

**DESCRIPTION OF MAP UNITS**

**SURFICIAL DEPOSITS AND EROSION SURFACES**

For detailed descriptions and age assignments of most of the surficial deposits, see Williams (1962)

**Qa1** FLOOD-PLAIN AND LOW-TERRACE ALLUVIUM --- Well-stratified layers and lenses of gray to brown, coarse to fine, well-sorted, rounded to subangular gravel, and minor amounts of sand and silt, mantled by as much as 25 feet of well-stratified layers and lenses of silt, sand, and locally organic matter, chiefly peats, sticks, and logs. Generally perennially frozen; many unfrozen zones, particularly beneath present and former water bodies. Ground-ice masses generally limited to widths 2 to 3 feet thick in a polygonal network in local areas where silt mantle is more than 8 feet thick.

**Qsm** SOLIFLUCTION MANTLE ON BEDROCK --- Poorly sorted sand, silt, and clay derived from local upslope bedrock sources. May contain minor amounts of organic material and coarse material. Generally consists of a mixture of soil and other fine-grained materials that are subject to slow downslope creep under thawing conditions. Mapped only where developed over a large area.

**Qs** EOLIAN SAND --- Massive well-sorted homogeneous gray to tan sand and silty sand, ranging from 6 to 60 feet in thickness. Generally perennially frozen but contains few ground-ice masses. Active dunes are shown by dotted pattern.

**Qaf** ALLUVIAL FAN SILT DEPOSITS --- Well-stratified poorly stratified layers and lenses of gray to brown well-sorted silt, fine sand, and, near fan apex, sand and fine gravel; deposited at base of terrace and marginal escarpment by alluvial and colluvial processes. Include layers and lenses of peat and woody material. Form veneer as thick as 100 feet over terrace deposits of Yukon River. Generally perennially frozen; many occurrences of large, irregular, tabular and polygonal ground-ice masses.

**Qf** FAN DEPOSITS --- Poorly sorted to very poorly sorted, angular to subangular, silty, sandy gravel. Boulders common near apex of fans. Probably derived by both colluvial and alluviation. Collecting fans are present along the floors and margins of some stream valleys in the northern part of the map area.

**Qet** ALLUVIAL FAN AND RELATED TERRACE DEPOSITS --- Well-stratified layers and lenses of well-sorted, gray to brown, coarse to fine gravel containing minor amounts of sand and silt and a few layers and lenses of peat and woody material. Dominantly pebble to boulder gravel deposited by the Yukon River and its larger tributaries. Locally stained and cemented by iron oxide. Gravely deposits covered by mantle of silt, sand and organic matter as thick as 25 feet. Generally perennially frozen; a few unfrozen zones beneath water bodies and in well-sorted silts. Polygonal ice wedges present locally where silt mantle is thicker than 8 feet. Thickness not known, but locally probably exceeds 100 feet. Unit includes numerous small deposits of eolian sand (Qs, shown by dotted pattern) in three areas north of the Yukon River. Because of the gradational character of their boundaries the individual deposits of eolian sand are not differentiated on the map.

**Qap** ALLIPLANATION TERRACE --- Flat surfaces formed on bedrock at altitudes of 2,500 to 3,500 feet and mantled with thin veneer of rock rubble. Present only in the western part of area.

**Ql** LOESS --- Massive well-sorted homogeneous tan to gray silt and sandy silt as much as 50 feet thick on flat interfluves, hillsides, and upper slopes. Deposits generally perennially frozen; large ground-ice masses especially common in creek-bottom deposits. The deposits in the large areas mapped are probably of Pleistocene age. Small active deposits are not shown, but include some fan deposits (Qaf) of reworked loess in creek-bottoms, not differentiated on the map.

**Qt** TILL --- Poorly sorted silty, sandy, bouldery gravel; generally perennially frozen. Present only in the northwest corner of map area.

**Qg** HIGH-LEVEL GRAVEL AND SAND --- Stratified gray to blue-gray to rusty-brown, well-sorted, pebbles to boulder gravel and coarse sand. Coarse sand particularly common in the northeast of the Hodzana River. Particles slightly cemented and stained by iron oxide. Maximum thickness not known but locally exceeds 100 feet.

**BEDROCK**

Mapped areas of each of the units described may contain some unrecognized rocks of other units

**Ts** SEDIMENTARY ROCKS --- Yellow and gray, thin-bedded water-lain tuff and siltstone; quartz-pebble conglomerate with a soft sandy matrix; and amber-bearing coal in beds as much as five feet thick. Only about 100 feet exposed. Tuff and siltstone contain tertiary pollen of probably Miocene age at fossil locality 1. Coal is of subbituminous rank according to analyses by U.S. Bureau of Mines.

**Tkr** RHYOLITE --- Gray, brown, pale-red, and orange porphyritic rhyolite, welded rhyolitic tuff, and siltified laminated rhyolitic flows; minor amount of obsidian. Appears to overlie granitic rocks (Kg) and may be intruded by them.

