



Alaska Resource Data File, Russian Mission quadrangle, Alaska

By Travis L. Hudson¹ and Madelyn A. Millholland²

Open-File Report 02–70

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This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards or with the North American Stratigraphic Code. Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

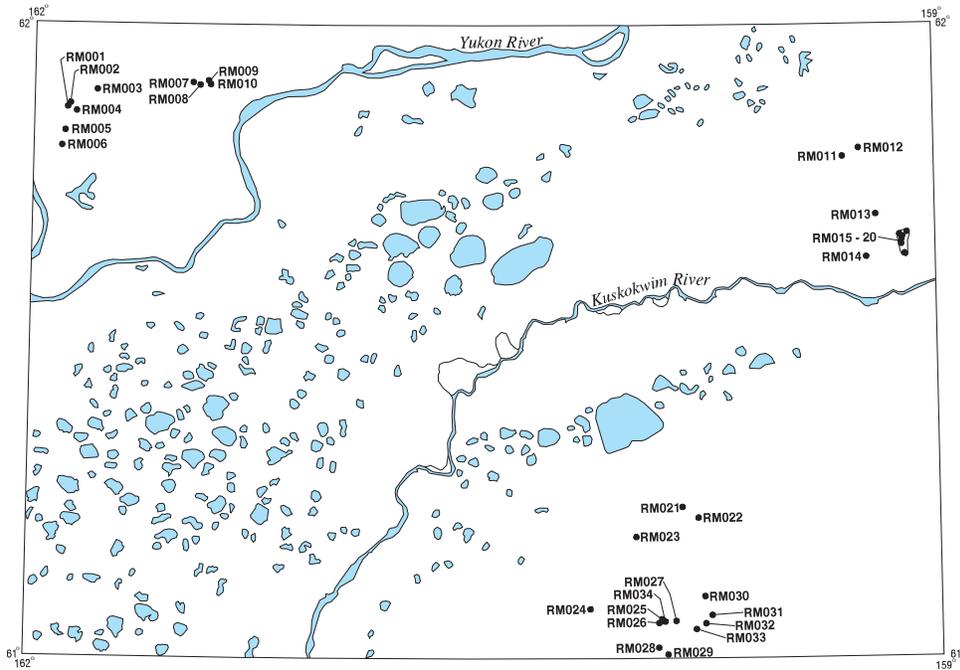
**U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY**

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Russian Mission quadrangle

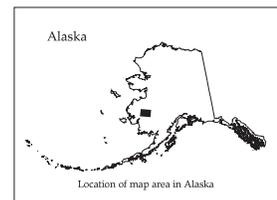
Descriptions of the mineral occurrences shown on the accompanying figure follow. See U.S. Geological Survey (1996) for a description of the information content of each field in the records. The data presented here are maintained as part of a statewide database on mines, prospects and mineral occurrences throughout Alaska.



*Distribution of mineral occurrences in the Russian Mission
1:250,000-scale quadrangle, Alaska*

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OPEN-FILE REPORT 02-70

Site name(s): Disappointment Creek**Site type:** Mine**ARDF no.:** RM001**Latitude:** 61.867**Quadrangle:** RM D-8**Longitude:** 161.889**Location description and accuracy:**

Disappointment Creek flows north to Wilson Creek from its headwaters near the summit of Mount Okumiak. The map site is on the lower part of the creek, in the NW1/4 sec. 35, T. 21 N., R. 69 W., of the Seward Meridian. It is included in locality 8 of Hoare and Cobb (1972, 1977).

Commodities:**Main:** Au**Other:** PGE**Ore minerals:** Gold, hematite, magnetite, platinum**Gangue minerals:****Geologic description:**

Placer gold mining of about the lower one-half mile of Disappointment Creek started in 1914 and continued intermittently until 1939 (Hoare and Cobb, 1977). The pay streak was as much as 300 feet wide. The gravels were 10 to 12 feet thick upstream and more than 35 feet thick at the mouth. The gravels comprised mostly small and well-rounded pebbles and cobbles as much as 8 inches in diameter. The placer concentrates included hematite, magnetite, and minor platinum (Harrington, 1918). Bedrock near the mouth includes slate and conglomerate. Elsewhere in the drainage, Carboniferous (?) to Cretaceous sedimentary and volcanic rocks are intruded by Mesozoic or Tertiary granitic rocks (Hoare and Coonrad, 1959).

Alteration:**Age of mineralization:**

Quaternary.

Deposit model:

Placer Au-PGE (Cox and Singer, 1986; model 39a)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

39a

Production Status: Yes; small**Site Status:** Inactive**Workings/exploration:**

Open-cut mining took place intermittently from 1914 to 1939. A shaft sunk 35 feet failed to reach bedrock near the mouth, but it was abandoned because of flooding.

Production notes:**Reserves:****Additional comments:****References:**

Harrington, 1918; Hoare and Coonrad, 1959; Hoare and Cobb, 1972; Hoare and Cobb, 1977.

Primary reference: Hoare and Cobb, 1977**Reporter(s):** Travis L. Hudson and Madelyn A. Millholland**Last report date:** 06/10/01

Site name(s): Wilson Creek (including Happy Creek)

Site type: Mine

ARDF no.: RM002

Latitude: 61.873

Quadrangle: RM D-8

Longitude: 161.880

Location description and accuracy:

Wilson Creek is a west-flowing drainage in the lowlands north of Mount Okumiak. It has been placer mined between the junction of Elephant Creek (RM004) and Disappointment Creek (RM001). The map site is in the NW1/4 sec. 35, T. 21 N., R. 69 W., of the Seward Meridian. It is included in locality 8 of Hoare and Cobb (1972, 1977).

Commodities:

Main: Au

Other: PGE

Ore minerals: Gold, hematite, magnetite, platinum

Gangue minerals:

Geologic description:

Gold was discovered on Wilson Creek in 1913, and some mining took place on this creek between the mouths of Disappointment Creek (RM001) and Elephant Creek (RM004). The placer deposit on Wilson Creek may be continuous with those on Disappointment and Elephant Creeks. Happy Creek is a north tributary to Wilson Creek that enters between Disappointment and Elephant Creeks. Fine, well-worn gold on bedrock was reported on Happy Creek (Brooks, 1915). It is assumed that Brooks' report refers to lower Happy Creek near the Wilson Creek flood plain. In general, gold was irregularly distributed in deeper gravels of Wilson Creek.

Alteration:

Age of mineralization:

Quaternary.

Deposit model:

Placer Au (Cox and Singer, 1986; model 39a)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

39a

Production Status: Yes; small

Site Status: Probably inactive

Workings/exploration:

The workings along Wilson Creek were probably open-cut operations.

Production notes:

Reserves:

Additional comments:

References:

Brooks, 1915; Hoare and Cobb, 1972 ; Hoare and Cobb, 1977.

Primary reference: Hoare and Cobb, 1977

Reporter(s): Travis L. Hudson and Madelyn A. Millholland

Last report date: 06/10/01

Site name(s): Edgar Creek**Site type:** Prospect**ARDF no.:** RM003**Latitude:** 61.895**Quadrangle:** RM D-8**Longitude:** 161.791**Location description and accuracy:**

Edgar Creek is a west headwater tributary of the Kuyukutuk River. The prospect is on the north side of the headwaters of Edgar Creek and is approximately located, perhaps within one-half mile. The map site is at an elevation of 750 feet, in the SW1/4 sec. 20, T. 21 N., R. 68 W., of the Seward Meridian. This is locality 2 of Hoare and Cobb (1972, 1977).

Commodities:**Main:** Au**Other:****Ore minerals:** Gold**Gangue minerals:** Quartz**Geologic description:**

Harrington (1918) reported that free-milling gold in quartz veins was discovered near the head of Edgar Creek. Claims were staked on these veins, but other information about them is not available. Hoare and Coonrad (1959) show a prospect symbol at this location and interpret the country rocks as Paleozoic to Mesozoic sedimentary and volcanic strata of the Gemuk Group.

Alteration:**Age of mineralization:**

Cretaceous or younger. Veins crosscut Carboniferous (?) to Cretaceous rocks of the Gemuk Group (Hoare and Coonrad, 1959).

Deposit model:

Low-sulfide Au-quartz veins? (Cox and Singer, 1986; model 36a)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

36a?

Production Status: None

Site Status: Probably inactive

Workings/exploration:

Claims were staked on this prospect by 1916, and some surface excavations are probably present.

Production notes:

Reserves:

Additional comments:

References:

Harrington, 1918; Hoare and Coonrad, 1959; Hoare and Cobb, 1972; Hoare and Cobb, 1977.

Primary reference: Harrington, 1918

Reporter(s): Travis L. Hudson and Madelyn A. Millholland

Last report date: 06/10/01

Site name(s): Elephant Creek**Site type:** Mine**ARDF no.:** RM004**Latitude:** 61.861**Quadrangle:** RM D-8**Longitude:** 161.859**Location description and accuracy:**

Elephant Creek flows north to Wilson Creek from headwaters 1.7 miles east of the summit of Mount Okumiak. Placer mining may have taken place at least locally along about 2 miles of its length. The map site is at an elevation of about 350 feet in the southeast corner of sec. 35, T. 21 N., R. 69 W., of the Seward Meridian. This is locality 9 of Hoare and Cobb (1972, 1977).

Commodities:**Main:** Au**Other:** W**Ore minerals:** Gold, scheelite**Gangue minerals:****Geologic description:**

The trail development along Elephant Creek suggests that placer gold mining may have taken place at least locally along about 2 miles of its length upstream from Wilson Creek (RM002). The placer gold was discovered in 1914, and hydraulic mining was under way by 1916. The gold is in modern stream deposits and is accompanied by minor scheelite (Joesting, 1942). Bedrock in the Elephant Creek drainage is sedimentary and igneous rocks of the Gemuk Group that are locally intruded by Mesozoic or Tertiary granitic rocks (Hoare and Coonrad, 1959). The sedimentary rocks include chert, siltstone, sandstone, and conglomerate, and the intrusive rocks include biotite quartz monzonite, diorite, gabbro, hornblende porphyry, and felsic rocks (Bull and Schneider, 1997).

Alteration:**Age of mineralization:**

Quaternary.

Deposit model:

Placer Au (Cox and Singer, 1986; model 39a)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

39a

Production Status: Yes; small

Site Status: Undetermined

Workings/exploration:

Underground mining methods were used before 1916; hydraulic methods were used from 1916 intermittently until at least 1940.

Production notes:

Reserves:

Additional comments:

References:

Joesting, 1942; Hoare and Coonrad, 1959; Hoare and Cobb, 1972; Hoare and Cobb, 1977; Bull and Schneider, 1997.

Primary reference: Hoare and Cobb, 1977

Reporter(s): Travis L. Hudson and Madelyn A. Millholland

Last report date: 06/10/01

Site name(s): Arnold

Site type: Prospect

ARDF no.: RM005

Latitude: 61.830

Quadrangle: RM D-8

Longitude: 161.896

Location description and accuracy:

The Arnold prospect is in the northeast headwaters of Willow Creek. It is at an elevation of about 1,250 feet and 1 mile east-southeast of the summit of Mount Okumiak. The map site is in the SW1/4 sec. 12, T. 20 N., R. 70 W., of the Seward Meridian. This is locality 1 of Hoare and Cobb (1972, 1977).

