



### EXPLANATION

This map illustrates the distribution of a variety of unconsolidated deposits and undifferentiated bedrock in the Fortymile mining district. It was prepared by interpreting 1:63,360-scale, false-color, infrared aerial photographs taken from July 1978 through August 1981 and was locally verified by ground observations during field visits.

Terms used to describe the estimated percentages of cobbles and boulders are 'numerous', 'scattered', and 'rare'. 'Numerous' implies that drilling through the layer would encounter two cobbles or boulders in an interval of 0.6 to 3 m; 'scattered' implies that drilling would encounter two cobbles or boulders in an interval of 3 to 4.5 m; and 'rare' implies that drilling would encounter two cobbles or boulders in an interval of more than 4.5 m.

### DESCRIPTION OF MAP UNITS

#### UNCONSOLIDATED DEPOSITS

##### Alluvial Deposits

**Qa** ALLUVIUM OF MODERN STREAM CHANNELS — Elongate deposits of moderately to well-sorted, well-stratified, fluvial pebble-cobble gravel, sand, and silt, with scattered to numerous boulders, deposited in active stream channels, floodplains, and associated low terraces. Deposit is medium- to thick-bedded, locally crossbedded, shows fining-upward cycles, and is locally auriferous. Cobbles are generally rounded and may reach a maximum diameter of 1 m. Locally overlain by up to 3 m of ice-rich organic silt and muck, particularly along valley margins, containing Pleistocene mammalian remains (including mammoth, horse, caribou, sheep, and bison). Surface disturbances, such as from excavation, commonly result in melting and subsequent slumping and flowage. Surface smooth except for local low scarps and bogs.

**Qaf** ALLUVIAL-FAN DEPOSITS — Fan-shaped, heterogeneous mixtures of poorly to moderately sorted, stratified pebble-cobble gravel and sand with trace to some silt and rare to numerous boulders forming elevated benches bordering major streams. Deposits are locally channelized across fan surface. Clasts generally locally derived from the immediate vicinity along the short, steep streams feeding many of the fans. May include torrential fluvial deposits and debris-flow deposits. Thick- to thin-bedded. Generally form at intersection between tributary and trunk streams. Surface smooth except for numerous shallow, interconnected channels.

**Qa1-10** YOUNG TERRACE ALLUVIUM — Elongate deposits of well-sorted, well-rounded to subrounded, stratified pebble-cobble gravel and sand with trace to some silt and rare to numerous boulders forming elevated benches bordering floodplains of larger streams. Clearly related to recent drainage. Maximum tread elevation approximately 15 m above the present streams. Deposits may be capped by variable thickness of locally ice-rich primary and reworked eolian silt. Surface smooth to hummocky with local low scarps and bogs.

**Qa11-15** OLD TERRACE ALLUVIUM — Elongate deposits of well-sorted, well-rounded to subrounded, pebble-cobble gravel and sand with trace to some silt and rare to numerous boulders forming elevated benches bordering major streams. Probably related to Pleistocene drainage. Maximum tread elevation approximately 30 to 40 m above the present streams. Thickness highly variable. Deposits locally capped by variable thickness of ice-rich primary and reworked eolian silt. Surface smooth to hummocky with local low scarps and bogs.

**Qa16-20** OLDEST TERRACE ALLUVIUM — Elongate deposits of well-sorted, well-rounded to subangular, generally poorly stratified gravel, sand, and silt, possibly of glaciofluvial origin, forming elevated benches bordering major streams. Especially prominent and continuous on north side of Walker Fork valley and lower Canyon Creek. Maximum tread elevation approximately 200 to 220 m above the present streams. Thickness highly variable, ranging from thin gravel veneers on bedrock to a reported maximum of 40 m at Napoleon Creek in the Eagle A-2 Quadrangle (Yeend, 1996). Drilling by a placer miner on the north side terrace of Walker Fork near Boundary showed maximum gravel thicknesses of approximately 13 m. Maximum cobble size observed was 0.5 m diameter, but most large clasts are in the range of 0.1 to 0.2 m diameter. Mostly clast-supported, with a medium to coarse, subangular sand matrix. Locally stained orange by limonite. While generally massive and structureless, locally they preserve bedding structures, boulder lags, and ice-wedge casts up to 2 m tall. Locally thickly mantled by ice-rich, primary and redeposited eolian silt. Surface generally smooth and heavily vegetated. Bench gravels are auriferous and have been successfully mined at Napoleon Creek and upper Walker Fork.

