

# Areas of Landslides

## Froelich Dam Quadrangle, North Dakota

Christopher A. Maike  
&  
Fred J. Anderson

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### UNIT DESCRIPTIONS

#### QUATERNARY SYSTEM

#### RECENT/PLEISTOCENE

##### Qlsa Areas of Recently Active Landslides

Landslide areas showing movement between 2008 and 2023.

##### Qls Landslide Deposits

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

Landslides identified on this quadrangle were mapped from stereo pairs, black and white 1:20,000 scale aerial photographs flown in August 1957 by the United States Department of Agriculture (USDA). Additional data sources include digital orthophotography from the USDA National Agriculture Imagery Program (NAIP) flown in September 2024 and the North Dakota Geological Survey LiDAR Map Series, which compiles raw data flown in May to November 2023 from the North Dakota State Water Commission.

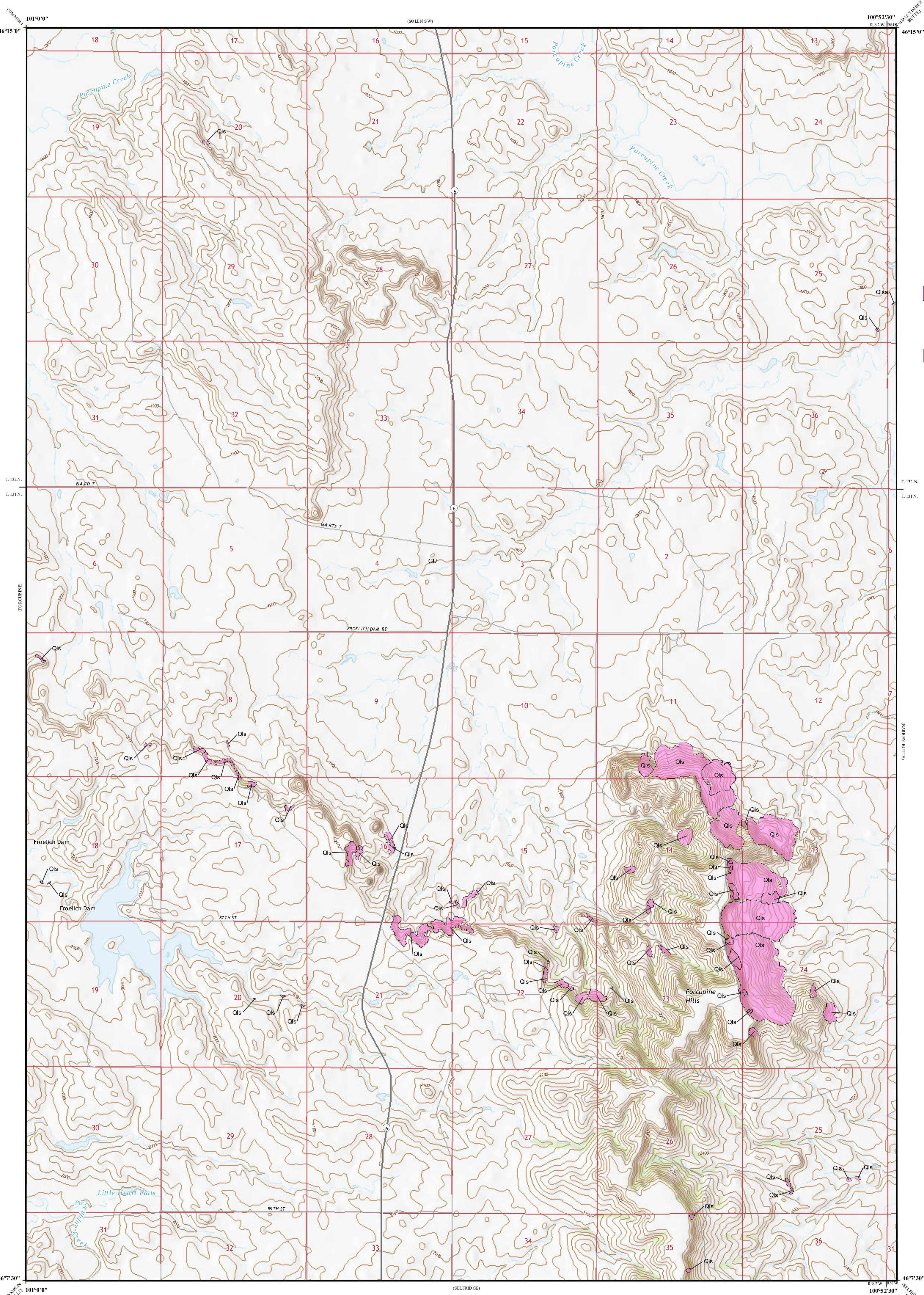
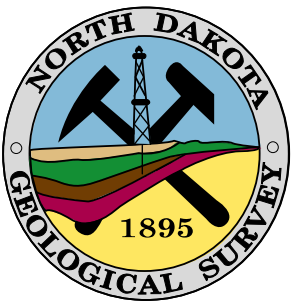
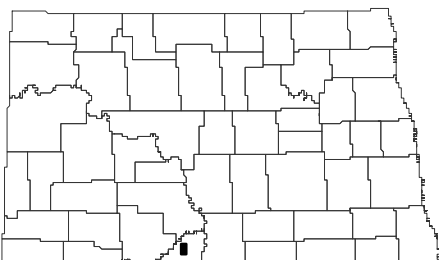
Areas of recently active landslides (Qlsa) mapped on this quadrangle were identified from changes between the 2008 and 2023 LiDAR elevation datasets observed on an elevation subtraction raster. Noise introduced from data precision (typically within a foot between the LiDAR datasets) is removed on this 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 2023 window between LiDAR collects.

| Slope Failure Statistical Summary |                   |                       |                |            |
|-----------------------------------|-------------------|-----------------------|----------------|------------|
| Map Unit                          | No. of Landslides | Mapped Landslide Area |                | Map Area % |
|                                   |                   | acres                 | m <sup>2</sup> |            |
| Total Landslides (Qls & Qlsa)     | 69                | 522                   | 2,114,053      | 1.7        |
| Recently Active Landslides (Qlsa) | 1                 | 0                     | 253            | 0.01       |

1.8% of the mapped landslide area was active between 2008 and 20 23

#### ROAD CLASSIFICATION

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



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