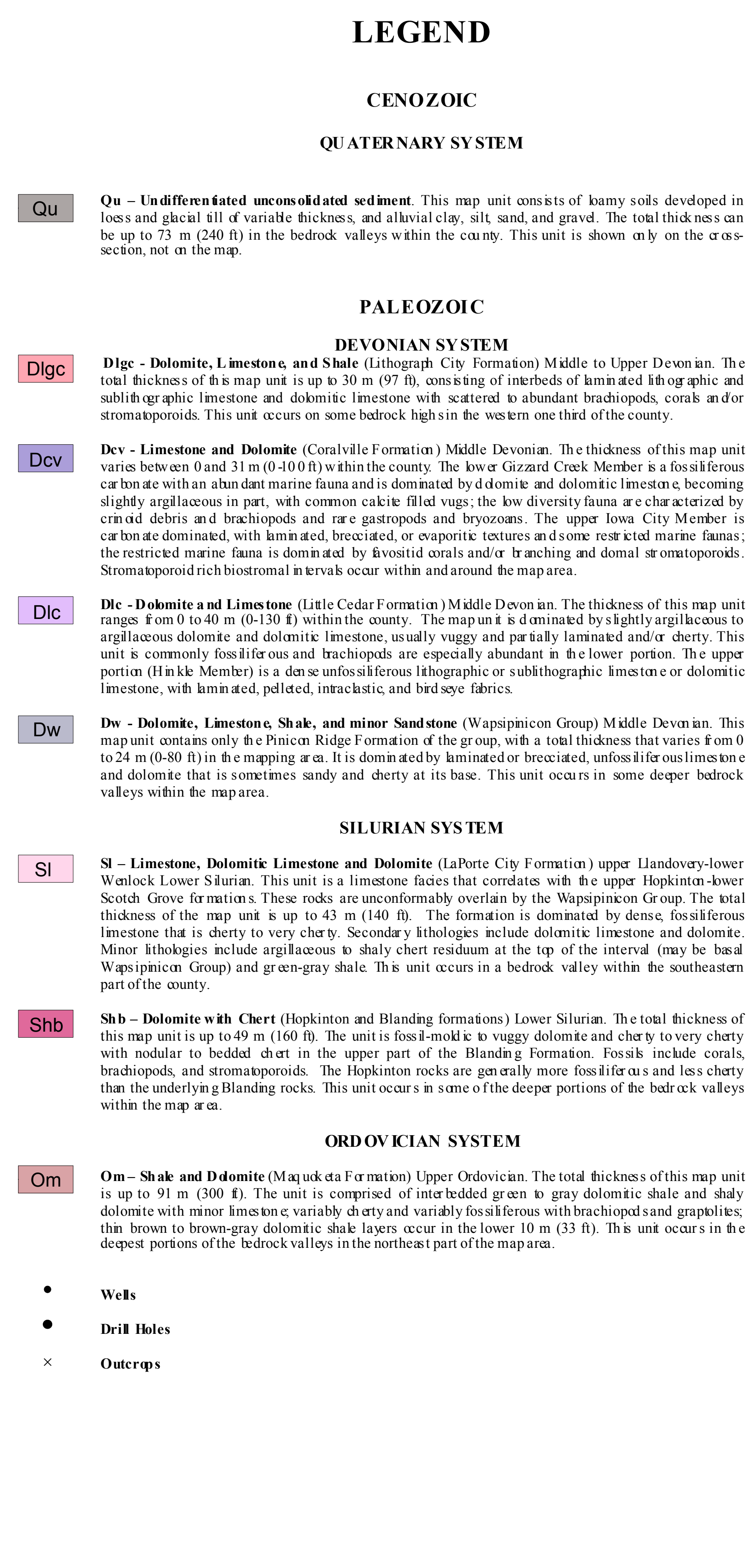
