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August 2, 1999

John Field
Gulf of Mexico Hypoxia Working Group
National Centers for Coastal Ocean Science
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Dear John Field,

**Subject: Gulf of Mexico Hypoxia Working Group**

Enclosed please find our comments on the Gulf of Mexico Hypoxia Reports to the Committee on Environment and Natural Resources. Please contact me at (937)384-0659 if you have any questions or concerns.

Sincerely,

Bruce MacLeod
Technical Services Manager

Enclosures (2)

cc: Jeffrey Faust, Pamela Gratton

# Comment on the Reports of the Hypoxia Task Groups to the Committee on Environment and Natural Resources and the Gulf of Mexico Hypoxia Work Group

## Wheelabrator Water Technologies Inc., Bio Gro Division

Wheelabrator Water Technologies Inc., Bio Gro Division is the largest biosolids management firm in the Midwest United States, as well as North America. The company currently has over 200 biosolids management projects nationwide. Bio Gro is involved in both the treatment of wastewater solids and distribution and marketing and land application of the treated solids (biosolids) on farmland.

Bio Gro is disappointed in the direction that the assessment has taken. The reports started from the foregone conclusion that nutrient reductions are necessary in the Mississippi River. A more appropriate starting point would be to first identify **if** there is a problem and then look for **potential** solutions to the problem. The reports are written to defend a course of action when there is no scientific basis for that course of action. Such statements as, "Lack of identified hypoxic effects in available fisheries and fish population data does not imply that effects would not occur should conditions worsen." Report 2, Section 5.1 Pg 51. This quotation is one of the numerous examples of language throughout this report used to justify a massive and costly ratcheting down of nitrogen fertilizer usage in the Cornbelt based completely on speculation. This statement is particularly misleading when you consider that the conditions would have to be worse than "the most devastating flood in modern U.S. history" according to the USGS. Taking **any** mitigating action based on this unrealistic hypothetical situation is irresponsible.

### *Specific Comments on the Reports*

*"The lack of obvious detrimental ecological and economic effects does not preclude the possibility of ecological and economic disaster in the future."*
Topic 2, Section 5.1 , Pg. 52

Nor does it predict it.

*"Consideration of how hypoxia and other stressors interact with all aspects of the Gulf ecosystem is essential prior to planning any restoration efforts."*
Topic 2, Section 5.3, Pg. 54

We agree with the above statement, unfortunately the restoration plan was required before the process began. The work group has developed a plan before steps essential to the development of the plan were completed.

*"No satisfactory framework currently exists to predict the quantitative effects of changes in stream nutrient concentrations on either fish yield or fish species composition, and thus no quantitative statements can be made about the potential effects of nutrient loading restriction on fisheries throughout the MRB. Attempts should be made to develop such models."*
Report 4, Section 4.1.3 Pg. 74

*"Moreover, projected changes in nutrient inputs to MRB rivers from improved land management practices and additional controls on point sources are not likely to have dramatic effects on trophic state conditions in the rivers; i.e. they likely will remain moderately productive systems. On this basis, it seems unlikely that sport fisheries would be affected negatively. Any declines that may occur in total biomass production likely would be compensated for by improvements in habitat and other changes that would promote the development of game fish populations over rough fish populations."*
Report 4 , Section 3.2.4 pg. 59-60

The authors, while readily admitting that they do not have the framework available to make quantitative predictions about the fish yield or fish species composition, are quite willing to speculative about what would likely happen in the Mississippi River Basin. To exacerbate this, the same speculative results are included as a positive ecological effect without the qualifying statements. It is clearly a very biased opinion to state that this is a positive and a negative, but likely not a negative.

