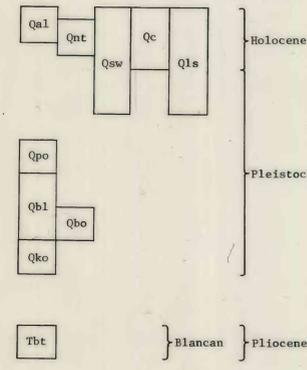


CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

- Surficial units, where mapped, generally are 5 ft (1.5 m) or more thick and 300 ft (90 m) or more wide. Unlabeled areas are areas of bare bedrock or deposits smaller than the above dimensions.
- Qal** ALLUVIUM (UPPER HOLOCENE)—Unconsolidated bouldery cobble gravel, sand, and silt in the channel and on the floodplain and low terraces along the La Plata River. Well-layered thin- to thick-bedded pebbly sand. Clast composition: about 90% intermediate volcanic and dike rocks; remainder includes quartzite, banded purplish-gray and green argillite(?), and sandstone. Includes terrace gravels less than 40 ft (12 m) above the La Plata River that have a weak soil at their surface and are equivalent to Tsegi Alluvium of Hack (1942). Thickness probably exceeds 20 ft (6 m).
 - Qnt** NAHA AND TSEGI ALLUVIUMS (HOLOCENE)—Gray, brownish-gray, or dark reddish-brown humus-rich, stratified silty clayey alluvium in valley bottoms. Locally includes thin to thick beds of sand and thin layers of pebbles. Includes contemporaneous intergrading fan alluvium from tributaries and colluvium from valley walls. Correlated to Naha and Tsegi Alluviums of Hack (1942) based on elevation above modern streams and weak soil in top of units, making them older than Qal unit which has no soil. Clasts mainly volcanic and dike rocks in the La Plata River valley and sandstone and siltstone in valleys of tributary streams. Thickness 5-20 ft (1.5-6 m).
 - Qls** LANDSLIDE DEPOSITS (HOLOCENE AND PLEISTOCENE)—Unsorted loose debris ranging in size from clay to sandstone blocks up to 2 ft across. Contains water-rounded cobbles derived from Tbt unit upslope. Thickness 5-12 ft (1.5-3 m).
 - Qsw** SHEETWASH ALLUVIUM (HOLOCENE AND PLEISTOCENE)—Sandy cobble gravel to cobbly, sandy clay or silty clay. Thin, crudely layered deposits on crests and slopes of low drainage divides; locally mixed with unsorted gravity deposits and eolian silt in the modern soil zone. In the northeast part of the quadrangle includes thin layer of abundant round cobbles draped over tops of undulating hills developed on soft Cretaceous Lewis Shale. Clast composition: sandstone and siltstone 37%; diorite-monzonite porphyry 33%; quartzite 21%; granite, rhyolite(?), and granodiorite 7%; chert and other 2%. Derived from a high alluvial terrace (unit Qko) of an ancestral La Plata River of Kansan? age. West of Bridge Timber Mountain (southeast edge of map), cobbles and pebbles derived from the Tbt unit rest on hillslopes and in ravines cut into soft mudstone, siltstone, and sandstone. Thickness 1-5 ft (0.3-1.5 m).
 - Qc** COLLUVIUM (HOLOCENE)—Unsorted dark-yellowish-brown sandy or silty clay to gravelly sand. Thickness 3-5 ft (1-1.5 m).
 - Qpo** OUTWASH (PINDALE GLACIATION)—Bouldery, cobbly alluvium containing loose sandy matrix. Clasts composed of diorite-monzonite porphyry, sandstone, siltstone, quartzite, rhyolite, and granitoid rocks. Terraces lie 40-60 ft (12-18 m) above La Plata River. Unit has moderately developed soil consisting of a humus-rich silty A horizon 3 in. (8 cm) thick over a moderate brown clayey B horizon 8-20 in. (20-50 cm) thick with weak Cca horizon at the bottom. Thickness of unit 20 ft (6 m).
 - Qbl** LOESS (BULL LAKE? GLACIATION)—Clayey wind-deposited silt strongly oxidized to a moderate reddish-brown color. Widespread throughout the quadrangle on noneroded terrain of surficial deposits (except on Qpo and Qt deposits which are younger) and on bedrock, but mapped only where on bedrock. A soil is developed: an A horizon 1.5 ft (0.5 m) thick having a moderate prismatic structure; a clayey B horizon 40 in. (1 m) thick having a strong prismatic structure; plastic and sticky when wet, hard when dry. Cca horizon about 3-4 ft (1 m) thick having calcium carbonate coatings, veinlets, and small hard nodules. Loess thickness 2-15 ft (0.5-5 m); thin in drainageways; thick on uplands.
 - Qbo** OUTWASH (BULL LAKE? GLACIATION)—Cobbly, stratified, fairly well-sorted alluvium including medium boulders. Clasts are well rounded and are composed of diorite-monzonite porphyry, sandstone, siltstone, quartzite, rhyolite, and granitoid rocks. Capped by 5-10 ft (1.5-3 m) of loess (not mapped). Contains red-brown clayey B horizon 20 in. (0.5 m) thick; bottoms of cobbles in C horizon have 1 mm-thick calcium carbonate crusts. Terrace lies 80-100 ft (24-30 m) above the La Plata River. Thickness 20 ft (6 m), locally as much as 80 ft (24 m).
 - Qko** OUTWASH (KANSAN? GLACIATION)—Sandy cobble and pebble gravel; generally fairly well-sorted alluvium with few boulders. Clast composition approximately 1/3 sandstone and siltstone, 1/3 diorite-monzonite porphyry, 1/5 quartzite, and the remainder granitic rocks and chert. A thin sand and the remainder granitic rocks and chert. A thin sand bed containing the Lava Creek B volcanic ash (600,000 years old) rests on top of gravel in roadcut in SE1/4SW1/4 Sec. 11U, T. 34 N., R. 11 W. Forms an alluvial terrace about 100 ft above the La Plata River. Terrace slopes southward 120-100 ft/m. Capped by 10-15 ft (3-4 m) reddish brown wind-deposited clayey silt (not mapped) having strong Cca horizon. Thickness generally 40-60 ft (12-18 m); water well logs suggest thickness locally can exceed 120 ft (36 m).