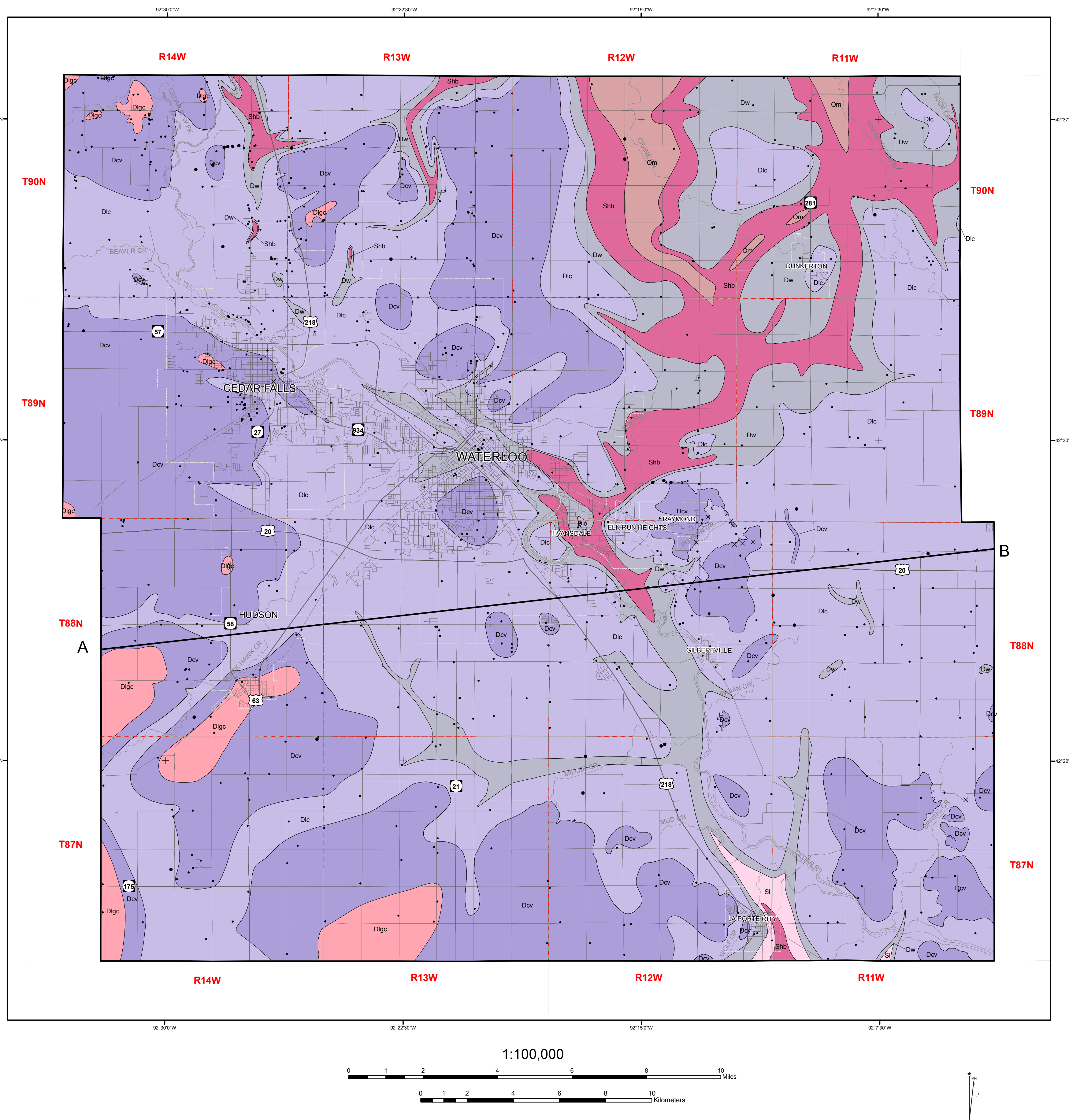


