U.S. IOOS FY20 National Harmful Algal Bloom Observing Network Awards

Alaska Ocean Observing System (AOOS)

Funded amount: $200,000
Funding period: June 2020–June 2021

Alaska, especially in the U.S. Arctic, is emerging as a new at-risk region for HAB-related events. The Alaska Harmful Algal Bloom Network (AHAB), formed in 2017, seeks to improve the effectiveness of HAB monitoring and event response across the state. This award will support the nascent network, supporting a full-time AHAB coordinator and statewide action plan; ensuring that data are collected, synthesized, and accessible through a central portal; and incorporate proven, cost-effective technologies, such as qPCR testing for Alexandrium cell abundance (cause of paralytic shellfish poisoning) and Domoic Acid (DA) field test kits, into operational monitoring across Alaska.

Central and Northern California Ocean Observing System (CeNCOOS) & Southern California Coastal Ocean Observing System (SCCOOS)

Funded amount: $250,000
Funding period: June 2020–June 2021

Identifying and quantifying the diversity of phytoplankton in the waters off of the California coast is vital for monitoring and understanding harmful algal blooms.. Nearly every year, recreational and commercial fisheries are closed due to excessive amounts of biotoxins found in shellfish and crustaceans that are produced by harmful algae. This award supports the operation and maintenance of a suite of autonomous water samplers, Imaging Flowcytobots (IFCB), to identify HAB species in real-time at critical land-based and offshore locations throughout California. Developed at Woods Hole Oceanographic Institution and manufactured by McLane Labs, the IFCB continuously takes images of each particle in a small sample (~15 mL) of water every hour. An onboard computer then uses image recognition processes and a machine-learning model to estimate both the identity and the volume of the phytoplankton.

This project, with additional funding from other NOAA resources and the CA Ocean Protection Council, provides an efficient way to quickly and consistently test for HAB toxins off the California coast. NOAA's National Centers for Coastal Ocean Science/PCMHAB program is funding a complimentary project to develop a data infrastructure for this network.

Northwest Association of Networked Ocean Observing Systems (NANOOS)

Funded amount: $250,000
Funding period: June 2020–June 2021

Harmful algal blooms have made a sizable impact on the economic and human health of the Pacific Northwest region, prompting frequent fishery closures and disrupting jobs, tourism, and food supply chains. The Pacific Northwest Harmful Algal Blooms Bulletin, a forecasting tool based on field observations and modeling output, has been providing critical, timely information to state and tribal managers in both Washington and Oregon since 2017. Data, information, and forecasts in the bulletin support decision-making for opening or closing shellfisheries, including delayed openings; selective harvests at "safe" beaches; and harvest

limits, protecting the health of tens of thousands of harvesters and consumers in the region. This award will be used for a combination of salary support, Live Ocean ocean circulation modeling, offshore sampling, beach sampling, and sample analysis.

The project complements an FY20 U.S. IOOS Ocean Technology Transition project to support HAB sampling using the Submaran, and autonomous surface vehicle; a NOAA National Centers for Coastal Ocean Science/MERHAB five-year regional project, developing improvements to the bulletin; and another MERHAB project that is funding deployment of the Environmental Sample Processor for the next three years.

Gulf of Mexico Coastal Ocean Observing System (GCOOS)

Funded amount: $150,000
Funding period: June 2020–June 2021

Florida's "red tide," a harmful algal bloom caused by Karenia brevis, takes a devastating toll on the Gulf Coast. When a bloom occurs, it can kill marine animals as well as birds, shutter fisheries, and release air borne toxins that can cause respiratory and neurological symptoms in humans along the shore. The HABscope, an innovative K. brevis sampling tool developed by GCOOS and NOAA's National Centers for Coastal Ocean Science, brings citizen science to the effort to manage and mitigate red tide . Trained citizen scientists can collect water samples, take a video of the sample using a low-cost microscope and iPod, and connect to the GCOOS RA image recognition software to calculate a cell count. Expanding the HABscope user group, allows for increased sampling with broader coverage, improving red tide forecasting and better illustrating the status of any given bloom. This award will support recruitment, retention, and training of citizen scientists, allow GCOOS to maintain the image recognition software, and acquire necessary supplies like microscopes, iPods, and disposable items.

Great Lakes Observing System (GLOS)

Funded amount: $150,000
Funding period: June 2020–June 2021

Lake Erie is a vital resource for the U.S. It supports jobs, tourism, and—critically—drinking water for more than 11 million people. Harmful algal blooms have been on the rise in Lake Erie, once contaminating the Toledo, Ohio water supply to such an extent that the city was cut off from fresh water for three days. GLOS has partnered with NOAA, LimnoTech, The Ohio State University, Cleveland Water Alliance, Cooperative Institute for Great Lakes Research, and RPS Group to develop and operationalize an early warning system for Lake Erie to support decision making to take steps for public safety when facing these blooms.This award will upgrade hardware and software of existing instrumentation to improve telemetry and allow compatibility with GLOS data management platform. That will allow for improved integration of different sources of HABs data, incl. real-time data and modeled data; development of a marine IoT platform to improve ingestion, processing and dissemination of observation and model data; and support the seasonal deployment of three Environmental Sample Processors that automate the analysis of water samples and transmit results researchers on land in real time.

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For more information, please contact Kate Culpepper, U.S. IOOS, kate.culpepper@noaa.gov