**Qfp** FLOODPLAIN ALLUVIUM — Elongate deposits of moderately to well-sorted, well-stratified, fluvial gravel, sand, and silt with scattered to numerous boulders in floodplains and associated low terraces. Locally auriferous. Deposits may reflect former channels and flow regimes. Typically mantled by thin layer of silty overbank deposits. May locally include Wisconsin- to Holocene-age terrace alluvium. Lower surfaces may be flooded during periods of maximum stream discharge. Locally overlain by up to 3 m of ice-rich organic silt and muck, particularly along valley margins, containing Pleistocene mammalian remains (including mammoth, horse, caribou, sheep, and bison). Surface disturbances of the frozen silt cover, such as from excavation, commonly result in melting and subsequent slumping and flowage. Ground ice content highly variable. Surface smooth to hummocky with local low scarps and bogs.

##### Colluvial Deposits

**Qc** UNDIFFERENTIATED COLLUVIUM — Irregular, heterogeneous blankets, aprons, and fans of angular to subangular rock fragments, gravel, sand, and silt that are left on slopes, slope bases, or high-level surfaces by residual weathering and complex mass-movement processes including rolling, sliding, flowing, gelifluction, and frost action. Locally washed by meltwater and slope runoff. Deposit is generally unsorted to very poorly sorted, and medium to thick bedded. Thickness is highly variable, with thickest deposits at the bases of slopes. Organic material is commonly incorporated in the deposit, and it is locally overlain by up to 3 m of ice-rich organic silt and muck that may contain Pleistocene mammalian remains, especially at the bases of slopes bordering streams. Surface disturbances, such as from excavation, commonly result in melting and subsequent slumping and flowage. Surface smooth, lobed, or terraced and, if deposit is thin, generally reflects configuration of underlying bedrock surface.

**Qcf** FINE-GRAINED COLLUVIUM AND SILT — Irregular, heterogeneous blankets, fans, and aprons of fine-grained colluvium and silt. Silt is largely retransported from original hillside sites of eolian deposition to lower slopes by mudflows, slopewash, gelifluction, and frost action. May contain abundant angular clasts of local origin. Thickness is highly variable, with thickest deposits at the bases of slopes. Commonly perennially frozen and ice rich. Surface disturbances, such as from excavation, may result in melting and subsequent slumping and flowage. Surface smooth and steep to gently sloping. Unit mapped only in southern part of study area where preservation is best. These deposits are probably remnants of a much more extensive thick silt blanket that has been largely removed by slope processes and stream erosion.

**Qcl** LANDSLIDE DEPOSIT — Oval- to tongue-shaped heterogeneous mixture of fractured bedrock and pebble-cobble gravel with trace to some sand and silt believed to be deposited by near-surface to deep creep and sliding due to instability of failed bedrock near Cherry Creek in southern map area. Feature is characterized by arcuate headwall with pronounced depression at base emphasized by snow and brushy vegetation. Deposit ranges from slightly hummocky to extremely irregular with jumbled blocks on the surface.

**Qcr** RUBBLE DEPOSITS — Irregular blankets of coarse, angular rubble derived largely from frost shattering of local bedrock. Maximum block diameter commonly ranges to 2 m. Occurs on the crests and upper flanks of high ridges as jumbled, openwork rubble fields showing little or no evidence of transport.

