Chesapeake Bay sees smaller-than-average 'dead zone' in 2022

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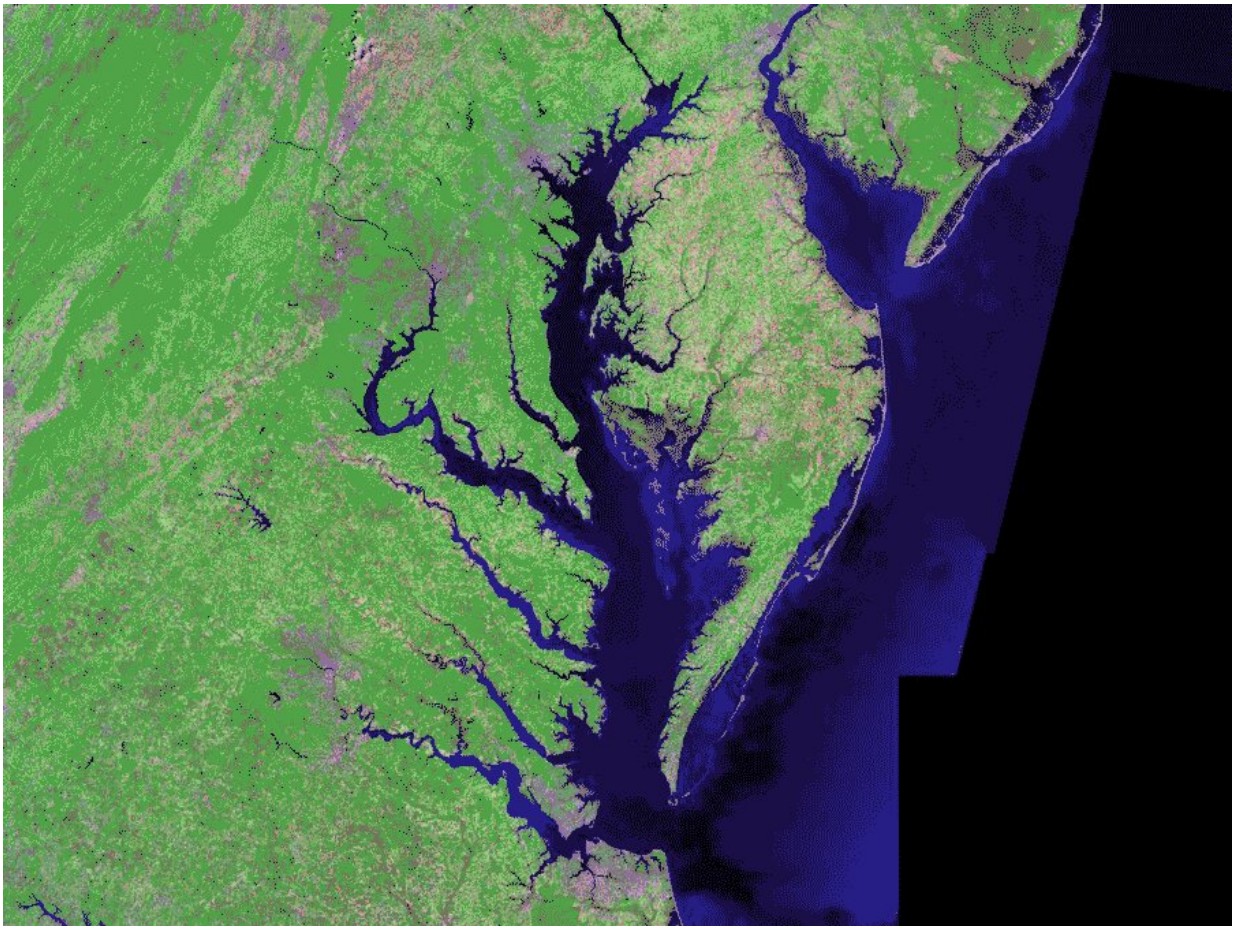

Satellite (Landsat) picture of Chesapeake Bay (center) and Delaware Bay (upper right) – and Atlantic coast of the central-eastern United States. Credit: Landsat/NASA, Public Domain, via Wikimedia Commons

This year's Chesapeake Bay "dead zone" was the 10th-smallest observed since 1985, according to findings released Nov. 16 by the Chesapeake Bay Program and its partners, including the University of Michigan.

