UNIVERSITY OF MINNESOTA
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Harvey Thorleifson, Director

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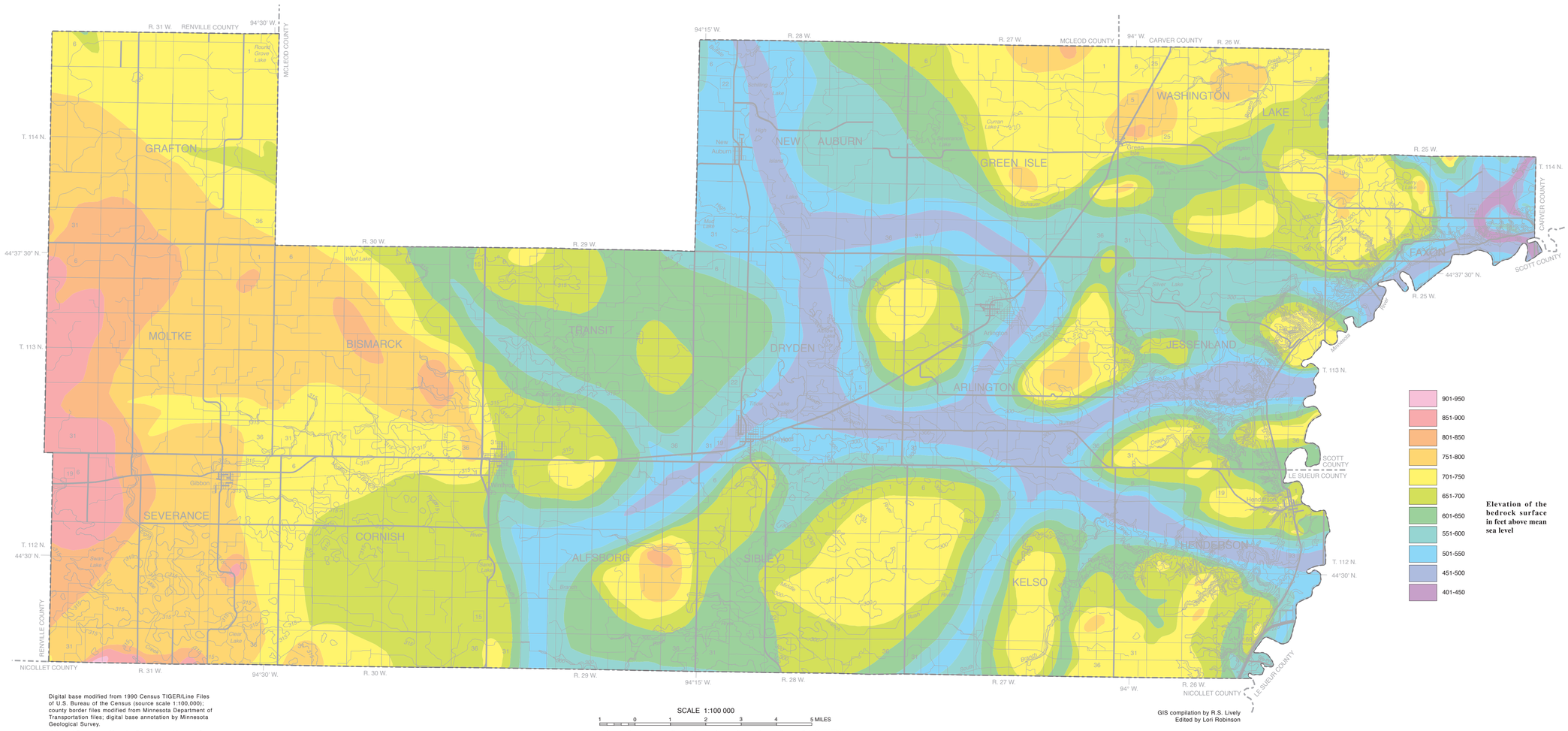
COUNTY ATLAS SERIES
ATLAS C-24, PART A
Sibley County
Plate 6—Bedrock Topography
***and* Depth to Bedrock**



901-950
851-900
801-850
751-800
701-750
651-700
601-650
551-600
501-550
451-500
401-450

Elevation of the bedrock surface in feet above mean sea level

Digital base modified from 1990 Census TIGER/Line Files of U.S. Bureau of the Census (source scale 1:100,000); county border files modified from Minnesota Department of Transportation files; digital base annotation by Minnesota Geological Survey.

