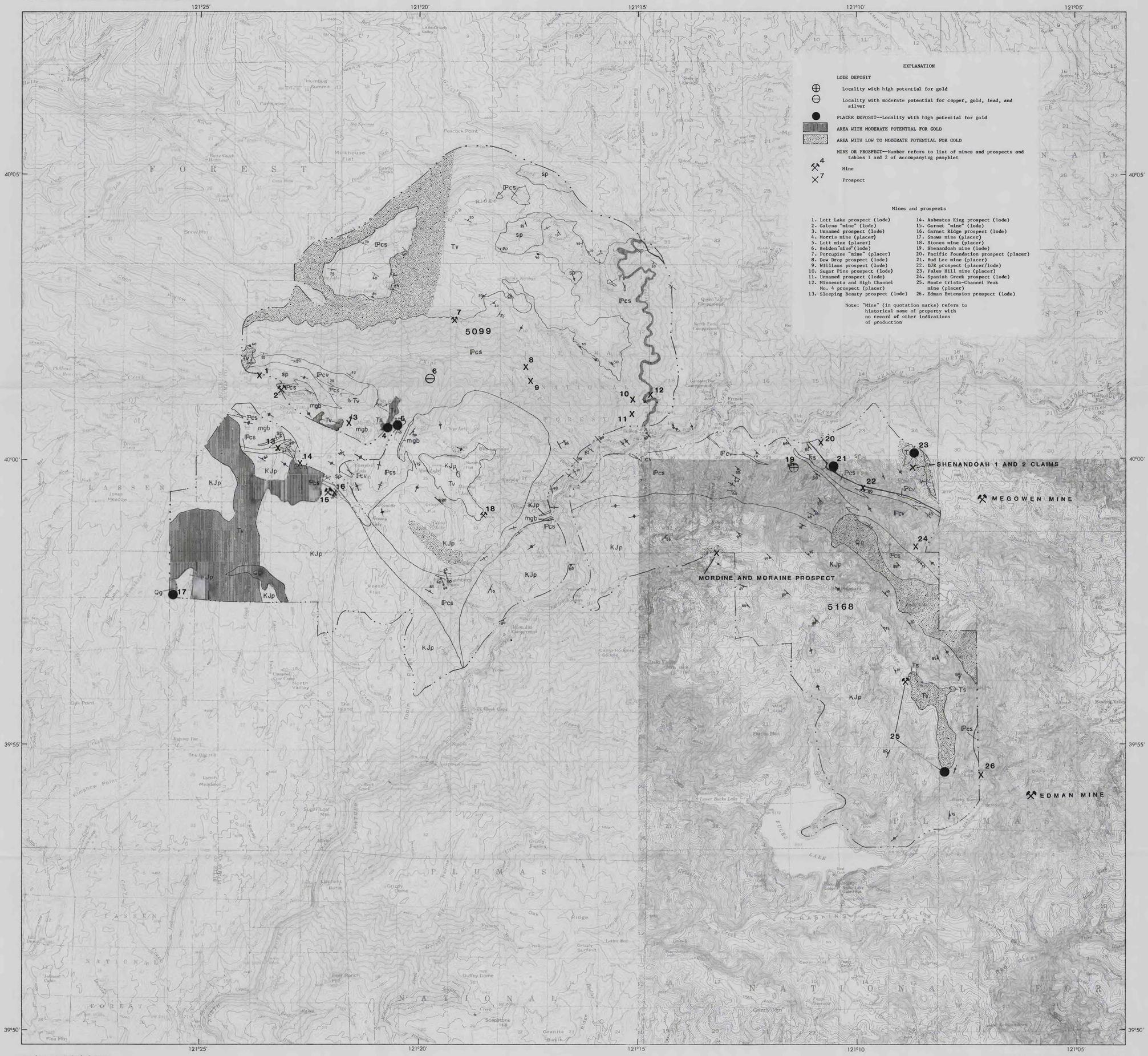
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-1419-B



