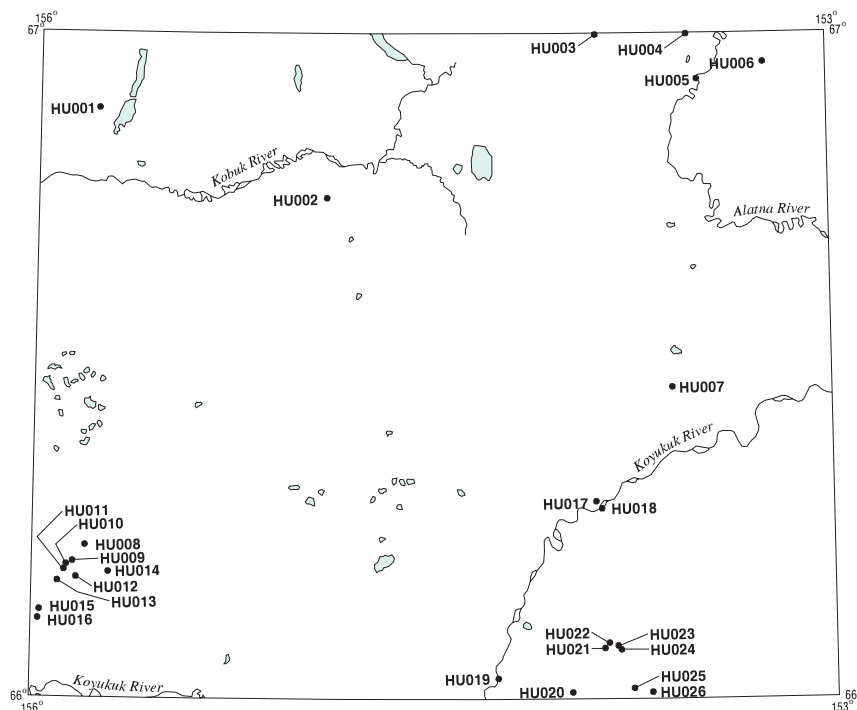


Hughes quadrangle

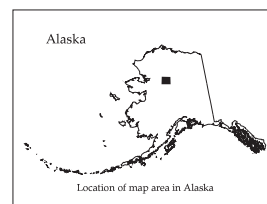
Descriptions of the mineral occurrences shown on the accompanying figure follow. See U.S. Geological Survey (1996) for a description of the information content of each field in the records. The data presented here are maintained as part of a statewide database on mines, prospects and mineral occurrences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



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

This and related reports are accessible through the USGS World Wide Web site <http://ardf.wr.usgs.gov>. Comments or information regarding corrections or missing data, or requests for digital retrievals should be directed to: Frederic Wilson, USGS, 4200 University Dr., Anchorage, AK 99508-4667, e-mail fwilson@usgs.gov, telephone (907) 786-7448. This compilation is authored by:

Joe Britton
Anchorage, AK



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, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

OPEN-FILE REPORT 03-58

Site name(s): Unnamed (northwest of Lake Selby)

Site type: Occurrence

ARDF no.: HU001

Latitude: 66.8860

Quadrangle: HU D-6

Longitude: 155.7765

Location description and accuracy:

This occurrence is located between Killak River and Lake Selby, about 3.5 miles north-northwest of the high point of land between Lake Selby and Narvak Lake and 3.5 miles southeast of Coal Pass. It is at an elevation of about 1,950 feet, 0.2 mile southwest of the center of section 10, T. 17 N., R. 14 E. of the Kateel River Meridian. Location is accurate within one-half mile.

Commodities:

Main: Cu

Other: Zn

Ore minerals: Azurite, chalcopryrite, malachite

Gangue minerals: Limonite, quartz

Geologic description:

This occurrence consists of a copper-bearing quartz vein in Cretaceous conglomerate (Patton and Miller, 1966). The vein contains chalcopryrite, and is stained with malachite, azurite, and limonite. The conglomerate borders pre-Cretaceous volcanic and metamorphic rocks, and the conglomerate is cut by a small, plug-like body of andesite porphyry. A rock sample contains more than 10% copper, 0.05% zinc, traces of cobalt, chromium, and nickel, 0.01 ounce of silver per ton, and no detectable gold. No other information is available.

Alteration:

Oxidation of chalcopryrite to secondary copper and iron minerals.

Age of mineralization:

Cretaceous or younger.

Deposit model:

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

Production Status: None

Site Status: Inactive

Workings/exploration:
Only surface sampling.

Production notes:

Reserves:

Additional comments:

References:
Patton and Miller, 1966; Berg and Cobb, 1967; Cobb, 1972 (MF458); Cobb, 1975 (OF75-627); Grybeck, 1977; Degenhart and others, 1978; Bottge, 1988 (USBM OF 14-88).

Primary reference: Patton and Miller, 1966

Reporter(s): J.M. Britton (Anchorage)

Last report date: 8/1/2002

Site name(s): Unnamed (Norutak Hills)

Site type: Occurrence

ARDF no.: HU002

Latitude: 66.7527

Quadrangle: HU D-4

Longitude: 154.9062

Location description and accuracy:

This occurrence is at an elevation of about 2,525 feet, in a saddle in the Norutak Hills. It is in the SE1/4 of section 26, T. 16 N., R. 18 E. of the Kateel River Meridian. The location is accurate within 1 mile.

Commodities:

Main: Cu, Mo, Zn

Other: Au

Ore minerals: Pyrite

Gangue minerals:

Geologic description:

According to Grybeck (1977), this occurrence mainly consists of intensely oxidized, porphyritic granite and pyritized, soda rhyolite that are weakly anomalous in zinc. The oxidized rocks are marked by prominent gossan. Two semi-quantitative spectrographic analyses of altered andesite and soda rhyolite with disseminated pyrite each show 0.007% Cu and 0.001 ounce of gold per ton, but no detectable molybdenum or zinc (Patton and Miller, 1966). The rocks in the area are Jurassic or Cretaceous andesitic volcanic rocks, intruded by small hypabyssal bodies, chiefly latite and quartz-latite porphyry, with subordinate pyritiferous, soda rhyolite (Patton and Miller, 1966).

Alteration:

Oxidation of pyrite forms prominent gossan.

Age of mineralization:

Intrusive bodies are Cretaceous or younger.

Deposit model:

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

Production Status: None

Site Status: Inactive

Workings/exploration:
Only surface sampling.

Production notes:

Reserves:

Additional comments:

References:
Patton and Miller, 1966; Grybeck, 1977.

Primary reference: Grybeck, 1977

Reporter(s): J.M. Britton (Anchorage)

Last report date: 8/1/2002

Site name(s): Unnamed (in the Helpmejack Hills)

Site type: Occurrence

ARDF no.: HU003

Latitude: 66.9980

Quadrangle: HU D-2

Longitude: 153.8829

Location description and accuracy:

This occurrence is north of the Helpmejack Hills, about 10 miles west-northwest of Helpmejack Lakes and about 18 miles northeast of Norutak Lake. It is at an elevation of about 3,400 feet in the SW 1/4 of section 32, T. 19 N., R. 23 E., of the Kateel River Meridian. The location is accurate within 1 mile.

