

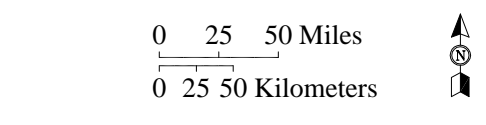
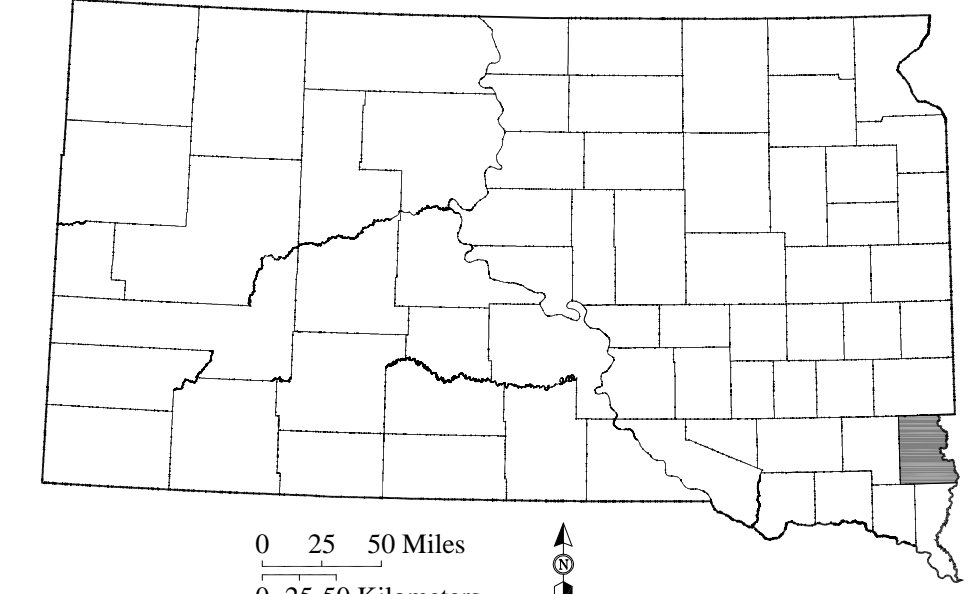
Plate 1. Bedrock map of Lincoln County, South Dakota.

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 Division of Financial and Technical Assistance
 Geological Survey

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 Kelli A. McCormick
 Richard H. Hammond

- UNDIFFERENTIATED ROCKS** (Ku)
 - NIORARA FORMATION** (Kn)
Outcrops are represented by darker fill.
 - CARLILE SHALE** (Kc)
 - GREENHORN LIMESTONE** (Kg)
 - GRANEROS SHALE** (Kgr)
 - DAKOTA FORMATION** (Kd)
 - SIoux QUARTZITE** (pCs)
-
- CRETACEOUS**
- PRECAMBRIAN**
- Data point; number is elevation of bedrock surface in feet above mean sea level. A "less than" symbol (<) indicates bedrock surface elevation is less than the number shown. A "less than or equal to" symbol (≤) indicates bedrock surface elevation may be equal to or less than the number shown. A "question mark" (?) indicates bedrock surface elevation is uncertain.
 - Data point where two test holes were drilled; numbers are elevation of bedrock surface in feet above mean sea level.
 - ▲ Data point where test hole was started on a bedrock outcrop; number is elevation of bedrock surface in feet above mean sea level.
 - Contour on bedrock surface. Number is elevation above mean sea level. Contour interval = 50 feet.
 - - - Geologic contact. Dashed where approximate.
 - Major highway
 - Township boundary
 - Section line

