

EXPLANATION

Recent
Pleistocene
Upper Cretaceous
Lower Cretaceous

Qal
Alluvium
Gravel and sand. Includes Piney Creek Alluvium east of the mountains except along Boulder Creek and Lefthand Creek

Qaf
Alluvial fan deposits
Angular fragments in a sandy matrix

Qc
Colluvium
Locally derived rock debris and soil

Qls
Landslide deposits
Rock slides of Dakota Group along hogback north of Boulder Canyon and of Fountain Formation south of Boulder Canyon

Qp
Piney Creek Alluvium
Dark-gray humic silt, sand, and pebbles; a younger soil occurs in upper part. Locally includes alluvium of Wisconsin age, which commonly underlies Piney Creek Alluvium

Qw
Alluvium of Wisconsin age
Gray to reddish-brown stratified silt, sand, and pebbles. Includes some overlying Piney Creek Alluvium locally. As much as 20 feet thick

Qs
Slocum Alluvium
Reddish-brown sand and gravel in clayey matrix. Contains partly decomposed pebbles, cobbles, and boulders of igneous, sedimentary, and metamorphic rocks. Caps pediment. As much as 30 feet thick

Qv
Verdos Alluvium
Brown sand and gravel on highest pediment in quadrangle. Contains clayey matrix and partly decomposed pebbles, cobbles, and boulders of igneous, sedimentary, and metamorphic rocks. As much as 30 feet thick

Tb
Bostonite porphyry
Grayish-reddish-purple; contains orthoclase phenocrysts in aphanitic groundmass; forms dikes

Tas
Alkali syenite
Pale-brownish-gray, medium-grained; contains orthoclase microperthite and minor quartz; forms dikes

Tql
Quartz latite porphyry
Light- to medium-gray; contains biotite, feldspar, and quartz phenocrysts in aphanitic groundmass; locally intensely altered; forms dikes

Tqm
Quartz monzonite
Fine- to medium-grained, biotitic and hornblende; forms small irregular bodies and stocks

TKd
Diabase
Black, fine-grained; forms dikes

Kpu
Kph
Kpl
Pierre Shale
Kpu, upper member; chiefly olive-gray noncalcareous clayey to sandy siltstone and beds of limestone concretions; only part of the 5,700-foot total thickness of the member exposed in quadrangle
Kph, Hygiene Sandstone Member; olive-gray to light-olive-gray silty to fine-grained sandstone, carbonaceous in part; contains prominent olive-gray clayey siltstone 40 feet thick beginning 210 feet above base; forms low ridge; about 500 feet thick
Kpl, lower member; medium- to dark-gray and olive-gray claystone and clayey siltstone; contains subordinate layers and concretions of ironstone, and beds of limestone concretions and calcareous claystone; about 1,650 feet thick

Kns
Knf
Niobrara Formation
Kns, Smoky Hill Shale Member; olive-gray to light-olive-gray calcarenite to calcareous siltstone interstratified with olive-gray to dark-gray siltstone and calcareous siltstone; olive-gray silty calcarenite 23 feet thick at top of member. Weathers to prominent grayish orange; 370 feet thick
Knf, Fort Hays Limestone Member; light-olive-gray to medium-gray calcarenite and microcrystalline limestone; forms low hogback; 15 to 18 feet thick

Kgg
Carlile Shale, Greenhorn Limestone, and Graneros Shale
Upper part: olive-gray silty claystone, sandy siltstone, and silty sandstone of Carlile Shale, about 75 feet thick; middle part: interlayered dark-gray microcrystalline and bioclastic limestone and calcarenite and olive-gray silty claystone and clayey to calcareous siltstone of the Greenhorn Limestone, about 260 feet thick; lower part: dark-gray to grayish-black siltstone and claystone of the Graneros Shale, about 160 feet thick

Kd
Dakota Group
Upper part: light-gray to grayish-orange well-sorted fine-grained cross-stratified and ripple-laminated sandstone and subordinate horizontally stratified sandy siltstone of South Platte Formation, about 225 feet thick; lower part: white, pinkish-gray, and greenish-gray generally well-sorted fine- to medium-grained sandstone of Lytle Formation, about 50 feet thick

QUATERNARY
TERTIARY
CRETACEOUS (TERTIARY)
CRETACEOUS

Jmu
Jml
Morrison Formation
Jmu, upper member; greenish-gray to pale-reddish-brown clayey siltstone and claystone and subordinate olive-gray limestone; 170-220 feet thick
Jml, lower member; light-brownish-gray to pinkish-gray fine-grained cross-stratified sandstone interbedded with greenish-gray to greenish-red sandy to clayey siltstone and subordinate limestone; 80-100 feet thick. Includes at base greenish-gray siltstone and sandstone and gray limestone, 5 to 20 feet thick, provisionally assigned to Ralston Creek Formation of Late Jurassic age