Commodities:

Main: Mn

Other:

Ore minerals: Manganite, pyrolusite, rhodochrosite

Gangue minerals:

Geologic description:

Rhodochrosite, manganite, and pyrolusite occur in Devonian(?) altered mafic volcanic rocks and phyllite (Patton and Miller, 1966). Field investigators in the 1990's were not able to locate the occurrence (Kurtak and others, 2002). No other information is available.

Alteration:

Age of mineralization:

Deposit model:

Volcanogenic Mn(?) (Cox and Singer, 1986; model 24c)

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

24c(?)

Production Status: None

Site Status: Inactive

Workings/exploration:

Production notes:

Reserves:

Additional comments:

References:

Patton and Miller, 1966; Bottge, 1988 (USBM OF 14-88); Foley and others, 1985; Kurtak and others, 2002.

Primary reference: Patton and Miller, 1966

Reporter(s): J.M. Britton (Anchorage)

Last report date: 8/1/2002

Site name(s): Helpmejack Creek**Site type:** Occurrence**ARDF no.:** HU004**Latitude:** 66.9985**Quadrangle:** HU D-2**Longitude:** 153.5333**Location description and accuracy:**

This placer occurrence is located on Helpmejack Creek but its exact location is not known. The site is arbitrarily plotted 2.2 miles north of the northernmost of the Helpmejack Lakes in the SE1/4 section 35, T. 19 N., R 24 E. of the Kateel River Meridian.

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

Mendenhall (1902) reports that colors of gold had been found on Helpmejack Creek, but that none of the prospects were rich enough to justify much time or money. In this area, the creek cuts across mafic volcanic rocks and phyllite that range in age from Devonian(?) to Cretaceous or Jurassic(?) (Patton and Miller, 1966). A recent, panned-concentrate sample from the creek contains 54 ppb Au, but no visible gold (Kurtak and others, 1999). No other information is available.

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:

Prospecting, including sinking of shafts.

Production notes:

Reserves:

Additional comments:

References:

Mendenhall, 1902; Patton and Miller, 1966; Heiner and Wolff, 1968; Cobb, 1972 (MF458); Cobb, 1973 (B1374); Cobb, 1975 (OF75-627); Degenhart and others, 1978; Bottge, 1988 (USBM OF 14-88); Wyman, 1988; Kurtak and others, 1999.

Primary reference: Mendenhall, 1902

Reporter(s): J.M. Britton (Anchorage)

Last report date: 8/1/2002

Site name(s): Lost Pipe; Alatna River

Site type: Prospect

ARDF no.: HU005

Latitude: 66.9307

Quadrangle: HU D-1

Longitude: 153.4951

Location description and accuracy:

This placer prospect (mine?) is located on the Alatna River about 2 miles downstream from the mouth of Helpmejack Creek. The location is accurate within 1 mile.

Commodities:

Main: Au

Other:

Ore minerals: Gold

Gangue minerals:

Geologic description:

There was placer activity in the area for several years in the 1920's and 1930's, but no indication of its extent. Recent samples collected here contain small amounts of fine- to very fine-grained gold particles (Kurtak and others, 2002). This occurrence is probably similar to other bar deposits on the Koyukuk River. Although no bedrock occurs here, the rocks in the adjacent hills are Cretaceous graywacke, mudstone, and conglomerate, and Upper Jurassic mafic-volcanic rocks (Patton and Miller, 1966). No other information is available.

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: Undetermined.

Site Status: Inactive

Workings/exploration:

Prospecting and possibly a small amount of mining. There was placer activity in the area for several years in the 1920's and 1930's, but no indication of its extent.

Production notes:

Reserves:

Additional comments:

References:

Mendenhall, 1902; Smith, 1913; Smith, 1930; Smith and Mertie, 1930; Smith, 1939; Smith, 1941; Patton and Miller, 1966; Heiner and Wolff, 1968; Degenhart and others, 1978; U.S. Bureau of Mines. 1979; Bottge, 1988 (USBM OF 14-88); Kurtak and others, 2002.

Primary reference: Kurtak and others, 2002

Reporter(s): J.M. Britton (Anchorage)

Last report date: 8/1/2002

Site name(s): Rockybottom Creek**Site type:** Prospects**ARDF no.:** HU006**Latitude:** 66.9553**Quadrangle:** HU D-1**Longitude:** 153.2405**Location description and accuracy:**

Rockybottom Creek is a northwest-flowing tributary to the Alatna River. It joins the Alatna River about 1.5 miles north-northeast of the junction of the Alatna River and Helpmejack Creek. The prospects are about 4.6 miles east of the junction of Rockybottom Creek and the Alatna River. The location is accurate within one-half mile.

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

Good colors of gold were reported on Rockybottom Creek prior to 1898 (Wyman, 1988). Mendenhall (1902) also reports gold colors and that two men were prospecting on the creek, but did not cite evidence of any significant mining. Kurtak and others (2002) collected several pans of broken-up bedrock that produced a few fine to very fine, flat gold particles. Their placer sample of a thin gravel layer on bedrock has a value of about 0.0003 ounces of gold per cubic yard. In the lower part of Rockybottom Creek, thin gravels cover Cretaceous conglomerate (Patton and Miller, 1966). Upstream the bedrock is graywacke and mudstone. The gold that has been found on the creek appears to be concentrated in fractures and depressions in the bedrock (Kurtak and others, 2002).

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:**

Apparently only prospecting.

Production notes:

Cobb (1973) refers to reports that indicate the gold on Rockybottom Creek could not be mined profitably.

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

Mendenhall, 1902; Heiner and Wolff, 1968; Cobb, 1972 (MF458); Cobb, 1973 (B1374); Cobb, 1975 (OF75-627); Cobb, 1977 (OF77-168B); Bottge, 1988 (USBM OF 14-88); Wyman, 1988; Kurtak and others, 2002.

Primary reference: Kurtak and others, 2002**Reporter(s):** J.M. Britton (Anchorage)**Last report date:** 8/1/2002

Site name(s): Discovery Creek**Site type:** Occurrence**ARDF no.:** HU007**Latitude:** 66.4681**Quadrangle:** HU B-2**Longitude:** 153.6015**Location description and accuracy:**

Discovery Creek flows north-northeast from Niitluktalogi Mountain and then southeast to the Koyukuk River. The exact location of placer prospects on this creek are unknown and the map site is arbitrarily plotted at the location of a recent sample site of the U.S. Bureau of Land Management (Kurtak and others, 1999). It is in the SE1/4 of section 6, T. 12 N., R. 25 E. of the Kateel River Meridian.

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

A panned sample from three pans of gravel produced one fine gold particle (Kurtak and others, 1999). The rocks in the area are Cretaceous graywacke and mudstone (Patton and Miller, 1966). No other information is available.

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:

Surface sampling only.

Production notes:

Reserves:

Additional comments:

References:

Patton and Miller, 1966; Bottge, 1988 (USBM OF 14-88); Kurtak and others, 1999.

Primary reference: Kurtak and others, 1999

Reporter(s): J.M. Britton (Anchorage)

Last report date: 8/1/2002

Site name(s): Boston Ridge**Site type:** Prospect**ARDF no.:** HU008**Latitude:** 66.2292**Quadrangle:** HU A-6**Longitude:** 155.8031**Location description and accuracy:**

Boston Ridge, which is not named on the A-6 topographic map, is on the eastern margin of the Zane Hills between Clear and Aloha Creeks. The Boston Ridge prospect is along the top of the ridge at an elevation of about 1,650 feet, in the NW1/4 of section 36, T. 10 N., R. 14 E. of the Kateel River Meridian. The location is accurate within one-quarter mile.

