

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

prepared by
Jamers R. Leone and Karl J. Backhaus

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Introduction

The geology of the Callicoon 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. The purpose of this map was to identify and delineate various geologic formations in the Callicoon Quadrangle with the intent that this information can guide the National Parks Service and municipalities in land use, environmental, and natural resource decisions. The Callicoon Quadrangle is within the Catskill Region of New York near the state border with Pennsylvania. Much of the quadrangle is in Sullivan County, and a small portion in the north in Delaware County. The towns of Fremont, Delaware, Callicoon Sullivan County, and Hancock, Delaware County are the municipalities that makes up the quadrangle and include the hamlets of Long Eddy, Hankins, Callicoon, Fremont, Hortonville, and North Branch. 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 southern 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 2,004 feet, or 611 meters, above mean sea level (ams) in the northeastern portion of the quadrangle with the lowest elevation being 735 feet, or 224 meters, where the Delaware River exits the quadrangle to south. The sediments found in the quadrangle includes sand, gravel, diamicton (till) and bedrock exposed throughout the quadrangle.

The portions of the Callicoon Quadrangle within the boundaries of the UDSRR, consist primarily of exposed bedrock, sand, gravel, till, and alluvium on the floodplain of the river and stream valleys. The New York portion of the quadrangle is located north and east of the Delaware River. The Delaware River Valley, Basket Brook, Hankins Creek, and Callicoon Creek, all have deposits of stratified sand and gravel on the banks above the floodplains. The summits and ridges are mostly topped with bedrock. Till is deposited in the valleys and lower slopes of the mountains.

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 in 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 104 observation points were made during the mapping process, with 46 samples collected for grain size analysis. Four Geoprobe samples were collected of Kellams Bridge Road 13 meters in elevation east of the Delaware River.

Water wells (38 in total) from the Department of Environmental Conservation, engineering borings (12 in total) from the Department of Transportation and exploratory boreholes (4 in total) by the New York State Geological Survey were also used to decipher the subsurface geology of the Callicoon Quadrangle. The subsurface data from the well set were 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.

Diamict Colluvium (Hdc)

Unsorted and unstratified deposit of gravel, sand, silt, clay, with boulders/cobbles possible. Described as a mass-wasting deposit at the base of steep hillslopes and cliffs as part of a slump or hillslope failure. A small portion of a meander in the East Branch of the Delaware has been identified as slope failure.

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 the on the near the banks of the Delaware River along with the tributaries.

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 most valley walls and lower slopes of this mountainous quadrangle. It is generally matrix supported, sand-dominant, and tan and reddish brown in color.

Summary and Discussion

The Callicoon Quadrangle located in the New York State's Catskill Mountains. The region 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 along the slopes of the mountain sides. The stream valleys may have contained some stagnant ice left behind by retreating glaciers. This is inferred by the sand and gravel deposits that make up the hummocky topography on the sidewalls of the valleys. An OSL sample was collected from 13 meters above the Delaware River in the sand and gravel deposit. The returned date may give some guidance as to when glacial retreat took place in the in the quadrangle.

