

Division of Geological & Geophysical Surveys

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FROM ROCKS COLLECTED IN THE RICHARDSON MINING DISTRICT,
BIG DELTA QUADRANGLE, ALASKA**

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MAJOR-OXIDE AND TRACE-ELEMENT GEOCHEMICAL DATA FROM ROCKS COLLECTED IN THE RICHARDSON MINING DISTRICT, BIG DELTA QUADRANGLE, ALASKA

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INTRODUCTION

During the 2018 field season, geologists from the Alaska Division of Geological & Geophysical Surveys (DGGs) conducted geologic mapping and sampling of part of the Richardson mining district southeast of Fairbanks, including parts of the Big Delta B-5 and B-6 quadrangles. The project area has produced approximately 122,000 ounces of gold (Singh and others, 2017), mostly from placer mines, and it includes the Richardson, Tower, and Hilltop lode gold exploration properties. The goal of DGGs's work in this area is to conduct a mineral-resource assessment and to build an improved understanding of the area's geology and controls on gold mineralization to facilitate industry exploration targeting.

This report is based on 15 days of fieldwork completed June 4-8, July 23-27, and August 13-17, 2018 by six DGGs geologists. The 2018 study area lies between the Trans-Alaska Pipeline, Shaw Creek, and the Tanana River (fig. 1); the crew accessed the interior of the study area by helicopter, all-terrain vehicles, and foot. The Richardson area is characterized by moderate-relief hills, with boreal spruce and deciduous forests typical of Interior Alaska. Loess deposits of variable thickness blanket the area. Rock outcrop accounts for much less than one percent of the study area, consequently, many of the rock samples were collected from up to 1-meter-deep pits dug with shovels into rocky colluvial deposits below the surficial loess.

The analytical data tables associated with this report are available in digital format as comma-separated value (CSV) files. Additional details about the organization of information are noted in the accompanying metadata file. All files can be downloaded from the DGGs website (<http://doi.org/10.14509/30119>).

Samples collected during this project, as well as laboratory sample rejects and pulps, will be stored at DGGs for the duration of the project and will be available for public viewing upon request. Once the project concludes, the samples and pulps will be stored at the Alaska Geologic Materials Center in Anchorage.

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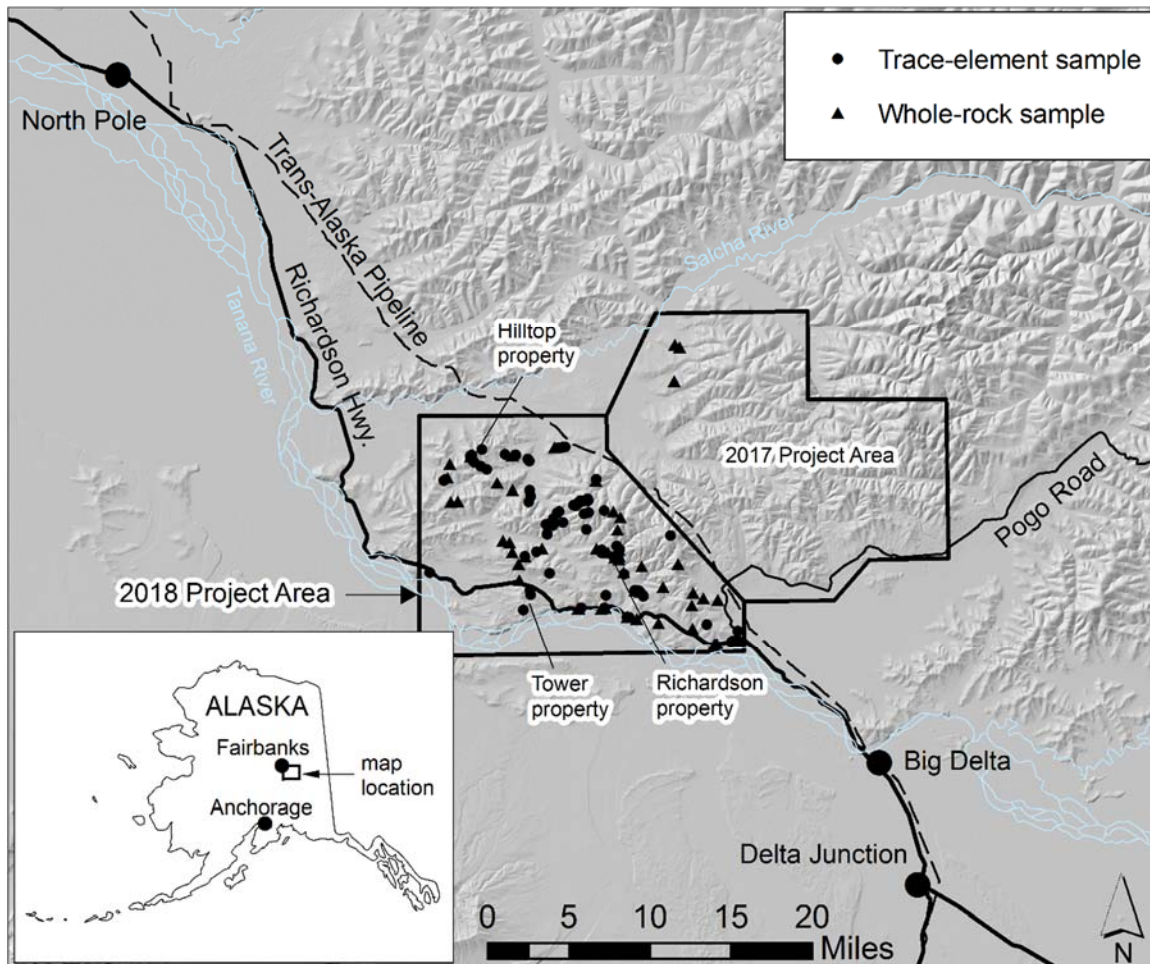


