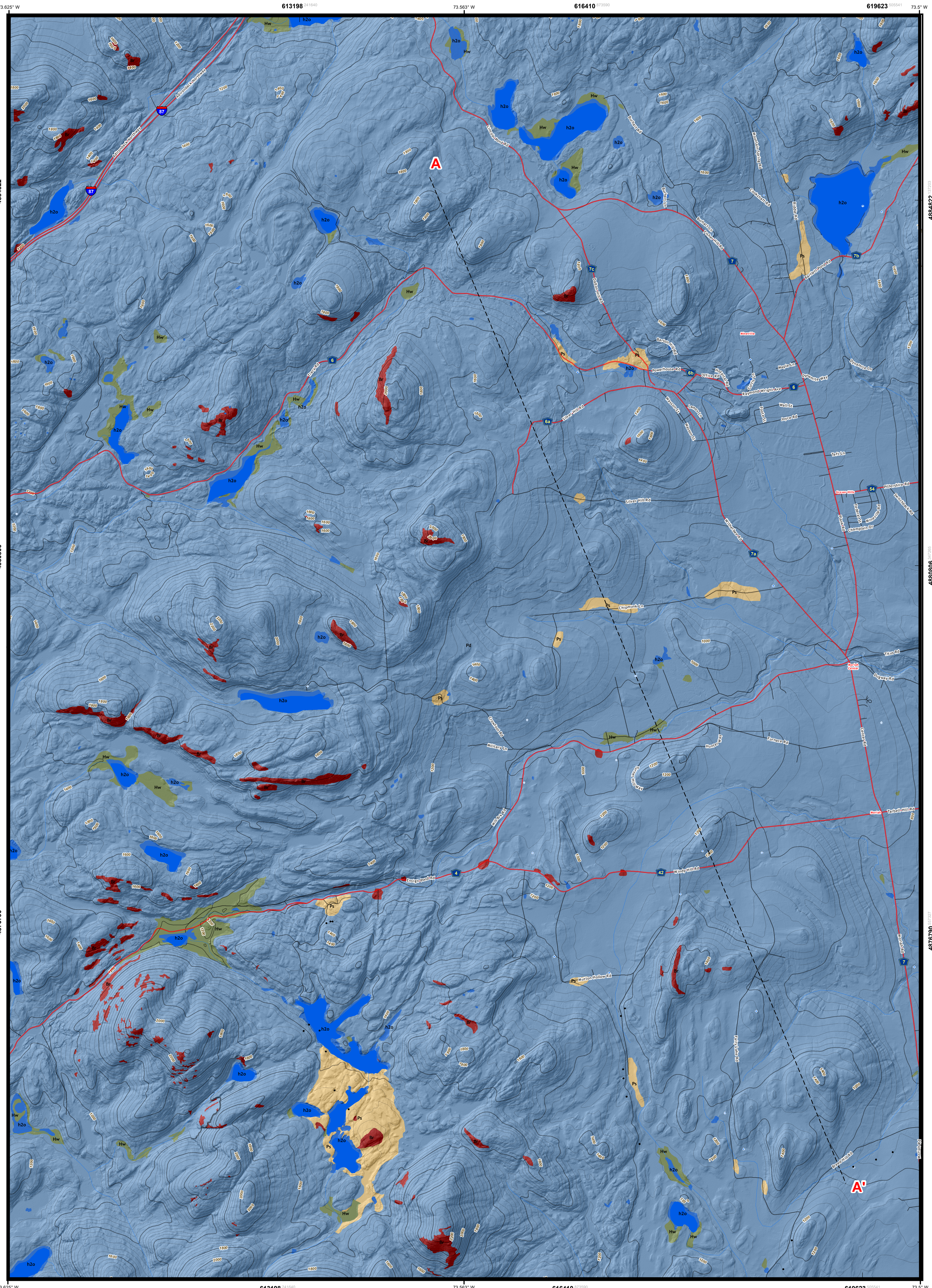
New York State Museum
Mark Schaming, Director

