

Overview of Gulf of Mexico Hypoxia Policy in 2017

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Doug Daigle, Coordinator of the Lower Mississippi River Sub-basin Committee, will give an overview of current policy to address the Gulf of Mexico hypoxic zone, focusing on the national Action Plan and Task Force that Mississippi and other lower river states are participants on. The revised Goal and Interim Target of the Action Plan will be explained, since they set the direction for joint action among Task Force states and agencies for the next decade, and provide the broader context for the work of SERA-46 and state and federal agencies described by other speakers in this session.

Doug Daigle has coordinated the Lower Mississippi River Sub-basin Committee, part of the national Mississippi River/ Gulf of Mexico Watershed Nutrient Task Force, since organizing it in 2003. The Sub-basin Committee consists of Arkansas, Louisiana, Mississippi, Missouri, and Tennessee, along with federal partner agencies, researchers, and stakeholders in the region. He also coordinates the Louisiana Hypoxia Working Group, a monthly forum held at Louisiana State University.

Introduction

2017 marks an important point for the national policy response to the spread of hypoxia (low oxygen) in the northern Gulf of Mexico, with both ongoing progress and significant uncertainties about the prospects for success in reaching federal-state goals to address this problem.

Background and History

It's helpful to remember that the science documenting and recording the trend of hypoxia in the northern Gulf goes back several decades, with initial measurements of a large area of low oxygen being recorded in the 1970s, and annual mapping of the hypoxic zone beginning in 1985. During that time the measured size of the mid-summer Gulf Hypoxic zone has gone from 9,774 square kilometers (3,775 square miles) in 1985 to 16,760 square kilometers (6,474 square miles) in 2015. The 30 year average for the hypoxic zone's size is 13,752 square kilometers (5,312 square miles.)

The national policy response to the Gulf Hypoxia problem is now over 20 years in the making. An initial Clean Water Act petition by several non-governmental organizations in 1995 led to a White House level response by the Clinton administration, with organization of special science committees and the eventual formation of a federal-state Task Force

involving key agencies and states along the main stem Mississippi River.

Legislative authorization came from the Harmful Algal Bloom and Hypoxia Research and Control Act (HABHRCA) in 1998, which required an integrated assessment of the science by 1999 and an action plan for addressing Gulf Hypoxia by 2000. The Mississippi River Gulf of Mexico Watershed Nutrient Task Force reached agreement on an Action Plan in late 2000, and the final version was submitted to Congress in January 2001.

The *Action Plan for Reducing Hypoxia in the Gulf of Mexico* continues to be the national policy vehicle for addressing this problem. Three central, co-equal goals formed the core of the 2001 (and subsequent) versions of the Action Plan:

1. A Coastal Goal of achieving a 5 year average annual aerial extent for the Gulf Hypoxic Zone of less than 5000 square kilometers (1950 square miles) by the year 2015;
2. A Within-Basin Goal of improving water quality across the entire Mississippi River Basin;
3. A Quality of Life Goal of improving communities and economic conditions through these efforts.

The Coastal Goal, the centerpiece of the Action Plan, focused on “practical... and cost-effective voluntary actions” to address “all categories of sources and removals within the [basin] to reduce the annual discharge of nitrogen and phosphorus into the Gulf.” An underlying goal, articulated since the beginning of the process, was also to protect the fishery resources of the Gulf before pervasive negative impacts were seen in the system. The 2001 version of the Action Plan anticipated a coordinated, tightly phased implementation process using an adaptive management approach. Unfortunately, the Integrated Budget proposed at the federal level to drive the effort was never adopted.

The 2008 Revision of the Action Plan kept all 3 goals, including the 2015 target date for reaching the central or coastal goal of achieving a 5000 square kilometer average annual size. The 2008 Revision also utilized the findings of a special U.S. Environmental Protection Agency (EPA) Science Advisory Board, which concluded that a dual reduction of 45% of the main nutrients nitrogen and phosphorus entering the Gulf was necessary for achieving the Action Plan’s Coastal Goal.