Commodities:**Main:** REE, Th, U**Other:****Ore minerals:** Allanite, betafite(?), magnetite**Gangue minerals:** Fluorite, tourmaline**Geologic description:**

This prospect consists of altered bostonite dikes that cut feldspar porphyry; the dikes contain allanite, probably betafite (a uraniferous niobate mineral), and abundant magnetite. Samples of the bostonite contain up to 400 ppm uranium and 550 ppm thorium (Miller and Elliot, 1977). Barker (1991) investigated this area to evaluate reports that the intrusive rocks contain as much as 1.51% rare earth elements (REE). He describes the rocks as an intrusive complex of small stocks and dikes of syenite and monzonite that cover an area about 2000 feet in diameter. These plutons intrude Cretaceous andesite. The monzonite stocks form the center of the complex and vary from aphanitic feldspar porphyry to amphibole-rich hornblende porphyry. Syenitic and/or trachytic intrusive rocks occur as xenoliths and as dikes cross-cutting the monzonitic rocks. Tourmaline and magnetite occur on fractures in the monzonite and syenite. The syenite also contains minor purple fluorite. Chip samples of the most radioactive rocks contain a similar content of uranium and thorium as those reported by Miller and Elliot (1977). However, these samples failed to confirm the reported high values of REE, they contain near-normal background levels of lanthanum, cerium, and yttrium.

Alteration:

The bostonite dikes are described as altered, but details of the alteration are not given.

Age of mineralization:

The intrusive complex probably is an apophysis of the Zane Hills pluton which is Cretaceous based on a K-Ar date of 81 Ma.

Deposit model:

Felsic plutonic U-REE (Nokleberg and others, 1987)

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

Production Status: None

Site Status: Inactive

Workings/exploration:

Only surface sampling.

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

Eberlein and others, 1977; Miller and Elliot, 1977; Nokleberg and others, 1987; Barker, 1991; Nokleberg and others, 1996.

Primary reference: Barker, 1991

Reporter(s): J.M. Britton (Anchorage)

Last report date: 8/1/2002

Site name(s): Unnamed (ridge between Bear and Clear Creeks)

Site type: Occurrence

ARDF no.: HU009

Latitude: 66.2046

Quadrangle: HU A-6

Longitude: 155.8481

Location description and accuracy:

This occurrence is on the ridge between Clear and Bear Creeks, about 3.5 miles north-east of the summit of Caribou Mountain. It is at an elevation of about 1,600 feet, in the NW1/4 E1/4 of section 3, T. 9 N., R. 14 E. of the Kateel River Meridian. The location is accurate within one-half mile.

Commodities:

Main: Sb

Other: Au

Ore minerals:

Gangue minerals: Quartz

Geologic description:

This occurrence consists of altered quartz breccia in the contact zone between the Cretaceous, Zane Hills pluton and Lower or Upper Jurassic, andesitic volcanic rocks. A grab sample of the breccia contains 200 ppm antimony (Miller and Ferrians, 1968). No sulfides were noted in the sample description. Stream-sediment sample in the area are anomalous in lead and copper (Miller and Ferrians, 1968). A stream-sediment sample from a nearby spring contains 1.74 ppm Au (Miller and Ferrians, 1968). The rocks in the area are gneissic monzonite and quartz monzonite.

Alteration:

Age of mineralization:

The Zane Hills pluton is Cretaceous based on a K-Ar date of 81 Ma.

Deposit model:

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

Production Status: None

Site Status: Inactive

Workings/exploration:
Only surface sampling.

Production notes:

Reserves:

Additional comments:

References:
Miller and Ferrians, 1968; Grybeck, 1977.

Primary reference: Miller and Ferrians, 1968

Reporter(s): J.M. Britton (Anchorage)

Last report date: 8/1/2002

Site name(s): Unnamed (northeast ridge of Caribou Mountain)

Site type: Occurrence

ARDF no.: HU010

Latitude: 66.1997

Quadrangle: HU A-6

Longitude: 155.8716

Location description and accuracy:

This occurrence is at an elevation of about 2,200 on the northeast ridge of Caribou Mountain, about 2.8 miles northeast of the summit. The location is accurate within one-half mile.

Commodities:

Main: Mo(?)

Other: Bi, Pb

Ore minerals: Molybdenite(?)

Gangue minerals: Quartz

Geologic description:

This occurrence consists of a molybdenite(?) -bearing quartz vein (Miller and Ferrians, 1968). A grab sample of the vein contains 200 ppm molybdenum, 100 ppm lead, and 3,000 ppb bismuth. The rocks in the area are Cretaceous porphyritic monzonite and quartz monzonite. No other information is available. Stream-sediment samples from creeks draining the intrusive contact in this area are anomalous in lead and copper (Miller and Ferrians, 1968).

Alteration:

Age of mineralization:

The Zane Hills pluton is 81 Ma as dated by K/Ar methods (Miller and others, 1966).

Deposit model:

Porphyry Cu-Au (?) (Cox and Singer, 1986; model 20c)

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

20c(?)

Production Status: None

Site Status: Inactive

Workings/exploration:
Only surface sampling.

Production notes:

Reserves:

Additional comments:

References:
Miller and Ferrians, 1968; Grybeck, 1977.

Primary reference: Miller and Ferrians, 1968

Reporter(s): J.M. Britton (Anchorage)

Last report date: 8/1/2002

Site name(s): Unnamed (northeast ridge of Caribou Mountain)

Site type: Occurrence

ARDF no.: HU011

Latitude: 66.1919

Quadrangle: HU A-6

Longitude: 155.8795

Location description and accuracy:

This occurrence is about 4 miles west of Hogatza and 2.3 miles northeast of the summit of Caribou Mountain. It is at an elevation of about 2,500 feet, in the SW1/4 of section 10, T. 9 N., R. 14 E. of the Kateel River Meridian. The location is accurate within 1 mile.

Commodities:

Main: REE, Th, U

Other:

Ore minerals: Allanite, betafite, sphene, thorite, uranothorianite, zircon

Gangue minerals:

Geologic description:

This occurrence consists of radioactive and rare-earth accessory minerals in the border phases of the Cretaceous, Zane Hills pluton. Miller and Ferrians (1968) note that the quartz monzonitic to monzonitic border phase of the generally granodioritic Zane Hills pluton is 5 to 10 times more radioactive than background. They also noted that large K-feldspar phenocrysts, with tourmaline-bearing aplite dikes, are common in the border phase. A sample of porphyritic quartz monzonite from the border phase contains 20 ppm uranium. Miller and Elliot (1977) subsequently described the border phase rocks as monzonite, syenite, quartz monzonite and hybrid diorite. They propose an intrusive contact between the border phase and the main Zane Hills granodiorite, and suggest that the monzonitic border phase is younger. Samples of border-phase rocks contain 11 to 99 ppm uranium, and 46 to 269 ppm thorium. The uranium and thorium are concentrated in grains of uranothorianite, thorite, betafite, allanite, zircon, and sphene, which occur as disseminated accessory minerals in the monzonite. They found no vein-type mineralization and concluded that the border phase intrusives are enriched in U and Th.

