

Harmful Algal Bloom and Hypoxia Research and Control Act

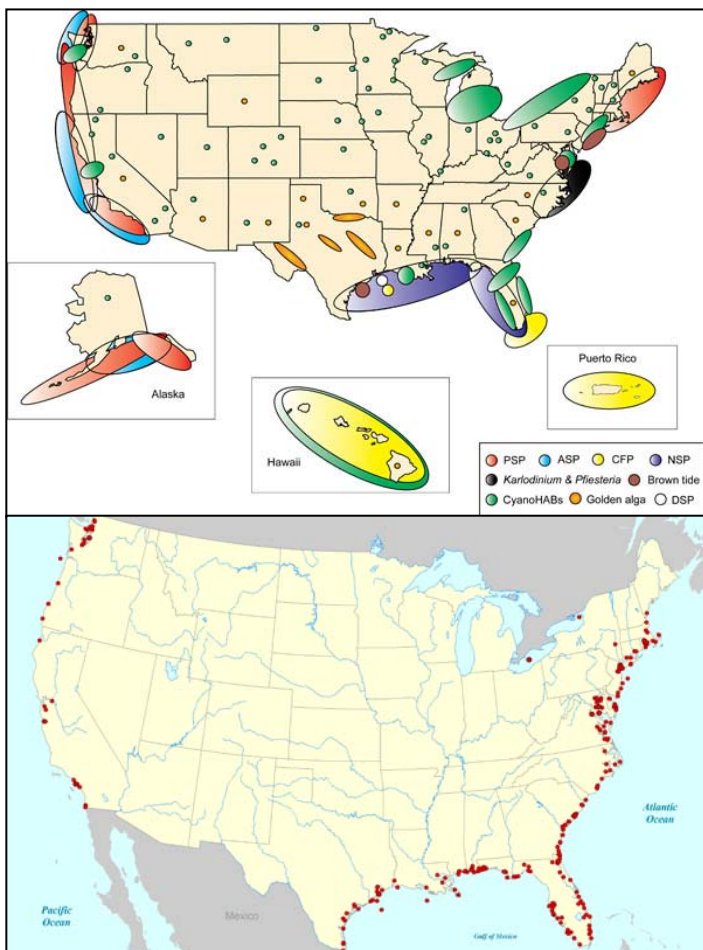
The Issue

Harmful algal blooms (HABs) and hypoxic events (severe oxygen depletion) are some of the most scientifically complex and economically damaging coastal issues challenging our ability to safeguard the health of our Nation's coastal ecosystems. Almost every state in the U.S. now experiences some kind of HAB event (Figure 1), and the number of hypoxic water bodies in the U.S. has increased 30 fold since the 1960's with over 300 coastal systems now impacted (Figure 2).

A 2006 study showed that the economic impacts from a subset of HAB events in U.S. marine waters averaged to be \$82 million/year (2005 dollars). However, just one major HAB event can cost local coastal economies tens of millions of dollars, indicating that the Nationwide economic impact of HABs is likely much larger.

Impacts of HABs and Hypoxia

- Fish kills
- Loss of critical coastal habitats
- Shellfish harvesting closures
- Mass mortality of marine animals, including protected species
- Unsafe beaches
- Serious threats to human health from algal toxins



The Legislation

In December 2004, Congress recognized the severity of these threats and reauthorized the Harmful Algal Bloom and Hypoxia Research and Control Act of 1998 (HABHRCA 1998) with the Harmful Algal Bloom and Hypoxia Amendments Act of 2004 (HABHRCA 2004, Public Law 108-456).

HABHRCA 2004 reaffirmed and expanded the mandate for NOAA to advance the scientific understanding and ability to detect, monitor, assess, and predict HAB and hypoxia events. It authorized funding for existing and new competitive research programs on HABs and hypoxia, including a new program to research methods of prevention, control, and mitigation of HABs.

HABHRCA 2004 also required a total of five interagency reports to address various aspects of HABs and hypoxia in U.S. waters.

