PLACER SAMPLING AND RELATED BUREAU OF MINES ACTIVITIES ON THE KENAI PENINSULA, ALASKA

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rt C. Horton, Director

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PLACER SAMPLING AND RELATED BUREAU OF MINES ACTIVITIES ON THE KENAI PENINSULA, ALASKA

by

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Abstract

The Bureau of Mines and U.S. Geological Survey have completed two years of a four-year multidisciplinary mineral appraisal of 2.8 million acres of the Chugach National Forest, Alaska. In 1979 and 1980 Bureau of Mines crews spent a total of three months evaluating the mineral potential of approximately 1,120,000 acres in the northeastern portion of the Kenai Peninsula and northwestern Prince William Sound.

Systematic placer sampling in 1980 identified that several previously nonproducing drainages in the east-central portion of the Kenai Peninsula and on the east side of Port Wells contain highly anomalous values of gold. This placer gold mineralization led to the identification of two potentially mineralized, northeasterly striking belts of limonite-stained pyrrhotite-bearing metasediments that are characterized by the presence of numerous felsic sills and dikes and sulfide bearing quartz veins. These rivers and the basins they drain should be explored further for placer and lode gold deposits.

Placer and lode mines in the study area have produced approximately 165,000 ounces of gold since 1895. Estimated 1980 placer production from 22 operations is about 2,000 ounces; lode mines are not currently producing in the area.

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Introduction

The Bureau of Mines subdivided the Forest into three study areas based upon geography and mineralization for purposes of efficient field investigation. A crew has been assigned to each of the study areas. This is a status report covering literature research and field work completed in 1979 and 1980 on the mineral potential of the westernmost study area which contains approximately 1,120,000 acres and includes the northeastern portion of the Kenai Peninsula, the Girdwood area, and northwestern Prince William Sound of the Chugach National Forest (Figure 1).

Physiography

The northeastern portion of the Kenai Peninsula and the Girdwood area are characterized by glaciated, mountainous terrain typically with a relief of 3,000 feet or more. Alpine glaciers and rock glaciers are common above 3,000 feet, but some extend to sea level. Portions of the area are accessible by highway or trail, but the majority of the area is most efficiently reached by helicopter. Vegetation is relatively sparse above 1,400 feet allowing much of the higher area to be worked with relative ease. Stream drainages are poorly to moderately developed and are characterized by relatively steep gradients, cascades, and numerous bedrock canyons. Several of the streams, notably the Kenai River system, serve as significant spawning grounds for several species of anadromous fish.

Northwestern Prince William Sound is characterized by high relief, numerous large alpine glaciers, several of which reach tidewater, and steep rocky cliffs. The shoreline is accessible by boat or float plane but the interior portions can be easily reached only by helicopter. Field evaluation is hampered by dense vegetation below 1,400 feet and the extremely steep terrain. Stream drainages are generally poorly developed, steep and with numerous falls and canyons. Most of the clear-water streams serve as spawning areas for anadromous fish near tidewater.

Mining History, Production, and Potential

The earliest recorded attempts to identify mineral resources in the area that is now the Chugach National Forest were made by Russian explorers in the mid-1800's. In 1848 Peter Doroshin, a mining engineer sent by the Russian American Company, reported finding widespread auriferous gravels along the Kenai River system but was apparently unsuccessful in locating commercial quantities of gold. In the 1890's gold placers were discovered on Resurrection, Mills, Canyon, and other creeks on the Kenai Peninsula and many prospectors originally destined for the Klondike gold fields were attracted to the area. Many of these early prospectors also explored Prince William Sound and discovered significant gold and copper deposits. Several of these were brought into production during the early 1900's.

Mine production figures for the area are incomplete but it is estimated that about 125,000 ounces of gold has been recovered from the Kenai Peninsula and Girdwood districts since 1895. The majority of this production came from placer mines located on Crow, Canyon, and Resurrection Creeks, but at least 20,000-30,000 ounces were produced from lode mines in the Moose Pass, Summit Lake, Hope, and Girdwood districts.

Northwestern Prince William Sound has produced an additional 40,000 ounces of gold, mostly from the Granite Mine located on the west side of Port Wells, prior to 1920.

