B5: GLACIAL FEATURES AND THE "GREAT DIVIDE" BETWEEN WATKINS GLEN AND ITHACA

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Glacial features are generally studied on the large-scale, just as glaciers are naturally large. Here we look at some features in a small valley in the Finger Lakes Region of upstate New York that are interesting because they were developed by the interaction and possible collisions of ice and meltwater forces on a larger scale when the Valley Heads Moraine was formed. In this study we are looking at conditions that began in approximately 15,000 years cal BP.

The area of study starts in the Susquehanna River Valley in south-central New York State (Figure 1), to the south of the Valley Heads Moraine (VHM). A tributary to the Susquehanna from Bath to Waverly, NY, is the Cohocton River that runs along the southwest side of the VHM at the bottom of the Finger Lakes. It merges with the Tioga River into the Chemung River in Corning, which continues eastward on the south side of Elmira, and joins the Susquehanna River south of Waverly, NY. While Horseheads, NY, sits on an alluvial plain just north of the Chemung, no significant river runs through the city today. Rather the alluvium was deposited by the ice sheet runoff over time, and one of the VH lobes ended just north the city (Figure1).

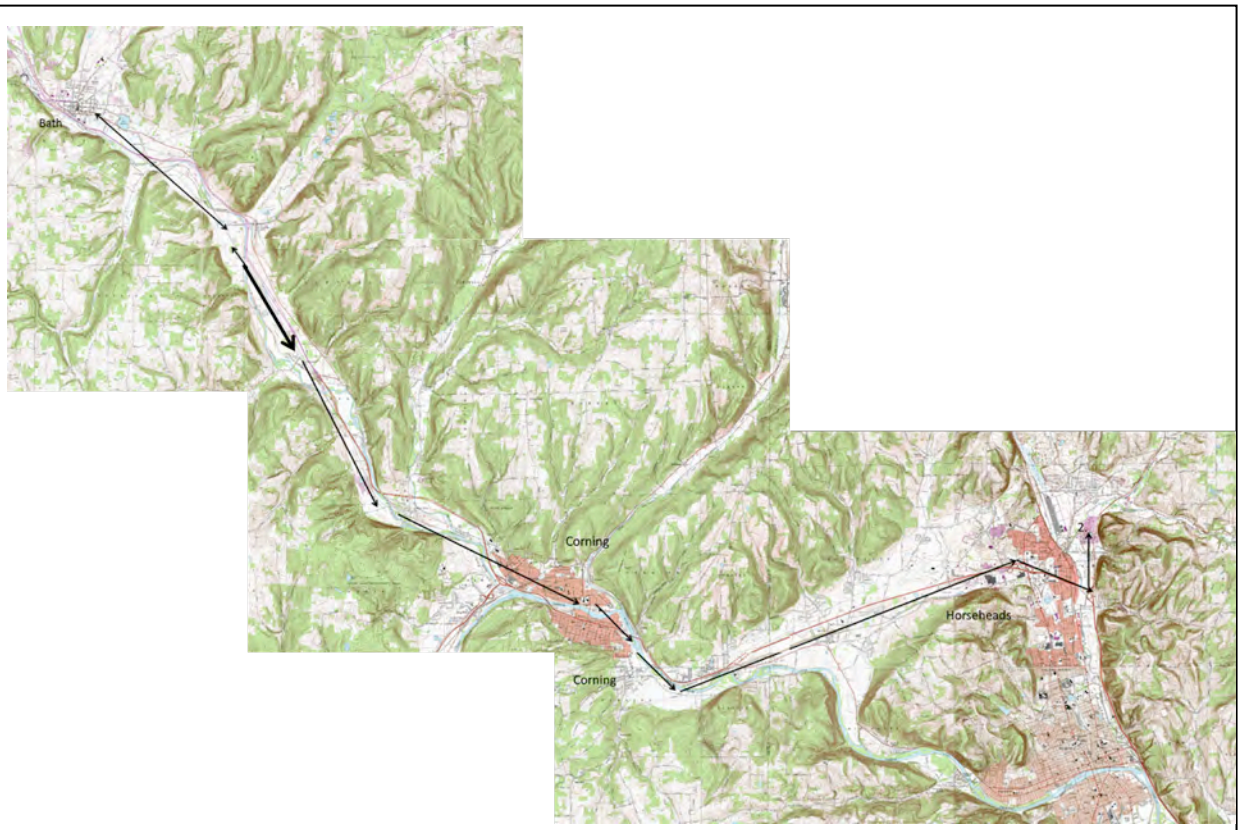

Figure 1. The route from Bath, along the Cohocton and Chemung Rivers, to Horseheads in south-central New York.

