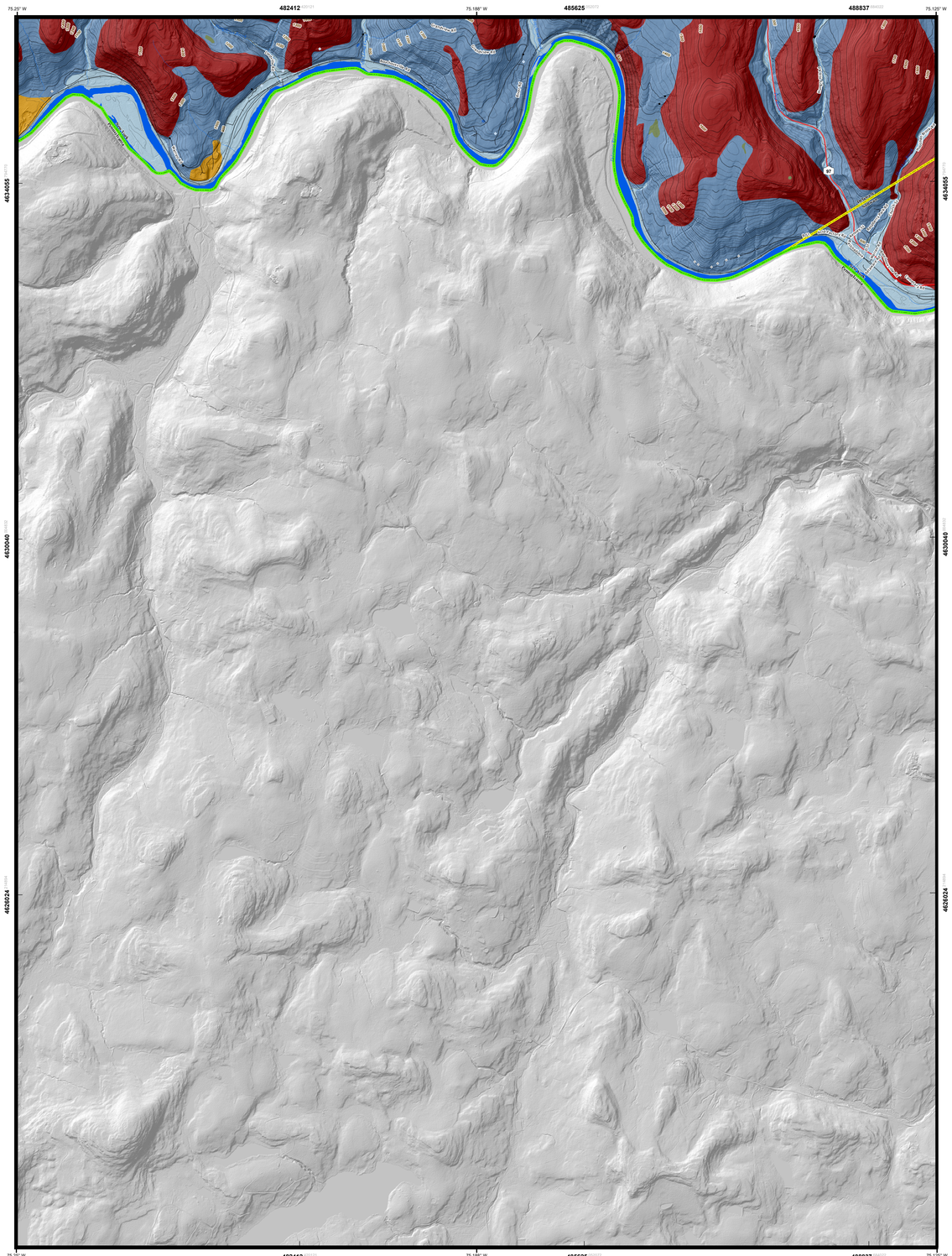
New York State Museum
Mark Schaming, Director

New York State Geological Survey

SURFICIAL GEOLOGY OF THE LONG EDDY 7.5-MINUTE QUADRANGLE, DELAWARE AND SULLIVAN COUNTIES, NEW YORK

prepared by
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Supported in part by the National Park Service Task Agreement Number P15AC01482 in the year 2015.



Introduction

The geology of the Long Eddy 7.5-minute Quadrangle was mapped during 2015, 2016 and 2017 as part of the National Parks Service Task Agreement P15AC01482 for Geologic Mapping of the Upper Delaware Scenic and Recreational River (UDSRR). This map is part of Phase I of the mapping project in Delaware and Sullivan Counties, New York. The purpose of this map was to identify and delineate various geologic formations in the Long Eddy Quadrangle with the intent that this information can guide the National Parks Service and municipalities in land use, environmental, and natural resource decisions. The Long Eddy Quadrangle is within the Catskill Region of New York near the state border with Pennsylvania. The towns of Hancock, Delaware County and Fremont, Sullivan county are the municipalities that makes up the quadrangle and include the hamlets of Lordville and Long Eddy. The quadrangle is mainly wooded with large tracts of land for lumber and recreation. Bluestone mining is another major land uses in the quadrangle and surrounding area.

