

DEGLACIATION OF EASTERN LONG ISLAND: THE TERMINAL MORAINE, RECESSIONAL MORAINES, OUTWASH PLAINS, PROGLACIAL LAKES AND MELTWATER CHANNELS

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The following field trip and discussion is taken from my book*, "Eastern Long Island Geology." The geology and interpretations are documented in numerous published works: including USGS bulletins, professional papers, and reports; NYSGS and NYS Museum maps and bulletins; GSA Bulletins and Memoir; NYSGA and NEIGC Guidebooks; Friends of the Pleistocene Guidebooks; chapters in several symposium volumes; and my book "Block Island Geology".

Field Trip 2: A south to north traverse from the outwash plain through the Late Wisconsinan terminal moraine and recessional moraines of eastern Long Island (Sag Harbor, Greenport and Southold Quadrangles) (Figure 1).

0.0 miles. This trip begins at the junction of Montauk Highway, Rt 27, and Sagg Road, east of Bridgehampton. Proceed north on Sagg Road crossing the outwash plain east of Poxabogue Pond. Sagg Road runs parallel to the Long Pond meltwater channel and chain of lakes.

1.7 miles. Cross an area of pitted outwash and loess-rich soil.

Stop 1. 1.8 miles. This is the approximate contact between the outwash plain and the distal slope of the terminal moraine, east of Crooked Pond, which appears to straddle the contact.

2.4 miles. West of the southern half of Long Pond is the site of the old Town landfill, which can be entered from Sag Harbor-Bridgehampton Turnpike. The landfill pit was dug into morainal sediments and revealed till of the lower drift at the base of the excavation.

Stop 2. 3.0 miles. Kame and kettle topography is prominent, making up the morainal hills east of Little Round Pond. To the west is the modern northwest-trending valley in a possible meander scar left over from the original south-flowing meltwater channel. It is now occupied by Ligonee Brook, an underfit stream flowing from Long Pond at about ten feet above sea level to Sag Harbor Cove. The village of Sag Harbor and the adjacent Sag Harbor Bay occupy the lowland to the north.

4.2 miles. Junction of Sagg Road with Sag Harbor-Bridgehampton Turnpike. Continue northward. Sag Harbor is on a low plain underlain by lower drift till. Stream valley alluvium fills the valley, and marine sediments and marsh deposits cover the coastal areas. Along the northern margin of the village, Sag Harbor Cove, southern Noyack Bay to the west, and Sag Harbor Bay to the east are relicts of east-west drainage along the margin of the glacier when it stood north of the terminal moraine at the Sag Harbor position (Figure 2).

4.4 miles. Junction with Rt 114 (Greenport Quadrangle). Bear left to North Haven. Rt 114 leads across North Haven and Shelter Island

through a number of turns. Stay on Rt 114, nevertheless.

Stop 3. 4.8 miles. Rt 114 rises onto the generally low-lying North Haven terrain. North Haven is an island tied to the mainland of the South Fork by tombolos, although the eastern sand bar is now submerged. The peninsula is underlain by lower drift till, and its surface is covered with a veneer of upper drift ground moraine and kames that range from thirty to eighty feet high. The kames are concentrated along the east and west sides of the peninsula and contain abundant till stones and erratics. On the west shore, the kame on which the Retreat House stands is eighty feet high. It is made mostly of outwash, capped by a few feet of sandy and stony till. These upper drift kames and surficial deposits show that North Haven is a segment of a recessional moraine of the last glaciation. In the reconstruction of recessional moraines, North Haven occupies the interlobate position between a western lineation of related deposits from Cow Neck to Jessup Neck to North Haven that are associated with the Connecticut Lobe of the last glacier, and the eastern lineation from North Haven to Fireplace with the Connecticut-Rhode Island sublobe of the glacier (Figure 3).

5.6 miles. Turn right (north) on Rt 114. The road traverses low areas where drainage is to the east and reaches a drainage divide at about 6.5 miles.

