

## **Trophic Transfer in lake Erie: A Whole Food Web Perspective.**

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Recent changes in the Lake Erie ecosystem, which include reductions in smelt and yellow perch harvests, loss of deep water amphipods, reduced chlorophyll concentrations, and increased water clarity have been ascribed to reduced phosphorous loadings and the establishment of exotic species such as dreissenid mussels and *Bythotrephes*. We present the analysis of a trophic transfer model which quantifies patterns of energy flow through this ecosystem and can identify potential instabilities in the food web. The model comprises estimates of seasonal production and consumption of functional groups including algae, bacteria, ciliates, heterotrophic nanoflagellates, rotifers, herbivorous and predatory zooplankton as well as copepod nauplii, dreissenid adults and veligers, benthic predators and detritivores, smelt, yellow and white perch, walleye, and salmonids. A submodel is presented for each of the three Lake Erie basins. Data were collected in a series of cruises that included the whole lake as well as specific index stations. Model results, averaged over different spatial and temporal scales for the various trophic groups, reflect the average state of the food web from 1992 to 1995. Initial results indicate an enormous energy requirement by mussels that apparently cannot be met by the production of prey groups represented in the model.