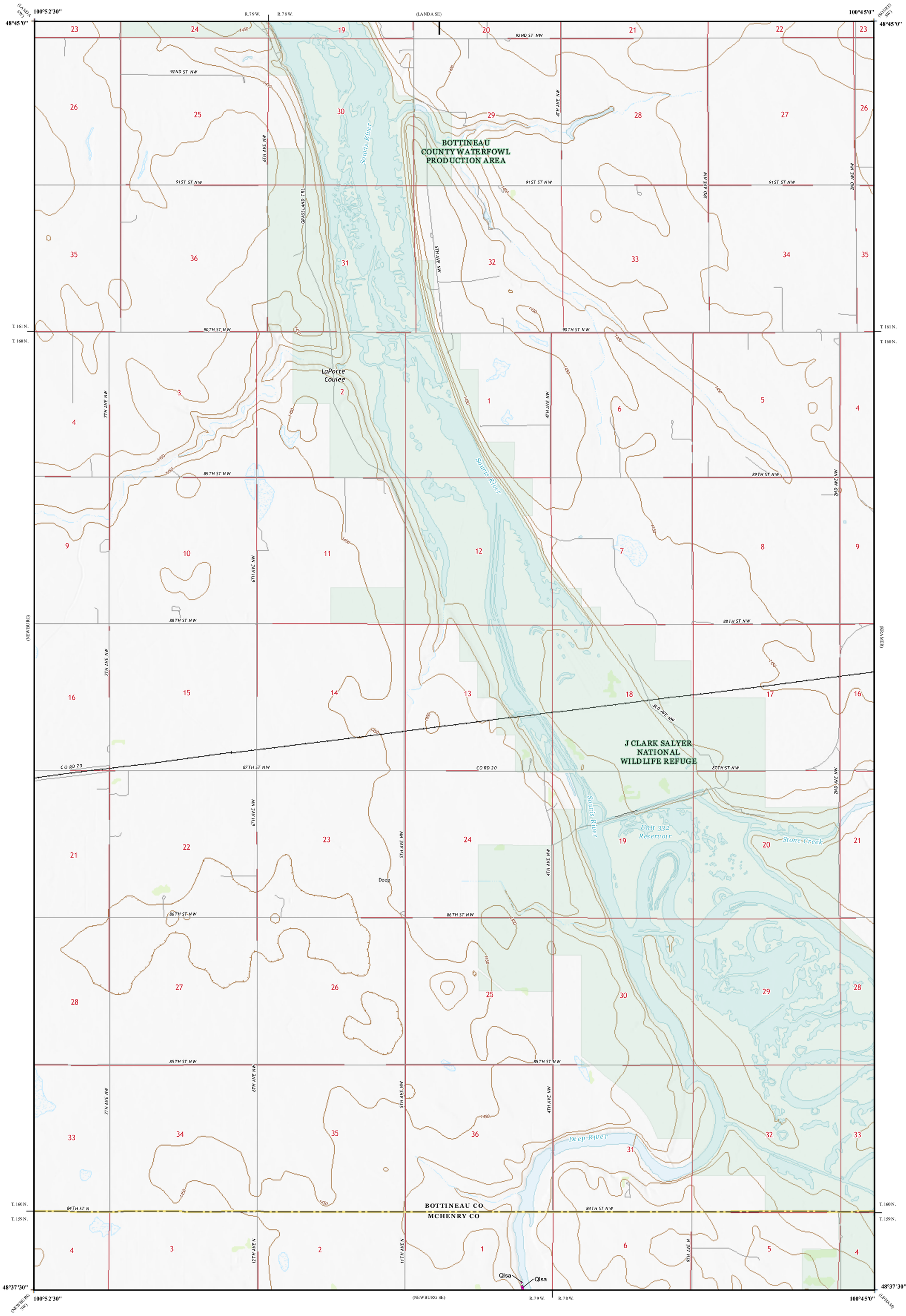
North Dakota Geological Survey
24K: Deep - 13

Edward C. Murphy, State Geologist
Nathan D. Anderson, Director Dept. of Mineral Resources

Areas of Landslides
Deep Quadrangle, North Dakota



Benjamin C. York
&
Christopher A. Maike

2025

UNIT DESCRIPTIONS

QUATERNARY SYSTEM

RECENT/PLEISTOCENE

Qlsa **Areas of Recently Active Landslides**

Landslide areas showing movement between 2008 and 2021.

Landslides identified on this quadrangle were mapped from stereo pairs, black and white 1:20,000 scale aerial photographs flown in 1961 and 1962 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 April to October 2021 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 2021 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 2021 window between LiDAR collects.

ROAD CLASSIFICATION

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

Slope Failure Statistical Summary				
Map Unit	No. of Landslides	Mapped Landslide Area		Map Area %
		acres	m^2	
Total Landslides (Qls & Qlsa)	2	0	1,624	0.0
Recently Active Landslides (Qlsa)	2	0	1,624	0.0
100% of the mapped landslide area was active between 2008 and 20 21				

Deep 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 46°37'30"N, 46°45'0"N
NGVD 1988
Contour Interval 10 Feet

6°4' MN

2017 Magnetic North
Declination at Center of Sheet

Cartographic Compilation: Navin Thapa