Universal Transverse Mercator Projection, grid zone 15
1983 North American Datum

SCALE 1:100 000
1 0 1 2 3 4 5 MILES
1 0 1 2 3 4 5 6 7 8 KILOMETERS
CONTOUR INTERVAL 15 METERS

GIS compilation by R.S. Lively
Edited by Lori Robinson

LOCATION DIAGRAM

BEDROCK TOPOGRAPHY

By

John H. Mossler and Julia R. Steenberg

2012

INTRODUCTION

The configuration of the bedrock surface in Sibley County is represented by the colors assigned to 50-foot (15-meter) elevation intervals (example: 751 to 800 feet above sea level) on the Bedrock Topography map. The position of the contour intervals was determined from records of water-well construction, scientific borings, and seismic soundings. The seismic data were collected specifically for this project by the Minnesota Department of Natural Resources (Todd Petersen) and the Minnesota Geological Survey (V.W. Chandler) and were focused in the central part of the map area. The somewhat irregular distribution of data can be seen on the Data-Base Map (Plate 1) and should be considered when assessing the reliability of the map at any particular location. Records of drill holes that intersect bedrock are most abundant in the eastern part of the county near populated areas that rely on ground water from bedrock aquifers. There are fewer wells that reach bedrock in rural areas of the county because many of the domestic wells in those areas get sufficient water from sand and gravel beds in the glacial sediment.

The bedrock surface in Sibley County varies from more than 900 feet (274 meters) above sea level in the western part to less than 450 feet (137 meters) above sea level in the extreme northeast part of the county. The most prominent feature of the bedrock topography is an extensive, deeply buried valley network in the central part of the county that deepens to the east. Based on recent mapping, prominent buried bedrock valleys to the north in McLeod County and south in Nicollet County join the valley network in Sibley County and drain east into northwestern Le Sueur County, western Scott County, and continue east into Dakota County, entering the ancestral Mississippi River drainage system south of the Twin Cities metropolitan area (Mossler, 2009; Mossler and Chandler, 2009; Jirsa and others, 2010; Mossler and Steenberg, 2012).

Other highlights of the bedrock topography include the flat uplands developed across the hard, resistant bedrock of the Oneota Dolomite and the St. Lawrence Formation in the western part of Sibley County. The uplands are incised by narrow valleys of softer, less resistant rock formations including the Lone Rock Formation, Wonewoc Sandstone, and Eau Claire Formation. These formations also tend to form more shallowly dipping slopes on the bedrock topography surface in the central part of the county.