Latitude	Longitude	Stop or View Description
42.17397	-76.80574	STOP 2. Gravel pit

One glacial feature (#2, Figure 1) is a gravel pit in Horseheads. A large layer of logs was uncovered when the gravel pit was excavated in the mid-1970s. A report of this finding indicated that the company could

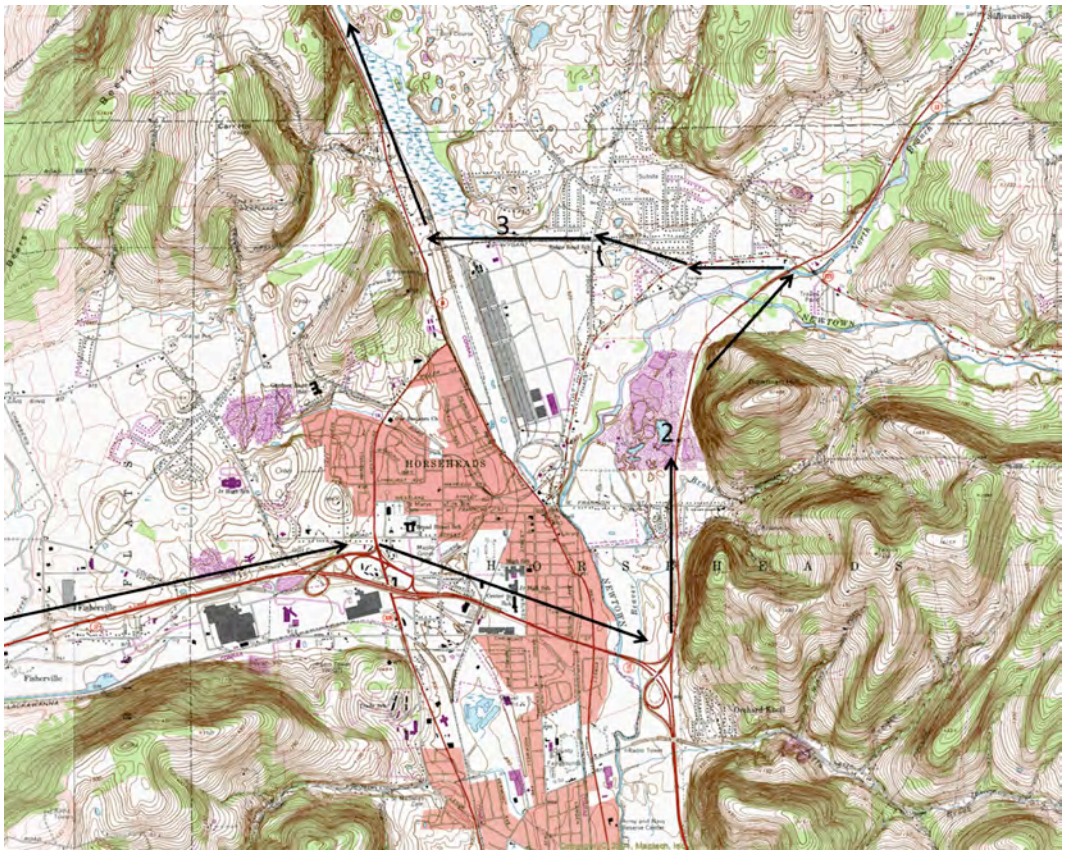

Figure 2. Horseheads, NY, where the Valley Heads Moraine is at its southernmost tip. Site 2 is a Gravel pit where many logs were found far below surface level, and are probably from before the Last Glacial Maximum. Site 3 is the southern tip of the moraine, where drainage basins meet. Streamflow to the south of the moraine goes into the Susquehanna River and north into Lake Ontario.

not dig any farther down and had tried to find someone interested in the logs, but with no response. Unfortunately that pit was no longer excavated, flooded in, and remains so to this day. The logs were most likely pushed down by ice flow, and could have been deposited before the glacier advanced over the valley, or earlier.

Latitude	Longitude	Stop or View Description
42.19017	-76.8979	STOP 3. Catherine Creek turns almost completely around

North of Wygant Rd in the same floodplain as the gravel pit is the southernmost point of Catherine Creek (#3 in Figure 2), where it does a rounded 175° turn to west, then north to drain into Seneca Lake.

