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PRELIMINARY RESULTS OF STREAM SEDIMENT SAMPLING, UPPER MACLAREN RIVER AREA, SOUTH-CENTRAL ALASKA

by

Thomas E. Smith, Thomas C. Trible, and Donald R. Stein

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INTRODUCTION

This brief report summarizes economic implications of a geochemical sampling program conducted in the northwest part of the Mt. Hayes A-6 quadrangle during the summer of 1971. The information contained here is released in this advance form in order to make it available for public use during the 1972 field season. The material presented in this summary will eventually be incorporated in conventional Division reports.

GEOLOGY

Bedrock forming the mountainous terrain in the headwaters of Clearwater Creek and the Maclaren River consists largely of two rock sequences, (1) a northwest-dipping succession of slightly metamorphosed volcanic rocks of Triassic age and (2) a strongly folded sequence of pelitic metasediments of Jurassic age which vary in grade from argillite to biotite schist (fig. 1). In the upper Clearwater Creek drainage, these main rock sequences are separated by a transitional zone of interbedded lava, tuff, limestone, and argillite. Coal-bearing sediments of Tertiary(?) age are exposed in Coal Creek and in the headwaters of Little Clearwater Creek. Most valleys and other lowland area are mantled by a variety of glacial and alluvial deposits of Pleistocene and Holocene age. High angle faults and associated fractures have been localized along the contact between lavas and sediments, and also by sedimentary bedding planes in rocks of the transitional zone. Subsequent hydrothermal activity and weathering has produced extensive limonitic staining in the highly fractured areas (fig. 2). These stratigraphic and structural relationships are similar to those at the Denali Copper prospect, 10 miles to the southwest (Smith, 1970, p. 6 and 27).

