	ls	limestone
ar	argillite	mag	magnetite
aspy	arsenopyrite	mg	medium-grained
bt	biotite	meta	metamorphic
br	breccia/brecciated	ml	malachite
calc	calcite/calcareous	mo	molybdenite
carb	carbonate/carbonaceous	msv	massive
cg	coarse-grained	peg	pegmatite
chl	chlorite/chloritic	po	pyrrhotite
cp	chalcopyrite	porph	porphyry/porphyritic
dissem	disseminated/disseminations	py	pyrite/pyritic
dol	dolomite/dolomitic	qz	quartz
fel	felsic	sed	sediment
fest	iron-stained	sc	schist
fg	fine-grained	sil	silicified/siliceous
gn	galena	sl	sphalerite
gp	graphite/graphitic	sulf	sulfide
gw	graywacke	vn	vein
gs	greenstone	volc	volcanic
hbl	hornblende	w/	with

Table A-1. Analytical results for samples from mines, prospects, and mineral occurrences

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Location	Sample Type	Sample Size (ft)	Sample Site	Sample Description	Au ppb * opt	Ag * ppm opt	Cu * ppm %	Pb * ppm %	Zn * ppm %	Mo ppm
1	9604	Allied Mine Group E	C	0.1	OC	Pink barite pod in volcaniclastics	<5	0.2	360	<2	18	<1
1	9605	Allied Mine Group E	C	0.4	OC	Barite-carb vn in volcaniclastics	<5	<0.1	82	<2	10	2
1	9606	Allied Mine Group E	Rep	1.4	OC	Barite vn in volcaniclastics	<5	<0.1	14	<2	11	<1
2.1	9622	Cornwallis Peninsula	G		OC	Ls w/ cg calc, limonite	<5	<0.1	12	74	489	6
2.2	167	Cornwallis Peninsula	G	0.3	OC	Fest volc w/ py, limonite, fg sl	<5	1.5	40	384	8382	20
2.2	9623	Cornwallis Peninsula	C	1	OC	Barite vns in coarse breccia	<5	<0.1	91	6	319	<1
2.3	155	Cornwallis Peninsula	SC	2 @ 0.5	OC	Barite vn w/ calcite	<5	0.5	86	134	116	2
2.3	156	Cornwallis Peninsula	G	0.4	FL	Conglomerate w/ py, trace sl	7	2.3	660	149	553	15
2.3	9612	Cornwallis Peninsula	C	2.3	OC	Barite vn w/ fg py	7	0.2	11	11	78	<1
2.4	9611	Cornwallis Peninsula	Rep	0.6	OC	Ls w/ dissem sulf	<5	6.7	26	660	**2.0** *	5
3.1	161	Keku Islet	C	4	OC	Basalt dike w/ sl ladder vns	6	1.9	153	15	**8.8** *	<1
3.1	9617	Keku Islet	C	2.4	OC	Alt basalt dike w/ sl ladder veinlets	<5	1.8	191	36	**6.0** *	1
3.1	9618	Keku Islet	C	4.3	OC	Alt basalt dike w/ sl ladder veinlets	<5	1.3	126	249	7773	2
3.1	9619	Keku Islet	C	3	OC	Alt basalt dike w/ sl ladder veinlets	<5	2.3	216	71	**5.1** *	<1
3.1	9620	Keku Islet	C	6	OC	Alt basalt dike w/ sl ladder veinlets, py	<5	2.4	252	42	**13.8** *	<1
3.1	9621	Keku Islet	C	2	OC	Alt basalt dike w/ sl ladder veinlets	<5	1.3	283	33	**3.6** *	2
3.2	2614	Keku Islet	S	0.1	OC	Fractured & br basalt w/ sl along fractures	<5	3.1	200	600	**13.5** *	<10
3.3	162	Keku Islet	C	1.75	OC	Basalt dike w/ sl stringers	<5	1	276	6	**6.1** *	<1
3.3	163	Keku Islet	C	0.07	OC	Sl veinlet in basalt	<5	2.2	179	9	**14.2** *	<1
3.3	164	Keku Islet	C	0.6	OC	Basalt w/ sl vn	<5	2.5	166	8	**31.2** *	<1
3.3	165	Keku Islet	C	0.07	OC	Basalt w/ sl vn	<5	3.6	181	23	**10.9** *	<1
3.3	166	Keku Islet	C	0.1	OC	Basalt w/ sl vn	<5	1.3	115	6	**8.6** *	1
4	159	Little Creek	SS			Kuiu volc outcrop in stream	6	0.8	11	401	76	2
4	160	Little Creek	G	0.4	RC	Rhyolite w/ jasper	<5	<0.1	6	22	101	<1
5.1	9616	Kuiu Lead-Zinc	RC		OC	Alt rhyolite	<5	1.6	4	302	287	<1
5.2	9578	Kuiu Lead-Zinc	S		TP	Dol w/ gn & sl	<5	**21.72** *	428	**20.54** *	**13.4** *	8
5.2	9615	Kuiu Lead-Zinc	S		TP	Dol w/ gn & black manganese oxide alt	10	313.6	187	**10.31** *	**7.7** *	3
6.1	9613	Katherine	Rep	1.5	OC	Barite stringers w/ minor gn in ls	<5	12.9	218	2355	**3.2** *	2
6.2	157	Katherine	G	0.5	RC	Vuggy, drusy qz vn w/ py & gray sulf	31	9.5	55	371	748	17
6.2	9614	Katherine	Rep	1	OC	Sil zone w/ drusy qz, py	62	9.6	49	605	735	14
7	151	Saginaw Bay	G	0.3	FL	Cherty, sil boulder w/ bands of py & gray sulf	<5	0.5	9	71	67	4
7	152	Saginaw Bay	G	0.3	FL	Chert w/ bands & blebs of py	<5	<0.1	4	9	36	<1
7	153	Saginaw Bay	SS			Metavolc outcrop in stream	<5	0.2	13	26	168	2
8.1	9577	Hungerford	G	1.2	OC	Br w/ barite, gn, sl, jasper, chert	<5	**5.82** *	25	**2.84** *	2228	2
8.2	154	Hungerford	RC	15	OC	Amygdaloidal basalt w/ py & wisps of gray sulf	12	84.7	24	**2.23** *	7028	2
8.2	158	Hungerford	G	0.6	OC	Conglomerate w/ barite, sl	<5	16.4	11	5625	6019	<1
9	9608	Corn	G	2	OC	Sil rhyolite w/ scattered fg gray sulf	<5	1.6	12	86	32	2
9	9609	Corn	G		OC	Sil rhyolite w/ scattered fg gray sulf	<5	2.7	11	194	423	6
9	9610	Corn	G		FL	Barite w/ sl, gray sulf	<5	11	1959	1691	**1.5** *	71
10	148	Saginaw Bay Barite	C	0.4	OC	Barite veinlet in ls	<5	<0.1	9	4	8	<1
10	9607	Saginaw Bay Barite	Rep	2.4	OC	Cg bladed barite vn in ls	<5	<0.1	40	4	7	2
11	174	Kadake Bay	C	0.1	OC	Carb fossils in shale	<5	0.3	51	22	264	20
11	175	Kadake Bay	C	0.3	OC	Carb bed in ls	6	<0.1	6	8	168	5
11	176	Kadake Bay	C	0.07	OC	Carb bed in ls	<5	<0.1	10	10	114	5
11	9627	Kadake Bay	C	1	OC	Carb fossil seams in mg qz arenite	<5	<0.1	8	22	121	9
12.1	9625	Kuiu	SS			Metaseds outcrop in stream	24	<0.1	10	22	60	3
12.1	9626	Kuiu	SS			Metaseds outcrop in stream	6	<0.1	8	12	37	<1

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Ni ppm	Co ppm	Al %	As ppm	Ba ppm	* xrf	Bi ppm	Ca %	Cd ppm	Cr ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm	Na %	Nb ppm	Sb ppm	Sc ppm	Sn ppm	* xrf	Sr ppm	Te ppm	Ti %	V ppm	W ppm	* xrf	Pt ppb	Pd ppb
1	9604	3	11	0.1	<5	>20000	*	<5	4.7	<0.2	7	2.36	<2	0.238	0.02	9	1.05	2569	0.02	<1	<5	<5	<20		674	<10	<0.01	12	<20			
1	9605	2	2	0.1	6	>20000	*	<5	4.5	<0.2	25	0.69	<2	0.21	0.05	4	0.23	536	0.01	<1	<5	<5	<20		1410	<10	<0.01	7	<20			
1	9606	5	10	0.2	19	>20000	*	<5	0.3	<0.2	29	2.07	<2	0.186	0.13	6	0.12	736	0.05	<1	<5	<5	<20		761	<10	<0.01	21	<20			
2.1	9622	4	1	0	11	308	*	<5	40	4.7	2	0.86	<2	0.356	0.02	2	0.28	1113	0.03	5	<5	<5	<20		302	<10	<0.01	3	<20			
2.2	167	15	10	0.3	158	12805	*	<5	0.2	20.6	35	11.89	5	11.39	0.26	4	0.03	150	0.03	<1	28	6	<20		28	<10	<0.01	30	<20			
2.2	9623	<1	<1	0	19	>20000	*	<5	2.2	1.3	4	0.72	<2	0.727	0.02	6	0.97	1467	0.02	<1	9	<5	<20		415	<10	<0.01	<1	<20			
2.3	155	1	2	0.1	10	>20000	*	<5	6.8	1.1	12	2.96	2	0.179	0.05	166	3.04	6207	0.01	1	<5	<5	<20		741	<10	<0.01	4	<20			
2.3	156	2	12	0.2	644	>20000	*	<5	4	3.4	31	16.78	5	3.684	0.06	<1	1.75	3366	0.02	<1	69	<5	<20		58	<10	<0.01	2	<20			
2.3	9612	2	<1	0.1	37	**44.46%**	*	<5	1	0.7	20	2.28	<2	2.464	0.02	22	0.44	757	0.01	<1	<5	<5	<20		1180	<10	<0.01	<1	<20			
2.4	9611	4	1	0	123	>20000	*	<5	25	149.8	19	1.74	<2	1.551	0.01	2	0.28	992	0.02	3	22	<5	<20		139	11	<0.01	1	<20			
3.1	161	29	31	0.4	34	980	*	<5	3.1	608.1	51	2.87	8	7.32	0.31	<1	0.13	863	0.05	<1	8	16	<20		42	33	<0.01	92	83			
3.1	9617	20	17	0.2	29	878	*	<5	3.2	411.5	48	1.46	7	4.185	0.25	3	0.05	506	0.03	<1	<5	8	<20		51	25	<0.01	56	64			
3.1	9618	39	35	0.8	14	843	*	<5	6.3	46.5	27	6.14	2	0.451	0.23	5	0.45	2989	0.12	<1	<5	26	<20		89	<10	0.05	162	<20			
3.1	9619	44	34	0.3	80	903	*	<5	1.4	345.1	52	8	7	3.706	0.23	2	0.19	1014	0.05	<1	14	12	<20		20	22	<0.01	73	54			
3.1	9620	43	31	0.2	26	475	*	<5	2.2	1025	49	4	13	10.36	0.21	2	0.03	451	0.03	<1	10	9	<20		31	37	<0.01	42	149			
3.1	9621	33	33	0.4	27	1089	*	<5	5.6	248.8	31	3.3	5	2.823	0.31	4	0.16	1277	0.05	<1	<5	24	<20		63	19	<0.01	101	35			
3.2	2614	12	15	0.3	12	30		4	6.2	>100.0	22	1.34	10	11.49	0.3	<10	0.05	1005	0.04		10	12			59		<.01	29	<10			
3.3	162	31	26	0.3	7	1088	*	<5	6.4	355.1	31	1.26	5	3.78	0.25	<1	0.04	1505	0.04	<1	<5	17	<20		74	22	<0.01	35	58			
3.3	163	32	22	0.3	55	343	*	<5	7.6	733.5	27	1.86	10	10.94	0.21	<1	0.04	1776	0.04	1	10	16	<20		101	35	<0.01	38	131			
3.3	164	39	23	0.2	67	218	*	<5	3.2	1798	14	3.45	26	22.59	0.16	<1	0.04	930	0.03	<1	18	7	<20		49	43	<0.01	33	254			
3.3	165	34	28	0.3	32	654	*	<5	5.4	623.1	26	1.69	9	7.447	0.23	<1	0.03	1227	0.03	<1	8	18	<20		68	32	<0.01	54	101			
3.3	166	15	16	0.3	6	770	*	<5	5.6	524.9	25	1.12	6	5.813	0.25	<1	0.04	1219	0.04	<1	6	12	<20		58	26	<0.01	32	77			
4	159	3	10	2.5	6	176		<5	0.1	0.8	8	2.57	6	0.226	0.09	34	0.09	3890	0.02	<1	<5	<5	<20		8	<10	0.01	27	<20			
4	160	4	<1	0.3	9	1359	*	<5	0.3	0.4	141	2.17	<2	0.088	0.17	48	0.1	582	0.07	2	<5	<5	<20		40	<10	<0.01	1	<20			
5.1	9616	4	<1	0.3	7	1231	*	<5	<0.01	2.3	105	1.16	2	0.089	0.27	29	<0.01	1054	0.02	<1	<5	<5	<20		5	<10	<0.01	<1	<20			
5.2	9578	2	1	0.1	19	3		<5	0.4	1057	25	11.5	<2	17.43	0.07	12	0.1	>20000	<0.01	<1	355	<5	<20		20	34	<0.01	<1	<20			
5.2	9615	2	1	0.1	11	2292	*	<5	1.4	546	30	14.74	11	12.85	0.02	13	0.21	**5.41%**	0.01	<1	221	<5	<20		27	26	<0.01	<1	70			
6.1	9613	7	9	0.1	44	>20000	*	<5	15	133.8	4	2.6	<2	23.14	0.02	<1	3.09	2879	0.01	2	44	<5	<20		71	15	<0.01	26	29			
6.2	157	48	29	0.1	2725	8498	*	<5	0.1	0.6	43	30.7	6	6.185	0.02	<1	0.02	74	0.01	<1	377	<5	<20		6	<10	<0.01	5	<20			
6.2	9614	38	13	0.1	1602	7107	*	<5	0.6	1.3	96	16.19	4	3.618	0.04	<1	0.22	347	0.02	<1	206	<5	<20		5	<10	<0.01	3	<20			
7	151	3	<1	0.3	465	2256	*	<5	0.1	<0.2	73	11.8	5	0.525	0.19	29	0.03	232	<0.01	<1	123	<5	<20		21	<10	<0.01	4	<20			
7	152	2	<1	0.3	11	2227	*	<5	0	<0.2	70	4.19	4	0.266	0.27	43	<0.01	42	<0.01	<1	<5	<5	<20		9	<10	<0.01	2	<20			
7	153	8	14	2.1	23	1079		<5	0.7	0.3	11	5.47	5	0.299	0.09	30	0.21	4010	0.02	1	<5	<5	<20		62	<10	0.03	45	<20			
8.1	9577	3	5	0.1	<5	70		<5	0.7	49.8	24	7.14	<2	34.46	0.06	5	0.31	15162	0.02	<1	72	<5	<20		705	<10	<0.01	<1	<20			
8.2	154	3	3	1.2	<5	4014	*	<5	5.1	123.4	15	4.1	6	6.911	0.4	34	0.38	8800	0.03	1	27	8	<20		101	<10	<0.01	20	<20			
8.2	158	3	4	0.5	7	>20000	*	<5	1.4	53.4	37	4.48	3	6.768	0.25	10	0.48	6880	0.03	<1	<5	6	<20		464	<10	<0.01	11	<20			
9	9608	3	<1	0.2	54	14625	*	<5	0.1	0.3	72	6.94	2	0.407	0.18	3	<0.01	15	<0.01	<1	10	<5	<20		22	<10	<0.01	<1	<20			
9	9609	3	<1	0.2	66	>20000	*	<5	<0.01	5	70	4.89	2	0.818	0.19	5	<0.01	75	<0.01	<1	16	<5	<20		58	<10	<0.01	<1	<20			
9	9610	3	3	0.1	449	>20000	*	<5	2.4	117.8	36	1.35	<2	3.07	0.04	21	0.03	543	<0.01	<1	347	<5	<20		143	<10	<0.01	<1	<20			
10	148	3	2	0	<5	>20000	*	<5	6.2	<0.2	3	1.27	<2	0.633	0.01	<1	0.65	963	0.02	1	<5	<5	<20		1220	<10	<0.01	6	<20			
10	9607	<1	<1	0	<5	>20000	*	<5	12	<0.2	4	0.37	<2	2.011	<0.01	<1	0.16	430	0.01	2	7	<5	<20		864	<10	<0.01	3	<20			
11	174	14	15	1	18	1240	*	<5	1.8	1.8	48	3.83	8	0.15	0.17	2	0.98	700	0.09	<1	<5	14	<20		228	<10	<0.01	96	<20			
11	175	3	2	0.1	20	104	*	<5	17	0.8	4	2.55	<2	0.033	0.02	<1	4.36	1382	0.08	2	<5	<5	<20		1787	<10	<0.01	37	<20			
11	176	5	5	0.2	6	1050	*	<5	9.7	0.5	8	3.06	<2	0.049	0.03	<1	3.33	1466	0.07	2	<5	<5	<20		883	<10	<0.01	146	<20			
11	9627	5	5	0.2	6	2641	*	<5	16	0.6	11	3.26	<2	0.04	0.04	8	4.76	1377	0.08	2	<5	<5	<20		1910	<10	<0.01	121	<20			
12.1	9625	6	5	1.1	9	59		<5	0.3	<0.2	14	3.5	4	0.052	0.08	19	0.37	146	0.05	<1	<5	5	<20		24	<10	0.03	64	<20			
12.1	9626	4	6	0.9	<5	159		<5	0.3	<0.2	9	3.76	4	0.119	0.04	5	0.18	531	0.02	<1	<5	<5	<20		34	<10	0.07	109	<20			

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No	Sample No.	Location	Sample Type	Sample Size (ft)	Sample Site	Sample Description	Au ppb	* opt	Ag ppm	* opt	Cu ppm	* %	Pb ppm	* %	Zn ppm	* %	Mo ppm
12.2	9624	Kuiu	SS			Metaseds outcrop in stream	18		<0.1		17		25		93		<1
12.3	168	Kuiu	SS			Metased float in stream	<5		<0.1		16		18		111		<1
12.3	169	Kuiu	SS			Very small stream w/ no exposed bedrock or float	<5		<0.1		15		14		111		<1
12.3	170	Kuiu	PC			Panned fg seds found in old box	2255		0.2		12		6		77		3
12.3	171	Kuiu	SS			Metased float in stream	<5		<0.1		14		11		100		<1
12.3	172	Kuiu	SS			Very small stream w/ no exposed bedrock or float	<5		<0.1		16		10		96		<1
12.4	173	Kuiu	SS			Very small stream w/ no exposed bedrock or float	12		0.2		16		23		130		<1
13.1	9628	Point Saint Albans	C	0.5	OC	Gw w/ py band at margins of dike	5535		33.6		313		152		8409		3
13.2	178	Point Saint Albans	G	0.3	OC	Qz lens w/ py	<5		8.2		64		123		214		4
13.2	179	Point Saint Albans	C	0.1	OC	Qz lens w/ blebs of sl	<5		6.8		25		62		**1.7**	*	4
13.2	180	Point Saint Albans	C	0.4	OC	Qz vn w/ aspy, py, sl, gn	22		161.7		80		9834		**2.4**	*	2
13.2	9629	Point Saint Albans	C	2.4	OC	Fault zone in gw w/ qz & sulf	42		16.1		24		764		7343		4
13.2	9630	Point Saint Albans	C	1.1	OC	Fest shear zone w/ qz & sulf	7		34.7		45		2106		2279		2
13.2	9631	Point Saint Albans	S	0.4	OC	Sheared gw br w/ gn	20		342.2		30		**8.15**	*	**1.1**	*	3
13.3	177	Point Saint Albans	Rep	1.5	OC	Fest qz-calc zone w/ py, fg sl	91		5.7		16		381		2186		2
14	2363	Pinta Point	Rep	11	OC	Gp sc & chert w/ msv & dissem sulf	43		0.8		143		20		624		52
14	2364	Pinta Point	S		OC	Gp sc/slate w/ seams of py	78		2.1		249		44		878		52
14	2391	Pinta Point	S		OC	Fel sc w/ layered sulf	81		0.9		165		38		489		51
15	3710	Kake Area Road System	S		TP	Py in narrow alt shear zone in hbl diorite	13		1		56		5		18		27
15	3711	Kake Area Road System	S		TP	Msv cp, py in hbl diorite	454		30.6		**11.2**	*	8		275		1253
16	3705	Kake Area Road System	S		OC	Msv barite w/ gn, sl	49		13.1		66		**1.02**	*	**3.0**	*	<1
16	8671	Kake Area Road System	S		OC	Barite w/ qz, sl, trace gn	27		3.3		69		2070		**2.9**	*	<1
17.1	3728	Gunnuk Creek	SS			Ar outcrop in stream w/ar, gs & minor qz float	<5		<0.1		25		12		119		<1
17.2	3729	Gunnuk Creek	SS			Ar outcrops in stream w/ar & chert float	<5		<0.1		24		12		122		<1
17.2	8688	Gunnuk Creek	SS			Ar outcrop in creek	<5		0.2		30		11		161		4
17.3	3730	Gunnuk Creek	SS			Ar outcrops in stream w/ ar & chert float	6		<0.1		48		14		167		2
17.3	8689	Gunnuk Creek	SS			Ar float in creek	<5		0.2		28		13		140		2
18	3700	Kake Area Road System	Rep		TP	Band of py, sl, cp in sil ar	1135		30.5		7327		501		**5.4**	*	<1
19.1	2813	Kane Peak	RC	2	OC	Hornblendite w/ po	2		<0.1		325		3		12		<1
19.1	2814	Kane Peak	C		OC	Fest hornblendite w/ po	3		<0.1		271		5		30		<1
19.2	392	Kane Peak	Rep	3	OC	Hornblendite w/ mag, py	<5		<0.1		144		5		95		2
19.2	393	Kane Peak	SS			Hornblendite outcrops in stream	17		<0.1		14		2		41		<1
19.2	394	Kane Peak	SS			Hornblendite outcrops in stream	19		<0.1		43		12		91		<1
19.2	395	Kane Peak	SS			Hornblendite outcrops in stream	17		<0.1		31		2		43		<1
19.2	396	Kane Peak	SS			Hornblendite outcrops in stream	15		<0.1		80		10		88		<1
19.2	2810	Kane Peak	G		RC	Hornblendite	6		<0.1		107		7		87		2
19.2	2811	Kane Peak	G	2	OC	Hornblendite w/ po	8		<0.1		410		6		79		2
19.2	2812	Kane Peak	C	2	OC	Hornblendite w/ po	6		<0.1		300		7		95		2
19.3	397	Kane Peak	SS			Granite & metased float in stream	15		<0.1		10		2		42		<1
19.3	398	Kane Peak	SS			Granite & metased float in stream	14		<0.1		24		8		66		<1
20	2803	Portage Bay Pit	Rep	20	TP	Int w/ po	16		0.7		192		52		104		4
20	2804	Portage Bay Pit	Rep	12	TP	Int w/ po	<5		0.2		207		19		40		11
20	2805	Portage Bay Pit	Rep	8	TP	Int w/ po	6		0.2		70		20		78		4
20	2806	Portage Bay Pit	Rep	8	TP	Int w/ po	7		0.3		184		23		38		5
20	3673	Portage Bay Pit	S		TP	Diorite w/ banded sulf including po & cp	74		1.6		920		41		88		4
20	3674	Portage Bay Pit	S		TP	Fg sc w/ sulf in shear zone along margin of int	3271		13.9		3025		4708		**1.4**	*	4
20	3675	Portage Bay Pit	S		RC	Int w/ bands of msv sulf	36		1.6		2067		41		77		37

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Ni ppm	Co ppm	Al %	As ppm	Ba ppm	* xrf	Bi ppm	Ca %	Cd ppm	Cr ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm	Na %	Nb ppm	Sb ppm	Sc ppm	Sn ppm	* xrf	Sr ppm	Te ppm	Ti %	V ppm	W ppm	* xrf	Pt ppb	Pd ppb
12.2	9624	8	31	1.9	<5	238		<5	0.3	0.2	15	6.51	7	0.187	0.04	9	0.32	4138	0.02	<1	<5	<5	<20		31	<10	0.06	120	<20			
12.3	168	11	23	2.3	<5	280		<5	0.5	0.2	18	5.64	4	0.195	0.05	10	0.61	1946	0.02	<1	<5	6	<20		49	<10	0.11	93	<20			
12.3	169	11	22	2.2	<5	281		<5	0.5	<0.2	17	5.08	4	0.217	0.05	10	0.55	1893	0.02	<1	<5	5	<20		54	<10	0.09	85	<20			
12.3	170	12	13	1.7	<5	885	*	<5	0.3	<0.2	285	3.4	4	0.154	0.1	10	0.38	758	0.07	5	<5	<5	<20		27	<10	0.09	63	<20			
12.3	171	9	21	1.5	<5	444		<5	0.7	0.3	14	4.93	5	0.112	0.07	12	0.36	3053	0.03	<1	<5	<5	<20		97	<10	0.03	71	<20			
12.3	172	11	13	1.6	<5	281		<5	0.6	0.3	17	4.45	5	0.64	0.1	19	0.63	891	0.02	<1	<5	7	<20		55	<10	0.05	79	<20			
12.4	173	15	18	2.1	<5	448		<5	1	0.8	17	5	4	0.109	0.05	16	1.08	1696	0.03	<1	<5	7	<20		118	<10	0.06	76	<20			
13.1	9628	3	9	0.6	**1.55%**	2444	*	17	1.3	95.1	65	7.09	3	0.81	0.33	3	0.29	1815	0.03	<1	69	<5	<20		35	<10	<0.01	4	<20			
13.2	178	13	7	0.3	70	140	*	<5	3.1	1.4	91	3.65	<2	0.089	0.16	<1	0.83	477	0.04	<1	61	<5	<20		82	<10	<0.01	14	<20			
13.2	179	12	2	0.2	357	61	*	<5	2.6	123.1	137	2.11	<2	1.655	0.07	1	0.59	561	0.02	<1	30	<5	<20		51	10	<0.01	17	<20			
13.2	180	7	6	0.8	**1.46%**	<10	*	<5	7.4	171.1	66	4.09	2	2.71	0.08	<1	0.7	1407	0.02	1	**0.44%**	<5	<20		226	14	<0.01	29	20			
13.2	9629	9	4	0.2	7432	350	*	<5	4.7	32.6	64	4.64	<2	1.01	0.13	3	1.14	1780	0.03	<1	398	<5	<20		159	<10	<0.01	5	<20			
13.2	9630	10	7	0.5	**5.53%**	117	*	<5	4.5	<0.2	64	7.86	2	0.252	0.15	3	1.3	1169	0.03	<1	275	7	<20		130	<10	<0.01	24	<20			
13.2	9631	4	3	0.4	**1.37%**	106	*	<5	4.8	123.4	60	4.67	<2	2.249	0.18	2	1.18	1275	0.03	<1	530	<5	<20		144	<10	<0.01	9	<20			
13.3	177	6	5	0.4	**2.17%**	119	*	<5	5	0.4	65	4.83	<2	0.308	0.13	<1	1.06	1430	0.02	<1	254	<5	<20		176	<10	<0.01	9	<20			
14	2363	278	21	1.8	226	952	*	<5	5.3	3.9	132	20.07	<2	0.33	0.14	3	1.69	1019	0.01	5	12	9	<20		91	<10	0.01	150	<20			
14	2364	427	13	0.5	287	746	*	<5	4.9	5.4	77	17.41	<2	1.359	0.13	2	0.42	301	<0.01	1	27	<5	<20		151	<10	<0.01	78	<20			
14	2391	261	24	1.2	279	1201	*	<5	1.7	2	83	24.87	<2	1.868	0.17	3	1.05	466	0.01	<1	7	<5	<20		11	<10	<0.01	90	<20			
15	3710	23	128	0.2	<5	45	*	<5	0.04	0.4	56	40.54	<2		0.01	<1	0.03	26	<0.01	<1	<5	<5	<20		12	<10	<0.01	7	<20			
15	3711	37	35	1.1	<5	565	*	20	0.3	4.1	107	17.41	<2		0.06	<1	0.61	246	0.01	<1	<5	<5	<20		28	12	0.19	98	<20			
16	3705	3	1	0.1	16	**48.37%**	*	<5	0.4	197.5	9	0.68	6		0.03	<1	0.18	200	<0.01	<1	11	<5	<20		109	12	<0.01	2	27			
16	8671	3	1	0.1	10	**46.12%**	*	<5	0.7	188.6	15	0.54	5	1.329	0.03	<1	0.28	389	<0.01	<1	<5	<5	<20		192	12	<0.01	2	26			
17.1	3728	23	12	1.5	9	1010	*	<5	0.4	0.2	28	3.45	3		0.12	8	0.67	1753	0.02	<1	<5	<5	<20		25	<10	0.05	50	<20			
17.2	3729	24	13	1.6	8	953	*	<5	0.4	0.2	28	3.31	3		0.11	8	0.69	1696	0.01	<1	<5	<5	<20		19	<10	0.05	48	<20			
17.2	8688	91	18	1.8	16	283		<5	0.4	0.8	57	3.99	3	0.099	0.12	9	0.99	2182	0.01	<1	<5	<5	<20		18	<10	0.03	56	<20			
17.3	3730	48	16	2	9	993	*	<5	0.8	0.5	45	4.11	3		0.2	9	1.16	1713	0.02	<1	<5	<5	<20		42	<10	0.09	59	<20			
17.3	8689	34	14	1.7	11	987	*	<5	0.4	0.3	35	3.77	3	0.097	0.12	8	0.77	2050	0.02	<1	<5	<5	<20		22	<10	0.04	52	<20			
18	3700	16	44	0.8	412	1051	*	33	0.1	196.1	52	25.41	4		0.05	<1	0.35	496	0.01	<1	6	<5	<20		8	43	<0.01	16	47			
19.1	2813	111	67	0.2	<5	10	*	<5	0.5	<0.2	218	2.31	<2	0.018	0.03	<1	2.02	154	0.02	1	<5	<5	<20		12	<10	0.01	14	<20		<5	2
19.1	2814	177	68	0.2	6	14	*	<5	0.7	<0.2	390	4.4	<2	0.028	0.02	<1	6.74	486	0.02	2	<5	6	<20		19	<10	0.01	25	<20		11	12
19.2	392	42	39	3	<5	458	*	<5	3.3	0.3	132	8.75	<2	0.028	1.18	<1	2.71	797	0.48	31	<5	20	<20		213	<10	0.16	297	<20			
19.2	393	214	33	0.5	<5	222	*	<5	0.2	<0.2	102	3.25	<2	<0.01	0.04	4	3.97	696	<0.01	<1	<5	<5	<20		26	<10	0.04	46	<20		24	17
19.2	394	316	80	1	5	436	*	<5	0.3	<0.2	137	5.45	<2	0.036	0.12	3	4.82	2162	0.03	1	<5	<5	<20		62	<10	0.06	50	<20		34	18
19.2	395	275	43	0.3	<5	161	*	<5	0.1	<0.2	77	3.99	<2	<0.01	0.07	2	6.63	538	<0.01	1	<5	<5	<20		5	<10	0.03	55	<20		22	17
19.2	396	259	47	0.8	<5	349	*	<5	0.2	<0.2	95	4.22	<2	0.023	0.23	3	6.04	568	0.06	<1	<5	<5	<20		9	<10	0.07	60	<20		11	13
19.2	2810	6	32	2.3	<5	266	*	<5	4.2	0.3	13	8.73	6	0.02	0.76	<1	2.18	648	0.41	36	<5	16	<20		276	<10	0.05	340	<20		<5	<1
19.2	2811	47	59	2.2	<5	325	*	<5	2.8	0.3	70	8.45	<2	0.056	0.72	<1	1.9	635	0.37	22	<5	13	<20		181	<10	0.18	215	<20		<5	5
19.2	2812	35	41	2.5	<5	390	*	<5	3.2	0.2	56	7.43	<2	0.044	0.87	<1	2.21	723	0.37	23	<5	14	<20		194	<10	0.11	225	<20		<5	4
19.3	397	24	7	0.6	7	519	*	<5	0.5	<0.2	24	2.69	<2	<0.01	0.07	8	0.74	284	0.07	<1	<5	<5	<20		30	<10	0.07	58	<20		16	13
19.3	398	15	6	1.1	<5	582	*	<5	0.6	<0.2	22	2.18	2	0.033	0.17	4	0.78	319	0.13	<1	<5	<5	<20		42	<10	0.09	40	<20		15	16
20	2803	27	16	1.4	17	526	*	<5	1.2	0.6	63	2.91	<2	0.075	0.19	9	0.56	369	0.1	1	<5	<5	<4	*	160	<10	0.14	46	6	*		
20	2804	9	16	0.8	13	1089	*	<5	1.5	0.2	40	1.85	<2	0.026	0.28	10	0.17	209	0.09	<1	<5	<5	<4	*	125	<10	0.12	34	<4	*		
20	2805	24	13	1.6	7	627	*	<5	0.9	<0.2	64	2.85	<2	0.027	0.24	5	0.8	499	0.09	1	<5	<5	<4	*	79	<10	0.16	40	<4	*		
20	2806	23	17	0.9	<5	836	*	<5	1.1	<0.2	44	2.16	<2	0.016	0.23	10	0.19	147	0.1	1	<5	<5	<4	*	115	<10	0.15	34	4	*		
20	3673	35	53	0.7	17	98	*	<5	1.2	<0.2	74	>10	<2	0.039	0.09	7	0.14	245	0.04	<1	<5	<5	7	*	80	<10	0.11	21	6	*		
20	3674	30	51	0.5	9762	203	*	<5	0.8	173	77	>10	<2	0.82	0.18	<1	0.26	469	<0.01	1	10	<5	11	*	15	<10	0.04	11	<4	*		
20	3675	74	89	0.7	38	253	*	<5	0.9	<0.2	44	>10	<2	0.025	0.24	13	0.18	167	0.03	2	<5	<5	6	*	70	<10	0.09	20	<4	*		

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Location	Sample Type	Sample Size (ft)	Sample Site	Sample Description	Au ppb (* opt)	Ag ppm (* opt)	Cu ppm (* %)	Pb ppm (* %)	Zn ppm (* %)	Mo ppm
20	3678	Portage Bay Pit	S		TP	Diorite? w/ seam of mo & dissem po & cp	16	0.6	766	14	41	855
20	3679	Portage Bay Pit	S		TP	Fault gouge in diorite	7	0.3	178	19	98	19
20	3680	Portage Bay Pit	S		TP	Int w/ sulf-bearing seams	817	2	1738	20	**1.2** *	56
20	3681	Portage Bay Pit	S		TP	Int w/ concentrated sulf in sil zone	9	0.4	822	12	67	7
20	3682	Portage Bay Pit	S		TP	Calc-silicate w/ minor sulf	<5	0.3	132	386	89	5
21.1	415	Northern Copper	C	2	UW	Msv cp, py, po	389	37.7	**12.4** *	9	631	2
21.1	416	Northern Copper	CC	0.75	UW	Msv sulf in gs	332	23	**7.4** *	9	772	3
21.1	417	Northern Copper	Rep	0.25	OC	Sulf band w/ py, po, cp	440	15.1	**4.7** *	13	947	2
21.1	2832	Northern Copper	C	3	UW	Sulf band w/ py, po, cp	144	11	**3.1** *	9	370	4
21.1	2833	Northern Copper	C	2.5	UW	Gs w/ py, po, cp	152	15.7	**4.6** *	12	801	5
21.2	3677	Northern Copper	S		MD	Msv sulf w/ po & cp w/ minor andesite	24	8.2	**2.2** *	17	1164	<1
21.2	3684	Northern Copper	C	5.2	UW	Chl sc w/ minor py	<5	<0.1	113	11	166	3
21.2	3685	Northern Copper	C	0.6	UW	Msv sulf layer in chl sc	10	11.5	**3.1** *	15	1427	2
21.2	3686	Northern Copper	C	1.9	UW	Msv sulf layer w/ interlayered chl sc	14	3.8	**1.0** *	17	639	3
21.2	3687	Northern Copper	C	2.2	UW	Sil zone w/ sulf veinlets	<5	0.3	860	12	217	3
21.2	3806	Northern Copper	C	1.4	UW	Msv po, cp in chl sc	29	9.3	**2.5** *	7	723	<1
21.2	3807	Northern Copper	C	5	UW	Chl sc in hanging wall of msv sulf layer	<5	0.5	662	3	268	2
21.2	3808	Northern Copper	C	0.5	UW	Msv po w/ cp in chl sc	25	7.2	**1.5** *	9	887	3
21.2	3809	Northern Copper	C	0.8	UW	Msv po w/ cp in chl sc	26	8.7	**1.8** *	8	1156	4
21.2	3810	Northern Copper	C	2.7	UW	Sil phyllite	<5	<0.1	171	<2	369	22
21.2	3811	Northern Copper	C	0.4	UW	Msv po w/ cp in chl sc	28	10.5	**2.0** *	9	1630	7
21.2	3812	Northern Copper	C		UW	Chl sc w/ minor sulf	<5	0.2	310	3	647	3
21.2	3813	Northern Copper	C	1.3	UW	Chl sc & gs w/ patchy msv po, cp	16	9.9	**2.0** *	7	1196	14
21.2	3814	Northern Copper	C	4.8	UW	Sil phyllite w/ minor sulf	13	0.2	240	3	483	33
21.2	3815	Northern Copper	C	2.2	UW	Msv gs w/ minor sulf	<5	<0.1	88	<2	90	2
21.2	8659	Northern Copper	C	1.5	UW	Msv sulf of po & lesser cp	19	6.2	**1.9** *	13	1302	2
21.2	8709	Northern Copper	C	0.6	UW	Fault zone w/ msv py, po	<5	0.4	2764	12	200	<1
21.2	8710	Northern Copper	C	2	UW	Gs w/ py, po, trace cp	6	1	3313	11	584	2
21.3	104	Northern Copper	G	0.5	TP	Fest gs w/ py, cp	18	2.6	8111	13	118	<1
21.3	105	Northern Copper	S	0.5	MD	Msv po, py, cp	6	7.1	**1.7** *	10	341	<1
21.3	106	Northern Copper	SC	20 @ 1.0	TP	Gs w/ sulf zones of cp, py, po	28	6	5657	12	191	<1
21.3	107	Northern Copper	Rep		MD	Calc gs w/ bands & blebs of po, cp, sl	21	8.5	**1.2** *	14	661	<1
21.3	108	Northern Copper	Rep	3	MD	Gs w/ sl, cp, po, py	<5	1.4	1717	42	**1.2** *	<1
21.3	266	Northern Copper	Rep	2.5	TP	Alt sil ar w/ dissem sulf	<5	1.2	1429	84	7961	<1
21.3	267	Northern Copper	Rep	2.2	TP	Gs w/ dissem & msv sulf	12	1.1	3855	20	179	<1
21.3	268	Northern Copper	S		MD	Gs w/ dissem & msv sulf	6	1.7	8222	12	83	<1
21.3	413	Northern Copper	SC	3 @ 0.25	TP	Blebs & dissem po & cp in blocky gs	<5	<0.1	804	5	104	<1
21.3	414	Northern Copper	G	0.4	RC	Gs w/ blebs of cp	<5	0.8	4507	7	64	2
21.3	2809	Northern Copper	Rep	1.8	OC	Ar	<5	0.2	199	12	59	31
21.3	2831	Northern Copper	C	2	TP	Weathered gs w/ cp	<5	3.3	1774	10	9398	<1
21.3	3665	Northern Copper	G		RC	Sil andesite w/ cp, po,ml	12	<0.1	1090	17	120	3
21.3	3666	Northern Copper	S		OC	Alt ar w/ minor cp in sil zones	67	32.6	**3.5** *	39	299	5
21.3	3667	Northern Copper	S		OC	Msv sulf w/ po &cp	11	4.4	9087	12	379	2
21.3	3714	Northern Copper	C	1.8	TP	Layer of msv sulf in gs	7	6.3	**1.4** *	12	837	2
21.3	3715	Northern Copper	C	1.5	TP	Sil gs w/ sl, cp, py	12	3.3	4028	6	**2.4** *	5
21.3	3716	Northern Copper	C	1	TP	Gs w/ cp, mag	13	2.9	5221	8	**1.2** *	<1
21.3	3717	Northern Copper	C	5	TP	Msv sulf & skarn in gs sc	9	2.2	5342	10	147	2

