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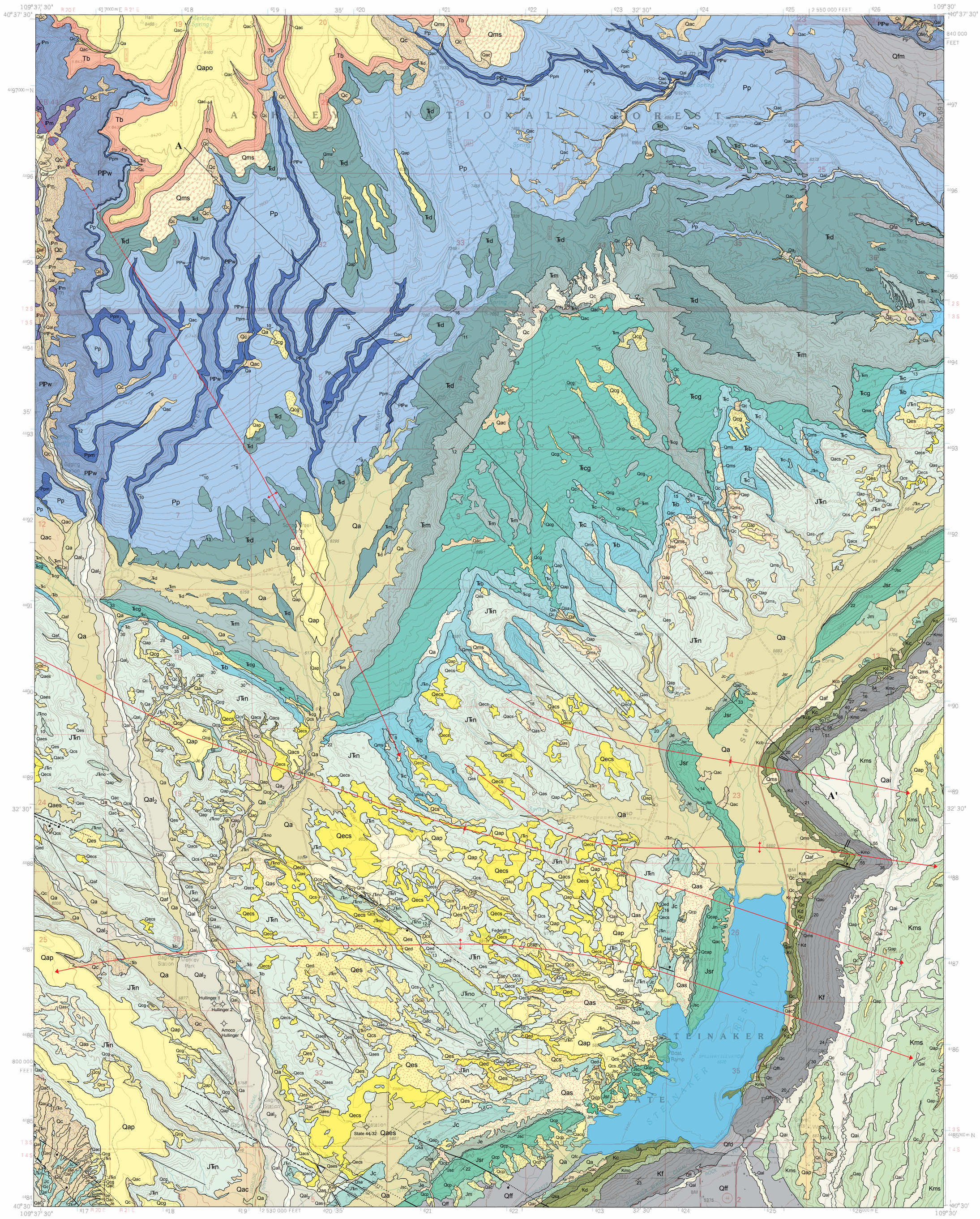

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SCALE 1:24,000

1 0.5 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0.5 0 1 KILOMETER

CONTOUR INTERVAL 40 FEET
STRUCTURAL CONTOUR INTERVAL 500 FEET

Base from U.S. Geological Survey, Steineker Reservoir 7.5' quadrangle, 1996
Field mapping by David A. Haddox, 2006-2009
Supplemental mapping by Bart J. Kowallis and Douglas A. Sprinkel, 2006-2009
Cartographer, Lori J. Douglas

TRUE NORTH
MAGNETIC NORTH
11°16'
APPROXIMATE MEAN DECLINATION, 2010

GEOLOGIC MAP OF THE STEINAKER RESERVOIR QUADRANGLE, UINTAH COUNTY, UTAH

by

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2010

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QUADRANGLE LOCATION

1	2	3
4		5
6	7	8

1 Taylor Mountain
2 Dyer Mountain
3 Burnt Cabin Gorge
4 Dry Fork
5 Donkey Flat
6 Vernal NW
7 Vernal NE
8 Naples

ADJOINING 7.5' QUADRANGLE NAMES

DESCRIPTION OF MAP UNITS

FILL

Qfh — **Highway fill** (Historical) – Fill material used for road base; material is derived from local gravel pits and quarries; thickness varies.