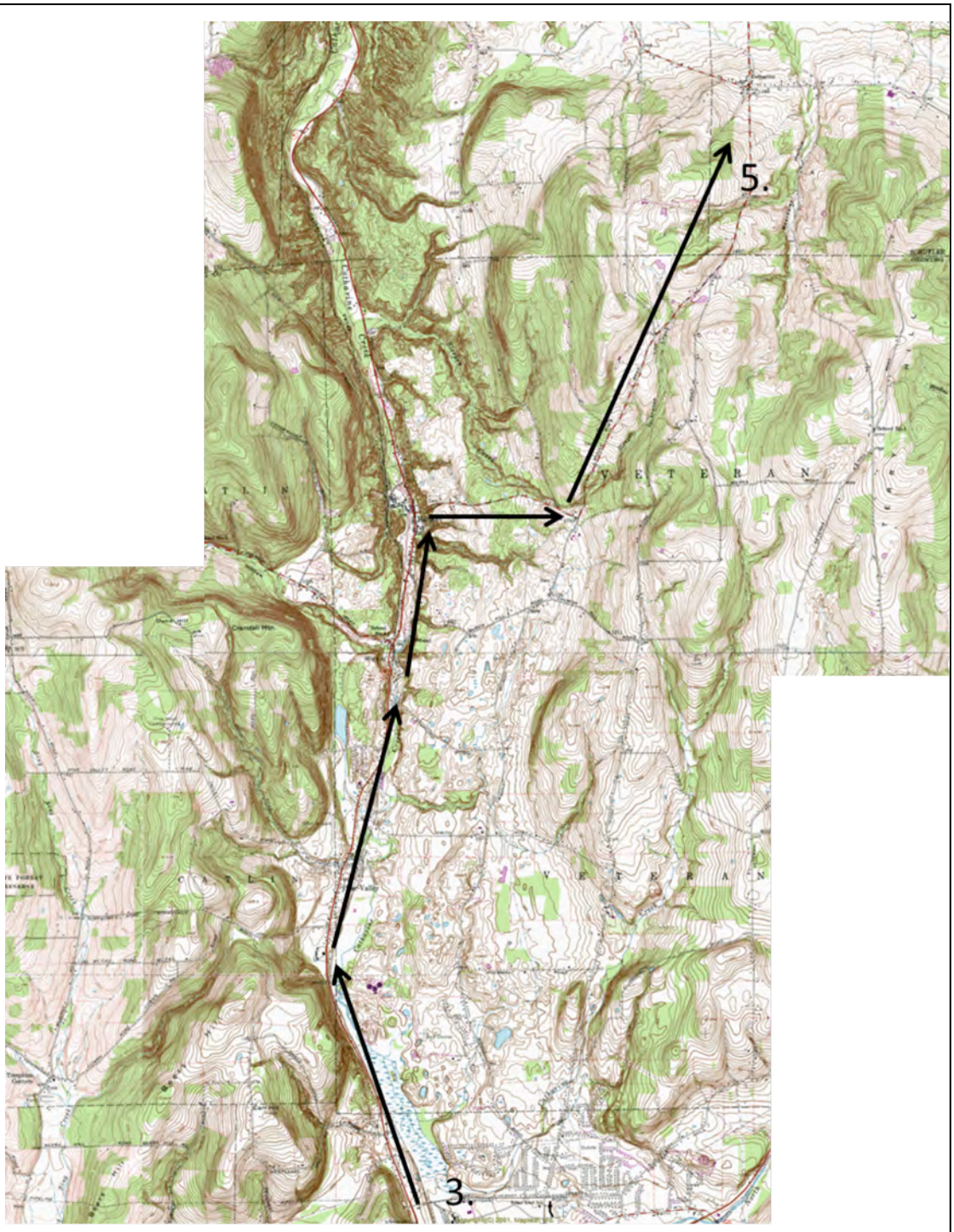

Figure 3. From the south tip of the VHM lobe (#3) to the area of mastodon site (#4) and the top of the VHM looking north (#5).

Latitude	Longitude	Stop or View Description
42.25206	-76.83596	STOP 4. Post Office near the Mastodon site

Within the Catherine Creek Valley is the Chemung mastodon site but it was not found in the creek itself, but above the valley in a small kettle pond in the vicinity of #4 (Figure 3). In general, mastodon sites in

upstate New York are small kettle ponds or small-scale alluvial plains in the VHM and on the Allegheny Plateau (Griggs and Kromer 2008). Definitive sites with at least some articulated bones have not been found in larger river valleys.