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Ni ppm	Co ppm	Al %	As ppm	Ba ppm	* xrf	Bi ppm	Ca %	Cd ppm	Cr ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm	Na %	Nb ppm	Sb ppm	Sc ppm	Sn ppm	* xrf	Sr ppm	Te ppm	Ti %	V ppm	W ppm	* xrf	Pt ppb	Pd ppb
20	3678	17	27	0.6	5	485	*	<5	1.1	0.3	57	2.86	<2	0.057	0.2	9	0.12	183	0.08	1	<5	<5	<4	*	101	<10	0.13	32	<4	*		
20	3679	28	17	2	15	624	*	<5	1.8	<0.2	61	3.66	<2	0.06	0.21	6	1.34	842	0.06	1	<5	<5	<4	*	101	<10	0.13	50	<4	*		
20	3680	36	58	1.3	5	19	*	<5	3.3	57.5	117	>10	<2	1.405	0.02	7	0.21	1789	0.02	1	<5	<5	5	*	225	<10	0.12	35	<4	*		
20	3681	65	44	1.1	<5	447	*	<5	0.6	<0.2	67	3.9	<2	0.015	0.21	4	0.51	293	0.1	1	<5	<5	<4	*	39	<10	0.19	42	<4	*		
20	3682	1365	33	0.4	15	<10	*	<5	0.5	<0.2	537	2.1	<2	0.037	<0.01	<1	1.3	222	<0.01	<1	<5	<5	<4	*	-2	<10	<0.01	5	<4	*		
21.1	415	26	425	1.2	<5	201	*	6	1	6.5	22	30.05	2	0.167	0.07	<1	0.71	637	0.01	<1	<5	<5	<20		16	<10	0.03	28	<20			
21.1	416	38	281	2.3	<5	700	*	16	0.6	6	3	21.01	3	0.053	0.22	<1	1.52	1052	0.02	<1	<5	<5	<20		8	<10	0.07	56	<20			
21.1	417	70	562	0.9	18	238	*	17	0.1	6.5	38	27.94	2	0.052	0.04	<1	0.53	270	0.01	<1	<5	<5	<20		6	<10	0.02	20	<20		7	2
21.1	2832	32	139	1.3	<5	486	*	14	0.7	3.2	19	18.22	<2	0	0.12	<1	0.92	793	0.08	<1	<5	<5	<20		18	<10	0.08	45	<20			
21.1	2833	35	145	0.9	<5	115	*	20	1.7	5.6	<1	20.7	<2	0.061	0.07	<1	0.59	992	0.08	<1	<5	<5	<20		29	<10	0.04	33	<20			
21.2	3677	21	157	0.6	<5	119	*	<5	0.4	3	20	>10	<2	0.031	0.07	<1	0.39	454	0.03	<1	<5	<5	<20		6	<10	0.02	14	<20			
21.2	3684	48	26	2.9	<5	1101	*	<5	1.9	<0.2	85	5.14	<2	0.099	0.35	7	2.28	1003	0.05	1	<5	<5	<20		26	<10	0.07	90	<20			
21.2	3685	20	108	0.8	<5	237	*	<5	0.7	4.9	29	>10	<2	0.149	0.13	<1	0.56	516	0.03	<1	<5	<5	<20		8	<10	0.02	25	<20			
21.2	3686	20	147	1	<5	263	*	<5	1.4	0.5	32	>10	<2	1.772	0.11	2	0.74	1075	0.04	<1	<5	<5	<20		15	<10	0.03	34	<20			
21.2	3687	13	39	2.9	<5	273	*	<5	1.5	<0.2	19	>10	5	0.275	0.04	27	2.34	658	0.06	2	<5	7	<20		25	<10	0.04	94	<20			
21.2	3806	18	166	0.8	<5	335		<5	0.4	3.6	23	>10	<2	1.36	0.07	2	0.62	585	0.03	<1	<5	<5	25		4	14	0.02	28	<20	*		
21.2	3807	50	32	3	<5	986		<5	0.3	0.7	88	6.26	5	4.63	0.22	6	2.46	1082	0.03	<1	<5	<5	157		8	11	0.06	89	<20	*		
21.2	3808	23	117	0.8	<5	359		<5	0.5	4.8	18	>10	<2	0.073	0.12	3	0.6	647	0.03	<1	<5	<5	52		5	14	0.03	37	<20	*		
21.2	3809	32	97	1.6	<5	447		<5	0.8	5.6	37	>10	<2	0.87	0.17	2	1.26	756	0.04	<1	<5	<5	22		8	14	0.04	65	<20	*		
21.2	3810	63	7	1.3	<5	5084		<5	1.1	2	187	2.3	<2	0.72	0.32	3	1.02	669	0.04	<1	<5	<5	<20		20	<10	0.09	213	<20	*		
21.2	3811	40	206	1.3	<5	731		<5	0.7	7.3	34	>10	<2	0.5	0.27	2	0.98	625	0.06	<1	<5	<5	58		6	20	0.06	62	<20	*		
21.2	3812	36	27	3.3	<5	1075		<5	0.5	1.9	67	6.83	5	2.28	0.3	6	2.63	981	0.04	<1	<5	5	180		12	<10	0.07	104	<20	*		
21.2	3813	47	272	2.1	<5	319		<5	0.3	6.3	90	>10	2	7.86	0.1	2	1.59	677	0.05	<1	<5	5	11		5	13	0.05	171	<20	*		
21.2	3814	29	4	1	<5	2420		<5	0.3	2.2	169	8.39	2	2.17	0.21	5	0.74	362	0.03	<1	<5	<5	133		13	<10	0.09	292	<20	*		
21.2	3815	15	8	1	<5	495		<5	1	<0.2	53	6.84	<2	1.03	0.08	1	0.8	693	0.08	<1	<5	<5	291		21	<10	0.19	51	<20	*		
21.2	8659	11	139	0.4	<5	296	*	<5	0.4	1.8	14	>10	<2	2.387	0.05	<1	0.31	337	0.02	2	<5	<5	<20		3	<10	0.01	14	<20			
21.2	8709	24	111	0.8	<5	162		<5	0.3	2.6	25	>10	<2	0.663	0.04	1	0.6	418	0.04	<1	<5	<5	23		3	<10	0.02	24	<20	*		
21.2	8710	9	54	0.1	<5	<10		<5	2.1	3.9	68	>10	<2	0.581	<0.01	<1	0.11	999	<0.01	<1	<5	<5	10		7	<10	<0.01	7	<20	*		
21.3	104	13	44	0.1	<5	1518	*	<5	0.1	0.6	172	44.97	<2	0.019	<0.01	<1	0.02	117	<0.01	<1	<5	<5	<20		<1	<10	<0.01	3	<20			
21.3	105	11	55	0.1	<5	<10	*	<5	0.01	2.1	88	46.28	<2	0.029	<0.01	2	0.03	116	<0.01	<1	<5	<5	<20		<1	<10	<0.01	4	<20			
21.3	106	3	5	0.2	<5	58	*	<5	0.7	1.3	42	24.74	<2	<0.01	<0.01	2	0.08	1581	<0.01	<1	<5	<5	<20		4	<10	0.01	8	<20			
21.3	107	<1	11	0.1	<5	699	*	<5	1.1	3.7	27	6.84	<2	<0.01	0.01	2	0.07	1202	0.01	<1	<5	<5	<20		4	<10	<0.01	3	<20			
21.3	108	7	9	0.5	<5	549	*	<5	3.3	56.6	33	6.35	<2	0.048	0.02	5	0.36	3005	0.03	<1	<5	<5	<20		55	<10	0.03	13	<20			
21.3	266	5	13	0.3	8	29	*	<5	3.5	34.1	86	5.33	<2	0.014	0.03	1	0.11	3380	0.03	<1	<5	<5	<20		29	<10	0.01	6	<20			
21.3	267	4	97	0.2	<5	49	*	<5	2.2	1.1	50	26.19	<2	<0.01	<0.01	7	0.1	1966	0.02	<1	<5	<5	<20		11	<10	0.03	8	<20			
21.3	268	9	169	0.1	<5	<10	*	<5	0.4	0.7	36	28.88	<2	<0.01	<0.01	<1	0.07	461	0.01	<1	<5	<5	<20		2	<10	<0.01	<1	<20			
21.3	413	6	7	0.5	<5	36	*	<5	1.3	0.4	50	6.82	<2	0.012	0.01	<1	0.19	1412	0.03	1	<5	<5	<20		26	<10	0.1	23	<20			
21.3	414	5	14	0.3	6	<10	*	<5	5.9	0.4	60	23.95	3	<0.01	<0.01	<1	0.02	2383	<0.01	<1	<5	<5	<20		4	<10	<0.01	9	<20			
21.3	2809	45	8	1	<5	168	*	<5	0.4	<0.2	134	3.12	<2	<0.01	0.03	3	0.73	528	0.08	3	<5	<5	<20		8	<10	0.06	248	<20			
21.3	2831	2	5	0.6	<5	4816	*	<5	0.4	43	18	29.04	2	0.042	0.1	<1	0.2	1597	0.03	<1	<5	<5	<20		8	<10	0.05	25	<20			
21.3	3665	5	9	0.3	8	22	*	<5	7.7	<0.2	52	>10	<2	0.01	0.01	<1	0.04	2075	<0.01	<1	<5	<5	<20		3	<10	<0.01	5	<20			
21.3	3666	7	160	0.5	17	1809	*	<5	0.3	<0.2	104	>10	<2	0.062	0.37	<1	0.29	315	0.08	2	<5	<5	<20		4	<10	0.07	50	<20			
21.3	3667	34	112	0.4	<5	16	*	<5	0.2	<0.2	15	>10	<2	0.013	0.06	<1	0.3	282	0.01	<1	<5	<5	<20		3	<10	<0.01	5	<20			
21.3	3714	12	68	0.6	<5	16	*	8	0.2	8	22	40.81	2		<0.01	<1	0.29	459	<0.01	<1	<5	<5	<20		10	<10	0.03	23	<20			
21.3	3715	7	8	0.2	<5	509	*	<5	2.6	107.2	168	5.19	<2		<0.01	<1	0.04	2096	0.01	<1	<5	<5	<20		11	11	0.03	8	22			
21.3	3716	4	7	0.4	<5	887	*	<5	0.7	50.8	89	9.57	<2		0.04	<1	0.33	1664	0.08	<1	<5	<5	<20		10	<10	0.05	22	<20			
21.3	3717	10	42	0.3	<5	20	*	<5	1	1.3	33	38.92	<2		<0.01	<1	0.09	462	0.02	<1	<5	<5	<20		11	<10	0.03	13	<20			

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Location	Sample Type	Sample Size (ft)	Sample Site	Sample Description	Au ppb	* opt	Ag ppm	* opt	Cu ppm	* %	Pb ppm	* %	Zn ppm	* %	Mo ppm
21.3	3723	Northern Copper	C	5.1	UW	Sil gs w/ po & minor cp	7		0.6		2973		33		5837		<1
21.3	3724	Northern Copper	SC	5.0@0.5	UW	Sil gs w/ po	<5		<0.1		376		7		2028		<1
21.3	3725	Northern Copper	C	1.2	TP	Msv sulf lens in gs sc	165		1.3		2709		9		209		<1
21.3	3726	Northern Copper	C	2.6	TP	Skarn mineralization in gs	7		0.7		1407		14		7843		<1
21.3	3727	Northern Copper	C	3.3	TP	Gs w/ skarn mineralization & minor cp	<5		1.3		1179		5		43		<1
21.3	8657	Northern Copper	SC	6 @ 0.5	OC	Dark gray ar	6		0.1		540		8		206		28
21.3	8658	Northern Copper	Rep	4	OC	Alt, fest, gossany br	10		0.8		1173		26		389		5
21.3	8676	Northern Copper	Rep	2.5	TP	Indurated, fest gs w/ irregular seams of po, trace cp	<5		0.5		3337		6		84		<1
21.3	8677	Northern Copper	Rep	1	TP	Green sc w/ irregular seams & pods of po & cp	<5		3.3			**1.0** *	6		224		<1
21.3	8681	Northern Copper	C	6.5	TP	Gs	<5		<0.1		37		5		160		<1
21.3	8682	Northern Copper	C	5.1	TP	Gs w/ cg radiating actinolite, mag, garnet, epidote	<5		<0.1		23		5		4170		<1
21.3	8683	Northern Copper	C		TP	Gs w/ irregular seams & knots of py, mag, lesser cp	<5		1.1		1838		6		6500		<1
21.3	8684	Northern Copper	C	1.5	TP	Gs w/ po, mag, cp	17		10.3			**1.7** *	4		1043		<1
21.3	8685	Northern Copper	C	2	TP	Very weathered msv sulf lens	10		4.4		8843		13		818		<1
21.3	8686	Northern Copper	C	3.4	TP	Sil gs w/ po, mag, lesser cp	6		1.9		3830		9		121		<1
21.3	8687	Northern Copper	C		TP	Sil gs w/ po, lesser cp, locally skarnified	<5		1.1		947		6		83		<1
22.1	111	Towers Creek	C	0.9	OC	Fest sc w/ fg py, po, cp	16		0.2		565		6		98		6
22.1	112	Towers Creek	C	4.5	OC	Fest sc w/ fg py, po, cp	9		<0.1		175		7		77		6
22.1	113	Towers Creek	Rep	0.6	OC	Sulf band of msv fg py, w/ sparse cp	8		<0.1		192		6		54		4
22.1	270	Towers Creek	Rep	2.1	OC	Gs w/ dissem sulf	8		<0.1		250		13		90		7
22.1	271	Towers Creek	Rep	1.7	OC	Gs sc w/ dissem sulf	11		0.1		238		8		40		10
22.1	272	Towers Creek	Rep	1.1	OC	Gs sc w/ dissem sulf	5		0.2		713		9		71		13
22.2	2345	Towers Creek	C	0.5	RC	Mica sc w/ banded sulfs	69		0.4		185		8		27		3
22.2	9558	Towers Creek	RC	1.5	RC	Fest gray sc w/ banded & nodular sulf	24		0.2		200		6		32		2
22.3	2346	Towers Creek	SS			Stream in gs	12		0.5		114		31		171		4
22.3	2347	Towers Creek	G	0.5	FL	Sil gs br w/ py	7		<0.1		94		5		69		2
22.3	9559	Towers Creek	SS			Creek flows on gs sc	<5		<0.1		37		7		76		<1
23.1	109	Salt Chuck	S	0.4	OC	Sil gs w/ py, po, cp	61		9.9			**7.1** *	7		194		3
23.1	110	Salt Chuck	C	0.9	OC	Fest sil gs w/ py, po, cp	31		3.4			**1.8** *	5		48		2
23.1	269	Salt Chuck	Rep	1	OC	Sil gs w/ cp	41		3.4			**3.0** *	8		102		<1
23.1	279	Salt Chuck	C	2.7	OC	Fest sc, chert w/ py, cp	26		3.1		5500		11		54		12
23.1	280	Salt Chuck	C	1.1	OC	Sil, fest zone w/ cp	128		4.3			**1.4** *	8		73		8
23.1	513	Salt Chuck	C	1.3	OC	Sil andesite w/ cp & py	26		2.8			**1.1** *	4		53		2
23.2	114	Salt Chuck	C	1.2	OC	Sil gs sc w/ fg py	59		0.3		30		21		78		4
23.2	115	Salt Chuck	C	0.5	OC	Qz vn w/ po & sl in bands & blebs	8		0.6		264		50		5898		<1
23.2	273	Salt Chuck	Rep	0.5	RC	Qz vn	64		2.2		1775		200		3160		<1
23.2	9647	Salt Chuck	C	0.075	OC	Qz vn w/ py, sl in sc	<5		0.5		55		57			**2.3** *	<1
24.1	60	Portage Creek	S		RC	Hbl-rich int w/ py & cp	<5		<0.1		233		10		92		2
24.1	61	Portage Creek	G		RC	Hbl-rich int w/ py & cp	<5		<0.1		262		9		94		1
24.1	62	Portage Creek	G		RC	Hbl-rich int w/ py & cp	<5		<0.1		925		9		101		2
24.1	138	Portage Creek	SC	15 @ 1.0	OC	Hornblendite w/ cp, py	5		0.4		1853		11		143		2
24.1	139	Portage Creek	SC	15 @ 1.0	OC	Hornblendite w/ cp, py	<5		0.6		4666		9		223		2
24.1	140	Portage Creek	SC	15 @ 1.0	OC	Hornblendite w/ sulf	<5		0.2		1111		8		151		2
24.1	141	Portage Creek	C	2.5	OC	Hornblendite w/ py, cp	<5		0.4		2692		8		221		2
24.1	2367	Portage Creek	SC	40 @ 2	OC	Hornblendite w/ sulf	5		<0.1		2597		6		164		2
24.1	2368	Portage Creek	SC	12 @ 1	OC	Hornblendite w/ sulf	2		0.2		4554		7		214		2
24.1	2369	Portage Creek	S	0.5	OC	Hornblendite w/ cp, mal & py	2		0.3		4294		4		194		4

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Ni ppm	Co ppm	Al %	As ppm	Ba ppm	* xrf	Bi ppm	Ca %	Cd ppm	Cr ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm	Na %	Nb ppm	Sb ppm	Sc ppm	Sn ppm	* xrf	Sr ppm	Te ppm	Ti %	V ppm	W ppm	* xrf	Pt ppb	Pd ppb
21.3	3723	11	18	0.1	<5	100	*	<5	2	33.3	60	6.2	<2		<0.01	<1	0.16	2285	0.01	<1	<5	<5	<20		25	<10	<0.01	2	<20			
21.3	3724	2	4	0.1	<5	62	*	<5	2.2	9.4	48	5.03	<2		0.01	<1	0.17	2423	0.02	<1	<5	<5	<20		15	<10	<0.01	3	<20			
21.3	3725	8	20	0.9	<5	76	*	<5	1.4	0.8	44	26.37	<2		0.05	<1	0.49	970	0.13	<1	<5	<5	<20		37	<10	0.09	32	<20			
21.3	3726	4	30	0.4	<5	113	*	<5	2.5	29.1	45	9.36	<2		0.05	<1	0.19	2500	0.05	<1	<5	<5	<20		19	<10	0.02	9	<20			
21.3	3727	1	4	0.3	<5	36	*	<5	0.8	0.2	28	4.62	<2		<0.01	<1	0.05	595	<0.01	<1	<5	<5	<20		21	<10	0.03	4	<20			
21.3	8657	19	3	0.4	7	293	*	<5	0.3	0.3	91	1.97	<2	0.019	0.04	2	0.32	164	0.02	1	<5	<5	<20		3	<10	0.03	116	<20			
21.3	8658	5	<1	0.1	5	205	*	<5	0.1	<0.2	22	>10	<2	0.014	0.02	<1	0.04	235	<0.01	<1	<5	<5	<20		1	<10	<0.01	6	<20			
21.3	8676	4	115	0.1	<5	23	*	<5	0.7	0.6	25	22.31	<2	0.017	<0.01	<1	0.13	954	0.02	<1	<5	<5	<20		5	<10	<0.01	2	<20			
21.3	8677	2	8	0.2	<5	79	*	<5	1.1	2.8	31	5.56	<2	0.015	0.01	<1	0.14	1031	0.03	<1	<5	<5	<20		6	<10	0.02	5	<20			
21.3	8681	40	26	3.1	<5	1371	*	<5	1.1	0.2	77	7.06	<2	<0.01	0.41	<1	2.24	2324	0.13	11	<5	8	<20		25	<10	0.2	120	<20			
21.3	8682	18	15	1.8	<5	371	*	<5	1.6	19.9	60	4.08	<2	0.014	0.09	<1	1.13	2000	0.12	7	<5	6	<20		52	<10	0.18	68	<20			
21.3	8683	2	28	0.1	<5	37	*	<5	2.8	32.3	31	6.31	<2	0.016	<0.01	<1	0.06	2538	0.01	<1	<5	<5	<20		16	<10	<0.01	4	<20			
21.3	8684	2	54	0.1	<5	56	*	13	1.4	7.2	27	6.9	<2	0.022	<0.01	<1	0.12	1470	0.02	<1	<5	<5	<20		5	<10	<0.01	2	<20			
21.3	8685	10	51	0.6	<5	<10	*	<5	0.1	4.7	<1	49.22	3	0.019	<0.01	<1	0.29	373	<0.01	<1	<5	<5	<20		11	<10	<0.01	11	<20			
21.3	8686	6	19	0.2	<5	<10	*	<5	0.7	0.8	76	27.03	<2	0.017	<0.01	<1	0.09	999	0.01	<1	<5	<5	<20		9	<10	0.02	8	<20			
21.3	8687	2	3	0.3	<5	66	*	<5	1.3	0.5	57	19.94	<2	<0.01	<0.01	<1	0.06	1252	0.01	<1	<5	<5	<20		14	<10	0.03	7	<20			
22.1	111	69	42	2.1	24	177	*	<5	1	0.3	93	13.38	<2	0.471	0.07	2	2.05	575	0.03	<1	<5	14	<20		18	<10	0.3	215	<20			
22.1	112	54	46	3	18	173	*	<5	1.5	<0.2	85	12.61	<2	0.297	0.05	3	2.81	879	0.01	3	<5	20	<20		22	<10	0.3	245	<20			
22.1	113	48	57	2.1	21	503	*	<5	0.7	<0.2	72	9.5	<2	0.368	0.17	2	1.79	533	0.02	1	<5	7	<20		6	<10	0.28	132	<20			
22.1	270	50	30	2.7	18	196	*	<5	2.8	0.3	98	11.19	<2	0.364	0.1	3	2.46	940	0.03	4	<5	15	<20		36	<10	0.29	226	<20			
22.1	271	84	55	1	64	579	*	<5	1	0.4	63	19.33	<2	1.396	0.2	2	0.7	257	0.02	<1	<5	5	<20		11	<10	0.24	80	<20			
22.1	272	82	27	1.9	34	97	*	<5	3.2	0.6	92	20.77	<2	0.759	0.06	2	1.66	843	0.02	<1	<5	12	<20		53	<10	0.26	156	<20			
22.2	2345	136	86	0.4	22	637	*	<5	1.4	<0.2	45	29.8	<2	0.512	0.09	<1	0.17	221	0.01	<1	<5	<5	<20		33	<10	0.27	23	<20			
22.2	9558	132	59	0.6	15	1403	*	<5	2.4	<0.2	57	19.63	<2	0.385	0.12	<1	0.36	368	0.02	3	<5	<5	<20		43	<10	0.44	48	<20			
22.3	2346	29	15	1.3	40	94		<5	0.6	1	27	4.53	<2	0.262	0.07	7	0.81	942	0.02	3	<5	<5	<20		23	<10	0.1	67	<20			
22.3	2347	45	40	0.5	10	270	*	<5	1.8	<0.2	163	9.78	<2	0.539	0.03	2	0.37	236	0.06	7	<5	10	<20		18	<10	0.47	153	<20			
22.3	9559	22	14	1.4	7	66		<5	0.4	<0.2	24	2.9	<2	0.087	0.05	6	0.68	600	0.02	4	<5	<5	<20		21	<10	0.1	52	<20			
23.1	109	<1	8	0.7	<5	469	*	<5	0.4	0.6	33	16.6	<2	0.087	0.13	5	0.13	116	0.02	8	<5	<5	<20		65	<10	0.05	6	<20			
23.1	110	<1	2	0.2	<5	164	*	<5	0.1	<0.2	8	5.94	<2	0.038	0.04	7	<0.01	20	0.04	3	<5	<5	<20		10	<10	0.06	5	<20			
23.1	269	2	18	0.8	<5	107	*	<5	0.1	0.3	42	6.96	<2	0.037	0.04	11	0.2	139	0.07	5	<5	<5	<20		16	<10	0.06	11	<20			
23.1	279	2	3	0.4	9	463	*	6	0.2	0.3	28	5.22	<2	0.16	0.18	6	0.02	50	0.07	1	<5	<5	<20		29	<10	0.04	9	<20			
23.1	280	1	4	0.4	<5	563	*	12	0.1	0.4	15	6.4	<2	0.142	0.14	3	<0.01	9	0.08	3	<5	<5	<20		27	<10	0.1	11	<20			
23.1	513	3	5	0.8	<5	42		<5	0.4	<0.2	59	5.06	<2	0.257	0.08	12	0.14	129	0.12	1	<5	<5	<20		59	<10	0.06	13	<20			
23.2	114	4	4	0.1	54	340	*	<5	0.03	0.3	37	1.77	<2	0.028	0.06	<1	<0.01	44	<0.01	<1	<5	<5	<20		2	<10	<0.01	1	<20			
23.2	115	20	15	0.1	11	120	*	<5	2	20	95	3.69	<2	0.335	0.04	<1	<0.01	534	<0.01	<1	<5	<5	<20		46	<10	<0.01	<1	<20			
23.2	273	16	3	0.1	24	37	*	<5	0.02	12	269	1.22	<2	0.215	0.04	<1	<0.01	35	<0.01	<1	<5	<5	<20		1	<10	<0.01	2	<20			
23.2	9647	5	13	0.6	13	256	*	<5	2.3	86.5	91	2.56	<2	2.313	0.15	1	0.43	1046	0.03	<1	<5	<5	<20		138	12	0.06	34	25			
24.1	60	6	13	3.5	<5	230	*	<5	4	<0.2	61	7.11	<2	<0.01	0.33	4	2.13	922	0.42	4	<5	10	<20		287	<10	0.19	235	<20		<5	3
24.1	61	2	17	3.7	<5	281	*	<5	4.1	<0.2	34	8.75	<2	0.018	0.57	5	2.38	1116	0.55	4	<5	16	<20		248	<10	0.13	332	<20		<5	3
24.1	62	2	31	3.3	<5	200	*	<5	3.8	<0.2	28	>10	<2	0.015	0.4	5	1.93	1206	0.47	4	<5	12	<20		276	<10	0.12	352	<20		32	38
24.1	138	3	48	4.1	<5	790	*	<5	2.8	<0.2	39	17.65	<2	0.016	2.15	8	3.37	2083	0.43	20	<5	11	<20		95	<10	0.31	367	<20		5	24
24.1	139	4	51	4.4	<5	1091	*	<5	1.7	<0.2	30	19.92	<2	<0.01	3.01	6	3.57	1956	0.19	18	<5	8	<20		75	<10	0.24	380	<20		6	15
24.1	140	4	30	5	<5	796	*	<5	3.6	<0.2	36	16.37	<2	0.014	2.58	10	3.69	2396	0.52	24	<5	14	<20		200	<10	0.21	466	<20		<5	12
24.1	141	4	225	5	11	1067	*	<5	1.7	<0.2	45	23.21	<2	0.011	3.23	5	4.3	2174	0.17	22	<5	8	20		64	<10	0.62	443	<20		10	29
24.1	2367	5	47	3.8	<5	644	*	<5	3.1	<0.2	51	17.39	<2	<0.01	1.56	9	2.82	1976	0.42	14	<5	11	<20		138	<10	0.27	354	<20		7	13
24.1	2368	8	57	4.3	<5	833	*	<5	2.3	<0.2	55	18.98	<2	0.025	2.35	6	3.65	1967	0.28	17	<5	9	<20		87	<10	0.37	369	<20		<5	25
24.1	2369	7	56	3.3	<5	314	*	<5	4.1	<0.2	47	21.07	<2	<0.01	0.94	11	2.15	2095	0.49	11	<5	11	<20		152	<10	0.3	291	<20		<5	8

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Location	Sample Type	Sample Size (ft)	Sample Site	Sample Description	Au ppb	* opt	Ag ppm	* opt	Cu ppm	* %	Pb ppm	* %	Zn ppm	* %	Mo ppm
24.1	9599	Portage Creek	SC	10 @ 0.5	OC	Hbl diorite w/ dissem po, cp	<5		<0.1		239		7		96		2
24.1	9600	Portage Creek	SC	18 @ 1.0	OC	Hbl diorite w/ dissem po	<5		0.2		22		9		64		<1
24.2	136	Portage Creek	SC	27 @ 1.0	OC	Hbl diorite w/ po & cp	<5		2.1		311		50		134		2
24.2	137	Portage Creek	G	0.3	RC	Green-gray volc w/ fg dissem po, cp	6		0.3		708		17		139		5
24.2	232	Portage Creek	S		RC	Hbl-rich int w/ py	<5		<0.1		81		11		96		<1
24.2	233	Portage Creek	Rep	1.5	OC	Hbl-rich int w/ py & cp	<5		<0.1		215		7		91		<1
24.2	9598	Portage Creek	C	6.8	OC	Hbl diorite w/ dissem po, cp	<5		<0.1		91		11		86		2
25.1	53	Taylor Creek	Rep	0.7	OC	Dol ls w/ py, sl & gn	45		25.9		16			**7.72**		**6.9**	1
25.1	54	Taylor Creek	S		MD	Dol ls w/ sulf	99		>500		70		7217			**2.1**	2
25.1	226	Taylor Creek	G		TP	Gossan	903		160		47			**9.69**		**3.0**	9
25.1	227	Taylor Creek	RC		TP	Dol ls w/ sulf	32		4.1		5		2333			**2.4**	1
25.2	51	Taylor Creek	Rep	0.8	OC	Gossan in ls	129		6.9		81		1114		4417		3
25.2	52	Taylor Creek	G		MD	Dol ls w/ py, sl & gn	183		93		453			**0.78**		**5.1**	3
25.2	225	Taylor Creek	Rep	1.5	OC	Gray ls w/ qz & py	176		10.1		69		2431		9441		4
26	50	Indian Point	Rep	0.15	OC	Sulf-bearing sil band in qz-sericite sc	187		0.2		47		115		129		7
26	224	Indian Point	Rep	0.13	OC	Sulf	87		0.4		44		131		110		5
27	47	West Duncan	Rep	0.5	OC	Black slate w/ py & sl	24		24.2		58		2547			**3.0**	8
27	48	West Duncan	Rep	0.15	OC	Sulf band in slate	24		25.3		52		4651			**2.8**	10
27	222	West Duncan	Rep	0.2	OC	Sil black slate w/ sulf	6		9.3		33		893		3382		12
27	223	West Duncan	Rep	1.5	OC	Sil black slate w/ sulf	8		19.7		46		1633			**1.2**	9
27	2622	West Duncan	G	0.3	OC	Py band in slate	20		30.8		51		5400			**3.0**	5
27	9645	West Duncan	Rep	0.5	OC	Sil zone w/ dissem py, sl, gn in gray sc	<5		5.8		23		1849			**5.4**	4
28	278	Kupreanof Pyrite	C	6	OC	Msv py band in sil sc	22		31.8		36		1304		4765		7
28	9646	Kupreanof Pyrite	C	6	OC	Msv py in sil black phyllite	7		24.1		37		1210			**1.7**	21
29.1	42	Castle Island Mine	G		MD	Barite w/ very fg sulf	59		15.9		518		1584		5630		7
29.1	43	Castle Island Mine	G		MD	Barite w/ banded py	76		42.8		247		5547			**1.4**	4
29.1	46	Castle Island Mine	G	0.4	MD	Banded barite w/ py	347		151		298		7783			**2.3**	3
29.1	218	Castle Island Mine	G		MD	Barite w/ sulf	58		28.8		413		4971			**1.7**	3
29.2	44	Castle Island Mine	C	0.75	OC	Qz & dike	8		0.2		6		121		534		1
29.2	219	Castle Island Mine	C	1	OC	Qz vn	<5		<0.1		12		31		109		<1
29.3	45	Castle Island Mine	G		OC	Fest sil gs sc	9		0.3		187		11		116		1
29.3	220	Castle Island Mine	G		OC	Fest sil green-gray sc w/ py	<5		<0.1		65		21		89		<1
29.3	221	Castle Island Mine	G		OC	Fest sil gs	<5		<0.1		81		6		173		<1
30	2862	East Duncan Pyrite	Rep	3.5	OC	Sil slate w/ layers, lenses, knots of py	9		2		88		7		36		36
30	3817	East Duncan Pyrite	SC	6.0@0.5	OC	Slate w/ minor py	8		0.6		98		9		244		22
30	3818	East Duncan Pyrite	C	4.5	OC	Slate w/ interbedded py	<5		0.7		81		11		57		37
31.1	351	Spruce Creek	C	0.3	OC	Qz vn w/ py, gn,sl	213		7		223		1690		4163		6
31.1	9683	Spruce Creek	S		TP	Qz br w/ minor py hosted in sc	<5		0.2		47		17		73		3
31.2	407	Spruce Creek	C	1.4	OC	Ls w/ fg sulf	416		14.9		98		820		5221		5
31.2	408	Spruce Creek	SC	5 @ 0.5	OC	Br gs to gs sc w/ carb inclusions, sulf	<5		0.4		128		11		233		2
31.2	409	Spruce Creek	G		OC	Sheared fest gs w/ sulf	7		0.2		91		13		65		3
31.2	410	Spruce Creek	G		RC	Sheared, sil gs w/ blebs of sulf	<5		<0.1		37		13		54		<1
31.2	411	Spruce Creek	Rep	4	OC	Sheared gs w/ sulf	98		0.6		91		32		207		3
31.2	412	Spruce Creek	G		RC	Sheared, sil gs w/ sulf	7		<0.1		44		9		60		3
31.2	2823	Spruce Creek	SC	5 @ 0.5	OC	Gs, ls & sc w/ py	12		<0.1		208		9		87		4
31.2	2824	Spruce Creek	SC	5 @ 0.5	OC	Gs & ls	13		0.3		105		6		76		2
31.2	2825	Spruce Creek	SC	5 @ 0.5	OC	Gs & ls	<5		<0.1		92		6		53		3

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Ni ppm	Co ppm	Al %	As ppm	Ba ppm	* xrf	Bi ppm	Ca %	Cd ppm	Cr ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm	Na %	Nb ppm	Sb ppm	Sc ppm	Sn ppm	* xrf	Sr ppm	Te ppm	Ti %	V ppm	W ppm	* xrf	Pt ppb	Pd ppb
24.1	9599	2	15	3.2	<5	226	*	<5	2.7	<0.2	51	5.05	<2	<0.01	0.25	4	1.89	757	0.28	9	<5	6	<20		279	<10	0.13	177	<20		<5	2
24.1	9600	3	27	2.5	<5	96	*	<5	2.8	<0.2	25	16.97	<2	<0.01	0.3	1	2.06	637	0.4	23	<5	18	<20		144	<10	0.22	499	<20		39	21
24.2	136	2	23	3.9	6	463	*	<5	3.7	<0.2	43	4.32	<2	<0.01	0.45	8	1.87	1284	0.5	13	<5	8	<20		583	<10	0.24	208	<20		<5	59
24.2	137	7	30	3.8	8	1111	*	<5	1.8	<0.2	7	13.74	<2	<0.01	0.23	27	0.7	468	0.05	6	<5	31	<20		565	<10	0.13	160	<20		<5	<1
24.2	232	2	9	2.3	<5	262	*	<5	2.2	<0.2	37	4.34	<2	0.034	0.3	6	1.45	1042	0.24	3	<5	6	<20		190	<10	0.18	163	<20		<5	8
24.2	233	1	20	2.5	<5	401	*	<5	2.2	<0.2	34	3.92	<2	0.012	0.23	7	1.56	1039	0.19	3	<5	6	<20		285	<10	0.16	144	<20		<5	7
24.2	9598	2	18	3.3	<5	277	*	<5	3.1	<0.2	43	4.86	<2	<0.01	0.35	5	1.89	916	0.36	10	<5	9	<20		319	<10	0.18	191	<20		<5	<1
25.1	53	13	3	0	417	5505	*	<5	6	180.3	36	9.84	<2	49.12	<0.01	2	3.05	5572	<0.01	<1	229	<5	<20		30	<10	<0.01	7	<20			
25.1	54	3	<1	0	94	4028	*	<5	7.3	29.5	44	7.7	<2	24.3	<0.01	2	3.35	7244	<0.01	<1	182	<5	<20		24	<10	<0.01	3	<20			
25.1	226	9	<1	0.1	1362	865	*	<5	0.1	6.7	5	>10	<2	>50	<0.01	3	0.01	1081	<0.01	<1	435	<5	<20		3	<10	<0.01	11	<20			
25.1	227	5	<1	0	69	670	*	<5	10	13	2	2.59	<2	10.22	<0.01	5	7.72	6700	<0.01	7	8	<5	<20		39	<10	<0.01	7	<20			
25.2	51	5	2	0.1	318	190	*	<5	6.5	11.6	5	>10	<2	2.298	<0.01	4	3.31	5571	<0.01	<1	87	<5	<20		21	<10	<0.01	6	<20			
25.2	52	49	15	0	437	>20000	*	<5	3.5	121.7	48	>10	<2	25.02	<0.01	<1	2.16	2149	<0.01	<1	223	<5	<20		20	<10	<0.01	5	<20			
25.2	225	10	3	0.1	179	894	*	<5	10	38.9	8	7.86	<2	4.382	<0.01	4	6.64	5369	<0.01	5	33	<5	<20		46	<10	<0.01	12	<20			
26	50	38	13	0.2	47	207	*	<5	0.4	0.5	117	>10	<2	0.15	0.03	2	0.14	575	0.02	<1	10	<5	<20		21	<10	<0.01	3	<20			
26	224	54	23	0.2	39	246	*	<5	1.5	<0.2	69	8.8	<2	0.167	0.02	3	0.29	1672	0.02	<1	8	<5	<20		58	<10	<0.01	3	<20			
27	47	11	<1	0.1	653	887	*	<5	1.5	95.5	39	>10	<2	36.38	0.06	<1	0.56	303	<0.01	<1	42	<5	<20		19	<10	<0.01	4	<20			
27	48	13	<1	0.1	878	1062	*	<5	2.2	124	62	>10	<2	37.78	0.09	<1	1.15	566	<0.01	<1	49	<5	<20		28	<10	<0.01	7	<20			
27	222	20	<1	0.1	427	665	*	<5	5.6	17.3	39	>10	<2	5.551	0.06	2	2.89	1268	<0.01	<1	28	<5	<20		96	<10	<0.01	19	<20			
27	223	11	<1	0.1	441	265	*	<5	2.4	44.2	34	>10	<2	18.44	0.05	<1	1.47	706	<0.01	<1	32	<5	<20		34	<10	<0.01	9	<20			
27	2622	8	3	0	782	10		<2	1.8	>100.0	19	>15.00	<10	40.8	0.01	<10	0.48	330	<.01		40	1			29		<.01	1	<10			
27	9645	9	1	0.1	491	351	*	<5	5.2	61.5	19	17.08	3	>50	0.03	<1	2.57	964	<0.01	1	14	<5	<20		161	22	<0.01	<1	44			
28	278	12	2	0.2	1268	4044	*	<5	0.1	13.4	68	24.04	6	11.27	0.08	<1	<0.01	32	0.01	<1	46	<5	<20		10	<10	<0.01	4	<20			
28	9646	18	3	0.2	944	2087	*	<5	0.3	97.4	81	12.29	4	19.95	0.08	<1	0.03	98	0.02	<1	39	<5	<20		12	11	<0.01	10	<20			
29.1	42	10	<1	<0.01	198	>20000	*	<5	<0.01	59.9	16	7.24	<2	3.255	<0.01	<1	<0.01	50	<0.01	<1	54	<5	<20		25	<10	<0.01	3	<20			
29.1	43	8	<1	<0.01	306	>20000	*	<5	0.2	95	9	5.36	<2	5.096	<0.01	<1	<0.01	73	<0.01	<1	113	<5	<20		38	<10	<0.01	3	<20			
29.1	46	2	<1	<0.01	64	>20000	*	<5	<0.01	185.2	2	0.94	2	13.33	<0.01	<1	<0.01	49	<0.01	<1	92	<5	<20		67	<10	<0.01	1	<20			
29.1	218	3	1	0	58	>20000	*	<5	0.01	130.4	4	0.84	<2	5.408	<0.01	<1	<0.01	34	<0.01	<1	60	<5	<20		104	<10	<0.01	4	<20			
29.2	44	10	5	0.2	10	>20000	*	<5	9.1	2	90	2.19	<2	0.355	0.1	3	2.6	6484	0.02	3	<5	8	<20		414	<10	<0.01	15	<20			
29.2	219	6	2	0.1	<5	11530	*	<5	4.2	0.4	106	1.03	<2	0.08	0.08	1	1.05	3118	<0.01	1	<5	<5	<20		191	<10	<0.01	10	<20			
29.3	45	49	29	1.2	33	1674	*	<5	7.6	0.3	60	6.34	<2	0.134	0.44	5	1.41	1427	0.04	2	<5	11	<20		149	<10	<0.01	89	<20			
29.3	220	19	13	0.4	9	4721	*	<5	10	<0.2	24	4.04	<2	0.072	0.16	4	0.86	3537	0.01	1	<5	8	<20		324	<10	<0.01	39	<20			
29.3	221	44	26	1	<5	875	*	<5	5.3	0.4	62	7.97	<2	0.175	0.26	5	1.38	1661	0.05	<1	<5	19	<20		110	<10	<0.01	159	<20			
30	2862	204	48	0.4	91	4593	*	<5	0.02	0.2	122	>10	<2	0.149	0.22	1	0.12	76	0.01	<1	<5	<5	<20		<1	<10	<0.01	19	<20			
30	3817	276	88	1.1	50	5010	*	<5	5.7	0.5	122	7.14	<2	0.056	0.18	2	1.1	413	0.02	<1	<5	<5	<20		125	<10	<0.01	28	<20			
30	3818	332	82	1	101	5077	*	<5	2.7	<0.2	113	>10	<2	0.072	0.16	2	0.97	449	0.01	<1	<5	<5	<20		61	<10	<0.01	27	<20			
31.1	351	21	11	0.4	49	470	*	<5	8.2	19.7	84	4.96	<2	1.104	0.22	5	2.91	5737	0.02	1	<5	<5	<20		278	<10	<0.01	14	<20			
31.1	9683	17	12	1	<5	255	*	<5	4.1	<0.2	95	2.46	<2	0.038	0.07	2	0.51	419	0.06	<1	<5	<5	<20		74	<10	0.14	33	<20			
31.2	407	5	8	0.4	27	579	*	<5	23	23.4	12	2.78	<2	7.802	0.14	<1	0.32	1497	0.03	<1	30	<5	<20		267	<10	<0.01	10	<20			
31.2	408	5	17	2	<5	889	*	<5	3.1	0.4	24	4.55	<2	0.041	0.23	<1	1.45	1369	0.03	7	<5	<5	<20		201	<10	0.1	75	<20			
31.2	409	4	12	1.1	<5	1588	*	<5	0.7	0.3	48	3.92	<2	0.061	0.52	3	0.58	378	0.04	5	<5	<5	<20		53	<10	0.16	49	<20			
31.2	410	3	11	1.2	<5	767	*	<5	1	<0.2	27	2.62	<2	0.016	0.29	4	0.88	643	0.06	7	<5	<5	<20		108	<10	0.16	65	<20			
31.2	411	5	16	1.5	8	767	*	<5	8.3	0.4	19	4.07	<2	0.062	0.15	<1	1.25	1680	0.02	4	<5	<5	<20		431	<10	0.07	51	<20			
31.2	412	3	13	1.3	<5	1022	*	<5	0.5	<0.2	37	4.73	<2	0.029	0.26	<1	1.25	678	0.03	6	<5	<5	<20		54	<10	0.15	58	<20			
31.2	2823	11	23	1.6	<5	861	*	<5	2.1	0.2	25	5.01	<2	0.015	0.25	<1	1.51	1007	0.03	6	<5	<5	<20		162	<10	0.1	65	<20			
31.2	2824	4	13	1.3	<5	1214	*	<5	0.7	<0.2	18	4.72	<2	0.022	0.39	3	1.13	667	0.03	6	<5	<5	<20		51	<10	0.15	58	<20			
31.2	2825	4	15	1.7	<5	1022	*	<5	0.7	<0.2	20	4.84	<2	0.02	0.55	<1	1.38	586	0.03	7	<5	<5	<20		143	<10	0.23	73	<20			

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Location	Sample Type	Sample Size (ft)	Sample Site	Sample Description	Au ppb	* opt	Ag ppm	* opt	Cu ppm	* %	Pb ppm	* %	Zn ppm	* %	Mo ppm
31.2	2826	Spruce Creek	SC	5 @ 0.5	OC	Gs & ls	<5		<0.1		78		5		75		2
31.2	2827	Spruce Creek	SC	5 @ 0.5	OC	Gs & ls	<5		<0.1		122		6		56		4
31.2	2828	Spruce Creek	SC	4 @ 0.5	OC	Gs	12		<0.1		106		5		48		2
31.2	2829	Spruce Creek	SC	6 @ 0.5	OC	Gs	30		<0.1		151		7		83		10
31.2	2830	Spruce Creek	S	0.8	OC	Fest gs	122		0.2		150		8		91		5
31.3	421	Spruce Creek	G	0.4	OC	Marble w/ gn & sl	779		59.1		405		**5.62**	*	**2.1**	*	11
31.3	2835	Spruce Creek	G		OC	Volc w/ sulf	17		0.2		169		22		59		2
32	465	Nicirque	Rep	3.5	OC	Slate w/ py bands	56		2.6		104		14		333		23
33	188	Southwest Duncan	S	20	RC	Gs w/ lenses & blebs of py	821		1.2		1189		25		93		20
33	189	Southwest Duncan	G	0.3	RC	Gs w/ blebs of py, ml stain	50		0.5		1150		5		35		2
33	9634	Southwest Duncan	S		RC	Sil gs w/ py	208		1.4		954		149		99		8
33	9635	Southwest Duncan	G		FL	Vuggy qz-calc vn w/ py, cp, po in sil gs	15		1		1086		22		37		7
34	2626	TB	G	0.3	RC	Sil, br rhyolite w/ py in br	<5		0.5		3		115		425		6
35	181	Monongehela	C	3	OC	Fest volc	<5		0.4		7		37		203		3
35	185	Monongehela	G	2	OC	Rhyolite	<5		<0.1		6		24		192		3
36.1	9682	Scott	Rep		RC	Pale gray alt volc w/ qz & sl	1449		12.6		150		2559		**1.3**	*	3
36.2	325	Scott	G	0.4	FL	Qz & gs w/ fg, msv py	8157		3.1		196		289		4547		5
36.2	326	Scott	Rep	0.7	OC	Msv py w/ sl & gn	276		38		218		9706		**14.2**	*	<1
36.2	327	Scott	C	0.6	OC	Gs & gs sc	12		2.4		199		78		520		2
36.2	328	Scott	CC	0.7	OC	Msv py w/ sl & gn	213		10.8		156		761		**1.7**	*	2
36.2	329	Scott	CC	0.3	OC	Msv sl w/ gn	266		94		59		**2.63**	*	**40.9**	*	<1
36.2	330	Scott	C	0.45	OC	Msv py	112		7.4		174		1064		6510		3
36.2	331	Scott	C	0.4	OC	Barite	<5		0.3		<1		28		354		<1
36.2	332	Scott	CC	0.9	OC	Msv py	158		12.8		104		362		5651		<1
36.2	333	Scott	CC	1	OC	Gs & gs sc	6		1		138		22		228		<1
36.2	334	Scott	CC	0.3	OC	Gs sc w/ barite, py, sl	383		5.4		425		1942		**3.9**	*	2
36.2	335	Scott	C	1	OC	Gray to green gs sc w/ py, sl, barite	33		17		277		5853		9794		6
36.2	336	Scott	CC	0.1	OC	Msv sulf band w/ sl	1122		15.3		1599		715		**5.4**	*	1
36.2	337	Scott	CC	0.3	OC	Msv py w/ sl	265		15.1		400		2657		**9**	*	2
36.2	338	Scott	C	0.7	OC	Green sc	<5		0.2		121		33		303		<1
36.2	339	Scott	Rep	1	OC	Blocky gs w/ py	<5		0.5		92		11		214		<1
36.2	340	Scott	C	2	OC	Msv py w/ bands of gs & sl	175		11.8		202		2275		**6.7**	*	2
36.2	341	Scott	C	1	OC	Gs sc w/ dissem py, sl	39		9.6		289		1872		**1.5**	*	2
36.2	342	Scott	CH	0.2	OC	Msv py w/ bands of sl	139		6.5		641		356		**1.0**	*	2
36.2	343	Scott	C	0.5	OC	Fault gouge w/ sc fragments	<5		0.6		206		18		292		<1
36.2	9671	Scott	C	0.5	OC	Sil zone w/ calc, cubic py, trace gn & sl in gray sc	376		3.1		161		380		1245		4
36.2	9672	Scott	C	0.4	OC	Gray to green gs sc w/ minor py	19		0.5		205		13		231		3
36.2	9673	Scott	C	5	OC	Gray sc to phyllite w/ to 0.4 ft bands of msv py	125		4.1		294		106		**1.5**	*	3
36.2	9674	Scott	C	1.4	OC	Band of msv py	319		9.7		151		280		**1.3**	*	2
36.2	9675	Scott	C	0.8	OC	Msv banded sl, py	575		31.3		286		4630		**14.2**	*	4
36.2	9676	Scott	C	0.4	OC	Msv py lens	927		7.4		41		320		1527		3
36.2	9677	Scott	C	1.4	OC	Band of msv py & sl	166		24.2		137		1007		**6.3**	*	3
36.2	9678	Scott	C	1.2	OC	Band of msv py w/ thin fingers of sc	177		22.6		231		641		**1.1**	*	3
36.2	9679	Scott	C	2.1	OC	Msv py & sl	1011		47.3		269		2157		**10.3**	*	3
36.2	9680	Scott	Rep	0.3	OC	Gray sc w/ minor dissem py	40		2.4		203		99		2260		2
36.2	9681	Scott	SS			Gray sc & bands of msv sulf outcrop in stream	24		0.4		109		45		265		1
37	196	Lost Show	C	4	TP	Fest sc w/ py	15		7.7		215		69		589		<1

