PRELIMINARY BEDROCK GEOLOGIC MAP DATABASE, NORTHEASTERN RICHARDSON MINING DISTRICT, ALASKA

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PRELIMINARY BEDROCK GEOLOGIC MAP DATABASE, NORTHEASTERN RICHARDSON MINING DISTRICT, ALASKA

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INTRODUCTION

During the 2017 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, Alaska. The project area is about 30 miles west of the Pogo gold mine and covers gold exploration activity at the Montecristo and Uncle Sam properties. This work aims to build an improved understanding of the area's geology and controls on gold mineralization for purposes of exploration targeting and mineral-resource assessment.

The 260-square-mile map area lies between the Salcha River and Shaw Creek and is bounded by the Trans-Alaska Pipeline access road to the southwest (fig. 1). The area is characterized by forested, moderate-relief hills blanketed by vegetation, loess, and locally, sand dunes. Rock outcrop is less than one percent; consequently, the map interpretation relies heavily on the DGGS East Richardson airborne magnetic and electromagnetic survey (Burns and others, 2019) as well as rocks collected from pits dug into rocky colluvial deposits below surficial loess or sand.

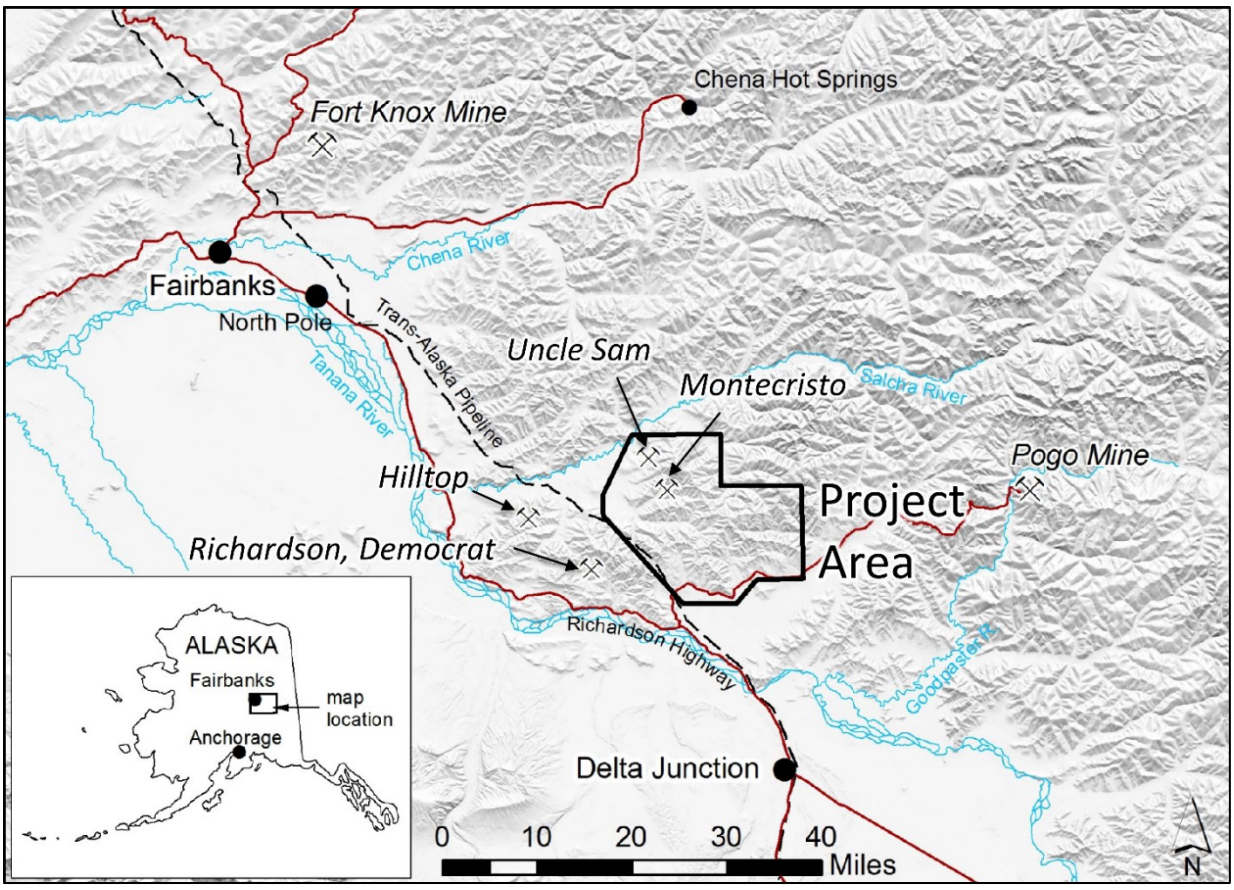

Figure 1. Location map of the project area showing selected prospects, mines, and infrastructure.

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This report releases GIS files for the most-recent draft of the geologic map. For additional discussion, context, and photographs, refer to our presentation on the geology of the map area (Twelker and others, 2017). All files associated with this release are available from the DGGS website: https://doi.org/10.14509/30676.

SUMMARY OF THE GEOLOGY OF THE MAP AREA

Metamorphic rocks form a map-scale upright synform plunging gently northwest (fig. 2). Sillimanite-bearing paragneiss displaying migmatitic textures (unit mpg) forms the lowest structural level. The overlying unit is characterized by similar paragneiss but lacks migmatitic texture (unit pg). The structurally highest rock package (unit sg) is a mixed unit comprised of similar sillimanite-bearing paragneiss, biotite and muscovite schist, quartzite, calc-silicate rock, and graphitic schist and quartzite. This unit also contains small, discontinuous bodies of granitic orthogneiss, amphibolite, and serpentinite. These subsidiary units are mapped separately where possible.