Figure 1. Location map showing the 2018 Richardson project area and sample locations.

DOCUMENTATION OF METHODS

Sample Collection

Rock samples were collected for two different purposes. First, samples of visibly mineralized or altered rock were preferentially collected and analyzed for trace-element geochemistry. Second, igneous and metaigneous rocks showing little alteration or weathering were collected for whole-rock major-oxide, minor-oxide, and trace-element analyses to aid in classification and study of petrogenesis and tectonic setting. Most samples are ‘grab’ samples, which were collected for their overall representation of the outcrop. However, a few samples are ‘select’ samples, which were more deliberately collected from a specific feature, as noted in the sample field description.

Location data were collected using GPS-enabled tablets (2017 Samsung Galaxy Tab A) running the ESRI Collector App. Data were merged into an ArcGIS geodatabase. The devices have a reported error of about 10 m. Latitude and longitude are reported in the WGS84 datum.

Magnetic susceptibility measurements were collected using Terraplus KT 5-, 6-, 9-, and 10-model handheld magnetic susceptibility meters. The values reported herein are for individual Système International (SI) measurements performed on representative surfaces of the sampled rock outcrop.

Sample Preparation

Rock samples were processed by ALS Geochemistry using their PREP-31 package. The samples were crushed to greater than 70 percent passing through a 2 mm mesh, and a 250-g split was pulverized to greater than 85 percent of the material being less than 75 microns in diameter. Prior to crushing, samples for whole-rock analysis were trimmed by DGGs staff to remove weathering.

Analytical Methods

Samples were analyzed for a variety of suites of major and trace elements depending on the sample type. In addition to ALS Geochemistry' accredited (ISO/IEC 17025–2005) internal quality-control program, DGGs monitored analysis quality with one standard reference material per batch of 20 analyses.

Major- and trace-element values for rock samples were determined by ALS Geochemistry method ME-MS61: Four-acid digestion followed by inductively-coupled plasma–atomic emission spectrometry (ICP-AES) and inductively-coupled plasma–mass spectroscopy (ICP-MS); Au values were analyzed using flux digestion and fire assay and ICP-AES (ALS Geochemistry method Au-ICP21); Hg values were analyzed by aqua regia digestion followed by ICP-MS (ALS Geochemistry method Hg-MS42).

Samples that exceeded detection limits for elements of interest were reanalyzed using specific elemental tests. Overlimit values for Au were analyzed using 30-g fire assay with gravimetric finish (ALS Geochemistry method Au-GRA21). Overlimit values for Ag were analyzed by four-acid digestion followed by inductively-coupled plasma–atomic emission spectrometry (ALS Geochemistry method Ag-OG62) or by 30-g fire assay with gravimetric finish (ALS Geochemistry method Ag-GRA21). Overlimit values for Pb were analyzed by four-acid digestion followed by inductively-coupled plasma–atomic emission spectrometry (ALS Geochemistry method Pb-OG62)

For whole-rock geochemistry samples, major and minor oxides were analyzed by lithium metaborate fusion digestion and ICP-AES (ALS Geochemistry method ME-ICP06). Trace elements, including rare-earth elements, were determined using lithium metaborate fusion digestion and ICP-MS (ALS Geochemistry method ME-MS81). Ag, Cd, Co, Cu, Li, Mo, Ni, Pb, Sc, and Zn were determined by four-acid digestion and ICP-AES (ALS Geochemistry method ME-4ACD81); and As, Bi, Hg, In, Re, Sb, Se, Te, and Tl were determined by aqua regia digestion followed by ICP-MS (ALS Geochemistry method ME-MS42). Total C and S were analyzed by Leco furnace (ALS Geochemistry methods C-IR07 and S-IR08, respectively). Au was analyzed using flux digestion and fire assay and ICP-AES (ALS Geochemistry method Au-ICP21).

For each sample, data tables contain either assay values or coded-value placeholders (null = not analyzed; -1 = the element's assay result is less than the lower detection limit for the method; -2 = the element's assay result is greater than the upper detection limit for the method). Detection limits for each of the reported elemental values obtained by the various methods are documented in the metadata file.

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