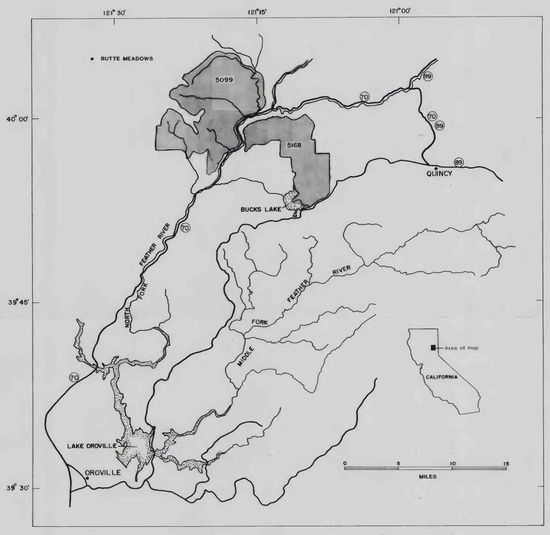
Base from U.S. Geological Survey
Bucks Lake, 1950; Almanor, 1955;
Pulga, 1957; and Jonesville, 1958

Geology from Sorensen and Pietropaoli (1982)

SCALE 1:62500

CONTOUR INTERVAL 40 AND 80 FEET

NATIONAL GEODETIC VERTICAL DATUM OF 1929



INDEX MAP SHOWING LOCATION OF BUCKS LAKE (5168) AND CHIPS CREEK (5099) ROADLESS AREAS, CALIF.

CORRELATION OF MAP UNITS

Qg			QUATERNARY
Tv			TERTIARY
Ts			
KJp			CRETACEOUS AND JURASSIC
sp	mgb		JURASSIC TO DEVONIAN
Rs			TRIASSIC
IPcv	IPcs	IPcm	PENNSYLVANIAN

DESCRIPTION OF MAP UNITS

Qg — GLACIAL DEPOSITS (HOLOCENE)--Unconsolidated morainal material

Tv — VOLCANIC ROCKS (PLIOCENE AND MIOCENE)--Basalt and andesite

Ts — STREAM DEPOSITS (EOCENE)--Locally auriferous cobble, pebble, and sand deposits

KJp — PLUTONIC ROCKS (CRETACEOUS AND JURASSIC)--Mostly quartz diorite and granodiorite according to Streckeisen (1973)

sp — SERPENTINE AND ASSOCIATED ULTRAMAFIC ROCKS--(JURASSIC TO DEVONIAN)--Peridotite, pyroxenite, and olivinite, generally altered to serpentine, soapstone, and talc schist

mgb — METAGABBRO (JURASSIC TO DEVONIAN)--Metagabbro, locally grading to hornblendite and quartz diorite

Rs — SEDIMENTARY ROCKS (TRIASSIC)--Phyllite and metachert

CALAVERAS FORMATION (PENNSYLVANIAN)--In this area, divided into:

IPcv — Volcanic rocks--Northwest of North Fork of Feather River, pillow greenstone and volcanogenic sedimentary rocks. Elsewhere, meta-andesite, metadacite, and metatuff, all formerly assigned to the Franklin Canyon Formation

IPcs — Sedimentary rocks--Phyllite, quartzite, and metachert

IPcm — Marble

CONTACT

FAULT--Dashed where approximately located

STRIKE AND DIP OF BEDDING

Inclined

Vertical

Inclined, showing bearing and plunge of lineation

STRIKE AND DIP OF FOLIATION

Inclined

Vertical

Inclined, showing bearing and plunge of lineation

STRIKE AND DIP OF JOINTING

Inclined

Vertical

BOUNDARY OF ROADLESS AREA

MINERAL RESOURCE POTENTIAL MAP OF THE CHIPS CREEK AND BUCKS LAKE ROADLESS AREAS, BUTTE AND PLUMAS COUNTIES, CALIFORNIA

By

Martin L. Sorensen and Andrew Griscom

U.S. Geological Survey

and

J. Mitchell Linne, Scott A. Stebbins, and Donald E. Graham

U.S. Bureau of Mines

1983

STUDIES RELATED TO WILDERNESS

The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts require the U.S. Geological Survey and the U.S. Bureau of Mines to survey certain areas on Federal lands to determine their mineral resource potential. Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a mineral resource potential survey of the Bucks Lake and Chips Creek Roadless Areas in the Lassen and Plumas National Forests, Butte and Plumas Counties, Calif. Bucks Lake and Chips Creek Roadless Areas were classified as further planning areas during the Second Roadless Area Review and Evaluation (RARE II) by the U.S. Forest Service, January 1979.