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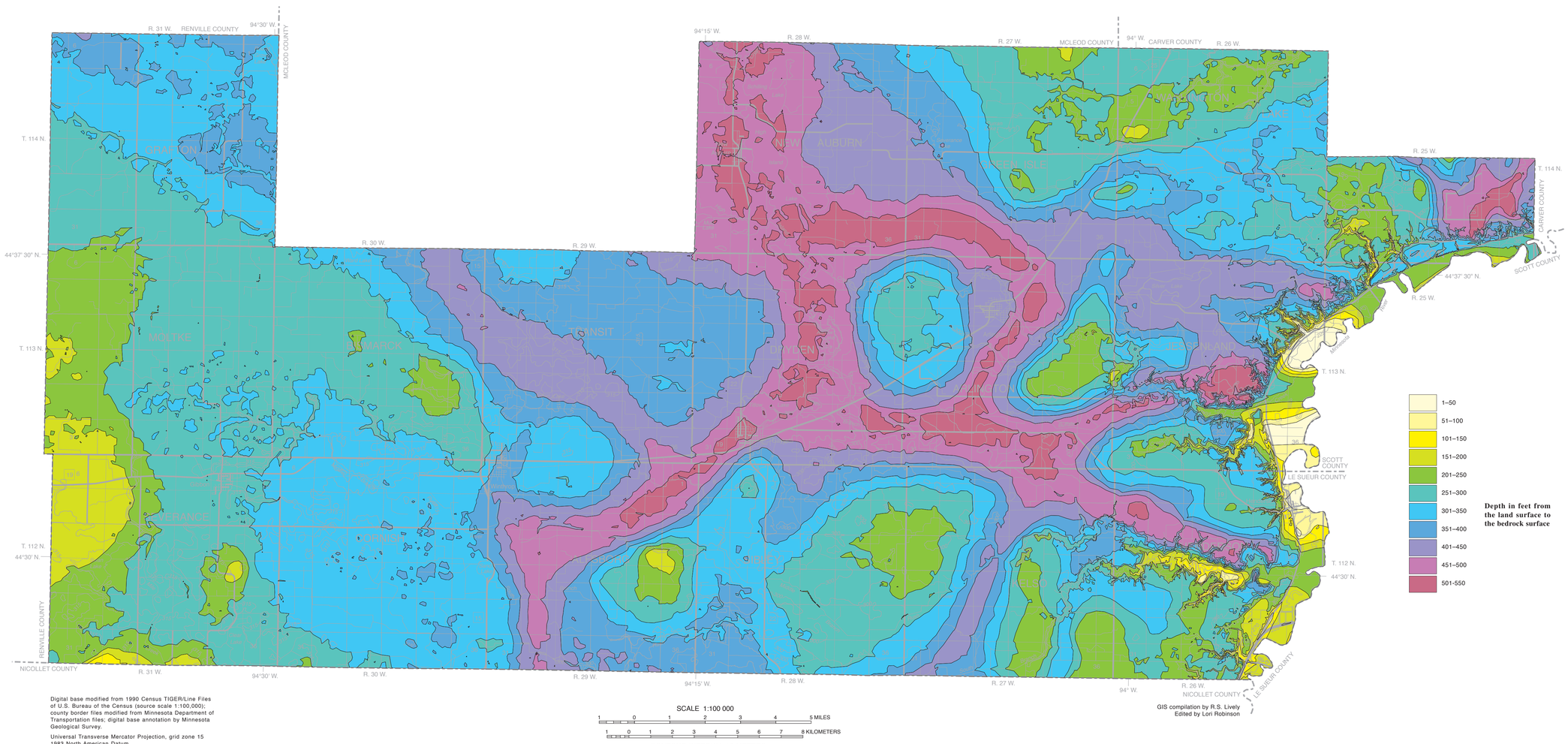

1–50
51–100
101–150
151–200
201–250
251–300
301–350
351–400
401–450
451–500
501-550

Depth in feet from the land surface to the bedrock surface

Digital base modified from 1990 Census TIGER/Line Files of U.S. Bureau of the Census (source scale 1:100,000); county border files modified from Minnesota Department of Transportation files; digital base annotation by Minnesota Geological Survey.

Universal Transverse Mercator Projection, grid zone 15
1983 North American Datum

SCALE 1:100 000
1 0 1 2 3 4 5 MILES
1 0 1 2 3 4 5 6 7 8 KILOMETERS
CONTOUR INTERVAL 15 METERS

GIS compilation by R.S. Lively
Edited by Lori Robinson

DEPTH TO BEDROCK

By

John H. Mossler and Julia R. Steenberg

2012

INTRODUCTION

The thickness of the glacial sediment is equal to the depth from the land surface to the bedrock surface. To calculate this thickness, a grid of bedrock-surface elevations was subtracted from a corresponding grid of land-surface elevations (30-meter cell size). The surface elevation grid was resampled from the National Elevation 10-meter data set of the U.S. Geological Survey, and the bedrock elevation grid was interpolated from interpretation of water well data (see the Introduction to the Bedrock Topography map). The residual grid was then classified at a 50-foot (15-meter) interval to produce the color-coded Depth to Bedrock map. The angular lines on this map are the result of the mathematical process used to create this model. Because the surface of a lake is regarded as the land surface elevation, the thickness of glacial sediment within lake boundaries includes the depth of the lake water. To calculate the true thickness of sediment beneath the lake it is necessary to subtract the water depth at that location. In places the thickness of the glacial sediment varies greatly over short distances, and mapping at this scale (1:100,000) may not properly resolve such prominent variations. For that reason it is best to consult site-specific data, such as water well records and seismic soundings, wherever they are available.

The thickest sediments in Sibley County occur over deep, pre-glacial valleys in the bedrock surface. In the central part of the county more than 500 feet (152 meters) of sediment overlie a network of deep bedrock valleys. In contrast, bedrock is at or within 50 feet (15 meters) of the land surface in the easternmost part of the county within the Minnesota River valley. Most of the details in the Depth to Bedrock map are related to landforms because the model of the bedrock surface is based on much less data than the land surface topography model.