**Kg** GRANITIC ROCKS --- Porphyritic to granular, locally gneissic, quartz monzonite and granite; apatite; and a few pegmatite dikes. Includes diorite near contact on upper Dall River. Potassium-argon age of 101 ± 4 m.y. on biotite from Hodzana pluton 1 1/2 miles north of quadrangle (Brosge and Reiser, 1964). Potassium-argon age of 109 ± 2 m.y. on biotite from Sibylmetak pluton 3 1/2 miles west of quadrangle (Patton and Miller, 1973).

**Kgc** CONTAMINATED GRANITIC ROCKS --- Dark, fine- to coarse-grained granitic rocks with abundant mafic inclusions of amphibole, plagioclase, epidote, sphene, apatite, and minor quartz.

**Jpv** MAFC VOLCANIC AND INTRUSIVE ROCKS --- Basalt, gabbro, diorite, and andesite. Subordinate amounts of green, gray, and red chert; minor amounts of sandstone. Unit includes rocks that are probably correlative with the fossiliferous Permian rocks on the Yukon River and near Bettles (Brosge and Reiser, 1965; Patton and Miller, 1973), with potassium-argon dated Triassic mafic rocks on the Yukon River (Brosge and others, 1969), and with potassium-argon dated Jurassic mafic rocks near the Christian River (Reiser and others, 1965).

**Jpc** CHERT AND ARGILLITE --- Red, green, gray, and black bedded chert, dark-green siliceous argillite, and black shale and siltstone. Differentiated locally from mafic rocks of unit Jpv.

**Ecl** ECLIGITE AND AMPHIBOLITE --- Banded dark-green, gray, and red eclogite and banded amphibolite. Eclogite is composed of green pyroxene, potikioblastic garnet with inclusions of pyroxene, secondary (?) plagioclase, and secondary amphibole and chlorite that replace the garnet and pyroxene. Contact relations with volcanic rocks of unit Jpv are not known, but the mafic composition of both units Jpe and Jpv suggests that they are related.

**Mezg** GREENSTONE AND BASIC SCHIST --- Dark green, coarse grained, slightly to strongly foliated. Composed mostly of plagioclase and secondary amphibole and chlorite; some relic pyroxene. Probably derived from intrusive rocks. Age uncertain.

**Dss** SANDSTONE AND SHALE --- Yellow and brown-weathering, gray to greenish-gray, fine-grained, thin-bedded, partly calcareous and limonitic quartz arenite and quartz wacke. Includes interbedded dark-gray shale, calcareous mudstone, and sandy ferruginous limestone. This unit on the Granite Fork and on the Mud Fork is schistose, slightly metamorphosed mudstone and sandy crinoidal limestone interbedded in sandstone east of the contacts of units (Dss) with adjacent probably Late Devonian age at fossil locality 2. The contacts of units (Dss) with adjacent sedimentary rock units have not been seen. The lack of chert clasts and the abundance of carbonate in the quartz wackes of unit Dss distinguishes them from the wackes in unit Dp.

**Dg** GRAYWACKE --- Brown-weathering, gray to olive-gray, fine- to medium-grained, thin- to medium-bedded quartz-chert wacke and siltstone; interbedded black shale, siltstone, and minor ironstone. Rocks are schistose west and north of Twin Sisters and near Lone Mountain. Contains identifiable plant fragments in outcrops on the west bank of Hodzana River. Age uncertain, but probably Devonian and correlative with the plant-bearing lithic wacke of Devonian (?) age on the Christian River (Brosge and Reiser, 1962).

**Dh** HORNFELDS --- Thermally altered gray to black quartzite, spotted siltstone, and phyllite; locally contains biotite and andalusite shown on map by letter symbols B, A, C, S, St, and G. Subordinate amount of calcareous hornfels at Lone Mountain. Rocks are slightly schistose except on Hodzana River. Probably equivalent to graywacke and phyllite units Dg and Dp.

**Dp** PHYLLITE --- Dark-gray to black phyllite and schistose siltstone interbedded with subordinate amounts of quartz wacke and sheared slate- and chert-pebble conglomerate. Age probably Devonian.

**EXPLANATION OF SYMBOLS**

Bedrock contact based on field observation. Location is approximate. May include some faults.

Inferred bedrock contact based largely on interpretation of aerial photographs. May include some faults.

Indefinite bedrock contact in area of few outcrops and dense cover of soil or timber. May include some faults.

Concealed contact

Inferred fault. Dashed where doubtful; dotted where concealed

Syncline, showing direction of plunge. Approximately located; dotted where concealed

Strike and dip of beds. May include overturned beds

Strike and dip of foliation

Strike and dip of beds or foliation based on distant observation. Dip angle estimated where shown

Fossil locality. Number refers to fossil list in table 1.

B A C S  
St G

LOCALITY OF PELTIC SCHIST OR HORNFELDS CONTAINING EPIGENETIC BIOTITE (B), ANDALUSITE (A), CORDEIERITE (C), SILLMANITE (S), STAUROLITE (St), OR GARNET (G).

**REFERENCES**

Brosge, W. P., and Reiser, H. N., 1962, Preliminary geologic map of the Christian quadrangle, Alaska: U. S. Geol. Survey open-file map, scale 1:250,000.

