

Studies Predict Rapid Rise in Sea Levels Along U.S. East Coast

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Sea levels could rise faster along the U.S. East Coast than in any other densely populated part of the world, new research shows, as changes in ice caps and ocean currents push water toward a shoreline inlaid with cities, resort boardwalks and gem-rare habitats.

Three studies this year, including one out last week, have made newly worrisome forecasts about life along the Atlantic over the next century. While the rest of the world might see seven to 23 inches of sea-level rise by 2100, the studies show this region might get that and more -- 17 to 25 inches more -- for a total increase that would submerge a beach chair.

Might.

Scientists say the information comes from computer models, which could be wrong. And the mid-Atlantic region's ample high ground means it will probably never be as vulnerable as Louisiana and Florida.

But some are already sketching a new vision for the East Coast, as a region under siege by the ocean. In the coming decades, they say, it will probably be necessary to spend heavily to defend some waterside places -- and to make hard choices about where to let the sea win.

"There will probably be some very difficult decisions that have to be made," said Rob Thieler, a scientist with the U.S. Geological Survey. "Are there places where we should simply retreat because the cost of holding the line is unacceptably high?"

Today, the governors of coastal states from New York to Virginia are scheduled to release an agreement on Atlantic Ocean issues, including the need to prepare for sea-level rise. The governors will pledge to identify places and facilities most vulnerable to high water, including port areas, parts of the power grid and other infrastructure.

Researchers say rising seas are one of the most tangible consequences of a changing climate. They rise because they are warming, expanding in volume like a highway bridge on a summer day. And they rise because they are filling up, fed by melting ice.

In the 20th century, global seas rose about 0.07 inches per year -- a steady climb up tide gauges, even as the world debated the existence and the science of climate change.

"It doesn't matter who's causing global warming. Sea-level rise is something we can measure," said Rob Young, a geosciences professor at Western Carolina University. "You can't argue that sea level isn't rising."

And it has been rising faster in the mid-Atlantic because the land here is sinking.

Understanding this phenomenon requires thinking of the Earth as an enormous balloon. Push down in one spot on the ball's surface and surrounding areas are raised up. Glaciers did this to Earth's surface during the last ice age: They pressed down on northern North America and areas to the south tilted up, like the other end of a seesaw. Today, thousands of years after the glaciers retreated, the seesaw is tipping back the other way, and the region from New York to North Carolina is falling about six inches per century.

Researchers are finding that climate change could bring new bad luck by untracking a system of ocean currents that performs the astounding feat of keeping the sea here below the average sea level.

They say it works like this: Warm water from the south Atlantic flows north along the coast, cools off and sinks. That sinking happens on such a vast scale that the Atlantic's surface is lower here, a depression in the ocean 28 inches deep. But two new studies have shown that climate change could make northern waters warmer and could dump a disruptive flood of freshwater from melting glaciers in Greenland.

"You're getting less sinking, because [freshwater] is less heavy, it doesn't sink as much. That kind of slows down this whole conveyor-belt thing," said Gerald Meehl, a scientist at the National Center for Atmospheric Research in Colorado whose study of this phenomenon came out last week.

"You'd get an additional one or two feet over this global sea-level rise" along parts of the coast, Meehl said, an effect that would be strongest in the Northeast.

Another study last month found a threat from a Texas-size ice sheet in Antarctica. If it broke off and melted, the shift of mass from pole to ocean would change both Earth's gravitational field and its rotation.

The result? Still more water would slosh to the U.S. Atlantic Coast, along with the Pacific Coast. But in this case, it would probably not happen for centuries.

Scientists concede that these predictions could be flawed or flat wrong.

Even if they are right, New York still isn't in the same danger as New Orleans. Even a yard of sea-level rise, they say, would not put any major East Coast cities underwater. But higher waters would mean bigger storm surges, a greater chance of flooding on rivers such as the Potomac or the Patapsco in Baltimore.

It could be a much bigger problem for barrier islands and marshes, which are typically just a few inches above the water. Even before the recent research forecast accelerating rise, Blackwater National Wildlife Refuge -- a rare, vast marsh on Maryland's Eastern Shore -- was predicted to become mainly open water by 2030.

So some researchers have already begun thinking about how to defend the coast. Professors at the State University of New York at Stony Brook have suggested building barriers that might pop up during big storms and seal off the city's water like a bathtub. The fishing port of New Bedford, Mass., has had such a "hurricane barrier" since the 1960s.

In the Washington region, Environmental Protection Agency official James G. Titus said that Hains Point, along the Southwest Waterfront, and K Street NW in Georgetown might have to be elevated. Sections of the waterfront Fells Point neighborhood in Baltimore might also need to be jacked up.

And, Titus said, rural areas along the water might have to be abandoned. On Maryland's Eastern Shore, for instance, rising seas could eat up large sections of marshy Dorchester County.

A more uncertain fate awaits such places as Assateague Island, a celebrated nature preserve, or the Maryland and Delaware beach resorts. They sit on barrier islands, just a few feet above the water.

"If these sea-level-rise numbers . . . come to pass, then I think it's pretty much a certainty" that these resorts would be abandoned, said Young, of Western Carolina University. "We're going to be spending so much money protecting metropolitan areas that it's hard to imagine we'd have enough left over to protect resort communities."

For now, that idea is almost too big to think about for resort-town mayors.

In Dewey Beach, Del., Mayor Dell Tush said the town had been staggered by the \$12,000-per-house cost of elevating just a few homes that are too close to the water.

"The town basically has no plans, you know, for doing anything" to prepare for rising seas, Tush said. To raise all the town's houses "would be cost-prohibitive, it really would."

The threat is more tangible at Joey's Pizza and Pasta on Long Beach Island, N.J., another narrow, built-up barrier island. There, rain can bring Little Egg Harbor within a few feet of the door; a high tide and a good storm can put water in the dining room.

"You can't fight it. People say 'Sandbag the doors.' No, it comes in everywhere," said manager Tom Kowal. The restaurant makes light of its situation with a sign that says "Occasional Waterfront Dining." But Kowal said he is worried about what's coming.

"Ten inches higher than sea level right now? I'm underwater."