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

HEARING CHARTER

Harmful Algal Blooms: Formulating an Action Plan

Thursday, September 17, 2009
1:00 p.m. to 3:00 p.m.
2318 Rayburn House Office Building

Purpose

On Thursday, September 17, 2009 the Subcommittee on Energy and Environment of the Committee on Science 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 2009." Witnesses will provide their comments on, and suggestions to, the bill.

Witnesses

Dr. Robert Magnien is the Director of the Center for Sponsored Coastal Ocean Research in the National Oceanic and Atmospheric Administration (NOAA). Dr. Magnien will discuss NOAA's current HABs and hypoxia activities, as well as the need for the implementation action plans to address both marine and fresh water blooms and hypoxia events.

Ms. Suzanne E. Schwartz is Acting Director of the Office of Wetlands, Oceans, and Watersheds, U.S. Environmental Protection Agency (EPA). Ms. Schwartz will discuss EPA's current HABs and hypoxia activities as well as the agency's role in addressing the impacts and research needs of freshwater harmful algal blooms.

Mr. Dan Ayres is a Coastal Shellfish Manager and Lead Biologist at the Washington State Department of Fish and Wildlife Region Six Office. Mr. Ayres will discuss the impacts HABs and hypoxia events impose on the west coastline. He will also discuss research and need for response and implementation plans regarding HABs and hypoxia for prevention, control, and mitigation.

Dr. Donald Anderson is a Senior Scientist and Director of the Coastal Ocean Institute at Woods Hole Oceanographic Institution. Dr. Anderson will discuss the impacts HABs and hypoxia events impose on the nation's coastlines. He will also discuss the current research and need for response and implementation plans regarding HABs and hypoxia for prevention, control, and mitigation.

Dr. Greg L. Boyer is a Professor of Biochemistry at the State University of New York College of Environmental Science and Forestry and Director of the Great Lakes Research Consortium. Dr. Boyer will discuss impacts of freshwater harmful algal blooms and hypoxia and the research and implementation needs to respond to freshwater HABs events.

Dr. Donald Scavia is a Graham Family Professor of Environmental Sustainability and Professor of Natural Resources and Environment at the University of Michigan. Dr. Scavia will discuss the impacts of HABs and hypoxia on the Great Lakes and Chesapeake Bay areas, as well as the needs for an implementation strategy for hypoxia in the Northern Gulf of Mexico and Mississippi River.

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 using up the available oxygen in the water, which then results in a hypoxia (severe oxygen depletion) event. These 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, an environmental change in the water quality, temperature, sunlight, or other factors allows certain algae to out-compete other microorganisms for nutrients, which can result in a bloom of the algae with the advantage.

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 all U.S. coastal regions have reported major blooms. These phenomena have devastating environmental, economic, and human health impacts. 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 dramatic fish, bird, and mammal mortalities. There are also devastating impacts to ecosystems, leading to environmental damage that may reduce the ability of those systems to sustain species due to habitat degradation, increased susceptibility to disease, and long-term alterations to community structure.

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

Scientific understanding of harmful algal blooms and hypoxic events has progressed significantly since the early 1990s; however, there is a need for additional efforts in monitoring, prevention, control and mitigation of these complex phenomena. Practical and innovative

approaches to address hypoxia and HABs in U.S. waters are essential for management of aquatic ecosystems and to fulfill a stronger investment in the health of the coasts and oceans called for by the U. S. Ocean Action Plan[1] and recent reports on ocean policy. Recognizing this need, in 2004 Congress reauthorized and expanded the Harmful Algal Bloom and Hypoxia Research and Control Act of 1998 (*Public Law 105-383*) by passing the Harmful Algal Bloom and Hypoxia Amendments Act of 2004 (*Public Law 108-456).*

The 1998 Harmful Algal Bloom and Hypoxia Research and Control Act (HABHRCA) established an Interagency Task Force to develop a national HABs assessment and authorized funding for existing and new research programs on HABs. This includes two multi-year research programs at 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. HABHRCA was reauthorized in 2004, requiring assessments of HABs in different coastal regions and in the Great Lakes and 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 2004 reauthorization also directed NOAA to produce several reports and assessments. The *Prediction and Response Report*, released in September 2007, addresses both the state of research and methods for HAB prediction and response, especially at the federal level. The *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 law also required development of local and regional Scientific Assessment of Hypoxia and a Scientific Assessment of Harmful Algal Blooms. These assessments were to be initiated at the request of 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 NOAAs National Ocean Service.

The HABHRCA authorized funds were directed to conduct research and seek to control HABs and hypoxia in U.S. marine waters, estuaries and the Great Lakes. The 2004 reauthorization also required a reporting requirement on The *Scientific Assessment of Freshwater Harmful Algal Blooms* that describe 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.

[1] U.S. Commission on Ocean Policy. Bush Administration, 2004. http://ocean.ceq.gov/actionplan.pdf

However, since the completion of the report, the Environmental Protection Agency (EPA) has unilaterally determined its obligations regarding implementation of the report recommendations and the agency has ceased participation in freshwater HAB research and mitigation activities.