Bedrock Geology of Black Hawk County, Iowa



BEDROCK GEOLOGY OF BLACK HAWK COUNTY, IOWA

Iowa Geological and Water Survey
Open File Map OFM-13-3
September 2013

prepared by
Robert Rowden, Robert McKay, Huaibao Liu, Stephanie Tassier-Surine, Deb Quade, and James Gigliero

Iowa Geological and Water Survey, Iowa City, Iowa

Iowa Department of Natural Resources, Chuck Gipp, Director
Iowa Geological and Water Survey, Robert D. Liba, State Geologist

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Introduction to the Bedrock Geology of Black Hawk County

Black Hawk County, Iowa, is located in the south-central portion of the Iowan Surface landform region, which is characterized by various episodes of erosion before the Wisconsin glacial events (Prior, 1991).

The county is covered by various Quaternary glacial deposits with a maximum thickness of up to 73 m (240 ft) occurring in bedrock valleys. Eleven bedrock outcrops (five quarries, five road cuts and one excavation for a lift station) were found in the map area during the field investigation. Subsurface information for the bedrock mapping was mostly derived from the analysis of water well materials and drill-hole information collected by the Iowa Geological & Water Survey (IGWS) and stored in the GEOSAM database of IGWS. A total of 822 private and public wells and 26 drill holes were reviewed within the map area. Bedrock information from 10 quarries in Black Hawk County and quarries in surrounding counties was also helpful in mapping the bedrock geology of the county.

In the mapping area, Middle Devonian rocks form the major bedrock surface, and water wells are developed in both Devonian and Silurian rocks. Being part of the Iowa Basin, the stratigraphy of the regional area has been intensively studied by IGWS staff (e.g., Belanski, 1927; Koch, 1970) and re-studied and correlated by Witzke and Bunker (1984), Witzke and others (1988, 2010), Anderson and Bunker (1998), Groves and others (2008), etc. Other studies in the area include Anderson and Garvin (1984) and Day and others (2006). The bedrock surface of two quadrangles within Black Hawk County was recently mapped by Rowden and others (2011 and 2012). Results from these studies helped in the delineation of the geologic units at the bedrock surface and the stratigraphic framework for this bedrock geologic map. The stratigraphic nomenclature and correlation in this map follow the stratigraphic framework proposed by Witzke and others (1988).

The youngest bedrock unit within the county is the Devonian Lithograph City Formation, while the oldest rocks forming part of the bedrock surface are included in the Ordovician Maquoketa Formation. The Devonian is dominated by carbonates varying between limestone and dolomite with accompanying minor shale. Based on lithologic features and fossils, the Devonian rocks in the mapping area can be subdivided, in descending order, into the Lithograph City, Coralville and Little Cedar formations and the Wapsipicon Group. The Silurian is comprised mostly of dolomite with varying amounts of chert and minor shale, and includes a limestone facies interval. The Silurian rocks are subdivided into the LaPorte City Formation (limestone) and the Hopkinton and Blanding formations (dolomite).

The Lithograph City Formation consists of interbeds of laminated lithographic and sublithographic limestone and dolomitic limestone with scattered abundant brachiopods, corals, and/or stromatoporoids. This unit occurs on some bedrock highs in the western one-third of the county.

The Coralville Formation occurs throughout most of the county on bedrock highs, but is absent in the northeast part of the map area. It is characterized by a lower fossiliferous carbonate member with abundant marine fauna (Gizzard Creek Member) and an upper carbonate dominated unit with laminated, brecciated, or evaporitic textures and some restricted marine faunas (Iowa City Member).

The Little Cedar Formation is the dominant bedrock surface unit in the county and is characterized by fossiliferous dolomite and dolomitic limestone in the lower part and by sparsely fossiliferous to unfossiliferous dolomite, shale, and limestone (laminated or brecciated) in the upper part.

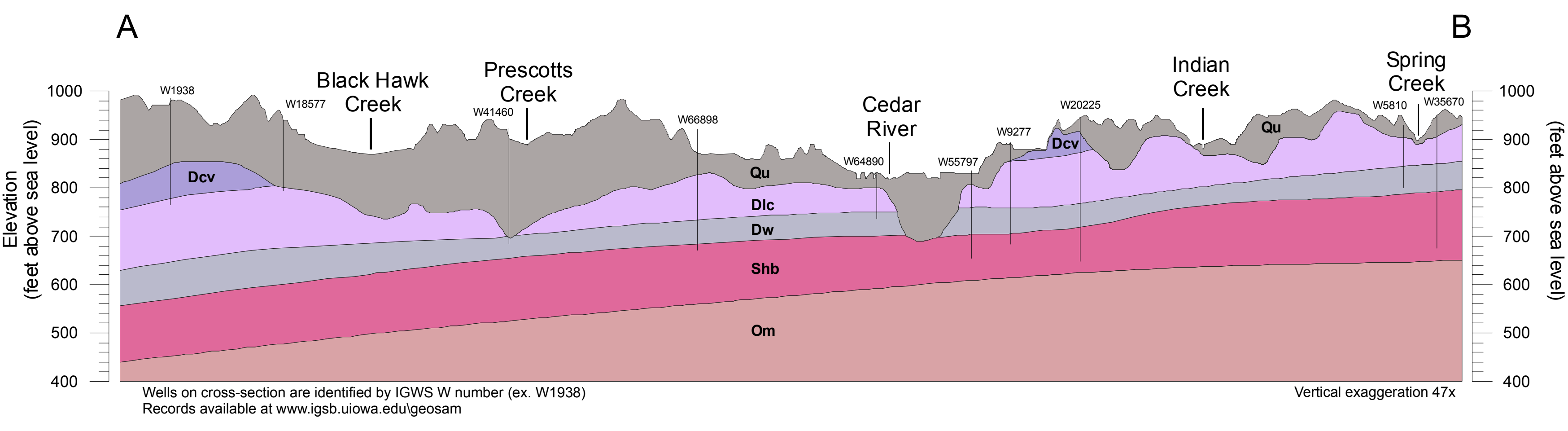
The Wapsipicon Group is dominated by laminated or brecciated, unfossiliferous limestone and dolomite that is sometimes sandy and cherty at its base. Within the map area, only the Pinicon Ridge Formation of the group is present, and it forms the bedrock surface in some deeper bedrock valleys in the county.