NYSGS
NEW YORK State Museum

New York State Geological Survey

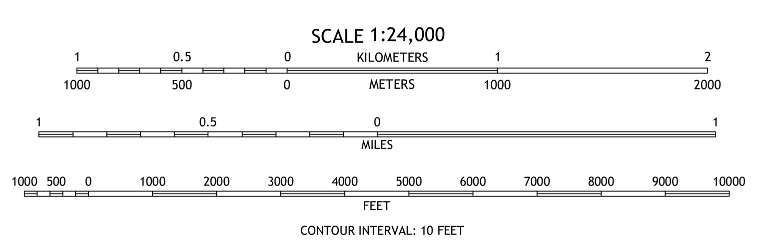


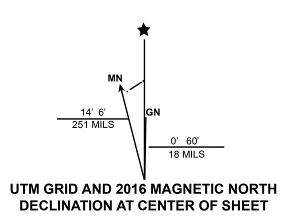
Universal Transverse Mercator, Zone 18 N
North American Datum of 1983

Hygrology, and planimetry layers from the
New York State DOT Raster Quadrangle separates for Essex County
(https://gis.ny.gov/gisdata/inventories/member.cfm?OrganizationID=108).
Geographic data layers from 2017 TIGER/Line shapes for transportation
and hydrograpghy (https://www.census.gov/cgi-bin/geo/shapefiles/index.php)

Shaded relief from 2015 Clinton, Franklin and Essex County 1m, 2015
Warren, Washington and Essex County 1m, and NYS 10m DEM lidar data sets
(http://gis.ny.gov/elevation/index.cfm)

Magnetic declination from the NOAA online Declination Calculator:
http://www.ngdc.noaa.gov/geomag-web/#declination





Geologic mapping by A. Clift and B. Graham, 2013

Digital data and cartography, A. Clift and K. Backhaus, 2013 & 2019.

SURFICIAL GEOLOGY OF THE WITHERBEE 7.5-MINUTE QUADRANGLE, ESSEX COUNTY, NEW YORK

Andrew Clift and Brandon Graham

2013

SURFICIAL GEOLOGY OF THE WITHERBEE 7.5-MINUTE QUADRANGLE, ESSEX COUNTY, NEW YORK

prepared by
Andrew Clift, Brandon Graham and Karl Backhaus

Supported in part by the New York State Museum Research and Collections Division

Map Discussion

The Witherbee quadrangle is located along the eastern boundary between the High Peaks and Central Highlands physiographic subdivisions of the Adirondack Province in northern New York State. It contains approximately 139 km^2 of public and private land that is heavily forested and home to a variety of plant and animal species. Located in the east-central portion of this quadrangle is the historic town of Moriah, known for its significant role throughout the 19th and 20th centuries as a major iron mining town in New York State. The physiography of this region consists of numerous hills and northeast-trending valleys that form broad, topographic prominences throughout the landscape west of Moriah. Drainage from these valleys funnels east towards Moriah Center, which is situated at the confluence of several streams and brooks that enter into Mill Brook, and ultimately into Lake Champlain, approximately 6 km east of Moriah Center. The highest point in this quadrangle is Bald Peak at 704 m above sea level (ASL), and the lowest point is just east of Moriah Center along Mills Brook at approximately 210 m ASL.

The nature of the topography in this region is most broadly controlled by structural deformation in the bedrock that is primarily associated with the Grenville Orogeny (1,250 - 980 M.a.). Zones of bedrock weakness attributed to episodes of complex faulting, folding and fracturing have developed into linear ridges and valleys due to surficial processes since the beginning of the Adirondack Uplift, approximately 10 - 20 M.a., and continuing to present. The bedrock in this region consists of Precambrian metamorphosed Grenville sedimentary rocks such as Proterozoic marbles, calc-silicates and gneisses that are interlayered with igneous/meta-igneous rocks including granite, gabbro, syenite, anorthosite, gneiss, and diorite (Staaz et al., 1980). The remnants of large tailings piles from historical iron mining operations are scattered throughout this region and used for gravel including the construction of roads. The iron ore bodies are primarily magnetite deposits, including magnetite and apatite, with gangue minerals such as augite, hornblende, albite and tourmaline, and many of these minerals have been shown to host a variety of rare earth elements (Mckeown and Klemic, 1957).

Central to the recent geomorphologic development of the Witherbee quadrangle were the continental ice sheets that intermittently advanced and retreated across the landscape. During the Pleistocene Epoch (2.588 M.a. to 11,700 years B.P.), these cyclic episodes of continental ice sheets periodical overrode this region and were major catalysts in sculpting the present-day landscape by means of their tremendous erosional and depositional nature. Subsequently, the development and presence of proglacial Lake Coveville during the most recent ice sheet retreat inundated the Witherbee quadrangle up to elevations of at least 400 m. For this reason, lacustrine sediment deposits including deltaic structures and shoreline terraces can be observed throughout the eastern portion of this quadrangle.

