

SURFICIAL GEOLOGY OF THE HANCOCK 7.5-MINUTE QUADRANGLE, BROOME AND DELAWARE COUNTIES, NEW YORK

prepared by
Jamers R. Leone and Karl J. Backhaus

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Introduction

The geology of the Hancock 7.5-minute Quadrangle was mapped during 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, with a small section of Broome County on the west shore of the West Branch of the Delaware River. The purpose of this map was to identify and delineate various geologic formations in the Hancock Quadrangle with the intent that this information can guide the National Parks Service and municipalities in land use, environmental, and natural resource decisions. The Hancock Quadrangle is within the Southern Tier of New York along the state border with Pennsylvania. The Town of Hancock and the Town of Deposit are within the quadrangle. 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.

The confluence of the West and East Branches of the Delaware River is in the quadrangle at the southern end of Point Mountain in the Village of Hancock. Situated at the western edge of the Catskill Mountain physiographic province the landscape varies from floodplain in the Delaware River Valleys to mountainous topography. The highest elevation is at 2,050 feet, or 626 meters, above mean sea level (amsl) in the northeastern portion of the quadrangle with the lowest elevation being 859 feet, or 262 meters, where the Delaware River exits the map to the south. The sediments found in the quadrangle includes sand, gravel, diamicton (interpreted as glacial till) and bedrock exposed throughout the quadrangle.

The portions of the Hancock 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. Outside of the UDSRR is made up of mountains and valleys with bedrock exposures on the valley walls and summits. A feature of note is Point Mountain, this hill is known as an unlaufberg, as it is a bedrock hill surrounded on all sides by unconsolidated sediments. It is possible that one of the East or West Branches of the Delaware River flowed over what is now land in the Village of Hancock, north of Point Mountain, before meeting up with the other branches of the Delaware River. The change in the rivers course could be related to glacial ice blocking off the northern pathway causing the river to cut a new channel through the rock.

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 are some quartz pebble conglomerate beds and there is the 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 during the 2016 and 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 or within quarry/sand and gravel pits. Sample collection was also taken with a two-meter long hand auger to collect samples below the soil layer where possible. A total of 11 observation points were made during the mapping process, with 6 samples collected for grain size analysis. Two wireline rotary cores were collected in the floodplain adjacent to the Delaware River.

Water wells (2 in total) from the Department of Environmental Conservation, engineering boreholes (21 in total) by the Department of Transportation, and Exploratory Boreholes (2 in total) by the New York State Geological Survey were also used to decipher the subsurface geology of the Hancock quadrangle. The subsurface data from these wells were simplified using the drillers descriptions to more standard and uniform descriptions. The location, thickness and depths of all lithologies were also recorded and used to create cross-sections and 3D borings logs within the quadrangle.

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

Artificial Fill (Af)

This material is found throughout the Village of Hancock within the quadrangle. This lithology is generally composed of coarse/fine, large cement mounds and/or crushed rock anthropogenically transported and used for construction purposes.

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 areas along the three sections of 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 is upwards of 130ft thick in the valleys. Psg is found within the east-west oriented valleys of the West and East Branches of the Delaware River.

Pleistocene Diamicton (Pd)

This unit is a mixture of sediment grains that range from clay to boulders in size. In this quadrangle, all diamicton is interpreted to be glacial till, sediment deposited directly beneath the glacier. This material is found on the lower slopes of the hillsides. It is generally matrix supported, sand-dominant, and tan and reddish brown in color.

Summary and Discussion

The Hancock Quadrangle located in the New York State's Southern Tier on the western edge of the Catskill Mountains. The region is like the surrounding Catskill Mountains with greenish blue to dark gray sandstones with zones of crossbedding and red shales of the Devonian Period Catskill Deltas making up the bedrock of the mountains. The light brown to reddish brown diamicton, till, is deposited along the slopes of the mountain sides, shorter hilltops could be till covered as well. Sand and gravel deposits in the form of kame terraces and hummocks is found in the valleys of the East and West Branches of the Delaware River. The valley of the main branch of the Upper Delaware River is primarily alluvium floodplain deposits. The wireline core collected by the NYSGS in 2017 shows that there is till below what could be lacustrine clays, silts and fine sands. The lacustrine sediments could represent a glacial lake, possibly even Lake Sparrow Bush that is described in the Port Jervis North Quadrangle (Leone and Backhaus, 2019).

