

U. S. DEPARTMENT OF THE INTERIOR
U. S. GEOLOGICAL SURVEY

GEOLOGIC MAP OF THE RIFLE FALLS QUADRANGLE, GARFIELD COUNTY,
COLORADO

By

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Miscellaneous Field Studies Map MF-2341

Abstract

New 1:24,000-scale geologic map of the Rifle Falls 7.5' quadrangle, in support of the USGS Western Colorado I-70 Corridor Cooperative Geologic Mapping Project, provides new interpretations of the stratigraphy, structure, and geologic hazards in the area of the southwest flank of the White River uplift. The map sheet also has three cross sections and a correlation of map units.

Bedrock strata include the Upper Cretaceous Iles Formation through Ordovician and Cambrian units. The Iles Formation includes the Cozzette Sandstone and Corcoran Sandstone Members, which are undivided. The Mancos Shale is divided into three members, an upper member, the Niobrara Member, and a lower member. The Lower Cretaceous Dakota Sandstone, the Upper Jurassic Morrison Formation, and the Entrada Sandstone are present. Below the Upper Jurassic Entrada Sandstone, the easternmost limit of the Lower Jurassic and Upper Triassic Glen Canyon Sandstone is recognized. Both the Upper Triassic Chinle Formation and the Lower Triassic(?) and Permian State Bridge Formation are present. The Pennsylvanian and Permian Maroon Formation is divided into two members, the Schoolhouse Member and a lower member. All the exposures of the Middle Pennsylvanian Eagle Evaporite intruded into the Middle Pennsylvanian Eagle Valley Formation, which includes locally mappable limestone beds. The Middle and Lower Pennsylvanian Belden Formation and the Lower Mississippian Leadville Limestone are present. The Upper Devonian Chaffee Group is divided into the Dyer Dolomite, which is broken into the Coffee Pot Member and the Broken Rib Member, and the Parting Formation. Ordovician through Cambrian units are undivided.

The southwest flank of the White River uplift is a late Laramide structure that is represented by the steeply southwest-dipping Grand Hogback, which is only present in the southwestern corner of the map area, and less steeply southwest-dipping older strata that flatten to nearly horizontal attitudes in the northern part of the map area. Between these two is a large-offset, mid-Tertiary(?) Rifle Falls normal fault, that dips southward placing Leadville Limestone adjacent to Eagle Valley and Maroon Formations. Diapiric Eagle Valley Evaporite intruded close to the fault on the down-thrown side and presumably was injected into older strata on the upthrown block creating a blister-like, steeply north-dipping sequence of Mississippian and older strata. Also, removal of evaporite by either flow or dissolution from under younger parts of the strata create structural benches, folds, and sink holes on either side of the normal fault. A prominent dip slope of the Morrison-Dakota-Mancos part of the section forms large slide blocks that form distinctly different styles of compressive deformation called the Elk Park fold and fault complex at different parts of the toe of the slide.

The major geologic hazard in the area consist of large landslides both associated with dip-slope slide blocks and the steep slopes of the Eagle Valley Formation and Belden Formation in the northern part of the map. Significant uranium and vanadium deposits were mined prior to 1980.

Purpose

This map was funded by the National Cooperative Geologic Mapping Program. The map is a product of the I-70 Urban Corridor Project. This corridor is experiencing rapid urban growth and geologic mapping is needed to aid in land development planning in order to address, avoid, or mitigate known and potential geologic hazards.

LIST OF MAP UNITS

[See Description of Map Units in the accompanying pamphlet for detailed descriptions of map units.]

af	Artificial fill (latest Holocene)
Qfp	Flood-plain and stream-channel deposits (Holocene and late Pleistocene)
Qg	Gravelly alluvium (late to early? Pleistocene)
QTg	High-level gravelly alluvium (early Pleistocene or late Pliocene)
Qfy	Younger fan-alluvium and debris-flow deposits (Holocene and latest Pleistocene)
Qac	Undivided alluvium and colluvium (Holocene and late Pleistocene)
Qfo	Older fan alluvium and debris-flow deposits (late Pleistocene)
Qp	Pediment deposits (middle Pleistocene)
Qc	Colluvium, undivided (Holocene and late Pleistocene)
Qsw	Sheetwash deposits (Holocene and late Pleistocene)
Qls	Landslide deposits (Holocene and late Pleistocene)
Qcm	Mass-movement deposit (Holocene to middle? Pleistocene)
Qd	Debris-flow deposits (Holocene(?) to late Pleistocene)
Qtu	Tufa deposits (Holocene and late Pleistocene?)
Qlo	Loess (late and middle? Pleistocene)
Qlo/Qp	Loess over pediment deposits
Qlo/Qg	Loess over gravelly alluvium
Qlo/Qfo	Loess over older fan alluvium and debris-flow deposits

Ki	Iles Formation (Upper Cretaceous)
Kicc	Cozzette Sandstone and Corcoran Sandstone Members undivided
	Mancos Shale (Upper Cretaceous)
Kmu	Upper member (Upper Cretaceous)
Kmn	Niobrara Member (Upper Cretaceous)
Kml	Lower member (Upper Cretaceous)
Kd	Dakota Sandstone (Lower Cretaceous)
Jm	Morrison Formation (Upper Jurassic)
Je	Entrada Sandstone (Middle Jurassic)
Jg	Glen Canyon Sandstone (Lower Jurassic)
Jeg	Entrada Sandstone (Middle Jurassic) and Glen Canyon Sandstone (Lower Jurassic), undivided
dc	Chinle Formation (Upper Triassic)
dPs	State Bridge Formation (Lower Triassic and Permian)
	Maroon Formation (Lower Permian to Middle Pennsylvanian)
Pms	Schoolhouse Member (Lower Permian)
Phml	Lower member (Lower Permian? to middle Pennsylvanian)
hev	Eagle Valley Formation (Middle Pennsylvanian)
hevl	Limestone bed
hee	Eagle Valley Evaporite (Middle Pennsylvanian)
hb	Belden Formation (Middle and Lower Pennsylvanian)
MI	Leadville Limestone (Lower Mississippian)
Dc	Chaffee Group (Upper Devonian)
	Dyer Dolomite
Ddc	Coffee Pot Member

Ddb	Broken Rib Member
Dp	Parting Formation
Oeu	Ordovician and Cambrian units, undivided
Xu	Metamorphic rocks, undivided (Early Proterozoic)

MAP SYMBOLS

Contact—Dashed on map where approximately located

Trace of strata in the Maroon Formation and the Mancos Shale—Locally shown on map and on cross sections

Trace of breakaway zones of younger landslides within landslide complexes—Hachures on the downslope side

Normal fault—Dashed where approximately located; dotted where concealed; queried where location uncertain. Bar and ball on down thrown side. Arrow and number show dip directions and amount of fault-plane dip. Arrows show relative sense of movement in cross section

Basal detachment of gravity-driven slide block—Dashed where approximately located; dotted where concealed. Teeth are on the upper plate of the slide block. Arrows show relative sense of motion in cross section

Shear zone along normal fault

Breccia zone along normal fault

Syncline axial trace—Dotted where concealed.

Anticline axial trace—Dotted where concealed.

Contact between evaporite intrusions and surrounding map units—Shown both on map and in cross sections. Dotted where concealed

Presumed flow direction of injected evaporite bodies—Shown by double-sided arrows in cross section A-A'

Sink Hole

Strike and dip of bed

Inclined

Horizontal

Overturned

Adit