Commodities:

Main: Au

Other: Cu, Mo, Pb, W

Ore minerals: Anglesite, chalcopyrite, galena, gold, hematite, magnetite, malachite, molybdenite, pyrite, pyrrhotite, scheelite

Gangue minerals: Calcite, iron carbonate, limonite, quartz

Geologic description:

The Arnold prospect was first staked in 1914 (Harrington, 1918). It has been explored with surface trenches and pits at several times since, but mining has not occurred. The deposit is quartz veins, quartz vein stockworks, and quartz-cemented breccia in pyrite-bearing mafic volcanic rocks intruded by quartz porphyry. As mapped by Turner (1987), the breccia is commonly in quartz porphyry but also includes greenstone fragments. The largest stockwork and (or) breccia zone is about 200 feet wide and 700 feet long, but exposure is mostly slope rubble. Most geologic units trend northwest, including well-developed shears and small faults; contacts are commonly slickensided. The quartz veins contain as much as 2 percent sulfide minerals, including chalcopyrite, galena, molybdenite, pyrite, pyrrhotite, and sphalerite. Other minerals in the veins include magnetite, hematite, anglesite, malachite, limonite, scheelite, and calcite. The best gold grades are in quartz veins. Selected quartz veins contain as much as 2.72 ounces of gold per ton but altered greenstone with or without quartz veins commonly contains a few tens to a few hundreds parts per billion gold (Turner, 1987). Homestake collected 78 rock, 5 stream sediment, and 70 soil samples in the general area, but almost all anomalous samples were from the Arnold prospect (Bull and Schneider, 1997). The anomalous rock and soil samples mostly contained a few tens to hundreds of parts per billion gold, although one quartz

vein with visible gold contained 63.5 grams of gold per ton. Copper, in the 100 to 835 ppm range, was the element most commonly anomalous in these samples. Molybdenum, as much as 126 ppm, was locally anomalous, and lead, zinc, silver, antimony, and arsenic were present in low amounts in most of the samples. A reconnaissance examination of the prospect for radioactive minerals did not find any material containing more than 0.001 percent equivalent uranium (West, 1954). The general area is one where mafic volcanic rocks are intruded by a variety of intermediate to felsic igneous rocks (Hoare and Coonrad, 1959; Turner, 1987; Bull and Schneider, 1997). Mineralization appears to be dominantly associated with felsic intrusive rocks.

Alteration:

Silicification, oxidation, sericitization, iron-carbonate development, and potassic replacement(?).

Age of mineralization:

Cretaceous or Tertiary. The altered and mineralized host volcanic rocks are part of the Gemuk Group that includes rocks as young as Early Cretaceous (Hoare and Coonrad, 1959). The felsic intrusive rocks in the prospect area may be part of a Upper Cretaceous and Lower Tertiary suite of igneous rocks that are widespread in southwest Alaska (e.g., Box and others, 1993).

Deposit model:

Polymetallic veins (Cox and Singer, 1986: model 22c)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

22c

Production Status: None

Site Status: Active

Workings/exploration:

The Arnold prospect has been explored with surface trenches, pits, and dozer cuts several times since it was first staked in 1914. Drilling has not been reported. Surface mapping and sampling was completed for Calista Corporation in the 1980's (Turner, 1987), and additional sampling, including a soil grid, was completed in 1997 (Bull and Schneider, 1997).

Production notes:

A test shipment of high-grade material returned \$80 per ton in 1915.

Reserves:

Additional comments:

References:

Harrington, 1918; West, 1954; Hoare and Coonrad, 1959; Hoare and Cobb, 1972; Hoare and Cobb, 1977; Turner, 1987; Box and others, 1993; Bull and Schneider, 1997.

Primary reference: Turner, 1987

Reporter(s): Travis L. Hudson and Madelyn A. Millholland

Last report date: 06/10/01

Site name(s): Willow Creek**Site type:** Mine**ARDF no.:** RM006**Latitude:** 61.806**Quadrangle:** RM D-8**Longitude:** 161.906**Location description and accuracy:**

Willow Creek flows south to Spruce Creek from headwaters near the summit of Mount Okumiak. Placer mining took place along about 2 miles of the drainage from the headwaters of the west fork of Willow Creek downstream to an elevation of about 200 feet. The map site is on the creek at the village of Willow Creek, near the west boundary of sec. 24, T. 20 N., R. 70 W., of the Seward Meridian. This is locality 7 of Hoare and Cobb (1972,1977).

Commodities:**Main:** Au**Other:** Ag, Pt**Ore minerals:** Gold, hematite, ilmenite, magnetite, platinum**Gangue minerals:****Geologic description:**

Placer gold was discovered on Willow Creek in 1914. Mining started in 1915, and more than 12,000 ounces were produced in 1916 (Hoare and Cobb, 1977). By the 1950's, placer mining took place along about 2 miles of the drainage from the headwaters of the west fork of Willow Creek near the Arnold lode prospect (RM005) downstream to an elevation of about 200 feet. The deposits were rich. Retherford (1987) estimated that the average grade may have been 0.049 ounce of gold per cubic yard and Brooks (1922) reported that recovery was as much as one-third ounce (\$6) of gold per cubic yard. As much as 85,000 ounces of gold may have been produced from Willow Creek by the 1950's (Retherford, 1987). Inasmuch as many of the gravels were coarse and bouldery, much mining included the separate washing of large, angular boulders. Retherford (1987) divided the creek into three segments: (1) the upper canyon is the first mile below the Arnold prospect, where the steep-walled, narrow valley carries 5 to 15 feet of gravel on bedrock; (2) the lower canyon is the next 3,500 feet of the creek, where the flood plain gradually broadens downstream and the alluvial fill is 15 to 35 feet thick; and (3) the next mile downstream is an alluvial fan ('deltaic') complex that has not been mined. The gold was commonly coarse and concentrated on bedrock in the upper canyon. In the middle

part of the lower canyon, 15 feet of overburden alluvium with moderate to low gold values covered a thin clay hardpan. Below the hardpan, gold was distributed through 15 feet of a bouldery and clayey pay zone above bedrock (Retherford, 1987). Placer concentrates contained magnetite, ilmenite, hematite, and minor platinum (Harrington, 1918). Retherford (1987) estimated that the potential reserves at Willow Creek include (1) about 480,000 cubic yards of tailings with a grade of 0.008 to 0.012 ounce of gold per cubic yard; and (2) 2,715,000 cubic yards of unmined material in the alluvial fan complex that may have a grade of 0.02 ounce of gold per cubic yard. The low elevation (in part about 150 feet) and proximity to the lower Yukon River lowlands suggests that Quaternary sea-level fluctuations may have influenced the development of the Willow Creek placer deposit.

Alteration:**Age of mineralization:**

Quaternary.

Deposit model:

Placer Au-PGE (Cox and Singer, 1986; model 39a)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

39a

Production Status: Yes; medium

Site Status: Undetermined

Workings/exploration:

Hand methods, draglines, scrapers, and eventually dozers were used in mining. A ditch was built in 1917 to divert water from Slope Creek to Willow Creek for use in hydraulic mining. A dryland dredge was brought in after WWII and operated for a few years. Many exploration shafts were sunk along the lower part of the creek, nearby tributaries, and along the mountain front both to the east and west of Willow Creek (Retherford, 1987).

Production notes:

Retherford (1987) estimated that the average grade may have been 0.049 ounce of gold per cubic yard, and Brooks (1922) reported that recovery was as much as one-third ounce (\$6) of gold per cubic yard. As much as 85,000 ounces of gold may have been produced from Willow Creek by the 1950s (Retherford, 1987).

Reserves:

Retherford (1987) estimated that the potential reserves at Willow Creek include (1) about 480,000 cubic yards of tailings with a grade of 0.008 to 0.012 ounce of gold per cubic yard, and (2) 2,715,000 cubic yards of unmined material in the alluvial fan complex that may have a grade of 0.02 ounce of gold per cubic yard.

Additional comments:

References:

Harrington, 1918; Brooks, 1922; Hoare and Cobb, 1972; Hoare and Cobb, 1977; Retherford, 1987.

Primary reference: Retherford, 1987

Reporter(s): Travis L. Hudson and Madelyn A. Millholland

Last report date: 06/10/01

Site name(s): Kako

Site type: Prospect

ARDF no.: RM007

Latitude: 61.908

Quadrangle: RM D-7

Longitude: 161.470

Location description and accuracy:

The Kako prospect is on the ridge crest at the head of Buster Creek (see RM008). It is on a saddle at an elevation of about 800 feet, 1,200 feet southwest of hill 901. The map site is in the SE1/4 sec. 13, T. 21 N., R. 67 W., of the Seward Meridian.

Commodities:

Main: Ag, Au

Other:

Ore minerals: Gold

Gangue minerals: Clay, iron oxide, jarosite(?), quartz, sericite

Geologic description:

The Kako lode gold prospect was discovered in 1974 by Resource Associates of Alaska (RAA) geologists under contract to Calista Corporation. RAA completed surface examination and a grid geochemical survey in 1974 and 1975. Calista Corporation and others continued work on the prospect in 1989 (Hickok and McAtee, 1990), 1996, and 1997 (Enos, 1997; Bull and Schneider, 1997). The principal gold-bearing area that has been identified is centered on a saddle at the head of Buster Creek, where there is a 30- by 300-foot area of rhyolite breccia. The breccia consists of angular sericite/clay-altered rhyolite fragments in a matrix of quartz, iron oxide, sericite/clay, and possibly jarosite (Bull and Schneider, 1997). It is vuggy and variably silicified. Thirty-two rock samples of the breccia range in gold content from 100 ppb to 900 ppb (Hickok and McAtee, 1990). Silver content ranges as much as 9.6 ppm, and arsenic content is commonly several hundred parts per million to greater than 2,000 ppm. A few hundred rock and soil samples have been collected in the general prospect area over several years. These samples show that arsenic is widely distributed at anomalous levels that are commonly a few hundred or more parts per million. Other elements locally occur in anomalous amounts (Hickok and McAtee, 1990). These include silver (to 17.9 ppm), copper (to 562 ppm), lead (to 431 ppm), zinc (to 750 ppm), antimony (to 112 ppm), and mercury (to 100 ppm). Bedrock in the area of the prospect includes a zone about 2,500 feet across in which outcrops of felsic intrusive rocks are common. These rocks consist of aphanitic rhyolite to quartz por-

phyry that intrude strata that include chert, limestone, siltstone, and shale. The sedimentary rocks are in contact to the north and south with mafic volcanic rocks (Enos, 1997). The sedimentary and mafic volcanic rocks are part of the Paleozoic to Mesozoic Gemuk Group (Hoare and Coonrad, 1959). The bedrock units and several faults strike approximately northwest-southeast and trend toward Buster Creek (RM008), where felsic intrusive rocks have been reported to be bedrock in some areas of previous placer mining (Hickok and McAtee, 1990).

Alteration:

Silicification, sericite/clay replacement, and oxidation.

Age of mineralization:

Cretaceous or Tertiary. Mineralization is hosted by felsic intrusive rocks that are probably part of a regional suite of Upper Cretaceous and Lower Tertiary igneous rocks that are widespread in southwest Alaska. The sedimentary rocks intruded by the felsic igneous rocks may be as young as Early Cretaceous (Hoare and Coonrad, 1959).

Deposit model:

Gold in altered and brecciated rhyolite

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Active

Workings/exploration:

The Kako prospect has been explored by surface mapping and grid-based soil and rock geochemical surveys. Some of the geochemical surveys used hand and power augers to recover subsurface materials.

Production notes:**Reserves:****Additional comments:****References:**

Hoare and Coonrad, 1959; Hickok and McAtee, 1990; Bull and Schneider, 1997; Enos, 1997.