#### GLACIAL DEPOSITS

**Qg** UNDIFFERENTIATED DRIFT — Heterogeneous mixtures of poorly to moderately sorted, subangular to rounded boulders, gravel, sand, and silt believed to be deposited by ancient alpine glaciers. Preserved as extremely localized, irregular patches of possible drift characterized by hummocky topography with a surface scattering of angular to subrounded boulders up to 1.5 m diameter, and associated with coarse boulder lags in streams that form small rapids. Identified only in two localities in the southeastern map area. Associated valley headwalls in the highest elevations exhibit subdued cirque-like morphology that is especially apparent on northern faces. Valley cross-profiles are highly modified U-shaped, with streams that are markedly underfit for the relative valley width. Based on characteristics such as subdued morphology, elevation of source areas, and apparent extreme age, the mapped deposits may be correlative with glacial deposits of Charley River age (early Pleistocene) mapped by Weber (1986) in the Yukon-Tanana Upland.

#### COMPLEX DEPOSITS

**Qca** COLLUVIAL AND ALLUVIAL VALLEY-FILL DEPOSITS — Elongate, apron- and fan-shaped, heterogeneous mixtures of poorly to moderately sorted angular rock fragments with trace to some gravel, sand, and silt deposited in upper stream courses and on lower slopes along the margins of stream valleys by complex mass-movement processes (including rolling, sliding, flowing, gelifluction, and frost action) and strongly influenced by meltwater and slope runoff. Other important depositional processes may include debris flows, brief, intense (torrential) summer stream flows, and minor snow-avalanching. Commonly forms alternating stratified and unstratified zones and lenses in gullies and steep tributary valleys with intermittent or ephemeral streams. Locally overlain by variable thickness of ice-rich organic silt and muck, especially in areas of little or no slope. Surface disturbances, such as from excavation, commonly result in melting and subsequent slumping and flowage. Surface steep to gently sloping, with local low scarps and shallow channels from ephemeral runoff streams.

**Qcs** SWAMP DEPOSITS — Elongate to blanket deposits of complexly bedded peat, organic silt, and organic sand accumulated as surface deposits in local basins and in former stream channels. Saturated and locally frozen, locally ice rich. Thickness highly variable. Surface smooth, hummocky, or pitted. May have standing water.

#### MAN-MADE DEPOSITS

**Qm** PLACER-MINE TAILINGS AND ARTIFICIAL FILLS — Pebble-cobble gravel with trace to some sand and silt forming bases for roads and airports and piled in active or former gravel pits, open-pit mines, and dredged areas. Well to poorly sorted. Surface smooth to irregular. Extent based primarily on distribution between July 1978 and August 1981 when the aerial photographs were taken.

#### BEDROCK

**b** UNDIFFERENTIATED BEDROCK — Exposed undifferentiated bedrock.

**v** SHALLOWLY BURIED BEDROCK — Undifferentiated bedrock that is covered by a thin (generally 1 m thick or less) veneer of colluvium. Cover is generally sufficiently thin that planar bedrock structures like joints, foliation, and bedding are reflected at the ground surface by linear and curvilinear shallow troughs and bands of moist ground or hydrophilic vegetation.

### ACKNOWLEDGMENTS

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### REFERENCES

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Yeend, W., 1996, Gold placers of the historical Fortymile River region, Alaska: U.S. Geological Survey Bulletin 2125, 74 p., 1 sheet, 1:63,360 scale.

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Eagle A-1 Quadrangle, U.S. Geological Survey digital raster graphic image, 1997.  
Map projection: UTM Zone 7  
Datum: NAD27

SCALE 1:63,360

CONTOUR INTERVAL 100 FEET  
DATUM IS MEAN SEA LEVEL

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## SURFICIAL-GEOLGIC MAP OF THE EAGLE A-1 QUADRANGLE, FORTYMILE MINING DISTRICT, ALASKA

by  
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