

INVESTIGATION OF A GLACIAL-ALLUVIAL
FAN PLACER AT TAKU INLET

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UNITED STATES DEPARTMENT OF INTERIOR

Mauuel Lujan, Jr., Secretary

BUREAU OF MINES

T S Ary, Director

INTRODUCTION

A large glacial-alluvial fan beach placer sand deposit occurs near the head of Taku Inlet in southeast Alaska (fig 1). The deposit, known as Grizzly Bar, is located in the Juneau (B-1) Quadrangle about 20 miles from the City of Juneau. Local prospectors have staked placer claims over the fan and report recoverable fine gold that has encouraged further exploration (1). In addition to gold, the claimant, Mr. Hayes, reported the deposit to contain titanium, rare earth elements, yttrium, niobium, and zirconium. Reports prepared for Mr. Hayes by Hazen Research Inc., Golden, Colorado, were made available for examination by the Bureau investigator. Hazen had performed mineral concentrations using heavy liquids and electro magnetic separations, and had followed this with mineral grain optical and SEM analysis. Magnetite was found to constitute 5.7% of the original material and sphene, apatite, zircon, rutile, monazite, allanite, and uraninite-thorianite were noted in trace (<1.0%) to rare (<0.1%) abundance. Of note was yttrium enrichment of the sphene.

The U.S. Bureau of Mines conducted a two day reconnaissance of the Grizzly Bar prospect on October 1-2, 1988. The work was part of the Bureau's project to evaluate strategic and critical minerals in Alaska. The principle objective was to collect representative samples for heavy mineral concentration and elemental analyses. Sufficient sample materials were collected for additional mineralogical studies if initial analytical results

1) Written communication, Howard Hayes, H&S Mining and Milling, P.O. Box 229, Douglas, AK 99824

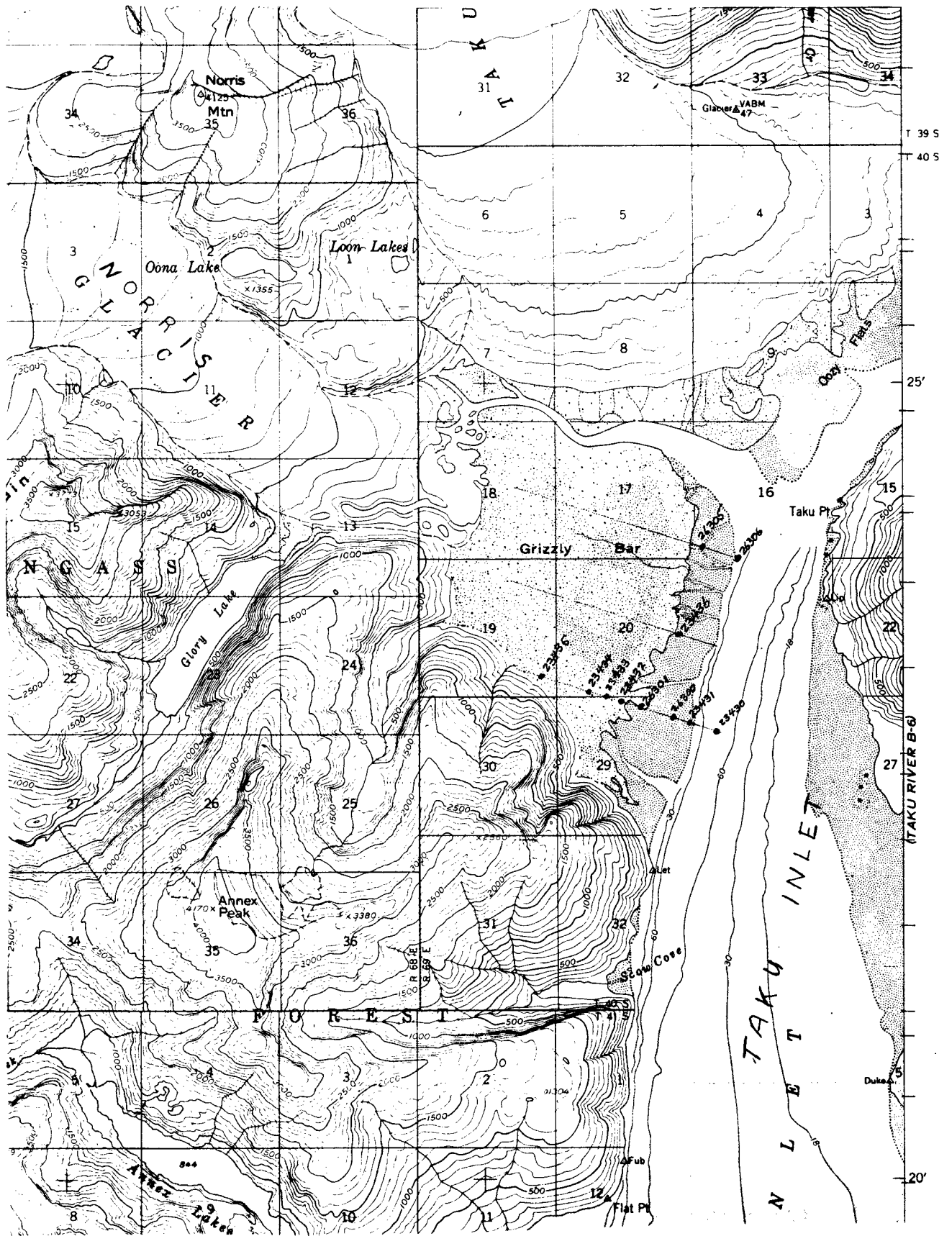


Figure 1 - Location of the Grizzly Bar prospect in southeast Alaska, Taku Quadrangle.

indicated these were to be warranted. No effort was made by the Bureau to verify or assess the presence or absence of gold values.