The 2008 Revision of the Action Plan shifted the focus of implementation efforts from the sub-basin level to states, and from Sub-Basin Committees to State Nutrient Reduction Strategies. The Plan called for states to “complete and implement comprehensive nitrogen and phosphorus reduction strategies... encompassing watersheds with significant contributions of nitrogen and phosphorus to the surface waters of the Mississippi/Atchafalaya River Basin [MARB], and ultimately the Gulf of Mexico.”

Mississippi was the first Hypoxia Task Force state to develop a nutrient reduction strategy following the 2008 Revision of the Action Plan. The state convened/organized 11 Work Groups to formulate the details for 11 strategic elements of the strategy:

1. Stakeholder awareness, outreach, and education;
2. Watershed characterization;
3. Current status and historical trends;
4. Analytical tools;
5. Water Management;
6. Input Management;
7. Best management practices;

8. Point source treatment;
9. Monitoring;
10. Economic incentives and funding sources;
11. Information management.

The Mississippi Nutrient Reduction Strategy focused on the state’s Delta region, responding to dual needs for addressing interior water quality issues and nutrient loading to the river. Seven watersheds with completed total maximum daily load (TMDL) plans were selected for the Strategy: Harris Bayou, Porter Bayou, Coldwater River, Bee Lake, Lake Washington, Steele Bayou, and Wolf/Broad Lake.

A central challenge for the Gulf Hypoxia Action Plan has been that of funding. The 2001 and 2008 versions of the *Action Plan* both stated that reducing or making significant progress toward reducing the five year running average areal extent of the hypoxic zone was “subject to the availability of additional resources.” Implementation of the Action Plan has never been fully funded, though particular components have been.

During the time between the first and second versions of the Action Plan, the conservation and management programs in the Farm Bill provided funding for projects in many of the tributary watersheds of the Mississippi River. These were focused on achieving broad conservation and water quality benefits, some of which occurred in watersheds contributing to the Gulf Hypoxia problem. The first targeted federal funding for implementation of the Gulf Hypoxia Action Plan came in 2009 from the USDA Natural Resource Conservation Service’s (NRCS) Mississippi River Basin Healthy Watersheds Initiative (commonly known as MRBI).

MRBI has continued and expanded cooperative efforts with landowners and producers in watersheds that stakeholders help select in each state. Project sites in Mississippi include Beaver Bayou-Mound Bayou, Burrell Bayou, Tommie Bayou/Brook Bayou, Christmas Lake Bayou, Stillwater Bayou and Long Lake in Bolivar, Washington and Sunflower Counties.

Latest Revision of the Action Plan

As 2015 approached and it was clear that the Coastal Goal

of the Action Plan was not going to be met, the Task Force convened an assessment committee. After a year-long process of discussion and evaluation, the Task Force decided to revise the Action Plan Goal. The size of the Goal – less than 5000 square kilometers – was kept, but the end date was pushed out to the year 2035.

An Interim Target was added to the Goal: achieving a 20% reduction of nitrogen and phosphorus loading to the Gulf by the year 2025. This Interim Target was identified as a milestone for immediate planning and implementation actions. The Action Plan directs federal agencies, States, Tribes, and other partners to “work collaboratively to plan and implement specific, practical, and cost-effective actions to achieve both the Interim Target and the Updated Coastal Goal.”

The 2015 Revision of the Action Plan Goal was clear that “reaching this final goal will require a significant commitment of resources to greatly accelerate implementation of actions to reduce nutrient loading from all major sources of nitrogen and phosphorus in the [MARB]...” and reinforced this point by stating that a “significant scaling up of action [is] needed to reach to reach the Interim Target and the Goal.”