Index map showing location of Lincoln County, South Dakota



Sectionized Township

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

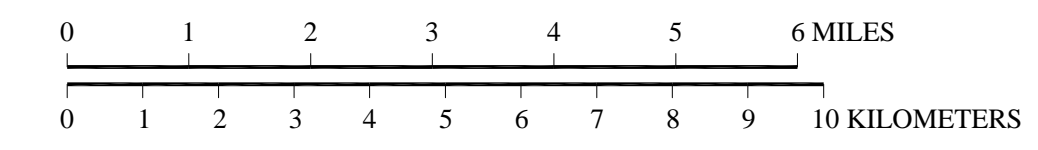
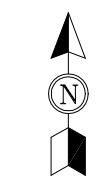
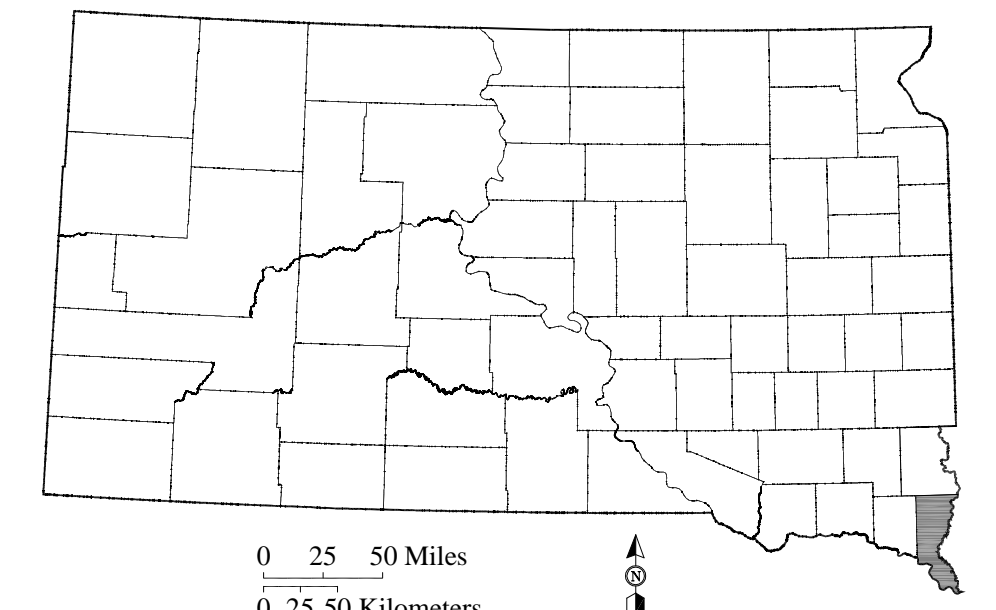


Plate 2. Bedrock map of Union County, South Dakota.

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Index map showing location of Union County, South Dakota



0 25 50 Miles
0 25 50 Kilometers

- CRETACEOUS**
- Kn **NIORARA FORMATION**
 - Kc **CARLILE SHALE**
Outcrops are represented by darker fill.
 - Kg **GREENHORN LIMESTONE**
Outcrops are represented by darker fill.
 - Kgr **GRANEROS SHALE**
 - Kd **DAKOTA FORMATION**

• ≤ 1267 Data point; number is elevation of bedrock surface in feet above mean sea level. A "less than" symbol (<) indicates bedrock surface elevation is less than the number shown. A "less than or equal to" symbol (\leq) indicates bedrock surface elevation may be equal to or less than the number shown. A "question mark" symbol (?) indicates bedrock surface elevation is uncertain.

• ≤ 1034
1018 Data point where two test holes were drilled; numbers are elevation of bedrock surface in feet above mean sea level.

— Contour on bedrock surface. Number is elevation above mean sea level. Dashed where approximate. Contour interval = 50 feet.

- - - Geologic contact. Dashed where approximate.

