

INTERIM GEOLOGIC MAP OF THE  
FRANCIS CANYON QUADRANGLE,  
LOST CREEK DRAINAGE,  
MORGAN, RICH, AND SUMMIT COUNTIES, UTAH

BY

JAMES C. COOGAN  
Department of Geology  
Western State College  
Gunnison, Colorado 81231

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## MAP UNIT DESCRIPTIONS

for the Lost Creek drainage, Lost Creek Dam, Peck Canyon, and Francis Canyon 7.5' quadrangles  
(all Quaternary units are not present nor are all bedrock units exposed in each quadrangle)

### QUATERNARY

**Qa3** Alluvium, undivided (Quaternary) – Sand, silt, clay, and gravel in stream and alluvial-fan deposits; composition depends on source area; located about 80 to 100 feet (12-30 m) above drainages in Coyote and Toone Canyons in Lost Creek Dam quadrangle; may be same age as Qat3 and Qaf3; 0 to 20 feet (0-6 m) thick.

**Qao** High-level alluvium (Pleistocene) – Sand, silt, clay, and gravel above adjacent stream terraces; located about 100 to 120 feet (30-36 m) above Saleratus Creek in Francis Canyon quadrangle as well as above Lost Creek prior to damming, now located next to Lost Creek Reservoir; in Lost Creek Dam quadrangle likely older than Qa3, Qat3, and Qaf3, and younger than Qat4 and Qaf4; age in the Francis Canyon quadrangle uncertain because it's in a different drainage system; thickness 0 to 20 feet (0-6 m).

**Qal** Stream and floodplain alluvium (Holocene) -- Sand, silt, clay, and gravel in channels and floodplains; locally includes fan alluvium in canyons; composition depends on source area; 0 to 20 feet (0-6 m) thick.

#### Qat2, Qaty, Qat3, Qat4

Stream-terrace alluvium (Quaternary) -- Sand, silt, clay, and gravel in terraces above floodplains; terraces just above floodplains (Qat2) are located downstream from Lost Creek Dam and near the mouth of Francis Canyon; slightly higher terraces (Qaty) are about 40 feet (12 m) above Toone Canyon drainage in Lost Creek Dam quadrangle, and 20 to 40 feet (3-12 m) above Saleratus Creek in Francis Canyon quadrangle, except where down-dropped by normal faults; higher terraces (Qat3) are present about 80 feet (25 m) above Lost Creek south of the dam, likely about 80 feet (25 m) above pre-dam drainage near Lost Creek Reservoir, and 40 to 80 feet (12-25 m) above Lost Creek in Peck Canyon quadrangle; Qat4 is 160 feet (50 m) above drainage in Hell Canyon in Lost Creek Dam quadrangle, but might correlate with Qa5 (>160 feet above drainage) near Henefer; 0 to 20 feet (0-6 m) thick.

#### Qaf, Qafy, Qaf1, Qaf2, Qaf3, Qaf4, Qaf5

Alluvial-fan deposits (Quaternary) -- Mostly sand, silt, and gravel that is poorly stratified and poorly sorted; deposited mainly by debris flows in drainages and at drainage mouths; generally less than 40 feet (12 m) thick; where possible younger deposits (suffix y) are separated; number suffixes (1-5), used in Guildersleeve Canyon, Lost Creek Dam quadrangle, indicate relative age (1 is youngest); Qaf2 is incised by present drainage; Qaf3 is more than 80 feet (25 m) above present drainage and likely the same age as Qat3; Qaf4 is 160 feet (50 m) above present drainage; generally less than 40 feet (12 m) thick.

