NCCOS | NATIONAL CENTERS FOR COASTAL OCEAN SCIENCE

SCIENCE SERVING COASTAL COMMUNITIES

National Competitive HAB Programs

Ongoing Projects & Future Opportunities

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HQ in Silver Spring

280+ staff
4 labs

Congressional Direction - *Harmful Algal Bloom and Hypoxia Research and Control Act (HABHRCA)*

- Actions Plans and Integrated Assessments of causes, consequences, economic costs, progress of research, and needs for HABs and hypoxia research and control
- Administer competitive grant funding to address research and management needs and accelerate methods of intervention and mitigation to reduce the frequency, severity, and impacts of HABs and hypoxia
- Identify research, development, and demonstration needs and priorities relating to monitoring, prevention, control, mitigation, and response to marine and freshwater HABs and hypoxia
- Enhance communication and coordination among Federal agencies carrying out marine and freshwater HAB and hypoxia activities and research

NCCOS 2022-2026 Strategic Plan

1. Advancing Ecosystem Science for Conservation and Sustainable Use

2. **Developing and Implementing Advanced Observation Technologies and Ecological Forecasts**
   a. *Predict where, when, magnitude/severity, and socioeconomic impacts of HABs and hypoxia using diverse data, models, and observational technology and expanding forecasting capabilities spatially and temporally*

3. Facilitating Resilience and Adaptation to Inundation and Climate Impacts

4. **Detecting, Monitoring, and Mitigating Impacts of Chemical and Biological Stressors**
   a. *Detect, monitor, quantify, and reduce impacts of HABs and hypoxia*
   b. *Develop and validate toxin analytical methods*

5. **Advancing Social, Economic, and Behavioral Approaches to Coastal Stewardship**
   a. *Deploy toxin detection tools, training, and products to stakeholders*

6. Investing in our People and Achieving Organizational Excellence

NCCOS 2022-2026 Strategic Approach

HAB Observing

R&D

- Research and development of improved detection technologies and validation of data;
- Marine and freshwater satellite remote-sensing;
- PMN monitors marine and estuarine HAB species at over 250 coastal sites.

Operations

- NHABON Implementation Plan with IOOS

HAB Forecasting

R&D

- Applied research needed to inform ecological forecasts;
- Advancing satellite methods for detecting HABs;
- Developing and delivering regional forecasts.

Operations

- Plan in development with IOOS

IOOS Integrated Ocean Observing System

HAB PCM

R&D

- Control advances promising technologies for preventing, controlling, or mitigating HABs;
- HAB Event Response provides enhanced monitoring and response to events;
- Prevention through understanding the causes and impacts of HAB events.

HAB Monitoring & Reference

HAB Monitoring & Reference Branch

- Produces reference methods, materials and validation
- Designs, fabricates and calibrates toxin sensors
- Advances HAB prevention and control technologies
- Establishes and transitions regional user laboratories
- Sustains citizen science for HAB monitoring and underrepresented communities

HAB Forecasting

HAB Forecast Branch

- Develops and delivers ecological forecasts
- Conducts applied research needed to inform ecological forecasts
- Advances satellite methods for detecting HABs
- Helps stakeholders mitigate HAB impacts

Competitive Research Program

CRP HAB and Hypoxia Programs

- ECOHAB - Ecology and Oceanography
- MERHAB - Monitoring and Event Response
- PCMHAB - Prevention, Control, and Mitigation
- SEAHAB - Social and Economic Assessments (new)
- HAB Event Response

- CHRP - Coastal Hypoxia Research
- Other focus areas (ESLR, RER, OA)

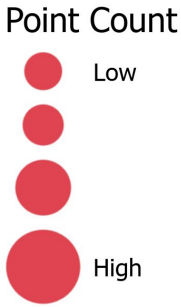
Active projects:

