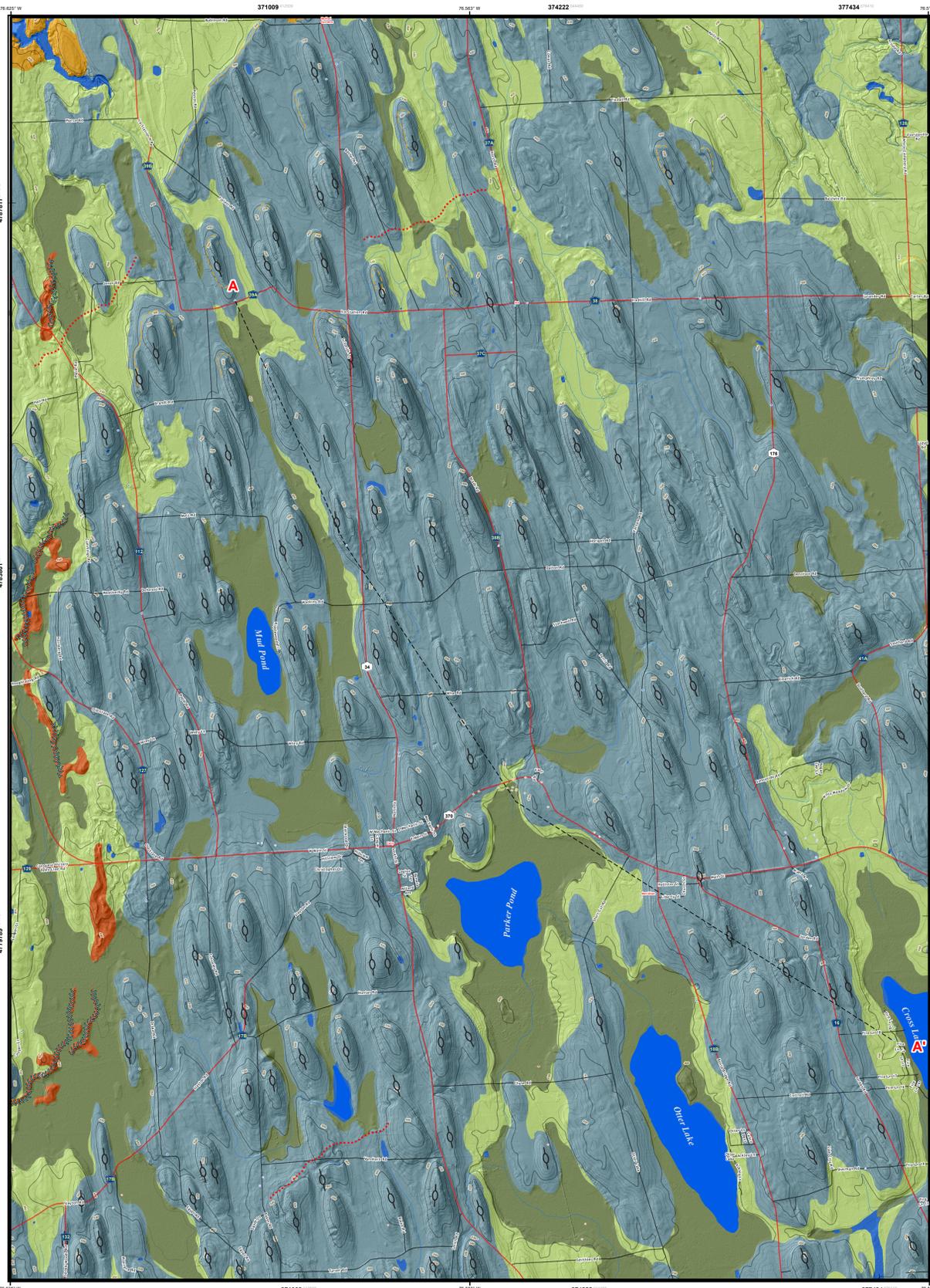


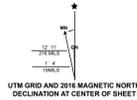
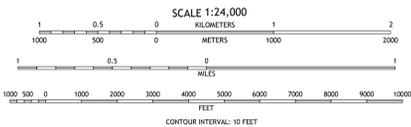
SURFICIAL GEOLOGY OF THE CATO 7.5-MINUTE QUADRANGLE, CAYUGA COUNTY, NEW YORK

prepared by
Nathan Hopkins

Supported in part by the U.S Geological Survey's
National Cooperative Geologic Mapping Program EDMAP Grant



