Image credit: Jeanne Emerick

Hurricane Irma and Sewage Spills

*Over **28 million gallons of wastewater** have spilled across Florida in the wake of Hurricane Irma. **That's equivalent to every resident in the city of Miami flushing the toilet 38 times.***

Florida's sewage systems are already strained by the Florida coast's rapidly growing population. City growth policies encourage housing and economic development without updating necessary infrastructure. In many of the state's biggest coastal cities, sewer systems were ill-prepared to handle Irma's heavy rains and high tides.

Sewage Spills Result from Power Outages and Floodwater

Hurricanes can put sewer systems at risk due to power loss and flooding. When power outages affect lift stations that pump sewage from low to higher elevations for treatment, a city has limited ability to process and dispose of wastewater properly.[1] Sewer systems back up, forcing utilities to relieve pressure by spilling wastewater into nearby water bodies. Sewage can also spill as facilities are ramped up after power has been restored.[2]

Widespread flooding also causes sewer systems to back up when rainwater infiltrates pipes faster than waste plants can process it.[3] Sewer systems in Florida are built to keep stormwater and wastewater separate, but leaky infrastructure can allow floodwater into waste pipes, overwhelming the system.[4] When that happens, sewage can bubble out of manholes and contaminate streets, forcing treatment plants and lift stations to pump wastewater out into nearby rivers and coastal waters.[5]

About 30 percent of Florida residents use septic tanks, rather than city sewers.[6] Rising groundwater levels prevent septic tanks from draining properly, causing them to back up and overflow, too.[7] Sewage overflows can disrupt ecosystems, pollute recreational areas like beaches and lakes and contaminate drinking water.[8]

Sewage Spills Are a Public Health Concern

Raw sewage contains many pathogens that can make people sick:

- **Bacteria:** *E. coli*, *Salmonella*, *Shigella* and others can cause diarrhea, vomiting and fever.
- **Viruses**: Hepatitis A. Also, echoviruses and coxsackieviruses, which cause flu-like symptoms.
- **Parasites**: Giardia, roundworm, tapeworm, hookworm, whipworm, and others.[9]

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When sewage mixes with stormwater and stands in houses or in streets, contact with the water can cause unmanageable infections.[10] One 2016 study by the University of South Florida found bacteria resistant to vancomycin, a "last-resort" antibiotic, in wastewater.[11]

Environmental Impacts of Sewage Spills

In addition to the health risks they cause, sewage spills pollute oceans, lakes and rivers with nutrients such as phosphorus and nitrogen. Elevated levels of these substances can trigger blooms of algae that eventually suffocate wildlife.[12] The bacteria and viruses in wastewater can infect animals as well as humans, putting native species in jeopardy. In 2016, after a season of heavy rains and Hurricane Hermine, spilled sewage was linked to a mass bird die-off on the shores of St. Pete Beach.[13] In Tampa Bay, seagrass and scallop populations are finally recovering from decades of habitat loss and degradation, and frequent sewage spills put their survival at risk.[14]

A History of Sewer System Failures

Florida's low-lying geography and miles of coastline put the state at increased risk of flooding, especially during hurricanes.[15] Flooding can overwhelm inadequately maintained sewer systems and when high winds down power lines, treatment plants are left with little or no ability to process the extra flow.[16] According to the Florida Department of Environmental Protection, about 240 million gallons of partially treated and raw sewage were discharged from sewage plants because of Hurricane Hermine, a Category 1 storm in 2016.[17] Below are recent examples of sewer failures caused by flooding on Florida's coast:

Miami: In 2016, a study of recent king tide floodwater pumped out to Biscayne Bay revealed leaks from sewage pipes are widespread on Miami Beach.[18] And in 2012, federal authorities forced Miami-Dade County to overhaul its sewage system after it ruptured more than 65 times over the course of two years.[19] **After Hurricane Irma:** The sewer authority in Miami-Dade County reported releasing 6 million gallons of partially treated wastewater into Biscayne Bay.[20] Power outages at treatment plants were reported in Haileah, a city in Miami-Dade County, and Delray Beach.[21]

St. Petersburg: After Hurricane Hermine in 2016, the city's sewage plants released 136 to 151 million gallons of partially treated sewage mixed with rainwater over the course of 10 days, due to flooding.[22] The year before, 31.5 million gallons of partially treated sewage was dumped into Tampa Bay and Boca Ciega Bay after weeks of heavy rain.[23] Chronic sewage problems led the city to invest in new storage tanks, additional filters and overflow wells in 2016, increasing their sewage treatment plant's capacity from 40 million gallons per day to 175 million gallons per day.[24]

