

CORRELATION OF MAP UNITS

Qa1	Qs	Qm	Qass	Qes	Holocene
Qg1	Qg2	Qg3	Qg4	Qg5	Quaternary
Qc	Qd	Qe	Qf	Qg	Pleistocene
Qh	Qi	Qj	Qk	Ql	Quaternary
Qm	Qn	Qo	Qp	Qq	Pleistocene
Qr	Qs	Qt	Qu	Qv	Quaternary
Qw	Qx	Qy	Qz	Qaa	Pleistocene
Qab	Qac	Qad	Qae	Qaf	Quaternary
Qag	Qah	Qai	Qaj	Qak	Pleistocene
Qal	Qam	Qan	Qao	Qap	Quaternary
Qaq	Qar	Qas	Qat	Qau	Pleistocene
Qav	Qaw	Qax	Qay	Qaz	Quaternary
Qba	Qbb	Qbc	Qbd	Qbe	Pleistocene
Qbf	Qbg	Qbh	Qbi	Qbj	Quaternary
Qbk	Qbl	Qbm	Qbn	Qbo	Pleistocene
Qbp	Qbq	Qbr	Qbs	Qbt	Quaternary
Qbu	Qbv	Qbw	Qbx	Qby	Pleistocene
Qbz	Qca	Qcb	Qcc	Qcd	Quaternary
Qce	Qcf	Qcg	Qch	Qci	Pleistocene
Qcj	Qck	Qcl	Qcm	Qcn	Quaternary
Qco	Qcp	Qcq	Qcr	Qcs	Pleistocene
Qct	Qcu	Qcv	Qcw	Qcx	Quaternary
Qcy	Qcz	Qda	Qdb	Qdc	Pleistocene
Qdd	Qde	Qdf	Qdg	Qdh	Quaternary
Qdi	Qdj	Qdk	Qdl	Qdm	Pleistocene
Qdn	Qdo	Qdp	Qdq	Qdr	Quaternary
Qds	Qdt	Qdu	Qdv	Qdw	Pleistocene
Qdx	Qdy	Qdz	Qea	Qeb	Quaternary
Qec	Qed	Qee	Qef	Qeg	Pleistocene
Qeh	Qei	Qej	Qek	Qel	Quaternary
Qem	Qen	Qeo	Qep	Qeq	Pleistocene
Qer	Qes	Qet	Qeu	Qev	Quaternary
Qew	Qex	Qey	Qez	Qfa	Pleistocene
Qfb	Qfc	Qfd	Qfe	Qfg	Quaternary
Qfh	Qfi	Qfj	Qfk	Qfl	Pleistocene
Qfm	Qfn	Qfo	Qfp	Qfq	Quaternary
Qfr	Qfs	Qft	Qfu	Qfv	Pleistocene
Qfw	Qfx	Qfy	Qfz	Qga	Quaternary
Qg1	Qg2	Qg3	Qg4	Qg5	Pleistocene
Qg6	Qg7	Qg8	Qg9	Qg0	Quaternary
Qg1	Qg2	Qg3	Qg4	Qg5	Pleistocene
Qg6	Qg7	Qg8	Qg9	Qg0	Quaternary
Qg1	Qg2	Qg3	Qg4	Qg5	Pleistocene
Qg6	Qg7	Qg8	Qg9	Qg0	Quaternary

DESCRIPTION OF MAP UNITS

Qa1 LOM ALLUVIAL TERRACE AND FLOODPLAIN DEPOSITS (HOLOCENE)—Pinkish-gray to grayish-brown boulders to pebble-size gravel in a fine sand matrix. Gravel is well-sorted, well-rounded basalt and lesser amounts of local sedimentary rocks. Lenses of reddish-brown sandy silt common.

Qs SLUMP, EARTHFLOW, AND LANDSLIDE DEPOSITS (HOLOCENE)—Small slumps developed in tertiary claystone beds grade downslope into hummocky earthflow having flow ridges. Fresh slide scars common. Vegetation commonly uprooted and tilted. Most slides presently active.

Qm MIDDLE DEPOSITS (HOLOCENE)—Angular to subangular boulders, cobbles, and pebbles in a matrix of reddish-brown silty clay, and yellowish-green, brown, and grayish-brown sandy silt; unsorted. Scattered clay pods, boulders of locally derived basalt, sandstone, marlstone, siltstone, and claystone. Surfaces irregular, containing small ponds, lobate flow ridges, modified scars, streamlike forms, and uncommon natural levees. Commonly developed on claystones of the Wasatch Formation. Some deposits presently active.

