

DESCRIPTION OF MAP UNITS

- Qal** Alluvium (upper Holocene)—Yellowish-gray, silty to gravely, stratified, stream deposits in lowest parts of valleys. Except in the Gachupin and Juan Baca drainages in the northeast corner of the map, gravels dominated by pebbles and cobbles of yellowish-gray weathering rhyolite of Ash Mountain with some mixing of other older rock types derived from mountains to the west. Unit locally more than 40 ft (12 m) thick
- Qfa** Fan alluvium (Holocene and upper Pleistocene)—Fan-like accumulations of poorly sorted gravely alluvium at mouths of gullies draining mountainous areas. Material composed chiefly of sandstone and shale mixed with rhyolite of Ash Mountain. Generally about 10 ft (3 m) thick
- Qal** Alluvium and fan deposits (Holocene and upper Pleistocene)—Locally includes debris-flow, talus, and slopewash deposits
- Qls** Landslide deposit (Holocene and upper Pleistocene)—Slump and earthflow deposits consisting of large blocks in a fine-grained matrix. Surface of landslides hummocky and littered with large blocks. Unit formed on steep unstable slopes of mesas. Further sliding of landslide deposits and underlying bedrock could occur where the toe of a slide is undercut or the head is loaded, especially where deposits are saturated
- Qba** Barela Alluvium (lower middle Pleistocene)—Yellowish-gray to grayish-orange stratified gravel composed chiefly of subangular to rounded pebbles, cobbles, and boulders of rhyolite mixed with local sandstone and other older rock types. The Barela Alluvium locally found on two pediment levels. Alluvium of each level 5-10 ft (1.5-3 m) thick. Alluvium lies on youngest of three pediments described by Pillmore and Scott (1976). Barela Alluvium is equivalent to Slocum Alluvium of Colorado Front Range (Pillmore and Scott, 1976; Scott, 1984, and Levings, 1951) and probably was deposited during interglacial time, about 120,000-130,000 yr ago
- Qbal** —Younger (lower pediment); about 50-60 ft (15-18 m) above modern streams
- Qbah** —Older (higher pediment); about 70-80 ft (21-24 m) above modern streams
- Qbe** Beshoar Alluvium (lower middle Pleistocene)—Grayish-orange and yellowish-gray, stratified, sandy gravel. Most clasts are rhyolite with some quartzitic sandstone and some metamorphic rocks. Unit includes many boulders larger than 4 ft (1.2 m) in diameter; some boulders that project above gravel surface are polished by wind abrasion. Alluvium is 10-15 ft (3-5 m) thick and locally forms two pediment levels that are mapped separately. The Beshoar Alluvium is considered equivalent to Verdos Alluvium of the Colorado Front Range (Pillmore and Scott, 1976; Scott, 1984, and Levings, 1951) and probably was deposited during an interglacial time, starting about 600,000 yr ago and ending thousands of years later
- Qbel** Younger (lower) pediment; about 80-100 ft (25-33 m) above major streams
- Qbeh** Older (higher) pediment; about 110-130 ft (33-39 m) above major streams