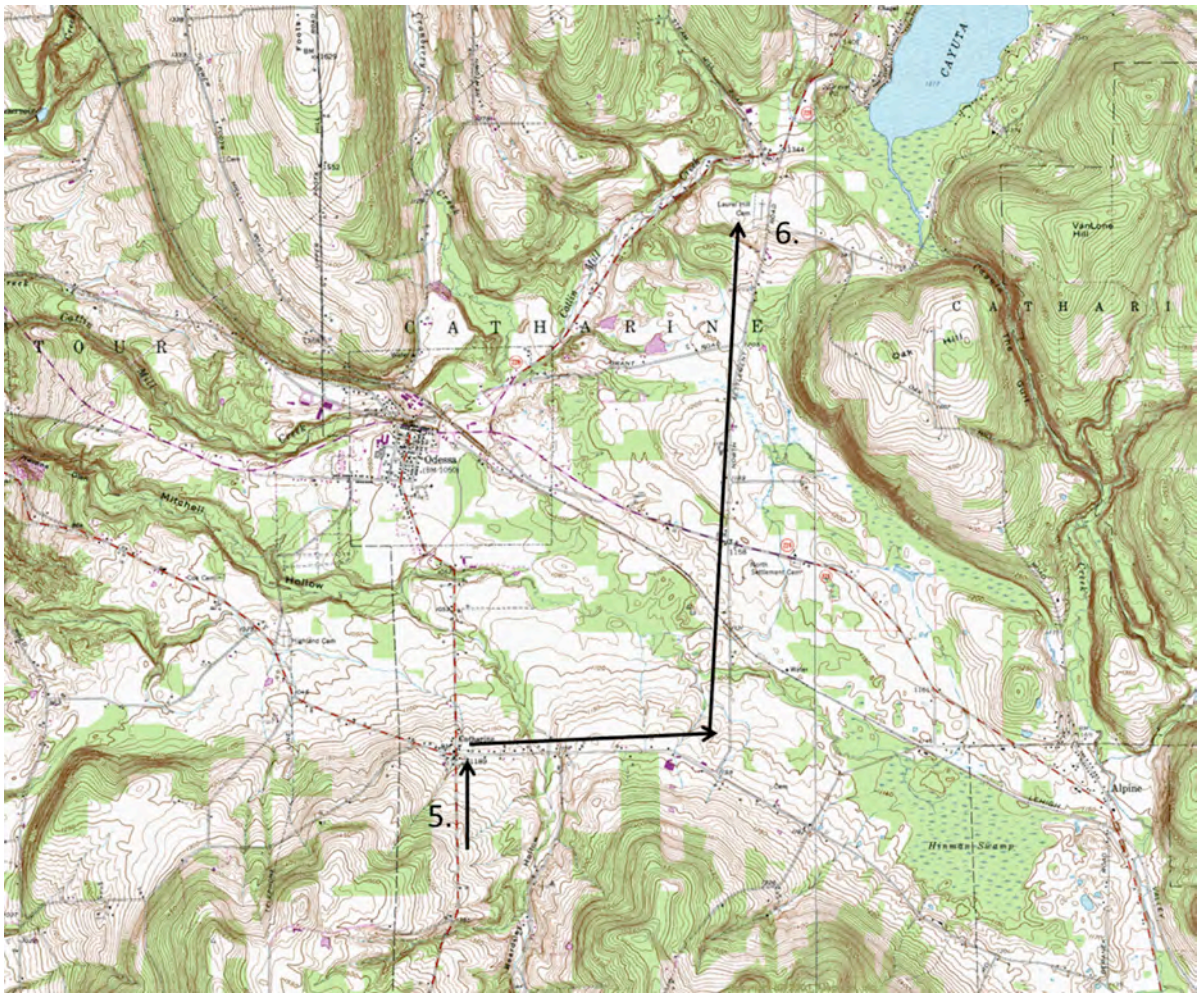

Figure 4. Locations of stops: #5 - overlook on top of VHM; #6 - dike on south side of Cayuta Lake.

Above the Catherine Creek Valley floor is the Valley Heads Moraine (#5; Figures 3, 4).

Latitude	Longitude	Stop or View Description
42.3059	-76.7847	STOP 5. Top of Valley Heads Moraine – complex

To the north is the town of Odessa, with streamflow from its immediate surroundings draining into Seneca Lake and Lake Ontario. Cayuta Lake (or "Little Lake") is in the valley beyond the two main hills to the N and NE. Going up that valley, which still drains into Lake Ontario, we come to an abrupt divide between the Lake Ontario drainage and the Susquehanna/Chesapeake Bay system. The divide is a dike (#6; Figure 5), formed by a moraine at the south end of the Cayuta Lake basin, and north side of the basin is essentially where the ice sheet split into two lobes (addendum, other map?).

