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Rising sea levels threaten Delaware

Coastal, inland areas face habitat loss, flood damage

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For the last century, the sea level along the Delaware coast has risen an average of about 3.2 millimeters a year.

That's about the width of the letters "t" and "h" at the start of this sentence, unnoticeable to most people, unless they drive along the winding back road named Thirteen Curves that leads to Fowler Beach.

In 2006, a team of volunteers built a bird-viewing platform west of the sand dunes -- several hundred feet from Delaware Bay. Today, the access ramp is gone, and the platform is in the tidal zone. So much of the parking lot has washed away that crews moved the dead-end barrier landward, and the once-fresh marsh is filled with salty bay water.

Erosion and storms, combined with sea-level rise, have pushed this strip of land along Delaware Bay to a tipping point between being part of the land or part of the bay.

Prime Hook National Wildlife Refuge Manager Michael Stroeh plans to leave the platform there as long as it's safe.

"It's a great illustration," he said. "The bay is moving in."

And you don't have to live on the beach to be affected.

David Carter, a manager with Delaware's Coastal Programs office, said rising sea level affects people the length of the state.

"People see it as a beachfront, coastal issue," Carter said, adding that rising sea level affects communities from Wilmington to Milford to Seaford.

To the south of the bird platform, a marsh used to line the road at the small community of Prime Hook Beach. Today, it's so inundated with water that it looks like a lake.

"You have to see it to start believing it," Stroeh said.

Among Delawareans, 63 percent believe that sea levels are rising, according to a 2010 survey commissioned by the Department of Natural Resources and Environmental Control. A third aren't convinced.

Carter said planning for sea-level rise is a no-lose proposition.

"If we are completely wrong, the very worst we will have done is protect life and property in coastal storms," he said. "It's just sound coastal management."

Scientists generally believe sea-level rise is real and caused by the earth's climate getting warmer. On Wednesday, people will gather in Dover to discuss the implications as the League of Women Voters host Sea Level Rise -- How will Delaware Adapt?

The program is designed to explain why sea level is rising, the impacts on the state and what officials are doing to address the threat.

Carter said data show that sea levels definitely have risen a total of about 1 foot over the last 100 years. Less clear, he said, is whether the rate of sea-level rise is increasing with global warming.

Some scientists are concerned that higher temperatures from global warming will make warmer ocean waters expand and also speed the melting of ice sheets in Antarctica and Greenland, greatly increasing the rate of sea-level rise.

The International Panel on Climate Change has concluded that sea levels could rise as much as 2 feet during the next century.

Because so much of Delaware's coastal area, from wetlands to beaches, has been altered by draining or filling wetlands for roads, housing and mosquito control or while shooting sand on beaches to cope with shoreline erosion -- it is hard to get a clear picture of sea-level rise.

But one clue could lie in the tide data collected at Breakwater Harbor in Lewes for more than 50 years.

In the 1980s, there were typically 10 to 20 times each year with consecutive tides about the mean high-water level. In 2009, the number of consecutive tides above mean high-water level was exceeded 30 times. Last year, it was exceeded 27 times.

Another benchmark the U.S. Fish and Wildlife Service looked at when it assessed the situation at Fowler Beach was that the number of coastal flood warnings issued by the National Weather Service also has risen.

Problem a statewide issue

In Wilmington's Southbridge neighborhood, higher sea levels have led to increased flooding.

"We are very much aware" of the problem, said Marvin Thomas, president of the Southbridge Civic Association.

Flooding already occurs during storms, and the state's sea-level inundation model suggests that, with a rise of 1.64 feet, Plant Street, parts of A and B streets and East Eighth Street would be under water during a normal high tide.

With a 3-foot rise in sea level, historic areas like Fort Christina and Old Swedes Church would be compromised.

South along the bay, Delaware City Mayor John Martin said, flooding is a growing concern.

"One of our biggest issues is access in and out of town," he said.

When water levels in the Dragon Run Creek are high, the roads flood.

With sea-level rise, "we'd kind of be an island community," Martin said. "But we have a really nice marina."

This comes as municipal officials have worked on increasing tourism, revitalization and improvements to the scenic Del. 9 byway, one of the state's most vulnerable roads, Martin said.

What can Delawareans expect sea-level rise to look like?

Carter said downstate residents can think about the inundation from the Mother's Day storm of 2008.

The difference is that in a storm, floodwater recedes. With sea-level rise, the water doesn't go away.

The state must account for sea-level rise in its planning, said Collin O'Mara, the state environmental secretary. To do otherwise "is just irresponsible," he said.

State and local officials need to make sure the investments they make today won't end up under water, O'Mara said.

People should be asking, for instance, whether they should invest in raising a road or relocating residents, he said.

"It's not an overnight transition," he said. "It's a generation, not just in a few years."

With planning, state and local officials won't be faced with crisis decision-making to "fight or flight," O'Mara said.

Short-term fixes under way

Carter's team already has worked with residents in Southbridge, and they are working with other low-lying and coastal areas.

A 2006 South Wilmington Neighborhood Plan looked at ways to alleviate existing flooding.

"There's a drainage problem, and we are on the borders of the Christina River," he said. "There's no place for the water to go except back into the community."

One idea, Thomas said, is to use open space in the area to create a flood-retention system to capture excess water.

But what to do about places like John Chirtea's neighborhood at Prime Hook Beach, where flooding already is a way of life?

The community has an early taste of what sea-level rise may look like. Three breaches in the dunes to the north have caused extensive flooding of the marsh.

For the short term, Chirtea believes, state and refuge officials simply need to fill the breaches.

"Everybody understands it's a temporary fix," he said.

Federal officials are seeking a state permit to close the three dune breaches and build a low dune to repair the wetland damage.

There is opposition from Delaware Audubon and the Public Employees for Environmental Responsibility, who question the environmental impact of the proposal.

Stroeh said the bird platform, built in 2006, is a nice example of the importance of taking account of possible sea-level rise.

"If we would have thought ahead, we wouldn't have built it there," he said.

These days, U.S. Fish & Wildlife Service officials also acknowledge that the decision in 1988 to convert salt marsh to freshwater ponds and to repair dunes damaged by storms, "however well-intentioned, probably exacerbated the problems we confront today," according to an environmental assessment done last year.

The creation of the fresh marsh from the naturally occurring one was done by using the dunes as a dam on the eastern side and a water-control device on the west. But when the dunes were breached, the salt water came gushing in.

The plants in the freshwater environment aren't as effective as saltwater varieties in building up a base of organic material to keep pace with rising sea level, Stroeh said. Sea level is rising at a rate of 3.2 millimeters to 3.3 millimeters a year in the area, he said, while the fresh marsh was accreting at a rate of 1.7 millimeters -- not enough to keep pace. To the north, meanwhile, the natural salt marsh has been keeping pace with sea-level rise, he said.

The implications have been significant. The dune breaches allow thousands of gallons of salt water into the once-fresh marsh -- causing flooding in neighboring Prime Hook Beach.

The flooding also has caused significant habitat loss and is beginning to affect forested areas as salt water migrates from the marsh through inland guts.

"I need a marsh," to provide habitat for migratory birds -- the mission of the refuge, he said. "It's all open water, and that's real bad" for diversity.

Stroeh said the rapid changes at the refuge caught everyone by surprise.

"All of us are just starting to figure out we've got problems on the horizon."