6.6 miles. Northward from the divide, the drainage is to the north, mainly via a small stream into Shelter Island Sound. The road cuts through a kame that forms the northeastern section of the peninsula.

7.5 miles. Proceed to the ferry landing. Take the ferry to Shelter Island.

7.9 miles. Shelter Island occupies the interlobate position along the Robins Island-Little Hog Neck-Great Hog Neck-Shelter Island-Gardiners Island Recessional Moraine and ice margin.

Stop 4. 9.3 miles. Junction with Manhasset Road. Turn left (west) on Rt 114. The alignment of morainal hills to the east and southeast represents the east-trending segment of the recessional moraine. The range of hills across northern Shelter Island represents the western segment of the recessional moraine. The two separate morainal segments are separated on Shelter Island by a low-lying central area, roughly parallel to Smith Road. The offset of the trends of the two morainal segments in the interlobate zone indicates that they, in fact, overlap, as did the glacial lobes that formed them (Figure 4).

9.8 miles. Turn left (west) on Ferry Road (Rt 114).

10.2 miles. Turn right (north) on Ferry Road (Rt 114) through Shelter Island village and into the hilly northern terrain. The kames forming Shelter Island Heights have elevations above one hundred eighty feet, with significant exposures of the morainal sediments in the bluffs along the northwest coast.

11.0 miles. Left (west) on West Ferry Road.

11.5 miles. Right (north) on North Ferry Road (Rt 114).

12.0 miles. The road turns left, crosses north-flowing drainage at Chase Creek, and then skirts the edge of Shelter Island Heights.

12.5 miles. Proceed to the ferry landing. Take the ferry to

Greenport.

13.5 miles. Greenport. Although much of the surface is covered by roads, buildings and fill, the village lies on a low-lying outwash plain that extends from the Roanoke Point Moraine to the north. Join Rt 25 and proceed northward to Stirling.

Stop 5. 14.5 miles. Stirling. Intersection with Rt 48. Outwash extends northward from Stirling to a narrow band of the Roanoke Point Moraine that forms low bluffs along the north coast. Turn right (east) on Rt 48.

15.0 miles. Rt 48 merges into Rt 25.

20.0 miles. Turn left (north) on Rocky Point Road, crossing the outwash fan, toward the moraine and Long Island Sound.

21.0 miles. Large erratics appear on the right side, marking the transition from the outwash fan to the moraine.

Stop 6. 21.2 miles. At Rocky Point, a fifty foot exposure of glacial strata consists of nearly ten feet of bouldery till overlying the coarse sand and fine quartz pebble gravel of the outwash, and is characteristic of the Roanoke Point Moraine.

The lobate nature of the recessional moraine is confirmed by the till fabric, which is determined by the orientation of till stones, and rock types taken sequentially from upper till exposures in bluffs on the long, east to west curve of the Roanoke Point Moraine that borders Long Island Sound. Till stones show a closer affinity to bedrock sources more directly to the north; those taken between Riverhead and Wading River match the Hartford Basin rock types in the Connecticut River Valley, and the till fabrics point in that direction. Fabrics from the west end of the moraine point to the northeast; those from the east side to the northwest. This evidence gives credence to the moraine's concave shape-as inherited from the Connecticut Lobe- as opposed to an erosional origin for the arc of the moraine (Figure 5).

The late Wisconsinan age of the moraines is corroborated by the extensive, radiocarbon-dated pollen stratigraphy for this region: all of the pollen records from the moraines (terminal and recessional) postdate the last glaciation and have the typical cold to warm, postglacial sequence of climate as inferred from the pollen zonation, beginning with the herb pollen zone and ending with the oak pollen zone.

22.4 miles. Return to junction with Rt 25. Turn left (east).

22.9 miles. Village of East Marion. The apparent change in the direction of the segments of the recessional moraine at East Marion (the Orient Point segment trends more east-west, the Roanoke Point segment northeast-southwest) describes the interlobate angle between lobes of the last glacier.

23.2 miles. Orient Point Bathing Beach.