Currently there are approximately 650 placer, 270 lode, and 5 patented mining claims located within the "Peninsula Study Area." Twenty-two gold placer operations were active during the 1980 mining season (Figure 1). These ranged from 4 to 8-inch suction dredges and pick and shovel operations capable of processing 10-15 yds^3/day to backhoe-dozer-washing plant operations which process up to 2,000 yds^3/day. Numerous "recreational" miners also worked along the gold-bearing streams of the Kenai Peninsula but their estimated aggregate production did not likely exceed 100 ounces of gold. Estimated total 1980 production for the area based upon interviews with many of the mine operators is:

Drainage Basin	Estimated 1980 Production (troy ounces)	Operations (See Fig 1)
Resurrection Creek, Bear Creek	1,000 - 1,300	3, 4, 5, 6
Canyon - Mills Creek	300 - 400	10, 13, 14, 15
Quartz - Crescent Creek	150 - 200	16, 17, 18, 19
Crow Creek	50 - 100	1, 2
Others (East Fork-Sixmile Creek, Gulch	150 - 250	7, 8, 9
Lynx, Silvertip		11, 12
Stetson-Cooper Creek		20, 21
Falls Creek)		22
TOTAL	1,650 - 2,250	

While hardrock mining operations were not active in 1980, interest is being expressed in reopening several lode gold properties such as the Crown Point (4L), East Point (4L), Falls Creek (5L), and Grant Lake Mines (3L) in the Moose Pass district and the Granite (1L) and Mineral King Mines (2L) on Port Wells (Figure 1). In 1980, development work at these consisted of road improvements, sampling, and application for permits. Proposed work for 1981 includes establishing a small cyanide

leaching plant to process stamp mill tailings at the Granite Mine and extensive underground sampling of the East Point and Falls Creek mines.

Recent discussions with local miners reveal that increased lode and placer mining activity is likely on the Kenai Peninsula and northwestern Prince William Sound in 1981. While gold production can be expected to increase, the total annual production is not anticipated to exceed 5,000 ounces/year during the next five years. Production will increase slightly from existing placer operations and additional production may come from subeconomic placer deposits which will become minable should gold prices continue to rise. The greatest potential for increased future production is from the reopening of lode mines and development of new placer discoveries.

Previous Work

The earliest reports concerning the mineral potential of the study area were published by the U.S. Geological Survey (Becker, [1][2/] Mendenhall, [24]). Moffit [27] gave the first detailed description of the placer gold deposits in the Hope-Sunrise district and Johnson [11] first discussed the lode deposits of the northern Kenai Peninsula. Later U.S. Geological Survey reports concerned with geology and mining on the Kenai Peninsula and nearby areas include Martin [21], Tuck [34], and Park [29]. The Port Wells lode-gold district was first described by Grant and Higgins [9], in greater detail by Johnson [12-13], and mentioned briefly in later U.S. Geological Survey Mineral Resources of Alaska Reports. MacKevett [22-23] published tables describing the metalliferous deposits of southern Alaska which include those occurring in the

2/ Underlined numbers in brackets refer to items listed in the reference section.

those occurring in the study area. Mitchell [25-26], and Silberman [33] while working for the U.S. Geological Survey have collected oxygen isotope data and studies the geology of the Hope-Sunrise mining district.

To date only reconnaissance level geologic mapping, generally at a scale of 1:250,000, has been completed in the study area. The McHugh Complex in the western end of the area has been discussed by Clark [6-7] and Tysdal and Case [36]. Characteristics of the Valdez and Orca Group metasediments have been summarized by Moffit [28], and reviewed in greater detail by Tysdal and Case [35, 37-38-39]. Intrusive rocks are discussed by Grant and Higgins [9], Lanphere [18], Lanphere and Plafker [19], and Tysdal and Case [37-38]. Results of regional aeromagnetic and gravity surveys in the Seward and Blying Sound Quadrangles were published by the U.S.G.S. (Case et al, [4, 5]). Le Compte [20] compiled maps displaying linear and arcuate features interpreted from Landsat imagery for the same quadrangles. Quaternary geology of the western portion of the study area has been described by Karlstrom [16] and Kachadoorian and others [15]. Interpretations of the regional tectonic framework of the Kenai Peninsula and Prince William Sound have been published by Plafker [30-31], Budnik [3], and Tysdal and Case [37], Jones and Silberling [14], Hillhouse and Gromme [10], Cowan and Boss [8], and Kirschner and Lyon [17].

Reports by the Territorial Department of Mines discuss several mines and occurrences located on the Kenai Peninsula and Prince William Sound. More recent studies by geologists of the State of Alaska DGGS include a geochemical traverse of the Nellie Juan River (Herreid, 1965, Geol. Report No. 9) and an examination of the lode gold deposits near Nuka Bay (Richter, [32]).

Land Status

The study area consists of lands which were opened to mineral entry in December 1980 with the signing into law of the Alaska Lands Bill (P. L. 96-487). The majority of the study area had previously been withdrawn from mineral entry on December 5, 1978, by the Secretary of the Department of the Interior at the request of the Director of the Department of Agriculture. However, over the years several small areas have been withdrawn for recreational or other purposes and land status should be checked with the U.S. Forest Service prior to staking areas of interest.

