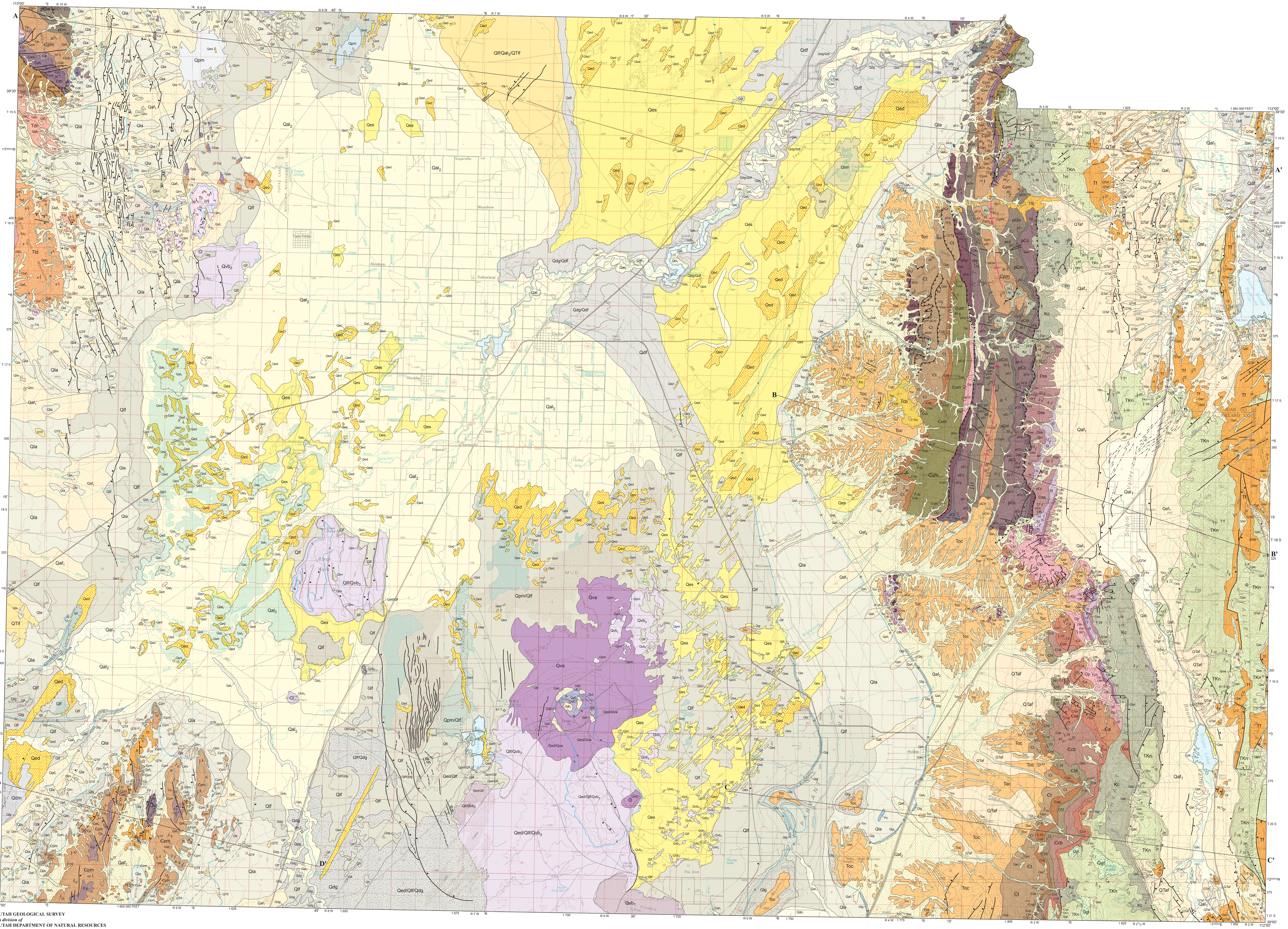

UTAH GEOLOGICAL SURVEY
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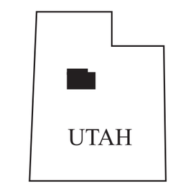
U. S. GEOLOGICAL SURVEY
Statemap Agreement No. 98HQAG2067

Projection: UTM Zone 12
Units: Meters
Datum: NAD 1927
Spheroid: Clarke 1866

GEOLOGIC MAP OF THE DELTA 30' x 60' QUADRANGLE AND PART OF THE LYNNDYL 30' x 60' QUADRANGLE, NORTHEAST MILLARD COUNTY AND PARTS OF JUAB, SANPETE, AND SEVIER COUNTIES, UTAH

by
Lehi F. Hintze and Fitzhugh D. Davis
2002

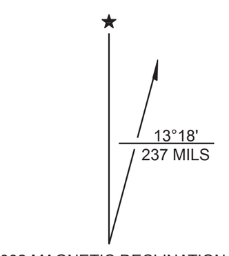


SCALE 1:100,000
Contour interval 40 meters

2 1 0 2 4 6 8 10 Kilometers

2 1 0 2 4 Miles

Base from U.S.G.S. Delta and Lynndyl 30' x 60' quadrangles



2002 MAGNETIC DECLINATION
AT CENTER OF SHEET

Plate 1 of 2
Utah Geological Survey Map 184
Geologic map of the Delta 30' x 60' quadrangle, and part of Lynndyl 30' x 60' quadrangle.

Project Manager: Jon King
GIS compilations: Denise Y.M. Laes, Ann Tillia, Kent D. Brown, and Basia Matyjasik
Cartography: Lori Douglas

The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either express or implied, of the U.S. Government.

