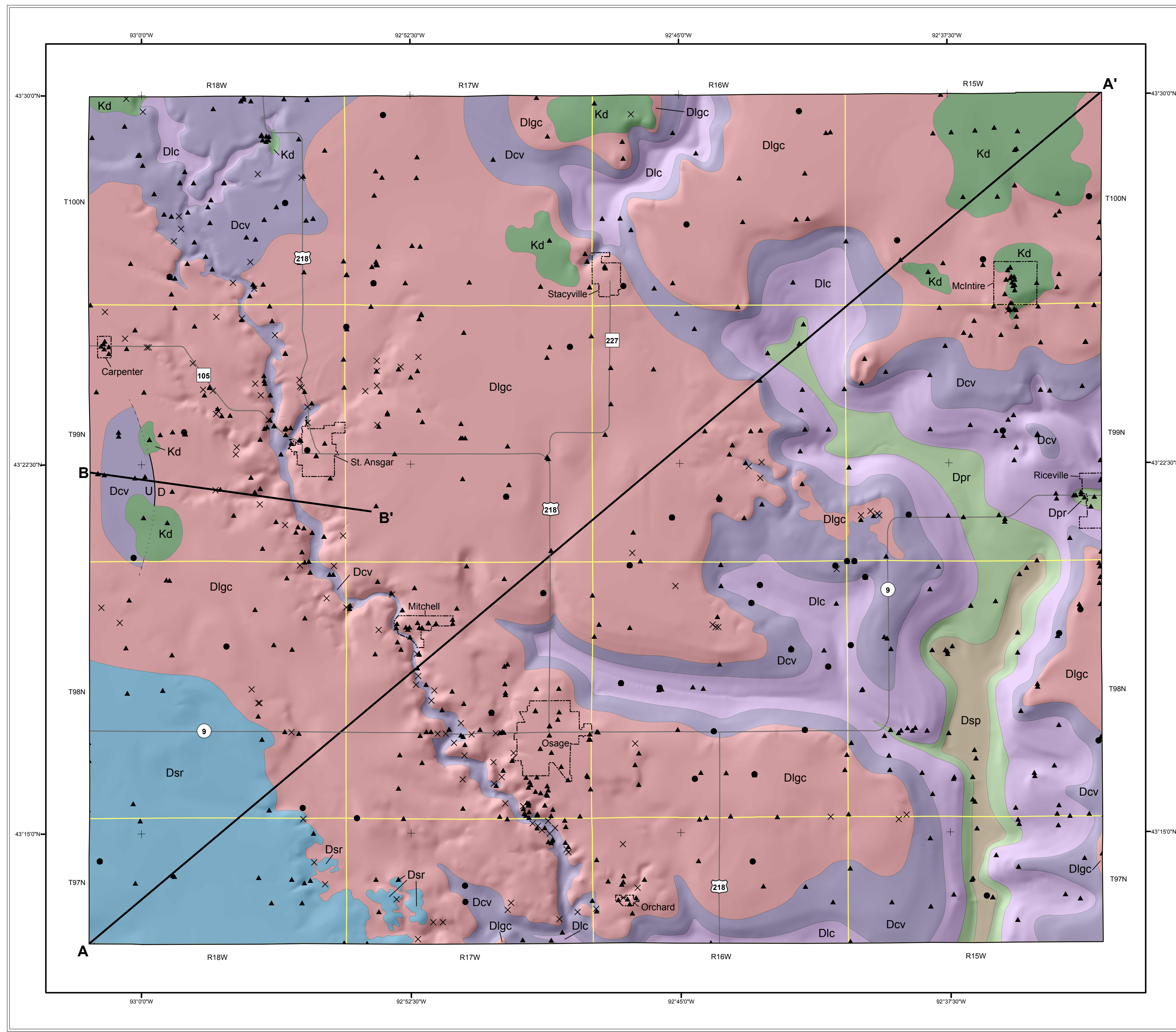
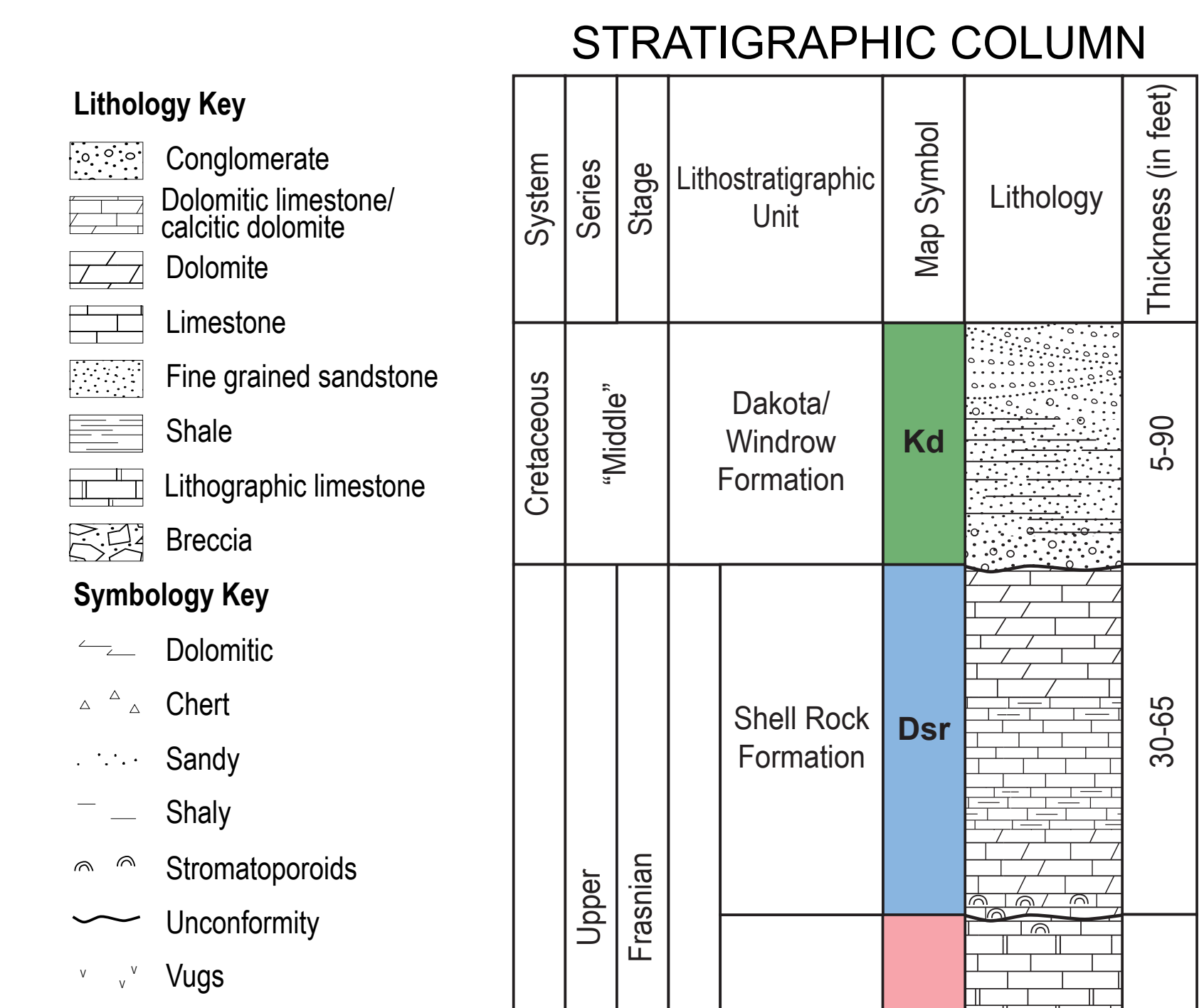