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DESCRIPTION OF MAP UNITS

Holocene

Af

Artificial 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-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

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 former ice margins.

Pd

Diamicton (Pd)

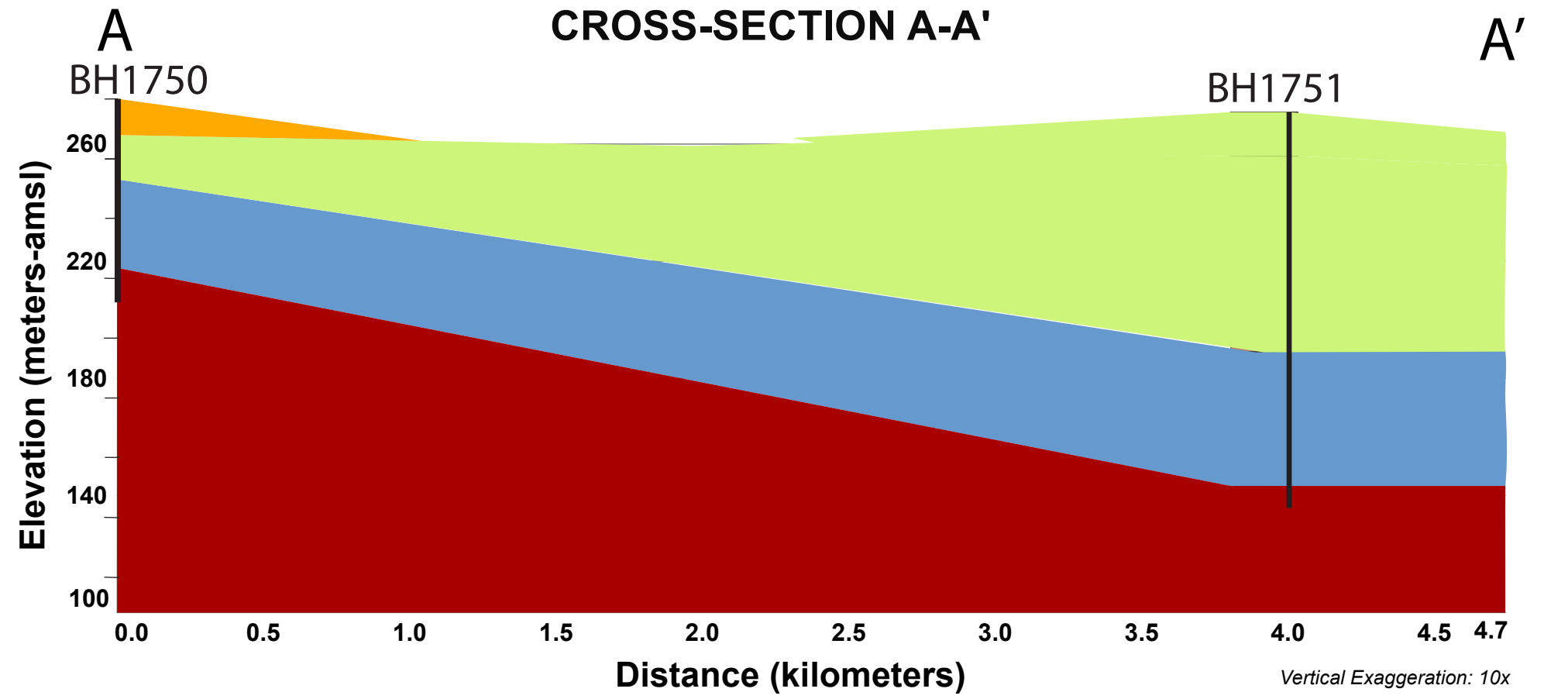
An admixture of unsorted sediment ranging from clay to boulders. Generally matrix supported, massive and clast-rich, and interpreted to be glacial till.

