Mississippi River Basin & Gulf of Mexico Hypoxia Task Force
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Comments offered by

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We offer the following comments as senior environmental scientists who have been engaged in a wide variety of scientific assessments of coastal environmental issues throughout the nation and internationally. In particular, we have conducted, directed and synthesized scientific investigations concerning the diagnosis and reversal of eutrophication, including long-term involvement with Gulf of Mexico hypoxia.

We each played roles in producing the Integrated Assessment of Hypoxia, completed in 2000, that led to the Action Plan for Reducing, Mitigating and Controlling Hypoxia in the Northern Gulf of Mexico. It is now approaching a decade since the formation of the Task Force and almost exactly six years since the submission of the Action Plan to Congress. We are deeply concerned about the lack of tangible progress in its implementation. The time frames of all 11 of the short-term actions have been exceeded and most of these actions—all of which were to have been completed by December, 2005—remain to be addressed or fully executed. Needless to say, nutrient loads to the Gulf have not declined, nor has the scale of hypoxia been reduced. In fact, some signs (record-size hypoxia and increased fertilizer application) suggest we are actually headed in the wrong direction.

At the same time, Gulf hypoxia was cited no less than four times in the report of the U.S. Commission on Ocean Policy[3] as a prime example of the problems in our nation's ocean environments, the need to address related causes on land, and the requirements for interagency coordination. Moreover, the United Nations Environmental Programme, at its recent Intergovernmental Review of the Global Programme Action for the Protection of the Marine Environment from Land-Based Sources[4], underscored the expanding number of hypoxic zones around the world, for which Gulf hypoxia is clearly the global "poster child." Our national resolve, as well as our international leadership, are clearly in question.

With this background in mind and the Task Force reportedly developing a new vision, we offer the following recommendations for accelerating the achievement of goals of the Action Plan:

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[3] U.S. Commission on Ocean Policy. 2004. *An Ocean Blueprint for the 21st Century*. Washington, DC.

[4] http://www.unep.org/Documents.Multilingual/Default.asp?ArticleID=5393&DocumentID=486&l=en

1. Refocus the Reassessment on Nutrient Load Reductions

Short-term action number 11 of the Action Plan states:

> "By December 2005 and every five years thereafter, the Task Force will **assess the nutrient load reductions achieved and the response** of the hypoxic zone, water quality throughout the Basin, and economic and social effects. **Based on this assessment**, the Task Force will determine appropriate actions to continue to implement this strategy or, if necessary, revise the strategy." [Emphasis added.]

With the EPA Science Advisory Board Panel on Hypoxia starting approximately 10 months later than planned, it is clear that the Reassessment will not be completed until sometime in 2008 based on interpretation of the Timetable for Reassessment[5]. Furthermore, it appears that neither the SAB Panel nor the various symposia and workshops conducted as part of the Reassessment are, in fact, addressing the central objective envisioned in the Action Plan, namely assessing the nutrient load reductions achieved and the responses to these nutrient load reductions.

Instead, almost all of these activities seem to be revisiting and questioning the findings of the 2000 Integrated Assessment, but without the experience of nutrient load reductions and responses to them, as was the intent of adaptive management framework elected by the Action Plan. It is if, after failing to produce any results in terms of reducing nutrient loads or hypoxia for six years, we are once again asking does hypoxia really occur, is it caused by nutrient enrichment, are these nutrients primarily from agriculture, and how can nutrient loads be reduced?

From our vantage point, the Reassessment has unfortunately been marred by preoccupation with red herrings (e.g., conducting a time-consuming peer review of leaked versions of the Region 4 White Paper to confirm what the EPA already knew: the analysis was seriously flawed); costly compilation of unnecessary bibliographies; poorly focused symposia dominated by individuals with little knowledge of the comparative science of eutrophication; synthesis papers that have not been credibly completed; and a SAB Panel process that has not only excluded participation by those most experienced in Gulf hypoxia science or otherwise involved in the earlier Integrated Assessment, but also dissuaded professional contact with them. The long overdue Management Action Reassessment Team report, which at least was supposed to inventory information on management activities undertaken, is so general and disconnected with actions specific to nutrient source reductions as to be useless in tracking progress in Action Plan implementation or load reductions.

