

EXPLANATION

ALLUVIAL FACIES

COLLUVIAL FACIES

BEDROCK

TIME OF DEVELOPMENT OF LATE RECENT SOIL

Qal

Low terrace and floodplain deposits  
 Pinkish-gray to grayish-brown boulder, cobble, and pebble gravel in a fine sand matrix; well sorted, well rounded; stones are predominantly basalt with subsidiary amounts of local sedimentary rocks. Reddish-brown lenses of sandy silt are common

Qes

Alluvial and eolian sand and silt  
 Yellowish-brown gravelly silt and sand, reddish-brown silt; generally well sorted. Contains mostly quartz derived from nearby sedimentary rocks; commonly fills depressions and young valleys; arroyos 10-12 feet deep are incised in the deposits. Mapped only where moderately extensive and thick enough to cover the underlying deposits. 1-30 feet thick

Qes

Earthflow and solifluction deposits  
 Unsorted boulder, cobble, and pebble gravel in a light-greenish-gray sandy silt matrix; contains some basalt boulders derived from older till and landslide deposits; predominantly angular fragments of sandstone, siltstone, and claystone derived from the Wasatch Formation. Surfaces are irregular, often crudely terraced with lobes and swales and undrained depressions. 1-30 feet thick

TIME OF DEVELOPMENT OF POST-GRAND MESA SOIL

Qga

Terrace and fan gravels of Grand Mesa  
 Pebble, cobble, and boulder gravel in a sandy matrix; moderately well sorted; subrounded to well rounded; tabular structure; stones are mostly basalt but also include variable amounts of sedimentary rocks. Gradients are 50-100 feet per mile. 5-200 feet thick  
 Qgay, younger gravels; merges with Recent floodplain deposits (Qal); less than 80 feet above streams  
 Qgao, older terrace gravels; 50-200 feet above streams

Qgp

Pediment gravel of Grand Mesa  
 Pebble, cobble, and boulder gravel in a light-greenish-gray silty sand matrix; poorly sorted; commonly unstratified; stones angular to subangular, slabs predominantly locally derived sandstone, siltstone, claystone, and marlstone; basalt boulders scarce. Deposits especially common at the base of steep slopes in arid regions. Probably includes some colluvial material. Gradients 150-200 feet per mile. Commonly mantles with thin reddish-brown eolian silt. 5-40 feet thick

TIME OF DEVELOPMENT OF LANDS END-GRAND MESA INTERGLACIAL SOIL

Qla

Terrace and fan gravels of Lands End  
 Grayish-brown sandy gravel; moderately to poorly sorted; poorly stratified, rock fragments angular to well rounded; basalt and locally derived slabby siltstone, marlstone and sandstone. Gradients of fans 400 feet per mile. 20-200 feet thick

Qal

Solifluction deposits  
 Large angular blocks of basalt enclosed in silty sandy matrix. Block rubble deposits are included

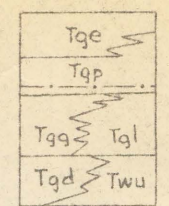
TIME OF DEVELOPMENT OF PRE-LANDS END INTERGLACIAL SOIL

Qa

Terrace and fan gravels  
 Pebble, cobble, and boulder gravel; stones subrounded to well rounded; sorting poor to good; stones equally divided between basalt and locally derived sandstone, claystone, siltstone and marlstone; matrix is greenish-gray silty sand. Reddish-brown windblown sand and silt locally mantles terrace surfaces

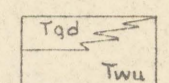
Qp

Pediment gravel  
 Subangular to subrounded pebble, cobble, and boulder gravel; basalt boulders as much as 8 feet in diameter; cobbles, pebbles, and matrix are approximately 50 percent locally derived grayish-green sandstone, siltstone, and claystone; poorly sorted except near Colorado River to the north. Gravel surface is commonly mantled with a thin veneer of reddish-brown windblown sand and silt. Gradients commonly 300-400 feet per mile. Generally less than 50 feet thick  
 Qp, pediment gravel undifferentiated; 440-500 feet above Colorado River  
 Qpo, older pediment gravel; 1,300 feet above Colorado River



