DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20250

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Dr. Donald Scavia
Chief Scientist
National Ocean Service
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1305 East-West Highway, Room 13508
SSMC 4
Silver Spring, Maryland 20910

Dear Dr. Scavia:

We applaud your efforts and those of your fellow researchers in developing the six reports on the Committee on Environment and Natural Resources.

The enclosed comments are provided from several Department of Agriculture agencies as a follow-up to the research briefings that were provided on hypoxia at the June 1999 meeting held in Memphis, Tennessee. We look forward to any response you or your colleagues may have to these comments.

Thank you for the opportunity to provide our comments.

Sincerely,

Glenda Humiston

GLENDA L. HUMISTON
Deputy Under Secretary
Natural Resources and Environment

Enclosure



NOT-99-66

COMMENTS on the CENR-HYPOXIA REPORTS

**TOPIC 1: CHARACTERIZATION OF HYPOXIA**

1. Data presented seemed to indicate that the extent of the hypoxia area may be ephemeral or has rapidly changing boundaries. This makes the area difficult to define in size and also suggests response to periodic changing events or conditions.

2. The finding that hypoxia did not exist historically was not convincing. Whether or not hypoxia is a naturally occurring condition must be definitively answered if the general public is expected to embrace the hypoxia issue as a problem and actively, willingly participate in seeking solutions.

3. Additional data are needed to track location and size of the area. This data could be used, in conjunction with other weather or seasonal events, to determine what causes the hypoxia zone to change.

4. The hypoxic zone doubled in size after the Mid-West floods of 1993. The zone did not start gradually shrinking again until 1998. The factors that changed and caused this doubling in size must have persisted and been readily available during the hypoxic season for the next 5 years. Would nitrogen persist over that long a period of time? Would carbon be more likely to persist and with the annual addition of sediment, nitrogen, and phosphorus, be able to sustain the zone at 7,000 square miles? Would this carbon enrichment be sufficient to keep the process fueled and stable for 5 years?

5. The changes brought about by the 1985 Farm Bill, namely compliance plans emphasizing conservation tillage, should have had significant effects on the Redfield ratio. Erosion rates should have been much lower than under a similar storm under pre-Farm Bill conditions leading to lower delivery of silica and higher deliveries of carbon (crop residues) and soluble phosphorus. (Some scientists say that the Mississippi is a sediment-starved river.) Much of the crop residues and "new" organic matter added to the topsoil would have enriched the floodwaters. The large quantities of water would have mobilized a much larger quantity of carbon than would have occurred under less extreme events. Much of this carbon would have been in the form of suspended detritus, with significant quantities unattached to sediment.

6. Water quality monitoring during the flood stages of the 1993 event was pretty sketchy because of not being able to reach gauging stations. No records exist on the amount of carbon delivered during the '93 floods. Wouldn't the addition of plentiful supplies of carbon plus other nutrients, such as soluble phosphorus have been the cause of the zone's growth in '93?

7. Another consideration relating to carbon is the erosion and loss of 30,000 acres of wetlands along the coast of Louisiana as well as major diversions from the Atchafalya River. Coincidentally, the hypoxia zone does not extend much west of the Louisiana coast. The

nutrients added from these eroding areas should be quantitatively addressed and their effects mentioned in the assessment.

## TOPIC 2: ECOLOGICAL AND ECONOMIC CONSEQUENCES OF HYPOXIA

1. The "total system collapse" scenario is supported by comparisons between the Gulf of Mexico and hypoxia related fisheries impacts in the Baltic Sea, Black Sea and Sea of Japan. We should determine whether the conditions causing hypoxia in these locations are the same as in the Gulf. We should also determine whether there are conditions unique at those locations that prevents fisheries from recovering (i.e. over-fishing) or favors maintaining hypoxia conditions (i.e. water temperature, water movement or mixing, and constant loading of carbon into the system).

## TOPIC 3: FLUX AND SOURCES OF NUTRIENTS IN THE MISSISSIPPI-ATCHAFALAYA RIVER BASIN

1. Non-agriculture, non-point sources of pollution (i.e. urban fertilizer use and septic systems) contribution to total nutrient load needs to be determined.

2. Need to determine the percent of naturally occurring nutrient load in the system

3. The assessment did not provide answers to the percent of edge of the field nitrogen loss that actually reaches the gulf.