Pre-Pleistocene

Br

Bedrock (Br)

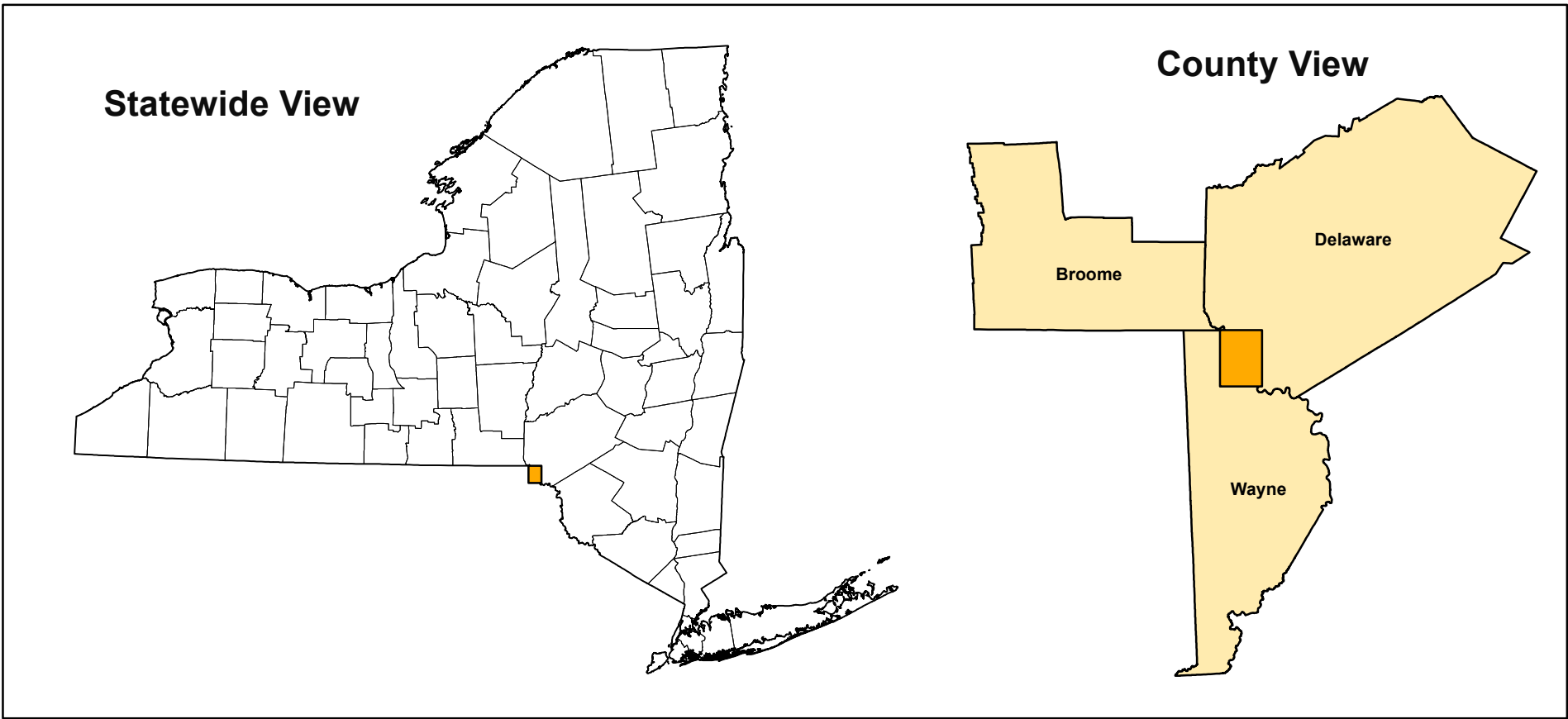
Non-glacially derived, hard rock, pre-pleistocene in age. May be covered up to a meter in diamicton, sand and gravel, or sand and clay in areas marked as Br.



