New York State Museum & Science Service
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NEW YORK State Museum

New York State Geological Survey
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BEDROCK TOPOGRAPHY OF TOMPKINS COUNTY, NEW YORK

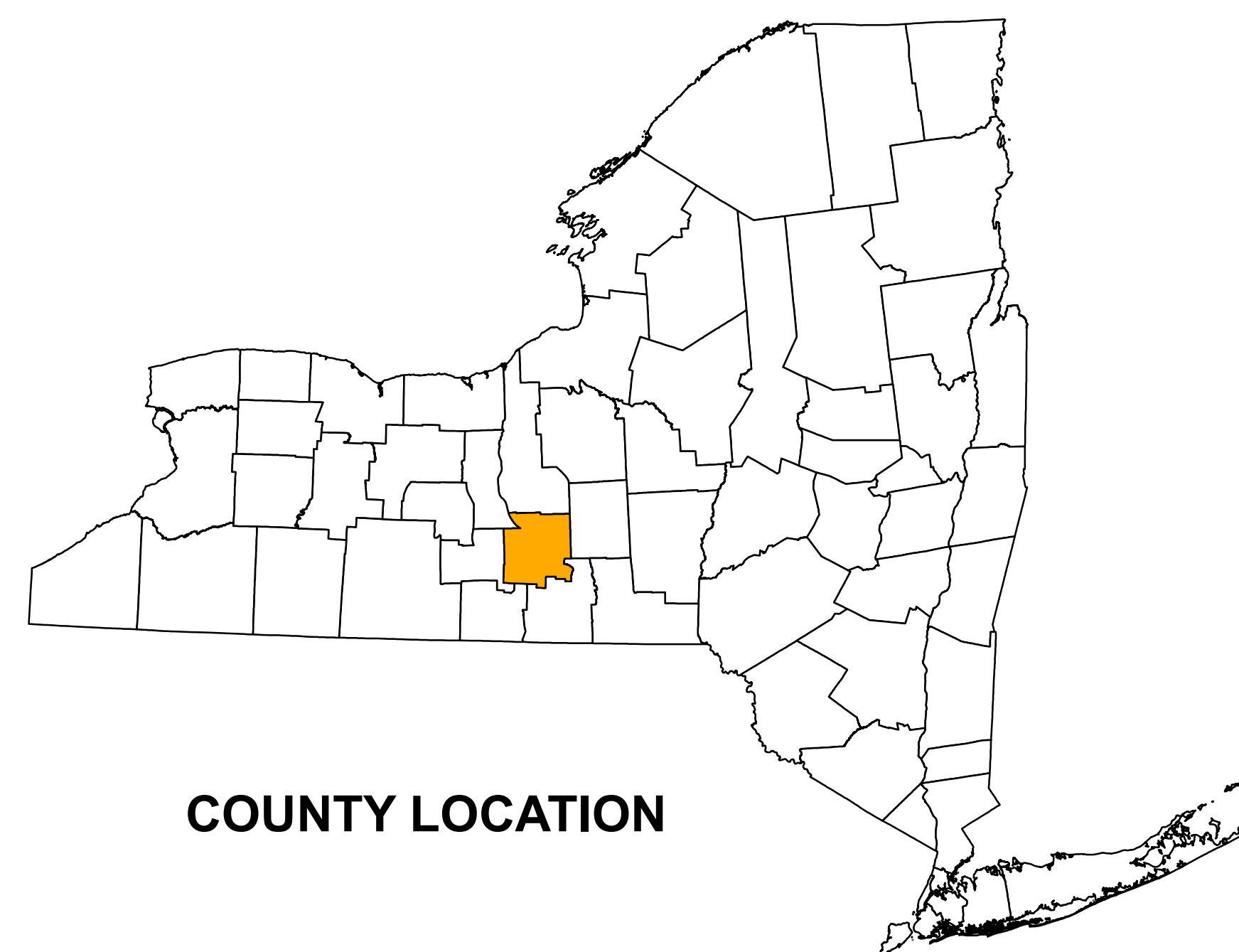Karl J. Backhaus

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Introduction

Beginning in 2019, under the guidance and funding provided by the United States Geological Survey - Great Lakes Geological Mapping Coalition (award G20AC00401), the New York State Museum - Geological Survey began a statewide effort to conduct geologic mapping of bedrock elevations throughout New York. Tompkins County, of Central New York, lies within the Allegheny Plateau physiographic province. The county is bounded by Schuyler, Chemung, Tioga, Cortland, Cayuga and Seneca Counties. Tompkins County is also dissected Cayuga Lake in the central portion of the county. Surficial and subsurface bedrock point data and maps were compiled from publicly available sources, vetted, and organized into a comprehensive geospatial database. A technical workflow was developed to categorize the overall geology and differentiate between the underlying bedrock and overlying unconsolidated sediments. The resulting bedrock elevation map provides a detailed representation of bedrock topography across Tompkins County. This map is useful for various applications, including geological studies, engineering and construction, natural resource management (such as water or mineral resources), and environmental studies.

Methodology

A total of 2,791 bedrock control points were used to delineate bedrock topography in Tompkins County. These points consisted of 2,406 water wells, 231 bedrock outcrops, 118 waterfall locations, 32 engineering boreholes, and four oil and gas wells. These data were compiled from a variety of public sources and imported into ESRI's ArcMap 10.8 software platform. Ground surface elevations for all control points were extracted from a compilation of three separate digital elevation models (DEM) which were resampled to match a 1-meter LIDAR DEM cell size. Bedrock elevations were calculated at each location by subtracting the depth-to-bedrock from the ground surface elevation. 50-foot bedrock elevation contours were auto-generated and manually refined through a multi-step quality control process to resolve any interpolation errors. The finalized contours were converted into a 1-meter raster, using the "Topo to Raster" tool, that represents county-wide bedrock topography.

Summary

The New York State Museum – Geological Survey has developed a detailed Bedrock Topography Map for Tompkins County. This map represents a compilation of various surficial and subsurface bedrock data sources, analytical methods, and quality control procedures. The resulting bedrock elevations reveal a range of distinct geological features including a variety of Paleozoic bedrock erosional profiles, and evidence of past glaciation. These characteristics are likely the result of a variety of functions including bedrock stratigraphy, structural deformation, and erosional processes such as past glaciation and fluvial geomorphology. This map is significant for applications in geological research, engineering, natural resource management, and environmental studies. Continued research and work on subsurface geology will provide additional data and insight and enhance the geologic framework of bedrock geology throughout New York State.

Explanation

- Data Point
- 50ft Bedrock Topography Contour
- 100ft Bedrock Topography Contour
- Highway
- Tompkins County Line
- Adjacent County
- Water Body

Bedrock Topography

Feet-amsl

- -200 - -100
- -100 - 0
- 0 - 100
- 100 - 200
- 200 - 300
- 300 - 400
- 400 - 500
- 500 - 600
- 600 - 700
- 700 - 800
- 800 - 900
- 900 - 1,000
- 1,000 - 1,100
- 1,100 - 1,200
- 1,200 - 1,300
- 1,300 - 1,400
- 1,400 - 1,500
- 1,500 - 1,600
- 1,600 - 1,700
- 1,700 - 1,800
- 1,800 - 1,900
- 1,900 - 2,000
- 2,000 - 2,100

COUNTY LOCATION

SCALE 1:62,500

Kilometers

Meters

Miles

Feet