Dominant surficial materials throughout this mapping area were diamictons that blanketed the topography with varying thicknesses. The diamictons studied can be classified as glacial till, colluvium, or stratified lacustrine or deltaic mixed sands and gravels. In several locations, well-sorted sands were observed at excavated gravel pits and construction sites that displayed excellent stratification including a variety of deposition structures such as cross bedding, soft-sediment faulting and folding, grading, asymmetrical ripple marks and imbrication. The majority of stratified sand consisted of alternating layers of predominately dark (garnet, amphibole) and predominantly light colored (quartz) minerals, approximately 0.1 - 0.3 m thick. At some outcrops, alternating beds of sand and gravel approximately 0.5 – 1.0 m thick were observed dipping east. Rarely observed at any outcrop were deposits of well-sorted stratified silts and clays, although fine to very-fine silty/clayey sands were found.

References Cited

Mckeown, F. A. and Klemic, H., 1957, Rare-earth-bearing apatite, at Mineville, Essex County, New York: Bull. U.S. Geol. Sur., 1046B, 9-23.

Staaz, M. H., Hall, R. B., Macke, D. L., Armbrustmacher, T. J., and Brownfield, I. K., 1980, Thorium resources of selected regions in the United States: U.S. Geological Survey Circular 824, 32p.

Cross-Section A-A' Discussion

The geology displayed in cross section A – A' is based on a combination of surficial mapping and subsurface data, and the topographic profile was extracted from a digital elevation model (DEM). The cross section begins approximately 1.5 km north of the northern-most apex of Tracy Road, and trends towards the southeast corner of the quadrangle, ending just beyond Sherman Lake Road. The surficial geology is comprised primarily of Pleistocene diamicton with localized occurrences of surface sands and subsurface sands, silts and clays. Surficial cover is relatively thin throughout the cross section, with a maximum thickness of approximately 20 m to bedrock. Surface topography is heavily dependent on bedrock control.

DESCRIPTION OF MAP UNITS

Holocene

Hw — **Wetland Deposit (Hw)**
Peat, muck, marl, silt, clay or sand deposited in association with wetland environments. Various sediments can be present at transitional boundaries from one facies to another

Pleistocene

Ps — **Stratified Sand (Ps)**
Well sorted and stratified sand, deposited by fluvial, lacustrine or eolian processes. Inferred as deposits associated with distal glacial environments.

Pd — **Diamicton (Pd)**
An admixture of unsorted sediment ranging from clay to boulders. Generally matrix supported, massive and clast-rich.

