

Is converting to centralized sewer *always* the best response to water quality problems? Maybe not in some hazardous areas. . . .

Governor Ron DeSantis made news with his focus on water quality. As part of this, Governor DeSantis emphasized dedicating \$150 million to “targeted” water quality projects such as connecting properties currently using septic systems to a centralized sewer system with treatment at a regional wastewater plant; state law does provide requirements to connect to centralized wastewater systems under certain circumstances. The septic tank issue garnered coverage in "After Toxic Beaches and Waterways, Florida Eyes Septic Tank Upgrades." The article discusses how rising sea levels and storms can cause septic systems to contribute serious nutrient and bacteriological pollution, causing risk to human health and the environment. Research has demonstrated the likelihood of nitrogen pollution from septic systems in Florida, including a paper that directly advocated conversion from septic systems to centralized sewer to address the problem.

Even before moving to eliminate some of Florida’s estimated 2.6 million septic systems, it might at least make sense to be sure that the septic systems function properly, although even properly functioning systems release nutrients. As detailed in this news article, the Florida Legislature passed a law in 2010 requiring inspections of septic systems every five years. However, septic system owners and others opposed the law, resulting in a repeal of the law in 2012.

In late 2018, Miami-Dade County issued the “Report Regarding Vulnerability of Septic Systems to Sea Level Rise—Directive No. 162242.” The report states that about 105,000 parcels just within Miami-Dade County are served by septic systems rather than centralized wastewater systems. To function properly, septic system drain fields must remain at least a certain distance above the seasonal groundwater table; this allows the liquid coming out of the system to receive treatment in unsaturated soils. But rising sea levels also raise groundwater elevations near the coast. For an excellent example of a local government addressing this, see the “future groundwater level maps” from Broward County. Even a currently functioning septic system with a drain field with sufficient elevation above the groundwater table now may not be so in the future due to groundwater that rises along with sea-level rise and more intense rain events. Miami-Dade County’s report indicates that in parts of the county, there are likely already about 1,000 septic systems not providing adequate treatment due to groundwater impacts during at least part of the year. Failed or non-working septic systems pose serious human health and environmental pollution risks.

Typically, when septic systems cause pollution problems, the proposed solution is simple if expensive: convert lots using septic to centralized wastewater systems.

However, this can be extremely expensive as tearing up streets and working around other existing infrastructure makes adding centralized sewer after development of an area far, far more expensive than adding it in during construction. A Miami-Dade County study from 2016 indicated an infrastructure cost of about \$3.3 *billion* to connect residential properties in the county to centralized wastewater systems.

Even assuming the funding and local support to undertake centralization of wastewater to eliminate septic systems, such action does not necessarily solve wastewater issues. Numerous other problems and challenges may remain. These include engineering/design challenges, storms, and unintended consequences.

This [article in Florida Today](#) looked at a sewage spill that occurred in Brevard County's wastewater system in Satellite Beach in early 2018, a barrier-island community along Florida's central east coast. The leak of an estimated 375,000 gallons of wastewater occurred along some of the lowest land in Satellite Beach near the Indian River Lagoon. It was far from the first sewer line break in past years in Satellite Beach. While the line that ruptured is only 30 years old and has a design-life expectancy of 90 years, it had been damaged in the same area just 5 years prior. This exemplifies one of the first challenges: designing and maintaining infrastructure for changing conditions. Some believe this area of pipe is experiencing so many problems because of variability in the depth and salinity of the groundwater. Infrastructure may be designed for each of these environments independently, but constantly changing conditions can speed deterioration of underground infrastructure. Even [research](#) that is several years old discusses problems with "I&I" or "inflow & infiltration" of groundwater into centralized systems. The research showed that wastewater collection systems are leaky, and that heavy rainfall and sea-level rise leading to higher groundwater increase I&I. This reduces treatment efficiencies and increases risks of bypasses of the treatment system. Increased groundwater salinity may also damage both the physical as well as biological systems of water treatment facilities.

Centralized systems also face challenges because the treatment plant for systems typically reside at the "bottom of the hill" so that the system could function as much as possible using gravity flows. Yet these locations make water treatment plants especially vulnerable to flooding and other coastal hazards. The article "[Sea Level Rise Impacts on Wastewater Treatment Systems Along the U.S. Coasts](#)" indicates that at 3 feet of sea-level rise 162 wastewater treatment plants are at risk around the country and at 4 feet of sea-level rise, the number rises to 245 and that as many as five times as many people may be at risk from wastewater infrastructure disruptions around the coast as are at risk of direct flooding.

On a related note, storms present another design issue for centralized sewer systems. As noted in the [October 2017 Coastal Planning Newsletter's](#) article on hurricanes and infrastructure, Hurricane Irma resulted in over 500 documented sewage spills with an unknown amount of undocumented spills also possible. These resulted primarily from power failures at lift stations and inflow and infiltration of stormwater overwhelming wastewater systems.

Finally, maybe the least discussed but also important issue to address when looking at conversions from septic to wastewater is the longer-term future of an area considered for expansion. This specifically includes the need and responsibility to ask extremely difficult questions when proposing septic-to-central conversions in the most low-lying and at-risk coastal areas. How much will the project cost and what is the amortization period for that cost? Will adding centralized sewer be done in a way that ensures the infrastructure will effectively function through its design lifespan? Or at least through its amortization period? Will the neighborhoods and areas served by the new system still be viable places to live at the end of the design life or amortization period of the new system? Will replacing septic systems with centralized sewer (i.e. massive public investment) promote increased private investment in the area? This could occur in areas where the existence of septic systems and lack of central sewer operate as the de facto limitations on development density; remove these constraints on areas with higher zoning densities and private interests could increase the population living in hazardous areas. And who will pay for the increased maintenance costs that come with centralized sewer systems being attacked by sea-level rise?

No one wants water quality problems. But we need to think carefully about the longer-term future before assuming that massive public and private expenditures in hazardous areas constitute a solution. They may actually contribute to further future problems. We need to begin adding into the equation that areas in some communities will not be viable areas to protect from significant amounts of sea-level rise. While many communities have begun assessing their vulnerability to sea-level rise, few are yet willing to discuss publicly what so many already acknowledge privately: We will lose parts of many communities as there will not be enough money for infrastructure to turn them into the model of risk characterized by, say, New Orleans.