Sphene from two samples gneissic monzonite (presumed to be border phase rocks) from the Zane Hills pluton a few kilometers upstream of the Hogatza placer deposit (HU014) contains from 27,890 to 39,180 ppm REE, including 380 to 760 ppm thorium (Staatz and others, 1977). Later investigations, however, indicate that the border phase rocks contain no unusual concentrations of REE (Barker, 1991).

Alteration:

At the contact between border-phase, monzonite-quartz monzonite and the core granodiorite, the granodiorite is, at least locally, strongly altered to a bleached, fine-grained, sericitic rock. Although the alteration diminishes in intensity away from the contact, all of the original biotite is completely altered to sericite. The granodiorite exhibits cataclastic texture near the contact.

Age of mineralization:

K-Ar age dating of hornblende from the monzonite at the south end of the Zane Hills pluton gives an age of 81.9 Ma (Miller and others, 1966).

Deposit model:

Felsic plutonic U-REE (Nokleberg and others, 1987)

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

Production Status: None

Site Status: Inactive

Workings/exploration:

Only surface sampling.

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

See also HU016.

References:

Miller and Ferrians, 1968; Miller and Bunker, 1975; Eakins and Forbes, 1976; Miller, 1976; Staatz and Miller, 1976; Eakins and others, 1977; Jones, 1977; Miller and Elliott, 1977; Staatz and others, 1977; Nokleberg and others, 1987; Barker, 1991; Nokleberg and others, 1996.

Primary reference: Miller and Elliott, 1977

Reporter(s): J.M. Britton (Anchorage)

Last report date: 8/1/2002

Site name(s): Unnamed (east of Caribou Mountain)**Site type:** Prospect**ARDF no.:** HU012**Latitude:** 66.1809**Quadrangle:** HU A-6**Longitude:** 155.8346**Location description and accuracy:**

This prospect is east of Caribou Mountain, centered along the ridge that separates Dry Creek and Ida Gulch. The prospect is at an elevation of about 1,600 feet, about 3.2 miles east-northeast of the summit of Caribou Mountain and 3 miles west of Hogatza. The location is accurate within one-half mile.

Commodities:**Main:** Au, Cu, Mo**Other:** Pb, Zn**Ore minerals:** Chalcopyrite, covellite, molybdenite, pyrite**Gangue minerals:** Quartz**Geologic description:**

Miller and Ferrians (1968) collected a grab sample of pyrite-bearing quartz that contains 2.4 ppm gold, 300 ppm copper, 150 ppm lead, and 300 ppm zinc. Sediment samples from streams draining the intrusive contact are anomalous in Pb and Cu (Miller and Ferrians, 1968). Nokleberg and others (1996) subsequently described the deposit as quartz veins and a quartz stockwork in Upper Cretaceous monzonite porphyry and Lower Cretaceous-Upper Jurassic andesitic volcanic rocks. The veins and stockwork contain chalcopyrite, pyrite, and traces of molybdenite and covellite. The monzonite porphyry is altered to a phyllic-argillic-propylitic assemblage, which is distributed concentrically around the core of the intrusive. Samples contain up to 2.0% copper, 0.2% molybdenum, and 2.4 grams of gold per ton. Nokleberg and others (1996) interpret the prospect as a porphyry copper (-gold) deposit.

Alteration:

A phyllic-argillic-propylitic alteration assemblage is distributed concentrically around the core of a monzonitic intrusive.

Age of mineralization:

The Zane Hills pluton is Cretaceous based on a K/Ar date of 81 Ma (Miller and others,

1966).

Deposit model:

Porphyry Cu-Au (?) (Cox and Singer, 1986; model 20c)

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

20c(?)

Production Status: None

Site Status: Inactive

Workings/exploration:

Surface sampling.

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

Miller and Ferrians, 1968; Grybeck, 1977; Hollister, 1978; Nokleberg and others, 1995; Nokleberg and others, 1996.

Primary reference: Nokleberg and others, 1996

Reporter(s): J.M. Britton (Anchorage)

Last report date: 8/1/2002

Site name(s): Unnamed (head of Dry Creek)

Site type: Occurrence

ARDF no.: HU013

Latitude: 66.1749

Quadrangle: HU A-6

Longitude: 155.9035

Location description and accuracy:

This occurrence is on the east side of the Zane Hills about 1.8 miles east of Caribou Mountain. The occurrence is at an elevation of about 3,000 feet at the head of Dry Creek, in the SW1/4 of section 10, T. 9 N., R. 14 E. of the Kateel River Meridian. The location is accurate within one-half mile.

Commodities:

Main: Ag, Au

Other: Cu, Mo, Pb

Ore minerals: Pyrite

Gangue minerals: Quartz

Geologic description:

This occurrence consists of a grab sample of quartz that contains pyrite. A sample contains 15 ppm silver, 0.4 ppm gold, 500 ppm copper, 300 ppm lead, and 30 ppm molybdenum. The rocks in the area are Cretaceous granodiorite and quartz monzonite of the Zane Hills pluton. No other information is available.

Alteration:

Age of mineralization:

The Zane Hills pluton is Cretaceous based on a K-Ar date of 81 Ma (Miller and others, 1966).

Deposit model:

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

Production Status: None

Site Status: Inactive

Workings/exploration:

Only surface sampling.

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

Miller and Ferrians, 1968; Grybeck, 1977.

Primary reference: Miller and Ferrians, 1968

Reporter(s): J.M. Britton (Anchorage)

Last report date: 8/1/2002

Site name(s): Hogatza; Hog River; Bear Creek**Site type:** Mine**ARDF no.:** HU014**Latitude:** 66.1894**Quadrangle:** HU A-6**Longitude:** 155.7148**Location description and accuracy:**

The placer mine at Hogatza is located on the east side of the Zane Hills along Bear Creek. The coordinates are on Bear Creek near the midpoint of the area of tailings shown on the Hughes A-6 topographic map. The placered area extends up and down Bear Creek for about 1.5 miles.

Commodities:**Main:** Au**Other:** PGE(?), REE, Sn(?), Th, U**Ore minerals:** Cassiterite(?), gold, platinum group metals(?), uranothorianite**Gangue minerals:** Epidote, garnet, sphene, zircon**Geologic description:**

Placer mining on Bear Creek began in the early 1900's. A dredge was installed on Bear Creek in 1957 and operated until 1975 (Boswell, 1979). The dredge was reactivated in 1981, deactivated again in 1984, and reactivated in 1990 (Swainbank and others, 2000). The current (2001) operational status of the dredge is not known. The cumulative placer gold production from the Koyukuk-Hughes mining district from 1930 to 1999 is 245,188 ounces (Swainbank and others, 2000). Most of that production is from the dredge at Hogatza. Swainbank and others (1997) reported some production from Hogatza in 1996.

The gold-bearing gravels at the Hogatza mine were derived from glaciofluvial material deposited by outwash streams flowing from a glacier that moved eastward down Clear Creek and into the Bear Creek valley in the early Pleistocene (Miller and Ferrians, 1968). Miller and Ferrians suggest that the source of the gold was mineralization along the contact zone between Upper Cretaceous porphyritic monzonite and Lower Cretaceous andesitic volcanic rock. This contact crosses the upper parts of both Clear and Bear Creeks.