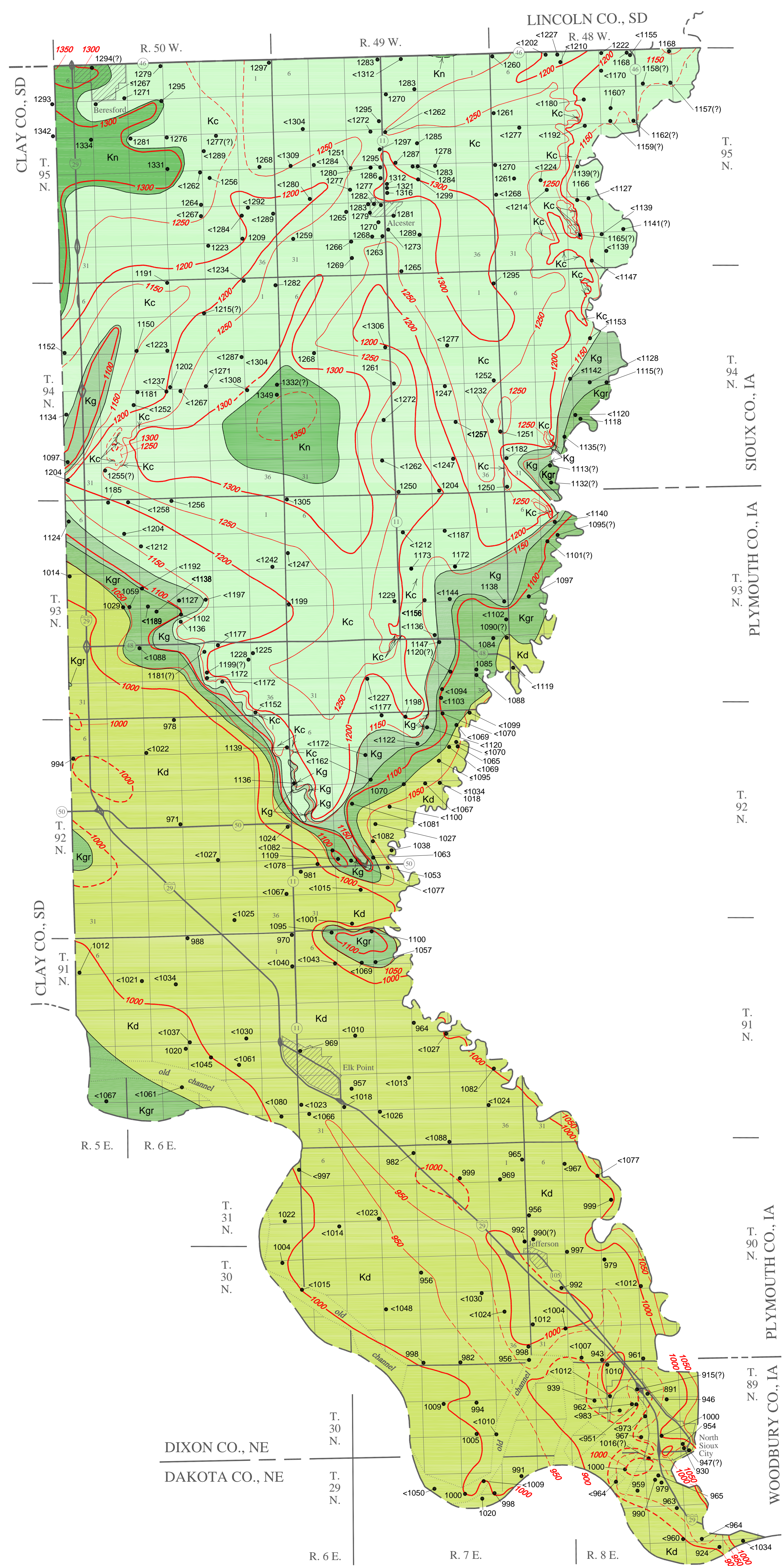
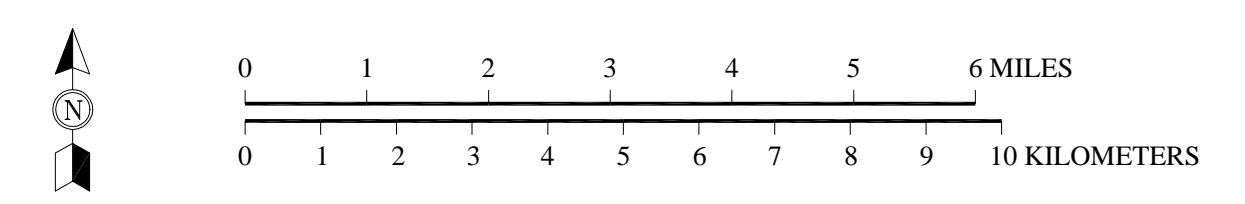
— Major highway