The investigation into marine blooms is critically important, as are HABs found in the Great Lakes; therefore, there is a need to research and respond to HABs in inland waterways, such as rivers, lakes and reservoirs. The Environmental Protection Agency 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. EPA currently has no research and development effort that addresses freshwater harmful algal blooms. In conjunction with its statutory responsibilities to ensure water quality under the Clean Water Act and the Safe Drinking Water Act, EPA has a program of research and development on water treatment technologies, health effects of water pollutants, security from deliberate contamination, and watershed protection. Current annual funding for these activities is approximately $50 million.

Currently, EPA and Louisiana researchers are studying whether the dead zone pollution violates water quality standards. With EPA's assistance, the State of Louisiana could set standards using the legal authority of the Federal Clean Water Act, including non-point source runoff of nitrogen and phosphorus fertilizer. EPA and the National Oceanic and Atmospheric Administration (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 a participating member of the Mississippi River/Gulf of Mexico Watershed Nutrient Task Force. However, at present, there is a lack of significant federal research and development aimed at addressing freshwater HABs. Because of the agency's complementary work on inland water ecosystems, the EPA is a logical federal entity to partner with NOAA to develop and implement a research, development, and demonstration program to address freshwater harmful algal blooms and hypoxia through research, monitoring, prevention, mitigation, and control. As the lead agency with oversight over freshwater quality, the EPA should ensure the protection of aquatic ecosystems to protect human health, support economic and recreational activities, and provide healthy habitat for fish, plants, and wildlife by conducting research to develop HAB prevention, control and mitigation technologies.

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

For the past 12 years, the science community has been guided by the *National Plan for Marine Biotoxins and Harmful Algae* (Anderson, et al, 1993)[2]. This plan has 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. HABs have increased in their type, frequency, location, duration and severity, yet the decision-making and management systems have not changed. Thus, the national plan was updated to reflect the current state of the HAB problem,

[2] 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

needs, priorities and approaches. The new plan, *Harmful Algal Research and Response: A National Environmental Science Strategy 2005-2015*[3] (HARRNESS) is composed of views from the research and management community and outlines a framework for actions over a ten-year period.

The HABs issue has been approached at a multi-agency level to address its many dimensions. There is presently a range of programs and agencies that address specific aspects of HABs. There have been several reports and assessments on the range of aspects. The reauthorization of the HABHRCA should build upon and utilize the findings and results of these workings to formulate a national action strategy as well as develop regional research action plans. There is also a need to expand the work and research of Harmful Algal Blooms to include both marine and freshwaters.

Draft Legislation: *the Harmful Algal Blooms and Hypoxia Research and Control Amendments Act of 2009*

Section-by-Section Analysis

The Harmful Algal Blooms and Hypoxia Research and Control Amendments Act of 2009
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 2009

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; and the Under Secretary of Commerce for Oceans and Atmosphere.

Section 4: National Harmful Algal Bloom and Hypoxia Program

[3] *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/

Section 4 directs the Under Secretary of Commerce for Oceans and Atmosphere, through the Interagency Task Force, to establish and 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 support international research efforts on HABs and hypoxia; 6) to ensure the development and implementation of methods and technologies to protect ecosystems damaged by HABs; 7) to coordinate an outreach, education, and training program; 8) to facilitate regional, State, tribal, and local efforts to implement response plans, strategies, and tools; 9) to provide resources for training of regional, State, tribal and local coastal and water resource managers; 10) to enhance observations, monitoring, modeling, data management, information dissemination, and operational forecasts; 11) to oversee the updating of the Regional Research and Action Plans; and 12) 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. Section 4 also directs the Under Secretary and the Administrator of the Environmental Protection Agency to jointly carry out the duties for the freshwater aspects of the Program.

This bill also 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, and progress of the Program.

Section 5: Regional Research and Action Plans

Section 5 directs the Under Secretary, through the Task Force, to oversee the development and implementation of Regional Research and Action Plans by identifying the appropriate regions and sub-regions to be addressed by each Plan. 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) actions to minimize the occurrence of HABs and hypoxia; 4) ways to reduce the duration and intensity of HABs events; 5) research and methods to address the impacts of HABs on human health; 6) mechanisms to protect vulnerable ecosystems that could be or have been affected by HABs; 7) mechanisms by which data is transferred between the Program and State, tribal, and local governments and relevant research entities; 8) communication, outreach, and dissemination methods used to educate and inform the public; and 9) 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 12 months of the date of enactment and updated once every 5 years. Furthermore, Section 5 requires that the Under Secretary submit a report to Congress not later than 12 months after the date of enactment and once every 2 years after the completion of the Regional Research and Actions Plans.

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 5 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

Section 7 provides a five year authorization to the Under Secretary to carry out the Program and a separate authorization for the development of the Regional Research and Action Plans. Section 7 also provides a five year authorization to the Administrator for the freshwater HABs Program.