- Qap Pediment-mantle deposits (Pleistocene) -- Mapped only in Lost Creek Dam quadrangle, overlapping and uncut by Toone Canyon normal fault, and south of the mouth of Toone Canyon; surfaces appear to be at least 40 feet (12 m) above adjacent drainages and developed on older mass movement deposits.
- Qac Alluvium and colluvium (Quaternary) -- Includes stream and fan alluvium, colluvium, and, locally, mass-movement deposits; 0 to 20 feet (0-6 m) thick.
- Qc Colluvium (Quaternary) -- Includes slopewash and soil creep; composition depends on local bedrock; generally less than 20 feet (6 m) thick.
- Qm Mass-movement deposits, undivided (Quaternary) -- Includes slides, slumps, and flows, as well as colluvium and talus; mapped on steep slopes where several mass-movement processes may contribute to deposit; composition depends on local sources; 0 to 40 feet (12 m) thick.
- Qmc Mass-movement and colluvial deposits, undivided (Quaternary) -- Includes landslide, slump, slopewash, and soil creep; mapped in areas of subdued morphology where separate mapping of mass movement and colluvial deposits is not possible; composition depends on local sources; 0 to 40 feet (12 m) thick.
- Qms, Qmsy, Qmso  
Slides and slumps (Quaternary) -- Poorly sorted clay- to boulder-sized material derived from steep local source terrain; generally characterized by hummocky topography, head and internal scarps, and chaotic bedding in displaced bedrock; locally includes flow deposits; morphology becomes subdued with age; where possible divided into younger and older (Pleistocene) deposits (suffixes y and o, respectively); thicknesses highly variable.
- Qf Artificial fill (Recent) -- Mapped only at Lost Creek Dam.

#### TERTIARY

- Tw Wasatch Formation (Eocene and uppermost Paleocene) -- Typically red sandstone, siltstone, mudstone, and conglomerate with minor gray limestone and marlstone locally; lighter shades of red, yellow/tan, and light gray more common in uppermost part; total thickness up to 4,500 feet (1,370 m) south of Henefer; thickness varies locally due to considerable relief on basal erosional surface in all three quadrangles.
- Twc Basal conglomerate of Wasatch Formation -- Red-orange- and tan-weathering, cobble conglomerate; mainly comprised of Proterozoic and Cambrian quartzite clasts (DeCelles, 1994); forms prominent cliffs along the western tributaries of Lost Creek in Lost Creek Dam quadrangle and to south near Devils Slide; 0 to 400 feet (120 m) thick.

## CRETACEOUS

- Evanston Formation (Paleocene and Upper Cretaceous-Maastrichtian/Campanian)
- Keh Hams Fork Member (Upper Cretaceous) -- Light-gray, brownish-gray, and tan sandstone, conglomeratic sandstone, and quartzite- and chert-pebble conglomerate, variegated gray, greenish-gray, and red mudstone, and dark-gray, carbonaceous shale and coal in upper part; member coarsens downward and northwestward into basal conglomerate; member thickens to north, from 300 feet (90 m) to south at Echo Canyon to 1,200 feet (365 m) at Lost Creek Dam and then thins farther north above basal unconformity. Coal beds are present just above and up to 200 feet (60 m) above of contact with basal conglomerate, or, if conglomerate is missing, the base of the Hams Fork Member in the Lost Creek Dam quadrangle. Coal is about 400 feet (120 m) above the contact with the basal conglomerate up Coal Hollow in the Francis Canyon quadrangle (see Doelling, 1972).
- Kehe Basal conglomerate of Hams Fork Member (Upper Cretaceous) -- Tan and gray, cobble to boulder conglomerate with minor interbedded gray, carbonaceous mudstone; conglomerate comprises >80% Proterozoic and Cambrian quartzite clasts, but locally contains clasts of Triassic and Jurassic sandstone and rare Precambrian crystalline basement clasts (DeCelles, 1994); 150 feet (45 m) thick in the hanging wall of the Crawford thrust in Lost Creek Dam and Francis Canyon quadrangles; thickness varies in the Crawford footwall from about 300 feet (90 m) in Toone Canyon in Lost Creek Dam quadrangle to about 115 feet (35 m) in Francis Canyon quadrangle; conglomerate is absent to north along the regional angular unconformity in Peck Canyon quadrangle.
- Kwc Weber Canyon Conglomerate (Upper Cretaceous-Campanian/late Santonian) -- Red, gray and tan, boulder to cobble conglomerate with minor sandstone and mudstone interbeds; locally exposed within a growth syncline above the buried Crawford thrust trace in Lost Creek Dam and Francis Canyon quadrangles; clasts are from the Tintic Quartzite, Weber Quartzite, Nugget Sandstone, Lodgepole Limestone, Park City Formation, and Twin Creek Limestone (DeCelles, 1994); contains progressive intraformational unconformities; base not exposed, but at least 1,900 feet (580 m) thick near Devils Slide south of Lost Creek Dam quadrangle.
- Kk Kelvin Formation (Lower Cretaceous-Albian/Aptian) -- Upper half contains tan and gray, coarse-grained, cross-bedded sandstone and pebbly sandstone with abundant chert; interbedded with red and minor gray-green mudstone. Middle part contains thin, discontinuous beds of nodular, blue-gray and lavender, micritic limestone. Lower half comprises chert-pebble conglomerate separated by recessive red mudstone and sandstone zones. Approximately 2,500 feet (700 m) thick in Toone Canyon, Lost Creek Dam quadrangle, but top not exposed. At least 5,700 feet (1,740 m) thick to south near Henefer, though base not exposed.