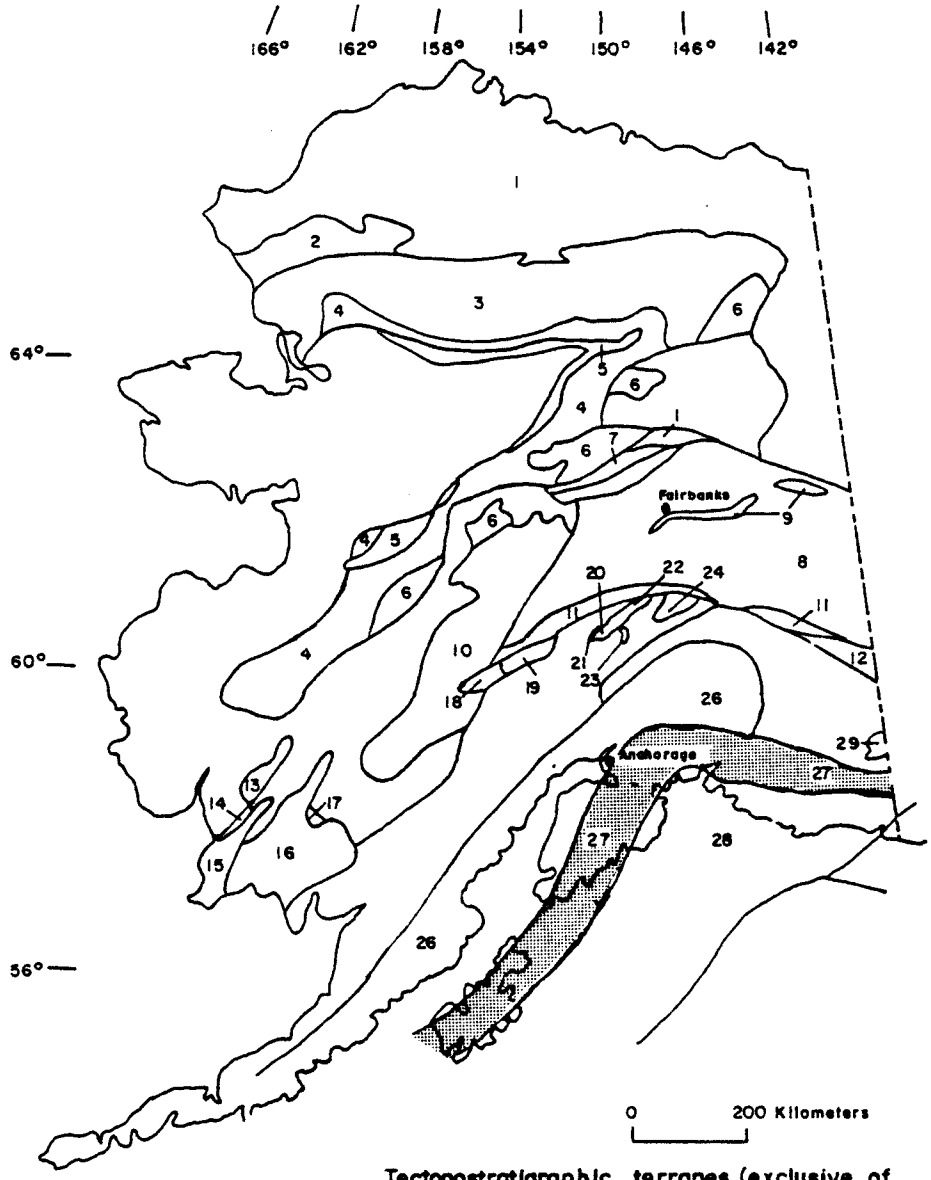
Geology and Mineralization

The Cretaceous Chugach Terrane, which consists predominantly of a northerly striking, steeply dipping marine metaclastic sequence (Valdez Group slates and graywacke) (Figure 2), underlies most of the Peninsula Study Area. Tysdal and Case [37] and others speculate that these rocks accreted to the southern Alaska mainland during the latest Cretaceous and early Tertiary time. It is part of a subduction complex which extends north from Kodiak Island through the study area and continues east nearly to the Canadian border.

Small high-grade gold-bearing quartz veins and gold-bearing placer deposits, presumably derived from the veins as a result of glacial erosion and fluvial processes, are the major locatable mineral deposits in the study area. Potentially valuable common variety materials such as sand and gravel, building stone, haydite, and limestone also occur in the area.

Placer Deposits

Placer gold deposits are present in variable amounts in most drainages within the study area. Many of these have been operated commercially.