The map area is intruded by abundant dikes and several small stocks of muscovite ± tourmaline ± garnet-bearing granite (unit tmg), as well as biotite granite. Whole-rock geochemical analyses indicate both are peraluminous granites of arc character (Twelker and others, 2017). They most closely resemble the early Cretaceous (105–114 Ma) peraluminous felsic dikes documented in the southeastern Richardson district (Graham and others, 2002). Altered hypabyssal quartz-feldspar porphyry dikes found south of the study area may correlate with ca. 90 Ma dikes of similar composition and texture at the Democrat prospect.

Shallowly dipping, brittle–ductile-style shearing is evident in drill core, and these structures are an important host for gold mineralization at the Naosi and other prospects in the area. At map scale, fault-bounded and discontinuous serpentinite bodies offer evidence of a broader, layer-parallel shear zone affecting the structurally uppermost mixed schist-gneiss unit. A similar broad shear zone cutting a similar mixed lithologic package hosts the low-angle veins at Pogo gold mine.

Two sets of high-angle faults cut the area; these are mappable as lineaments and offsets in airborne magnetic and electromagnetic survey data. Northwest-trending high-angle structures show apparent right-lateral offset of geologic markers, and faults of this orientation are mapped at both the Naosi and Lone Tree prospects. A similar structure localizes the porphyry dikes of the Democrat prospect south of the map area. Several northeast-trending structures cut the area, and these apparently cut the area's northwest-trending faults. The most prominent of these faults (at map center, fig. 2) shows clear left-lateral offset of geological and geophysical markers. A similarly oriented structure in the western map area connects the areas of the Lone Tree, Wolf, Naosi, and Democrat prospects.

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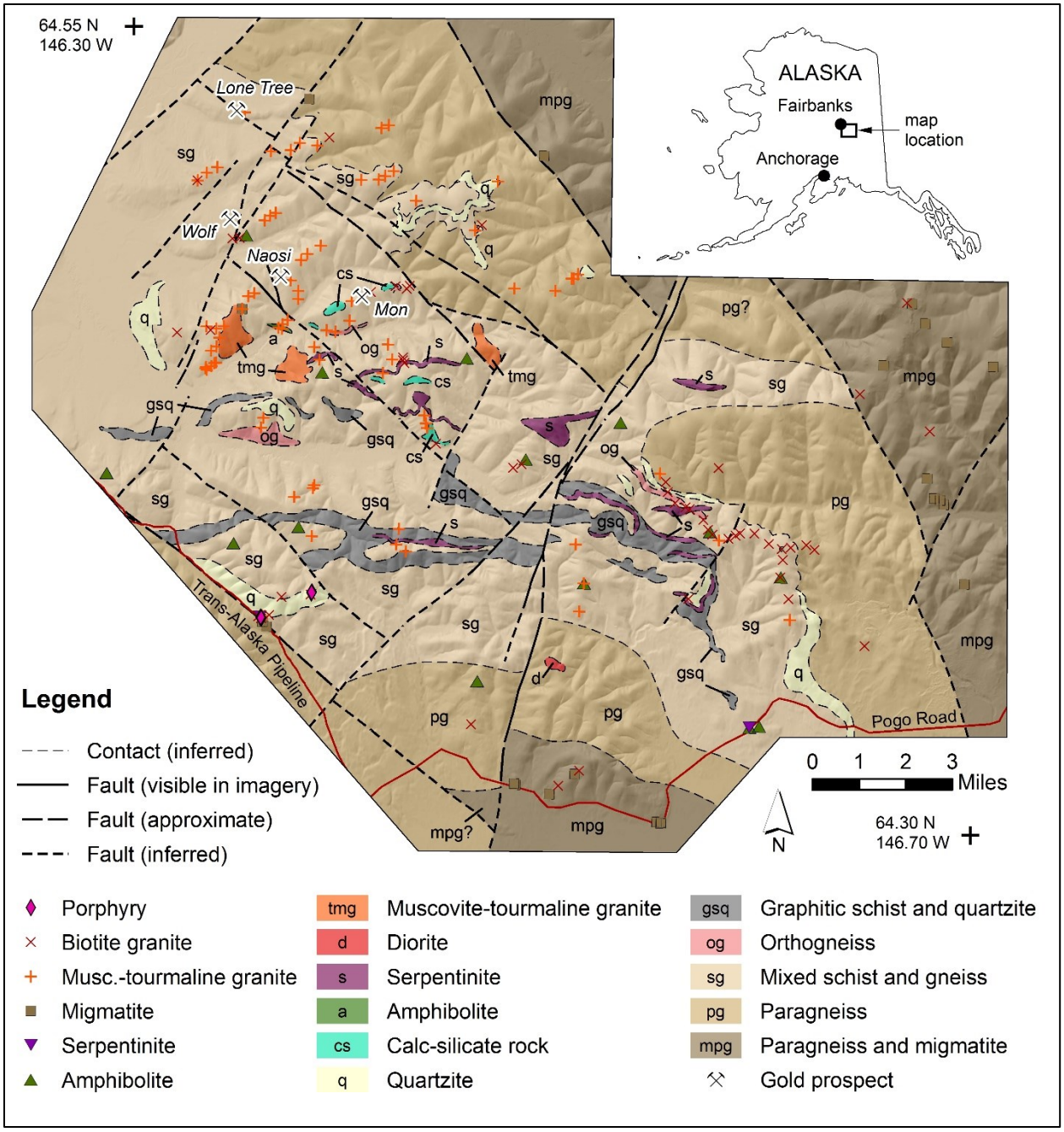

Figure 2. Bedrock geologic map of the eastern Richardson mining district.

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