

# Geologic Map of the Thoreau NE 7.5-Minute Quadrangle, McKinley County, New Mexico

Surficial geology for the entire quadrangle interpreted from aerial photography by:

**Rawling, Geoffrey C.<sup>1</sup>,**

Bedrock geology, bedrock unit descriptions, and subsurface interpretation for the entire quadrangle by:

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*Open-File Geologic Map OF-GM 148*  
Scale 1:24,000**

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*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 or the State of New Mexico.*

## Map Units for the Thoreau NE Quadrangle

Surficial geology for the entire quadrangle interpreted from aerial  
photography by Geoffrey C. Rawling

Bedrock geology, bedrock unit descriptions, and subsurface interpretation for the entire  
quadrangle by Morris W. Green and Charles T. Pierson, USGS Geologic Quadrangle  
Map GQ-954

### Surficial deposits

**daf – disturbed ground and artificial fill.** Anthropogenic fill for highway and railroad  
embankments and earthen dams, and disturbed ground at industrial and mine sites  
where underlying geology is obscured.

**QH<sub>a</sub> – Recent alluvium.** Unlithified gravel, sand, silt, and clay in incised active  
drainages.

**Qsu – Upland deposits.** Unlithified to poorly lithified sand, silt, and clay forming low-  
relief sheets and thin (< 5 feet) valley fills on upland surfaces. Generally unincised by  
modern drainages.

**Qft – Fan and hillslope toe deposits.** Unlithified to poorly lithified gravel, sand, silt, and  
clay. Forms coalesced, low-gradient alluvial fans and the toes of slopes. Generally  
undissected by modern drainages.

**Qvf – Valley fill.** Unlithified to poorly lithified gravel, sand, silt, and clay beneath very  
low gradient valley floors and alluvial slopes. Undissected by modern drainages.  
Composition probably becomes progressively finer-grained with increasing distance  
from bedrock slopes.

**Qt - Talus.** Unlithified talus, landslide blocks, and colluvium.

*Unconformity*

**Km – Main body of Mancos Shale.** Dark-olive-gray, friable, silty shale, locally interbedded with minor very thin-bedded to laminated, yellowish-brown, sandy siltstone. Incompletely exposed.

**Kdt – Twowells Tongue of Dakota sandstone.** Yellowish-brown, fine-grained, silty sandstone and sandy siltstone with light-gray, lenticular beds of fossiliferous limestone. 4–6 feet thick.

**Kmw - Whitewater Arroyo Tongue of Mancos Shale.** Yellowish-brown to yellowish-gray fossiliferous shale. 90–110 feet thick.

**Kml - Lower part of Mancos Shale.** Olive-gray to pale-grayish-yellow shale with interbeds of yellowish-brown, sandy siltstone and silty sandstone containing dark-gray, fossiliferous, lenticular-shaped limestone bodies. 100–150 feet thick.

**Kd – Dakota Sandstone.** Yellowish-brown to buff, medium- to fine-grained, well-sorted, siliceous sand-stone, with thin beds of black to gray, carbonaceous shale, interbedded locally. 80–140 feet thick.

*Unconformity*

**Jcx – Collapse/breccia pipes** (Jurassic age is uncertain). Collapse features/breccia pipes.

**Morrison Formation**

**Jmb – Brushy Basin Member of Morrison Formation.** Greenish-gray to purplish-gray, claystone and sandy siltstone. 80–120 feet thick.

**Jmbs - Sandstone lenses within the Brushy Basin Member of Morrison Formation.**

Yellowish-brown, pink, and white, medium- to coarse-grained, poorly sorted sandstone.

**Jmw – Westwater Canyon Member of Morrison Formation.** Yellowish-gray to reddish-brown, medium to coarse-grained, poorly sorted fluviially cross-bedded sandstone. Intertongues with the Recapture Member. 150–200 feet thick.

**Jmwc - Claystone and siltstone lenses within the Westwater Canyon Member of the Morrison Formation.** Local lenses of dusky-reddish- to purplish-gray claystone and siltstone.

**Jmr – Recapture Member of the Morrison Formation.** Purplish- and greenish-gray to white siltstone and claystone containing lenses of greenish-white, fine- to medium-grained, moderately well-sorted sandstone. Intertongues with Westwater Canyon Member and Cow Springs Sandstone. 110–140 feet thick.

**Jcs - Cow Springs Sandstone.** Light- to greenish-gray, medium- to fine-grained, moderately well-sorted sandstone with high-angle aeolian crossbedding. Intertongues with the Morrison Formation and Bluff Sandstone. 0–65 feet thick.

**Jb – Bluff Sandstone -** Very light-reddish-brown, pale-orange, and greenish-gray, fine- to medium-grained sandstone and silty sandstone; contains alternately cross-bedded and parallel-bedded units, separated locally by thin claystone and siltstone partings. 100–150 feet thick.

**Js – Summerville Formation.** Parallel-bedded, reddish-brown to light-orange, fine-grained silty sandstone and thin-bedded, reddish-brown claystone and siltstone. 95–140 feet thick.

**Jt – Todilto Limestone.** Light- to dark-gray, thin-bedded limestone, locally containing small secondary calcite crystals. Lower third is laminated sandy limestone. 20–30 feet thick.

### **Entrada Sandstone**

**Jeu – Upper sandy member of the Entrada Sandstone.** Reddish-orange to reddish-brown, medium- to fine-grained, well-sorted aeolian cross-bedded sandstone. 130–150 feet thick.

**Jem – Medial silty member of the Entrada Sandstone.** Dark-reddish-purple, clayey siltstone and very fine-grained silty sandstone. 45–50 feet thick.

### *Unconformity*

**Ƒw – Wingate Sandstone.** Reddish-orange, medium- to fine-grained, well-sorted, aeolian cross-bedded sandstone containing randomly oriented calcite-filled joints. Commonly contains fine- to medium-grained, angular, white chert grains that tend to be concentrated along cross-bed laminations. Angular, pebble-sized and smaller, white chert grains occur locally in a zone approximately 6 inches thick at the base of the unit. 35–45 feet thick.

### *Unconformity*

### **Chinle Formation**

**T̄co** – Owl Rock member of the Chinle Formation. White, light-green and purplish-gray limestone-pebble conglomerate interbedded with reddish-purple siltstone. 15-20 feet thick.

**T̄cpu** – Upper part of the Petrified Forest member of the Chinle Formation. Dark- to light-purplish-gray clayey siltstone. About 680 feet thick.

**T̄cpc** – Correo Sandstone Bed of the Petrified Forest member of the Chinle Formation. Light- to medium-dark-purplish-gray, medium- to fine-grained, fluviially cross-bedded siliceous sandstone. Locally contains grayish-brown, limestone-pebble conglomerate. 20–35 feet thick.

**T̄cps** – Sonsela Sandstone Bed of the Petrified Forest Member of the Chinle Formation. Yellowish-brown to white, medium- to coarse-grained sandstone containing fluvial cross-beds. Locally conglomeratic and contains micaceous minerals that tend to be concentrated along cross-bed laminations; also locally contains lenses of reddish- to purplish-gray claystone and siltstone. Base not exposed (bed separates upper and lower parts of Petrified Forest Member). Cross section only.

*Units below T̄rcps are undivided on the cross-section(unit pT̄rcps).*

**pT̄cps** – Pre-Sonsela Sandstone units undivided. Cross section only.