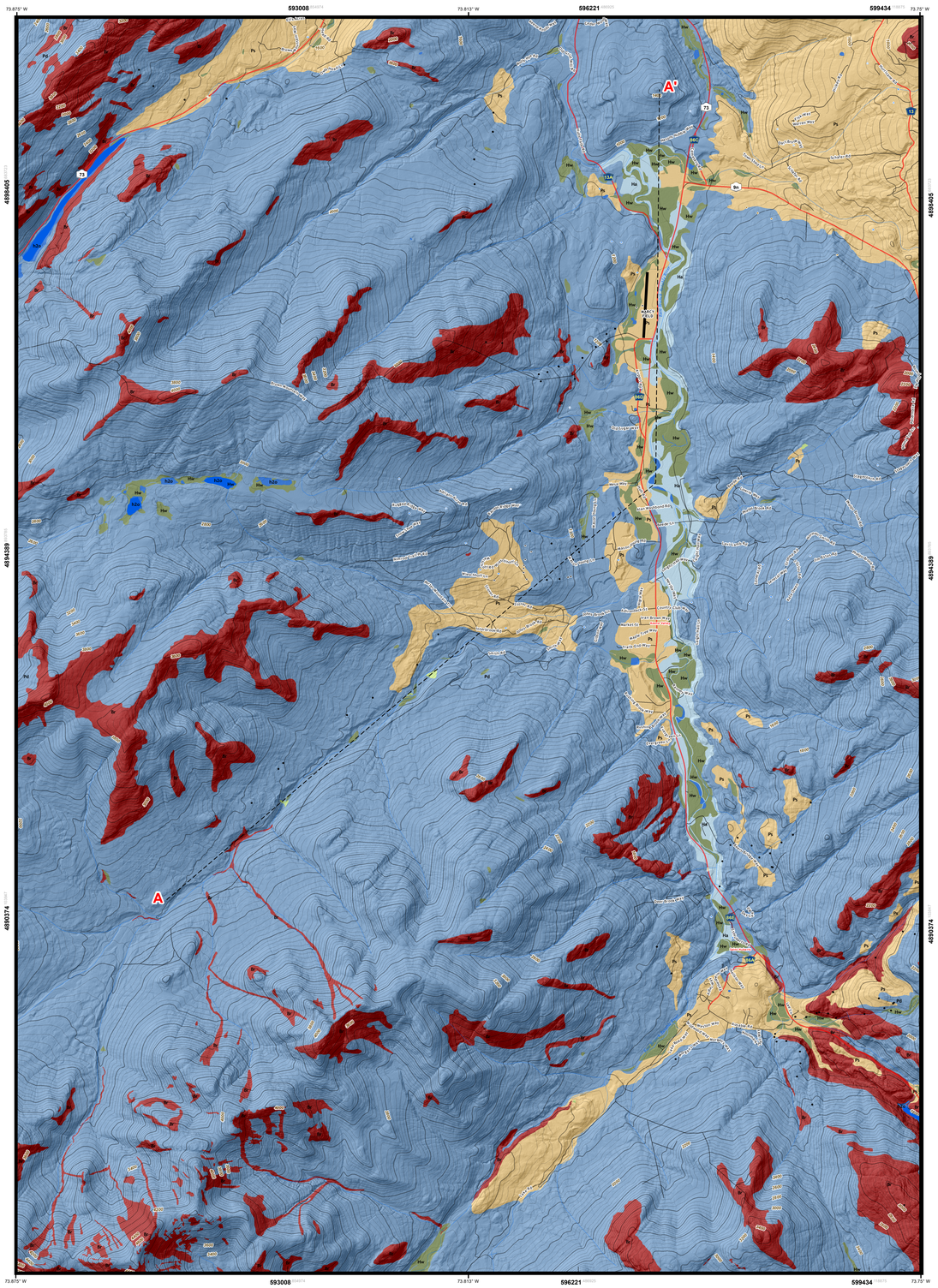
New York State Museum
Mark Schaming, Director

New York State Geological Survey

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

prepared by
Andrew Clift and Brandon Graham

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



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

Hygrology, and planimetry layers from the New York State DOT Raster Quadrangle for Essex County (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 2015 USGS Clinton Essex and Franklin 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

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

Geologic mapping by A. Clift and B. Graham, 2013.
Digital data and cartography by B. Bird, A. Clift, and K. Backhaus 2013 & 2019.