Tectonostratigraphic terranes (exclusive of the Seward Peninsula and S.E. Alaska)

1 North America
2 Kagvik
3 Endicott
4 Ruby
5 Angayucham
6 Innoko
7 Livengood
8 Yukon-Tanana
9 70-mile
10 Nixon fork
11 Pingston-McKinley, undivided
12 Mentasta
13 Nyack
14 Kilbuck
15 Goodnews
16 Togiak
17 Tikchik
18 Dillinger
19 Mystic
20 Chulitna
21 West fork
22 Broad Pass
23 Susitna
24 McLaren
25 Wrangellia
26 Peninsular
27 Chugach
28 Prince William
29 Alexander

FIGURE 2. Tectonostratigraphic Terranes of Alaska, Exclusive of the Seward Peninsula and S. E. Alaska, from Jones and Silberling (1979)

Origin

The gold in the placer deposits is believed to be derived by glacial erosion and fluvial concentration of gold obtained from the numerous small high-grade lode gold deposits which occur in the area. The lode deposits consist of epigenetic quartz veins emplaced along shear zones and fractures in Valdez Group slates and metagraywackes. Bedrock in the region has been extensively eroded at least five times by glaciation during the Pleistocene (Karlstrom, [16]), and gold placers were likely developed during preglacial and interglacial stages. The preservation of placers would have been largely dependent upon their location relative to later glacial scour. Several deposits of this type, recognized by their relatively high degree of compaction and cementation, have been identified in the study area. The time elapsed since the last glacial stage and postglacial advances has been insufficient to allow the development of large placer deposits such as those found in interior Alaska and the existing deposits occur as small, relatively rich, placers in existing stream valleys.

Placer Types in the Study Area

Placer deposits within the study area can be classified into four broad categories: 1) alluvial placers, 2) bench placers, 3) eluvial placers, and 4) glacial placers. These are discussed in detail below. Alluvial placers produced the greatest quantities of gold with lesser production from bench deposits; eluvial and glacial placers have potential for future mineral development and may have a genetic relationship to some alluvial and bench placers.

Alluvial Placers

Alluvial placers result from the depositional and sorting processes of existing streams and include gravel bars such as point and mid-channel bars, thin veneers of gravel resting directly on fractured bedrock within active stream channels and consolidated gravels. Significant production from alluvial deposits has occurred along Resurrection, Bear, Canyon, and Crescent Creeks. Gravel bars usually consist of relatively loose, sandy, moderately well sorted material and are generally limited in size. They are suitable for mining by small scale mechanized or hand-placer techniques. Values as high as 0.14 oz/yd^3 3/ have been obtained from gravel bars within the project area during this evaluation. The pay streaks are discontinuous and often confined to near-surface accumulations of flood gold (flood gold consists of small [<0.2 mm], very thin flakes which are easily transported during periods of high water). Samples obtained from such deposits can easily mislead the prospector because values often do not continue to depth and values obtained during one evaluation may not be duplicated by a later evaluation. Bars containing high gold values are often entirely removed by flooding. Nevertheless, gravel bars located along several drainages on the Kenai Peninsula have been successfully mined during periods of low water. Potentially valuable bars have been identified along Sixmile-East Fork, Canyon-Mills, Quartz, Crescent, and Cooper Creeks.

Active channel deposits consist of a layer of actively migrating unconsolidated sandy gravel resting upon moderately consolidated, clay-bearing gravel interspersed with angular bedrock fragments and boulders lying directly on bedrock. Coarse gold flakes and small nuggets commonly

3/ All gold values are given in troy ounces.

occur within the clay-bearing layer and in open fractures in bedrock. Suction dredges have been successfully used to mine such deposits along many of the streams on the Kenai Peninsula with recovery ranging from 1/4 to several ounces per day depending upon dredge size, water conditions, and ore concentration.

Consolidated alluvial deposits have supplied much of the gold produced from the study area. These deposits occur beneath existing flood plains and consist of poorly-sorted moderately-consolidated stratified gravels containing a significant clay-silt matrix resting directly on bedrock or, as at Resurrection Creek, upon a clay hard-pan. Gold is usually concentrated within a foot or two of bedrock and within bedrock fractures which extend as deep as 18 inches. A sticky light-brown clay which occurs in bedrock fractures examined along most gold-bearing drainages in the study area can be used to indicate the lower limit of excavating needed to recover the majority of the gold. Gold has not been found in significant quantities within or beneath this clay layer. Values of gold from consolidated alluvial deposits range from 0.005-0.025 oz/yd^3. These deposits have been and are being mined on Mills, Bear, and Resurrection Creeks by medium-sized dozer-backhoe-washing plant sluice operations capable of processing 300-2,000 yds^3/day.