Tampa: In June 2016, 352,000 gallons of untreated sewage were dumped into the Hillsborough River after Tropical Storm Colin dropped 12 inches of rain over a three-day period.[25] During Hurricane Hermine in 2016, the city released 1.7 million gallons of sewage into Tampa Bay and nearby water bodies.[26] Currently, Tampa's wastewater treatment plant is permitted to handle 96 million gallons of sewage per day and can handle surges of up to 200 million gallons per day.[27] The peak flow during Hurricane Hermine was 155 million gallons per day.[28]

Fort Lauderdale: According to city records, the number of pipe breaks and bursts has been on the rise.[29] State environmental officials are preparing to force the city to take action due to the overwhelming number of sewage leaks in the past two years.[30] A city report from May 2017 estimated $1.4 billion is needed to fix Ft. Lauderdale's sewer and water system due to the following factors:

- Nearly 25% of the city's wastewater pipes are made of high-risk materials,
- A large portion of the city's pipelines will reach their end-of-life service date in next 10 years, and
- The downtown sewage pumping station is nearly at its capacity, but city growth continues full-speed ahead: 5,186 housing units are being developed downtown, along with 1,024 hotel rooms and 405,555 square feet of office space.[31]

Jacksonville: In July 2017, Jacksonville facilities spilled 300,000 gallons of raw sewage into nearby creeks due to flash flooding after heavy rains.[32] In 2016, Hurricane Matthew knocked out power across the city, disabling treatment plants and lift stations.[33] The resulting overflow led to five million gallons of wastewater entering the Ortega River; about 2.9 million gallons was sewage and the rest was stormwater that infiltrated the sewer system during the flood.[34] After Hurricane Matthew, the city installed 350 generators at lift stations.[35] The utility also removed limbs and trees nearby that could fall onto station power lines.[36] **After Hurricane Irma**: From September 11 to 13, 2017, Jacksonville Electric Authority reported spilling more than 2.2 million gallons of sewage due to power outages, water inflows and equipment failure following the hurricane.[37] Power failures were responsible for 1,323,650 gallons of sewage spilling, while water inflow caused 804,580 gallons to spill into local waterways.[38] Many lift stations were reported to be under water at the height of the storm, and at least one backup generator failed at a treatment plant in Mandarin.[39] Deep Bottom Creek, Fishing Creek, Tiger Creek and Ribault River were each polluted with at least 245,000 gallons of sewage.[40] So far, 122,070 gallons of sewage has been dumped in St. Johns River, excluding one incident reported on September 13 affecting St. Johns River that is still missing an estimate.[41]

Naples: Following heavy rain in June 2017, about 2,700 gallons of raw sewage spilled out of a manhole in Naples.[42]

Hurricane Irma Overwhelmed Sewer Systems

Over 28 million gallons of wastewater have spilled across Florida in the wake of Hurricane Irma.[43] That's equivalent to **every resident in the city of Miami flushing the toilet 38 times.*** The total volume of sewage pollution due to Irma will likely end up higher ~ Florida's State Watch Office, the bureau responsible for filing these reports, continues to receive calls of violations as of September 16.[44] In addition to the post-Irma sewage spills in the cities described above, in **Lee County**, power outages forced lift stations to shut down or operate with limited capacity; sewage backups have already contaminated floodwaters and utility authorities are asking residents to conserve water to prevent backing up the system further and spilling more sewage.[45] In **Fort Myers**, 32 of the city's 200 or so lift stations were offline as of September 14, with local reports of wastewater flowing out of yards and into streets.[46] In addition to the danger of sewage mixed with stormwater in damaged homes and flooded streets, contaminated wastewater can reach **drinking water supplies**. For four days, residents of **Brevard County** were told to boil their water before using it.[47] A boil-water notice was sent to all residents in Collier County following "extensive damage" to sewer and drinking water lines on September 11.[48] In Naples, the city issued a boil-water notice due to reported breaks in their water pipes on September 10.[49] Naples also shut down its wastewater treatment plant due to flooding.[50]

To Minimize Future Sewage Spills

Future storms could bring more sewage into our streets and homes. To be as prepared as possible, we need to make sure that pipes don't leak and that pumping stations have access to power. But we should also make room for low-tech solutions that can make a big difference. For example, rain barrel installation is a very low-cost measure to prevent runoff pollution that can be done quickly. At 50 gallons each, 20,000 rainbarrels could capture up to one million gallons of stormwater, which would make a difference in any metropolitan area. Florida should also take steps to protect and restore our wetlands. Just one acre of wetlands can absorb up to one million gallons of stormwater, making it Nature's best flood control.[51]

How to Report Sewage Spills

- For spills of more than 1,000 gallons, call Florida's State Watch Office in the Department of Emergency Management: 850-815-4001
- For smaller spills, contact your local district wastewater office: http://www.dep.state.fl.us/water/wastewater/contacts.htm

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