North Dakota Geological Survey
100K Series: Bwmn - c

Lignite Reserves

Bowman 100K Sheet, North Dakota

Adjoining 100K Maps

13°
1981 Magnetic North
Declination at Center of Sheet

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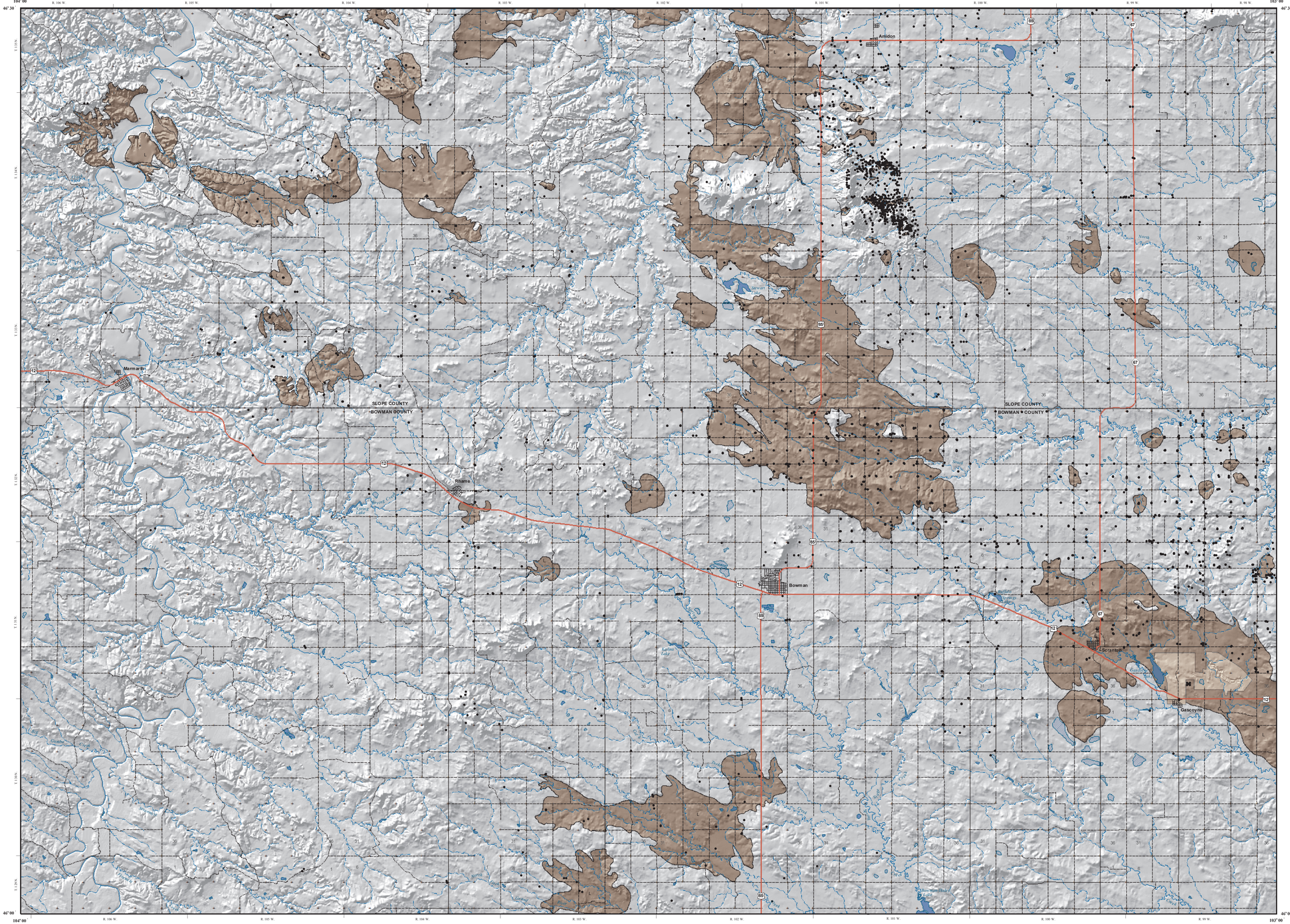