Bench Placers

Bench placers are the result of alluvial processes but they were deposited by glacial runoff at higher elevations within present valleys, prior to the formation of the more deeply eroded active stream channels of today. Some of these deposits were likely formed during interglacial periods prior to the last advance. Bench gravels have supplied significant quantities of gold from Mills, Canyon, Crow, Quartz, and Stetson-

Cooper Creeks. Benches provide the greatest potential for future gold production because of the large volume of gravel they contain along Canyon-Mills, Sixmile, Crow, Resurrection, Quartz, Crescent, and Stetson-Cooper Creeks. These deposits tend to be poorly sorted, moderately consolidated, poorly to moderately stratified, contain a significant amount of clay-silt matrix and generally rest directly on bedrock. Gold values are concentrated near bedrock and within bedrock fractures on top of a light-brown sticky clay similar to that discussed above. Gold values in bench deposits worked along Quartz Creek range from 0.02-0.04 oz/yd^3; those sampled along Canyon Creek and East Fork Creek range from 0.004-0.016 oz/yd^3. Additional evaluation of benches located along the major drainages of the Kenai Peninsula seems warranted based upon data obtained to date. These deposits have been successfully mined using hydraulic mining techniques and more recently by small loader operations.

Eluvial Placers

The principle mechanism for the concentration of heavy minerals in eluvial placers is the winnowing action of gravity and downhill creep, the latter being essentially dependent on the angle of slope or gradient where the placers are formed on the sides of hills or mountains Boyle, [2]. Eluvial placers usually occur in the form of irregular sheets of angular rock fragments and soil mantling hillside slopes below gold-quartz veins or other sources of a valuable mineral.

Little data has been obtained concerning this type of deposit within the study area. Grant Lake Development Co. recently sampled for eluvial placer potential below the Case Mine, located on the north side of Grant Lake, using hand dug pits but was unsuccessful at finding economic concen-

trations of gold. Promising areas for accumulation of eluvial deposits include slopes below high-grade gold-quartz veins located along Falls Creek near Moose Pass, Slate and Summit Creeks near Summit Lake, Crow Creek near Girdwood, and Palmer Creek near Hope. Eluvial placers may grade into alluvial deposits and provide a source of alluvial gold.

Glacial Placers

Glacial deposits composed largely of till are common in the study area. They tend to contain sparsely disseminated gold and offer minimal resource potential at the present time. Till deposits consist of unsorted, unstratified angular rock fragments in a clay-silt matrix and commonly form steep river banks up to 200 feet high, where cut by subsequent stream action. Although economic glacial placer deposits have not been found, they are a significant source of gold for concentration by alluvial processes. Notable placers have been mined at the mouths of Palmer and Mills Creeks where the streams have eroded through recessional moraines of significant lateral extent and thickness and apparently concentrated the contained gold.

Present Investigations

This investigation on gold mineralization started in 1979 and includes library research and related studies, a field program, an evaluation of the geologic controls and environments of the deposits, and the identification of zones that have potential for gold occurrences.

Literature Research

A literature search and compilation of bibliographies has been made using the following sources: U.S. Geological Survey (including a review of historical files in Menlo Park), Bureau of Mines (including MAS files), U.S. Forest Service, State of Alaska, and mining companies which have

been active in the study area. Claim records have been obtained and updated by using the Bureau of Land Management and State of Alaska Kardex recording systems. Additional information has been obtained from interviews with and correspondence received from several miners and other individuals knowledgeable about the geology, mining history and mineral development of the area. Much of the above information, together with new data obtained by the Bureau of Mines and U.S. Geological Survey, has been placed in files which have been established for all known mines, claims, and prospects in the study area. Existing claims and mineral occurrences have been plotted on both 1:250,000 and 1:63,360 scale topographic maps.

Field Programs

Field investigations of the Peninsula Study area which commenced in 1979 and continued during the 1980 field season, have included obtaining stream sediment, placer, rock, and mineral samples; mapping and sampling of underground and surface mine workings; and traversing potentially mineralized terrains in search of previously unreported deposits. Placer sampling has been completed in approximately two-thirds of the Kenai Peninsula portion of the study area and in the Golden district in Prince William Sound. Stream sediment samples have been collected from most of the remaining portions of the study area. Regional geologic mapping has been restricted to locating boundaries of potential mineral belts and positions and attitudes of significant structures not indicated on existing geologic maps.

In 1979, stream sediment samples were taken from drainages within the Summit Lake-Hope mining districts at quarter-mile intervals to determine if this technique would be useful for prospecting for gold on the

Kenai Peninsula. Each sample consisted of 50-100 grams of sediment collected from within the active stream channel. These samples were sent to a commercial testing laboratory in Anchorage for sizing and quantitative analyses for Au, Ag, Cu, Pb, Zn, Ni, and occasionally Hg and Mo. Splits of the samples were sent to a commercial testing laboratory in Colorado for 31 element emission spectrographic analysis. Sediment samples taken from streams flowing close to known lode-gold deposits were often found to contain anomalously high Au and Pb values. However, the sediment samples taken from placer producing drainages commonly did not contain detectable gold. These results suggest that stream sediment samples cannot be used reliably to directly detect Au in placers. Analyzing the samples for known geochemical indicators associated with gold such as As, Sb, Pb, and Mo may be helpful in identifying lode gold occurrences. Stream sediment sampling in 1980 was used primarily to identify the geochemical expression of known mineral deposits such as the Antimony prospect on Kenai Lake.