— Township boundary

— Section line

Sectionized Township

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36



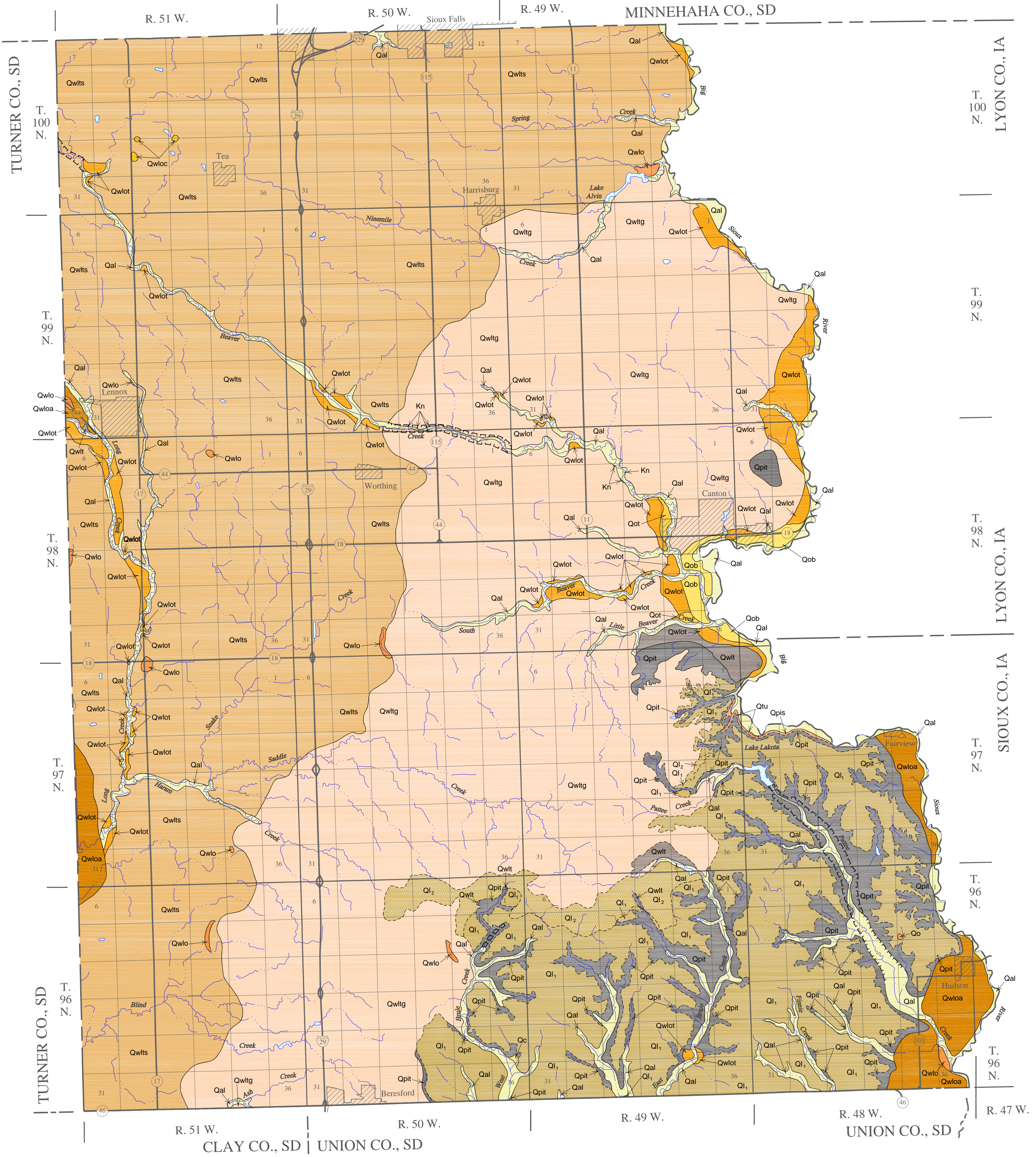
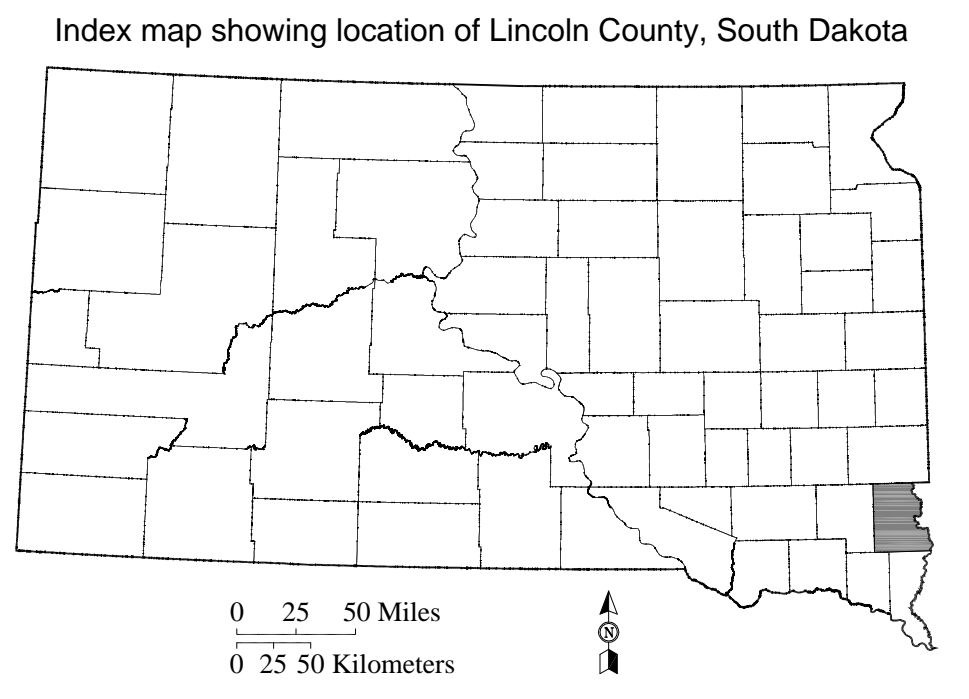