Qass ALLUVIAL AND EOLIAN SAND AND SILT (HOLOCENE)—Well-sorted, reddish-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. Mapped only where moderately extensive. About 1-30 ft (0.3-9 m) thick.

Qes EARTHFLOW AND SOIL CREEP DEPOSITS (HOLOCENE)—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 and angular fragments of sandstone, siltstone, and claystone derived from the Wasatch Formation. Surfaces are irregular, crudely terraced and contain lobes and swales and undrained depressions; local pond deposits. About 1-30 ft (0.3-9 m) thick.

Qm GRAND MESA FORMATION (PLEISTOCENE)—?medial (?) Glaciation

Qgt TILL—Light-grayish-brown and moderate-brown to olive-gray, gravelly, sandy, and silty loam, to grayish-brown, gravelly, sandy silt; angular to subangular boulders to pebbles of which more than 50 percent are basalt. A few basalt boulders and cobbles are striated, but many are soiled and faceted. Smooth till plains common. Coarse basalt fragments within the till show little weathering. Maximum thickness about 600 ft (180 m).

Qga Alluvial terrace gravels—Less than 60 ft (20 m) above streams

Qgam Middle alluvial terrace gravels—About 40-160 ft (12-48 m) above streams

Qgao Older alluvial terrace gravels—About 160-300 ft (48-90 m) above streams

Qga Intertongue with till (Qgt) in till plains on the lower slopes of Grand Mesa. About 50-200 ft (15-60 m) above streams

DEPOSITS OF PRE-BULL LAKE(?) GLACIATIONS (PLEISTOCENE)

Qc Colluvium—angular to subangular, poorly sorted boulder, cobble, and pebble gravel in a greenish-gray sandy silt matrix. May include some till. Basalt boulders as much as 5 ft (1.5 m) in diameter, and sandstone, marlstone, and claystone slabs as much as 1 ft (0.3 m) in length are common. Occurs high above present streams and has irregular topographic form

CORELATION OF MAP UNITS

Qa Alluvial terrace and fan gravels, undifferentiated—Younger than gravels of unit Qao. Pebble, cobble, and boulder gravel; subrounded to well rounded; poorly to well sorted. Gravel 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. About 200 ft (60 m) thick near Plateau Creek

Qao Older alluvial terrace and fan gravels—About 40-800 ft (12-240 m) thick (bedrock gravel)—Subangular to subrounded pebble, cobble, and boulder gravel. Basalt boulders as much as 8 ft (2.5 m) in diameter. Cobbles, pebbles and matrix are locally derived, poorly sorted, grayish-green sandstone, siltstone, and claystone. Gravel surface is commonly mantled with a thin veneer of reddish-brown, windblown sand and silt. Generally less than 50 ft (15 m) thick

GREEN RIVER FORMATION (Eocene)

Tga Anvil Points Member—Fine- to coarse-grained, gray and brown sandstone containing minor amounts of gray siltstone, marlstone, and oolitic, oolitic, and algal limestone and a few tan low-grade oil-shale beds. Crops out only on top of Chalk Mountain in southwest part of quadrangle. About 500 ft (150 m) thick

WASATCH FORMATION (Eocene and Paleocene)

Tw Note: Age designations follow those of Johnson and Douglas (1980) in the Wasatch Ridge quadrangle to the northwest where the Shire Member was designated Eocene, the Molina Member was designated Eocene and Paleocene(?), and the Atwell Gulch Member was designated Paleocene

Tw Wasatch Formation, undifferentiated—Shown only southwest of Chalk Mountain where the Molina Member has pinched out. Unit there includes lithologic equivalents of the Shire and Atwell Gulch Members

Tw Shire Member—Variegated maroon, gray, and brown shale and clay, and some lenticular beds of sandstone and conglomerate. About 160-500 ft (50-150 m) thick

Tw Molina Member—Massive, fine- to coarse-grained, gray and brown sandstone, in part conglomeratic; lesser gray, green, and variegated claystone. Conspicuous ledge-forming unit. Pinches out on west flank of Chalk Mountain. Maximum thickness about 320 ft (98 m). Donnell (1969, p. 14-15) measured detailed reference sections of the Molina Member just north of the quadrangle in secs. 24, T. 9 S., R. 97 W., and just east of the quadrangle in sec. 4, T. 10 S., R. 96 W.