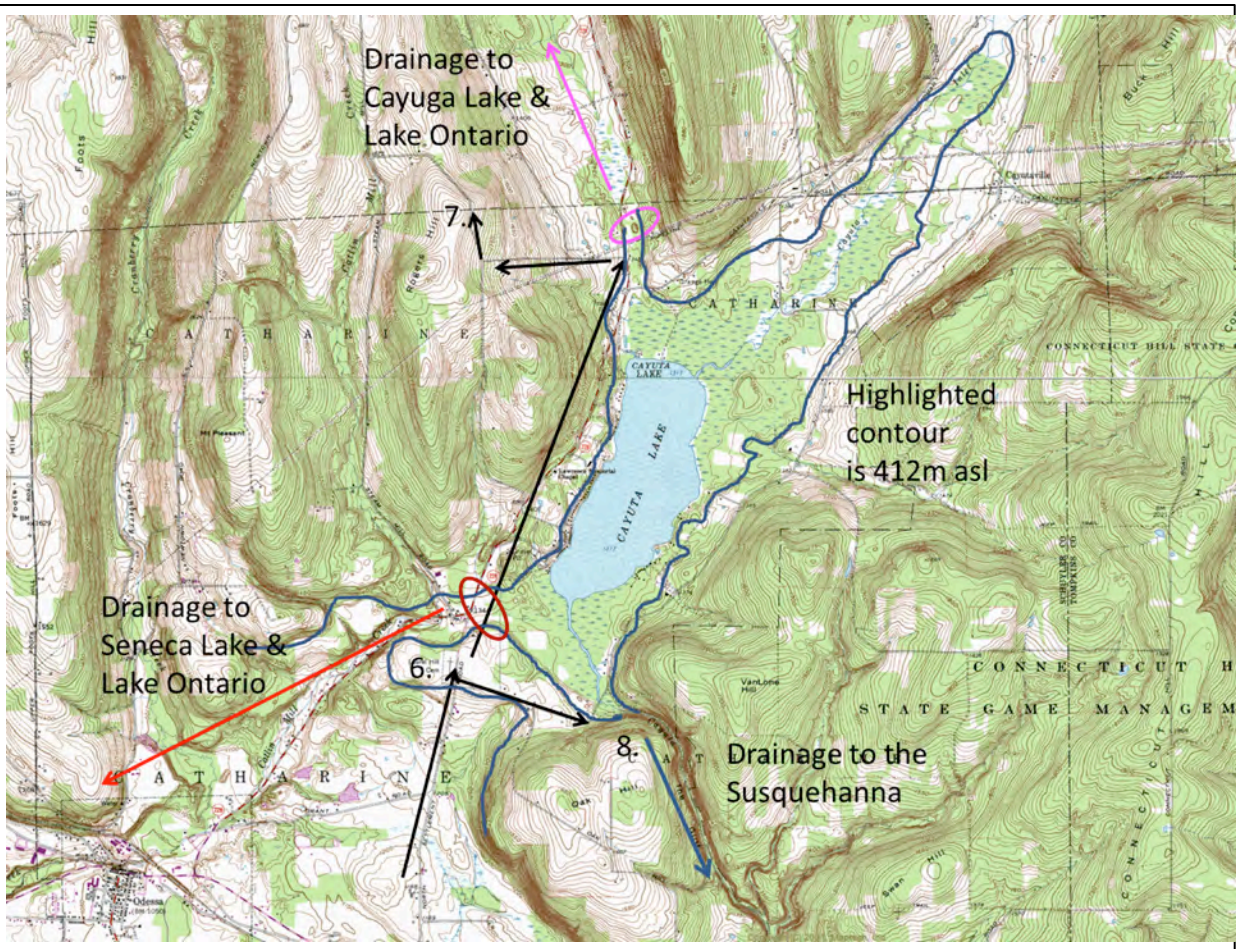

Figure 5. The Cayuta Lake basin. Stop #6 is on the dike. The valley to the SW drains into Seneca Lake with the divide at the oval shape, and the valley to the north is the headwater of Taughannock Creek into Cayuga Lake. Both of the Finger Lakes join and drain into Lake Ontario. Cayuta Lake drains SSE into the Susquehanna River and into the Chesapeake Bay. Stop #7 is an overview of the Cayuta Lake Basin and the swamp and headwater of Taughannock Creek.