PLATE 2 of 2

Map 184

Geologic Map of the Delta 30' x 60' Quadrangle and part of the Lynndyl 30' x 60' Quadrangle, Northeast Millard County and parts of Juab, Sanpete, and Sevier Counties, Utah

by Lehi F. Hintze and Fitzhugh D. Davis

2002

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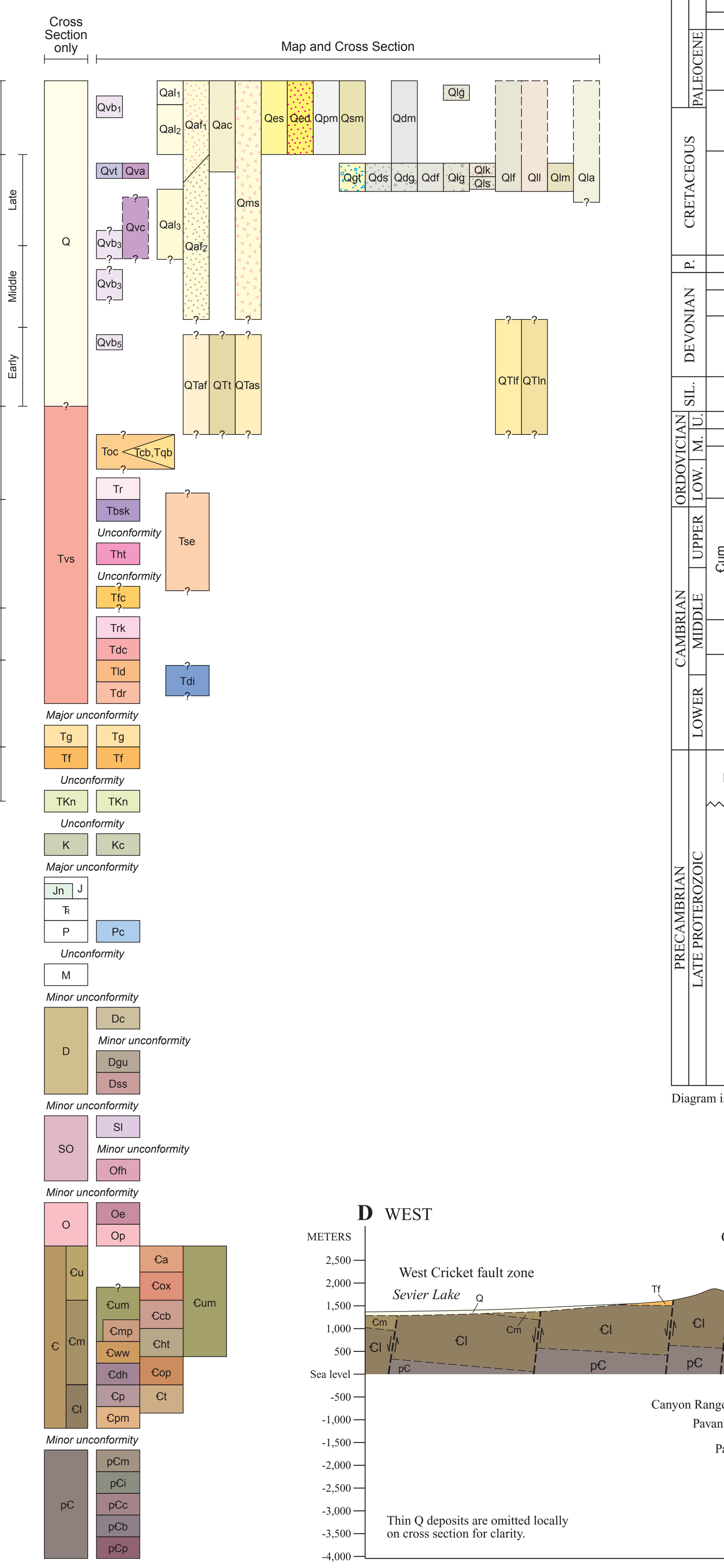
STATEMAP Agreement No. 98HQAG2067

CORRELATION OF GEOLOGIC UNITS



LITHOLOGIC COLUMN

AGE	MAP SYMBOL	MAP UNIT	THICKNESS FEET	THICKNESS METERS	SCHEMATIC COLUMN	OTHER INFORMATION
QUATERNARY	Q-various	Alluvial, lacustrine, eolian, basalt, and other deposits	0-1,000±	0-300±		
	Qvb_1	Basalt of Ice Springs	0-200	0-60		660 to 4,000± years
	Qva,Qvt	Basaltic ash (va) and tuff (vt) of Pahvant Butte	0-600	0-180		15,300 to 16,000 years
	Qvc	Basaltic cinders	0-30±	0-10±		Pre-Lake Bonneville
	Qvb_3	Basalt of Pahvant Butte	0-1,000	0-300		128,000 years
		Basalt of Deseret, Pot Mtn., Sunstone Knoll	0-300	0-100		0.4 Ma local vents
	Qvb_5	Basalt of Crater Bench	0-20±	0-6±		0.95 Ma
	QTaf,QTas	Alluvial fan (af) and Sevier River (as) deposits	0-300+	0-90+		
QT	QTt	Travertine in Canyon Mountains near Whiskey Spring	0-140	0-43		
	QTlf,QTln	Fine lake sediments (lf); shoreline deposits (ln)	0-870+	0-265+		Pliocene to mid-Pleistocene
TERTIARY — MIO.-PLIO.	Toc Tqb Tcb	Oak City Formation including quartzite (qb) and carbonate (cb) breccias	0-2,000±	0-600±		2-11 Ma?
	Tr	Rhyolite of Smelter Knolls	Flowdomes			3.4 Ma
	Tbsk	Basaltic andesite north of Smelter Knolls	0-30+	0-10+		6.1 Ma
	Tht	Tuff of Holden	0-200?	0-60?		10.5-10.8 Ma
	Tfc	Fool Creek Conglomerate	0-530	0-160		Age uncertain
OLIG.	Trk	Red Knolls Tuff	200	60		36.5 Ma Ar/Ar
	Tdc	Volcanic sequence of Dennison Canyon, basal tuff only	500	150		36.7-37.1 Ma Ar/Ar
EOCENE	Tdi	Drum Mountains intrusions	intrusions			
	Tld	Little Drum Formation	1,500-2,325	450-708		Alternating tuffs and volcanic conglomerates; 37.6 Ma Ar/Ar; 38.4 Ma Ar/Ar
	Tdr	Drum Mountains Rhyodacite	2,000±	600±		36.9 and 37.6 Ma Ar/Ar (reset?); Amygdaloidal flows with pyroxene latite below
	Tg	Green River Formation	0-200	0-60		HIATUS AND UNCONFORMITY
PALEOCENE	Tf	Flagstaff Formation	300-2,460	90-750		Freshwater limestone with oncolites
CRETACEOUS	TKn	North Horn Formation	3,000-3,900	915-1,200		Yellowish sandstone grading to conglomerate westward
	Kc	Canyon Range Conglomerate	790-4,500	240-1,370		LATE STAGE THRUST; Quartzite clast, carbonate clast, and mixed clast deposits
P.	Pc	Cherty dolomite near Holden	100+	30+		MAJOR UNCONFORMITY
DEVONIAN	Dc	Cove Fort Quartzite	250	77		HIATUS
	Dgu	Upper Guilmette Formation	774	236		
	Dss	Lower Guilmette, Simonson, and Sevy equivalents	2,720	830		Light-gray dolomite
SIL.	Sl	Laketown Dolomite	832-1,092	254-333		Cherty dolomite
ORDOVICIAN U.	Ofh	Fish Haven Dolomite	138-261	42-79		
M.	Oe	Eureka Quartzite	180-394	54-120		
LOW.	Op	Pogonip Group	1,684	513		