Qfm — **Mining-related fill** (Historical) – Fill material related to mine-reclamation operations; materials mostly derived from mined areas; thickness varies.

Qfa — **Airstrip fill** (Historical) – Fill material used to build airstrips; material may be derived from local gravel pits or quarries or may be derived on site; thickness varies.

Qfc — **Canal levee** (Historical) – Fill material used to build canal levees; material most likely derived from materials trenched during canal construction, but may be reinforced with materials derived from local gravel pits or quarries; thickness varies.

Qfd — **Dam-related fill** (Historical) – Fill material used to construct earthen dams such as Steinaker dam; fill material and rip rap derived from local gravel pits or quarries; thickness varies.

Qff — **Farm-related fill** (Historical) – Fine-grained material created from or distributed by farming activities such plowing, disking, or harrowing; usually contains organic-rich mud, silt, and sand; thickness varies.

ALLUVIUM

Qal — **Stream alluvium** (Holocene) – Unconsolidated silt, sand, and gravel deposited in drainages of larger perennial creeks like Ashley Creek and in some smaller creeks and tributaries; locally grades to Qa_2 deposits; less than 30 feet thick.

Qal_2 — **Older stream alluvium** (Holocene to Pleistocene) – Unconsolidated silt, sand, and gravel dissected by active channels of Dry Fork and Ashley Creeks; locally grades to Qa deposits; less than 30 feet thick.

Qa — **Alluvium** (Holocene) – Unconsolidated to poorly consolidated, poorly to moderately sorted sand, gravel, cobbles, and boulders deposited mostly in the broad valleys of Steinaker Draw and Spring Creek; also deposited in some smaller creeks and tributaries, and on some low-gradient slopes; less than 30 feet thick.

Qa_2 — **Older alluvium** (Holocene to Pleistocene) – Unconsolidated to poorly consolidated, poorly to moderately sorted sand, gravel, cobbles, and boulders deposited mostly in Spring Creek; these deposits are a few feet to as much as 40 feet above the banks of modern drainage; also deposited above an unnamed drainage south of the landing strip in the northeast quadrant of the map; some deposits have poorly developed soil profile with some calcic soil (caliche) coatings on undersides of clasts; less than 10 feet thick.

Qai — **Alluvial silt deposits** (Holocene to Pleistocene[?]) – Unconsolidated silt deposited on low-gradient slopes and some drainages developed on the Mancos Shale; less than 10 feet thick.

Qas — **Alluvial sand deposits** (Holocene to Pleistocene[?]) – Unconsolidated sand deposited on low-gradient slopes and some drainages developed mostly on the Nugget Sandstone; less than 10 feet thick.

Qat — **Stream terrace deposits** (Upper and Middle Pleistocene) – Unconsolidated to locally cemented silt, sand, gravel, cobbles, and boulders; located approximately 160 feet above Ashley Creek and about 400 feet above Steinaker Draw; a few tens of feet thick.

Qaf — **Alluvial-fan deposits** (Holocene to Upper Pleistocene) – Unconsolidated, poorly sorted boulders, gravel, sand, and silt; less than 100 feet thick.

Qap — **Piedmont alluvium** (Holocene to Pleistocene) – Unconsolidated, poorly sorted boulders, gravel, sand, and silt mostly deposited on planar bedrock surfaces; part of a regional deposit along the south flank of the Uinta Mountains that was dissected; locally grades to Qac and Qa deposits; less than 30 feet thick.

Qapo — **Older piedmont alluvium** (Pleistocene) – Alluvial pebble to boulder deposit; unconsolidated to poorly consolidated, poorly sorted; characterized by large rounded boulders (as large as 10 x 8 feet in diameter) of Neoproterozoic Uinta Mountain Group scattered on a seemingly planar surface that is often mistaken for the Gilbert Peak erosion surface on Diamond Mountain Plateau, northeast of the quadrangle; typically blankets Bishop Conglomerate and is commonly covered by vegetation; 0-50 feet thick.

