North Dakota Geological Survey
24K: Zap - l3

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# Areas of Landslides
# Zap Quadrangle, North Dakota


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## UNIT DESCRIPTIONS

**Geology Undifferentiated**

**QUATERNARY SYSTEM**

**RECENT/PLEISTOCENE**

**Qlsa** **Areas of Recently Active Landslides**

Landslide areas showing movement between 2008 and 2024.

**Qls** **Landslide Deposits**

A mass of material that has moved downslope. Includes earth flows, slumps, and areas of soil creep.

**Qml** **Abandoned Mine Lands**

Surface underlain by voids created by the underground mining of lignite. Collapse of the mine voids often creates sinkholes or depressions at the surface.

Landslides identified on this quadrangle were mapped from stereo pairs, black and white 1:20,000 scale aerial photographs flown in June 1958 by the United States Department of Agriculture (USDA). Additional data sources include digital orthophotography from the USDA National Agriculture Imagery Program (NAIP) flown in August to September 2024 and the North Dakota Geological Survey LiDAR Map Series, which compiles raw data flown in October 2021 to May 2024 from the North Dakota State Water Commission.

Areas of recently active landslides (Qlsa) mapped on this quadrangle were identified from changes between the 2008 and 2024 LiDAR elevation datasets observed on an elevation subtraction raster. Noise introduced from data precision (typically within a foot between the LiDAR datasets) is removed on this raster by excluding the signal from elevation change in the +/- 1 foot interval. Geologists interpret areas of landslide movement in geomorphic context (typically a decrease in elevation near a landslide headscarp paired with an increase in elevation downslope near the toe) and delineate those areas within the larger landslide dataset. Landslides not identified as recently active may have also experienced movement relatively recently, but did not show discernable signs of movement during the 2008 to 2024 window between LiDAR collects.

| Slope Failure Statistical Summary | | | | |
|---|---|---|---|---|
| Map Unit | No. of Landslides | Mapped Landslide Area | | Map Area % |
| | | acres | $m^2$ | |
| Total Landslides (Qls & Qlsa) | 131 | 347 | 1,405,235 | 1.1 |
| Recently Active Landslides (Qlsa) | 15 | 1 | 3,415 | 0.01 |
| *0.2% of the mapped landslide area was active between 2008 and 20 24* | | | | |

## ROAD CLASSIFICATION

Expressway — Local Connector
Secondary Hwy — Local Road
Ramp — 4WD
Interstate Route — US Route — State Route

Zap Quadrangle, North Dakota

Scale 1:24,000
0 0.5 1
Miles

Lambert Conformal Conic Projection
North American 1983 Datum
USGS 7.5 Minute Topo Map

Standard Parallels 47°15'0"N, 47°22'30"N
NGVD 1988
Contour Interval 10 Feet

6°30' MN
2019 Magnetic North
Declination at Center of Sheet

Cartographic Compilation: Navin Thapa