The Silurian LaPorte City Formation is a limestone facies that correlates with the upper Hopkinton-lower Scotch Grove formations. These rocks are unconformably overlain by the Wapsipicon Group. The formation is dominated by dense, fossiliferous limestone that is cherty to very cherty. Secondary lithologies include dolomitic limestone and dolomite. Minor lithologies include argillaceous to shaly chert residuum at the top of the interval (may be basal Wapsipicon Group) and green-gray shale. This unit occurs in a bedrock valley within the southeastern part of the county.

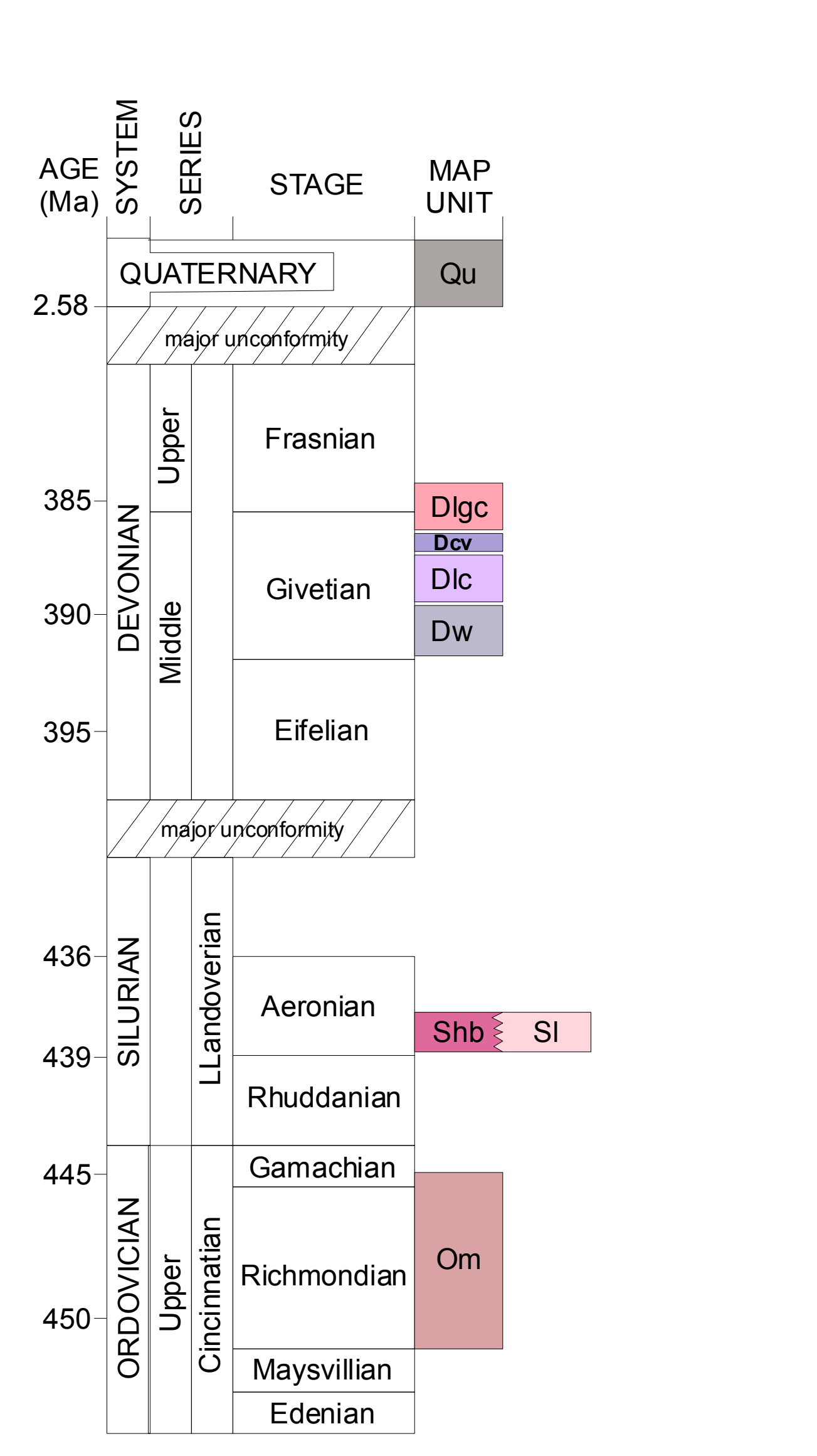
The Silurian Hopkinton and Blanding formations are comprised of fossiliferous to vuggy dolomite that are cherty to very cherty with nodular to bedded chert in the upper part of the Blanding Formation. The Hopkinton rocks are generally more fossiliferous and less cherty than the underlying Blanding rocks. These rocks form the bedrock surface in some of the deeper parts of the bedrock valleys in the county.