COLLUVIUM

Qc — **Colluvium** (Holocene) – Heterogeneous mixture of boulders, gravel, cobbles, sand, and silt deposited on slopes; may grade into talus, landslide, and alluvial deposits; less than 10 feet thick.

Qcs — **Colluvial-sand deposits** (Holocene) – Sand-dominated colluvium derived from sand-rich surficial units like alluvium or bedrock formations like the Frontier Sandstone, Entrada Sandstone, Nugget Sandstone, Gartra Member of Chinle Formation, and Weber Sandstone; may grade into talus, landslide, and alluvial deposits; less than 10 feet thick.

Qcg — **Colluvial-gravel deposits** (Holocene) – Gravel-dominated colluvium derived from gravel-rich surficial units like piedmont alluvium or bedrock formations like the Bishop Conglomerate and Gartra Member of Chinle Formation; may grade into talus, landslide, and piedmont alluvium; less than 10 feet thick.

Qcp — **Older colluvium** (Holocene and Upper Pleistocene) – Unconsolidated, poorly sorted boulder, gravel, sand, and silt; derived from piedmont alluvium; less than 10 feet thick.

EOLIAN DEPOSITS

Qes — **Eolian deposits** (Holocene) – Unconsolidated, well-sorted, fine-grained sand deposited on low-gradient slopes as sheet sand that may mound up on vegetation; generally derived from Nugget Sandstone; less than 10 feet thick.

Qed — **Eolian dune deposits** (Holocene) – Unconsolidated, well-sorted, fine-grained sand having well developed dune morphology; generally derived from Nugget Sandstone; less than 10 feet thick.

SPRING DEPOSITS

Qsa — **Spring deposits** (Holocene to Pleistocene[?]) – Unconsolidated, fine-grained calcareous tufa deposits generally associated with active springs; less than 10 feet thick.

MASS-MOVEMENT DEPOSITS

Qms — **Landslides and slumps** (Holocene to Pleistocene) – Areas that exhibit hummocky topography with closed depressions; landslides and slumps are generally derived from unconsolidated to poorly consolidated surficial deposits and clay-rich units in Cretaceous, Jurassic, and Triassic, and Paleozoic formations; these deposits generally contain significant amounts of materials derived from the Tertiary Bishop Conglomerate, particularly along the flanks of the Uinta Mountains; as much as 100 feet thick.

Qms_2 — **Older slides and slumps** (Pleistocene [?]) – Similar to Qms, but field relations suggest they are older; generally derived of Triassic Chinle Formation and Tertiary Bishop Conglomerate; largely preserved on Nugget Sandstone north of Steinaker Draw; deposits typically capped by Qap; as much as 100 feet thick.

MIXED DEPOSITS

Qac — **Mixed alluvium and colluvium** (Holocene to Pleistocene) – Unconsolidated, poorly to moderately sorted mud, silt, sand, and gravel deposited on slopes adjoining drainages and on some ridges; less than 30 feet thick.

Qacs — **Mixed alluvial and colluvial sand deposits** (Holocene to Pleistocene) – Unconsolidated, moderately to well sorted, sand and silt deposited by mixed alluvial and colluvial processes on low slopes generally underlain by Nugget Sandstone; less than 10 feet thick.

Qaes — **Mixed alluvial and eolian sand deposits** (Holocene to Pleistocene) – Unconsolidated, well sorted, fine-grained sand deposited by alluvial processes and reworked by wind in subdued drainages and small depressions developed on the underlying Nugget Sandstone; less than 10 feet thick.

Qecs — **Mixed eolian and colluvial deposits** (Holocene) – Unconsolidated, well- to moderately sorted, fine-grained sand and silt mixed with some coarser material; closely associated with nearby Qap, Qac, or Qc deposits; generally deposited on Nugget Sandstone and Gartra Member of Chinle Formation; less than 10 feet thick.

Tb — **Bishop Conglomerate** (Oligocene) – Conglomerate with interbedded sandstone and some siltstone; mostly consolidated, cobble and boulder clasts of reddish-gray quartz sandstone (Neoproterozoic Uinta Mountain Group) and gray Paleozoic limestone; includes thick, tuffaceous sandstone; the relationship between the conglomerate and tuffaceous sandstone is unknown; fluvial; landslides in the region are often derived from this unit; 120-200 feet thick.