The Interim Target and Revised Coastal Goal are the Action Plan’s main directives now, with the Interim Target being the initial focal point for action. What do they mean? Both are non-binding, and represent the cumulative result of all actions taken throughout the Mississippi and Ohio River basins. In terms of reaching the Target and ultimately the Revised Goal, specific reduction targets are not allocated by state, but states and agencies on the Task Force have all made a commitment to help. The Interim Target represents a key milestone of progress for achieving the Goal – if the Target is reached, then the Goal can be seen as both possible and feasible.

The 2015 Action Plan Framework lists a series of Near-Term Actions that can be used to achieve the Interim Target and Revised Goal:

State Nutrient Reduction Strategies: The 2015 Framework called for both implementation and updating of the state

strategies as needed so that they could aid in documenting, tracking, and reporting on action, including quantifying nutrient load reductions, so that their contribution to meeting the Interim Target can be assessed.

Federal Programs: In addition to the Farm Bill programs and the MRBI, a number of interagency initiatives have been working at a basin scale, including the Regional Conservation Partnership Program (RCPP), the Landscape Conservation Cooperative (LCC) Partnership, and the U.S. Fish and Wildlife Service’s Mississippi River Habitat Initiative.

Quantitative Measures: The 2015 Framework emphasizes the importance of verifying actions to reduce nutrient loadings with improved tracking, and watershed monitoring and modeling tools.” Key partners in this effort include the U.S. Geological Survey (USGS) and the National Oceanic and Atmospheric Administration, along with a number of state gauge stations on the rivers and tributaries.

Modeling plays a key role in the annual Gulf Hypoxic Zone forecast developed by NOAA and partners that include the Louisiana Universities Marine Consortium (LUMCON). The LUMCON annual summer mapping cruise has been carried out since 1985, providing a key baseline of data and 30 years of information. It is a central means of measuring success in achieving the Action Plan Goals, i.e., reducing the trend of growth along with the average annual size of the zone. The cruise has only been cancelled twice, once in 1989 for lack of funds, and in 2016 when the federally selected vessel broke down. The funding and future of the summer mapping cruise are uncertain at this point.

Funding: The 2015 Framework also states explicitly that achieving the Interim Target and Revised Goal will not be possible without additional resources. The level of resources that will be available at the federal and state levels remains highly uncertain. At the federal level, agencies such as NOAA and EPA are facing significant proposed budget cuts, along with bedrock programs like the 319 Grant Program, initiatives like the Landscape Conservation Cooperative (LCC), and long-term sources like the Land and Water Conservation Fund.

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While state budgets are facing challenges as well, several Task Force states (Iowa, Minnesota, and Missouri) have utilized funding mechanisms such as state taxes or legislative appropriations to apply funding to their nutrient reduction strategies. The states of Louisiana and Mississippi can draw on a funding source unavailable to other Task Force states, the settlement monies from the 2010 BP Oil Disaster, codified in the RESTORE Act.

Partnerships: Partnerships bring additional capacity and resources that can help significantly in reaching the Action Plan goals. The SERA 46 Land Grant University Consortium is one of the most prominent partners to align with the Task Force. The Land Grant Universities in the Mississippi-Ohio River states signed a Memorandum of Understanding with the Task Force, and are working aggressively on a set of research and extension goals tied to the Action Plan.

Several NGO partners are also working at a basin scale on projects that complement the Action Plan. The Nature Conservancy has launched a Mississippi River Initiative explicitly tied to the Action Plan's Interim Target of a 20% reduction in nitrogen and phosphorus loading from the river to the Gulf by 2025.

Research: The 2015 Framework also elevates the role that research will play in improving current efforts and developing new techniques for nutrient reduction and water quality improvement. Some partners such as the SERA 46 Consortium will play a role in this area, along with agency programs like the USDA Agricultural Research Service (ARS). When fully funded, the annual LUMCON Gulf Hypoxia mapping cruise utilized that opportunity carry out related research, working with partner agencies and universities.

A final near-term action in the Revised Action Plan is a Biennial Report to Congress required by the 2014 Revision of the HABHRCA law, which could be utilized to build Congressional support.