SUMMARY

A survey of the Bucks Lake and Chips Creek Roadless Areas, Butte and Plumas Counties, Calif., indicates several areas with identified resources and mineral resource potential. A high potential for lode gold resources exists in the Bucks Lake Roadless Area at and near the Shenandoah mine. The potential for placer gold resources within the Bucks Lake Roadless Area is high at and near the Bud Lee, Fales Hill, and Monte Cristo-Channel Peak mines and low to moderate in areas covered by Quaternary glacial deposits. A moderate potential for copper-gold-lead-silver lode resources exists in the Chips Creek Roadless Area at and near the Belden mine. The potential for placer gold resources within the Chips Creek Roadless Area is high at and near the Lott, Morris, and Snows mines and is moderate in the area between Mount Hope and Snows mine and along Yellow Creek. The potential for reworked placer gold in areas covered by Quaternary glacial deposits is low to moderate.

INTRODUCTION

The Bucks Lake and Chips Creek Roadless Areas are on the west slope of the Sierra Nevada approximately 20 mi west of Quincy, county seat of Plumas County, Calif. The two areas are separated by California Highway 70 and the canyon of the North Fork of the Feather River. In both areas, the uplands support thick growths of manzanita, ceanothus, and other plants of the chapparal assemblage, and the slopes and drainages are heavily forested. Elevations range from 2,200 ft in the canyon of the North Fork of the Feather River to 7,067 ft at Mount Pleasant.

The Bucks Lake Roadless Area comprises 19,400 acres in Plumas National Forest. The south boundary is accessible by paved road from Quincy. Terrain consists of a northwest- to north-trending ridge flanked by steep north and east slopes and somewhat gentler south and west slopes.

The Chips Creek Roadless Area comprises 43,400 acres in Lassen and Plumas National Forests. The northwestern boundary is reached by unpaved roads from Butte Meadows. Terrain consists of gently rolling uplands dissected by narrow steep-walled drainages.

GEOLOGY

The geology of the Bucks Lake and Chips Creek Roadless Areas has been summarized by Sorensen and Pietropaoli (1982). Both roadless areas are in the northern part of the western Sierra Nevada metamorphic belt. They are in part of a northwest-trending belt underlain mostly by the Pennsylvanian Calaveras Formation. The Calaveras is bordered on the west by metavolcanic rocks of the fault-bounded Franklin Canyon Formation and on the east by ultramafic rocks that occupy the Melones fault zone. Several geologic terranes within the study area appear to be favorable sites for mineral deposits.

Tertiary stream deposits

Lower Tertiary stream deposits that are locally auriferous are exposed northeast of Bucks Lake at Spanish Peak, north of Bucks Lake near the East Branch of the North Fork of the Feather River, and northwest of Bucks Lake at Mount Hope. Tertiary gravels are also present northwest of Bucks Lake near Table Mountain, where they are covered by Tertiary lava and Quaternary glacial deposits.

Quaternary glacial deposits

Quaternary glacial deposits are present north and northwest of Spanish Peak, south and southeast of Table Mountain, and north of Chambers Peak. Similar glacial deposits have been mined for gold by hydraulic methods (Lindgren, 1911, p. 98).

Calaveras Formation

The Shenandoah mine, a gold-quartz lode (sec. 28, T. 25 N., R. 7 E.), is in metasedimentary rocks of the Calaveras Formation near the contact of the Calaveras with ultramafic rocks occupying the Melones fault zone. The proximity of the Melones fault zone to the Shenandoah mine and to several other mines outside of the roadless area suggests that mineral-rich solutions may have migrated along the Melones fault zone and formed deposits at favorable locations.

Melones fault zone

Ultramafic rocks occupying the Melones fault zone underlie the Shenandoah 1 and 2 claims (sec. 25, T. 25 N., R. 7 E.) and approximately 3 mi^2 in the northeastern part of the Bucks Lake Roadless Area. Slightly less than 3 tons of relatively low-grade ore was shipped from these claims in 1943 according to Rynearson (1953, p. 291).