Tse- Sevier River Formation in Sevier County 5.2 to 15(?) Ma

AGE	MAP SYMBOL	MAP UNIT	THICKNESS	SCHEMATIC COLUMN
CAMBRIAN UPPER	Ꞓum: Ꞓa	Ajax Dolomite	966 ft (295 m)	
	Ꞓum: Ꞓox	Opex Formation	670 ft (204 m)	
MIDDLE	Ꞓum: Ꞓcb	Cole Canyon-Bluebird Dol.	536 ft (164 m)	
	Ꞓum: Ꞓht	Herkimer-Dagmar-Teutonic Fms	1,000+ ft (300+ m)	
	Ꞓop	Ophir Formation	1,080 ft (329 m)	
LOWER	Ꞓt	Tintic Quartzite	3,000± ft (950± m)	
PRECAMBRIAN LATE PROTEROZOIC	pCm	Mutual Formation	1,500± ft (450± m)	
		Not exposed. Paleozoic sequence above is part of the parautochthonous Pavant thrust plate.		

MAP SYMBOL	MAP UNIT	FEET	METERS	SCHEMATIC COLUMN	OTHER INFORMATION
Ꞓum	Upper and Middle Cambrian strata, undivided	1,600	490		In Canyon Mts. *Crepicephalus*
Ꞓmp	Pierson Cove Formation	803	243		In Drum Mts.
Ꞓww	Wheeler-Swasey-Whirlwind Fms	853-1,230	260-375		*Elrathia*
Ꞓdh	Dome-Chisholm-Howell Fms	731-835	222-255		*Ehmaniella*, *Glossopleura*
Ꞓp	Pioche Fm	415-800	127-245		Trace fossils
Ꞓpm	Prospect Mountain Quartzite	2,760-4,000	835-1,200		Pink and orange quartzite
pCm	Mutual Formation	1,600-3,000	490-915		Red and maroon quartzite
pCi	Inkom Fm	275-308	84-93		Phyllitic shale
pCc	Caddy Canyon Quartzite	1,930	585		White quartzite; Quartzite and phyllite
pCb	Blackrock Canyon Limestone	150-610	45-186		Algal limestone
pCp	Pocatello Formation	2,100+	645+		Quartzite and phyllite; Quartzite

Cambrian-Precambrian sequence above comprises the Canyon Range thrust plate and strata in the Drum Mountains.

Diagram is schematic--- no fixed thickness scale

GEOLOGIC SYMBOLS

CONTACT
Dashed where location inferred.

EROSIONAL SURFACE
Shown on cross sections.

(On map)
(Shown vertical or inclined on cross section)
NORMAL FAULT
Dashed where location inferred; dotted where concealed, location approximate; queried where speculative on cross section; bar and ball on downthrown side; arrows show relative movement on cross section.

NORMAL FAULT
Inferred and delineated from geophysical data; concealed; bar and ball on downthrown side.

TEAR FAULT
High-angle fault with strike-slip offset; dashed where location inferred; dotted where concealed, location approximate; arrows show relative movement on map.

STEEPLY DIPPING FAULT
Sense of motion not known or complex; dashed where location inferred; dotted where concealed.

THRUST FAULT
Dashed where location inferred; dotted where concealed, location approximate; barbs on upper plate; arrows show relative movement on cross sections.

ATTENUATION FAULT
Younger over older rocks with strata thinned or cut out between; present in Drum Mountains; barbs on upper plate; dotted where concealed.

LINEAMENT
Aligned sinkholes in Scipio Valley.

syncline — overturned syncline
FOLD AXES
Arrows on axes show plunge.

50 inclined — vertical — 45 overturned — horizontal
STRIKE AND DIP OF BEDDING

60 inclined — vertical
STRIKE AND DIP OF PLANAR FEATURES IN VOLCANIC ROCK
Shown at Smelter Knolls.

BLOWOUT
Closed depressions in Sevier Desert due to eolian deflation.

MASS MOVEMENT SCARP
Only shown in Oak Creek Canyon in Canyon Mountains.

TOPOGRAPHIC ESCARPMENT
Only shown along Sevier River north of Delta.

DEEP EXPLORATION WELL
Map symbol on left, cross section symbol on right.

VOLCANIC VENT

Qlf/QTaf
Indicates thin cover of the first unit overlying the second unit.

