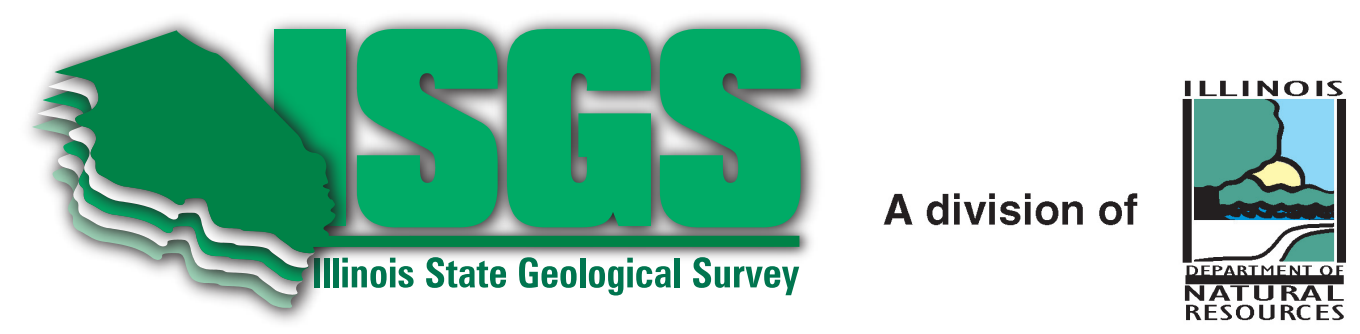


3-D Visualization of Bedrock Resources in Lake County, Illinois

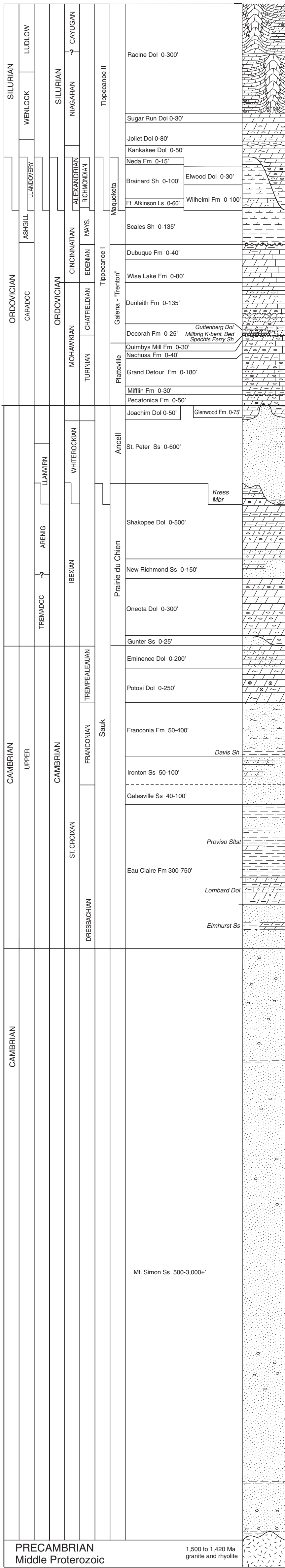
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Rod R. Blagojevich, Governor

Department of Natural Resources
Joel Brunsvold, Director
ILLINOIS STATE GEOLOGICAL SURVEY
William W. Shiels, Chief