In short, we feel that the Reassessment has to date failed to meet the objectives originally set for it in the Action Plan. However, it is not too late. We urge the Task Force to refocus the Reassessment to assess the nutrient load reductions achieved, the efforts taken to achieve them, and what it would take for those efforts to be more

[5] As indicated at http://www.epa.gov/msbasin/taskforce/pdf/timeline_process01_06.pdf.

effective in terms of meeting the overall environmental goals of the Plan. On the basis of such assessment a revised Action Plan should be developed with more specificity in terms of nutrient load reduction allocations and practices, accountability for both processes and outcomes, and identification of the programs and resources needed to achieve results. If we have learned anything from shortcomings of the Chesapeake Bay Program's efforts to reverse eutrophication[6], it is that even the best plans only work if they are implemented.

2. Purposefully Implement the Action Plan

Lack of specific new funding has been used as a reason for inaction in implementing the Action Plan. This is a poor excuse. The Federal government alone provided $167 billion in subsidies to agriculture from 1995 to 2005 ($20 billion conservation subsidies alone), a significant fraction of that in the Mississippi Basin. The Environmental Working Group has shown that the 124 counties that account for 40% of spring nitrate fertilizer pollution in the Gulf received $11.4 billion in subsidies from 1995 through 2002[7]. EPA, USDA, USGS, USACE and state agencies and Land Grant universities have substantial capacities to develop basin and state specific allocation strategies and implementation plans. In short, much more could have been done during the last six years and much more could be done between now and 2015 to reduce nutrient loads by improved fertilization and drainage practices, waste treatment, and wetland and riparian zone restoration. And, this can be done within the scope of existing resources, programs, and capacities. However, the parties to the Action Plan have been on hold waiting for new federal funding or the next Farm Bill. The Task Force should develop specific implementation actions to be taken based on the significant existing resources and authorizations.

3. Align New Farm Bill Programs with Action Plan Objectives

Having said that much can be done under existing authorities, there are potentially great opportunities afforded by the enactment of a new Farm Bill as the present legislation expires this November. There are many downward fiscal, political, and fair-trade pressures on commodity based subsidies[8] and financial support for agriculture may be more acceptable if it accomplishes a greater public good, such as improved water quality. The Task Force should examine how a new Farm Bill could be written that would facilitate accomplishment of the goals of the Hypoxia Action Plan, particularly by providing incentives for avoiding excessive fertilization, more effective animal waste management, drainage mitigation, and wetland conservation and restoration.

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[6] D.A. Fahrenthold. 2007. A revitalized Chesapeake may be decades away. EPA official warns of slow progress toward 2010 goals. *Washington Post*, January 5, 2007. http://www.washingtonpost.com/wp-dyn/content/article/2007/01/04/AR2007010401051.html

[7] Environmental Working Group. 2006. *Dead in the Water: Reforming Wasteful Farm Subsidies Can Restore Gulf Fisheries*. Washington, DC http://www.ewg.org/reports/deadzone/execsumm.php

[8] Agriwelfare. Editorial in the *Washington Post*, January 8, 2007. http://www.washingtonpost.com/wp-dyn/content/article/2007/01/07/AR2007010700953.html

4. Minimize the Effects of Expanded Biofuel Production on Gulf Hypoxia

Interests in reducing dependence on foreign oil and gas and greenhouse gas emissions are driving a great expansion of biofuel production in the U.S. In the Midwest, this is manifest in a dramatic growth in ethanol distilleries that mainly use corn as the feedstock. By one recent estimate the existing and new distillation plants under construction will require 139 million tons of corn per year, more than twice the present level of U.S. corn exports[9]. While there are many public policy questions concerning the wisdom of this spike in corn-based ethanol production (whether as much or more fossil fuel energy is consumed than is yielded by the biofuel energy, increases in food prices, should corn be grown to feed people or SUVs, etc.), we focus here on the repercussions of expanded biofuel production on nutrient loading downstream and, thus, hypoxia in the Gulf. Increases in the demand and prices of corn are likely to increase the application of fertilizers (particularly in the production of high nitrogen demanding corn crops), reduction in crop rotation, and expansion of land under corn into marginal and often poorly drained lands. Indeed, these seem to be going on already. These changes in agricultural practices could increase nutrient loading, counteracting any efforts to reduce loading under the Action Plan.

On the other hand, if biofuel production evolves to utilize cellulosic sources, including perennial plants, such production could require less fertilization, drainage or barren soil conditions, thus reducing nutrient losses downstream. And if those cellulosic sources come as part of broader conservation measures, such as riparian buffers, even greater gains in water quality will be made.

