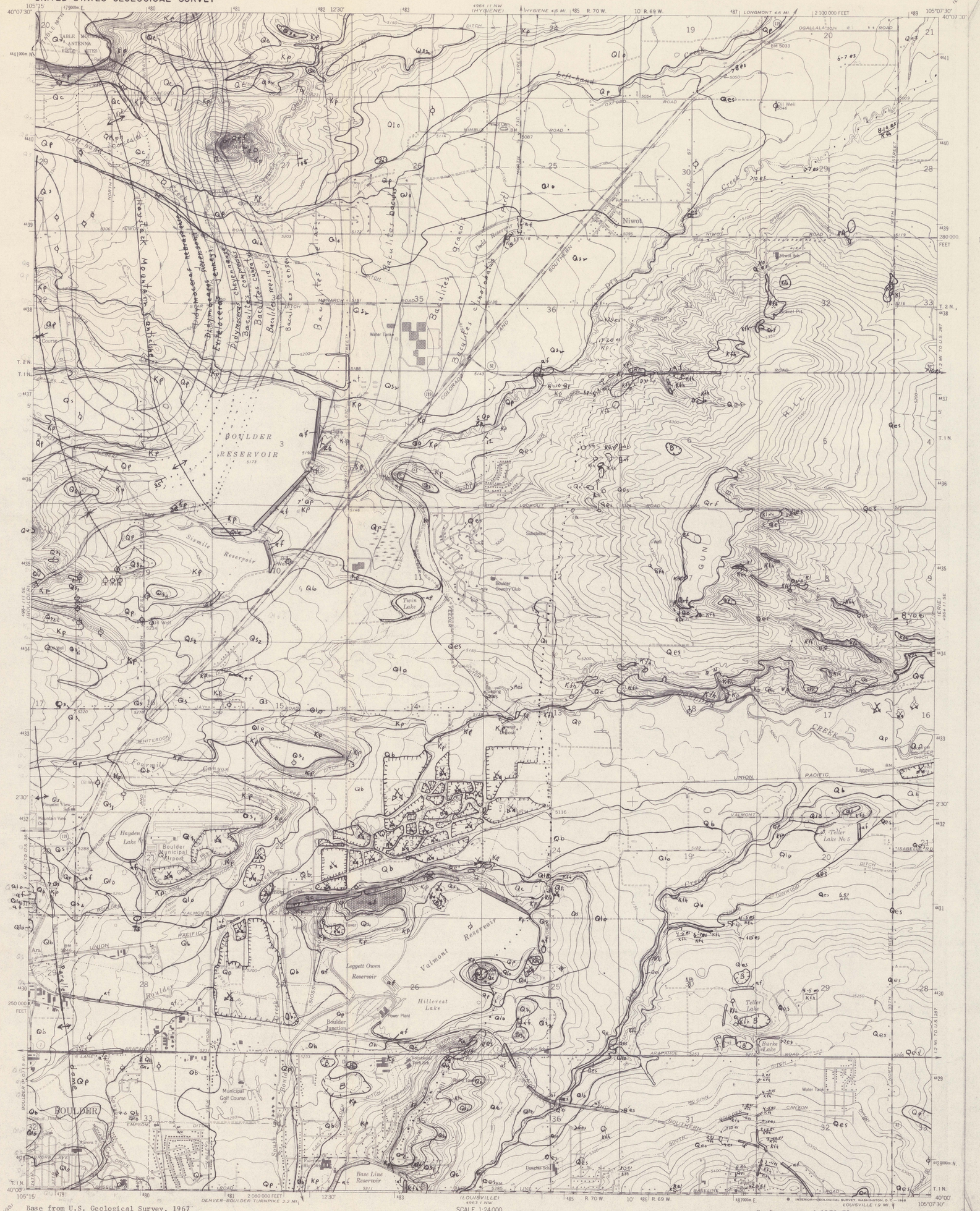
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

OPEN-FILE REPORT
74-10



Geology mapped 1971-72
Faunal zones from Scott and Cobban (1965)

U.S. Geological Survey
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This map is preliminary and has not been edited or reviewed for conformity with Geological Survey standards.

