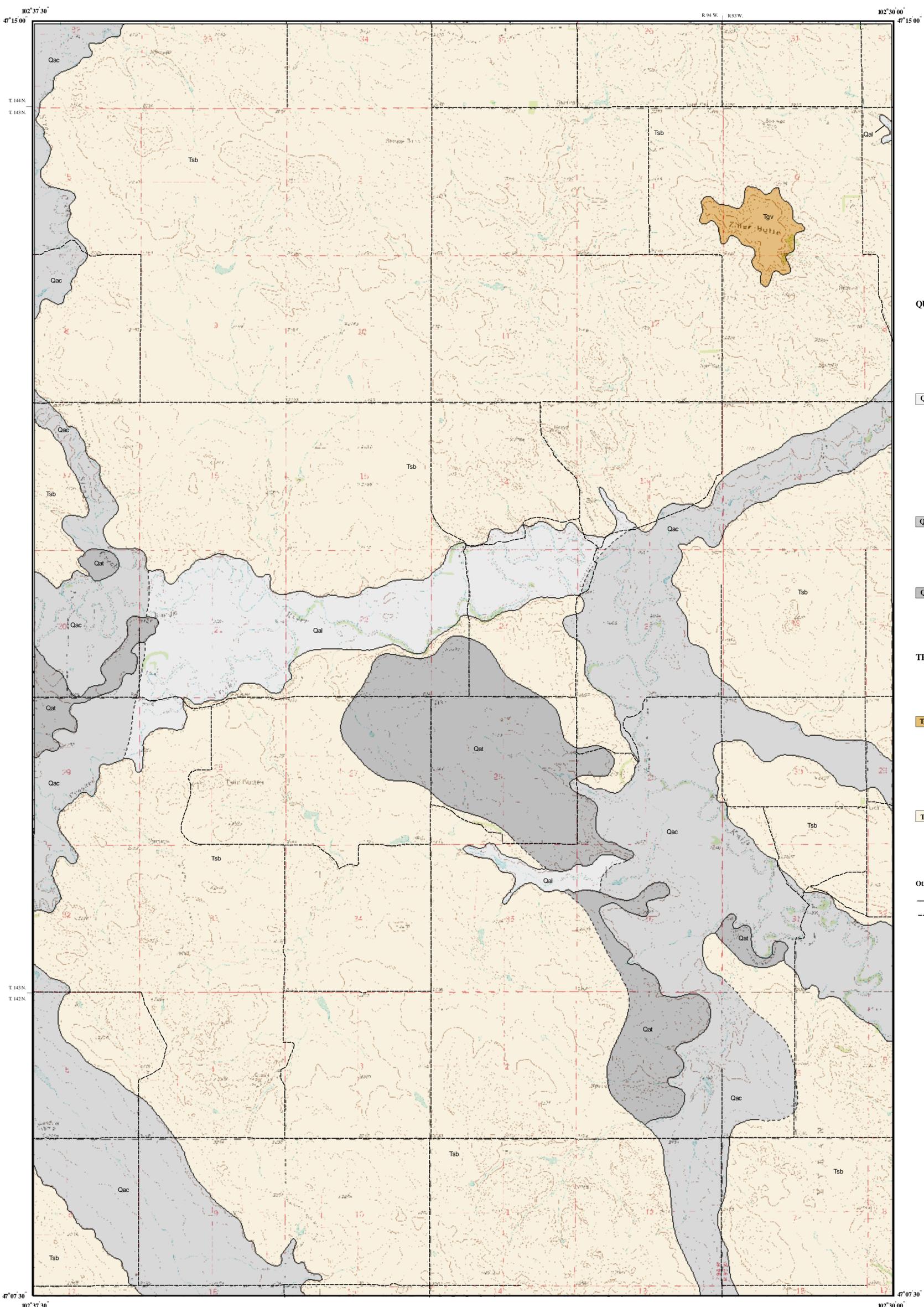


# Surface Geology

## Ziner Butte Quadrangle, North Dakota

**Edward C. Murphy**  
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.

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.

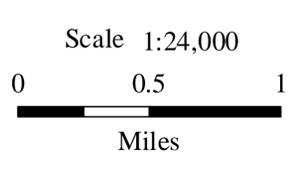
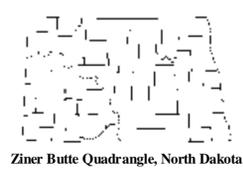
#### TERTIARY SYSTEM

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.

Other Features	Geologic Symbols
— Paved Road	— Known contact between two geologic units
- - - Unpaved Road	- - - Approximate contact between two geologic units



Lambert Conformal Conic Projection  
Standard Parallels 47°07'30" and 47°15'00"



The North Dakota Geological Survey compiled this map according to conventional cartographic standards, using what is thought to be the most reliable information available. The North Dakota Geological Survey does not guarantee freedom from errors or inaccuracies and disclaims any legal responsibility or liability for interpretations made from the map, or decisions based thereon. This geologic map was funded in part by the USGS National Cooperative Geologic Mapping Program.

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