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Ni ppm	Co ppm	Al %	As ppm	Ba ppm	* xrf	Bi ppm	Ca %	Cd ppm	Cr ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm	Na %	Nb ppm	Sb ppm	Sc ppm	Sn ppm	* xrf	Sr ppm	Te ppm	Ti %	V ppm	W ppm	* xrf	Pt ppb	Pd ppb
31.2	2826	5	20	2.1	<5	1107	*	<5	1.4	<0.2	13	4.59	<2	0.015	0.68	<1	1.63	1031	0.03	8	<5	<5	<20		173	<10	0.21	88	<20			
31.2	2827	5	21	1.4	<5	1886	*	<5	0.9	<0.2	13	3.47	<2	0.017	0.5	2	1.05	922	0.02	5	<5	<5	<20		88	<10	0.15	51	<20			
31.2	2828	12	20	1.9	<5	657	*	<5	1.0	<0.2	44	5.02	<2	0.023	0.34	<1	1.67	709	0.03	9	<5	<5	<20		148	<10	0.21	90	<20			
31.2	2829	7	18	2.6	<5	477	*	<5	0.9	<0.2	26	6.14	<2	0.019	0.11	<1	2.35	743	0.04	9	<5	<5	<20		53	<10	0.1	99	<20			
31.2	2830	18	24	2.7	<5	498	*	<5	0.3	<0.2	72	7.22	6	0.015	0.13	<1	2.95	754	0.04	9	<5	5	<20		17	<10	0.03	98	<20			
31.3	421	12	7	0.2	127	7496	*	<5	14	158.6	24	2.72	<2	1.233	0.13	<1	0.34	7771	<0.01	<1	30	<5	<20		493	11	<0.01	6	<20			
31.3	2835	4	8	1.4	<5	909	*	<5	0.7	0.2	17	4.39	<2	0.011	0.32	2	0.91	307	0.04	6	<5	<5	<20		158	<10	0.19	59	<20			
32	465	93	14	0.7	93	1902		<5	0.4	2.4	178	>10	<2	1.34	0.22	5	0.47	429	<0.01	<1	9	<5	8		6	<10	<0.01	149	<20			
33	188	71	53	0.9	1906	1336	*	<5	16	<0.2	140	18.36	7	0.123	0.18	<1	0.66	1197	0.02	2	56	<5	<20		309	10	0.03	106	<20			
33	189	39	50	1.1	21	2081	*	<5	2.6	0.3	67	3.8	<2	0.036	0.07	<1	0.4	329	0.04	<1	<5	7	<20		247	<10	0.37	109	<20			
33	9634	57	57	0.9	103	759	*	<5	8.2	0.9	264	18.79	7	0.111	0.13	8	0.45	1367	0.02	<1	6	<5	<20		164	11	0.02	199	<20			
33	9635	7	10	0.4	99	24	*	56	14	0.4	312	4.14	2	0.015	0.01	16	0.19	790	0.01	1	<5	<5	<20		190	35	0.01	143	<20			
34	2626	1	2	0.3	150	30		<2	0.01	1	60	5.03	<10	1.1	0.16	30	<.01	30	0.03		<2	<1			2		<.01	1	<10			
35	181	2	2	0.3	54	317	*	<5	0.04	0.6	65	1.91	<2	0.016	0.15	30	0.02	102	0.16	4	11	<5	<20		4	<10	0.1	4	<20			
35	185	2	2	0.4	16	257	*	<5	0.1	0.5	76	2.08	<2	0.011	0.2	40	<0.01	180	0.19	3	<5	<5	<20		7	<10	0.08	4	<20			
36.1	9682	10	14	0.2	9	**13.76%**	*	<5	0.7	76	93	0.89	<2	2.82	0.11	<1	0.01	94	0.01	<1	<5	<5	<20		74	<10	0.2	32	<20			
36.2	325	37	27	0.3	8	10204	*	<5	0.4	23	203	1.58	<2	1.36	0.16	<1	0.09	161	0.05	1	<5	<5	<20		27	<10	0.19	56	<20			
36.2	326	57	55	0.2	24	6900	*	<5	1.5	990.4	42	>10	<2	23.5	0.08	<1	0.07	215	<0.01	<1	19	<5	<20		12	<10	0.02	7	55			
36.2	327	50	38	4	7	951	*	<5	2.8	2	113	9.39	<2	0.112	1.46	<1	3.01	1249	0.06	2	<5	9	<20		26	<10	0.57	270	<20			
36.2	328	62	50	0.1	25	3931	*	<5	1.7	100.8	56	>10	<2	3.024	0.04	<1	0.05	212	<0.01	<1	6	<5	<20		15	<10	0.01	2	<20			
36.2	329	10	66	0.3	35	957	*	<5	0.1	>2000	38	>10	26	>50	0.22	<1	0.09	301	<0.01	<1	54	<5	<20		3	<10	0.05	20	255			
36.2	330	56	52	0.1	16	**10.81%**	*	<5	2.7	22.7	39	>10	<2	1.021	0.07	<1	0.03	803	<0.01	<1	24	<5	<20		16	<10	0.03	10	<20			
36.2	331	<1	<1	0.01	<5	**56.35%**	*	<5	0.1	2.8	2	0.22	<2	0.069	<0.01	<1	<0.01	18	<0.01	<1	<5	<5	<20		219	<10	<0.01	<1	<20			
36.2	332	63	47	0.1	14	**8.75%**	*	<5	1.8	38.3	43	>10	<2	1.207	0.03	<1	0.05	210	<0.01	<1	<5	<5	<20		10	<10	0.01	2	<20			
36.2	333	34	34	3	5	2546	*	<5	4.1	0.5	146	6.51	<2	0.052	0.84	1	2.47	1010	0.06	2	<5	9	<20		52	<10	0.44	194	<20			
36.2	334	35	46	0.9	17	3189	*	<5	2.7	230.8	131	7.5	<2	5.393	0.5	<1	0.23	509	0.03	<1	<5	<5	<20		15	<10	0.25	58	<20			
36.2	335	48	48	0.6	20	3522	*	<5	3.5	44.4	59	2.07	<2	1.944	0.39	1	0.06	789	0.03	<1	7	<5	<20		19	<10	0.38	62	<20			
36.2	336	27	67	0.4	86	490	*	<5	0.3	394.2	75	>10	<2	11.72	0.22	<1	0.13	157	0.01	1	6	<5	<20		4	<10	0.13	30	<20			
36.2	337	39	49	0.2	15	1753	*	<5	0.9	649.8	57	>10	<2	17.72	0.11	<1	0.09	118	<0.01	<1	9	<5	<20		19	<10	0.04	13	<20			
36.2	338	32	31	2.7	<5	1552	*	<5	3	1.3	171	5.39	<2	0.057	0.57	2	2.24	958	0.06	2	<5	7	<20		63	<10	0.31	139	<20			
36.2	339	19	26	2.3	<5	1865	*	<5	2	1.1	128	3.5	<2	0.035	0.24	2	1.85	637	0.1	1	<5	5	<20		187	<10	0.23	87	<20			
36.2	340	50	53	0.7	32	1715	*	<5	1.1	484.2	64	>10	<2	14.94	0.23	<1	0.29	314	<0.01	<1	<5	<5	<20		21	<10	0.1	31	<20			
36.2	341	40	40	2.8	19	7547	*	<5	1.7	78.1	71	7.82	<2	3.78	1.49	<1	1.02	899	0.01	1	<5	10	<20		14	<10	0.49	139	<20			
36.2	342	35	53	0.1	23	7031	*	<5	2.7	62	51	>10	<2	2.172	0.04	<1	0.02	563	<0.01	<1	16	<5	<20		26	<10	0.03	5	<20			
36.2	343	33	34	2.7	<5	2343	*	<5	2.8	1	132	5.49	<2	0.06	0.63	2	2.24	957	0.07	2	<5	8	<20		94	<10	0.49	158	<20			
36.2	9671	42	26	0.4	12	**11.17%**	*	<5	4.3	3.6	56	9.1	<2	1.486	0.26	<1	0.08	565	<0.01	<1	7	<5	<20		25	<10	0.22	33	<20			
36.2	9672	21	17	1.4	5	4142	*	<5	3.6	0.4	35	3.03	<2	0.027	0.47	<1	0.75	733	<0.01	<1	<5	<5	<20		24	<10	0.2	58	<20			
36.2	9673	43	42	1.6	19	18640	*	<5	3.9	91.8	69	>10	<2	3.639	0.75	<1	0.48	1113	0.01	<1	<5	<5	<20		25	<10	0.36	91	<20			
36.2	9674	24	24	0.2	11	**7.01%**	*	<5	1.1	36.4	18	9.28	<2	2.047	0.08	<1	0.06	175	<0.01	<1	<5	<5	<20		5	<10	0.02	7	<20			
36.2	9675	28	42	0.7	19	1865	*	<5	2.6	979.4	47	>10	7	26.32	0.23	<1	0.21	428	<0.01	<1	41	<5	<20		22	36	0.12	38	143			
36.2	9676	21	17	0.1	8	**26.34%**	*	<5	4.5	5.7	28	>10	2	0.349	0.03	3	0.04	553	<0.01	1	<5	<5	<20		24	<10	0.03	13	<20			
36.2	9677	34	40	0.02	16	**9.45%**	*	<5	2	330.3	32	>10	<2	13.56	0.02	<1	0.01	433	<0.01	<1	21	<5	<20		10	<10	<0.01	<1	<20			
36.2	9678	42	57	0.8	24	5765	*	<5	2.2	63.7	59	>10	<2	3.23	0.41	<1	0.31	498	0.01	<1	7	<5	<20		35	<10	0.11	57	<20			
36.2	9679	42	56	0.3	24	2934	*	<5	0.4	683.3	63	>10	<2	20.36	0.18	<1	0.11	147	<0.01	<1	6	<5	<20		4	<10	0.05	21	<20			
36.2	9680	45	36	3	9	4234	*	<5	3	11.8	75	7.92	<2	0.411	0.55	<1	1.44	1276	0.01	1	<5	7	<20		40	<10	0.41	122	<20			
36.2	9681	37	32	2.9	<5	1113	*	<5	0.7	1	98	6.64	8	0.145	0.35	3	2.04	1659	0.01	13	<5	<5	<20		20	<10	0.41	166	<20			
37	196	40	17	0.8	75	984	*	<5	0.2	2.5	88	9.11	5	8.955	0.39	1	0.13	4062	<0.01	<1	19	7	<20		4	<10	<0.01	68	<20			

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Location	Sample Type	Sample Size (ft)	Sample Site	Sample Description	Au ppb	* opt	Ag ppm	* opt	Cu ppm	* %	Pb ppm	* %	Zn ppm	* %	Mo ppm
37	197	Lost Show	CC	0.6	TP	Msv py, sl	21		105.6		321		2067		**10.9**	*	<1
37	198	Lost Show	C	4.4	TP	Bands of py & sl in fest sc	84		153.8		259		5519		**11.5**	*	<1
37	199	Lost Show	C	2.4	TP	Fest sc w/ fg py	10		7.4		105		1510		1179		<1
37	2627	Lost Show	C	1.2	OC	Sericite sc w/ lenses & bands of sl & py	210		**5.4**	*	235		**2.08**	*	**12.7**	*	2
37	2628	Lost Show	C	1.9	OC	Msv sulf w/ sl & py in fel sc	450		**7.1**	*	370		**4.20**	*	**15.3**	*	1
37	2629	Lost Show	C	1	OC	Sil msv sulf w/ py & sl	90		76		230		2150		**12.1**	*	<1
37	9639	Lost Show	SC	7.5 @ 0.2	OC	Thinnly bedded sil sc w/ thin banded py, gn, sl	66		83.9		252		5180		**4.5**	*	1
37	9640	Lost Show	SC	5.5 @ 0.2	OC	Thinnly bedded sil sc w/ thin banded py, gn, sl	133		84		179		3217		**5.0**	*	2
37	9641	Lost Show	G		OC	Sil metavolc w/ fg dissem py	9		0.3		115		14		148		2
37	9697	Lost Show	C	1.1	TP	Sil metavolc w/ py, gn, sl	392		282		258		**2.79**	*	**24.2**	*	2
38.1	30	Helen S Mine	Rep	1.5	OC	Qz vn w/ inclusions of gs w/ py	**0.328**	*	22.7		209		795		1042		2
38.1	31	Helen S Mine	Rep	0.4	OC	Gs	41		1.7		191		47		314		2
38.1	32	Helen S Mine	S	0.4	MD	Sil volc w/ sulf	82		38.9		54		7539		**5.4**	*	3
38.1	33	Helen S Mine	C	2.3	TP	Qz vn	14		1.1		12		506		2870		2
38.1	34	Helen S Mine	C	1.2	OC	Qz vn	15		2.9		8		442		337		3
38.1	35	Helen S Mine	C		TP	Fest sil gs	30		2.4		116		585		995		2
38.1	36	Helen S Mine	G		MD	Slightly sil gs w/ py	4248		1.6		570		86		258		2
38.1	37	Helen S Mine	SS			Stream in gs to gs sc			3		90		457		948		<1
38.1	38	Helen S Mine	G		MD	Fest qz w/ sulf bands	120		53		60		**1.0**	*	**8.5**	*	<1
38.1	39	Helen S Mine	G		MD	Fest qz w/ sulf bands	150		48.6		52		6811		**6.3**	*	1
38.1	40	Helen S Mine	SS		MT	Sample of mine tailings			16.5		135		1888		**1.4**	*	3
38.1	41	Helen S Mine	SS		MT	Sample of mine tailings			12.3		111		927		9950		3
38.1	200	Helen S Mine	C	1.8	TP	Msv py, po, gn	64		69.7		42		7564		3055		3
38.1	213	Helen S Mine	G		MD	Qz	4536		2.6		50		283		491		2
38.1	214	Helen S Mine	G		MD	Gs	41		1.9		254		341		2471		1
38.1	215	Helen S Mine	S		MD	Sulf	76		77		99		8858		**4.0**	*	3
38.1	216	Helen S Mine	Rep	8	TP	Qz vn	<5		1.4		239		295		513		1
38.1	217	Helen S Mine	RC		TP	Slate & sc	58		3.3		573		629		945		2
38.1	381	Helen S Mine	C	2.5	TP	Fest sc	11		2		936		896		600		2
38.1	382	Helen S Mine	C	1.6	TP	Msv py w/ sl, gn	48		65		56		9560		2540		3
38.1	383	Helen S Mine	C	0.7	TP	Sil sc w/ sulf	45		29		92		3078		**3.0**	*	3
38.1	2359	Helen S Mine	G	0.5	RC	Qz vn w/ sulf	35		15.5		36		3175		**1.9**	*	2
38.1	2623	Helen S Mine	Rep	0.8	OC	Qz vn	10		1.8		10		500		330		1
38.1	2624	Helen S Mine	RC		MD	Msv sulf, py, sl	80		67		86		7200		**3.4**	*	2
38.1	9565	Helen S Mine	C	0.9	OC	Qz vn & sil br zone in fest slate	132		**1.78**	*	64		**1.09**	*	**12.8**	*	2
38.1	9566	Helen S Mine	C	2.6	OC	Qz vn & sil br zone in fest slate	48		15.8		53		1429		4942		<1
38.1	9642	Helen S Mine	Rep		RC	Sil, fest metavolc w/ dissem py, gn, sl	152		113.5		81		**2.50**	*	**5.3**	*	<1
38.1	9698	Helen S Mine	G		FL	Greenish-gray alt volc w/ dissem & msv py	<5		0.4		437		43		495		2
38.1	9700	Helen S Mine	G		MD	Qz vn w/ sulf	75		**2.13**	*	39		**1.74**	*	7758		2
38.2	281	Helen S Mine	C	0.1	OC	Fest qz vn w/ py	3878		0.3		88		9		55		3
39.1	9569	Harvey Creek	SS			Soil sample taken @ surface	1208		0.8		106		69		133		2
39.2	274	Harvey Creek	G	0.6	RC	Qz block w/ inclusions of phyllite, trace py	<5		0.8		43		61		54		3
39.2	275	Harvey Creek	Rep	0.9	RC	Fest qz vn w/ inclusions of phyllite, trace py	7		0.4		38		18		70		2
39.2	276	Harvey Creek	S	0.05	OC	Py band in fest, sil phyllite	36		0.3		337		13		99		2
39.2	277	Harvey Creek	S	0.5	RC	Qz vn w/ py in sil, fest phyllite	<5		0.2		143		13		61		6
39.2	9567	Harvey Creek	C	1.2	OC	Qz w/ calc & py	6		0.4		184		12		126		5
39.2	9568	Harvey Creek	Rep	1.4	OC	Gs w/ dissem py	25		0.4		196		37		306		2

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Ni ppm	Co ppm	Al %	As ppm	Ba ppm	* xrf	Bi ppm	Ca %	Cd ppm	Cr ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm	Na %	Nb ppm	Sb ppm	Sc ppm	Sn ppm	* xrf	Sr ppm	Te ppm	Ti %	V ppm	W ppm	* xrf	Pt ppb	Pd ppb
37	197	38	25	0.3	49	105	*	<5	0	658.7	73	13.58	13	>50	0.06	2	0.02	528	<0.01	<1	119	<5	<20		2	38	<0.01	12	121			
37	198	33	23	0.4	46	85	*	<5	0.1	725.1	69	>10.37	10	>50	0.1	2	0.1	3934	<0.01	<1	120	6	<20		3	36	<0.01	34	123			
37	199	48	26	1.3	49	813	*	<5	0.1	5.4	126	4.41	5	15.72	0.2	1	0.06	385	<0.01	<1	27	23	<20		4	<10	<0.01	111	<20			
37	2627	21	17	0.1	34	10		<2	0.1	>100.0	123	6.85	10	>100	0.03	<10	0.08	680	<.01		144	4			<1		<.01	19	<10			
37	2628	33	14	0.1	84	10		<2	0	>100.0	87	>10.9	10	>100	<.01	<10	<.01	175	<.01		138	<1			<1		<.01	1	<10			
37	2629	28	25	0.2	32	10		<2	0	>100.0	132	>10.1	<10	>100	0.01	<10	0.02	545	<.01		44	1			<1		<.01	11	<10			
37	9639	44	20	0.8	35	834	*	<5	0.2	356.7	123	7.91	7	>50	0.12	3	0.12	888	<0.01	<1	56	14	<20		5	25	<0.01	97	54			
37	9640	20	13	0.7	25	503	*	<5	0	289.2	69	13.09	9	>50	0.14	1	0.02	2120	<0.01	<1	80	9	<20		3	24	<0.01	118	54			
37	9641	46	39	2.5	<5	493	*	<5	2	0.7	116	6.05	<2	0.353	0.13	3	1.95	940	0.06	<1	<5	5	<20		27	<10	0.58	163	<20			
37	9697	24	18	0.2	49	43	*	<5	0	1298	52	9.53	8	>50	0.04	<1	<0.01	442	<0.01	<1	142	<5	<20		1	<10	<0.01	17	<20			
38.1	30	13	3	0.4	892	214	*	<5	0.8	14.3	237	2.64	<2	0.796	0.06	<1	0.3	162	0.01	<1	<5	<5	<20		4	<10	<0.01	19	<20			
38.1	31	54	24	4.7	81	1185	*	<5	0.9	1.5	63	>10	4	0.13	0.13	4	3.6	1170	0.01	3	<5	26	<20		8	<10	0.01	229	<20			
38.1	32	19	7	0.02	347	65	*	<5	1.5	152.1	77	>10	<2	22.06	<0.01	<1	0.02	957	<0.01	<1	107	<5	<20		11	<10	<0.01	<1	<20			
38.1	33	7	4	0.1	6	13	*	<5	0.3	13.4	229	1.16	<2	5.669	<0.01	<1	0.02	272	<0.01	<1	<5	<5	<20		6	<10	<0.01	5	<20			
38.1	34	15	1	0.04	<5	200	*	<5	0	0.4	283	1.31	<2	2.454	<0.01	<1	<0.01	107	<0.01	<1	<5	<5	<20		<1	<10	<0.01	12	<20			
38.1	35	19	18	1.7	13	18497	*	<5	0.6	3.9	66	6.77	<2	4.008	0.7	5	0.54	733	0.02	<1	<5	17	<20		9	<10	0.13	156	<20			
38.1	36	17	31	3.0	1471	685	*	<5	5.8	4.7	47	>10	5	0.216	0.12	6	2.08	1844	0.02	<1	<5	30	<20		115	<10	0.04	409	<20			
38.1	37	22	47	2.5	28	782	*	<5	0.6	3.2	19	8.38	<2	0.382	0.05	6	1.02	6093	0.08	6	<5	10	<20		17	<10	0.09	219	<20			
38.1	38	6	2	0.1	72	957	*	<5	0.3	350.6	162	3.93	<2	20.42	<0.01	<1	0.02	236	<0.01	<1	35	<5	<20		4	<10	<0.01	5	<20			
38.1	39	10	1	0.04	102	231	*	<5	0.1	273.4	169	5.97	<2	20.7	<0.01	<1	<0.01	129	<0.01	<1	45	<5	<20		2	<10	<0.01	3	<20			
38.1	40	20	18	0.7	371	2271	*	<5	8	56.2	13	7.26	<2	5.256	0.11	8	1.03	3560	0.17	1	24	7	<20		78	<10	0.03	63	<20			
38.1	41	29	20	0.8	159	1278	*	<5	4.1	41	26	7.8	<2	2.215	0.12	7	1.52	1798	0.26	1	14	9	<20		67	<10	0.04	74	<20			
38.1	200	28	11	0.1	446	138	*	<5	0.02	7.2	55	30.86	8	8.488	<0.01	<1	<0.01	77	<0.01	<1	147	<5	<20		4	<10	<0.01	<1	<20			
38.1	213	13	<1	0.1	317	77	*	<5	0.1	9.6	186	0.92	<2	0.323	0.01	<1	0.08	72	<0.01	<1	<5	<5	<20		1	<10	<0.01	7	<20			
38.1	214	52	28	3.4	33	1115	*	<5	1.5	11.1	62	8.57	4	1.081	0.1	5	2.39	1044	0.02	4	<5	24	<20		12	<10	<0.01	195	<20			
38.1	215	39	17	0.1	709	657	*	<5	2.9	105.4	52	>10	<2	17.06	0.05	2	0.08	1774	<0.01	<1	159	<5	<20		17	<10	<0.01	12	<20			
38.1	216	5	2	0.3	<5	354	*	<5	0.3	1.9	170	1.31	<2	0.7	0.03	<1	0.12	316	0.01	<1	<5	<5	<20		6	<10	0.01	23	<20			
38.1	217	9	34	3.1	9	3339	*	<5	1.7	4	19	>10	<2	0.461	0.93	6	1.72	1684	0.01	1	<5	33	<20		29	<10	0.24	201	<20			
38.1	381	15	42	3.7	16	508	*	<5	1.9	3.6	15	>10	8	0.064	0.05	6	2.29	1309	0.02	3	<5	36	<20		45	<10	0.04	527	<20			
38.1	382	33	10	0	315	193	*	<5	0.01	4.1	75	>10	<2	5.902	0.02	<1	<0.01	63	<0.01	<1	96	<5	<20		2	<10	<0.01	<1	<20			
38.1	383	33	14	0.2	445	620	*	<5	2.4	82.2	40	>10	<2	10	0.07	<1	0.07	1657	<0.01	<1	86	<5	<20		18	<10	<0.01	8	<20			
38.1	2359	6	3	0	51	1011	*	<5	4.1	68.2	142	2.61	<2	4.789	0.01	1	0.02	1323	<0.01	<1	21	<5	<20		43	13	<0.01	1	<20			
38.1	2623	4	<1	0	8	890		<2	0.1	0.5	300	2.27	<10	3.2	<.01	<10	<.01	415	<.01		<2	1			10		<.01	5	<10			
38.1	2624	21	13	0	540	10		<2	1.1	>100.0	31	>15.00	<10	9	<.01	<10	0.02	955	<.01		112	<1			11		<.01	1	<10			
38.1	9565	6	5	0.1	86	3		<5	3.7	534.2	74	5.45	<2	30.52	0.01	<1	0.06	823	<0.01	<1	46	<5	<20		22	35	<0.01	15	<20			
38.1	9566	6	2	0.1	73	43		<5	0.1	19.1	226	2.88	<2	3.65	0.06	2	<0.01	210	<0.01	<1	40	<5	<20		3	<10	<0.01	4	<20			
38.1	9642	14	12	0.2	117	831	*	<5	1.6	222.5	44	15.47	5	20	0.02	<1	0.13	2274	<0.01	<1	81	<5	<20		37	22	<0.01	45	54			
38.1	9698	3	24	1.5	6	540	*	<5	0.9	2.1	19	>10	<2	1.217	0.18	11	0.79	603	0.04	2	<5	8	<20		17	<10	0.27	20	<20			
38.1	9700	8	1	0.1	68	12		<5	0.2	22.2	145	5.54	<2	5.084	0.02	<1	<0.01	239	<0.01	<1	47	<5	<20		19	<10	<0.01	<1	<20			
38.2	281	4	2	0.2	3494	549	*	<5	2.5	<0.2	128	4.17	<2	0.107	0.13	5	0.41	1237	0.02	<1	<5	<5	<20		46	<10	<0.01	2	<20			
39.1	9569	10	7	2	42	78		<5	0.2	0.3	36	4.19	6	0.426	0.07	5	0.87	326	0.02	5	<5	7	<20		9	<10	0.05	89	<20			
39.2	274	14	6	0.1	9	55	*	<5	0.1	0.4	229	1.51	<2	0.156	0.01	<1	0.04	340	0.01	<1	<5	<5	<20		4	<10	<0.01	3	<20			
39.2	275	9	3	0.4	61	212	*	<5	0.04	0.4	190	2	<2	0.195	0.04	<1	0.3	174	0.01	<1	<5	<5	<20		3	<10	<0.01	17	<20			
39.2	276	82	68	2	25	129	*	<5	0.8	0.5	162	15.5	13	0.262	<0.01	5	2.39	1369	0.05	<1	<5	16	<20		12	<10	0.03	262	<20			
39.2	277	39	7	0.4	<5	359	*	<5	0.1	0.2	174	6.36	2	0.327	0.07	2	0.31	250	<0.01	<1	<5	<5	<20		2	<10	<0.01	15	<20			
39.2	9567	57	21	0.8	12	30		<5	7.1	0.2	58	6.83	<2	0.636	0.16	8	2.67	1499	0.01	5	<5	8	<20		134	<10	<0.01	70	<20			
39.2	9568	61	35	2	34	3		<5	0.4	0.4	167	15.77	<2	0.387	0.03	5	2.22	696	0.03	10	9	18	<20		5	<10	0.02	248	<20			

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Location	Sample Type	Sample Size (ft)	Sample Site	Sample Description	Au ppb	* opt	Ag ppm	* opt	Cu ppm	* %	Pb ppm	* %	Zn ppm	* %	Mo ppm
39.2	9591	Harvey Creek	C	2.7	OC	Sc w/ thin bands of dissem sulf	29		0.8		340		62		131		2
39.2	9643	Harvey Creek	RC		OC	Fest, sil sc w/ py	<5		1		112		107		365		3
39.2	9644	Harvey Creek	Rep	2.3	OC	Sheared, weathered, fest sc w/ py	6		0.5		179		48		246		2
39.2	9701	Harvey Creek	Rep	2.5	OC	Sil gs sc w/ sulf	20		0.5		174		99		145		7
40	2381	Maid of Mexico Mine	CC	1.3	UW	Qz vn w/ minor py	383		0.5		87		190		237		4
40	2382	Maid of Mexico Mine	CC	0.8	UW	Dol	1462		0.5		194		42		112		1
40	2383	Maid of Mexico Mine	CC	0.8	UW	Slate	11		<0.1		48		36		85		12
40	2384	Maid of Mexico Mine	CC	0.8	UW	Qz vn in dol w/ minor py	30		3.2		69		1844		29		3
40	2385	Maid of Mexico Mine	Rep	4.5	UW	Sheared dol w/ qz stringers & minor py	679		0.7		139		17		67		2
40	2386	Maid of Mexico Mine	Rep		TP	Qz-calc vn w/ py	294		1		67		390		42		2
40	2387	Maid of Mexico Mine	Rep	1.8	OC	Qz vn	<5		<0.1		55		30		34		2
40	2388	Maid of Mexico Mine	RC		-----	Mill feed of dol & qz	2098		3.5		234		1358		693		3
40	2389	Maid of Mexico Mine	G		-----	Mill concentrate	**1.020**	*	**2.62**	*	981		4226		679		9
40	2390	Maid of Mexico Mine	G		-----	Mill concentrate	**1.076**	*	**3.17**	*	1224		**2.05**	*	746		10
40	2620	Maid of Mexico Mine	S	1	MD	Qz vn w/ sulf	80		0.3		100		200		200		<10
40	9575	Maid of Mexico Mine	RC		MD	Qz-rich zone w/ fg sulf @ contact	546		0.5		314		96		317		10
41	384	East of Harvey Lake	G	0.4	RC	Sil sc w/ bands of py	<5		0.7		180		105		207		4
41	8650	East of Harvey Lake	C	3.7	OC	Fest, weathered sc w/ dissem py	12		<0.1		114		12		111		3
41	9571	East of Harvey Lake	Rep	1.8	OC	Fest sil sc	<5		0.2		151		6		119		5
41	9699	East of Harvey Lake	C	5.1	OC	Fest, weathered sc w/ dissem py	<5		0.3		140		28		284		3
42.1	9570	Mad Dog 2	C	0.7	OC	Weathered gs w/ msv banded sulf	676		16.6		322		115		7481		<1
42.1	9702	Mad Dog 2	S		MD	Sil msv sulf	2867		27.1		1512		79		**2.9**	*	2
42.2	344	Mad Dog 2	C	0.8	TP	Fest sc	151		2.5		240		76		732		2
42.2	345	Mad Dog 2	C	0.9	TP	Fest sc	172		2.4		310		118		1120		<1
42.2	346	Mad Dog 2	C	0.6	TP	Sil, fest sc & msv py	1046		21.7		395		112		**1.0**	*	2
42.2	347	Mad Dog 2	C	0.3	TP	Gray sc w/ wisps of py	67		2.9		310		75		1875		2
42.2	348	Mad Dog 2	SS			Taken from small stream w/ no bedrock exposed	10		0.3		27		33		314		1
42.2	349	Mad Dog 2	G	0.3	FL	Sil, fest zone w/ py	105		1.3		50		24		317		13
42.2	350	Mad Dog 2	C	0.4	OC	Qz-calc vn w/ sulf	14		<0.1		3		32		138		4
43	28	Fortune	Rep	0.075	OC	Sulf band in sil gs	295		630.4		256		**9.76**	*	**18.3**	*	2
43	29	Fortune	Rep	2	OC	Fest gs w/ bands of fg sulf	1590		188		902		**1.49**	*	**10.7**	*	1
43	211	Fortune	G		OC	Sulf bands in sil gs	255		617		868		**7.39**	*	**20.1**	*	1
43	212	Fortune	Rep	3	OC	Qz w/ sulf	420		54		663		341		3951		2
44	27	Hattie	G		MD	Qz	<5		<0.1		7		3		16		2
44	2630	Hattie	C	5	OC	Qz vn	<5		0.4		6		76		186		2
44	2631	Hattie	C	5	OC	Qz vn	10		<0.2		3		10		148		1
44	2632	Hattie	C	1.75	OC	Qz vn	<5		<0.2		7		6		26		3
44	2633	Hattie	C	0.7	OC	Qz vn	<5		<0.2		5		2		25		2
44	2634	Hattie	C	4.5	OC	Qz vn	<5		<0.2		3		2		25		3
44	2635	Hattie	G		RC	Qz vn	<5		<0.2		11		<1		32		<1
44	2636	Hattie	Rep	6	OC	Qz vn	<5		<0.2		60		<1		19		2
45	190	Brushy Creek	Rep	3	OC	Calc volc w/ bands of py, sl	151		5.4		289		184		**2.2**	*	2
45	191	Brushy Creek	SC	4 @ 0.25	OC	Calc volc w/ bands of py, sl	96		6.1		258		794		**1.6**	*	2
45	192	Brushy Creek	SC	4.7 @ 0.2	OC	Fest, calc volc w/ py, trace fg sl	33		1.2		111		117		1735		<1
45	193	Brushy Creek	SC	10 @ 0.2	OC	Gray sil sc w/ py	16		1.3		196		131		588		2
45	194	Brushy Creek	C	0.07	OC	Sil band w/ py, sl, trace gn in gray sc	44		10.5		142		3236		**1.3**	*	5
45	195	Brushy Creek	C	2	OC	Sil gs w/ dissem & banded py, sl	423		27.9		166		7380		**2.6**	*	7

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Ni ppm	Co ppm	Al %	As ppm	Ba ppm	* xrf	Bi ppm	Ca %	Cd ppm	Cr ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm	Na %	Nb ppm	Sb ppm	Sc ppm	Sn ppm	* xrf	Sr ppm	Te ppm	Ti %	V ppm	W ppm	* xrf	Pt ppb	Pd ppb
39.2	9591	72	42	2.1	20	126	*	<5	0.8	<0.2	180	11.74	<2	0.252	0.02	7	2.45	1122	0.03	13	<5	19	<20		10	<10	0.08	272	<20			
39.2	9643	20	9	2.3	6	404	*	<5	0.3	1.4	155	7.58	9	0.686	0.08	3	2.58	852	0.04	<1	<5	10	<20		6	<10	0.01	197	<20			
39.2	9644	40	19	1.9	7	130	*	<5	0.1	0.9	171	8.73	10	0.363	0.02	3	2.36	731	0.05	<1	<5	17	<20		3	<10	0.02	263	<20			
39.2	9701	66	25	1.4	25	21		<5	3.2	0.6	81	7.07	<2	0.38	0.2	8	2	1029	<0.01	6	<5	10	<20		49	<10	<0.01	99	<20			
40	2381	21	6	0.2	229	49	*	<5	3.3	11.5	187	1.57	<2	0.325	0.06	<1	0.38	288	<0.01	2	<5	<5	<20		40	<10	<0.01	16	<20			
40	2382	46	30	0.9	1303	533	*	<5	9.1	6.3	52	6.75	<2	0.251	0.24	3	2.09	1204	0.01	5	<5	9	<20		140	<10	<0.01	62	<20			
40	2383	40	5	0.3	64	336	*	11	28	1.8	19	1.93	<2	0.09	0.15	5	0.66	420	<0.01	6	<5	<5	<20		256	<10	<0.01	9	<20			
40	2384	16	6	0.2	<5	105	*	<5	3.4	2.6	202	2.02	<2	0.2	0.05	<1	0.5	316	<0.01	2	<5	<5	<20		40	<10	<0.01	20	<20			
40	2385	29	26	0.6	510	621	*	<5	8	2	43	6.93	<2	0.637	0.32	3	2.18	1126	0.01	3	<5	7	<20		113	<10	<0.01	33	<20			
40	2386	19	9	0.2	10	163	*	<5	2.3	1.7	223	1.45	<2	0.543	0.1	<1	0.47	257	<0.01	2	<5	<5	<20		26	<10	<0.01	13	<20			
40	2387	14	5	0.2	5	15	*	<5	0.2	0.8	340	0.83	<2	0.031	0.04	<1	0.07	214	<0.01	<1	<5	<5	<20		3	<10	<0.01	9	<20			
40	2388	39	24	0.5	425	461	*	<5	6.8	32	155	6.32	<2	1.635	0.27	2	2.21	909	0.01	2	8	6	86		141	<10	<0.01	27	<20			
40	2389	216	117	1.2	4297	123	*	<5	0.04	38.9	10	39.68	<2	>50	0.04	<1	0.01	20	<0.01	<1	38	<5	<20		3	12	<0.01	<1	<20			
40	2390	201	113	1.2	2790	138	*	<5	0.02	37.8	2	40.93	<2	>50	0.04	<1	<0.01	13	<0.01	<1	26	<5	<20		4	12	<0.01	<1	<20			
40	2620	20	9	1.3	2	100		<2	5.3	1	181	4.22	<10	0.16	0.14	<10	1.65	870	<.01		<2	7			115		<.01	77	<10			
40	9575	59	20	0.4	<5	70		<5	5.1	8.9	166	4.58	<2	0.616	0.19	3	1.26	671	0.01	2	<5	<5	<20		117	<10	<0.01	19	<20			
41	384	62	46	1.3	27	2351	*	<5	4.4	<0.2	73	>10	<2	0.446	0.09	4	1.55	1045	<0.01	<1	<5	16	<20		48	<10	<0.01	144	<20			
41	8650	34	35	3.7	30	2756	*	<5	0.3	<0.2	145	>10	<2	0.065	0.09	1	3.42	935	0.03	3	<5	14	<20		5	<10	0.19	239	<20			
41	9571	51	38	3.3	22	5		<5	1.8	<0.2	116	15.5	3	0.281	0.09	3	3.05	1139	<0.01	8	<5	18	<20		18	<10	<0.01	198	<20			
41	9699	38	29	3.1	10	2470	*	<5	1.2	0.6	120	>>10	<2	0.769	0.06	2	2.71	884	0.02	3	<5	17	<20		14	<10	0.12	228	<20			
42.1	9570	2	11	0	160	3		6	0.02	37.8	66	>10.54	<2	<0.01	0.02	<1	<0.01	34	<0.01	<1	10	<5	<20		20	<10	0.02	2	<20			
42.1	9702	5	49	0	92	<1		9	0.02	144.6	54	23.21	<2	3.088	0.03	<1	<0.01	51	<0.01	<1	7	<5	<20		5	11	0.02	<1	<20			
42.2	344	17	31	1.6	43	>20000	*	<5	0.05	1	77	7.56	<2	1.6	0.41	2	0.48	2043	<0.01	2	<5	9	<20		86	<10	0.41	128	<20			
42.2	345	24	37	1.9	45	>20000	*	<5	0.04	1.1	96	>10	<2	0.543	0.5	2	0.68	2441	0.01	2	<5	11	<20		32	<10	0.42	158	<20			
42.2	346	6	16	0.1	133	>20000	*	<5	0.01	45.1	52	>10	<2	2.809	0.02	<1	<0.01	62	<0.01	<1	8	<5	<20		8	<10	0.03	7	<20			
42.2	347	42	39	2.9	45	>20000	*	<5	2.9	7.9	108	9.17	<2	0.202	2.22	<1	1.88	4826	0.03	2	<5	11	<20		47	<10	0.54	254	<20			
42.2	348	65	344	1.1	42	2113	*	<5	0.7	1	48	16.74	<2	0.272	0.04	11	0.27	6.98	0.03	5	<5	5	<20		57	<10	0.02	60	<20			
42.2	349	49	20	0.6	103	3345	*	<5	0.03	1	98	6.81	<2	1.036	0.15	<1	0.11	492	<0.01	<1	35	6	<20		5	<10	<0.01	29	<20			
42.2	350	4	4	0.4	5	415	*	8	10	0.4	8	2.97	<2	1.599	<0.01	5	1.32	2959	<0.01	<1	<5	12	<20		355	<10	<0.01	49	<20			
43	28	14	45	0.5	35	201	*	<5	0.3	1436	62	6.1	<2	>50	0.06	1	0.18	748	0.03	<1	324	5	<20		17	17	<0.01	33	<20			
43	29	25	42	0.7	49	1655	*	<5	0.5	774	53	9.05	<2	37.2	0.14	3	0.42	5348	0.03	<1	148	14	<20		15	<10	0.01	71	<20			
43	211	19	61	0.5	53	334	*	<5	0.3	1438	46	7.38	<2	>50	0.06	2	0.26	1140	0.03	<1	642	6	<20		14	<10	<0.01	30	<20			
43	212	4	10	0.7	<5	568	*	<5	0.6	17	121	5.88	<2	1.989	0.09	5	0.38	3868	0.03	<1	21	12	<20		27	<10	0.01	25	<20			
44	27	16	7	0.3	<5	79	*	<5	0.8	<0.2	230	1.72	<2	0.737	0.03	<1	0.26	361	<0.01	<1	<5	5	<20		15	<10	<0.01	21	<20			
44	2630	6	2	0.1	<2	40		<2	<.01	1.5	291	0.63	<10	0.35	<.01	<10	<.01	35	<.01		<2	1			<1		<.01	16	<10			
44	2631	6	1	0.1	6	30		<2	<.01	0.5	370	1.04	<10	1.12	0.01	<10	<.01	45	<.01		2	1			<1		<.01	19	<10			
44	2632	7	2	0.1	2	30		<2	<.01	<.5	261	0.84	<10	0.12	<.01	<10	0.01	50	<.01		<2	1			<1		<.01	17	<10			
44	2633	8	3	0.2	4	40		<2	<.01	<.5	433	0.97	<10	0.23	0.05	<10	0.01	50	<.01		<2	1			<1		<.01	18	<10			
44	2634	9	3	0.1	<2	10		<2	<.01	<.5	324	1.85	<10	2.36	<.01	<10	0.01	75	<.01		<2	3			<1		<.01	27	<10			
44	2635	11	5	0.2	<2	10		<2	<.01	<.5	341	3.88	<10	0.64	<.01	<10	0.03	320	<.01		<2	12			<1		<.01	91	<10			
44	2636	10	5	0.1	<2	30		<2	1	<.5	245	1.74	<10	0.07	<.01	<10	0.4	325	<.01		<2	5			20		<.01	46	<10			
45	190	42	28	4.7	99	3734	*	<5	4.3	81.3	80	8.73	12	0.756	0.09	<1	2.94	1628	<0.01	<1	18	22	<20		54	<10	<0.01	259	<20			
45	191	37	27	3.6	148	5014	*	<5	6.1	73.4	66	9.1	10	0.5	0.12	<1	2.68	1684	<0.01	<1	18	19	<20		118	<10	<0.01	194	<20			
45	192	30	25	3.8	83	1869	*	<5	2.4	7.6	77	6.28	9	0.172	0.1	<1	3.59	1662	<0.01	<1	13	16	<20		39	<10	<0.01	174	<20			
45	193	44	29	3.8	30	1078	*	<5	7.1	1.8	58	7.71	10	0.048	0.16	<1	2.17	2371	<0.01	<1	20	13	<20		73	<10	<0.01	154	<20			
45	194	32	27	0.5	30	200	*	<5	25	46.3	16	3.72	<2	1.521	0.09	<1	0.33	3327	<0.01	3	56	6	<20		173	<10	<0.01	21	<20			
45	195	31	20	1.4	600	297	*	<5	0.7	87.1	79	9.21	9	4.241	0.05	2	1.5	2217	<0.01	<1	68	12	<20		9	12	<0.01	36	24			

