

Introduction

The New York State Museum – Geological Survey (NYSGS) began an effort to create topographic maps of bedrock elevation across New York State under the guidance and funding provided by the United States Geological Survey – Great Lakes Geological Mapping Coalition (award number G19AC00338). The Finger Lakes Sheet, which primarily includes central New York, extends across the Erie-Ontario Lowlands and Allegheny Plateau physiographic provinces. The region consists of the adjacent counties: Allegany, Broome, Cayuga, Chemung, Chenango, Cortland, Livingston, Madison, Monroe, Oneida, Onondaga, Ontario, Oswego, Schuyler, Seneca, Steuben, Tioga, Tompkins, Wayne, and Yates (see inset map). The region contains large bodies of water: Lake Ontario, Oneida Lake, and the entirety of the major Finger Lakes (Seneca, Cayuga, Skaneateles, Owasco, Keuka, and Canandaigua). Other large bodies of water include the Onondaga, Cross, Otisco, Hemlock, and Honeoye Lakes, as well as many others. 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 characterize the overall geology and differentiate between the underlying bedrock and overlying unconsolidated sediments. The resulting bedrock elevation map provides a detailed topography of the bedrock surface across the Finger Lakes Sheet. This map is useful for various applications including geological studies, engineering and construction, natural resource management (such as water or mineral resources), energy resources, and environmental studies. In this region, the bedrock surface is largely covered by glacial sediments left behind during the Pleistocene, but the solid rock below has its own hills, valleys, and slopes. A bedrock topography map reveals that buried rock landscape and provides important context for understanding how the modern land surface relates to the geologic history of the region.

Methodology

A total of 34,798 bedrock control points were used to delineate the bedrock topography in the Finger Lakes Sheet. These points consisted of 29,246 water wells, 4,264 bedrock outcrops, 941 engineering boreholes, 286 oil and gas wells and 61 geological survey stratigraphic boreholes. This data were compiled from a variety of public sources and imported into ESRI's ArcGIS Pro 3.3.1 software platform. Ground surface elevations for all control points were extracted from a compilation of three separate digital elevation models (DEMs) 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. Fifty-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 the Finger Lakes Sheet. This map compiles numerous published and unpublished surficial and bedrock data sources assessed by geologists at the NYSGS through multiple 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 diverse set of influences 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, environmental studies, energy management and energy development applications such as geothermal heat sources. Continued research and work on subsurface geology will provide additional data and insight and will enhance the scientific understanding of bedrock geology throughout New York State.