UTM GRID AND 2016 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

Introduction
The Keene Valley 7.5-Minute Quadrangle is located in the High Peaks region of the Adirondack Highlands physiographic subdivision of New York State. This area is characterized by broad, prominent peaks and steep mountain ridges with a dominant northeast-southwest trend. Seven of the mountains in this quadrangle stand over 4,000 feet above sea level (ASL), the highest being Gothics Peak at 4,736 feet ASL. The East Branch Ausable River trends north-south through this quadrangle and drains northward from its source at the Upper and Lower Ausable Lakes, located in the Ausable Valley immediately south of the Keene Valley Quadrangle. Major tributaries to the East Branch Ausable River within this quadrangle are Putnam Brook, Roaring Brook, Johns Brook, Phelps Brook and Slide Brook.

The bedrock geology of the Keene Valley Quadrangle consists primarily of Precambrian meta-anorthosite. The structural deformation of the bedrock is primarily associated with the Grenville Orogeny (1,250-980 M.a.) and is a dominant topographic control throughout the quadrangle. This is most notably observed by the north-south East Branch Ausable River valley, and adjacent northeast-southwest trending ridges and valleys.

During the Pleistocene, this region was intermittently covered with continental glaciers based upon evidence of glacial lake features and till. Glacial lake features include stratified silts, clays, and sands, associated with deltaic landforms and terraced lake levels. Diamicton is found throughout the area and varies from predominantly loose, brown medium sand containing some silt and gravel to compact, poorly sorted clayey/silty/ very fine sand matrix supported diamicton with gravel to boulder clasts. One location near the summit of Gothics Mountain contained a packet of dark gray/blue over-consolidated silty clay matrix supported diamicton with angular pebble gravel clasts. Rotational slumps, translational slumps, rock slides, and debris falls and slides along with other slope hazards are found in abundance throughout the quadrangle.

The Ausable Club Delta Complex is located near St. Huberts in the southwest corner of the quadrangle. Multiple lake levels are present in this narrow valley as evidenced by a series of lake deltas. The deltas are characterized by their sandy facies with dipping foresets and clay bottom sets

Johns Brook is a tributary into the west side of the Ausable River. Measuring approximately 19 km (12 miles) with a recharge area of approximately 100 km2 (37 miles2), Johns Brook's difference in elevation is 1000m. After heavy erosional events such as Hurricane Irene in 2011, large sections of sediment have been exposed or re-excavated for inspection. Several exposures were observed and documented in the production of this map.
Along the northern side of the brook at an elevation of 610m, is a 40m thick exposure of stratified silt/clay and sand. The location contained deformed sediment in the form of folding and faults. At the base, heavily weathered rock is present that exhibits spheroidal weathering rinds and likely represents an unmodified pre-glacial surface. Positioned immediately above, matrix supported diamicton is draped by compacted and partially cemented, cm scale, clay/silt rhythmites exhibiting deformation. This 10-20m thick package of rhythmites transitions into layered sand and eventually apparent massive sand. This clay/silt and sand package provides some of the best documentation of the vertical and lateral extent of large glacial lakes having occupied the Keene Valley.
An exposure 2.5 km downstream exhibited compacted stratified silt/clay overlain by dense fine sand at the level of the river. Positioned on top is an imbricated boulder/cobble deposit with measured direction of flow downstream. Interlaced amongst the boulder/cobble are layers of oxidized coarse sands. Distinctly capping this feature by an unconformity is an apparently unorganized deposit of boulder/cobble that stretches northwest as a linear ridge.

Putnam Brook is a tributary into the east side of the Ausable River. Measuring approximately 7.25 km (4.5 miles) with a recharge area of approximately 11 km2 (4.3 miles2), and difference in elevation of approximately 550m, creating a steep gradient. At the eastern most extent of the river in the quadrangle, a large translational landslide has formed. The landslide is active between 600-650m elevations and is composed of compacted matrix supported diamicton at the base with stratified sands, gravel and cobble on top. The landslide has been reported visible for the past 20 years and has continued to grow. The toe of the slump is continuously advancing into the Putnam Brook and creates a pool behind the toe.

Adrian's Acres Road, located at the base of Little Porter Mountain, has experienced a rotational slump with an area of 82 acres, and is currently considered the largest, naturally occurring landslide in New York State recorded history. The slump began significant movement in May 2011 after a wet fall, heavy snow load winter and intense spring precipitation. Located at the head scarp are several homes along Adrian's Acres road. The landslide continues to the base of the slope were currently a well-defined, multi-lobate toe is present. The slump is composed of stratified silts and sand. Borings done by NYSGS on site were drilled to 25m through sand without hitting bedrock, even though rock outcropped 100m away. Also, weathered evidence of previous landslides of similar magnitude is apparent in the proximity of the current slump. Therefore, this area is geologically sensitive, and better characterization and understanding of the geology of this location likely could have provided geologic insight to builders and land owners developing building sites on valley slopes.