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DESCRIPTION OF MAP UNITS

Holocene

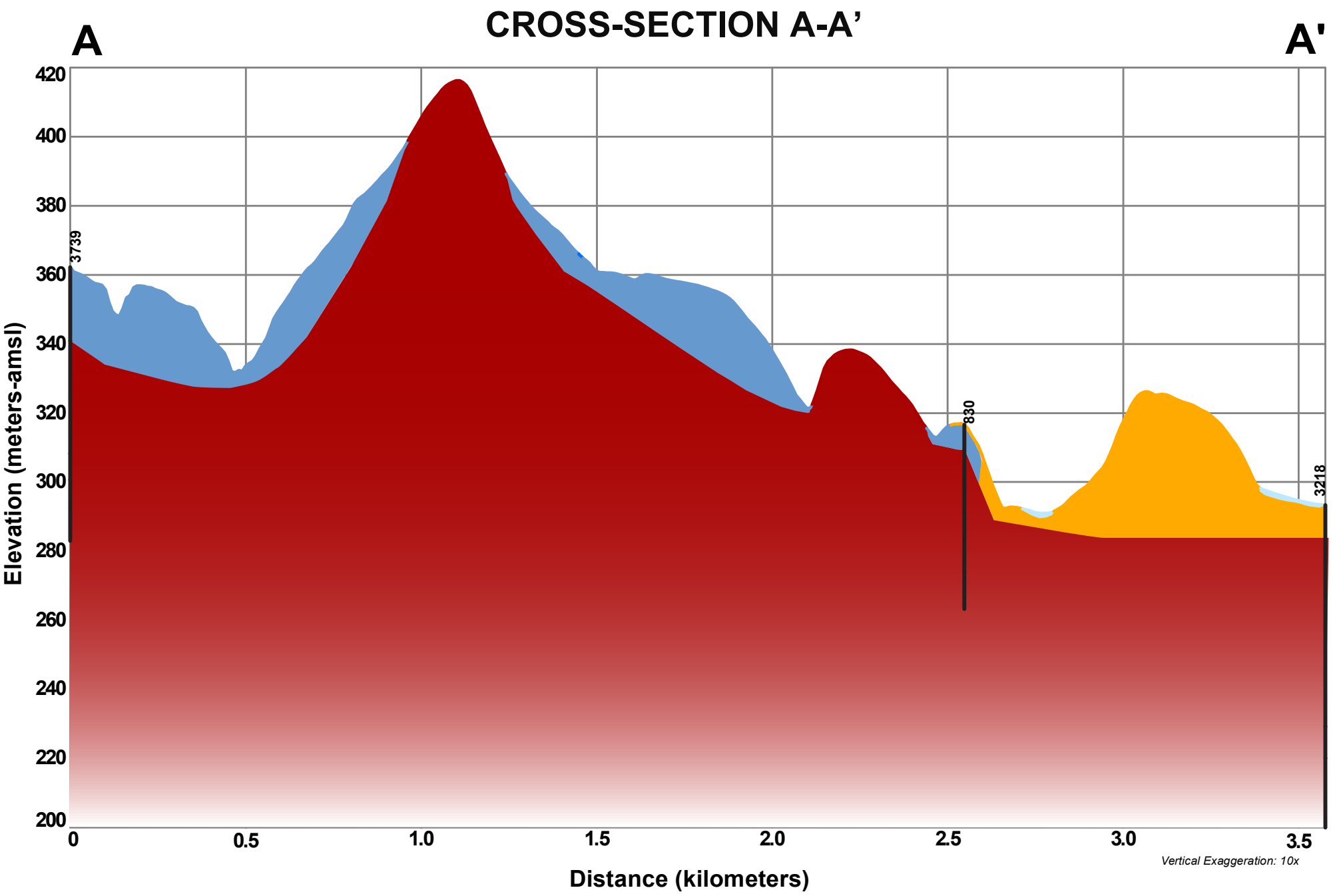
Ha	Stratified silt, sand and gravel (Ha) Sorted and stratified silt, sand, and gravel, deposited by rivers and streams. May include cobbles and boulders. Inferred as post-glacial alluvium and includes modern channel, over-bank and fan deposits
Hw	Wetland Deposit (Hw) Peat, muck, marl, silt, clay or sand deposited in association with wetland environments. Various sediments can be present at transitional boundaries from one facies to another
Hdc	Diamict Colluvium (Hdc) Unsorted and unstratified deposit of gravel, sand, silt, clay, with boulders/cobbles possible. Described as a mass-wasting deposit at the base of steep hillslopes and cliffs as part of a slump or hillslope failure.

