Division of Geological & Geophysical Surveys

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GEOCHEMICAL, MAJOR-OXIDE, MINOR-OXIDE, TRACE-ELEMENT, AND RARE-EARTH-ELEMENT DATA FROM ROCK, STREAM SEDIMENT, AND PAN-CONCENTRATE SAMPLES COLLECTED IN 2011 IN THE WILLIAM HENRY BAY AREA, JUNEAU C-4 AND D-4 QUADRANGLES, SOUTHEAST ALASKA

By

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INTRODUCTION

Mineral-resources personnel from the Alaska Division of Geological & Geophysical Surveys (DGGS) carried out a helicopter-supported, reconnaissance sampling project in the William Henry Bay area, located in the Juneau C-4 and D-4 quadrangles in Southeast Alaska, August 9–13, 2011. Fieldwork was performed to evaluate the mineral-resource potential of a block of State land near the mouth of William Henry Creek, and to investigate reported rare-earth-element, uranium, and thorium mineral occurrences on adjacent Tongass National Forest land. This fieldwork and sampling was conducted as part of the State's *Rare Earth Element and Strategic Minerals Assessment* project, which is designed to evaluate Alaska's potential for these resources. Highlights of the field project include: (1) the discovery of previously unreported lode gold mineralization (gold values up to 500 parts per billion [ppb]) on the State land parcel, and (2) stream sediments from the project area with up to 1,970 ppb gold. This report also provides analyses for the full suite of rare-earth elements to characterize the area's igneous and mineralized rocks.

The text and analytical data and tables associated with this report are being released in digital format as PDF files and .csv files. Additional details about the sampling project can be found in the metadata file associated with the digital version of this report, which is available from the DGGS website (www.dggs.alaska.gov) at no charge.

ANALYTICAL METHODS

SAMPLE COLLECTION TECHNIQUES

For the William Henry Bay project, 40 rock samples, 4 stream-sediment samples, and 2 heavy-mineral pan-concentrate samples were collected for geochemical analysis (rdf2012-2-geochemical-data.csv). Location coordinates were collected using hand-held GPS units. Coordinates are presented in latitude and longitude (based on the NAD 27 Alaska datum).

Unaltered igneous rocks, and samples of visibly mineralized or altered rocks, were collected from throughout the field area. Two stream-sediment samples were collected from the active-channel margin of William Henry Creek, and two additional stream-sediment samples were collected from the active channel at the mouth of small, unnamed streams draining eastward into Lynn Canal. Two heavy mineral pan-concentrate samples were collected from the same locations on William Henry Creek as the stream-sediment samples. These heavy-mineral concentrates were obtained by filling a large gold pan to the upper riffle with sediment, and then hand-panning the sediment down to about 75 grams of material.

SAMPLE PREPARATION

Igneous rocks intended for whole-rock analysis were trimmed at DGGS with a diamond-blade tile saw to remove weathering rinds, iron-oxide-coated fracture surfaces, and veins (if present) to ensure the submitted rock contained only fresh, unaltered rock. Samples were submitted to Activation Laboratories, Ltd. (Actlabs), where rock samples were crushed to a nominal minus-10 mesh (1.7 mm), mechanically split via riffling to obtain a 100-gram sample, and then pulverized to at least 95 percent minus-150 mesh (105 microns) using a mild steel mill. The mild steel milling process is best for its low-contamination property, but it potentially introduces iron as a contaminant, up to a possible level of 0.2 percent. Stream-sediment and pan-concentrate samples were dried at a temperature of 60°C and then sieved to minus-80 mesh (177 microns). For REE analysis, all samples were further pulverized to minus-200 mesh (0.074 mm) using a mild steel mill to ensure thorough fusion of resistate minerals. Cleaning sand was used between each sample pulverization to prevent cross-sample contamination.

ANALYTICAL METHODS FOR DGGS SAMPLES ANALYZED BY ACTLABS

All samples were analyzed for major oxides, minor oxides, and petrologic trace elements, as well as ore-related trace elements and rare-earth elements. In addition to the internal quality-control program at Actlabs, DGGS monitored analysis quality by inserting igneous-rock and REE standards of known composition into the sample roster for every sample batch.

The major-oxide, minor-oxide, petrographic trace-element, and ore-related trace-element analyses were conducted using inductively-coupled plasma (ICP) and inductively-coupled plasma mass spectrometry (ICP-MS) following lithium metaborate/tetraborate fusion. Mass balance was used for the major-oxide and minor-oxide analyses as an additional quality control technique, requiring elemental totals of oxides to be between 98 and 101 percent. Gold assays were performed using gravimetric analysis following fire assay (FA-GRAV) on 29.16 grams of material. Separate splits of 4 samples were reanalyzed for gold using Instrumental Neutron Activation Analysis following fire assay (FA-INAA); grams of material analyzed is noted in the .csv file. Detection limits for each of the reported oxide and elemental values obtained by the various methods are documented in the metadata file.

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