Js
Sandstone equivalent to Sundance Formation
Very light gray to yellowish-gray fine-grained, in part cross-laminated sandstones equivalent to the Canyon Springs Sandstone Member; 0-37 feet thick. Pinkish-gray very fine grained sandstone at base near northern border of quadrangle may be Jelmu Formation of Late Triassic age

Rll
RPlu
Rlc
Rll
Lykins Formation
Rll, ledge-forming member; light-brown to pale-reddish-brown silty fine-grained sandstone and siltstone; 72-153 feet thick
RPlu, upper slope-forming member; pale-reddish-brown siltstone and sandy siltstone; poorly exposed; 320 feet thick
Rlc, Glennon Limestone Member of Le Roy (1946); pale-red dolomitic siltstone to silty dolomite; has wavy to contorted laminae; 8-16 feet thick
Rll, lower ledge-forming member; pale-reddish-brown to moderate-reddish-brown siltstone and subordinate sandstone; small gypsum nodules locally; 100-150 feet thick

Ply
Lyons Sandstone
Moderate-orange-pink to pinkish-gray fine- to medium-grained well-sorted cross-stratified quartzose sandstone; about 250 feet thick

PPf
Fountain Formation
Pale-red poorly sorted arkosic sandstone and conglomeratic sandstone interstratified with pale-reddish-brown feldspathic sandstone in the upper 550 feet and with pale-reddish-brown siltstone in the lower 400 feet; about 900-950 feet thick

pa
Pegmatite and aplite

hbl
Hornblende-biotite lamprophyre
Greenish-black or greenish-black mottled with pale red, fine- to medium-grained; chiefly hornblende, biotite, and microcline, but may contain quartz and plagioclase; forms dikes. Includes some dark-gray fine-grained quartz monzonite

spe
spp
Silver Plume Granite
spe, pale-grayish-orange to pale-reddish-gray equigranular fine- to medium-grained biotite-muscovite quartz monzonite
spp, gray to tan medium- to coarse-grained seriate porphyritic quartz monzonite that contains tabular microcline phenocrysts; commonly shows trachytoid flow structure

qm
Quartz monzonite
Light- to medium-gray fine-grained biotite quartz monzonite; massive to weakly foliated

bc
Boulder Creek Granodiorite
Light-gray medium-grained granodiorite to quartz monzonite; locally seriate porphyritic with microcline phenocrysts; contains abundant biotite in small aggregates; locally hornblende bearing; weakly to strongly foliated

d
Diorite
Dark-gray fine- to medium-grained diorite and quartz diorite; chiefly biotite, hornblende, cummingtonite, and labradorite. Probably represents metamorphosed gabbro

ba
Biotitic amphibolite
Dark-gray biotite- and quartz-bearing fine-grained amphibolite; forms small irregular bodies

bg
Biotite gneiss
Light- to dark-gray migmatitic, locally sillimanitic, biotite-quartz-plagioclase gneiss and subordinate quartz-microcline-plagioclase gneiss and calc-silicate gneiss; contains well-developed foliation and lineation

JURASSIC
PERMIAN (LATE TRIASSIC)
PERMIAN
PENNSYLVANIAN
CARBONIFEROUS
PRECAMBRIAN

Contact
Dashed where approximately located; short dashed where gradational or inferred

Fault, showing dip
Dashed where approximately located; short dashed where inferred; dotted where concealed

Shear zone
Zones of intense shearing and recrystallization of Precambrian age

Atticline
Folds
Syncline
Short dashed where inferred

Inclined
Overturned
Strike and dip of bedding

Inclined
Vertical
Strike and dip of foliation

Strike and dip of foliation and plunge of lineation

Bearing and plunge of lineation

Vein, showing dip
Dashed where approximately located

Shaft
Prospect
Adit or tunnel

Baculites reesidei
Ammonite zone
Dashed where approximately located; short dashed where inferred beneath surficial cover; queried where diagnostic fossils are lacking to permit extension. Zone lines drawn through central parts of zones or through principal collections of ammonites. Data on ammonite zones from Scott and Cobban (1965)

References

LeRoy, L. W., 1946, Stratigraphy of the Golden-Morrison area, Jefferson County, Colo.: Colo. School Mines Quart., v. 41, no. 2, 115 p.

Scott, C. R., and Cobban, W. A., 1965, Geologic and biostratigraphic map of the Pierre Shale between Jarre Creek and Loveland, Colorado: U.S. Geol. Survey Misc. Geol. Inv. Map I-439.