Kms — **Mancos Shale** (Upper Cretaceous) – Shale, dark to medium gray; minor color change (shades of gray) and lithology change (varying degrees of siltstone and mudstone) throughout formation; marine; forms badlands topography; as much as 4700 feet thick.

Kf — **Frontier Sandstone** (Upper Cretaceous) – Interbedded sandstone and shale with local coal; sandstone is brown to light brown, medium to coarse grained, thin bedded to massively weathering, cliff and ledge forming; shale is dark gray, calcareous, slope forming; formation contains large carbonate concretions (locally called "cannonballs") as large as 10 x 6 feet in diameter; marine to marginal marine; 140-270 feet thick.

Kmo — **Mowry Shale** (Upper Cretaceous) – Shale, bluish gray, interbedded with thin bentonitic ash beds; weathers characteristically in small, hard "chips;" commonly deformed; contains abundant fish scales; marine; 90-120 feet thick.

Kd — **Dakota Formation** (Lower Cretaceous) – Sandstone and conglomerate interbedded with shale; sandstone is commonly light brown, coarse grained with conglomerate lenses, commonly stained with limonite; ledge and cliff forming; shale is dark gray, carbonaceous, and contains petrified wood at base; slope forming; fluvial to marine; 115-140 feet thick.

Kc — **Cedar Mountain Formation** (Lower Cretaceous) – Mudstone interbedded with limestone, conglomerate, and minor sandstone lenses and beds; mudstone is pink, red, light gray, and purple, and contains calcic paleosols that weather to form limestone nodules; the formation also contains chert pebbles and gastroliths that commonly weather out; slope forming; fluvial-lacustrine; 210 feet thick.

Kcb — **Buckhorn Conglomerate Member of Cedar Mountain Formation** (Lower Cretaceous) – Channel-form pebble conglomerate locally preserved at base of unit; fluvial; 0-10 feet thick.

Jm — **Morrison Formation** (Upper Jurassic) – Mudstone interbedded with conglomerate and sandstone; mudstone is variegated (purple, green, very light gray, and pink hues), ashy and commonly slope forming; pebbly conglomerate and sandstone lenses are channel form, resistant, and ledge forming; fluvial-lacustrine; 520-650 feet thick.

Jsr — **Redwater Member of Stump Formation** (Upper Jurassic) – Sandstone and limestone interbedded with shale; sandstone is light gray to greenish gray, glauconitic; limestone is brown, sandy, oolitic, cross-stratified, and ledge forming; shale is olive brown, contains gypsum and belemnites; slope forming; marine; 180 feet thick.

Jsc — **Curtis Member of Stump Formation** (Upper Jurassic) – Sandstone, light-gray to light-greenish-gray, coarse grained, cross-stratified; glauconitic; marine; 40-90 feet thick.

Je — **Entrada Sandstone** (Middle Jurassic) – Two sandstone beds bounded by siltstone and mudstone beds; sandstone is light gray to yellowish gray, medium grained, friable, and commonly slope forming; siltstone and mudstone are reddish brown and slope forming; eolian (sandstone) and fluvial (siltstone-mudstone); 160-215 feet thick.

Jc — **Carmel Formation** (Middle Jurassic) – Upper siltstone and lower limestone with interbedded gypsum; siltstone is greenish white and red, fine grained, slope forming; limestone is medium gray, sandy, fossiliferous, with jasperized fossils, ledge forming; gypsum is thick, massive, very light gray and light greenish gray; marine to marginal marine; 150-220 feet thick.

JTRno / JTRn — **Nugget Sandstone** (Lower Jurassic and Upper Triassic) – Sandstone; light brown to light pinkish gray, medium to fine grained; massive weathering with large-scale high-angle cross-beds; forms cliffs and ledges, monoliths, arches, and spires; commonly jointed; weathers into modern eolian deposits; predominantly eolian with thin fluvial lenses near the base; also contains a brown to cream-colored, sandy dolostone to reddish siltstone (JTRno) of interdunal lacustrine origin, typically about 150 to 200 feet below top; age based on Early Jurassic dinosaur tracks near the top of the formation and Late Triassic vertebrate tracks in lower 30 feet of the formation; 720-1030 feet thick.

TRb — **Formation of Bell Springs** (Upper Triassic) – Sandstone, siltstone, and mudstone; red, white, orange, and mottled; fine to medium grained, ripple laminated, and locally massive weathering; forms prominent ledges and slopes beneath the Nugget Sandstone within the quadrangle but becomes more slope forming eastward outside the quadrangle; predominantly fluvial-lacustrine with some eolian beds; 90-135 feet thick.

