

Lake Erie Indicator Monitoring 1983-2002

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Biographical Sketches of Authors

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Abstract

The U.S. EPA Great Lakes National Program Office maintains a long term, open water, monitoring program on the Laurentian Great Lakes. Accelerated eutrophication of the Great Lakes has been recognized for over sixty years. Control of accelerated eutrophication required controlling external phosphorus loads. The general success of the phosphorus load control in all of the Great Lakes can be seen in decreases in total phosphorus (TP) concentrations in all three basins of Lake Erie during the 1980's. However, 0.2 ug-P/L/yr increases in the Central Basin ($p < 0.001$) and 0.7 ug-P/L/yr increases in the Western Basin ($p < 0.005$) in seasonal TP concentration since 1989 and cessation of decreases of TP concentrations in the Eastern basin suggest a change in Lake Erie's ecosystem. These internal changes are occurring in spite of external phosphorus loads controls.

From 1983 to 1989, Central Basin TP and dissolved reactive silica (DRS) responded as expected by the Schelske and Stoermer hypothesis, that as over enrichment of TP declined, severe SI depletion was diminishing (4.4 ug-Si/L/yr increase ($p < 0.01$)). However, post 1989, TP increased and DRS increased or decreased in tandem during 1989-1997 and 1997-2001 respectively.

Dissolved oxygen (DO) monitoring data collected from 1983 to 2002 were analyzed for trends with time. Decreases in DO depletion rates were detected prior to 1989. Since 1990 no change in DO depletion rates has been observed.

A temperature increase was detected in the Central Basin of 0.015°C/yr (1983 to 2002). These results are close to a commonly accepted value for global warming of 0.02 °C/y