Chesapeake Bay 'dead zone' predicted to be 13% lower than average this summer

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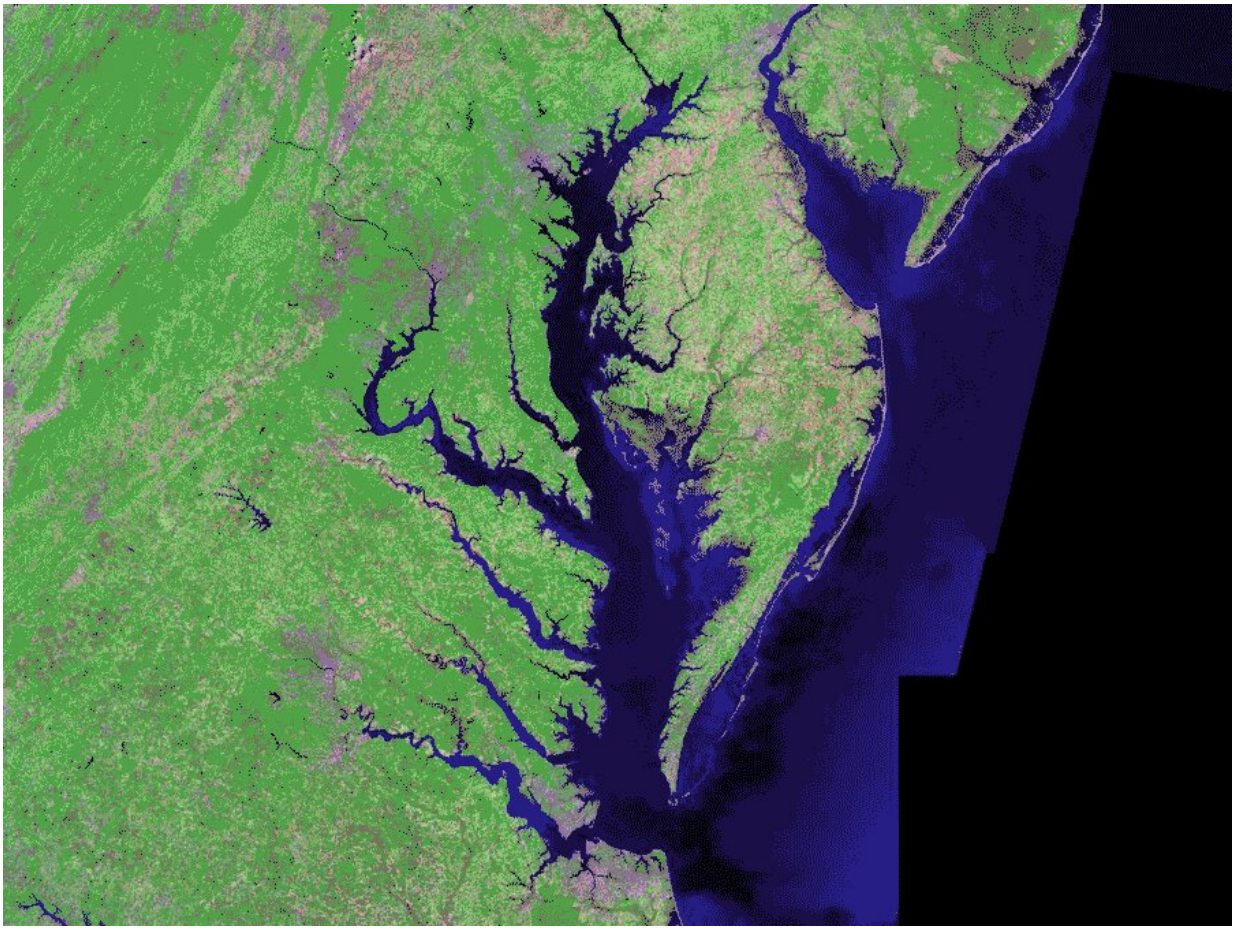

Satellite (Landsat) picture of Chesapeake Bay (center) and Delaware Bay (upper right) – and Atlantic coast of the central-eastern United States. Credit: Landsat/NASA, Public Domain, via Wikimedia Commons

This summer's Chesapeake Bay "dead zone" is expected to be smaller than the long-term average, according to a forecast released today by researchers from the University of Michigan, Chesapeake Bay Program, University of Maryland Center for Environmental Science and U.S. Geological Survey.

This is due to a below average amount of water entering the bay from the watershed's tributaries this past spring, as well as decreased nutrient and sediment pollution from jurisdictions within the watershed.

Areas of low oxygen, also known as hypoxic regions, are primarily caused by excess nutrient pollution flowing into the bay. These regions can result in the loss of habitat for various types of marine life, including fish, blue crabs, oysters and underwater grasses.

