

# Oysters hold secrets to Chesapeake Bay's past

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Credit: Florida International University

People began to negatively impact the water quality of the Chesapeake Bay earlier than previously thought, a new study finds.

Nitrogen is one of the most abundant elements in the planet found in air and water. But when too much of it enters the environment, usually from human activities, the air and water can become polluted. In a study published in *Scientific Reports*, FIU Ph.D. student Heather Black found pollution in the Chesapeake Bay appeared as early as 1800, but it generally confirms industrialization and deforestation around the bay led to water quality issues before the American Civil War began in 1861.

Previous studies using sediments dug from the bay floor showed similar levels of nitrogen in about the same time period, but [oyster shells](#) are easier to date, according to the study's researchers. Sitting at the bottom of the bay, oysters eat much of what washes over them and act as a record of environmental changes. Black compared the amounts nitrogen stored in modern shells with amounts found in shells that are up to 3,400 years old. By analyzing the shell's growth bands – which form somewhat similarly to tree rings – scientists can determine environmental conditions during its lifespan.

"We know Chesapeake Bay is heavily polluted, but no one knows exactly what a 'pristine' bay of the past looked like in terms of nitrogen concentrations," Black said. "Hopefully, this can give scientists and managers a better idea of what degree of restoration is needed, since the bay's health is currently in a steep decline."

The study was conducted when Black was a master's student at the University of Alabama. It was co-authored with researchers from the University of Alabama, the Smithsonian Natural History Museum and Union College.

Black is currently a Ph.D. student in FIU's Department of Earth and Environment. As part of the International Ocean Discovery Program Expedition 346, Black is working alongside Geology Professor William Anderson to reconstruct oceanic currents as old as 5 million years to determine when the East Asian monsoon began. The East Asian monsoon is a large-scale sea breeze that carries air inland from the Indian and Pacific oceans, influencing the climate of eight countries and one-third of the world's population. According to Black, understanding how the region's climate has fluctuated in the past will give scientists a better idea of how it will vary in the future.

Black aspires to a career in academia where she can teach and conduct research on how marine environments change over time.

**More information:** H. D. Black et al.  $\delta^{15}\text{N}$  Values in *Crassostrea virginica* Shells Provides Early Direct Evidence for Nitrogen Loading to Chesapeake Bay, *Scientific Reports* (2017). [DOI: 10.1038/srep44241](https://doi.org/10.1038/srep44241)

Provided by Florida International University

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