Colorado Geological Survey
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John W. Rold, Director

Map Series 27
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Map Series 27

Surficial Geology and Geologic Hazards of the Douglas Pass–Baxter Pass Region, Rio Blanco and Garfield Counties, Colorado

By B. K. Stover

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MAP UNITS

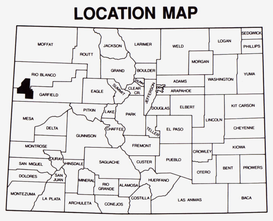
MAP SYMBOL	NAME AND AGE OF UNIT	COMMON DESCRIPTION OF UNIT	ORIGIN OF UNIT	TYPICAL POSITION IN LANDSCAPE	THICKNESS (M)	SLOPE (%)
			ALLUVIAL DEPOSITS			
a	Floodplain and Low Terrace Alluvium (Holocene)	Sand, silt, and clay interbedded with cross-bedded gravel lenses. Pebbles and cobbles of sandstone, siltstone, conglomerate, and marlstone derived from the Mesaverde, Wasatch, and Green River Formations make up the gravel-clast lithologies. Some minor alluvial-fan gravels, along the margins of floodplains and terraces may be included in this unit where it is not practical to delineate them separately at the map scale.	Deposition of channel and overbank sediments by streams. Some sediments occur as low terraces isolated by stream incision. Modern floodplain is generally flooded every 2 to 3 years. The lowest terrace may be inundated during large floods.	Floodplains and low terraces as much as 3 m above stream beds along main stream and tributary drainages. Some valley floors have been deeply incised during the past 100 years, exposing alluvial valley fill deposits in the banks of streams.	1 to 10	0 to 5
ca	Contemporary Floodplain Alluvium	Alluvium of the active beds of modern streams, often incised into older valley fill alluvium. Mapped only where practical at map scale.	Reworked older floodplain and low terrace alluvium.	Beds of modern ephemeral streams.	1 to 2	0 to 1
sw	Sheetwash Alluvium (Holocene)	Sand, silt, clay, and minor interbeds of pebbly sand and fine gravel. Consists of reworked material eroded from adjacent or underlying rocks. Includes small areas of residuum, eolian deposits, and colluvium formed by creep.	Deposition by unchanneled flow of water (sheetwash) on lower hillslopes and depressions.	Gently sloping swales, valley bottoms, upland depressions. Commonly associated with eolian deposits on the Roan Plateau and upland areas.	.6 to 1.5	1 to 4
adf	Alluvial-Fan and Debris-Fan Deposits	Clay, sand, silt, subangular gravel, cobbles, and boulders of rock types derived from the drainage basin of the associated stream. Deposits commonly consist of interlayered matrix-supported mudflow deposits alternating with cobble gravels.	Deposition of alluvial gravels and mudflow and debris-flow deposits derived from steep, rocky drainage basins primarily during flash floods associated with storms or rapid snowmelt.	Deposits form wedge or fan-shaped landforms at the confluence of side valleys or steep, incised canyons, with larger stream valley, or a local base-level. Most are formed by alternating alluvial deposition and debris-flow deposition.	.3 to 6	1 to 10
v	Valley-fill Alluvium (Holocene and Pleistocene)	Silt, sand, clay, and minor interbedded gravel lenses. Gravels consist of sandstone, siltstone, conglomerate, and marlstone clasts derived from the Mesaverde, Wasatch, and Green River Formations. Bison fossils, bones, arrow heads, and charcoal stringers are common. The modern floodplain **(ca)** has been incised into these deposits, but is only shown in larger stream valleys where practical to map.	Alluvial sediment-filled valleys cut in underlying Cretaceous and Tertiary bedrock formations. These deposits are formed primarily by streams and deposition of sheetwash, but probably also contain some eolian materials. After deposition, fill was incised (mostly during the last 100 years) isolating the surfaces of the deposits from the modern stream regimen.	Broad, flat valley floors where modern streams have become deeply incised.	6 to 18	0 to 4
ta	High Terrace Alluvium (Holocene and Pleistocene)	Sand, silt, and clay interbedded with crossbedded gravel lenses. These deposits are similar in composition and origin to floodplain and low terrace alluvium(s). The gravel and alluvium generally show a greater degree of soil development and clast weathering than younger stream alluvium.	Deposition of channel and overbank sediments by streams before their incision to present levels. These deposits are above limits of present day flooding.	Terraces typically lie 10 to 30 m above the pre-incised alluvial valley floor in larger tributary canyons and valleys. Some shallow terrace remnants over 10 m above present valley floors are also present in the mapped area.	1.2 to 7.6	0 to 4