SHORELINES
Dotted where obscure; queried where conjectural.
Lake Gunnison shoreline
Provo shoreline of Lake Bonneville
Bonneville shoreline of Lake Bonneville

Note: "Pavant" and "Pahvant" are both used in this document. "Pahvant" is now the accepted spelling for geographic features. "Pavant" usage is for geologic features named in publications.

DESCRIPTION OF GEOLOGIC UNITS

Q — Quaternary surficial units, undivided--On cross sections only; for included units see correlation chart and descriptions.

Qal_1 — Alluvium, upper Holocene--Youngest alluvium in the channels, floodplains, and adjacent low terraces of the Sevier and Beaver Rivers, streams in Round, Scipio, and Mills Valleys, and other perennial streams; also in lower Pahvant Valley near West Mountain; consists of sand, silt, and clay with lenses of gravel; mostly 0 to 20 feet (0-6 m) thick, but may be thicker locally.

Qal_2 — Alluvium, middle and lower Holocene--Tan and gray silt and sandy silt in large low-gradient alluvial fans of the Sevier and Beaver Rivers, terraces of the Sevier River, and abandoned Sevier River channels on the Sevier River delta; 0 to 30 feet (0-9 m) thick.

Qal_3 — Alluvium, pre-Lake Bonneville--Lenticular sand and sandy gravel beds that are pre-Lake Bonneville, but post-QTlf in age; located north of Delta but mostly covered by Lake Bonneville deposits (Qlf); 5 feet (1.5 m) are exposed; complete thickness unknown.

Qaf_1 — Younger alluvial-fan deposits--Poorly sorted silt, sand, and pebble, cobble, and boulder gravel deposited by streams, sheetwash, debris flows, and flash floods on alluvial fans, and in canyons and mountain valleys; post-Bonneville shoreline in age; 0 to 60 feet (0-18 m) thick.

Qaf_2 — Older alluvial-fan deposits--Poorly sorted silt, sand, and pebble, cobble, and boulder gravel deposited by streams, debris flows, and flash floods on alluvial fans, and in canyons and mountain valleys above the Bonneville shoreline; includes colluvium in canyons and mountain valleys; mostly Pleistocene and pre-Lake Bonneville in age, but locally includes younger material; up to 200 feet (60 m), or more, thick.

Qac — Alluvium and colluvium, undifferentiated--Mixed alluvial and colluvial deposits that consist of fluvially reworked, coarse-grained colluvium and/or alluvium with a significant colluvium component; includes talus; mapped in and along the Canyon Mountains, Pahvant Range, Valley Mountains and in northeast corner of quadrangle; generally 0 to 50 feet (0-15 m) thick, but may be thicker locally.

Qms — Mass movements, slides, and slumps--Masses large enough to show on this map are found north of Horse Canyon and in Oak Creek Canyon in the Canyon Mountains, the Scipio Pass quadrangle, north of Lone Cedar Pass in the Valley Mountains, and in the Drum Mountains; masses north of Horse Canyon and in the Scipio Pass area may include older tectonically emplaced blocks; small, isolated slides or slumps are present in many mountainous areas, but are too small to show at 1:100,000 scale; up to 200 feet (60 m) thick.

Qes — Eolian sand--Windblown sand in sheets, low irregular mounds, shrub-coppice dunes, and narrow northeast-trending ridges that are largely stabilized by vegetation; mostly silty, well-sorted, fine-grained quartz sand; 0 to 10 feet (0-3 m) thick. Larger blow-outs shown as closed depressions on map.

Qed — Eolian dunes--Chiefly barchan, parabolic, dome, and transverse sand dunes that are active and not stabilized by vegetation; mostly tan, well-sorted, fine-grained quartz sand; also silt dunes downwind from playas; 3 to 35 feet (1-11 m) thick.

Qpm — Playa mud--Laminated, silty fine sand, silt, and clayey silt infused with various salts, gypsum, and calcium carbonate; thickness probably 20 feet (6 m) or less.

Qsm — Marsh deposits associated with springs--Gray to black, organic silt, clayey silt, and sandy silt near the Fool Creek Reservoirs; probably 0 to 20 feet (0-6 m) thick.

Qgt — Glacial till--Unsorted mixtures of clay, silt, sand, and angular pebbles, cobbles, and boulders in Pahvant Range; probably late Wisconsin (Pinedale) in age; 0 to 200 feet (0-60 m) thick.

Qdm — Deltaic mud--Holocene mud in the Sevier River delta at the northeastern end of the Sevier Lake playa; likely 0 to 30 feet (0-9 m) thick.

Qdf — Underflow-fan deposits--Thin-bedded to laminated, calcareous silt with minor interbedded very fine sand in thin beds that were deposited in the Lake Bonneville deltas of the Sevier River; 0 to 64 feet (0-20 m) thick.

Qds — Deltaic sand--Moderately sorted, fine to coarse sand in a single exposure along I-15 in Juab County 2 miles (3 km) north of the Millard County line; contains Pahvant Butte basaltic ash (15,500 years); deposited at margin of Lake Bonneville by overflow from lake in Scipio Valley; 23 feet (7 m) thick.

Qdg — Deltaic sand and gravel--Deposited at the apexes of deltas of the Sevier and Beaver Rivers in Lake Bonneville then distributed by waves and currents; consists of silty, fine- to coarse-grained sand and gravel; 0 to 24 feet (0-7.3 m) thick.

Qlg — Lacustrine gravel--Shore-zone gravel of Lake Bonneville, Lake Gunnison, and Sevier Lake; chiefly silty, fine- to coarse-grained sand and gravel; gravel of Lakes Bonneville and Gunnison is late Pleistocene; gravel of Sevier Lake is Holocene; generally 0 to 30 feet (0-9 m) thick.

Qls — Lacustrine sand--Fine- to coarse-grained sand, marly sand, and pebbly sand deposited in Lake Bonneville as beaches, spits, and offshore bars; 0 to 30 feet (0-9 m) thick.