TRc — **Upper Member of Chinle Formation** (Upper Triassic) – Siltstone, mudstone, and sandstone interbedded with conglomerate and carbonate lenses; siltstone is red, fine grained, and slope forming; mudstone is yellow, purple, or variegated, fine-grained, ashy, and weathers in badlands topography; sandstone is reddish brown, fine grained, and very thin bedded; can be divided into an upper red unit dominated by reddish-brown siltstone, mudstone, and sandstone, a middle ochre unit dominated by yellowish-gray mudstone, and a lower mottled unit dominated by purplish-red siltstone and mudstone; terrestrial deposits; 125-230 feet thick.

TRcg — **Gartra Member of Chinle Formation** (Upper Triassic) – Conglomerate and sandstone; conglomerate is grayish white with pebble-size clasts of mixed lithologies including chert and petrified wood; sandstone is pale reddish brown to light gray, medium to coarse grained; forms cliffs; fluvial with channel-form base that cuts into underlying Moenkopi Formation; 10-100 feet thick.

TRm — **Moenkopi Formation** (Lower Triassic) – Siltstone and sandstone interbedded with gypsum; siltstone is reddish orange, fine grained, ripple laminated, thinly bedded, micaceous and forms ledges and slopes; sandstone is brown, fine grained, micaceous and massive, forms ledges at the top; locally interbedded with thin gypsiferous beds; gypsum is massive and forms a prominent ledge in the middle of the unit; contains reptile tracks; marginal marine to fluvial; 820-1120 feet thick.

TRd — **Dinwoody Formation** (Lower Triassic) – Shale and gypsum interbedded with sandstone; shale is light gray to light greenish gray, ripple marked, and forms slopes; sandstone is light gray, medium to fine grained, micaceous, and forms thin resistant beds; contains minor amounts of limestone; chert nodules found near base; marine; 0-170 feet thick.

Pp — **Park City Formation** (Middle Permian) – Dolostone interbedded with siltstone and shale; dolostone beds are light gray and brown, glauconitic, sandy, and form prominent ledges; siltstone is reddish-orange and forms a slope; represents the Franson Member; basal Grandeur Member (Lower Permian) is missing in the quadrangle but is preserved elsewhere in the eastern Uinta Mountains; marine; 50-145 feet thick.

Ppm — **Meade Peak Member of Phosphoria Formation** (Lower Permian) – Shale, dark gray; contains chert and is mined for phosphate; marine; 15-20 feet thick.

IPPw — **Weber Sandstone** (Lower Permian and Upper Pennsylvanian) – Sandstone, light gray to light brown, fine to medium grained; large-scale cross-bedding characterizes formation; lower part of formation contains sandstone and thin beds of limestone; lower sandstone is light brown, medium grained, glauconitic, cross-bedded; limestone is gray, thin bedded, and fossiliferous; Weber forms massive-weathering cliffs; dominantly eolian with interbedded marine beds in lower part; 1015-1275 feet thick.

IPm — **Morgan Formation** (Middle Pennsylvanian) – Sandstone interbedded with limestone and mudstone; sandstone is reddish gray, medium to coarse grained, forms step-like ledges; limestone is dark lavender-gray, dense wackestone, and forms ledges; mudstone is various shades of gray (green, red, and purple), thin bedded, and forms recesses under the sandstone and limestone beds; marine to marginal marine; 110 feet exposed thickness but is 360-500 feet thick regionally.

IPr — **Round Valley Limestone** (Lower Pennsylvanian) – Not exposed in quadrangle but shown on cross section; mostly limestone interbedded with mudstone; limestone is dark gray to light gray, fossiliferous, and forms ledges; mudstone includes various colors (mainly green, red, and purple), is thin bedded, and forms recesses and slopes between the much thicker limestone beds; marine to marginal marine; 230-260 feet thick.

Md — **Doughnut Shale** (Upper Mississippian) – Not exposed in quadrangle but shown on cross section; mostly covered in nearby areas but regionally it consists of dark gray (organic-rich) shale with some reddish-gray shale near base; may include interbedded thin limestone and sandstone beds; marine; about 50-80 feet total thickness.

Mh — **Humbug Formation** (Upper Mississippian) – Not exposed in quadrangle but shown on cross section; interbedded sandstone, limestone, mudstone, and shale; sandstone is light brownish gray to light reddish gray, very fine to fine grained, dense beds; limestone is gray to dark gray, contains chert; mudstone and shale are usually covered; forms covered slope with few ledges poking through slope; marine to marginal marine; 125-160 feet.

