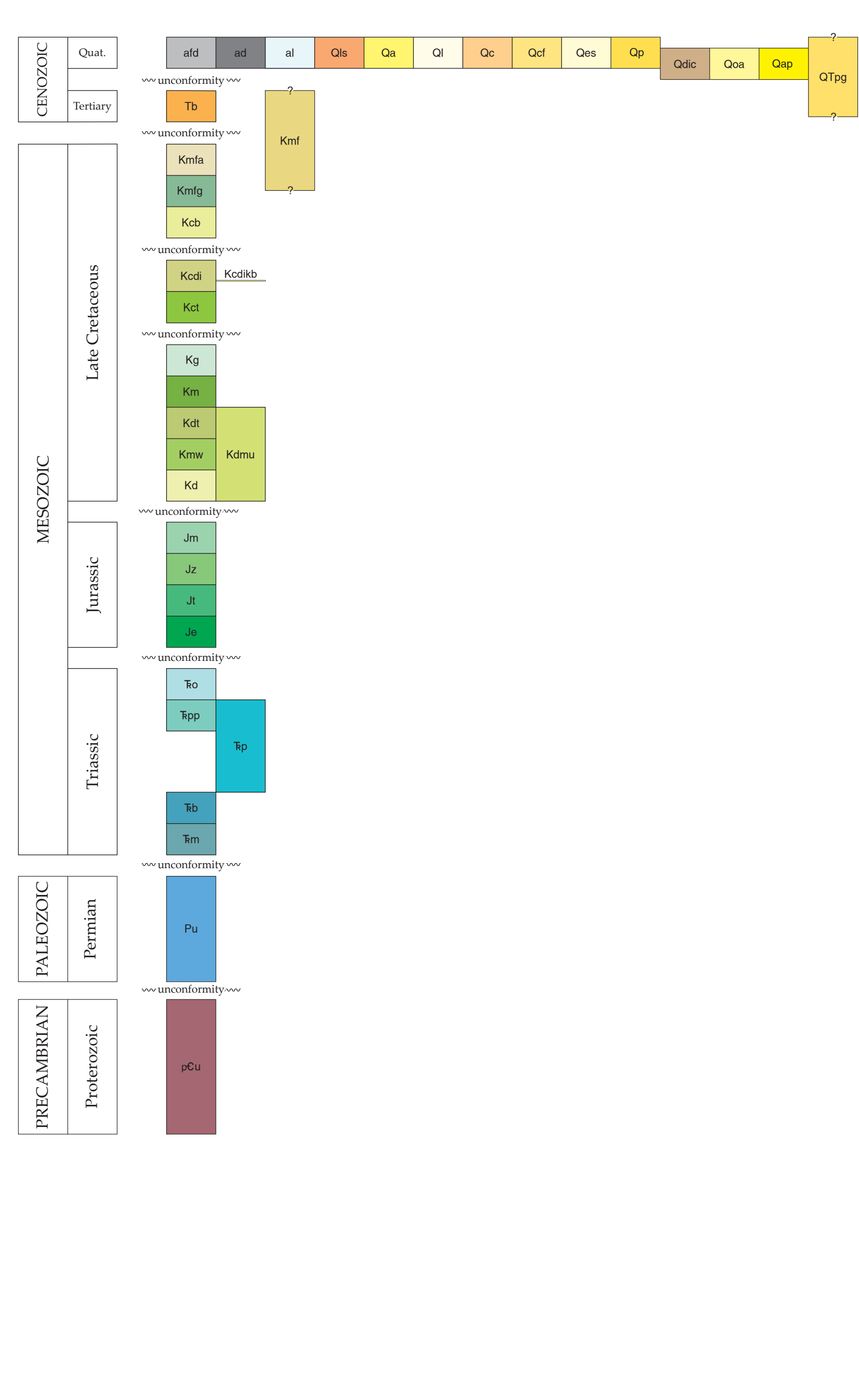


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This and other STATEMAP quadrangles are available for free download in both PDF and ArcGIS formats at:
http://geoplatform.nmt.edu
September 2024
by
Jacob O. Thacker

Geologic Map of the Bread Springs 7.5-Minute Quadrangle, McKinley County, New Mexico

