

Edwards, W.J., J.D. Conroy, and D.A. Culver. 2005. **Hypolimnetic oxygen depletion dynamics in the central basin of Lake Erie**. *Journal of Great Lakes Research* 31(Suppl. 2): 262-271.

The abstract:

Hypolimnetic oxygen depletion has been recognized as a problem in the central basin of Lake Erie since the 1970s. However, recent expansion in distribution of the depletion after several years of low depletion rates in the 1990s has led investigators to explore the factors that influence the extent of the depletion. We have investigated the vertical oxygen budget in the central basin, which is influenced by the following factors: 1) vertical mixing; 2) exchange across the air-water interface; 3) photosynthesis; 4) respiration of plankton; and 5) sediment oxygen demand. We tested the importance of these factors using a 1-D vertical oxygen budget and transport simulations through sensitivity analysis and by estimating vertical mixing parameters using a temperature gradient microprofiler. Epilimnetic factors were found to be robust and the present monitoring efforts are sufficient; while epilimnetic production is ultimately the source of the hypolimnetic oxygen depletion, epilimnetic factors do not directly influence on hypolimnetic oxygen depletion. However, hypolimnetic depletion was sensitive to sediment oxygen demand and hypolimnion respiration, which are the results of primary production in the epilimnion, and hypolimnetic mixing, which is not related to eutrophication. These parameters, especially the physical mixing measurements, and their links with eutrophication and primary production require greater monitoring and analysis because of their influence on the expansion of oxygen depletion in the central basin of Lake Erie.