Edward C. Murphy

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There are approximately 3.5 billion tons of economically mineable lignite within the Bowman 100k Sheet (Murphy et al., in press). Roughly 70% of this reserve, 2.4 billion tons, is attributable to the Harmon bed. The Harmon bed is the most extensive lignite in North Dakota, extending over an area of 13,000 square miles in western North Dakota (Murphy et al., 2002). The Harmon bed is 34 feet thick in outcrop near the old Russell Ranch west of Amidon, the thickest occurrence of mineable coal in North Dakota. The Harmon bed is thickest where it has combined with the underlying Hanson bed (Murphy et al., 1999). The Harmon bed is 15 to 30 feet thick in the mineable deposits that parallel US Highway 85 between Bowman and Amidon. There is a noticeable absence of economic deposits beneath Black Butte where the overburden becomes too thick for surface mining. Where it burned, the Harmon bed has formed thick clinker deposits that cap low-lying buttes along the county line north of the town of Bowman.

The Harmon bed, the source of coal for the Gascoyne Mine, is 10 to 20 feet thick in the Gascoyne area. The Gascoyne Mine closed in 1995. Dakota Westmoreland and Montana Dakota Utilities have recently been exploring the feasibility of reopening the Gascoyne Mine and constructing an adjacent power plant. Leonardite, oxidized or weathered lignite, has been mined for years in the Gascoyne area by the American Colloid Company, formerly NL Baroid. The Harmon bed is the source of leonardite in this area.

The T Cross has a maximum thickness of 31 feet northwest of Rhame, but is 200 feet beneath the surface at this location, too deep for surface mining. Hares (1928) reported that the T Cross was up to 24 feet thick in surface exposures in this area.

References
Hares, C.J., 1928, Geology and lignite resources of the Marmarth Field, southwestern North Dakota: United States Geological Survey Bulletin 775, 110 p.
Murphy, E.C., Kruger, N.W., and Goven, G.E., 1999, Thick coals in Bowman, Slope, Hettinger, and Adams counties, North Dakota: North Dakota Geological Survey Open-File Report 99-1, 55 p.
Murphy, E.C., Kruger, N.W., Vandal, Q.L., Goven, G.E., and Tudor, E.A., 2002, The Harmon lignite bed in Western North Dakota: North Dakota Geological Survey Miscellaneous Map No. 35.
Murphy, E.C., 2006, in press. The Lignite Reserves of North Dakota: North Dakota Geological Survey Report of Investigation No. 104.

UNIT DESCRIPTIONS

Geology Undifferentiated

Area of Mined Lignite

L **Economic Coal Deposits**

Economic coal deposits are those that meet the minimum criteria established by coal companies operating surface mines in North Dakota. These economic criteria include a minimum cumulative coal thickness of ten feet-typically occuring in less than two beds, a minimum individual bed thickness of at least 2.5 feet, a ratio of overburden to coal thickness of not more than 10:1, a minimum of 25 feet of overburden, and a maximum depth to coal of approximately 150 feet.

Geologic Symbols

Extent of Local Lignite Reserves

Data Points

Includes coal exploration NDGS/USGS drill holes, sub-surface mineral drill holes, oil & gas wells, and NDSWC drill holes.

Other Features

- Water
- Water - Intermittent
- River/Stream - Perennial
- River/Stream - Intermittent
- Section Corners
- County Boundary
- US Highway
- State Highway
- Paved Road
- Unpaved Road

Scale 1:100,000

0 1 2 3 4
Miles

Mercator Projection 1927 North American Datum
Standard parallel 46° 00 Central meridian 103° 30
USGS NED Shaded Relief - Vertical Exaggeration 9x

The North Dakota Geological Survey can publish on demand 1:24,000 scale quadrangle maps (24k - c series) of the mineable coal deposits in the Bowman 100k sheet. These maps would include information on mineable coal thicknesses.

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Cartographic Compilation: E. L. Kadrmas