Qlk — Lacustrine carbonate sand--Lacustrine sand and pebbly sand that consists of white and light-gray carbonate pellets, carbonate-coated gastropods, and ooids deposited in Lake Bonneville; generally 0 to 10 feet (0-3 m) thick.

Qlf — Fine-grained lacustrine deposits--Grayish-tan, tan, and light-gray, calcareous silts that are deep-water sediments of Lake Bonneville, Lake Gunnison (both late Pleistocene), and Sevier Lake (when it contained surface water in the Holocene); locally includes younger alluvium; thickness probably 10 feet (3 m) or less.

Qll — Lacustrine lagoon deposits--Sand, silt, clay, and silty marl that accumulated in lagoons behind (landward) gravel barrier beaches of Lake Bonneville; locally includes younger alluvium; generally less than 10 feet (3 m) thick.

Qlm — Lacustrine marl--Fine-grained, thinly bedded to laminated, white to light-gray, offshore to deep-water marl deposited in Lake Bonneville; ostracodes are abundant throughout marl and, locally, gastropods are present at top and base of marl; 0 to 30 feet (0-9 m) thick.

Qla — Lacustrine and alluvial deposits, undifferentiated--Mixed and reworked, gravelly lacustrine and alluvial deposits on piedmont slopes; grades from pebbly sand and silt to sandy pebble gravel; generally 0 to 12 feet (0-3.7 m) thick, but may be thicker locally.

Qvb_1 — Basalt of Ice Springs--Contains 2 percent phenocrysts and has a greater glass content than other lavas in the Black Rock Desert; estimated to be between 4,000 and 660 years old; may be as much as 200 feet (60 m) thick just south of the map area.

Qva — Basaltic ash of Pahvant Butte--Gray to black, basaltic ash; blown into atmosphere during hydrovolcanic eruption when Lake Bonneville was near its highest level, about 15,500 years ago; layer of this ash interbedded in the upper part of Qlm, commonly 1 to 6 inches (2.5-15 cm) thick; reworked by waves on east side of Pahvant Butte.

Qvt — Basaltic tuff of Pahvant Butte--Gray, basaltic tuff and brown, orange, and yellow palagonite comprise the volcanic cone of Pahvant Butte; deposited during hydrovolcanic eruption in Lake Bonneville about 15,500 years ago, when lake was near its highest level; up to about 600 feet (180 m) thick.

Qvc — Basaltic cinders--Basaltic cinders ejected from a volcanic vent about 4 miles (6.4 km) south of Pahvant Butte; middle or late Pleistocene in age; less than 30 feet (10 m) thick.

Qvb_3 — Basalt of Deseret, Pot Mountain, Sunstone Knoll, Smelter Knolls, and Pahvant Butte--Basalt flows of probable middle and late Pleistocene age; 0 to 1,000 feet (0-300 m) thick.

Qvb_5 — Basalt of Crater Bench--Only the southern tip of this basalt flow is in northern Millard County, where it is 20 feet (6 m) thick; K-Ar date 0.95 ±0.1 Ma (early Pleistocene).

QTlf — Fine-grained lacustrine deposits of Sevier Desert--Brown and light-olive-gray, calcareous, lacustrine silt and silty clay with minor sand; offshore to deep-water sediments; Pliocene to middle Pleistocene in age; 0 to 870 or more feet (0-265+ m) thick.

QTln — Nearshore lacustrine limestone of Sevier Desert--Light-gray limestone and conglomeratic limestone that comprise the shoreline facies of QTlf; only exposed in McCornick quadrangle; 20-30 feet (6-9 m) exposed.

QTas — Sevier River deposits in Mills Valley--Moderately well-sorted sand, gravel, and mud of mixed sedimentary and volcanic clasts derived from the Sanpete Valley-Marysvale area; 0 to more than 20 feet (6 m) thick; early Pleistocene to Pliocene in age. Includes poorly sorted calcareous sand and silt to silty clay (QTab of Oviatt, 1992).

QTaf — Quaternary-Tertiary alluvial-fan deposits--Poorly sorted silt, sand, and gravel, including boulders, that have, locally, a calcic soil with a stage IV carbonate morphology (early Pleistocene age) near the top of the deposit; 0 to 300 feet (0-90 m), or more, thick.

QTt — Travertine in Canyon Mountains--Tan to brownish-orange, thin-bedded travertine in Whiskey Creek of the Canyon Mountains; 0 to 140 feet (0-43 m), or more, thick.

Tvs — Tertiary volcanic and sedimentary units, undivided--On cross sections only; for included units see correlation chart and descriptions.

Toc — Oak City Formation--Sandy, bouldery gravel, poorly to well cemented; forms dissected alluvial apron on west and south-west sides of Canyon-Pahvant-Range fault block; base not exposed; contains landslide blocks (Cop and Tf at Red Cedar Hill, 7 miles (11 km) south of Holden, and Tqb and Tcb in the hills south of Oak City); estimated thickness 0 to 2,000 feet (0-600 m).

Tqb — Quartzite breccia slide blocks within Oak City Formation--Quartz-cemented breccia of angular blocks of Tintic Quartzite; as much as 400 feet (120 m) across near bedrock source diminishing to 50 feet (15 m) 2.5 miles (4 km) to the west.

Tcb — Carbonate breccia slide blocks within Oak City Formation--Carbonate-cemented breccia of angular blocks of Cambrian limestone and dolomite; as much as 2,000 feet (600 m) thick near bedrock source diminishing to 30 feet (10 m) 3.0 miles (5 km) to the west.

Tr — Rhyolite of Smelter Knolls--White to light-gray, devitrified rhyolite containing less than 20 percent small phenocrysts of quartz and feldspar; Smelter Knolls are small extrusive domes about 100 feet (30 m) high; age 3.4 Ma.