Primary reference: Hickok and McAtee, 1990

Reporter(s): Travis L. Hudson and Madelyn A. Millholland

Last report date: 06/10/01

Site name(s): Buster Creek**Site type:** Mine**ARDF no.:** RM008**Latitude:** 61.904**Quadrangle:** RM D-7**Longitude:** 161.447**Location description and accuracy:**

Buster Creek is a west tributary of lower Kako Creek. It is not named on the USGS 1:63,360 topographic map (1952 edition) of the area. The junction of Buster Creek with Kako Creek is 3 miles north-northwest of Kako Landing on the Yukon River. The map site is at the midpoint of about 1 mile of placer workings on Buster Creek, in the NE1/4 sec. 19, T. 21 N., R. 66 W., of the Seward Meridian. It is locality 10 of Hoare and Cobb (1972, 1977). The site is called the 'Kako Mine' on the Russian Mission D-7 topographic map.

Commodities:**Main:** Au**Other:** Hg**Ore minerals:** Arsenopyrite, cassiterite, cinnabar, gold, ilmenite, magnetite, scheelite**Gangue minerals:** Garnet**Geologic description:**

Placer gold was discovered on Buster Creek in 1920, and about 4,800 feet of the uppermost part of the drainage was mined by WWII. This mining was by hand, scraper, and dragline operations, and an estimated 5,000 to 7,000 ounces of gold were recovered (Hickok and McAtee, 1990). In the 1980's, the Penz family restarted mining with dozer, hoe, loader, and sluice and jig operations. They patented four claims on the creek in 1989. In 1940, H. R. Joesting (written commun. to J. Ramstad, 1940) used exploration drilling results to estimate that there were two unmined segments of the creek with potential economic reserves totaling about 8,000 ounces of gold. About three-quarters of these reserves were downstream of the patented claims. The placer gold is rough, coarse, and irregular in shape. Many pieces are attached to quartz, sericite-altered rhyolite, and, rarely, arsenopyrite (Hickok and McAtee, 1990). Other minerals recovered with the gold include cinnabar, garnet, arsenopyrite, scheelite, cassiterite, magnetite, and ilmenite. Rhyolite pebbles and cobbles are abundant in the stream gravels. The placer gold in Buster Creek is derived from the rhyolite-hosted Kako lode gold prospect (RM007) on the saddle between Buster Creek and East Fork Kuyukutuk River.

Alteration:**Age of mineralization:**

Quaternary.

Deposit model:

Placer Au (Cox and Singer, 1986, model 39a)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

39a

Production Status: Yes; small

Site Status: Active

Workings/exploration:

Placer gold was discovered on Buster Creek in 1920 and about 4,800 feet of the uppermost part of the drainage was mined by WWII. This mining was by hand, scraper, and dragline, and an estimated 5,000 to 7,000 ounces of gold were recovered (Hickok and McAtee, 1990). In the 1980's, the Penz family restarted mining with dozer, hoe, loader, and sluice and jig operations. They patented four claims on the creek in 1989.

Production notes:

An estimated 5,000 to 7,000 ounces of gold were recovered from Buster Creek before WWII (Hickok and McAtee, 1990).

Reserves:

In 1940, R. Joesting (written communication to Mr. J. Ramstad) used exploration drilling results to estimate that there were two unmined segments of the creek with potential economic reserves totaling about 8,000 ounces of gold. About three-quarters of these reserves were downstream of the patented claims.

Additional comments:**References:**

Joesting, 1940; Hoare and Cobb, 1972; Hoare and Cobb, 1977; Hickok and McAtee, 1990.

Primary reference: Hickok and McAtee, 1990

Reporter(s): Travis L. Hudson and Madelyn A. Millholland

Last report date: 06/10/01

Site name(s): Bobtail Creek**Site type:** Mine**ARDF no.:** RM009**Latitude:** 61.911**Quadrangle:** RM D-7**Longitude:** 161.419**Location description and accuracy:**

Bobtail Creek is a north tributary to Buster Creek (RM008), a west tributary to Kako Creek. These creeks are not named on the USGS 1:63,360 topographic map (1952 edition) of the area. The map site of the Bobtail Creek placer mine is 4.5 miles northwest of Kako Landing on the Yukon River. It is about 0.1 mile southwest of the center of sec. 17, T. 21 N., R. 66 W., of the Seward Meridian. This is locality 14 of Hoare and Cobb (1972, 1977).

Commodities:**Main:** Au**Other:** Hg**Ore minerals:** Cinnabar, gold**Gangue minerals:****Geologic description:**

Bobtail Creek was mostly mined by dragline in the 1930's. Mining took place from an elevation of about 220 feet, downstream for a distance of about 2,500 feet (Hickok and McAtee, 1990). The tailings gravel mostly comprise siltstone and shale, along with 10 percent or less chert, rhyolite, tuff, and andesite (Hickok and McAtee, 1990, p. 11). Joesting (1942) reported that rare cinnabar accompanies the placer gold. Hickok and McAtee (1990) estimated that 2,000 to 4,000 ounces of gold were recovered from Bobtail Creek and that reserves exist along and below the old tailings. Bobtail Creek heads on the ridge where the rhyolite-hosted Kako lode gold prospect (RM007) is located.

Alteration:**Age of mineralization:**

Quaternary.

Deposit model:

Placer Au (Cox and Singer, 1986; model 39a)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

39a

Production Status:**Site Status:** Undetermined**Workings/exploration:**

About 2,500 feet of dragline workings are present on Bobtail Creek.

Production notes:

Hickok and McAtee (1990) estimate that 2 to 4 thousand ounces of gold were recovered from Bobtail Creek.

Reserves:

Hickok and McAtee (1990, p. 11) conclude that reserves are present along and below the old tailings.

Additional comments:**References:**

Joesting, 1942; Hoare and Cobb, 1972; Hoare and Cobb, 1977; Hickok and McAtee, 1990.

Primary reference: Hickok and McAtee, 1990**Reporter(s):** Travis L. Hudson and Madelyn A. Millholland**Last report date:** 06/10/01

Site name(s): Montezuma Creek**Site type:** Mine**ARDF no.:** RM010**Latitude:** 61.905**Quadrangle:** RM D-7**Longitude:** 161.412**Location description and accuracy:**

Montezuma Creek is a small drainage between Buster Creek (RM008) and Bobtail Creek (RM009). These creeks are not named on the USGS 1:63,360 topographic map (1952 edition) of the area. All three creeks are west tributaries of lower Kako Creek. The map site of the Montezuma placer mine is 4 miles north-northwest of Kako Landing on the Yukon River. The site is about 0.2 mile north of a landing strip in the NE1/4 sec. 20, T. 21 N., R. 66 W., of the Seward Meridian. Montezuma Creek is included in localities 11, 12, and 13 of Hoare and Cobb (1972, 1977).

Commodities:**Main:** Au**Other:****Ore minerals:** Gold**Gangue minerals:****Geologic description:**

Montezuma Creek is a small stream between Bobtail (RM009) and Buster Creeks (RM008). Although mining has been reported from as early as 1924 and intermittently until 1936 (Hoare and Cobb, 1977), little is known about the placer deposit or the mine workings. Hickok and McAtee (1990, p. 11) noted that reserves are expected on Montezuma Creek along and below old workings. The headwaters of Montezuma Creek trend toward the Kako lode gold prospect (RM007).

Alteration:**Age of mineralization:**

Quaternary.

Deposit model:

Placer Au (Cox and Singer, 1986; model 39a)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

39a

Production Status: Yes; small**Site Status:** Undetermined**Workings/exploration:**

Some open-cut mine workings are expected to be present along Montezuma Creek.

Production notes:**Reserves:****Additional comments:****References:**

Hoare and Cobb, 1972; Hoare and Cobb, 1977; Hickok and McAtee, 1990.

Primary reference: Hoare and Cobb, 1977**Reporter(s):** Travis L. Hudson and Madelyn A. Millholland**Last report date:** 06/10/01

Site name(s): Black Mountain**Site type:** Prospect**ARDF no.:** RM011**Latitude:** 61.791**Quadrangle:** RM D-1**Longitude:** 159.304**Location description and accuracy:**

Black Mountain, unnamed on the USGS 1:63,360 topographic map (1952 edition) of the area, is an isolated 1585-foot-high upland about 2.3 miles southwest of Molybdenum Mountain. The map site is 0.25 mile south of the summit of Black Mountain at an elevation of about 1,350 feet. It is in the SW/4 sec. 29, T. 20 N., R. 55 W., of the Seward Meridian. This is locality 3 of Hoare and Cobb (1972, 1977). Hoare and Coonrad (1959) show a prospect symbol at this location.

Commodities:**Main:** Ag, Au, Sb**Other:****Ore minerals:** Stibnite**Gangue minerals:****Geologic description:**

A single, 2-inch wide, stibnite-bearing vein in shaly sandstone was traced for a distance of 200 feet at this location (Ebbley and Wright, 1948). The vein trends subparallel to the contact between clastic sedimentary country rocks and a granitic stock upslope to the north of the vein (Ebbley and Wright, 1948; Hoare and Coonrad, 1959). Host rocks to the vein are not altered, and only one vein has been identified at this prospect. A sample collected along 50 feet of the vein contained 48.9 percent antimony, 0.02 ounce of gold per ton, and 0.2 ounce of silver per ton (Ebbley and Wright, 1948). The sedimentary rocks may either be part of the mid-Cretaceous Kuskokwim Group (Hoare and Coonrad, 1959), or possibly an upper Paleozoic or Mesozoic section correlative with parts of the Gemuk Group (Bundtzen and Laird, 1991). The nearby granitic rocks may be part of a Cretaceous or Tertiary igneous assemblage that is widespread through southwest Alaska.

Alteration:**Age of mineralization:**

Cretaceous or Tertiary (?). The vein crosscuts clastic sedimentary rocks that may range

in age from late Paleozoic to mid-Cretaceous (Bundtzen and Laird, 1991). The nearby granitic rocks may be Cretaceous or Tertiary.

Deposit model:

Simple Sb deposits (Cox and Singer, 1986; model 27d)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

27d

Production Status: None

Site Status: Inactive

Workings/exploration:

Cady and others (1955) reported that claims have been staked on the prospect. Some small pits or trenches are probably present.

Production notes:

Reserves:

Additional comments:

References:

Ebbley and Wright, 1948; Cady and others, 1955; Hoare and Coonrad, 1959; Hoare and Cobb, 1972; Hoare and Cobb, 1977; Bundtzen and Laird, 1991.

Primary reference: Ebbley and Wright, 1948

Reporter(s): Travis L. Hudson and Madelyn A. Millholland

Last report date: 06/10/01

Site name(s): Brink (Molybdenum Mountain)**Site type:** Prospect**ARDF no.:** RM012**Latitude:** 61.804**Quadrangle:** RM D-1**Longitude:** 159.250**Location description and accuracy:**

This prospect is on the southeast side of Molybdenum Mountain at an elevation of about 800 feet, upslope of the Owhat River. The map site is in the SE/4 sec. 21, T. 20 N., R. 55 W., of the Seward Meridian. It is approximately located, perhaps within one-half mile. This is locality 4 of Hoare and Cobb (1972, 1977). Hoare and Coonrad (1959) showed a prospect symbol at this location.

