New York State Museum & Science Service

New York State Geological Survey
Dr. Andrew L. Kozlowski, Director

BEDROCK TOPOGRAPHY OF CORTLAND COUNTY, NEW YORK

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2024

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. Cortland County, of Western New York, located in the Allegheny Plateau physiographic province. The county is nestled between Tompkins, and Chenango counties. Cortland County is also located along two large bodies of water, Lake Ontario and Oneida Lake. 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 Cortland 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 2,010 bedrock control points were used to delineate bedrock topography in Cortland County. These points consisted of 1,544 water wells, 45 engineering boreholes, 393 bedrock outcrops, and 28 waterfall locations. 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 Cortland 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.

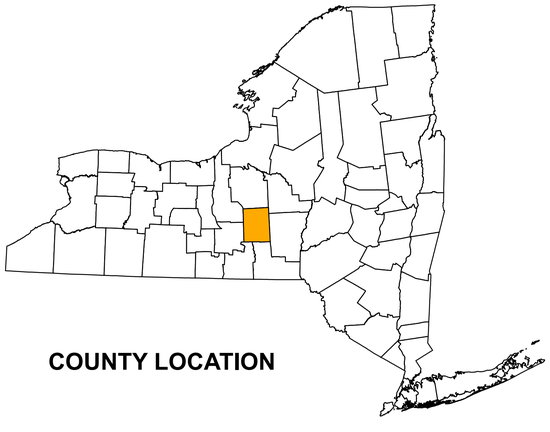
Explanation

- Data Point
- 50ft Bedrock Elevation Contour
- 100ft Bedrock Elevation Contour
- Highway
- Cortland County Line
- Adjacent County

Bedrock Topography

Feet-amsl

- 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
- 2,100 - 2,200



Onondaga
Madison
Cayuga
Chenango
Tompkins
Tioga
Broome

76.250° W 76.188° W 76.125° W 76.063° W 76° W 75.938° W 75.875° W
42.750° N 42.688° N 42.625° N 42.563° N 42.500° N 42.438° N

SCALE 1:62,500

Digital Data and Cartography by S. Grasing and K. Backhaus, 2022-24

Universal Transverse Mercator, Zone 18 N North American Datum of 1983

Geographic and hydrography data obtained from the NYSGIS Clearinghouse (https://gis.ny.gov/)

Kilometers 0 1.5 3 6 9 12
Meters 0 6,250 12,500
Miles 0 0.5 1 2 3 4
Feet 0 4,000 8,000 16,000 24,000 32,000

NOTICE

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The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily presenting the official policies, either expressed or implied, of the U.S. Government.

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