## JURASSIC

- Jsp Stump Sandstone and Preuss Redbeds, undivided (Upper and Middle Jurassic) -- Red and purple-red sandstone, mudstone, and shale; poorly exposed; top of combined unit

contains about 100-foot (30-m)-thick covered interval of gray-green sandy soil representing the Stump Sandstone at Toone Canyon; basal Preuss Redbeds contains halite in subsurface; combined unit is about 1,000 feet (300 m) thick at Toone Canyon, Lost Creek Dam quadrangle. Stump is about 250 feet (76 m) thick to the north at Watton Canyon (Pipiringos and Imlay, 1979).

Twin Creek Limestone (Middle Jurassic) -- Mostly white- to gray-weathering, shaley limestone with some shale; 2,722 and 2,600+ feet (825 and 790+ m) thick to south at Devils Slide and to north at Birch Creek, respectively (Imlay, 1967); mapped as separate members listed below.

- Jtgc Giraffe Creek Member -- Gray, greenish-gray, and tannish-gray, calcareous sandstone and lime grainstone; forms ridges; about 225 feet (70 m) thick and structurally thickened in synclinal hinges; mapped only in Lost Creek Dam and Peck Canyon quadrangles.
- Jtl Leeds Creek Member -- Light-gray, thin- to very thick-bedded, soft, clay-rich, micritic limestone with tan silt partings; locally exhibits bedding-normal, pencil cleavage; forms barren, scree-covered slopes; 1,000 to 1,200 feet (300-365 m) thick.
- Jtw Watton Canyon Member -- Dark-gray, lime micrite and wackestone and minor oolite packstone; forms prominent ridges; locally exhibits bedding-normal, stylolitic, spaced cleavage; about 400 feet (120 m) thick.
- Jtb Boundary Ridge Member -- Gray, very thick-bedded, ridge-forming, oolitic, lime grainstone to wackestone beds in middle and upper part that separate red and purple siltstone and gray, silty, limestone beds in middle and lower part; 100 to 250 feet (30-75 m) thick.
- Jtr Rich Member -- Light-gray, thin- to very thick-bedded, soft, clay-rich, micritic limestone in upper part and gray, lime wackestone in lower part; locally exhibits bedding-normal, pencil cleavage; forms barren, scree-covered slopes; about 500 feet (150 m) thick.
- Jts Sliderock Member -- Dark-gray, very thick-bedded, lime wackestone in upper part and dark-gray, pelecypod and crinoid grainstone in lower part; forms small ridges; 100 to 227 feet (30-70 m) thick.
- Jtgs Gypsum Spring Member -- Red siltstone and sandstone, and gray, vuggy dolomite, with anhydrite in subsurface; up to 208 feet (65 m) thick.
  
- Jn Nugget Formation (Lower Jurassic) -- Pale-grayish-orange, pinkish, and locally white, well-cemented, cross-bedded, quartz sandstone; about 1,100 and 1,500 feet (335 and 460 m) thick at Toone Canyon, Lost Creek Dam quadrangle, and to south at Devils Slide (Eardley, 1944), respectively.

TRIASSIC (mapped only in the Francis Canyon quadrangle)

- Traw Wood Shale Tongue of the Ankareh Formation (Upper Triassic) -- Bright orange-red shale, siltstone, and sandstone; locally micaceous; about 500 feet (150 m) thick.
  
- Trht Higham Grit; and Timothy Sandstone and Portneuf Limestone Members of the Thaynes Formation, undivided (Triassic) -- Gray and greenish-gray, micaceous, quartz-granule

sandstone at top (Higham); greenish-gray, lithic-pebble conglomerate in middle, containing green siltstone clasts and rare fossil wood fragments (Timothy); and thin (2 feet [0.6 m]), gray and lavender, mottled limestone at base (Portneuf); aggregate thickness about 200 feet (60 m).