Stop 7. 23.7 miles. Stop along the highway where convenient. The glacial meltwater channel cut through the moraine between Terry Point and west of Dam Pond. Trumans Beach on the north shore and the sand bars on the south side have formed a double tombolo which closed the channel and reconnected the Orient Point and East Marion segments of the North Fork in more recent time. The meltwater

channel drained the proglacial lake to the north and crossed Gardiners Bay as a tributary of the main channel that trimmed the Amagansett Moraine (the terminal moraine) at Acabonack and cut through the recessional moraine at Napeague Beach (Figure 6).

*Eastern Long Island Geology will be published in the Spring 1995.



Figure 1. Route of Field Trip 2.

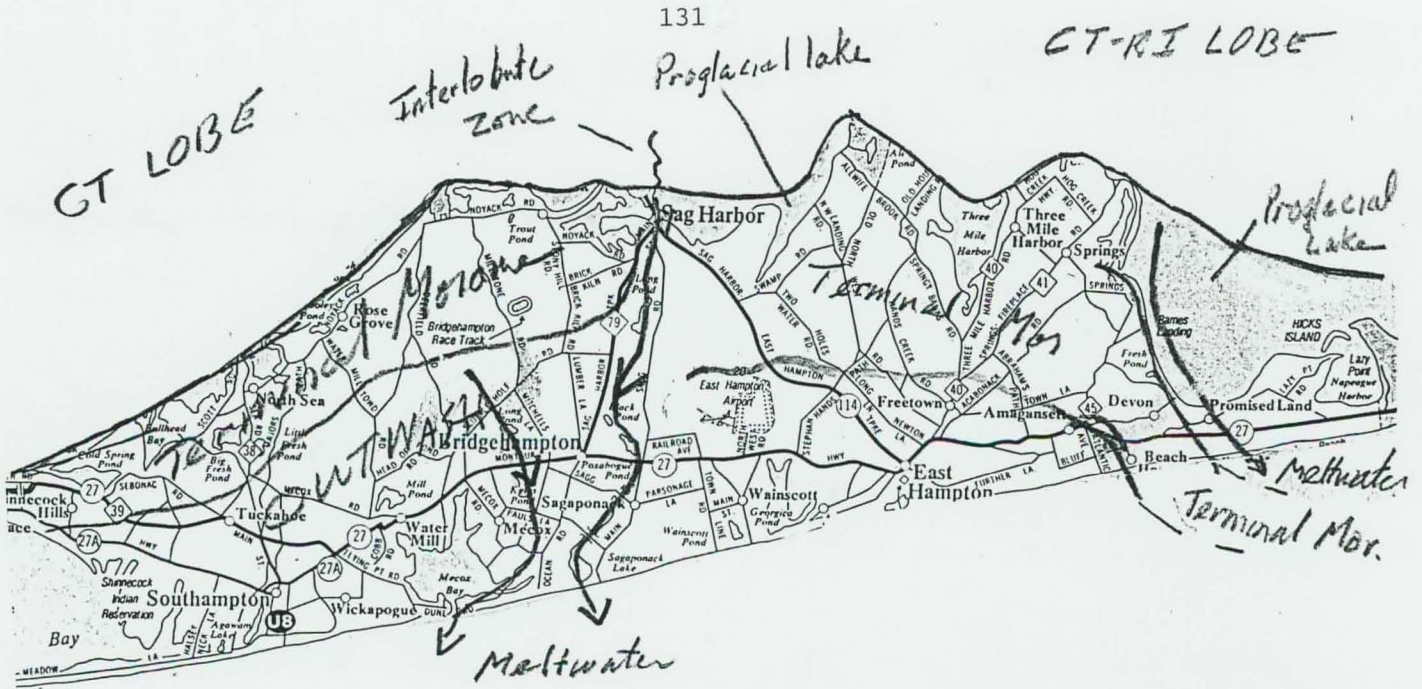


Figure 2. The Sag Harbor Ice Margin.