SYMBOLS

Streets	County Line	Cross-Section Line	NYSDOT Boring Location
Highways	Water Bodies	NYSGS Soil Sample Location	NYSEDC Oil & Gas Well Locations
Railroads	Streams	NYSGS Borehole Location	Umlaufberg
State Line	Contours	NYSEDC Water Well Location	

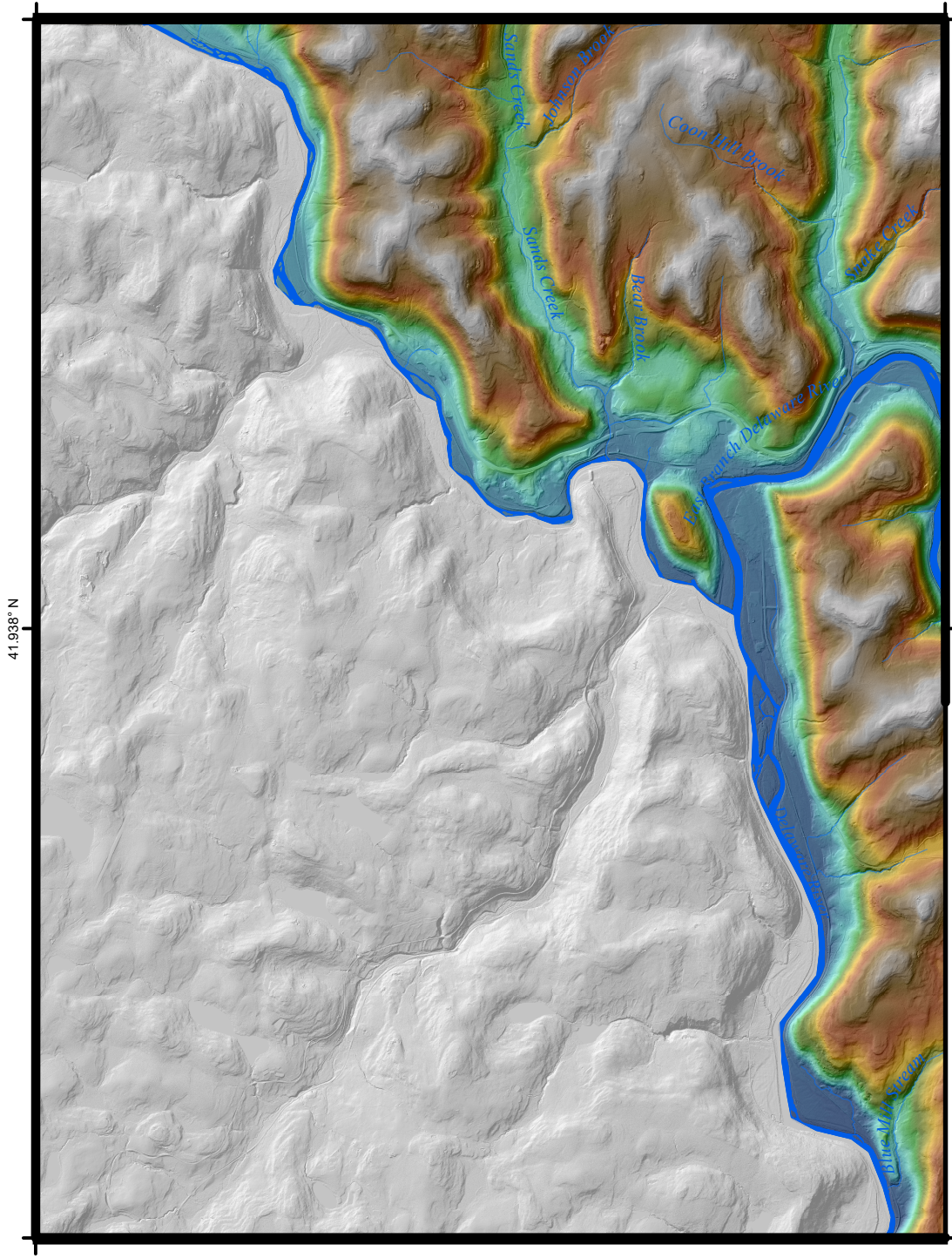
QUADRANGLE LOCATION



ADJOINING QUADRANGLES

Deposit	Chenango River	Reuben
Saratoga	Hancock	Fiske City
Oran	Lake Umbagog	Long City

QUADRANGLE ELEVATION



NOTICE

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