*"When available P levels at the soil surface exceed threshold levels at which there is no further response by the crop (Sharpley et al. 1994), the potential for P losses to surface waters increases. The critical threshold varies by state and crop but generally ranges from 25 to100 mg P/kg for the Bray-1 soil extraction and from 35 to 120 mg P/kg for the Mehlich-1 extraction (Sharpley et al. 1994)."*
Topic 3.2.1.3 Page 21

The writer is over simplifying this document and this creates a misunderstanding of the issue of soil phosphorus levels. The "critical threshold" that the author is talking about is the agronomic critical value for soil test P, or the P soil test value above which the addition of phosphorus fertilizer does not economically increase crop yields. It is being presented as an environmental threshold for preventing P losses to surface waters. In fact, the soil test P content of surface soils is a very poor indicator of P loss to surface soils because the volume of runoff, as affected by climatic, edaphic and agronomic factors plays a larger role (Sharpley et al. 1996). Many states are developing arbitrary "environmental" thresholds that are at least 3 to 10 times higher than agronomic critical values (Sharpley et al. 1996). There is an insignificant correlation between the soil test phosphorus levels and total P loss from soils. Applying a threshold P concentration value on all soils across a watershed is not scientifically defensible as a method of protecting surface water.

*" Without focusing on these critical source areas, broadly applied remedial measures are likely to be an* ***inefficient*** *and expensive approach to reducing P exports to surface waters.*

*"A significant difference between strategies for N and P is that N losses can occur from any location in the watershed, while areas prone to surface runoff contribute most to P losses. Hence, remedial strategies for N can be applied to the whole watershed. The* ***most effective*** *P strategy, however, would be to prevent excessive buildup of P across the whole watershed and reduce surface runoff from critical areas that have a high potential for exporting P to surface waters."*
Report 4, Section 3.2.1.3 Page 23

In the space of one paragraph, application of the management strategy of "preventing the development of excessively high levels of soil available P" in all soils in the watershed is changed from an "inefficient and expensive approach", to the "most effective" P strategy. I believe this is a mistake and this statement would make more sense if the last statement read: "The most effective P strategy, however, would be to prevent excessive buildup of P and to reduce surface runoff from critical areas that have a high potential for exporting P to surface water."

*"In addition to control and treatment of runoff and erosion and proper management of fertilizers and manure, changes in animal feed may provide significant reductions in P losses to surface waters. The P content of animal feed can be matched to dietary intake requirements, thereby reducing P concentrations in animal manure (Daniel et al. 1998). An alternative strategy is to add the enzyme phytase to animal feed to increase the retention efficiency of feed phosphorus by animals (Daniel et al. 1998). Finally, corn used for animal feed can be altered genetically to produce low levels of phytic acid phosphorus (Ertl et al. 1998), thereby reducing excretion of P."*
Report 4, Section 3.2.1.3 page 23

Stating that changes in animal feed may provide significant reductions in P losses to surface waters is not correct. To make this assertion you have to accept as fact that significant quantities of animal manure are discharged directly into surface waters. This is not the case. Reducing P concentrations of animal manure is advantageous because it reduces the amount of land area over which the manure would need to be applied if it was applied at a phosphorus agronomic rate. It is a tool which may help farmers to reduce the cost of compliance with regulatory restrictions on the amount of phosphorus that may be applied to the soil. It is a stretch of logic to assert that it would provide significant reductions in P losses to surface waters, especially since the soil concentration of P is not even significantly related to P losses to surface water.

*"Keeney and DeLuca (1993) examined nitrate concentrations in the Des Moines River in 1945, 1955, 1976, and from 1980 through 1990 and found the average nitrate-nitrogen concentration to have changed little in the last 45 years (5.0 mg-N/L in 1945 to 5.6 mg-N/L in 1980-90). They concluded that intensive agricultural practices that enhance mineralization of soil nitrogen coupled with subsurface artificial drainage are the major contributors of nitrate-nitrogen to streams and rivers of the Midwest."*
Report 5, Section 1.3.1, Pg. 5

The authors have glossed over the evidence that supports the scientific conclusion that mineralization of soil nitrogen is the major contributor of nitrate-nitrogen to the Mississippi River Basin and have instead focused only on fertilizer nitrogen. Mineralization of soil nitrogen is a natural process that provides beneficial nitrogen for crop production. Soil organic matter content, water holding capacity and crop production capacity are degraded if mineralized soil nitrogen is not replaced in the soil. Elsewhere in these reports the authors have asserted that nitrate-nitrogen concentrations have been steadily rising in the Mississippi River. The above quotation appears to contradict this assertion.

