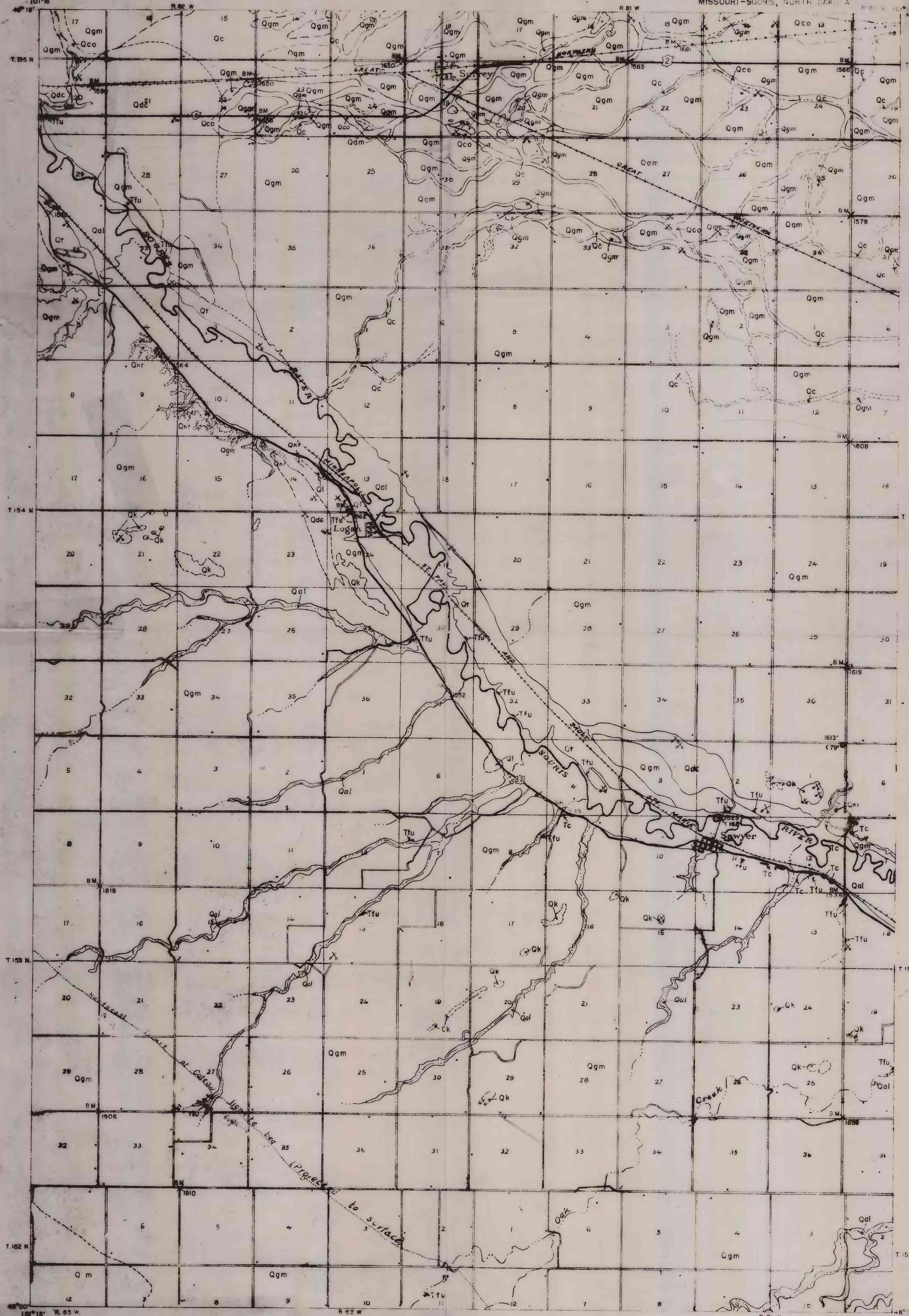
UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Prepared as a part of the Department of Interior's program for development of the Missouri River Basin

MISSOURI RIVER BASIN
GEOLOGIC MAPPING AND MINERAL RESOURCE INVESTIGATION
MISSOURI-SOURIS, NORTH DAKOTA

47-4



Compiled on U S Geological Survey Topographic map. Aerial photographs used to map northern one-fourth.