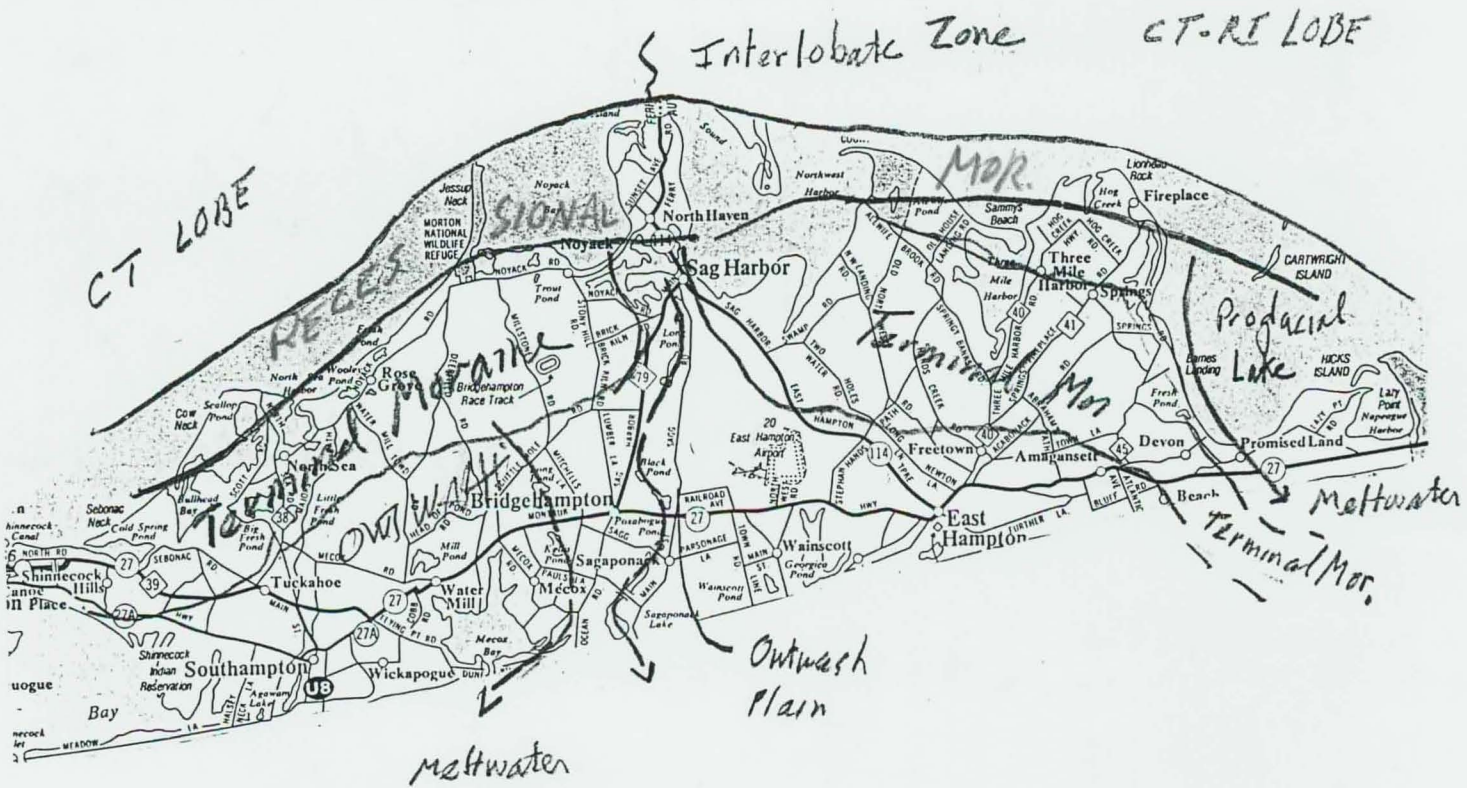


Figure 3. Jessup Neck-North Haven-Fireplace Recessional Moraine

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