BEDROCK GEOLOGIC MAP DATABASE OF THE CARIBOU CREEK AREA, BIG DELTA C-4 AND D-4 QUADRANGLES, EAST-CENTRAL ALASKA

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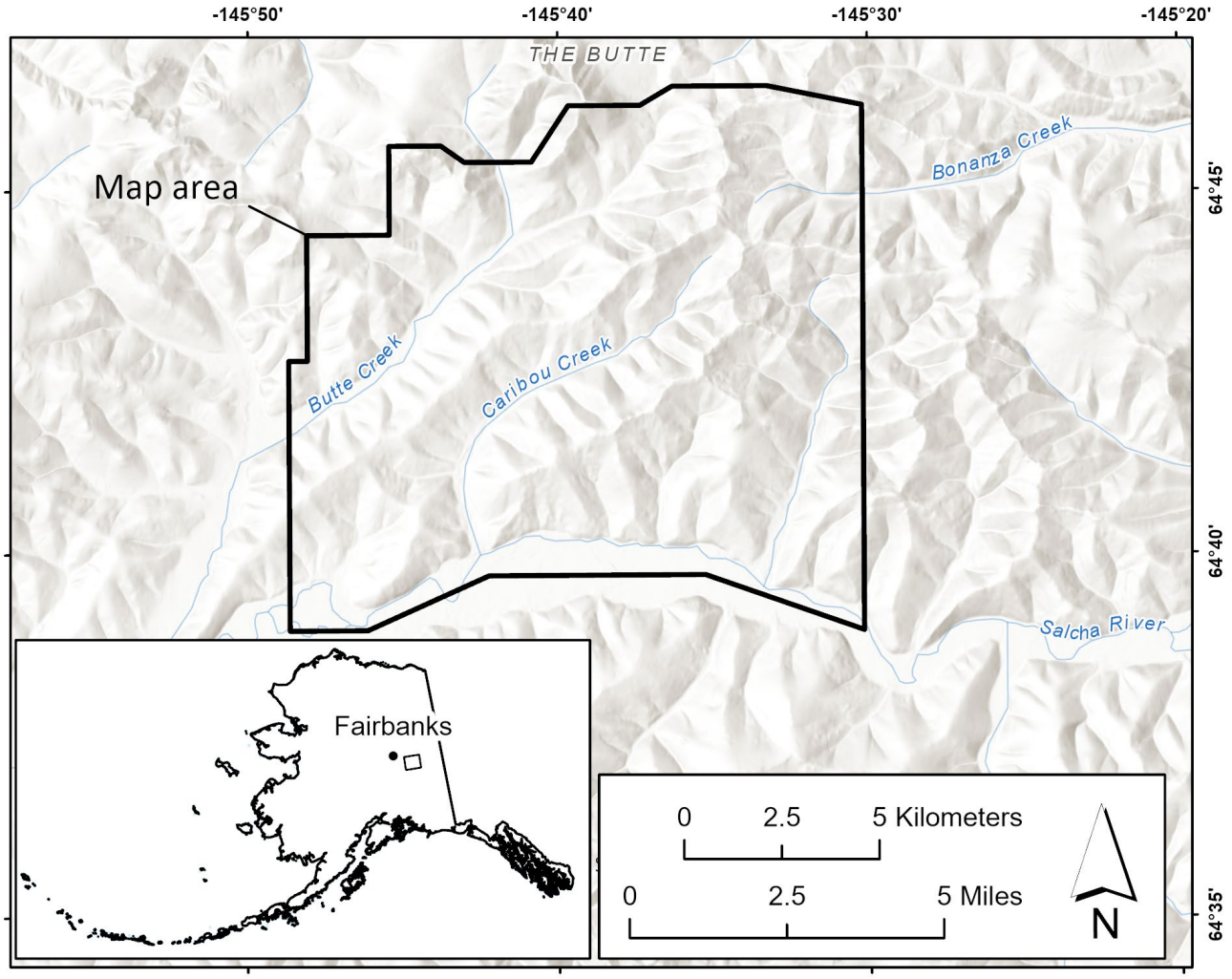

Location map of map area

This report has not been reviewed for technical content or for conformity to the editorial standards of DGGS.

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BEDROCK GEOLOGIC MAP DATABASE OF THE CARIBOU CREEK AREA, BIG DELTA C-4 AND D-4 QUADRANGLES, EAST-CENTRAL ALASKA

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INTRODUCTION

The Caribou Creek area in the Big Delta northeastern C-4 and southeastern D-4 quadrangles in east-central Alaska is located approximately 90 km east of Fairbanks and approximately 40 km northwest of the Pogo gold deposit. The Caribou Creek area is known for significant placer gold but no known lode gold source. Additionally, it is one of the few regions in interior Alaska where native bismuth has been reported in placers (Menzie and Foster, 1978). During an 11-week field campaign in the summer of 2002, an area of approximately 200 km^2 was mapped at a 1:25,000 scale to delineate the area's geologic rock units, identify structural elements and their relative orientation, and collect rock samples for the geochemical and geochronological analysis needed to develop a model for the geological evolution of the area and potential source of the area's abundant placer gold. The resultant bedrock geologic map was published as a component of a University of Alaska master's thesis (Lessard, 2006).

This publication release provides a modern compilation of the thesis map's GIS data. The data collection delivers geologic, structural, stratigraphic, and geochronologic data organized according to the GeMS and AK GeMS mapping schemas (Ekberg and others, 2021; Hendricks and others, 2021; U.S. Geological Survey National Cooperative Geologic Mapping Program, 2020). All files associated with this release are available from the Alaska Division of Geological & Geophysical Surveys (DGGS) website: https://doi.org/10.14509/30866.

METHODS

The fieldwork paired ground-based geologic mapping and airborne geophysical surveys (Burns and others, 2019) to collect samples, characterize key outcrops, and infer subsurface geology. Mapping included foot traverses, ATV traverses, and helicopter transfers to record over 780 geologic stations and collect approximately 750 rock samples. Map units, contacts, and faults were mapped in the field based on rock identification and geophysical survey maps. In some cases, rock types and contacts were determined using modal estimates from petrographic analysis and whole-rock geochemical analysis (Lessard, 2006).

Location data were collected using recreational-grade hand-held GPS units. These devices typically provided a reported error of about 10–50 m. Coordinate data and geologic observations were merged into an ArcMap geodatabase and examined relative to topographic base maps and georeferenced aerial photographs to verify relative accuracy. Latitude and longitude are reported in the UTM Zone 6, NAD27 datum.

SUMMARY OF THE GEOLOGY OF THE MAP AREA

Mapping and petrography by Lessard (2006) delineate 10–20 km^2 blocks containing contrasting rock units and mineral assemblages. Amphibolite-facies blocks contain abundant post-kinematic andalusite, with central blocks containing partially replaced kyanite and blocks to the southeast and west containing post-kinematic

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sillimanite. Geothermobarometry shows that the amphibolite-facies blocks experienced pressures/temperatures of 11.5 kbars/650°C, followed by a collisional event associated with low-P/variable-T post-kinematic recrystallization. The distribution of alumino-silicates suggests the central blocks were down-dropped relative to adjacent blocks.

Gold occurrences are found in west- to northwest-trending, steeply dipping quartz veins with stibnite ± arsenopyrite. Located in the central blocks, they are separated from a barren granodiorite pluton by a sinistral, northeast-trending, high-angle fault. This study has shown the existence of major faults with significant vertical and horizontal movement, making gold source determination difficult. Future lode gold exploration in the area must consider the high-angle faulting.

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