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Location	Sample Type	Sample Size (ft)	Sample Site	Sample Description	Au ppb	* opt	Ag ppm	* opt	Cu ppm	* %	Pb ppm	* %	Zn ppm	* %	Mo ppm
45	9636	Brushy Creek	S		RC	Thinly bedded metaseds w/ banded py, gn, sl	81		33.9		79		9824		8491		4
45	9637	Brushy Creek	SC	15 @ 0.25	OC	Thinly bedded metaseds & gray, sil sc, sl, gn, py	68		3.3		195		289		4904		2
45	9638	Brushy Creek	C	0.1	OC	Banded metaseds w/ banded py	<5		0.3		160		25		99		3
46	399	Freel & Durham	SS			Slate, sc, qz float in stream	15		<0.1		14		3		55		<1
46	400	Freel & Durham	G		FL	Qz vn	<5		<0.1		13		<2		7		3
46	2815	Freel & Durham	SS			No bedrock exposed	9		<0.1		23		11		93		<1
46	2816	Freel & Durham	SS			Shallow stream w/ no bedrock exposed	<5		<0.1		22		8		79		<1
46	2817	Freel & Durham	G		FL	Qz	13		<0.1		6		<2		4		<1
46	2818	Freel & Durham	G		FL	Qz	<5		<0.1		8		4		13		<1
47	401	Road Show	PC			Metased, metavolc, qz diorite float in stream	10		0.3		8		3		24		<1
47	402	Road Show	G		FL	Qz vn fragments	<5		<0.1		16		<2		4		2
47	2819	Road Show	SS			No bedrock exposed	<5		<0.1		28		12		90		<1
47	2820	Road Show	SS			No bedrock exposed	<5		<0.1		19		14		60		<1
48	391	Mitkof Island, FS Rd 6245	G	0.2	TP	Msv, fest po w/ hbl	18		6.8		1007		303		395		4
49	291	Zarembo Is., FS Rd 52009	G	0.2	FL	Purple & green fluorite	18		<0.1		21		5		20		7
49	9651	Zarembo Is., FS Rd 52009	G		FL	Sil metaseds w/ narrow lens of msv py	546		3.1		15		20		40		3
50	17	Frenchie, adit	C	5.5	UW	Sil sulf band w/ sl & py	1204		12.1		5453		1736		**3.5** *		29
50	18	Frenchie, adit	C	5	OC	Sil sulf band w/ sl & py	260		7.8		1619		3213		**4.9** *		20
50	207	Frenchie, adit	C	5.5	OC	Py	729		8.5		2600		805		9882		29
50	2616	Frenchie, adit	C	5	OC	Fg msv sulf w/ carbonate & silica	835		11.3		2300		600		**1.4** *		40
50	2617	Frenchie, adit	SC	6 @ 0.5	OC	Msv sulf	295		9.3		1300		1800		**2.4** *		20
50	303	Frenchie	C	1.1	OC	Banded chert w/ bands of fg sl, py	26		2.3		47		1250		1037		8
50	304	Frenchie	C	0.8	OC	Graphitic phyllite	28		<0.1		281		1732		6971		4
50	305	Frenchie	C	4.7	OC	Sil zone w/ banded sulf	972		16.1		1214		1144		1923		50
50	306	Frenchie	Rep	1	OC	Qz-muscovite sc	13		<0.1		73		23		175		<1
50	307	Frenchie	C	1.8	OC	Banded chert w/ sulf	18		1		126		944		2340		3
50	308	Frenchie	C	4.6	OC	Sil zone w/ banded sulf	488		15		3830		638		**2.1** *		32
50	9660	Frenchie	C	2	OC	Banded, sil volc w/ bands of py, sl @ fault margin	28		2.5		75		3973		**1.5** *		9
50	9661	Frenchie	C	0.3	OC	Black slate in banded volc w/ sulf bands	26		0.7		131		933		708		4
50	9662	Frenchie	C	3.7	OC	Sil, banded volc w/ banded py, sl	495		10.1		1472		3029		**3.7** *		24
51.1	311	Zarembo Island Hornblendite	SS			Hornblendite & granodiorite outcrop in stream	6		<0.1		44		4		26		<1
51.1	9664	Zarembo Island Hornblendite	RC	0.2	OC	Granite dike in hornblendite	7		<0.1		43		13		14		<1
51.1	9665	Zarembo Island Hornblendite	SS			Hornblendite outcrops in stream	<5		<0.1		20		7		76		2
51.1	9666	Zarembo Island Hornblendite	RC		OC	Fest, cg hornblendite w/ po	15		1.3		2760		9		90		3
51.2	312	Zarembo Island Hornblendite	G	0.3	OC	Fest hornblendite w/ po, py	7		0.2		520		5		45		7
51.2	313	Zarembo Island Hornblendite	SS			Hornblendite outcrops in stream	22		<0.1		64		17		75		<1
51.3	299	Zarembo Island Hornblendite	G	0.4	TP	Qz vn	7		<0.1		43		4		53		<1
51.3	300	Zarembo Island Hornblendite	G	0.1	TP	Hornblendite w/ po, cp	30		1		787		5		38		2
51.3	301	Zarembo Island Hornblendite	G	0.2	TP	Hornblendite w/ po, bornite	14		0.8		1172		3		39		<1
51.3	309	Zarembo Island Hornblendite	S		TP	Hornblendite w/ po, py, cp	13		0.2		75		6		58		2
51.3	310	Zarembo Island Hornblendite	S	0.3	TP	Cg hornblendite w/ py, po	12		<0.1		272		9		80		2
51.3	9657	Zarembo Island Hornblendite	Rep		RC	Hbl peg w/ mag, py	14		0.4		631		4		29		<1
51.3	9663	Zarembo Island Hornblendite	G		TP	Cg hornblendite w/ cg py, mag	9		0.2		201		9		71		<1
51.4	298	Zarembo Island Hornblendite	G	0.4	FL	Hornblendite w/ po	17		0.3		1291		<2		19		<1
51.4	9656	Zarembo Island Hornblendite	Rep		RC	Hbl peg w/ mag, py	10		0.2		60		4		52		2
52	15	Lost Zarembo	C	0.8	OC	Fest sil sulf band w/ sl & py	89		14.8		1215		1960		**4.0** *		4
52	16	Lost Zarembo	C	1	OC	Sil fest sulf band	108		22.1		3529		2856		**3.7** *		36

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Ni ppm	Co ppm	Al %	As ppm	Ba ppm	* xrf	Bi ppm	Ca %	Cd ppm	Cr ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm	Na %	Nb ppm	Sb ppm	Sc ppm	Sn ppm	* xrf	Sr ppm	Te ppm	Ti %	V ppm	W ppm	* xrf	Pt ppb	Pd ppb
45	9636	35	26	0.6	37	247	*	<5	24	29.7	15	3.8	<2	0.685	0.11	1	0.38	3188	<0.01	3	59	6	<20		134	<10	<0.01	22	<20			
45	9637	44	33	3.3	76	1362	*	<5	6.7	19.4	64	8.02	8	0.389	0.14	3	2.23	1869	0.02	1	63	13	<20		95	<10	<0.01	135	<20			
45	9638	23	21	3.2	33	563	*	<5	8.1	0.4	68	7.64	8	0.09	0.05	5	2.12	1626	<0.01	1	<5	13	<20		282	<10	<0.01	140	<20			
46	399	33	6	0.9	<5	612		<5	0.2	<0.2	46	1.68	<2	<0.01	0.05	7	0.63	209	0.01	<1	<5	<5	<20		17	<10	0.05	31	<20		20	14
46	400	10	1	0.1	<5	57	*	<5	0.04	<0.2	358	0.49	<2	<0.01	0.02	<1	0.03	75	0.02	<1	<5	<5	<20		7	<10	<0.01	4	<20			
46	2815	64	13	1.7	<5	729	*	<5	0.3	<0.2	92	2.85	3	0.025	0.12	8	1.12	376	0.04	<1	<5	<5	<20		21	<10	0.07	47	<20			
46	2816	52	12	1.3	5	689	*	<5	0.3	<0.2	64	2.58	3	0.021	0.09	10	0.85	445	0.02	<1	<5	<5	<20		22	<10	0.04	40	<20			
46	2817	6	1	0.1	<5	133	*	<5	0.02	<0.2	125	0.23	<2	0.012	0.03	2	0.04	42	0.02	<1	<5	<5	<20		5	<10	<0.01	3	<20			
46	2818	11	2	0.2	<5	156	*	<5	0.1	<0.2	197	0.52	<2	0.011	0.03	<1	0.08	106	0.02	<1	<5	<5	<20		8	<10	<0.01	5	<20			
47	401	9	4	0.7	<5	494	*	<5	0.4	<0.2	22	1.12	<2	0.012	0.09	9	0.41	224	0.03	<1	<5	<5	<20		20	<10	0.07	33	<20			
47	402	8	<1	0.1	<5	<10	*	<5	0.1	<0.2	335	0.34	<2	0.013	<0.01	<1	0.01	42	<0.01	<1	<5	<5	<20		19	<10	<0.01	5	<20			
47	2819	20	8	1.5	5	617	*	<5	0.5	<0.2	48	2.24	4	0.034	0.23	7	0.81	464	0.04	<1	<5	<5	<20		29	<10	0.12	57	<20			
47	2820	19	9	1.4	<5	595	*	<5	0.4	0.3	50	2.16	4	0.013	0.21	8	0.76	468	0.04	<1	<5	<5	<20		26	<10	0.11	55	<20			
48	391	81	100	1.2	9	103	*	<5	1.2	1.7	39	>10	<2	0.198	0.3	1	0.83	397	0.17	<1	<5	7	<20		39	<10	0.13	98	<20		6	5
49	291	2	2	1.2	40	22	*	<5	9.9	<0.2	42	1.16	3	0.013	0.37	3	0.27	79	0.22	<1	<5	<5	<20		42	<10	0.01	30	<20			
49	9651	5	21	0.7	826	144	*	<5	0.3	3.1	43	19.99	<2	0.108	0.17	8	0.2	265	<0.01	1	68	<5	<20		9	<10	<0.01	26	<20			
50	17	7	<1	0.1	468	>20000	*	5	0.9	99.1	29	>10	<2	1.883	<0.01	<1	0.11	276	<0.01	<1	16	<5	<20		16	<10	<0.01	4	<20			
50	18	9	<1	0.4	952	>20000	*	<5	0.1	168.9	37	8.08	<2	0.904	0.05	<1	0.14	90	<0.01	<1	7	<5	<20		19	<10	<0.01	6	<20			
50	207	13	<1	0.5	290	>20000	*	<5	3.2	24	64	>10	<2	0.517	0.21	1	0.3	518	0.02	<1	8	<5	<20		41	<10	<0.01	16	<20			
50	2616	8	2	0.4	488	50		2	0.9	39.5	99	14.1	<10	1.05	0.14	<10	0.21	225	<.01		12	<1			18		<.01	10	<10			
50	2617	7	3	0.8	1010	20		<2	0.3	73	99	8.06	<10	0.57	0.18	<10	0.43	200	<.01		12	<1			22		<.01	14	<10			
50	303	8	<1	1	170	>20000	*	<5	0.1	2.5	33	3.22	2	0.033	0.48	4	0.28	58	0.02	<1	<5	<5	<20		11	<10	<0.01	24	<20			
50	304	32	<1	2.1	11	4417	*	<5	8.5	8	114	2.64	7	<0.01	0.09	43	2.85	2081	<0.01	<1	<5	<5	<20		1227	<10	<0.01	60	<20			
50	305	7	2	0.1	582	>20000	*	<5	0.04	7.2	46	12.68	<2	0.862	0.03	<1	0.09	69	<0.01	<1	14	<5	<20		9	<10	<0.01	11	<20			
50	306	3	<1	1.4	<5	3734	*	<5	0.1	0.2	80	1.39	4	0.014	0.21	10	1.15	287	0.03	<1	<5	<5	<20		11	<10	<0.01	1	<20			
50	307	4	<1	1.3	38	>20000	*	<5	0.3	4.8	100	2.24	5	0.032	0.38	13	0.66	320	0.02	<1	<5	<5	<20		37	<10	<0.01	16	<20			
50	308	8	7	0.1	339	>20000	*	<5	0.1	59.6	38	12	<2	0.482	<0.01	<1	0.07	122	<0.01	<1	19	<5	<20		10	<10	<0.01	6	<20			
50	9660	5	<1	0.6	87	>20000	*	<5	0.01	36.9	53	2.55	<2	0.113	0.32	5	0.09	47	0.01	<1	6	<5	<20		2	11	<0.01	2	<20			
50	9661	26	2	2.5	90	11297	*	<5	0.4	1.2	151	4.28	9	0.012	0.25	26	2.1	1114	<0.01	<1	<5	<5	<20		47	<10	<0.01	70	<20			
50	9662	7	3	0.2	2406	>20000	*	<5	0.7	118.2	27	>10.32	<2	0.723	<0.01	<1	0.15	575	<0.01	<1	49	<5	<20		11	<10	<0.01	11	<20			
51.1	311	43	28	4.4	<5	378	*	<5	6.6	<0.2	136	7.68	4	0.02	0.63	<1	4.25	826	0.89	2	<5	37	<20		360	<10	0.49	394	<20		11	6
51.1	9664	4	5	0.2	<5	897	*	<5	0.1	<0.2	97	0.57	<2	0.012	0.17	<1	0.02	18	0.06	<1	<5	<5	<20		18	<10	<0.01	2	<20		5	<1
51.1	9665	16	9	1.7	<5	633	*	<5	0.6	<0.2	23	3.23	3	0.218	0.21	9	0.87	600	0.32	<1	<5	5	<20		39	<10	0.11	88	<20		<5	1
51.1	9666	264	147	2.1	<5	677	*	<5	2	0.3	101	18.43	<2	0.026	0.47	1	1.85	547	0.35	<1	<5	13	<20		85	<10	0.23	185	<20		10	28
51.2	312	37	62	2.2	<5	345	*	<5	2.5	<0.2	42	6.91	<2	<0.01	0.47	2	1.97	455	0.37	1	<5	22	<20		93	<10	0.25	240	<20		<5	2
51.2	313	30	41	1.3	<5	642	*	<5	0.9	0.2	38	2.81	4	0.12	0.1	4	0.81	729	0.24	2	<5	6	<20		42	<10	0.1	106	<20		<5	4
51.3	299	4	11	2	<5	682	*	<5	1.7	<0.2	26	3.23	3	0.017	0.37	5	1.12	410	0.21	<1	<5	5	<20		148	<10	0.21	85	<20		<5	1
51.3	300	71	226	1.6	<5	26	*	<5	1.8	<0.2	15	27.47	<2	0.041	0.28	1	1.34	347	0.28	<1	<5	15	<20		75	<10	0.25	272	<20		9	3
51.3	301	83	344	1.2	<5	16	*	<5	1.5	<0.2	21	32.15	<2	0.039	0.18	1	1.2	151	0.17	<1	<5	14	<20		54	<10	0.15	258	<20		10	7
51.3	309	3	31	2.7	<5	683	*	<5	2.6	<0.2	22	7.89	2	0.059	0.4	<1	2.82	349	0.42	4	<5	35	<20		114	<10	0.3	649	<20		<5	<1
51.3	310	7	48	2.5	5	1034	*	<5	2.6	<0.2	28	6.92	2	0.029	0.72	3	1.8	617	0.37	<1	<5	11	<20		122	<10	0.25	159	<20		<5	1
51.3	9657	186	129	1.2	<5	64	*	<5	1	0.2	114	6.24	<2	0.016	0.04	<1	1.81	247	0.07	2	<5	13	<20		18	<10	0.1	105	<20		20	4
51.3	9663	14	49	1.6	<5	812	*	<5	1.8	<0.2	57	5.06	<2	0.022	0.28	<1	2.33	329	0.27	1	<5	19	<20		76	<10	0.16	133	<20			
51.4	298	251	148	0.9	<5	35	*	<5	1.4	0.2	147	7.69	<2	0.03	0.08	<1	1.3	193	0.13	<1	<5	13	<20		31	<10	0.1	82	<20		6	3
51.4	9656	26	31	2.1	<5	349	*	<5	2.4	<0.2	34	5.37	<2	0.011	0.37	4	1.87	446	0.29	<1	<5	18	<20		78	<10	0.25	227	<20		<5	1
52	15	13	26	0.3	<5	>20000	*	<5	1.1	130.6	38	>10	<2	0.079	0.04	<1	0.12	876	<0.01	<1	<5	<5	<20		16	<10	0.02	32	<20			
52	16	26	27	2.1	10	5188	*	8	0.04	112.3	55	>10	5	0.089	0.52	<1	0.63	272	0.03	<1	<5	<5	<20		5	<10	<0.01	13	<20			

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Location	Sample Type	Sample Size (ft)	Sample Site	Sample Description	Au ppb	* opt	Ag ppm	* opt	Cu ppm	* %	Pb ppm	* %	Zn ppm	* %	Mo ppm
52	314	Lost Zarembo	C	2	TP	Andesite	<5		0.5		7		113		813		2
52	315	Lost Zarembo	C	1	TP	Sil, banded gs	17		1.2		167		384		1827		27
52	316	Lost Zarembo	C	0.4	TP	Discontinuous band of fest, sil gs w/ sulf	38		8.9		1867		2225		**2.0**	*	20
52	317	Lost Zarembo	C	1.2	TP	Sil, fest gs w/ sulf	37		0.4		66		135		2038		3
52	318	Lost Zarembo	C	0.8	TP	Fest, sil gs w/ sulf	58		27.6		3781		3657		**4.6**	*	44
52	319	Lost Zarembo	C	3.0	TP	Sil, banded gs w/ sulf	9		0.2		29		33		331		<1
52	320	Lost Zarembo	C	1.6	TP	Sil, fest, fg rock w/ sulf	108		14.3		1204		1388		**3.5**	*	4
52	321	Lost Zarembo	C	2.6	TP	Sil, fest, fg rock w/ sulf	131		8.3		966		818		**1.9**	*	8
52	322	Lost Zarembo	C	0.7	TP	Sil, banded gs	8		<0.1		15		16		220		2
52	2625	Lost Zarembo	G	0.4	OC	Sil msv sulf w/ sl, py, cp	180		16.7		870		3000		**5.5**	*	9
52	9658	Lost Zarembo	Rep		TP	Fest rhyolite	7		<0.1		21		12		74		10
52	9667	Lost Zarembo	Rep		RC	Sil, banded, msv sulf in sil volc host	151		13.6		866		2817		**4.9**	*	7
52	9668	Lost Zarembo	RC		OC	Fest rhyolite	10		0.2		24		12		147		10
52	9669	Lost Zarembo	Rep	1	TP	Very thinnly banded, sil volc	6		<0.1		9		8		119		<1
53.1	295	Zarembo Island Fluorite	Rep	3	OC	Stained, sil zone w/ py on fractures	50		<0.1		3		15		23		3
53.2	9654	Zarembo Island Fluorite	C	0.4	OC	Vuggy, crystalline qz br in andesite	13		<0.1		5		5		31		<1
53.3	296	Zarembo Island Fluorite	Rep	8	OC	Fest, banded andesite w/ py	15		<0.1		2		10		20		5
53.4	19	Zarembo Island Fluorite	G	0.3	OC	Geode	<5		<0.1		20		28		172		2
53.4	20	Zarembo Island Fluorite	G	0.3	OC	Geode	<5		<0.1		12		23		113		2
53.4	21	Zarembo Island Fluorite	G	0.1	RC	Fluorite vn in basalt	291		0.6		6		14		69		2
53.4	22	Zarembo Island Fluorite	C	3	OC	Sil, gray-green, banded volc	<5		<0.1		4		12		36		1
53.4	23	Zarembo Island Fluorite	Rep	10	OC	Basalt	<5		<0.1		40		6		113		3
53.4	208	Zarembo Island Fluorite	G		RC	Geodes	<5		0.1		8		19		44		1
53.4	209	Zarembo Island Fluorite	G		RC	Geodes	<5		<0.1		10		18		55		2
54	293	ZF	G	1	OC	Fest felsite	7		<0.1		7		8		47		<1
55	354	Round Point	C	0.9	OC	Qz-muscovite sc w/ dissem cp, sl	68		55		**2.1**	*	29		**1.1**	*	17
55	355	Round Point	C	0.4	OC	Qz-muscovite sc w/ dissem sulf	62		1		262		19		109		9
55	356	Round Point	G	0.1	OC	Qz-muscovite sc w/ bands of fg cp & sl	11		17.2		5588		32		3827		20
55	357	Round Point	C	0.8	OC	Qz-muscovite sc w/ bands & wisps of py, sl, trace cp	30		1.5		349		59		2245		7
55	358	Round Point	C	1.5	OC	Qz-muscovite sc w/ bands & wisps of py, sl, trace cp	<5		0.5		29		165		3346		8
55	359	Round Point	C	0.1	OC	Sil band w/ dissem cp	<5		2.9		2521		45		209		20
55	360	Round Point	C	1.5	OC	Qz-muscovite sc w/ qz vns	14		<0.1		28		23		27		6
55	9686	Round Point	C	5	OC	Sil, fest, pale gray sc w/ banded py & sl	6		3.1		103		757		7000		8
55	9687	Round Point	S		OC	Very pale gray, fest sc w/ banded py & sl	8		2		122		31		**1.5**	*	7
56	8	Exchange	Rep	2	OC	Qz vn and fel dike w/ sulf	35		6.5		10		265		174		3
56	9	Exchange	Rep	3	OC	Qz vn and fel dike w/ sulf	131		18		23		632		86		2
56	12	Exchange	S	0.3	UW	Sulf-rich band in qz vn w/ py & gn	30		5.9		23		253		68		<1
56	13	Exchange	S	0.3	RC	Contact of qz vn & dike	89		11		9		381		56		2
56	14	Exchange	SS			Stream w/ granite porph float	<5		0.4		6		22		65		1
56	205	Exchange	RC	5	OC	Qz vn	43		9		6		348		7		2
56	10	Exchange, adit	Rep	3.2	UW	Qz vn w/ sulf	532		58		9		2660		204		2
56	11	Exchange, adit	SC	3	UW	Qz vn	<5		0.3		4		11		5		2
56	204	Exchange, adit	Rep	6.5	OC	Fest qz vn	<5		0.1		15		13		27		2
56	206	Exchange, adit	RC	5	OC	Qz vn	923		26.6		6		944		8		2
57	63	Sunrise	PC			Stream in slate	<5		<0.1		9		9		72		<1
57	64	Sunrise	SS			Stream in slate	<5		<0.1		10		11		92		1
57	65	Sunrise	SS			Stream in slate	<5		<0.1		8		8		71		<1

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Ni ppm	Co ppm	Al %	As ppm	Ba ppm	* xrf	Bi ppm	Ca %	Cd ppm	Cr ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm	Na %	Nb ppm	Sb ppm	Sc ppm	Sn ppm	* xrf	Sr ppm	Te ppm	Ti %	V ppm	W ppm	* xrf	Pt ppb	Pd ppb
52	314	38	33	4.4	11	14343	*	<5	0.9	3.9	54	>10.95	30	<0.01	0.2	20	3.29	1543	0.02	<1	<5	10	<20		53	<10	0.07	248	<20			
52	315	4	<1	2.2	6	**3.68%**		<5	0.04	0.3	47	2.59	11	0.017	0.55	24	1.1	392	0.03	<1	<5	<5	<20		142	<10	<0.01	26	<20			
52	316	11	4	4.4	<5	**7.54%**		<5	0.04	86.5	62	5.51	20	0.065	1.12	4	0.94	270	0.06	<1	<5	<5	<20		122	12	<0.01	38	<20			
52	317	4	<1	3	<5	**4.25%**		<5	0.1	2	50	2.12	13	0.012	0.95	24	0.99	324	0.05	<1	<5	<5	<20		148	<10	<0.01	18	<20			
52	318	33	36	1.7	13	15305	*	<5	0.2	114.8	21	24.45	3	0.112	0.31	1	0.46	264	0.02	<1	<5	<5	<20		3	<10	<0.01	14	<20			
52	319	2	<1	1.7	<5	15633	*	<5	0.2	0.8	34	1.93	10	0.013	0.42	34	1.14	283	0.03	<1	<5	<5	<20		35	<10	0.01	4	<20			
52	320	15	28	0.1	<5	**20.54%**		<5	0.5	107.3	29	11.55	<2	0.076	0.02	<1	0.08	556	<0.01	<1	6	<5	<20		13	<10	<0.01	33	<20			
52	321	15	22	0.9	6	**10.10%**		<5	0.4	49.4	44	12.37	<2	0.037	0.12	<1	0.43	321	0.02	<1	<5	<5	<20		8	<10	0.03	33	<20			
52	322	5	3	2.7	<5	19473	*	<5	0.5	<0.2	47	3.34	10	<0.01	0.57	25	1.82	417	0.03	<1	<5	<5	<20		52	<10	0.09	57	<20			
52	2625	18	44	0.2	10	10		<2	1.1	>100.0	35	11.05	<10	0.06	<.01	<10	0.04	805	<.01		<2	<1			15		<.01	34	<10			
52	9658	2	<1	0.4	7	177	*	<5	0.01	0.7	47	1.54	3	<0.01	0.13	14	0.02	145	0.11	8	<5	<5	<20		2	<10	0.02	3	<20			
52	9667	11	25	0.1	8	**29.30%**	*	<5	1.2	195	8	6.18	<2	0.086	0.02	<1	0.06	797	<0.01	<1	13	<5	<20		26	17	<0.01	34	<20		<5	2
52	9668	2	<1	0.2	<5	689	*	<5	0.01	0.9	52	1.17	2	0.018	0.1	14	<0.01	119	0.08	8	<5	<5	<20		4	<10	0.02	<1	<20			
52	9669	3	<1	2.3	<5	19201	*	<5	0.1	<0.2	55	1.91	9	<0.01	0.55	17	1.46	171	0.05	<1	<5	<5	<20		93	<10	0.02	9	<20			
53.1	295	2	<1	0.5	97	299	*	<5	0.1	0.4	44	0.97	<2	<0.01	0.25	31	0.06	51	0.02	<1	<5	<5	<20		3	<10	<0.01	<1	<20			
53.2	9654	4	<1	0.2	7	211	*	<5	0.02	<0.2	127	0.67	<2	0.012	0.04	11	0.02	110	0.03	<1	<5	<5	<20		3	<10	<0.01	2	<20			
53.3	296	2	<1	0.5	28	263	*	<5	0.01	<0.2	70	0.75	3	<0.01	0.26	30	0.06	32	0.05	<1	<5	<5	<20		3	<10	<0.01	2	<20			
53.4	19	7	2	0.9	<5	1768	*	<5	0.8	0.4	166	1.47	3	<0.01	0.22	38	0.33	176	0.12	<1	<5	<5	<20		24	<10	<0.01	5	<20			
53.4	20	11	1	0.7	<5	914	*	<5	0.6	0.3	171	1.23	3	<0.01	0.19	33	0.24	133	0.11	<1	<5	<5	<20		16	<10	<0.01	4	<20			
53.4	21	3	<1	3.2	132	121	*	<5	10	0.4	100	2.83	6	<0.01	1.79	9	0.14	613	0.95	5	<5	<5	<20		66	<10	<0.01	2	<20			
53.4	22	10	2	0.8	<5	243	*	<5	0.9	<0.2	136	1.27	4	<0.01	0.26	37	0.21	207	0.14	<1	<5	<5	<20		13	<10	<0.01	5	<20			
53.4	23	51	29	5.3	<5	329	*	<5	5.1	<0.2	107	9.15	8	0.019	0.06	16	3.2	1108	0.52	6	<5	21	<20		209	<10	0.07	180	<20			
53.4	208	6	2	0.6	<5	510	*	<5	0.1	<0.2	157	1.09	2	<0.01	0.16	29	0.22	112	0.09	<1	<5	<5	<20		9	<10	<0.01	3	<20			
53.4	209	11	2	0.8	<5	748	*	<5	0.1	<0.2	175	1.3	3	<0.01	0.19	32	0.36	94	0.11	1	<5	<5	<20		11	<10	<0.01	4	<20			
54	293	1	<1	0.7	<5	72	*	<5	0.1	<0.2	46	0.69	5	0.013	0.4	5	0.03	79	0.02	<1	<5	<5	<20		2	<10	<0.01	1	<20			
55	354	4	13	0.8	10	6400	*	<5	0.1	32.9	61	>10	<2	0.139	0.18	10	0.15	261	0.02	2	<5	<5	<20		7	<10	0.01	<1	<20			
55	355	3	1	0.5	57	4521	*	<5	0.01	0.4	84	2.37	<2	0.022	0.36	6	0.03	28	<0.01	<1	<5	<5	<20		1	<10	<0.01	<1	<20			
55	356	4	11	0.5	12	7855	*	<5	0.02	12.4	80	3.5	<2	0.054	0.17	8	0.13	192	0.01	<1	<5	<5	<20		5	<10	<0.01	<1	<20			
55	357	3	<1	1.8	7	>20000	*	<5	0.1	7.9	59	2.68	7	0.036	0.58	17	0.21	285	0.04	<1	<5	<5	<20		95	<10	0.02	2	<20			
55	358	3	<1	1.2	46	6291	*	<5	0.03	1.7	49	6.64	2	0.024	0.64	22	0.47	150	0.01	2	<5	<5	<20		4	<10	0.02	<1	<20			
55	359	5	8	0.7	6	4170	*	<5	0.5	1.5	64	5.27	<2	<0.01	0.26	16	0.23	335	0.06	1	<5	<5	<20		32	<10	0.02	<1	<20			
55	360	3	<1	0.6	13	5820	*	<5	0.1	<0.2	72	3.04	2	0.012	0.34	14	0.19	99	0.01	1	<5	<5	<20		11	<10	<0.01	<1	<20			
55	9686	4	1	1.3	15	16934	*	<5	0.1	21.1	103	3.14	4	0.269	0.53	16	0.42	320	0.04	1	<5	<5	<20		24	<10	0.02	1	<20			
55	9687	5	<1	1.7	13	>20000	*	<5	0.01	58.3	99	3.01	5	0.527	0.42	3	0.17	148	0.03	<1	<5	<5	<20		45	<10	<0.01	<1	<20			
56	8	13	6	0.4	<5	382	*	10	3.1	0.7	177	3.29	<2	0.276	0.25	3	1.22	947	0.04	1	<5	7	<20		551	<10	<0.01	23	<20			
56	9	12	7	0.2	<5	167	*	29	2.1	0.8	178	3	<2	0.153	0.14	2	0.7	666	0.05	<1	6	<5	<20		323	<10	<0.01	13	<20			
56	12	2	5	0.5	<5	987	*	6	3.8	0.5	58	3.28	<2	0.184	0.24	5	0.48	952	0.06	<1	<5	<5	<20		318	<10	<0.01	8	<20			
56	13	9	3	0.1	<5	28	*	14	0.7	0.4	286	1.52	<2	0.096	0.06	<1	0.23	278	0.04	<1	<5	<5	<20		117	<10	<0.01	10	<20			
56	14	7	7	1.1	<5	506	*	<5	0.4	<0.2	15	2.97	<2	0.103	0.18	6	0.5	1460	0.03	2	<5	<5	<20		37	<10	0.08	59	<20			
56	205	14	1	0	<5	<10	*	14	0.01	<0.2	221	0.48	<2	0.048	<0.01	<1	0.02	43	<0.01	<1	<5	<5	<20		3	<10	<0.01	1	<20			
56	10	8	9	0.5	<5	213	*	71	4.1	1.2	96	3.76	<2	0.313	0.13	2	1.43	1364	0.04	<1	<5	7	<20		573	<10	<0.01	21	<20			
56	11	8	<1	0	<5	11	*	<5	0.3	<0.2	307	0.4	<2	0.014	0.01	<1	0.03	111	0.01	<1	<5	<5	<20		19	<10	<0.01	1	<20			
56	204	7	1	0.2	<5	231	*	<5	1.3	<0.2	242	1.06	<2	0.13	0.11	5	0.19	460	0.05	<1	<5	<5	<20		133	<10	<0.01	5	<20			
56	206	9	<1	0.1	<5	<10	*	37	0.04	<0.2	312	0.48	<2	0.065	<0.01	<1	0.03	88	0.01	<1	<5	<5	<20		5	<10	<0.01	1	<20			
57	63	16	5	1.8	<5	837	*	<5	1.0	<0.2	198	2.46	<2	0.06	0.27	11	0.73	614	0.16	7	<5	<5	<20		122	<10	0.14	56	<20			
57	64	18	8	1.8	<5	705	*	<5	0.6	<0.2	35	2.84	<2	0.051	0.18	7	0.96	660	0.03	4	<5	<5	<20		48	<10	0.13	68	<20			
57	65	16	6	1.6	<5	674	*	<5	0.5	<0.2	28	2.43	<2	0.045	0.15	7	0.83	547	0.03	4	<5	<5	<20		43	<10	0.12	59	<20			

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Location	Sample Type	Sample Size (ft)	Sample Site	Sample Description	Au ppb * opt	Ag ppm * opt	Cu ppm * %	Pb ppm * %	Zn ppm * %	Mo ppm
58.1	467	Steamer Bay	G	0.4	FL	Sil, qz gs br w/ po	72	10.9	1407	**1.01** *	**1.9** *	14
58.2	8719	Steamer Bay	G		FL	Pale gray sil volc w/ dissem & veinlets of po	<5	1	78	62	80	11
59	3821	Wrangell Airport Pit	G		TP	Peg dike	<5	<0.1	11	3	5	8
59	3822	Wrangell Airport Pit	Rep		TP	Gray, mg, bt granite	<5	<0.1	10	<2	103	2
59	3823	Wrangell Airport Pit	Rep		TP	Alt granite w/ epidote	<5	<0.1	14	5	112	3
60	76	Salamander Creek Pit	G	0.3	RC	Sil metaseds w/ po & cp	<5	0.6	227	6	41	4
60	77	Salamander Creek Pit	G	0.3	RC	Fest, sil metased w/ po	<5	0.4	84	5	25	4
60	78	Salamander Creek Pit	G	0.5	RC	Sil fest sc	<5	0.3	60	7	82	17
60	79	Salamander Creek Pit	G	0.2	RC	Sil fest sc w/ po	<5	0.2	68	7	129	5
60	80	Salamander Creek Pit	G	0.7	RC	Fest contact zone in metaseds	<5	<0.1	36	7	29	2
60	243	Salamander Creek Pit	S	1	TP	Garnet-mica sc	<5	0.3	61	9	52	4
60	244	Salamander Creek Pit	Rep	14	TP	Granite	<5	<0.1	14	7	104	2
61	468	Bruiser	C	1.6	OC	Qz w/ slate & po	<5	0.4	64	23	101	6
61	469	Bruiser	C	4	OC	Qz vn	<5	0.3	10	7	24	<1
61	8720	Bruiser	C	0.2	OC	Qz vn in blk sandy slates to phyllites	<5	<0.1	25	4	14	2
61	8721	Bruiser	C	1	OC	Qz vn in sandy slate	<5	<0.1	10	5	3	6
62	8716	Niblack Island	Rep		OC	Fel int w/ trace cp	11	8.5	1725	14	198	3
63	3690	K&D Mine	CC	2.3	OC	Qz vn w/ ribbons of gray sulf	994	26.2	22	422	1206	4
63	3691	K&D Mine	C	1.2	OC	Chl sc w/ minor po	7	0.4	59	13	295	4
63	3692	K&D Mine	C	1.3	OC	Carb sc w/ po	21	0.7	80	16	357	9
63	3693	K&D Mine	C	2.3	UW	Qz w/ gray sulf, stibnite, po	**0.757** *	50	8	2181	2324	<1
63	3694	K&D Mine	S		UW	Qz w/ stibnite, py, po	7447	169	94	**1.06** *	6528	6
63	3695	K&D Mine	Rep		OC	Qz vn	55	0.5	9	46	38	2
63	8660	K&D Mine	C	0.3	OC	Layer of gray sulf in qz vn	3716	33.9	197	518	4712	6
63	8661	K&D Mine	Rep	4.3	OC	Qz vn	35	1.2	23	26	32	3
63	8662	K&D Mine	Rep	1.6	OC	Qz vn w/ minor py & gray sulf	863	0.8	12	40	76	4
63	8663	K&D Mine	Rep	1.3	OC	Chl to carb sc w/ py	14	0.5	77	10	401	8
63	8664	K&D Mine	C	0.5	OC	Wedge of gray sulf in qz vn	32	2.4	103	49	271	23
63	8665	K&D Mine	C	0.1	OC	Unknown talc-like mineral	179	6.7	41	76	239	7
64.1	2807	Sun	SS			Gneiss outcrop in stream	71	0.5	48	11	83	3
64.2	389	Sun	CC	0.1	OC	Msv band of gn w/ sl	1411	1245.5	272	**9.99** *	**7.1** *	6
64.2	8656	Sun	S		FL	Rounded cobble of gneiss w/ py & trace cp	27	3.7	1888	9	75	4
65	385	The Islander	CC	0.5	OC	Qz-carb vn w/ py, sl, cp	7352	13.1	4530	340	**2.5** *	4
65	386	The Islander	G	1	OC	Gw w/ py	116	0.6	250	49	553	2
65	387	The Islander	C	0.9	OC	Msv py, sl, cp	**1.077** *	37.1	7463	404	**9.7** *	3
65	388	The Islander	C	0.1	OC	Qz-carb vn	92	0.2	28	22	402	6
65	8652	The Islander	C	0.45	OC	Msv band of py & sl in gw	7584	16.3	3767	707	**8.6** *	4
65	8653	The Islander	SC	7.5 @ 0.5	OC	Py- & sl-rich zone in qz-rich gw	1645	4.7	684	1287	**1.5** *	3
65	8654	The Islander	C	0.4	OC	Vn of msv sulf in gw	**0.669** *	20.2	4731	384	**8.2** *	3
65	8655	The Islander	C	0.45	OC	Barren qz vn	47	<0.1	34	16	256	3
66	2800	Cascade Mine	C	6.5	UW	Shear zone w/ py	38	4.9	58	286	372	4
66	2801	Cascade Mine	C	3.5	UW	Shear zone w/ py	589	1.3	33	57	203	14
66	2802	Cascade Mine	C	5.6	UW	Shear zone w/ py	205	2.5	41	30	122	14
66	3668	Cascade Mine	C	4.4	UW	Sil sc w/ py	32	1.1	120	15	364	16
66	3669	Cascade Mine	Rep	6	UW	Sil sc w/ py	41	0.6	120	14	327	27
66	3670	Cascade Mine	G		TP	Qz-sericite sc w/ fg sulf	<5	0.7	76	17	290	3
66	3671	Cascade Mine	Rep	0.9	OC	Sil bt-sericite sc w/ minor py & fg sulf	<5	0.2	65	9	39	7

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Ni ppm	Co ppm	Al %	As ppm	Ba ppm	* xrf	Bi ppm	Ca %	Cd ppm	Cr ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm	Na %	Nb ppm	Sb ppm	Sc ppm	Sn ppm	* xrf	Sr ppm	Te ppm	Ti %	V ppm	W ppm	* xrf	Pt ppb	Pd ppb
58.1	467	9	13	1.6	59	243		<5	6.9	238.1	70	5.19	3	3.164	0.11	3	1.71	1677	<0.01	<1	7	<5	31		90	18	<0.01	32	<20	*		
58.2	8719	11	14	3	8	482		<5	2	0.2	61	5.41	6	0.018	0.07	2	1.64	743	0.19	<1	<5	6	36		97	<10	0.13	129	<20	*		
59	3821	12	<1	0.4	<5	488		<5	0.1	<0.2	237	0.51	<2	<0.01	0.19	12	0.06	61	0.12	<1	<5	<5	44		16	<10	0.02	4	<20	*		
59	3822	9	3	1.7	<5	1152		<5	0.9	<0.2	84	2.7	4	0.013	1.12	3	0.85	446	0.08	<1	<5	<5	322		49	<10	0.17	25	<20	*		
59	3823	7	5	2	<5	1012		<5	2.1	<0.2	107	2.7	6	<0.01	0.39	2	0.84	384	0.07	<1	<5	<5	120		56	<10	0.15	22	<20	*		
60	76	23	13	2.6	<5	124	*	<5	2.4	<0.2	136	4.15	<2	<0.01	0.19	6	0.55	345	0.2	4	<5	<5	<20		104	<10	0.12	53	<20			
60	77	46	17	1.7	<5	696	*	<5	0.1	0.2	105	4.73	<2	0.015	1.01	5	1.01	246	0.06	2	<5	8	<20		7	<10	0.17	92	<20			
60	78	22	8	1.8	<5	861	*	<5	0.4	0.3	123	4.15	<2	0.014	0.65	6	1.25	347	0.06	3	<5	11	<20		10	<10	0.14	111	<20			
60	79	39	11	2.6	<5	933	*	<5	0.6	<0.2	133	5.58	<2	<0.01	1.49	5	1.57	525	0.12	4	<5	16	<20		23	<10	0.27	211	<20			
60	80	20	8	1.9	<5	704	*	<5	0.3	<0.2	138	3.21	<2	<0.01	0.9	6	0.85	168	0.08	2	<5	<5	<20		27	<10	0.15	80	<20			
60	243	14	4	3.6	<5	1768	*	<5	0.1	<0.2	85	6.35	<2	<0.01	2.25	10	2.24	220	0.07	4	<5	12	<20		5	<10	0.31	190	<20			
60	244	13	5	2.7	<5	995	*	<5	0.6	<0.2	87	4.6	<2	<0.01	1.43	8	1.58	673	0.11	4	<5	8	<20		30	<10	0.25	96	<20			
61	468	46	9	2.5	<5	417		<5	2.4	0.6	206	2.17	4	<0.01	0.42	<1	0.78	238	0.13	<1	<5	<5	133		168	<10	0.08	47	<20	*		
61	469	14	1	0.3	<5	104		<5	0.1	<0.2	408	0.73	<2	<0.01	0.13	2	0.25	66	0.03	<1	<5	<5	75		6	<10	0.03	16	<20	*		
61	8720	25	3	0.5	<5	53		<5	1.5	<0.2	219	0.6	<2	<0.01	0.13	<1	0.27	186	0.04	<1	<5	<5	54		69	<10	0.02	14	<20	*		
61	8721	15	<1	0.1	<5	<10		<5	0.1	<0.2	348	0.38	<2	<0.01	0.02	<1	0.05	31	0.01	1	<5	<5	8		8	<10	<0.01	3	<20	*		
62	8716	2	<1	1.0	70	42		5	0.1	0.8	120	1.88	7	<0.01	0.49	29	0.02	126	0.08	2	<5	<5	6		<1	<10	0.02	3	<20	*		
63	3690	13	2	0.1	523	125	*	<5	0.1	16.5	256	0.81	<2	0.507	0.03	<1	0.12	42	<0.01	<1	6	<5	<4	*	4	11	<0.01	8	<4	*		
63	3691	115	44	4	12	382	*	<5	4	<0.2	394	7.19	3	0.021	0.08	6	4.09	856	0.02	2	<5	12	<4	*	147	<10	0.23	186	<4	*		
63	3692	101		2.1	8	894	*	<5	6.2	2.5	135	6.84	5		0.16	<1	2.42	893	0.01	9	25	8	<4	*	280	<10	0.01	100	8	*		
63	3693	9	2	0.1	**1.27%**	97	*	8	0.3	28.4	206	1.55	<2		0.02	<1	0.02	64	<0.01	<1	51	<5	<4	*	14	<10	<0.01	4	<4	*		
63	3694	17	5	0.3	>10000	169	*	29	0.5	179.7	194	5.07	<2	14.4	0.06	1	0.5	103	<0.01	1	>2000	<5	57	*	25	<10	<0.01	11	<4	*		
63	3695	8	4	0.4	70	433	*	<5	0.1	0.7	125	0.25	<2	0.034	0.11	<1	0.04	172	0.17	<1	42	<5	<4	*	13	<10	<0.01	2	<4	*		
63	8660	55	21	0.4	6323	1223	*	<5	3.1	64.1	150	3.81	<2	2.06	0.19	1	0.38	274	<0.01	<1	24	<5	<4	*	92	11	<0.01	20	<4	*		
63	8661	12	1	0.04	24	<10	*	<5	0.02	0.3	218	0.36	<2	0.029	<0.01	<1	0.08	106	<0.01	<1	<5	<5	<4	*	2	<10	<0.01	<1	<4	*		
63	8662	14	1	0.1	1376	29	*	<5	0.1	4.7	276	0.59	<2	0.055	0.01	<1	0.16	45	<0.01	<1	<5	<5	<4	*	3	<10	<0.01	3	<4	*		
63	8663	119	32	2.3	26	1247	*	<5	6.5	2	182	6.36	4	0.15	0.16	6	2.37	852	0.01	1	34	7	<4	*	345	<10	<0.01	87	40	*		
63	8664	93	24	0.6	10	2933	*	<5	4.6	2	77	6.12	<2	0.209	0.34	4	0.39	721	0.01	<1	14	<5	6	*	207	<10	<0.01	38	26	*		
63	8665	60	10	1	50	1078	*	<5	0.6	2	171	2.65	10	0.118	0.1	1	3.03	162	0.02	2	49	<5	<4	*	56	<10	<0.01	10	19	*		
64.1	2807	33	10	1.5	13	1254	*	<5	1.1	0.6	16	2.98	4	0.018	0.23	8	0.5	150	0.08	3	<5	<5	<4	*	45	<10	0.07	40	26	*		
64.2	389	17	7	2.3	173	641	*	<5	1.7	726.3	187	3.17	7	3.54	0.29	6	0.68	1549	0.11	2	1017	<5	942	*	66	13	0.08	70	<4	*		
64.2	8656	160	151	0.5	12	44	*	<5	0.7	<0.2	28	>10	<2	0.031	0.03	6	0.22	102	0.1	1	<5	<5	6	*	35	<10	0.07	16	6	*		
65	385	23	45	1	129	39	*	<5	4	180.5	102	>10	<2	4.88	0.09	1	0.77	986	0.02	<1	<5	5	6	*	135	<10	0.04	50	<4	*		
65	386	32	33	2.3	14	488	*	<5	4.1	2.5	147	5.97	<2	0.117	0.29	1	2.3	1151	0.04	<1	<5	6	<4	*	192	<10	0.14	130	<4	*		
65	387	12	45	0.5	>10000	<10	*	27	0.1	571.6	70	>10	<2	30.1	0.03	<1	0.43	458	0.03	<1	7	<5	22	*	7	<10	<0.01	19	<4	*		
65	388	2	1	0.2	31	<10	*	10	10	2	17	0.5	<2	0.116	<0.01	<1	0.16	714	0.01	<1	<5	<5	<4	*	2340	<10	<0.01	9	<4	*		
65	8652	18	34	0.2	>10000	<10	*	<5	0.1	577.6	79	>10	<2	26.02	0.08	<1	0.06	286	0.07	<1	15	<5	22	*	8	<10	<0.01	4	<4	*		
65	8653	20	24	1.1	1956	211	*	<5	6.5	94.7	113	>10	<2	4.08	0.26	2	0.88	1114	0.04	<1	<5	6	<4	*	145	<10	0.08	58	<4	*		
65	8654	7	18	0.3	>10000	<10	*	7	0.3	283.3	39	8.74	<2	18.98	0.03	<1	0.25	277	0.01	1	<5	<5	28	*	20	<10	<0.01	13	<4	*		
65	8655	6	2	0.4	85	<10	*	<5	10	1.3	91	0.9	<2	0.065	<0.01	3	0.41	446	0.02	<1	<5	<5	<4	*	901	<10	0.01	20	<4	*		
66	2800	34	11	0.5	65	944	*	<5	0.3	3.5	115	3.96	<2	1.207	0.24	6	0.27	510	<0.01	<1	34	8	<4	*	26	<10	<0.01	41	14	*		
66	2801	33	12	0.4	>10000	588	*	<5	0.1	34	165	2.77	<2	0.187	0.18	4	0.02	25	<0.01	<1	38	<5	<4	*	6	<10	<0.01	69	<4	*		
66	2802	28	4	0.3	544	619	*	<5	0.04	2.4	165	2.59	<2	4.015	0.19	4	0.01	19	<0.01	<1	17	<5	<4	*	5	<10	<0.01	94	9	*		
66	3668	35	5	0.4	197	439	*	<5	0.1	5.1	146	2.44	<2	0.251	0.16	3	0.02	21	<0.01	1	19	<5	<4	*	3	<10	<0.01	105	<4	*		
66	3669	56	8	0.4	26	1068	*	<5	0.8	3.9	109	2.72	<2	0.083	0.22	6	0.29	350	<0.01	<1	17	5	<4	*	33	<10	<0.01	48	7	*		
66	3670	98	14	0.6	14	1066	*	<5	0.4	1.1	96	3.69	<2	0.052	0.28	6	0.84	316	<0.01	<1	8	<5	<4	*	12	<10	<0.01	35	4	*		
66	3671	25	4	0.4	<5	767	*	<5	0.3	<0.2	181	1.48	<2	0.03	0.13	6	0.16	84	0.01	<1	<5	<5	<4	*	11	<10	0.01	41	<4	*		

