



GRAPPLING WITH GREATNESS

When the Great Lakes burst their banks, the Corps helps mitigate the damage

Bird Island Pier, Buffalo, N.Y.

USACE BUFFALO DISTRICT

By Matt Alderton

JUST A FEW YEARS AGO, summers in Southwest Michigan were a walk on the beach. In lakeside hamlets like New Buffalo, St. Joseph and South Haven, visitors could meander up and down the shoreline for miles at a time. Now, these beaches are underwater. To the west, Lake Michigan surges and seethes, throwing waves like punches at the coast. To the east, water smothers the strand, taking bites from bluffs until exposed tree roots dangle out of the earth like entrails. Meanwhile, homes teeter overhead like ballerinas dancing precariously en pointe.

To be sure, Lake Michigan has always vacillated between highs



A house along
Lake Ontario

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and lows, retreating from the shore in some years and encroaching on it in others. Recently, though, its highs have gotten higher.

"We had an unusually long period of low water from the late '90s until about 2013. And then the lake climbed really high, really fast," said coastal management expert Richard Norton, a professor of urban and regional planning at the University of Michigan. "Now, it's at or above record levels — and it looks like it's going to stay there for a while."

What's happening in Lake Michigan is happening across the Great Lakes, according to hydrologist Drew Gronewold, associate professor of environment and sustainability at the University of

Michigan. "The last decade for the United States has been the wettest on record," he said. "The Great Lakes have received a lot of that precipitation, which turns into high water levels."

Of course, high water in and of itself isn't the problem; rather, it's the destruction it sows. "The impacts depend a lot on the unique conditions along each lake's shoreline," Gronewold continued. "Some of the land around western Lake Erie or eastern Lake Ontario, for example, is very flat and dominated by wetlands. When water levels go up just a little bit above their normal highs, the water turns

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Detroit city workers fill sandbags to help with flooding.

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— KEITH KORALEWSKI,

chief of hydrology and hydraulics engineering and water management, USACE Buffalo District

into flooding that spreads across the land. In contrast, the shoreline along eastern Lake Michigan in many places is very steep and dominated by tall, sandy dunes. There, instead of immediate flooding, you get erosion and deterioration of the shoreline.”

The fallout can be significant for lakeside communities. “There are environmental consequences and economic consequences,” Norton said. “Environmentally, shorelines are dynamic habitats for fish, birds and plants. If all that’s left (are) waves pounding hard rocks, you lose that. Economically, the Great Lakes are a huge economic engine. A lot of coastal communities rely on revenue from tourism and part-time residents. There’s good reason to think that if folks don’t have beaches to walk on anymore, they’re no longer going to spend their time and money in those communities.”

Ultimately, protecting lives and livelihoods from wild waters requires a diverse coalition of local, state and federal stakeholders — including the Corps. Federal law gives the Corps jurisdiction over all “navigable waters” of the United States, including the Great Lakes.

WATCHING THE WATER

One of the most important things the Corps does on the Great Lakes is monitor water levels. “The water level record has gauges that go back to 1860, and they have been meticulously maintained throughout that entire time period so that we have a really good understanding of how water levels have changed over time. That water level record is like gold,” Gronewold said.

Hydrologists in the Corps’ Detroit District use historical data, contemporaneous climate information and forward-looking models

to author a monthly bulletin featuring six-month forecasts for each of the Great Lakes.

“We coordinate our forecast with our partners in Canada, and that forecast goes out in print to more than 4,000 people in the United States,” said Lauren Fry, technical lead for Great Lakes hydrology in the Detroit district. “We use that forecast to engage with local communities through things like public meetings to let them know that water levels are high, and that we expect them to remain high for at least the next six months.”

As recently as March, lakes Michigan and Huron had a mean elevation of 581.43 feet above sea level; that’s 3 feet above their average March elevation, more than 5 feet above their record low and less than an inch from their record high. By September, the Corps forecasts, water levels could rise by as much as another foot.

“There’s no reason to believe we’re going to be at record-high water levels forever, but we do need to buckle up for a little while,” Fry said. “It will take some dry conditions for a long period of time in order to bring us back to normal conditions.”

Unfortunately, “normal conditions” might be a thing of the past. “It’s difficult to say whether high water levels are part of climate change, but if you look at the past 125 years, 15 of the 50 wettest years have occurred since 2006. And if you look at the 50 driest years in the same 125-year period, not one of them has occurred since 2000,” said Keith Koralewski, chief of hydrology and hydraulics engineering and water management in the Corps’ Buffalo District.

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Determining sandbag placement in Sodus, N.Y.

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■ HIGH-WATER HELP

Armed with Corps forecasts, flood-prone communities can put in motion emergency plans to proactively protect people and property. Families with coastal homes can build seawalls, move their houses away from the shore or even demolish structures to avoid the expense of fishing them out of the lake later.

Although such decisions and corresponding mitigations generally fall to local governments and private citizens, Public Law 84-99 gives the Corps discretionary authority to act and react to coastal emergencies caused by floods.

"Public Law 84-99 enables each of our districts to have a dedicated emergency operations center and a dedicated emergency management staff," said Krystle Walker, an emergency management specialist for USACE's Detroit District.

This Corps emergency staff provides both technical and direct assistance. "Under technical assistance, we send out subject matter experts to look at areas of concern that are affected by high water levels, and we provide recommendations about what to do to help with the situation," said Michelle Kozak, emergency manager for USACE's Chicago District.

"Here in the Chicago District, our emergency operations center has been activated since July 8, 2019, and since then we've been on more than 40 site visits to provide technical assistance up and down the lakeshore in Indiana, Illinois and Wisconsin."

Among the recipients of technical assistance in the Chicago District are the Chicago Department of Transportation, which has installed jersey barriers along portions of Lake Shore Drive to

mitigate erosion, and the Chicago Park District, which has installed boulder riprap to protect eroding beaches.

"Direct assistance is our ability to provide actual, physical flood-fighting materials like empty sandbags and HESCO barriers to communities at a reimbursable rate," said Walker, who cited Detroit as one recipient of this work. This spring, to prevent Detroit's wastewater treatment plant from becoming overwhelmed, causing sewage backup into residents' basements, the Corps provided wire mesh sand-filled basket walls and sandbag sleeves that the city used to construct a temporary levee around the Harding Canal.

"Even while the Detroit District and the Corps nationwide is surging to help the nation respond to (the COVID-19 pandemic), we're working diligently to help the city of Detroit and state of Michigan protect our communities from historically high water levels," Detroit District commander Lt. Col. Greg Turner said in a statement.

■ SHORING UP SHORES

Still, the war against rising waters is mostly up to communities to wage. Fortunately, local governments are more buoyant than ever thanks to Corps support. "If there's any silver lining to having had sustained high water levels over the last few years, it's that it's given us an opportunity to improve our communications. As a result, I think people are better prepared," Koralewski said. "It doesn't prevent the problem, of course — it's very difficult to prevent flooding and erosion due to high waters — but knowing they can come to us and ask questions makes communities more resilient."