Situated at the western edge of the Catskill Mountain physiographic province the landscape varies from floodplain in the Delaware River Valley to mountainous topography. The highest elevation is at 1,837 feet, or 560 meters, above mean sea level (amsl) in the northeastern portion of the quadrangle with the lowest elevation being 807 feet, or 246 meters, where the Delaware River exits the quadrangle to east. The sediments found in the quadrangle include sand, gravel, diamicton (till) and bedrock exposed throughout the quadrangle.

The portions of the Long Eddy Quadrangle within the boundaries of the UDSRR, consist primarily of exposed bedrock, till over rock, and alluvium on the floor of the Delaware River Valley. The New York portion of the quadrangle is located along the northern edge of the quadrangle with much of the land area being on the north valley wall of the Delaware River Valley. While much of the area mapped was bedrock ledges and cliffs there were sections of diamicton along the valley walls in the central part of the mapped portion along with some sand and gravel in the western edge of the quadrangle. The valley floor itself was made up mostly of alluvium sediments.

Clastic Upper Devonian rocks make up virtually all bedrock in this region. These shales, mudstones, fine to coarse sandstone were observed in the area. There is some quartz pebble conglomerate beds and there is a possibility to have localized lacustrine carbonate beds (Ver Straeten, 2013), Multiple cycles and similar facies, that cover 25 million years, make this area difficult to correlate without spending great amounts of time exclusively mapping the bedrock.

Extensive geophysical, geochemical, and fossil identification would need to be carried out to create a comprehensive bedrock map of the region. The age of the rocks spans the Frasnian stage, ~385 million year ago (Ma) to ~360 Ma. In that time, this region was an expansive coastline with a complex river system, transporting massive amounts of sediment coming from the ancestral Acadian Mountains, which occupied present day eastern New England

Methods

Field mapping for this quadrangle was completed from late 2015 through 2017. Mapping efforts included traversing the quadrangles primarily by vehicle along roadways, with some mapping taking place on private land. Sample collection was taken by pick and shovel from outcrops in drainage ditches, road and streams cuts. Sample collection was also taken with a two-meter long hand auger to collect samples below the soil layer where possible. A total of 10 observation points were made during the mapping process, with five samples collected for grain size analysis. Six Geoprobe samples were collected along Acid Factory Road and NYSGS BH1753 core was collected on the western edge of the quadrangle about 100 meters north of the Delaware River

Water wells (one in total) from the Department of Environmental Conservation and exploratory boreholes (six in total) from the New York State Geological Survey were also used to decipher the subsurface geology of the Long Eddy Quadrangle. The subsurface data from this well was simplified using the drillers descriptions to more standard and uniform descriptions.

Field data were digitized in ArcMap 10.6. Polygons were created based upon the lithology of the surface material and the sample and boring locations were plotted. The boring logs and map data were created using the Adobe Illustrator CS6 using the data created in the ArcMap program.

Surficial Map Units

Holocene Alluvium (Ha) and Holocene Wetland Deposits (Hw)
Post glacial sediments occupy the low areas or land depression throughout the quadrangle. Ha is associated with fluvial process in along the Delaware River and its tributaries. This lithology generally consists of stratified silt, sand, and gravel. Hw is associated with low areas and depressions in the highlands of the quadrangle where wetlands form due to poor drainage. This lithology consists of peat, marl, clay or sand in these areas of poor drainage.

Pleistocene Sand and Gravel (Psg)
Characterized as well-sorted and stratified sand and gravel this unit is interpreted to be deposited by glacial meltwater at or very near the glacier and can be found several meters in elevation higher than the present-day river valley floors. Psg is found in an old gravel pit in the extreme western edge of the quadrangle.

Pleistocene Diamicton (Pd)
This unit is a mixture of sediment grains that range from clay to boulders in size. In this quadrangle, all diamicton in interpreted to be glacial till, sediment deposited directly beneath the glacier. This material is found throughout the mapped portion of the quadrangle covering valley walls on the north side of the Delaware River. It is generally matrix supported, sand-dominant, and tan and reddish brown in color.

Summary and Discussion

The Long Eddy Quadrangle located on the western edge of the Catskill Mountains. The quadrangle is like the surrounding Catskill Mountains with greenish blue to dark grey sandstones with zones of crossbedding, and red shales of the Devonian Period Catskill Delta making up the bedrock of the mountains. The light brown to reddish brown diamicton, till, is deposited on the slope of the valley walls as well as in the level uplands north of the Delaware River.