Commodities:**Main:** Mo**Other:****Ore minerals:** Molybdenite, powellite(?)**Gangue minerals:** Quartz**Geologic description:**

Float specimens from this location contained molybdenite and powellite (?) in quartz (Smith, 1942). Hoare and Coonrad (1959) show a prospect symbol in a granitic stock at this location. The granitic stock may be part of a Cretaceous or Tertiary igneous assemblage that is widespread through southwest Alaska. The country rocks to the stock are clastic sedimentary rocks that may be part of the mid-Cretaceous Kuskokwim Group (Hoare and Coonrad, 1959) or possibly an older Paleozoic or Mesozoic section correlative with the Gemuk Group (Bundtzen and Laird, 1991).

Alteration:**Age of mineralization:**

Cretaceous or Tertiary (?). The granitic rocks may be part of a Cretaceous or Tertiary igneous assemblage that is widespread through southwest Alaska. The country rocks to the stock are clastic sedimentary rocks that may be part of the mid-Cretaceous Kuskokwim Group (Hoare and Coonrad, 1959) or possibly an older Paleozoic or Mesozoic section correlative with the Gemuk Group (Bundtzen and Laird, 1991).

Deposit model:

Porphyry Mo? (Cox and Singer, 1986; model 21b)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

21b?

Production Status: None

Site Status: Inactive

Workings/exploration:

Production notes:

Reserves:

Additional comments:

References:

Smith, 1942; Hoare and Coonrad, 1959; Hoare and Cobb, 1972; Hoare and Cobb, 1977;
Bundtzen and Laird, 1991.

Primary reference: Hoare and Cobb, 1977

Reporter(s): Travis L. Hudson and Madelyn A. Millholland

Last report date: 06/10/01

Site name(s): Unnamed (northern Russian Mountains)**Site type:** Occurrence**ARDF no.:** RM013**Latitude:** 61.699**Quadrangle:** RM C-1**Longitude:** 159.196**Location description and accuracy:**

This occurrence is in the northern Russian Mountains, on a ridge crest 1,500 feet north-east of peak 2940. The map site is in the NE1/4 sec. 35, T. 19 N., R. 55 W., of the Seaward Meridian. This is sample locality 3 of Bundtzen and Laird (1991).

Commodities:**Main:** Ag, Cu, Pb, Sb**Other:** Cd**Ore minerals:** Arsenopyrite, chalcopyrite, galena, malachite**Gangue minerals:** Quartz**Geologic description:**

Bundtzen and Laird (1991) report two, small, malachite-stained quartz veins containing chalcopyrite, galena, and arsenopyrite. The veins are 1 to 3 centimeters wide and occur along northwest-trending joints in the cupola zone of a syeno-monzonite just below the contact with thermally metamorphosed andesite country rocks. A sample of the veins contained 0.46 percent arsenic, 0.13 percent antimony, 0.94 percent lead, 0.09 percent cadmium, and 45 ppm silver; gold was not detected. The veins are in the Upper Cretaceous intrusive complex of the Russian Mountains (Bundtzen and Laird, 1991).

Alteration:

Quartz veining.

Age of mineralization:

Late Cretaceous or Tertiary. Veins crosscut part of the intrusive complex of the Russian Mountains. Quartz monzonite from this complex has yielded a K/Ar age of 70.3 +/- 2.1 Ma (Bundtzen and Laird, 1991).

Deposit model:

Polymetallic veins (Cox and Singer, 1986; model 22c)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

22c

Production Status: None**Site Status:** Inactive**Workings/exploration:**

Surface observation and sampling has been completed (Bundtzen and Laird, 1991).

Production notes:**Reserves:****Additional comments:****References:**

Bundtzen and Laird, 1991.

Primary reference: Bundtzen and Laird, 1991**Reporter(s):** Travis L. Hudson and Madelyn A. Millholland**Last report date:** 06/10/01

Site name(s): Ptarmigan**Site type:** Prospect**ARDF no.:** RM014**Latitude:** 61.632**Quadrangle:** RM C-1**Longitude:** 159.229**Location description and accuracy:**

The Ptarmigan prospect is on the southwest flank of the Russian Mountains. It is on the low ridge along the west side of Mission Creek, opposite the mouth of Ptarmigan Gulch. The map site is at an elevation of about 1,050 feet and about 0.25 mile south-southeast of the center of sec. 22, T. 18 N., R. 55 W., of the Seward Meridian. This is sample locality 19 of Bundtzen and Laird (1991).

Commodities:**Main:** U**Other:** Amethyst**Ore minerals:****Gangue minerals:** Quartz**Geologic description:**

Bundtzen and Laird (1991) report that a brecciated and quartz-flooded zone in hornfels contains small vugs lined with euhedral, even doubly terminated, amethyst crystals to 5 centimeters long. A sample of this material contained 38 ppm uranium. The hornfels is developed in Cretaceous clastic sedimentary rocks peripheral to the intrusive complex of the Russian Mountains (Bundtzen and Laird, 1991).

Alteration:

Silicification.

Age of mineralization:

Late Cretaceous or Tertiary. Veins post-date hornfels developed around the intrusive complex of the Russian Mountains. Quartz monzonite from this complex has yielded a K/Ar age of 70.3 +/- 2.1 Ma (Bundtzen and Laird, 1991).

Deposit model:

Silicified zone in hornfels

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Undetermined

Workings/exploration:

Some small surface pits may be present.

Production notes:

Reserves:

Additional comments:

References:

Bundtzen and Laird, 1991.

Primary reference: Bundtzen and Laird, 1991

Reporter(s): Travis L. Hudson and Madelyn A. Millholland

Last report date: 06/10/01

Site name(s): Unnamed (western Russian Mountains)**Site type:** Prospect**ARDF no.:** RM015**Latitude:** 61.670**Quadrangle:** RM C-1**Longitude:** 159.093**Location description and accuracy:**

This occurrence is in the Russian Mountains on the east side of the cirque valley at the head of Cobalt Creek. The map site is at an elevation of about 1,950 feet, in the north-west corner of sec. 9, T. 18 N., R. 54 W., of the Seward Meridian. This is sample locality 9 of Bundtzen and Laird (1991).

Commodities:**Main:** Au**Other:** Sn**Ore minerals:****Gangue minerals:** Quartz**Geologic description:**

A gossan-rich, sheeted quartz vein in hornfels has been explored by a now-caved adit at this location. Euhedral quartz crystals are well-developed in the vein. A sample contained 250 ppb gold, 250 ppm arsenic, and 62 ppm yin (Bundtzen and Laird, 1991). The prospect is within about 300 feet of the southern contact of the Russian Mountains intrusive complex.

Alteration:

Quartz veining.

Age of mineralization:

Late Cretaceous or Tertiary. Veins post-date hornfels developed around the intrusive complex of the Russian Mountains. Quartz monzonite from this complex has yielded a K/Ar age of 70.3 +/- 2.1 Ma (Bundtzen and Laird, 1991).

Deposit model:

Polymetallic veins? (Cox and Singer, 1986; model 22c)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

22c?

Production Status: None

Site Status: Inactive

Workings/exploration:

A now-caved adit explored this prospect.

Production notes:

Reserves:

Additional comments:

References:

Bundtzen and Laird, 1991.

Primary reference: Bundtzen and Laird, 1991

Reporter(s): Travis L. Hudson and Madelyn A. Millholland

Last report date: 06/10/01

Site name(s): Owhat (Cobalt Creek)**Site type:** Prospect**ARDF no.:** RM016**Latitude:** 61.663**Quadrangle:** RM C-1**Longitude:** 159.108**Location description and accuracy:**

The Owhat prospect is in the Russian Mountains in the cirque valley at the head of Cobalt Creek. The map site is at the approximate center of sec. 8, T. 18 N., R. 54 W., of the Seward Meridian. This is locality 6 of Hoare and Cobb (1972, 1977), and sample locality 13 of Bundtzen and Laird (1991).

Commodities:**Main:** Au, Cu, Sb, Sn**Other:** Ag, Bi, Co, Pb, Zn**Ore minerals:** Arsenopyrite, aramayoite, bismuth, bismuthite, bornite, chalcopyrite, galena, gold, marcasite, pekoite or gladite, pyrite, sphalerite, stephanite, stetefeldite, tetrahedrite**Gangue minerals:** Axinite, quartz, tourmaline**Geologic description:**

The Owhat, or Cobalt Creek prospect was discovered by Native prospectors before 1900 (Maddren, 1915; Holzheimer, 1926). The deposits include 8 to 10 sulfide-tourmaline-axinite-quartz veins or greisens in syeno-monzonite (Bundtzen and Laird, 1991). The individual greisens are several inches to more than 3 feet thick in a zone that is 5 to 26 feet thick; the average width of the zone is about 8 feet, and it has been traced more than 280 feet vertically. The greisens trend northwest and dip steeply northeast near a contact with an axinite-bearing andesite porphyry dike. The mineralized zone has been traced on the surface for a distance of 870 feet, and extensions totaling 650 feet in both directions are indicated by the distribution of mineralized float. The deposit is mineralogically complex and includes arsenopyrite, aramayoite, bismuth, bismuthite, bornite, chalcopyrite, galena, gold, marcasite, pekoite or gladite, pyrite, sphalerite, stephanite, stetefeldite and tetrahedrite in the sulfide-rich material in the quartz-tourmaline-axinite greisen. Multiple episodes of mineralization are indicated by cross-cutting relations among the veins. Late-forming minerals include arsenopyrite, chalcopyrite, and pyrite, but the youngest cross-cutting assemblages include bornite, stephanite, tetrahedrite, sphalerite, and lead-bismuth sulfides (Bundtzen and Laird, 1991). Microprobe analyses indicate that arsenopyrite contains 0.1 to 0.2 weight percent gold in lattice structures.

Bundtzen and Laird (1991) collected 16 chip-channel samples averaging 4.4 feet wide, along 860 feet of the greisen zone. The samples average 5.3 ppm gold, 13.4 percent arsenic, 0.21 percent antimony, 0.39 percent copper, 0.07 percent tin, 0.05 percent zinc, and 0.017 percent cobalt. Assuming dimensions, in feet, of 4.4 x 280 x 870, Bundtzen and Laird (1991) estimated that the resource at this prospect is 63,000 tons of material with the stated average grades. The syeno-monzonite host rocks are part of the Upper Cretaceous intrusive complex of the Russian Mountains (Bundtzen and Laird, 1991).

Alteration:

Silicification and tourmalinization.

Age of mineralization:

Late Cretaceous or Tertiary. Veins crosscut part of the intrusive complex of the Russian Mountains. Quartz monzonite from this complex has yielded a K/Ar age of 70.3 +/- 2.1 Ma (Bundtzen and Laird, 1991).

Deposit model:

Polymetallic veins (Cox and Singer, 1986; model 22c)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

22c

Production Status: None

Site Status: Undetermined

Workings/exploration:

Three shallow shafts as much as 40 feet deep and several surface trenches and pits explore about 800 feet of strike length of this deposit.

Production notes:**Reserves:**

Assuming dimensions, in feet, of 4.4 x 280 x 870, Bundtzen and Laird (1991) estimate that the resource at this prospect is 63,000 tons of material with average grades of 5.3 ppm gold, 13.4 percent arsenic, 0.21 percent antimony, 0.39 percent copper, 0.07 percent tin, 0.05 percent zinc, and 0.017 percent cobalt.

Additional comments:**References:**

Maddren, 1915; Holzheimer, 1926; Hoare and Cobb, 1972; Hoare and Cobb, 1977; Bundtzen and Laird, 1991.