- Tla** Dike of intermediate composition (Tertiary)—Fine-grained medium-gray dacite porphyry. Phenocrysts are euhedral to subhedral and consist predominantly of plagioclase (An 25-35) together with pyroxene, biotite, and orthoclase. Feldspars are extensively altered. Groundmass feldspar appears to be predominantly orthoclase. Dike forms persistent conspicuous wall across southwestern part of quadrangle. Age is 26.34 ± 0.50 based on ^{40}Ar ^{39}Ar isochron of Windy Gap dike in the adjacent Ash Mountain quadrangle of the same composition. These dikes are two of several that are probably of the same age and radiate out from Mt. Baldy that is about 13 mi to the south.
- Tpc** Poison Canyon Formation (Paleocene)—Sandstone with interbeds of sandy claystone; caps flat-topped ridges. Sandstone is conglomeratic in upper part, containing pebbles of quartzite, chert, gneiss, feldspar, and quartz; medium grained to granule in lower part; light gray to yellowish gray, weathers grayish orange, dusky yellow, and grayish yellow with stains of red, pink, and brown; arkosic; numerous plant impressions in lower part; massive, forms prominent ledges. Sandy claystone is medium gray to grayish yellow, weathering to grayish-orange or dark-yellowish-orange soil; micaceous; sand grains mostly medium to coarse; forms slopes between and intertongues with sandstone beds. Contact with underlying Raton Formation is generally indefinite and gradational through a transition zone as thick as 100 ft (30.5 m) that consists of very fine to medium grained sandstone with seams and stringers of arkosic granules; sandstone generally in discontinuous beds that intertongue and are interbedded with poorly bedded dusky-yellow-weathering micaceous sandy claystone and mudstone; transition zone also contains thin discontinuous carbonaceous seams and zones and numerous plant impressions. Where lithologies are not significantly different, the contact is mapped above the highest coal or carbonaceous zone and beneath the lowest persistent bed of arkosic granule sandstone. Thickness preserved in the quadrangle is 800-900 ft (245-275 m)
- TKpr** Poison Canyon and Raton Formations, undivided (Paleocene and Upper Cretaceous)—Sandstone and siltstone beds predominantly of Poison Canyon lithologies. Little or no carbonaceous shale or coal. Grain size coarsens to the west. A stippled pattern drawn across the map indicates diagrammatically a zone of lateral intertonguing of rocks of Raton lithology with rocks of Poison Canyon lithology. The zone is arbitrarily drawn to indicate a broad zone of intertonguing across the quadrangle. To the west of the zone, mostly coarser-grained rocks of Poison Canyon lithology become dominant; to the east, finer-grained rocks of the Raton Formation are dominant. Individual tongues of either lithology are difficult or impossible to identify and trace in the field. The zone is shown only to indicate the presence of intertonguing between these two formations and it should not be considered a mappable unit.
- TKr** Raton Formation (Paleocene and Upper Cretaceous)—Sandstone, interbedded with siltstone, claystone and mudstone, and beds of carbonaceous shale and coal; exposures generally poor to fair, individual beds difficult to trace; upper part of Raton Formation intertongues with the Poison Canyon Formation to the west. Sandstone is very fine to medium grained, light gray to yellowish gray, weathering grayish yellow to grayish orange; locally calcareous and carbonaceous; contains numerous plant impressions; some cross-bedding; generally forms ledges. Siltstone is light gray to medium gray; cross laminated; contains streaks of carbonaceous shale, coaly material, and plant fossils. Claystone and mudstone are medium gray to brownish gray; silty and sandy; contain scattered plant impressions and carbonaceous plant fragments; structureless. Carbonaceous shale is mostly associated with coal or occurs as discontinuous seams and lenses in other clastic rocks; contains abundant plant fossils. Coal beds are single beds or composite zones comprised of coal and partings of carbonaceous shale, claystone, and bony or impure coal. The trace of some of the coal beds and zones greater than 2 ft (0.6 m) in thickness that were exposed in dug pits in Juan Baca and Pooler canyons are shown on the map. Thickness of Raton Formation preserved in the quadrangle is about 1900 ft (589 m)

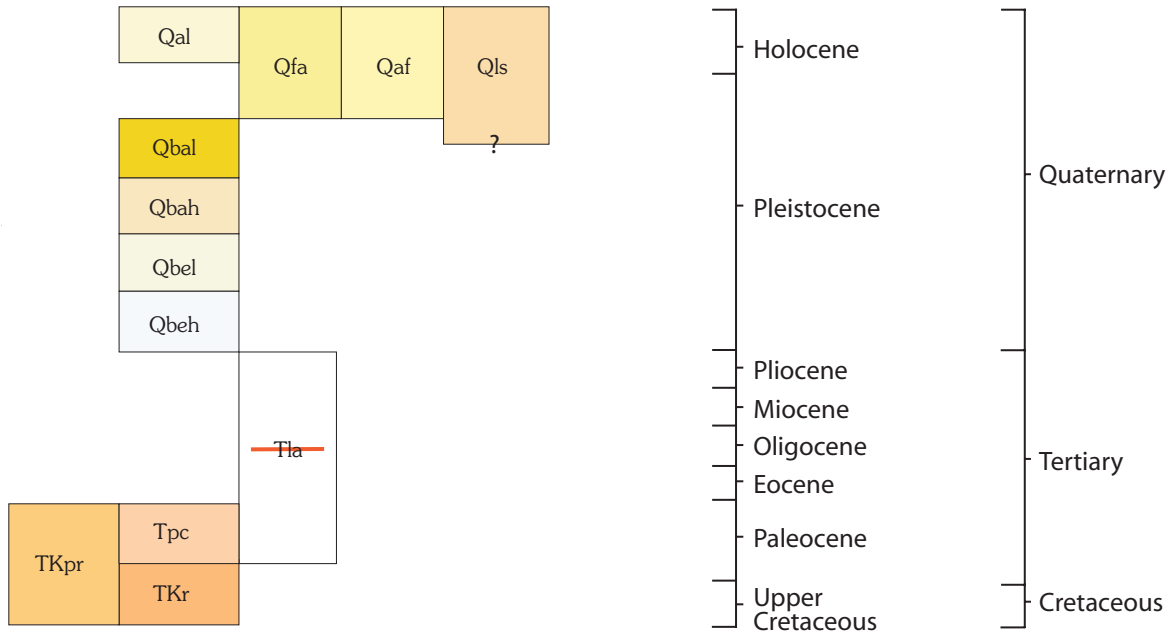
EXPLANATION

- Contact—certain
- Coal bed—approximately located; dashed where inferred
- Structure contours—drawn on top of Trinidad Sandstone
- Inclined bedding—showing strike and dip
- Transition zone—Zone of intertonguing of Poison Canyon and Raton Formations (diagrammatic)—undivided to the west; divided to the east of the zone.