APPROXIMATE MEAN DECLINATION 1936

Scale $\frac{1}{48000}$

1 0 1 2 3 Miles
5000 0 5000 10000 15000 20000 Feet

Geology mapped by Richard W. Lemke, J. Hiram Smith and Fred S. Jensen, 1947

GEOLOGIC MAP OF THE SAWYER QUADRANGLE, NORTH DAKOTA

EXPLANATION

QUATERNARY

Recent

Qal

Alluvium

Sand, silt, and clay constituting the floor of the Souris River valley and larger tributaries. In places also includes colluvium. Not differentiated in glacial channels and other places where present in small amounts.

Pleistocene — Wisconsin stage — Late Wisconsin

Ql

Landslide deposits

Hummocky area of slumped till

Qco Qc

Outwash channel deposits

Deposits in channels incised by glacial meltwater. (Qco) consists of gravel, sand, and silt, in general ranging in thickness from 2 to 15 feet. (Qc) consists chiefly of silt and clay ranging in thickness from a few feet to less than a foot; in places includes thin deposits of Recent alluvium deposited by small intermittent streams incised in the floors of the channels and also of slope wash. (Qco) and (Qc) intergrade.

Qt

Outwash terrace deposits

Remnants of glacial outwash fill left as terraces along valley walls of Souris River. Deposit in sec. 2, T. 155 N., R. 82 W., is more than 35 feet thick and consists chiefly of medium to poorly sorted sand and gravel commonly as much as 3 inches in diameter; minor beds of silt and a few boulders as much as 6 feet long. Deposit between Sawyer and Logan is in most places 5 to 10 feet thick and consists chiefly of poorly sorted coarse gravel and abundant boulders on the surface.

Qdc

Diversion channel deposits

Outwash deposited on floors of high level diversion channels incised by glacial meltwater flowing down the Souris River. Consists chiefly of poorly sorted sand and gravel, commonly as much as 4 inches in diameter; local accumulations of boulders. Deposits commonly range in thickness from 10 feet to less than 2 feet. Some outwash terrace deposits (Qt) in secs. 20 and 21, T. 155 N., R. 82 W., are lithologically gradational with these deposits and are therefore included with this geologic unit.

Qk

Kames

Mostly small mounds and ridges consisting chiefly of poorly sorted sand and gravel. A conspicuous conical hill about 100 feet high in sec. 1, T. 153 N., R. 80 W., consisting chiefly of sand, gravel, and boulders as much as 4 feet across, is interpreted to be a kame.

Qgm

Ground moraine

Chiefly a compact highly impervious stony clay-rich till. Generally 50 to 100 feet thick. Locally mantled, especially near glacial channels, by sand and silt deposited by glacial meltwater. Also includes small deposits of alluvium and colluvium deposited in numerous kettles and other undrained depressions. Surface in most places poorly drained.

Qm

Moraine on Coteau du Missouri

Hummocky area consisting of a stony clay-rich till similar in composition to the ground moraine. Unintegrated to poorly integrated surface drainage.

Qkt

Exhumed kame terrace (?) deposits

Discontinuous ice contact deposits of sand and fine-grained gravel generally from 5 to 15 feet thick along valley walls of Souris River. Deposits overlie till and in turn are buried in most places by younger till but partly exposed by Recent erosion.

TERTIARY

Paleocene

Tfu

Fort Union formation
Tongue River member

Continental beds of poorly to moderately consolidated sandstone, sand, siltstone, shaly clay, and lignite. Weathered exposures are gray to tan. Solid pattern shows individual exposure or area of closely spaced outcrops.

Tc

Cannonball formation

Chiefly thin bedded marine fossiliferous brown sand and sandy shale. Solid pattern shows individual exposure or area of closely spaced outcrops.

Contact, sharply defined

Contact, approximate

Contact, gradational or indefinite

Terrace scarp

Spring

Lignite coal mine, inactive underground mine

Lignite coal mine, active strip pit

Gravel pit

Farm buildings

School house

Church

52

Paved U. S. highway

Road, secondary

1525'
<168'

Approximate location of test hole drilled by the U. S. Geological Survey. Top figure gives surface altitude. Bottom figure is interpreted depth to bedrock. In some holes bedrock may be considerably closer to the surface than indicated.

BM
1619'

Bench mark and altitude, approximate location

Intermittent stream

Marsh

County boundary

Section boundary