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December 17, 1999

Gulf of Mexico Hypoxia Working Group
National Oceanic and Atmospheric Administration
National Centers for Coastal Ocean Science
Room 9127
11305 East-West Highway
Silver Spring, MD 20910

Re: Comments on Integrated Assessments of Hypoxia in the Northern Gulf of Mexico

As we indicated in our previous comments on the six Topic reports, a significant number of the American Farm Bureau Federation's five million members live and farm within the Mississippi River Basin. We appreciate the opportunity to respond to the Integrated Assessment by the National Science and Technology Council's Committee on Environment and Natural Resources (CENR).

[redacted]

While the integrated assessment does give some acknowledgement of these changes, there are vast gaps of knowledge regarding how these changes might affect the hypoxia zone in the Gulf of Mexico. While we will subsequently go into greater detail, one quick example is the fact that currently, about 22% of the water in the Mississippi River is diverted to the Atchafalaya River, routing these waters onto shallow coastal shores where the hypoxia zone has subsequently developed on a regular basis.

2. Other factors such as the carbon issue have been discussed at some length. Although we would concur that this may not be a major factor, our view is that waterflow and the disbursement of the flow are probably the most important variable, the carbon issue still needs more study.

While the integrated assessment attempts to draw a simple picture of the causes, consequences and cures for hypoxia, a close reading reveals a more complicated scenario. In fact, there are many factors that play a role in the incidence and extent of Gulf hypoxia. An action plan that deals with one factor – nutrient enrichment – and that places the burden of reducing that factor on one segment of the economy – agriculture– is unlikely to significantly reduce Gulf hypoxia.

Following are our more specific/technical comments:

Page 8 of the draft integrated assessment clearly focuses on nutrients and states:

> *"reductions in total nitrogen flux of about 40 percent are necessary to return to loads comparable to those before the large increases in 1950-1970."*

In the final IA, this particular sentence needs to read as follows:

> "reductions in total nitrogen flux of about 40 percent are necessary to return to loads comparable to those between 1955-63 before the large increases in 1963-1983."

The need for this sentence to be clarified is contained in Figure 2.4 of the draft Integrated Assessment. The chart in Figure 2.4 shows that data on nitrate flux does not start until 1955 and information on organic nitrogen does not start until 1973. The same chart also shows that the low point in nitrate flux occurred in 1963 and increased to a peak in 1983 before declining.

It appears from the sentence, as quoted in the Draft IA, that the 40% reduction is being compared to total nitrogen loads in the 1940s- for which there is no data. That same sentence also states that the large increases in total nitrogen flux occurred in 1950-1970 which the graph in Figure 2.4 of the IA clearly contradicts by showing that the large increase in nitrate flux occurred between 1963 and 1983.

Page 8 of the draft-integrated assessment also continues by stating:

> *"Model simulations indicate that nutrient load reductions of 20-30% would result in a 15 to 50% increase in bottom water dissolved oxygen concentrations and a 5 to 15 % decrease in surface chlorophyll concentrations. Such increases in oxygen are significant*

in that they represent an over all average for the hypoxic zone and that any increase about the 2 mg/l threshold will have a significant effect on marine life."

Our comment about this section is that, in fact, the quickest way to test the nutrient enrichment theory is to suspend all diversion of Mississippi River flow into the Atchafalaya River, which consequently goes directly into the center of the hypoxic zone. That will immediately reduce the flux of both nitrate and total nitrogen that moves into the hypoxic zone from the Mississippi River by 33.9 percent.[1],[2] This fact needs to be included in the integrated assessment so that policymakers can consider all the options.

Current MS River Flow is Split 22% to Atchafalaya River and 78% Through New Orleans

		Total N to Hypoxic Zone (Million Metric Tons)	Total N to Other Parts of Gulf (Million Metric Tons)	TOTAL Nitrogen to Gulf from MS R Basin (Million Metric Tons)
MS R. Total N to Deep Water (1.6 x 78% x50%)			0.624	
MS R. Total N to Non-Hypoxic Zone (1.6x 78% x 50 % x 40%)			0.2496	
MS R. Total N to Hypoxic Zone ((1.6 x 78% x 50% x 60%)		0.3744		
Total N to Hypoxic Zone from MS R. to Atchafalya R. (1.6 x 22%)		0.352		
	Subtotals	0.7264	0.8736	
	TOTAL			1.6

Assume 100% of MS River Flow goes through New Orleans and None is Diverted to Atchafalya River

MS R. Total N to Deep Water (1.6 x 50%)			0.8	
MS R. Total N to Non-Hypoxic Zone (1.6 x 50%x 40%)			0.32	
MS R. Total N to Hypoxic Zone (1.6 x 50% x 60%)		0.48		
	Subtotals	0.48	1.12	
	TOTAL			1.6

The benefit to the hypoxic zone of keeping 100% of the flow of the Mississippi River in the Mississippi River channel and routing it through New Orleans and out the birdsfoot delta into deep water is that it would reduce the amount of total nitrogen moving into the hypoxic zone from the Mississippi River by 33.9% (0.0.7264- 0.48)/0.7264*100)

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[1] 50% of MS River flow and nitrogen is lost to deep water in the Gulf of Mexico and 40% of the remaining 50% of the flow and nitrogen of Mississippi River exiting out of birdsfoot delta south of New Orleans never make it to the hypoxic zone. Based on unpublished paper dated November 29, 1999, prepared by Donald F. Boesch, University of Maryland Center for Environmental Science for Gulf Hypoxia Science Meeting.

