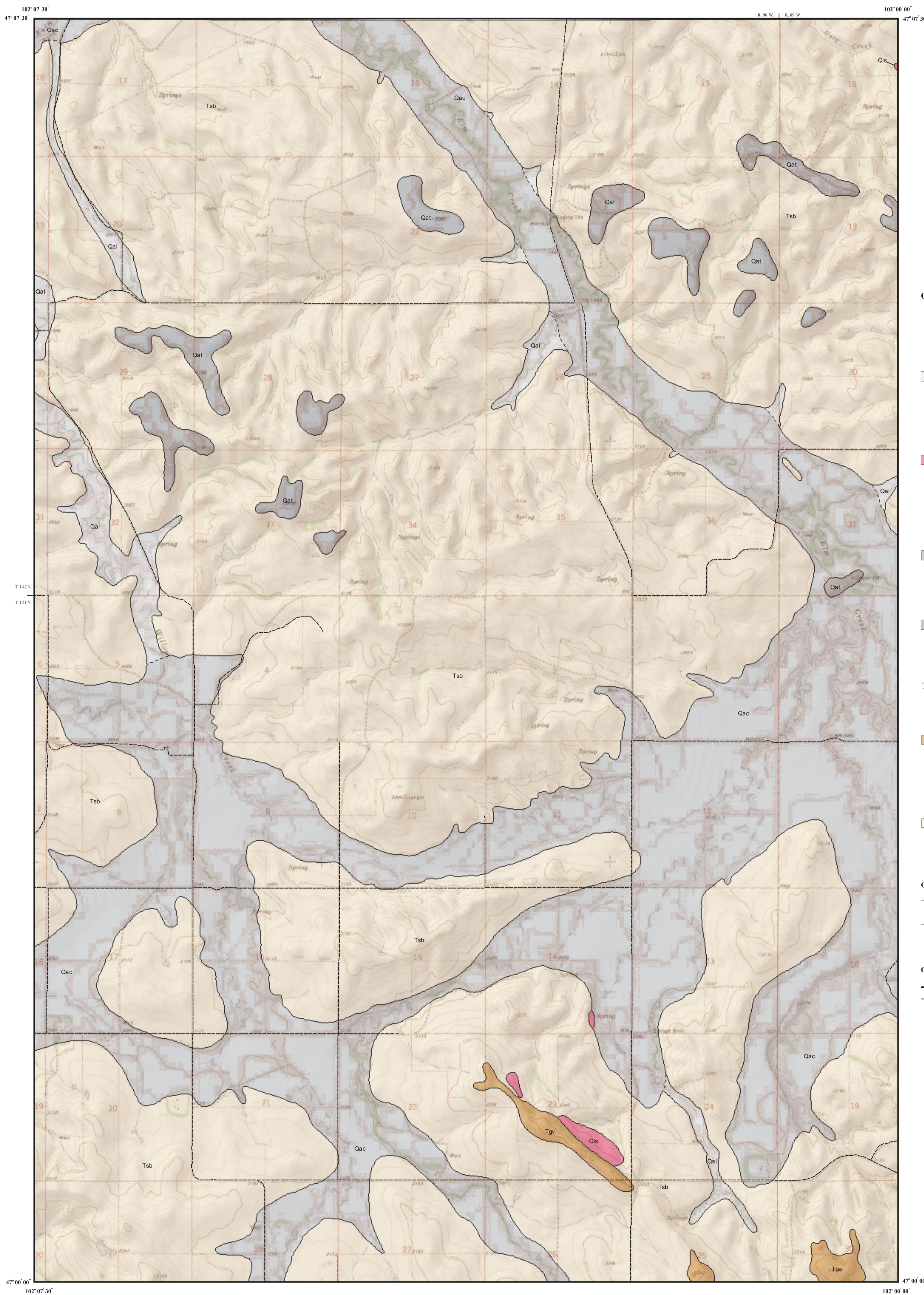


# Surface Geology

## Willow Creek East Quadrangle, North Dakota

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2004



### UNIT DESCRIPTIONS

#### QUATERNARY SYSTEM

##### RECENT

##### OAHE FORMATION

**Qal** Alluvium  
Brownish gray to black sand, silt, clay, and lenses of gravel; floodplain deposits (typically less than 30 feet thick) along recent drainages. Not differentiated where it overlies Qac.

##### RECENT/PLEISTOCENE

**Qs** Landslide Deposits  
Variable mixture of strata and deposits that have slid to the base of steep slopes.

##### PLEISTOCENE

##### COLEHARBOR GROUP

**Qac** Proglacial Channels  
Generally contain 50 to 200 feet of sand and gravel, silt, clay, and till (meltwater-channel fill). Overlain by Recent alluvium (Qal) of variable thickness. This map unit was created to distinguish between these very thick channel deposits and the moderate to thin deposits mapped as Qal.

**Qat** Terrace Deposits  
Five- to 20-foot-thick layers of sand and gravel (consisting primarily of silcrete, chert, flint, agate, petrified wood, siltstone) found beneath flat to gently undulating slopes adjacent to many of the major creeks and rivers.

#### TERTIARY SYSTEM

##### EOCENE-PALEOCENE

**Tgv** GOLDEN VALLEY FORMATION  
**Camels Butte Member:**  
Alternating beds of yellowish brown to brown, micaceous sandstone, siltstone, mudstone, claystone, and lignite.  
**Bear Den Member:**  
Brightly colored, kaolinitic claystone, mudstone, and sandstone typically overlain by a thin siliceous bed (silcrete) or lignite.

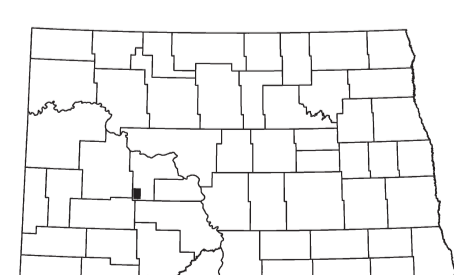
**Tsb** SENTINEL BUTTE FORMATION  
Alternating beds of grayish brown to gray sandstone, siltstone, mudstone, claystone, and lignite.

#### Geologic Symbols

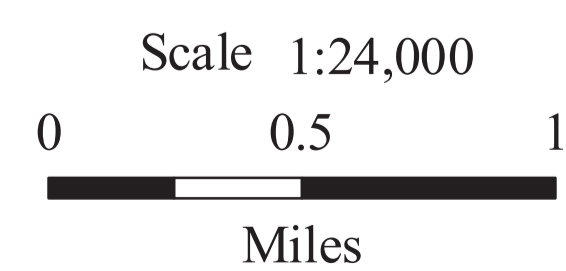
- Known contact between two geologic units.
- - - Approximate contact between two geologic units.

#### Other Features

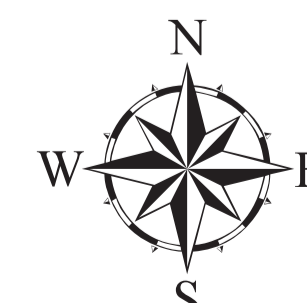
- Paved Road
- - - Unpaved Road



Willow Creek East Quadrangle, North Dakota



Lambert Conformal Conic Projection  
Standard Parallels 47° 00' 00" and 47° 07' 30"



This geologic map was funded in part by the USGS National Cooperative Geologic Mapping Program.