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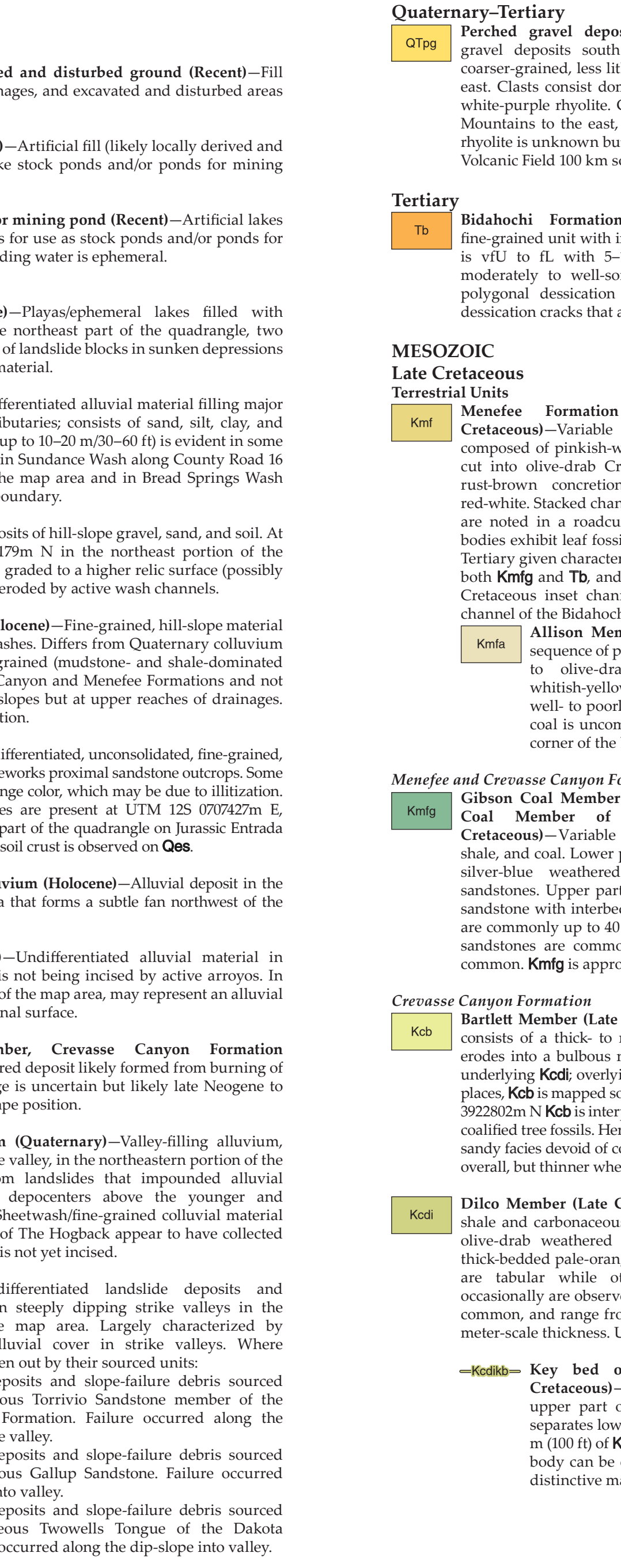
Correlation of Map Units



