

**DESCRIPTION OF MAP UNITS**

**SURFICIAL DEPOSITS:**

Qay Younger alluvium--mainly clay, silt, sand, and gravel in present flood plains; includes alluvial fans graded to present drainage.

Qc Colluvium--poorly sorted silt, sand, and gravel that contains numerous angular fragments of limestone and quartzite derived from Cambrian formations.

Qla Landslide deposits--chaotic blocks and angular fragments of Lodgepole Limestone in the NW 1/4 sec. 31, T. 4 N., R. 3 E.

Qao Older alluvium--poorly sorted clay, silt, sand, and gravel, deeply weathered, graded to a base level 100-200 feet above present drainage. May be same age as Bonneville Formation.

Qb **BONNEVILLE FORMATION**--mainly grayish-orange evenly bedded silty sandstone but includes gravel bars; upper extent of deposits is about 5,200 feet.

**SALT LAKE FORMATION:**

Tac Upper conglomeratic unit (0-1,000 ft)--mainly rounded quartzite boulder conglomerate derived from Precambrian formations but includes numerous lenses of conglomerate composed of angular fragments of rocks derived from formations exposed in the quadrangle and sparse lenses of tuffaceous sandstone. In general, rounded quartzite boulders are larger than similar boulders in the Wasatch Formation exposed in the Morgan 7 1/2-minute quadrangle.

Tsn Norwood Tuff Member (about 5,000 ft)--mainly light-gray tuffaceous sandstone; exposures in southwest corner of quadrangle include abundant volcanic conglomerate, and in southeastern exposures the Norwood includes thin (1-12 ft) lenses of cherty limestone.

Tw **WASATCH FORMATION** (about 3,000 ft exposed in quadrangle)--mainly rounded quartzite boulder and cobble conglomerate interbedded with reddish-brown conglomeratic sandstone; sparse beds of pale-red silty limestone.

Pw **WEBER QUARTZITE** (about 2,500-3,000 ft)--near the Weber River the Weber is grayish-orange medium-grained quartzitic sandstone in upper part and interbedded quartzite and dark-gray cherty dolomite and siltstone in basal 1,500 feet; northward the dolomite and siltstone grade into quartzitic sandstone that contains scattered beds of medium-gray limestone.

Pm **MORGAN FORMATION** (0-1,000 ft)--mainly reddish-brown sandstone and siltstone and sparse light-gray limestone in exposures near Weber River. Grades northward into light-gray quartzitic sandstone and limestone that cannot be distinguished from quartzitic sandstone and limestone in overlying Weber Quartzite.

Pr **ROUND VALLEY LIMESTONE** (about 400 ft)--mainly light-gray evenly bedded limestone; contains nodules and seams of grayish-orange chert; sparse beds of limestone conglomerate near base.

**DOUGHNUT FORMATION:**

Mdu Upper member (about 290 ft)--mainly thick-bedded dark-gray limestone; contains scattered beds of dark-gray siltstone 1-3 feet thick.

Mdl Lower member (about 120 ft)--mainly grayish-red and grayish-green siltstone, scattered beds of light-gray limestone, and a distinctive yellowish to reddish-brown-weathering chert bed 3-12 feet thick near base. Structurally incompetent.

**HUMBURG FORMATION:**

Mhu Upper member (about 300-350 ft)--mainly dark-gray medium-bedded limestone; scattered beds 5-15 feet thick of light-gray and grayish-orange sandstone near base.

Mhl Lower member (about 400-500 ft)--mainly light-gray to grayish-orange fine-grained cross-laminated sandstone; includes interbeds as much as 15 feet thick of medium-gray limestone and dolomite. Cross-laminations are low (8°-15°) angle.

Mde **DESERET LIMESTONE** (about 500 ft)--interbedded dark-gray limestone, dolomite, and light-gray sandstone; contains zone of phosphatic shale and chert 1-6 feet thick at base.

Ml **LODGEPOLE LIMESTONE** (about 800 ft)--mainly thin- to medium-bedded (1-24 in.) dark-gray limestone, locally cherty, very fossiliferous. Structurally incompetent. The Lodgepole beds are commonly contorted and contain many minor bedding-plane faults that locally greatly thicken the Lodgepole.

Dt **THREE FORKS FORMATION** (about 230 ft)--interbedded grayish-orange mixed-grained quartzitic sandstone, reddish-brown siltstone, grayish-yellow silt, limestone, and reddish-brown conglomerate composed of small angular fragments of siltstone in a sandy siltstone matrix. The Three Forks is structurally incompetent and is contorted and faulted in most outcrops.

