



The Great Flood of 2010 — Truth and Consequences

After Rhode Island's Great Flood of 2010, a team of Brown University graduate students conducted a wide-sweeping series of interviews with state and local officials and employees.

The municipal workers were predominantly from Warwick, Rhode Island's second largest city, located just to the south of Providence. During the flood the Warwick wastewater treatment plant was overrun with waters from the nearby Pawtuxet River, swollen by the stormwater runoff from two massive shopping malls nearby. Interstate Route 95, which runs through the heart of Warwick, was also overwhelmed, shutting down the major road artery in New England, which also limited access to T.F. Green Airport and its national and international air traffic.

All of the interviewees said that Warwick specifically, and Rhode Island generally, did not expect and were therefore not prepared to face a flood event of this magnitude. Based on the factors most often mentioned by the key interviewees, the flood's impacts were narrowed down to the following main areas.

Anatomy of a Flood

Impacts on Warwick: Wastewater Treatment

- "The Wastewater Treatment Facility was shut down for three days. Completely wiped out, pretty much," recalled wastewater treatment facility director Jeanine Burke. "Six out of 48 pumping stations went down, and a significant portion of the collection system wasn't functioning. The treatment plant was completely submerged, and it didn't take long for the entire facility to be flooded. Our priority was public health, even though it was still coming here and not going anywhere. (Sewage) basically sat here piling up and eventually went into the (Pawtuxet) River. We had direct wastewater discharges into the river. The predictions were within heights we could protect ourselves from with the levee. We had our equipment, but nothing was working. We were at the mercy of Mother Nature."
- Regional EPA officials interviewed said, "There is a berm that surrounds three sides of the treatment plant. It's not common that you see something like that in a traditional treatment plant. The plant was built at the lowest point in the city, and all water off (Route) 95 infiltrated the plant. The Army Corps of Engineers did an evaluation and found that the berm was designed three feet higher than a 100-year storm. The Army Corps of Engineers can't rebuild it now, because it's three feet higher."
- "Most of the damage was to the electrical system," EPA officials said. "They were operating under temporary power and generators. The EPA promotes use of 'green' technology, and gave Warwick and West Warwick \$3 million to replace damaged electrical systems with more energy-efficient systems."
- "On March 15th, we lost three pumping stations in Warwick, all by the Pawtuxet River," said Joel Burke, superintendent of the Warwick Sewer Authority. "We worked 24/7 trying to get those facilities back on line, and it took over a week. We evacuated the facility on March 30th. Prior to the evacuation, they moved as much as possible out of the center to a place on a higher elevation. You have to keep in mind that the floods weren't just bringing water into the plant, there was also raw sewage. We hope to be back running on original standards in February 2011, but the plant will still be as vulnerable to these kind of events as it was in March 2010."
- "There were efforts made to protect some of the treatment plants," said local DEM officials. "In Warwick, there was a dike built maybe 20 years ago, and with the dike they included equipment to pump sewage up to the river. They specifically took measures to allow the plant to function. I'd say it worked, for the designed flood, the 100-year flood—but not for the 200- or 500-year flood that happened," said DEM staff members.
- "As soon as the facility was inundated, word went out not to shower or use washing machines so that the flow was minimized," said a regional EPA interviewee.

Impacts on Warwick: Economics

- “People think they’re not affected, but the whole city is affected. Warwick Mall and other businesses that were forced to be shut down weren’t generating any revenue for the town,” said Warwick City Planner William DePasquale. He added that some people, either temporarily or indefinitely, lost their jobs.
- “Sound, forward-thinking, adaptive management on issues of climate is positive for economics,” said John Torgan, a director at the advocacy group Save the Bay. “Small investments can prevent a huge problem that will be impactful down the road. We need to try to get people to understand and agree that you can’t trade off environmental protection and quality for economic development.”
- “The flooding was economically devastating, and the environmental impact could have been a lot worse,” said Superintendent Burke. “Commercial businesses and malls were underwater.”
- “Going over to Warwick Mall, there were benches and planters floating upside down,” recalled Warwick Mayor Scott Avedisian. “I don’t think people really understood the intensity of the river and what it could really do until then. When you look at some of the damage—it picked up huge chunks of concrete and just threw them!”
- “We built a highway and two shopping malls on an oxbow of the Pawtuxet River—what a dumb thing to do. No one ever thought the mall would be flooded as it was,” said CRMC policy staffer Jim Boyd.

Impacts on Warwick: Transportation

- “Infrastructure fared pretty well—the most damage was in and around bridges,” said RIDOT spokesman Charles St. Martin. “About 100 bridges and roads were closed all at once. A specific example was the Laurel Avenue Bridge in Coventry. During the flood, there were concerns that the bridge would fail—it did not, but because of the concern, RIDOT demolished it and is replacing it.”
- “RIDOT went into 24/7-mode. I-95 is close to the Pawtuxet River, and was flooded pretty fast,” said St. Martin. “We had to try to get out there and keep roads open, but the most we could do was wait. In the beginning, the purpose was to open roads—there were 307 locations that were identified as ‘flood damaged.’ It took 60 different projects to fix it, and some are still in the process of being completed (in January 2011). The Federal Highway Administration owns I-95, and they

usually cover 80 percent of its reparation costs. This time, they covered 90 percent.”

- “Almost all the roads crossing the river were closed. It hampered movement in the state and the economic impact was significant. This idea of trying to make sure that passageways and roadways can be maintained and open is probably going to be a focus of some of these departments in the years ahead,” said the DEM staffers surveyed.
- “They made a decision to close down I-95 with very little warning to us,” said Mayor Avedisian. “So we get a call saying we’ve got to close 95 because it’s impassable. Post Road was totally impassable, too. There was gridlock in the city.”

Ecological Implications

“In the short term, there were severe environmental impacts. All tributary rivers from Narragansett Bay out to the coast were polluted with bacteria, contamination, debris, and sediment. It was unsuitable for shellfishing or swimming, due to being full of sewage and bacteria, and could make people sick,” said Save the Bay’s Torgan. “Within a period of a few weeks, tidal circulation and dilution caused the bacteria and sewage to dissipate. The impact to marine life and animals was pretty small, and there were no long-term ecological effects.”

- “There was sediment deposited in Natco Pond. The water quality was impaired by sediment in the aquifer, but it wasn’t completely damaged,” said Kevin Farmer, a USDA conservation engineer.
 - Jim Boyd of CRMC explained, “The second thing that occurred was, with any flood, there’s a tremendous amount of sediment in the river, and that sediment is carried downstream until it hits quieter waters. There was extensive shoaling within the federal navigable channel, which is dredged to maintain consistent water depths so that boats can navigate up into the cove, get to residential docks, etc. The sediment came into Pawtuxet Cove, physically filling up the channel, as a hazard. The Army Corps is going to hire a contractor to dredge the channel and restore it to navigable depths.”
- “There’s a potential for problems if we don’t dredge the river; it won’t flow the way it needs to,” said Mayor Avedisian. “We have a plan to take out part of the dam in Pawtuxet Village to allow fish the chance to spawn; it’s also helpful because it lets the river flow naturally.”
- “Topsoil needs to be preserved—it’s very important for future growth and for the watershed,” said Farmer of the USDA. “During flood events, soil can help decrease impacts by acting like a sponge.”