Stratigraphic Column

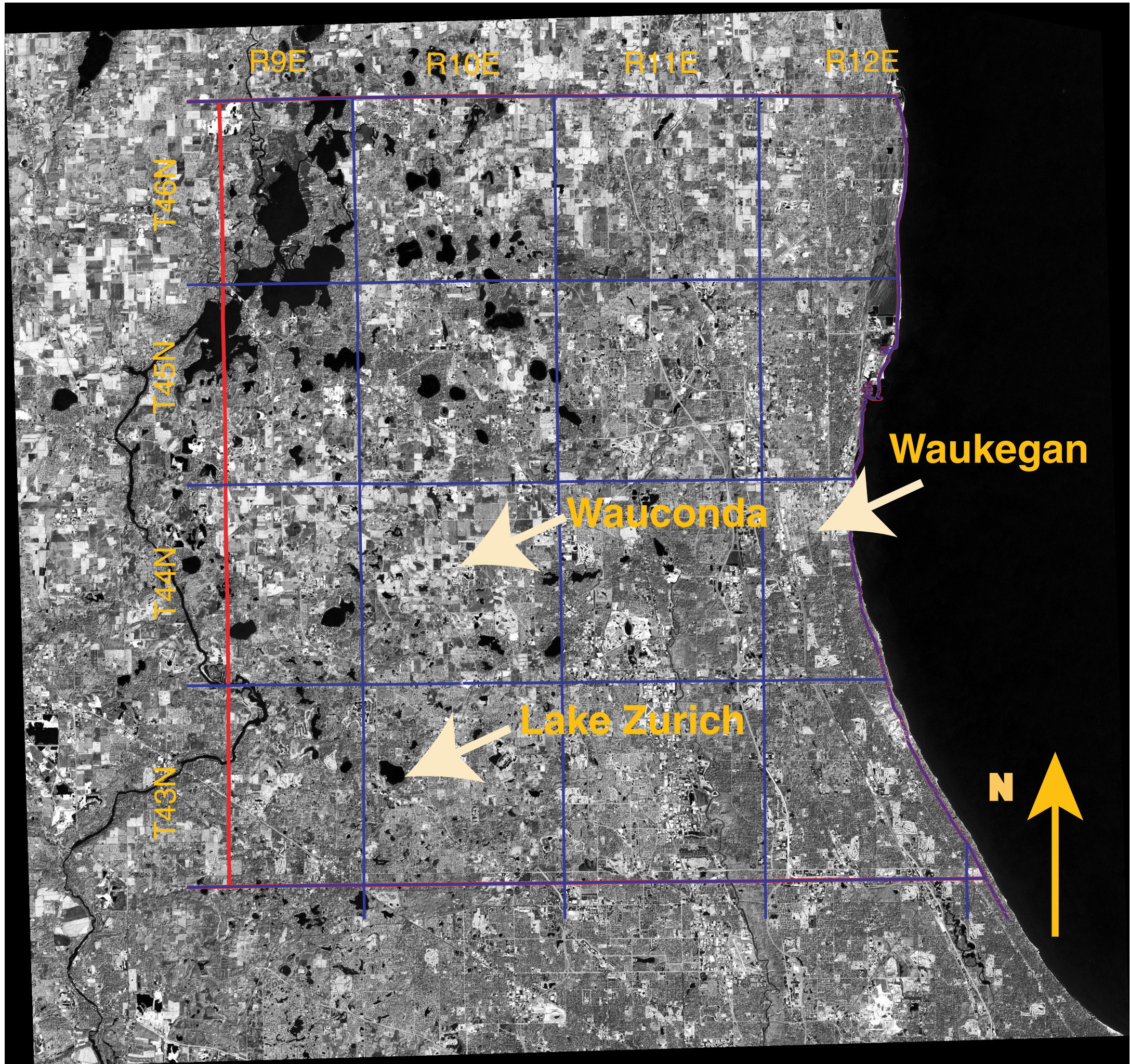


Map Compilation and Interpretation by:

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Index Map



This image of Lake County, Illinois, was acquired by the Landsat 7 satellite on September 6, 1999, and is derived from the panchromatic channel of the L7 Thematic Mapper sensor. The ground spatial resolution is 15 m x 15 m (50 ft x 50 ft). The image has been ortho-corrected.

Introduction

According to the 2000 United States Census, Lake County is one of the fastest-growing counties in Illinois. Rapid urban expansion and its impact on the environment and mineral resources requires increasingly more detailed information about the bedrock geology in order to make informed planning decisions. In particular, the bedrock is a major source of water for residential, municipal, and industrial use. Consequently, key issues facing Lake County include the quality, quantity, distribution, and accessibility of bedrock groundwater resources. Other potential bedrock issues include underground construction as well as mineral resource assessment and management.

Lake County is situated on the eastern flank of the southward-plunging Wisconsin Arch and in the far western part of the Michigan Basin. All Paleozoic formations dip eastward away from the arch. Silurian rocks thicken eastward into the Michigan Basin and the underlying Cambrian and Ordovician strata thicken southward into the Illinois Basin. An exploratory hole drilled in the northeastern part of the county (U.S. Geological Survey No. 1 Illinois Beach State Park) penetrated approximately 3,400 feet of Silurian, Ordovician, and Cambrian sedimentary rocks (primarily of dolomite, sandstone, and shale) before encountering Precambrian granite. The bedrock is covered throughout the county by 75 to 300 feet of unconsolidated surficial deposits consisting of clay, silt, sand and gravel formed primarily by glacial processes. Silurian dolomite is present at the bedrock surface over the entire county, ranging in thickness from less than 20 feet in the southwestern part to more than 300 feet on the far eastern side. Silurian dolomite forms the uppermost bedrock aquifer in Lake County. The upper part of the dolomite has a large number of fractures, crevices, and solution cavities which tend to yield moderate amounts of water. Higher yields are obtained from the more deeply buried St. Peter Sandstone, Ironton-Galesville Sandstone, and the upper part of the Mt. Simon Sandstone (Larsen, 1973).

Purpose

The principal objective of this mapping effort is to compile a subsurface database that can be used to depict in three dimensions the thickness, distribution, and structure of the major bedrock units in Lake County. Such a database can be used to produce 3-D maps and cross sections down to the top of the Precambrian crystalline rocks. It is anticipated that the database and the maps and models produced from the database will provide important insight to subsurface conditions in Lake County.

Methods

Formation tops were determined for approximately 1,600 drill hole records on file at the Illinois State Geological Survey. The information was entered into a digital database and used to compile county-wide structure and thickness maps, cross sections, 3-D block diagrams, and a stratigraphic column. The data are displayed in Lambert Conformable projection.