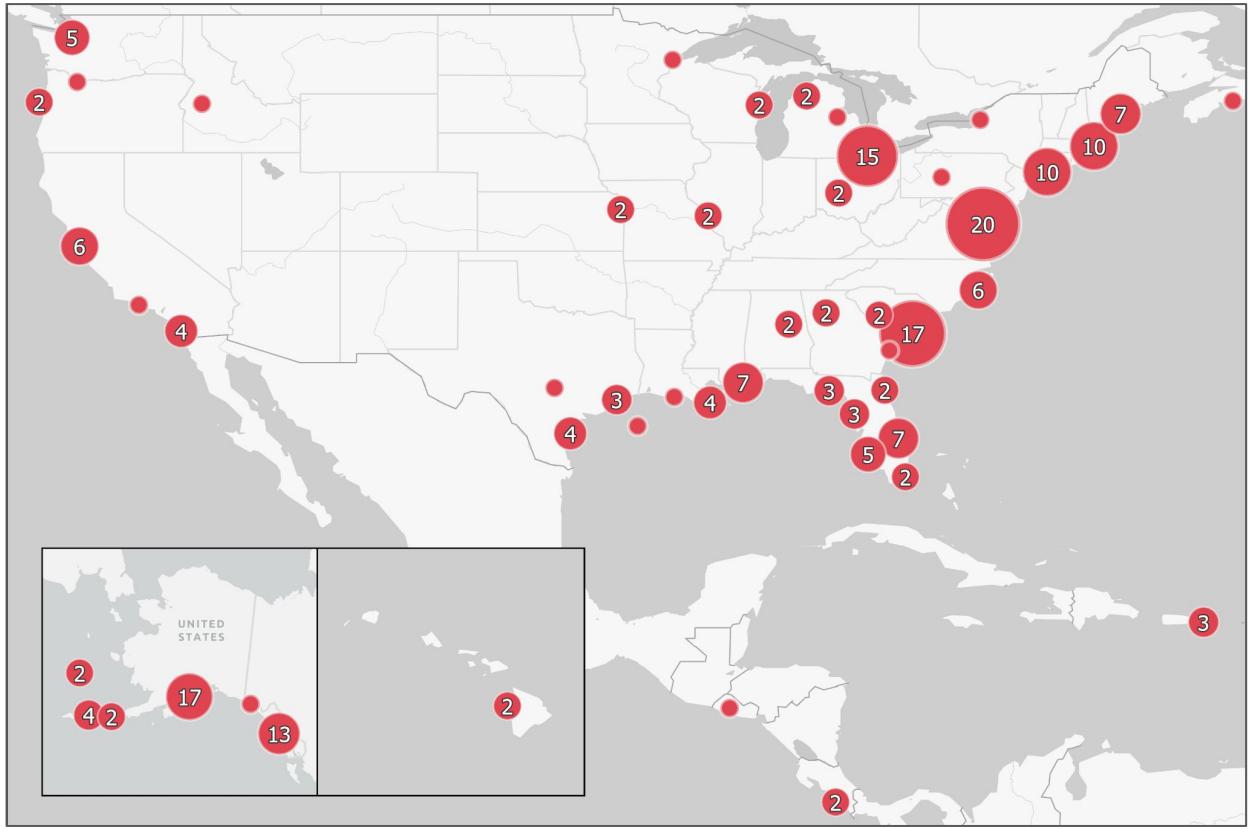
157 total (FY19-FY23)