"Goolsby et al. (1999) found 2.7 million metric tons per year of nitrogen being **discharged** into the Mississippi River Basin, about 40% of the total fertilizer use in the basin (Table 1.1)."

Report 5, Section 1.3.2, Pg. 7

"Point source discharges of nitrogen are estimated to add 0.27 million metric tons/yr of nitrogen to the streams and rivers of the Mississippi River Basin, about 1.5% of the total loading generally coming from agricultural lands (fertilizer use, mineralizing soil, and legume N-fixation) (Goolsby et al., 1999; Table 1.1)."

Report 5, Section 1.3.4, Pg. 7

The above statements are very misleading, the manure nitrogen mentioned above was not "discharged" but rather was managed as a nutrient source for crop production through methods such as land application, composting and other methods. The use of the word "discharge" puts an unnecessary negative connotation on the activity. The second quote further misleads the public by attempting to downplay the amount of nitrogen **discharged** to the rivers and streams of the Mississippi River Basin, describing it as "1.5% of the total loading generally **coming from** agricultural lands." This would better be described as 17% of the nitrogen that is ultimately discharged to the Gulf of Mexico. It is incorrect to state that it is 1.5% of the nutrients "coming from" agricultural lands.

*"Long-term changes in annual precipitation due to climate shifts could have a major effect on nitrate loading to the Gulf of Mexico from the Mississippi River*

*Basin. Increased amounts of annual precipitation would likely lead to greater surface runoff and subsurface drainage of water containing nitrates."*

Report 5, Section 3.1.1.5 , Pg.18

I can find no scientific justification for the above assertion. Increased annual precipitation is likely to have a large number of environmental effects within the Mississippi River Basin, including a decrease in the likelihood of drought years, an increase in denitrification, and increased crop yields, and yes increased runoff and subsurface drainage of water. It is as likely , if not more likely, that increased precipitation would decrease the nitrate loadings to the Gulf of Mexico from the Mississippi River Basin. If we are willing to accept as scientific fact that there is a trend toward increased precipitation of between 10% over 90 years, or 3% a decade, both of which the author claims are correct, then the effects of this increased rainfall should be accounted for in any plan for the Mississippi River Basin.

## Conclusion

In general, there are too many things that are either identified as unknown, and likely others that have not been identified that lead a person to conclude that the development of a remediation plan for the hypoxia in the Gulf of Mexico is premature. It is evident from the topic papers that not only are we unsure about the need to remediate, it is quite possible that any remediation would have negative economic effects on the Gulf of Mexico fisheries. It is irresponsible to spend billions of dollars in additional environmental controls in one region of the U.S. with the potential effect of hurting another region.

The document fails to relate the amount of food produced in the Mississippi River Basin to the increased use of nutrients. Nor does it identify the amount of nitrogen that is removed from the Mississippi River Basin annually in the form of feed for animals and food for humans. The documents are written as if there is a one way flow of these nutrients into this ecosystem and the only removal is downstream into the Gulf of Mexico. The proposed plan will hobble the most productive food producing region of the world, only to remove nutrients and productivity from the Gulf of Mexico fisheries.

We are concerned about the great potential for negative consequences of going forward with the proposed planned activities contained within these integrated assessment documents. We are also very concerned with much of the language and the way this "scientific" document is written. These documents are written more from the viewpoint of building a case against nitrogen fertilizer use in modern high-yield crop production rather than as a scientific assessment of the situation. They even go so far as to admit that the costs far outweigh the potential benefits, but cost/benefit analysis is rarely used in public policy decisions.

It is obvious from these documents that the plan to reduce the efficiency of Midwest agriculture through cutting back nitrogen fertilizer and taking acreage out of production would be both arbitrary and without scientific justification. Regulations need to be based on sound science.

We also add that, in addition to our comments, we concur with the comments submitted by Richard A. Halpern on behalf of the Hudson Institute Center For Global Food Issues (copy attached).

Please contact me at (937) 384-0659 if you have any questions or would like further information.

## References

Sharpley, A.N., T.C. Daniel, J.T. Sims, and D.H. Pote. 1996. Determining environmentally sound soil phosphorus levels. J. Soil Water Conserv. **51**: 160-166.