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

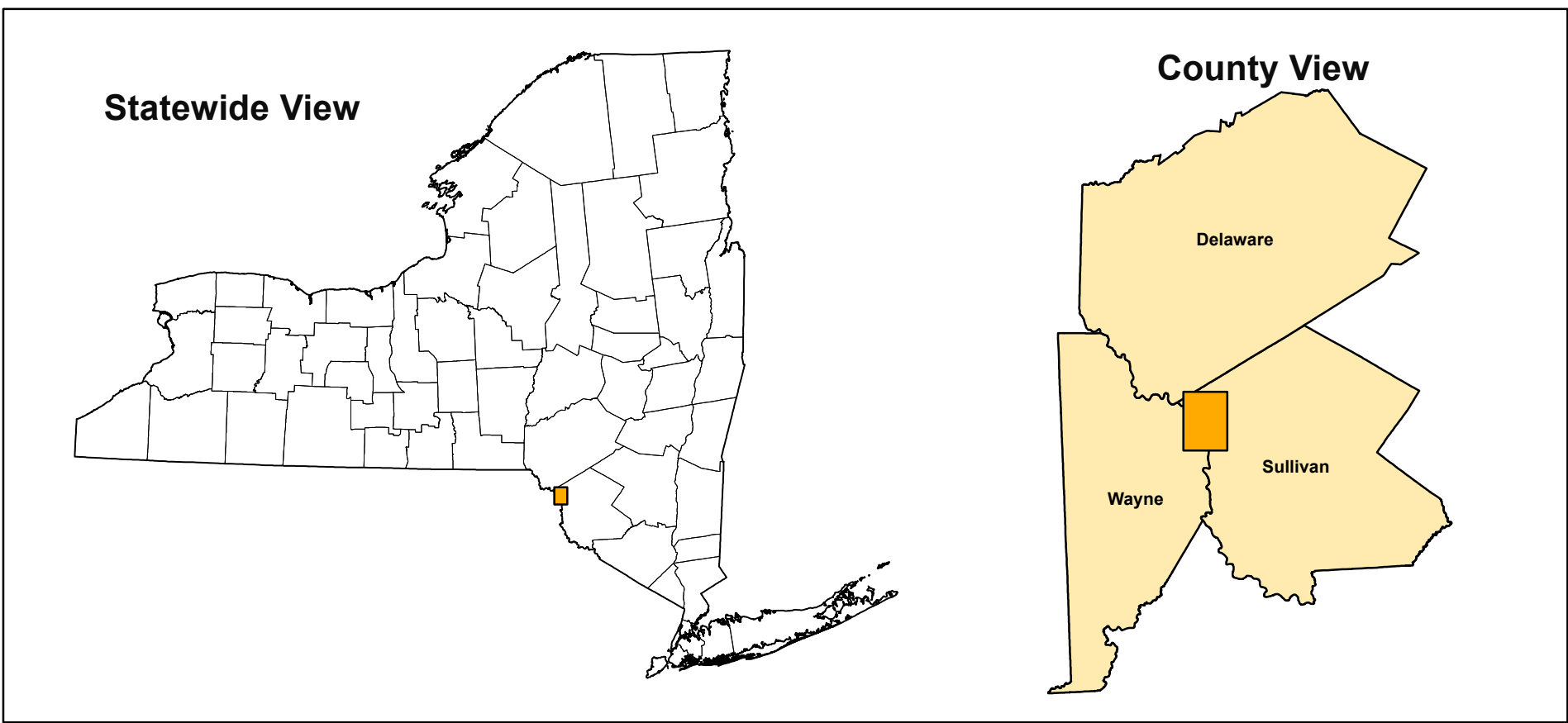
Br	Bedrock (Br) Non-glacially derived, hard rock, pre-pleistocene in age. May be covered up to a meter in diamicton, sand and gravel, or sand and clay in areas marked as Br.
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SYMBOLS

Streets	County Line	NYSGS Soil Sample Location
Highways	Water Bodies	NYSGS Borehole Location
Railroads	Streams	NYSDEC Water Well Location
State Line	Contours	NYSOT Boring Location
	Cross-Section Line	

