

June 29, 2007

To: EPA SAB Hypoxia Advisory Panel
From: Alan Lewitus and David Kidwell, NOAA
Re: 5/24/2007 Draft EPA SAB Hypoxia Advisory Panel Report Comments

Below, we summarize comments from several NOAA scientists in response to a broad call within NOAA for comments to the 5/24/07 Draft EPA SAB Hypoxia Panel Report. This report was reviewed by Alan Lewitus, David Kidwell, Robert Magnien and David Whittall from the National Ocean Service, and Roger Zimmerman, Rick Hart, and Nelson May from the National Marine Fisheries Service. The consensus view was to applaud the Hypoxia Advisory Panel for their objective and exhaustive review of available science for the development of the draft Gulf of Mexico hypoxia report. Only minor suggestions and comments are provided. The draft was well organized, insightful, and extensively researched, including a broad base of literature developed on Gulf of Mexico hypoxia and its relationship to Mississippi River watershed nutrients and environmental factors. The attention given to the potential impacts of expanding corn-based biofuel to water quality within the Mississippi River Basin and in the Gulf of Mexico was considered a valuable asset to ecosystem management in this region.

General Comments

- In section 2.1.8, “Possible Regime Shift in the Gulf of Mexico”, it is stated that the Gulf of Mexico has not yet displayed the features of a regime change. It would be beneficial to know what biological characteristics are used to define a regime change. Regions impacted by Gulf hypoxia have displayed direct mortality of benthos and displacement of nekton, and an ecosystem regime shift due to enhancement of phytoplankton production is suggested, but the direction, degree and complexity of trophic effects on primary and secondary consumers is still a question. Thus it would be useful to know what spatial and temporal scales are used to quantify a regime change. Finally, recommendations for research to further define and predict the threshold of ecological regime change and quantify the resilience of the Gulf ecosystem would be useful.
- During the Hypoxia Advisory Panel Public Meeting on 13-15 June 2007, information regarding recent trends in nutrient loads and hypoxic zone size was presented that may have been misinterpreted based upon the discussion that we witnessed. The suggestion was made that nitrogen flux into the Gulf of Mexico has decreased during recent years without a concomitant decrease in the area of the hypoxic zone. This issue was addressed by the Hypoxia Task Force Coordinating Committee through discussions and exchanges of analyses in October 2006. Comparative analyses (R. Greene, US EPA pers. comm.) of USGS loadings data in the lower Mississippi River between 1980-1996 and 2000-2004 indicated that the annual flux of Total Kjeldahl Nitrogen (sum of ammonia nitrogen + organic nitrogen) and total nitrogen were lower during the latter period (2000-2004) but that there was no significant difference in annual loads of nitrate.

However, most studies and models indicate that the extent of the hypoxic zone is poorly related to annual loadings. Rather, spring, and especially May, loadings are a better predictor of hypoxic zone area. Comparative analyses during May indicated no significant difference in nitrate or total nitrogen, but a significant decrease in Total Kjeldahl Nitrogen, in 2000-2004 compared to 1980-1996. Thus, it would be incorrect to make a blanket statement about lower nitrogen loads in recent years without providing the important information about differences in fractions of total nitrogen and seasonal vs. annual loads.

Specific Comments from Dr. Roger Zimmerman,

- p. 46, lines 4-5. The statement "There is also evidence that hypoxia has affected the valuable brown shrimp fishery (Zimmerman and Nance, 2001)." needs clarification. I suggest replacing the sentence with, "An inverse correlation exists between the annual size of the hypoxia area and annual catch of brown shrimp, suggesting a negative effect on the valuable brown shrimp fishery (Zimmerman and Nance, 2001)."
- p. 245, lines 3-6. The reference is incorrectly cited and needs to be corrected and verified. It should read, "Zimmerman, R.J. and Nance, J.M., 2001. Effects of hypoxia on the shrimp fishery of Louisiana and Texas: Chapter 15: In Rabalais, N.N. and Turner, R.E. (Eds.), Coastal Hypoxia: Consequences for Living Resources and Ecosystems, Coastal and Estuarine Studies, 58, American Geophysical Union, Washington, D.C., p. 203-310."