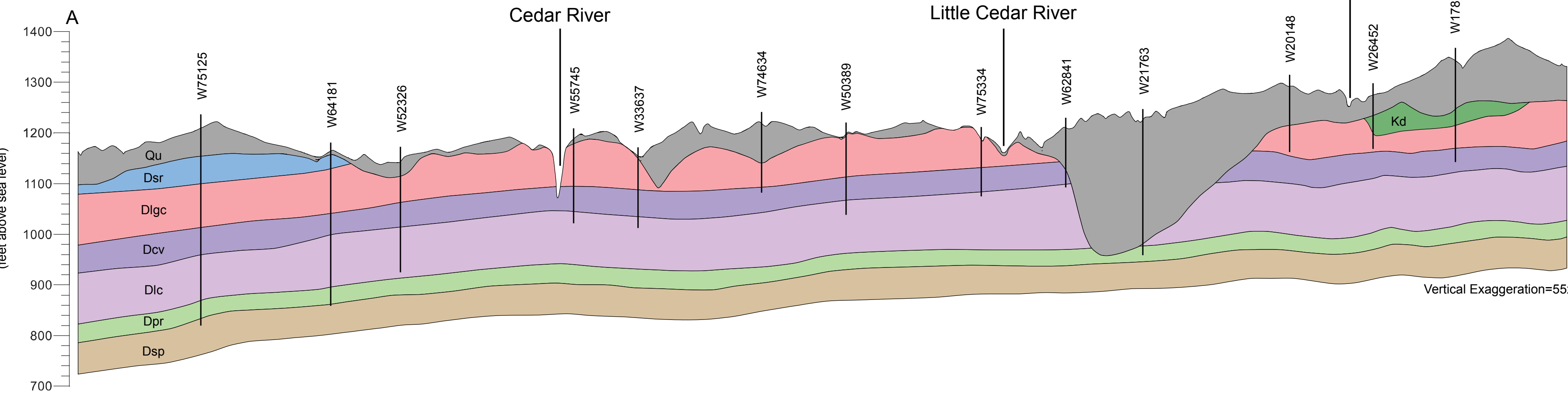
# Bedrock Geologic Map of Mitchell County, Iowa



