There's a giant dead zone in the Gulf of Mexico thanks in large part to pollution from Chicago

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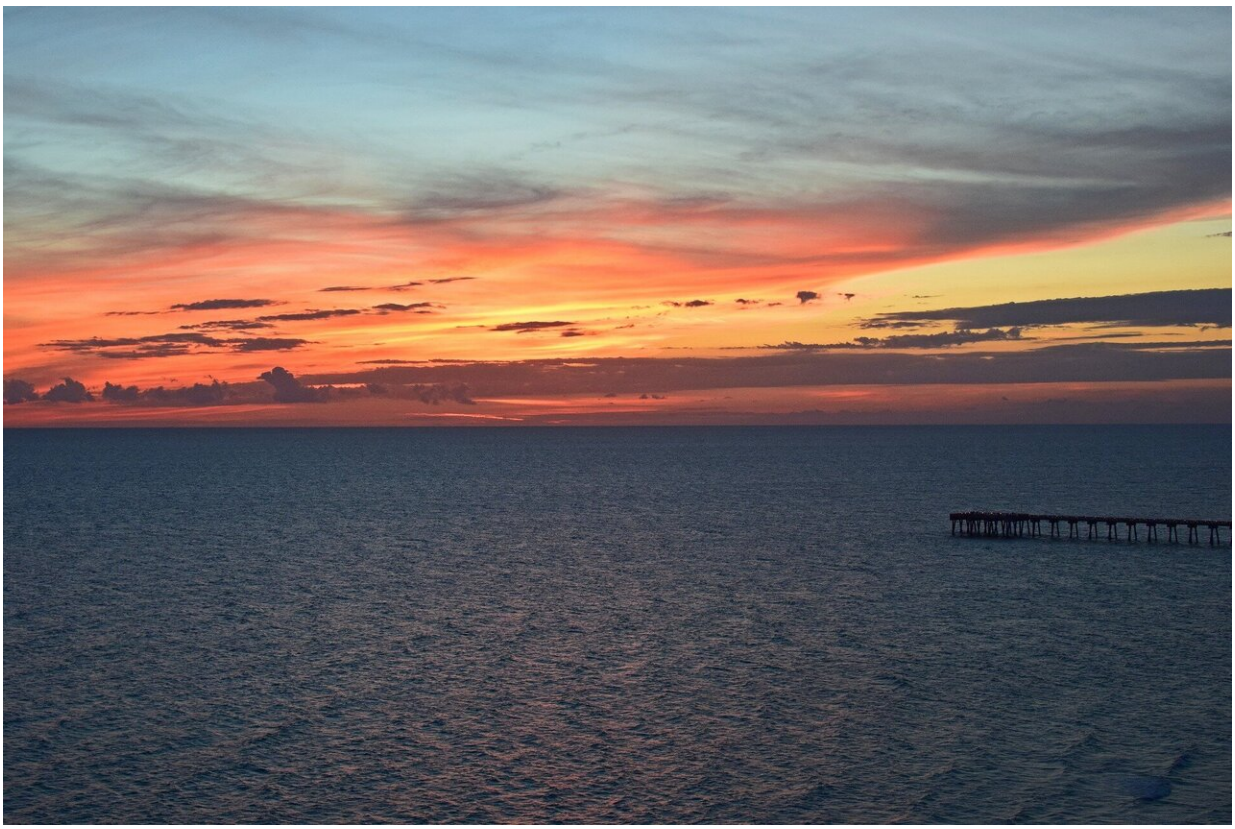

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Just off the coast of Louisiana, where the Mississippi River lets out into the Gulf of Mexico, an enormous algae bloom, fueled by fertilizer from

Midwestern farm fields and urban sewage, creates an area so devoid of oxygen it's uninhabitable to most marine life every summer.

Nutrients like nitrogen from fertilizer and phosphorus from sewage act as a catalyst for algae growth. While algae are the base of the food chain for some fish, when these green plumes proliferate beyond what fish are capable of eating, their decomposition consumes much of the oxygen in the water.

This year, historic rains and flooding in the Midwest have roiled farm fields and overwhelmed sewer systems, flushing a tremendous amount of nutrients into the Mississippi River and into the Gulf, spurring a remarkable amount of algae. While the agricultural runoff from farms—exempted under the Clean Water Act—is the main driver of the Gulf dead zone, Chicago's sewage is the largest single source of phosphorus pollution.

The Stickney Water Reclamation Plant, which handles the waste of 2.3 million people in Chicago and the Cook County suburbs, is the biggest single source in the entire region and drains into the Mississippi River. According to the U.S. Geological Survey, agricultural sources in the watersheds of the Mississippi River basin contribute more than 70% of the nitrogen and phosphorus, versus about 9% to 12% from urban sources.

"It's amazing how big the Illinois impact is on something that's 1,100 miles away," said Josh Mogerman of the Natural Resources Defense Council, a nonprofit with offices in Chicago.

"I think there's less focus on it in Chicago because the (sewage) water is going the other way. We don't interact with the water that we're shooting toward St. Louis and the Gulf of Mexico. If we're not bathing in it, we're not going to the beach in it and we're certainly not drinking it, there's

less of an awareness."

Climate scientists say this issue is only expected to get worse in the future as a wetter climate in the Midwest—specifically one characterized by heavy rainfall in the winter and spring—creates more runoff.