The placer concentrates include several accessory minerals that contain rare earth elements (REE), uranium, and thorium (Staatz and others, 1977). These minerals include zircon, uranothorianite, sphene, garnet, and epidote. Sphene from one sample contained 28,450 ppm REE and 1,400 ppm thorium. There have been reports of platinum-group metals (PGE) and tin in placer concentrate samples collected in the 1920's from the plac-

ers on Bear Creek (Cobb, 1973 [B1374]), but Cobb and Miller (1981) indicate that the earlier reports may be incorrect. Placer concentrates stockpiled from dredge operations contain 2.97% uranium, 4.38% thorium, 0.06% lanthanum, 0.21% cerium, 1.73% niobium, 0.05% praseodymium, 0.01% gadolinium, 0.02% yttrium, and less than 0.01% each of neodymium, tantalum, and tin (Barker, 1991). The REE values are relatively low for a dredge concentrate, although the neodymium are unusually high.

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:

Placer mining on Bear Creek began in the early 1900's. A dredge was installed on Bear Creek in 1957 and operated until 1975 (Boswell, 1979). The dredge was reactivated in 1981, deactivated again in 1984, and reactivated in 1990 (Swainbank and others, 2000). The current (2001) operational status of the dredge is not known.

Production notes:

The cumulative placer gold production from the Koyukuk-Hughes mining district from 1930 to 1999 is 245,188 ounces (Swainbank and others, 2000). Most of that production is from the dredge at Hogatza. Swainbank and others (1997) reported some production from Hogatza in 1996.

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

Brooks, 1923; Wimmmler, 1925; Patton and Miller, 1966; Heiner and Wolff, 1968; Miller and Ferrians, 1968; Cobb, 1972 (MF458); Cobb, 1973 (B1374); Cobb, 1975 (OF75-627); Carnes, 1976; Cobb, 1977 (OF77-168B); Eakins and others, 1977; Eberlein and others, 1977; Grybeck, 1977; Miller and Elliott, 1977; Staatz and others, 1977; Eberlein and Menzie, 1978; Boswell, 1979; Arctic Environmental and Information and Data Center, 1982; Bundtzen and others, 1982; Eakins and others, 1983; Bundtzen and others, 1984; Eakins and others, 1985; Bundtzen and others, 1984; Bundtzen and others, 1987; Bottge,

1988; Barker, 1991; Swainbank and others, 1991; Bundtzen and others, 1992; Swainbank and others, 1993; Bundtzen and others, 1996; Swainbank and others, 1997.

Primary reference: Miller and Ferrians, 1968

Reporter(s): J.M. Britton (Anchorage)

Last report date: 8/1/2002

Site name(s): Unnamed (south of upper Caribou Creek)

Site type: Occurrence

ARDF no.: HU015

Latitude: 66.1314

Quadrangle: HU A-6

Longitude: 155.9685

Location description and accuracy:

This occurrence is on the northeast side of the Zane Hills, south of upper Caribou Creek. The map site is at an elevation of about 2,150 feet, about 0.5 mile south-southwest of the center of section 31, T. 9 N., R. 14 E. of the Kateel River Meridian. The location is accurate within one-half mile.

Commodities:

Main: Ag, Bi, W

Other: Pb

Ore minerals: Pyrite

Gangue minerals: Quartz

Geologic description:

This occurrence consists of pyritiferous, silicified, fine-grained intrusive rock near the contact between two phases of the Cretaceous, Zane Hills pluton (Miller and Ferrians, 1968). The principal phase is granodiorite and quartz monzonite; the other is a border phase of porphyritic monzonite and quartz monzonite. A sample of the principal phase near the contact contains 200 ppm silver, 1,000 ppm bismuth, 700 ppm tungsten, and 500 ppm lead (Miller and Ferrians, 1968). No other information is available.

Alteration:

Pyritization and silicification of pluton.

Age of mineralization:

The Zane Hills pluton is 81 Ma as dated by K/Ar methods (Miller and others, 1966).

Deposit model:

Porphyry Cu-Au (?) (Cox and Singer, 1986; model 20c)

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

20c(?)

Production Status: None

Site Status: Inactive

Workings/exploration:
Only surface sampling.

Production notes:

Reserves:

Additional comments:

References:
Miller and Ferrians, 1968; Grybeck, 1977.

Primary reference: Miller and Ferrians, 1968

Reporter(s): J.M. Britton (Anchorage)

Last report date: 8/1/2002

Site name(s): Unnamed (in Zane Hills, south of upper Caribou Creek)

Site type: Occurrence

ARDF no.: HU016

Latitude: 66.1181

Quadrangle: HU A-6

Longitude: 155.9733

Location description and accuracy:

This occurrence is about 8.5 miles southwest of Hogatza and four miles south of Caribou Mountain. It is about 0.2 mile south of the center of section 5, T. 8 N., R. 14 E. of the Kateel River Meridian. The location is accurate within 1 mile.

Commodities:

Main: REE, Th, U

Other:

Ore minerals: Allanite, betafite, sphene, thorite, uranothorianite, zircon

Gangue minerals:

Geologic description:

This occurrence consists of radioactive and rare-earth accessory minerals in the border phases of the Cretaceous, Zane Hills pluton. Miller and Ferrians (1968) noted that the quartz monzonitic to monzonitic border phase of the generally granodioritic, Zane Hills pluton showed 5 to 10 times background radioactivity. They also noted that large K-feldspar phenocrysts, as well as tourmaline-bearing aplite dikes, are common in the border phase. Samples of porphyritic quartz monzonite from the border phase contain 20 ppm uranium. Miller and Elliott (1977) described the border phase rocks as monzonite, syenite, quartz monzonite, and hybrid diorite. They indicate an intrusive contact between the border phase and the main Zane Hills granodiorite, and that the monzonitic, border phase is younger. Their samples from the border phase contain 11 to 99 ppm uranium and 46 to 269 ppm, thorium. The uranium and thorium are concentrated in grains of uranothorianite, thorite, betafite, allanite, zircon, and sphene, which occur as disseminated accessory minerals in the monzonite. Although they found no vein-type mineralization, Miller and Elliott (1977) conclude that the border phase intrusives are enriched in U and Th.

Sphene from two samples of gneissic monzonite (presumed to be border phase intrusive) from the Zane Hills pluton a few kilometers upstream from the Hogatza placer deposit (HU014) contain 27,890 to 39,180 ppm REE, and 390 to 760 ppm thorium (Staat and others, 1977). Later investigations, however, suggest that the border phase rocks contain no unusual concentrations of REE (Barker, 1991).

Alteration:

At the contact between border phase monzonite-quartz monzonite and the core granodiorite, the granodiorite is, at least locally, strongly altered to a bleached, fine-grained, sericitic rock. Although the alteration diminishes in intensity away from the contact, all of the original biotite is completely altered to sericite. The granodiorite exhibits cataclastic texture near the contact.

Age of mineralization:

K-Ar age dating of hornblende from the monzonite at the south end of the Zane Hills pluton gives an age of 81.9 Ma (Miller and others, 1966).

Deposit model:

Felsic plutonic U-REE (Nokleberg and others, 1987)

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

Production Status: None

Site Status: Inactive

Workings/exploration:

Only surface sampling.

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

See also HU011.