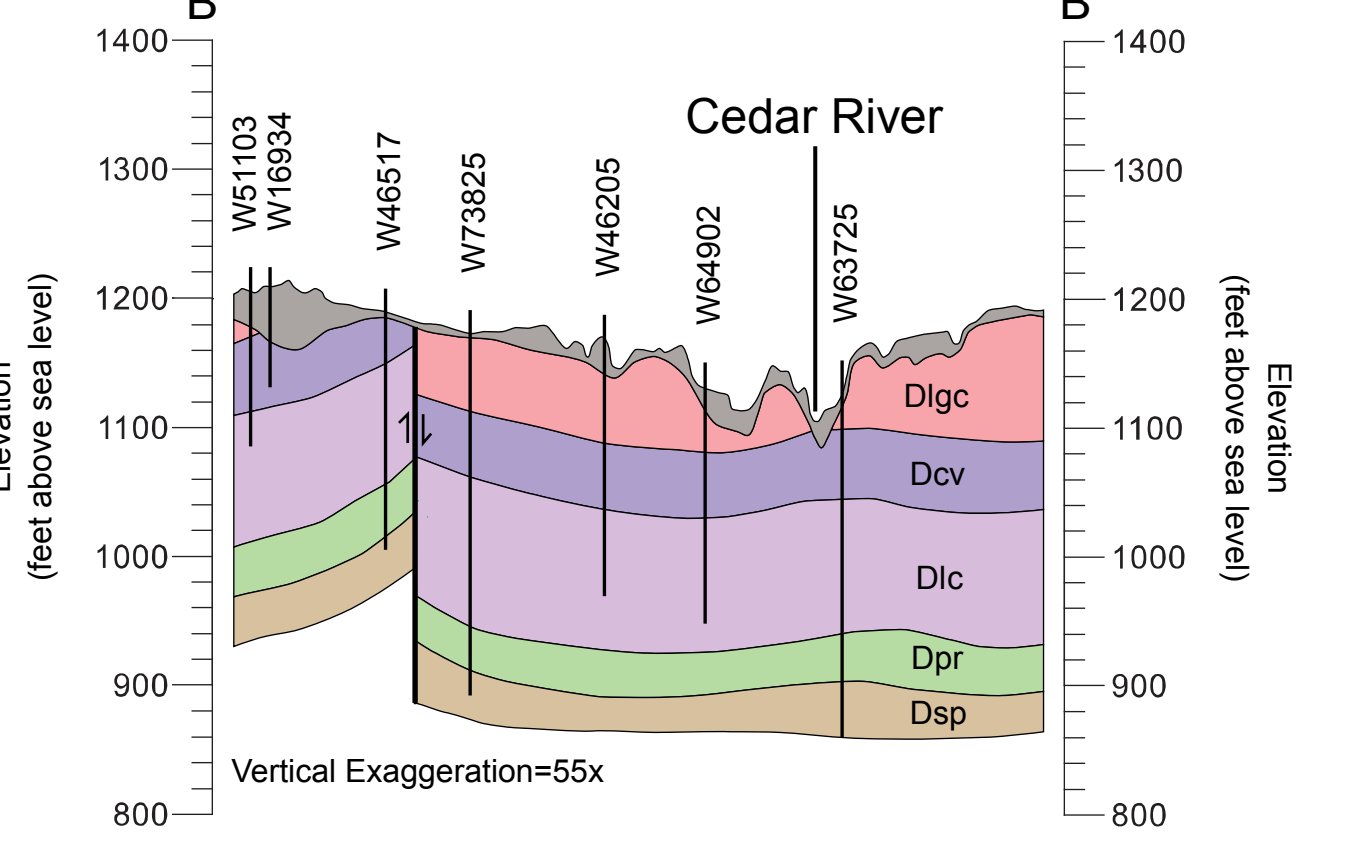
- LEGEND**
- CENOZOIC**
- QUATERNARY SYSTEM**
- Qu - Undifferentiated Unconsolidated Sediment
- MESOZOIC**
- CRETACEOUS SYSTEM**
- Kd - Santonine, Maclure, and Siderite Pellets (Dakota/Window Formation)
- PALEOZOIC**
- DEVONIAN SYSTEM**
- Dsr - Limestone, Dolomite, and Shale (Shell Rock Formation)
  - Dgc - Dolomite, Limestone, and Shale (Lithograph City Formation)
  - Dcv - Limestone and Dolomite (Coralville Formation)
  - Dlc - Dolomite, Limestone, and Shale (Little Cedar Formation)
  - Dpr - Dolomite and Limestone (Pinon Ridge Formation)
  - Dsp - Dolomite (Spillville Formation)
- OTHER FEATURES**
- Bedrock outcrop
  - New drill holes for this map project
  - IGS GEOSAM data points
  - Wells used for geologic cross-section
  - Fault - U is upthrown side, D is downthrown side
  - IGS Incorporated city boundary