Tw Atwell Gulch Member—Purple, lavender, red, and gray claystone, and minor amounts of gray and brown lenticular sandstone and siltstone. About 300-700 ft (90-210 m) thick. Donnell (1969, p. 12-13) measured a detailed reference section of the Atwell Gulch Member just north of the quadrangle in secs. 23 and 26, T. 9 S., R. 97 W.

MESAVERT FORMATION (UPPER CRETACEOUS)

Kmvo Ohio Creek Member—Purple, lavender, red, and gray claystone, and minor amounts of gray and brown lenticular sandstone and siltstone. About 300-700 ft (90-210 m) thick. Donnell (1969, p. 12-13) measured a detailed reference section of the Ohio Creek Member just north of the quadrangle in secs. 23 and 26, T. 9 S., R. 97 W.

Kmvl Lower part—Fine- to medium-grained, ledge-forming, brown sandstone interbedded with gray shale, carbonaceous shale, and some thin coal beds. Extreme lateral variation in thickness of sandstone beds. Approximately upper 1,300 ft (390 m) exposed

Table 1.—Data for drill holes in the Mesa quadrangle, Colorado

Map No.	Section	Company and drill-hole name	Total depth Feet	Meters
		T. 9 S., R. 96 W.		
1	30	Pacific Natural Gas 14-30-3 Govt.	3,507	1,069
2	31	Chandler and Assoc. 5-31 Shire Gulch-Federal	3,657	1,115
3	31	Chandler and Assoc. 13-31 Grunhaus-Federal	3,330	1,012
4	32	Chandler and Assoc. 11-32 North Plateau Creek	4,323	1,317
		T. 9 S., R. 97 W.		
5	25	Norris Oil Co., 25-1 Federal	3,251	991
6	28	Koch Exploration #3 Horseshoe Canyon	3,215	980
7	29	Koch Exploration #1 Horseshoe Canyon	7,183	2,189
8	29	Koch Exploration #2 Horseshoe Canyon	3,059	932
9	32	Garman & Hawkins 1-A	4,096	1,248
10	32	Texaco #1 Heffeline-Govt.	7,580	2,310
11	33	Texaco #2 Roberts Canyon	7,077	2,157
12	33	Koch Exploration #4 Horseshoe Canyon	3,215	980
13	34	Koch Exploration #5 Horseshoe Canyon	3,285	1,001
14	34	Koch Exploration #1-34 Horseshoe Canyon	3,322	1,013
15	35	Inland Oil and Gas	3,164	964
16	35	Pacific Natural Gas 23-35 Shire Gulch	7,483	2,281
17	35	Martin Oil 35-1 Fed. Shire Gulch	3,210	978
18	36	Norris Oil Co., 36-1 Fed.	3,350	1,021
19	36	Norris Oil Co., 36-2 Fed.	3,220	981
20	36	Norris Oil Co., 36-3 Fed.	3,422	1,043
		T. 10 S., R. 96 W.		
21	6	Compas Exploration, #1 Govt.	3,631	1,107
22	17	Chandler and Assoc., 2-17 Jenacaro	3,460	1,315
23	17	Chandler and Assoc., 5-17 Bruton	3,146	959
24	17	Adolph Coors Co., 4-17 Ute	3,215	980
25	18	Adolph Coors Co., 2-18 Mystem	3,060	932
26	18	Adolph Coors Co., 1-18 Fetters	3,052	930
27	19	Adolph Coors Co., 1-19 Fetters	3,174	967
28	19	Adolph Coors Co., 4-19 Harvey	3,166	965
29	19	Adolph Coors Co., 3-19 Fetters	3,200	975
30	20	Adolph Coors Co., 1-20 Acco-Ute	3,600	1,097
31	20	Adolph Coors Co., 3-20 Shepard	3,173	967
32	29	Adolph Coors Co., 1-29 Bevan	3,220	981
33	29	Adolph Coors Co., 2-29 Wilson	3,180	969
		T. 10 S., R. 97 W.		
34	1	McCulloch Oil & Compas Expl. #1 Govt William	3,490	1,063
35	1	Flying Diamond Oil, 1-1 Federal	3,550	1,082
36	1	Martin Oil Service, #1 Blair	8,089	2,466
37	1	Martin Oil Service, 1-3 Federal	3,364	1,025
38	2	Pacific Natural Gas 31-2 Shire Gulch	7,645	2,330
39	2	Gasco Inc., 2-A Govt.	7,467	2,276
40	2	Martin Oil Service, 2-1 Federal	3,570	1,088
41	4	Texaco, #3 Roberts Canyon	7,087	2,160
42	4	Norris Oil Co., #4-1 Federal	2,675	815
43	5	Texaco, #1 Roberts Canyon	7,518	2,291
44	9	Norris Oil, Fed 9-1	2,722	830
45	12	Norris Oil, Fed 12-1	3,151	960
46	13	Coors Energy Co. Wolvorton 1-13	7,040	2,146
47	14	Coors Energy Co. Nichols 1-14	7,898	2,406
48	15	Coors Energy Co. Nichols 1-15	7,920	2,414
49	22	Adolph Coors Co. 1-22M Nichols	8,100	2,469
50	23	Adolph Coors Co. Nichols 1-23	7,992	2,436
51	24	Adolph Coors Co. 1-24 Acco-Nichols	3,600	1,097
52	24	Adolph Coors Co. 1-24 Acco-Davis	3,118	975
53	24	Adolph Coors Co. 1-24 Acco-Meadors	3,300	1,006
54	24	Adolph Coors Co. 2-24 Acco-Meadors	3,308	1,008
55	25	Atlantic Refining Co. 1 Winder Flats	3,351	1,021
56	26	Adolph Coors Co. 1-26 Meadors	3,348	1,020
57	26	Adolph Coors Co. 2-26 Nichols	8,082	2,463

