

301-713-3338 to leave a mailing request.

**FOR FURTHER INFORMATION CONTACT:**

*Technical Information.* Marc Suddleson, MERHAB 2004 Program Manager, NCCOS/CSCOR/COP, 301-713-3338/ ext 162, Internet:

[marc.suddleson@noaa.gov](mailto:marc.suddleson@noaa.gov)

*Business Management Information.*

Leslie McDonald, NCCOS/CSCOR/COP Grants Administrator, 301-713-3338/ ext 155, Internet:

[Leslie.McDonald@noaa.gov](mailto:Leslie.McDonald@noaa.gov)

**SUPPLEMENTARY INFORMATION:**

**Electronic Access**

The following web sites furnish supplementary information from reports dealing with harmful algal blooms:

Boesch *et.al.*, Feb 1997, *Harmful Algal Blooms in Coastal Waters: Options for Prevention, Control and Mitigation*, Silver Spring, MD at <http://www.cop.noaa.gov/pubs/das/das10.html>; and Anderson *et.al.*, Sept 2000, *Estimated Annual Economic Impact from Harmful Algal Blooms (HABs) in the U.S.* WHOI at [http://www.redtide.whoi.edu/hab/pertinentinfo/Economics\\_Report.pdf](http://www.redtide.whoi.edu/hab/pertinentinfo/Economics_Report.pdf).

Information on the Harmful Algal Bloom and Hypoxia Research and Control Act and the 2000 National Assessment of HABs in U.S. Waters, National Science and Technology Council Committee on Environment and Natural Resources (CENR), Washington, DC, can be located at <http://www.habhrca.noaa.gov>.

Details about ongoing MERHAB projects currently funded by the NCCOS/CSCOR/COP MERHAB Program are found at [http://www.cop.noaa.gov/Fact\\_Sheets/MERHAB.htm](http://www.cop.noaa.gov/Fact_Sheets/MERHAB.htm). Hard copies of these resources can be obtained from the CSCOR/COP office.

**Background**

*Program Description*

For complete program description and other requirements for NCCOS/CSCOR/COP, see the General Grant Administration Terms and Conditions for the Coastal Ocean Program annual notification in the **Federal Register** November 8, 2002 (67 FR 68103), and at the CSCOR/COP home page.

In spite of a growing list of affected resources and coastal communities, our ability to prevent, control, and mitigate the impacts of HABs remains limited. Acting on the findings of a 1996 NOAA and DOI Report, *Harmful Algal Blooms in Coastal Waters: Options for Prevention, Control and Mitigation*, the research agenda of the Ecology and Oceanography of Harmful Algal Bloom (ECOHAB) program for the past five

years has focused on building a scientific understanding about the cause and behavior of HABs. ECOHAB continues to support research that develops understandings of the linkages between the biology, ecology, physiology, and behavior of harmful species and the physics, chemistry, bathymetry, and meteorology of the surrounding environment. ECOHAB research is developing the capabilities to forecast bloom landfall, evaluate toxicity, and provide mitigation strategies that might ameliorate the impact of blooms along U.S. coasts. ECOHAB is also producing new state-of-the-art HAB technologies, such as detection assays and molecular probes.

With the maturation of ECOHAB and other HAB research programs, more effort is needed to adapt their research products into regionally and locally tested tools that can be used to prevent, control, or mitigate the impact of HABs. The 1996 NOAA and Department of Interior (DOI) Report noted that knowledge about the basic information on the causes and behavior of HABs would ultimately lead to the development of prevention, control, and mitigation (PCM) strategies. The plan called for Federal and state agencies with responsibilities for resource management, environmental protection, and public health to support PCM research.

While prevention of HABs is the preferred management option, effort to enhance the current abilities to reduce the incidence and extent of harmful algal blooms (before they begin) requires additional research and face legislative hurdles. For example, more research is needed to determine whether a cause-and-effect relationship exists between increased pollution and nutrient loading and an incidence of some HAB species (e.g., *Pfiesteria*, *Pseudo-nitzschia*, cyanobacteria). Further, a national regulatory strategy to effectively control polluted run off and nutrient loading is under development; but more research is required to educate decision makers.

Efforts to control HABs are also being explored, but these, too, face serious scientific and policy hurdles. Attempts to use chemicals to directly control HAB cells encounter many logistical problems and environmental objections. Chemicals are likely to be nonspecific, indiscriminately targeting all co-occurring algae and other organisms along with the target algal species. Chemical application and other options, such as flocculants or biological controls need additional research to determine their wider impacts to the coastal ecosystem.

Strategies to mitigate or minimize human health risks, ecosystem damage, fisheries losses, and declines in tourism due to algal blooms are currently the best option for coastal management of the HAB problem. Many different types of actions can be taken to mitigate the impact of HABs, including forecasting bloom development and movement, monitoring HAB cells and toxins, and responding rapidly to HAB events.

Monitoring combined with rapid response to HAB events has been identified as the most effective way to mitigate the impact of HABs (CENR 2000). A number of coastal states have existing monitoring programs designed to prevent human illness from shellfish poisoning syndromes. State shellfish monitoring programs detect toxins in different fisheries species either to provide advance warning of outbreaks or to delineate areas that require harvest restrictions. Fewer coastal states monitor the environment for HAB blooms and forecast their development and movement. However, states with environmental monitoring programs for plankton and fish in coastal estuaries and bays are often able to provide early warning of blooms and help focus shellfish toxicity testing efforts.

Some states supplement their HAB monitoring activities with rapid response teams that are deployed to assess suspected HAB events. HABs have the potential to develop rapidly, and often the observable event may be short-lived. Rapid response is essential to ensure that the appropriate sampling is done to determine whether a HAB event is in progress. A few regions have also have established communication networks to distribute information about outbreaks to researchers, managers, and the public. Providing rapid and accurate information is critical to assess the risks to resources and human health and to avoid public misconceptions about the safety of coastal resources. Such misconceptions have caused severe economic impacts to regions not directly affected by HAB events. A study completed by Woods Hole Oceanographic Institute in September 2000 calculated the total estimated annual cost from HABs on public health, commercial fisheries, recreation and tourism, and monitoring and management in the United States to be \$49 million. This estimate was noted by the authors to be highly conservative and sensitive to single events that equal or exceed the total estimated economic impact.

Most coastal communities experiencing HABs are not covered by regular public or private monitoring programs for HABs, and many do not