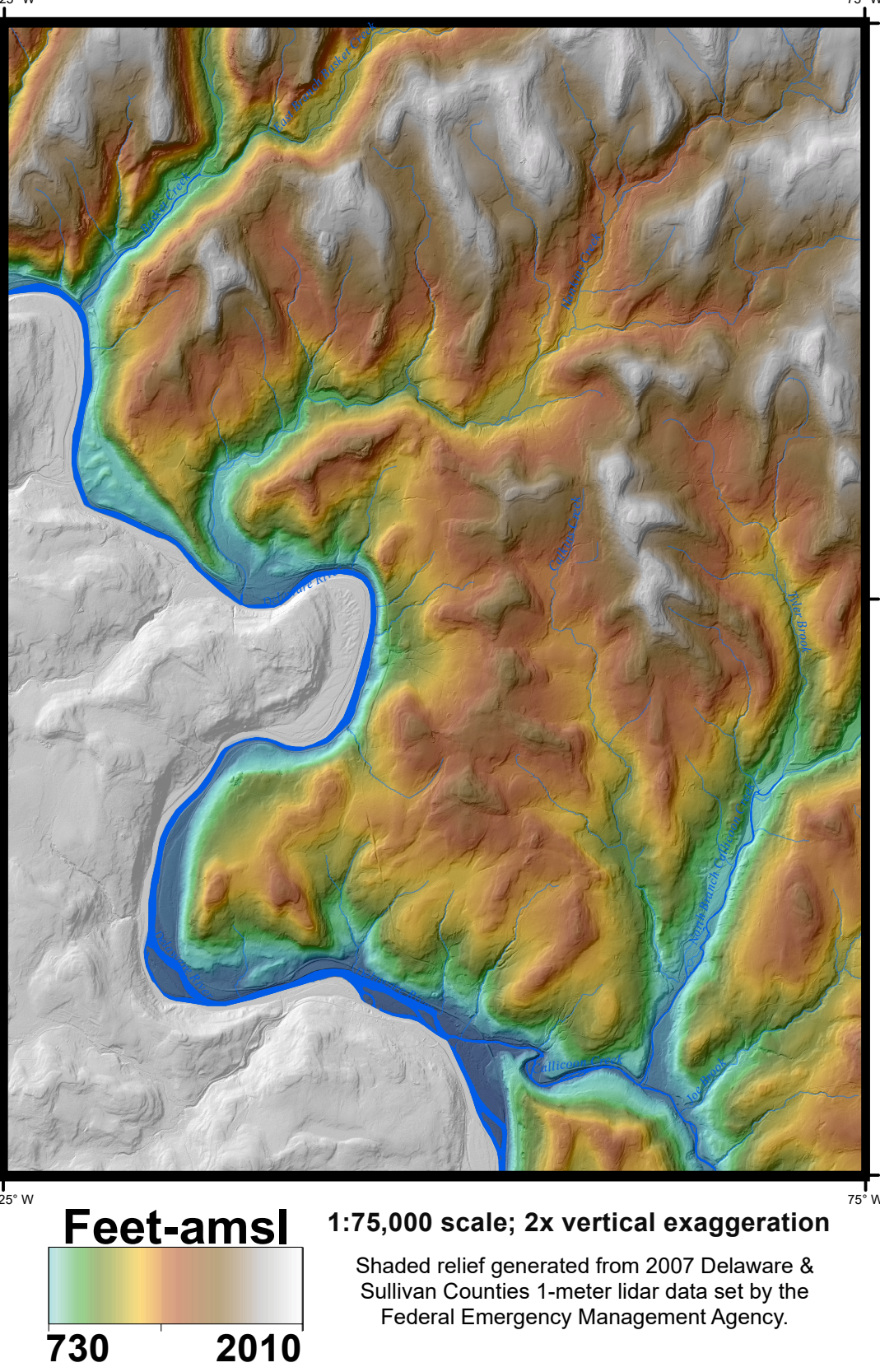
QUADRANGLE LOCATION



ADJOINING QUADRANGLES

Fishes Eddy	Horton	Roscoe
Long Eddy	Callicoon	Jeffersonville
Galilee	Danvers	Lake Huntington

QUADRANGLE ELEVATION



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NOTICE

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