Compared to the previous 36 years, this year's Chesapeake Bay hypoxic volume, or "dead zone," is predicted to be 13% lower than the long-term average, similar to the measured dead zones of the past two years. The model used to generate these hypoxia forecasts has been accurate in 13 of the last 14 years.

"In addition to this year's forecast, the measured dead zone has been below the long-term average in eight of the past 10 years," said University of Michigan aquatic ecologist Don Scavia, who leads one of several research teams partnering with the federal government on the annual forecast.

"While progress has been frustratingly slow and we are still considerably above the goal, these trends suggest the nutrient-reduction efforts of the bay program are moving us in the right direction," said Scavia, professor emeritus at Michigan's School for Environment and Sustainability.

In 2022, summer hypoxia also began later than it did in several previous

years—in early June rather than mid-to-late May. This late start is largely due to cooler May temperatures than those in other years.

The levels of pollution reaching the Chesapeake Bay each year vary due to the amount of spring rainfall impacting river flows, which flushes excess nutrients and sediment into the water, as well as conservation practices implemented by jurisdictions to reduce and manage those pollutants.

Although different types of nutrients contribute to the annual dead zone, it is the amount of nitrogen that enters the bay during spring that is a key driver in how hypoxic conditions can vary from year to year. The amount of nitrogen pollution entering the bay during spring 2022 was 22% lower than the long-term average and included 102 million pounds of nitrogen recorded at nine river-input monitoring stations and 5.7 million pounds from treated wastewater.

"The fact that hypoxia in the bay is once again forecasted to be lower than the long-term average is clearly a positive sign for bay restoration. When we consider that hypoxia is continually being exacerbated by marine heat waves and warmer bay waters, this recent success of our nutrient management efforts is even more impressive," said Marjy Friedrichs, research professor at Virginia Institute of Marine Science.

A baywide assessment of the 2022 dead zone will be available this fall.

Throughout the year, researchers measure oxygen and nutrient levels as part of the Chesapeake Bay Monitoring Program, a baywide cooperative effort involving watershed jurisdictions, several federal agencies, 10 academic institutions and more than 30 scientists. Among these institutions, the Maryland Department of Natural Resources and Virginia Department of Environmental Quality conduct 8-10 cruises between May and October, depending on weather conditions, to track summer

hypoxia in the bay.

Results from each monitoring cruise can be accessed through the Eyes on the Bay website for the Maryland portion of the bay and the VECOS website for the Virginia portion. The U.S. Geological Survey monitors river flow, nutrients and sediment entering the bay at the nine river-input monitoring stations.

A model developed by the University of Michigan has been used since 2007 to forecast the volume of summer hypoxia for the main stem of the Chesapeake based on the amount of nitrogen pollution flowing into the bay from nine river monitoring stations and the wastewater treatment plants that are located downstream of them.

The hypoxia forecast model, enhanced in 2020, allows for projections for an average July, average summer and the total annual hypoxic volume, and is based on the monitoring of nitrogen pollution and river flow at the nine river input monitoring stations along the Appomattox, Choptank, James, Mattaponi, Pamunkey, Patuxent, Potomac, Rappahannock and Susquehanna rivers.

The dead zone is an area of little to no oxygen that forms when excess nutrients, including both nitrogen and phosphorus, enter the water through polluted runoff and feed naturally occurring algae. This drives the growth of algae blooms, which eventually die and decompose, removing oxygen from the surrounding waters faster than it can be replenished. This creates low-oxygen—or hypoxic—conditions.

"Dissolved oxygen levels are a key measure of bay health, as sufficient oxygen is needed to support vital fish, crab and oyster populations, as well as a healthy ecosystem," said Mark Trice, water quality program manager at the Maryland Department of Natural Resources. "The forecast brings attention to our continued progress toward

implementation of nutrient reduction strategies to improve oxygen conditions."

Pollution-reducing practices used in backyards, cities and on farms can reduce the flow of nutrients into waterways.

Nutrient reductions are done under the Total Maximum Daily Load section of the federal Clean Water Act, which identifies the maximum amount of a pollutant that Chesapeake Bay can receive while meeting water quality standards, and develops a plan to achieve those goals.

"While the bay's TMDL was established in 2010, there appears to finally be progress toward the goal," Scavia said.

The Chesapeake Bay Program is a regional partnership that has coordinated and conducted the restoration of the Chesapeake Bay for 30 years, since its formation in 1983.

More information: Eyes on the Bay: eyesonthebay.dnr.maryland.gov/… esonthebay/index.cfm

VECOS: vecos.vims.edu/

Provided by University of Michigan