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Sandy recovery: Walls won't stop superstorms

After Sandy, New York and other cities want to protect themselves, but walls only provide expensive false security

BY DAVID GESSNER

TOPICS: CLIMATE CHANGE, GLOBAL WARMING, HURRICANE SANDY, SUPERSTORM SANDY, LIFE NEWS

FILE - In this Wednesday, Oct. 31, 2012 file photo, waves wash over a roller coaster from a Seaside Heights, N.J., amusement park that fell in the Atlantic Ocean during Superstorm Sandy. (AP Photo/Mike Groll, File) (Credit: AP)

If the sea is pouring in, if a place is flooding and we don't want it to, most humans have a fairly primal response: build a wall. This response is so ingrained, and so

seemingly common-sensical, that it is hard to uproot in people, and communities. After all, exactly what is wrong with building a wall to hold back the water?

Well, it turns out that what sea walls do is kill natural shorelines and beaches, and those beaches and shores are what protect us during storms. To vastly oversimplify: throw up a wall and water no longer rolls in and out, the natural slope of the ocean floor is destroyed, and you have a deep pool of water slapping against that wall. Which is fine unless the wall is breached.

Perhaps the most glaring example of the troubles that walls can bring occurred in Galveston, Texas. In 1900, that island town was hit by a hurricane with sustained winds of over 120 mph that ripped through the town, dragged its buildings out to sea, and killed over 5,000 people in the worst natural disaster in U.S. history. The town responded, after the horror and shock, not by retreating, but by erecting a 17-foot-high wall in front of the beach, protecting them, or so they imagined, from any future storm.

I first learned about Galveston from the Duke coastal geologist Orrin Pilkey during a trip down the Outer Banks.

"What the wall really did was kill the beach," he said then. "The beach is what naturally protects an island. You put a wall up and the ocean swallows the beach up to the wall. Ensuring eventual disaster."

Pilkey uttered those words over a year before Hurricane Ike made landfall in Galveston as a Category 2 hurricane in the fall of 2008. Sure enough, waves toppled the sea wall, the eroded beach offering no protection, and flooded the town while washing away hundreds of homes and killing over a hundred people. A day later, two meters of water — or approximately 7 feet — filled the Galveston County Courthouse. The thousands who had refused to evacuate and managed to survive spoke of the horror, brutality and sheer noise of the storm. While Ike did not get the press that Katrina did, at the time it was the third most destructive hurricane in U.S. history.

So, if walls are out, what is to be done? When Pilkey, and many other coastal geologists, give their answers to this question they often sound a little like Monty Python's Knights of Knee: *run away, run away!*

During our trip down the Carolina coast, Pilkey and I stood among dozens of houses that looked like they had tried to do just that, only to be run down and caught by the sea. At Topsail Island, for instance, we walked far out on the wet low-tide sand, where you might expect to walk picking up shells or sea glass, and stood below large abandoned homes on stilts. Hundreds of sandbags leaned against the stilts, though to call them "bags" is to not get the point across. They were enormous, 10-feet long and terrifically ugly, great lumpish loaves that transformed the beach into a war zone. Farther out water washed over the sandbags at their base and waves sloshed in the spaces beneath the houses. The houses themselves, stranded out on the low tide beach, distanced from their usual

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surroundings of roads and neighboring homes and telephone poles, had the look of sci-fi space stations, floating far away from earth. Stairs ran down off the houses and hung in the air, hovering above the water, and "Condemned: Do Not Enter" signs shone orange in the windows. It was a truly wild sight, no less wild for the fact that the structures were man-made.

As he stared up at the houses, Pilkey summarized the three basic choices for any beach community with eroding beaches (which is to say almost *all* beach communities) as being: 1) arming the beaches with sea walls and metal groins or jetties, 2) dumping more sand on the beach or 3) relocating the houses, that is, retreating. Orrin made it clear what he thought of the first two options, which wasn't much. According to him, sea walls, jetties and groins didn't work, ultimately destroying beaches, and so-called beach nourishment, or sand-dumping, was equally ineffective, depending on hard-to-find, high-quality sand.

"The way to go, I think, is to relocate and get out of the way or stay and do nothing," he had said to the homeowners. "If the buildings fall into the sea, they fall into the sea."

* * *

And yet. And yet. Something is there that really likes a wall. That something, deeply ingrained in our DNA, developed out of a natural desire for self-protection. Do *nothing*? *Really?*

Let's just say for a minute that we were able to convince people in beach communities that they should back away from the sea; let's say that science won out and people happily, and logically, abandoned their beach homes. Well, OK, that would be great, though obviously unlikely. But even that fantasy is not as far-fetched as the idea that people would ever back away from the water in New York City. Or that New Yorkers would ever be able to stifle their own wall-building instincts.