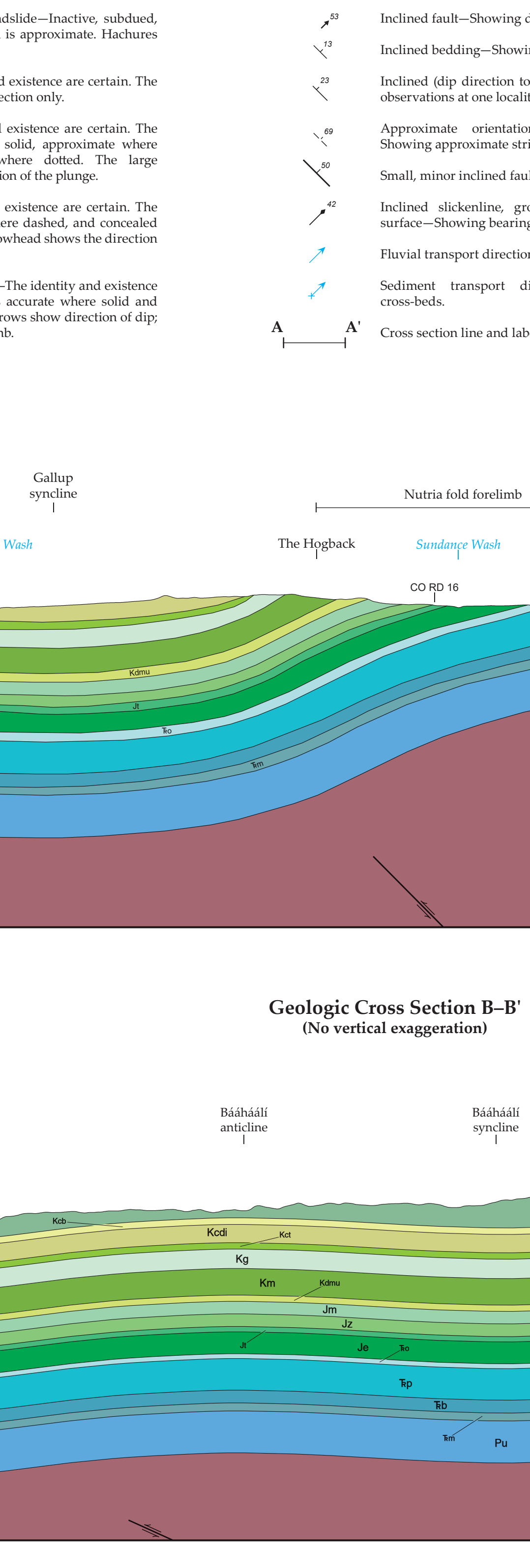
Description of Map Units

Quaternary-Tertiary
Quaternary
Anthropogenic fill—Excavated and disturbed (Recent)—Fill along roadways, across drainages, and excavated and disturbed areas from past coal mining.
Anthropogenic dam (Recent)—Artificial fill (likely locally derived and excavated) in arroyos to make stock ponds and/or ponds for mining operations.
Artificial lake, stock pond, or mining pond (Recent)—Artificial lakes made by anthropogenic dams for use as stock ponds and/or ponds for mining operations. Most standing water is ephemeral.
Surficial Deposits
Epithermal lake (Holocene)—Playas/epithermal lakes filled with fine-grained sediment. In the northeast part of the quadrangle, two plain areas are formed on top of landslide blocks in surficial deposits at the head of the translated material.
Alluvium (Holocene)—Undifferentiated alluvial material filling major wash drainages and their tributaries; consists of sand, silt, clay, and gravel. Deep arroyo incision (up to 20 m) is evident in some areas; the most notable areas in Sundance Wash along County Road 16 in the northeastern part of the map area and in Broad Springs Wash near NM 662 at the western boundary.
Colluvium (Holocene)—Deposits of hill-slope gravel, sand, and soil. At UTM 12S 079334m E, 3025179m N in the northeast portion of the quadrangle, **Qc** appears to be graded to a higher relief surface. **Qsp** that is now incised and eroded by active wash channels.
Colluvium, fine-grained (Holocene)—Fine-grained, hill-slope material that flanks alluvium-filled washes. Differs from Quaternary colluvium by being sourced from fine-grained (mudstone- and shale-dominated) facies portions of Crevasse Canyon and Menefee Formations and not located at the base of slopes but at upper reaches of drainages. May reflect beach/terrace deposition.
Older alluvium (Holocene)—Undifferentiated alluvial material in broad-valley exposures that is not being incised by active arroyos. In the extreme northeast corner of the map area, may represent an alluvial (pre-Quaternary) aggradational surface.
Chinker in Dikeo Member, Crevasse Canyon Formation (Quaternary)—Black and colored deposit likely formed from burning of aerially exposed coal. The age is uncertain but likely late Neogene to Quaternary given the landscape position.
Perched valley-fill alluvium (Quaternary)—Valley-filling alluvium, located in Mancos Shale strike valley, in the northeastern portion of the map area. **Qap** formed from landslides that impounded alluvial material and caused local depositional above the younger and lower-elevation **Qa** surface. Short-wavelength colluvial material eroded from flanking ridges of The Hogback appear to have collected beyond an axial position that is not yet defined.
Landslide (Holocene)—Undifferentiated landslide deposits and slope-failure debris found in steeply dipping strike valleys in the northeastern portion of the map area. Largely characterized by translated bedrock and colluvial cover in strike valleys. Where discernible, deposits are broken out by their source units.
Qaf—Landslide deposits and slope-failure debris sourced from Late Cretaceous Toiyabe Tongue of the Dakota Sandstone. Failure occurred along the dip-slope into strike valley.
Qad—Landslide deposits and slope-failure debris sourced from Late Cretaceous Toiyabe Tongue of the Dakota Sandstone. Failure occurred along the dip-slope into valley.

