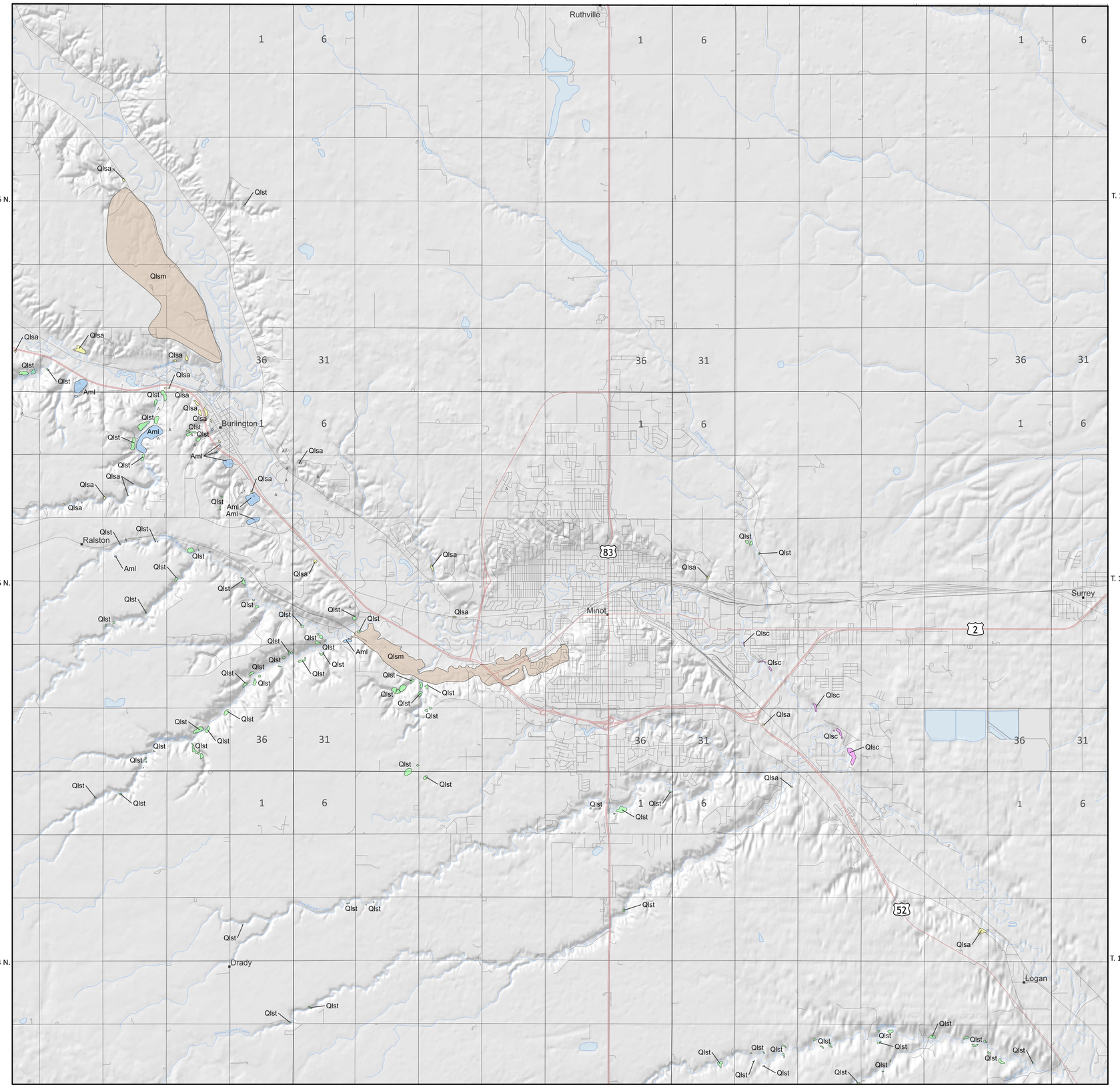
North Dakota Geological Survey
Geological Investigation No 281

LANDSLIDES IN THE MINOT AREA, WARD COUNTY, NORTH DAKOTA

2024

Fred J. Anderson

North Dakota Geological Survey
Edward C. Murphy, State Geologist



MINOT AREA QUADS, NORTH DAKOTA

Scale: 1:48,000

0 1 2 3 4 Miles

0 1 2 3 4 Kilometers

N W E S

LANDSLIDES IN THE MINOT AREA

There are 166 landslide areas found in the greater Minot area, most are along the south side of the Souris River Valley or south of the valley itself, along coulees and tributary drainages that feed into the Souris River and Des Lacs Valley. They can be temporally classified based on their geologic setting.

The oldest landslide areas (Qlsm) are large meltwater slides (fig. 1) associated with deglaciation and catastrophic flooding within the Souris River Valley resulting from glacial outburst flooding from glacial Lake Regina. There are two of these larger slide areas mapped. One is northwest of Burlington along the western side of the Souris River Valley and covers an area of 1,280 acres. The second is along the southern side of the Souris River Valley in Minot which covers and area of 533 acres and would have been along the eroding side of glacial meltwater flow within the Souris River Valley.

The second and younger type of landslide area would be the relatively larger slide areas along the Des Lacs and Souris River Valleys (fig. 2) resulting from flooding within the Souris River and Des Lacs Valley (Qlsa). There are 29 of these types of landslides which are located mostly west of Burlington that collectively cover an area of 34 acres. These slide areas range in size from 0.06 to 7.8 acres with an average of 1.1 acres.

