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Chesapeake Bay sees smaller than average dead zone in 2022

Duration shortened by cool temperatures, strong winds

Annapolis, MD—Today, Chesapeake Bay Program partners released information on the state of the 2022 Chesapeake Bay dead zone. Experts from both the Maryland Department of Natural Resources and Virginia Institute of Marine Science concurred that hypoxic conditions in the Chesapeake Bay were better than average in 2022.

The [dead zone](#) is an area of low oxygen that forms in deep Bay waters 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 at the bottom of the Bay.

The Virginia Institute of Marine Science in their [2022 Chesapeake Bay Dead Zone Report Card](#), as well as the Maryland Department of Natural Resources in their [2022 Final Hypoxia Report](#), 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—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](#) (CBEFS) 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.”

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These findings are on par with the [forecast](#) released in June 2022, which estimated a 13% smaller than average dead zone, predicted as such due to lower amounts of winter and spring precipitation that resulted in smaller river flows that brought fewer nutrient and sediment pollutants into the Chesapeake Bay from its surrounding watershed. This annual forecast is developed by the [University of Michigan](#) and informed by data provided by the [Chesapeake Bay Program](#), Maryland Department of Natural Resources, Virginia Department of Environmental Quality and [U.S. Geological Survey](#).

The U.S. Geological Survey reported that water year 2022 (measured from October 1, 2021—September 30, 2022) had river flows entering the Bay averaging 73,000 cubic feet per second, which is below the long-term water-year average of 79,000 cubic feet per second. Estimates of river flow and nutrients entering the Bay can be accessed on the U.S. Geological Survey's [website](#).

“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 Dr 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.”

Weather conditions play a large role in the size and duration of the annual dead zone. Cool and windy conditions in the spring resulted in hypoxia first appearing in June, which is later than the average year. The 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 Dr. 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.”