

CORRELATION OF MAP UNITS
(Subdivisions of Pleistocene from G.M. Richmond and L.S. Dalrymple, written commun., 1953)

Qal	Holocene	(0-10,000 years B.P.)	QUATERNARY	
Qes	Upper Pleistocene	(10,000-130,000 years B.P.)		
Qup	Upper middle Pleistocene	(130,000-370,000 years B.P.)		
Qba	Lower middle Pleistocene	(370,000-730,000 years B.P.)		
Qbl	Lower Pleistocene-blancan	(730,000-1,700,000 years B.P.)		
Qm	Pliocene and Miocene			
Tb				TERTIARY

INTRODUCTION
This map of the Trinidad area is considered to be a special purpose map, as it shows only gravel-bearing alluvial deposits laid down by streams and a series of stacked flow erupted from local volcanism. It does not show the distribution, character, and age of the alluvial deposits and a practical one, to map the distribution of deposits of gravel and crushable rock for use as construction materials.

- DESCRIPTION OF MAP UNITS**
- Qal ALLUVIUM (HOLOCENE)—Poorly sorted, gravelly alluvium along the floodplain of the Purgatoire River. Thickness of alluvium unknown.
 - Qes BOLLAN SAND (LOWER HOLOCENE TO UPPER PLEISTOCENE)—Fairly brown to light-yellowish-brown, silty medium sand overlying low terraces along Purgatoire River. Upper part has a grayish-brown B horizon and locally a C₁ horizon containing nodules of calcitic carbonate 1/4-1/2 in. (0.25-0.5 cm) in diameter. Upper part commonly contains lenses of pebbly, sandy, shaly-brown B horizon. A graded A₁ horizon is present in the upper part of the alluvium. Soil is 15 ft (4.5 m) thick but locally exceeds 25 ft (7.6 m).
 - Qup ALLUVIUM ALONG THE PURGATORIO RIVER (UPPER PLEISTOCENE)—Gravel composed of boulders, cobbles, pebbles, and sand that covers the pediments and caps terraces. Clasts (stones) are composed of Precambrian igneous and metamorphic rocks, Tertiary igneous rocks, and some Cretaceous sandstone. North of the Purgatoire River and east of Interstate Highway 25, clasts are composed of sandstone fragments as large as 6 in. (15 cm). A surface soil developed in the upper part of the alluvium contains a grayish-brown to light-yellowish-brown B horizon having blocky to columnar structure and a sticky plastic consistency. The oldest deposit (Qup₁) contains a K horizon (dense concentration of CaCO₃ that surrounds all clasts) as much as 2 ft (0.6 m) thick and underlying pale-brown C₁ horizon 3 ft (0.9 m) thick. Bollan sand generally is 15 ft (4.5 m) thick but locally exceeds 25 ft (7.6 m).
 - Qba₁ TERRACE AND PEDIMENT NO. 1 ALLUVIUM—Lies 100 ft (30 m) above the river.
 - Qba₂ BARILLA ALLUVIUM (UPPER MIDDLE PLEISTOCENE)—Gravel composed of boulders, cobbles, pebbles, and sand that covers pediments and caps terraces along the Purgatoire River. Clasts are similar in composition to those in the upper Pleistocene alluvium but are somewhat more weathered. A horizon of surface soil in upper part of alluvium is light yellowish brown, brown, or reddish brown and has a columnar or prismatic structure and a sticky plastic consistency. F horizon is pinkish white and several feet thick.
 - Qbe₁ TERRACE AND PEDIMENT NO. 2 ALLUVIUM—Lies 150-150 ft (30-45 m) above the Purgatoire River.
 - Qbe₂ TERRACE AND PEDIMENT NO. 1 ALLUVIUM—Lies 130-150 ft (30-45 m) above the Purgatoire River and other local streams.
 - Qbe₃ RESHORE ALLUVIUM 2 (LOWER MIDDLE PLEISTOCENE)—Bouldery, cobbly, pebbly, sandy alluvium that also contains some silt and clay. Clasts are mainly of igneous Precambrian and Tertiary rocks but include some Cretaceous sandstone. Most clasts north of Fisher Peak are almost entirely composed of basaltic clasts. Well-developed soil in the upper part of the alluvium contains a grayish-brown, light-brown, or reddish-brown B horizon that has a prismatic or columnar structure and a sticky plastic consistency. It also has a white K horizon several feet thick. Gravel is produced from the terraces east of Trinidad. Weathering of some clasts into high content of calcitic carbonate may make the gravel unworkable for use as aggregate in concrete or bituminous mix.
 - Qbe₄ TERRACE AND PEDIMENT NO. 2 ALLUVIUM—Lies 100-200 ft (30-60 m) above the Purgatoire River.
 - Qbe₅ TERRACE AND PEDIMENT NO. 1 ALLUVIUM—Lies 200-300 ft (60-90 m) above the Purgatoire River and other major streams.
 - Qbl₁ LAVA CREEK 2 (600,000 years old)—White to yellowish-gray silty volcanic ash (Purletts type) with former terminology is about 3 ft (0.9 m) thick. The silty ash below boundary basalt gravel about 15-20 ft (4.5-6 m) thick and above yellowish-orange gravelly sand about 40 ft (12 m) thick at the base of the Washoe Alluvium in the center of sec. 27, T. 33 S., R. 62 W., Las Animas County, Colo.
 - Qbl₂ SAN MIGUEL CREEK ALLUVIUM 3 (LOWER PLEISTOCENE)—Bouldery, cobbly, pebbly alluvium forming a cover on pediments sloping northward toward the Purgatoire River. Most clasts are composed of basalt, but some cobbles and pebbles are sandstone. A soil in the upper part contains a clayey, brown B horizon. A calcitic carbonate-encrusted K horizon beneath the B horizon is 1.5 ft (0.45 m) thick. The gravel-covered pediments lie 40-60 ft (12-18 m) above the major tributaries of the Purgatoire River. Gravel is inferior to construction material compared to younger alluvial deposits because clasts are deeply weathered and calcitic carbonate is too abundant.
 - Qls LANDSLIDE DEPOSIT (QUATERNARY)—Mass composed of large blocks of basalt and sandstone, siltstone, and claystone on the steep flanks of the basalt-capped mesa along the boundary between Colorado and New Mexico. Movement of slides probably was caused and accelerated by periodic saturation of the clayey Pierre Shale. Deposit is very hummocky and contains many undrained depressions.
 - Tb BASALT (PLIOCENE AND MIOCENE)—Hard, dark-greenish-gray to black olivine basalt or basaltic lava flow. Now reduced to large remnants that cap mesas along the boundary between Colorado and New Mexico.

