Sea-level rise becoming a hazard for South Florida neighborhoods miles from ocean

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Sea-level rise may appear to be a problem only for coastal residents, a hazard that comes with the awesome views and easy access to the beach.

But neighborhoods 20 miles inland are starting to feel the impact, as the Atlantic Ocean's higher elevation makes it harder for drainage canals to keep them dry. The problem showed up last year in Tropical Storm Eta, when floodwater remained in southwest Broward neighborhoods for days, partly because the elevated ocean blocked canals from draining the region.

"It was pretty scary," said Barb Besteni, who lives in far west Miramar. "I stepped out of house into ankle-deep water. It came three-fourths up the driveway. I'd never seen the water that high. It was scary because I didn't know if it was going to continue to rise."

Although her house in the Sunset Lakes community stands at the edge of the Everglades, the Atlantic's higher elevation prevented it from draining as efficiently as in the past.

"It took a very, very long time to recede," she said. "Two or three weeks to recede to normal levels."

The South Florida Water Management District, which operates the big canals that sweep water into the ocean, submitted a funding request to the state this week for fixing the system, with the preliminary list of projects carrying a price tag of more than $1.5 billion. Although expensive, the pumps and other improvements would help restore the efficiency of a system built after World War II that has become more difficult to operate at a time of rising sea levels.

"When ocean water is higher, we cannot discharge, so we close the gates to avoid ocean water coming inside," said Carolina Maran, district resiliency officer for the South Florida Water Management District. "During Eta, it was much higher than normal. And that means again that we cannot discharge to the ocean and that diminished our capacity to prevent and address flooding."

Storms overwhelm flood-control systems

Although there's never a great time to endure 15-plus inches of rain, Tropical Storm Eta struck South Florida at a particularly challenging period.

The ground already had been saturated by previous storms. And coastal waters were undergoing a king tide, a phenomenon that occurs when the positions of sun and moon combine to produce the highest tides of the year. As sea levels rise, king tides get higher.

The wide canals that run through Broward and Miami-Dade counties, carrying rainwater to the ocean, depend partly on gravity. When rainwater raises the level of the canal on the inland side, water managers lift the gate dividing it from the ocean side of the canal and the water flows away, eventually reaching the Atlantic.

But when the Atlantic side is high, there may be no difference in elevations between each side of the gate, so when it's lifted, the water doesn't move. Or worse, the Atlantic side could be higher, so lifting the gate would allow ocean water to pour inland.

During Tropical Storm Eta, staffers at the South Broward Drainage District found themselves consulting tide charts to determine when they could open the gates and discharge water.

"We had to close our gate because the downstream gets equal to our upstream," said Kevin Hart, district director of the South Broward Drainage District, which operates the canal system that feeds into the larger canals that drain into the ocean. "We don't want to drain in, we want to drain out. We've got to close our gate.

"We were looking at tide charts—Low tides going to be at 2 o'clock and

at 5 or 6 we can see the levels dropping and open our gate again."

Aging system confronts sea-level rise

Constructed largely in the 1940s and 1950s, South Florida's drainage system has been an efficient—some would say too efficient—system for keeping a once-swampy part of Florida dry.

The system contributed to the decline of the Everglades, at times flooding the area, at other times drying it out. But it accomplished what it was supposed to do, keeping the land dry for cities such as Pembroke Pines and Miramar by swiftly moving rainwater through a system of canals to the ocean.

But now that movement of water isn't that swift and doesn't always happen. As a result, people in cities without ocean views are finding that the water level of the Atlantic Ocean can affect their homes.

Although cities are installing pumps and other flood-control devices, they need capacity in the canals to get rid of the water.

"No matter what we do, if they don't lower those canals so our water can escape, there's nothing to be done," said Angelo Castillo, a Pembroke Pines commissioner. "We can spend as much money as we want on drainage but if they can't access the canals because the canals won't take that capacity, nothing that we do in terms of conveying water faster to those canals will work."

Sea levels have been rising at an accelerating rate, largely due to climate change caused by pollution from cars, power plants and other sources of heat-trapping gasses. A NOAA study says global sea levels have gone up 3.4 inches from 1993 to 2019.

In South Florida, estimates from the Southeast Florida Regional Climate Change Compact, which represents local governments, call for sea levels to rise another 10-17 inches by 2040.

Hoping to revamp the system for an age of rising sea levels, the water management district has proposed improvements at 23 drainage structures in Broward and Miami-Dade counties. They range from southern Miami-Dade County to the Hillsboro Canal, which separates Broward and Palm Beach counties.

The major projects would be the addition of powerful pumps to allow water to be moved to the ocean side of the canal when the ocean is too high to move water by gravity. But these projects are expensive.

The improvements, assuming they go through, could help homeowners with their flood insurance bills. A better drainage system could hold down rates and reduce the number of properties required to get flood insurance.

The water management district is seeking federal and state money for the work. As soon as the first funding comes through, the district plans to start designing the new pumps and other improvement for water-control structures on the canal that drains southern Broward and the one that drains northeast Miami-Dade.

Jennifer Jurado, who oversees climate-change planning for Broward County, said the improvements will help prevent neighborhoods from flooding in future storms, but the region needs to come up with ways to keep as much water as possible rather than just pumping it away.

"It's trying to ensure the system works at least as well as it was intended," she said. "It's a huge part of the fix. Our system can't just pump it out. We have to be able to store as much of it as we can because the rain that

falls is the rain we use for our water supply. We need to capture and store that water, in addition to providing flood relief."