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Shifting Sands, Shifting Strategies

by Jenna Whewell

Right now you are wearing a winter hat, gloves, a thick wool coat, and winter boots, standing upon the desolate, cold, and exposed winter beach. You see the sand bar in the distance that has been formed from the waves moving the sand that once covered the beach in the summer and realize that you are reviewing a dynamic natural force. As the freezing breeze blows harshly into your face, sending a straight chill down your back, you recall hot sand, refreshing cool water, thrilling waves, and radiant sunsets of the summer that draw not only you, but flocks of others to the shore.

Between Memorial Day and Labor Day, tourists from surrounding states rush to Connecticut's coastline to enjoy the refreshing and invigorating elements of the beach and the ocean beyond. However, it wasn't always that way. The idea of the beach has ebbed and flowed through history from a place of health, to reflection, and now vacation.

On the surface, the beach has become a great recreational pastime, but both nature and human impacts affect the geography and biology of the shore, so it is by no means a static entity. Through both political and individual decisions, we strive to restore the beach to conform to what we desire or recall. But before discussing the ever-changing shoreline, and what we do to try to prevent that change, let's consider the very long history of the beach and how its perception has changed over time.

Human perception of the shoreline has been intertwined with wars, commerce, and conquest. In times gone by, people actually feared the beach and the ocean, because it represented the unknown—what if the beach was the end of the earth? The progressional change of purpose for going to the beach begins in the seventeenth century and continues until present day.

During the seventeenth century, health was becoming a large issue for all. It was anecdotally assumed that mineral springs had healing potential; therefore, mineral springs were being sought for medicinal purposes. In 1667, Dr. Robert Wittie went to Scarborough, England in hopes of finding mineral springs closer to the

seashore cliffs. Yet the mineral springs near the shore were not as abundant as inland; therefore, he shifted his attention towards the ocean to cure ills. His justifications were that the sea would never dry out and there was never any crowding....then.

The eighteenth century brought upon the Enlightenment. Romanticism blossomed, and poets revolutionized the shore by transforming the perception of the beach from a feared place of hard substances, made of only salt and sand, into having a more symbolic value. Glorifying mental and physical benefits of the seaside brought forth a greater force beyond poetry and medicine. Because of the breathtaking scenery, the refreshing breeze, and the cooling water, the beach inevitably became a commodity.

During the nineteenth century changes in society, such as new forms of transportation and more leisure time, led to the birth of vacationing and a booming tourism industry.

In the twentieth century the beach evolved into what it is today: swarms of people lying blanket to blanket, concession stands, seaside resorts and parks. In Connecticut, beaches such as Hammonasset, Sherwood, and Seaside Park became, and still are, extremely popular. Hammonasset, in Madison, was undertaken by the Connecticut State Park and Forest Commission, now known as Department of Environmental Protection (DEP), for use as a public park in 1914. In 1920, the park opened. In that first three-month season more



Kellogg family

Taking advantage of leisure time, an extended family enjoys a beach vacation in Milford, Connecticut, circa 1900.

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than 75,000 visitors went there.

As the years went on, the park size increased, more facilities, campsites, and other conveniences were added; thus, increasing the number of visitors per season (www.friendsofhammonasset.org).

Sherwood Beach in Westport was considered for park designation at the same time as Hammonasset in 1914 by Connecticut State Park and Forest Commission. Yet, a two-decade war broke out between the state and the nearby residents. The residents did not want a park in their backyards, but the State eventually succeeded by receiving enough support to eventually follow through.

Seaside Park in Bridgeport is an early example of a partially artificial beach. Seaside Park “took its present shape between 1865 and 1920. Before 1869, the land west of the statue of Elias Howe was underwater. The area between Park and Iranistan Avenue was the first to be drained and dyked...The city acquired the waterbound area that compromises the west beach and Fayerweather Island in 1911, and completed construction of a seawall in 1919 that connected to the mainland.” (www.ci.bridgeport.ct.us).