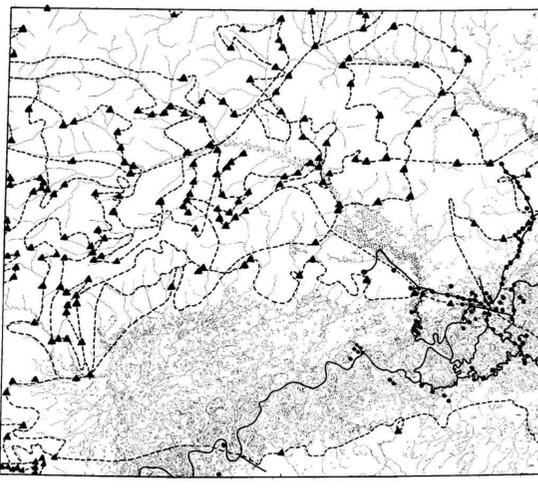
Brosge, W. P., and Reiser, H. N., 1964, Geologic map and section of the Chandalar quadrangle, Alaska: U. S. Geol. Survey Misc. Geol. Inv. Map I-375, scale 1:250,000.

Brosge, W. P., Lanphere, M. A., Reiser, H. N., and Chapman, R. M., 1969, Probable Permian age of the Wiseman C-pine, central Alaska: U. S. Geol. Survey Bull. 1298-B, p. B1-B19.

Patton, W. M., Jr., and Miller, T. P., 1973, Bedrock geologic map of Bettles and southern part of Wiseman quadrangles, Alaska: U. S. Geol. Survey Misc. Field Studies Map MF-492, scale 1:250,000.

Reiser, H. N., Lanphere, M. A., and Brosge, W. P., 1965, Jurassic age of mafic igneous complex, Christian quadrangle, Alaska: U. S. Geol. Survey Prof. Paper 825-C, p. C68-C71.

Williams, J. R., 1962, Geologic reconnaissance of the Yukon Flats district, Alaska: U. S. Geol. Survey Bull. 1111-H, p. 209-331.



Map of Beaver quadrangle showing location of field observation points (dots) and continuous foot and boat traverses (solid lines) by Williams in 1948 and 1949, and geology extended between traverses by interpretation of aerial photographs. Surficial geology taken in large part from Williams (1962).

**TABLE 1. FOSSIL COLLECTIONS**

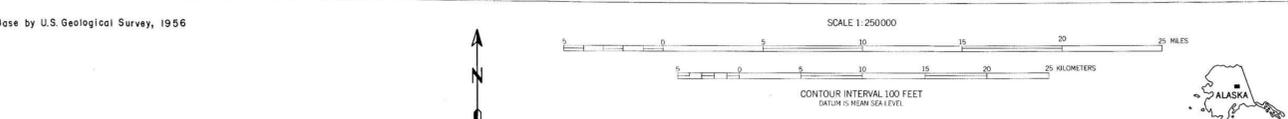
Sample localities are shown on map as 2

No.	Field collection number	U.S.G.S. locality number	Fossils	Latitude and longitude
1	72A836A	8484A	Sedimentary rocks (Ts) Indeterminate plant fragments and a diverse and well-preserved pollen assemblage containing some conifers (Pinus, Picea, Taxus) but dominated by broad-leaved genera (Carya, Juglans, Fraxinex, Pagus, Ulmus-Zelkova, Liquidambar, and others).	66° 19' 37"
	72A836B	8484B		149° 50' W
	72A836C	8484C		149° 50' W
2	72A842	USGS 8966-SD	Sandstone and shale (Dss) Oryzospirifer sp., indeterminate strophomenoid, productella, Trichonellid, and agostiferoid brachiopods; pelecypods and gastropods.	66° 40' N
				148° 47' W
3	72A821	USGS 8999-SD	Limestone (Pz1) Cladophora sp., Spiriferopsis sp., indeterminate horn coral, and Bryozoa?	66° 40.1' N
				149° 46.5' W
4	72A831	USGS 8999-SD	Fossiliferous corals, bryozoans, and crinoidal debris.	66° 55.5' N
				148° 35.5' W

Fossils in collection 1 identified by Jack A. Wolfe, U.S. Geological Survey.

Fossils in collection 2 identified by J. T. Dutro Jr., U.S. Geological Survey.

Fossils in collections 3 and 4 identified by William A. Oliver Jr., U.S. Geological Survey.



Geology by J.R. Williams, 1948-49; W.P. Brosge and H.N. Reiser, 1960 and 1971; W.W. Patton, Jr., and T.P. Miller, 1967-68, 1970; R.M. Chapman and Warren Yeend, 1970; W.P. Brosge, H.N. Reiser, and Warren Yeend, 1972. Geology of Yukon Flats largely from Williams (1962)

# RECONNAISSANCE GEOLOGIC MAP OF THE BEAVER QUADRANGLE, ALASKA

By  
W. P. Brosge, H. N. Reiser, and Warren Yeend  
1973