Explanation

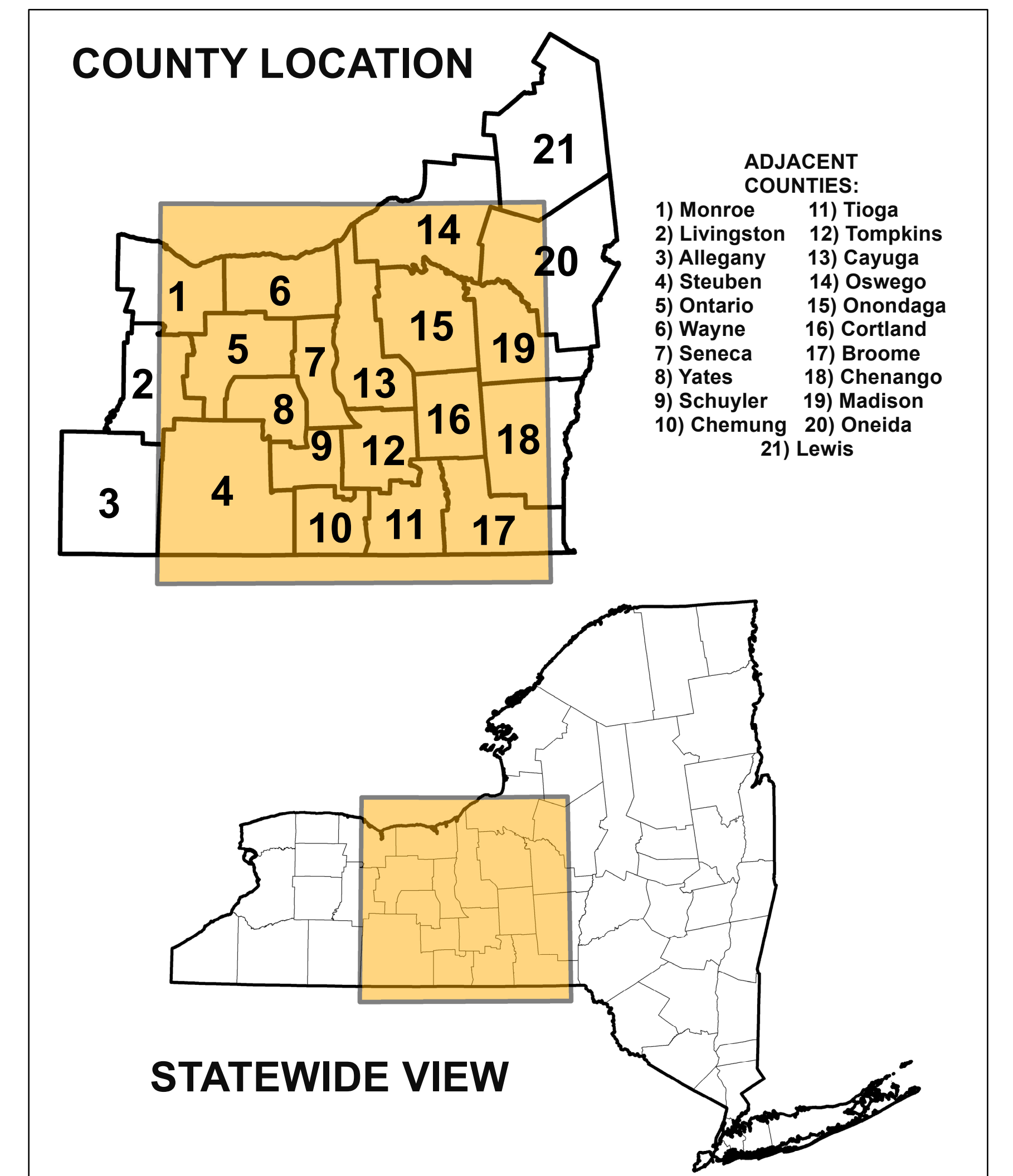
- Data Point
- 50ft Bedrock Elevation Contour
- Interstate
- U.S. Route
- Interstate
- State Line
- ⊕ NYS County Boundary
- ⊕ Adjacent State
- ☁ Water Body

Bedrock Topography

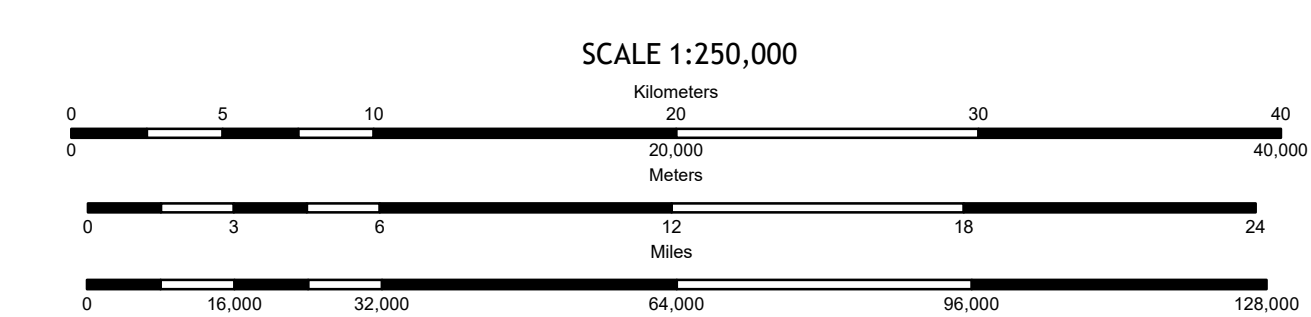
Feet-amsl

- -600 - -400
- -400 - -200
- -200 - 0
- 0 - 200
- 200 - 400
- 400 - 600
- 600 - 800
- 800 - 1,000
- 1,000 - 1,200
- 1,200 - 1,400
- 1,400 - 1,600
- 1,600 - 1,800
- 1,800 - 2,000
- 2,000 - 2,200
- 2,200 - 2,400

REGION LOCATION



Universal Transverse Mercator, Zone 18 N
North American Datum of 1983
Hydrology and streamlines layers from the New York State DOT
(https://gis.ny.gov/gisdata/arcswtserver/member.cfm?Organization=DOT108)
Geographic data layers from 2022 (2022) are subject to transportation
(https://www.nysdot.gov/gis/gisdata/geographic/2022/)



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**BEDROCK TOPOGRAPHY OF NEW YORK STATE
FINGER LAKES SHEET**

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2026

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