l	Lake and Pond Deposits (Holocene)	Massive to thinly bedded clay and silt.	Deposition of sediments in small ponds and marshy areas and in closed depressions associated with slump and landslide terrain. Also found behind landslide dams which blocked tributary streams and formed lakes.	Natural closed depressions in hummocky landslide terrain. Also behind landslide dams on tributary streams, where deposits may be up to 30 m thick.	.3 to 20 .9 to 6.1	0 to 1
			EOLIAN DEPOSITS			
e	Eolian Deposits (Holocene and Pleistocene)	Reddish silt and minor amounts of sand. May include some sheetwash alluvium.	Wind deposited silt and silty sand derived from alluvium and Cretaceous and Tertiary sandstone and siltstones west and southwest of the area.	Wind-protected valley heads, small upland depressions, and the lee of some hills. Active erosion is common due to overgrazing.	.6 to 6.1	0 to 5
			COLLUVIAL DEPOSITS			
t	Talus and Scree (Holocene)	Deposits of loose, angular, unconsolidated rock debris ranging from pebble and granule size to larger boulders and slabs. Lithologies reflect rock types in source areas above deposits; most talus in the mapped area consists of marlstone (oil shale) from cliffs in the Green River Formation **(Tgr)**. Some dry talus flow occurs within these deposits. Only larger accumulations are mapped.	Movement downslope by rockfall from cliffs and steep slopes deposits broad aprons, narrow bands, or cone or wedgeshaped accumulations of loose rocky debris.	Steep slopes and at the base of cliffs. Long narrow streams of loose talus commonly form chutes on steep slopes below cliffs	1 to 8	10 to 75
c	Colluvium (Holocene and Pleistocene)	Deposits of angular pebbles, cobbles, and boulders in a sandy or clayey matrix. Lithology of clasts and consistency and nature of matrix reflect adjacent slope from which the materials were derived. May contain sheetwash alluvium or eolian deposits in upper part. May also include some residuum, and small or indistinct landslide deposits. Includes thicker areas of rocky soils with imbricated flat clasts developed on the Green River Formation.	Downslope creep of residuum and weathered debris from adjacent side slopes and sliding over moderate to steep slopes. Includes some material deposited by rockfall, but which has become incorporated into the finer grained matrix of the deposit.	Steep flanking slope and footslope positions below cliffs, eroding slopes, and in swales and along upland valleys.	1.5 to 8	10 to 75
ls	Landslide and Slump Deposits (Holocene and Pleistocene)	Homogenous masses of admixed clay, silt, sand, cobbles, and boulders. Includes large toreva (slump) blocks of sedimentary rock which have detached and slumped down from cliffs, forming benches on the steep slopes below. Lithology of deposits reflects the bedrock formation from which it was derived, which is almost exclusively the Wasatch Formation claystones. (Symbols denote activity within the landslide deposits.)	Mass wasting and resulting rotational and translational sliding and debris flowage of material from steep cliffs and unstable slopes. Includes all types of mass-movement deposits, including those formed by earthflow, debris-flow, and slumping.	Forms broad, hummocky areas of landslide terrain around margins of Piceance Creek Basin, and erosional ridges of Green River and Wasatch Formations. Many valleys and canyons are significantly filled and mantled with landslide deposits. Often forms distinctive bench-like landforms below cliffs rimming the Piceance Creek Basin below the stratigraphic contact of the Green River and Wasatch Fms.	Highly variable	Highly variable
			RESIDUUM			
rU	Residuum on Uinta Fm. (Holocene & Pleistocene)	Sand, silt, clay, and pedogenic soil. Grades downward into unweathered Uinta Formation. Contains some sheetwash alluvium, and eolian deposits in upper part. May include small areas of Uinta Formation outcrop which is impractical to map at the map scale.	Sediment formed in place chiefly by disintegration and decomposition of Uinta Formation bedrock. May be distributed by sheetwash, soil or slope creep, and erosion and deposition by wind.	Flat to gentle slopes underlain by Uinta Formation rocks.	2.4 to 4.5	0 to 15