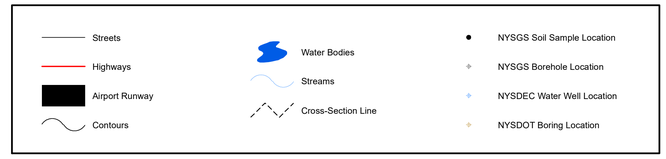
Owls Head, located at the northern extent in the center of the map, is a bald bed rock prominence of anorthosite. A relatively short hike, this peak is a good vantage point for a view of the valley. At the base of the trail, a road cut exhibits stratified sand over matrix supported diamicton with an elevation of 510 m. Proceeding up the trail, the sand contact quickly disappears and transitions into a loose, sandy diamicton. At numerous spots along the trail, small bedrock outcrops protrude out with a layer of gravel scattered across the surface. This gravel is composed of various lithologies not characteristic of the mountain area including gneiss, sandstone, and quartzite. This mixed lithology gravel washout from glacial till that was once deposited on the now bald prominence. The gravel is also found in limited number on the peak. Another possible explanation is from human or animal transport, as is a case on the peak of Cascade to the west, but that is for the creation of borders around delicate alpine plants which are not present on the low peak.

The geology observed throughout the mapping area consisted of diamicton of either glacial till of colluvium in origin. Deposits of glacial sands and clays are apparent in discrete packets along with deltaic deposits. Landslides of various styles are numerous throughout the quad, and some are associated with the deposition of lake sediments on valley walls.

Cross-Section 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 proximal to a ranger station along the Johns Brook, trends north-east into the East Branch Ausable River Valley, and then extends directly north to the summit dome of Beede Hill. The surficial geology is comprised primarily of Pleistocene diamicton with localized occurrences of high-elevation silts, clays and sands. Lower elevations exhibit stratified silt, sand and gravel accumulated from more recent Holocene alluvium. Surficial cover is relatively thin throughout the cross section, with a maximum thickness of approximately 30 meters to bedrock. Surface topography is heavily dependent on bedrock control.

SYMBOLS



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

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

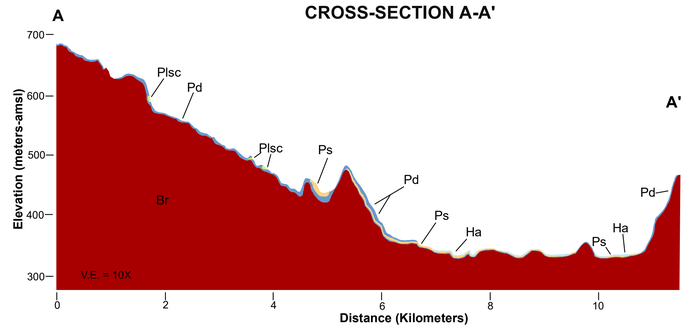
Plsc — **Silt and Clay (Psc)**
Stratified, fine-grained sediment consisting of fine sand, silt and clay size particles. Inferred to be deposited in mid shore to deepwater settings of glacial lakes. May include marl, rythmites, and varves.

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

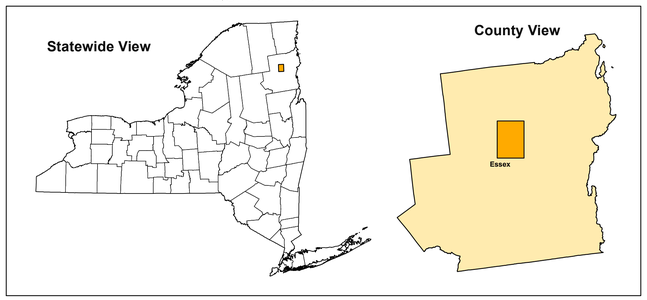
Pre-Pleistocene

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.

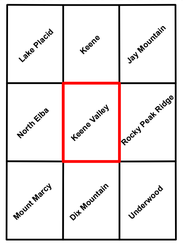
CROSS-SECTION A-A'



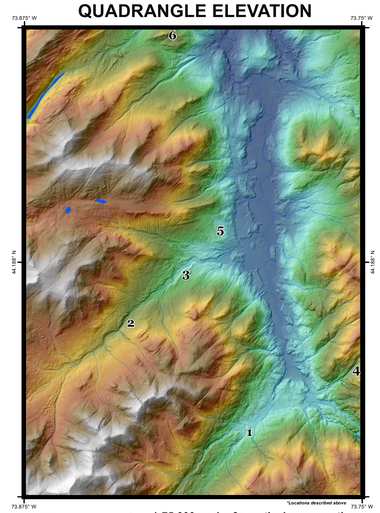
QUADRANGLE LOCATION



ADJOINING QUADRANGLES



QUADRANGLE ELEVATION



Feet-amsl
850 4735

1:75,000 scale; 2x vertical exaggeration

Shaded relief generated from 2015 Clinton Essex and Franklin County 1m lidar data set by the United States Geological Survey.

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