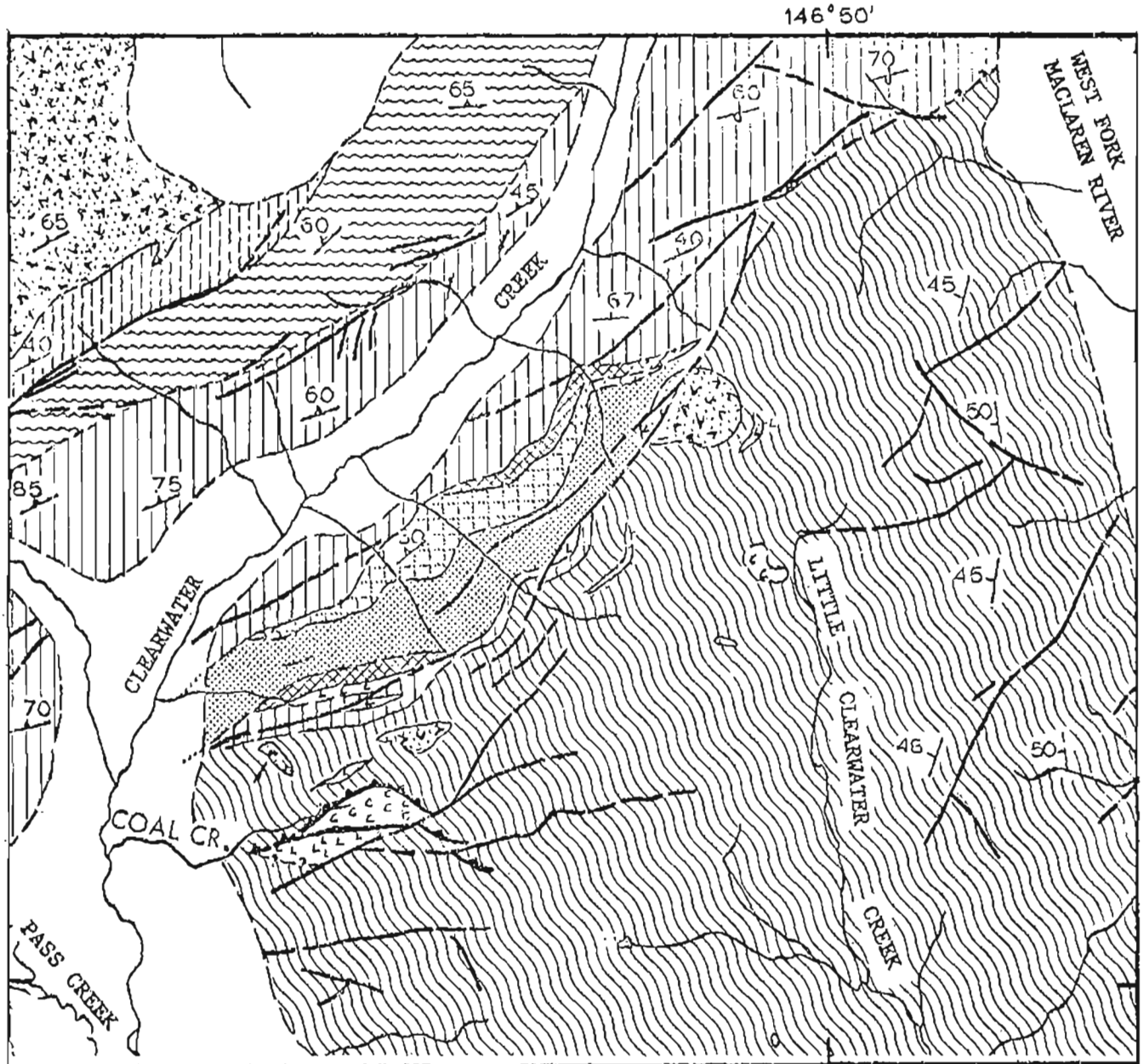

Figure 1. GENERALIZED GEOLOGIC MAP, NORTHWEST CORNER OF MT. HAYES A-6 QUADRANGLE, SOUTH-CENTRAL ALASKA

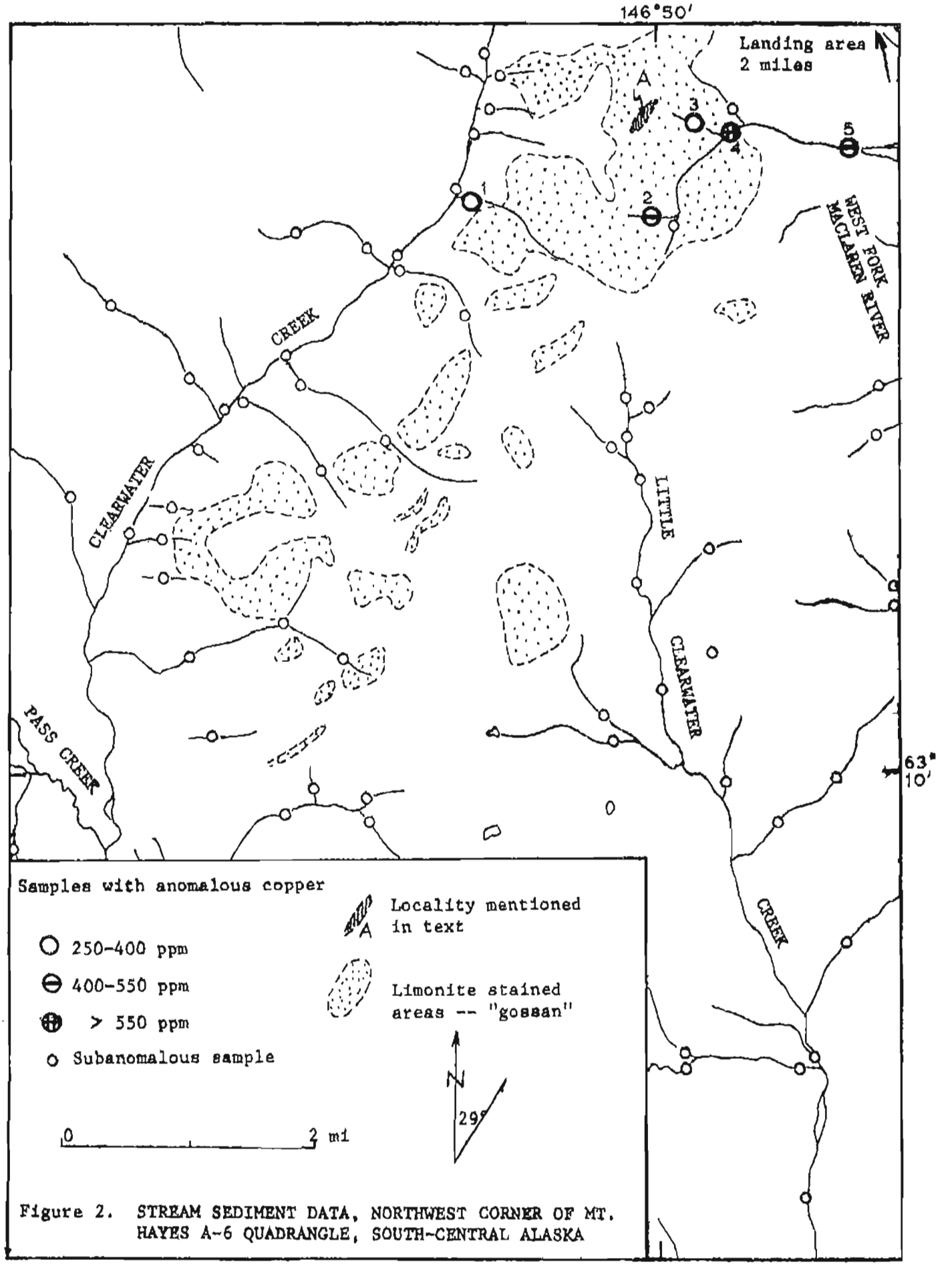

Figure 2. STREAM SEDIMENT DATA, NORTHWEST CORNER OF MT. HAYES A-6 QUADRANGLE, SOUTH-CENTRAL ALASKA

STREAM SEDIMENT DATA AND MINERAL OCCURRENCES

Stream sediment samples collected from sites shown on figure 2 were analyzed by emission spectrograph for Nb, Ca, Fe, W, Sb, As, Mg, Au, Cr, Sr, Co, Ni, Sc, Zn, La, Y, Ag, Zr, Cu, Cd, Sn, Mo, Tl, Be, V, Bi, Mn, Pb, B, and Ba. Additional analyses of all samples by atomic absorption were made for Cu, Pb, Zn, and Ag. A preliminary inspection of these data using previously determined background and threshold values for a nearby area (Smith, 1970, p. 16) indicates that several samples have anomalously high copper contents. All other elements appear to be subanomalous. Table 1 provides copper analyses of the anomalous samples, (keyed to figure 2) as well as background and threshold values. As shown on figure 2, most of the anomalous samples were collected from a

Table 1. Copper analyses of anomalous samples

Sample	Cu, ppm	
1	250	
2	500	Background = 90 ppm
3	350	Threshold = 250 ppm
4	760	
5	450	

single tributary draining into the West Fork of the Maclaren River. In a previous report, Kaufman (1964) noted an anomalous field test for copper in a sediment sample collected just north of sample 4, within the same drainage system. The analytical results presented here suggest that the highest copper anomalies are found in the southern branches of the drainage system, an area previously unreported in geological literature.