Latitude	Longitude	Stop or View Description
42.35285	-76.754867	STOP 6. Dike (park in the cemetery)
42.38826	-76.76354	STOP 7. Potato Hill Overview of Cayuta Valley
42.38805	-76.72242	STOP 8. Middle of Valley
42.37636	-76.73298	STOP 9. North Shore of Cayuta Lake
42.34911	-76.73733	STOP 10. Cayuta Lake outlet - Barton Dam

The valley floor is relatively flat, but all except the northeastern sector has relatively steep valley walls (Figure 5). The ancestral lake bed sediments across the valley have a large variety of glacial clays to pure pea-size gravel, both sorted and unsorted.

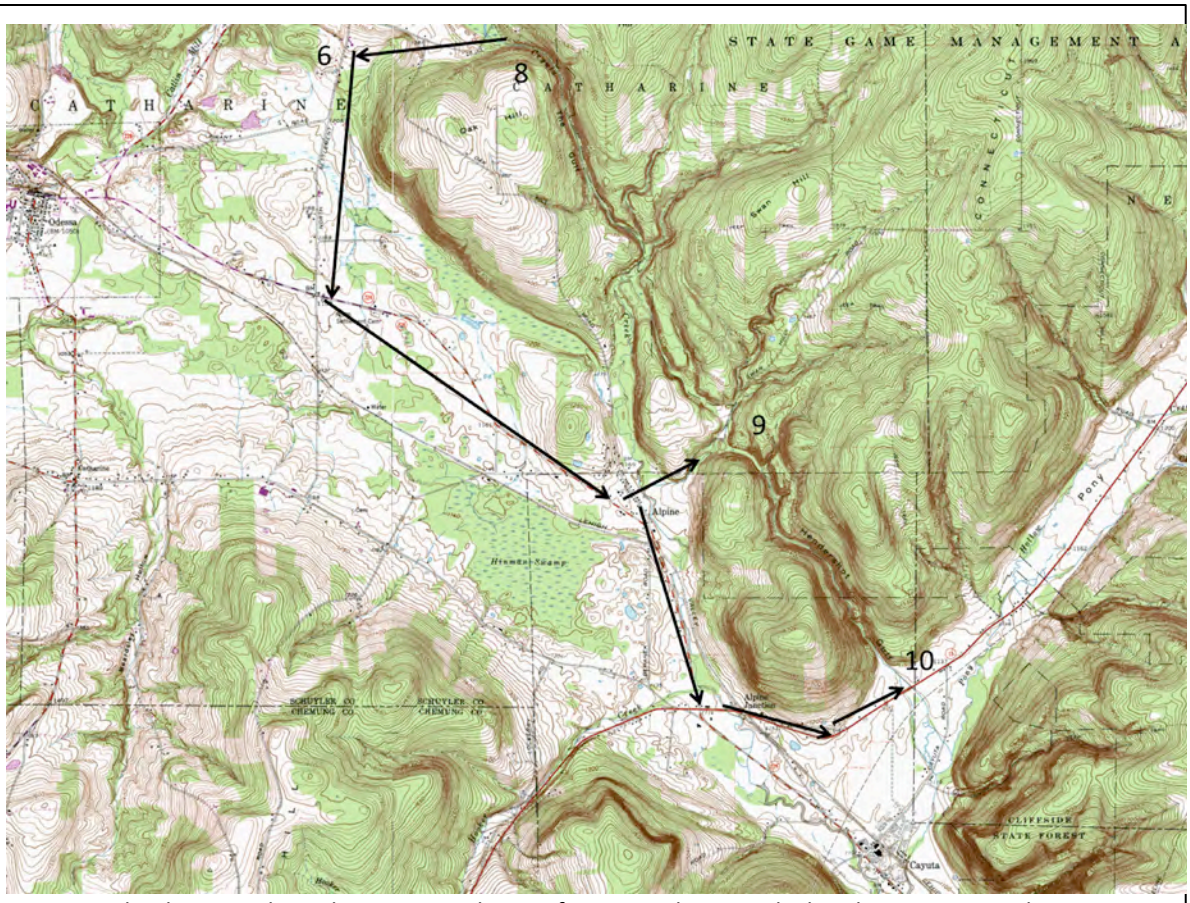

Figure 6. The drainage through gorges southeast of Cayuta Lake into which it drains. #8 is at the entrance of "The Gulf"; #9 is one of the two breaks in the gorges where drainage direction changes over time; and #10 is the end of the hanging gorge which today has very little outlet.

The elevation of the top of the dike and around the valley indicate that when lake was at the top of the dike, the whole valley was filled, and at considerable depth. Currently the lake is relatively shallow, 5-10m deep, with a few deeper holes.