References:

Miller and Ferrians, 1968; Miller and Bunker, 1975; Eakins and Forbes, 1976; Miller, 1976; Staatz and Miller, 1976; Eakins and others, 1977; Staatz and others, 1977; Jones, 1977; Miller and Elliott, 1977; Cobb and Miller, 1981; Nokleberg and others, 1987; Barker, 1991; Nokleberg and others, 1996.

Primary reference: Miller and Elliott, 1977

Reporter(s): J.M. Britton (Anchorage)

Last report date: 8/1/2002

Site name(s): Unnamed (near Red Mountain Creek)

Site type: Occurrence

ARDF no.: HU017

Latitude: 66.2969

Quadrangle: HU B-2

Longitude: 153.8916

Location description and accuracy:

This occurrence is on the north side of Koyukuk River, about 0.5 mile north-northwest of the junction of Red Mountain Creek and Koyukuk River. The occurrence is at an elevation of about 750 feet, 0.2 mile east-northeast of the center of section 2, T. 10 N., R. 23 E. of the Kateel River Meridian. The location is accurate within one-half mile.

Commodities:

Main: Au

Other: Zn

Ore minerals: Gold

Gangue minerals: Pyrite

Geologic description:

This occurrence is marked by a prominent gossan in a small, hypabyssal intrusion of Cretaceous(?) latite porphyry (Patton and Miller, 1966). The porphyry contains disseminated pyrite. Samples contained trace amounts of gold, zinc, and other metals (Patton and Miller, 1966). The latite porphyry intrudes Cretaceous graywacke and mudstone. Samples of latite porphyry, quartzite, and slate collected by Kurtak and others (1999) do not contain anomalous gold or other metals.

Alteration:

Gossan formed by oxidation of disseminated pyrite.

Age of mineralization:

Patton and Miller (1966) suggest that the latite porphyry is Cretaceous.

Deposit model:

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

Production Status: None

Site Status: Inactive

Workings/exploration:
Only surface sampling.

Production notes:

Reserves:

Additional comments:

References:

Patton and Miller, 1966; Berg and Cobb, 1967; Cobb, 1972 (MF458); Cobb, 1975 (OF75-627); Eberlein and others, 1977; Grybeck, 1977; Cobb and Miller, 1981; Bottge, 1988 (USBM OF 14-88); Kurtak and others, 1999.

Primary reference: Patton and Miller, 1966

Reporter(s): J.M. Britton (Anchorage)

Last report date: 8/1/2002

Site name(s): Red Mountain**Site type:** Mine**ARDF no.:** HU018**Latitude:** 66.2861**Quadrangle:** HU B-2**Longitude:** 153.8709**Location description and accuracy:**

The exact location of this placer mine is vague. It is probably located on the south bank of the Koyukuk River, opposite the mouth of Mountain Creek. The location is accurate within 2 miles.

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

Eakin (1914) reported that some placer gold had been recovered on the south bank of the Koyukuk River. Reed (1938) mentions a bar deposit on the lower Koyukuk River, opposite Red Mountain, similar to other bar deposits along the river. Six panned-concentrate samples from a gravel bar in this area all contained very fine- to fine-grained gold. The best sample had 1 fine and 12 very fine flakes of gold; the concentrate was analyzed and contains 3,848 ppb gold (Kurtak and others, 2002).

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

Site Status: Inactive

Workings/exploration:
Surface mining.

Production notes:
Minor production.

Reserves:

Additional comments:

References:
Eakin, 1914; Eakin, 1916; Reed, 1938; Heiner and Wolff, 1968; Cobb, 1972 (MF458); Cobb, 1973 (B1374); Cobb, 1975 (OF75-627); Cobb, 1977 (OF77-168B); Eberlein and others, 1977; Bottge, 1988 (USBM OF 14-88); Kurtak and others, 2002.

Primary reference: Kurtak and others, 2002

Reporter(s): J.M. Britton (Anchorage)

Last report date: 8/1/2002

Site name(s): Hughes Bar**Site type:** Mine**ARDF no.:** HU019**Latitude:** 66.0310**Quadrangle:** HU A-3**Longitude:** 154.2596**Location description and accuracy:**

The Hughes Bar placer mine is on the east bank of the Koyukuk River about a mile south of the village of Hughes. The exact location is problematic; for this record, the site is the location shown by Cobb (1972, [MF458]).

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

Fine gold has been mined from several bars along the Koyukuk River since at least the 1890's. Hughes Bar, with Florence and Tramway Bars (in the Wiseman quadrangle), were some of the better-known localities (Maddren, 1910). Smith (1913) concluded that the gold on these bars had been carried for a considerable distance. Maddren (1910) indicates that perhaps \$4,000 in gold (about 200 ounces) has been produced from the Hughes Bar. No other information is available.

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

Site Status: Inactive

Workings/exploration:
Surface mining.

Production notes:

Reserves:

Additional comments:

References:

Schrader, 1900; Schrader, 1904; Maddren, 1910; Smith, 1913; Reed, 1938;
Heiner and Wolff, 1968; Cobb, 1972 (MF458); Cobb, 1973 (B1374); Cobb, 1975 (OF75-627); Cobb, 1977 (OF77-168B); Eberlein and others, 1977; Bottge, 1988.

Primary reference: Maddren, 1910

Reporter(s): J.M. Britton (Anchorage)

Last report date: 8/1/2002

Site name(s): Pocahontas Creek**Site type:** Prospects**ARDF no.:** HU020**Latitude:** 66.0099**Quadrangle:** HU A-2**Longitude:** 153.9837**Location description and accuracy:**

The exact location of placer prospects on Pocahontas Creek is not known. The site is arbitrarily placed in the NE1/4 of section 15, T. 7 N., R. 23 E. of the Kateel River Meridian. The prospects may be in the Melozitna quadrangle.

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

Eakin (1916) reported that placer gold prospects had been found on Pocahontas Creek. Panned concentrate samples collected by Kurtak and others (1999) contained moderate amounts of magnetite, but no gold or other ore minerals. The rocks in the Pocahontas Creek area (in the Hughes quadrangle) are Cretaceous, medium-grained hornblende-biotite granodiorite and quartz monzonite of the Indian Mountain pluton (Patton and Miller, 1966). No other information is available on this occurrence.

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:

Prospecting and surface sampling.

Production notes:

Reserves:

Additional comments:

References:

Eakin, 1916; Heiner and Wolff, 1968; Miller and Ferrians, 1968; Cobb, 1972 (MF458); Cobb, 1973 (B1374); Cobb, 1975 (OF75-627); Cobb, 1977 (OF77-168B); Eberlein and others, 1977; Bottge, 1988; Kurtak and others, 1999.

Primary reference: Eakin, 1916

Reporter(s): J.M. Britton (Anchorage)

Last report date: 8/1/2002

Site name(s): Black Creek (lode)**Site type:** Occurrence**ARDF no.:** HU021**Latitude:** 66.0764**Quadrangle:** HU A-2**Longitude:** 153.8631**Location description and accuracy:**

This occurrence is located on Black Creek, upstream from the placer area (HU022). The occurrence is at an elevation of about 2,000 feet on the west side of Black Creek, about 0.3 mile south of the center of section 20, T. 8 N., R. 24 E., of the Kateel River Meridian. The location is accurate.