- TRal Lanes Tongue of the Ankareh Formation (Lower Triassic) -- Purple and brownish-red shale, siltstone, and sandstone; about 450 feet (140 m) thick.
- Thaynes Formation (Lower Triassic)
- TRtu Upper calcareous siltstone member – Brownish-gray, thin-bedded, calcareous siltstone and thin-bedded, gray, fossiliferous limestone; about 750 feet (260 m) thick.
- TRtms Middle shale member – Gray, thin-bedded, calcareous, silty shale; about 100 feet (30 m) thick.
- TRtml Middle limestone member – Gray, very thick- to medium-bedded, fossiliferous limestone; forms prominent ridge; about 110 feet (33 m) thick.
- TRtls Lower shale member -- Gray to brownish-gray, thin-bedded, calcareous siltstone to silty shale; *Meekoceras* ammonite zone at base; about 375 feet (115 m) thick.
- TRtll Lower limestone member – Gray to grayish-brown, thick- to thin-bedded, fossiliferous limestone; about 200 feet (60 m) thick.
- TRw Woodside Formation (Lower Triassic) -- Dark-red, sandy shale and siltstone, locally exhibits green reduction spots; only upper 200 feet (60 m) exposed.

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

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## MAP SYMBOLS

for the Lost Creek drainage, Lost Creek Dam, Peck Canyon, and Francis Canyon 7.5' quadrangles  
(all map symbols are not present on each map)

	Contact, dashed where approximately located or gradational, dotted where concealed.
	Marker Bed, in map unit Jtl to show structure near Lost Creek Thrust, Lost Creek Dam quadrangle.
	Normal Fault, bar and ball on downthrown side, dashed where approximately located, dotted where concealed.
	Thrust Fault, teeth on upper plate, dotted where concealed; locally bar and ball on fault shows later normal movement.
	Anticline Axis, dashed where approximately located, dotted where concealed, arrow shows plunge.
	Syncline Axis, dashed where approximately located, dotted where concealed, arrow shows plunge.
	Overturned Anticline Axis, dashed where approximately located, dotted where concealed, arrow shows plunge.
	Overturned Syncline Axis, dotted where concealed, arrow shows plunge.
	Mass-Movement Scarp
	Sinkhole, mapped only in Peck Canyon quadrangle
<b>Strike and Dip of Bedding</b>	
	Upright (top known on right)
	Overturned (top known on right)
	Vertical
	Horizontal
	Determined by Photogrammetry (upright)
<b>Strike and Dip of Cleavage</b>	
	
<b>Sample Location and Number</b>	
	



# Lost Creek Drainage - Lithologic Column

AGE	MAP SYMBOL	MAP UNIT	THICKNESS		SCHEMATIC COLUMN	OTHER INFORMATION
			FEET	METERS		
Q.	Q-various	Alluvium, lake beds, mass movements	0-500	0-150		UNCONFORMITY
TERT. PAL.-EO.	Tw	Wasatch Formation	up to 4,500	up to 1,370		
	Twc	Basal conglomerate	0-400	0-120		
CRETACEOUS	Keh	Hams Fork Member of Evanston Formation	0-1,200	0-365		ANGULAR UNCONFORMITY Top not exposed
	Kehc	Basal conglomerate of Hams Fork Member	0-300	0-90		
	Kwc	Weber Canyon Conglomerate	0-1,900	0-580		
	Kk	Kelvin Formation	2,500+	700+		
JURASSIC	Jsp	Stump Sandstone	~1,000	~300		UNCONFORMITY Salt in subsurface
	Jsp	Preuss Sandstone				
	Jtgc	Giraffe Creek Member	~225	~70		UNCONFORMITY
	Jtl	Leeds Creek Member	1,000-1,200	300-365		
	Jtw	Watton Canyon Member	400	120		
	Jtb	Boundary Ridge Member	100-250	30-75		
	Jtr	Rich Member	~500	~150		
	Jts	Sliderock Member	100-230	30-70		
	Jtgs	Gypsum Spring Member	50?-210	15?-65		
	Jn	Nugget Sandstone	1,100-1,500	305-460		
TRIASSIC	Raw	Wood Shale Tongue of Ankareh Fm	~500	~150		Exposed only in Francis Canyon quadrangle
	Rht	Hingham Grit, and Mbrs of Thaynes Fm	~200	~60		
	Ral	Lanes Shale Tongue of Ankareh Fm	~450	~140		
	Rtu	Upper calcareous siltstone member	~750	~260		
	Rtms	Middle shale member	~100	~30		
	Rtmi	Middle limestone member	~110	~33		
	Rtls	Lower shale member	~375	~115		
	Rtll	Lower limestone member	~200	~60		
	Rw	Woodside Shale	200+	60+		