Figure 1. (Top left) Distribution of major HAB problems in the United States. HAB poisoning syndromes include paralytic shellfish poisoning (PSP), neurotoxic shellfish poisoning (NSP), amnesic shellfish poisoning (ASP), ciguatera fish poisoning (CFP), and diarrhetic shellfish poisoning (DSP). For information on impacts of HABs, visit <http://www.whoi.edu/redtide/>.
Source: Judy Kleindinst, WHOI
<http://www.whoi.edu/redtide/page.do?pid=14898>

Figure 2. (Bottom left) Over 300 U.S. coastal areas now experience hypoxia, a near 30-fold increase from just 12 documented areas in 1960.
Source: Robert Diaz, VIMS

NOAA CSCOR HAB and Hypoxia Research

NOAA CSCOR HAB research programs authorized by HABHRCA include the interagency Ecology and Oceanography of Harmful Algal Blooms ([ECO HAB](#)) Research Program, the Monitoring and Event Response for Harmful Algal Blooms ([MER HAB](#)) Research Program, and the Prevention, Control, and Mitigation for Harmful Algal Blooms ([PCM HAB](#)) Research Program. NOAA CSCOR hypoxia programs include the Coastal Hypoxia Research Program ([CHRP](#)) and the Northern Gulf of Mexico Ecosystems and Hypoxia Assessment ([NGOMEX](#)) Research Program. All of these programs support competitive, interdisciplinary extramural research—involving Federal, state, and academic partners—to address the issues of HABs and hypoxia in an ecosystem context.

Recent HAB and Hypoxia Reports and Plans

The reports required by HABHRCA 2004 were developed for the U.S. Congress by the U.S. Joint Subcommittee on Ocean Science and Technology's Interagency Working Group on Harmful Algal Blooms, Hypoxia, and Human Health. Major report findings are given below. All required HABHRCA reports have been completed and are available at http://www.cop.noaa.gov/stressors/extremeevents/hab/habhrca/Report_Plans.aspx

Harmful Algal Bloom Management and Response: Assessment and Plan, 2008—This document combined two reports to 1) evaluate Federal actions to predict and respond to HAB events and 2) present a plan to advance current capabilities and reduce HAB impacts. The report highlighted significant progress in HAB mitigation, but noted progress in HAB prevention and control has been more challenging. The plan proposes a HAB “Research, Development, Demonstration, and Technology Transfer (RDDTT) Program” with the following components to optimize progress in HAB management: 1) research program on HAB prevention, control, and mitigation, 2) HAB event response program, and 3) a program for core infrastructure that supports HAB research.

Scientific Assessment of Marine Harmful Algal Blooms, 2008—This assessment describes the nature of HABs in U.S. marine waters and reviews major advances in research over the last decade. Advances were most notable in the areas of HAB prediction and tracking, detection methods for HAB cells and toxins, knowledge of toxin impacts, and recognition of emerging HAB problems.

Scientific Assessment of Freshwater Harmful Algal Blooms, 2008—This document reports the state of the knowledge on HABs in U.S. inland and fresh waters, and it presents a plan to advance research and reduce freshwater HAB impacts. The report notes research progress in the U.S. has been made mostly at the individual project level, with larger Federal efforts focused on the Great Lakes. It highlights seven priority areas to optimize future research progress.

Scientific Assessment of Hypoxia in U.S. Coastal Waters, 2010—This report provides a thorough assessment of the hypoxia problem in U.S. coastal and estuarine waters and describes recent advances made to improve scientific understanding of hypoxia and our ability to manage and prevent these events. It also brings together conclusions of a number of reports by identifying research directions that will best lead to improved hypoxia management.

Recently Published Related HAB and Hypoxia Reports:

- *HAB Research, Development, Demonstration, and Technology Transfer (RDDTT) National Workshop Report, 2008*, <http://www.whoi.edu/fileservlet.do?id=43464&pt=10&p=19132>
- *Gulf Hypoxia Action Plan, 2008*, <http://www.epa.gov/msbasin/actionplan.htm>
- *Scientific Assessment of Marine Harmful Algal Blooms, 2008*, http://www.cop.noaa.gov/stressors/extremeevents/hab/habhrca/assess_12-08.pdf
- *Scientific Assessment of Freshwater Harmful Algal Blooms, 2008*, http://www.cop.noaa.gov/stressors/extremeevents/hab/habhrca/FreshwaterReport_final_2008.pdf
- *International Symposium on Cyanobacterial Harmful Algal Blooms (ISOC-HAB, 2005,)* http://www.epa.gov/cyano_habs_symposium/
- *Effects of Nutrient Enrichment in the Nation's Estuaries: A Decade of Change, National Estuarine Eutrophication Assessment Update, 2007*, <http://ccma.nos.noaa.gov/publications/eutrouupdate/>
- *Harmful Algal Research and Response: a National Environmental Science Strategy (HARRNESS) 2005-2015, 2005*, <http://www.esa.org/HARRNESS/>

For more information: Visit <http://www.cop.noaa.gov/> or contact Dr. Robert Magnien (rob.magnien@noaa.gov), Director, NOAA/NOS/NCCOS/ Center for Sponsored Coastal Ocean Research (CSCOR)