GEOCHEMISTRY

A total of 157 rock samples and 454 panned concentrates of stream-sediment samples were collected from the Bucks Lake, Chips Creek, and nearby (20 mi south) Bald Rock and Middle Fork Feather River Roadless Areas and analyzed by atomic-absorption, fire-assay, and semiquantitative spectrographic methods for 31 elements (Sorensen and others, 1982). Local low-grade mineralization is indicated by anomalously high manganese, silver, tin, and tungsten values for samples from a quartz vein that intrudes serpentine in sec. 15, T. 25 N., R. 5 E. Gold that was present in panned concentrates of stream-sediment samples from Yellow Creek apparently was derived from Tertiary stream deposits outside of the Chips Creek Roadless Area.

GEOPHYSICS

Aeromagnetic and gravity maps of the Bucks Lake and Chips Creek Roadless Areas were prepared as an aid to the evaluation of the mineral resource potential. Examination of the aeromagnetic map (Andrew Griscom, unpub. data, 1982) indicates that most of the magnetic anomalies and irregularities in magnetic patterns occur over the fault-bounded ultramafic bodies and mafic volcanic rocks. Anomalies associated with the ultramafic bodies enable one to trace these rocks beneath the overlying volcanic rocks at the north end of the Chips Creek Roadless Area and hence indicate areas of possible chromite occurrence.

MINES AND MINERALIZED AREAS

Lode deposits

The Shenandoah mine, located in the northern part of the Bucks Lake Roadless Area, has produced at least 95 oz of gold from a zone of irregular bunches and stringers of quartz (Averill, 1928, p. 295-296) in silicified metasedimentary rocks of the Calaveras Formation. The Edman and Megowen mines, just east of the roadless area, have produced approximately 2,100 oz of gold and 450 oz of silver from workings that are in geologic environments similar to that of the Shenandoah (Preston, 1890, p. 484-489). The Callahan Mining Corporation currently is conducting an evaluation of the Shenandoah mine.

In the Chips Creek Roadless Area, quartz veins with minor amounts of gold, silver, lead, and copper occur in metasedimentary rocks of the Calaveras Formation at the Belden and Galena mines and at the Dew Drop and Williams prospects. At the Garnet mine, a tactite body contains minor amounts of molybdenum, silver, copper, and tungsten; asbestos and marble occur in nearby peridotite bodies and limestone lenses.

Placer deposits

In the Bucks Lake area, the Monte Cristo-Channel Peak and the Fales Hill mines were developed in Tertiary river gravel deposits between 1860 and 1890. More than 2,500 ft of drifts has developed gravel at the Monte Cristo mine (Fariss and Smith, 1882, p. 255) and more than 25 acres of gravel has been mined hydraulically at Fales Hill. Placer gold currently is being mined from a gravel deposit at the Bud Lee mine.

In the Chips Creek Roadless Area, the Lott and Morris mines were opened in the early 1880's on Tertiary river gravel deposits and hydraulicked when water was available; the Lott mine was operated continuously for 20 years. Incomplete records indicate at least 80 oz of gold and 9 oz of silver were produced from the Lott between 1934 and 1937. The Snows mine produced approximately 15,000 oz of gold before 1911 (Lindgren, 1911, p. 95) from an extension of the gravels exposed at the Lott and Morris workings. Several drift mines have been developed on similar deposits adjacent to the west boundary of the Chips Creek Roadless Area.

ASSESSMENT OF MINERAL RESOURCE POTENTIAL

Where possible, mineral resources are identified for specific deposits; where resources are unknown, the potential for resources is described. The mineral resource potential of an area is classified as high, moderate, or low and is based on the results of geologic, geochemical, and geophysical studies and on the history of mining and mineral exploration in the area. A high mineral resource potential exists where nearly all conditions of a geologic environment favorable for ore accumulations in an area are met. Such areas may include known mining districts, as well as other areas where geologic, geophysical, geochemical, and other data demonstrate or suggest a high probability that mineralized rock exists. Moderate mineral resource potential exists where a favorable geologic model has been identified or may reasonably be interpreted to occur but where evidence for mineralization is less clearcut or has not yet been found. Areas lacking evidence for either a high or moderate potential are considered to have a low mineral resource potential.

BUCKS LAKE ROADLESS AREA

Lode deposits

A high potential for disseminated gold deposits exists at and near the Shenandoah mine. Sampling data of the U.S. Bureau of Mines (Linne and Stebbins, 1983) indicate approximately 7,500 tons of indicated and inferred subeconomic resources averaging 0.19 oz gold per ton at the Shenandoah mine. The mineral potential of the Shenandoah mine is currently being evaluated by the Callahan Mining Corporation (R. D. Thomas, Callahan Mining Corp., written commun., 1981).