Dcd **DOLOMITE** (800-900 ft)--mainly massive-bedded medium- to dark-gray dolomite, scattered interbeds of olive-gray linguloid-bearing siltstone. Contains fish plates in upper part; no fossils observed in lower 500 feet. Contains many minor bedding-plane faults whose accumulative displacement locally greatly thickens the unit.

Cl **LIMESTONE** (about 640 ft)--mainly thin-bedded (1-6 in.) grayish-black locally oolitic limestone interbedded with grayish-orange and olive-gray calcareous siltstone. Limestone contains numerous blebs and branching tubes of grayish-orange silty limestone. Structurally incompetent, contorted, and contains minor bedding-plane faults in most outcrops.

Cl1 Lower marker bed (mapped locally, 60-90 ft)--mainly thin-bedded (1-4 in.) dark-gray limestone that contains numerous globs of grayish-orange and pale-red silty limestone.

Co **OPHIR SHALE** (about 380 ft)--mainly yellowish-brown siltstone and sandstone in lower 60 feet and yellowish-brown siltstone with scattered interbeds of bluish-gray limestone in upper 320 feet. Upper part is structurally incompetent and commonly contains contorted beds.

Ct **TINTIC QUARTZITE** (800-1,500 ft)--light-colored evenly bedded medium-grained quartzite in upper half; light-colored conglomeratic quartzite in lower part. Clasts are mainly rounded pebbles and cobbles derived from Precambrian quartzite-bearing formations. Basal 50 feet is arkosic conglomerate composed of material from underlying Farmington Canyon Complex.

pCf **FARMINGTON CANYON COMPLEX**--mainly light- to dark-gray medium- to coarse-grained gneiss composed of quartz, alkalic feldspar, and biotite.

pCfp Pegmatite--very coarse grained quartz, alkalic feldspar, and muscovite, mainly forms irregular globs, but locally intrudes along foliation in the gneiss.

**ECONOMIC GEOLOGY**

Several prospects for mica, lead, and copper occur in the Morgan 7 1/2-minute quadrangle, but none is of current economic importance. Shallow pits were dug in sec. 2, T. 4 N., R. 3 E., in prospect for mica in pegmatites in the Farmington Canyon Complex. The mica is in small blocks, not exceeding 3 inches across, is badly ruled, and is suitable only for scrap. Prospects in secs. 1, 24, 25, and 36 were to test for lead and copper minerals associated with iron minerals in small calcite veins and fault breccia. Seemingly, other prospects and small mines in the area have been obliterated by erosion, as Loughlin (in Butler and others, 1920, p. 219-221) reported that small quantities of ore were shipped from the Morgan mining district in 1907 and 1908 and that prospecting continued at least to 1912.

A zone of phosphatic shale 1-6 feet thick occurs at the base of the Mississippian Deseret Limestone. In most places this zone is either concealed by rubble or is squeezed out along one of the many minor bedding-plane faults; so its character is known mainly from float. It consists of black shale and thin (1-4 inches) beds of phosphatic and phosphatic chert in most places, but it grades into slightly phosphatic chert in the area between Cedar Canyon and the Weber River. R. M. Schell and R. J. Hite (written commun., 1965) sampled this phosphate zone at Sheep Herd Creek, 6 miles north of the Morgan 7 1/2-minute quadrangle. There, the zone is 8.9 feet thick and averages about 25.5 percent P<sub>2</sub>O<sub>5</sub> in the basal 1.5 feet but contains only slightly phosphatic mudstone in the upper part.

Considerable gravel suitable for construction is available in the alluvium along the Weber River and in gravel bars in the Bonneville Formation. Large-scale exploitation of the gravel, however, is not possible at the present time owing to no local market.

