New York State Museum
Mark Schaming, Director

New York State Geological Survey

SURFICIAL GEOLOGY OF THE LYONS 7.5-MINUTE QUADRANGLE, ONTARIO, SENECA AND WAYNE COUNTIES, NEW YORK

prepared by
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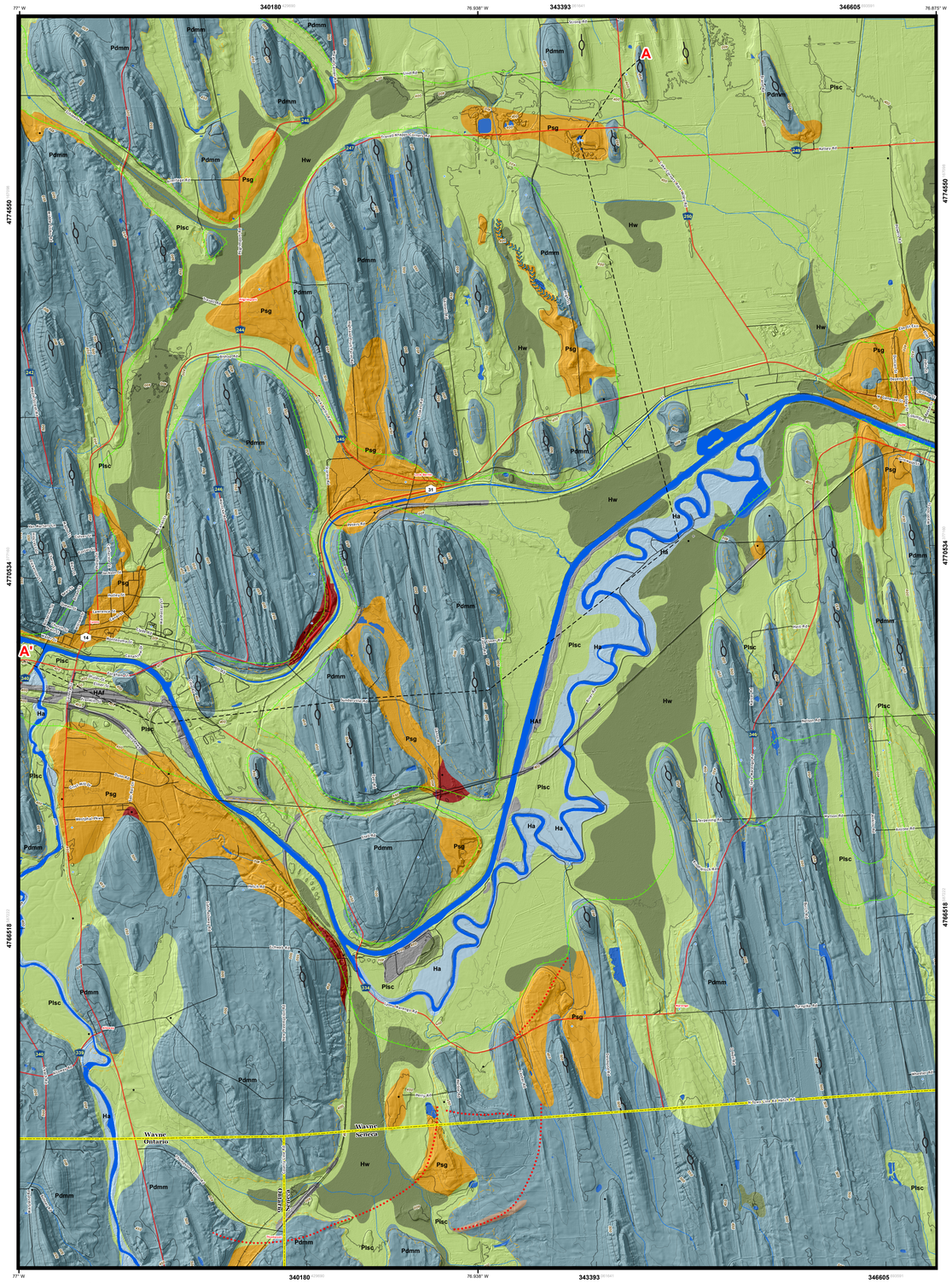
National Cooperative Geologic Mapping Program Great Lakes Mapping Coalition Award Number G13AC00338



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 Wayne, Ontario and Seneca Counties (https://gis.ny.gov/gisdata/inventories/member.cfm?OrganizationID=108). Geographic data layers from 2017 TIGER/Line shapes for transportation and hydrography (https://www.census.gov/cgi-bin/geo/shapefiles/index.php)

Shaded relief from Seneca Lake Watershed 2 m, NYS 10m DEM, and Ontario County 2-meter 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

SCALE 1:24,000

1 0.5 0 KILOMETERS 1 2
1000 500 0 METERS 1000 2000
1 0.5 0 1
MILES
1000 500 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
FEET

CONTOUR INTERVAL: 10 FEET

UTM GRID AND 2016 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

Geologic mapping by Brian Bird and Andrew Kozlowski 2013
Digital data and cartography: B. Bird and Karl J. Backhaus, 2013 & 2018.

