

## THE FORMATION AND GEOMORPHOLOGY OF SHORT BEACH AND LONG BEACH

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Long Island's north shore coastline is indented in that it consists of headlands projecting into the Long Island Sound and inland harbors protected by barrier beaches. The portion of the coastline considered in this study extends from the Nissequogue River eastward to Stony Brook Harbor; this includes Short Beach and Long Beach. The prevailing northwest winds across Long Island Sound cause the long shore current to travel from west to east along the coast. This current is capable of transporting a considerable quantity of sediment eastward. When the current encounters an indentation, it disperses, loses velocity, and deposits sediments at the western headland, forming a primary bay mouth bar. Primary bay mouth bars form in the direction of the long shore current. The current continues into the harbor, travels seaward on the eastern headland, where the current disperses and deposits sediments along eastern headland, ultimately forming a secondary bay mouth bar, which forms in the direction opposite to the long shore current. Bay mouth bars usually form parallel to the shore. The bay mouth bars considered in this report, Short Beach and Long Beach, are atypical since they have not extended in a linear fashion from the headland. This is due to the geomorphology of the coastline where the bay mouth bars are located.

Short Beach is a secondary bay mouth bar, which extends westward across the mouth of the Nissequogue River. The sediment carried to the Long Island Sound by Nissequogue River combines with the sediments moving with the long shore current. When the two currents meet, they lose velocity and deposit sediment offshore of Short Beach. This sediment eventually accumulates to such a degree that it breaks the surface of the water forming an offshore island. The island attaches to the tip of Short Beach causing this bay mouth bar to extend in an atypical fashion into Long Island Sound, rather than across the mouth of Nissequogue River. The vegetational patterns on Short Beach are typical: older vegetation, such as oaks and cedars, can be found closer to the headland and younger vegetation, such as grasses and shrubs, can be found on the western or recent portion of the bay mouth bar.

Long Beach is a primary bay mouth bar extending eastward across the mouth of Stony Brook harbor to the Crane Neck headland. The vegetational patterns on this bay mouth bar are atypical, in that the youngest vegetation, dune grass and shrubs, is located on the area of the bar that should be the oldest portion. The older vegetation sequences (cedar and oak communities) are located on what should be the most recent portion of the bay mouth bar. The area inhabited by oaks and cedars is characterized by a series of ridges, while the topography of the shrub and grass communities is consistent with typical bay mouth bars. The difference in the topography and vegetational communities on this bay mouth bar suggests that two different discrete processes may have formed it. The western portion of the bay mouth bar consisting of the dune grass and shrub communities is thought to be formed by the typical bay mouth bar vegetation processes. The central and eastern portions of Long Beach, with oak, pine communities are believed to have formed by different coastal processes. The Crane Neck headland, which extends three miles further into the sound than the Nissequogue headland,

forces the long shore current to travel southward, forming the West Meadow sand spit. As this current travels westward it collides with the easterly moving long shore current, and when this occurs sediment is deposited as a series of linear off shore ridges. As the sediment accumulates, the ridges will break through the surface of the water forming a series of islands with an east-west orientation. While the islands form, the bay mouth bar continues to extend eastward, and eventually connects with the islands. The vegetational sequences discussed previously indicate that the island formed at a more rapid rate than the bay mouth bar extended eastward. This scenario explains the topography of Long Beach, as well as the vegetation.

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