Tse — Sevier River Formation--Light-gray, yellowish- or greenish-gray, poorly to moderately sorted mudstone, sandstone, conglomerate, and carbonaceous mudstone; only exposed in small outcrop in southeast corner of map area in Sevier County; extensively exposed to east, where it is probably more than 600 feet (180 m) thick; fission-track date 5.2 Ma on upper part of formation, but base of formation dated at about 15 Ma by fission-track methods.

Tbsk — Basaltic andesite north of Smelter Knolls--Dark-gray, finely crystalline, basaltic andesite; exposed thickness about 30 feet (10 m); age 6.1 Ma.

Tht — Tuff of Holden--White tuff interbedded with pink to white, shaly siltstone, clay, grit, and gravel in section 10, T. 21 S., R. 4 W.; may be as much as 200 feet (60 m) thick; age probably 10.5 to 10.8 Ma.

Tfc — Fool Creek Conglomerate--Boulder to cobble conglomerate with a pink, silty, calcareous sandstone matrix at the head of Fool Creek in Canyon Mountains; age uncertain; up to 530 feet (160 m) thick.

Trk — Red Knolls Tuff--Grayish-pink, crystal-rich, dacite, welded ash-flow tuff present in the Drum and Little Drum Mountains; about 200 feet (60 m) thick; Ar/Ar age 36.5 Ma.

Tdc — Volcanic sequence of Dennison Canyon--Only the basal tuff member is present in map area; it is a light-pink, partly welded tuff with abundant pumice and lithic fragments in the Drum and Little Drum Mountains; about 500 feet (150 m) thick just west of map area; Ar/Ar age 36.7 to 37.1 Ma.

Tld — Little Drum Formation--Interbedded andesitic tuffs and conglomerates that contain volcanic and quartzite clasts in various proportions; twelve members were mapped in the Smelter Knolls West quadrangle where it is from 1,500 to 2,325 feet (450-708 m) thick; Ar/Ar ages 37.6 and 38.4 Ma but overlies Drum Mountains Rhyodacite.

Tdi — Drum Mountains intrusions--Small bodies of dark-gray finely crystalline diorite in the Drum Mountains; probably younger than Drum Mountains Rhyodacite.

Tdr — Drum Mountains Rhyodacite--Dark-red- to dark-green-weathering, amygdaloidal flows and breccias; about 2,000 feet (600 m) thick; age 37.3 Ma. Map unit includes pyroxene latite of Black Point; about 1,000 feet (300 m) thick, with anomalous 50 Ma K-Ar age.

Tg — Green River Formation--Light-brown, calcareous sandstone, oolitic limestone, and cherty limestone that forms ledges in low hills at south end of Valley Mountains; about 200 feet (60 m) of this upper part of the formation is exposed in southeast corner of map area.

Tf — Flagstaff Formation--Interbedded, pinkish-weathering limestone, sandstone, siltstone, mudstone, and conglomerate; size and percentage of clastic material generally increase westward in the northeast part of the map area; thickness 1,300 to 2,460 feet (395-750 m) in Canyon Mountains and northern Valley Mountains, and 300 to 585 feet (90-190 m) thick in Cricket Mountains.

TKn — North Horn Formation--Predominantly yellowish-gray sandstone with interbeds of siltstone, mudstone, conglomerate, and limestone; proportion of conglomerate decreases eastward from Canyon Mountains to Valley Mountains; maximum thickness is in northern Canyon Mountains, where it is more than 3,900 feet (1,200 m) thick; thins to south to about 3,000 feet (915 m) thick in northern Pahvant Range.

K — Cretaceous strata (Pre-North Horn Formation)--On cross sections only.

Kc — Canyon Range Conglomerate--Synorogenic deposit of interbedded quartzite-clast, carbonate-clast, and mixed-clast boulder to pebble conglomerate in a sandy matrix; upper half is locally thrust over lower half; as much as 4,470 feet (1,360 m) thick in Canyon Mountains, and 792 to 3,100 feet (241-950 m) thick in northern Pahvant Range.

J — Jurassic strata--On cross sections only.

Jn — Navajo Sandstone--On cross sections only.

Ʀ — Triassic strata--On cross sections only.

P — Permian strata--On cross sections only.

Pc — Cherty dolomite near Holden--Light-gray, cherty dolomite; folded and silicified; probably structurally related to parautochthonous thrusted rocks on the southeast flank of the Pahvant Range south of this map; exposed thickness about 100 feet (30 m).

M — Mississippian strata--On cross sections only.

D — Devonian, undivided--On cross sections only; for included units see correlation chart and descriptions.

Dc — Cove Fort Quartzite--Interbedded pale-orange sandstone, sandy dolomite, and quartzite; only exposed south of Little Oak Canyon in the Canyon Mountains; 250 feet (77 m) thick.

Dgu — Upper Guilmette Formation--Brownish-gray, sugary dolomite that forms cliffs on the east side of the Canyon Mountains south of Little Oak Canyon; thickness 774 feet (236 m).

Dss — Lower Guilmette, Simonson, and Sevy equivalents, undivided--Light-olive-gray, thin-bedded, laminated dolomite with a few reddish-gray, silty dolomite interbeds; unfossiliferous; 2,720 feet (830 m) thick.

SO — Silurian-Upper Ordovician, undivided--On cross sections only; for included units see correlation chart and descriptions.

Sl — Laketown Dolomite--Medium- to dark-gray, thick-bedded, cliff-forming, cherty dolomite; thickness 832 to 1,092 feet (254-333 m).

Ofh — Fish Haven Dolomite--Medium-dark-brownish-gray, fine-grained dolomite; generally chertless; thickness 138 to 261 feet (42-79 m).

O — Middle and Lower Ordovician, undivided--On cross sections only; for included units see correlation chart and descriptions.

Oe — Eureka Quartzite--White, thin- to medium-bedded, cliff-forming quartzite; locally brecciated and attenuated; 180 feet (54 m) thick in the Canyon Mountains where it may be structurally thinned; about 395 feet (120 m) thick in the northern Pahvant Range.