Primary reference: Bundtzen and Laird, 1991

Reporter(s): Travis L. Hudson and Madelyn A. Millholland

Last report date: 06/10/01

Site name(s): Louise**Site type:** Prospect**ARDF no.:** RM017**Latitude:** 61.666**Quadrangle:** RM C-1**Longitude:** 159.118**Location description and accuracy:**

This prospect is on the west side of the cirque valley at the head of Cobalt Creek in the Russian Mountains. The map site is at an elevation of about 1,850 feet, about 0.25 mile west of a small cirque-basin lake, in the NW1/4 sec. 8, T. 18 N., R. 54 W., of the Seward Meridian. This is sample locality 12 of Bundtzen and Laird (1991).

Commodities:**Main:** Au**Other:** Sb, Sn**Ore minerals:** Arsenopyrite, chalcopyrite**Gangue minerals:** Quartz, tourmaline**Geologic description:**

The Louise prospect is about 1,500 feet northwest of the Owhat prospect (RM016). According to Bundtzen and Laird (1991), it was first reported by Holzheimer (1926) as a 1,000-foot-long gold-arsenic deposit. Bundtzen and Laird (1991) described the deposit as an arsenopyrite, chalcopyrite, quartz, and black tourmaline vein that trends northwest for at least 245 feet along the contact between syenite and an altered andesite porphyry dike. The width of this poorly exposed vein could not be determined. A sample of the vein contained 4.1 ppm gold, 10 percent arsenic, 0.99 percent antimony, and 0.12 percent tin (Bundtzen and Laird, 1991). The host rocks are part of the Upper Cretaceous intrusive complex of the Russian Mountains.

Alteration:

Quartz and tourmaline veining.

Age of mineralization:

Late Cretaceous or Tertiary. Veins crosscut part of the intrusive complex of the Russian Mountains. Quartz monzonite from this complex has yielded a K/Ar age of 70.3 +/- 2.1 Ma (Bundtzen and Laird, 1991).

Deposit model:

Polymetallic veins? (Cox and Singer, 1986; model 22c)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

22c?

Production Status: None

Site Status: Probably inactive

Workings/exploration:

Surface observation and sampling have been completed (Bundtzen and Laird, 1991).

Production notes:**Reserves:****Additional comments:****References:**

Holzheimer, 1926; Bundtzen and Laird, 1991.

Primary reference: Bundtzen and Laird, 1991

Reporter(s): Travis L. Hudson and Madelyn A. Millholland

Last report date: 06/10/01

Site name(s): Headwall**Site type:** Prospect**ARDF no.:** RM018**Latitude:** 61.658**Quadrangle:** RM C-1**Longitude:** 159.111**Location description and accuracy:**

This prospect is in the Russian Mountains on the northeast flank of the sharp ridge between the headwaters of Cobalt and Mission Creeks. The map site is in the SW1/4 sec. 8, T. 18 N., R. 54 W., of the Seward Meridian. It is at an elevation of about 2,350 feet, about 0.15 mile south-southwest of a small cirque-basin lake. It is sample locality 14 of Bundtzen and Laird (1991).

Commodities:**Main:** Au, Sb, Sn**Other:** Cu, Pb**Ore minerals:** Arsenopyrite, bindheimite, bismuth, chalcopyrite, galena, pekoite, scorodite**Gangue minerals:** Quartz, sericite, tourmaline**Geologic description:**

The Headwall prospect is in syenite and includes several 10-foot wide banded tourmaline greisen zones that trend northwest for a distance of at least 790 feet (Bundtzen and Laird, 1991). The zones are exposed over a vertical range of 400 feet. The tourmaline greisens contain euhedral quartz, along with sericite and sulfide veinlets and clots. Arsenopyrite, native bismuth, pekoite, galena, bindheimite, and scorodite have been identified in the sulfide-rich assemblages (Bundtzen and Laird, 1991). The sulfide-bearing zones are disrupted by later faulting. Six channel samples average 3.3 ppm gold, 7.32 percent arsenic, 0.16 percent antimony, and 0.04 percent tin. Bismuth, copper, and lead analyses are not available. Assuming dimensions, in feet, of 4.45 x 400 x 790, Bundtzen and Laird (1991) estimated a resource of 82,900 tons of material with the stated average grades. The host rocks are part of the Upper Cretaceous intrusive complex of the Russian Mountains.

Alteration:

Silicification and tourmalinization.

Age of mineralization:

Late Cretaceous or Tertiary. Greisens crosscut part of the intrusive complex of the Russian Mountains. Quartz monzonite from this complex has yielded a K/Ar age of 70.3 +/- 2.1 Ma (Bundtzen and Laird, 1991).

Deposit model:

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Undetermined

Workings/exploration:

Surface observation and sampling has been completed (Bundtzen and Laird, 1991).

Production notes:

Reserves:

Assuming dimensions, in feet, of 4.45 x 400 x 790, Bundtzen and Laird (1991) estimate a resource of 82,900 tons of material with average grades of 3.3 ppm gold, 7.32 percent arsenic, 0.16 percent antimony, and 0.04 percent tin. Bismuth, copper, and lead analyses are not available.

Additional comments:

References:

Bundtzen and Laird, 1991.

Primary reference: Bundtzen and Laird, 1991

Reporter(s): Travis L. Hudson and Madelyn A. Millholland

Last report date: 06/10/01

Site name(s): Konechney Prospect (Mission Creek)**Site type:** Prospect**ARDF no.:** RM019**Latitude:** 61.651**Quadrangle:** RM C-1**Longitude:** 159.112**Location description and accuracy:**

This prospect is in the Russian Mountains on the ridge at the head of Mission Creek, 1,000 feet northeast of peak 2710. The map site is in the NW1/4 sec. 17, T. 18 N., R. 54 W., of the Seward Meridian. This is locality 5 of Hoare and Cobb (1972, 1977) and sample locality 15 of Bundtzen and Laird (1991).

Commodities:**Main:** Ag, Au, Cu**Other:** Pb, Sb?, Sn, U?, W

Ore minerals: Arsenopyrite, azurite, bornite, cassiterite, chalcocite, chalcopyrite, chrysocolla, covellite, cuprite, galena, goethite, gold, malachite, metazeunerite, pyrite, scheelite, stephanite, stibnite(?)

Gangue minerals: Quartz, tourmaline

Geologic description:

This prospect, discovered and first staked in 1921, is named after one of its discoverers, Joseph Konechney. Konechney persistently explored the prospect with trenches and two levels of underground workings for many years (Hoare and Coonrad, 1977). The deposits are quartz-sulfide-tourmaline greisen veins developed near the contact between syenite and an axinite-bearing andesite porphyry dike. The mineralized zone, which has been traced northwest for at least 470 feet, contains quartz, tourmaline, arsenopyrite, chalcopyrite, pyrite, metazeunerite, gold, scheelite, and cassiterite. Late-forming minerals include chalcocite, bornite, stibnite (?), stephanite, covellite, cuprite, azurite, malachite, goethite, and chrysocolla (Bundtzen and Laird, 1991). Twelve channel samples collected by Bundtzen and Laird (1991) combined with five collected by Holzheimer (1926) average 4.44 ppm gold, 1.64 percent copper, 1.14 percent arsenic, and 0.24 percent antimony. The samples also contain anomalous levels of tin (to 200 ppm), silver (to 317 ppm), and uranium (to 106 ppm). The only sample analyzed for bismuth by Bundtzen and Laird (1991) contained 112 ppm of this element. Wedow and others (1953) and West (1954) examined the prospect for radioactive minerals; the highest eU content they observed was 0.006 percent. Assuming dimensions, in feet, of 3.4 x 400 x 470, Bundtzen and Laird (1991)

estimated a resource of 37,600 tons of material with the stated average grades. The country rocks are part of the Upper Cretaceous intrusive complex of the Russian Mountains.

Alteration:

Silicification and tourmalinization.

Age of mineralization:

Late Cretaceous or Tertiary. Veins crosscut part of the intrusive complex of the Russian Mountains. Quartz monzonite from this complex has yielded a K/Ar age of 70.3 +/- 2.1 Ma (Bundtzen and Laird, 1991).

Deposit model:

Polymetallic veins (Cox and Singer, 1986; model 22c)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

22c

Production Status: None**Site Status:** Undetermined**Workings/exploration:**

Surface trenches and two adits (now caved) with a total of 900 feet of underground workings have been completed. The main adit was 800 feet long. Maps of the underground workings were made by Holzheimer (1926) and are described in Bundtzen and Laird (1991).

Production notes:**Reserves:**

Assuming dimensions, in feet, of 3.4 x 400 x 470, Bundtzen and Laird (1991) estimate a resource of 37,600 tons of material averaging 4.44 ppm gold, 1.64 percent copper, 1.14 percent arsenic, and 0.24 percent antimony, along with as much as 200 ppm tin, 317 ppm silver, and 106 ppm uranium.

Additional comments:**References:**

Holzheimer, 1926; Wedow and others, 1953; West, 1954; Hoare and Cobb, 1972; Hoare and Cobb, 1977; Bundtzen and Laird, 1991.

Primary reference: Bundtzen and Laird, 1991**Reporter(s):** Travis L. Hudson and Madelyn A. Millholland**Last report date:** 06/10/01

Site name(s): Unnamed (southern Russian Mountains)**Site type:** Occurrence**ARDF no.:** RM020**Latitude:** 61.636**Quadrangle:** RM C-1**Longitude:** 159.101**Location description and accuracy:**

This occurrence is in the Russian Mountains about 0.7 mile southeast of peak 2815. The map site is on a ridge crest, at an elevation of about 2,500 feet, about 0.25 mile east of the center of sec. 20, T. 18 N., R. 54 W., of the Seward Meridian. It is sample localities 16 and 17 of Bundtzen and Laird (1991).

Commodities:**Main:** Sb**Other:** Nd, Ta, U**Ore minerals:****Gangue minerals:** Limonite, quartz**Geologic description:**

This occurrence consists of two gossan-rich quartz veins, as much as 1.5 feet wide, along northwest-trending joints and fractures in quartz syenite (Bundtzen and Laird, 1991). Sulfide minerals were not identified in these strongly oxidized veins. Samples contained up to 0.3 percent arsenic, 1.5 percent antimony, 353 ppm neodymium, 54 ppm tantalum, and 52 ppm uranium. The host quartz syenite is part of the Late Cretaceous intrusive complex of the Russian Mountains (Bundtzen and Laird, 1991).

Alteration:

Quartz veining.

Age of mineralization:

Late Cretaceous or Tertiary. Veins crosscut part of the intrusive complex of the Russian Mountains. Quartz monzonite from this complex has yielded a K/Ar age of 70.3 +/- 2.1 Ma (Bundtzen and Laird, 1991).

Deposit model:

Polymetallic veins? (Cox and Singer, 1986; model 22c)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

22c?

Production Status: None**Site Status:** Probably inactive**Workings/exploration:**

Surface observation and sampling has been completed.

Production notes:**Reserves:****Additional comments:****References:**

Bundtzen and Laird, 1991.

Primary reference: Bundtzen and Laird, 1991**Reporter(s):** Travis L. Hudson and Madelyn A. Millholland**Last report date:** 06/10/01

Site name(s): Ophir Creek**Site type:** Prospect**ARDF no.:** RM021**Latitude:** 61.239**Quadrangle:** RM A-3**Longitude:** 159.846**Location description and accuracy:**

Ophir Creek flows northwest to the Kuskokwim River from headwaters along the west side of Mount Hamilton. The map site is located on the creek in the SE/4 sec. 3, T. 13 N., R. 59 W., of the Seward Meridian. This is locality 16 of Hoare and Cobb (1972, 1977).

