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JERRY M. CONLEY, Director

Reply to: **Conservation Research Center**
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August 9, 1999

Gulf of Mexico Hypoxia Working Group
National Centers for Coastal Ocean Science
WS 13446 SSMC4
1304 East-West Highway
Silver Spring, MD 20910

Dear Sirs or Madams:

I have reviewed the series of documents that comprise the assessment of *Hypoxia in the Gulf of Mexico*. Overall the assessment was comprehensive and very well done. I only have a few comments:

1) While the assessment was unable to document impacts of hypoxia on fisheries, the primary parameter appears to be impacts on commercial and sportfish harvest over time. One of the problems with documenting impacts on fisheries is that the complex interactions between physical phenomena and fish are not nearly as well known in the oceans as in fresh water. Unlike benthic organisms, fish can move out of areas where conditions are becoming unsuitable. The document does show a significant negative impact on benthic organisms which ultimately impacts fish. There is also a loss in productivity in the hypoxic zone, which ultimately will impact fisheries on a larger scale should hypoxia worsen, which has been documented in other smaller seas. There needs to be an effort to document impacts on non-commercial and sportfish in order to predict the reaction of fish to reductions in benthic productivity.

2) Under Topic 2, the authors attribute the clearing up of Lake Erie to nutrient input reductions. While nutrient reductions in the watershed may have played a role, the primary reason for the change in Lake Erie water quality was the invasion and proliferation of zebra mussels during the mid-to-late 1980s.

3) Many of the recommendations (e.g. reduction of fertilizer application rates, altering the timing of fertilizer application, use of wetlands and buffers to reduce nutrient runoff to streams, better management of animal manures) for reducing nutrient movement to the Gulf will improve water quality in Midwestern rivers and streams. The hypoxia problem in the Gulf reinforces the need for nutrient reduction in these streams. The ultimate impact will likely be a significant improvement in water quality and fisheries in these streams.

Thank you for the opportunity to comment on this assessment.

Sincerely,

Alan C. Buchanan

Alan C. Buchanan,
Environmental Services Biologist

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