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Location	Sample Type	Sample Size (ft)	Sample Site	Sample Description	Au ppb	* opt	Ag ppm	* opt	Cu ppm	* %	Pb ppm	* %	Zn ppm	* %	Mo ppm
66	3672	Cascade Mine	Rep	9	TP	Sil sc in shear zone	183		0.9		53		49		351		15
67.1	86	Buck Bar	SS			Sand bar	9		0.2		43		9		61		<1
67.1	87	Buck Bar	SS			Sand bar	<5		0.2		48		11		66		1
67.1	249	Buck Bar	SS			Sandy clay river sed	7		<0.1		48		10		65		1
67.1	250	Buck Bar	SS			Sandy clay river sed	5		<0.1		45		11		66		<1
67.2	2857	Buck Bar	PC				54		<0.2		7		9		55		<1
67.2	2858	Buck Bar	PC				36		<0.2		7		4		55		<1
67.3	2856	Buck Bar	PC				70		<0.2		5		14		54		<1
67.4	251	Buck Bar	SS			Sandy clay river sed	80		<0.1		33		11		76		<1
67.4	252	Buck Bar	SS			Sandy clay river sed	15		<0.1		40		10		65		<1
67.5	88	Buck Bar	SS			Sand bar	<5		0.2		41		9		66		<1
67.5	89	Buck Bar	SS			Sand bar	<5		0.3		47		12		73		1
67.6	253	Buck Bar	SS			Sandy clay river sed	<5		0.2		40		8		67		<1
68	84	Mary Moose	SS			Sand bar	8		<0.1		58		12		84		1
68	85	Mary Moose	SS			Sand bar	<5		<0.1		35		10		100		1
68	247	Mary Moose	SS			Clayey sand	<5		<0.1		37		9		66		<1
68	248	Mary Moose	SS			River bank	29		<0.1		42		10		63		<1
69.1	2859	Andrew Creek	PC				1058		<0.2		24		7		72		3
69.1	3804	Andrew Creek	SS			Gneiss & sc outcrop in stream	6		<0.2		38		6		81		2
69.1	3805	Andrew Creek	SS			Sc outcrop in stream	<5		<0.2		28		3		37		1
69.2	9691	Andrew Creek	SS			Rhyolite outcrop in stream	12		<0.1		58		41		169		<1
69.3	145	Andrew Creek	G		OC	Gneiss w/ dissem po	15		0.5		45		13		151		10
69.3	146	Andrew Creek	G		FL	Qz vn	**0.822**	*	16.2		24		49		16		4
69.3	361	Andrew Creek	SS			Granite & fel volc float in stream	34		<0.1		15		19		116		3
69.3	362	Andrew Creek	SS			Abundant qz float in stream	13		0.2		24		40		121		4
69.3	363	Andrew Creek	SS			Abundant qz float in stream	493		0.3		42		64		155		4
69.3	364	Andrew Creek	SS			Abundant qz float in stream	15		0.3		37		51		102		3
69.3	9688	Andrew Creek	RC		FL	Vuggy qz	558		0.8		5		12		50		3
69.3	9689	Andrew Creek	RC		FL	Vuggy qz	162		0.4		5		10		16		3
69.3	9690	Andrew Creek	RC		FL	Qz vn	301		0.2		6		5		11		3
69.4	365	Andrew Creek	SS			Abundant qz float in stream	27		0.3		30		40		103		3
69.4	366	Andrew Creek	SS			Abundant qz float in stream	335		0.3		29		52		118		3
69.4	367	Andrew Creek	SS			Abundant qz float in stream	117		0.3		35		52		110		3
69.4	2848	Andrew Creek	SS			Qz float in stream	33		<0.2		54		59		104		3
69.4	2852	Andrew Creek	SS			Sc outcrop in stream	16		0.4		60		23		132		4
69.4	3750	Andrew Creek	G		FL	Qz w/ minor py	137		1		26		17		13		3
69.4	3802	Andrew Creek	SS			Gneiss & sc outcrop in stream	21		0.3		68		21		126		3
69.5	2849	Andrew Creek	S		FL	Qz	141		0.9		6		9		4		<1
69.5	2850	Andrew Creek	Rep		FL	Qz	1992		2.1		13		31		12		9
69.5	2851	Andrew Creek	SS			Sc float in stream	24		0.3		91		47		135		2
69.5	3800	Andrew Creek	G		FL	Fest qz w/ fg py	693		0.5		15		3		10		2
69.5	3801	Andrew Creek	G		RC	Br qz vn w/ fg sulf	480		1.1		14		11		10		7
69.6	2853	Andrew Creek	SS			Sc float in stream	23		0.5		58		34		116		4
69.6	3803	Andrew Creek	SS			Gneiss & sc outcrop in stream	54		0.8		40		26		112		2
69.7	368	Andrew Creek	G	0.7	RC	Fest qz vn	<5		<0.1		7		13		21		<1
69.8	369	Andrew Creek	SS			Metased float in stream	6		0.5		64		67		245		4
69.8	370	Andrew Creek	SS			Metased float in stream	18		0.7		87		133		318		4

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Ni ppm	Co ppm	Al %	As ppm	Ba ppm	* xrf	Bi ppm	Ca %	Cd ppm	Cr ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm	Na %	Nb ppm	Sb ppm	Sc ppm	Sn ppm	* xrf	Sr ppm	Te ppm	Ti %	V ppm	W ppm	* xrf	Pt ppb	Pd ppb
66	3672	40	6	0.3	4574	503	*	<5	0.1	17.3	166	1.85	<2	0.156	0.14	2	0.08	48	<0.01	<1	14	<5	<4	*	18	<10	<0.01	84	<4	*		
67.1	86	30	11	1.2	<5	148		<5	2.1	0.2	32	2.98	3	0.025	0.1	8	1.02	452	0.06	2	<5	<5	<20		60	<10	0.09	60	<20			
67.1	87	32	12	1.3	<5	146		<5	1.7	0.3	35	3.27	3	0.029	0.11	9	1.04	497	0.06	3	<5	<5	<20		51	<10	0.09	66	<20			
67.1	249	30	12	1.3	5	159		<5	2.1	0.3	36	3.46	3	0.02	0.1	9	1.09	515	0.05	2	<5	<5	<20		59	<10	0.1	71	<20			
67.1	250	32	13	1.3	6	170		<5	2	0.3	38	3.63	3	0.019	0.11	9	1.08	518	0.05	3	<5	<5	<20		62	<10	0.1	74	<20			
67.2	2857	10	18	0.2	<5	172	*	<5	0.5	<0.2	124	>10	9	<0.01	0.03	48	0.15	614	0.03	<1	<5	<5	<20		8	<10	0.12	1001	<20			
67.2	2858	11	17	0.4	<5	269	*	<5	0.7	<0.2	132	>10	10	0.014	0.06	65	0.3	689	0.06	<1	<5	<5	<20		14	11	0.14	941	<20			
67.3	2856	12	15	0.6	<5	23		<5	0.9	<0.2	148	>10	9	0.032	0.08	92	0.44	715	0.09	<1	<5	<5	<20		18	10	0.16	810	<20			
67.4	251	28	14	1	<5	107		<5	1.4	0.3	65	15.38	4	0.019	0.07	14	0.89	550	0.04	9	<5	<5	<20		44	<10	0.11	251	<20			
67.4	252	30	12	1.3	<5	163		<5	1.8	0.3	42	4.39	3	0.034	0.09	9	1.06	510	0.05	4	<5	<5	<20		56	<10	0.1	93	<20			
67.5	88	29	12	1.3	6	159		<5	1.8	0.3	34	3.62	3	0.024	0.09	9	1.05	508	0.06	3	<5	<5	<20		56	<10	0.09	73	<20			
67.5	89	30	13	1.4	6	185		<5	1.9	0.3	34	3.82	3	0.026	0.11	9	1.11	564	0.06	3	<5	<5	<20		60	<10	0.1	76	<20			
67.6	253	28	11	1.3	<5	161		<5	1.7	0.3	29	3.19	3	0.024	0.1	8	1.01	502	0.06	3	<5	<5	<20		54	<10	0.09	62	<20			
68	84	33	14	1.5	8	196		<5	1.8	0.4	35	3.58	4	0.032	0.15	10	1.13	621	0.06	3	<5	5	<20		59	<10	0.1	68	<20			
68	85	30	12	1.3	8	141		<5	0.8	0.3	36	3.51	3	0.06	0.1	9	0.92	510	0.04	4	<5	<5	<20		37	<10	0.08	70	<20			
68	247	31	12	1.3	5	91		<5	0.5	0.3	37	4.05	3	0.023	0.08	11	0.85	512	0.03	4	<5	<5	<20		29	<10	0.1	86	<20			
68	248	30	12	1.3	5	140		<5	1.3	0.3	35	3.66	3	0.025	0.1	9	1.02	501	0.05	3	<5	<5	<20		45	<10	0.09	74	<20			
69.1	2859	19	10	1.9	12	649	*	<5	1.6	0.3	251	6.32	4	0.01	0.21	18	1.01	1166	0.18	<1	<5	10	<4	*	35	<10	0.22	156	58	*		
69.1	3804	18	14	1.7	12	878	*	<5	0.7	0.5	26	3.27	<2	0.063	0.31	5	1.04	504	0.05	5	<5	6	<4	*	21	<10	0.15	72	<4	*		
69.1	3805	26	12	1.4	<5	695	*	<5	0.7	<0.2	42	2.34	<2	0.014	0.19	3	1.04	320	0.03	4	<5	<5	<4	*	15	<10	0.12	43	<4	*		
69.2	9691	15	16	2	9	1189	*	<5	0.8	0.9	31	4.37	5	0.081	0.73	5	1.56	718	0.06	8	<5	6	<4	*	15	<10	0.21	98	6	*		
69.3	145	26	14	1.8	<5	56		<5	0.4	<0.2	151	3.78	<2	<0.01	0.4	4	1.14	432	0.07	6	<5	11	<20		14	<10	0.2	111	<20			
69.3	146	9	<1	0.1	102	6		<5	<0.01	<0.2	281	0.3	<2	0.013	0.03	<1	<0.01	26	<0.01	<1	7	<5	<20		<1	<10	<0.01	3	<20			
69.3	361	13	8	1.3	30	821	*	<5	0.8	0.6	100	2.98	4	0.041	0.22	10	0.77	479	0.09	7	<5	6	<4	*	16	<10	0.13	79	4	*		
69.3	362	14	26	1.6	115	676	*	<5	0.6	0.4	27	4.1	4	0.071	0.21	8	0.49	3907	0.24	6	<5	<5	<4	*	16	<10	0.08	58	<4	*		
69.3	363	17	14	1.8	75	857	*	<5	0.6	0.7	43	3.29	5	0.063	0.32	9	0.77	986	0.09	7	<5	<5	<4	*	15	<10	0.12	77	12	*		
69.3	364	13	9	1.7	54	715	*	<5	0.8	0.3	34	2.61	5	0.05	0.27	10	0.66	366	0.09	6	<5	<5	<4	*	18	<10	0.1	61	14	*		
69.3	9688	8	<1	0.3	80	676	*	<5	0.1	0.3	182	0.34	<2	0.014	0.13	<1	0.02	33	0.05	<1	<5	<5	<4	*	10	<10	<0.01	2	<4	*		
69.3	9689	9	<1	0.2	84	243	*	<5	0.03	0.4	217	0.39	<2	<0.01	0.13	<1	<0.01	41	0.02	<1	<5	<5	13	*	2	<10	<0.01	5	<4	*		
69.3	9690	8	<1	0.1	212	71	*	<5	0.04	0.7	193	0.29	<2	<0.01	0.07	<1	<0.01	21	<0.01	<1	<5	<5	<4	*	4	<10	<0.01	6	<4	*		
69.4	365	14	10	1.9	50	867	*	<5	0.6	<0.2	39	2.63	6	0.036	0.29	8	0.75	391	0.15	7	<5	<5	<4	*	14	<10	0.12	67	4	*		
69.4	366	14	11	1.9	49	839	*	<5	0.5	0.3	39	2.76	6	0.046	0.32	10	0.81	424	0.13	7	<5	<5	<4	*	13	<10	0.13	71	6	*		
69.4	367	17	13	2.1	82	831	*	<5	0.6	0.3	44	3.22	7	0.053	0.32	9	0.8	540	0.18	8	<5	<5	<4	*	17	<10	0.13	76	9	*		
69.4	2848	19	14	2.3	70	716	*	<5	0.9	0.5	39	2.92	<2	0.045	0.28	14	0.82	533	0.03	7	<5	<5	<4	*	22	<10	0.14	65	8	*		
69.4	2852	33	19	2	41	1082	*	<5	1	0.9	37	3.97	<2	0.031	0.23	8	1.04	450	0.06	5	<5	6	<4	*	39	<10	0.13	91	<4	*		
69.4	3750	6	<1	0.5	169	67	*	<5	0.4	<0.2	277	0.58	<2	<0.01	0.28	2	0.05	45	0.01	<1	35	<5	<4	*	52	<10	<0.01	28	<4	*		
69.4	3802	37	25	2.3	54	749	*	<5	0.9	0.7	51	4.65	<2	0.042	0.19	6	1.46	619	0.06	6	<5	8	465	*	37	<10	0.18	105	<4	*		
69.5	2849	5	<1	0	220	<10	*	<5	<0.01	<0.2	294	0.35	<2	<0.01	0.02	<1	<0.01	30	0.01	<1	<5	<5	<4	*	<1	<10	<0.01	<1	<4	*		
69.5	2850	14	<1	0.4	2741	25	*	<5	0.2	<0.2	297	0.84	<2	<0.01	0.2	2	0.03	37	0.01	<1	8	<5	<4	*	10	<10	<0.01	10	<4	*		
69.5	2851	34	22	2.3	89	914	*	<5	1.2	1	58	3.73	<2	0.069	0.53	13	1.12	845	0.06	7	<5	<5	<4	*	29	<10	0.16	84	5	*		
69.5	3800	9	2	0.5	349	207	*	<5	0.2	<0.2	192	1.04	<2	<0.01	0.26	5	0.04	30	<0.01	<1	12	<5	<4	*	9	<10	<0.01	7	6	*		
69.5	3801	11	2	0.2	298	131	*	<5	<0.01	<0.2	201	2.57	<2	0.016	0.14	1	<0.01	22	<0.01	<1	18	<5	<4	*	<1	<10	<0.01	5	13	*		
69.6	2853	37	18	1.9	35	1186	*	<5	1.1	1	37	4.14	<2	0.021	0.21	7	1.05	384	0.07	5	<5	6	<4	*	41	<10	0.13	88	<4	*		
69.6	3803	26	16	1.6	91	924	*	<5	0.6	0.6	35	3.52	<2	0.033	0.25	7	0.87	469	0.04	4	<5	<5	<4	*	20	<10	0.11	74	10	*		
69.7	368	5	<1	0.4	<5	306	*	<5	0.03	<0.2	111	0.25	<2	<0.01	0.15	<1	0.02	52	0.09	<1	<5	<5	<4	*	5	<10	<0.01	<1	<4	*		
69.8	369	32	15	1.8	37	1465	*	<5	0.6	1.2	40	4.1	5	0.05	0.28	13	1.07	589	0.09	8	<5	6	<4	*	20	<10	0.11	100	<4	*		
69.8	370	27	15	1.7	49	185		<5	0.7	1.3	43	3.25	5	0.073	0.33	56	0.79	676	0.32	6	<5	<5	<20		31	<10	0.09	70	<20			

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Location	Sample Type	Sample Size (ft)	Sample Site	Sample Description	Au ppb	* opt	Ag ppm	* opt	Cu ppm	* %	Pb ppm	* %	Zn ppm	* %	Mo ppm
69.8	9692	Andrew Creek	SS			Metaseds outcrop in stream	52		0.5		63		107		258		3
69.8	9693	Andrew Creek	SS			Metaseds outcrop in stream	31		0.5		58		51		183		3
69.9	371	Andrew Creek	SS			Granite float in stream	20		0.4		73		17		157		4
70.1	124	North Silver	S	0.45	OC	Qz-sulf vn w/ sl, gn, cp, py, po	372		**119.32**	*	580		**22.50**	*	**3.6**	*	2
70.1	125	North Silver	C	3.3	OC	Shear zone w/ fault gouge, clay & sulf	46		46.6		130		2451		5245		10
70.1	126	North Silver	C	0.2	OC	Qz-sulf vn w/ gn, sl, po	287		**16.28**	*	493		**28.34**	*	**2.4**	*	14
70.1	9586	North Silver	C	0.8	OC	Fault gouge w/ msv gn stringer & py	12		**7.45**	*	217		**4.69**	*	**2.9**	*	4
70.1	9587	North Silver	C	0.25	OC	Msv gn in fault	111		**84.30**	*	1104		**48.61**	*	**2.9**	*	1
70.1	9588	North Silver	S		TP	Sil contact zone w/ dissem sulf	40		34.9		62		5090		8490		1
70.2	122	North Silver	C	1.4	TP	Qz-sulf zone w/ gossan, sl, gn	408		**79.46**	*	295		**11.00**	*	**9.5**	*	<1
70.2	123	North Silver	G		MD	Msv gn & sl	107		**33.03**	*	283		**9.71**	*	**12.4**	*	1
70.2	431	North Silver	C	2.75	TP	Fest zone w/ sulf	10		31.3		97		1795		2734		4
70.2	432	North Silver	C	0.5	TP	Fest shear zone w/ sl, gn	26		180.1		92		9048		**1.7**	*	2
70.2	433	North Silver	C	1.5	TP	Fest gneiss w/ dissem py	67		9.6		47		434		145		12
70.2	434	North Silver	C	0.5	OC	Fest, sil gneiss w/ dissem py	<5		3		76		42		87		5
70.2	435	North Silver	C	4	TP	Fest, sheared gneiss w/ sparse sulf	9		19.7		88		1678		1268		3
70.2	8693	North Silver	C	0.5	TP	Shear zone w/ gn & sl in gneiss	732		2735.8		232		**33.47**	*	**9.8**	*	2
70.2	9584	North Silver	Rep	4.9	TP	Gossan in fault br w/ sulf	33		**4.84**	*	379		6843		**1.8**	*	2
70.2	9585	North Silver	S		TP	Msv gn in fault	86		**15.54**	*	904		**11.36**	*	**8.1**	*	<1
70.3	436	North Silver	G		TP	Fest gneiss w/ py	<5		0.4		135		10		88		4
70.4	120	North Silver	Rep	1	OC	Sil band w/ sulf	4345		11.5		31		778		391		3
70.4	121	North Silver	C	0.4	OC	Sil shear zone w/ gn	1165		**517.62**	*	205		**39.75**	*	3764		<1
70.4	437	North Silver	C	2.4	UW	Fest gneiss w/ qz bands & sulf	35		5.6		29		379		492		11
70.4	438	North Silver	G	0.3	RC	Fest, sil band w/ po, py, sl, gn	<5		93.4		954		5098		**1.9**	*	<1
70.4	439	North Silver	G	0.2	RC	Fest, sil gneiss w/ po, py, sl, gn	46		212.9		1052		**2.45**	*	**11.0**	*	2
70.4	2640	North Silver	G		MD	Sil fel dike w/ sulf & mo	10		10.4		520		1200		1900		74
70.4	8694	North Silver	C	3.6	OC	Fest, sil, shear w/ po, qz & fluorite-filled vugs in gneiss	33		11.9		25		954		399		4
70.4	8695	North Silver	S		OC	Fluorite- & qz-filled vug	<5		1.4		9		87		54		2
70.5	430	North Silver	G	0.3	RC	Fest, vuggy qz w/ blebs of gn	14		120.4		145		2158		377		<1
70.5	2641	North Silver	S	0.2	OC	Mo & py blebs in sil host	35		7.5		46		3050		280		10
70.5	8696	North Silver	Rep	3	OC	Zone of alt gneiss w/ cg gn	<5		42.1		130		3475		1640		2
71.1	419	Northeast Cliffs	G	1	OC	Fest, sil metaseds & metavolc w/ sulf	<5		1.3		838		36		9559		<1
71.1	427	Northeast Cliffs	G	2	RC	Fest rhyolite	<5		1.1		112		126		1663		<1
71.1	2834	Northeast Cliffs	G		OC	Rhyolite w/ py	9		0.5		219		36		1569		4
71.2	418	Northeast Cliffs	G	0.5	RC	Sil band w/ fg dissem sulf	<5		8.3		980		436		3959		15
72	144	AMAX Molybdenum	G	0.2	RC	Bt granite w/ mo in fractures	7		0.3		20		23		97		5392
73.1	101	Groundhog Basin	G		RC	Fest granite w/ sl, gn, po	8		12.4		146		8425		5849		2
73.1	102	Groundhog Basin	G		RC	Fest granite w/ sl, gn, po	<5		6.3		188		4726		**1.3**	*	2
73.1	103	Groundhog Basin	G		RC	Fest granite w/ sl, gn, po	<5		8.5		199		5240		7231		2
73.2	265	Groundhog Basin	RC		MD	Msv sulf zone	66		**6.4**	*	1205		**5.91**	*	**4.1**	*	3
73.2	2610	Groundhog Basin	S		MD	Sil bands w/ po, py, sl, gn	20		**4.85**	*	1300		**5.06**	*	**9.1**	*	<10
73.3	2611	Groundhog Basin	S		UW	Sil volc w/ po, py, sl	<5		**1.66**	*	3400		2900		**8.6**	*	<10
73.3	2639	Groundhog Basin	G		RC	Sl lens	15		82		900		**1.83**	*	**20.8**	*	2
73.4	98	Groundhog Basin	G		UW	Msv, fg po, gn, cp, sl	24		141.0		1772		**10.57**	*	**7.7**	*	<1
73.4	99	Groundhog Basin	G	0.4	MD	Msv po, sl, gn, cp	16		7		872		152		**16.0**	*	<1
73.4	100	Groundhog Basin	C	1.5	MD	Dissem sulf in metamorphosed country rock	14		1.8		115		59		4500		2
73.4	263	Groundhog Basin	Rep		OC	Msv sulf zone	8		35.7		1185		368		**12.3**	*	<1

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Ni ppm	Co ppm	Al %	As ppm	Ba ppm	* xrf	Bi ppm	Ca %	Cd ppm	Cr ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm	Na %	Nb ppm	Sb ppm	Sc ppm	Sn ppm	* xrf	Sr ppm	Te ppm	Ti %	V ppm	W ppm	* xrf	Pt ppb	Pd ppb
69.8	9692	31	19	1.8	129	912	*	<5	0.7	0.9	46	4.08	5	0.054	0.44	17	0.89	841	0.16	7	<5	<5	<4	*	24	<10	0.11	80	14	*		
69.8	9693	28	15	1.9	106	952	*	<5	0.6	0.4	42	3.85	5	0.043	0.32	11	0.83	585	0.07	7	<5	5	<4	*	20	<10	0.12	87	8	*		
69.9	371	40	15	1.7	26	1334	*	<5	1.2	1.2	37	4.27	4	0.027	0.21	7	1.03	322	0.1	8	<5	<5	<4	*	41	<10	0.12	103	<4	*		
70.1	124	14	20	0.7	120	<10	*	<5	1.8	291.7	72	17.75	<2	1.136	0.03	1	0.7	4351	<0.01	<1	176	<5	482	*	50	<10	<0.01	21	<4	*		
70.1	125	50	20	1.2	228	433	*	<5	0.3	53.5	147	5.63	<2	0.055	0.2	7	0.39	6521	<0.01	3	9	14	9	*	9	<10	<0.01	65	<4	*		
70.1	126	21	2	0.7	1372	<10	*	<5	0.8	228	100	8.14	<2	0.14	0.04	3	0.44	5142	<0.01	8	309	<5	162	*	47	<10	<0.01	171	<4	*		
70.1	9586	24	11	0.8	37	280	*	8	9	221.4	54	7.05	<2	0.076	0.14	7	0.62	14801	<0.01	3	61	<5	70	*	243	<10	<0.01	17	<4	*		
70.1	9587	9	5	0.3	38	<10	*	6	3	284.8	31	8.92	<2	0.124	0.03	1	0.3	6290	<0.01	<1	887	<5	264	*	63	12	<0.01	5	<4	*		
70.1	9588	5	<1	0.4	67	<10	*	9	3.2	53	36	27.46	<2	0.021	0.03	<1	0.77	>20000	<0.01	<1	<5	<5	117	*	57	<10	<0.01	<1	<4	*		
70.2	122	3	7	1	80	<10	*	<5	0.02	623.9	60	13.6	<2	0.303	0.08	1	0.44	5087	<0.01	<1	167	<5	370	*	5	18	<0.01	14	<4	*		
70.2	123	4	10	1.2	47	<10	*	<5	0.2	903.1	87	8.07	<2	0.282	0.05	<1	0.58	5839	<0.01	<1	105	<5	165	*	2	24	<0.01	17	<4	*		
70.2	431	8	6	1.8	96	161	*	<5	0.03	21	97	8.2	3	0.052	0.18	5	0.69	7598	<0.01	<1	<5	<5	34	*	4	<10	<0.01	27	<4	*		
70.2	432	6	6	2	6	77	*	<5	0.03	197.7	108	>10	4	0.117	0.17	5	0.58	6802	0.01	<1	13	<5	38	*	3	19	<0.01	39	<4	*		
70.2	433	17	4	0.7	105	295	*	<5	0.1	1.1	152	4.05	4	0.011	0.29	5	0.1	548	<0.01	<1	6	<5	72	*	5	<10	<0.01	28	<4	*		
70.2	434	9	3	1.6	<5	1001	*	<5	0.3	0.5	162	6.24	4	<0.01	0.38	4	0.56	732	0.05	<1	<5	6	<4	*	10	<10	0.08	108	<4	*		
70.2	435	7	12	2.1	10	558	*	<5	0.1	9.5	67	7	4	0.016	0.27	7	1.04	5925	<0.01	<1	<5	6	50	*	4	<10	<0.01	52	6	*		
70.2	8693	4	5	0.7	57	<10	*	<5	0.01	838.1	35	9.38	<2	0.188	<0.01	3	0.41	6308	<0.01	<1	558	<5	279	*	4	52	<0.01	17	<4	*		
70.2	9584	8	9	1.4	63	61	*	<5	0.03	124.8	131	13.25	<2	0.077	0.12	2	0.62	3506	<0.01	<1	11	<5	47	*	1	<10	<0.01	12	<4	*		
70.2	9585	6	19	0.7	123	<10	*	7	0.1	499.7	52	21.67	<2	0.168	0.02	<1	0.37	2688	<0.01	<1	84	<5	73	*	1	<10	<0.01	1	<4	*		
70.3	436	66	45	2.8	<5	8475	*	<5	0.8	0.6	124	6.09	5	<0.01	0.47	3	1.88	298	0.17	<1	<5	35	5	*	18	<10	0.19	297	<4	*		
70.4	120	4	3	1.6	770	206	*	<5	0.9	6.7	127	2.68	14	<0.01	0.7	5	0.2	225	<0.01	2	8	<5	32	*	6	<10	<0.01	36	16	*		
70.4	121	1	4	0.2	1534	<10	*	<5	0.01	32.3	63	3.36	<2	1.159	0.08	1	0.02	92	<0.01	<1	548	<5	1497	*	2	<10	<0.01	2	<4	*		
70.4	437	15	3	1.1	123	281	*	<5	0.8	2.5	145	1.72	7	0.013	0.44	2	0.14	369	<0.01	<1	<5	<5	17	*	4	<10	<0.01	30	<4	*		
70.4	438	12	29	0.4	65	44	*	<5	1.4	98.7	27	>10	<2	0.07	0.03	2	0.23	2221	<0.01	<1	<5	<5	47	*	13	19	<0.01	17	<4	*		
70.4	439	14	41	0.5	375	<10	*	<5	0.3	594.2	52	>10	<2	0.208	0.06	2	0.22	1997	<0.01	<1	37	<5	178	*	8	40	<0.01	13	<4	*		
70.4	2640	11	4	0.5	94	30		<2	0.2	10.5	265	1.99	<10	0.03	0.1	<10	0.16	260	<.01		<2	2			4		<.01	48	<10			
70.4	8694	10	3	1.4	100	401	*	<5	0.7	3	150	2.25	7	<0.01	0.54	3	0.33	473	<0.01	<1	<5	<5	10	*	5	<10	<0.01	36	<4	*		
70.4	8695	2	<1	0.7	5	<10	*	<5	10	0.3	60	0.31	<2	<0.01	0.32	<1	0.08	97	0.37	<1	<5	<5	6	*	37	<10	<0.01	8	<4	*		
70.5	430	5	<1	0.6	38	21	*	<5	0.02	1.4	180	3.37	3	0.106	0.04	1	0.32	733	<0.01	<1	16	<5	39	*	<1	<10	<0.01	15	<4	*		
70.5	2641	7	5	0.6	>10000	70		<2	0.01	2	292	4.22	<10	0.01	0.28	<10	0.03	50	<.01		16	1			3		<.01	34	<10			
70.5	8696	8	7	3	6	1077	*	<5	0.2	22.4	61	>10	8	0.012	0.19	3	1.44	3451	0.02	<1	<5	10	117	*	4	12	0.01	121	7	*		
71.1	419	12	18	3.4	<5	239	*	<5	1.3	51.9	48	9.5	8	0.015	0.14	<1	1.04	587	0.25	9	<5	<5	209	*	131	<10	0.09	107	<4	*		
71.1	427	8	6	2.2	5	927	*	<5	0.5	4	50	4.07	3	0.011	0.43	<1	0.63	705	0.11	5	<5	<5	119	*	31	<10	0.05	55	<4	*		
71.1	2834	21	12	4.9	6	674	*	<5	2.2	9	71	5.08	5	<0.01	0.86	<1	1.17	832	0.51	10	<5	8	58	*	152	<10	0.12	109	<4	*		
71.2	418	38	23	3.5	18	253	*	<5	1.9	20.4	182	11.41	19	0.019	1.38	<1	1.37	2858	0.01	6	<5	8	1941	*	66	<10	0.04	80	19	*		
72	144	12	2	1.3	<5	49	*	<5	0.8	0.2	168	2.04	<2	<0.01	0.4	59	0.25	175	0.1	4	<5	<5	4	*	9	<10	0.01	23	23	*		
73.1	101	3	<1	0.6	45	68	*	<5	0.03	53.4	94	1.66	2	<0.01	0.4	4	<0.01	57	0.01	29	<5	<5	311	*	<1	<10	<0.01	<1	8	*		
73.1	102	2	<1	0.6	33	77	*	<5	0.01	109.7	55	4	<2	<0.01	0.38	17	<0.01	83	0.01	30	<5	<5	142	*	<1	<10	<0.01	<1	26			
73.1	103	2	1	0.9	<5	75	*	<5	0.2	60.9	78	2.74	4	<0.01	0.45	7	<0.01	46	0.05	50	<5	<5	108	*	2	<10	<0.01	<1	8	*		
73.2	265	25	17	1.2	428	411	*	<5	0.3	391.7	41	19.05	<2	0.107	0.32	2	0.58	521	0.02	<1	104	<5	1300	*	2	<10	0.05	59	59			
73.2	2610	17	13	1.7	310	<10		4	0.2	>100.0	66	14.15	<10	0.05	0.84	<10	0.89	955	0.03		56	7			5		0.14	86	10			
73.3	2611	13	18	0.7	12	<10		138	0.2	>100.0	27	>15.00	<10	0.24	0.14	<10	0.4	315	<.01		6	2			7		0.06	22	10			
73.3	2639	7	34	0.6	202	10		64	0.01	>100.0	24	>15.00	10	0.34	0.17	<10	0.17	495	<.01		4	1			<1		0.01	9	<10			
73.4	98	7	6	0.5	2508	90	*	<5	0.2	504.7	27	30.95	<2	0.229	0.26	1	0.13	456	<0.01	<1	55	<5	1604	*	5	<10	<0.01	12	126			
73.4	99	9	26	1.9	1487	26	*	<5	0.2	1040	13	24.38	4	0.06	0.17	1	1	718	<0.01	<1	<5	<5	6115	*	2	14	0.02	34	326			
73.4	100	7	8	2.3	9	1109	*	31	1.8	27.6	43	4.4	<2	0.155	0.64	3	1.01	813	0.15	5	<5	6	290	*	45	<10	0.18	82	<4	*		
73.4	263	7	11	0.5	3930	<10	*	53	0.1	823.6	23	27.56	<2	0.036	0.17	<1	0.09	259	<0.01	<1	<5	<5	65	*	1	20	<0.01	5	223			

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Location	Sample Type	Sample Size (ft)	Sample Site	Sample Description	Au ppb	* opt	Ag ppm	* opt	Cu ppm	* %	Pb ppm	* %	Zn ppm	* %	Mo ppm
73.4	264	Groundhog Basin	Rep	2.2	UW	Msv sulf zone	14		**1.9**	*	3100		1926		**8.9**	*	<1
73.4	2612	Groundhog Basin	Rep		OC	Msv sl, po, py	5		24.3		1500		400		**5.1**	*	10
74	428	South Silver	G	0.4	OC	Qz vn w/ sulf	14		0.6		29		28		41		12
74	8690	South Silver	Rep	10	OC	Qz vn in gneiss	<5		1		14		11		25		13
74	8691	South Silver	S		OC	Fractured, fest, gossany gneiss w/ trace gn	<5		63.9		98		1417		378		14
74	8692	South Silver	G		RC	Fest gneiss w/ qz br	6		3.3		26		405		205		7
75.1	127	Copper Zone	G		FL	Silica-rich fg volc w/ blebs of po, cp, sl	34		**1.52**	*	1896		2047		405		2
75.1	128	Copper Zone	G		RC	Msv sulf w/ po, sl, cp	299		42.1		2277		451		**3.1**	*	4
75.2	130	Copper Zone	C	1	OC	Sil, fest gneiss w/ cp in fractures	15		**8.17**	*	**1.7**	*	753		7077		5
75.2	131	Copper Zone	S	0.4	RC	Msv cp in sil gneiss	2812		**16.07**	*	**8.1**	*	234		6980		3
75.2	132	Copper Zone	S	0.05	RC	Band of sl, gn	111		30.8		3204		164		**2.5**	*	4
75.2	133	Copper Zone	C	0.5	OC	Gossan w/ cp	55		**19.65**	*	**2.2**	*	**1.71**	*	**2.7**	*	<1
75.2	9592	Copper Zone	S		TP	Sil contact w/ cp, po, sl	179		12.1		1088		59		282		2
75.2	9593	Copper Zone	C	0.45	OC	Sil contact w/ cp, py	10		19.2		658		1190		**1.3**	*	10
75.2	9594	Copper Zone	C	0.7	OC	Sil contact w/ py, cp	17		14.4		1947		151		7808		8
75.2	9595	Copper Zone	C	0.5	OC	Sil contact w/ cp, py	30		**2.09**	*	7415		41		906		10
75.2	9596	Copper Zone	C	0.2	OC	Lens of cp & sl in gneiss	4580		**16.91**	*	**7.4**	*	225		5613		8
76.1	2642	North Marsha Peak	Rep	0.4	TP	Sulf along a shear in trench	15		**8.8**	*	**1.7**	*	600		**14.5**	*	10
76.1	2643	North Marsha Peak	Rep	0.5	OC	Vuggy, fest, sil band in sc & gneiss	<5		12		275		870		540		6
76.2	440	North Marsha Peak	C	0.4	OC	Fest, sil br w/ po, trace sl	<5		3.6		69		1144		2933		7
76.2	8697	North Marsha Peak	C	2.4	TP	Fracture zone w/ qz & sulf @ rhyolite-gneiss contact	18		53.9		3899		1084		**1.3**	*	27
76.2	8698	North Marsha Peak	S		OC	Vuggy fracture zone in gneiss	5661		9.6		47		250		92		5
77.1	441	East Marsha Peak	SC	7@0.125	TP	Fest, shear zone w/ po, sl, gn	<5		13.9		858		**1.25**	*	**1.9**	*	5
77.1	442	East Marsha Peak	SC	4.7@0.12	TP	Sil zone w/ sparse sulf	<5		3		92		530		2443		6
77.1	443	East Marsha Peak	SC	7.7@0.12	TP	Fest shear zone w/ po, sl, gn	<5		11.3		846		**1.06**	*	**1.5**	*	8
77.1	444	East Marsha Peak	C	6.5	TP	Sheared, fest gneiss w/ po, sl, gn	6		7.9		749		1520		**1.2**	*	4
77.1	445	East Marsha Peak	C	2.2	OC	Qz-sulf band w/ sl, gn, cp	19		35.3		2300		3921		**27.1**	*	8
77.1	446	East Marsha Peak	S	0.4	TP	Qz-sulf bands w/ po, sl, gn, cp	35		51.6		3523		309		**10.4**	*	79
77.1	447	East Marsha Peak	S	0.2	TP	Gray sulf w/ py	27		139.3		7169		306		**14.2**	*	15
77.1	448	East Marsha Peak	C	2	TP	Msv sl & gn in gneiss	36		49.6		785		**3.47**	*	**16.1**	*	2
77.1	449	East Marsha Peak	C	3	TP	Sil, fest, hbl-rich rock w/ blebs of cp, sl, gn	<5		27.4		1590		324		**2.2**	*	27
77.1	450	East Marsha Peak	C	6	TP	Sil, fest, sheared gneiss w/ po, sl, gn, cp	18		11.1		831		119		**2.4**	*	5
77.1	451	East Marsha Peak	C	3.5	TP	Fest, sil gneiss w/ po, sl, gn	<5		78.7		7260		**2.42**	*	**9.4**	*	27
77.1	452	East Marsha Peak	C	7	OC	Vuggy, fest qz vn w/ sulf	272		13.7		353		490		**1.5**	*	30
77.1	453	East Marsha Peak	SC	5@0.125	RC	Vuggy, fest qz vn w/ po, sl, gn	139		14.3		145		556		3750		27
77.1	8699	East Marsha Peak	SC	10@0.5	OC	Fest gneiss w/ dissem & stringers of py, po, gn, sl, cp	6		25.1		405		**2.04**	*	**1.7**	*	3
77.1	8700	East Marsha Peak	SC	10@0.5	OC	Fest, sil gneiss w/ gn, py, po, sl, cp	<5		8.5		370		2186		**1.2**	*	3
77.1	8701	East Marsha Peak	SC	10@0.5	OC	Fest, sil gneiss w/ gn, py, po, sl, cp	6		20.1		196		7849		**1.3**	*	2
77.1	8702	East Marsha Peak	SC	10@0.5	OC	Fest, sil gneiss w/ gn, py, po, sl, cp	<5		11.8		613		1351		**2.6**	*	10
77.1	8703	East Marsha Peak	Rep	1.5	OC	Fest, sil, alt gneiss w/ py, cp	9		33.7		3834		139		**2.8**	*	4
77.1	8704	East Marsha Peak	C	0.5	OC	Lens of dissem sl in qz fracture zone in sil gneiss	<5		9.5		410		279		**10.7**	*	103
77.1	8705	East Marsha Peak	SC	10@0.5	OC	Qz br vn w/ fluorite, py, sl, gn, cp in fractured gneiss	19		38.2		2543		3792		9833		48
77.1	8706	East Marsha Peak	SC	11@0.5	OC	Qz br vn w/ py, gn, sl in fractured gneiss	369		32		1653		6326		**1.5**	*	39
77.1	8707	East Marsha Peak	C	2.1	OC	Qz-filled fracture w/ sl stringers in gneiss	<5		19.4		817		492		**1.4**	*	288
77.2	134	East Marsha Peak	S	0.3	OC	Irregular vuggy qz vn w/ hbl, sl, gn	7		6.8		518		3980		7157		6
77.2	135	East Marsha Peak	G	0.3	OC	Vuggy, fest qz vn w/ sl	17		12.9		655		932		936		12
77.2	9597	East Marsha Peak	S		OC	Gneiss w/ mo	<5		1.2		89		15		72		17