Now, most of the population lives, if not on the shore, definitely near the coast. As population has increased, so has the crowding of the beaches. Crowding of the coastline affects much more than your ability to find a spot on the sand. Small towns along Connecticut shoreline are bombarded with tourists from surrounding towns and states, causing traffic congestion along I-95. Beach season also affects pollution. Litter becomes piled on beaches; car emissions fume everywhere because of the



The wooden steps to the Boardwalk in Niantic are shown here in 2004 (L) and in 2007 (R). Engineers anticipated the seasonal rise and fall of the beach by including deep-rooted supports into the design of the lowest steps. Unfortunately, the steps now are undermined and exposed year-round.

increase in traffic. Beach time is a great time, but it also has many consequences.

Once all the tourists have left, and the quiet shoreline towns of Connecticut have returned to their normal, “off-season,” beat, there is yet another factor. State and town officials have to look upon our beaches and ask—will they be there next season?

Beaches are not stable. The sand does not become frozen and the waves do not stop. As the waves continue to hit the shore, they transport sand both to and from the shore, but it doesn’t necessarily end up in the same place from where it came. The waves hit the shore at an angle, transporting the sand in the direction they are headed. This is a simple definition of a long shore current. As the waves continuously shift sand, they also move the beach. Large breaking waves can also erode sand from beaches. If a storm arrives, which is not unusual on the Connecticut coast, the impact is increased, either leaving the beach depleted of sand or depositing heaps of sand from elsewhere. When there is no sand, there is no beach. Various actions have been taken in preventing the movement of the beach, or replen-

ishing the beach.

A recent example of beach recovery is Hammonasset Beach in Madison. A meeting open to the public was held by the DEP in April 2007 to discuss the causes of beach retreat, and to evaluate possible solutions to recover West Beach in Hammonasset. Frederick Riese, at the Connecticut D.E.P.’s Office of Environmental Review, outlined four possibilities. The first is ‘managed retreat,’ which would be to move the park’s infrastructures inland. Such a move would allow the beach to continue to migrate landward.

The second possibility would be to take sand from Hammonasset’s East Beach to replenish its West Beach. Yet, as Riese states, “these solutions involving sand sources in the park are at best short-term solutions, due to the limited volumes of sand available.”

The third possibility is the construction of an offshore breakwater or sand bar, which would absorb the wave energy and create a sheltered environment between it and shore.

The fourth, and most likely option, Riese states, “involves beach nourishment using sand from either marine, riverine, or upland sources.

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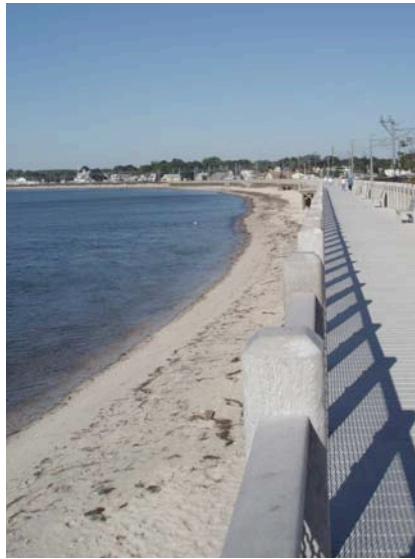
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This would involve dredging sand from areas either offshore of the park, in Clinton Harbor or the Housatonic River or elsewhere, or transporting upland sand to the park from source areas such as Cape Cod or Long Island.” Detailed surveys of the existing beach topography and offshore bathymetry are underway to determine the volumes of sand needed. The grain size of the new sand should match the existing beach sand as closely as possible. A groin, a long wall perpendicular to the beach, could possibly be built to absorb wave action and help keep the sand in place.

“Building a groin would increase the life of the improvements, i.e., the sand would erode more slowly, but would increase the cost of the project, and would have a range of both positive and negative recreational and aesthetic impacts on the park,” said Riese.

So with one decision come a few others. When making these decisions, state officials must also consider money, aesthetics and attraction of the park, and environmental issues. But never fear, they have help. These “detailed surveys” will be performed by experts who will aid in selecting the best solution. The experts are comprised of marine engineers, biologist, archaeologists, traffic engineers, recreational planners, and environmental analysts. On top of choosing the best option, the team will also prepare an Environmental Impact Evaluation which will analyze the different existing impacts that the solution will have on the park, environment, and community.