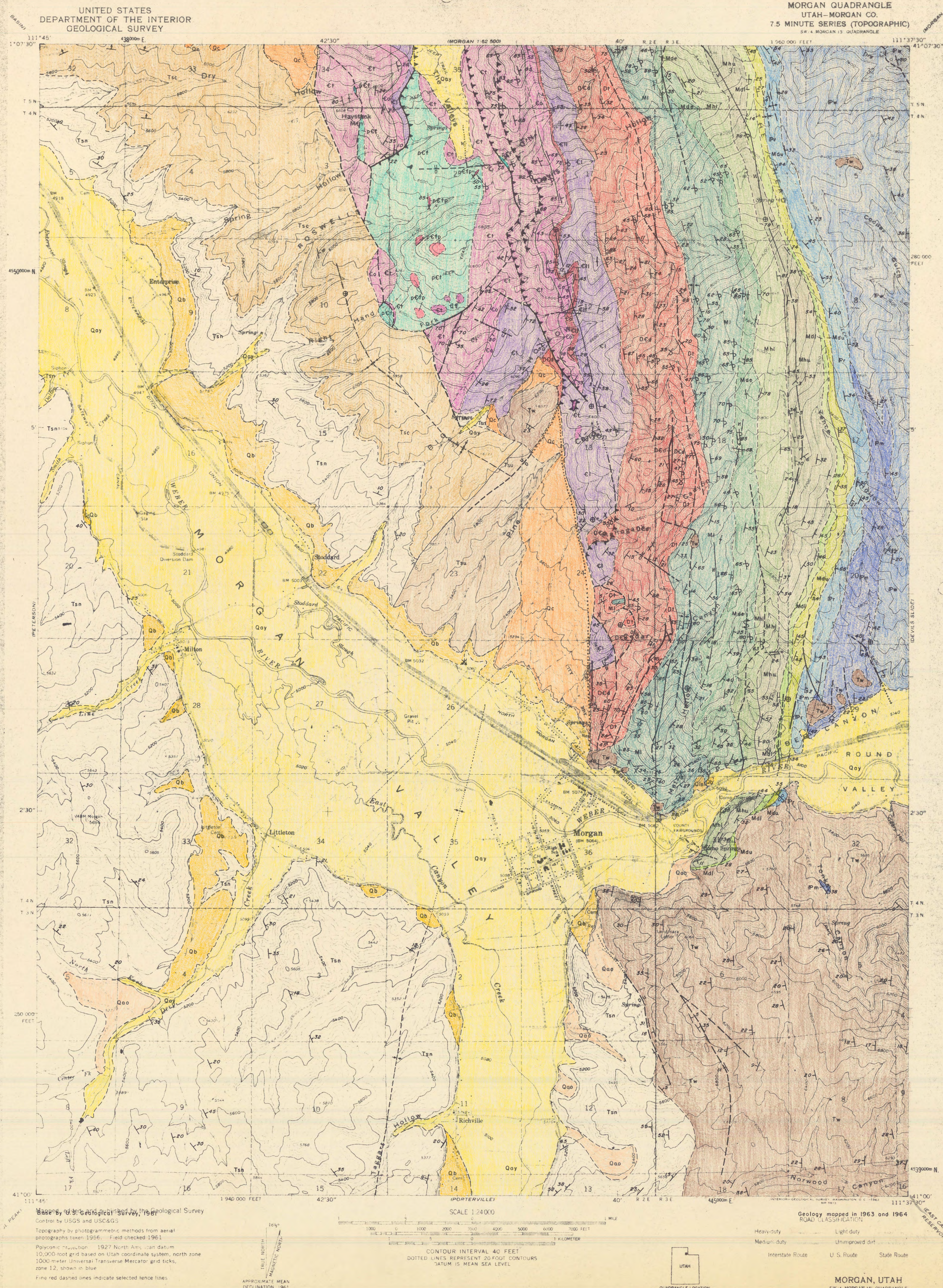
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This report is preliminary and has not been edited or reviewed for conformity with U.S. Geological Survey standards

# PRELIMINARY GEOLOGIC MAP OF THE MORGAN 7 1/2' QUADRANGLE, MORGAN COUNTY, UTAH

By  
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*Utah (Morgan quad.) Geol. 1:24,000. 1967. esp. 1.*

1 The Norwood Tuff was defined as an Oligocene age formation in the Salt Lake Group by Eardley (1944, p. 845) for exposures near the mouth of Norwood Canyon. In the Morgan quadrangle the Norwood cannot consistently be separated from the upper conglomerate part of the Salt Lake Formation, so it is here designated as a member of the Salt Lake Formation. Gazin (1959, p. 127) concluded that fossils collected in 1954 indicate a late Eocene age for part of the Norwood.

2 The Farmington Canyon Complex was named by Eardley and Hatch (1940, p. 61) for a sequence of Precambrian metamorphic rocks widely exposed in the northern Wasatch Mountains. The type locality is about 5 miles southwest of the Morgan quadrangle. The name is used here for gneiss and pegmatite similar to parts of the Farmington Canyon.

3 Numerous bedding-plane faults of presumably small displacement were not mapped. Accumulative total displacement of unmapped faults, however, is locally great.