rG	Residuum on Green River Formation (Holocene and Pleistocene (?)]	Sand, silt, clay, pedogenic soil, and flat pebbles and clasts of marlstone and silt and sandstone weathered from the underlying Green River Formation. Grades downward into unweathered Green River Formation; contains some sheetwash **(sw)** and eolian deposits in upper part. May include small areas of Green River outcrops impractical to map at the mapping scale.	Sediment formed in place chiefly by disintegration and decomposition of underlying Green River bedrock. May be distributed by sheetwash, soil and slope creep, and erosion and deposition by wind.	Flat to gentle slopes and upland areas underlain by Green River Formation rocks.	2.4 to 4.5	0 to 15
rW	Residuum on Wasatch Formation (Holocene)	Clay, silt, granules, pedogenic soil, and pebbles and cobbles of conglomerate and chert. Grades downward into unweathered Wasatch Formation. Contains some sheetwash and eolian **(e)** material in upper part. May include small areas of Wasatch outcrop impractical to map at the mapping scale. Pebbles of chert and conglomeratic are common and form a layer of lag pebbles and cobbles.	Formed in place by disintegration and decomposition of the Wasatch Formation. May be distributed by sheetwash, soil and slope creep, and erosion and deposition by wind. Pebbles of chert and conglomeratic gravel clasts often form a surface veneer of lag pebbles and gravel.	Flat to gentle slopes underlain by Wasatch Formation beds that have not undergone mass wasting. Most often found on ridges and hilltops capped by Wasatch beds. Material weathered from Wasatch claystone beds is notoriously unstable, and is highly susceptible to creep and slope failure.	.6 to 2.4	0 to 10
rMv	Residuum on Mesaverde Formation (Holocene)	Sand, silt, pebbles, and clasts of sandstone and conglomeratic sandstone. Grades downward to crumbly gray shale or brown sandstane of the Mesaverde Group. Materials reflect variations in bedrock lithology of the Mesaverde Group which consists of alternating sandstone, shale, and siltstone. Contains some sheet wash **(sw)** and eolian deposits in upper part. May include small areas of Mesaverde outcrop which are impractical to map at the mapping scale.	Formed in place chiefly by disintegration of underlying Mesaverde Formation bedrock.	Flat to gentle slopes underlain by Mesaverde bedrock.	.6 to 2.4	0 to 14
rM	Residuum on Mancos Shale (Holocene)	Gray clay, silt, and subordinate amounts of sand. Contains chips and fragments of sandstone. Grades downward into crumbly gray or black Mancos shale. May include some sheetwash **(sw)** and eolian materials in upper part.	Sediment formed in place chiefly by disintegration and decomposition of underlying Mancos shale bedrock. May be distributed by sheetwash and soil creep.	Flat to gentle slopes underlain by Mancos Shale bedrock.	.3 to 1.8	0 to 14
			BEDROCK			
Tgr	Green River Formation (Eocene)	Marlstone (oil shale), siltstone, and sandstone; generally forms steep, smooth slopes, cliffs, and spires. Includes lower, middle, and upper parts of the Douglas Creek Member, the Mahogony oil-shale bed, and the Parachute Creek Member.	Ancient lacustrine sediments.	Caps many summits and commonly forms cliffs.	Variable	Commonly steep
Tw	Wasatch Formation (Eocene and Paleocene)	Purple, maroon, and gray massive mudstone containing lentiular sandstone beds.	Fluvial and continental-lacustrine sediments.	A source of sediment for alluvial deposits of various types. Forms slopes usually overlain by various colluvial deposits of variable thickness below the Green River Formation.	75 to 200	Gentle to steep
Kmv	Mesaverde Group (Upper Cretaceous)	Gray-to-white, fine-grained, massive sandstone interbedded with medium-gray massive, silty shale, brownish-gray sandy shale, coal, medium-grained sandstone, and minor siltstones.	Probably shallow water marine and non-marine environments near a shoreline with (coal forming) swamps.	Often forms rugged terrain with sandstone cliffs.	About 700	Variable depends on outcrop lithology
Km	Mancos Shale (Upper Cretaceous)	Brown to dark gray marine shale with interbedded siltstone marine and fine-grained sandstones.	Marine	Forms slopes usually overlain by various colluvial deposits of variable thickness.	Uppermost 100 crops out	Variable steep

