

**COMMITTEE ON SCIENCE AND TECHNOLOGY  
SUBCOMMITTEE ON ENERGY AND ENVIRONMENT  
U.S. HOUSE OF REPRESENTATIVES**

**HEARING CHARTER**

*Harmful Algal Blooms: Action Plans for Scientific Solutions*

Wednesday, June 1, 2011  
2:00 p.m. to 4:00 p.m.  
2318 Rayburn House Office Building

**PURPOSE**

On Wednesday, June 1, 2011, the Subcommittee on Energy and Environment of the Committee on Science, Space, and Technology will hold a legislative hearing to examine harmful algal blooms (HABs) and hypoxia research and response needs to develop and implement action plans to monitor, prevent, mitigate and control both marine and fresh water bloom and hypoxia events. The Subcommittee will also receive testimony on draft legislation entitled “The Harmful Algal Blooms and Hypoxia Research and Control Act of 2011.” Witnesses have been asked to provide comments on, and suggestions to, the bill.

**WITNESSES**

**Dr. Robert Magnien**, Director of the Center for Sponsored Coastal Ocean Research, National Oceanic and Atmospheric Administration (NOAA).

**Dr. Richard Greene**, Chief, Ecosystems Dynamics and Effects Branch, Gulf Ecology Division, Office of Research and Development, U.S. Environmental Protection Agency (EPA).

**Dr. Donald Anderson**, Senior Scientist and Director of the Coastal Ocean Institute, Woods Hole Oceanographic Institution.

**Dr. Kevin Sellner**, Executive Director, Chesapeake Research Consortium

**Dr. Stephanie Smith**, Chief Scientist, Algaeventure Systems

**Dr. Beth McGee**, Senior Water Quality Scientist, Chesapeake Bay Foundation

## **Background**

### ***Harmful Algal Blooms and Related Impacts***

A harmful algal bloom (HAB) is a bloom, or rapid overproduction of algal cells, that produces toxins which are detrimental to plants and animals. These outbreaks are commonly referred to as “red” or “brown” tides. Blooms can kill fish and other aquatic life by decreasing sunlight available to the water and by depleting the available oxygen in the water, causing hypoxia. The produced toxins accumulate in shellfish, fish, or through the accumulation of biomass that in turn affect other organisms and alter food webs. In recent years, many of the nation’s coastlines, near shore marine waters, and freshwaters have experienced an increase in the number, frequency, duration and type of HABs. Blooms can be caused by several factors; for example, an increase in nutrients can cause algae growth and reproduction to increase dramatically. In other instances, HABs may result from naturally occurring environmental changes in water quality, temperature, sunlight, or other factors allowing certain algae to out-compete other microorganisms for nutrients.

Harmful algal blooms are one of the most scientifically complex and economically significant coastal management issues facing the nation. In the past, only a few regions of the U.S. were affected by HABs, but now almost all U.S. States have reported blooms. In severe cases, these phenomena can have serious environmental, economic, and human health impacts. Such impacts include human illness and mortality following direct consumption or indirect exposure to toxic shellfish or toxins in the environment; economic hardship for coastal economies, many of which are highly dependent on tourism or harvest of local seafood; as well as fish, bird, and mammal mortalities. Broader ecosystem impacts are also a concern, wherein environmental damage may reduce the ability of those systems to sustain species due to habitat degradation and increase susceptibility to disease..

### ***The Harmful Algal Bloom and Hypoxia Research and Control Act and Current Federal Research***

In 1998, Congress passed the Harmful Algal Bloom and Hypoxia Research and Control Act (HABHRCA, Public Law 105-83), which established an Interagency Task Force to develop a national HABs assessment and authorized funding for existing and new research programs on HABs. The Interagency Task Force includes:

- Department of Commerce
- Environmental Protection Agency
- Department of Agriculture
- Department of the Interior
- Department of the Navy
- Department of Health and Human Services
- National Science Foundation
- National Aeronautics and Space Administration
- Food and Drug Administration
- Office of Science and Technology Policy
- Council on Environmental Quality

- Other federal agencies as the President considers appropriate

The funding went to support two multi-year research programs at the National Oceanic and Atmospheric Administration (NOAA) that focus on HABs— the Ecology and Oceanography of Harmful Algal Blooms (ECOHAB) program and the Monitoring and Event Response for Harmful Algal Blooms (MERHAB) program. These programs involve federal, state, and academic partners and support interdisciplinary extramural research studies to address the issues of HABs in an ecosystem context.