The dike and current drainage into "The Gulf" of Cayuta Creek (#8) suggest that the gorge was blocked for a long time before drainage began, possibly by glacial ice due to its depth and narrow shape. Also the bedrock that it runs through has a divide perpendicular to the gulf in a couple of places (7), and eventually the main stream channel became part of a wider valley floor, and abandoned the very narrow Hendershot Gulf south of the lake (8).

In addition to its identification as a northern point between the ice lobes that formed the VHM, the Cayuta Lake Basin is unusual in a number of other ways. A sponge species has been found in the lake, and is closest to a species found only in Russia (citation?). The basin's locations at the headwaters of tributaries for both the Cayuga and Seneca Lakes suggest it acted as some kind of reservoir for one or the other, maybe both, during the retreat of the ice lobes. The differences in drainage were possibly affected by changes in the ice sheets, alluvial deposition, and isostatic movement.

Latitude	Longitude	Stop or View Description
42.31648	-76.71359	STOP 11 The Gap on Swan Hill Road
42.29484	-76.69481	STOP 12. Henderson Gulf Exit

REFERENCES CITED:

Griggs, CB, B Kromer. 2008. Wood macrofossils and dendrochronology of three mastodon sites in upstate New York. In: Allmon, W., Nester, P. (Eds.) Mastodon paleobiology, taphonomy, and paleoenvironment in the Late Pleistocene of New York State: Studies on the Hyde Park, Chemung, and Java Sites. *Palaeontographica Americana* 61: 49–61.

