



## Predicting the response of Gulf of Mexico hypoxia to variations in Mississippi River nitrogen load

Scavia, Donald, Nancy N. Rabalais, R. Eugene Turner, Dubravko Justic, William J. Wiseman

Limnol. Oceanogr., 48(3), 2003, 951-956 | DOI: 10.4319/lo.2003.48.3.0951

**ABSTRACT:** The effects of nutrient loading from the Mississippi River basin on the areal extent of hypoxia in the northern Gulf of Mexico were examined using a novel application of a dissolved oxygen model for a river. The model, driven by river nitrogen load and a simple parameterization of ocean dynamics, reproduced 17 yr of observed hypoxia location and extent, subpycnocline oxygen consumption, and cross-pycnocline oxygen flux. With Monte Carlo analysis, we illustrate through hindcasts back to 1968 that extensive regions of low oxygen were not common before the mid-1970s. The Mississippi River Watershed/Gulf of Mexico Hypoxia Task Force set a goal to reduce the 5-yr running average size of the Gulf's hypoxic zone to less than 5,000 km<sup>2</sup> by 2015 and suggested that a 30% reduction from the 1980-1996 average nitrogen load is needed to reach that goal. Here we show that 30% might not be sufficient to reach that goal when year-to-year variability in ocean dynamics is considered.

### Article Links

[Download Full-text PDF](#)

[Return to Table of Contents](#)

### Please Note

Articles in L&O appear in PDF format. Open access articles may be freely downloaded by anyone. Other articles are available for download to subscribers only, or may be purchased for \$10 per article. All L&O articles are moved into Open Access after three years.