Placer sampling techniques such as hydraulic concentration, sluicing, panning and dredging were used in 1980 to obtain additional information to that obtained from stream sediment sampling, and to evaluate several types of placer deposits within each drainage. Sampling procedure consisted of processing 0.1 yd^3 increments of gravel through a portable sluice box or hydraulic concentrator and panning the recovered concentrate to retain only the gold and heavy minerals. Whenever possible channel samples were taken of gravels from surface to and including bedrock. Using these techniques, gold recovery varies depending upon size and shape of the gold, clay content of the gravels, and processing parameters, but generally exceeds 80 percent, based upon testing of the tailings.

A 3-inch Keene suction dredge was used occasionally to sample gravels within active stream channels. This method is most successful during periods of low water and was of limited use in 1980 due to flood conditions which persisted during most of the field season. Placer concentrates were retained in Anchorage in order to separate and weigh the visible gold and examine the heavy mineral concentrate with a microscope and under a UV light. Table 1 lists gold content in samples in ounces/ yd^3. Only gold coarser than approximately 0.25 mm was physically separated and weighed. Finer gold sizes will be separated by amalgamation. The listed gold values may be expected to increase when the weight of the finer gold is added. Upon completion of these studies, the samples were sent to the Bureau of Mines analytical lab located in Juneau for multielement X-ray spectrographic and/or fire assay to identify gold-silver ratios and analyze for trace elements which may be present in the gold (e.g. Ag, Cu, Fe, Bi, Pb, Te, Sb, As, S, Hg, Ti, Mo, Ba, Zn, and Cd). Fire assay results for several samples are listed on Table 2.

Results

Historic mining areas, as well as new placer gold-bearing areas, were identified. Placer sampling methods were highly effective in identifying known producing streams such as Crow, Quartz, Crescent, and Cooper Creeks and revealed gold values ranging from 0.002 oz/yd^3, or less, to over 1 oz/yd^3. Samples collected from several drainages located on the east central portion of the Kenai Peninsula and some rivers located on the east side of Port Wells in Prince William Sound were also found to contain placer gold ranging in value from 0.002-0.01 oz/yd^3 (Figure

1). These drainages have not previously been thought to have significant placer potential.

Geologic reconnaissance of the areas drained by the latter streams led to the identification of two potentially mineralized, north-northeast striking belts of limonite stained metasediments that are cut by numerous felsic dikes and sills, and sulfide-bearing quartz veins. One belt extends northeast from the toe of Wolverine Glacier along the west side of the Kings River to Blackstone Glacier. The second was traced twelve miles northeast from Davis Lake to the cirque located above Lafayette Glacier. Portions of these areas have recently been exposed due to retreating glaciers and it is unlikely that they were prospected during the heavy exploration period of the early 1900's.

Recommendations

Based upon the results obtained from the 1979 and 1980 field seasons, recommendations pertinent to additional resource evaluation of the study area can be made.

1. Systematic evaluation of the placer potential of the Kings, Snow, and Avery Rivers appears to be warranted. Drilling or small bulk processing equipment should be utilized to obtain samples at depth.
2. Exploration, using helicopter support, of the associated, potentially mineralized bedrock for lode deposits is also needed.
3. Processing of bulk samples using the techniques described appears to be a viable method of testing for placer mineralization. Advantages include:
    a. Results are quickly available in the field and follow-up can begin immediately.

b. Samples are obtained at greater depths, are of larger volume, and probably more representative than is usual for stream sediment and pan-concentrate samples.

c. Cuts made for bulk samples allow samplers to examine the geology of the deposits in some detail.

d. Large numbers of processed samples can be transported by helicopter in remote areas; only one or two 300-400 pound bulk samples can be carried at one time by most helicopters utilized for exploration in Alaska.

e. Larger quantities of gold are recovered from bulk samples than from pan-concentrates improving the opportunity for laboratory study of the gold.