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Ni ppm	Co ppm	Al %	As ppm	Ba ppm	* xrf	Bi ppm	Ca %	Cd ppm	Cr ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm	Na %	Nb ppm	Sb ppm	Sc ppm	Sn ppm	* xrf	Sr ppm	Te ppm	Ti %	V ppm	W ppm	* xrf	Pt ppb	Pd ppb
73.4	264	10	16	1.2	150	499	*	133	0.3	714.7	16	21.84	<2	0.082	0.31	2	0.8	435	0.02	<1	<5	<5	481	*	7	13	0.08	36	144			
73.4	2612	7	22	1	>10000	10		74	0.1	>100.0	50	>15.00	<10	0.03	0.41	<10	0.19	165	<.01		6	1			4		0.01	11	130			
74	428	5	2	0.8	70	229	*	<5	0.1	0.2	143	2.19	6	<0.01	0.25	4	0.23	235	<0.01	7	<5	<5	<4	*	2	<10	<0.01	63	<4	*		
74	8690	12	<1	0.6	89	<20	*	<5	0.8	<0.2	247	0.87	4	<0.01	0.25	2	0.06	119	0.01	<1	<5	<5	1089		7	<10	<0.01	25	<20			
74	8691	15	2	1.1	292	418	*	<5	0.1	1.4	245	4.09	3	<0.01	0.25	6	0.43	1572	<0.01	<1	<5	<5	80	*	4	<10	<0.01	54	<4	*		
74	8692	7	2	0.4	50	194	*	<5	0.01	1	214	1.45	3	<0.01	0.11	2	0.13	518	<0.01	<1	<5	<5	11	*	<1	<10	<0.01	21	<4	*		
75.1	127	7	14	0.5	868	2320	*	50	0.04	6.9	153	1.21	<2	<0.01	0.33	6	0.05	151	0.01	5	<5	<5	35	*	4	<10	<0.01	8	<4	*		
75.1	128	124	201	2.2	9	106	*	431	0.3	225.1	78	31.7	<2	0.025	0.46	87	1.22	847	0.01	<1	<5	7	109	*	10	<10	0.02	83	<4	*		
75.2	130	64	73	2.6	63	129	*	177	0.8	44.4	169	9.88	4	0.018	0.3	4	0.69	2743	0.02	7	<5	6	520	*	27	<10	0.01	93	<4	*		
75.2	131	122	310	0.7	171	188	*	529	0.2	63.4	90	17.45	<2	0.023	0.31	2	0.09	299	<0.01	20	<5	<5	321	*	12	<10	<0.01	<1	<4	*		
75.2	132	7	26	0.9	>10000	246	*	86	0.01	348.6	121	3.19	<2	0.021	0.39	1	0.09	193	<0.01	5	<5	<5	249	*	<1	17	<0.01	2	<4	*		
75.2	133	63	495	5.1	1195	202	*	534	0.7	120.3	31	21.95	12	0.049	0.47	2	1.29	6367	<0.01	5	<5	7	1728	*	40	<10	<0.01	87	<4	*		
75.2	9592	8	6	1	9	926	*	22	0.1	1.9	119	1.57	3	<0.01	0.4	6	0.1	257	0.01	5	<5	<5	78	*	3	<10	<0.01	3	8	*		
75.2	9593	20	9	2.6	<5	<10	*	15	2.4	84.2	140	5.29	6	0.016	0.32	5	0.93	1998	0.03	4	<5	<5	61	*	15	<10	0.01	47	<4	*		
75.2	9594	65	95	1.6	7	<10	*	45	0.4	66.6	158	14.44	3	0.014	0.14	8	1.07	380	<0.01	1	<5	6	49	*	4	<10	<0.01	57	<4	*		
75.2	9595	36	39	1.6	57	277	*	14	0.4	7.8	287	4.7	4	<0.01	0.17	10	0.37	751	<0.01	5	<5	6	57	*	5	<10	0.02	72	12	*		
75.2	9596	18	166	3.8	322	164	*	713	3.7	29.1	19	24.52	4	0.038	1.15	2	0.91	557	0.17	13	<5	9	240	*	28	<10	0.04	85	<4	*		
76.1	2642	2	59	2.8	34	30		410	0.5	>100.0	32	4.96	10	0.08	1.19	<10	0.32	990	<.01		2	2			18		<.01	43	<10			
76.1	2643	4	1	1	92	30		8	<.01	3	372	3.73	<10	0.01	0.19	<10	0.15	300	<.01		<2	1			1		<.01	23	<10			
76.2	440	19	20	4.5	27	141	*	<5	0.6	20.6	93	>10	11	0.01	0.19	6	1.38	5922	<0.01	<1	<5	5	529	*	6	15	<0.01	96	9	*		
76.2	8697	6	5	0.9	33	150	*	58	0.2	104.2	182	2.73	2	<0.01	0.38	4	0.15	286	<0.01	<1	<5	<5	433	*	20	15	<0.01	24	<4	*		
76.2	8698	3	<1	0.5	26	<10	*	<5	10	0.5	66	0.57	<2	<0.01	0.23	3	0.03	142	0.4	<1	<5	<5	10	*	37	<10	<0.01	6	9	*		
77.1	441	22	17	2.3	21	459	*	<5	0.5	159.4	114	9.42	7	0.03	0.29	6	0.87	2064	<0.01	<1	<5	<5	127	*	4	22	<0.01	57	<4	*		
77.1	442	7	1	0.6	19	49	*	<5	0.2	22	236	2.36	3	<0.01	0.14	2	0.16	436	<0.01	<1	<5	<5	11	*	2	<10	<0.01	8	<4	*		
77.1	443	22	12	2.3	33	693	*	<5	0.3	126.7	137	8.01	5	<0.01	0.37	7	0.81	1838	<0.01	<1	<5	<5	112	*	6	16	<0.01	59	<4	*		
77.1	444	14	14	2.7	31	1180	*	<5	1	102.9	89	6.35	8	<0.01	0.55	10	0.83	1726	0.02	<1	<5	5	121	*	20	19	<0.01	78	<4	*		
77.1	445	4	102	0.9	58	<10	*	<5	2.4	>2000	82	>10	8	0.145	0.27	<1	0.25	2666	<0.01	<1	47	<5	168	*	12	73	<0.01	20	<4	*		
77.1	446	11	37	0.7	156	<10	*	35	1.5	861.8	127	>10	3	0.106	0.11	1	0.24	1228	<0.01	<1	28	<5	829	*	30	45	<0.01	29	<4	*		
77.1	447	11	60	0.4	77	<10	*	59	0.9	1067	70	>10	3	0.172	0.19	1	0.07	785	<0.01	<1	32	<5	2483	*	4	45	<0.01	12	<4	*		
77.1	448	19	31	2.1	20	99	*	<5	0.3	1273	61	>10	3	0.113	0.2	5	0.91	3763	<0.01	<1	57	<5	80	*	5	31	<0.01	47	<4	*		
77.1	449	20	10	2.3	11	86	*	24	3.5	191.8	133	9.16	8	0.014	0.39	6	0.75	1715	0.02	<1	<5	<5	166	*	133	22	<0.01	99	<4	*		
77.1	450	26	18	2.5	77	1158	*	<5	0.4	225	141	7.62	9	0.013	0.27	12	1.28	2125	<0.01	<1	5	5	113	*	6	23	<0.01	104	<4	*		
77.1	451	15	59	2.6	41	580	*	76	0.8	776.2	61	>10	9	0.067	0.3	13	0.86	2323	0.01	<1	18	6	368	*	21	43	0.01	122	<4	*		
77.1	452	9	12	1.4	679	62	*	7	6	63.8	152	3.26	18	<0.01	.0.23	2	1.61	3656	0.05	<1	9	<5	35	*	35	17	0.02	30	<4	*		
77.1	453	13	5	1.9	597	74	*	6	2.9	36.2	248	3.88	17	0.012	0.57	2	1.18	1541	<0.01	<1	11	<5	26	*	25	11	<0.01	54	10	*		
77.1	8699	21	16	2.2	18	420	*	<5	1.6	124	137	9.9	4	0.018	0.41	8	0.81	2529	<0.01	<1	15	<5	83	*	29	19	<0.01	66	<4	*		
77.1	8700	29	15	2.7	7	672	*	<5	2.5	88.1	77	8.79	6	<0.01	0.26	9	1.37	3370	0.01	<1	<5	6	159	*	62	15	0.01	99	<4	*		
77.1	8701	29	10	1.6	28	412	*	8	2.1	103.3	66	6.15	2	<0.01	0.26	3	0.86	2291	0.01	<1	7	<5	43	*	44	14	<0.01	45	<4	*		
77.1	8702	21	24	2.6	20	738	*	8	1	226.5	69	7.3	7	0.016	0.37	11	0.99	2222	<0.01	<1	<5	5	113	*	24	16	<0.01	82	<4	*		
77.1	8703	28	38	1.1	20	57	*	5	0.2	268.8	227	8	2	0.041	0.1	5	0.32	1043	<0.01	<1	11	<5	119	*	8	24	<0.01	43	<4	*		
77.1	8704	13	78	1.5	16	<10	*	<5	0.1	966.4	101	7.33	7	0.085	0.04	2	0.81	2826	<0.01	<1	29	<5	55	*	4	43	<0.01	57	<4	*		
77.1	8705	8	9	1.7	82	139	*	9	3.3	91.9	210	4.17	8	0.024	0.52	2	0.63	1374	0.02	<1	<5	<5	152	*	36	21	<0.01	60	<4	*		
77.1	8706	5	14	1.2	1489	29	*	18	6.5	86.3	106	3.02	11	<0.01	0.14	<1	1.27	3882	0.04	<1	44	<5	155	*	50	17	<0.01	22	<4	*		
77.1	8707	14	14	2.3	12	609	*	19	2.4	107.7	190	3.85	6	0.018	1.01	5	0.62	1959	0.02	<1	<5	<5	72	*	45	14	<0.01	74	<4	*		
77.2	134	13	10	2.1	22	147	*	<5	1.8	54.5	270	4.07	3	<0.01	0.62	2	0.71	1649	0.01	6	<5	6	14	*	18	<10	0.01	79	<4	*		
77.2	135	8	3	1	38	32	*	<5	0.1	5.2	250	2.82	2	0.024	0.13	4	0.21	586	<0.01	2	<5	<5	47	*	1	<10	<0.01	30	12	*		
77.2	9597	13	2	0.7	13	1283	*	6	0.1	<0.2	236	2.1	<2	<0.01	0.27	6	0.26	125	0.02	4	<5	<5	<4	*	2	<10	<0.01	83	<4	*		

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Location	Sample Type	Sample Size (ft)	Sample Site	Sample Description	Au ppb	* opt	Ag ppm	* opt	Cu ppm	* %	Pb ppm	* %	Zn ppm	* %	Mo ppm
78.1	116	Nelson Glacier	Rep	0.07	OC	Qz-sulf vn w/ sl, gn, cp, py	15		42		624		**3.73**	*	**3.6**	*	10
78.1	117	Nelson Glacier	Rep	0.4	FL	Msv sulf boulder w/ sl, gn, cp, po	29		36.8		2358		**8.21**	*	**5.9**	*	3
78.1	118	Nelson Glacier	Rep	1	FL	Sil sulf zone w/ sl, cp, gn, po & qz bands	106		**2.64**	*	8394		4692		**15.5**	*	14
78.1	119	Nelson Glacier	Rep	0.5	FL	Msv cg sl w/ cp & po	24		**8.43**	*	**1.5**	*	6202		**30.0**	*	3
78.1	9580	Nelson Glacier	Rep	0.8	FL	Sil gneissic metaseds w/ py stringers	902		3.4		24		155		473		4
78.1	9581	Nelson Glacier	Rep	0.5	FL	Sil gneissic metaseds w/ sl, cp, gn	93		44.9		3451		2245		**12.0**	*	49
78.1	9582	Nelson Glacier	Rep	0.2	FL	Msv sl w/ minor cp	17		**2.87**	*	**1.4**	*	273		**13.8**	*	14
78.1	9583	Nelson Glacier	Rep	0.4	FL	Sil gneissic metaseds w/ blebs of msv sl, gn, cp	<5		45.4		1393		**6.06**	*	**19.9**	*	3
78.2	129	Nelson Glacier	Rep	0.65	FL	Msv gn, sl, py, po w/ qz & calc	71		**5.69**	*	4700		**7.80**	*	**10.4**	*	43
78.2	9589	Nelson Glacier	Rep	0.5	OC	Msv py & gray sulf in qz br	359		12		325		624		2491		<1
78.2	9590	Nelson Glacier	Rep	0.5	FL	Qz br w/ gn, py, sl	35		**7.09**	*	1273		**1.63**	*	**1.9**	*	17
79.1	422	Huff	C	3	OC	Sulf in shear zone w/ gossan & qz vns	86		1.8		38		107		136		<1
79.1	423	Huff	C	5	OC	Gossan in shear zone	296		2.2		76		27		194		3
79.1	424	Huff	C	3	OC	Sheared, fest gneiss w/ sulf	137		0.6		26		14		99		2
79.1	425	Huff	C	1.8	OC	Sheared, vuggy qz vns	198		2.1		21		20		51		4
79.1	426	Huff	C	1.8	OC	Shear zone w/ vuggy qz bands & sulf	81		2.1		28		35		87		3
79.1	2836	Huff	G		FL	Qz vn	28		1.1		17		8		10		4
79.1	2837	Huff	C	0.7	OC	Qz vn w/ sulf	37		1.2		32		10		51		3
79.1	2838	Huff	S		OC	Msv py	11		2.9		22		29		25		2
79.2	96	Huff	C	0.4	OC	Fest qz vn w/ gn, po, & py	2166		**228.4**	*	309		**6.24**	*	595		2
79.2	97	Huff	G	0.7	OC	Qz-calc br zone w/ sulf	39		40.1		49		960		945		5
79.2	261	Huff	C	5.2	OC	Qz vn	<5		<0.1		3		19		12		<1
79.2	262	Huff	Rep	2.5	OC	Qz vn	<5		0.4		7		18		23		<1
79.2	420	Huff	S	0.3	RC	Vuggy qz-py band w/ sl & gn	157		162.6		475		6528		**3.1**	*	6
79.3	92	Huff	G	0.6	RC	Gneiss w/ po	<5		0.9		88		274		629		9
79.3	93	Huff	Rep	0.2	OC	Granular py lens in marble & calcsilicates	212		1.3		142		83		84		3
79.4	90	Huff	G	5	OC	Msv band of gn, sl, po in marble	<5		46.7		2688		**3.28**	*	**7.3**	*	2
79.4	91	Huff	Rep	1.4	OC	Msv band of gn, sl, po in marble	<5		114.9		6412		**11.18**	*	**7.1**	*	<1
79.4	254	Huff	Rep	2.7	OC	Msv sulf layer in ls and marble	<5		**4.6**	*	7330		**15.71**	*	**9.1**	*	<1
79.4	255	Huff	Rep	7	OC	Msv sulf in marble	<5		**2.9**	*	6212		**20.08**	*	**6.8**	*	<1
79.4	454	Huff	C	0.3	OC	Fest, sheared ls w/ po,sl, gn	81		251.3		3994		**4.87**	*	**5.1**	*	4
79.5	256	Huff	Rep	4	OC	Marble w/ dissem sulf	<5		1		152		691		486		8
79.5	259	Huff	RC	1	OC	Alt intermediate int w/ fg dissem po	<5		<0.1		100		25		34		<1
79.6	257	Huff	Rep	1.7	OC	Irregular qz vn in heavily fest marble	<5		0.2		17		60		60		<1
79.6	258	Huff	Rep	2	OC	Fest marble w/ sulf	<5		0.6		90		354		261		6
79.7	8708	Huff	S		OC	Lens of fest, sil gneiss w/ po in marble	<5		2.1		164		14		105		5
80	143	West Nelson Glacier	C	0.4	OC	Qz br zone w/ gneiss, sulf	<5		1		38		236		621		10
80	9602	West Nelson Glacier	C	0.5	OC	Vuggy qz vn w/ py, gn, cp, sl	9		11.8		442		2075		2057		12
80	9603	West Nelson Glacier	C	0.2	OC	Msv sulf in vuggy qz shear zone	94		**4.39**	*	526		**2.70**	*	9577		30
81	2608	Glacier Basin	S	1	OC	Lenses of sl, gn, py in sil volc	<5		**3.97**	*	500		**4.64**	*	**7.9**	*	10
81	2609	Glacier Basin	Rep	2	OC	Gn in sil volc	<5		**7.98**	*	6600		**33.40**	*	**4.3**	*	10
82.1	376	Lake	S	0.5	TP	Meta rock w/ sl & gn	<5		161		271		**8.54**	*	**2.1**	*	3
82.1	377	Lake	C	0.5	MD	Br qz w/ blebs of sl, gn, cp	14		195		2049		**7.89**	*	**5.7**	*	3
82.1	378	Lake	CH	0.25	TP	Msv gn, sl, cp	18		411		3266		**25.10**	*	**3.6**	*	3
82.2	379	Lake	S		MD	Qz br w/ py, sl, gn	<5		37.6		909		**1.65**	*	**1.1**	*	5
82.2	380	Lake	G		MD	Qz br w/ gn, sl	7		178		342		**13.21**	*	**16.4**	*	3
82.2	2613	Lake	S		MD	Sil meta host w/ gn, sl, cp, py	<5		**4.73**	*	1300		**10.50**	*	**6.6**	*	10

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Ni ppm	Co ppm	Al %	As ppm	Ba ppm	* xrf	Bi ppm	Ca %	Cd ppm	Cr ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm	Na %	Nb ppm	Sb ppm	Sc ppm	Sn ppm	* xrf	Sr ppm	Te ppm	Ti %	V ppm	W ppm	* xrf	Pt ppb	Pd ppb
78.1	116	22	44	1.2	10	389	*	<5	0.5	270	75	9.99	<2	1.252	0.11	3	0.6	2092	0.02	2	23	<5	21	*	11	10	0.05	61	<4	*		
78.1	117	7	49	0.4	79	<10	*	<5	0.7	374.4	37	31.9	<2	0.282	0.06	2	0.17	2179	<0.01	<1	15	<5	133	*	6	<10	<0.01	<1	<4	*		
78.1	118	13	82	0.7	647	<10	*	10	1.6	1270	88	6.56	<2	0.806	0.01	<1	0.66	2805	0.01	2	14	<5	667	*	13	26	<0.01	18	<4	*		
78.1	119	4	138	0.7	19	<10	*	153	0.1	>2000	64	12.08	<2	1.375	0.02	<1	0.3	2723	<0.01	2	<5	<5	146	*	2	30	<0.01	11	<4	*		
78.1	9580	15	8	1.8	1470	96	*	<5	1.1	13.4	135	6.15	11	<0.01	0.72	4	0.44	494	<0.01	2	48	<5	89	*	7	<10	<0.01	43	108	*		
78.1	9581	9	62	0.9	173	<10	*	23	2.5	1039	140	5.98	4	0.086	0.05	<1	0.91	2416	0.01	3	8	<5	164	*	20	21	<0.01	26	<4	*		
78.1	9582	36	87	3.4	14	<10	*	42	3.9	1180	72	11.98	3	0.089	0.71	5	0.84	2993	<0.01	7	<5	<5	533	*	117	19	<0.01	101	<4	*		
78.1	9583	23	41	1.7	13	321	*	24	0.1	1243	44	13.06	<2	0.105	0.07	<1	0.56	2408	<0.01	<1	12	<5	60	*	2	22	<0.01	13	<4	*		
78.2	129	10	13	0.3	2837	<10	*	58	0.7	841.2	137	19.3	<2	0.068	0.06	<1	0.1	2359	<0.01	<1	42	<5	904	*	16	27	<0.01	5	<4	*		
78.2	9589	28	54	0.1	702	<10	*	5	0.1	41.7	147	27.75	<2	0.089	0.06	<1	0.06	206	<0.01	<1	10	<5	9	*	10	<10	<0.01	<1	<4	*		
78.2	9590	18	14	0.6	70	129	*	<5	0.2	126	209	6.61	<2	<0.01	0.15	3	0.22	822	<0.01	<1	11	<5	134	*	5	<10	<0.01	17	<4	*		
79.1	422	7	9	1.3	234	551	*	<5	1.3	1	82	2.58	6	0.018	0.21	<1	1.16	2237	<0.01	4	<5	13	<4	*	20	<10	<0.01	42	7	*		
79.1	423	25	18	2.8	554	197	*	<5	0.3	1.2	71	5.08	15	0.017	0.22	<1	3.02	2082	<0.01	15	12	18	<4	*	8	<10	<0.01	142	27	*		
79.1	424	19	13	2.9	270	313	*	<5	5.2	0.5	102	4.16	8	0.011	0.38	<1	2.65	4009	<0.01	7	<5	14	12	*	68	<10	<0.01	80	10	*		
79.1	425	6	3	1.7	584	157	*	<5	15	0.5	67	2.3	13	0.011	0.39	<1	1.86	5155	0.03	2	<5	5	<4	*	100	<10	<0.01	34	<4	*		
79.1	426	3	2	1.1	156	118	*	<5	9.6	0.5	44	2.75	7	<0.01	0.04	<1	2.3	3488	0.07	<1	<5	<5	<4	*	88	<10	<0.01	16	<4	*		
79.1	2836	2	<1	0.5	228	15	*	<5	21	<0.2	39	1.65	4	<0.01	0.02	<1	1.23	11980	0.04	<1	<5	<5	4	*	224	<10	<0.01	3	<4	*		
79.1	2837	9	6	1.5	108	297	*	<5	6.2	0.3	82	3.94	5	0.011	0.1	<1	1.64	6782	0.01	2	<5	7	<4	*	80	<10	<0.01	30	<4	*		
79.1	2838	8	29	0.9	126	1127	*	<5	0.1	0.3	26	>10.96	<2	0.288	0.19	<1	0.21	380	0.03	<1	9	5	<4	*	11	<10	<0.01	22	12	*		
79.2	96	4	<1	0.3	2440	154	*	<5	0.1	2	127	8.64	<2	0.148	0.1	1	0.03	207	0.01	<1	75	<5	1295	*	15	<10	<0.01	22	<4	*		
79.2	97	<1	<1	0.2	438	<10	*	<5	24	4.7	10	2.74	<2	<0.01	0.01	5	0.9	>20000	<0.01	3	<5	<5	11	*	567	<10	<0.01	<1	<4	*		
79.2	261	3	<1	0.2	<5	3693	*	<5	0.1	<0.2	43	0.17	<2	<0.01	0.05	<1	0.02	74	0.05	2	<5	<5	<4	*	20	<10	<0.01	<1	<4	*		
79.2	262	4	<1	0.2	29	164	*	<5	0.2	<0.2	155	0.3	<2	<0.01	0.02	2	0.06	345	<0.01	1	<5	<5	<4	*	4	<10	<0.01	2	<4	*		
79.2	420	10	16	0.1	**1.77%**	38	*	<5	1.6	182.4	63	8.51	<2	0.057	0.03	<1	0.19	11087	<0.01	<1	23	<5	46	*	45	<10	<0.01	3	<4	*		
79.3	92	41	9	1.8	<5	2734	*	<5	0.9	5.5	124	3.74	<2	0.019	0.4	4	1.09	549	0.09	3	<5	10	<4	*	35	<10	0.1	133	<4	*		
79.3	93	28	22	2.3	53	1620	*	<5	2	0.4	106	13.81	<2	0.118	0.34	1	1.34	1090	0.04	<1	56	20	<4	*	64	<10	<0.01	140	11	*		
79.4	90	10	1	0.6	11	<10	*	<5	0.1	488.9	37	39.82	<2	0.094	<0.01	<1	0.59	813	<0.01	<1	<5	<5	198	*	4	<10	<0.01	19	125			
79.4	91	17	8	0.2	6	<10	*	<5	0.8	382.9	11	35.27	<2	0.053	0.04	<1	0.14	963	<0.01	<1	64	<5	290	*	9	14	<0.01	8	96			
79.4	254	5	<1	0.1	6	237	*	<5	0.02	525.9	<1	34.39	<2	0.205	0.02	<1	0.08	571	<0.01	<1	35	<5	76	*	2	<10	<0.01	7	127			
79.4	255	4	4	0.4	<5	465	*	<5	2.3	366.1	13	26.16	<2	0.071	0.06	<1	0.18	1156	<0.01	<1	23	<5	87	*	52	15	<0.01	72	108			
79.4	454	14	21	1.8	198	<10	*	<5	7.7	246.5	40	>10	4	0.07	<0.01	3	1.43	13907	<0.01	<1	23	6	153	*	247	37	<0.01	57	<4	*		
79.5	256	64	22	2.4	<5	2222	*	<5	2.6	3.5	29	4.82	2	<0.01	0.08	6	0.45	108	0.18	3	<5	<5	<4	*	73	<10	0.04	28	<4	*		
79.5	259	38	29	0.6	<5	2794	*	<5	0.6	0.2	22	3.46	<2	<0.01	0.05	<1	0.57	198	0.08	<1	<5	6	<4	*	3	<10	0.1	65	<4	*		
79.6	257	4	<1	0.4	<5	1964	*	<5	0.1	0.3	54	0.79	<2	<0.01	0.14	8	0.2	152	0.04	2	<5	<5	<4	*	4	<10	0.04	20	<4	*		
79.6	258	41	11	2.5	<5	1418	*	<5	0.8	2	129	4.71	<2	<0.01	0.91	2	1.37	571	0.22	5	<5	14	<4	*	54	<10	0.26	197	<4	*		
79.7	8708	56	39	4	<5	1636	*	<5	2.4	0.9	52	7.86	6	<0.01	0.31	<1	1.21	244	0.29	<1	<5	<5	<4	*	95	<10	0.14	110	<4	*		
80	143	25	5	0.9	11	628	*	<5	0.5	4.2	223	1.58	<2	<0.01	0.16	5	0.55	1401	<0.01	5	<5	<5	<4	*	17	<10	<0.01	92	<4	*		
80	9602	11	3	0.5	217	97	*	<5	0.1	16.4	243	1.41	<2	<0.01	0.11	1	0.3	416	<0.01	1	<5	<5	<4	*	4	<10	<0.01	15	<4	*		
80	9603	22	23	2	8363	<10	*	<5	4.8	95.9	57	15.22	<2	0.026	0.05	2	1.78	5741	<0.01	5	16	<5	27	*	172	<10	<0.01	108	<4	*		
81	2608	21	52	3.1	4	30		230	3.7	>100.0	103	4.16	<10	0.08	1.42	<10	0.48	2670	0.74		6	1			114		<.01	41	10			
81	2609	3	12	0.6	4	30		16	0.5	>100.0	24	5.03	<10	0.01	0.07	10	0.07	850	0.07		140	1			32		0.03	17	10			
82.1	376	32	15	1.9	26	195	*	<5	3.1	360.7	163	4.94	3	0.063	0.16	7	0.96	3823	<0.01	<1	103	6	18	*	42	<10	<0.01	47	<4	*		
82.1	377	36	18	1	519	212	*	<5	0.03	634	122	4.85	<2	0.113	0.16	5	0.33	816	<0.01	<1	50	<5	30	*	4	<10	<0.01	34	<4	*		
82.1	378	26	20	1.5	16	90	*	<5	0.1	406.2	142	5.33	<2	0.075	0.06	3	0.55	1685	<0.01	1	186	<5	51	*	5	<10	0.02	65	<4	*		
82.2	379	27	19	0.6	51	333	*	20	0.3	120	184	2.47	<2	0.051	0.12	5	0.14	410	0.01	1	8	<5	<4	*	4	<10	0.01	90	<4	*		
82.2	380	8	45	0.5	<5	216	*	92	0.01	1649	109	4.25	<2	0.508	0.13	<1	0.12	762	<0.01	<1	70	<5	35	*	3	19	<0.01	23	<4	*		
82.2	2613	18	19	2.1	42	10		24	3.2	>100.0	78	6.38	<10	0.19	0.13	<10	0.81	4440	<.01		64	3			122		0.01	81	<10			

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Location	Sample Type	Sample Size (ft)	Sample Site	Sample Description	Au ppb	* opt	Ag ppm	* opt	Cu ppm	* %	Pb ppm	* %	Zn ppm	* %	Mo ppm
82.2	9694	Lake	Rep	4.6	UW	Shear zone w/ qz br, phyllite, py, sl, gn	<5		10.3		289		1058		**1.3**	*	4
82.2	9695	Lake	Rep	3	UW	Shear zone w/ qz br, py, sl, gn	<5		1.7		38		820		717		3
82.2	9696	Lake	C	0.9	TP	Shear zone w/ qz, gn, sl, py, trace cp	<5		19.3		566		3500		18.8		2
83	2644	Berg Basin	G	0.4	FL	Qz vn w/ blebs of sl, gn & py	10		75		530		**2.12**	*	**5.0**	*	20
84.1	373	Copper King	G		FL	Msv py w/ cp, sl	23		11.3		4849		35		**2.7**	*	31
84.1	374	Copper King	C	0.7	OC	Irregular band of msv py, cp, sl w/ qz	39		18.9		5639		41		**2.1**	*	24
84.1	375	Copper King	S		MD	Alt int w/ msv py, sl, lesser cp	16		12		4694		81		**1.9**	*	27
84.2	372	Copper King	S	1.6	OC	Qz vn w/ py	679		2.1		20		7		41		4
85	73	Berg	SS				<5		0.2		40		10		99		2
85	241	Berg	RC		FL	Qz peg cobbles in stream	<5		<0.1		14		20		41		1
86.1	466	Black Crag	G	0.3	FL	Fest, qz-rich br w/ po	93		43.5		37		70		558		23
86.2	476	Black Crag	G	0.2	FL	Felsite w/ mo along fractures	<5		0.2		75		19		44		1348
86.2	479	Black Crag	G	1	FL	Fest, sil volc w/ py cubes	<5		2		58		17		6		6
86.2	8731	Black Crag	G		FL	Gray, fest, sil volc w/ fg py lenses & pods	110		9		25		16		206		4
86.3	480	Black Crag	G	0.4	FL	Fg fel int w/ qz-mo seam	<5		1.2		187		18		167		735
86.3	8733	Black Crag	S		FL	Sil, fest int w/ py, cp	<5		1.8		1508		4		77		43
86.3	8734	Black Crag	RC	5	OC	Maroon, very fg hornfels w/ minor po, py	<5		<0.1		56		10		108		8
86.4	8732	Black Crag	S		RC	Fest granite w/ very fg dissem py	<5		<0.1		8		33		48		15
87	2844	Craig River area	G	0.5	OC	Qz vn w/ py	35		0.6		280		<2		33		2
87	3736	Craig River area	G		RC	Msv py in qz & metaseds	17		0.3		46		3		10		478
87	3746	Craig River area	C	2.2	OC	Gossan w/ qz at margins of marble	41		<0.1		121		<2		10		11
87	3747	Craig River area	S		RC	Sil skarn w/ msv py, po	37		2.3		1781		3		19		8
88.1	2840	Craig Claims area	C	0.7	OC	Metaseds w/ po	<5		0.2		266		5		36		42
88.1	2841	Craig Claims area	C	1.1	OC	Fest metaseds	<5		0.3		371		<2		18		10
88.1	3741	Craig Claims area	RC		OC	Skarn w/ py in metaseds	8		2.7		1277		17		2288		58
88.2	3737	Craig Claims area	G		RC	Sil sc w/ py, minor cp	<5		<0.1		213		5		6		91
88.2	3738	Craig Claims area	Rep		RC	Py, po, minor cp in metaseds	8		1.2		1273		5		45		12
88.2	3739	Craig Claims area	G		RC	Py in skarn	<5		0.5		560		<2		11		3
88.2	3740	Craig Claims area	G		RC	Msv py, po, cp in hornblendite	30		9.2		5706		79		**3.1**	*	8
89.1	473	North Bradfield River Skarn	G	0.5	RC	Fest, sil rock w/ po,cp	<5		1		539		4		47		12
89.1	8726	North Bradfield River Skarn	G		RC	Qz-rich gneiss w/ dissem po, trace cp on fractures	<5		0.7		398		7		57		3
89.2	455	North Bradfield River Skarn	G	0.3	RC	Msv po w/ cp	26		1.3		1540		27		236		2
89.2	456	North Bradfield River Skarn	Rep	2	OC	Hbl w/ po, mag, cp	115		8.7		**1.3**	*	9		178		2
89.2	2860	North Bradfield River Skarn	G		RC	Skarn w/ po, cp	25		1.7		2084		3		139		2
89.2	2861	North Bradfield River Skarn	G		RC	Skarn w/ po, cp	164		2.4		3739		<2		182		3
89.3	471	North Bradfield River Skarn	C	2	TP	Fest mag	190		1.2		1482		<2		151		3
89.3	8725	North Bradfield River Skarn	S		RC	Msv mag	32		0.9		820		<2		53		4
89.4	474	North Bradfield River Skarn	G	0.5	FL	Msv mag w/ bands of po, cp	34		0.4		809		<2		112		3
89.4	475	North Bradfield River Skarn	G	0.6	FL	Qz-calc-garnet skarn w/ po, cp	26		2.1		6629		<2		33		8
89.4	8727	North Bradfield River Skarn	Rep	1	RC	Very fg, maroon, fest, msv garnet w/ py, cp	6		0.8		2664		5		31		10
89.4	8728	North Bradfield River Skarn	Rep	1	OC	Bt sc w/ py, po	<5		0.4		121		11		45		3
89.4	8729	North Bradfield River Skarn	S	0.8	FL	Very fg, maroon, fest, msv garnet w/ py, cp	26		1.2		3606		3		50		168
89.5	472	North Bradfield River Skarn	S	0.4	RC	Hbl, mag, po, cp	60		1.5		3073		3		53		4
89.5	484	North Bradfield River Skarn	C	4.5	TP	Msv garnet skarn w/ streaks of cp, dissem po	93		1.7		3316		4		40		7
89.6	481	North Bradfield River Skarn	C	1	OC	Fest, sil gneiss w/ dissem mag, py	<5		0.3		36		<2		45		220
89.6	487	North Bradfield River Skarn	SC	18 @ 0.25	TP	Tactite w/ mag, po, cp .	69		1		870		<2		39		6
89.6	488	North Bradfield River Skarn	SC	18 @ 0.25	TP	Tactite w/ mag, po, cp	14		1.1		844		<2		38		4

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map	Sample	Ni	Co	Al	As	Ba	*	Bi	Ca	Cd	Cr	Fe	Ga	Hg	K	La	Mg	Mn	Na	Nb	Sb	Sc	Sn	*	Sr	Te	Ti	V	W	*	Pt	Pd
No.	No.	ppm	ppm	%	ppm	ppm	xrf	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	%	ppm	%	ppm	ppm	ppm	ppm	xrf	ppm	ppm	%	ppm	ppm	xrf	ppb	ppb
82.2	9694	29	23	3.2	8	1059	*	<5	5	119.6	105	7.72	4	0.787	0.33	7	2.27	3388	0.04	1	<5	14	8	*	140	<10	0.09	223	<4	*		
82.2	9695	115	30	4.3	37	217	*	<5	5.5	5.9	440	7.09	5	0.086	0.15	11	4.18	4463	<0.01	2	<5	16	<4	*	211	<10	<0.01	129	<4	*		
82.2	9696	15	31	1.7	11	357	*	<5	0.1	1717	74	8.05	<2	0.288	0.09	1	0.65	2463	<0.01	2	<5	<5	22	*	5	11	0.02	86	<4	*		
83	2644	14	26	0.3	1060	20		<2	0.02	>100.0	206	4.55	<10	0.05	0.09	<10	0.08	245	<.01		16	<1			<1		<.01	17	<10			
84.1	373	60	128	0.8	<5	373	*	<5	0.6	483.7	57	>10	<2	0.391	0.09	<1	0.71	436	0.01	<1	<5	<5	22	*	11	<10	<0.01	45	<4	*		
84.1	374	74	86	0.3	15	1040	*	<5	0.02	381.4	53	>10	<2	0.605	0.09	<1	0.17	41	0.02	<1	<5	<5	26	*	2	<10	<0.01	7	<4	*		
84.1	375	73	81	0.4	5	1004	*	<5	1.2	286.1	24	>10	<2	0.458	0.08	<1	0.42	583	0.01	<1	<5	<5	20	*	18	<10	<0.01	16	<4	*		
84.2	372	23	9	0.9	151	306	*	<5	1.7	0.5	226	2.15	2	<0.01	0.08	2	0.81	485	<0.01	<1	<5	15	<4	*	33	<10	<0.01	44	<4	*		
85	73	22	14	1.7	12	1952	*	<5	0.7	0.3	39	3.05	4	0.02	0.33	9	1.18	426	0.03	3	<5	<5	<4	*	26	<10	0.14	61	<4	*		
85	241	5	<1	0.4	<5	899	*	<5	0.5	<0.2	87	0.55	<2	<0.01	0.18	2	0.08	102	0.06	3	<5	<5	<20		9	<10	0.01	7	<20			
86.1	466	17	6	0.3	117	87	*	<5	0.02	4	94	>10	<2	0.572	0.15	5	0.01	29	<0.01	26	<5	<5	5	*	<1	<10	0.01	4	6	*		
86.2	476	3	<1	0.2	<5	<10	*	<5	<0.01	1.6	120	0.66	<2	<0.01	0.15	6	<0.01	24	0.07	<1	<5	<5	<4	*	<1	<10	0.02	<1	5	*		
86.2	479	7	<1	<0.01	36	41	*	<5	<0.01	<0.2	176	9.61	<2	<0.01	<0.01	2	<0.01	21	<0.01	20	<5	<5	8	*	1	<10	0.04	2	<4	*		
86.2	8731	2	6	0.5	336	4344	*	<5	0.5	0.2	36	7.13	<2	0.03	0.27	23	0.04	64	<0.01	2	<5	<5	<4	*	5	<10	0.06	3	13	*		
86.3	480	4	<1	0.5	<5	194	*	<5	0.8	2.2	178	1.69	<2	<0.01	0.35	130	0.08	186	0.26	53	<5	<5	6	*	27	<10	0.08	14	21	*		
86.3	8733	57	60	0.6	<5	16	*	<5	0.1	<0.2	58	>10	2	<0.01	0.59	11	0.03	54	0.04	10	<5	<5	<4	*	7	<10	0.02	7	8	*		
86.3	8734	15	11	2.5	<5	532	*	<5	0.2	0.3	62	4.42	10	<0.01	1.23	14	1.43	702	0.11	<1	<5	10	6	*	9	<10	0.24	69	8	*		
86.4	8732	4	<1	0.3	<5	225	*	<5	<0.01	<0.2	155	1.35	4	<0.01	0.15	13	0.02	24	0.06	<1	<5	<5	<4	*	<1	<10	<0.01	4	5	*		
87	2844	8	118	1.2	5	1314	*	<5	0.6	<0.2	151	6.17	4	<0.01	0.17	2	0.59	215	0.09	<1	<5	<5	<4	*	33	<10	0.12	63	<4	*		
87	3736	13	96	0.4	8	543	*	<5	0.3	<0.2	100	>10	<2	<0.01	0.04	1	0.03	30	0.04	<1	<5	<5	13	*	12	11	0.13	19	<4	*		
87	3746	11	26	0.2	9	24	*	<5	0.3	<0.2	193	>10	<2	<0.01	0.02	<1	0.06	87	<0.01	<1	<5	<5	<4	*	8	<10	0.02	69	7	*		
87	3747	26	24	0.3	<5	17	*	<5	2.9	<0.2	61	>10	<2	0.021	<0.01	<1	0.1	217	<0.01	<1	<5	<5	14	*	17	17	0.01	13	<4	*		
88.1	2840	219	41	2.7	<5	829		<5	1.8	<0.2	310	4.42	3	<0.01	0.85	1	1.94	306	0.19	<1	<5	5	79		106	<10	0.19	131	<20	*		
88.1	2841	31	35	1.3	<5	147		<5	1.6	<0.2	58	4.13	3	<0.01	0.09	<1	0.58	231	0.19	<1	<5	6	9		84	<10	0.33	73	<20	*		
88.1	3741	351	91	1	<5	454	*	<5	1.1	33.9	62	>10	2	<0.01	0.09	1	0.31	219	0.04	<1	<5	<5	<4	*	26	<10	0.06	73	<4	*		
88.2	3737	19	9	0.3	<5	3042	*	<5	0.2	<0.2	145	1.38	<2	<0.01	0.11	3	0.12	91	0.11	3	<5	<5	<4	*	43	<10	0.05	16	8	*		
88.2	3738	106	37	1.6	<5	1219	*	<5	1.6	0.6	143	5.42	3	<0.01	0.3	<1	0.79	262	0.16	<1	<5	<5	<4	*	81	<10	0.22	69	<4	*		
88.2	3739	54	36	0.7	<5	<10	*	<5	5	<0.2	128	9.04	2	<0.01	<0.01	<1	0.03	1292	<0.01	<1	<5	<5	<4	*	10	<10	0.05	149	<4	*		
88.2	3740	119	47	0.4	9	163	*	<5	1.1	296.1	41	>10	3	1.2	0.02	4	0.14	735	0.02	<1	<5	<5	108	*	23	19	0.13	47	<4	*		
89.1	473	32	28	0.5	<5	1632	*	<5	0.7	0.7	67	5.55	<2	<0.01	0.15	4	0.4	117	0.07	<1	<5	<5	<4	*	20	<10	0.13	47	7	*		
89.1	8726	26	25	0.6	<5	2016	*	<5	0.5	0.5	70	4.37	<2	<0.01	0.1	3	0.46	139	0.05	<1	<5	<5	<4	*	15	<10	0.09	52	<4	*		
89.2	455	31	84	0.6	<5	12	*	<5	0.6	0.6	16	>10	<2	<0.01	0.03	2	0.14	808	0.02	<1	<5	<5	29	*	20	16	0.04	87	5	*		
89.2	456	56	155	1.2	<5	107	*	<5	1.9	1.9	64	>10	<2	0.018	0.09	2	0.4	634	0.08	<1	<5	<5	17	*	52	12	0.05	63	<4	*		
89.2	2860	34	81	1.5	8	323	*	<5	1.5	0.4	29	>10	4	<0.01	0.09	3	0.22	645	0.1	<1	<5	<5	26	*	65	15	0.08	142	<4	*		
89.2	2861	43	129	0.2	<5	<10	*	<5	1.2	0.9	10	>10	3	<0.01	<0.01	2	0.14	526	<0.01	<1	<5	<5	37	*	6	21	<0.01	37	<4	*		
89.3	471	12	19	0.4	<5	<10	*	<5	0.2	<0.2	9	>10	<2	<0.01	<0.01	3	0.07	632	<0.01	<1	<5	<5	37	*	5	19	<0.01	65	<4	*		
89.3	8725	7	16	0.3	<5	<10	*	<5	0.04	<0.2	6	>10	4	<0.01	<0.01	1	0.06	488	<0.01	<1	<5	<5	31	*	2	11	<0.01	262	<4	*		
89.4	474	11	136	0.1	<5	<10	*	<5	0.2	<0.2	17	>10	<2	<0.01	<0.01	2	0.05	634	<0.01	<1	<5	<5	36	*	3	14	<0.01	26	<4	*		
89.4	475	25	88	1	<5	14	*	<5	6	0.9	109	>10	4	0.014	0.01	2	0.04	1371	0.01	<1	<5	<5	5	*	5	<10	0.02	24	<4	*		
89.4	8727	51	225	0.9	<5	11	*	<5	6.3	0.6	86	>10	3	<0.01	<0.01	3	0.05	1554	<0.01	<1	<5	<5	11	*	3	<10	0.03	34	<4	*		
89.4	8728	75	23	2.6	<5	450	*	<5	3.3	<0.2	58	2.82	6	<0.01	0.07	13	0.74	186	0.16	<1	<5	<5	5	*	228	<10	0.12	29	6	*		
89.4	8729	81	65	1	<5	69	*	<5	6.1	1.2	104	>10	2	<0.01	<0.01	1	0.09	1804	<0.01	<1	<5	<5	7	*	3	<10	0.05	42	9	*		
89.5	472	74	146	2	<5	<10	*	<5	3.7	0.4	59	>10	3	<0.01	<0.01	<1	0.07	1112	0.04	<1	<5	<5	11	*	102	12	0.07	80	<4	*		
89.5	484	45	72	3.9	<5	260	*	<5	5.4	0.6	54	6.24	5	<0.01	0.03	3	0.09	680	0.14	<1	<5	<5	<4	*	193	13	0.08	60	<4	*		
89.6	481	21	4	0.7	<5	1204	*	<5	1	0.4	153	1.79	<2	<0.01	0.09	5	0.14	58	0.09	<1	<5	<5	<4	*	49	<10	0.06	25	<4	*		
89.6	487	14	49	1.1	<5	714	*	<5	2.6	<0.2	50	>10	3	<0.01	0.05	4	0.12	702	0.04	<1	<5	<5	14	*	46	12	0.04	95	10	*		
89.6	488	12	40	0.5	<5	<10	*	<5	2.2	<0.2	42	>10	5	<0.01	0.04	3	0.12	713	0.02	<1	<5	<5	29	*	18	14	0.03	185	<4	*		