Future Prospects

A key question facing the Gulf Hypoxia effort is whether can the Action Plan can work. The 2015 Framework lays out a series of Near Term Actions that are necessary but not sufficient steps to reach the Interim Target and Revised

Coastal Goal. Final success is conditional - achieving the Interim Target by 2025 will indicate (but not guarantee) that the Coastal Goal can be reached by 2035.

Background Information:

Gulf Hypoxic Zone Mid-Summer Mapping Cruise reports
www.gulfhypoxia.net

Harmful Algal Bloom and Hypoxia Research and Control Act
<https://coastalscience.noaa.gov/research/habs/hab-hrca>

Action Plan for Reducing Hypoxia in the Gulf of Mexico (2001, 2008, 2015)
<https://www.epa.gov/ms-htf>

EPA Science Advisory Board Report on Hypoxia in the Northern Gulf of Mexico
<https://yosemite.epa.gov/sab/sabproduct.nsf/95eac6037dbec075852573a00075f732/6f6464d3d773a6ce85257081003b0efe!OpenDocument&TableRow=2.3#2>.

Mississippi Delta Nutrient Reduction Strategies Implementation Projects
https://www.deq.state.ms.us/mdeq.nsf/page/WMB_MDNRSIP?OpenDocument

Gulf Hypoxia Action Plan New Goal Framework
<https://www.epa.gov/ms-htf/hypoxia-task-force-new-goal-framework>

USDA NRCS Landscape Initiatives
[https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/initiatives/Hypoxia Task Force – Land Grant Universities statement on collaborative work](https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/initiatives/Hypoxia%20Task%20Force%20-%20Land%20Grant%20Universities%20statement%20on%20collaborative%20work)
<https://www.epa.gov/ms-htf/htf-lgu-priorities-collaborative-work>

Nature Conservancy Mississippi River Basin Initiative
<https://www.nature.org/ourinitiatives/urgentissues/water/protecting-rivers/mississippi-river.xml>

Figure 1. Record of Mid-Summer Gulf Hypoxic Zone Measurements, 1985-2015. (Source: Dr. Nancy Rabalais, c/o GulfHypoxia.net)

| Year | Square kilometers | Square miles |
|------|-------------------|--------------|
| 1985 | 9,774 | 3,775 |
| 1986 | 9,592 | 3,705 |
| 1987 | 6,688 | 2,583 |
| 1988 | 40 | 15 |
| 1989 | n.d. | n.d. |
| 1990 | 9,420 | 3,638 |
| 1991 | 11,920 | 4,604 |
| 1992 | 10,804 | 4,173 |
| 1993 | 17,520 | 6,767 |
| 1994 | 16,680 | 6,443 |
| 1995 | 17,220 | 6,651 |
| 1996 | 17,920 | 6,922 |
| 1997 | 15,950 | 6,161 |
| 1998 | 12,480 | 4,820 |
| 1999 | 20,000 | 7,725 |
| 2000 | 4,400 | 1,699 |
| 2001 | 19,840 | 7,663 |

n.d. = no data, entire area not mapped

| Year | Square kilometers | Square miles |
|-------------------|-------------------|--------------|
| 2002 | 22,000 | 8,497 |
| 2003 | 8,320 | 3,214 |
| 2004 | 14,640 | 5,655 |
| 2005 | 11,800 | 4,558 |
| 2006 | 16,560 | 6,396 |
| 2007 | 20,480 | 7,910 |
| 2008 | 21,764 | 8,406 |
| 2009 | 8,240 | 3,183 |
| 2010 | 18,400 | 7,107 |
| 2011 | 17,680 | 6,829 |
| 2012 | 7,480 | 2,889 |
| 2013 | 15,120 | 5,840 |
| 2014 | 13,080 | 5,052 |
| 2015 | 16,760 | 6,474 |
| Goal | 5,000 | 1,991 |
| 30-yr Ave. | 13,752 | 5,312 |
| 5-yr Ave. | 14,024 | 5,543 |

Figure 2. Mississippi Delta projects with drainage weirs, reservoirs.