Introduction

The surficial geology of the Lyons 7 ½ minute USGS Quadrangle was mapped in 2014 as part of the Great Lakes Mapping Coalition program. The adjacent quadrangles, Wolcott, Savannah, and Seneca Falls have been recently mapped as part of the Federal StateMap program or the Great Lakes Mapping Coalition program. Located in central New York about 50 miles west of Syracuse, NY, the Lyons Quadrangle is bound between the parallels 43o00'N and 43o7'30"N and the meridians 76o52' 30"W and 77o00'W. The villages of Lyons and Clyde are the largest municipalities in the quadrangle. Included are the towns of Lyons, Galen, Junius, and Phelps. The modern Erie Canal as well as the abandoned predecessors, the old Erie Canal and Clinton's Ditch traverse across the quadrangle along the low areas. The Lyons Quadrangle is mostly in Wayne County but also included narrow portions of Ontario and Seneca Counties to the south. The village of Lyons serves as the County seat for Wayne County.

Methodology

The surficial map was created using traditional field mapping techniques with hand auger, sediment coring and New York State Department of Environmental Conservation (NYDEC) water well records. The quadrangle was traversed by vehicle as well as foot. Sediment samples (32) were collected with a hand auger or shovel. Samples were collected below the top soil layer from one to two meters below the surface. Polygons were created on the field map representing the various classifications of sediment. In order to augment the surface sediment data, 80 water well records were used. This data collection was provided by the NYDEC and local well drilling operators. The description of the upper material was noted and compared to the primary data collected directly in the field. A GeoProbe boring was collected in the Galen Marsh State Wildlife Management Area. This boring collected nearly continuous samples to 118 feet deep. The sediment recorded at depth was used to create geologic cross-section of the area.

Geologic Setting

The Lyons Quadrangle is situated in the Ontario Lowlands physiographic province of New York State. Rock formations with in the quadrangle are the Vernon, Syracuse and Camillus Formations. These bedrock formations consist of predominantly shale but include dolostone, gypsum, and salt. The bedrock is near the surface to the east of the village of Lyons. Exposures are mostly the result of road cuts or drainage ditch excavation. Bedrock encountered is red in color and typically weathered to the extent the original sedimentary structures, including bedding, are difficult to distinguish. It can be mistaken for clay deposits if it were not for the presence of bands of green, characteristic of the Camillus Shale (Gillette, 1940). New York Department of Environmental Conservation Water well records in the area indicate an average depth to bedrock of 52 feet, with a range of 3 to107 feet. Bedrock was not encountered in the GeoProbe boring which ended in diamicton at 118 feet below the surface. The surficial geology is quite varied and generally follows the geomorphology of the landscape. Upland areas are usually composed of diamicton or deposits of sand and gravel. Low lying areas usually are characterized by finer grained sand, silt, and clay as well as organic rich deposits. The uplands composed of diamicton are streamlined and the presence of drumlins is marked on the map. The inference that the diamicton is indeed till is supported by the drumlins as these features are created subglacially. Associated with the uplands are areas of sand and gravel. The occurrence of this material is the result of meltwater from the glacier. Existing as fans, these areas represent an ice marginal position. These deposits may also represent a lag deposit created by flowing meltwater or wave action. Meltwater eroded a series of anastomosing channels which crosscut the uplands and marked by blue hachured lines on the accompanying map. One esker can be found in the central portion of the map sub parallel to High Street, north off NYS 31. This esker would have been deposited subglacially as meltwater began to wane and deposition filled the void. The blue dashed line on the map marks the shoreline of glacial Lake Iroquois. The clearest shore feature is on the east side of a drumlin in the northeast corner of the map (marked with a red X). The lake elevation at this point would be 132 meters above mean sea level (modern). At the time this lake existed the land surface was still isostatically depressed and as a result the shoreline features would not be at the same elevation as the northern areas would be lower than the south. As a result of rebound, the shoreline features are now higher in elevation in the northern portion of the quadrangle. Using a water plane of 0.78m/km from work done in Cayuga County (Bird and Kozlowski, 2014), the shoreline matches the topography and sediment assemblages expected for lacustrine environments. Along the shoreline wave action would have winnowed away fine grained sediment, leaving the courser material behind. Near the depicted shoreline the sediments can vary widely as diamicton was being wave washed and the sand and gravel deposits were likely deposited in water with a heavy suspended load. As a result there are areas along the shoreline where the diamicton is sandy and less stiff and likewise the sand and gravel deposits are "dirty" as there is fine grained silt and clay contained within. Below this shoreline the low lying areas are dominated by fine silt and clay.