Commodities:**Main:** Au**Other:****Ore minerals:** Gold**Gangue minerals:****Geologic description:**

Maddren (1915) reported that fine colors of gold were found along upper Ophir Creek as early as 1901-02, but serious prospecting did not start until 1913. The alluvial deposits along the upper 5 miles of the creek are coarse gravels that contain large cobbles and boulders. Farther downstream, the gravels become finer, and silt makes up a large part of the deposits. Alluvial fan deposits from tributary streams have been incised by Ophir Creek. The incised fan deposits are frozen, but the gravels of the present Ophir Creek floodplain are not. Prospect shafts as deep as 38 feet have been used to explore Ophir Creek, but the fine gold, although widespread along Ophir Creek and its tributaries, does not appear to be significantly concentrated. Mining has not been reported along Ophir Creek, but the entire upper drainage and its tributaries were once staked. Bedrock in upper Ophir Creek includes large areas of thermally metamorphosed Jurassic rocks along the northeast side of a large mid-Cretaceous granitic pluton (Box and others, 1993).

Alteration:**Age of mineralization:**

Quaternary.

Deposit model:

Placer Au (Cox and Singer, 1986; model 39a)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

39a

Production Status: None

Site Status: Probably inactive

Workings/exploration:

Surface prospecting, sinking of shafts to depths of at least 38 feet, and some drilling and trenching have been done along Ophir Creek. The upper 10 miles of the creek and its tributaries have been staked.

Production notes:

Reserves:

Additional comments:

References:

Maddren, 1915; Hoare and Cobb, 1972; Hoare and Cobb, 1977; Box and others, 1993.

Primary reference: Maddren, 1915

Reporter(s): Travis L. Hudson and Madelyn A. Millholland

Last report date: 06/10/01

Site name(s): Unnamed (north of Mount Hamilton)**Site type:** Prospect**ARDF no.:** RM022**Latitude:** 61.222**Quadrangle:** RM A-3**Longitude:** 159.794**Location description and accuracy:**

This prospect is on the crest of a ridge north of Mount Hamilton and east of Ophir Creek, near a local summit with an elevation of 1,310 feet. The map site is at the north-east corner of sec. 14, T. 13 N., R. 59 W., of the Seward Meridian. This is locality 1 of Frost (1990). The location is probably accurate within one-quarter mile.

Commodities:**Main:** Au**Other:****Ore minerals:** Gold, pyrite**Gangue minerals:** Calcite, chlorite, iron oxide, quartz**Geologic description:**

Frost (1990) described gold- and pyrite-bearing quartz veins cutting sericitized andesite and volcanoclastic hornfels at this location. The veins are vuggy and contain euhedral quartz prisms extending into open spaces. Other gangue minerals in the iron oxide-stained veins are commonly calcite and chlorite. A quartz vein from this prospect contained 12 ppm gold and 10 ppm silver (Frost, 1990, sample locality 1). Bedrock in the area includes thermally metamorphosed Jurassic volcanic or volcanoclastic rocks (Box and others, 1993). The thermal metamorphism is caused by a large mid-Cretaceous granitic pluton exposed to the west of Ophir Creek.

Alteration:

Sericitization and silicification.

Age of mineralization:

Cretaceous or Tertiary. The gold-bearing quartz veins crosscut hornfels developed in country rocks around a mid-Cretaceous granitic pluton.

Deposit model:

Low-sulfide Au-quartz veins (Cox and Singer, 1986; model 36a)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

36a

Production Status: None**Site Status:** Undetermined**Workings/exploration:**

Prospecting pit(s) are present at this location.

Production notes:**Reserves:****Additional comments:****References:**

Frost, 1990; Box and others, 1993.

Primary reference: Frost, 1990**Reporter(s):** Travis L. Hudson and Madelyn A. Millholland**Last report date:** 06/10/01

Site name(s): Bogus Creek**Site type:** Prospect**ARDF no.:** RM023**Latitude:** 61.192**Quadrangle:** RM A-3**Longitude:** 159.998**Location description and accuracy:**

This placer prospect is very approximately located in the headwaters of Bogus Creek. Bogus Creek flows northwest to the Kuskokwim River and the map site is arbitrarily located along the headwater drainage in the NE1/4 sec. 27, T. 13 N., R. 60 W., of the Seward Meridian. This is locality 15 of Hoare and Cobb (1972, 1977).

Commodities:**Main:** Au**Other:****Ore minerals:** Gold**Gangue minerals:****Geologic description:**

Placer gold colors have been found along upper Bogus Creek where it drains foothills to the Kuskokwim River lowlands (Maddren, 1915). In about 1904, a prospect shaft was sunk to a depth of about 50 feet in frozen gravel somewhere along this part of the creek. Bedrock in upper Bogus Creek includes volcanic rocks of the Whitefish Lake volcanic field and thermally metamorphosed Jurassic rocks along the west side of a large, mid-Cretaceous granitic pluton (Box and others, 1993).

Alteration:**Age of mineralization:**

Quaternary.

Deposit model:

Placer Au (Cox and Singer, 1986; model 39a)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

39a

Production Status: None

Site Status: Inactive

Workings/exploration:

At least one 50-foot shaft was dug on upper Bogus Creek.

Production notes:

Reserves:

Additional comments:

References:

Maddren, 1915; Hoare and Cobb, 1972; Hoare and Cobb, 1977; Box and others, 1993.

Primary reference: Maddren, 1915

Reporter(s): Travis L. Hudson and Madelyn A. Millholland

Last report date: 06/10/01

Site name(s): Firebear**Site type:** Occurrence**ARDF no.:** RM024**Latitude:** 61.078**Quadrangle:** RM A-4**Longitude:** 160.149**Location description and accuracy:**

This occurrence is on a small knob at an elevation of about 700 feet in the NW1/4 sec. 5, T. 11 N., R. 61 W., of the Seward Meridian. It is about 1,500 feet northwest of a saddle having an elevation of 685 feet.

Commodities:**Main:** Ag, Au, Hg**Other:** Pb**Ore minerals:****Gangue minerals:****Geologic description:**

This occurrence consists of an epithermal hot spring deposit containing carbonized fossil plant fragments preserved in siliceous cap rock. Grab samples of the deposit contain as much as 0.24 ppm gold, 1.8 ppm silver, 3 ppm mercury, and 380 ppm lead. The country rocks are largely Jurassic volcanic rocks (Box and others, 1993).

Alteration:**Age of mineralization:**

Tertiary? The preservation of a surface hot spring deposit containing plant fragments suggests that they are Tertiary in age.

Deposit model:

Hot spring Au-Ag? (Cox and Singer, 1986; model 25a)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

25a?

Production Status: None

Site Status: Inactive

Workings/exploration:

No workings are present. Only reconnaissance surface geochemical sampling of this occurrence has been completed.

Production notes:

Reserves:

Additional comments:

This description is from unpublished field notes (station #92AM25) of M.L. Miller, U. S. Geological Survey, Anchorage, Alaska.

References:

Primary reference: This record

Reporter(s): Travis L. Hudson and Madelyn A. Millholland

Last report date: 06/10/01

Site name(s): Wallace**Site type:** Prospect**ARDF no.:** RM025**Latitude:** 61.062**Quadrangle:** RM A-3**Longitude:** 159.915**Location description and accuracy:**

The Wallace prospect is located on the crest of the ridge along the northwest side of lower California Creek. It is at an elevation of about 1,300 feet, in the NE1/4 sec. 9, T. 11 N., R. 60 W., of the Seward Meridian. It is accurately located.

Commodities:**Main:** Au**Other:** Zn**Ore minerals:** Gold, sphalerite, telluride(?)**Gangue minerals:** Amphibole, chlorite, limonite**Geologic description:**

In 1945, R. E. Wallace of the U.S. Geological Survey discovered free gold in quartz veins cutting a granitic dike at this location (unpub. field data, 1945). Wallace described the deposit in unpublished notes and memoranda (1945, 1997), although the U.S. Geological Survey announced the discovery in a press release on August 4, 1945. The steeply dipping or vertical granitic dike is about 40 feet wide and trends N 20 E, subparallel to the ridge. Wallace traced it along strike for about 300 feet in this area. A similar dike may occur a few thousand feet to the southwest (RM026). Wallace noted that quartz veinlets were localized in the southeastern half of the dike and that the gold occupied open spaces in the interior of the veinlets. Two samples were assayed; one contained 0.59 ounce of gold per ton and the other 1.3 ounces of gold per ton. Accompanying the gold was a slightly more abundant, soft (hardness of 2 to 3), silver-white mineral having laminar cleavage. This mineral was tentatively identified as a telluride. Limonite and traces of sphalerite, chlorite, and amphibole were also present in the veins. The dike, which may be an apophysis of a nearby mid-Cretaceous pluton, intrudes Jurassic volcanic rocks (Box and others, 1993).

Alteration:

Silicification.

Age of mineralization:

Cretaceous or Tertiary. The gold-bearing quartz veins crosscut a granitic dike that may be mid-Cretaceous in age. The dike intrudes Jurassic volcanic rocks.

Deposit model:

Low-sulfide Au-quartz veins (Cox and Singer, 1986; model 36a)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

36a

Production Status: None

Site Status: Undetermined

Workings/exploration:

Prospecting pit(s) are probably present at this location.

Production notes:

Reserves:

Additional comments:

References:

Box and others, 1993.

Primary reference: This record

Reporter(s): Travis L. Hudson and Madelyn A. Millholland

Last report date: 06/10/01

Site name(s): Unnamed (near California Creek)**Site type:** Prospect**ARDF no.:** RM026**Latitude:** 61.056**Quadrangle:** RM A-3**Longitude:** 159.925**Location description and accuracy:**

This prospect is at an elevation of about 1,000 feet on the south end of the ridge north of lower California Creek. The map site is in the SE1/4 sec. 9, T. 11 N., R. 60 W., of the Seward Meridian. It is locality 3 of Frost (1990); the location is probably accurate to within one-quarter mile.

Commodities:**Main:** Au**Other:****Ore minerals:** Gold, pyrite**Gangue minerals:** Calcite, chlorite, quartz**Geologic description:**

Frost (1990) described gold- and pyrite-bearing quartz veins cutting sericitized andesite and volcanoclastic hornfels at this location. The veins are vuggy and contain euhedral quartz prisms extending into open spaces. Other gangue minerals in the iron oxide-stained veins are commonly calcite and chlorite. A quartz vein from this prospect contained 4.5 ppm gold (Frost, 1990, sample locality 3). Bedrock in the area includes thermally metamorphosed Jurassic volcanic or volcanoclastic rocks and a small granitic stock (Box and others, 1993). Much of the thermal metamorphism is caused by a large mid-Cretaceous granitic pluton exposed to the north in the headwaters of the Tuluksak River. This prospect may be close to a granitic dike outcrop described in unpublished 1945 and 1997 notes and memoranda by R. E. Wallace (USGS). The dike is cut by small, auriferous quartz veins along its southeast margin. A granitic dike outcrop cut by auriferous quartz veins is at the Wallace prospect, about one-half mile to the northeast along this ridge (RM025).

Alteration:

Sericitization and silicification.

Age of mineralization:

Cretaceous or Tertiary. The gold-bearing quartz veins crosscut hornfels developed in country rocks around a mid-Cretaceous granitic pluton.

Deposit model:

Low-sulfide Au-quartz veins (Cox and Singer, 1986; model 36a)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

36a

Production Status: None

Site Status: Undetermined

Workings/exploration:

Prospecting pit(s) are present at this location.

Production notes:

Reserves:

Additional comments:

References:

Frost, 1990; Box and others, 1993.