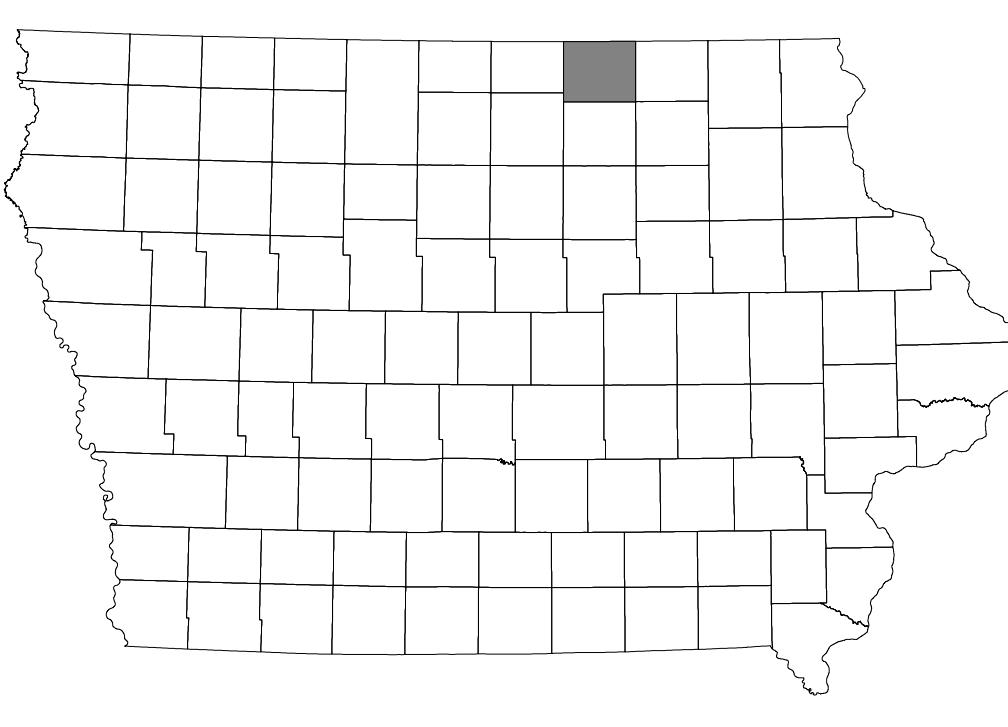
**GEOLOGIC CROSS-SECTION A-A'**



**GEOLOGIC CROSS-SECTION B-B'**



**Location Map**



**BEDROCK GEOLOGIC MAP OF MITCHELL COUNTY, IOWA**

Iowa Geological Survey  
Open File Map OFM-16-1  
June 2016

Ryan Clark<sup>1</sup>, Huanhao Liu<sup>1</sup>, Phil Kerr<sup>1</sup>, Stephanie Tassier-Surine<sup>1</sup>, Robert Rowden<sup>1</sup>, and Matthew Streeter<sup>2</sup>

<sup>1</sup>Iowa Geological Survey, IHR-Hydroscience & Engineering, University of Iowa, Iowa City, Iowa

<sup>2</sup>Iowa Geological Survey, Robert D. Libra, State Geologist

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<sup>1</sup>Iowa Geological Survey, IHR-Hydroscience & Engineering, University of Iowa, Iowa City, Iowa  
<sup>2</sup>Iowa Department of Natural Resources, Des Moines, Iowa

**Introduction to the Bedrock Geologic Map of Mitchell County, Iowa**

Mitchell County is located in north-central Iowa within the Wisconsin-age Iowan Surface landform region (Prior, 1991; Prior and Kohrt, 2006). This area has been subjected to multiple periods of Quaternary glaciations and subaerial erosion providing a relatively low-relief terrain with moderately increased drainage valleys.