Another location that is threatened every year is the Boardwalk in Niantic, Connecticut. The Boardwalk runs along the side of the Niantic Bay where many residents and tourist use it daily to



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In Niantic, beach sands have retreated as the water's edge migrates landward, closer to the popular Boardwalk.

enjoy the view. Half the Boardwalk resembles a seawall constructed of inappropriately-sized rocks. After most storms the wall is partially or completely destroyed, leaving half the Boardwalk out of use, until it is fixed.

Fixing the problem of the moving beach seems like an easy decision with sand replacement or building a seawall. After all, these solutions attempt to keep the beach static. The beach lures people in

year after year which definitely help the economy of a coastal town. Everyone enjoys going to the beach, so why shouldn't we struggle to keep it the way it is? The environment and ecology must be closely considered.

Geologist Ralph Lewis is concerned with the way we view our beaches. “We are trying to control the most mobile part of the earth,” he says, and we are, by trying to create stable things around an unstable environment. He states that “most erosion occurs during catastrophic events” (such as storms), which puts into question the strength and longevity of any infrastructure trying to control the beach.

Infrastructures need to be viewed as continuous projects. The option of building a structure for a “100-year storm” or a “30-year storm” can be misleading. The terms refer to intensity rather than frequency. A high intensity storm might strike, on average, once in 100 years, but it could happen tomorrow. Preparing for the worst case scenario is what matters.

Living in Connecticut, one



Jenna Whewell

This collapsing section of Boardwalk in Niantic, shows both structures intended to provide stability and cement curbing originally intended to be decorative, but later undermined as rocks slumped and waves overtopped the walkway.

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Matthew Bristol

The author experiences the sharp autumn/winter drop-off of eroded beach sand personally, during a walk with her boyfriend (the photographer) at Hammonasset Beach in Madison.

knows how many storms hit the shore...quite a few. There is also the option of sand replenishment, the same idea that is being considered for Hammonasset. Sounds a little less destructive, but it actually throws off the ecology of the shore if the necessary precautions are not taken. Sand brought in from an outside resource may be rejected by the beach it was brought onto. The wrong-size sand will be foreign if it does not match the existing sediment, and will not stay long.

In the 1950s, Ocean Beach in New London, Connecticut was replenished with the wrong-size sand and the beach was depleted as soon as it was recreated. The new sand didn't take. Lewis explains that the "natural energy regime that [the sand] exists in" needs to be the same in order for beach replenishment to work.

Yet, there is an up side to all of this. The geography of the Connecticut coastline prevents more critical damage from happening. Because Connecticut is sheltered by Long Island, there is not much fetch for the waves to increase their energy. Fetch is the distance traveled by waves without obstruction; it depends on wind direction

in coastal waters. Fetch and wind speed are two key factors that determine the size of the waves.

"When a strong wind blows from the southeast, a direction with long fetch between the tip of Long Island and Fisher's Island, large waves are generated that can impact the Niantic Bay coastline," explains Michael Whitney, an oceanographer at the University of Connecticut's Department of Marine Sciences. Whitney adds that Long Island provides more shelter from large waves for the more western Connecticut beaches. Nearby beaches open to the ocean, such as Rhode Island's Misquamicut Beach, typically have larger waves than Connecticut beaches because of stronger winds and longer fetches.

Because of the Long Island blockade, Connecticut's shoreline on a whole is much safer

than other shorelines along the northeastern U.S. coast. The impact is seen on a smaller scale, for example, within local beaches, and the local beach towns. So what now?

Every season there will always be decisions on what to do with the moving shore. No matter how many attempts are taken, the shoreline will not stop moving because we tell it to. Simply put, there are only two roads that could be taken. Either continue beach replacement or let nature take its course. Either way, there are crucial decisions to be made and follow-up consequences that we must face.

About the Author:

Jenna Whewell is a Sea Grant Communications Intern and a Maritime Studies major at UConn. She lives in Niantic, and she loves the beach! Jenna also took the cover photo of the winter beach at Hammonasset and her dog, Briar.