GEOLOGIC MAP OF THE NIWOT QUADRANGLE, BOULDER COUNTY, COLORADO

By
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1974

CORRELATION OF MAP UNITS

af			
UNCONFORMITY			
Qp	Qes	Holocene	QUATERNARY
UNCONFORMITY			
Qb	Qc		
UNCONFORMITY			
Q1o		Pleistocene	
UNCONFORMITY			
Qs	Qs2, Qs1		
UNCONFORMITY			
Qv	Qv2, Qv1		
UNCONFORMITY			
Qrf			
UNCONFORMITY			
Ts		Paleocene	TERTIARY
INTRUSIVE CONTACT			
Kl		Upper Cretaceous	CRETACEOUS
Kfh			
Kp			
Kph			
Kp			

DESCRIPTION OF MAP UNITS

af ARTIFICIAL FILL (HOLOCENE)--Includes uncompacted rubbish, uncompacted dumped fill, and compacted select fill. Rubbish is unsuitable for most foundations and is a source of pollution to shallow water supplies. Dumped fill commonly contains large blocks of concrete, or other debris, and voids that make it unsuitable for most foundations. Compacted fill generally is placed under highways and in small earth dams at optimum moisture and maximum density. Ditch-bank material not shown as artificial fill

Qp PINEY CREEK ALLUVIUM (HOLOCENE)--Dark-gray humic clayey silt and sand in upper 15-61 cm (6 in.-2 ft); gravel, as large as small boulder size (less than 36 cm or 14 inches) in Left-hand Creek and cobble size (6 cm) in Boulder Creek, composed mainly of rounded pebbles of Precambrian crystalline rocks. Little or no alteration of pebbles and cobbles. Consists of medium- to dark-gray clayey sandy silt in Dry Creek. Contains upper Holocene weak Brown soil in upper part. Thickness 0-6 m (0-20 ft). Forms terrace 1.2-6 m (4-20 ft) above modern stream. Locally includes some post-Piney Creek alluvium. Locally may be covered by seasonal floods. Source of gravel for concrete aggregate

Qb BROADWAY ALLUVIUM (PLEISTOCENE--PINEDALE GLACIATION)--Yellowish-orange to reddish-brown humic clayey silt and sand in upper 20-91 cm (8 in.-3 ft); cobbly pebble gravel composed mainly of Precambrian crystalline rocks in lower part. Little or no alteration of pebbles and cobbles. Weak Brown soil of early Holocene age (Altithermal) in upper part. Thickness 0-7.6 m (25 ft). Forms terrace 6-12 m (20-40 ft) above modern stream. Excellent source of gravel for concrete aggregate

Q1o LOUVIERS ALLUVIUM (PLEISTOCENE--BULL LAKE GLACIATION)--Reddish-brown pebbly to bouldery alluvium, much stained by oxides of manganese and iron. Strong Brown soil in upper part. Some vertical threads and slight coatings of $CaCO_3$ in most exposures of the soil profile. Underlies Broadway Alluvium at shallow depth (61-183 cm, 2-6 ft) between Boulder Creek and South Boulder Creek. Maximum thickness probably >7.6 m (>25 ft). Forms terrace 6-12 m (20-40 ft) above modern stream. Base level of cutting deepest of any Quaternary deposits. Source of gravel for concrete aggregate

Qes EOLIAN SAND AND SILT (HOLOCENE TO PLEISTOCENE--SANGAMON INTERGLACIATION)--Mostly grayish-orange to light-brown fine to medium sand and silt. Probably derived mainly from alluvial deposits of Left-hand Creek and Boulder Creek. Thickness 1.5-7.6 m (5-25 ft). Brown Holocene soil in upper part. Locally includes some colluvium

Qc COLLUVIUM (HOLOCENE TO PLEISTOCENE--SANGAMON INTERGLACIATION)--Crudely bedded material deposited on slopes by gravity movement and slopewash. Character of the material reflects the deposit from which it was derived. Thickness 0->7.6 m (>25 ft). Brown Holocene soil in upper part. Colluvium not shown where <1.5 m (<5 ft) thick

Qs SLOCUM ALLUVIUM (PLEISTOCENE--SANGAMON INTERGLACIATION OR ILLINOIAN GLACIATION)--Coarse gravel as large as small boulder size (generally >35 cm, >14 in.), consisting mostly of Precambrian crystalline rocks; some stones are deeply altered by weathering. Upper part of deposit is overbank silt on which a very strong Brown soil is developed, from which the uppermost part commonly is stripped and the Cca (calcium carbonate enriched) horizon is at or near surface. The calcium carbonate fills voids and coats stones, particularly their undersides, and fades out downwards as threads and stringers over a depth of about 1.2 m (4 ft). Maximum thickness of deposit probably about 6 m (20 ft). May be a source of gravel but many stones are much altered and coated by calcium carbonate. Perhaps suitable for use as road metal and bituminous mix

