

Areas of Landslides

Beulah Quadrangle, North Dakota

Christopher A. Maike
&
Fred J. Anderson

2026

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.

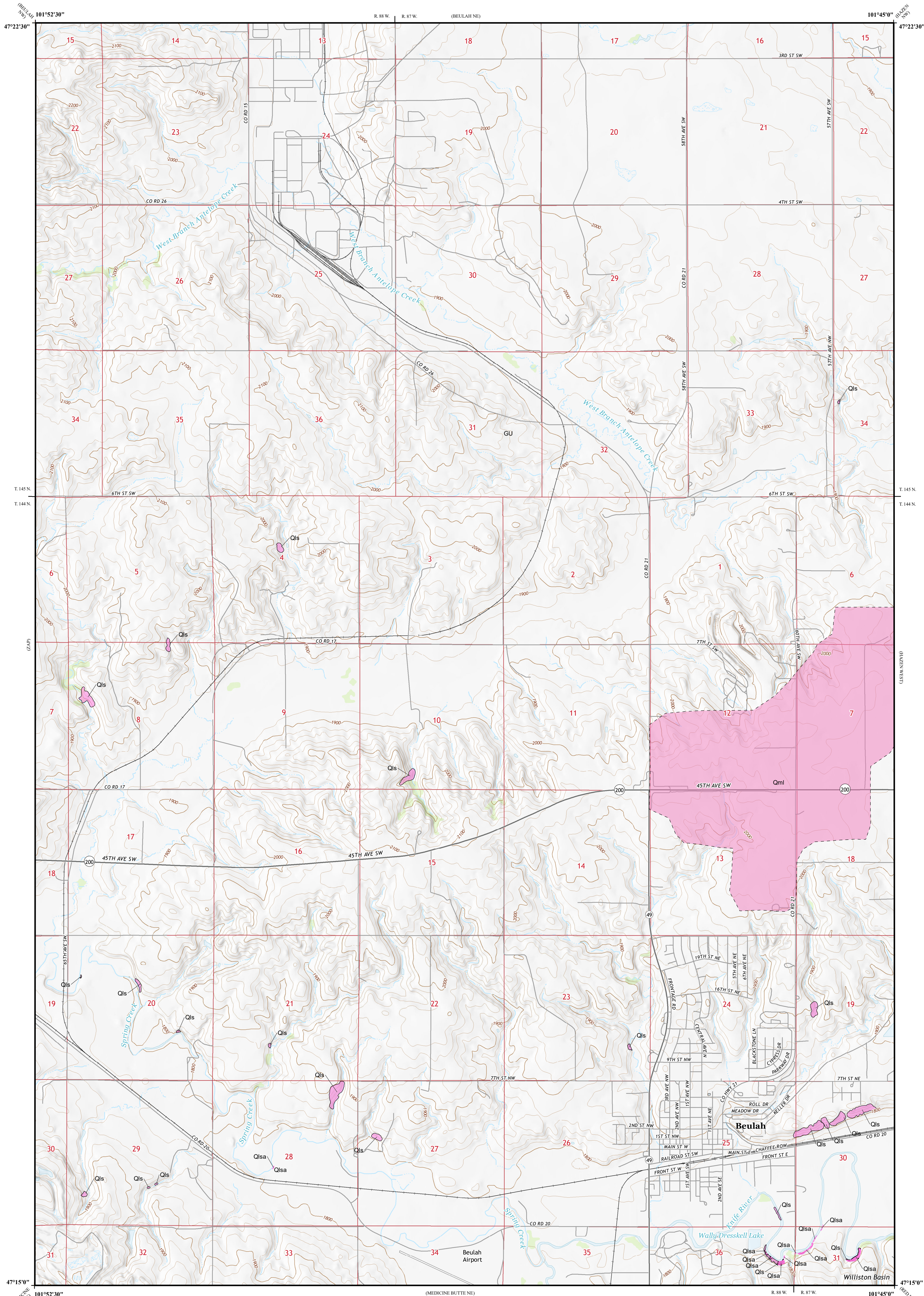
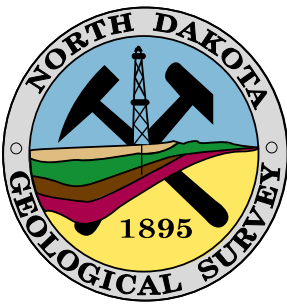
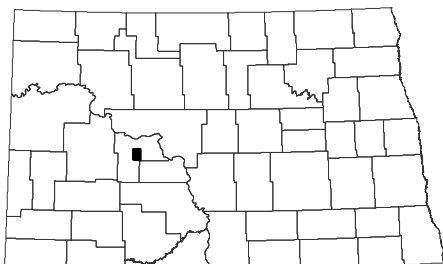
Areas of recently active landslides (Qlsa) mapped on this quadrangle were identified from changes between the 2008 and 2024 LiDAR elevation datasets observed on an elevation subtraction raster. Noise introduced from data precision (typically within a foot between the LiDAR datasets) is removed on this 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)	36	347	1,405,235	1.1
Recently Active Landslides (Qlsa)	15	4	18,009	0.01

1.2% 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



Beulah Quadrangle, North Dakota