Commodities:**Main:** Au, Cu**Other:** As, Bi**Ore minerals:** Arsenopyrite, chalcopyrite, gold, pyrite, pyrrhotite**Gangue minerals:** Quartz**Geologic description:**

This occurrence consists of disseminated pyrite and traces of chalcopyrite in Cretaceous metavolcanic rocks and late-stage aplite near the margin of a Cretaceous, granodiorite-quartz monzonite pluton (Miller and Ferrians, 1968). The occurrence is upstream from the placer gold area on Black Creek (HU022). Grab samples collected by Miller and Ferrians, described as pyritiferous hornfels and pyritiferous, felsic-intrusive rock, contain disseminated sulfides, 1,000 copper and up to 0.05 ppm gold.

Kurtak and others (1999) describe the geology as interbedded graywacke and mudstone that have been metamorphosed to resistant, brown hornfels along the contact of the granodiorite/quartz monzonite. They also observed quartz cemented breccia zones, quartz veinlets, felsic dikes, and lesser porphyritic andesite(?) cutting the sediments and hornfels. The graywacke and hornfels contain 1-2% pyrrhotite and minor arsenopyrite that occur as disseminations and stringers. Quartz veinlets contain a little chalcopyrite. The sulfides appear to be more prevalent near the felsic dikes. Samples contain up to 611 ppb gold, 3,912 ppm copper, 2,676 ppm arsenic, and 473 ppm, bismuth.

Nokleberg and others (1996) describe, without a specific location, the general Indian Mountain area as a porphyry Cu-Au system. This system, which likely includes all the individual lode occurrences within the area, consists predominately of chalcopyrite- and tourmaline-bearing intrusive breccias that are surrounded by concentric phyllic-argillic-

propylitic alteration halos. A pyrite zone surrounds the intrusive rocks.

Alteration:

Fine-grained, pyritiferous intrusive rocks in the area are reported to be highly altered but there is no detailed description of the alteration.

Age of mineralization:**Deposit model:**

Porphyry Cu-Au (?) (Cox and Singer, 1986; model 20c)

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

20c(?)

Production Status: None

Site Status: Inactive

Workings/exploration:

Only surface sampling.

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

Miller and Ferrians, 1968; Cobb, 1972 (MF458); Cobb, 1975 (OF75-627); Eberlein and others, 1977; Bottge, 1988; Nokleberg and others, 1996; Kurtak and others, 1999.

Primary reference: Miller and Ferrians, 1968

Reporter(s): J.M. Britton (Anchorage)

Last report date: 8/1/2002

Site name(s): Black Creek**Site type:** Mine**ARDF no.:** HU022**Latitude:** 66.0844**Quadrangle:** HU A-2**Longitude:** 153.8466**Location description and accuracy:**

The Black Creek placer mine is about 4.5 miles west-northwest of the summit of Indian Mountain. The creek flows northeast for about 2 miles where it joins the Indian River. The area of placer mining on Black Creek extends for about 0.8 miles above its mouth. The coordinates are near the midpoint of placer mining. The location is accurate. May be the same as Synder Creek (See HU024).

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

Placer mining began on Black Creek about 1913. The gold-bearing gravels are about 12 feet wide and the depth to bedrock about 20 feet. Eakin (1915) reports that the bedrock is altered Mesozoic strata near a granite pluton. According to Miller and Ferrians (1968), Black Creek flows over the contact between Cretaceous graywacke and mudstone, and Cretaceous granodiorite and quartz monzonite. Eberlein and others (1977) speculate that the gold is probably derived from this contact zone. The graywacke and mudstone have been hornfelsed by the intrusive. Gold panned from the upper reaches of Black Creek is coarse and angular (Miller and Ferrians, 1968). Kurtak and others (1999) collected samples of gravel overlying hornfels bedrock along upper Black Creek. The gravel contains up to 0.84 ounce of gold per cubic yard, 813 ppm arsenic, and more than 2,000 ppm tungsten. According to Kurtak and others (2002), the placer resource is small. The gold-bearing gravels on Black Creek are finer than those on Indian River (HU024), which contain many boulders.

Alteration:

Eakin (1915) noted altered bedrock but did not describe the 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

Site Status: Inactive

Workings/exploration:

Surface mining.

Production notes:

Incomplete records indicate that from 1914 through 1942, at least 1,352 ounces of gold were produced from Black Creek (Kurtak and others, 2002).

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

Eakin, 1914; Brooks, 1916; Eakin, 1916; Martin, 1919; Heiner and Wolff, 1968; Miller and Ferrians, 1968; Cobb, 1972 (MF458); Cobb, 1973 (B1374); Cobb, 1975 (OF75-627); Cobb, 1977 (OF77-168B); Eberlein and others, 1977; Kurtak and others, 1999; Kurtak and others, 2002.

Primary reference: Eakin, 1916

Reporter(s): J.M. Britton (Anchorage)

Last report date: 8/1/2002

Site name(s): Unnamed (lode on Indian River)**Site type:** Occurrence**ARDF no.:** HU023**Latitude:** 66.0800**Quadrangle:** HU A-2**Longitude:** 153.8144**Location description and accuracy:**

This lode occurrence is in the placer workings on Indian River. The exact location within the placer workings is not known and the site is located somewhat arbitrarily about a mile down Indian River from the mouth of Black Creek.

Commodities:**Main:** Mo**Other:****Ore minerals:** Molybdenite**Gangue minerals:****Geologic description:**

Joesting (1942) reported that a molybdenum deposit had been discovered on the Indian River during placer operations. Although the mineralization was said to be high grade there apparently was no attempt to systematically sample the deposit. There is no information that suggests that any work was done to further explore this occurrence. The only other indication of Mo mineralization in the area was an anomalous Mo value of 25 ppm in a placer sample collected by the Bureau of Land Management in about 1997 (Kurtak and others, 1999). The bedrock under the placer workings is Cretaceous granodiorite and quartz monzonite (Patton and Miller, 1966).

Nokleberg and others (1996) describe, without a specific location, the general Indian Mountain area as a porphyry Cu-Au system. This system, which likely includes all the individual lode occurrences within the area, consists predominately of chalcopyrite- and tourmaline-bearing intrusive breccias. The breccias are surrounded by concentric phyllic-argillic-propylitic alteration halos. A pyrite zone surrounds the intrusive rocks.

Alteration:

Highly altered intrusive rocks have been described in the general area but none specifically associated with this occurrence. The type of alteration is not specified.

Age of mineralization:

Deposit model:

Porphyry Cu-Mo(?) (Cox and Singer, 1986; model 21a)

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

21a(?)

Production Status: None

Site Status: Inactive

Workings/exploration:

Apparently none.

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

Joesting, 1942; Berg and Cobb, 1967; Cobb, 1972 (MF458); Cobb, 1973 (B1374); Cobb, 1975 (OF75-627); Eberlein and others, 1977; Cobb and Miller, 1981; Bottge, 1988; Nokleberg and others, 1996; Kurtak and others, 1999; Kurtak and others, 2002.

Primary reference: Joesting, 1942

Reporter(s): J.M. Britton (Anchorage)

Last report date: 8/1/2002

Site name(s): Indian River; Felix Fork; Snyder Creek

Site type: Mine

ARDF no.: HU024

Latitude: 66.0740

Quadrangle: HU A-2

Longitude: 153.8028

Location description and accuracy:

This placer mine is on the Indian River west of Indian Mountain. The area of placer mining extends downstream on Indian River for about 3 to 4 miles from its junction with Black Creek. The coordinates are near a landing strip about midway along the mined area. The location is accurate.