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Location	Sample Type	Sample Size (ft)	Sample Site	Sample Description	Au ppb	* opt	Ag ppm	* opt	Cu ppm	* %	Pb ppm	* %	Zn ppm	* %	Mo ppm
89.7	482	North Bradfield River Skarn	G	0.9	RC	Fest, sil gneiss w/ ml, cp	289		1.6		2586		<2		18		8
89.7	483	North Bradfield River Skarn	C	1.2	OC	Gossan w/ po, cp	19		3.4		3307		<2		37		100
89.7	2645	North Bradfield River Skarn	Rep	8	OC	Mag & hematite band	3600		11.6		1130		6		150		3
89.7	2646	North Bradfield River Skarn	C	0.8	OC	Fest qz lens w/ mag	1360		3.4		2200		27		95		3
89.7	8735	North Bradfield River Skarn	C	2.3	TP	Msv mag w/ po, cp replacing marble	136		2.9		3351		<2		64		4
89.7	8736	North Bradfield River Skarn	C	7.6	TP	Msv mag w/ fg to mg euhedral garnet in marble	95		1.2		658		<2		32		6
89.7	8737	North Bradfield River Skarn	SC	10.4 @ 0.	OC	Msv mag w/ garnet, trace cp in marble	281		1.6		623		<2		47		3
89.7	8738	North Bradfield River Skarn	SC	10.4 @ 0.	OC	Msv mag & garnet in marble	121		2.5		1481		<2		42		3
90.1	463	Mt Lewis Cass	G		FL	Fest metamorphics w/ po, cp	41		1.3		1832		3		29		3
90.1	464	Mt Lewis Cass	G	0.3	FL	Sil metamorphics w/ vuggy qz	28		0.9		74		3		12		15
90.2	8717	Mt Lewis Cass	S		FL	Boulder of purple metaseds w/ cp, po, mag in 1.5" vn	289		17.6		**1.3**	*	9		203		29
90.2	8718	Mt Lewis Cass	C	0.3	OC	Qz vn w/ dissem mo in int	<5		0.3		46		14		20		1240
90.3	470	Mt Lewis Cass	G	0.4	RC	Band of fest, sil marble & sc w/ py	<5		1.5		60		11		16		31
90.3	8723	Mt Lewis Cass	Rep	0.5	OC	Fest granulite w/ dissem po, trace cp	<5		0.5		198		4		62		4
90.3	8724	Mt Lewis Cass	Rep	5	OC	Purple, heavily fest granulite w/ dissem po	18		0.6		122		5		84		7
91	2845	Upper Marten Lake	Rep		OC	Qz vn	<5		0.3		26		4		119		6
91	2846	Upper Marten Lake	C	3	OC	Fault gouge	<5		0.6		80		7		188		14
91	2847	Upper Marten Lake	G		OC	Fest zone	475		86.9		44		1218		418		8
91	3748	Upper Marten Lake	S		OC	Fest qz in shear w/ minor py, po	<5		0.2		62		5		91		6
92.1	66	Bradfield River	SS			Sands in tide flat	<5		<0.1		19		9		74		1
92.1	67	Bradfield River	SS			Taken in mud flat @ tidal zone	<5		0.1		25		8		74		2
92.1	234	Bradfield River	SS			Mud from tidal flat	<5		0.1		24		8		69		<1
92.1	235	Bradfield River	SS			Mud from tidal flat	<5		0.1		25		9		70		1
92.2	68	Bradfield River	SS			Taken in mud flat @ tidal zone	<5		<0.1		15		6		38		<1
92.2	69	Bradfield River	SS			Mag sands in tidal zone	<5		<0.1		17		7		33		<1
92.2	236	Bradfield River	SS			Mud from tidal flat	<5		<0.1		16		5		35		<1
92.2	237	Bradfield River	SS			Mud from tidal flat	<5		<0.1		11		7		52		<1
92.3	70	Bradfield River	SS			Mag sands in tidal zone	<5		<0.1		13		9		55		<1
92.3	71	Bradfield River	SS			Mag sands in tidal zone	<5		<0.1		19		6		37		<1
92.3	238	Bradfield River	SS			Black sands	10		<0.1		10		7		90		<1
92.3	239	Bradfield River	SS			Black sands	<5		<0.1		17		6		32		<1

Table A-1. Analytical results for samples from mines, prospects, and occurrences

Map No.	Sample No.	Ni ppm	Co ppm	Al %	As ppm	Ba ppm	* xrf	Bi ppm	Ca %	Cd ppm	Cr ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm	Na %	Nb ppm	Sb ppm	Sc ppm	Sn ppm	* xrf	Sr ppm	Te ppm	Ti %	V ppm	W ppm	* xrf	Pt ppb	Pd ppb
89.7	482	28	127	2.3	7	43	*	<5	3.7	<0.2	51	9.34	2	<0.01	<0.01	2	0.11	611	0.02	<1	<5	<5	<4	*	69	<10	0.07	46	<4	*		
89.7	483	51	74	1.8	<5	104	*	<5	4.6	0.7	53	>10	4	<0.01	0.01	2	0.16	1308	0.04	<1	<5	<5	15	*	35	11	0.07	168	4	*		
89.7	2645	4	18	0.5	2	10		<2	0.5	1.5	21	>15.00	20	0.05	0.01	<10	0.02	670	<.01		<2	<1			9		0.01	36	<10			
89.7	2646	8	17	1.3	<2	10		<2	4.8	1.5	226	5.37	<10	0.02	<.01	<10	0.04	865	<.01		<2	1			7		0.02	40	<10			
89.7	8735	17	62	0.6	<5	303	*	<5	1.2	<0.2	11	>10	<2	0.011	0.02	2	0.08	518	0.01	<1	<5	<5	31	*	6	20	0.02	30	<4	*		
89.7	8736	8	29	0.7	<5	16	*	<5	2.2	<0.2	20	>10	<2	<0.01	0.04	<1	0.05	823	0.01	<1	<5	<5	24	*	8	15	0.02	32	24	*		
89.7	8737	6	22	1.1	<5	283	*	<5	1.3	0.3	15	>10	2	<0.01	0.06	2	0.13	494	0.06	<1	<5	<5	24	*	56	11	0.03	39	<4	*		
89.7	8738	4	14	0.8	<5	99	*	<5	1.8	<0.2	25	>10	<2	<0.01	0.02	2	0.05	709	0.03	<1	<5	<5	21	*	28	12	0.02	29	8	*		
90.1	463	36	68	0.9	7	59	*	<5	4.2	0.3	100	8.09	<2	0.012	0.07	<1	0.16	625	0.07	<1	<5	<5	<4	*	51	<10	0.05	20	82	*		
90.1	464	6	2	0.4	104	1677	*	<5	1.6	<0.2	108	1.16	<2	<0.01	0.15	9	0.32	173	0.06	<1	<5	<5	<4	*	22	<10	0.1	57	<4	*		
90.2	8717	15	24	3.2	<5	582	*	58	1.8	9.8	59	5.91	6	<0.01	0.97	2	0.92	702	0.29	<1	<5	6	<4	*	119	10	0.27	93	36	*		
90.2	8718	11	2	0.2	<5	1416	*	<5	0.1	0.2	251	1.06	<2	<0.01	0.08	4	0.04	135	0.05	<1	<5	<5	<4	*	32	<10	0.02	3	<4	*		
90.3	470	23	4	0	<5	<10	*	<5	0.2	<0.2	240	7.27	<2	0.016	<0.01	1	0.12	57	<0.01	<1	<5	<5	<4	*	1	<10	<0.01	2	5	*		
90.3	8723	44	23	0.5	<5	<10	*	<5	0.2	0.4	266	9.11	<2	<0.01	0.06	2	0.22	101	0.02	1	<5	<5	<4	*	5	<10	0.03	13	<4	*		
90.3	8724	27	15	3.1	31	1529	*	<5	2.3	0.5	80	5.35	7	<0.01	0.6	5	1.12	242	0.2	<1	<5	15	<4	*	85	<10	0.16	108	<4	*		
91	2845	24	3	0.5	<5	882	*	<5	2.4	1.5	231	1.19	<2	<0.01	0.13	3	0.22	299	0.02	<1	<5	<5	<4	*	46	<10	<0.01	32	<4	*		
91	2846	32	7	1.7	<5	2533	*	<5	0.1	2.3	172	3.94	3	<0.01	0.34	9	1.01	486	0.03	<1	<5	5	<4	*	15	<10	0.02	133	<4	*		
91	2847	25	6	1	<5	493	*	26	0.4	5.3	230	4.76	<2	0.095	0.15	4	0.13	295	0.02	<1	<5	<5	<4	*	19	47	<0.01	30	<4	*		
91	3748	17	3	0.8	<5	3177	*	<5	0.4	1.1	197	1.86	2	<0.01	0.27	3	0.5	233	0.04	<1	<5	<5	<4	*	14	<10	0.03	75	<4	*		
92.1	66	10	15	1.6	<5	1160	*	<5	0.6	<0.2	17	3.55	5	0.041	0.32	8	0.83	777	0.15	4	<5	<5	<4	*	58	<10	0.17	76	<4	*		
92.1	67	10	12	1.6	<5	1585	*	<5	0.8	<0.2	13	3.18	5	0.032	0.43	11	0.96	388	0.22	5	<5	<5	<4	*	87	<10	0.18	69	<4	*		
92.1	234	9	10	1.4	<5	1584	*	<5	0.8	<0.2	11	2.59	4	0.018	0.4	12	0.86	363	0.2	3	<5	<5	<4	*	70	<10	0.16	60	<4	*		
92.1	235	9	11	1.5	<5	1728	*	<5	0.8	<0.2	11	2.58	4	0.013	0.41	12	0.88	369	0.21	4	<5	<5	<4	*	71	<10	0.17	58	<4	*		
92.2	68	4	7	0.7	<5	1626	*	<5	0.5	<0.2	6	2.93	3	0.015	0.18	9	0.44	253	0.05	3	<5	<5	<4	*	53	<10	0.09	63	<4	*		
92.2	69	4	6	0.7	<5	1739	*	<5	0.5	<0.2	6	2.15	2	0.01	0.16	8	0.39	221	0.06	2	<5	<5	<4	*	58	<10	0.08	47	<4	*		
92.2	236	5	7	0.8	<5	1724	*	<5	0.5	<0.2	6	1.98	2	<0.01	0.18	8	0.46	244	0.05	2	<5	<5	<4	*	65	<10	0.09	43	<4	*		
92.2	237	3	7	0.4	<5	1295	*	<5	0.4	<0.2	12	>10.77	5	0.011	0.09	10	0.21	345	0.03	8	<5	<5	<4	*	26	<10	0.06	219	6	*		
92.3	70	3	9	0.4	<5	883	*	<5	0.5	0.2	14	20.34	7	0.022	0.06	17	0.17	483	0.02	11	<5	<5	4	*	21	<10	0.07	307	8	*		
92.3	71	5	7	0.8	<5	1720	*	<5	0.7	<0.2	7	2.4	3	0.013	0.19	10	0.47	269	0.04	2	<5	<5	<4	*	73	<10	0.1	53	<4	*		
92.3	238	2	14	0.2	<5	279	*	<5	0.3	0.5	23	54.89	13	0.011	0.02	9	0.05	835	0.01	21	<5	<5	23	*	9	<10	0.06	635	21	*		
92.3	239	4	7	0.7	<5	1742	*	<5	0.6	<0.2	7	2.78	3	0.012	0.15	9	0.39	237	0.04	2	<5	<5	<4	*	69	<10	0.08	62	<4	*		

Table A-2. Analytical results for reconnaissance investigation samples

Table A-2. Analytical results for reconnaissance investigations samples

Map No.	Sample No.	Location	Sample Type	Sample Size (ft)	Sample Site	Sample Description	Au30 ppb	* opt	Ag ppm	* opt	Cu ppm	* %	Pb ppm	* %	Zn ppm	* %	Mo ppm
R1	147	Little Saginaw Bay	G	0.1	OC	Barite in tan ls	30		<0.1		68		10		19		3
R2	149	Saginaw Bay	G	2	OC	Limey gray ar	<5		<0.1		43		13		109		12
R2	150	Saginaw Bay	S		RC	Black carb fossils in gray sandy ls	<5		<0.1		23		8		71		4
R3	2375	Kuiu Is, 3305 ft peak	Rep		RC	Fel dikes w/ dissem po	<5		<0.1		31		8		79		5
R3	2376	Kuiu Is, 3305 ft peak	G		OC	Fel dike w/ py & po	<5		<0.1		38		4		8		6
R3	9572	Kuiu Is, 3305 ft peak	Rep	4.7	OC	Fel int w/ dissem nodules of fg po	<5		<0.1		14		12		99		4
R3	9573	Kuiu Is, 3305 ft peak	Rep	1.6	OC	Mafic dike w/ very fg po	<5		<0.1		39		8		74		3
R3	9703	Security Bay, W of	Rep	6	OC	Fest fel dike w/ dissem po	11		0.6		16		44		209		3
R4	2360	Pinta Point area	Rep		OC	Sil sc w/ fg dissem sulf	<5		0.2		6		20		63		6
R4	2361	Pinta Point area	G		OC	Gp sc w/ po & py	<5		0.3		35		22		86		2
R4	2362	Pinta Point area	G		OC	Gp sc w/ dissem py	<5		<0.1		166		19		297		8
R4	2365	Pinta Point area	S		OC	Sulf-rich lens in gp sc	29		0.6		661		60		1595		86
R5	3713	Kake Rd, Pinta Pt area	S		TP	Qz w/ fg py, po	9		0.3		90		27		123		6
R5	8673	Kake Rd, Pinta Pt area	Rep		TP	Sil volc w/ calc, very fg dissem po,py	<5		0.1		57		18		220		6
R6	8674	Kake Rd, Pinta Pt area	S		RC	Skarn in hbl diorite	8		0.5		229		22		58		<1
R6	8675	Kake Rd, Pinta Pt area	S		RC	Skarn w/ py & trace cp	<5		1.3		918		10		66		<1
R7	3733	Kake Tribal Rd 4300	G		TP	Alt basalt w/ fg, dissem py, cp	23		0.4		1645		20		106		5
R8	3703	Kake Tribal Rd 3000	S		TP	Bedded sil ar & chert w/ lenses of py	12		1.7		84		79		142		37
R8	3704	Kake Tribal Rd 3000	S		TP	Py nodules in sil ar & chert	7		2.5		45		63		862		46
R8	8669	Kake Tribal Rd 3000	S		TP	Black, sil, carb ar & chert w/ 1/8" bands of py	7		1.5		57		61		164		30
R8	8670	Kake Tribal Rd 3000	S		TP	Py nodules in fault br hosted in bedded ar & chert	10		1.7		48		34		65		15
R9	3732	Kake Tribal Rd 2130	S		TP	Ar w/ knot of py	23		<0.1		85		12		103		<1
R10	3701	Kake Tribal Rd 2000	G		TP	Sil ar w/ lenses of fg py	77		1.9		76		43		232		11
R10	3702	Kake Tribal Rd 2200	S		OC	Thinly bedded ar w/ py lenses	43		1.4		36		13		67		29
R11	3706	Kake Tribal Rd 3000	G		TP	Qz w/ minor cp, py	7		1		1610		16		63		2
R12	8678	Kake Tribal Rd 1000	S		TP	Contorted graphitic ar w/ irregular knots of py	13		0.6		77		15		161		6
R13	3718	Kake Tribal Rd 7000	S		TP	Patches & seams of py in ar & ls	18		0.6		88		21		26		100
R14	3731	Gunnuk Ck tributary	SS			Ar outcrops in stream w/ ar, gw, & chert float	<5		<0.1		37		12		462		<1
R15	3719	Kake Rd, Turn Mtn area	G		TP	Black ar w/ seams of py	13		0.5		281		27		89		7
R16	3712	Kake Rd, Turn Mtn area	G		TP	Ar w/ minor py	12		0.6		143		27		38		5
R16	3721	Kake Rd, Turn Mtn area	G		FL	Sil ar w/ dissem cp, py	24		1.9		1599		15		8		3
R16	3722	Kake Rd, Turn Mtn area	Rep	8	OC	Sil ar w/ fg py laminae & cg py lenses	39		1.6		63		60		20		57
R16	8680	Kake Rd, Turn Mtn area	G		OC	Sil ar w/ cg dissem py cubes	88		1.8		23		46		13		2
R17	8679	Kake Rd, Turn Mtn area	G		RC	Sil, bedded ar w/ py seams along fractures	9		0.3		93		18		40		<1
R18	3709	Kake Rd, Turn Mtn area	G		FL	Qz w/ py & minor native copper	20		1.6		1942		5		63		1
R19	3707	Kake Rd, Turn Mtn area	Rep		TP	Alt hbl di w/ py	6		<0.1		288		7		42		3
R19	3708	Kake Rd, Turn Mtn area	S		TP	Skarn mineralization in di w/ py	11		0.2		518		26		83		2
R19	8672	Kake Tribal Rd 5000	S		TP	Qz float w/ py	7		0.5		386		11		107		2
R20	3720	Kake Rd, Turn Mtn area	G		TP	Gs w/ seams & dissem py, po	<5		<0.1		79		8		106		3
R21	3696	Kake, USFS Rd 6304	G		TP	Black carb ar w/ py lenses	34		1.1		56		115		405		67
R21	8666	Kake, USFS Rd 6304	Rep	0.9	TP	Sil, bedded ar w/ py on fault surfaces	163		0.6		34		119		51		42
R22	3697	Kake, spur of USFS Rd 6304	G		TP	Barite w/ minor cp in ar	8		0.8		198		<2		1337		<1
R22	3698	Kake, spur of USFS Rd 6304	S		TP	Ar to slate w/ lenses of py	38		2.8		63		38		41		27
R22	3699	Kake, spur of USFS Rd 6304	G		RC	Jasperoid w/ minor cp	12		<0.1		35		<2		14		2
R22	8667	Kake, spur of USFS Rd 6304	C	4.4	TP	Sil bedded ar & chert w/ py in cubes & blebs	<5		0.9		33		14		38		13
R23	8668	Kake, USFS Rd 6304	Rep		TP	Alt zone w/ calc & limonite adj to fault br in ar	<5		<0.1		38		10		67		2

Table A-2. Analytical results for reconnaissance investigations samples

Map No.	Sample No.	Ni ppm	Co ppm	Al %	As ppm	Ba * ppm xrf	Bi ppm	Ca %	Cd ppm	Cr ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm	Na %	Nb ppm	Sb ppm	Sc ppm	Sn * ppm xrf	Sr ppm	Te ppm	Ti %	V ppm	W * ppm xrf	Pt ppb	Pd ppb
R1	147	3	2	0.05	<5	>20000 *	<5	27.38	<0.2	4	1.18	<2	1.63	0.01	<1	0.37	1036	0.02	3	<5	<5	<20	385	<10	<0.01	7	<20		
R2	149	38	12	2.09	6	4313 *	<5	7.69	0.3	44	3.47	6	0.046	0.51	13	1.06	409	0.03	1	<5	7	<20	166	<10	<0.01	68	<20		
R2	150	55	15	1.58	<5	1834 *	<5	15.03	0.2	97	3.44	4	0.028	0.2	11	0.86	549	0.02	2	<5	7	<20	237	<10	<0.01	69	<20		
R3	2375	6	2	0.41	6	27	<5	0.16	0.2	140	1.93	<2	<0.01	0.12	25	0.06	209	0.11	2	<5	<5	<20	7	<10	0.06	2	<20		
R3	2376	8	2	0.48	<5	25	<5	0.06	<0.2	148	1.6	3	<0.01	0.11	24	0.07	79	0.11	<1	<5	<5	<20	4	<10	0.01	1	<20		
R3	9572	5	2	0.4	6	156	<5	0.16	0.2	151	1.88	<2	0.273	0.12	21	0.06	223	0.11	2	<5	<5	<20	8	<10	0.06	2	<20		
R3	9573	29	31	3.11	13	70	<5	2.17	<0.2	89	5.44	<2	0.036	0.85	9	1.51	521	0.51	6	<5	8	<20	64	<10	0.33	89	<20		
R3	9703	4	<1	0.5	13	611	<5	0.02	1.1	121	1.33	<2	0.032	0.12	14	0.02	37	0.09	<1	<5	<5	20	8	<10	<0.01	<1	20		
R4	2360	9	<1	0.46	8	20	<5	0.29	<0.2	71	2.9	<2	0.027	0.31	33	0.04	162	0.01	<1	<5	<5	<20	17	<10	<0.01	<1	<20		
R4	2361	24	11	1.47	23	69	<5	3.74	<0.2	43	3.51	3	0.028	0.18	6	1.1	722	0.03	4	<5	<5	<20	115	<10	<0.01	27	<20		
R4	2362	82	30	3.25	<5	28	<5	0.16	0.6	82	8.5	5	0.024	0.09	1	3.69	1000	0.04	15	<5	18	<20	10	<10	<0.01	316	<20		
R4	2365	921	69	2.09	25	<1	<5	0.52	5.2	81	27.46	<2	0.015	0.06	8	2.35	391	0.02	9	<5	<5	<20	29	<10	0.2	210	<20		
R5	3713	25	17	1.31	<5	1398 *	<5	0.18	0.4	168	3.91	<2		0.07	<1	1.08	934	<0.01	5	<5	<5	<20	7	<10	0.04	53	<20		
R5	8673	47	14	0.87	<5	2250 *	<5	0.92	1.2	184	3.56	<2	0.02	0.13	<1	0.78	507	<0.01	5	<5	<5	<20	24	<10	0.03	53	<20		
R6	8674	4	34	0.93	57	811 *	<5	3.65	0.4	64	17.13	3	0.026	<0.01	<1	0.16	1062	<0.01	1	<5	<5	<20	19	<10	0.01	30	<20		
R6	8675	6	73	0.66	7	40 *	<5	1.35	0.4	46	16.35	5	0.061	0.03	<1	0.65	640	0.04	<1	<5	<5	<20	8	<10	0.01	16	<20		
R7	3733	84	44	2.36	<5	907 *	<5	2.41	0.6	103	13.79	3		0.17	<1	2.18	874	0.04	17	<5	16	<20	26	<10	0.11	182	<20		
R8	3703	142	7	0.54	191	1010 *	<5	0.43	1.1	121	11.28	<2		0.17	<1	0.31	819	<0.01	7	15	<5	<20	10	<10	<0.01	77	<20		
R8	3704	196	8	0.32	387	2472 *	<5	0.4	6.8	86	27.54	<2		0.1	<1	0.06	117	<0.01	7	70	<5	<20	17	<10	<0.01	90	<20		
R8	8669	119	9	0.47	234	1823 *	<5	0.19	2.1	125	14.98	<2	0.875	0.15	<1	0.16	222	<0.01	6	35	<5	<20	10	<10	<0.01	68	<20		
R8	8670	64	3	0.61	123	743 *	<5	0.31	0.5	166	8.62	2	0.435	0.23	<1	0.26	364	<0.01	8	5	<5	<20	7	<10	<0.01	87	<20		
R9	3732	10	7	1.87	65	485 *	<5	0.02	0.3	18	12.04	4		0.34	5	0.53	892	0.02	1	<5	8	<20	5	<10	<0.01	35	<20		
R10	3701	42	69	1.15	166	2733 *	<5	0.93	1.3	99	6.04	3		0.12	<1	0.68	906	0.06	2	<5	<5	<20	44	<10	<0.01	34	<20		
R10	3702	37	2	0.38	89	291 *	<5	<0.01	0.6	185	10.41	<2		0.12	2	0.02	93	<0.01	7	10	<5	<20	4	<10	<0.01	77	<20		
R11	3706	29	6	0.57	<5	457 *	<5	2.86	0.4	146	2.27	<2		0.13	<1	1.38	1596	0.02	<1	<5	<5	<20	26	<10	<0.01	13	<20		
R12	8678	38	4	0.5	33	662 *	<5	2.87	1.8	178	5.41	<2	0.1	0.2	5	0.99	1445	<0.01	5	<5	<5	<20	93	<10	<0.01	49	<20		
R13	3718	10	7	0.9	21	982 *	<5	2.85	0.2	88	11.49	3		0.29	2	0.32	773	0.03	<1	<5	<5	<20	37	<10	<0.01	25	<20		
R14	3731	82	21	2.07	6	1020 *	<5	0.62	4	38	3.63	4		0.13	10	0.79	5053	0.02	<1	<5	<5	<20	32	<10	0.04	52	<20		
R15	3719	13	8	1.79	11	330 *	<5	0.09	0.3	30	7.89	5		0.36	5	0.81	544	0.03	3	<5	<5	<20	5	<10	<0.01	41	<20		
R16	3712	16	12	1.25	98	647 *	<5	7.59	0.3	31	7.26	3		0.13	<1	0.77	1589	0.02	<1	<5	<5	<20	74	<10	<0.01	23	<20		
R16	3721	35	20	0.25	98	641 *	<5	0.08	<0.2	134	1.66	<2		0.14	17	0.02	45	<0.01	<1	7	<5	<20	2	<10	<0.01	8	<20		
R16	3722	49	24	0.37	137	1218 *	<5	<0.01	0.2	127	9.81	<2		0.1	5	0.16	353	<0.01	<1	7	<5	<20	4	<10	<0.01	15	<20		
R16	8680	15	5	0.24	541	794 *	<5	<0.01	0.3	232	3.53	<2	0.028	0.15	7	0.01	76	<0.01	<1	<5	<5	<20	6	<10	<0.01	6	<20		
R17	8679	11	9	0.84	333	583 *	<5	1.73	0.3	83	3.29	<2	0.011	0.37	<1	0.53	859	0.03	1	<5	<5	<20	32	<10	<0.01	19	<20		
R18	3709	21	457	0.23	17	814 *	<5	0.17	1.7	148	15.22	<2		0.01	<1	0.06	131	0.01	2	<5	<5	<20	10	<10	0.01	36	<20		
R19	3707	9	49	1.27	16	25 *	<5	1.61	0.2	95	6.08	<2		0.08	<1	0.53	429	0.07	5	<5	5	<20	57	<10	0.15	51	<20		
R19	3708	3	33	1.91	31	435 *	<5	3.61	0.5	90	7.19	<2		<0.01	<1	0.44	1415	0.02	20	<5	9	<20	179	<10	0.14	189	<20		
R19	8672	18	117	0.08	43	1060 *	<5	0.02	0.8	258	2.47	<2	0.033	<0.01	<1	0.02	58	<0.01	<1	<5	<5	<20	7	<10	<0.01	5	<20		
R20	3720	42	48	2.96	8	300 *	<5	1.76	0.5	17	6.44	<2		0.28	3	2.22	334	0.03	21	<5	16	<20	23	<10	0.47	203	<20		
R21	3696	15	4	1.03	58	4013 *	<5	0.1	5	139	7.4	4		0.26	9	0.6	134	<0.01	3	<5	<5	<20	17	<10	<0.01	43	<20		
R21	8666	7	2	0.48	25	530 *	<5	0.05	0.8	74	2.99	2	0.576	0.22	9	0.18	57	<0.01	2	<5	<5	<20	9	<10	<0.01	24	<20		
R22	3697	10	3	0.44	<5	>20000 *	<5	2.39	24.6	19	0.85	<2		0.02	<1	0.45	609	<0.01	2	<5	<5	<20	292	<10	<0.01	21	<20		
R22	3698	49	8	0.76	141	3049 *	<5	0.12	0.4	154	7.24	2		0.15	4	0.18	229	<0.01	6	10	<5	<20	7	<10	<0.01	68	<20		
R22	3699	12	4	0.42	<5	7661 *	<5	2.37	<0.2	231	2.69	<2		0.03	<1	0.94	4852	<0.01	<1	<5	<5	<20	50	<10	<0.01	11	<20		
R22	8667	21	4	0.87	22	623 *	<5	2.4	0.4	147	1.99	3	0.1	0.35	10	0.27	724	0.02	6	<5	<5	<20	54	<10	<0.01	59	<20		
R23	8668	33	10	0.56	6	1803 *	<5	14.58	0.3	47	6.6	<2	0.066	0.13	<1	5.13	1147	0.01	5	<5	9	<20	437	<10	<0.01	67	<20		

Table A-2. Analytical results for reconnaissance investigations samples

Map No.	Sample No.	Location	Sample Type	Sample Size (ft)	Sample Site	Sample Description	Au30 ppb	* opt	Ag ppm	* opt	Cu ppm	* %	Pb ppm	* %	Zn ppm	* %	Mo ppm
R24	3735	Kake, USFS Rd 6366	G		FL	Dol w/ seams of py	<5		<0.1		20		8		145		25
R25	3734	Kake, USFS Rd 6030	G		TP	Qz-calc vn w/ sulf	<5		<0.1		14		7		14		4
R26	3683	Portage Bay, USFS Rd 45603	G		TP	Qz w/ minor py	8		0.4		61		29		210		5
R27	3676	Portage Bay, USFS Rd 6031	G		TP	Sil fg int w/ sulf	15		1.6		252		11		108		3
R28	230	Salt Chuck area	C	6.5	OC	Qz vn	<5		<0.1		4		35		25		1
R28	231	Salt Chuck area	S		RC	Qz vn-sc contact w/ py	<5		<0.1		140		9		20		<1
R29	2358	Salt Chuck area	Rep	0.5	RC	Qz vn	<5		<0.1		6		<2		<1		<1
R30	59	Towers Arm	S		OC	Fest black ls & marble w/ py	<5		0.1		33		48		177		2
R31	56	North Arm	G	0.4	OC	Qz-sericite sc w/ py	<5		0.3		27		69		112		3
R31	57	North Arm	Rep	0.4	OC	Fest qz-sericite sc w/ py	<5		1.3		21		42		110		2
R31	229	North Arm	Rep	2.5	OC	Qz vn	<5		<0.1		4		22		118		3
R32	58	Towers Arm	Rep	0.5		Irregular qz stringers & lenses in ls	<5		<0.1		4		84		57		3
R33	55	North Arm	Rep	0.5	OC	Fest gs	<5		1.2		398		420		342		2
R33	228	North Arm	G	0.2	OC	Qz vn w/ sulf	<5		0.5		76		215		235		<1
R34	8651	Kupreanof Pyrite area	G		FL	Qz	<5		<0.1		13		14		16		6
R35	49	Castle River area	Rep	0.5	OC	Qz band in fest gs	8		0.2		44		41		129		1
R36	459	Lindenberg Pen, USFS Rd 6352	G	0.3	TP	Qz vn w/ trace gn	<5		0.4		39		97		31		<1
R37	457	Lindenberg Pen, USFS Rd 6352	Rep	1	TP	Gray, fest, sil sc w/ py	29		0.5		102		24		191		3
R37	458	Lindenberg Pen, USFS Rd 6352	G	0.3	TP	Sc w/ qz stringers & sulf	<5		0.2		497		4		34		2
R37	8711	Lindenberg Pen, USFS Rd 6352	S		RC	Sheared sc w/ cubic py	<5		<0.1		98		5		33		2
R38	9684	Lindenberg Pen, USFS Rd 6352	G		OC	Fest, gray sc w/ py on cleavage surfaces	<5		<0.1		102		10		48		2
R38	9685	Lindenberg Pen, USFS Rd 6352	G		TP	Blocky ar w/ py on cleavage surfaces	<5		0.2		49		12		135		3
R39	352	Spruce Ck	G		FL	Fest gs w/ py	12		<0.1		104		13		107		<1
R39	353	Spruce Ck	SS			Gs float in stream	16		0.3		104		23		283		11
R40	3816	Lindenberg Pen, USFS Rd 6352	G		FL	Fest qz w/ minor py	<5		<0.1		41		<2		23		2
R40	3819	Lindenberg Pen, USFS Rd 6352	S		FL	Qz w/ seams of py	6		<0.1		19		3		8		3
R40	3820	Lindenberg Pen, USFS Rd 6352	Rep		FL	Qz w/ fg py	<5		<0.1		15		<2		<1		2
R41	9648	Little Duncan Bay	Rep	0.8	OC	Vuggy qz-calc vn w/ po blebs in hbl porph	<5		0.6		255		10		196		2
R42	24	Duncan Canal area	Rep	3	OC	Fest marble	<5		<0.1		107		7		66		1
R42	25	Duncan Canal area	Rep	0.4	OC	Fest qz & marble	<5		<0.1		104		5		59		1
R42	26	Duncan Canal area	G	0.3	RC	Qz calc vn w/ sulf	<5		<0.1		3		11		15		1
R42	210	Duncan Canal area	Rep	5	OC	Fest ls & marble	<5		<0.1		73		7		42		1
R43	186	Totem Bay	SS			Rhyolite float in stream	<5		0.1		12		21		85		3
R44	187	Totem Bay	SS			Rhyolite float in stream	<5		0.3		24		37		218		4
R45	182	Little Totem Bay	SS			Volc float in stream	6		<0.1		16		35		280		6
R45	183	Little Totem Bay	SS			Volc float in stream	<5		0.2		17		24		189		13
R45	184	Little Totem Bay	SS			Volc float in stream	12		<0.1		15		25		160		5
R46	9632	Agony	SS			Alt rhyolite outcrop in stream	8		<0.1		5		10		14		<1
R47	9633	Agony	SS			Alt rhyolite outcrop in stream	<5		<0.1		11		15		82		5
R48	282	Helen S Mine area	G	1	OC	Fest sil gs sc	<5		<0.1		170		4		98		2
R49	2638	Charlie's Creek	G		OC	Sil msv py	<5		<0.2		75		<1		26		18
R50	429	Mitkof Is, USFS Rd 6246	C	1.5	TP	Qz vn w/ narrow band of py	<5		<0.1		15		11		6		22
R50	2839	Mitkof Is, USFS Rd 6246	G		OC	Qz vn w/ py	<5		<0.1		30		16		61		49
R51	405	Mitkof Is, USFS Rd 6245	G	0.4	RC	Qz vn w/ po	<5		<0.1		48		4		8		2
R52	406	Mitkof Is, USFS Rd 6282	G	0.5	RC	Qz vn w/ po hosted in hn	<5		<0.1		32		7		126		2
R52	2822	Mitkof Is, USFS Rd 6282	C	20	OC	Metamorphics w/ po	<5		0.3		54		6		118		3

Table A-2. Analytical results for reconnaissance investigations samples

Map No.	Sample No.	Ni ppm	Co ppm	Al %	As ppm	Ba * ppm xrf	Bi ppm	Ca %	Cd ppm	Cr ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm	Na %	Nb ppm	Sb ppm	Sc ppm	Sn * ppm xrf	Sr ppm	Te ppm	Ti %	V ppm	W * ppm xrf	Pt ppb	Pd ppb
R24	3735	8	2	0.16	85	203 *	<5	3.57	1.5	39	20.08	<2		0.04	<1	3.35	581	<0.01	<1	<5	<5	<20	32	<10	<0.01	4	<20		
R25	3734	3	3	0.14	<5	413 *	<5	19.7	0.6	66	2.24	<2		0.02	<1	2.23	3701	<0.01	<1	<5	<5	<20	250	<10	<0.01	15	<20		
R26	3683	37	11	0.31	<5	2926 *	<5	3.13	0.7	195	1.93	<2	0.32	0.14	2	0.27	1008	0.02	<1	<5	<5	<4 *	203	<10	<0.01	10	<4 *		
R27	3676	132	35	0.7	6	2580 *	<5	0.92	0.4	57	5.1	<2	<0.01	0.25	9	0.15	167	0.02	1	<5	<5	<4 *	83	<10	0.16	31	<4 *		
R28	230	9	<1	0.01	<5	24 *	<5	0.02	<0.2	157	0.2	<2	0.159	<0.01	<1	0.02	25	<0.01	<1	<5	<5	<20	<1	<10	<0.01	1	<20		
R28	231	11	8	0.22	<5	70 *	<5	3.48	<0.2	138	1.39	<2	0.015	0.02	<1	0.25	441	0.01	<1	<5	<5	<20	77	<10	<0.01	17	<20		
R29	2358	10	<1	0.04	<5	2	<5	0.01	<0.2	353	0.39	<2	<0.01	<0.01	<1	0.02	37	<0.01	<1	<5	<5	<20	1	<10	<0.01	2	<20		
R30	59	47	14	2.33	68	468 *	<5	10	0.4	42	10	<2	0.052	0.04	13	2.05	3025	0.01	1	<5	8	<20	116	<10	<0.01	109	<20		
R31	56	44	12	6.98	10	>20000 *	<5	1.3	0.5	80	8.6	7	0.103	0.05	<1	0.47	246	0.02	5	<5	<5	<20	2	<10	0.02	34	<20		
R31	57	59	13	6.05	33	>20000 *	<5	2.61	0.3	39	9.47	4	0.091	0.09	<1	1.19	688	0.01	3	<5	<5	<20	2	<10	<0.01	12	<20		
R31	229	14	1	0.81	<5	19527 *	<5	7.47	0.2	83	1.05	<2	0.108	<0.01	2	4.12	226	<0.01	5	<5	<5	<20	149	<10	<0.01	6	<20		
R32	58	15	<1	0.03	<5	583 *	<5	0.65	<0.2	303	0.34	<2	0.104	<0.01	<1	0.05	41	0.01	<1	<5	<5	<20	17	<10	<0.01	<1	<20		
R33	55	64	33	2.83	<5	252 *	<5	1.12	0.9	130	7.37	<2	0.413	0.03	4	1.96	857	0.05	3	<5	5		23	<10	0.6	179	<20		
R33	228	29	10	1.58	<5	444 *	<5	1.31	<0.2	136	3.48	<2	0.896	0.02	2	1.34	542	0.07	3	<5	<5		19	<10	0.32	82	<20		
R34	8651	11	<1	0.06	7	127 *	<5	0.04	<0.2	250	0.35	<2	0.018	<0.01	<1	0.01	32	0.01	<1	<5	<5	<20	4	<10	<0.01	1	<20		
R35	49	9	8	0.76	15	635 *	<5	3.95	0.6	186	2.27	<2	0.15	0.04	4	0.83	522	0.04	2	<5	6	<20	201	<10	<0.01	55	<20		
R36	459	7	2	0.49	<5	574 *	<5	6.46	<0.2	144	1.22	<2	<0.01	0.07	<1	0.45	1617	<0.01	<1	<5	<5	<20	566	<10	<0.01	12	574 *		
R37	457	34	29	2.89	6	554 *	<5	3	0.2	90	8.46	4	<0.01	0.22	2	3.15	1957	0.03	<1	<5	5	<20	52	14	0.2	90	554 *		
R37	458	66	13	2.12	32	655 *	<5	1.44	<0.2	81	6.92	4	0.014	0.28	5	1.65	692	0.06	<1	<5	<5	<20	78	<10	0.2	74	655 *		
R37	8711	24	10	1.35	<5	289 *	<5	1.13	<0.2	94	2.64	2	<0.01	0.16	6	1	343	0.05	<1	<5	<5	<20	102	<10	0.22	51	289 *		
R38	9684	25	27	1.09	<5	914 *	<5	0.86	<0.2	71	2.79	<2	0.012	0.33	2	0.65	295	0.03	<1	<5	<5	<20	47	<10	0.23	44	<20		
R38	9685	21	18	2.38	<5	761 *	<5	0.6	<0.2	59	5.25	<2	0.088	0.17	4	1.17	1026	0.04	1	<5	<5	<20	42	<10	0.21	43	<20		
R39	352	53	31	3.05	<5	405 *	<5	2.85	<0.2	99	5.41	<2	0.018	0.04	2	2.08	1079	0.06	2	<5	10	<20	21	<10	0.44	133	<20		
R39	353	69	21	1.52	31	836 *	<5	0.52	1.6	79	5.44	4	0.542	0.05	7	1.12	1210	0.01	7	<5	<5	<20	15	<10	0.11	94	<20		
R40	3816	18	2	0.05	<5	55 *	<5	0.41	0.2	219	0.7	<2	0.095	<0.01	2	0.19	165	<0.01	<1	<5	<5	<20	3	<10	<0.01	4	55 *		
R40	3819	17	3	0.09	90	662 *	<5	0.06	<0.2	183	7.79	<2	0.27	0.02	3	0.01	54	<0.01	<1	<5	<5	<20	3	<10	<0.01	6	662 *		
R40	3820	12	1	0.07	9	421 *	<5	<0.01	<0.2	304	0.65	<2	0.023	0.02	2	<0.01	35	<0.01	<1	<5	<5	<20	2	<10	<0.01	4	421 *		
R41	9648	25	18	1.5	10	213 *	<5	4.79	1.6	112	3.82	<2	0.098	0.02	5	1.48	584	0.09	<1	<5	8	<20	178	<10	0.11	114	<20		
R42	24	31	15	0.71	38	236 *	<5	10	<0.2	76	4.93	<2	0.298	0.07	2	3.52	832	0.02	4	<5	18	<20	332	<10	<0.01	125	<20		
R42	25	48	15	0.79	74	446 *	<5	10	<0.2	84	5.42	<2	0.09	0.05	4	4.39	1083	0.01	3	<5	14	<20	597	<10	<0.01	90	<20		
R42	26	20	2	0.25	<5	771 *	<5	5.99	<0.2	165	1.36	<2	0.022	0.02	<1	3.1	573	0.01	3	<5	<5	<20	445	<10	<0.01	15	<20		
R42	210	17	7	0.37	19	183 *	<5	10	<0.2	54	3.76	<2	0.434	0.05	2	4.63	713	0.02	4	10	10	<20	360	<10	<0.01	79	<20		
R43	186	11	9	1.37	14	53	<5	0.4	0.2	18	2.9	<2	0.067	0.12	18	0.53	452	0.22	<1	<5	<5	<20	30	<10	0.06	48	<20		
R44	187	22	26	2.62	11	43	<5	0.5	0.3	19	6.98	2	0.04	0.1	24	1.22	2836	0.25	<1	<5	<5	<20	54	<10	0.13	76	<20		
R45	182	17	20	2.38	18	78	<5	0.32	0.5	16	5.28	3	0.051	0.1	18	0.93	3054	0.14	2	<5	<5	<20	59	<10	0.12	58	<20		
R45	183	16	14	2.38	42	45	<5	0.3	0.2	17	9.45	4	0.07	0.09	18	0.83	334	0.21	2	<5	<5	<20	60	<10	0.1	73	<20		
R45	184	16	16	2.49	9	60	<5	0.35	0.3	18	3.82	4	0.081	0.07	20	0.78	2076	0.14	1	<5	<5	<20	61	<10	0.1	52	<20		
R46	9632	3	2	0.46	<5	28	<5	0.25	<0.2	8	0.52	<2	0.034	0.05	8	0.16	77	0.05	<1	<5	<5	<20	19	<10	0.07	14	<20		
R47	9633	11	11	1.68	15	43	<5	0.43	<0.2	17	3.99	<2	0.088	0.09	15	0.68	549	0.13	2	<5	<5	<20	55	<10	0.13	63	<20		
R48	282	51	28	0.88	6	449 *	<5	6.9	0.3	108	9.23	5	0.184	0.04	4	3.98	1394	0.02	<1	<5	24	<20	90	<10	<0.01	210	<20		
R49	2638	21	11	0.09	58	10	<2	4.75	<.5	35	>15.00	<10	1.81	0.01	<10	0.06	340	<0.01		12	2		69		<.01	10	<10		
R50	429	4	3	0.08	<5	<10 *	<5	0.3	<0.2	126	0.83	<2	0.019	0.01	<1	0.03	161	0.03	<1	<5	<5	<20	10	<10	<0.01	4	<20		
R50	2839	5	8	0.76	<5	760 *	<5	3.1	<0.2	41	3.32	<2	0.027	0.39	<1	0.52	1065	0.06	6	<5	<5	<20	117	<10	0.07	60	<20		
R51	405	7	4	0.26	<5	209 *	<5	0.62	<0.2	230	0.84	<2	<0.01	0.09	<1	0.08	133	0.05	2	<5	<5	<20	16	<10	0.01	15	<20		
R52	406	15	16	2.24	<5	1212 *	<5	0.4	0.2	89	4.52	2	0.01	0.8	4	1.82	932	0.08	11	<5	<5	<20	24	<10	0.11	110	<20		
R52	2822	33	24	1.4	<5	1485 *	<5	0.52	0.4	70	4.36	<2	0.011	0.61	<1	1.13	613	0.07	8	<5	<5	<20	19	<10	0.07	82	<20		