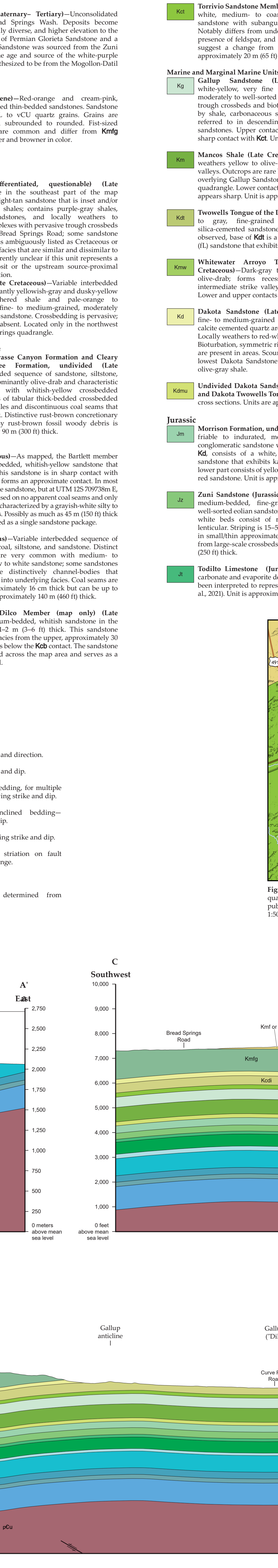
Geologic Cross Section A-A'



Geologic Cross Section B-B'



Geologic Cross Section C-C'



Explanation of Map Symbols

Head or main scarp of landslide—Inactive, subsided, indistinct, and (or) location is approximate. Hackles point down scarp.
Key bed—Kob—Identify and existence are certain. The location is accurate. Cross section only.
Articline—The identity and existence are certain. The location is accurate where solid, approximate where dashed, and concealed where dotted.
Syncline—The identity and existence are certain. The location is approximate where dashed, and concealed where dotted.
Normal fault—The identity and existence are certain and questionable where queried. The location is accurate where solid, approximate where long-dashed, inferred where short-dashed, and concealed where dotted.
Fault in cross section showing local upthrown offset—The arrows show the relative motion along the fault plane.

