Forecasters predict second-smallest Gulf of Mexico 'dead zone'

June 21 2012

A dry spring in portions of the Midwest is expected to result in the second-smallest Gulf of Mexico "dead zone" on record in 2012, according to a University of Michigan forecast released today.

The U-M prediction calls for a 2012 Gulf of Mexico dead zone of about 1,200 square miles, an area the size of Rhode Island. If the forecast is correct, 2012 would replace 2000 (1,696 square miles) as the year with the second-smallest Gulf dead zone. The smallest Gulf oxygen-starved, or hypoxic, zone was recorded in 1988 (15 square miles).

"While it's encouraging to see that this year's Gulf forecast calls for a significant drop in the extent of the dead zone, we must keep in mind that the anticipated reduction is due mainly to decreased precipitation in the upper Midwest and a subsequent reduced water flow into the Gulf," said aquatic ecologist Donald Scavia, professor at the U-M School of Natural Resources and Environment. "The predicted 2012 dead-zone decline does not result from cutbacks in nitrogen use, which remains one of the key drivers of hypoxia in the Gulf."

The U-M prediction is one of two Gulf dead zone forecasts released today by the National Oceanic and Atmospheric Administration, which funds the research. The other NOAA-supported team, from the Louisiana Universities Marine Consortium and Louisiana State University, predicts a 2012 Gulf dead zone of 6,213 square miles.

The Michigan forecast model is based solely on 2012 spring nutrient

inputs from the Mississippi River, which are significantly lower than average due to drought conditions throughout much of the watershed. The Louisiana State University forecast model takes into account last year's above-normal nutrient load, which the Louisiana researchers say can remain in bottom sediments and can result in a "carryover effect" that increases the size of the 2012 dead zone.

Last year, the Gulf dead zone measured 6,765 square miles. The largest Gulf hypoxic zone measured to date occurred in 2002 and encompassed more than 8,400 square miles. The Gulf dead zone has averaged about 6,000 square miles over the past five years.

This year, for the first time, Scavia's U-M team was able to forecast the volume of hypoxic water contained in the dead zone. The most likely 2012 scenario corresponds to a volume of 2.6 cubic miles, according to the U-M team.

Scavia, director of the Graham Sustainability Institute and special counsel to the U-M president for sustainability, also released his annual Chesapeake Bay dead zone forecast today. It calls for an average-size dead zone in the Bay this year, down significantly from last summer's record-setter.

"These dead zones are ecological time bombs," he said. "Without determined local, regional and national efforts to control nutrient loads, we are putting major fisheries at risk."

In 2009, the dockside value of commercial fisheries in the Gulf of Mexico was $629 million. Nearly 3 million recreational anglers further contributed more than $1 billion to the Gulf economy, taking 22 million fishing trips.

Farmland runoff containing fertilizers and livestock waste—some of it

from as far away as the Corn Belt—is the main source of the nitrogen and phosphorus that cause the annual Gulf of Mexico hypoxic zone. Each year in late spring and summer, these nutrients flow down the Mississippi River and into the Gulf, fueling explosive algae blooms there.

When the algae die and sink, bottom-dwelling bacteria decompose the organic matter, consuming oxygen in the process. The result is an oxygen-starved region in bottom and near-bottom waters: the dead zone.

"This forecast is a good example of NOAA, USGS and university partnerships delivering ecological forecasts that quantify the linkages between the watershed and the coast," said NOAA Administrator Jane Lubchenco. "While the occurrence of a low-flow year following a year with major flooding will help us to evaluate any carryover effect from prior years, we should not lose sight of the ongoing need to reduce the flow of nutrients to the Mississippi River and thus the Gulf."

According to U.S. Geological Survey estimates, the Mississippi and Atchafalaya rivers transported 58,100 metric tons of nitrogen (in the form of nitrite plus nitrate) to the northern Gulf in May 2012, an amount that is 56 percent lower than average May nitrogen loads estimated in the last 33 years.

"These forecasts are the product of decades of research, monitoring and modeling on how decisions we make in the vast drainage basin of the Mississippi and its tributaries translates into the health of the coastal zone of the Gulf of Mexico," said U.S. Geological Survey Director Marcia McNutt. "Comparing the actual hypoxic zone against the predictions will help scientists better understand the multiyear memory of this complex land-sea system, and ultimately better inform options for improving ecosystem productivity."

About a thousand miles northeast of the Gulf of Mexico in Chesapeake Bay, this year's hypoxic zone is expected to measure about 1.5 cubic miles, Scavia said. That's about average compared to measured volumes since 2000 but much smaller than last year's record-setter of 2.75 cubic miles, which was due to spring storms that washed large amounts of nutrients into rivers that feed the Bay.

So far in 2012, rainfall in the Chesapeake Bay watershed has been 50-to-75 percent of normal, Scavia said.

The actual size of the 2012 Gulf hypoxic zone will be announced following a NOAA-supported monitoring survey led by the Louisiana Universities Marine Consortium between July 27 and Aug. 3.

The amount of nitrogen entering the Gulf of Mexico each spring has increased about 300 percent since the 1960s, mainly due to increased agricultural runoff. The Gulf of Mexico/Mississippi River Watershed Nutrient Task Force has targeted 1,900 square miles as a long-term goal for the size of the Gulf dead zone.

More information: University of Michigan hypoxia forecasts: snre.umich.edu/scavia/hypoxia-forecasts

NOAA hypoxia pages: www.cop.noaa.gov/gulf_hypoxia_…orecast/default.aspx

Louisiana Universities Marine Consortium hypoxia information and forecasts: www.gulfhypoxia.net

Provided by University of Michigan