PROCEDURES

Samples were collected from sites described in Table 1 and measured by weight. Each sample was then partially panned to eliminate some of the lighter minerals before shipping the remaining material back to the laboratory. In the lab the samples were screened at 16 mesh and the undersize was tabled to produce a black sand concentrate. A middlings cut was made and this was run back over the table to recover additional concentrate. Both concentrates were combined and weighed (table 1). The plus 16 mesh material was not observed to contain any heavy minerals and was discarded.

Splits of approximately 50 g each were prepared from each black sand concentrate and submitted for analyses by X-ray fluorescence methods for Nb, Y, Zr, Sn, U, Th, Ta, W, and Ti. In addition La and Ce were analyzed by neutron activation procedures. Analyses were done by Nuclear Activation Services, Inc. of Ann Arbor, Michigan. As a check procedure a second split was prepared from samples NS 23430, 23436, and 26301. The three second splits were combined and submitted to the Bureau's analytical laboratory at the Albany, Oregon, Research Laboratory. The sample composite was analyzed by inductively-coupled plasma mass spectrometry procedure. Results are given in table 2.

A small cabin belonging to the claim owners is located on the prospect and was made available to the Bureau during this investigation.

Table 1 - Analyses of heavy mineral concentrates.

Sample number	Description	Sample weight in kg	Weight of Black sand in gm	Black sand percentage of total	Nb	Sr	Ta	Tb	Ti	U	V	Y	Zr	La	Ce
23430	Buff colored gravel layer above buff colored silty clay. b.s. acc. on surface, and buried, also buried oxidized zones	16.33	737.5	4.52	40	12	2	32	11000	16	3	58	710	230	363
23431	24" hole through organic layer, into well washed angular sandy gravel with few fines	39.92	659.5	1.65	28	2	2	16	8200	12	3	46	390	170	293
23432	24" hole through coarse granitic gravel, seems to have abundant b.s.	45.36	451.2	1.00	32	16	2	26	11000	16	3	48	630	200	346
23433	Sandy, granitic gravel, few fines	9.07	177.1	1.95	24	2	2	6	6500	6	3	40	350	124	211
23434	Sample from dump pile from backhoe workings	11.34	186.1	1.64	26	12	2	8	6500	8	3	42	340	149	256
23435	dug through 8" humus to grusy, granitic gravel, app. 150m south to steep bedrock hillslope, one boulder was pegmatitic	11.34	83.4	0.74	26	8	2	6	5600	12	3	34	470	103	171
23436	18" of sand, minor silt, gravel at 18"	45.36	661.4	1.46	34	12	2	30	13000	22	3	50	800	250	383
26301	sample composite of two locations, at sta. 220, 2' hole thru silt, then well sorted sand at tree line- sandy gravel	31.75	580.3	1.83	36	18	2	34	11000	18	3	56	570	260	400

26305 gravel below 18" muck(6") and sand (12"), silty heterogeneous gravel	15.88	248.6	1.57	26	8	2	4	5100	2	3	40	220	123	214
26306 exposede gravel with b.s. streaks	6.80	402.8	5.92	28	8	2	20	8800	24	3	52	710	175	305
26646 Howard Hays con, "beach area"	0.00	372.0	0.00	58	30	2	12	51000	45	3	58	2400	731	980
26673 Howard Hays con, Carlson Creek	0.00	309.6	0.00	64	4	2	52	60000	34	3	70	3200	371	542

Table 2 - MS-ICP analyses of composite¹ placer concentrate.

Zr	0.09 pct
Hf	0.02
La	0.03
Ce	0.04
Nd	0.02
Y	0.01
Ti	0.62
Se	<0.01
Nb	<0.01
Th	0.02

¹ Concentrate composite from samples NS 23430, 23436, and 26301.

analyses by USBM, Albany Research Center, Albany, OR.

INVESTIGATIONS

The grizzly Bar is a large, flat largely grass-covered alluvial fan formed from glacial sediment of the Norris and Taku Glaciers. Both glaciers lie immediately north and west of the fan. The western, or back side of the fan is partially timbered although little soil development has occurred. The seaward side has been reworked by tidal processes and ocean storm waves. Streaks of black sand up to 0.5 in thick are common in the intertidal zone and along streams flowing east across the fan. Large areas of the seaward portion of the fan are regularly inundated by high tides.

Exploration work by the claim owners had included establishing a survey grid and trenching with a back-hoe. Most of the Bureau samples were collected at sites along this grid so that they could be readily plotted on a prospect map (fig 1).

All samples were found to contain considerable concentrations of black sand, much of which was estimated to pass 150 mesh. Recovery of the finer black sand fractions during tabling was poor and black sand was consistently found in the tails. The data shown in table 1 relative to the percentage of black sand content in the original material is therefore lower than actual insitu content. Checking the black sand with a hand magnet indicated there was little present other than magnetite.

CONCLUSIONS

Analytical and magnetic results indicate the heavy minerals are largely magnetite with only trace concentrations of rare-earth or other economic minerals. Placer accumulations composed primarily of sand in a large alluvial

fan/marine environment generally will contain heavy minerals that do not vary significantly with respect to the ratio between the heavy species, particularly where the heavy minerals have similar specific gravity. Areas within the fan where greater concentrations of black sand occur will still contain similar magnetite to ilmenite or rare-earth mineral ratios. Therefore, given the very low content of REE or other metals of interest in the tabled concentrates, it is unlikely that substantial quantities of these economic minerals will be present, even if more highly concentrated occurrences of magnetite are found. No further work is recommended at this time.