Deep trouble: How sea-rise could cause havoc in South Florida

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The maps were intended to show how rising sea levels threaten some of Miami-Dade County's most vital facilities.

If they prove anywhere close to accurate, the fate of three major sewage plants would represent only the tip of a hulking, hugely expensive iceberg of concerns for South Florida.

Drawn up by climate scientists as part of an environmental lawsuit, the maps indicate the plants in coastal South Miami-Dade, North Miami and Virginia Key would remain dry in coming decades. But they'd be reduced to shrinking islands as high tides flood land, streets and neighborhoods nearby. It could happen faster than experts predicted only a few years ago - with a damaging two-foot rise potentially coming in less than 50 years, not the next century.

The sobering scenarios were filed last month in federal court by Biscayne Bay Waterkeeper, a clean-water advocacy group challenging Miami-Dade's $1.5 billion plan to repair the county's aging, spill-plagued sewage system. The Water and Sewer Department has drawn up the proposal, called a "consent decree," under the pressure of a U.S. Environmental Protection Agency lawsuit and threat of millions of dollars in potential fines.

Critics contend it has a gaping hole: It ignores looming sea-rise that both county and EPA planning policies acknowledge poses trouble, potentially deep trouble, for a region in line to feel the earliest effects of

climate change. Miami-Dade endorsed a pioneering four-county compact that calls for adapting roads and buildings for climate change. Last year, the EPA released two reports promoting "climate ready" utilities.

Yet after 10 months of negotiations between agencies, the sewer plan doesn't contain a word about dealing with flooding tides or the sort of storm surge that devastated the Northeast during Hurricane Sandy.

No calls for sea walls, elevated separating tanks, stronger casks for pressurized liquid chlorine or other "armoring" measures.

University of Miami geology professor Harold Wanless, one of five experts from UM, Florida International University and Florida Atlantic University retained by Waterkeeper, hopes the data will open the eyes of regulators before a deal is sealed. That could happen in the next few months, with any agreement subject to approval by county commissioners and a federal judge.

"At some point, and I hope it's this year, Miami-Dade government and everybody has to start truly recognizing that we're in for it, that this is coming," Wanless said.

When it does, it's clear there will be a lot more to worry about than sewage plants.

Brian Soden, a UM professor of atmospheric science, said many communities and residents will be facing difficult, costly decisions.

Miami Beach last year approved a $206 million overhaul of an aging drainage system increasingly compromised by rising seas. Just another foot of sea-rise, possible within 20 years, could worsen high-tide street flooding there. It also would inundate much of coastal South Miami-

Dade, leaving a sewage plant adjacent to the dump called Mount Trashmore, as well as Turkey Point nuclear power plant, virtual islands.

"If you look at downtown Miami, where all the new places have gone up, all the new condominiums, the billions going in there, those places are at some of the lowest levels," Soden said. "It's a broader impact all of South Florida is going to be facing sooner or later. Right now, a lot of people are choosing not to look at it."

With sea-rise trends appearing to accelerate, Waterkeeper and its hired science guns argue the county will be pouring nearly $1 billion into rehabbing plants likely to be incapacitated long before the 50-year life span expected of big-ticket public works projects. They believe the best choice is to move plants to more protected inland sites. At the least, they argue they should be built higher and much stronger, a choice they say the county hasn't realistically assessed that would likely add dramatically to costs.

Of particular concern: a nearly $600 million reconstruction of the trouble-prone plant on Virginia Key, where four spills over just three months in 2011 dumped some 19 million gallons of waste water into Biscayne Bay.

Even under conservative projections, the site is vulnerable, a sandy island fronting the Atlantic Ocean where beaches and mangroves could disappear within 35 years. "Why do we want to think about upgrading that plant?" Wanless said.

Doug Yoder, deputy director of the water and sewer department, defended the county plan as a cost-effective approach to resolving the most pressing concerns - orders by the EPA, U.S. Department of Justice and Florida Department of Environmental Protection to repair a system that has spilled 47 million gallons of sewage in the past few years.

With so much uncertainty over timing - differences in projected impacts span decades - Yoder said it didn't make financial sense to abandon the most critical and expensive components. Moving the Virginia Key plant alone, Yoder said, could run $3 billion - five times the cost of an upgrade. Another plant also could be built in 20 or 30 years if needed, he said.

"If you put aside storm surge and just look at the groundwater levels that will result, that plant is going to be still dry after a lot of the rest of Virginia Key, South Beach and Key Biscayne would be pretty much at ground water level," Yoder said. By then, the county would have gotten its money's worth out of upgrades and sewage flow might be reduced anyway if people are forced to retreat from flooded areas.

Yoder disputed charges of ignoring climate risks, saying the issues were beyond the scope of a legal agreement to fix existing problems.

He insisted the county would evaluate threats and beef up vulnerable components as it begins the formal design process. Existing building codes, the toughest in the nation, also may call for added protections, such as surge barriers or pumps, he said.

The county, for instance, elevated and strengthened a building housing backup electrical systems for a recent $600 million project at the south plant - a site that lost power for two weeks after Hurricane Andrew in 1992.

The EPA and DEP declined to discuss ongoing litigation.

Davina Marraccini, an EPA spokeswoman, said it was important for utilities to consider "all available information - including statistical data about population growth and weather patterns - and apply sound engineering practices." DEP spokeswoman Dee Ann Miller said her

agency "certainly appreciates the concerns" raised by Waterkeeper.

Attorneys for Waterkeeper, which is seeking to join the EPA action as an intervener and has filed a separate citizen's suit as well, are pushing regulators to exercise stronger oversight of a county they argue has a history of penny-wise, pound-foolish decisions. Despite two decrees in the 1980s and 1990s, the sewage system has slipped into such disrepair that the department director, John Renfrow, last year likened it to "being held together by chewing gum."

Paul Schwiep, a Miami attorney who represents Waterkeeper, acknowledged EPA's latitude was limited under a Clean Water Act primarily intended to prevent pollution. But he argues the agency also can invoke broader "public interest" authority.

Albert Slap, a Key Biscayne attorney also representing the group, said the county and EPA were ignoring their own initiatives encouraging climate "resilient" construction.

"They talk the talk," he said, "but when they have to walk the walk and spend money on climate change, they deny it."

With the county already under orders from state regulators to phase out the practice of pumping partially treated waste off shore by 2027, they also argue that would sharply reduce the economic advantage of coastal plants. But Yoder said Miami-Dade intends to ask Florida lawmakers for leeway and has plans to convert Virginia Key to deep-well disposal underground if necessary.

Leonard Berry, director of FAU's Center for Environmental Studies, said the plan lacked enough information to make an informed choice between renovation or building inland.

"We need that cost benefit analysis to know for sure," he said. "That's the issue."

The scientists aren't alone in their concerns. In a recent letter, Nathanial Reed, vice chairman of the Everglades Foundation and an influential former state and federal environmental official, urged the EPA not to rubber stamp a "defective plan." Key Biscayne Mayor Frank Kaplan, in a letter last month to County Mayor Carlos Gimenez, asked for a "more thoughtful long-term engineering, environmental and economic evaluation" of plans to rehab Virginia Key.

"We're not demanding they move it. We didn't even ask that," Kaplan said. "We just want answers."