"From a runoff point of view, it's actually the worst-case scenario to get more heavy rain," said Jim Angel, former Illinois state climatologist. "Those are the ones that really flush out the system. If you have a generally wet period, it doesn't have much of an impact on the system. If you get 2-inch, 4-inch rainfall events on saturated soils, you get the major flushing of the nutrients and get soil erosion as well. You're really sending Illinois farmland down the river."

In the Great Lakes, excess nutrients are also increasingly becoming a problem. Lake Erie—the most productive recreational fishery in the Great Lakes, which supplies drinking water to 11 million people—experiences perennial algae blooms that have rendered about one-third of its waters unlivable for fish and allowed bacteria to threaten potable water in communities like Toledo, Ohio. More recently, in Lake Michigan, a dead zone in Green Bay has become a common occurrence, causing similar problems.

Last week, scientists with the National Oceanic and Atmospheric Administration and several research universities announced that the so-called dead zone in the Gulf of Mexico is projected to be around 7,800 square miles, roughly the size of Massachusetts, the second largest on record behind 2017.

As in past years, the ensuing dead zone is expected to result in widespread die-offs and migration, influencing the region's fishing and shrimping industry.

"The fish that can move leave the area," said Don Scavia, an aquatic ecologist at the University of Michigan and collaborator on the NOAA forecast. "The organisms that live in the sediment—one of the main food supplies for the fish—can't. They die. There's been videography down there showing dead organisms, but most shrimp and fish that can swim completely leave the area. There are implications for that. The energy it costs the shrimp to leave the area tends to make them smaller. They aggregate in areas that make them easier to catch, so there's the threat of overfishing. The fishing fleets have to go farther away to find them."

Globally, dead zones have been growing in ocean waters since the 1950s. Since then, these oxygen-diminished areas have collectively expanded by an area about the size of the European Union, according to researchers. The Gulf of Mexico dead zone is considered the world's largest.

From June 2018 to May 2019, the United States experienced the wettest 12 months on record, with many of the hardest-hit areas in the Corn Belt: Iowa, Illinois, Nebraska and Missouri. Farmers in these areas typically apply fertilizer in the fall, which is when the unseasonably wet weather began in the Midwest. That was followed by a heavy winter snowpack and unrelenting spring rains.

Farmers and officials in Illinois and Missouri are desperately battling floodwaters along the Mississippi River. They're also battling each other.

While the concentrations of nutrients in the Mississippi River basin weren't particularly remarkable, the melting snow and spring rains poured into waterways, leading to record high river flows and delivering an overall larger nutrient load to the Gulf of Mexico.

Based on river flow and nutrient data, the U.S. Geological Survey estimates the faster current carried about 156,000 metric tons of nitrate (18% above average) and 25,300 metric tons of phosphorus (49% above

average) into the Gulf of Mexico in May alone.

Monitoring in August will confirm the actual size of this year's Gulf dead zone, but the projections have some worried about runoff into the Great Lakes.

Lake Michigan's Green Bay, Lake Huron's Saginaw Bay and much of western Lake Erie have seen considerable algae blooms from agriculture and urban wastewater. Lake Erie, specifically, has battled with toxic algae blooms, which consist of cyanobacteria rather than plankton, and can taint drinking water. The projection for the Erie bloom will be released in July.

"For a long time people said, 'You know, that's the shallow lake. That's where you expect it to happen.' But to see an emerging and growing one in a bigger, deeper lake in Lake Michigan is really, really concerning, and probably portends scary things for the whole system if we don't get to the root cause of this pollution," said Mogerman, of the defense council.

"When you have lakes in Ohio and other places where you're walking your dog and it takes a couple of gulps of lake water and ends up keeling over, you got a problem," Mogerman said. "That's something that needs to be addressed. So, we need to be looking at the Gulf of Mexico and seeing the magnitude of an individual algae outbreak. But we need to recognize this is a problem close to home. This is a problem in Illinois River, Lake Michigan and all over our inland waterways."

Environmental groups have tried to tackle the issue of water pollution and its effect on the Gulf. A coalition sued the Metropolitan Water Reclamation District of Greater Chicago over its share of phosphorus pollution in local waterways, citing its faraway impacts on the Gulf. The litigation resulted in a settlement in which the reclamation district agreed

to upgrade its pollution controls at its largest wastewater plants by 2030.

Environmental advocates have also worked to take on the larger hurdle: the tens of thousands of farms throughout Illinois.

In collaboration with the agricultural industry, the defense council pushed to incentivize the use of cover crops, plants like cereal rye that soak up water and nutrients during the off-season. Estimates indicate the practice is only used on 700,000 acres of farmland or 3.2% of farmland statewide.

This year, Illinois became the second state in the nation to begin a pilot program aimed at trying to financially encourage more farmers, starting with a goal of 50,000 acres in its first year. A similar program in Iowa picked up traction last year, receiving applications for more than 170,000 additional cover crop acres in 2018.

In a way, these cover crops could serve the same function as Illinois' bygone wetlands and prairie grasses. But more steps will need to be taken.

Mogerman said officials need to find smart policies that look to nature as a model to address flooding in urban and agricultural settings.

"Just like climate change, there's no one thing that is going to fix the algae apocalypse," he said.