Felix Fork and Snyder Creek are included with the Indian River occurrence as they were probably mined with Indian River. Mining activity was limited on these creeks and their exact locations are indeterminate other than Snyder Creek is said to be a headwater tributary of Indian River. Snyder Creek may be the same as Black Creek (HU022).

Commodities:

Main: Au

Other: Ag, Mo, W

Ore minerals: Gold

Gangue minerals:

Geologic description:

Placer gold was discovered along the Indian River in 1909 and mining began in 1911 (Eakin, 1914). The auriferous gravels extend from the headwaters of Indian River downstream for a distance of 5 miles (Heiner and Wolff, 1968). The paying gravels were in the modern stream channel and were about 50 feet wide and 2 to 6 feet thick. Bedrock along the productive portion of the stream is predominantly Cretaceous granodiorite and quartz monzonite. The intrusives cut Jurassic(?) and Cretaceous andesite, tuff, graywacke and mudstone.

Several pan-concentrate and placer samples several locations along Indian River contain fine to coarse gold (Kurtak and others, 2002) a sample of one of these placer samples contains returned values of 24 ppm gold, 225 ppm molybdenum, and 1127 ppm tungsten.

There are at least two known lode mineral occurrences (HU023, HU021) along the mined section of Indian River, but no nearby large alteration zones or other obvious sources of the placer gold in Indian River have been found (Joesting, 1942; Miller and Ferrians, 1968). The source may be lode deposits along Black Creek (HU021), where

rock samples at an intrusive contact showed anomalous gold (Kurtak and others, 1999).

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**Site Status:** Probably inactive**Workings/exploration:**

Surface mining beginning in the early 1900's, included some large-scale mining.

Production notes:

Total production between 1911 and 1915 was 5,154 ounces of gold and 653 ounces of silver (Eakin, 1916). Total production is unknown but probably more than 10,000 ounces (Cobb and Miller, 1981). Large scale mining ended in 1961 and all mining ended in 1965.

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

Brooks, 1912; Smith, 1913; Eakin, 1914; Brooks, 1916; Eakin, 1916; Martin, 1919; Joesting, 1942; USGS, 1965; Patton and Miller, 1966; Heiner and Wolff, 1968; Miller and Ferrians, 1968; Cobb, 1972 (MF458); Cobb, 1973 (B1374); Cobb, 1975 (OF75-627); Cobb, 1977 (OF77-168B); Eberlein and others, 1977; Cobb and Miller, 1981; Bottge, 1988; Kurtak and others, 1999; Kurtak and others, 2002.

Primary reference: Eakin, 1914**Reporter(s):** J.M. Britton (Anchorage)**Last report date:** 8/1/2002

Site name(s): Unnamed (near Indian River)**Site type:** Occurrence**ARDF no.:** HU025**Latitude:** 66.0160**Quadrangle:** HU A-2**Longitude:** 153.7556**Location description and accuracy:**

This occurrence is located on the west side of Indian River about 4.25 miles south-southwest of the summit of Indian Mountain. The occurrence is along a dirt road at an elevation of about 1,200 feet, about 0.4 mile north of the center of section 14, T. 7 N., R. 24 E. of the Kateel River Meridian. The location is accurate.

Commodities:**Main:** Au, Zn**Other:** Ag, Cu, Mo, Pb**Ore minerals:** Chalcopyrite, gold, pyrite, sphalerite, tetrahedrite(?)**Gangue minerals:****Geologic description:**

This occurrence consists of disseminated pyrite and sphalerite in fresher specimens of otherwise highly altered intrusive rocks that cut Upper Jurassic(?) and Lower Cretaceous andesite (Miller and Ferrians, 1968). Both the andesite and intrusives show considerable oxidization and alteration. Samples contain anomalous lead, zinc, copper, molybdenum, gold, and silver, with up to 15 ppm silver, 1,000 ppm copper, 30 ppm molybdenum, 3,000 ppm lead, and 700 ppm zinc (Miller and Ferrians, 1968). A float sample of silicified, vuggy meta-rhyolite(?) contains disseminated pyrite and possibly tetrahedrite(?); this sample contains 8.3 ppm gold, 11.5 ppm silver, 794 ppm copper, 1,771 ppm lead, and 998 ppm zinc (Kurtak and others, 1999).

Nokleberg and others (1996) describe, without a specific location, the deposit in the Indian Mountain area as a porphyry Cu-Au system. This system, which likely includes all the individual lode occurrences within the area, consists predominately of chalcopyrite- and tourmaline-bearing intrusive breccias that are surrounded by concentric phyllic-argillic-propylitic alteration halos. A pyrite zone surrounds the intrusive rocks.

Alteration:

The intrusive rocks and andesite are oxidized and altered but no details of the alteration are described.

Age of mineralization:

The andesite that host the deposit is Cretaceous or early Tertiary.

Deposit model:

Porphyry Cu-Mo(?) (Cox and Singer, 1986; model 21a)

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

21a(?)

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

Only surface sampling.

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

Miller and Ferrians, 1968; Cobb, 1972 (MF458); Cobb, 1975 (OF75-627); Eberlein and others, 1977; Cobb and Miller, 1981; Bottge, 1988 (USBM OF 14-88); Nokleberg and others, 1996; Kurtak and others, 1999; Kurtak and others, 2002.

Primary reference: Miller and Ferrians, 1968**Reporter(s):** J.M. Britton (Anchorage)**Last report date:** 8/1/2002

Site name(s): Unnamed (south of Indian Mountain)

Site type: Occurrence

ARDF no.: HU026

Latitude: 66.0100

Quadrangle: HU A-2

Longitude: 153.6880

Location description and accuracy:

This occurrence is located east of the Indian River, about 4.5 miles south of Indian Mountain. The occurrence is at an elevation of about 1,800 feet, 0.3 mile west of the center of section 18, T. 7 N., R. 25 E. of the Kateel River Meridian. The location is accurate within 1 mile.

Commodities:

Main: Ag, Au, Cu

Other:

Ore minerals: Pyrite

Gangue minerals: Quartz

Geologic description:

Kurtak and others (1999) report a small, conspicuous, color anomaly, which is the expression of hydrothermally altered andesite(?) that contains 2 to 3% pyrite. The andesite (?) and numerous quartz veinlets occur only as float. The oxidized rocks commonly exhibit boxworks and gossan textures which suggest a high, original sulfide content. Samples of quartz-rich float contain up to 593 ppb gold, 21.6 ppm silver, and 692 ppm, copper. The rocks in the area are Upper Jurassic-Lower Cretaceous, andesitic volcanic rocks (Patton and Miller, 1966).

Alteration:

Oxidation and unspecified hydrothermal alteration.

Age of mineralization:

Deposit model:

Porphyry Cu-Au (?) (Cox and Singer, 1986; model 20c)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
20c(?)

Production Status: None

Site Status: Inactive

Workings/exploration:
Only surface sampling.

Production notes:

Reserves:

Additional comments:

References:
Patton and Miller, 1966; Kurtak and others, 1999.

Primary reference: Kurtak and others, 1999

Reporter(s): J.M. Britton (Anchorage)

Last report date: 8/1/2002

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