

Costly Deep Tunnel flooding project can't handle Chicago area's severe storms fueled by climate change

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Credit: Pixabay/CC0 Public Domain

Hours before heavy rains swamped Chicago and Cook County suburbs

on July 2, the region's \$3.8 billion flood-control project appeared ready as can be to bottle up storm runoff.

The Deep Tunnel's massive sewers, capable of holding 2.3 billion gallons, were almost empty, according to Metropolitan Water Reclamation District records.

At the end of tunnels hundreds of feet below the Chicago River, Des Plaines River and North Shore Channel, the McCook Reservoir—more than 20 times larger than Soldier Field—was just 17% full of [raw sewage](#) and [runoff](#) being stored until it could be safely treated.

But the first sign of trouble came before 8:30 a.m., when runoff mixed with human and [industrial waste](#) began pouring into the Des Plaines from an overflow pipe at 40th Street in southwest suburban Lyons, district records show.

Two hours later, the same thing happened at a pump station in north suburban Wilmette and another, much larger facility off Lawrence Avenue in Chicago, where fetid gunk flowed into the North Branch of the Chicago River for nearly a day. Waste and runoff would end up pouring out of 19 other overflow pipes across the county, from Evanston to Westchester, many for hours at a time.

"When you have a slow-moving storm that's dumping a large amount of rainfall, it doesn't take much to cause problems," said Zachary Yack, a National Weather Service meteorologist who noted that up to 8 inches of rain fell in the western suburbs during the day. "That's a lot of water to contend with in a very short period of time."

Sewage overflows are an indicator that basements are flooding, effectively turning scores of homes into mini stormwater reservoirs.

By 2:27 p.m., local sewers and the Deep Tunnel were so saturated that district officials turned to their outlets of last resort. First they opened a sluice gate separating the North Shore Channel from Lake Michigan in Wilmette, and then they opened locks near Navy Pier, relieving pressure on the system by allowing more than 1.1 billion gallons of murky, bacteria-laden waste to flow into the region's chief source of drinking water.

Suburban leaders fielding complaints about standing water and basement backups attempted to pin the blame on district officials for not opening the gate and locks earlier. Several reminded their constituents that the Deep Tunnel, one of the nation's most expensive public works projects, was designed to prevent flooding and reduce the amount of stomach-churning sewage and runoff gushing into basements and local waterways.

"They've been talking about the Deep Tunnel, and that it's not ready. And that even when it is completed, it still won't be enough," said Shapearl Wells, who watched water in her west suburban Cicero basement reach waist high within an hour. "It is still not going to be sufficient to prevent this type of catastrophic disaster in the future—even if they finished it all today."

When construction of the Deep Tunnel began in 1975, leaders of what then was called the Metropolitan Sanitary District vowed their subterranean labyrinth of tunnels alone would keep pollution out of the Chicago River, and in particular, Lake Michigan.

Our changing climate is scrambling weather patterns, though. Recent storms suggest rain can now fall so quickly that stormwater tunnels can't move runoff to the reservoir fast enough to prevent sewage overflows and basement backups in the 252 square miles of Chicago and County served by the main part of the system.

"Mother Nature continues to be in the driver's seat and the main issue is the rain: too much, too intense and too frequent," said Marcelo Garcia, a University of Illinois hydrological engineer who studies the Deep Tunnel.

Scientists are finding the world is warmer than it has been in thousands of years. All of that hot air sucks moisture out of plants and soil, fueling droughts and wildfires. More moisture in the atmosphere also increases the amount of rain (or snow) that can fall during a particular storm.

"Essentially we find that every storm is now being affected by [climate change](#)," said Don Wuebbles, an emeritus professor of atmospheric sciences at the University of Illinois who was a science adviser to former President Barack Obama.

In 2010, Wuebbles and other scientists hired by former Mayor Richard M. Daley concluded that rains of more than 2.5 inches a day, the amount that can trigger sewage dumping into Lake Michigan, were expected to increase by 50% by 2039. By the end of the century, the number of big storms could jump by a whopping 160%.

Several monsoon-like storms in recent years highlight how challenging it is to manage stormwater in Chicago and the Cook County suburbs. Since 2008, district records show, nearly 40 billion gallons of runoff and waste have been released into the lake—three times more than during the previous two decades.

