

# **Measurements of Select Toxic Organic Contaminants in Surficial Sediments of Lake Michigan: Estimation of Lakewide Inventories and Seasonal Settling Fluxes**

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## **This Project Ended in 1999**

This project provides specific data related to the needs of the EPA-sponsored Lake Michigan Mass Balance Study (LMMB), and also the EPA-sponsored Environmental Monitoring and Assessment Program (EMAP). The LMMB Study seeks to determine a mass balance of inputs and outputs of select contaminants for Lake Michigan. The study is designed to answer questions posed in the amended Clean Air Act, and to assist environmental managers in developing and implementing the Lake Michigan Lakewide Management Plan. The goal of EMAP is to estimate the current status, trends, and changes in the Nation's ecological resources. More specifically, the program in Lake Michigan seeks to determine the areal extent of sub-nominal conditions in the nearshore zone. Status and spatial trends in the benthic community have been identified as the primary environmental indicator. Supplemental indicators include sediment toxicity (as determined by bioassay) and concentrations of organic contaminants.

The purpose of this project is to provide an inventory of critical contaminants (PCBs and trans nonachlor) in the Lake Michigan surface sediments. Contaminant deposition zones, hot spots, and local sources will be identified using trace organic contaminant concentration maps and sediment inventories. In addition, the seasonal transport of contaminants between regions of the water column, and between the water column and surface sediment will be estimated from sediment trap collections.

To test the applicability of the Equilibrium Partitioning model for assessing contaminant bioaccumulation in Lake Michigan benthic invertebrates, *Diporeia* spp. were collected at 72 LMMB/EMAP stations. Accumulation of PCBs, chlorinated pesticides, and PAHs will be examined to determine controlling factors, such as organism size, organism lipid content, sediment composition, sediment contamination, and compound hydrophobicity.

## **1999 Plans**

Manuscripts on the finding of this research will be written and submitted.

## **1999 Accomplishments**

The last of the data committed to EPA was supplied after careful quality control evaluation. A portion of the data was evaluated for a presentation at the 20th annual meeting of the Society of Environmental Toxicology and Chemistry. This project is terminated as the principle investigator departed the laboratory.

## **1998 Accomplishments**

EPA's Lake Michigan Mass Balance Program is attempting an inventory and mass balance of PCBs, trans-nonachlor, and atrazine in Lake Michigan. Concentrations of PCBs and trans-nonachlor along with other organic contaminants were measured in surficial sediments and sediment traps. The data for the PCB congeners in the surficial sediments have been evaluated for quality assurance and reported to the USEPA Great Lakes National Program Office, Chicago, IL. Samples for organochlorine pesticides (17 of 25 batches) and polycyclic aromatic hydrocarbons (7 of 25 batches) have been quantified. Samples from sediment cores are extracted and cleanup has begun. When completed these will contribute to the fate, transport and mass balance models for these contaminants in Lake Michigan.