[2] Diversion of Mississippi River flow into the Atchafalaya River is based on the formula: Flow diverted from MS River = (30% x(Flow in Red River + Flow in Mississippi River)) - Flow in Red River. Currently, based on this formula, about 22% of the Mississippi River flow gets diverted into the Atchafalaya River. Personal communication with Chuck Shadie, Corps of Engineers, New Orleans District.

Recent data presented by U.S.G.S.[3] show a very strong correlation (R^2 between 0.86 to 0.93) between the size of the hypoxic zone and the flux of nitrate and streamflow during the May – June time period of each year. While there are many factors involved in gulf hypoxia, this adds further credence to the idea that experiments should be conducted on reducing the rate of streamflow diversions of Mississippi River water into the Atchafalaya River in order to reduce the amount of nutrients introduced into the area of the Gulf of Mexico that is most likely to foster hypoxic conditions.

With the exception of June of 1943, the top 20 mean monthly flows of the Mississippi River at Vicksburg between 1931 and 1997 have occurred in January through May. None of the floods of 1993 even make the top twenty in terms of average monthly flows. The levees protecting New Orleans are designed to handle flows of 1.25 million cfs. The Bonnet Carre Diversion structure above New Orleans can move 250,000 cfs into Lake Ponchartrain. From looking at the table below, it would appear that since 1931, average monthly flow of the Mississippi River at Vicksburg would have exceeded the average design flow of the Mississippi River below Baton Rogue in only 10 of the 804 months. This means that unless some really extreme flow event occurred, more that 98 percent of the time it would be physically possible to test the theory of putting the entire flow of the Mississippi River up to 1.5 million cfs, out through the birdsfoot delta below New Orleans (1.25 million cfs) and Lake Ponchartrain (250,000 cfs if necessary) especially during Januray- June when the bulk of the nitrate flux occurs. (See Figure 1, Project Design Flood. Please include in the Final Integrated Assessment report.)

While current law mandates that a significant portion of the Mississippi River flow be diverted into the Atchafalaya River, it is physically possible to close the Old River Diversion and not allow any water from the Mississippi River to reach the Atchafalaya River. It also will surprise most people to know that under the design flood, 1.5 million cfs would be flowing out the Atchafalaya River, but only 1.25 million cfs would being flowing out the Mississippi River past New Orleans. Again, these facts need to be spelled out very clearly in the final IA so that policymakers can consider all the options, otherwise both the CENR reports and the Integrated Assessment will have failed to address the initial charge of P.L. 105-383 which calls for examination of "...methods of reducing nutrient loads..." and its development of a plan of action to reduce, mitigate and control hypoxia in the northern Gulf of Mexico.

Mean Monthly Flow of Mississippi River at Vicksburg between 1931-1997:

[3] Presentation by Don Goolsby, at Gulf Hypoxia Science Meeting, December 3, 1999 in St. Louis, MO.

Rank	year	Month	Flow cfs
1	1937	2	1,944,286
2	1973	5	1,850,129
3	1945	4	1,847,500
4	1950	2	1,796,357
5	1973	4	1,774,333
6	1983	5	1,623,290
7	1979	4	1,564,067
8	1975	4	1,561,167
9	1991	1	1,509,323
10	1949	2	1,500,250
11	1945	3	1,494,129
12	1997	3	1,469,545
13	1984	5	1,457,645
14	1950	3	1,414,194
15	1944	5	1,391,710
16	1943	6	1,382,933
17	1974	2	1,379,893
18	1979	3	1,375,097
19	1962	4	1,368,000
20	1939	3	1,366,774

Page 30 The second paragraph suggests that the Gulf of Mexico is comparable to other water bodies including the Kattegat, the Baltic and Adriatic Seas. This is further reinforced by Figure 4.2, Comparative Evaluation of Fishery Eco-systems Response to Increasing Nutrient Loading. As we pointed out in our August 9, 1999 comment letter on the six Topic Reports, page 26, "What the authors failed to acknowledge is that the Gulf of Mexico is an open, highly dynamic system compared to other water bodies such as the Black Sea and Baltic Sea." This section also seems to imply that hypoxia is strictly a man-made problem when there are significant hypoxic areas in oceans as a result of natural conditions.

Pages 30 and 32 should include language that acknowledges the above and that notes the reference Figure 4.2 is a theoretical possibility, not a forecast of what may actually happen in the Gulf of Mexico. Please go back and reread the Topic 2 Report regarding the shrimp and fish catch.

Concluding remarks:

Our hope would be that the integrated assessment would acknowledge that there is an extremely limited knowledge base insofar as the cause and, therefore, the possible remedies to the hypoxic zone in the Gulf of Mexico.

As representatives of the farmers and ranchers who occupy and farm much of the land in the MRB, we look forward to the opportunity to work with others on trying to resolve the many issues involved with the hypoxia zone in the Gulf of Mexico. However, we are strongly of the opinion that this needs to be a joint effort along with other parties that have also had an impact on the hypoxic zone.

Sincerely,

Richard W. Newpher
Executive Director
Washington Office