Universal Transverse Mercator, Zone 18 N
North American Datum of 1983
Hydrology, and planimetry layers from the New York State DOT Raster Quadrangle separates for Cayuga County (<https://gis.ny.gov/geoinformationcenter/arcgis/organizationContent>)
Geographic data layers from 2018 TIGERLine shapes for transportation and hydrography (<https://www.census.gov/geographic/tiger/index.php>)
Shaded relief from 2000 Cayuga County 2-meter and NYS 10-meter DEM lidar data sets (<http://gis.ny.gov/elevation/index.cfm>)
Magnetic declination from the NOAA online Declination Calculator (<http://www.ngdc.noaa.gov/gemmag-web/declination>)



Geologic mapping by N. Hopkins, 2012.
Digital data and cartography, B. Bird and Karl J. Backhaus, 2012 & 2018.

Introduction

The surficial geology of the Cato 7.5 minute USGS quadrangle was mapped in 2012 as part of the StateMap program. The quadrangle is located approximately 35 miles west of the city of Syracuse, in the northern part of Cayuga County. This quadrangle is adjacent to the Hannibal, Lysander, Weedsport and Victory quadrangles which have been, or are currently being, mapped through the StateMap Program. The Cato quadrangle is one of 24 quadrangles which comprise Cayuga County, New York.

Geologic Setting

The surficial geology of this quadrangle varies widely. Influenced by the Laurentide Ice Sheet, the sediments discovered throughout the quadrangle included: diamicton (inferred to be till directly deposited by the glacier), fluvial and lacustrine sediments deposited by the meltwater associated with the glacier and modern processes, and organic materials deposited after the retreat of ice. The distribution of these sediments generally follows the topography with diamicton comprising the higher areas while the meltwater associated sediments are in the low lying areas between the uplands. In the western portion of the quadrangle is a channel that is nearly 2 kilometers wide. This channel is currently occupied by a series of wetlands and represents a former drainage channel of meltwater from the glacier. Multiple esker landforms and inferred icemarginal positions are contained within this channel. These features represent meltwater flow beneath the ice as it emerges. The fans mark areas where the retreating ice stagnated for some time as the sediment load will disperse as it exits beneath the glacier.

Methodology

The surficial map was created using traditional field mapping techniques, water well records, and geophysical methods. The quadrangle was traversed by vehicle as well as foot. 48 sediment samples were collected with a hand auger or shovel. Samples were collected between one and two meters below the surface. Polygons were created on the field map representing the various types of sediment. In order to augment the surface sediment data, 32 water well records were used. This data collection was provided by the New York DEC and local well drilling operators. The description of the upper material was noted and compared to the first hand data collected by auguring. The sediment recorded at depth was used to create a three dimensional framework of the area. A cross section correlating various strata of sediments from water well data was created.

Conclusions

The pattern of surficial sediments in the Cato quadrangle is the result of a retreating glacier across the area. The diamicton was deposited directly by the ice during advance and retreat. As ice was retreating across the area copious amounts of meltwater carved channels and then filled those channels with sand and gravel deposits. These deposits exhibit a positive relief on the landscape as the fan and eskers were building up and filling in open areas under, and at the edge of, the ice. As the landscape became vegetated after ice retreat organic deposits began to build in the low, wet areas which still persist today.

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-glacial 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