Qs_2 Pediment level generally <30.5 m (<100 ft) above modern stream level

Qs_1 Pediment level 33.5-40 m (110-130 ft) above modern stream level

Qv VERDOS ALLUVIUM (PLEISTOCENE--YARMOUTH INTERGLACIATION OR KANSAN GLACIATION)--Coarse gravel as large as small boulder size (generally less than 41 cm, 16 in.), consisting mostly of Precambrian crystalline rocks; some stones are deeply altered by weathering. Upper part of deposit is overbank silt on which a very strong Brown soil is developed, from which the uppermost part commonly is stripped and the Cca (calcium carbonate enriched) horizon is at or near surface. The calcium carbonate fills voids and coats stones, particularly their undersides, and fades out downward as threads and stringers over a depth of about 1.2 m (4 ft). Thickness of deposits probably about 4.6-6 m (15-20 ft). May be a source of gravel but many of the stones are much altered and coated with calcium carbonate. Suitable for use as road gravel and bituminous mix

Qv_2 Pediment level about 61 m (200 ft) above modern stream level

Qv_1 Pediment level about 76 m (250 ft) above modern stream level

Qrf ROCKY FLATS ALLUVIUM (PLEISTOCENE--AFTONIAN INTERGLACIATION OR NEBRASKAN GLACIATION)--Coarse gravel as large as small boulder size (generally <36 cm, <14 in.), consisting mostly of Precambrian crystalline rocks; some stones are deeply altered by weathering. Complete soil profile not preserved, but calcium carbonate of Cca horizon abundantly present. Thickness of deposit on Haystack Mountain about 11 m (35 ft). Forms pediment surface 91-99 m (300-325 ft) above modern stream level. May be a source of gravel but many stones are much altered and coated with calcium carbonate. Perhaps suitable for use as road metal or bituminous mix

Ts SHOSHONITE OF THE VALMONT DIKE (PALEOCENE)--The name "shoshonite" has been applied to nearly identical rocks of South Table Mountain in the Morrison quadrangle, about 15 miles to the south. The Table Mountain Shoshonite (Scott, 1972) is a very potassic basaltic rock composed of phenocrysts of augite and olivine in a groundmass composed mainly of labradorite and interstitial orthoclase. Biotite, magnetite, and apatite also occur in the rock. The dike is 6-12 m (20-40 ft) wide, and nearly vertical. First described in 1896 (Emmons and others, 1896)

Kl LARAMIE FORMATION (UPPER CRETACEOUS)--Interbedded light- to yellowish- or pinkish-gray siltstone, claystone, and sandstone weathering yellowish orange to reddish brown. Sandstone layers fluviatile-crossbedded. Thickness probably about 213-244 m (700-800 ft), but <7.6 m (25 ft) exposed. Source of coal in adjoining areas

Kfh FOX HILLS SANDSTONE (UPPER CRETACEOUS)--Upper part is light-gray to light-yellow fine- to medium-grained crossbedded sandstone that in many places contains polygonal crack patterns locally called "turtlebacks," underlain by greenish-buff fine- to coarse-grained quartzose sandstone containing abundant dark-brown calcareous concretions. Upper and lower parts locally separated at White Rocks on the north side of Boulder Creek by a layer of coal as much as 20 cm (8 in.) thick capping a lens of mudstone and claystone. Boundaries of formation as defined by Spencer (1961). Total thickness about 91 m (300 ft). An important aquifer

Kp PIERRE SHALE (UPPER CRETACEOUS)--Olive-gray shale and interbedded brown fine-grained sandstone layers that are more abundant in upper part. Thickness 2,438 m (8,000 ft) (Scott and Cobban, 1965). Regional dip generally to the east but is interrupted in the northwest part of the quadrangle by the Haystack Mountain anticline, whose configuration is best delineated by biostratigraphic zones (Scott and Cobban, 1965). Low permeability and locally high swelling pressure. Potential source of clay for common brick and tile and of light-weight aggregate from bloated shale

Kph Hygiene Sandstone Member--A thick sandstone in lower half of the formation; crops out locally west of Haystack Mountain; probably underlies an area of nearly 1/4 square mile (Scott and Cobban, 1965). Thickness 204 m (670 ft)

CONTACT--Dotted where concealed

FAULT--Dotted where concealed. U, upthrown side, D, downthrown side

AMMONITE ZONE--Dotted where concealed. Zonation from Scott and Cobban (1965)

ANTICLINE

SYNCLINE

STRIKE AND DIP OF BEDS IN PIERRE SHALE--From Scott and Cobban (1965)

QUARRY

GRAVEL PIT--Outline (shown only for large pits) by R. B. Colton from February 1973 aerial photographs by Flatirons Co. Pierre Shale exposed on floors of many pits along Boulder Creek west of North 75th Street by removal of Broadway Alluvium or Piney Creek Alluvium is not shown because of constantly changing nature of pit operations

ABANDONED OIL OR GAS WELL OR DRY HOLE--In part from unpublished notes of F. D. Spencer, U.S. Geol. Survey

CLOSED DEPRESSION FORMED BY BLOWOUT

ABBREVIATED LOG--Showing thickness, in feet, of surficial cover and identifying underlying unit

REFERENCES

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