Plate 3. Geologic map of Lincoln County, South Dakota.

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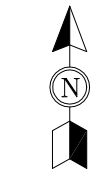
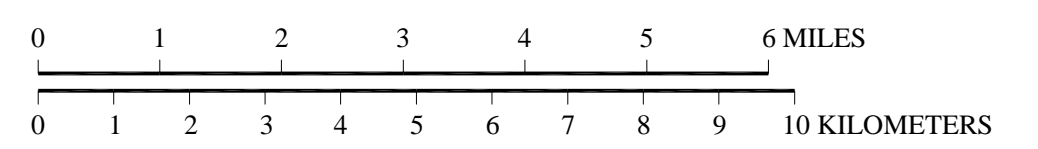
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- Qal** ALLUVIUM - Stream deposits of silt and clay with minor amounts of sand and gravel.
 - Qob** OVERBANK - Flood deposits of mainly clay and silt with minor sand. Locally includes minor alluvium.
 - Qtu** TUFA - Calcium carbonate precipitated at the surface from percolating ground water.
 - Qc** COLLUVIUM - Clay mixed with silt, sand, gravel, and boulders; deposited at the base of slopes by gravity.
 - Ql₂** LOESS - Eolian deposits of mainly silt-sized grains; forms relatively steep slopes; calcareous; gray, weathering to yellow or red. **Ql₁** - Overlying late Wisconsin till. **Ql₁** - Overlying pre-Illinoian till.
 - Qot** OUTWASH TERRACE - Sand and gravel of glaciofluvial origin that may have been reworked by Holocene streams; confined to a valley; sloping to relatively flat surface.
 - Qwloa** OUTWASH AND ALLUVIUM - Sand and gravel of glaciofluvial origin with minor alluvial overburden; confined to a valley.
 - Qwlota** OUTWASH TERRACE - Sand and gravel of glaciofluvial origin; confined to a valley; sloping to relatively flat surface.
 - Qwlo** OUTWASH - Sand and gravel of glaciofluvial origin; typically undulating surface; not associated with a valley.
 - Qwloc** OUTWASH, COLLAPSED - Sand and gravel of glaciofluvial origin; with minor amounts of till; typically undulating surface.
 - Qwt** TILL - Heterogeneous mixture of boulders, pebbles, sand, silt, and clay.
 - Qwtg** TILL, GROUND MORaine - Heterogeneous mixture of boulders, pebbles, sand, silt, and clay; flat to gently undulating topography.
 - Qwts** TILL, STAGNATION MORaine - Heterogeneous mixture of boulders, pebbles, sand, silt, and clay; undulating to hummocky topography characterized by poorly-developed drainages with numerous lakes and sloughs.
 - Qo** SAND AND GRAVEL - Sand and gravel with minor silt and clay of unknown age; not associated with a valley.
 - Qpit** TILL - Heterogeneous mixture of boulders, pebbles, sand, silt, and clay; typically occurs at higher elevation than late Wisconsin till; topography is characterized by well-developed drainages.
 - Qpis** SAND AND GRAVEL - Quartz- and feldspar-rich sands and gravels (Newton Hills sand, western-derived sand; nonglacial?).
 - Kn** NIOBRARA FORMATION - Medium- to dark-gray interbedded chalk, limestone, and calcareous shale, weathering to white and pale yellow or tan; calcareous; fossiliferous.
- Meltwater channel
- Geologic contact, dashed where approximate.
- Lake
- Intermittent lake
- Stream
- Intermittent stream
- Major highway
- Township boundary
- Section line