Claims are recorded for copper and chromite deposits, but the resource potential for these minerals in the Bucks Lake Roadless Area is low.

Placer deposits

A high potential for placer gold deposits exists at the Bud Lee mine. This mine, operational in 1982, consists of an estimated 89,000 yd^3 of auriferous Tertiary stream gravels with average gold value of $0.27 per yd^3 (gold values at $400 per troy oz) (Linne and Stebbins, 1983). The operator reports recovering an amount of gold equivalent to an average of $10 per yd^3 from local pods in the deposit.

There is a high potential for placer gold at the Fales Hill mine, where gold from Tertiary auriferous gravels has been reworked into underlying weathered bedrock during earlier hydraulic mining operations. Approximately 135,000 yd^3 of subeconomic resources containing gold values of $1.20 per yd^3 and 25,000 yd^3 of reserves containing gold values of $9.50 per yd^3 are indicated. Probable difficulties in extracting gold from the weathered bedrock at this deposit make mining using conventional methods difficult.

Approximately 56,000 yd^3 of auriferous Tertiary river gravels with average gold values of $1.65 per yd^3 are inferred at the Monte Cristo-Channel Peak mine, located near Spanish Peak. The potential for the occurrence of additional resources at the Monte Cristo-Channel Peak is low. Tertiary river gravel deposits exposed at and west of Spanish Peak contain less than $0.01 gold per yd^3.

Quaternary surficial deposits may contain gold reworked from Tertiary stream deposits. Areas north and northwest of Spanish Peak have a low to moderate potential for reworked detrital gold in glacial deposits.

CHIPS CREEK ROADLESS AREA

Lode deposits

A moderate potential for copper, gold, lead, and silver exists at and near the Belden mine (sec. 17, T. 25 N., R. 6 E.). Production is not recorded for this deposit, but U.S. Bureau of Mines data indicate the presence of 6,400 tons of subeconomic resources and infer an additional 8,900 tons of subeconomic resources with average assay values of 0.08 oz gold per ton, 0.52 oz silver per ton, 0.52 percent copper, and 1.69 percent lead (Linne and Stebbins, 1983).

Assays of samples collected during this study from the Dew Drop, Galena, Garnet, and Williams properties indicate minor amounts of copper, gold, lead, molybdenum, silver, and tungsten, but the properties have low resource potential for these metals.

Placer deposits

A high potential for placer gold resources exists at Mount Hope where the Lott and Morris mines contain an estimated 188,000 yd^3 of auriferous Tertiary stream gravels that are within 3 ft of bedrock. Samples collected by the owners of the Lott mine in 1936 are said to have had an average gold value of $11.40 per yd^3. One sample collected from a tailings pond at the Lott mine during this study had a gold value of $12.55 per yd^3 (Linne and Stebbins, 1983).

A high potential for placer gold exists at Snows mine, southwest of the Lott and Morris mines. The deposit is not exposed at present, but the operators are said to have been working in gravel with a high gold content when operations were halted due to a cave-in (Lindgren, 1911, p. 96).

There is moderate potential for placer gold resources in the area between the Lott, Morris, and Snows mines, where Tertiary stream deposits mined at these properties are probably present beneath Tertiary volcanic rocks. Similarly, a moderate to low potential for placer gold exists in the northwest corner of the Chips Creek Roadless Area, where Tertiary volcanic rocks may overlie a concealed extension of the deposits mined at the Lott and Morris properties.

A moderate potential for placer gold is present along Yellow Creek, near the east boundary of the Chips Creek Roadless Area. Panned concentrates of stream sediments collected during this study contained as much as 100 ppm gold (Sorensen and others, 1982). Tertiary auriferous gravel deposits traversed by Yellow Creek north of the roadless area have contributed reworked placer gold to the Yellow Creek drainage (Haley, 1923, p. 102).

Quaternary surficial deposits may contain gold reworked from Tertiary stream deposits. An area north of Chambers Peak has a low to moderate potential for reworked detrital gold in glacial deposits.

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Explanatory pamphlet accompanies map

Interior—Geological Survey, Reston, Va.—1983

For sale by Branch of Distribution, U.S. Geological Survey, Box 25286, Federal Center, Denver, CO 80225