## TOPIC 4: EFFECTS OF REDUCING NUTRIENT LOADS TO SURFACE WATERS WITHIN THE MISSISISIPPI RIVER BASIN AND THE GULF OF MEXICO

1. The presenters recommended, and we agree, that the data presented in this topic assessment should not be used to set target levels for nutrient loading.

2. The river/gulf system has a tremendous buffering effect to change making it difficult to predict the total impact or when change will occur in response to nutrient reduction. More modeling is needed to provide greater insight on where to direct financial and technical assistance.

## TOPIC 5: REDUCING NUTRIENT LOADS, ESPECIALLY NITRATE-NITROGEN, TO SURFACE WATER, GROUNDWATER, AND THE GULF OF MEXICO

1. The authors suggest drain tile spacing as one component of the nitrogen load reduction program. An estimate of future tile drainage in the Mississippi River Basin is needed. Programs to encourage redesign can be developed.

2. The Corps of Engineers has been "flood proofing" the lower basin for over a century, and has spent several millions of dollars to build levees and navigation structures, which have been generally successful. Unfortunately, these activities did not take account of possible or likely effects on the ecology of the Gulf of Mexico. While it is unrealistic to suppose that either the

"flood proofing" or the navigation improvements might be undone, it is not unrealistic to recognize that the time, effort, and funds that contributed to the disturbed ecology of the Gulf may need to be matched in restoring the ecology of the GoM.

## TOPIC 6: EVALUATION OF ECONOMIC COSTS AND BENEFITS OF METHODS FOR REDUCING NUTRIENT LOADS TO THE GULF OF MEXICO

1. The recommended solution is a pragmatic one. If implemented, what effect will it have on the extent of the hypoxic zone? Critical nitrogen source areas need to be identified and targeted for action in any program to reduce nitrogen loads to receiving waters.

## GENERAL COMMENTS

1. To what extent does channelization and levees contribute to hypoxia? What are the impacts from isolating the river from adjacent floodplain wetlands and impacts from rapidly delivering nutrients to the gulf through the channelized river?

2. What will be the impact to Gulf of Mexico hypoxia once all states meet water quality standards set by the Clean Water Act and court mandates?

3. What impacts would including conservation work completed since the 1985 Farm Bill have on conclusions in the six assessments?

4. There are concerns about the size of the hypoxic zone. Is it getting larger or smaller? Are the 7,000 square miles a one-time perturbation, as a result of the 1993 and 1995 floods, or is the zone actually enlarging?

5. The correlation between nitrogen fertilizer use in the Corn Belt and the nitrogen loads in the Mississippi River do not prove cause-and-effect. While the use of nitrogen was increasing, the population of the Mississippi River Basin was also increasing.

6. There is a lack of data to support the contention that the hypoxia zone has caused any adverse impacts upon the Gulf of Mexico fisheries--either commercial or sports. Reports should be prepared to show the benefits derived from restoring the ecology.

7. If nitrogen loads are reduced, by whatever means, it is important to recognize that the time lag between such curtailment and any ecological improvement in the hypoxic area may not be reflected over the short term--it may take several decades to see improvements in the Gulf of Mexico.

8. Extreme reductions in agricultural nitrogen use in the Corn Belt may well lead to production relocations to other parts of the United States or to other nations. This would potentially shift the problems from the Gulf of Mexico to some other locations. It would also work hardships on the farmers and rural communities and economies of the upper Midwest.

9. Production dislocations are likely to have a significant impact in the Nation's balance of trade. Agriculture is the only sector that has consistently produced a positive balance in international trade. Additionally, agriculture receives no credit for its beneficial contributions, for example, eliminating malaria (previously an endemic disease in the Midwest), from the region.

10. Federal agencies must pursue this matter with an even hand, affecting all segments of the contributing population(s), agencies and programs.

11. More data are needed on the extent, severity and impacts of Gulf hypoxia, as well as a broad look at potential solutions.

**Other Concerns:**

The reports do not reflect:

1. Shrimp trawls damage to the benthic community which causes a break in the food chain.

2. The impacts fishing / harvesting have on fish populations.

3. Farmers/producers use of precision agriculture and Certified Crop Advisors in the application of fertilizer, pesticides, and herbicides.