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Swanson: Remember Long Island's lagoons in future storm planning

Originally published: February 1, 2013 2:46 PM
 Updated: February 1, 2013 8:15 PM
 By R. LAWRENCE SWANSON

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Photo credit: Peter Kuper | There's no question that the barrier islands and marshes reduced the impact of Sandy on the "mainland" of Long Island.

While the devastation of superstorm Sandy is still fresh in our minds, planners and emergency managers are struggling with how to be better prepared for similar events in the future. Part of the debate concerns the value of preserving -- and even creating -- soft, green, marsh-type environments in critical locations, as opposed to constructing hard, technological fixes such as storm-surge barriers. Long Island's extensive South Shore lagoon system, rich with tidal marshes, can inform that discussion.

There's no question that the barrier islands and marshes reduced the impact of Sandy on the "mainland" of Long Island. The barrier islands absorbed and reflected wave energy and channeled

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wave-generated currents parallel to the coast. Dunes, where present, greatly improved the barrier islands' effectiveness.

Much of the sand that made up the now badly eroded barrier islands is temporarily naturally being stored in offshore sandbars and will be transported shoreward once again during the relatively calm oceanic conditions of summer. As the storm surge -- the difference between the storm-driven water level and the predicted tide -- flooded the lagoons through inlets, breaches and overtopping the beaches, the friction created by the marsh grasses slowed the progression of the surge. Without this calming effect, [Island Park](#) and [Bay Park](#) would have seen greater damage.

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The channels -- particularly deepened, dredged ones -- stored water, but they also provided a conduit for the surge to readily reach the interior of the shallow bays. As the surge associated with the first high tide of the raging storm began to retreat, the process was somewhat reversed: A balance was achieved between the tendencies of water to be rapidly removed through the channels, yet impeded by the friction of the marshes. Breaches served as relief valves to more expeditiously reduce the surge trapped behind the barrier islands in the [Great South Bay](#). In some places, the surge wasn't completely drained by the immediately succeeding low tide, and the bays began to fill more rapidly as the second high tide began to rise.

These lagoons performed as expected, serving as shock absorbers for Long Island, yet they did not prevent flooding. While they constrained the forces of the waves and currents, they didn't reduce the elevation of the surge. Once the surge entered the South Shore bays, the water level rose essentially to that of the open ocean. For example, even though protected by the barrier islands and marshes, the Bay Park Sewage Treatment Plant was still badly flooded.

Even without the sea-level rise predicted to occur as a result of [climate change](#), a storm surge from a hurricane similar to Sandy could be worse. Much was made of the fact that Sandy coincided with the full moon -- which meant tides with higher high waters than normal. Fortunately, it was only a modest moon tide, and the maximum surge actually took place near the time of the lower high tide that day. Had the storm arrived at new moon -- when it was closer to [Earth](#) in mid-October -- the ultimate water level would have been a foot higher. If at the time of the super moon in May 2012, higher still.

As we plan for the storms of the future, we must keep in mind that while "green solutions" such as natural and constructed wetlands might mitigate some storm forces, they won't hold back rising water. Sandy and many other storms -- like the 1962 Ash Wednesday and the Dec. 11, 1992, nor'easters -- demonstrated that. It's unreasonable to expect that constructed barrier islands and associated wetlands, complete with oyster reefs, will hold back rising water for an area like lower Manhattan. More traditional engineering approaches -- such as the storm barriers that have been constructed in the Netherlands -- will be necessary.

These have their own issues, including environmental concerns, social issues (who's protected and who isn't?), cost and reliability.

On Long Island, it's impractical to consider constructing hard barriers to protect our extensive lagoonal systems. The entire ecological functioning of these lagoons would be altered. They and the ecosystems they protect cannot be maintained behind artificial fortifications.

Seafaring people know not to turn their backs to the ocean. But, we as a society, have. We have built where we should not. When nature has its way, we ask why government hasn't protected us and what it will do to help rebuild and protect us from the next event. The kind of punishing storm and associated surge once considered unlikely have now occurred. And while it could have been worse, with the current rate of sea-level rise, these extreme events will take place more often. A commonality of past East Coast storm surges is that with the passage of time and the persistence of property owners, communities have been re-established where they will inevitably be destroyed again.

Testimony and debate at the [New York State Assembly Standing Committee on Environmental Conservation](#) hearing Thursday in [Lindenhurst](#) showed that there are strong and differing views about how to deal with rebuilding devastated communities. It is time for our government at all levels to

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aggressively lead. Protect the wetlands, rebuild the dunes and construct new dunes where they didn't exist previously. Despite their limitations, these barrier islands and lagoons are our best defense. More exposed areas such as [New York Harbor](#), particularly off lower Manhattan, Staten Island and [Jamaica Bay](#), require a creative mix of hard and soft solutions -- not one or the other -- to lessen the impacts of waves, currents and surge.

Most important, government must have the backbone to require that construction be built back and up from the coastline. And because this rebuilding is occurring now, new guidelines must be immediately forthcoming. Zoning and building codes need to be strengthened and adhered to. Variances have been granted too often, and they must be reduced.

These measures are essential to save lives, preserve property and reduce the need for large taxpayer-supported subsidies when coastal flooding inevitably happens again.

R. Lawrence Swanson is associate dean of [Stony Brook University's School of Marine and Atmospheric Sciences](#).

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