Primary reference: Frost, 1990

Reporter(s): Travis L. Hudson and Madelyn A. Millholland

Last report date: 06/10/01

Site name(s): Rocky Creek**Site type:** Mine**ARDF no.:** RM027**Latitude:** 61.059**Quadrangle:** RM A-3**Longitude:** 159.869**Location description and accuracy:**

Rocky Creek is a southeast tributary of California Creek in the headwaters of the Tuluksak River. Most of Rocky Creek has been placer mined upstream from its confluence with California Creek. The map site is the approximate midpoint of the placer workings. It is near the center of sec. 11, T. 11 N., R. 60 W., of the Seward Meridian. Rocky Creek is included in locality 17 of Hoare and Cobb (1972, 1977).

Commodities:**Main:** Au**Other:****Ore minerals:** Gold**Gangue minerals:****Geologic description:**

The placer deposit on Rocky Creek is a continuation of the deposit on California Creek (RM034). The Rocky Creek placer was one of the richest in the upper Tuluksak River drainage. About 2 miles of the creek from the mouth to the headwaters have been mined, much of it by dredging. The grade of the deposit increased upstream. The bedrock in the drainage is thermally metamorphosed Jurassic volcanic rocks that are intruded by a mid-Cretaceous granitic stock at the head of the drainage (Box and others, 1993). The placer appears to continue upstream to near the contact zone of the granitic stock.

Alteration:**Age of mineralization:**

Quaternary.

Deposit model:

Placer Au (Cox and Singer, 1986; model 39a)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

39a

Production Status: Yes; small

Site Status: Undetermined

Workings/exploration:

About 2 miles of the creek have been placer mined, much of it by dredging.

Production notes:

Reserves:

Additional comments:

References:

Hoare and Cobb, 1972; Hoare and Cobb, 1977; Box and others, 1993.

Primary reference: Hoare and Cobb, 1977

Reporter(s): Travis L. Hudson and Madelyn A. Millholland

Last report date: 06/10/01

Site name(s): Upper Tuluksak River**Site type:** Mine**ARDF no.:** RM028**Latitude:** 61.017**Quadrangle:** RM A-3**Longitude:** 159.926**Location description and accuracy:**

The Tuluksak River flows southwest past Nyac to the Kuskokwim River. About 2.5 miles of the river upstream of where it crosses the south boundary of the Russian Mission A-3 quadrangle have been placer mined. This placer deposit continues downstream into the Bethel quadrangle. The map site is at the approximate midpoint of the mapped placer workings in the Russian Mission quadrangle. It is in the NE1/4 sec. 28, T. 11 N., R. 60 W., of the Seward Meridian. It is included in locality 17 of Hoare and Cobb (1972, 1977).

Commodities:**Main:** Au**Other:** Pt**Ore minerals:** Gold**Gangue minerals:****Geologic description:**

Placer gold dredging has taken place over at least 2.2 miles of upper Tuluksak River in the Russian Mission quadrangle. This placer deposit and dredge operation continued downstream into the Bethel quadrangle (BH014) for another 3 miles. The dredged area is as much as 1,500 feet wide. Mining on this river started as early as 1909 and continued, with a hiatus for WWII, until 1964 and later (Hoare and Cobb, 1977). Some platinum was produced along with the gold, and Joesting (1942) reported that asbestos and graphite were dredged from bedrock. A significant part of the bedrock in the drainage is hornfels in Jurassic volcanic rocks surrounding a mid-Cretaceous granitic pluton (Box and others, 1993).

Alteration:**Age of mineralization:**

Quaternary.

Deposit model:

Placer Au-PGE (Cox and Singer, 1986; model 39a)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

39a

Production Status: Yes; medium

Site Status: Undetermined

Workings/exploration:

Dredge tailings are present along at least 2.2 miles of the Tuluksak River in the Russian Mission quadrangle. The tailings are shown on the U.S. Geological Survey topographic map (1954 edition) of the area. Mining may have continued further upstream, inasmuch as the deposit is essentially continuous with the placer deposit on California Creek (RM034). Mining took place during the periods 1909-1940, 1946-1964, and in the 1980's.

Production notes:**Reserves:****Additional comments:****References:**

Maddren, 1915; Hoare and Cobb, 1972; Hoare and Cobb, 1977; Box and others, 1993.

Primary reference: Hoare and Cobb, 1977

Reporter(s): Travis L. Hudson and Madelyn A. Millholland

Last report date: 06/10/01

Site name(s): Tiny Gulch**Site type:** Mine**ARDF no.:** RM029**Latitude:** 61.006**Quadrangle:** RM A-3**Longitude:** 159.896**Location description and accuracy:**

Tiny Gulch is a small tributary on the south side of lower Bear Creek. It is about 0.8 mile upstream of the mouth of Bear Creek on the Tuluksak River. The map site is on lower Tiny Gulch, in the SE1/4 sec. 27, T. 11 N., R. 60 W., of the Seward Meridian. It is locality 18 of Hoare and Cobb (1972, 1977).

Commodities:**Main:** Au**Other:****Ore minerals:** Gold**Gangue minerals:****Geologic description:**

Tiny Gulch cuts through alluvial bench deposits on the south side of Bear Creek (RM032). From 1909 to 1914, placer mining of 2- to 3-foot-thick gravels on the lower part of the creek produced about 250 ounces of gold (Madden, 1915).

Alteration:**Age of mineralization:**

Quaternary.

Deposit model:

Placer Au (Cox and Singer, 1986; model 39a)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

39a

Production Status: Yes; small**Site Status:** Undetermined

Workings/exploration:

Placer mining took place along the lower part of the creek. A water ditch crosses Tiny Gulch about 2,000 feet upstream of the mouth.

Production notes:

Total production from 1909-14 probably did not exceed \$5,000 or about 250 ounces of gold (Maddren, 1915).

Reserves:**Additional comments:****References:**

Maddren, 1915; Hoare and Cobb, 1972; Hoare and Cobb, 1977.

Primary reference: Maddren, 1915

Reporter(s): Travis L. Hudson and Madelyn A. Millholland

Last report date: 06/10/01

Site name(s): Unnamed (near Bonanza Creek)

Site type: Prospect

ARDF no.: RM030

Latitude: 61.098

Quadrangle: RM A-3

Longitude: 159.774

Location description and accuracy:

This prospect is at an elevation of about 2,500 feet on the crest of a ridge east of upper Bonanza Creek. The map site is about 0.3 mile east-southeast of the center of sec. 29, T. 12 N., R. 59 W., of the Seward Meridian. It is locality 2 of Frost (1990); the location is probably accurate to within one-quarter mile.

Commodities:

Main: Au

Other:

Ore minerals: Gold, pyrite

Gangue minerals: Calcite, chlorite, quartz

Geologic description:

Frost (1990) describes gold- and pyrite-bearing quartz veins cutting sericitized andesite and volcanoclastic hornfels at this location. The veins are vuggy and contain euhedral quartz prisms extending into open spaces. Other gangue minerals in the iron-oxide stained veins are commonly calcite and chlorite. A quartz vein from this prospect contained 20 ppm gold (Frost, 1990, sample locality 2). Bedrock in the area includes thermally metamorphosed Jurassic volcanic or volcanoclastic rocks and a small granitic stock (Box and others, 1993). The thermal metamorphism is caused by a large mid-Cretaceous granitic pluton exposed to the north in the headwaters of the Tuluksak River.

Alteration:

Sericitization and silicification.

Age of mineralization:

Cretaceous or Tertiary. The gold-bearing quartz veins crosscut hornfels developed in country rocks around a mid-Cretaceous granitic pluton.

Deposit model:

Low-sulfide Au-quartz veins (Cox and Singer, 1986; model 36a)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

36a

Production Status: None**Site Status:** Undetermined**Workings/exploration:**

Prospecting pit(s) are present at this location.

Production notes:**Reserves:****Additional comments:****References:**

Frost, 1990; Box and others, 1993.

Primary reference: Frost, 1990**Reporter(s):** Travis L. Hudson and Madelyn A. Millholland**Last report date:** 06/10/01

Site name(s): Bonanza Creek**Site type:** Mine**ARDF no.:** RM031**Latitude:** 61.068**Quadrangle:** RM A-3**Longitude:** 159.751**Location description and accuracy:**

Bonanza Creek is a north tributary to Bear Creek. The map site is along lower Bonanza Creek near the east boundary of the Russian Mission A-3 quadrangle. It is in the SE1/4 sec. 4, T. 11 N., R. 59 W., of the Seward Meridian. Bonanza Creek is included in locality 20 of Hoare and Cobb (1972 1977).

Commodities:**Main:** Au**Other:****Ore minerals:** Gold**Gangue minerals:****Geologic description:**

Most of the placer gold in Bonanza Creek occurs near the mouth of the creek, where it cuts through bench and flood-plain deposits of Bear Creek. The Bonanza Creek deposit is essentially part of the Bear Creek flood plain (RM032). Maddren (1915) reports that bedrock on Bonanza Creek includes granitic rock with malchite-bearing quartz stringers, but most of the bedrock in the Bonanza Creek drainage is Jurassic volcanic rocks locally intruded and thermally metamorphosed by mid-Cretaceous granitic rocks (Box and others, 1993).

Alteration:**Age of mineralization:**

Quaternary.

Deposit model:

Placer Au (Cox and Singer, 1986; model 39a)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

39a

Production Status: Yes; small

Site Status: Undetermined

Workings/exploration:

The U.S. Geological Survey topographic map (1954 edition) shows about 0.5 mile of dredge tailings near the mouth of Bonanza Creek. Mining took place as early as 1913.

Production notes:

Reserves:

Additional comments:

References:

Maddren, 1915; Hoare and Cobb, 1972; Hoare and Cobb, 1977; Box and others, 1993.

Primary reference: Maddren, 1915

Reporter(s): Travis L. Hudson and Madelyn A. Millholland

Last report date: 06/10/01

Site name(s): Bear Creek**Site type:** Mine**ARDF no.:** RM032**Latitude:** 61.055**Quadrangle:** RM A-3**Longitude:** 159.772**Location description and accuracy:**

Bear Creek is a large, northeast headwater tributary to the Tuluksak River. Placer mining took place along about 5.6 miles of Bear Creek from 1.1 miles above the mouth of Bonanza Creek in the Russian Mission A-2 quadrangle, to 4.5 miles below Bonanza Creek. The map site is about half way between Spruce Creek and Bonanza Creek, in the SE1/4 sec. 8, T. 11 N., R. 59 W., of the Seward Meridian. This is locality 20 of Hoare and Cobb (1972, 1977).

Commodities:**Main:** Au**Other:** Hg**Ore minerals:** Cinnabar, gold**Gangue minerals:****Geologic description:**

Paying quantities of placer gold were discovered on Bear Creek in 1907 or 1908 (Maddren, 1915). Mining has taken place at least discontinuously over about 5.6 miles of the drainage. Continuous dredge tailings have been shown on U.S. Geological Survey topographic maps (1952 and 1979 editions) from 1.5 miles below to 1.1 miles above the mouth of Bonanza Creek. The active flood plain of Bear Creek is incised 10 to 100 feet into alluvial valley fill deposits, but the gravels in the flood plain are apparently only 3 to 8 feet thick, at least in places (Maddren, 1915). The flood-plain deposits consist of coarse gravels containing large cobbles and boulders. Much of the mining on Bear Creek was by dredging, which started in 1926 and continued through most years until WWII. Mining restarted after WWII and continued up to about 1964. The most recent mining was from 1973 until at least 1991 (Bundtzen and others, 1991). The dredge concentrates from below the mouth of Bonanza Creek contained considerable cinnabar. Although early reports described bedrock as granitic rock cut by diabase dikes (Maddren, 1915), recent mapping shows most of the drainage to be underlain by Jurassic volcanic rocks locally intruded by mid-Cretaceous granitic rocks (Box and others, 1993). It is possible that small granitic dikes, plugs, or stocks are present in bedrock below alluvium along the creek.