Map Symbols

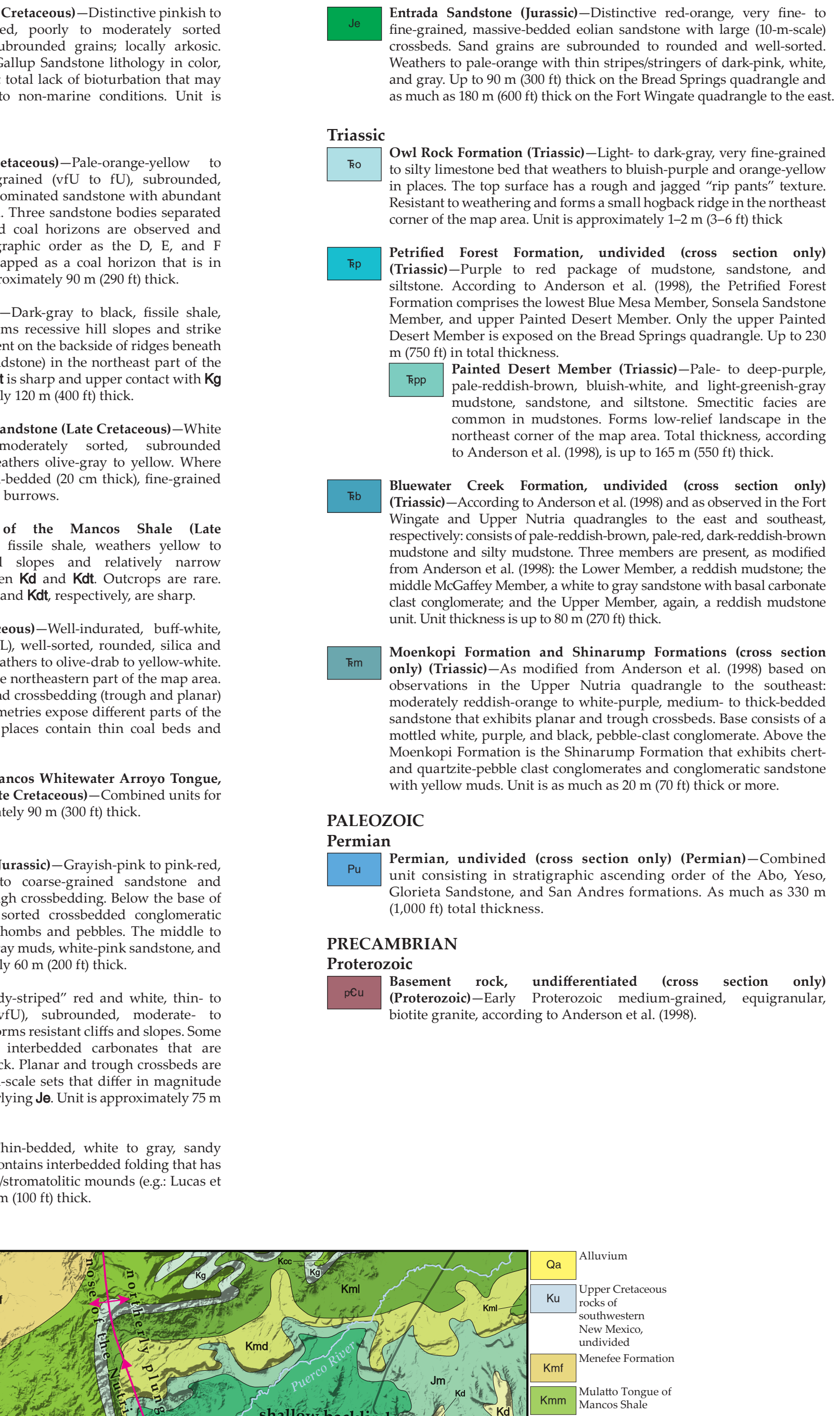


Figure 1—Regional map displaying the generalized extent and scale of the Nutria fold in relation to the Bread Springs quadrangle. Geology from the Geologic Map of New Mexico OCM-304. Unit descriptions can either be found in this publication or from the geologic map-unit descriptions in OCM-304. Note: **Kof** and **Koz** are mapped differently on the 1:500,000 state geologic map, and new Bread Springs mapping pushes **Kof** further to the south.

Figure 2—Regional map displaying the generalized extent and scale of the Nutria fold in relation to the Bread Springs quadrangle. Geology from the Geologic Map of New Mexico OCM-304. Unit descriptions can either be found in this publication or from the geologic map-unit descriptions in OCM-304. Note: **Kof** and **Koz** are mapped differently on the 1:500,000 state geologic map, and new Bread Springs mapping pushes **Kof** further to the south.

Figure 3—Regional map displaying the generalized extent and scale of the Nutria fold in relation to the Bread Springs quadrangle. Geology from the Geologic Map of New Mexico OCM-304. Unit descriptions can either be found in this publication or from the geologic map-unit descriptions in OCM-304. Note: **Kof** and **Koz** are mapped differently on the 1:500,000 state geologic map, and new Bread Springs mapping pushes **Kof** further to the south.

Figure 4—Regional map displaying the generalized extent and scale of the Nutria fold in relation to the Bread Springs quadrangle. Geology from the Geologic Map of New Mexico OCM-304. Unit descriptions can either be found in this publication or from the geologic map-unit descriptions in OCM-304. Note: **Kof** and **Koz** are mapped differently on the 1:500,000 state geologic map, and new Bread Springs mapping pushes **Kof** further to the south.