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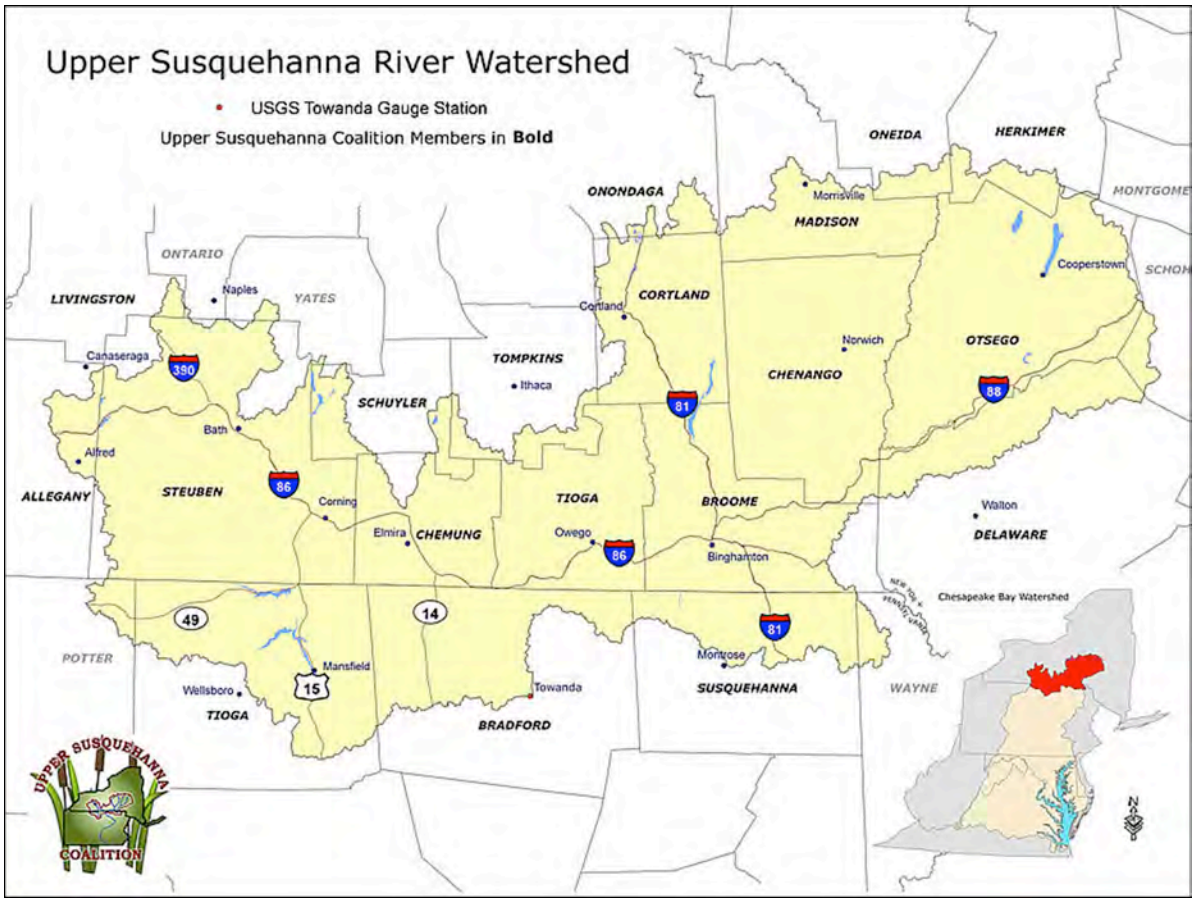
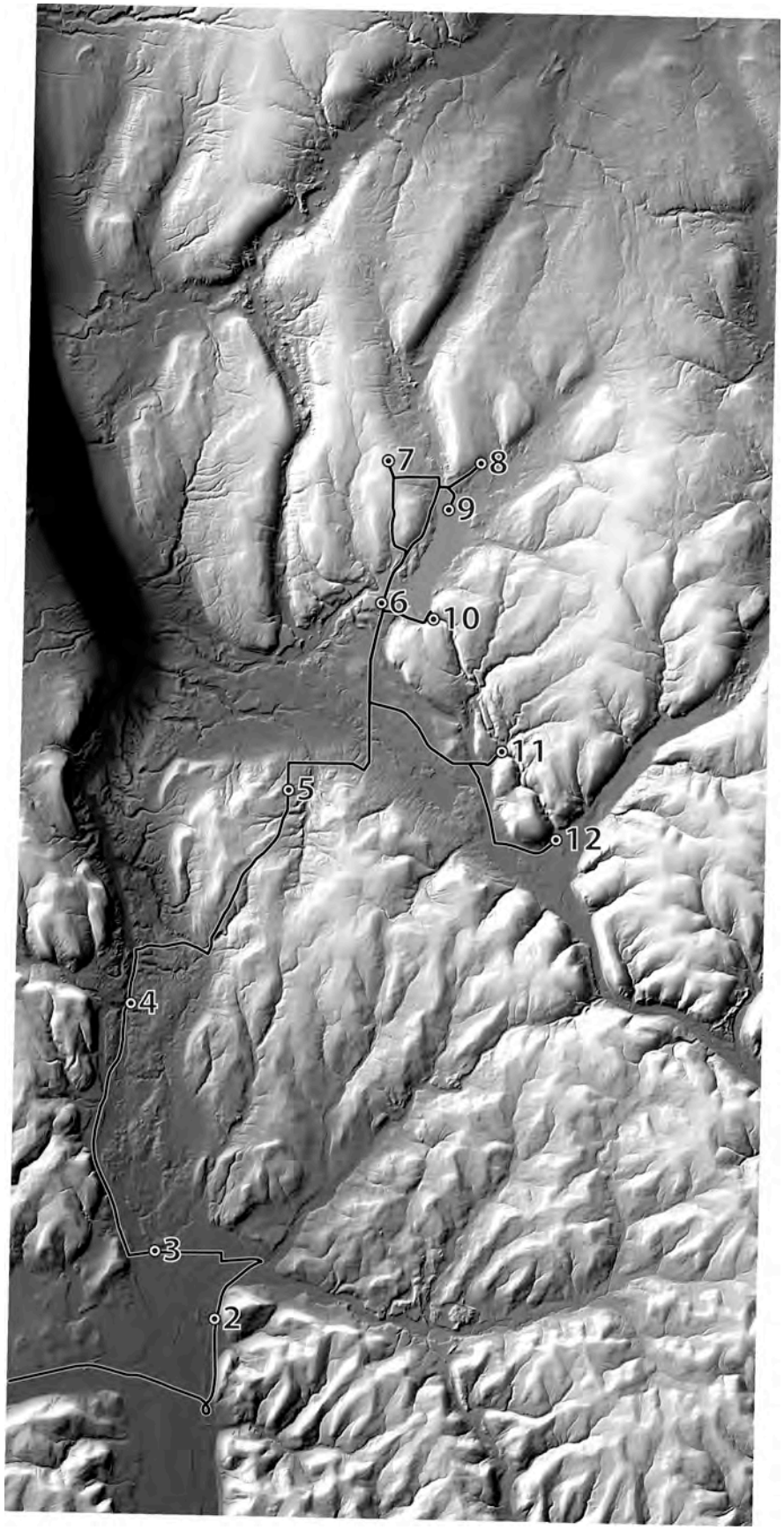


Addendum 1. The northern boundary of the Upper Susquhanna Watershed is very close to the location of the Valley Heads Moraine (e.g. Muller and Calkin 1993). Cayuta Lake is the small lake in the yellow background diagonal to the "R" in "SCHUYLER". Map is available at http://www.chesapeakebay.net/



Addendum 2. DEM of field trip area with stops noted by number