SELECTED REFERENCES

- Lee, W.T., 1917, Geology and paleontology of the Raton Mesa and other regions in Colorado and New Mexico: U.S. Geological Survey Professional Paper 101, 450 p.
- Levings, W.S., 1951, Late Cenozoic erosional history of the Raton Mesa region [Colorado-New Mexico]: Colorado School of Mines Quarterly, v. 46, no. 3, 111 p.
- Pillmore, C.L., 1969, Geologic map of the Casa Grande quadrangle, Colfax County, New Mexico, and Las Animas County, Colorado: U.S. Geological Survey Geologic Quadrangle Map GQ 823, scale 1:62,500.
- , 1976, Commercial coal beds of the Raton coal field, Colfax County, New Mexico in Guidebook of Vermejo Park, northeastern New Mexico: New Mexico Geological Society Guidebook, 27th Field Conference, p. 227-239.
- , 1991, Geology and coal resources of the Raton Coal field, in Molnia, C.L., Kottowski, F.E., Jobin, D. A., and O'Connor, J.C., eds., Coalfields of New Mexico—Geology and resources: U.S. Geological Survey Bulletin 1972, p. 49-68.
- Pillmore, C.L., and Flores, R.M., 1987, Stratigraphy and depositional environments of the Cretaceous-Tertiary boundary clay and associated rocks, Raton basin, New Mexico and Colorado, in Fassett, J.E., and Rigby, J.K., Jr., eds., The Cretaceous-Tertiary boundary in the San Juan and Raton basins, New Mexico and Colorado: Geological Society of America Special Paper 209, p. 111-130.
- Pillmore, C.L., and Maberry, J.O., 1976, Depositional environments and trace fossils of the Trinidad Sandstone, southern Raton basin, New Mexico in Guidebook of Vermejo Park, northeastern New Mexico: New Mexico Geological Society Guidebook, 27th Field Conference, p. 191-195.
- Pillmore, 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 Guidebook, 27th Field Conference, p. 111-120.
- Scott, G.R., 1984, Map showing gravel-bearing surficial deposits and basaltic rocks near Trinidad, Las Animas County, Colorado: U.S. Geological Survey Miscellaneous Field Studies Map MF-1738, scale 1:50,000.
- Scott, G.R., and Pillmore, C.L., 1993, Geologic and structure contour map of the Raton 30' x 60' quadrangle, Colfax, and Union Counties, New Mexico: U.S. Geological Survey Miscellaneous Investigations Series Map I-1266, scale 1:100,000.
- Scott, G.R., Wilcox, R.E., and Mehner, H.H., 1990, Geology of volcanic and subvolcanic rocks of the Raton-Springer area, Colfax and Union Counties, New Mexico: U.S. Geological Survey Professional Paper 1507, 58 p.
- Wanek, A.A., 1963, Geology and fuel resources of the southwestern part of the Raton coalfield, Colfax County, New Mexico: U.S. Geological Survey Coal Investigations Map C-45.

CORRELATION OF MAP UNITS



PRODUCED BY THE UNITED STATES GEOLOGICAL SURVEY
CONTROL BY: USGS, NORANDA
COMPILED FROM AERIAL PHOTOGRAPHS TAKEN: 1961
FIELD CHECKED: 1962
LIMITED REVISION FROM AERIAL PHOTOGRAPHS TAKEN: 1981
FIELD CHECKED: 1983, MAP EDITED: 1986
PROJECTION: TRANSVERSE MERCATOR
GRID: 1000-METER UNIVERSAL TRANSVERSE MERCATOR ZONE 13
HUNGAR-FOOT STATE GRID TICS: NEW MEXICO, EAST ZONE
UTM GRID DECLINATION: 90° WEST
1986 MAGNETIC NORTH DECLINATION: 17° EAST
VERTICAL DATUM: NATIONAL GEODETIC VERTICAL DATUM OF 1929
HORIZONTAL DATUM: 1983 NORTH AMERICAN DATUM
To place on the predicted North American Datum of 1983, move the projection lines as shown by dashed corner ticks (1 meter south and 48 meters east).
There may be private inholdings within the boundaries of any Federal and State Reservations shown on this map

PROVISIONAL MAP
Produced from original manuscript drawings. Information shown as of date of field check

SCALE 1:24 000
1 1000 0 1000 2 KILOMETERS
1 1000 0 1000 2 MILES
CONTOUR INTERVAL 20 FEET
To convert meters to feet multiply by 3.2808
To convert feet to meters multiply by .3048
THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225
OR RESTON, VIRGINIA 22092

QUADRANGLE LOCATION
1 2 3 4 5 6 7 8
1 The Wall
2 Vermejo Park
3 Casa Grande
4 Ash Mountain
5 Casa Grande SW
6 Baldy Mountain
7 Alamo Canyon
8 House Canyon
ADJOINING 1/4° QUADRANGLE NAMES

ROAD LEGEND
Improved Road
Unimproved Road
Trail
Interstate Route
U.S. Route
State Route
VAN BREMMER PARK, NEW MEXICO
PROVISIONAL EDITION 1986
36105-G1-TF-024

GEOLOGIC MAP OF VAN BREMMER PARK QUADRANGLE,

COLFAX COUNTY, NEW MEXICO

By
Charles L. Pillmore
2003