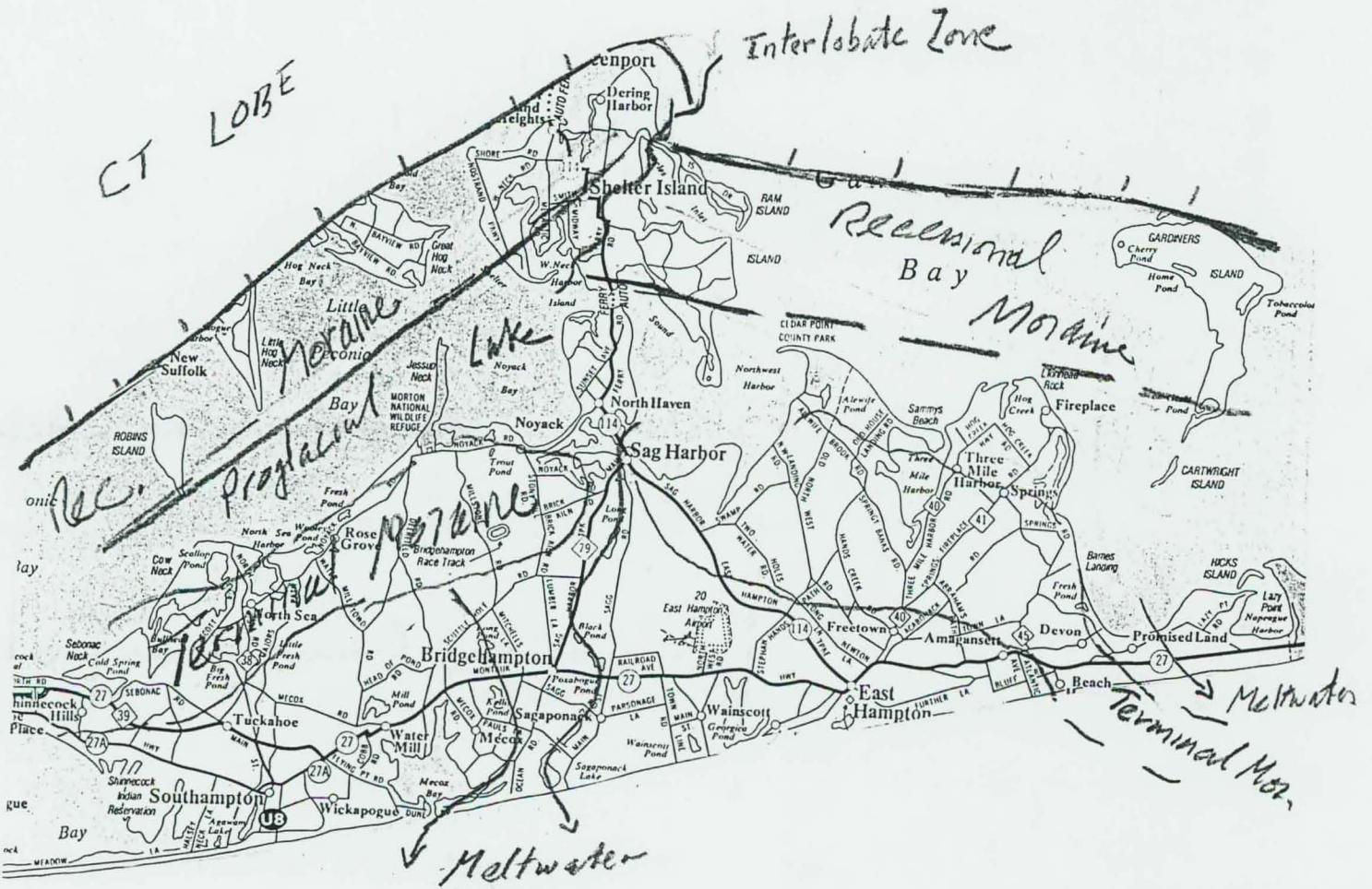


Figure 4. Robins Island-Shelter Island-Gardiners Island Recessional Moraine.