Md — **Deseret Limestone** (Lower Mississippian) – Not exposed in quadrangle but shown on cross section; limestone and dolostone, light gray to medium gray, abundant chert, forms cliff; massively bedded with vugs; includes collapse breccias and abundant calcite veins; basal 25 to 30 feet includes the Delle Phosphatic Shale Member, consisting of dark-gray organic-rich shale and chert that forms topographic recess; uppermost part of the Deseret is interbedded with sandstone, light brown, fine grained; forms ledges and cliffs; marine; as much as 775 feet thick regionally.

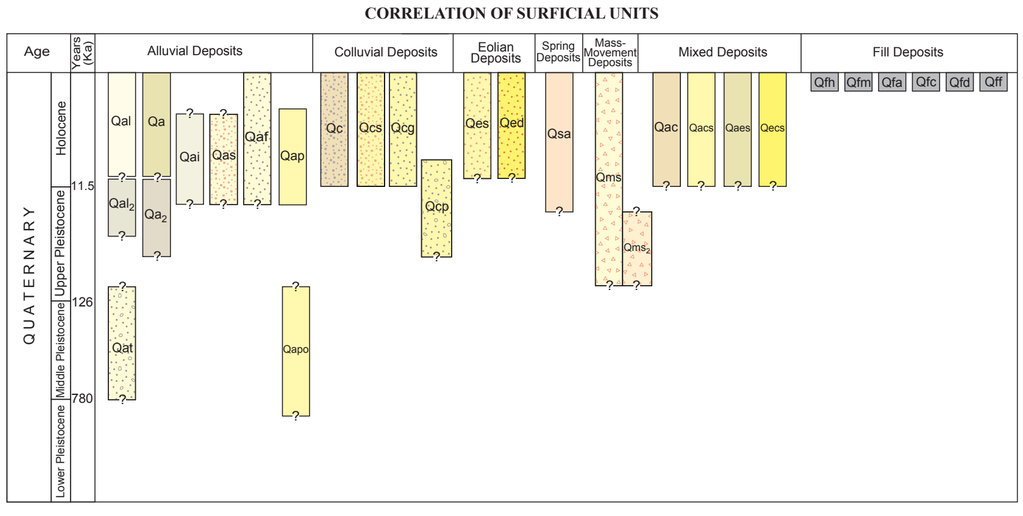
Mm — **Madison Limestone** (Lower Mississippian) – Not exposed in quadrangle but shown on cross section; limestone and dolostone, mostly dark gray, light-gray to white chert, fossiliferous, forms cliffs, massively bedded; marine; as much as 250 feet thick regionally.

Pre-Mississippian Rocks - Not exposed in quadrangle but shown on cross section; includes the Cambrian Lodore Formation, the middle Neoproterozoic Uinta Mountain Group, and Paleoproterozoic Red Creek Quartzite.