Diagram is schematic--- no fixed thickness scale  
PALEO.-EO. = Paleocene-Eocene

# Lost Creek Drainage Bedrock Correlation Chart

Tw
Twc

*Unconformity*

Keh
-----

*Unconformity*

Kehc
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*Unconformity*

Kwc
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*Unconformity*

Kk
----

*Unconformity*

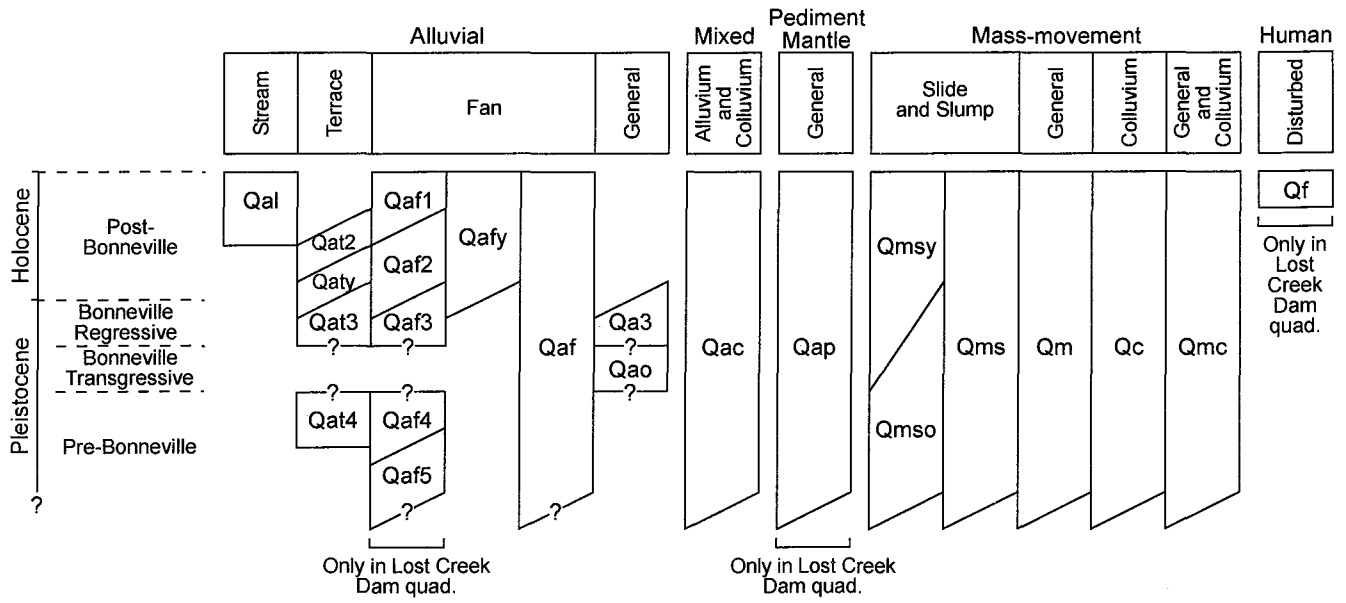
Jsp
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*Unconformity*

Jtgc
Jtl
Jtw
Jtb
Jtr
Jts
Jtgs
Jn
Raw
Rht
Ral
Rtu
Rtms
Rtml
Rtls
Rtll
Rw

Exposed only  
in Francis  
Canyon  
quadrangle

# Lost Creek Drainage Quaternary Correlation Chart





3786 IV SW  
(HORSE RIDGE)



This geologic map was funded by the Utah Geological Survey and the U.S. Geological Survey, National Cooperative Geologic Mapping Program through U.S. Geological Survey STATEMAP award number 98HQAG02067. The views and conclusions contained in this document are those of the author and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government.

CONTOUR INTERVAL 40 FEET  
NATIONAL GEODETIC VERTICAL DATUM OF



UTAH

ADRIANGLE LOCATION

FRANCIS CANYON, UTAH  
41111-B3-TF-024

1991  
DMA 3766 III NE-SERIES V897