Warming climate will impact dead zones in Chesapeake Bay

December 16 2019

Credit: CC0 Public Domain

In recent years, scientists have projected increasingly large summer dead

zones in the Chesapeake Bay, areas where there is little or no oxygen for living things like crabs and fish to thrive, even as long-term efforts to reduce nutrient pollution continue. Researchers warn that climate may also have significant impact that could change the equation for nutrient reduction goals.

Researchers including Ming Li and Wenfei Ni from University of Maryland Center for Environmental Science factored in local impacts of climate change to make projections of what the oxygen content of the Chesapeake Bay will look like in the future.

"We projected that the hypoxic and anoxic volumes in Chesapeake Bay would increase by 10-30% between the late 20th and mid-21st century," said study author Ming Li of the University of Maryland Center for Environmental Science.

The bay's hypoxic (low oxygen) and anoxic (no oxygen) zones, also called "dead zones," are caused by excess nutrient pollution, primarily from agriculture and wastewater. The excess nutrients stimulate an overgrowth of algae, which then sinks and decomposes in the water, consuming oxygen. The resulting low oxygen levels are insufficient to support most marine life and habitats in near-bottom waters, threatening the bay's crabs, oysters and other fisheries.

The Chesapeake Bay has been experiencing rapid warming and accelerating relative sea level rise. In coastal waters, the depletion of oxygen in bottom water has occurred at faster rates than the open ocean and has been traditionally attributed to nutrient pollution and organic matter from the surrounding watershed and rivers.

"Previous studies have suggested that the climate change impact on hypoxia in Chesapeake Bay would be modest," said Ming Li. "We are saying there might actually be a bigger increase in hypoxia, and we need

to factor climate change in to nutrient management strategies. Maybe we'll have to make a bigger reduction of nutrient loading to offset the impact of climate change."

The researchers used several climate models to make hypoxia projections for 2050 and got similar results.

"This has really raised some questions," he said. "The Chesapeake is vulnerable to climate change."

More information: Wenfei Ni et al, Large Projected Decline in Dissolved Oxygen in a Eutrophic Estuary Due to Climate Change, *Journal of Geophysical Research: Oceans* (2019). DOI: 10.1029/2019JC015274

Provided by University of Maryland Center for Environmental Science