

**Distribution of Large Glacial Erratic Boulders on the  
North Shore of Nassau County, New York**

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Following in the tradition of M.L.Fuller (1914), the current investigators have recorded the location, size, and rock types of over 1000 large boulders, ranging from 3 feet to 55 feet in length, within a study area in northern Nassau County, NY.

The area boundaries include the Long Island Sound shoreline to the north, and the Harbor Hill terminal moraine to the south. The east/west boundaries are the Nassau/Queens border to the west, and the Nassau/Suffolk border to the east. Most of the surface deposits within these boundaries were mapped as ground moraine by Swarzenski, (1963) and Isbister, (1966).

The current authors had no preconceived ideas going into this study other than to gather as much information as possible and to see what conclusions might be drawn from the data. The English measurement system was used to make direct comparison with Fuller's data easier. A 3-foot minimum for the longest dimension was chosen because rocks smaller than that would be too numerous to count and too easily moved from their original location. As boulders increase in size so does the likelihood that they remain at, or very close to, the spot where they were dropped from the ice. Exceptions include, those sliding down the bluffs on eroding shorelines and those excavated during sand mining that have been moved by heavy equipment but still remain in the same general area.

Besides locating large boulders what other purposes did this search accomplish? Rocks were identified by type, to the extent possible, using routine field methods. Some were unidentifiable due to weathering or growth of lichens, mold or marine life. A high percentage of those recorded were granites and felsic gneisses derived from source rocks found in coastal Connecticut (Harrison Fm.) and the Manhattan Prong (Fordham Gneiss). For uncommon rock types like soapstone and serpentine, attempts were made to locate probable bedrock sources. For example, distinctive mafic erratic boulders from the Cortlandt Complex near Poughkeepsie were found at Coffin Woods (Locust Valley) . In a few instances the 3-foot minimum rule was waived to include rare types such as the well-known, garnet-rich metagabbro from Gore Mountain found in the sand pits.

Three measurements at right angles were taken whenever possible. Occasionally, partially buried boulders had to be estimated.

The rocks were located on maps using GPS (Global Positioning Satellites) assisted in some coastal zones by Google Earth maps.

The Harbor Hill terminal moraine is a kame moraine where large boulders are rarely found. The land north of the terminal moraine is a ground moraine mostly covered by a till (Roslyn Till, Sirkin, 1968) that varies from 3 – 40 feet in thickness. This layer produces most of the large boulders, many of which are seen eroding from the till along the shoreline or in the former sand mines. In addition, some of the biggest ones, such as Shelter Rock in Manhasset, were probably let down on the land surface as the ice wasted away.

One of the most striking observations is the tremendous variability in the distribution of boulders in the ground moraine. The shoreline and sand mines along the west shore of Hempstead Harbor are littered with boulders of all sizes. They are also abundant on the eastern shore especially on the beach at the Garvies Point Museum and Preserve in Glen Cove.

One of the obvious anomalies is the very uneven distribution of boulders on the north shore nature preserves. For example, the 550 acre Muttontown Preserve that is bisected by the Harbor Hill Moraine, is nearly devoid of boulders of any size. This is because the kame and kettle topography consisting of stratified sand and gravel covers any till that may be present in the sub-surface.

In contrast, the 216 acre Sands Point Preserve, with one mile of eroding shoreline on Hempstead Harbor, contains dozens of large boulders, many over 20 feet. The large tidal range here permitted counts and measurements of boulders in the water as well as those sliding down the bluffs from a rock-studded surface till. Measurements in the shallow low tide waters were made from kayaks and dinghies assisted by Google Earth photos.

In general, the further east you go in Nassau County the fewer the boulders. One explanation might be that, going east, Long Island Sound widens so the bedrock source for the boulders becomes more distant from Long Island and large boulders often break apart in transit.

Some notable boulders include:

Shelter Rock (55x30x16) Largest boulder on Long Island, located ¼ mile south of Route 25A on Shelter Rock Road in Manhasset. Location is marked by an informational road sign.

Hen (49x39x8) with six chicks (12 to 16 feet). They sit in shallow water just offshore SE of the historic Guggenheim mansion “Falaise”. This group of similar boulders probably traveled as one “super-giant” that separated along joint surfaces during coastal erosion. Visible only at low tide.

Sands Point Giant (40x20x17 first reported in 1800 by Samuel L. Mitchell at (40 ft. long to 20 to 40 ft. wide to 10 to 17ft. high). Deeply weathered, uncertain rock type, several fragments have broken off since 1800, located on private estate.

Measurement reported in Medical Repository, vol., 3, 1800, p.330

Notes:

1) All three authors are retired employees of the Nassau County Division of Museums who had major responsibilities for the County's nature preserves. Our familiarity with these sites made locating boulders reasonably quick and comprehensive.

Sites that were surveyed include: \*publically accessible lands

Sands Point Preserve, \* Sands Point– 216 acres with one mile of shoreline on Long Island Sound.

Port Washington Sand Pits Nature Sanctuary – 200+ acres of mined out sand pits with important geological features.

William Cullen Bryant Preserve, \* Roslyn Harbor - 182 acres adjacent to Harbor Hill terminal moraine, few boulders, mapped as kame by Swarzenski , 1963

Garvies Point Museum & Preserve, \* Glen Cove – 62 acres including ¼ mile of rocky shoreline on Hempstead Harbor and a museum of Long Island archaeology and geology.

Welwyn Preserve, \* Glen Cove - 201 acres with ¼ mile shore on Long Island Sound.

Muttontown Preserve\*, Muttontown – 550 acres of “kame and kettle” topography bisected N/S by the Harbor Hill terminal moraine, few boulders.

Sagamore Hill National Historic Site\*, Oyster Bay (Cove Neck) 82 acres

Tiffany Creek Preserve\*, Oyster Bay Cove 192 acres

Stillwell Woods Preserve\*, Syosset/Woodbury 287 acres south of terminal moraine.

For this study access was also provided by private owners to:

Coffin Woods Sanctuary, Locust Valley 75 acres

Greentree Estate, Manhasset - 450 acres on the proximal slope of Harbor Hill terminal moraine, location of Shelter Rock.

*2) This is an expansion of a more limited study by the authors of the boulders found in the former Port Washington sand mines on the west shore of Hempstead Harbor in anticipation of the development of a geological interpretive trail.*

References:

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