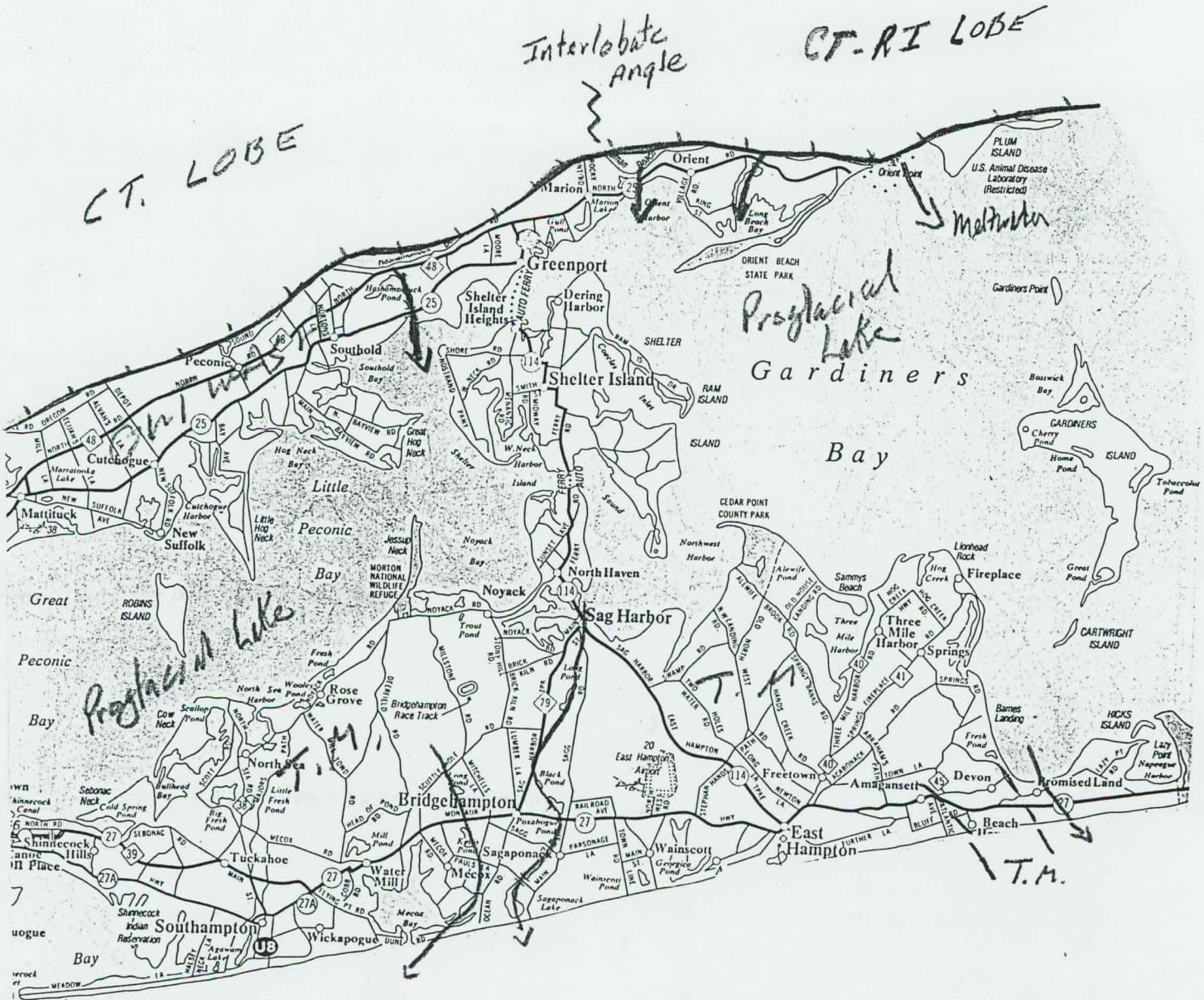


Figure 5. Roanoke Point Ice Margin and Glacial Lobes.