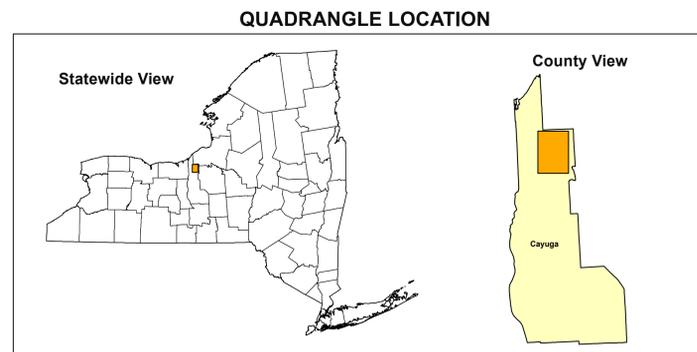
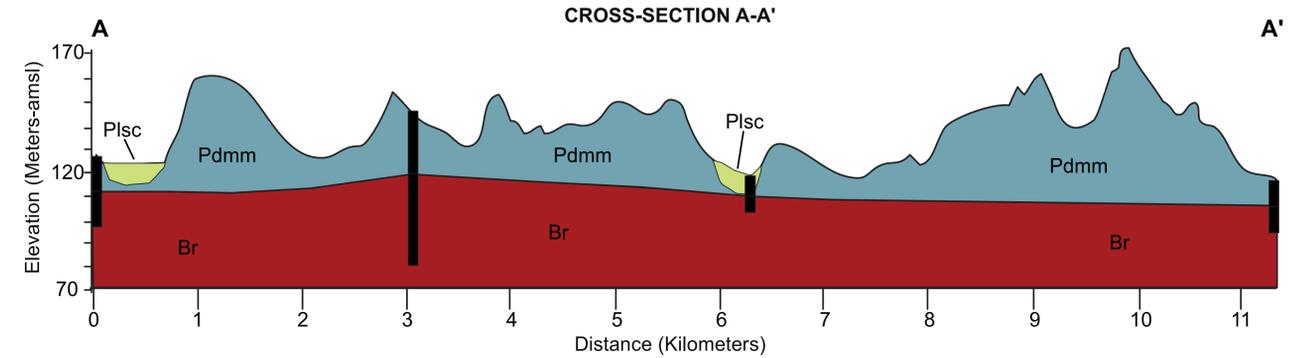
Plsc Silt and Clay (Psc)
Stratified, fine-grained sediment consisting of fine sand, silt and clay size particles. Inferred to be deposited in mid shore to deepwater settings of glacial lakes. May include marl, rhythmites, and varves.

Pics Cobbles to Sand (Pics)
Stratified ice contacted deposits, variable coarse-grained sediment consisting of boulders to sand size particles. Inferred to be deposited along an ice-margin. May include, interbedded coarse lenses of gravel and clast supported diamictons (flow tills).

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.

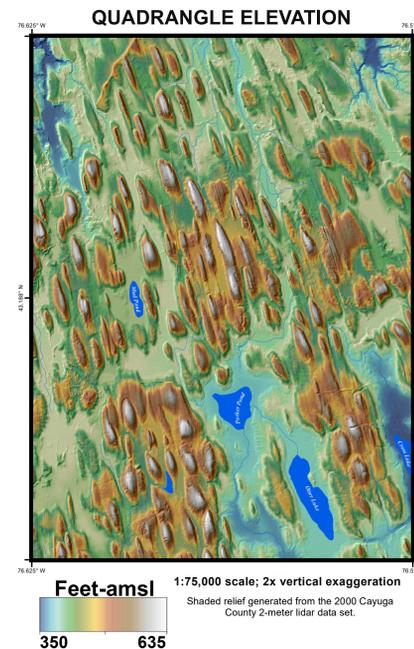
Pdmm Diamicton (Pdmm)
An admixture of unsorted sediment ranging from clay to boulders. Generally matrix supported, massive and clast-rich.

SYMBOLS



ADJOINING QUADRANGLES

Fair Haven	Hannibal	Fulton
Victory	Cato	Lysander
Montauk	Weedsport	Jordan



SURFICIAL GEOLOGY OF THE CATO 7.5-MINUTE QUADRANGLE, CAYUGA COUNTY, NEW YORK

Nathan Hopkins
2012

NOTICE
This geologic map was funded in part by the USGS National Cooperative Geologic Mapping Program EDMAP Grant award in the year 2012.
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.
While every effort has been made to ensure the integrity of this digital map and the factual data upon which it is based, the New York State Education Department ("NYSED") makes no representation or warranty, expressed or implied, with respect to its accuracy, completeness, or usefulness for any particular purpose or scale. NYSED assumes no liability for damages resulting from the use of any information, apparatus, method, or process disclosed in this map and text, and urges independent site-specific verification of the information contained herein. Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by NYSED.