Sectionized Township

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36



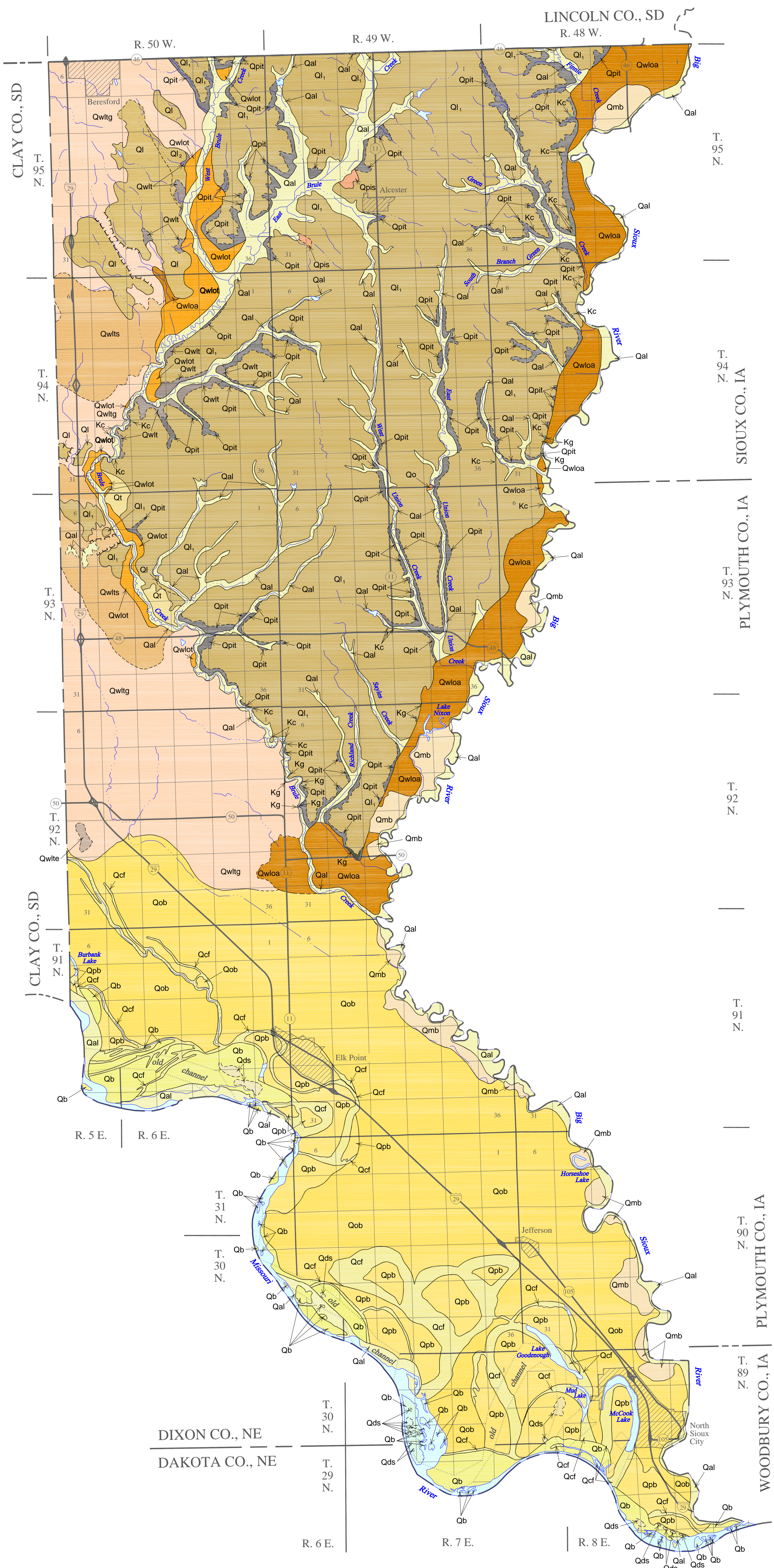
