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Shifting Sands

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Shifting Sands

the Story of Griswold Point

by Clay Arnold, Joel Stocker, and Juliana Barrett

The Connecticut coastline really is like no other in the world. Although not as spectacular as many coastlines that may have popped into your head, it has many factors that make it truly unique. For example, there is no other place that quite mimics the way Long Island creates a barrier and an estuary in front of the state, separating it from the Atlantic Ocean. The mix of salt water from the Atlantic Ocean and fresh water from rivers, mainly the Connecticut River, combine to create a distinctive ecosystem.

Despite the protection from Long Island, Connecticut's coast, like every other coast in the world, is ever-changing. Due to factors such as seasonality, sea level rise, and coastal storms, the coast is never the same for very long. This constant change can be illustrated in many different places along the coast of Connecticut. One of the best examples of this is a place called Griswold Point, situated on the eastern side of the mouth of the Connecticut River in Old Lyme. Griswold Point has an excellent example of what is called a *barrier beach*. A barrier beach is, by definition, "a sand ridge that rises

slightly above the surface of the sea and runs roughly parallel to the shore, from which it is separated by a lagoon." Barrier beaches are formed by longshore currents depositing sediment across the mouth of an inlet or harbor. These beaches are characterized by a frontal beach/dune area with a marsh or lagoon in the sheltered zone between the dune and the shore.

Griswold Point exhibits these characteristics perfectly.

The reason that the barrier beach at Griswold Point is such a good indicator of coastal change is because it is a large spit of sand, which as we've seen with Storms Irene and Sandy, is highly subject to change. The barrier beach area of Griswold Point is rather special, though. In addition to having a great deal of history behind it, this beach is a very important breeding

ground for piping plovers (*Charadrius melodus*), a federally listed endangered species.



Joel Stocker

Piping plovers are little birds, about the size of a sparrow, which have gained a lot of attention from wildlife and conservation groups since becoming a protected species under the Endangered

Species Act in 1986. They exist only in North America and are known to breed in just three different places – the Atlantic Coast, Great Lakes, and Northern Great Plains. The Atlantic Coast Plovers make up at least half of the world's population and nest on coastal beaches, sand flats at the ends of sand spits and barrier islands, gently sloped dunes, sparsely vegetated dunes, and washover areas cut into or between dunes. They arrive at these breeding grounds from mid-March to mid-May and stay for 3-4 months. They generally lay three to four eggs in shallow scraped depressions lined with light colored pebbles and shell fragments. The eggs are very well camouflaged and tend to blend in extremely well with their surroundings.

Unfortunately, their preference in breeding grounds turns out to be rather inopportunistically placed. Because the breeding grounds are right on the shore, human interaction is almost unavoidable. Commercial, residential, and recreational development has greatly decreased the amount of coastal habitat available for piping plovers to nest and feed. Human disturbance, includ-

ing pets and vehicular traffic, greatly curtail breeding success. That is why places like the sand spit at Griswold Point with minimal foot traffic are critical to the long term survival of these birds.

Griswold Point is so named because of the family that has owned the land for hundreds of years. How exactly it came into their possession is not documented or known for sure, but there is a story that has been passed down through the family that describes it. The story, as told by one of the 121 first and second cousins of the Griswold family, Austin Wilmerding, is as follows. An English nobleman was granted the land by King Charles I and lived there with his wife. However his wife became very ill and soon after died from this illness. The nobleman then became very depressed and decided to move back to England. Having nothing else to do with the land, he gave it to the Griswold family in exchange for them agreeing to maintain and watch over his wife's grave. This family account is actually quite similar to what is understood historically. Apparently a Colonel

George Fenwick, one of the original Saybrook landowners, gave this land to Matthew Griswold (a Saybrook colony resident and stonemason) in 1645 in payment for the continual maintenance of his wife's grave and monument.

Today, only a portion of the land remains under the ownership of the Griswold family. The Nature Conservancy acquired a 25-acre section of the land in 1974 (including the barrier beach area) from members of the Griswold Family.

The Nature Conservancy's main reason for acquiring this land was to protect the already dwindling Piping Plover nesting area. Each spring, a warden was hired to set up enclosures around nests, monitor the eggs and chicks, and to educate beach walkers on the importance of not disturbing the nesting areas. In just the past two years this stretch of barrier beach, has changed dramatically – as it has throughout its past. Tropical Storm Irene and “Superstorm” Sandy displaced large amounts of sand from the beach and altered its shape and appearance. This is nothing new, though. This beach has been moving for hundreds of years – since it was created, in fact. The movement of beaches and the shoreline is all part of a natural process. Barrier beaches have a tendency to “roll over” themselves.

“Sand on the water side is pushed landward by waves (wash over fans) and wind (dune migration). This removes sand from the water side and deposits it on the landward side of the beach, which typically buries back beach marshes or lagoons. Over time the whole beach system moves landward,” explains former Connecticut state geologist, Ralph Lewis. This process also happens when storms wash over the beach and displace some



Piping plovers.

Photo by Dave Gumbart.

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A Time Series of Griswold Point

1883



1934



of the sand on the front of the beach to the back. These factors, in addition to sea level rise, create the rolling action, slowly moving or “rolling” the beach landward. This can be clearly demonstrated in the time sequence of aerial shots of Griswold Point from 1883 to 2012, shown above. You can

see how the beach has changed shape and moved landward.

While the aerial photographs tell a compelling story of change, so does an oil painting by William Chadwick, circa 1910, showing a large rock when it was buried in the beach before present-day erosion removed the sand.

In 1994 William Hubbell brought the painting out on an easel at low tide and tried to match the same location where the painter would have been sitting.

The authors surmise that the rock has tilted due to erosion since the early 1900’s and so is presently at a slightly



© William Hubbell



1995



2006



2012

different angle than in the painting. Bill and other family members suspect the shifted appearance could be the result of “artistic license,” a trick to draw the eye to the center of the painting. Regardless of its tilt, the rock is now more than 150 feet from the beach on which it was once a popular perch; the shore has moved this far inland.

As we enter into another hurricane season, the Connecticut shoreline will inevitably be subject to more storms, whether of hurricane strength or not, and sand beaches and dunes will continue to shift.

“Nothing endures but change.”

–Heracitus, 540 – 480 BC

About the authors:

Clay Arnold is a freshman at Endicott College. He researched this article as part of an internship with Connecticut Sea Grant. Joel Stocker, an Extension Educator at UConn, specializes in geospatial analysis and training. He flies a remote control plane and quad copter in his spare time, capturing striking images of changes to the Connecticut shoreline. Juliana Barrett is an Extension Educator and Coastal Habitat Specialist with Connecticut Sea Grant focusing on climate change adaptation and coastal habitat management.

SHORELINE CHANGE,

whether erosion or accretion, is inevitable in sandy areas. In order to look at this shoreline change for Connecticut, Connecticut Sea Grant (CTSG) and the Center for Land Use Education and Research (CLEAR) have teamed up with the Connecticut Department of Energy and Environmental Protection (CTDEEP). With funding from National Sea Grant, the partners are conducting a GIS time series analysis using maps of the Connecticut shoreline from several different periods over the last 100 years. Added to a software tool developed by the US Geological Survey called the Digital Shoreline Analysis System (DSAS) these will help determine areas of erosion and accretion along the shoreline. The results of this analysis will show not just areas that have shown recent erosion, but how areas are changing over a 100 year period. There will be areas that are continuously eroding or accreting, as well as areas that erode and accrete over time. The results of this analysis will be shared with shoreline communities to help determine how to best balance protection of infrastructure and natural resources.