Op — Pogonip Group--Medium-gray, generally thin-bedded, silty to fine-sandy limestone with intraformational conglomerate beds common in the middle third; upper 320 feet (98 m) is interbedded, olive shale and thin-bedded, fossiliferous limestone; total thickness 1,684 feet (513 m).

PARAUTOCHTHONOUS CAMBRIAN AND PRECAMBRIAN STRATA OF THE PAVANT THRUST PLATE

Ꞓ — Cambrian, undivided--On cross sections only; for included units see correlation chart and descriptions.

Ꞓum — Upper and Middle Cambrian carbonate rocks, undivided--Medium- to dark-gray dolomite and limestone; generally thick bedded and forms ledges and cliffs; used where field mapping has not subdivided Cambrian strata between the Pogonip Group and Ophir Formation on the west side of the Canyon Mountains into formations; thickness about 2,000 to 3,000 feet (610-915 m).

Ꞓu — Upper Cambrian, undivided--On cross sections only; for included units see correlation chart and descriptions.

Ꞓa — Ajax Dolomite--Light-brown to dark-gray, thick-bedded dolomite that forms ledges and cliffs; sparse chert and "algal" stromatolites locally present; 966 feet (295 m) thick.

Ꞓox — Opex Formation--Gray, thin- to thick-bedded, shaly, and bioclastic limestone that contains trilobites; 670 feet (204 m) thick.

Ꞓm — Middle Cambrian, undivided--On cross sections only; for included units see correlation chart and descriptions.

Ꞓcb — Cole Canyon and Bluebird Dolomites, undivided--Medium-gray to light-brownish-gray, thick-bedded, mottled dolomite with interbeds of dark-gray dolomite that contain small, white, dolomite rods or flecks; 536 feet (164 m) thick.

Ꞓht — Herkimer, Dagmar, and Teutonic Formations, undivided--Interbeds of dark- to medium-gray limestone mottled with light-olive-gray dolomite, white laminated dolomite, and oolitic and oncolitic limestone; at least 1,000 feet (300 m) thick; base not exposed where mapped in northern Pahvant Range.

Ꞓop — Ophir Formation--Upper half is thin-bedded limestone that contains interbeds of olive shale near the base and top; the upper shale contains Ehmaniella trilobites; the lower shaly interval bears Glossopleura trilobites. Lower half is sandy siltstone, and white, red, and brown quartzite with Skolithos tubes; total thickness 1,080 feet (329 m).

Ꞓl — Lower Cambrian, undivided--On cross sections only; for included units see correlation chart and descriptions.

Ꞓt — Tintic Quartzite--White and light-brownish-gray, dense, vitreous quartzite that weathers pale-reddish-brown; exposed on west side of Canyon Mountains near Oak City where it is so completely deformed that its thickness is not accurately known; estimated to be about 3,000 feet (950 m) thick.

pꞒm — Mutual Formation--Maroon, dark-red, purple, and light-brown, dense, vitreous quartzite, grit, and pebble conglomerate; exposed on the west side of Canyon Mountains where it is locally structurally interleaved with the Tintic Quartzite; estimated thickness as much as 1,500 feet (450 m); 1,600 to 1,875 feet (500-570 m) thick in the Canyon Range thrust plate where it is least deformed.

CAMBRIAN AND PRECAMBRIAN STRATA IN THE DRUM AND CRICKET MOUNTAINS, AND ON THE CANYON RANGE THRUST PLATE

Ꞓum — Upper and Middle Cambrian strata, undivided--Medium- and dark-gray, thick-bedded dolomite and limestone with a sequence of olive shale and thin-bedded limestone about 40 feet (12 m) thick in upper part; this shale-limestone sequence contains sparse Crepicephalus zone (lower Upper Cambrian) trilobite fragments; used for Cambrian strata above the Wheeler Shale in the northern Canyon Mountains; total thickness about 1,600 feet (490 m). Exposed thickness 353 to 1,300 feet (107-360 m).

Ꞓm — Middle Cambrian, undivided--On cross sections only; for included units see correlation chart and descriptions.

Ꞓmp — Pierson Cove Formation--Dark-gray, medium- to thick-bedded limestone that rarely contains trilobites; 803 feet (243 m) thick in the Drum Mountains.

Ꞓww — Wheeler-Swasey-Whirlwind Formations, undivided--Listed from top downward. Wheeler Shale is olive, platy, calcareous shale that is 910 feet (277 m) thick in the Drum Mountains and only about 100 feet (30 m) thick in the Canyon Mountains. Swasey Limestone is dark-gray, massive, cliff-forming limestone that is about 180 feet (55 m) thick in the Drum Mountains and 614 feet (186 m) in the Canyon Mountains. Whirlwind Formation is olive shale and thin-bedded limestone that bears Ehmaniella trilobites; it is about 140 feet (43 m) thick in both the Drum and Canyon Mountains.

Ꞓdh — Dome-Chisholm-Howell Formations, undivided--Listed from top downward. Dome Limestone forms massive cliffs and is about 300 feet (90 m) thick in the Drum Mountains and 180 feet (55 m) thick in the Canyon Mountains. Chisholm Formation is interbedded, thin-bedded, fossiliferous (Glossopleura) limestone and olive shale, and is 205 feet (62 m) thick in the Drum Mountains and 247 feet (75 m) thick in the Canyon Mountains. Howell Limestone forms a massive cliff and is 330 feet (101 m) thick in the Drum Mountains, 303 feet (92 m) thick in the Canyon Mountains, and about 360 feet (110 m) thick in the northern Cricket Mountains.

Ꞓl — Lower Cambrian, undivided--On cross sections only; for included units see correlation chart and descriptions.

Ꞓp — Pioche Formation--Dark-green, micaceous, phyllitic siltstone interbedded with light-brown to greenish-black quartzite that locally contains abundant trace fossils; orange-weathering dolomite beds occur in uppermost Pioche; thickness 415 feet (127 m) in the Drum Mountains, about 800 feet (245 m) in the northern Cricket Mountains, and about 750 feet (228 m) in the Canyon Mountains.