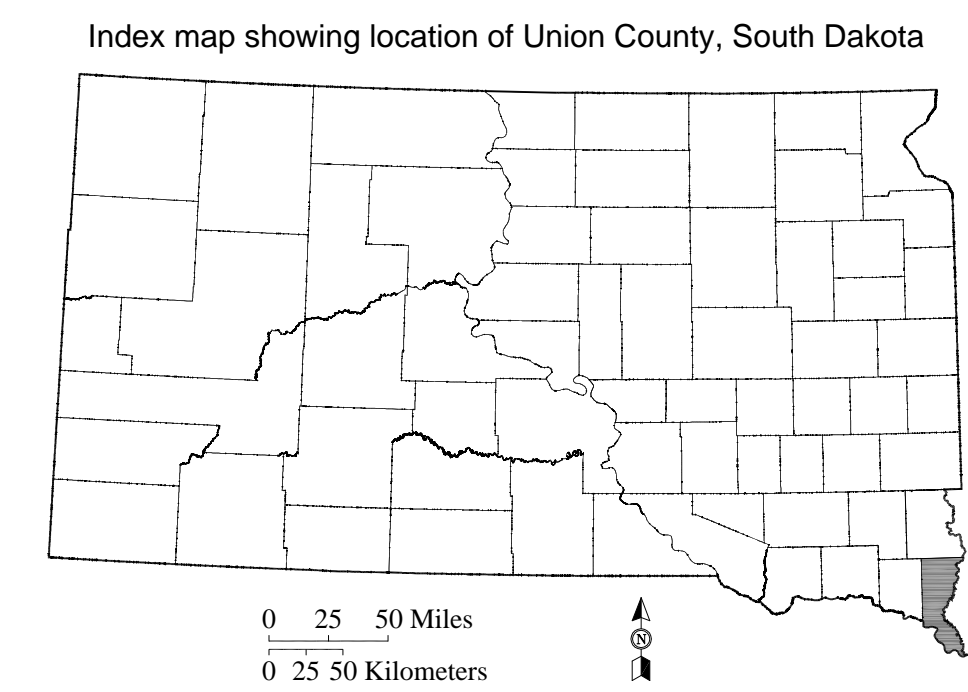


Plate 4. Geologic map of Union County, South Dakota.