Note. The surficial deposits of the Mesa quadrangle are described in a detailed paper on the Quaternary geology of the Grand and Battlement Mesas, Colo. (Yeend, 1969)

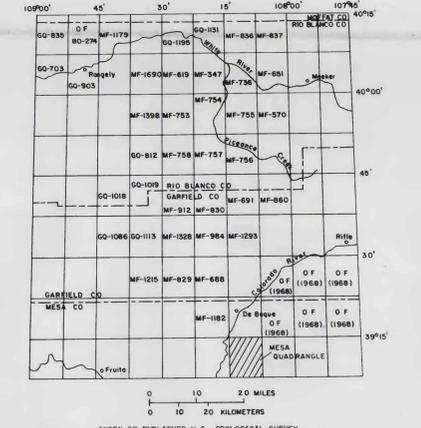
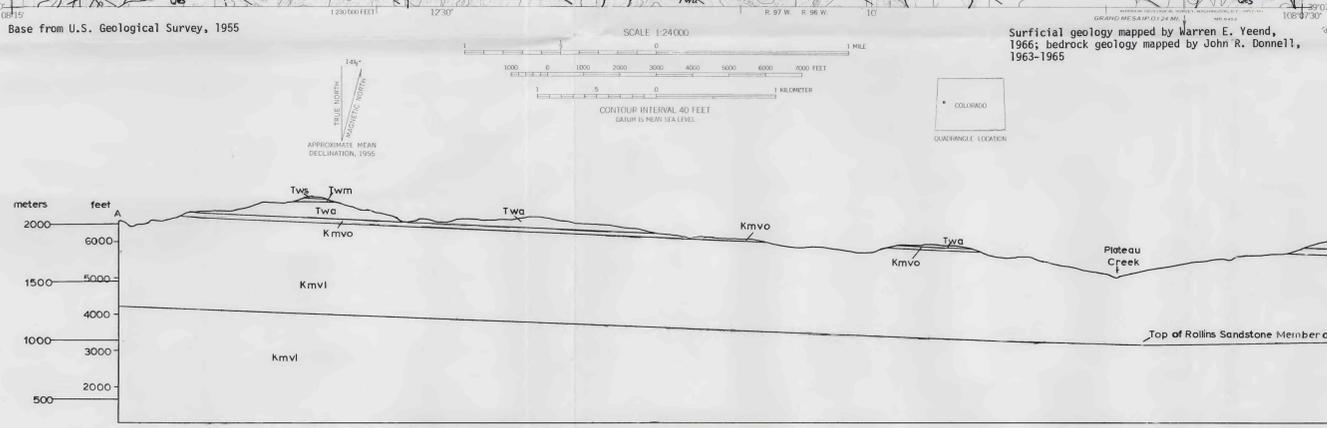
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Yeend, W. E., 1969, Quaternary geology of the Grand and Battlement Mesa area, Colorado: U.S. Geological Survey Professional Paper 617, 50 p.



PRELIMINARY GEOLOGIC MAP OF THE MESA QUADRANGLE, MESA COUNTY, COLORADO

By
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