TABLE 1. 1980 Placer Sample Results

Quad		Drainage	Sample No.	Sample Size	**Value/oz/ cu. yard	Comments
Seward	D3	Avery River	5451	0.1 yd^3	0.00016 oz	
Seward	D3	Avery River	5453	0.1 yd^3	0.008 oz	***Coarse gold recovered.
Seward	D3	Avery River	5453	0.1 yd^3	0.0016 oz	
Seward	D3	Avery River	5456	0.1 yd^3	0.00006 oz	
Seward	D4	Bettles Bay	4981	0.1 yd^3	0.00003 oz	Gold too fine to separate.
Seward	B4	Bettles Bay	5417	0.1 yd^3	0.0009 oz	
Seward	B4	Bettles Bay	5419	****1 pan	0.018 oz	Sample on bedrock.
Seward	B8	Boulder Creek	5257	0.1 yd^3	0.0003 oz	
Seward	C7	Canyon Creek	4752	0.1 yd^3	0.0054 oz	Coarse gold recovered.
Seward	C7	Canyon Creek	4753	0.05 yd^3	0.014 oz	Coarse gold recovered. Bedrock sample.
Seward	D8	Chickaloon River	4822	0.1 yd^3	0.00063 oz	
Anchorage	A3	Coghill River (North Fork)	5439	0.1 yd^3	0.0063 oz	Coarse gold recovered. Sampled to bedrock.
Seward	C7	Colorado Creek	4856	0.1 yd^3	0.00022 oz	
Seward	B8	Cooper Creek	4805	0.1 yd^3	0.01 oz	Coarse gold recovered.
Seward	B8	Cooper Creek	4735	0.1 yd^3	0.00183 oz	
Seward	B8	Cooper Creek	4841	0.2 yd^3	0.019 oz	Coarse gold recovered.
Seward	B8	Cooper Creek	5255	45 minutes dredging		
Seward	B8	Cooper Creek	5256	0.1 yd^3	0.0046 oz	Coarse gold recovered.

TABLE 1. 1980 Placer Sample Results - Continued

Quad	Drainage	Sample No.	Sample Size	**Value/oz/ cu. yard	Comments
Seward C8	Crescent Creek	5260	0.1 yd^3	0.01 oz	
Seward C8	Crescent Creek	5261	0.05 yd^3	0.031 oz	1 sq.yd. bedrock worked. Coarse gold recovered.
Seward C8	Crescent Creek	5262	0.1 yd^3	0.015 oz	Coarse gold recovered.
Seward C7	Crescent Creek	5356	0.04 yd^3	0.0135 oz	1 hours work sniping on bedrock. Coarse gold recovered.
Seward D6	Crow Creek	4736	0.1 yd^3	0.0127 oz	Coarse gold recovered.
Seward D6	Crow Creek	4737	1/2 hour of bedrock sniping		Coarse gold recovered.
Seward D6	Crow Creek	4739	0.1 yd^3	0.144 oz	Coarse gold recovered.
Seward D6	Crow Creek	4740	0.1 yd^3	1.17 oz	Coarse gold recovered.
		4743	0.05 yd^3	0.074 oz	Coarse gold recovered
Anchorage A6	Crow Creek	4744	0.1 yd^3	0.039 oz	Coarse gold recovered.
Anchorage A6	Crow Creek	4751	0.1 yd^3	0.0042 oz	Coarse gold recovered.
Seward C4	Culross Mine Drainage	5397	0.1 yd^3	0.0009 oz	
Seward B8	Dry Creek	4877	0.1 yd^3	0.0005 oz	
Seward C8	Falls Creek	4847	0.1 yd^3		Too fine to separate.
Seward C8	Falls Creek	4848	0.03 yd^3	0.0042 oz	Coarse gold recovered. Bedrock sample.

TABLE 1. 1980 Placer Sample Results - Continued

Quad		Drainage	Sample No.	Sample Size	**Value/oz/ cu. yard	Comments
Seward	B7	Falls Creek	4858	0.1 yd^3	0.0077 oz	Site of active mining operation.
Seward	B7	Falls Creek	5305	0.1 yd^3	0.0022 oz	
Seward	C7	Fresno Creek	4857	0.1 yd^3	0.00057 oz	
Seward	B8	Kenai River	4733	0.1 yd^3	0.0135 oz	
Seward	C5	Kings River	4959	0.1 yd^3	0.0003 oz	Considerable fine gold not separated from sample.
Seward	B5	Tributary to Kings River	5316	0.1 yd^3	0.0035 oz	Coarse gold recovered.
Seward	C5	Kings River	5373	0.1 yd^3	0.0083 oz	Coarse gold recovered.
Seward	C5	Kings River	5379	1 1/2 hour dredge		Sampling done at high level in channel coarse gold recovered.
Seward	C5	Kings River	5381	0.1 yd^3	0.0014 oz	
Anchorage	A3	Lafayette Gl.	5432	0.1 yd^3	0.001 oz	
Seward	C7	Mills Creek	4898	0.1 yd^3	0.0011 oz	
Seward	A7	Paradise Creek	5274	0.1 yd^3	0.00013 oz	Considerable galena recovered.
Seward	D4	Pirate Cove	4979	0.1 yd^3	0.001 oz	
Seward	B7	Porcupine Creek	4890	0.02 yd^3	0.0022 oz	Sample taken on bedrock.