Ꞓpm — Prospect Mountain Quartzite--Pinkish- to brownish-gray, fine-grained to pebbly, vitreous quartzite; thickness in Drum Mountains about 4,000 feet (1,200 m) and 2,760 feet (835 m) in northern Canyon Mountains.

pꞒ — Precambrian strata--On cross sections only.

pꞒm — Mutual Formation--Pale-red to maroon quartzite, about 10% of which is quartzite-pebble conglomerate; forms cliffs and ledges; thickness about 3,000 feet (915 m) in Drum Mountains and 1,600 to 1,875 feet (490-570 m) in northern Canyon Mountains.

pꞒi — Inkom Formation--Greenish- or reddish-gray, phyllitic shale with minor quartzite beds; generally poorly exposed along strike valleys in the Canyon Mountains; thickness 275 to 308 feet (84-93 m).

pꞒc — Caddy Canyon Quartzite--Grayish-orange-pink, medium- to coarse-grained quartzite with pebble conglomerate beds in the Canyon Mountains; upper four-fifths is massive, cliff-forming quartzite; lowest fifth is interbedded, thin-bedded quartzite and phyllite that forms slopes; thickness 1,930 feet (585 m).

pꞒb — Blackrock Canyon Limestone--Medium- to dark-gray, silty to sandy, coarse-grained limestone; some beds are oolitic or peletoidal; locally the limestone forms ledgy outcrops, but it typically forms brush-covered slopes; thickness from about 150 feet (45 m) in the northwestern part to 610 feet (186 m) in the southern part of the Canyon Mountains.

pꞒp — Pocatello Formation--Upper Pocatello is interbedded phyllitic siltstone, shale, and quartzite about 800 feet (245 m) thick that forms slopes and strike valleys; middle part is white, dense quartzite that contains cross-beds and pebble conglomerates and forms resistant hogbacks and ledges; about 1,310 feet (400 m) thick; lower shale described by Holladay (1984) on steep dip slope south of mouth of Fool Creek Canyon is 590 feet (180 m) thick, but Mitra and Sussman (1997) questioned the identity of these rocks; total thickness at least 2,100 feet (645 m).

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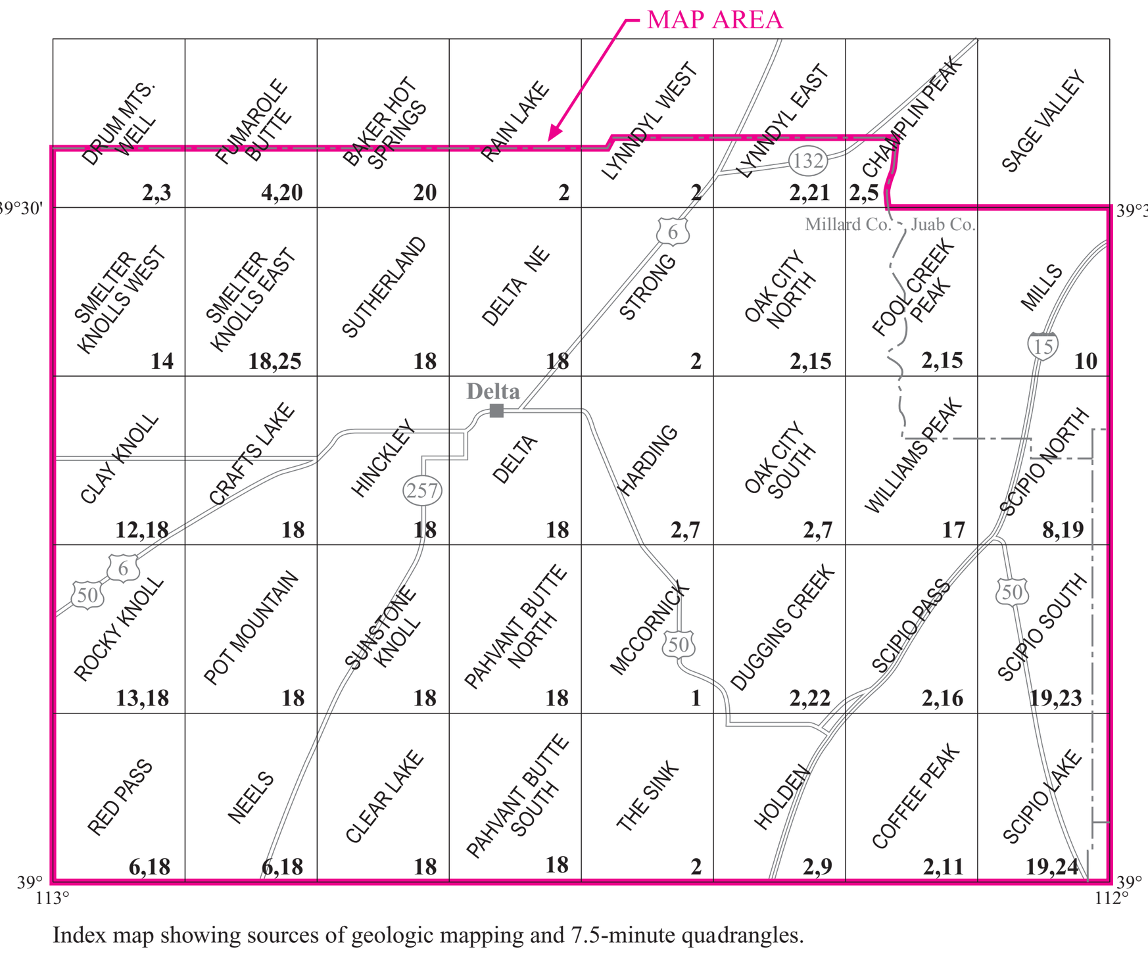

Index map showing sources of geologic mapping and 7.5-minute quadrangles.