Preliminary Survey of Glacial Deposits Exposed at Hallock State Park Preserve, Mattituck, NY

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Abstract

Hallock State Park is a 225-acre state park and preserve located in Mattituck, NY (Figure 1). It opened to the public in June of 2017, and is the first new Long Island state park in at least 10 years. It features a beachfront in addition to hiking trails and a high point called Jacobs Hill. Glacial deposits of the Roanoke Point moraine are exposed in the park, which were formerly mined for sand and aggregate. Mining operations left erosional remnants of the moraine forming hoodoos, which are tall spires of sediment left standing on the ground. Glacial sediments were sampled from outcrops within the park (Figure 2) and grain size analyses performed using standard sieves for the course fraction and laser particle size analysis for the fine fraction (Figure 7). Lead (Pb) levels were also measured in samples using x-ray fluorescence (Figure 7, Table 2). Based on the sedimentological analysis, three distinct units appear to be exposed in the park. Two units have the overall characteristics of glacial till, but differ in the relative proportions of gravel / sand, silt, and clay. The remaining unit is a silt-dominated outwash deposit. Hoodoos show two stacked till units with the upper till exhibiting subtle flow features and large clasts of bedded clay and peat. Radiocarbon dating of the peat would help constrain the age of deposition of the moraine. Pb levels measured in all sediments are between 3 ppm and 20 ppm, consistent with a pre-historical, Pleistocene age.

Figure 5. Hoodoos at Hallock State Park Preserve (W Hoodoo on bottom left, E Hoodoo on the right))

Figure 6: Location where sample HSP 12 was taken- top of the Sand pit, W. of Hoodoos

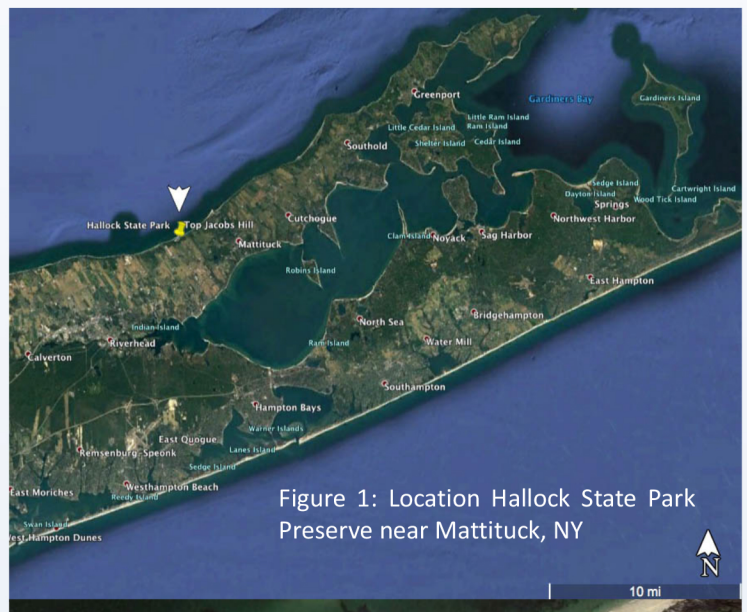

Figure 1: Location Hallock State Park Preserve near Mattituck, NY

Figure 2: Sample localities within Hallock State Park Preserve

Table 1: Physical Properties of Samples. Colors are represented by their corresponding color on the Munsell soil color chart.

Sample	Mass of original sample (g)	Color
Top Jacobs Hill	35.38	8/4
Upper Till	45.17	7/3
Upper Till- Clay Cast	31.99	7/3
Lower Till	43.66	7/3
HSP6	387.17	7/3
HSP7	252.57	7/3
HSP8	388.29	7/3
HSP9	421.48	8/2
HSP10	118.23	7/3
HSP11	377.53	8/4
HSP12	655.12	7/2

Table 2: X-Ray fluorescence was used to find the lead concentration of samples (ppm = parts per million)

Sample	Test 1		Test 2		Test 3	
	Ppm	±2σ	Ppm	±2σ	Ppm	±2σ
HSP6	6	3	6	3	7	3
HSP7	8	3	8	3	6	3
HSP8	17	4	17	4	20	4
HSP9	7	3	6	3	8	3
HSP10	10	3	10	3	12	3
HSP11	10	3	10	3	12	3

Figure 7: Grain size analysis and pXRF lead analysis data

Figure 3: Till exposed at the top of Jacobs hill

Figure 4: Location of HSP7: Large exposure at far end of sand pit, West of Jacobs HIll