Conclusions

The pattern of surficial sediments in the Lyons Quadrangle is the result of a retreating glacier across the area. The diamicton was deposited directly by the ice during advance and retreat and forming drumlins. As ice was retreating across the area copious amounts of melt water carved anastomosing channels. In some areas sand and gravel was deposited and exhibit a positive relief on the landscape as the fan or lag deposits. Later ponding of Lake Iroquois deposited fine sand silt and clay in the low areas and channels. Some are rhythmites and likely represent varves. As the landscape became vegetated after ice retreat organic deposits began to build in the low, wet areas which still persist today.

References

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DESCRIPTION OF MAP UNITS

Holocene

Af — **Artifical Fill (Af)**
Surficial sediment composed of coarse/fine and or crushed rock anthropogenically transported and used for construction purposes.

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

Plsc — **Silt and Clay (Psc)**
Stratified, fine-grained sediment consisting of fine sand, silt and clay size particles. Inferred to be deposited in mid shore to deepwater settings of glacial lakes. May include marl, rythmites, and varves.

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.

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

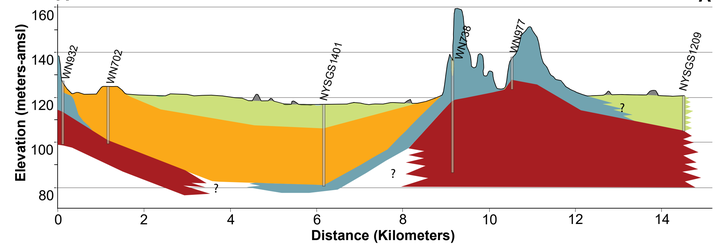
Pre-Pleistocene

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.

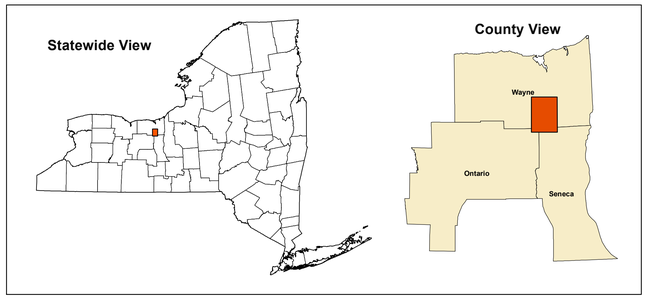
SYMBOLS

Streets
Highways
Railroads
County Line
Water Bodies
Streams
Contours
Cross-Section Line
NYSGS Boring Location
NYSGS Sample Location
NYSDEC Water Well Location
NYSDOT Boring Locations
Drumlins
Eskers
Ice-Margin
Meltwater Channels
Lake Iroqious Shoreline

CROSS-SECTION A'A'



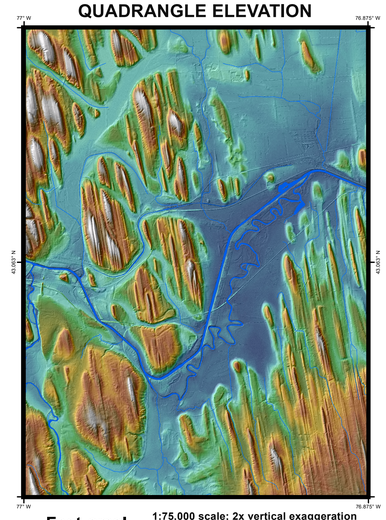
QUADRANGLE LOCATION



ADJOINING QUADRANGLES

Sodus	Rose	Wolcott
Newark	Lyons	Savannah
Phelps	Geneva North	Seneca Falls

QUADRANGLE ELEVATION



Feet-amsl
375 625

1:75,000 scale; 2x vertical exaggeration

Shaded relief generated from 2012 Seneca Lake Watershed lidar data set by the Federal Emergency Management Agency and the 2006 Ontario County 2-meter lidar data sets.

NOTICE

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