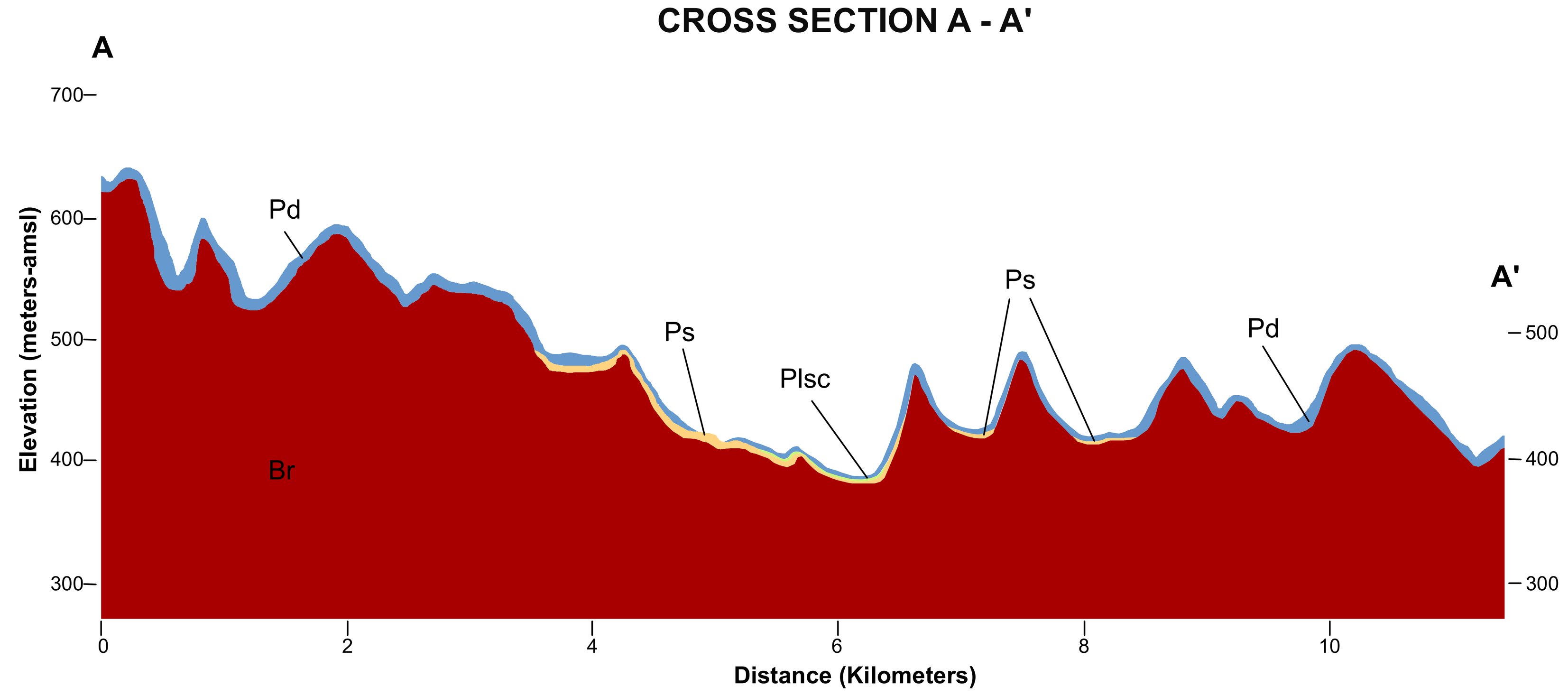
Pre-Pleistocene

Br — **Bedrock (Br)**
Non-glacially derived, hard rock, pre-pleistocene in age. May be covered up to a meter in diamicton, sand and gravel, or sand and clay in areas marked as Br.

