

The selection and enhancement of a topographical study site

Lee Ann Rafferty
Smithtown High School

Use of technology is spreading into many fields these days. One of those fields is the the study and research of topographical and geomorphological features. The program I have found to work well for this study is DeLorme's Topo USA 2.0. Applications for this program are many; here a few examples of the capabilities of the program will be given using geomorphologic areas on Long Island as the study sites. The first site to be examined is Montauk Point Long Island as depicted in Figures 1 and 2 below. The area of Montauk was once a chain of islands most likely left when parts of the moraine were destroyed and then the sea level rose to fill in some of the low spots in the moraine and turn them into channels. The islands were then connected by a series of tombolos. A tombolo is one or more sandbars or spits that connect an island to the mainland. A single tombolo may connect a tied island to the mainland. A double tombolo encloses a lagoon that eventually fills with sediment. The shallower waters that occur between an island and the mainland are the loci of such features because sandbars form there. Evidence of these tombolos and islands is clearly visible in the figures above. In figure 1 the high points correspond to the islands left by the moraine and rising sea level. The areas between are tombolos built up over time and now connecting the islands into a long peninsula on Long Island's south fork.



Figure 1. This figure is another three-dimensional simulation, this time of the Montauk peninsula.



Figure 2. The elevational profile of the line in Figure 1.

Another area on Long Island, which we can find tombolos and compare the simulations done by the program are the former islands of ram and little ram, Figures 3 and 4 below.



Figure 3 Three-dimensional simulation of old little ran and ram islands.



Figure 4 Elevational profile corresponding to yellow line in figure 3.

Using the figures 3 and 4 above we can again clearly see evidence of former islands and tombolos. In this case it is positive these were islands since the Native American name for them was ram and little ram islands. Over time though tombolos grew between the islands themselves and the islands and the sure making them an extension of the mainland just like Montauk is today. The profile in figure 4 is actually even clearer to view and it's exaggerated scale gives a very good feel for where the tombolo ends and the islands begin

again.



Figure 5 above and 6 below These two figures are of melt water channels near the Francis S. Gibreski Air Force base. Two of the channels are clearly visible while the third lays close to the flat area now used as an airport.

The figures 5 and 6 above show some of the glacial morphology mentioned earlier. The three depressions are melt water channels from the glacial recession. Another thing worth note other than the channels are the topographic contour lines visible on figure 5. It is easy to see in that figure why the simulation in three-dimensions is much easier to gather data from than a traditional topographical map.



Figures 7 top and 8 above These figures show a road in Selden called Adirondack Drive that has drastic elevational changes.

The simulations in figures 7 and 8 show a road that heads up the moraine. This ascension is easily visible in the profile as a steep gradient beginning at about 0.6 miles from the starting waypoint. This is an especially deceiving profile because of the short distance and high change of elevations. There is almost a 300-ft difference between the lowest and highest points. This is a steep difference especially on Long Island where the highest points occur only on the two moraines.