A traverse through the anomalous area during preparation of the geologic map revealed a zone of copper mineralization exposed on a small ridge between 4700 and 5100 feet above sea level. (Locality A on figure 2). Local areas in shattered metavolcanic rock along this ridge contain abundant azurite, malachite, and chalcopyrite (fig. 3). Old prospect pits were hand dug on a few of these showings, but no evidence of recent examination was noted.

The pattern of copper occurrence at Locality A is very similar to that at the Denali Copper prospect, making further examination of this area seem warranted. Points of similarity are as follows:

(1) It is located along a major fault near the contact of volcanic and sedimentary rocks.

(2) Small lenses of argillite, limestone, and calcareous argillite are interbedded with

volcanic flows at this point.

(3) Chalcopyrite was the only primary copper mineral noted.

(4) Pyrite and secondary limonite are ubiquitous over the area.

This occurrence is unlike the Denali prospect in that:

(1) Felsic magma (quartz monzonite?) has intruded the fault zone locally.

(2) The sites of highest potential, i.e. the fault zone and adjacent sediments are covered by talus (fig. 3).

(3) Mineralization does occur in the volcanic rocks.

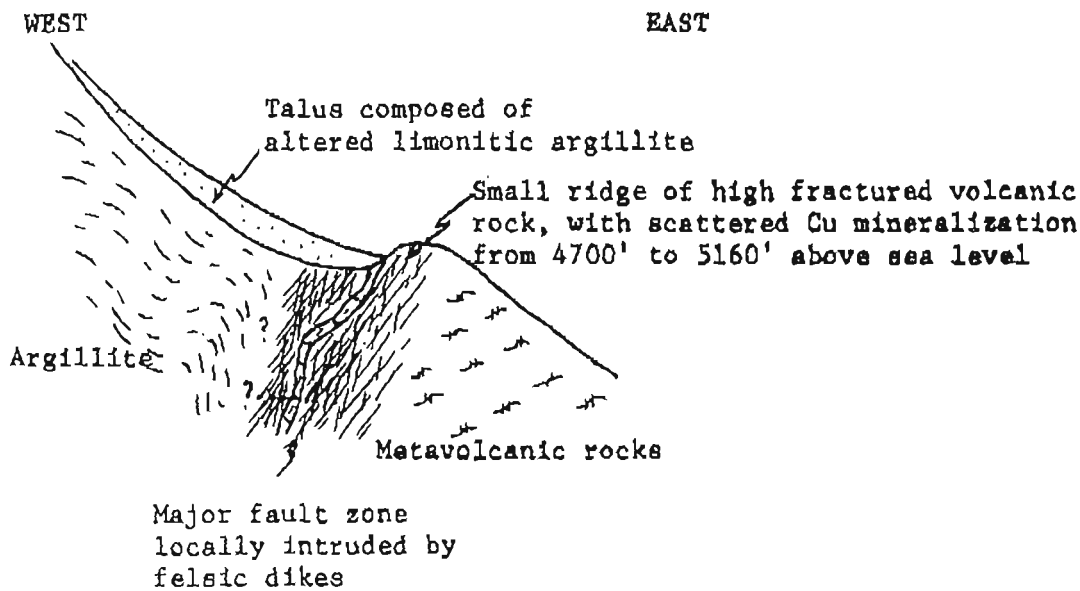

Figure 3. GENERALIZED SECTION ACROSS MINERALIZED ZONE AT LOCALITY 'A' OF FIGURE 2

Hillslopes below locality A are almost completely covered by sloughed limonitic soil and altered rock debris, which may well mask additional mineral occurrences. A systematic soil sampling program would be useful in assessing potential of the covered slopes (see Stevens, 1971, Denali Prospect Copper Distribution Map 2).

REFERENCES

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