The core, BH1723, recovered bedded red clays, silts and fine sands below the alluvium. The fine-grain material had a sharp contact with a red till. Below the till was about 10 feet of bedded medium to coarse sand and rounded gravels before reaching bedrock. An optically stimulated luminescence sample (OSL) was collected for dating from a medium sand bed within a meter of bedrock. This OSL sample will give us an approximate maximum age of the till unit above. These bedded sediments sitting immediately over bedrock also indicate that there was a pre-Delaware River flowing through the valley.

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DESCRIPTION OF MAP UNITS

Holocene

Ha — **Stratified silt, sand and gravel (Ha)**
Sorted and stratified silt, sand, and gravel, deposited by rivers and streams. May include cobbles and boulders. Inferred as post-glaical alluvium and includes modern channel, over-bank and fan deposits

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

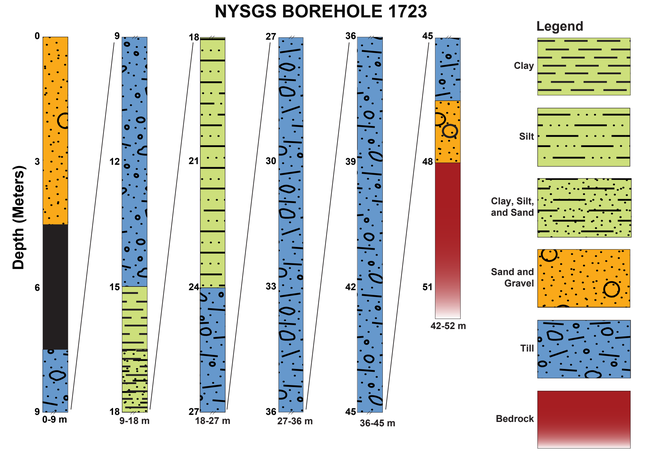
Psg — **Stratified sand and gravel (Psg)**
Well-sorted and stratified sand and gravel. May include cobbles and boulders. Inferred to be delta, fan or lag deposits in glacial channels or near ice margins.

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

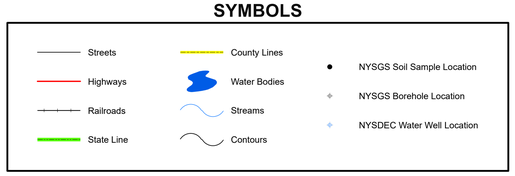
Pre-Pleistocene

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.

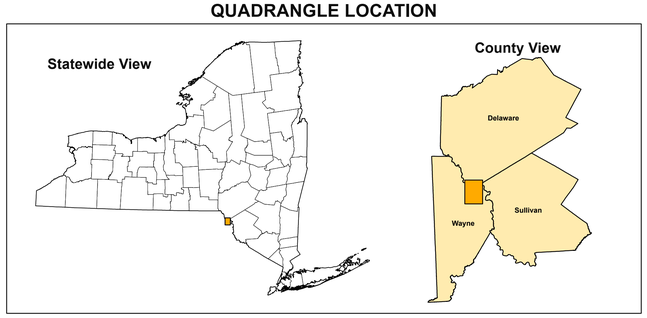
NYSGS BOREHOLE 1723



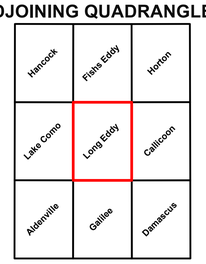
SYMBOLS



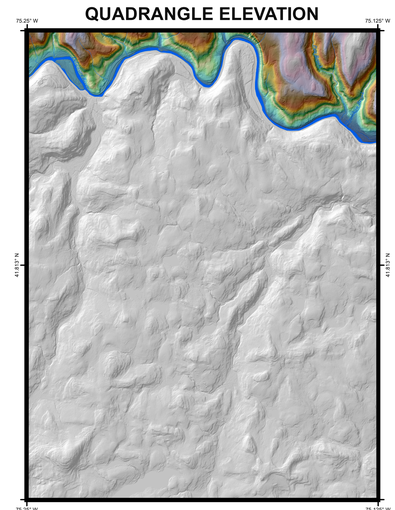
QUADRANGLE LOCATION



ADJOINING QUADRANGLES



QUADRANGLE ELEVATION



Feet-amsl
805 1840

1:75,000 scale; 2x vertical exaggeration
Shaded relief generated from 2007 Delaware & Sullivan Counties 3-meter lidar data set by the Federal Emergency Management Agency.

NOTICE

This geologic map was funded in part by the National Park Service Task Agreement Number P15AC01482 for the Geologic Mapping in Upper Delaware Scenic and Recreational River Phase 2 in the year 2015.

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New York State Museum Map & Chart No. 111

ISSN:0097-3793 ; ISBN:978-1-55557-282-2

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