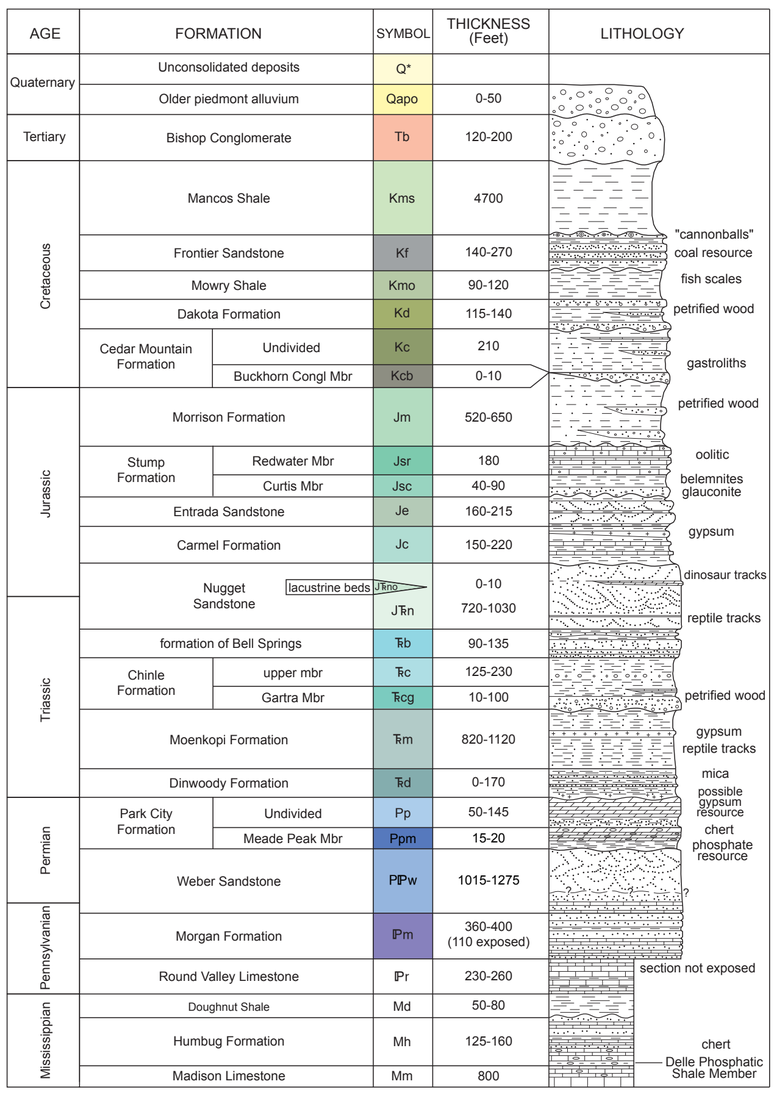
MAP SYMBOLS

- Contact – Dashed where inferred or approxmately located.
- Fault – Dashed where inferred or approximately located, dotted where covered; arrows indicate strike slip fault; bar and ball on downthrown side; dip indicated. (60)
- Joints
- Strike and dip of beds
  - 15 inclined
  - horizontal
- Fold – Showing trace of axial plane and plunge of axis; dashed where approximately located.
  - Anticline
  - Syncline
- Adit
- Shaft
- Abandoned oil and gas exploration drill holes

CORRELATION OF SURFICIAL UNITS



STRATIGRAPHIC COLUMN



*See Correlation of Surficial Units for symbols

Not to scale

CORRELATION OF BEDROCK UNITS

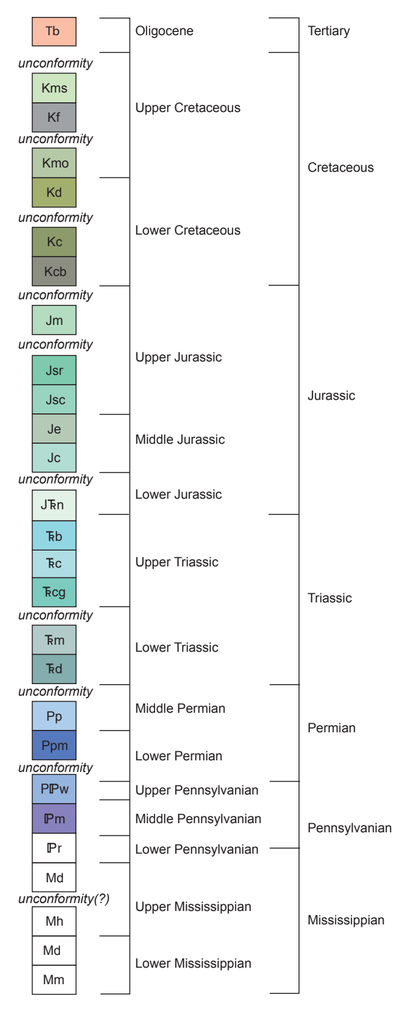
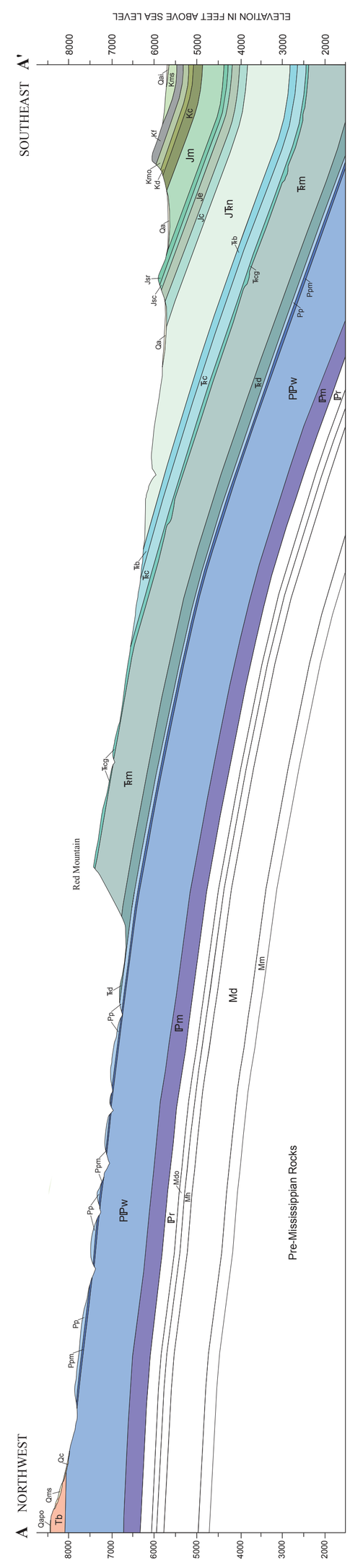