86 in FY23

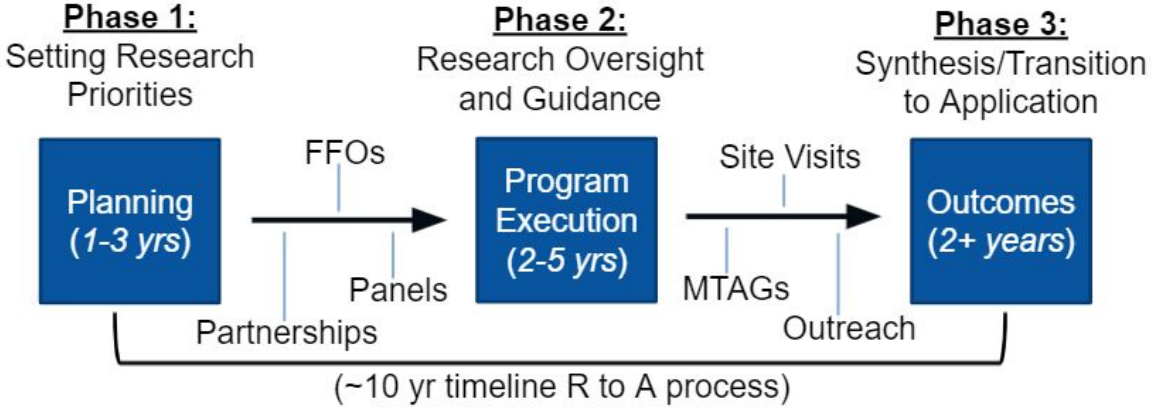
Over 100 partners

288 publications





Competitive HAB Programs - Science transition approach



- NOFO's either encourage or require Management Transition Advisory Group
- Proposal review and evaluation criteria
  - Relevance and Applicability - 35%
  - Technical merit - 35%
- Management and stakeholder representatives engaged in panel review

Toxin detection in seafoods & shellfish

- PCMHAB 2017: Advancing ISSC priorities/shellfish toxin detection methods
  - Alternative Methods of Analysis for NSP Monitoring and Management (PI: Leanne Flewelling, FL FWRI) - *ISSC 17-107, NSP Approved Limited Use in oysters, hard clams, sunray venus clams; positive tests require MBA*
  - Expanding Options for Monitoring DSP: LC-MS/MS and Two Rapid Screening Approaches (PI: Steve Archer, Bigelow Laboratory) - *Supporting data for ISSC 17-103, comparison with PP2A, ELISA*

- MERHAB 2019
  - Microcystins in Bivalves: Optimizing of Monitoring For and Minimizing Risk From an Emerging Human Health Threat (PIs: Christopher Gobler, Stony Brook University & Raphael Kudela, UCSC) - *Ongoing research presented in ISSC Biennial Symposium, March 2023*
  - Expanding the SEATOR Program for Monitoring of ASP and DSP (PI: Chris Whitehead, Sitka Tribe of Alaska) - *Ongoing, no current ISSC actions*
  - Developing a machine learning-based, high resolution, predictive capacity for monitoring paralytic shellfish toxins along the Gulf of Maine coastline (PI: Steve Archer, Bigelow Laboratory) - *Experimental Coastal Maine Shellfish PSP Toxicity 4 - 10 Day Forecast*

Toxin detection in seafoods & shellfish (& water)

- PCMHAB 2020: General (Mitigation of HAB impacts)
  - Validation of a multiplex test for saxitoxin and domoic acid in shellfish (PI: Greg Lewis, Lightdeck Technologies) - *ISSC preproposal, guidance from Laboratory Committee*
- PCMHAB 2023: Specific to seafood toxin testing (regulatory & rapid POST)
  - Advancing the use of the receptor binding assay to multispecies monitoring for PSP (PI: Shelley Lankford, WA DOH) - *ISSC 13-114 matrix extension*
  - Developing harmonized approaches to monitor DSP toxins in shellfish (PI: Steve Archer, Bigelow) - *ISSC 17-103 LC MS/MS clams only, 19-136 (Checklist)*
  - Validation of rapid lab-based brevetoxin aptamer assay prototypes (PI: Dana Wetzel, Mote Marine Lab) - *Method development, innovation*
- MERHAB 2023: "...faster, cost effective, and more reliable detection methods for HAB cells and toxins in routine monitoring programs"
  - HAB Monitoring and toxin testing to support community subsistence harvesting and forecast model development in the Kodiak Archipelago (PI: Julie Matweyou, UAF)
  - Expansion of anatoxin-a monitoring methods to additional congeners (PI: Nicholas Pflug, SUNY)

