EXPLANATION FOR PRELIMINARY GEOLOGIC MAP OF THE WALDEN QUADRANGLE

NORTH PARK, JACKSON COUNTY, COLORADO

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SCALE 1:48,000

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

QUATERNARY

Holocene

Qa

Alluvium

Flood-plain deposits along present streams

Qls — Landslide and colluvium deposits

Landslide deposits probably contemporaneous with pluvial conditions of glaciation 2 and 3

Qtr — Travertine deposits

Hot spring limestone. Present only on Delaney Butte

Qgp — Sediment gravels

Thin gravel deposits on erosion-cut surfaces. Related to terrace deposits.

Pleistocene

Qt1, **Qt2**

Younger terrace deposits

Qt_1, 10-20 ft above present stream level. Outwash gravel of glaciation 3. Approximately equivalent to Lake surface of Eschman, 1955

Qt_2, 30-40 ft above present stream level. Outwash gravel of glaciation 2. Walden surface of Eschman, 1955

Qot1, **Qot2**, **Qot3**

Older terrace deposits

Numbered in order of age. Qot_1 is the oldest

Qot_1, 80-100 ft above present stream level. Higher surface of Eschman, 1955. May be outwash from pre-Wisconsin glaciation

Qot_2, 170 ft above present stream level

Qot_3, 180 ft above present stream level

UNCONFORMITY

TERTIARY

Miocene

Tmp

North Park Formation

Greyish orange to gray calcareous nodular ashy siltstone, volcanic conglomerate, volcanic ash, pink siltstone, and fine sandstone. Thickness 1000 ft

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Oligocene

Twr

White River Formation

Gray calcareous ashy claystone, siltstone, and sandstone in discontinuous lenses at base of North Park Formation along Estabrook Ridge and Owl Ridge. Includes nonfossiliferous beds of lower and middle Oligocene age southwest of Rich Gulch in sec. 14, T. 8 N., R. 80 W. Thickness to 200 ft

UNCONFORMITY

Tc

Coalmont Formation

Subdivided into lower, Tcl, and middle, Tcm, members only in southwest quarter: fine-grained micaceous sandstone, carbonaceous siltstone, coarse sandstone, conglomerate, carbonaceous claystone or mudstone, and sub-bituminous coal in vicinity of Coalmont. Pollen zones 3 and 4 of R. H. Leopold (Hall, 1968, p. 26-28) of lower Eocene age shown where determinations available. On the basis of pollen east of Coalmont Coalmont, Tc, south of Spring Creek fault zone is equivalent to Tcm and north of Rich Park syncline to Tcl. To between Spring Creek fault zone and Rich Park syncline may be equivalent to Tcm. To within flanks of nutcracker Middle Park limestone is equivalent to Tcm. Thickness 8,000 ft beneath Walden syncline and as much as 12,000 ft to North Park syncline

Paleocene and Eocene

Tmp

Middle Park Formation

Fine- to coarse-grained, tan-weathering arkosic sandstone and marl interbedded with micaceous mudstone and carbonaceous shale. Marked only on southern border of quadrangle. Beds of coalescent age may be present in Coalmont Formation west of Thompson Creek fault on Delaney Butte. Thickness 1,600 ft

UNCONFORMITY

CRETACEOUS

Upper Cretaceous

Kpcs

Kmh

Pierre Shale

Kpcs, sandy member: interbedded brown to gray calcareous sandstone, siltstone, and shale; minor clay-pebble conglomerate and thin coal. Much of sandy member in northwest corner truncated by erosion prior to deposition of overlying zone 2 of Coalmont Formation. Thickness 1,600 ft in wells; 550 ft at surface

Kmh, shaly member: gray shale, silty to sandy in upper part, noncalcareous except near base. Thickness 1,300 ft in wells; 2,300 at surface

Km

Niobrara Shale

Mostly dark-gray calcareous shale; shaly limestone in upper part; basal 20 ft is gray silty limestone. Thickness 700 ft

Kb

Benton Shale

Interbedded brown sandy limestone, calcareous sandstone, and dark calcareous shale in upper part; dark calcareous to noncalcareous shale in middle part; gray siliceous platy shale in lower part; thin bentonite beds in lower and middle parts. Thickness 400-450 ft in wells; 575 ft at surface

Lower Cretaceous

Kd

Dakota Sandstone

Gray to brown sandstone and dark shale in upper part; sandstone, conglomerate, and locally siltstone and claystone in lower part. Thickness 150-170 ft

JURASSIC

Upper Jurassic

Jm

Morrison Formation

Variicolored shale and claystone and lenticular brown sandstone; thin limestone bed at base. Thickness 300-425 ft

Js

Sundance Formation

Gray to green glauconitic sandstone and shale; in upper part, light-gray medium- to coarse-grained massive to cross bedded sandstone in lower part. Thickness 160 ft

UNCONFORMITY

TRIASSIC

Upper Triassic

Ꞧc

Chinle Formation

Red shale, siltstone, and sandstone. Thickness 200 ft

UNCONFORMITY

PRECAMBRIAN

p€g

Granitic rocks

Mostly quartz monzonite

REFERENCES

Eschman, D. F., 1955, Glaciation of the Michigan River Basin, North Park, Colo.: The Journal of Geology, v 63, p. 197-211.

Hall, W. J. Jr., 1968, Geology of southwestern North Park and vicinity, Colo.: U. S. Geol. Survey Bull. 1247, p. 1-115.

SYMBOLS

Contact

Dashed where approximately located, dotted where concealed

Fault

Dashed where approximately located; dotted where concealed. Bar and ball on downthrown side

Thrust fault

Dashed where approximately located; dotted where concealed. Sawteeth on upper plate

Syncline

Showing plunge, dashed where approximately located

Anticline

Showing plunge, dashed where approximately located

Strike and dip of beds

Strike and dip of overturned beds

Coal mine, or crosscut, abandoned

Drill hole for oil, abandoned

Showing name, total depth, and symbol of oldest stratigraphic unit penetrated

Drill hole, show of oil, abandoned

Location and number of Denver polymology collection and age