



Mitigating and Managing Harmful Algal Blooms

The National Centers for Coastal Ocean Science (NCCOS) leads the nation's efforts to reduce, mitigate, and control the impacts of harmful algal blooms (HABs), as mandated by the Harmful Algal Bloom and Hypoxia Research and Control Act.

HABs occur when algae—simple organisms that live in the ocean and freshwater—accumulate and produce toxins harmful to people and animals, which can lead to hospitalization and even death. NCCOS science-based services reduce economic harm, protect human health, and advance technology to control HABs and their toxins. These services range from detection and observation tools—including forecasting and monitoring—to prevention, management, and mitigation strategies. HABs occur in every U.S. state, and new HABs have emerged in recent years, adding new threats to regions already impacted. The average economic impact of HABs in the U.S. is estimated at \$50 million annually, although recent analyses suggest that particularly severe HAB events can cause billions in losses, like the \$2.7 billion 2018 Florida Red Tide. ^{1,2}

NCCOS spends \$25.78 Million annually on HABs, including \$15.28 Million in direct funding throughout the country to help communities manage HABs. Explore several examples below.

Ohio

- **Testing New HAB Monitoring Technology:** Deploying long-range autonomous underwater monitoring vehicle equipped with an environmental sensor processor to remotely provide near-real time, detection of HAB toxins in Lake Erie.
- **Producing a HAB Forecast:** Providing forecasts for seasonal blooms in Lake Erie to alert state agencies, water utilities, and coastal managers about potential risks to tourism and drinking water.



1. Centers for Disease Control. Sept. 2023. Harmful algal blooms threaten our health, the environment, and the economy.

2. Alvarez, Brown, Diaz et al. Feb. 2024. Non-linear impacts of harmful algae blooms on the coastal tourism economy. *Journal of Environmental Management*
<https://doi.org/10.1016/j.jenvman.2023.119811>





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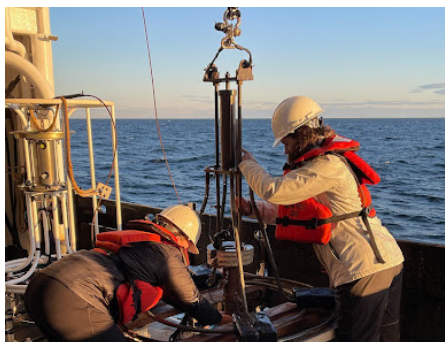
Florida

- **Addressing the Sargassum Crisis:** Funding a weekly risk map showing where and when Sargassum will land ashore.
- **Minimizing Red Tide Impacts:** Providing the Red Tide Respiratory Forecast to detail hazards throughout the day for the majority of Florida's southwest public beaches. NCCOS also provides satellite-based imagery to the South Florida Water Management District and the Army Corps of Engineers to guide toxin monitoring.
- **Developing HAB Control Technology:** Field testing two approaches in Florida: DinoSHIELD, an algicidal compound that can be used in small bays and marinas, and clay based control methods for large scale use.
- **Responding to HAB Events:** Funded local and regional collaborators to investigate unusual fish behavior linked to HABs in the Florida Keys.



Alaska

- **Creating a HAB Forecast:** Developing a much-needed early warning and forecasting capabilities for HABs in the Gulf of Alaska, an area popular for commercial and subsistence fishers.
- **Protecting Aquaculture and Subsistence Harvesters:** Informing shellfish harvesters of HAB toxin risks, and providing guidance on how coastal farmers can test clams, oysters, and crabs for toxins that cause shellfish poisoning.



Maine

- **Producing a HAB Forecast:** Monitoring, modeling, and predicting where HAB toxins could accumulate to protect shellfish harvesters and consumers.



North Carolina

- **Providing a HAB Monitoring System:** Producing near real-time satellite-based imagery for HABs in the Albemarle Sound to provide early warning and guidance for recreational boating, fishing, and ecotourism.



Texas

- **Producing a HAB Forecast:** Monitoring daily conditions of HABs in the Gulf of America to issue regular forecasts to local officials. In 2023, Texas had its first red tide in five years. NCCOS successfully coordinated with the state to routinely produce accurate locations of the bloom, which included respiratory forecasts.