Green River Formation

Tge, Evacuation Creek Member: light-brown and gray very fine to medium grained sandstone and light-gray marlstone and siltstone; contains ostracods  
 Tgp, Parachute Creek Member: black, brown, and gray oil shale of varying quality that locally forms cliffs; contains minor amount of light-gray siltstone and light-gray and brown fine- to medium-grained sandstone; numerous thin, persistent light-gray to brown analcite and tuff beds. Outcrop of richest oil-shale bed (Mahogany bed) indicated by dashed-and-dotted line  
 Tgd, Garden Gulch Member: light-gray barren marlstone, dark-brown to black paper shale (oil shale of varying quality), light-gray oolitic limestone and sandstone, light-gray algal limestone, and some massive brown fine- to medium-grained sandstone  
 Tgl, Douglas Creek Member: brown and buff massive fine- to coarse-grained sandstone that forms conspicuous ledges, and gray shale; on the south side of Battlement Mesa the member intertongues with and is replaced by the red claystone and lenticular channel sandstone of the upper member of the Wasatch Formation  
 Tgw, lower member: fine- to coarse-grained gray and brown sandstone containing minor amounts of light-gray siltstone and marlstone and a few thin tan low-grade oil-shale beds



Upper member of Wasatch Formation

Variegated red, gray, purple, and lavender shale and clay; red predominant; some lenticular fine- to coarse-grained channel sandstone; underlies, intertongues with, and replaces the Douglas Creek Member of the Green River Formation; underlies the lower member of the Green River Formation in the southeastern part of the quadrangle

Contact

Dashed where approximately located

U

D

Fault

U, upthrown side; D, downthrown side

Gas well

Dry hole

Although these strata are here assigned to the Evacuation Creek Member of the Green River Formation, as they commonly have been here and elsewhere in the Piceance Creek Basin, they are lithologically more similar to and probably equivalent to the Uinta Formation as used in the Uinta Basin (see H. D. Curry, 1968, Oil-content correlation of Green River oil shales, Uinta and Piceance Creek Basins; Intermountain Assoc. Petroleum Geologists Guidebook, 13th Ann. Field Conf., p. 169-171).

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

SOIL DESCRIPTIONS

Only those soils displaying a completely developed diagnostic profile are described. These soils may occupy as little as 10 percent of the mapped area of a unit.

LATE RECENT SOIL:

A horizon: reddish-gray to brownish-black silt, brownish-black fine sandy silt loam, and black silty clay; humic; 0.5-1.5 ft.  
 Cca horizon (generally absent): contains fracture fillings and thin stringers of grayish-white calcium carbonate; some thin carbonate films on stones; 0.4-2.0 ft.

POST-GRAND MESA SOIL:

A horizon: brown and dark-brown to dark-reddish-gray gravelly silt loam to brownish-black silt; friable; 0.9-1.8 ft.  
 B horizon: moderate-yellowish-brown (MFR 4/4) gravelly silt loam to reddish-brown (5YR 5/3) sandy silt loam to dark-reddish-gray gravelly silt loam; loose, weak granular structure; very weakly oxidized; pH 8.0; 0.8-1.7 ft.  
 Cca horizon: white to gray-white gravelly silt; calcium-carbonate impregnation ranges from very strong with well-developed platy structure to thin coatings on stones; 1.0-1.5 ft.

LANDS END-GRAND MESA INTERGLACIAL SOIL:

A horizon: brown to brownish-black silt and fine silty sand; loose, friable; 0.5-1.5 ft.  
 B horizon: dark-reddish-brown (5YR 3/3) clay to dark-reddish-brown (5YR 4/4) sandy silt to reddish-brown (2.5YR 4/4) silty clay loam and silt; clay skins, medium platy to blocky structure; moderately sticky; pH 8.5; secondary carbonate; 3.0-4.0 ft.  
 Cca horizon: pink (7.5YR 7/4) silt loam to white gravelly silt; strongly impregnated with calcium carbonate; locally indurated platy structure; 1.5-5.0 ft.

PRE-LANDS END INTERGLACIAL SOIL:

A horizon: dark-brown to brown sandy silt; friable; calcium-carbonate aggregates scattered throughout; probably of modern origin; no structure; pH 8.0; 0.5-1.5 ft.  
 B horizon (commonly partially or completely stripped): reddish-brown (5YR 5/3-5YR 4/3) fine sandy silt; a few partially weathered basalt pebbles; weak blocky structure; very slightly sticky; 2.0-3.0 ft.  
 Cca horizon: white gravelly silty sand; very strongly impregnated with calcium carbonate, stones often thickly coated; prominent platy structure, moderately well cemented, firm; 3.0-5.0 ft.