In 2004, HABHRCA was reauthorized by Public Law 108-456, which required assessments of HABs in different coastal regions and in the Great Lakes and included plans to expand research to address the impacts of HABs. The law also authorized research, education, and monitoring activities related to the prevention, reduction, and control of harmful algal blooms and hypoxia and reconstituted the Interagency Task Force on HABs and Hypoxia. The reauthorization expired in 2008, however, the Consolidated Appropriations Act of 2008 (P.L. 110-161) provided authorizations through 2010.

The 2004 reauthorization also directed NOAA to produce several reports and assessments, which have since been completed:

- The *Prediction and Response Report* (September 2007) addresses both the state of research and methods for HAB prediction and response, especially at the federal level.
- The 2008 *National Scientific Research, Development, Demonstration, and Technology Transfer Plan for Reducing Impacts from Harmful Algal Blooms* (RDDTT Plan) establishes research priorities to develop and demonstrate prevention, control and mitigation methods to advance current prediction and response capabilities.
- The *Scientific Assessment of Marine Harmful Algal Blooms* (December 2008) described the state of the science with respect to understanding HABs causes and controls and developing predictive models; developing detection methods for cells and toxins; characterizing toxins and impacts; HAB impacts on food webs and fisheries; and, assessing public health, economic and sociocultural impacts.
- The 2008 *Scientific Assessment of Freshwater Harmful Algal Blooms* released in 2008 that describes the state of the knowledge of HABs in U.S inland and freshwaters and presents a plan to advance research and reduce the impacts on humans and the environment.
- The *Scientific Assessment of Hypoxia in U.S. Coastal Waters* (September 2010) assesses the prevalence of low-oxygen “dead-zones”, or hypoxic zones, in U.S. coastal waters and outlines a series of research steps needed to address these occurrences.

Additionally, the 2004 reauthorization directed NOAA, in coordination with the Task Force, to conduct local and regional scientific assessments if requested by state, tribal, or local governments or for affected areas identified by NOAA. Funding was also authorized for ongoing and new programs and activities such as: competitive, peer-reviewed research through the ECOHAB program; freshwater harmful algal blooms added to the research priorities of ECOHAB; a competitive, peer-reviewed research program on management measures to prevent, reduce, control, and mitigate harmful algal blooms supported by the MERHAB program;

and activities related to research and monitoring of hypoxia supported by the competitive, peer-reviewed Northern Gulf of Mexico program and Coastal Hypoxia Research Program administered by NOAA's National Ocean Service.

The HABHRCA authorized funds to conduct research and reduce HABs and hypoxia in U.S. marine waters, estuaries and the Great Lakes. In its role as a task force participant, the Environmental Protection Agency (EPA) has signed memorandums of understanding to fund competitive research in these areas. However, since the completion of the freshwater report in 2008, EPA has ceased participation in freshwater HAB research and mitigation activities, asserting that its obligations regarding implementation of the report recommendations have been addressed. As a result, although EPA oversees a wide array of programs specifically designed to protect and preserve the coastal and marine waters of the United States, including watershed protection programs working through partnerships and an array of regulatory programs, the agency currently has no research and development effort that directly addresses freshwater harmful algal blooms.

#### *Other Interagency Efforts*

EPA and NOAA are co-leads of a Federal Workgroup of thirteen federal agencies committed to supporting the Gulf of Mexico Alliance, a partnership formed by the five Gulf State Governors. In addition, EPA is also the lead agency of the Mississippi River/Gulf of Mexico Watershed Nutrient Task Force.

#### ***Reauthorization of the Harmful Algal Bloom and Hypoxia Research and Control Act***

The first national plan to outline a roadmap for the scientific community was the *National Plan for Marine Biotoxins and Harmful Algae*.<sup>1</sup> This plan served as the foundation for the development of national, regional, state and local programs and the advancement of scientific knowledge on HABs and their impacts. In the years that followed, HABs have increased in type, frequency, location, duration and severity, while decision-making and management systems did not change. Thus, the national plan was updated to reflect the current state of the HAB problem, needs, priorities and approaches. The revised plan, *Harmful Algal Research and Response: A National Environmental Science Strategy 2005-2015*<sup>2</sup> (HARRNESS) is composed of views from the research and management community and outlines a framework for actions over a ten-year period.

