



Geologic Resources Inventory Fact Sheet

Fact Sheet Compiled in November 2023



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Geologic Issues

Archeological Resources Management

The historic site contains artifacts and building foundations related to the Roosevelt family, in addition to resources associated with Indigenous Peoples of Long Island. Ground disturbance projects should utilize nondestructive methods (i.e., ground penetrating radar, resistivity, and metal detection) to help preserve the integrity of any yet undiscovered resources. Archeological areas should be monitored to determine if these resources are naturally exposed or jeopardized by erosion. *Page 28.*

Climate Change Impacts

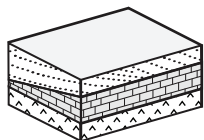
Climate change manifestations that may impact geologic features and processes include the following: (1) more frequent and intense storm surges; (2) increased flooding, coastal inundation, and loss of shoreline; and (3) increased damage to coastal habitats, features, resources, and infrastructure. *Pages 28–29.*

Coastal Resources Management

The Cold Spring Harbor shoreline is a dynamic setting influenced by sea level change combined with tidal, wave, and wind energy. Projected sea level rise will promote coastal instability, landward shoreline migration, and coastal displacement through accelerated erosion driven by enhanced tides, floods, and storm activity. Coastal infrastructure, habitats, and resources are highly susceptible to damage or loss resulting from storms, flooding, or inundation. *Pages 29–30.*

Disturbed Lands

Neighboring residential properties and infrastructure have impacted natural processes (e.g., sediment transport dynamics) and features (e.g., hydrology) within the wetland, tidal creek, accretionary spit complex (an elongate beach deposit that extends into a body of water), and one of the historic ponds. Additional degradation of the coast has occurred due to confusion of the boundary and mistaken use of the historic site shoreline, resulting in improper watercraft docking. *Pages 30–31.*



*The geology in and around
Sagamore Hill National Historic
Site spans about 2.58 million years.*

Geologic History

The following is a brief history of the geologic events that formed the present landscape. Pages 8–15.

Pleistocene Epoch (approximately 2.58 million to 11,700 years ago)

During the Wisconsin glacialiation, extensive glaciers of the Laurentide ice sheet advanced south across Canada and the northern United States. About 21,000 to 19,000 years ago, thick ice sheets covered the historic site and slowly retreated north as the climate warmed. As glaciers receded, immense amounts of meltwater were released, and large quantities of till (unconsolidated rock debris) were deposited. These ice-age remains now form a major component of the historic site's surficial geology.

Fluvial, Colluvial, and Slope Processes

The wetland area is sustained by a tidal channel (Eel Creek) and flanked by an erosional coastal scarp (cliff). The Eel Creek channel and mouth are part of a migratory accretionary spit complex that shifts in response to erosion. Storms and tidal activity regularly flood the low-lying coast. Upland areas have been eroded by streams and precipitation to form ravines and colluvial (unconsolidated debris at the foot of a slope or cliff) deposits. *Page 10.*

Paleontological Resources Management

Although paleontological (fossil) resources have not yet been documented, it is possible they may be present in glacial deposits or wash up along the shoreline. *Pages 31–32.*

Seismic Activity

The potential hazard level due to seismic activity is very low, as most earthquakes in the Long Island region are lower magnitude events. *Page 32.*

Glacial erratic at the base of the Sagamore Hill home

NPS photo





Geologic History (cont.)

Holocene Epoch (approximately 11,700 years ago to present)

Since the last Ice Age, stream processes have eroded and reworked Pleistocene glacial deposits to form gently rolling hills marked by ravines.

Along Cold Spring Harbor, the historic site contains an erosional coastal scarp, wetland, and accretionary spit complex that record dynamic coastal processes such as longshore drift (currents parallel to the shoreline), tidal activity, winds, and storm events. Over hundreds to thousands of years, the accretionary spit complex has migrated south to widen the historic site's shoreline and buffer the inland scarp and wetland region.

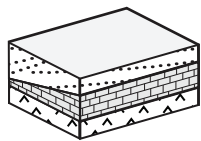


NPS photo

Damage to the nature trail boardwalk following Hurricane Sandy in October 2012

Geologic Features and Processes

Bedrock and Surficial Geology



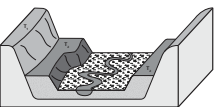
The surficial geology of Long Island consists of unconsolidated Cenozoic Era deposits that record the last glaciation ("Ice Age") of North America, in addition to recent fluvial and coastal processes. Borehole data extends the rock record of the north shore of Long Island to the Precambrian or Paleozoic Era (as much as 541 million years ago), with crystalline bedrock unconformably (significant gap in the rock record) overlain by Late Cretaceous (approximately 100.5 million to 66 million years ago) rocks. *Page 12.*

Glacial Features



Glacial features within the historic site include the following: (1) ground moraine deposits—a combination of till and outwash (sediments washed out from a glacier) consisting of boulders, cobbles, gravel, sand, silt, and clay; (2) erratics—large, exotic blocks of bedrock that were plucked, transported, and deposited by glacial ice; (3) kettles—topographic depressions that form when ice blocks detach from a glacier, are buried, and melt; (4) kettle ponds—water-filled depressions; and (5) kames—irregular hills or mounds of till. The Sagamore Hill estate sits on a glacial kame that forms the highest topographic point along the Cove Neck peninsula. *Pages 12–13.*

Fluvial and/or Colluvial Features



Intermittent streams and stream valleys drain the uplands of the historic site and have dissected ground moraine deposits to form ravines, gullies, and colluvial deposits. Along Cold Spring Harbor, Eel Creek is a dynamic tidal channel that sustains the coastal wetland and migrates in response to erosion driven by currents, winds, floods, tides, and storm activity. *Page 14.*

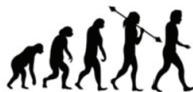
Coastal Features



The low-lying shoreline region consists of a coastal scarp, wetland, and accretionary spit complex. Incision of the scarp has occurred since the last Ice Age and records a pre-existing shoreline position along Cold Spring Harbor. A narrow wetland flanks the scarp and is fed by the Eel Creek tidal channel. The spit complex is a southerly migrating feature composed of a beach, an active gravelly ridge (younger, dynamic dune feature), an inactive gravelly ridge (older, abandoned dune feature), and an inter-ridge swale (low region between the gravelly ridges). *Pages 14–15.*

Historical and Archeological Resources

The historic site contains a vast collection of historical resources related to Theodore Roosevelt, his family, and staff. Archeological resources include Indigenous materials such as lithic tools, debitage (waste flakes produced making stone tools), split cobbles, and pottery sherds. *Page 16.*



Paleontological Resources

Although the surficial geology of the Sagamore Hill estate has yielded no fossil discoveries to date, similarly aged deposits within about 100 km (60 mi) of the historic site contain extinct Pleistocene mammals. It is possible that fossils are present in the glacial deposits or may wash up on the shoreline of the historic site. *Pages 16–17.*



Gravelly beach deposits and a spider crab

NPS photo