MAP SYMBOLS

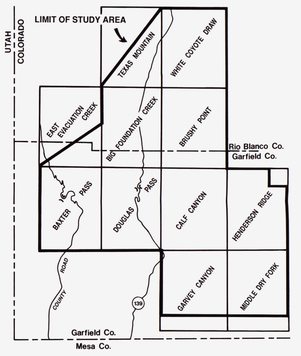
Contact, dashed where approximately located

Active landslides: landslides, slumps, and earthflows which were actively moving as of fall 1979 when the aerial photography upon which this mapping is based was flown. Scarp symbol denotes upslope extent of active movement; arrow symbol indicates direction of downslope movement and tip of arrow shows position of active toe or deposition area in 1979. Most of the active landslides have increased in size since aerial photography was done.

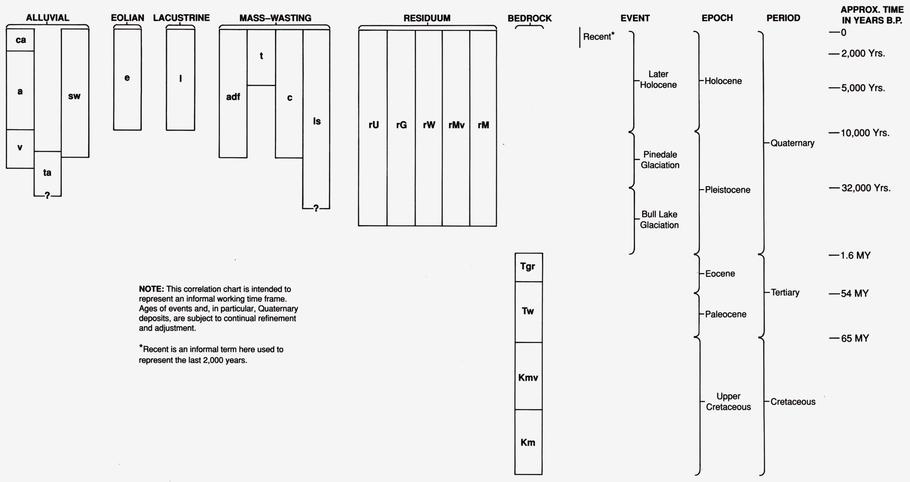
LOCATION MAP



TOPOGRAPHICAL LOCATION MAP



CORRELATION OF MAP UNITS



NOTE: This correlation chart is intended to represent an informal working time frame. Ages of events and, in particular, Quaternary deposits, are subject to continual refinement and adjustment.

*Recent is an informal term here used to represent the last 2,000 years.

Base maps from U.S. Geological Survey 1:50,000 scale
County Map Series, Rio Blanco and Garfield Counties

SCALE 1:50 000

1 ½ 0 1 2 3 MILES

1 .5 0 1 2 3 KILOMETERS

STATE OF COLORADO 1876