Ordovician Maquoketa Formation rocks occur in the deepest portions of the bedrock valleys in the northeast part of the map area, and directly underlie the Silurian rocks. The Maquoketa rocks include interbedded green to gray dolomitic shale and shaly dolomite with minor limestone, and are variably cherty and fossiliferous.

GEOLOGIC CROSS-SECTION A-B



CORRELATION CHART



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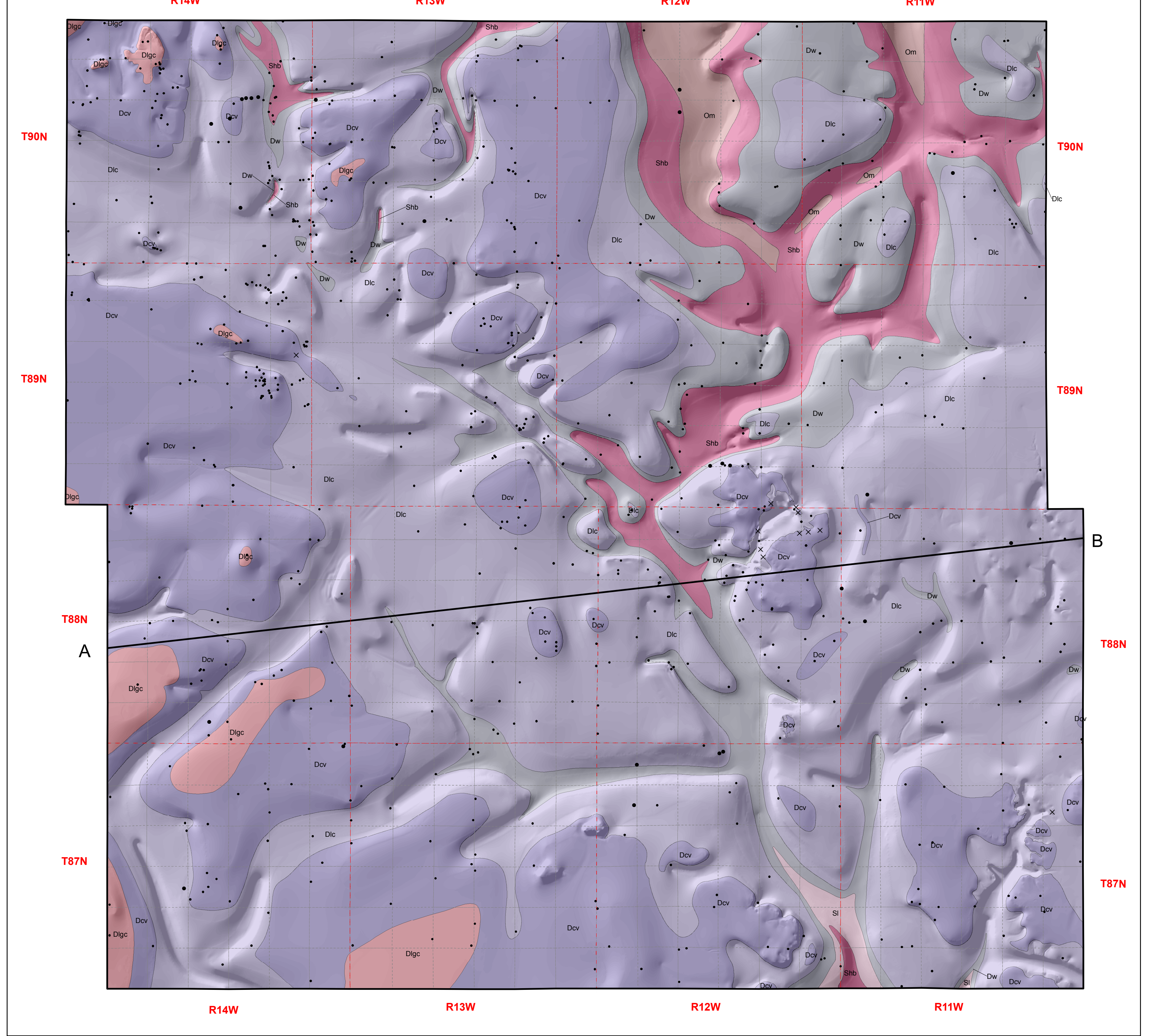
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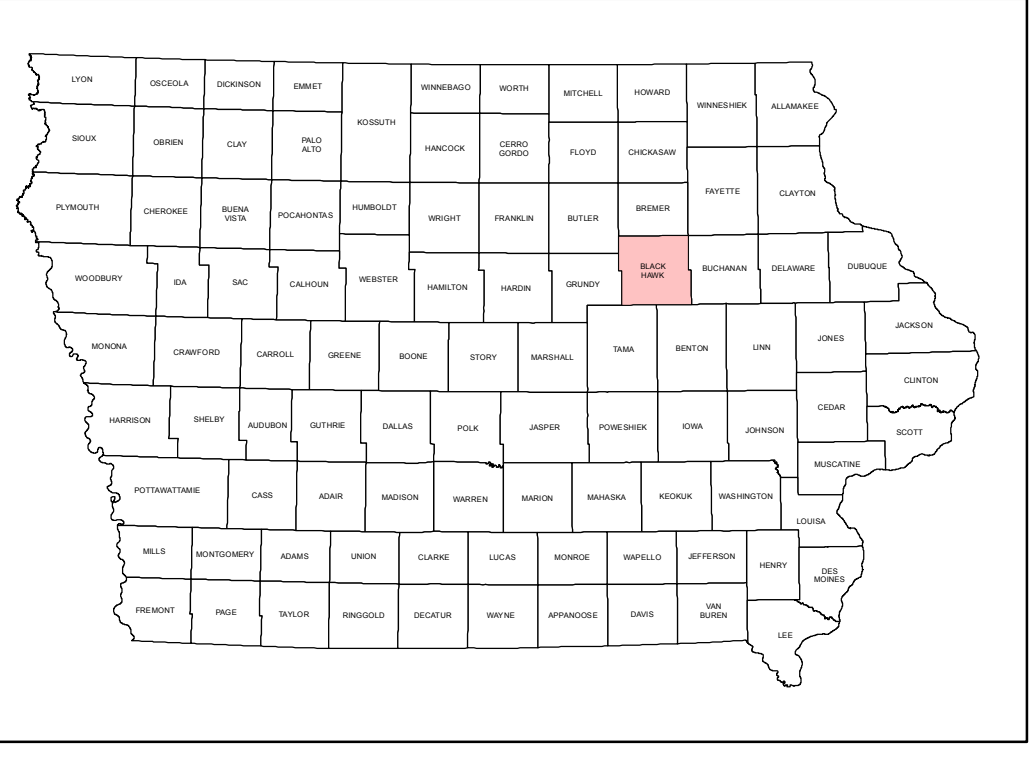
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BEDROCK GEOLOGY WITH SHADED RELIEF OF BEDROCK SURFACE



Location Map



Base map from Black Hawk County GIS data derived from IDOT Transportation Basemap files from 2009.
Iowa Geological and Water Survey digital cartographic file: BlackHawkCGI_Bedrock_100m.mxd, version 09/16/13, created 10/11/13.
Map projection and coordinate system based on Universal Transverse Mercator (UTM) Zone 16, datum NAD83.
Map and cross-sections 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.