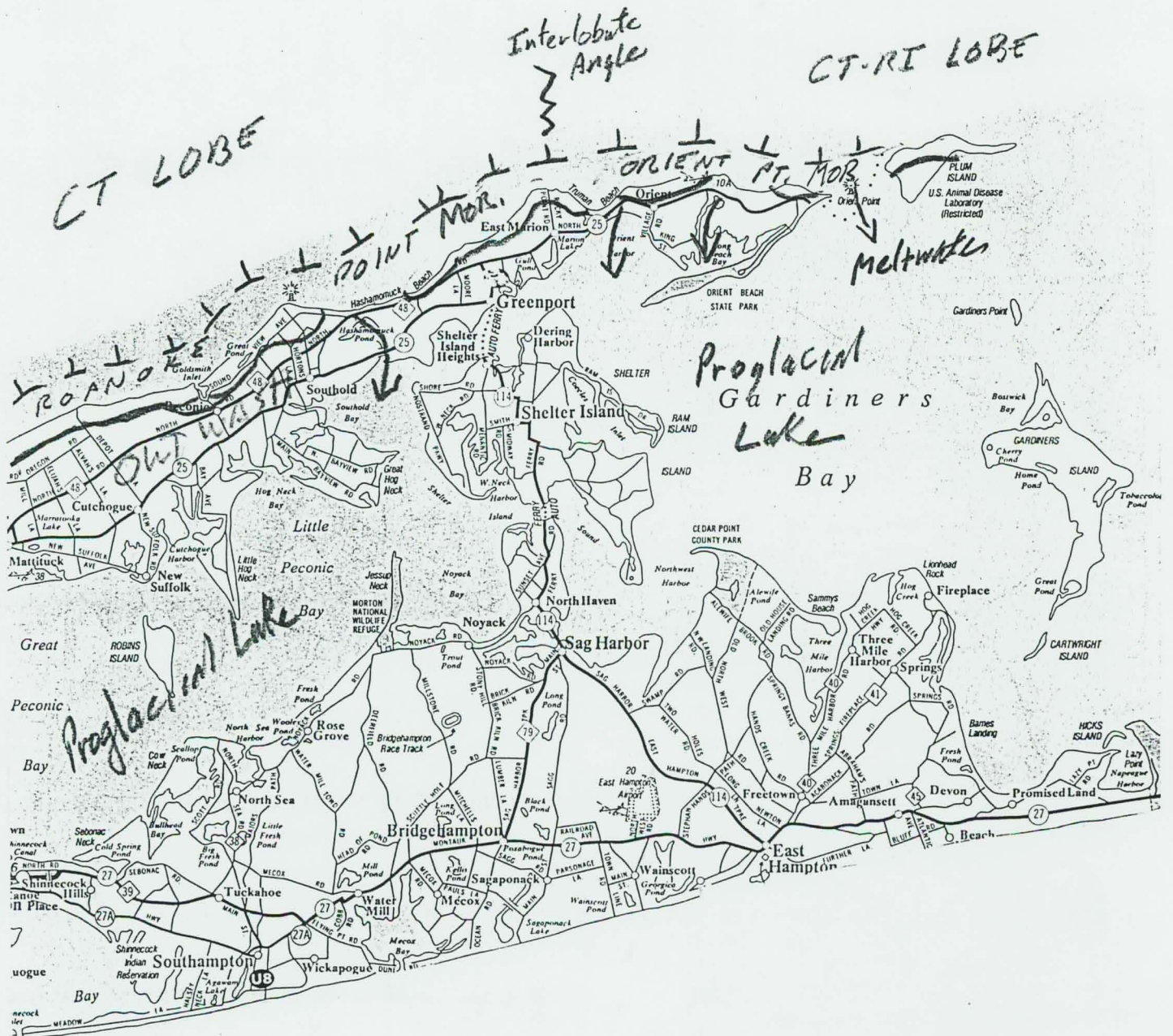


Figure 6. Roanoke Point Moraine, Meltwater Channels and Proglacial Lakes.