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<sup>1</sup> Anderson, D., Galloway, S.B., Joseph, J.D. A National Plan for Marine Biotoxins and Harmful Algae. 1993. <http://hdl.handle.net/1912/614>  
<https://darchive.mblwhoilibrary.org/bitstream/1912/614/1/WHOI-93-02.pdf>

<sup>2</sup> HARRNESS, *Harmful Algal Research and Response: A National Environmental Science Strategy 2005-2015*. National Plan for Algal Toxins and Harmful Algal Blooms. <http://www.esa.org/HARRNESS/>

*Funding Levels of HABs Programs.*

**NOAA HABHRCA Funding FY 2007 – FY 2010\***

	<b>FY 2007 Enacted</b>	<b>FY 2008 Enacted</b>	<b>FY 2009 Enacted</b>	<b>FY 2010 Enacted</b>
<sup>1</sup> <b>NOAA TOTAL</b>	\$13.1M	\$11.4M	\$14.6M	\$12.6M
<b>Regional Research and Action Plans</b>	\$0.0M	\$0.0M	\$0.0M	\$0.0M
<sup>2</sup> <b>Intramural Research and Assessment Activities</b>	\$6.0M	\$3.4M	\$3.4M	\$2.6M
<sup>3</sup> <b>ECOHAB</b>	\$2.8M	\$3.0M	\$5.1M	\$4.7M
<sup>4</sup> <b>MERHAB</b>	\$1.9M	\$1.6M	\$1.5M	\$0.6M
<sup>5</sup> <b>NGOMEX</b>	\$1.7M	\$2.4M	\$2.7M	\$2.4M
<sup>6</sup> <b>CHRP</b>	\$0.7M	\$0.9M	\$1.9M	\$1.3M
<sup>7</sup> <b>PCM HAB</b>	\$0.0M	\$0.0M	\$0.0M	\$1.0M
<b>Event Response</b>	\$0.01M	\$0.06M	\$0.04M	\$0.02M
<b>Infrastructure</b>	\$0.0M	\$0.0M	\$0.0M	\$0.0M

<sup>1</sup>Estimates do not include administration costs or ship charter costs

<sup>2</sup>Funding includes research related to HAB and Hypoxia research funded out of NCCOS Base funds

<sup>3</sup>Ecology and Oceanography of Harmful Algal Blooms program

<sup>4</sup>Monitoring and Event Response for Harmful Algal Blooms program

<sup>5</sup>Northern Gulf of Mexico Ecosystems and Hypoxia Program

<sup>6</sup>Coastal Hypoxia Research Program

<sup>7</sup>Prevention, Control, and Mitigation of Harmful Algal Blooms program

\*NOTE: HABHRCA programs do not receive individual line items in the administration budget, so FY12 request levels are unknown.

**Discussion Draft: *the Harmful Algal Blooms and Hypoxia Research and Control Amendments Act of 2011***

**Section-by-Section Analysis**

Purpose: To establish a National Harmful Algal Bloom and Hypoxia Program, to develop and coordinate a comprehensive strategy to address harmful algal blooms and hypoxia, and to provide for the development and implementation of comprehensive regional action plans to reduce harmful algal blooms and hypoxia.

**Section 1: Short Title**

*The Harmful Algal Blooms and Hypoxia Research and Control Amendments Act of 2011*

**Section 2: Amendment of Harmful Algal Bloom and Hypoxia Research and Control Act of 1998**

Section 2 explains that the text the bill modifies is the Harmful Algal Bloom and Hypoxia Research and Control Act of 1998, unless otherwise expressly stated.

**Section 3: Definitions**

Section 3 provides definitions for the Act, including: Administrator of the Environmental Protection Agency; the National Harmful Algal Bloom and Hypoxia Program; State; and the Under Secretary of Commerce for Oceans and Atmosphere.