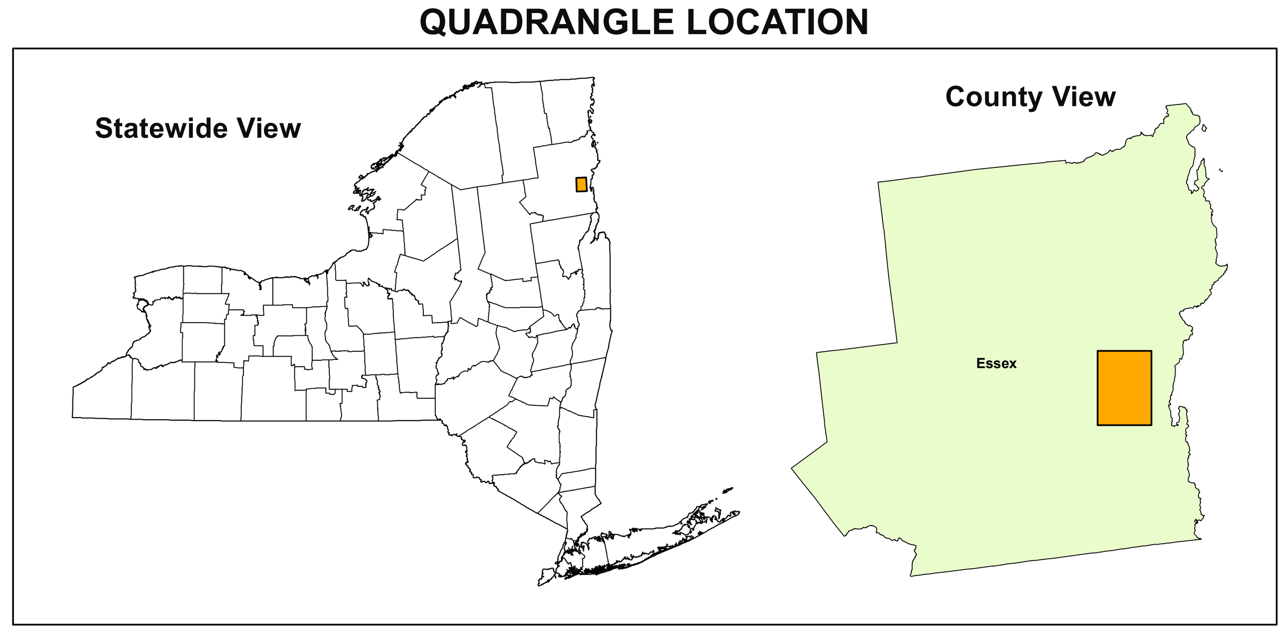
SYMBOLS

Streets
Highways
Contours
Cross-Section Line
Water Bodies
Streams
NYSGS Soil Sample Location
NYSDEC Water Well Location

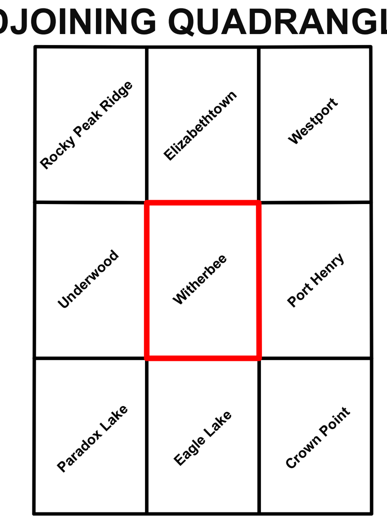
CROSS SECTION A - A'



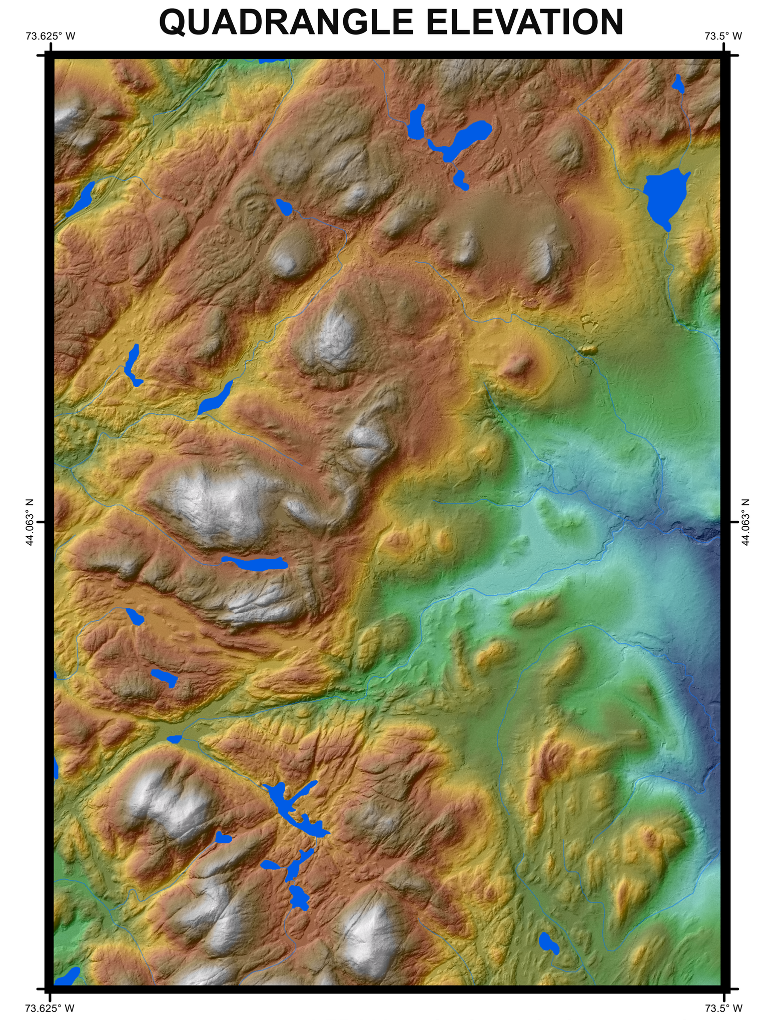
QUADRANGLE LOCATION



ADJOINING QUADRANGLES



QUADRANGLE ELEVATION



1:75,000 scale; 2x vertical exaggeration

Shaded relief generated from 2015 Clinton Franklin and Essex Counties and Warren Washington and Essex Counties 1m lidar data sets by the United State Geological Survey.

New York State Museum Map & Chart No. 106

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