Table A-2. Analytical results for reconnaissance investigations samples

Map No.	Sample No.	Location	Sample Type	Sample Size (ft)	Sample Site	Sample Description	Au30 ppb	* opt	Ag ppm	* opt	Cu ppm	* %	Pb ppm	* %	Zn ppm	* %	Mo ppm
R53	403	Mitkof Is, USFS Rd 6245	S		RC	Fest qz w/ po blebs	<5		<0.1		17		11		9		1
R54	404	Mitkof Is, USFS Rd 6245	G		RC	Qz vn w/ blebs & cubes of py	<5		<0.1		12		5		14		2
R54	2821	Mitkof Is, USFS Rd 6245	G		OC	Shear zone w/ py	<5		0.3		62		10		84		3
R55	283	Zarembo Is, USFS Rd 6590	S	0.3	TP	Fest rhyolite	16		<0.1		5		23		21		2
R55	9649	Zarembo Is, USFS Rd 6590	G		TP	Alt int w/ qz vns & py	96		5.3		7		29		20		27
R56	292	Zarembo Is, USFS Rd 6592	C	0.4	OC	Fest qz & green sc w/ py	7		0.2		63		4		16		<1
R56	9652	Zarembo Is, USFS Rd 6592	Rep	1	OC	Shear w/ py in alt volc	23		0.4		19		15		95		3
R57	323	Zarembo Is, USFS Rd 52022	S		RC	Hbl bt granite w/ sulf replacing mafics	28		<0.1		11		14		49		2
R57	324	Zarembo Is, USFS Rd 52022	S	0.4	OC	Alt sericitic granite w/ py	12		<0.1		12		9		40		<1
R57	9670	Zarembo Is, USFS Rd 52022	Rep		OC	Heavily weathered fest int	13		<0.1		16		13		82		<1
R58	302	Zarembo Is, USFS Rd 6590	G		FL	Banded gs w/ seams & dissem blebs of py	27		<0.1		39		33		222		6
R58	9659	Zarembo Is, USFS Rd 6590	G		FL	Sil rhyolite w/ py seams	14		0.5		104		41		254		7
R59	290	Zarembo Is, USFS Rd 6590	G		TP	Fest gs w/ sulf	9		0.1		116		5		54		1
R60	289	Zarembo Is, USFS Rd 6590	S	0.2	TP	Fest, qz monzonite w/ py	9		<0.1		15		20		34		4
R61	287	Zarembo Is, USFS Rd 6593	G	0.8	TP	Vuggy fest qz vn	8		<0.1		13		4		14		1
R61	9650	Zarembo Is, USFS Rd 6593	G		TP	Qz vn in slate	8		0.2		99		10		42		2
R62	285	Zarembo Is, USFS Rd 52021	G	0.3	RC	Vuggy qz vn w/ py blebs	9		<0.1		58		<2		5		<1
R63	284	Zarembo Is, USFS Rd 6590	G	0.3	OC	Phyllite w/ py blebs	18		<0.1		62		4		110		2
R64	286	Zarembo Is, USFS Rd 6590	C	0.7	OC	Fest sil shear w/ py in slate	15		<0.1		19		9		46		2
R65	288	Zarembo Is, USFS Rd 6597	G	0.6	TP	Fest qz vn w/ py	65		0.3		13		25		57		2
R66	297	Zarembo Is, USFS Rd 6585	S		RC	Fest andesite w/ blebs & banded fg py	267		0.6		21		9		83		<1
R66	9655	Zarembo Is, USFS Rd 6585	Rep		RC	Alt andesite w/ py & chalcedony in vugs	116		1.9		31		8		140		<1
R67	9653	Zarembo Is, USFS Rd 6587	G		RC	Fest, sil, gossany float	44		0.6		8		31		76		5
R68	294	Zarembo Is, USFS Rd 6594	C	0.5	OC	Fest rhyolite w/ fg py	7		0.2		8		21		111		6
R69	1	Elephant Nose, E of	Rep	2	RC	Fest qz vn	<5		<0.1		5		23		6		2
R69	2	Elephant Nose, E of	C	1.5	OC	Qz vn	<5		<0.1		22		<2		2		1
R69	3	Elephant Nose, E of	SC	6 @ 0.5	OC	Qz vn	<5		<0.1		14		<2		6		3
R69	4	Elephant Nose, E of	G	0.5	OC	Qz , cal, sericite lens in vn w/ limonite, py & ml	<5		<0.1		46		4		18		3
R69	5	Elephant Nose, E of	Rep	1	OC	Irregular qz vn	<5		<0.1		19		8		7		4
R69	6	Elephant Nose, E of	C	0.7	OC	Qz vn w/ ml	<5		<0.1		8		<2		2		2
R69	7	Elephant Nose, E of	SS			Stream in slate & granite float	<5		0.2		122		8		127		1
R69	203	Elephant Nose, E of	Rep	2.5	OC	Qz vn	<5		0.5		18		75		39		3
R69	201	Elephant Nose	C	1.5	OC	Qz vn	<5		0.2		7		11		16		2
R69	202	Elephant Nose	RC	10	OC	Irregular qz lenses	<5		<0.1		7		6		9		2
R70	2618	Wedge Point	Rep	1.3	OC	Qz vn w/ sparse py	<5		<0.2		20		68		214		8
R70	2619	Wedge Point	S		RC	Hn slate w/ py	<5		0.2		62		16		170		3
R71	460	Etolin Is, USFS Rd 51009	G	0.6	TP	Sil int w/ po, cp	12		0.6		177		20		77		12
R71	8712	Etolin Is, USFS Rd 51009	S		RC	Dioritic dike w/ fg po intruding marble	7		0.6		244		34		174		6
R72	477	Etolin Is, USFS Rd 6544	G	0.3	TP	Fest, sil metaseds w/ fg py	<5		<0.1		14		6		48		6
R72	478	Etolin Is, USFS Rd 6544	C	0.4	OC	Sil, fest, felsic int w/ py along shears	22		0.3		21		11		29		16
R73	8713	Etolin Is, USFS Rd 6540	Rep		RC	Andesite w/ dissem po	<5		<0.1		131		11		75		3
R74	8714	Etolin Is, USFS Rd 6540	S		TP	Rhyolite w/ py in small fractures	<5		0.2		12		27		145		6
R75	8730	Etolin Is, USFS Rd 51540	RC		TP	Fest rhyolite w/ dissem po	<5		<0.1		32		23		97		7
R76	8722	Etolin Is, USFS Rd 51540	Rep	0.5	RC	Fest qz vn w/ po in ar	6		2.2		152		77		393		5
R77	461	Etolin Is, USFS Rd 51581	C	0.5	TP	Qz vn	<5		<0.1		19		6		33		3
R78	8715	Etolin Is, USFS Rd 6539	Rep		TP	Pink to gray, mg, fel int w/ gray sulf	<5		0.2		14		27		178		5

Table A-2. Analytical results for reconnaissance investigations samples

Map No.	Sample No.	Ni ppm	Co ppm	Al %	As ppm	Ba * ppm xrf	Bi ppm	Ca %	Cd ppm	Cr ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm	Na %	Nb ppm	Sb ppm	Sc ppm	Sn * ppm xrf	Sr ppm	Te ppm	Ti %	V ppm	W * ppm xrf	Pt ppb	Pd ppb
R53	403	4	4	0.31	<5	322 *	<5	0.94	<0.2	154	1.07	<2	0.041	0.16	<1	0.03	110	0.07	<1	<5	<5	<20	17	<10	<0.01	7	<20		
R54	404	7	15	0.22	9	59 *	<5	1.2	<0.2	225	2.97	<2	0.013	0.02	<1	0.12	208	0.02	2	<5	<5	<20	33	<10	0.04	18	<20		
R54	2821	61	13	2.3	<5	521 *	<5	1.36	0.9	110	3.88	<2	0.029	0.14	4	0.98	819	0.01	6	<5	7	<20	99	<10	0.1	69	<20		
R55	283	2	<1	0.33	<5	143 *	<5	0.02	<0.2	52	0.61	<2	<0.01	0.28	20	<0.01	15	0.03	<1	<5	<5	<20	3	<10	<0.01	<1	<20		
R55	9649	8	5	0.28	116	154 *	<5	<0.01	0.6	97	6.9	<2	0.136	0.11	2	0.02	11	<0.01	<1	24	<5	<20	2	<10	<0.01	12	<20		
R56	292	7	6	0.73	9	1051 *	<5	0.12	<0.2	101	1.38	<2	0.012	0.34	13	0.18	237	0.03	<1	<5	<5	<20	8	<10	<0.01	8	<20		
R56	9652	12	20	2.44	102	414 *	<5	0.28	0.6	49	7.54	4	0.028	0.28	17	1.69	577	0.03	<1	<5	8	<20	14	<10	<0.01	99	<20		
R57	323	3	1	0.49	<5	249	<5	0.14	<0.2	67	0.79	<2	0.023	0.13	<1	0.15	132	0.08	<1	<5	<5	<20	34	<10	0.02	9	<20		
R57	324	4	4	0.67	<5	254	<5	0.09	0.3	82	1.45	<2	0.018	0.16	21	0.05	496	0.05	<1	<5	<5	<20	16	<10	<0.01	14	<20		
R57	9670	7	4	0.8	<5	253	<5	0.12	0.3	78	2.2	<2	0.032	0.23	15	0.09	312	0.04	<1	<5	<5	<20	16	<10	<0.01	20	<20		
R58	302	2	1	0.9	40	20 *	<5	0.01	0.7	61	4.05	7	<0.01	0.14	37	0.09	929	0.05	3	<5	<5	<20	2	<10	<0.01	2	<20		
R58	9659	3	<1	0.89	25	47 *	<5	0.03	0.4	77	4.46	7	<0.01	0.11	67	0.15	590	0.06	2	<5	<5	<20	4	<10	<0.01	2	<20		
R59	290	19	47	3.14	14	254 *	<5	0.98	<0.2	12	6.65	3	<0.01	0.05	<1	2.82	739	0.05	<1	<5	8	<20	72	<10	0.2	157	<20		
R60	289	2	<1	0.36	13	159 *	<5	0.06	0.2	62	0.84	3	<0.01	0.14	24	0.02	114	0.07	<1	<5	<5	<20	3	<10	<0.01	1	<20		
R61	287	9	3	0.37	<5	220 *	<5	0.07	<0.2	136	0.81	<2	<0.01	0.12	2	0.13	445	<0.01	<1	<5	<5	<20	6	<10	<0.01	7	<20		
R61	9650	11	4	0.85	<5	399 *	<5	5.63	0.2	90	1.61	<2	<0.01	0.13	3	0.54	679	0.02	<1	<5	<5	<20	461	<10	<0.01	17	<20		
R62	285	6	3	0.27	<5	4775 *	<5	0.1	<0.2	158	0.44	<2	0.078	0.25	<1	0.05	57	0.01	<1	<5	<5	<20	41	<10	0.01	5	<20		
R63	284	22	18	2.46	<5	862 *	<5	0.57	<0.2	33	5.2	<2	<0.01	0.7	3	1.48	784	0.03	<1	<5	<5	<20	42	<10	0.16	55	<20		
R64	286	31	8	1.19	<5	509 *	<5	4.77	<0.2	98	1.74	<2	0.018	0.13	4	0.5	1172	0.01	<1	<5	<5	<20	321	<10	<0.01	17	<20		
R65	288	8	2	0.53	179	545 *	<5	1.56	0.9	150	2.01	<2	0.015	0.25	<1	0.14	341	<0.01	<1	<5	<5	<20	53	<10	<0.01	13	<20		
R66	297	12	23	2.17	172	225 *	<5	1.41	1	29	8.38	8	0.141	0.13	11	1.32	708	0.05	<1	18	9	<20	27	<10	0.02	146	<20		
R66	9655	6	25	2.45	331	179 *	<5	0.24	1.4	19	13.12	5	0.024	0.17	17	0.94	355	0.02	<1	<5	12	<20	11	<10	<0.01	112	<20		
R67	9653	9	10	1.51	131	564 *	<5	0.1	0.6	66	3.76	6	0.012	0.23	18	0.64	1346	0.02	<1	<5	<5	<20	5	<10	0.01	36	<20		
R68	294	1	<1	0.54	20	1674 *	<5	0.05	0.8	30	1.93	2	0.215	0.34	28	<0.01	23	0.03	<1	<5	<5	<20	5	<10	<0.01	<1	<20		
R69	1	15	<1	0.04	<5	<10 *	<5	0.14	<0.2	254	0.46	<2	<0.01	<0.01	<1	0.01	70	<0.01	<1	<5	<5	<20	11	<10	<0.01	1	<20		
R69	2	7	<1	0.02	<5	<10 *	<5	0.02	<0.2	281	0.34	<2	<0.01	<0.01	<1	<0.01	33	<0.01	<1	<5	<5	<20	4	<10	<0.01	<1	<20		
R69	3	17	1	0.15	<5	93 *	<5	0.25	<0.2	261	0.58	<2	<0.01	0.05	<1	0.04	100	0.02	<1	<5	<5	<20	21	<10	<0.01	2	<20		
R69	4	15	5	0.4	<5	146 *	<5	1.06	0.2	214	1.32	<2	0.014	0.07	7	0.17	315	0.04	<1	<5	<5	<20	75	<10	<0.01	7	<20		
R69	5	21	2	0.1	<5	<10 *	<5	0.22	<0.2	312	0.67	<2	<0.01	<0.01	<1	0.07	93	0.01	<1	<5	<5	<20	24	<10	<0.01	3	<20		
R69	6	10	<1	0.02	<5	<10 *	<5	0.13	<0.2	363	0.46	<2	<0.01	<0.01	<1	<0.01	64	<0.01	<1	<5	<5	<20	16	<10	<0.01	<1	<20		
R69	7	20	22	2.42	6	465 *	<5	0.79	0.3	18	4.6	<2	0.114	0.35	9	1.25	1542	0.11	6	<5	<5	<20	67	<10	0.14	74	<20		
R69	203	12	3	0.27	<5	21 *	<5	1.11	0.2	191	1.1	<2	0.022	0.01	2	0.28	178	0.04	<1	<5	<5	<20	94	<10	<0.01	18	<20		
R69	201	7	<1	0.02	<5	45 *	<5	0.03	<0.2	248	0.31	<2	0.014	<0.01	<1	<0.01	41	<0.01	<1	<5	<5	<20	3	<10	<0.01	3	<20		
R69	202	14	<1	0.02	<5	50 *	<5	<0.01	<0.2	281	0.3	<2	<0.01	<0.01	<1	<0.01	29	<0.01	<1	<5	<5	<20	3	<10	<0.01	2	<20		
R70	2618	4	<1	0.41	10	1440	<2	0.09	0.5	178	0.74	<10	0.01	0.21	<10	0.05	175	0.12		<2	<1		21		0.01	4	<10		
R70	2619	48	23	1.8	2	160	<2	1.02	0.5	80	4.72	<10	0.01	0.22	<10	1.17	1135	0.08		<2	1		34		0.13	44	<10		
R71	460	16	38	1.77	107	791 *	<5	1.89	0.3	36	7.48	4	<0.01	0.3	17	0.24	744	0.1	<1	<5	5	<20	42	<10	0.17	59	791 *		
R71	8712	24	58	2.03	79	618 *	<5	0.56	0.4	22	9.12	6	<0.01	0.6	14	0.34	760	0.06	<1	<5	17	<20	16	<10	0.13	117	618 *		
R72	477	5	<1	1.93	21	57 *	<5	2.46	<0.2	90	2.95	10	0.173	0.26	62	0.07	673	1.14	<1	21	<5	<20	28	<10	0.02	15	57 *		
R72	478	7	<1	0.41	83	181 *	<5	0.01	<0.2	156	0.89	2	0.054	0.08	18	0.02	31	0.05	<1	6	<5	<20	1	<10	<0.01	1	181 *		
R73	8713	10	21	3.47	754	220 *	<5	2.66	0.4	27	4.77	5	<0.01	0.04	2	1.7	523	0.27	<1	<5	<5	<20	185	<10	0.25	141	220 *		
R74	8714	4	<1	0.3	<5	102 *	<5	0.02	0.5	87	1.49	<2	<0.01	0.15	8	0.03	48	0.11	<1	<5	<5	<20	2	<10	<0.01	2	102 *		
R75	8730	2	<1	0.3	6	13 *	<5	0.04	0.3	84	1.03	<2	<0.01	0.12	34	<0.01	63	0.05	<1	<5	<5	<20	2	<10	<0.01	2	13 *		
R76	8722	10	8	0.55	<5	77 *	<5	0.58	1.9	177	2.7	<2	<0.01	0.02	<1	0.06	303	0.01	<1	<5	<5	<20	51	<10	0.02	9	77 *		
R77	461	11	3	1.69	18	102 *	<5	10	0.6	61	1.06	4	<0.01	0.19	<1	0.51	1041	0.09	<1	<5	<5	<20	200	<10	0.07	30	102 *		
R78	8715	4	<1	0.33	<5	25 *	<5	<0.01	0.4	92	1.22	3	<0.01	0.11	31	<0.01	90	0.07	<1	<5	<5	<20	2	<10	<0.01	2	25 *		

Table A-2. Analytical results for reconnaissance investigations samples

Map No.	Sample No.	Location	Sample Type	Sample Size (ft)	Sample Site	Sample Description	Au30 ppb	* opt	Ag ppm	* opt	Cu ppm	* %	Pb ppm	* %	Zn ppm	* %	Mo ppm
R79	462	Etolin Is, USFS Rd6547	G		RC	Fest , sil dike w/ dissem py	<5		<0.1		8		26		115		7
R80	94	Pat Ck	SS			Diorite & metaseds float	<5		0.2		26		25		108		3
R80	260	Pat Ck	RC		FL	Qz diorite boulder	<5		<0.1		5		36		70		<1
R81	83	Wrangell Is, USFS Rd 50050	G		RC	Fest metaseds w/ dissem po	<5		0.3		62		10		50		2
R81	246	Wrangell Is, USFS Rd 50050	Rep	0.5	RC	Alt volc w/ fg dissem po	<5		<0.1		71		11		43		2
R82	74	Wrangell Is, USFS Rd 6265	G	0.4	RC	Qz vn w/ muscovite	<5		<0.1		27		5		39		1
R82	75	Wrangell Is, USFS Rd 6265	G	0.5	RC	Ar w/ bands of qz & po	7		0.3		72		7		119		3
R82	242	Wrangell Is, USFS Rd 6265	G		TP	Qz vn w/ po in mica sc	<5		0.2		52		9		56		<1
R83	81	Wrangell Is, USFS Rd 6265	G	0.6	RC	Garnet sc w/ qz lens & sulf	6		<0.1		39		3		73		1
R83	82	Wrangell Is, USFS Rd 6265	G	0.8	RC	Fest gossany sil bt sc	<5		<0.1		47		5		56		1
R83	245	Wrangell Is, USFS Rd 6265	Rep	0.4	RC	Qz vn in mica sc	<5		0.2		99		6		74		<1
R84	3688	K&D area	G		FL	Fg sulf in leucocratic int	7		1.3		41		177		125		7
R84	3689	K&D area	G		FL	Sc w/ qz, calc, po	182		3.4		45		47		143		4
R85	390	Glory Lake	SS			Granodiorite outcrop in stream	<5		<0.1		21		5		44		<1
R85	2808	Glory Lake	SS			Granite outcrop in stream	<5		0.2		21		9		44		<1
R86	2854	Buck Bar area	PC				64		<0.2		31		5		91		<1
R86	2855	Buck Bar area	PC				234		<0.2		30		5		92		<1
R87	142	Porterfield Ck, @ head	G	0.1	FL	Qz boulder w/ po, cp	<5		4.5		2372		19		334		2
R87	9601	Porterfield Ck, @ head	Rep	0.5	FL	Garnet gneiss w/ dissem sulf	<5		0.2		97		13		31		2
R88	2637	Camp 6 area	G	1	OC	Fel dike w/ fest sulf clots	<5		25		470		50		149		6
R89	95	Huff prospect area	G		OC	Fest qz vn w/ sparse po	<5		0.2		28		28		38		<1
R90	2842	Craig River area	Rep		RC	Fest metaseds	<5		0.5		88		<2		34		5
R91	3745	N Fork Bradfield River	G		OC	Gneiss w/ minor sulf in shear zone	<5		0.7		384		5		94		67
R92	3749	Upper Marten Lake area	Rep	0.7	OC	Fest qz vn in sc	517		1.2		26		3		5		9
R93	3744	White River	G		RC	Asbestiform minerals	<5		<0.1		16		<2		23		2
R94	2843	White River, NE of	Rep		RC	Fest metaseds w/ fg sulf	12		1.5		1151		7		86		7
R94	3743	White River, NE of	S		RC	Quartzite w/ py, minor cp	<5		0.4		458		<2		10		33
R95	3742	White River, NE of	G		OC	Gneiss pendant in int	13		1.1		137		<2		166		48
R96	72	Duck Point, W of	C	0.25	OC	Fest qz vn w/ bt & po	<5		<0.1		33		9		18		<1
R96	240	Duck Point	Rep	0.83	OC	Qz vn in metaseds	<5		<0.1		15		9		18		<1

Table A-2. Analytical results for reconnaissance investigations samples

Map No.	Sample No.	Ni ppm	Co ppm	Al %	As ppm	Ba * ppm xrf	Bi ppm	Ca %	Cd ppm	Cr ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm	Na %	Nb ppm	Sb ppm	Sc ppm	Sn * ppm xrf	Sr ppm	Te ppm	Ti %	V ppm	W * ppm xrf	Pt ppb	Pd ppb
R79	462	9	<1	0.24	5	90 *	<5	0.08	0.4	170	1.26	<2	<0.01	0.12	81	0.01	272	0.08	<1	<5	<5	<20	7	<10	<0.01	<1	90 *		
R80	94	48	47	2.5	<5	229	<5	0.33	<0.2	101	4.65	5	0.027	0.58	9	1.45	2958	0.09	3	<5	7	<20	29	<10	0.14	86	<20		
R80	260	4	3	0.95	<5	2559 *	<5	0.25	<0.2	73	2.27	<2	<0.01	0.61	6	0.6	515	0.08	3	<5	<5	<20	17	<10	0.18	41	<20		
R81	83	60	13	6.41	<5	165 *	<5	3.93	0.2	111	4.64	9	<0.01	0.49	3	0.84	530	0.4	10	<5	6	<20	312	<10	0.05	59	<20		
R81	246	32	11	3.59	<5	225 *	<5	8.85	0.3	36	3.49	<2	<0.01	0.33	2	0.7	1197	0.2	7	<5	<5	<20	264	<10	0.04	43	<20		
R82	74	49	5	1.22	<5	187 *	<5	0.83	0.3	222	1.28	<2	<0.01	0.27	2	0.6	147	0.09	2	<5	<5	<20	55	<10	0.06	36	<20		
R82	75	116	14	2.74	<5	1079 *	<5	0.19	0.3	259	4.44	<2	<0.01	1.55	5	2.09	243	0.07	5	<5	12	<20	8	<10	0.19	114	<20		
R82	242	50	7	1.97	<5	439 *	<5	1.62	0.2	114	2.14	3	0.01	0.63	3	0.96	132	0.09	3	<5	7	<20	60	<10	0.08	63	<20		
R83	81	56	12	2.74	<5	647 *	<5	1.64	<0.2	177	2.78	<2	<0.01	0.59	2	0.96	240	0.12	5	<5	6	<20	69	<10	0.12	63	<20		
R83	82	36	8	1.76	<5	537 *	<5	0.99	<0.2	179	3.48	<2	<0.01	0.38	2	0.64	268	0.1	<1	<5	<5	<20	97	<10	0.14	52	<20		
R83	245	60	17	1.58	<5	923 *	<5	0.4	<0.2	76	3.79	<2	<0.01	0.58	5	0.97	277	0.1	3	<5	6	<20	16	<10	0.13	75	<20		
R84	3688	5	4	2.05	12	895 *	<5	0.69	0.8	90	1.21	2	0.068	0.16	2	0.1	101	1.22	<1	<5	<5	<4 *	57	<10	0.02	31	<4 *		
R84	3689	112	25	0.6	846	1017 *	<5	10	2.9	103	3.1	<2	0.22	0.19	3	0.69	1494	<0.01	<1	63	7	<4 *	762	<10	<0.01	26	6 *		
R85	390	7	7	1.08	<5	1374 *	<5	0.66	<0.2	18	1.77	3	0.014	0.42	10	0.56	221	0.05	5	<5	<5	<4 *	31	<10	0.13	52	<4 *		
R85	2808	6	6	0.95	<5	1439 *	<5	0.8	<0.2	15	2,01	3	0.012	0.32	15	0.44	189	0.05	5	<5	<5	<4	33	<10	0.1	57	<4 *		
R86	2854	6	16	0.05	<5	25 *	<5	0.35	<0.2	43	10	<2	0.056	<0.01	22	0.02	843	<0.01	<1	<5	<5	<20	6	<10	0.09	771	<20		
R86	2855	6	18	0.07	<5	52 *	<5	0.44	<0.2	52	10	3	0.013	<0.01	30	0.03	875	<0.01	<1	<5	<5	<20	9	<10	0.12	788	<20		
R87	142	23	37	0.05	<5	258 *	<5	0.03	3	251	6.31	<2	<0.01	0.02	<1	0.04	40	<0.01	<1	<5	<5	<4 *	2	<10	<0.01	<1	<4 *		
R87	9601	64	22	4.82	<5	504 *	<5	4.22	<0.2	67	1.7	3	<0.01	0.03	<1	0.45	225	0.39	3	<5	<5	<4 *	122	<10	0.12	36	<4 *		
R88	2637	3	7	1.41	14	20	364	0.03	<.5	100	3.87	10	0.02	0.16	<10	0.31	290	0.07		<2	<1		3		<.01	13	<10		
R89	95	5	4	0.47	<5	100 *	<5	0.08	0.2	131	1.22	<2	<0.01	0.08	<1	0.24	103	0.05	<1	<5	<5	<4 *	5	<10	0.03	26	<4 *		
R90	2842	10	12	2.31	14	779 *	<5	1.18	<0.2	85	5.22	4	<0.01	0.09	4	0.9	307	0.17	<1	<5	8	<20	101	<10	0.14	163	779 *		
R91	3745	102	27	2.02	<5	1413 *	<5	1.2	0.6	241	4.12	5	<0.01	0.4	3	1.12	160	0.09	<1	<5	5	12 *	52	<10	0.13	157	1413 *		
R92	3749	14	<1	0.09	<5	<10 *	69	0.02	<0.2	262	0.76	<2	0.29	0.01	<1	0.08	43	<0.01	<1	<5	<5	<4 *	<1	20	<0.01	6	<10 *		
R93	3744	1402	64	0.25	<5	<10 *	<5	0.04	<0.2	265	3.51	<2	<0.01	0.08	<1	10	478	<0.01	4	<5	<5	<4 *	<1	<10	<0.01	5	<10 *		
R94	2843	59	37	5.21	<5	333 *	<5	3.86	1.1	116	4.57	12	<0.01	0.27	11	0.53	179	0.19	<1	<5	<5	<20	209	12	0.11	29	333 *		
R94	3743	35	19	0.41	<5	151 *	<5	0.2	0.2	299	1.36	<2	<0.01	0.03	2	0.01	34	0.1	<1	<5	<5	8 *	35	<10	<0.01	3	151 *		
R95	3742	35	4	0.68	<5	847 *	<5	0.21	1.7	213	2.59	2	0.011	0.36	10	0.43	152	0.08	<1	<5	<5	<4 *	19	<10	0.09	86	847 *		
R96	72	4	<1	0.38	<5	1274 *	<5	0.1	<0.2	97	0.6	<2	<0.01	0.15	2	0.1	47	0.09	<1	<5	<5	<20	13	<10	0.03	4	<20		
R96	240	1	<1	0.24	<5	2038 *	<5	0.05	<0.2	39	0.57	<2	<0.01	0.09	<1	0.08	51	0.04	2	<5	<5	<20	8	<10	0.02	4	<20		

Table A-3. Analytical results for rare earth element samples

Table A-3. Analytical results for samples analyzed for rare-earth elements

Map No.	Sample No.	Location	Sample Type	Sample Size (ft)	Sample Site	Sample Description	Ce ppm	Eu ppm	La ppm	Lu ppm	Nd ppm	Sc ppm	Sm	Tb ppm	Th ppm	U ppm	Yb ppm
11	174	Kadake Bay	C	0.1	OC	Carbonaceous fossils in shale	41	1.3	23	0.4	22	19.4	3.8	<1	6.6	46	3
11	175	Kadake Bay	C	0.3	OC	Carbonaceous bed in ls	12	0.6	7	<0.2	<10	2.1	1.6	<1	<0.5	8	1
13.1	9628	Point Saint Albans	C	0.5	OC	Gw w/ py band at margins of dike	27	<0.5	15	0.3	10	5.4	2.4	<1	4.9	<1	2
13.2	178	Point Saint Albans	G	0.3	OC	Qz lens w/ py	21	0.7	11	0.2	12	5.6	2.1	<1	2.1	4	1
13.2	179	Point Saint Albans	C	0.1	OC	Qz lens w/ blebs of sl	38	1	20	<0.2	17	2.7	3	<1	0.6	<1	<1
13.2	180	Point Saint Albans	C	0.4	OC	Qz vn w/ aspy, py, sl, gn	13	1.2	11	<0.2	<10	6.3	0.9	<1	<0.5	<5	<1
13.2	9629	Point Saint Albans	C	2.4	OC	Fault zone in gw w/ qz & sulf	14	0.8	7	<0.2	<10	3.7	1.8	<1	1.3	<1	<1
13.2	9630	Point Saint Albans	C	1.1	OC	Fest shear zone w/ qz & sulf	19	0.8	12	<0.2	10	10	2	<1	1.5	<1	<1
13.2	9631	Point Saint Albans	S	0.4	OC	Sheared gw br w/ gn	14	0.8	14	<0.2	<10	6.2	1.1	<1	1.2	<1	<1
13.3	177	Point Saint Albans	Rep	1.5	OC	Fest qz-calc zone w/ py, fg sl	12	0.7	6	<0.2	<10	5.9	1.9	<1	1.3	<1	1
35	181	Monongehela	C	3	OC	Fest volc	110	0.9	38	1	43	1.3	8.6	1	17	7	7
53.2	9654	Zarembo Is Fluorite	C	0.4	OC	Vuggy, crystalline qz br in andesite	24	<0.5	11	0.2	10	0.6	2.1	<1	1.8	1	1
53.3	296	Zarembo Is Fluorite	Rep	8	OC	Fest, banded andesite w/ py	65	<0.5	35	0.4	25	1.6	4.2	<1	20	9	3
R66	297	Zarembo Is, USFS Rd 6585	S		RC	Fest andesite w/ blebs & banded fg py	39	1.7	18	0.6	24	26.5	5.3	1	4.1	2	4

APPENDIX B - LISTS OF MINES, PROSPECTS, AND MINERAL OCCURRENCES

Table B-1. Alphabetical list of mines, prospects, and mineral occurrences

Name	Map no. (Plate 1)	Page no. (in text)	Name	Map no. (Plate 1)	Page no. (in text)
Allied Mine Group E	1	16	Kupreanof Pyrite	28	62
AMAX Molybdenum	72	144	Lake	82	171
Andrew Creek	69	132	Little Creek	4	21
Berg Basin	83	173	Lost Show	37	81
Berg	85	177	Lost Zarembo	52	104
Black Crag	86	178	Mad Dog 2	42	90
Bradfield River	92	188	Maid of Mexico Mine	40	87
Bruiser	61	118	Mary Moose	68	131
Brushy Creek	45	94	Mitkof Island, USFS Rd 6245	48	98
Buck Bar	67	130	Monongehela	35	73
Cascade Mine	66	128	Mt Lewis Cass	90	185
Castle Island Mine	29	64	Nelson Glacier	78	160
Copper King	84	175	Niblack Island	62	119
Copper Zone	75	152	Nicirque	32	70
Corn	9	31	North Bradford River Skarn	89	183
Cornwallis Peninsula	2	17	North Marsha Peak	76	154
Craig Claims area	88	181	North Silver	70	136
Craig River area	87	179	Northeast Cliffs	71	142
East of Harvey Lake	41	89	Northern Copper	21	49
East Marsha Peak	77	156	Pinta Point	14	40
East Duncan Pyrite	30	66	Point Saint Albans	13	36
Exchange	56	110	Portage Creek	24	56
Fortune	43	91	Portage Bay Pit	20	47
Freel & Durham	46	96	Road Show	47	160
Frenchie	50	101	Round Point	55	107
Glacier Basin	81	168	Saginaw Bay Barite	10	33
Groundhog Basin	73	146	Saginaw Bay	7	27
Gunnuk Creek	17	44	Salamander Creek Pit	60	117
Harvey Creek	39	86	Salt Chuck	23	54
Hattie	44	92	Scott	36	79
Helen S Mine	38	83	South Silver	74	150
Huff	79	163	Southwest Duncan Canal	33	71
Hungerford	8	28	Spruce Creek	31	68
Indian Point	26	60	Steamer Bay	58	114
K&D Mine	63	123	Sun	64	125
Kadake Bay	11	34	Sunrise	57	111
Kake Area Road System	15-16,18	42	Taylor Creek	25	58
Kane Pk	19	45	TB	34	72
Katherine	6	25	The Islander	65	126
Keku Islet	3	19	Towers Creek	22	53
Kuiu	12	35	Upper Marten Lake	91	186
Kuiu Lead-Zinc	5	22	West Duncan	27	61
West Nelson Glacier	80	166	Zarembo Island Hornblendite	51	103

Table B-1. Alphabetical list of mines, prospects, and mineral occurrences					
Name	Map no. (Plate 1)	Page no. (in text)	Name	Map no. (Plate 1)	Page no. (in text)
Wrangell Airport Pit	59	116	Zarembo Island, USFS Rd 52009	49	100
Zarembo Island Fluorite	53	105	ZF	54	106

Table B-2. Latitudes and longitudes of mines, prospects, and mineral occurrences in the Stikine area, based on map numbers from Plate 1.			
Map No.	LOCATION	Latitude deg min sec	Longitude deg min sec
1	Allied Mine Group E	56 54 27	-134 17 42
2.1	Cornwallis Peninsula	56 55 36	-134 11 50
2.2	Cornwallis Peninsula	56 55 17	-134 11 34
2.3	Cornwallis Peninsula	56 55 13	-134 11 11
2.4	Cornwallis Peninsula	56 55 7	-134 10 46
3	Keku Islet	56 55 39	-134 7 58
3.2	Keku Islet	56 55 24	-134 7 12
3.3	Keku Islet	56 55 18	-134 6 59
4	Little Creek	56 54 20	-134 7 46
5.1	Kuiu Lead-Zinc	56 53 59	-134 6 23
5.2	Kuiu Lead-Zinc	56 53 52	-134 6 19
6.1	Katherine	56 54 11	-134 5 21
6	Katherine	56 54 6	-134 4 42
7	Saginaw Bay	56 53 27	-134 9 38
8	Hungerford	56 53 30	-134 4 44
8	Hungerford	56 53 21	-134 4 19
9	Corn	56 52 51	-134 4 26
10	Saginaw Bay Barite	56 52 28	-134 13 19
11	Kadake Bay	56 48 23	-133 56 54
12	Kuiu	56 48 2	-133 56 39
12	Kuiu	56 47 53	-133 56 36
12	Kuiu	56 47 45	-133 56 30
12	Kuiu	56 47 42	-133 56 27
13	Point Saint Albans	56 6 31	-133 57 27
13	Point Saint Albans	56 6 16	-133 57 29
13	Point Saint Albans	56 6 8	-133 57 29
14	Pinta Point	57 5 54	-133 52 55
15	Kake Area Road System	57 3 4	-133 49 46
16	Kake Area Road System	57 2 17	-133 53 32
17.1	Gunnuk Creek	57 00 14	-133 51 25
17.2	Gunnuk Creek	56 59 57	-133 51 47
17.3	Gunnuk Creek	56 59 48	-133 52 17
18	Kake Area Road System	56 59 18	-133 57 32
19.1	Kane Pk	56 59 16	-133 4 22
19.2	Kane Pk	56 59 11	-133 4 20
19.3	Kane Pk	56 58 42	-133 4 5
20	Portage Bay Pit	56 54 52	-133 16 7
21.1	Northern Copper	56 53 31	-133 21 51

Table B-2. Latitudes and longitudes of mines, prospects, and mineral occurrences in the Stikine area, based on map numbers from Plate 1.

Map No.	LOCATION	Latitude deg min sec	Longitude deg min sec
21.2	Northern Copper	56 53 18	-133 21 59
21.3	Northern Copper	56 53 20	-133 22 10
22.1	Towers Creek	56 51 29	-133 24 2
22.2	Towers Creek	56 51 19	-133 23 47
22.3	Towers Creek	56 51 14	-133 23 42
23.1	Salt Chuck	56 50 26	-133 19 21
23.2	Salt Chuck	56 50 25	-133 18 36
24.1	Portage Creek	56 50 56	-133 15 42
24.2	Portage Creek	56 50 51	-133 15 48
25.1	Taylor Creek	56 47 46	-133 21 28
25.2	Taylor Creek	56 47 35	-133 21 31
26	Indian Point	56 44 24	-133 14 39
27	West Duncan	56 40 19	-133 15 29
28	Kupreanof Pyrite	56 39 59	-133 15 23
29.1	Castle Island Mine	56 39 7	-133 10 2
29.2	Castle Island Mine	56 39 00	-133 9 47
29.3	Castle Island Mine	56 38 53	-133 9 42
30	East Duncan Pyrite	56 39 27	-133 5 5
31.1	Spruce Creek	56 40 42	-133 3 19
31.2	Spruce Creek	56 40 31	-133 2 34
31.3	Spruce Creek	56 39 50	-133 1 44
32	Nicirque	56 38 58	-133 1 29
33	Southwest Duncan	56 33 55	-133 5 57
34	TB	56 31 52	-133 30 00
35	Monongehela	56 28 5	-133 26 5
36.1	Scott	56 34 29	-133 00 9
36.2	Scott	56 34 25	-133 00 14
37	Lost Show	56 34 24	-133 3 29
38.1	Helen S Mine	56 34 14	-133 4 1
38.2	Helen S Mine	56 33 52	-133 4 3
39.1	Harvey Creek	56 34 5	-133 3 57
39.2	Harvey Creek	56 33 53	-133 3 43
40	Maid of Mexico Mine	56 33 54	-133 1 53
41	East of Harvey Lake	56 33 28	-133 00 32
42.1	Mad Dog 2	56 33 1	-133 1 36
42.2	Mad Dog 2	56 32 50	-133 1 23
43	Fortune	56 31 59	-133 3 10
44	Hattie	56 31 58	-133 2 50

Table B-2. Latitudes and longitudes of mines, prospects, and mineral occurrences in the Stikine area, based on map numbers from Plate 1.

Map No.	LOCATION	Latitude deg min sec	Longitude deg min sec
45	Brushy Creek	56 31 12	-133 1 4
46	Freel & Durham	56 43 10	-132 46 47
47	Road Show	56 40 2	-132 42 39
48	Mitkof Is, USFS Rd 6245	56 33 10	-132 45 7
49	Zarembo Is, USFS Rd 52009	56 25 26	-132 59 2
50	Frenchie	56 25 8	-132 57 3
51.1	Zarembo Hornblendite	56 25 9	-132 37 48
51.2	Zarembo Hornblendite	56 24 53	-132 37 39
51.3	Zarembo Hornblendite	56 24 51	-132 37 55
51.4	Zarembo Hornblendite	56 24 51	-132 38 9
52	Lost Zarembo	56 22 54	-132 53 54
53.1	Zarembo Island Fluorite	56 17 57	-132 57 43
53.2	Zarembo Island Fluorite	56 17 44	-132 57 29
53.3	Zarembo Island Fluorite	56 17 33	-132 57 20
53.4	Zarembo Island Fluorite	56 16 13	-132 55 52
54	ZF	56 17 28	-132 48 24
55	Round Point	56 16 50	-132 42 12
56	Exchange	56 25 16	-132 31 58
57	Sunrise	56 25 7	-132 31 46
58.1	Steamer Bay	56 8 13	-132 39 22
58.2	Steamer Bay	56 8 9	-132 39 36
59	Wrangell Airport Pit	56 29 10	-132 22 49
60	Salamander Creek Pit	56 18 22	-132 13 29
61	Bruiser	56 6 24	-132 4 35
62	Niblack Island	56 3 7	-132 5 57
63	K&D Mine	57 28 49	-133 28 33
64.1	Sun	57 19 8	-132 57 55
64.2	Sun	57 19 53	-132 54 46
65	The Islander	57 16 3	-133 30 42
66	Cascade Mine	56 59 30	-132 47 20
67.1	Buck Bar	56 43 5	-132 4 12
67.2	Buck Bar	56 42 48	-132 6 23
67.3	Buck Bar	56 42 50	-132 6 11
67.4	Buck Bar	56 42 21	-132 3 49
67.5	Buck Bar	56 42 19	-132 3 37
67.6	Buck Bar	56 42 16	-132 3 15
68	Mary Moose	56 40 00	-132 14 22
69.1	Andrew Creek	56 36 19	-132 9 42

Table B-2. Latitudes and longitudes of mines, prospects, and mineral occurrences in the Stikine area, based on map numbers from Plate 1.			
Map No.	LOCATION	Latitude deg min sec	Longitude deg min sec
69.2	Andrew Creek	56 34 15	-132 6 45
69.3	Andrew Creek	56 34 7	-132 6 17
69.4	Andrew Creek	56 34 3	-132 5 57
69.5	Andrew Creek	56 33 57	-132 6 15
69.6	Andrew Creek	56 33 51	-132 5 35
69.7	Andrew Creek	56 33 38	-132 6 21
69.8	Andrew Creek	56 33 20	-132 5 48
69.9	Andrew Creek	56 33 24	-132 4 33
70.1	North Silver, N	56 31 28	-132 2 21
70	North Silver	56 30 54	-132 2 41
70.3	North Silver	56 30 56	-132 2 19
70.4	North Silver	56 30 43	-132 2 30
70.5	North Silver	56 30 37	-132 2 21
71.1	Northeast Cliffs	56 31 9	-132 3 8
71.2	Northeast Cliffs	56 30 39	-132 3 5
72	AMAX Molybdenum	56 31 8	-132 3 38
73.1	Groundhog Basin	56 31 1	-132 3 35
73.2	Groundhog Basin	56 30 56	-132 3 50
73.3	Groundhog Basin	56 30 50	-132 3 40
73.4	Groundhog Basin	56 30 40	-132 3 23
74	South Silver	56 30 25	-132 2 19
75.1	Copper Zone	56 30 29	-132 2 53
75.2	Copper Zone	56 30 16	-132 2 54
76.1	North Marsha Peak	56 29 40	-132 2 45
76.2	North Marsha Peak	56 29 34	-132 2 34
77.1	East Marsha Peak	56 29 26	-132 1 42
77.2	East Marsha Peak	56 29 20	-132 1 47
78.1	Nelson Glacier	56 29 30	-132 00 44
78.2	Nelson Glacier	56 28 59	-131 59 50
79.1	Huff	56 29 34	-131 59 56
79.2	Huff	56 29 21	-131 59 59
79.3	Huff	56 29 3	-131 59 49
79.4	Huff	56 28 57	-131 59 41
79.5	Huff	56 28 49	-131 59 29
79.6	Huff	56 28 45	-131 59 10
79.7	Huff	56 28 35	-131 59 17
80	West Nelson Glacier	56 28 45	-131 59 51
81	Glacier Basin	56 28 46	-132 1 14

Table B-2. Latitudes and longitudes of mines, prospects, and mineral occurrences in the Stikine area, based on map numbers from Plate 1.			
Map No.	LOCATION	Latitude deg min sec	Longitude deg min sec
82.1	Lake	56 28 25	-132 5 43
82.2	Lake	56 28 18	-132 5 47
83	Berg Basin	56 26 48	-132 00 36
84.1	Copper King	56 26 24	-131 57 50
84.2	Copper King	56 26 21	-131 57 55
85	Berg	56 23 20	-131 57 25
86.1	Black Crag	56 32 00	-131 42 4
86.2	Black Crag	56 32 16	-131 41 28
86.3	Black Crag	56 32 46	-131 40 38
86.4	Black Crag	56 32 56	-131 39 28
87	Craig River area	56 27 53	-131 21 19
88.1	Craig Claims area	56 27 4	-131 15 16
88.2	Craig Claims area	56 27 9	-131 14 13
89.1	North Bradfield River Skarn	56 24 37	-131 25 00
89.2	North Bradfield River Skarn	56 24 29	-131 25 4
89.3	North Bradfield River Skarn	56 24 10	-131 25 5
89.4	North Bradfield River Skarn	56 23 48	-131 25 2
89.5	North Bradfield River Skarn	56 23 28	-131 24 1
89.6	North Bradfield River Skarn	56 23 35	-131 23 25
89.7	North Bradfield River Skarn	56 23 13	-131 23 15
90.1	Mt Lewis Cass	56 23 32	-131 7 4
90.2	Mt Lewis Cass	56 23 33	-131 6 40
90.3	Mt Lewis Cass	56 23 9	-131 6 34
91	Upper Marten Lake	56 17 16	-131 47 30
92.1	Bradfield River	56 13 47	-131 32 37
92.2	Bradfield River	56 13 35	-131 30 25
92.3	Bradfield River	56 14 8	-131 27 4