The land surface of Mitchell County is mostly covered by Quaternary deposits. The general thickness of undifferentiated Quaternary materials is variable, ranging from 0 to 14 m (0-45 ft). However, several prominent bedrock valleys exist within the mapping area with the thickest accumulation of Quaternary materials, up to 106 m (330 ft), lying within a north-south trending valley in the southeastern portion of the mapping area. Shallow bedrock information from the state survey of Mitchell County (Voy and Highland, 1975) and unpublished historical records in the Iowa Geological Survey (IGS) archives were used for identifying potential bedrock outcrop locations during field mapping activities. Bedrock outcrops exist primarily along the Cedar and Little Cedar rivers and their tributary creeks, exposing bedrock of the Shell Rock, Lithograph City, and Coralville formations, primarily in the western two-thirds of the mapping area. Subsurface information was mostly derived from the analysis of water well cutting samples and one core reported at the IGS Oquidre rock library. More than 900 well records were studied with 665 from within Mitchell County. A total of 322 lithologic strip logs exist for Mitchell County, many of which were added as part of this mapping project. Lithologic and stratigraphic information from these samples are stored in the online GEOSAM database of the IGS. In addition to water well records, bedrock stratigraphic information from two sand and gravel pits, 13 quarries, and over 90 outcrops were utilized for this mapping project.

Paleogeographically, the mapping area is within the northern portion of the Devonian Iowa Basin, a region of thickened shelf carbonate and shale that was deposited from the late Frasnian through early Frasnian stage (Witzke et al., 1988). Middle and lower Upper Devonian rocks form the major bedrock surface and upper bedrock aquifers in this area. The hydrogeology of Floyd and Mitchell counties has been well studied (e.g., Libra and Hallberg, 1985 and Libra et al., 1994). Due to its stratigraphic completeness, rich fossil fauna, and hydrogeologic significance, the stratigraphy and depositional environments of the Devonian Iowa Basin have been intensively studied (e.g., Calvin, 1902; Belanski, 1927, 1928; Koch, 1970). More recent valuable geologic and stratigraphic studies of this basin include Witzke and Bunker (1984 and 1985), Anderson (1984), Bunker and others (1986), Witzke and others (1988), Day and others (1992), Bunker (1995), and Groves and others (2008).

Statewide bedrock geologic maps by Hershey (1969), and most recently by Witzke and others (2010), illustrate the improved understanding of the complex distribution of geologic units at the bedrock surface across north-central Iowa, including Mitchell County. Additional mapping efforts in north-central Iowa have been conducted by the IGS under the STATEMAP program since 2003, typically starting with 1:24,000 scale quadrangle maps and ending with 1:100,000 scale county maps. Bedrock geologic maps of north-central Iowa have been completed for Bremer County (McKay et al., 2010), Worth County (Liu et al., 2012), Black Hawk County (Rowden et al., 2013), and Cerro Gordo County (Liu et al., 2015). Results from these studies provided an important stratigraphic framework for this bedrock geologic map.

Seven bedrock formations comprise the bedrock surface of Mitchell County (in ascending order): the Devonian Spillville, Pinon Ridge, Little Cedar, Coralville, Lithograph City, Shell Rock, and the Cretaceous Dakota/Window. The Devonian bedrock stratigraphic nomenclature and correlation for this map follows that established by Witzke and others (1988). The general lithologic features and thickness of each map unit are shown in the Stratigraphic Column and described in the Legend section of this map. For a more detailed description of the lithologic units and further discussion of mapping methodologies, please refer to the accompanying Summary Report.

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Base map from Iowa DOT Road Map Layers 2006. Bedrock topography raster created internally for this map project.

Iowa Geological Survey digital cartographic file Mitchell\_Co\_BedrockGeology.mxd, version 6/30/16 (ArcGIS 10.3)

Map projection and coordinate system based on Universal Transverse Mercator (UTM) Zone 15 N, datum NAD83.

The map and cross-section are based on interpretations of the best available information at the time of mapping. Map interpretations are not a substitute for detailed site specific studies.

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