Table 1. Wells in the Steinaker Reservoir 7.5-minute quadrangle showing formation tops

API	NAME	FORMATION	DEPTH*	THICKNESS**	ELEVATION***	STATUS	UTMX_NAD83	UTMY_NAD83	LONGITUDE	LATITUDE
4304710697	Maude Ellen Oil Company	Unconsolidated sand	0	1	5750 GR	Abandoned	621013.00	4487337.00	-109.57	40.53
	Federal 1	Nugget Sandstone	1	207						
	2340 FSL 1540 FWL (NW¼SE¼) section 28	Formation of Bell Springs	208	117						
	T. 3 S., R. 21 E., Salt Lake Base & Meridian	Chinle Formation	325	125						
	Uintah County, Utah	Gartra Member of Chinle Formation	450	100						
		Moenkopi Formation	550	890						
		Dinwoody Formation	1440	63						
		Park City Formation	1503	52						
		Meade Peak Memebr of Phosphoria Formation	1555	20						
		Weber Sandstone	1575	501						
		Total Depth	2076							
4304711317	Uintah Dome Oil & Gas Company	Stream alluvium	0		6604 DF	Abandoned	618640.00	4486587.00	-109.60	40.52
	Hullinger 2	tops not reported; no available logs-samples								
	0230 FSL 0927 FEL (SE¼SE¼) section 30	tops are likely similar to Hullinger 1								
	T. 3 S., R. 21 E., Salt Lake Base & Meridian	Total Depth	1230							
	Uintah County, Utah									
4304711423	Vernal Oil & Gas Company	Stream alluvium	0	50	5799 GR	Abandoned	617824.00	4486587.00	-109.61	40.52
	Hullinger 1	Chinle Formation (estimated)	50	46						
	0230 FSL 1777 FWL (SE¼SE¼) section 30	Gartra Member of Chinle Formation (RBO)	96	54						
	T. 3 S., R. 21 E., Salt Lake Base & Meridian	Moenkopi Formation (RBO)	150	896						
	Uintah County, Utah	Park City-Phosphoria Formation (RBO)	1046	144						
		Weber Sandstone (RBO)	1190	1074						
		Morgan Formation (RBO)	2264	451						
		Total Depth	2715							
4304731438	Amoco Production Company	Stream alluvium	0	50	5788 GR	Abandoned	618620.00	4486366.00	-109.60	40.52
	Amoco Hullinger 1	Chinle Formation (estimated)	50	116						
	0495 FNL 0997 FEL (NE¼NE¼) section 31	Moenkopi Formation (RBO)	166	896						
	T. 3 S., R. 21 E., Salt Lake Base & Meridian	Park City-Phosphoria Formation (RBO)	1062	133						
	Uintah County, Utah	Weber Sandstone (RBO)	1195	1034						
		Morgan Formation (RBO)	2229	1123						
		Doughnut-Humbug Formations (RBO)	3352	138						
		Madison Limestone (RBO)	3490	1128						
		Total Depth	4618							
4304731817	Bataa Oil Inc	Unconsolidated sand	0	30	5821 GR	Abandoned	620269.00	4485056.00	-109.58	40.51
	State 44-32	Nugget Sandstone	30	632						
	0491 FSL 0965 FEL (SE¼SE¼) section 32	Formation of Bell Springs	662	133						
	T. 3 S., R. 21 E., Salt Lake Base & Meridian	Chinle Formation	795	127						
	Uintah County, Utah	Gartra Member of Chinle Formation	922	58						
		Moenkopi Formation	980	870						
		Park City-Phosphoria Formation	1850	130						
		Meade Peak Mbr of Phosphoria Formation	1980	18						
		Weber Sandstone	1998	44						
		Total Depth	2042							

*All depths in feet; verified or picked by Douglas A. Sprinkel using available petrophysical logs or sample descriptions unless noted
**All thicknesses in feet
***All elevations in feet; GR=Ground, KB=Kelly Bushing
RBO = Depths Reported by Operator