Tbt BRIDGETIMBER GRAVEL (PLIOCENE; BLANCAN)—Rounded pebbles, cobbles, and boulders in a grayish-brown sandy matrix. Upper part is oxidized reddish brown; a matrix of weathered sand, silt, and clay and variously colored disintegrated clasts of weak rocks supports both hard and rotten clasts of silicic to intermediate volcanic and dike rocks, sandstone and siltstone, quartzite, with minor quartz and granitic rocks. Composition suggests deposition by ancestral La Plata River draining the La Plata Mountains. Deposit is considered Pliocene because it is about 1,000 ft (305 m) above the La Plata River and 2,000 ft (610 m) above the Animas River (just east of map). Thickness 20 to more than 100 ft (6-30 m).

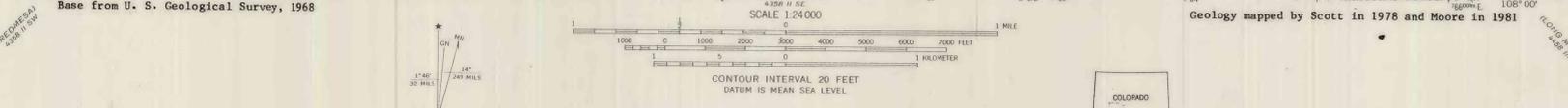
SYMBOLS
 CONTACT—Dashed where approximate
 34-11-17BBB WATER WELL—Boxed areas with diagonal used where precise location unknown

REFERENCE
 Hack, J. T., 1942, The changing physical environment of the Hopi Indians of Arizona: Peabody Museum Papers, v. 35 no. 1, 85 p.

DRILLER'S LOG OF WATER WELLS

Well number	Depth (ft)	Description of unit
3881-F	0-6 6-40 40-60	(no description) boulders sand and gravel
64192	0-3 3-138 138-144	soil boulders and gravel sand, water 33 gallons per minute (gpm) shale
61506	0-6 6-89 89-102	soil boulder gravel gravel and sand; water 33 gpm
87377	0-3 3-60 60-66	soil boulders sand and gravel; water 30 gpm shale
18536-F	0-9 9-138 138-145	soil boulders sand and gravel; water 6 gpm shale
34-11-17 BBB	0-76	gravel, sand, boulders (fluvial)
34-11-10 UDCC	0-116	Lewis Formation, dark gray shale
88248	0-92 92-200 200-240	boulders, alluvial gravel and boulder stringers gray shale

This report (map) is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards (and stratigraphic nomenclature).



GENERALIZED SURFICIAL GEOLOGIC MAP OF THE KLINE QUADRANGLE, COLORADO

By
 Glenn R. Scott and David W. Moore
 1981