A year after Pilkey and I explored the Outer Banks, we took a tour of New York City. Our main purpose was to get a sense of how a hurricane would impact the place, but we also took some time to talk to scientists about plans to protect New York from a hurricane. We visited NASA's Goddard Center for Space Studies, which is housed in a nondescript apartment building above Tom's Restaurant, the same restaurant that was used as the exterior shot for the famous hangout for the Seinfeld gang. But if the Seinfeldians liked to talk about nothing, the scientists upstairs were focused on a very particular something: New York's doom, not from ennui, but from weather.

The picture painted was fairly grim, the solutions few, but Dave Logan, a NASA scientist working on a climate change report for the city, was surprisingly upbeat about the way New York had prepared to that point. When I asked, he was happy to provide a concrete example of that preparation.

"Currently we are building storm surge barriers around all the wastewater plants," he said. "Now that is something that is going to make a huge difference in a storm."

I agreed that that was a good start. Other "solutions" included zoning requirements that would incorporate climate change predictions into building requirements, barriers for subways, restrictions for coastal development, and raising infrastructure, as much as possible, above the predicted sea level rise. And then there was the big solution, the grand solution, the eventual solution: the building of dikes or other barriers in the manner of that sinking nation, the Netherlands.

"That's off in the future 20 or 30 years," he said. "We need to tackle short-term goals now."

But in the wake of Sandy the long term has become the short term, and it turns out that there are those who have been planning for the biggest wall of all. In fact, the Storm Surge Research Group at Stony Brook University, headed by Malcolm Bowman and engineer Douglas Hill, have mapped out a plan that includes three large barriers at the Verrazano Narrows, Arthur Kill and Throgs Neck, barriers that would theoretically shield Manhattan in the manner of the Eastern Scheldt barrier that protects the Netherlands.

Of course it's not quite so simple. Beyond the staggering costs, there are countless problems with constructing such barriers, starting with the question of their effectiveness. Klaus Jacob, a Columbia geophysicist who worked on the climate change report along with Logan and others, is deeply skeptical about dikes and barriers. Jacob has consistently played the Pilkey role in the New York debate, and he thinks that barriers or walls would just give people a false sense of security.

"The higher the defense, the deeper the floods," he has written.

Jacob is one of the few people who, before Irene and Sandy, really gave deep thought to what a major hurricane would do to New York. In his work he has no problem envisioning, and describing, the devastation. Long before the rest of us, he saw streets like rivers, flooded subways and little chance for true evacuation, a Galveston with millions, not thousands, of people. His only practical solution sounds a lot less optimistic than that of Dr. Mason, and sounds a lot like the solution that Orrin has suggested for the Outer Banks. Get the hell out of low-lying areas.

Not long after Katrina he suggested the same to the residents of New Orleans, causing a stir by writing one of the first papers that suggested it was foolish to rebuild New Orleans. The idea might have been politically controversial, but Jacob argued that it was also innately common-sensical given sea level rise and the fact that parts of New Orleans are actually 10 feet *under* sea level. Why spend a hundred billion dollars to rebuild when the odds are it's going to happen again fairly soon? He wrote: "Some of New Orleans could be transformed into a

'floating city' using platforms not unlike the oil platforms off-shore, or, over the short term, a city of boathouses, to allow floods to fill in the 'bowl' with fresh sediment." New Orleans, he went on, would become an "American Venice."

In fact there are those who see the same fate for New York. The architect Adam Yarinsky recently won a $10,000 History Channel prize for envisioning the Manhattan of the next century, a design that, based on predictions of sea level, included canals running where some streets do now. Is this far-fetched? Perhaps. But perhaps we are just not looking, or thinking, with a large enough historical perspective.

"Many ancient cities of great fame have disappeared or are now shells of their former grandeur," writes Klaus Jacob. "Parts of ancient Alexandria suffered from the subsidence of the Nile Delta, and earthquakes and tsunamis toppled the city's famous lighthouse, one of the 'Seven Wonders of the World.'"

Jim Hansen, head of the Goddard Institute, takes things a step further:

> How much will sea level rise with five degrees of global warming? Here too, our best information comes from the Earth's history. The last time that Earth was five degrees warmer was three million years ago, when sea level was about eighty feet higher.
>
> The Earth's history reveals cases in which sea level, once the ice sheets begin to collapse, rose one meter (1.1 Yards) every twenty years. That would be a calamity for hundreds of cities around the world.....

All of a sudden these words don't seem so extreme. What Sandy has made clear is the obvious: 8 million people live on an island that is close to sea level with little chance of evacuation. Experts can talk in a positive fashion about "solutions," but the truth is that while sewage barriers are nice, the current strategy really comes down to being lucky. We can create barriers for sewage plants — and by all means we should — but we can't control what is essentially uncontrollable. No one wants to hear it but the real conclusion of an honest climate change impact report would be pretty simple: Keep your fingers crossed.

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