**Section 4: National Harmful Algal Bloom and Hypoxia Program**

Section 4 directs the Under Secretary of Commerce for Oceans and Atmosphere, through the Interagency Task Force, to maintain a National Harmful Algal Bloom and Hypoxia Program. The bill outlines tasks for the Under Secretary to ensure through the Program: 1) to develop a national strategy to address both marine and freshwater HABs and hypoxia; 2) to ensure the coordination of all Federal programs related to HABs and hypoxia; 3) to work with regional, State, tribal, and local government agencies; 4) to identify additional research needs and priorities; 5) to ensure the development and implementation of methods and technologies to protect ecosystems damaged by HABs; 6) to coordinate education programs; 7) to facilitate regional, State, tribal, and local efforts to implement response plans, strategies, and tools; 8) to provide resources for training of regional, State, tribal and local coastal and water resource managers; 9) to oversee the updating of the Regional Research and Action Plans; and 10) to administer peer-reviewed, merit-based competitive grant funding.

In addition, Section 4 directs the Under Secretary to work cooperatively with other offices, centers, and programs within NOAA, as well as, with States, tribes, nongovernmental organizations, and other agencies represented on the Task Force to avoid duplication.

This bill also requires the Under Secretary to maintain an existing competitive grant program at NOAA; conduct marine and freshwater HAB and hypoxia event response activities; and facilitate and coordinate among Federal agencies and increase the availability of analytical facilities and technologies, operational forecasts, and reference and research materials.

Section 4 requires that all monitoring and observation data collected shall conform to standards and protocols developed pursuant to the National Integrated Coastal and Ocean Observation System Act of 2009.

The bill requires the Under Secretary to transmit to Congress an action strategy that outlines the specific activities to be carried out by the Program, a timeline for such activities, and the programmatic roles of each federal agency in the Task Force. The action strategy shall be published in the Federal Register and be periodically revised by the Under Secretary. Section 4 also requires the Under Secretary to prepare a report to Congress describing the budget, activities, progress of the Program, and the need to revise or terminate activities under the Program.

### **Section 5: Regional Research and Action Plans**

Section 5 directs the Under Secretary, through the Task Force, to oversee the development of Regional Research and Action Plans by identifying the appropriate regions and sub-regions to be addressed by each Plan. It directs the Under Secretary, through the Task Force, to oversee the implementation of the Regional Research and Action Plans only at the request of the State. The bill outlines some contents the Plans should identify: 1) regional priorities for ecological, economic, and social research related to the impacts of HABs and hypoxia; 2) research, development, and demonstration activities to advance technologies to address the impacts of HABs and hypoxia; 3) ways to reduce the duration and intensity of HABs events; 4) research and methods to address the impacts of HABs on human health; 5) mechanisms to protect vulnerable ecosystems that could be or have been affected by HABs; 6) mechanisms by which data is transferred between the Program and State, tribal, and local governments and relevant research entities; 7) communication and dissemination methods used to educate and inform the public; and 8) the roles that Federal agencies can play to assist implementation of the Plan.

Section 5 directs the utilization of existing research, assessments, and reports in the development of the Plans. Section 5 also provides a list of individuals and entities that the Under Secretary may work with to develop the Plans. The bill also requires that the Plans be completed within 24 months of the date of enactment and updated once every 5 years.

### **Section 6: Northern Gulf of Mexico Hypoxia**

Section 6 directs the Mississippi River/Gulf of Mexico Watershed Nutrient Task Force to transmit a report to Congress and the President on the progress made toward attainment of the coastal goals of the 2008 Gulf Hypoxia Action Plan. The initial report is required no later than 2 years after the date of enactment and every 2 years thereafter. The reports are required to assess progress made toward nutrient load reductions, the response of the hypoxia zone and water quality throughout the Mississippi/Atchafalaya River Basin and the economic and social effects.

The reports shall include an evaluation of current policies and programs and lessons learned. In addition, Section 6 requires the reports to recommend appropriate actions to continue to implement or, if necessary, revise the strategy set forth in the 2008 Gulf Hypoxia Action Plan.

### **Section 7: Authorization of Appropriations**

The discussion draft does not propose specific funding levels for the program. However, the bill specifies that the Under Secretary shall ensure a substantial portion of appropriated funds go toward extramural research activities.

### **Section 8: Unfunded Mandates**

The draft states that the neither the Act nor the amendments made by the Act shall constitute a financial burden to State, tribal, or local governments.