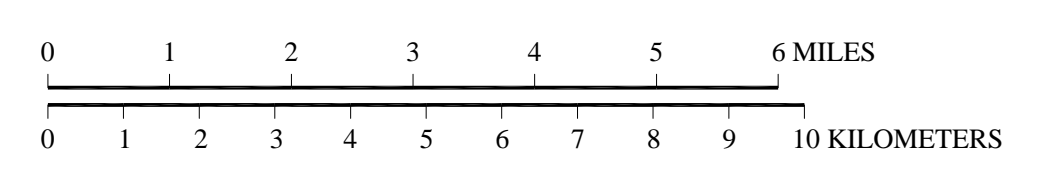
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Sectionized Township

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36



- Qal** ALLUVIUM - Stream deposits of silt and clay with minor amounts of sand and gravel.
 - Qob** OVERBANK - Flood deposits of mainly clay and silt with minor sand.
 - Qmb** MEANDER BAR - Abandoned river channels and bars consisting of mainly clay and silt in the channels and sand and gravel in the bars.
 - Qcf** CHANNEL FILL - Clay and minor silt and sand filling an abandoned river channel.
 - Qpb** POINT BAR - Sand with minor gravel, silt, and clay formed as a bar but no longer part of the active river system; usually bedded.
 - Qb** BAR - Sand with minor gravel, silt, and clay deposited as part of the active river system; usually bedded.
 - Qds** DUNE SAND - Fine to medium windblown sand; typically located on bar and point bar deposits; bedded.
 - Ql** LOESS - *Ql* - eolian deposits of mainly silt-sized grains; forms relatively steep slopes; calcareous; gray, weathering to yellow or red. *Ql2* - Overlying late Wisconsin till. *Ql1* - Overlying pre-Illinoian till.
 - Qt** TERRACE - Mainly clay forming a flat to gently sloping surface adjacent to streams; likely an erosional surface formed on till.
 - Qwloa** OUTWASH AND ALLUVIUM - Sand and gravel of glaciofluvial origin with minor alluvial overburden; confined to a valley.
 - Qwlot** OUTWASH TERRACE - Sand and gravel of glaciofluvial origin; confined to a valley; sloping to a relatively flat surface.
 - Qwit** TILL - Heterogeneous mixture of boulders, pebbles, sand, silt, and clay.
 - Qwltg** TILL, GROUND MORaine - Heterogeneous mixture of boulders, pebbles, sand, silt, and clay; flat to gently undulating topography.
 - Qwlts** TILL, STAGNATION MORaine - Heterogeneous mixture of boulders, pebbles, sand, silt, and clay; undulating to hummocky topography characterized by poorly-developed drainages with numerous lakes and sloughs.
 - Qwite** TILL, END MORaine - Heterogeneous mixture of boulders, pebbles, sand, silt, and clay; relatively elevated topography.
 - Qo** SAND AND GRAVEL - Sand and gravel with minor silt and clay of unknown age.
 - Qpit** TILL - Heterogeneous mixture of boulders, pebbles, sand, silt, and clay; typically occurs at higher elevation than late Wisconsin till; topography is characterized by well-developed drainages.
 - Qpis** SAND AND GRAVEL - Quartz- and feldspar-rich sands and gravels (Alcester sand; western-derived sand); nonglacial(?)
 - Kc** CARLILE SHALE - A greasy, dark-gray, concretionary shale; the lower part can be calcareous with numerous thin, silty beds; the upper part is non-calcareous and organic-rich with occasional thin sandstone and siltstone lenses.
 - Kg** GREENHORN LIMESTONE - Interbedded gray, silty, calcareous shale, calcarenite, and hard skeletal limestone.
- Meltwater channel**
Geologic contact, dashed where approximate.
Lake
Intermittent lake
Stream
Intermittent stream
Major highway
Township boundary
Section line

HOLOCENE
QUATERNARY
PLEISTOCENE
LATE WISCONSIN
PRE-ILLINOIAN
LATE CRETACEOUS
CRETACEOUS