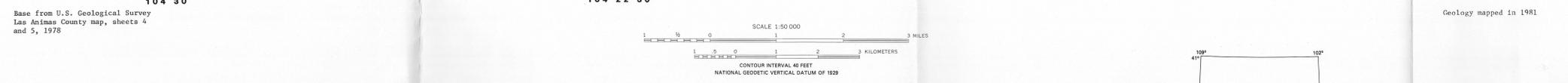
REFERENCES CITED
Levings, W. S., 1951, Late Cenozoic erosional history of the Raton Mesa region, Colorado School of Mines Quarterly, v. 46, no. 3, 111 p.
Fillmore, C. L., and Scott, G. R., 1976, Pediments of the Vermejo Park area, New Mexico, in Guidebook of Vermejo Park, northeastern New Mexico: New Mexico Geological Society Annual Field Conference Guidebook, No. 27, p. 111-120.

¹ The name Barilla Alluvium is here adopted from Levings' (1951, p. 72) name, Barilla surface; it is so called because of the excellent preservation of its remnants along San Francisco Creek near the farming community of Barilla. The spelling is here changed to agree with the name of the type locality; the type locality remains the same for the alluvium as for the surface (sec. 5, T. 34 S., R. 61 W., Las Animas County, Colo.). The alluvium was deposited by occasional or intermittent streams probably during interglacial time about 120,000-130,000 years ago. It forms a single gravel deposit that covers the lowest pediments in the Raton basin in southeastern Colorado and northeastern New Mexico. Its thickness averages about 20 ft (6 m) and its height above major streams ranges from 40 to 130 ft (12-40 m).

² The name Washoe Alluvium is here adopted from the Washoe surface (Levings, 1951, p. 72). The type locality is on the pediment 0.25 mi (0.4 km) east of the abandoned railway station Washoe on the Colorado and Southern Railroad in sec. 35, T. 32 S., R. 63 W., Las Animas County, Colo. The Washoe Alluvium was deposited by streams probably during an interglacial period that started about 600,000 years ago and ended some thousands of years later. The lower part of the alluvium contains the Lava Creek B ash (Purletts type "B" ash of former terminology) in the center of sec. 27, T. 33 S., R. 62 W., Las Animas County, Colo. The alluvial gravel, about 20 ft (6 m) thick, covers pediments about 120-240 ft (36-72 m) above major streams in the Raton basin in southeastern Colorado and northeastern New Mexico.

³ San Miguel Creek Alluvium is the name here adopted with modification from Levings' (1951, p. 71) name San Miguel surface. His surface name was not applied because the name San Miguel is preoccupied. The new alluvium is named for San Miguel Creek. The type locality is a high pediment remnant lying at 7,100-7,200 ft (2170-2195 m) altitude (SMU/4801A sec. 1, T. 34 S., R. 63 W., Las Animas County, Colo.), 1.25 mi (2 km) northwest of the old village of San Miguel. The San Miguel Creek alluvium probably was deposited during interglacial time about 1.4 m.y. ago. The stream-deposited gravelly alluvium overlies the highest of three pediments (Fillmore and Scott, 1976); very few remnants of this high pediment are preserved in the Raton basin in southeastern Colorado or northeastern New Mexico. The alluvium is about 20 ft (6 m) thick and lies 200-400 ft (60-120 m) above major streams.

Base from U.S. Geological Survey
Las Animas County map, sheets 4
and 5, 1976



MAP SHOWING GRAVEL-BEARING SURFICIAL DEPOSITS AND BASALTIC ROCKS NEAR TRINIDAD, LAS ANIMAS COUNTY, COLORADO

By
Glenn R. Scott