In any case, the present and projected growth of biofuel production in the Mississippi Basin should be taken into account in developing strategies to achieve Action Plan goals. At a minimum, increased biofuel production should be planned, allocated, managed, and accounted for in a way that makes it “hypoxia neutral.”

5. Integrate Nutrient Reduction with Coastal Restoration

The Action Plan recognized that there may be opportunities afforded by efforts to restore the Mississippi Deltaic Plain that could help reduce nutrient loads to the hypoxia sensitive parts of the continental shelf of northern Gulf. One of the key strategies in this coastal restoration is the diversion of river water into adjacent wetlands and estuaries to provide sediments to nourish rapidly subsiding wetlands, build new wetlands through the delta-building process, and stem saltwater intrusion into low salinity estuaries. General knowledge suggest that considerable nitrate can be removed from the river water as it flows through the estuarine-wetland complex through biological assimilation and denitrification and recent studies of small diversions (e.g. Caernarvon) confirm that. The benefits of nitrate removal for

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[9] L.R. Brown. 2007. Distillery demand for grain to fuel cars vastly understated. *Earth Policy Institute Eco-Economy Updates*, January 4, 2007. http://www.earth-policy.org/Updates/2007/Update63.htm

hypoxia mitigation are being included among the evaluation and design criteria for coastal restoration options in the Louisiana Coastal Area (LCA) Ecosystem Restoration Program. However, injecting nutrient-rich river water into these estuarine ecosystems may result in a new set of problems, including harmful algal blooms and hypoxia[10]

There is an emerging scientific consensus, however, that for coastal restoration to be effective the vast majority of the sediment load of the Mississippi and Atchafalaya system must be retained in the coastal zone or inner continental shelf. Presently, more than half of this load is deposited in deeper waters of the Gulf off the deepwater passes of the Birdsfoot Delta. Conserving and utilizing this material would entail abandoning the Birdsfoot Delta and allowing most of the lower Mississippi River flow to enter the shallow shelf west or east of the river[11]. Such large diversions would, or course, mean that fresh water and nutrients presently mixing with deep Gulf waters would be retained on the shelf where they would likely exacerbate hypoxia by increasing density stratification and increasing biological production. However, a substantial consensus of scientists suggests that such large changes are required if the ecosystem, the landscape, and the habitability of southeastern Louisiana is to be maintained. Therefore, substantial reductions in nutrient loading will be required by the time (ten or more years out) when large, shelf-freshening diversions are implemented if substantial expansion of hypoxia is to be avoided.

Integrated planning of hypoxia reduction and coastal restoration is urgently needed[12] as coastal restoration planning proceeds. The Task Force should develop a formal mechanism with the U.S. Army Corps of Engineers and the State of Louisiana to accommodate this integrated planning.

6. Structure Research, Monitoring and Modeling to the Adaptive Management Framework

Research, monitoring and modeling activities undertaken as part of or in support of the Action Plan to reduce Gulf hypoxia should be structured as essential parts of an adaptive management program, as called for in the Action Plan. This would provide a powerful mechanism whereby research priorities can be judged and differentiated between “need to know” and “nice to know.” Furthermore, it provides a framework for the design and interpretation of monitoring results that goes beyond just making systematic measurements. Finally, it provides a means for guiding the development of appropriate models that avoids the twin traps of reliance on just one model and the

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[10] N. Rabalais. 2005. Consequences of Mississippi River diversion for Louisiana coastal restoration. *National Wetlands Newsletter*. 27(4): 21-24.

[11] National Research Council. 2005. *Drawing Louisiana's New Map: Addressing Land Loss in Coastal Louisiana*. National Academies Press, Washington, DC http://books.nap.edu/catalog/11476.html

[12] D.F. Boesch. 2006. Scientific requirements for ecosystem-based management in the restoration of Chesapeake Bay and Coastal Louisiana. *Ecological Engineering* 26:6-26. http://www.umces.edu/president/EBM%20CB-LA.pdf

seductive allure of more and more complex and detailed models. The apparent interest in developing complex, eco-hydrodynamic models, like the Chesapeake Bay water quality model, for example, is particularly troubling for such an open boundary, event-dominated system such as the Louisiana shelf. While this would be scientifically challenging, it could lead to a false sense of certainty and, as in the Chesapeake, be one more reason to delay implementation until we "get the numbers right." This is why an adaptive management approach was adopted in the Action Plan.

We hope we have demonstrated our knowledge of and commitment to the task in hand and sincerely hope that our frank recommendations are helpful to the Task Force.