

Description of Ecology and Oceanography of Harmful Algal Blooms Program (derived from Federal Register Notice 05/04/09¹)

The goals of ECOHAB are to develop:

- (1) Quantitative understanding of HABs and, where applicable, their toxins in relation to the surrounding environment with the intent of developing new information and tools, predictive models and forecasts, and prevention strategies to aid managers in coastal environments; and
- (2) Understanding leading to models of trophic transfer of toxins, knowledge of biosynthesis and metabolism of toxins, and assessment of impacts of toxins on higher trophic levels. Research results will be used directly to guide management of coastal resources to reduce HAB development, impacts, and future threats and will feed into other HAB programs for development of tools to improve HAB management and response.

In order to meet the stated goals, research will be conducted in the following areas:

- (1) Developing methods for HAB cell and toxin detection that are necessary for the conduct of research on understanding the causes and dynamics of HABs and HAB impacts on higher trophic levels;
- (2) Understanding the factors controlling HAB growth and toxicity by focusing on harmful algal genetics, physiology, and toxin production;
- (3) Understanding community ecology and ecosystem dynamics, including top-down and bottom-up control of HABs;
- (4) Delineating the biosynthetic pathways and metabolism of toxins;
- (5) Determining the trophic transfer of toxins within food webs and the impacts of toxins on individual organisms and food webs;

ECOHAB is a peer-reviewed, national, competitive program that funds regional-scale and targeted studies. Regional ecosystem investigations of the causes and impacts of HABs leading to development of model-based operational ecological forecasting capabilities in areas with severe, recurrent blooms are a high priority. These can be either in new areas, areas that have been studied previously but where new or unanswered questions remain, or involve comparisons between ecosystems. Conducted by multi-disciplinary, multi-institutional teams, they are typically 3-5 years in duration. Targeted studies are conducted by individual or small groups of investigators for 2-3 years and address fundamental ecological and oceanographic questions related to HAB events.

Clarification of Appropriate Topics for proposals submitted to ECOHAB, [MERHAB](#), and [PCM HAB](#) (adapted from Federal Register Notice 04/05/09¹)

Several research topics may fit more than one CSCOR extramural, national, competitive HAB program. Further, there are some topics that are more appropriate for other NOAA programs or programs in other agencies. Section A. lists examples of appropriate programs for different components of potentially overlapping topics. Examples of topics which are not applicable to any of these three programs are provided in Section B.

A. Examples of Appropriate Research Topics for Each Program

1. Developing methods of measuring and monitoring HAB cells and toxins. The purpose of the research and the stage of development will determine which program is appropriate.
 - (a) ECOHAB will fund method development when it is necessary to conduct research.
 - (b) MERHAB will fund method development when it is needed to improve or test an existing method for use in monitoring HAB cells or toxins or environmental conditions that foster HABs.
 - (c) PCM HAB Phase 1 will fund novel method development where the concept is so new that it is unknown whether it will be suitable for research or monitoring.
 - (d) PCM HAB will also fund efforts to make existing technologies more widely available.
2. Use of models for forecasting and prediction
 - (a) HAB forecasting and prediction through the development of models, is covered by the ECOHAB program.
 - (b) Development of partnerships to test and utilize models for forecasting as part of specific monitoring programs is under the purview of MERHAB.
 - (c) Transfer of models for HAB forecasting and prediction to end users will be covered by PCM HAB.
 - (d) Modification or use of models to develop prevention strategies will be funded by PCM HAB.
3. HAB-related human dimensions research will be conducted as part of the PCM HAB program, including socio-economic impacts of HABs. However, an ECOHAB or a MERHAB proposal may have a socio-economic component as part of a larger study.

B. Examples of Non-Applicable Research Topics

1. Prevention of HABs by implementation of nutrient reductions or hydrodynamic modifications is a possible strategy, but numerous other programs in other agencies address implementation issues. PCM HAB will not fund, for example, research to develop new methods of nutrient removal or develop land use practices that may reduce nutrient inputs. However, if actual nutrient reductions or hydrodynamic changes are implemented, PCM HAB may fund research to monitor and model the consequences of those activities if they will be transferable to other situations.
2. Disease surveillance, clinical characterization, and therapeutic guidance in humans are the purview of other agencies, such as NSF/NIEHS COHH, CDC and FDA.
3. Drinking water monitoring and treatment is under the purview of EPA.

Authorization and Research Prioritization for ECOHAB Program

Legislation:

The ECOHAB program was authorized by the Harmful Algal Bloom and Hypoxia Research and Control Act ([HABHRCA](#)) of 1998 ([Pub.L. 105-383](#)) and was reauthorized in 2004 ([Pub.L. 108-456](#)). Continuation of the competitive programs was included when HABHRCA was reauthorized in 2014 ([Pub.L. 113-121](#)).

Reports

ECOHAB, the Ecology and Oceanography of Harmful Algal Blooms (1995)²

Harmful Algal Research and Response: A National Environmental Science Strategy (HARRNESS) 2005-2015 (2005)³
Comprehensive Research and Action Plan for HABs and Hypoxia (in review, 2016)

Federal Register Notice

Implementation of New Competitive Prevention, Control, and Mitigation of Harmful Algal Blooms (HAB) Program and Regional Rotation of the Existing and New National Competitive HAB Programs A Notice by the National Oceanic and Atmospheric Administration on 05/04/2009¹

References

1. Federal Register Notice HAB Programs A Notice by the National Oceanic and Atmospheric Administration on 05/04/2009 <https://www.federalregister.gov/articles/2009/05/04/E9-10187/implementation-of-new-competitive-prevention-control-and-mitigation-of-harmful-algal-blooms-hab>
2. Anderson, D.M. 1995. ECOHAB, the Ecology and Oceanography of Harmful Algal Blooms. Woods Hole, MA: Woods Hole Oceanographic Institution. <http://www.whoi.edu/redtide/nationplan/ECOHAB/ECOHABhtml.html>
3. Ramsdell, J.S., D.M. Anderson and P.M. Glibert (Eds.), 2005. Harmful Algal Research and Response: A National Environmental Science Strategy (HARRNESS) 2005-2015. Ecological Society of America. Washington, DC, 96 pp. <http://www.whoi.edu/fileserver.do?id=24149&pt=10&p=19132>