TABLE 1. 1980 Placer Sample Results - Continued

Quad		Drainage	Sample No.	Sample Size	**Value/oz/ cu. yard	Comments
Seward	B7	Porcupine Creek	4891	0.1 yd^3	0.0008 oz	
Seward	B7	Primrose Creek	4892	0.1 yd^3		Gold too fine to separate.
Seward	B7	Ptarmigan Creek	4962	0.2 yd^3	0.0003 oz	
Seward	C7	Quartz Creek	4820	0.1 yd^3	0.0024 oz	Coarse gold recovered.
Seward	C7	(Upper Quartz Creek)	4938	****1 pan	0.0384 oz	Sample taken on bedrock.
Seward	C7	(Upper Quartz Creek)	4939	0.1 yd^3	0.0024 oz	
Seward	A8	Redman Creek	5270	0.1 yd^3	0.00025 oz	
Seward	B7	Ship Creek	4960	0.1 yd^3		Gold too fine to separate.
Seward	B8	Stetson Creek	5340	0.1 yd^3	0.0043 oz	Coarse gold recovered, sampled to bedrock.
Seward	B6	Snow River	4864			Gold too fine to separate.
Seward	B6	Snow River	4882			Gold too fine to separate.
Seward	B6	Snow River	4883	****1 pan	0.0464 oz	Sample taken on bedrock. Could not separate all the gold.
Seward	B6	Snow River	4886	0.1 yd^3	0.0011 oz	Could not separate all the gold.
Seward	B6	Snow River	5306	40 minute dredge		Could not separate most of the gold.

TABLE 1. 1980 Placer Sample Results - Continued

Quad		Drainage	Sample No.	Sample Size	**Value/oz/ cu. yard	Comments
Seward	C7	Summit Creek	4851	0.1 yd^3	0.0001 oz	
Kenai	B1	Surprise Creek	4903	0.05 yd^3		Unable to weight.
Kenai	B1	Surprise Creek	4904	0.05 yd^3	0.00132 oz	
Kenai	B1	Surprise Creek	5251	0.2 yd^3	0.0045 oz	Coarse gold recovered.
Kenai	B1	Surprise Creek	5252	0.2 yd^3	0.0105 oz	Coarse gold recovered.
Kenai	B1	Surprise Creek	5253	0.1 yd^3	0.022 oz	Coarse gold recovered.
Kenai	B1	Surprise Creek	5254	0.1 yd^3	0.025 oz	Coarse gold recovered.
Seward	B7	Victor Creek	4860	0.1 yd^3	0.0043 oz	Coarse gold recovered.
Seward	B7	Victor Creek	4935	0.1 yd^3	0.00015 oz	
Seward	B7	Victor Creek	4936	0.1 yd^3	0.00069 oz	
Seward	D6	Winner Creek	4746	0.1 yd^3	0.0283 oz	Coarse gold recovered.
Seward	D6	Winner Creek	4748	4 hours		Coarse gold recovered sniping bedrock.
Seward	B6	Wolverine Gl.	5371	0.1 yd^3	0.0002 oz	

*Only gold coarser than 0.1 inch was separated from the concentrate and weighed. The above weights do not include what in some cases amounts to considerable very fine gold nor that which may be included in other minerals.

**Dollar values calculated from these values should assume gold is 0.8 fine.

***Coarse gold refers to particles >0.05 inches in diameter.

****Value calculated assumes 160-16 inches pans equals 1 cubic yard.

TABLE 2. 1980 Placer Sample Gold/Silver Ratios

Stream Drainage	Sample #	Fineness			Au/Ag
		Au	Ag	Base	
Avery River	5453	822	73	105	11.3
Canyon Creek	4752	840	96	64	8.8
	4753	855	93	52	9.2
Coghill River	5439	799	83	118	9.6
Cooper Creek	4805	572	156	272	3.7
	4841	820	136	44	6
	5256	770	42	188	18.3
Stetson Creek	5340	835	53	112	15.8
Crescent Creek	5260	770	82	147	9.4
	5261	770	124	106	6.2
	5262	818	64	118	12.8
	5356	773	111	116	7
Crow Creek	4736	711	154	135	4.6
	4737	744	206	50	3.6
	4739	719	209	72	3.4
	4740	706	248	46	2.8
	4743	729	246	25	3
	4744	715	206	79	3.5
Winner Creek	4746	716	213	72	3.4
	4748	709	229	63	3.1
Falls Creek	4848	808	23	169	35.1
	4858	776	127	97	6.1
	5305	803			
Kenai River	4733	814	106	80	7.7
Kings River	5316	742	94	168	7.9
	5373	812	100	88	8.1
	5379	827	104	69	8
Quartz Creek	4820	747	144	109	5.2
Resurrection Creek	4911	837	117	46	7.2
Surprise Creek	5251	811	135	54	6.0
	5253	820	119	61	6.9
	5254	811	122	67	6.6
Victor Creek	4860	745	111	144	6.7

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