The annual Chesapeake Bay dead zone is an area of low oxygen that forms in deep waters when excess nutrients, including both nitrogen and phosphorus, enter the water through polluted runoff and feed naturally occurring algae.

The findings announced today are on par with the forecast that researchers released in June, which estimated a 13% smaller-than-average dead zone due to lower amounts of winter and spring precipitation, which brought fewer nutrient and sediment pollutants into the bay from the surrounding watershed.

The annual forecast is developed by the University of Michigan and informed by data from the Chesapeake Bay Program, Maryland Department of Natural Resources, Virginia Department of Environmental Quality and U.S. Geological Survey.

"The fact that our June 2022 forecast and the measured size of this year's dead zone are in close agreement lends credibility to our models," said University of Michigan aquatic ecologist Don Scavia, who leads one of several research teams partnering with the federal government on the annual forecast.

"But the fact that both numbers are only a small percent below the 38-year average also points out that progress is still way behind goals set by the Chesapeake Bay Program in 2010," said Scavia, professor emeritus at the U-M School for Environment and Sustainability. "A recent assessment found that the nutrient targets are being missed by wide margins, and the likely reaction is to extend the deadlines."

Findings about the size of the 2022 Chesapeake Bay dead zone are based on research by the Virginia Institute of Marine Science and the Maryland Department of Natural Resources. The VIMS 2022 Chesapeake Bay Dead Zone Report Card and the MDNR 2022 Final Hypoxia Report both found this year's dead zone to be the 10th-smallest observed since 1985.

The Maryland Department of Natural Resources, in conjunction with Old Dominion University, conducted nine water quality sampling cruises between May and October 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.

Additionally, scientists at the Virginia Institute of Marine Science, in collaboration with Anchor QEA, use a computer model combined with local weather information, as well as regular estimates of how many nutrients are entering the bay from the surrounding watershed, to produce daily, real-time estimates of dead zone size throughout the summer.

The Chesapeake Bay Environmental Forecast System also provides daily estimates of other environmental conditions throughout the bay, including water temperature, salinity levels and acidification.

"It is always welcome news to see improved Chesapeake Bay dissolved oxygen conditions that are so vital for the health of fish, crabs, oysters and other aquatic life," said Mark Trice, water quality informatics program manager with the Maryland Department of Natural Resources.

"We are pleased that the 38-year Chesapeake Bay Program monitoring partnership has helped to refine bay modeling and forecasts, increase scientific understanding of bay processes, and inform and guide progress

towards restoration."

The U.S. Geological Survey reported that Water Year 2022 (Oct. 1, 2021, through Sept. 30, 2022) had river flows entering the Chesapeake Bay averaging 73,000 cubic feet per second, which is below the long-term water-year average of 79,000 cfs.

Rivers carry nutrients that drive the growth of algae blooms in the bay. The algae eventually die and decompose, removing oxygen from the surrounding waters faster than it can be replenished. This creates low-oxygen—or hypoxic—conditions at the bottom of the bay: the dead zone.

"Again, it's reassuring this year to see that our multiple methods for computing summer hypoxia in the Chesapeake Bay are producing consistent estimates of summer dead zone size," said Marjy Friedrichs, research professor at the Virginia Institute of Marine Science.

"In addition, it is now clear that actions taken by the Chesapeake Bay Program partnership to reduce nutrient pollution are offsetting the increases in hypoxia that would otherwise be occurring due to warming atmospheric temperatures."

Cool and windy conditions in spring 2022 resulted in hypoxia first appearing in June, which is later than average. This year's dead zone then grew to a more typical size through mid-August, due to moderate river flows, temperatures and winds throughout the region. Hypoxia was still observed in mid-September, but cooler temperatures and stronger winds allowed it to dissipate soon thereafter.

In fact, Virginia Institute of Marine Science models found that the duration of the 2022 dead zone was likely shorter than 95% of any since 1985.

"While it is encouraging to see a smaller dead zone in 2022, we must recognize that it could be even further improved if not for several environmental drivers, such as climate change, increasing populations and stormwater runoff," said Kandis Boyd, director of the Environmental Protection Agency's Chesapeake Bay Program Office.

"The partnership is taking actions across the watershed to reduce the flow of nutrient and sediment pollutants from entering the bay, which not only contributes to improved dissolved oxygen conditions, but also helps to offset the effects of climate change."

Provided by University of Michigan