Officials at the Water Reclamation District, a taxpayer-financed agency that operates separately from City Hall and Cook County government, declined to speak with the Chicago Tribune about how the Deep Tunnel performed during the most recent storms.

They've previously said the region's flooding would be far worse without

the project, technically known as the Tunnel and Reservoir Plan or TARP.

"TARP continues to operate as designed," the district said Thursday in a statement noting the system was holding more than 8 billion gallons that otherwise would be in basements, waterways and Lake Michigan. By then sewage and runoff was spilling out of only one spot: a pump station off Racine Avenue in McKinley Park that handles waste and runoff from a wide swath of Chicago's South and West sides.

In another statement, district officials said it would have been too dangerous to open the Wilmette sluice gate and Navy Pier locks any earlier on July 2. They waited until the North Shore Channel and Chicago River were higher than the lake, the statement explained, because otherwise a torrent of lake water would have overwhelmed the system.

Under a [legal settlement](#) with [environmental groups](#), the district is obligated to expand the McCook Reservoir. A neighboring hard-rock quarry will be added to the existing retention basin by 2029, increasing storage to 10 billion gallons, up from 3.5 billion gallons today.

Just before noon on July 2 there still was room to spare in the reservoir, according to a screenshot the Tribune took from the district's livestream. At the same time, Chicago's 311 system had already logged hundreds of calls reporting basement backups and the district's own records show sewage and runoff had been pouring into local waterways for hours.

Kathryn Taylor was getting ready to meet her sister visiting from New York when she noticed a puddle in her North Lawndale basement apartment, where she lives with her two sons, 32 and 20, her daughter, 24, and her daughter's 3-year-old.

She decided she could mop up the water later. But soon after she left one of Taylor's sons called to tell her the miasma was 3 feet high and rising.

Taylor returned to find food from the refrigerator floating in sewer water. Furniture, beds and clothes were irreparably damaged. Since the water receded the family has been constantly bleaching and washing their walls and floors.

"I basically lost everything," said Taylor, the family's sole provider. "It's just exhausting."

Flood losses in the city and suburbs cost taxpayers \$1.8 billion in subsidized grants, loans and insurance payments between 2004 and 2014, according to a 2019 report from the National Academy of Sciences. Only hurricane-ravaged areas of coastal Louisiana, New York and Texas received more federal flood aid during the decade.

Scientists who study flooding say the costs likely were significantly higher.

Computer models developed by the city can track down to the block level which neighborhoods are most at risk. Like so many other societal ills, the consequences hit the poorest Chicagoans the hardest. After a major storm in 2013, city officials determined the damages were concentrated in low- and middle-income census tracts on the West and South sides, similar to where many 311 calls originated after the more recent storms.

The region's struggle with chronic flooding begins with its location. Chicago and many of its suburbs were built on swamps, and storm runoff has become more difficult to manage as the region has been paved over.

To make matters worse, sewers in Chicago and older suburbs were designed to handle runoff as well as waste from homes and factories. The combined sewers are quickly overwhelmed when rainfall exceeds two-thirds of an inch, according to modeling by the Chicago Department of Water Management.

To supplement the Deep Tunnel, the Water Reclamation District has partnered with several flood-prone suburbs to build smaller retention basins, including some on land where frequently soaked property owners have sold their homes to make room for storm deluges.

Environmental groups have been calling for more "green infrastructure" solutions for years, including during the 1970s when district officials struggled to persuade Congress to bankroll a massive public works project.

Other cities, including Milwaukee and Philadelphia, are moving away from big construction projects and embracing smaller, neighborhood-scale improvements such as installing permeable pavement in parking lanes, creating rain gardens around gutters to slow runoff and disconnecting household downspouts from [sewers](#).

Some of those smaller measures are underway in the Chicago area, just not at the pace necessary to reduce flooding.

"The devastation around the neighborhood—it was just unbelievable," said Wells, the Cicero resident who on July 2 lost furniture, appliances and, most painfully, basketball trophies and other belongings of her son, Courtney Copeland, who was shot and killed in 2016 while on his way to visit a friend on the Northwest Side of Chicago.

"People were actually on boats. Elderly people," Wells said about the recent storm. "Until we have investment in (green) infrastructure, this is

going to continue to happen and we're going to continue to get flooded out."

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