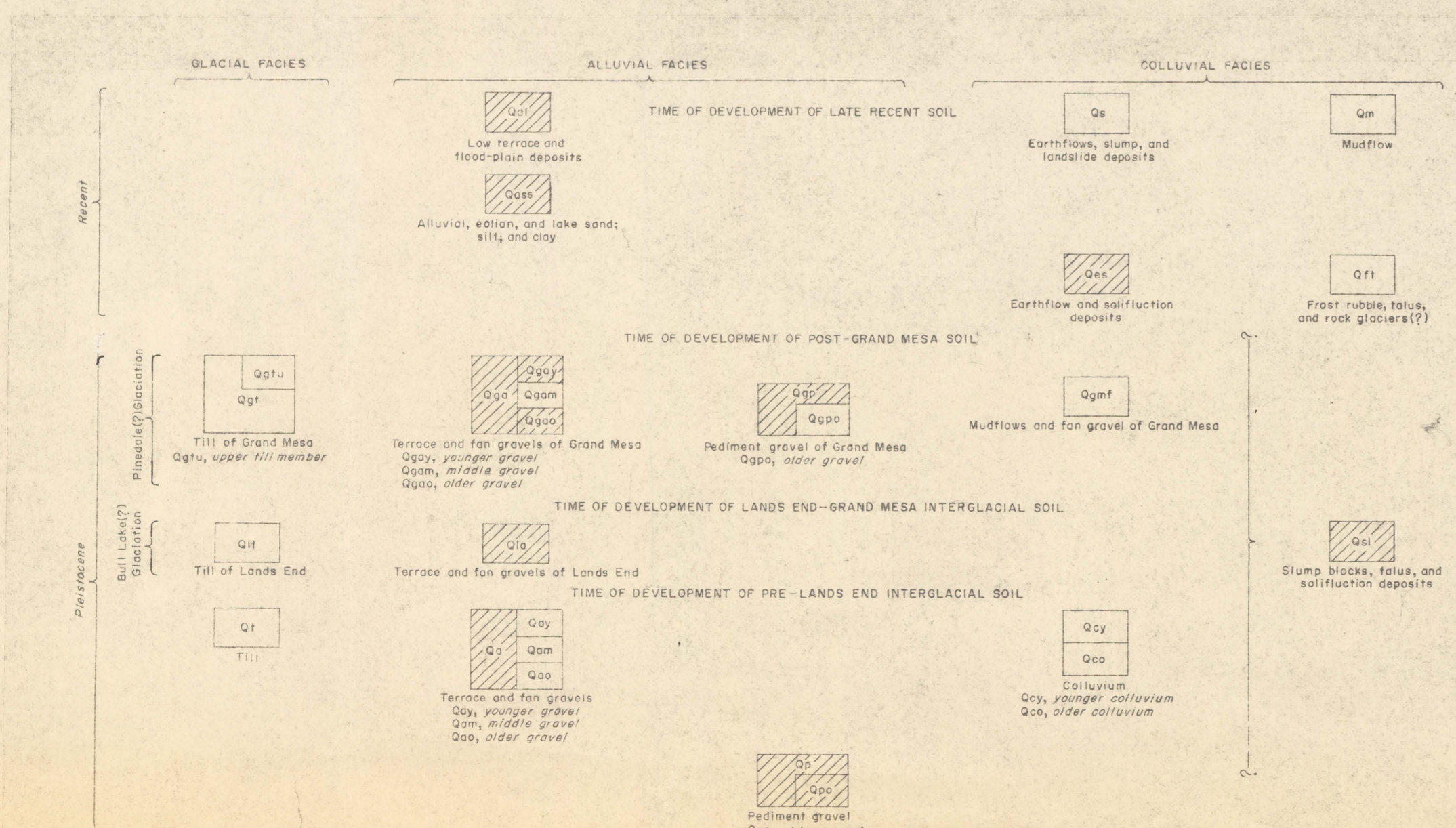
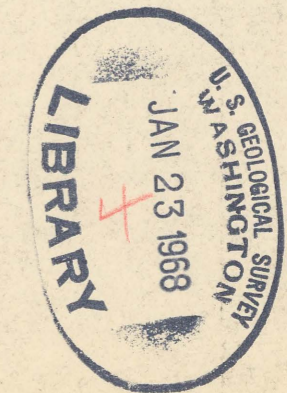


DIAGRAM SHOWING RELATIVE AGES OF SURFICIAL UNITS IN THE GRAND MESA-BATTELEMENT MESA AREA  
 Patterned boxes indicate units present in this quadrangle



Colorado (HouseTop Mountain quad.) Geol. 1:24,000 1968  
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