Alteration:**Age of mineralization:**

Quaternary.

Deposit model:

Placer Au (Cox and Singer, 1986; model 39a)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

39a

Production Status: Yes; medium

Site Status: Active

Workings/exploration:

The deposits were worked by hand methods, open cuts, and dredging. Mining has taken place at least discontinuously over about 5.6 miles of the drainage. Continuous dredge tailings have been shown on U.S. Geological Survey topographic maps (1952 and 1979 editions) from 1.5 miles below to 1.1 miles above the mouth of Bonanza Creek. Road and electric transmission lines parallel Bear Creek upstream to Bonanza Creek.

Production notes:

Bear Creek was mined at least intermittently during the periods 1909-1940, 1946-1964, and 1973-1991. Maddren (1915) reports that the early years of mining produced about \$35,000 or about 1,750 ounces of gold from Bear Creek and its tributaries.

Reserves:**Additional comments:****References:**

Maddren, 1915; Hoare and Cobb, 1972; Hoare and Cobb, 1977; Bundtzen and others, 1991; Box and others, 1993.

Primary reference: Maddren, 1915

Reporter(s): Travis L. Hudson and Madelyn A. Millholland

Last report date: 06/10/01

Site name(s): Spruce Creek**Site type:** Mine**ARDF no.:** RM033**Latitude:** 61.046**Quadrangle:** RM A-3**Longitude:** 159.803**Location description and accuracy:**

Spruce Creek is a small west tributary to Bear Creek. The mouth of Spruce Creek is 2.3 miles downstream of the mouth of Bonanza Creek (RM031). The map site is along lower Spruce Creek, in the NE1/4 sec. 18, T. 11 N., R. 59 W., of the Seward Meridian. This is locality 19 of Hoare and Cobb (1972, 1977).

Commodities:**Main:** Au**Other:****Ore minerals:** Gold**Gangue minerals:****Geologic description:**

The lower part of Spruce Creek has been placer mined where it crosses bench deposits along Bear Creek. Gravel deposits at the mouth of the creek are as much as 400 feet thick. Gravels along the active drainage are 20 to 30 feet thick 1,500 feet upstream of the mouth, and the headwaters of the creek cut directly into bedrock. Where the alluvial deposits are 20 to 30 feet thick, they consist of 2 to 4 feet of muck, 2 to 3 feet of coarse gravel with boulders as much as 1 foot in diameter, 1 to 1.5 feet of blue clay, and brown sandy and pebbly clay to bedrock (Maddren, 1915). Most of the gold occurred in the blue and brown pebbly clays and on bedrock. Some of the gold was coarse and attached to quartz. Maddren (1915) thought that it could have been derived from the contact zone around an intrusive at the head of the creek. Bedrock in the Spruce Creek drainage includes thermally metamorphosed Jurassic volcanic rocks developed around a mid-Cretaceous granitic stock (Box and others, 1993). Spruce Creek may be the only tributary of Bear Creek that contains substantial amounts of gold derived from bedrock in its own drainage.

Alteration:**Age of mineralization:**

Quaternary.

Deposit model:

Placer Au (Cox and Singer, 1986; model 39a)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

39a

Production Status: Yes; small

Site Status: Undetermined

Workings/exploration:

Open-cut placer mining took place along lower Spruce Creek until about 1920. Some of this work included a 280-foot long, 15- to 20-foot wide, and 10-foot-deep trench built as a bedrock drain.

Production notes:

Reserves:

Additional comments:

References:

Maddren, 1915; Hoare and Cobb, 1972; Hoare and Cobb, 1977; Box and others, 1993.

Primary reference: Maddren, 1915

Reporter(s): Travis L. Hudson and Madelyn A. Millholland

Last report date: 06/10/01

Site name(s): California Creek**Site type:** Mine**ARDF no.:** RM034**Latitude:** 61.058**Quadrangle:** RM A-3**Longitude:** 159.905**Location description and accuracy:**

California Creek is a headwater tributary of the Tuluksak River. The creek has been placer mined over at least 3 miles upstream from its mouth. The map site, near the mouth of Rocky Creek, is the approximate midpoint of the placer tailings. It is in the NW1/4 sec. 10, T. 11 N., R. 60 W., of the Seward Meridian. California Creek is included in locality 17 of Hoare and Cobb (1972, 1977).

Commodities:**Main:** Au**Other:****Ore minerals:** Gold**Gangue minerals:****Geologic description:**

California Creek is an important placer-gold producing tributary to the upper Tuluksak River. At least 3 miles of California Creek have been extensively dredged, including about on-half mile of the lower creek along the Tuluksak River valley. Dredging continued for about 1.5 miles upstream of the mouth of Rocky Creek (RM027), and some mining may have taken place for another mile to the headwaters of California Creek. Most of the California Creek drainage is underlain by thermally metamorphosed Jurassic volcanic rocks along the east side of a large mid-Cretaceous granitic pluton (Box and others, 1993).

Alteration:**Age of mineralization:**

Quaternary.

Deposit model:

Placer Au (Cox and Singer, 1986; model 39a)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

39a

Production Status: Yes; medium**Site Status:** Undetermined**Workings/exploration:**

Dredge tailings cover about 5.6 miles of the California Creek drainage, including about one-half mile of the lower creek along the Tuluksak River valley. Dredging continued for about 1.5 miles upstream of the mouth of Rocky Creek (RM027), and some mining may have taken place for another mile to the headwaters of California Creek. The tailings have an average width of about 0.15 mile and a maximum width of 0.4 mile near the mouth of the creek. Much of the mining took place from about 1947 to 1960 (Hoare and Cobb, 1977). Additional mining took place in the late 1980's.

Production notes:**Reserves:****Additional comments:**

Older references to California Creek refer to what is now called upper Tuluksak River (RM028) on USGS topographic maps.

References:

Hoare and Cobb, 1972; Hoare and Cobb, 1977; Box and others, 1993.

Primary reference: Hoare and Cobb, 1977**Reporter(s):** Travis L. Hudson and Madelyn A. Millholland**Last report date:** 06/10/01

References

- Box, S. E., Moll-Stalcup, E. J., Frost, T. P., and Murphy, J. M., 1993, Preliminary geologic map of the Bethel and southern Russian Mission quadrangles, southwestern Alaska: U.S. Geological Survey Miscellaneous Field Studies Map MF-2226-A, 20 p., scale 1:250,000.
- Brooks, A. H., 1915, The Alaska mining industry in 1914: U.S. Geological Survey Bulletin 622, p. 15-68.
- Brooks, A. H., 1922, The Alaska mining industry in 1920: U.S. Geological Survey Bulletin 722-A, p. 1-74.
- Bull, K., and Schneider, C., 1997, 1997 Summary report for Calista Corporation: Unpublished report prepared for Calista Corporation, Anchorage, 10 pages plus tables.
- Bundzten, T. K., and Laird, G.M., 1991, Geology and mineral resources of the Russian Mission C-1 Quadrangle, southwest Alaska: Alaska Division of Geological and Geophysical Surveys Professional Report 109, 24 p.
- Bundzten, T. K., Swainbank, R. C., Wood, J. E., and Clough, A. H., 1991, Alaska's mineral industry 1991: Alaska Division of Geological and Geophysical Surveys special report 46, 89 p.
- Cady, W. M., Wallace, R. E., Hoare, J. M., and Webber, E. J., 1955, The central Kuskokwim region, Alaska: U.S. Geological Survey Professional Paper 268, 132 p., 9 plates, scale 1:250,000.
- Cox, D. P., and Singer, D. A., 1986, Mineral deposit models: U.S. Geological Survey Bulletin 1693, 379 p.
- Ebbley, Norman, Jr., and Wright, W. S., 1948, Antimony deposits in Alaska: U.S. Bureau of Mines Report of Investigations 4173, 41 p.
- Enos, N., 1997, Kako property, July work summary: Calista Corporation, Anchorage, Internal memorandum, 6 p.
- Frost, T. P., 1990, Geology and geochemistry of mineralization in the Bethel quadrangle, southwestern Alaska, *in* Goldfarb, R. J., Nash, J. T., and Stoesser, J. W., eds., *Geochemical studies in Alaska by the U.S. Geological Survey, 1989*: U.S. Geological Survey Bulletin 1950, p. C1-C9.
- Frost, T. P., Bradley, L. A., O'Leary, R. M., and Motooka, J. M., 1992, Analytical results, sample locality map, and descriptions of rock samples from the Bethel and southern part of the Russian Mission 1 degree x 3 degree quadrangles, Alaska: U.S. Geological Survey Open-File Report 92-316, 229 p.
- Harrington, G. L., 1918, the Anvik-Andreafsky region, Alaska: U.S. Geological Survey Bulletin 683, 70 p., 1 sheet, scale 1:250,000.
- Hickok, B., and McAtee, J., 1990, Lode gold occurrences near the Kako and Stuyahok placer mines, southwestern Alaska: Calista Corporation, Anchorage, unpublished report, 17 p.
- Hoare, J. M., and Cobb, E. H., 1972, Metallic mineral resources map of the Russian Mission quadrangle, Alaska: U.S. Geological Survey Miscellaneous Field Studies Map MF-444, scale 1:250,000.
- Hoare, J. M., and Cobb, E. H., 1977, Mineral occurrences (other than mineral fuels and construction materials) in the Bethel, Goodnews, and Russian Mission quadrangles, Alaska: U.S. Geological Survey Open-File Report 77-156, 98 p.
- Hoare, J. M., and Coonrad, W. L., 1959, Geology of the Russian Mission quadrangle, Alaska: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-292, 1 sheet, scale 1:250,000.
- Holzheimer, F. W., 1926, Lode prospects in the Russian Mountains, Kuskokwim River region: Alaska Territorial

- Department of Mines Miscellaneous Report 81-1, 15 p.
- Joesting, H. R., 1940, Preliminary evaluation of placer ground on Buster Creek, Kako district, Alaska: Alaska Territorial Department of Mines, unpublished report, 3 p.
- Joesting, H. R., 1942, Strategic mineral occurrences in interior Alaska: Alaska Territorial Department of Mines Pamphlet 1, 50 p.
- Maddren, A. G., 1915, Gold placers of the lower Kuskokwim with a note on copper in the Russian Mountains: U.S. Geological Survey Bulletin 622-H, p. 292-360.
- Retherford, R. M., 1987, Willow Creek Placer, Marshall District: Calista Corporation, Anchorage, unpublished report, 14 p.
- Smith, P. S., 1942, Mineral industry in Alaska in 1939: U.S. Geological Survey Bulletin 926-A, p. 1-102.
- Turner, T. R., 1987, The geology and geochemistry of the Arnold prospect, Marshall district, Alaska: Calista Corporation, Anchorage, unpublished report, 13 p.
- Wedow, H., Jr., and others, 1953, Preliminary summary of reconnaissance for uranium and thorium in Alaska, 1952: U.S. Geological Survey Circular 248, 15 p.
- West, W. S., 1954, Reconnaissance for radioactive deposits in the lower Yukon-Kuskokwim region, Alaska, 1952: U.S. Geological Survey Circular 328, 10 p.