The third and younger still type of landslide areas are smaller localized slides that are found along the coulees and tributary drainages (Qlst) that cut across the landscape from the southwest to the northeast that flow into the Souris River and Des Lacs Valley (Fig. 3). There are 112 of these types of landslides and most are found along the slopes of South Branch Coulee in the northwest and Kemp Coulee in the southeast. These slide areas range in size from 0.05 to 7.6 acres with an average of 1.4 acres. They most commonly originate on washed till slopes.

The fourth and youngest type of landslide areas (Qlsc) are found along the riverbanks and meanders of the current Souris River main stem and are resultant of active erosional processes occurring along the river (fig. 4). There are eight of these types of slides which are found exclusively along the northeastern sides of the river and are generally localized to the areas around the individual meanders. These slides range in size from 0.2 to 11.8 acres.

Abandoned mine lands or AMLs are present along the western slopes of the Souris River Valley and along the Des Lacs and tributaries west of Burlington as coal mining was widespread in this area in the early 1900s. These areas often have slumped topography resulting from the caving in of underground shafts which were the popular method of accessing buried coal horizons during this period.

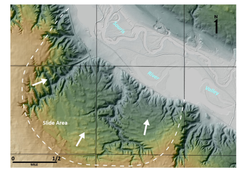


Figure 1. Geomorphic expression of large meltwater slide (Qlsm) along the Souris River northwest of Minot. Concentric ridges mark the crests of failed slide blocks oriented perpendicular to slide directions towards the Souris River Valley.

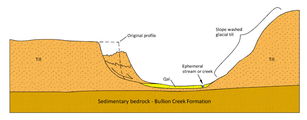


Figure 3. Landslides are common along the washed till slopes of coulees and tributary drainages (Qlst) that feed into the Souris River and Des Lacs Valley, particularly within South Branch and Kemp Coulee.

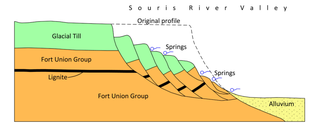


Figure 2. Landslides along the walls of the Souris River and Des Lacs Valley (Qlsa and Qlsm) can occur across several different types of rocks and sediments including sedimentary bedrock of the Fort Union Group and overlying glacial till of the Coleharbor Formation. Springs can be found at the crests of slide blocks.

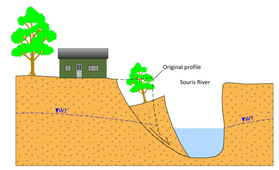
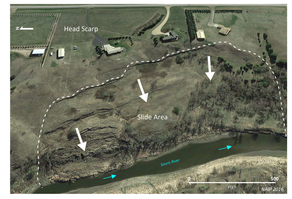
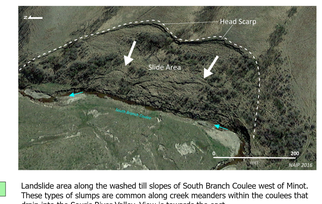


Figure 4. Localized slump failures within alluvium (Qlsc) occur along meanders and cutbanks of the Souris River resulting from changes in river and surrounding groundwater levels.

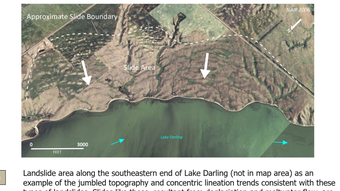


Qlsc Landslide area along the eastern bank of the Souris River just west of 55th Street in the southeastern part of the Souris River Valley. This slump has a head scarp near residential dwellings. A smaller more active area within the overall slide mass can be seen in the left foreground with parallel sets of tension fractures oriented perpendicular to downslope ground motion. View is towards the east.



Qlst Landslide area along the washed till slopes of South Branch Coulee west of Minot. These types of slumps are common along creek meanders within the coulees that drain into the Souris River Valley. View is towards the east.

Qlsa Landslide area along the Des Lacs River Valley northwest of Burlington. This slump is along the valley wall and is likely the result of steep local slopes close to the fluctuating groundwater and river levels in this area. View is to the northeast.



Qlsm Landslide area along the southeastern end of Lake Darling (not in map area) as an example of the jumbled topography and concentric lineation trends consistent with these types of landslides. Slides like these, resultant from deglaciation and meltwater flow, are quite large and best observed in LiDAR and aerial imagery. View is to the southeast.

EXPLANATION

Qlsc **Landslide Area -** Landslides along cutbanks and meanders of the Souris River main channel.

Qlst **Landslide Area -** Smaller localized landslides within coulees and tributary drainages of the Souris and Des Lacs River along washed till slopes.

Qlsa **Landslide Area -** Landslides within the Souris River Valley and Des Lacs originating in alluvium or within sedimentary bedrock and till.

Qlsm **Landslide Area -** Larger meltout landslides associated with deglaciation and outburst meltwater channel flow within the Souris River Valley.

Aml **Abandoned Mine Land -** Surface may be underlain by voids created by the underground mining of lignite. Collapse of the mine voids often creates sink holes or depressions at the surface.

A Abandoned Mine Lands (AML) location data maintained by the North Dakota Public Service Commission's Abandoned Mine Lands Program.

REFERENCES

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