Current/Future Opportunities

- ECOHAB 2024 - LOIs in, Applications Due January 31, 2024
- SEAHAB 2024 - LOIs in, Applications Due January 17, 2024
- TBD: MERHAB & PCMHAB 2025
- HAB Control Technologies Incubator (HCTI) - NCCOS partnership with Mote Marine Lab and University of Maryland's Institute of Marine and Environmental Technology (IMET)
- Other opportunities - Across NOAA & other federal agencies

Federal Funding for HAB Science and Management: Programs, Priorities, & Proposals

Panel Discussion at the 11th U.S. Symposium on Harmful Algae

Friday, October 28, 2022

Funding Source	Description
Other NOAA Programs	
NCCOS HAB Event Response Funding	The NCCOS HAB Event Response Program provides immediate assistance to help federal, state and local officials manage events and advance the understanding of HABs as they occur. Depending on need, the program may provide access to toxin analysis, training, technical assistance, and support ship-based offshore sampling.
Integrated Ocean Observing System (IOOS) Ocean Technology Transition (OTT) Program	The IOOS OTT program sponsors the transition of emerging marine observing technologies, for which there is an existing operational requirement and a demonstrated commitment to integration and use by the ocean observing community, to operational mode.
Sea Grant Programs	Sea Grant provides a variety of funding opportunities based on its work in four focus areas: Healthy Coastal Ecosystems, Sustainable Fisheries and Aquaculture, Resilient Coastal Communities and Economies, and Environmental Literacy and Workforce Development. Funding opportunities include National Strategic Investments, Special Projects, focused opportunities through each of the 34 Sea Grant programs, and more.
Small Business Innovation Research (SBIR) Program	NOAA's SBIR program is a highly competitive merit-based grant program that encourages U.S. small businesses to engage in federal Research/Research and Development (R/R&D), with the end goal of developing innovative and commercially-viable products or services.
Saltonstall-Kennedy Grant Competition	The Saltonstall-Kennedy Program administers a yearly grant competition which annually funds approximately 40 projects for $10 million that lead to the promotion, development and marketing of U.S. fisheries.
Aquaculture Funding Opportunities and Grants	Funding may address aquaculture-related topics such as environmental monitoring, recirculating systems, shellfish farming, alternative aquafeeds, new species research, and offshore aquaculture.
RESTORE Science Program	The RESTORE Science Program carries out research, observation, and monitoring to support the long-term sustainability of the ecosystem, fish stocks, fish habitat, and the recreational, commercial, and charter-fishing industry in the Gulf of Mexico.
US Army Corps of Engineers (USACE)	
USACE Freshwater HAB Research and Development Initiatives	Delivering scalable technologies to reduce the frequency and effects of HABs to our Nation's water resources through research, technology development and demonstration.
US Geological Survey (USGS)	
Cooperative Matching Funds	USGS Cooperative Matching Funds (CMF) support joint projects with our state, regional, tribal, and local partners to provide reliable, impartial, and timely information needed to understand and manage the Nation's water resources.
Water Resources Research Act Program	This is a Federal-State partnership that plans, facilitates, and conducts research that helps resolve State and regional water problems; promotes technology transfer; promotes dissemination and application of research; trains scientists through participation in research; and awards competitive grants under the Water Resources Research Act.
Youth and Education in Science	Engaging the next generation of scientists is an integral component of USGS science. The Youth and Education in Science (YES) office coordinates a variety of programs that target the spectrum of learners from early childhood through post-doctoral fellowships.

How can you get involved?

- Consider leading or participating on a proposal*
- Welcome an invitation from a PI or PM to serve on a management transition advisory group (MTAG)*
- Participate in a panel review*
- Build relationships with scientists in your focus area / region of interest -- or those with expertise that can address specific needs*
- Contact a NCCOS/CRP Program Manager to get/share information*
- * maggie.broadwater@noaa.gov

Questions?