

Lake Michigan Monitoring Coordination Council

Collaborative Monitoring in the Great Lakes: Revisiting the Lake Michigan Mass Balance Project

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National Monitoring Conference

May 10, 2006

San Jose, CA

Great Lakes Hydrologic and Political Boundaries



Monitoring Coordination Issues

- In most cases water resources data is collected according to political boundaries rather than resource boundaries
- Data collection agencies each have specific monitoring objectives that often do not overlap

Lake Michigan Monitoring Coordination Council (LMMCC) Background

- Inaugural meeting September 1999
- Broad ecosystem approach -- not only water quality monitoring



LMMCC Goals

- Serve as a regional forum to coordinate and support consistent, credible monitoring methods and strategies
- Help define a regionally-coordinated agenda for Lake Michigan basin monitoring, with improved collaboration and data comparability
- Link basin wide information systems
- Improve awareness of importance of monitoring

Membership

- State agencies (8)
- Federal agencies (7)
- Tribal nations/associations (2)
- Business, industry and consultants (2)
- Agricultural groups (1)
- Local volunteer or environmental groups (2)
- Sea Grant Programs or university-based institutes (4)
- Lake Michigan LaMP Forum (1)
- Local government/planning agencies (4)
- Great Lakes Fishery Commission (1)
- Chair of LaMP Technical Coordinating Committee and Great Lakes Commission (ex-officio members)

LMMCC Workgroups

- Air
- Aquatic Nuisance Species
- Fisheries
- Groundwater
- Land Use
- Collaboration and Outreach
 - Technical coordination
 - Communication/outreach
 - Workshop/ meeting planning
- Open Lake
- Recreational Waters
- Research
- **Tributaries**
- Wetlands
- Wildlife

Tributary Work Group Efforts

- Basin wide monitoring inventory
- Issue papers
 - Analysis of Monitoring Objectives
 - Coordinated Monitoring Network Considerations
 - Surface Water Monitoring Network Design
- Projects
 - Spatial analyses of historic surface water flow and chemistry data
 - **Coordinated Tributary Monitoring project**

Coordinated Tributary Monitoring Project Objectives

- Compare current loading rates with 1994-95 Lake Michigan Mass Balance (LMMB) loading rates
- Incorporate results into Lake Michigan Mass Balance models

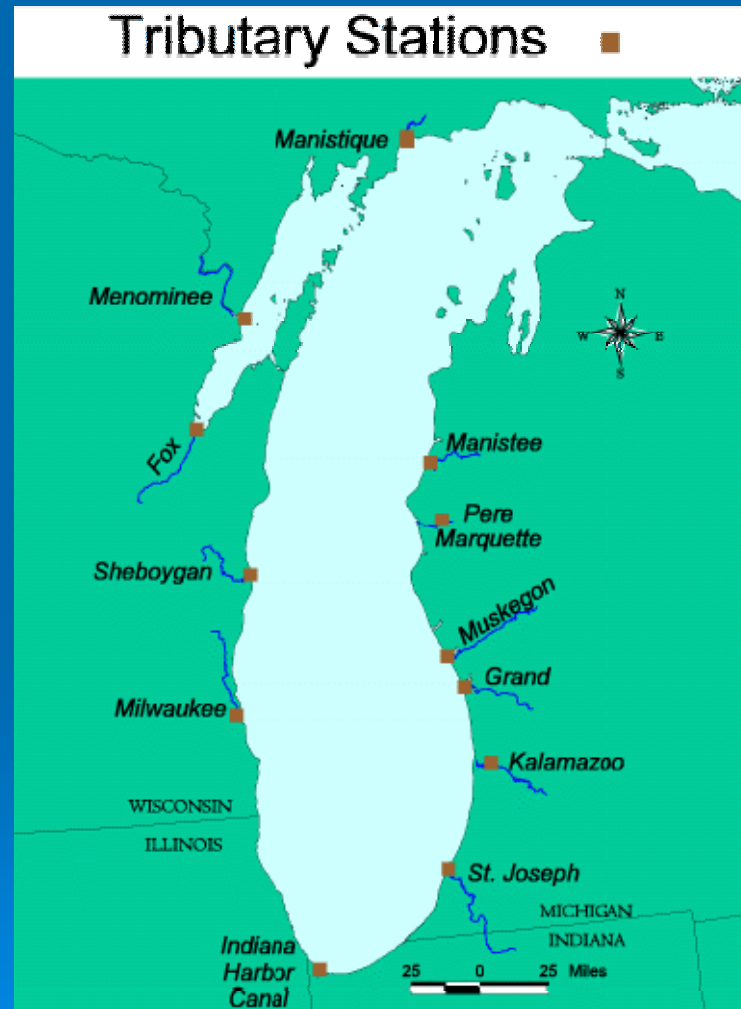
Development of Lake MI Tributary Monitoring Project

- Examined the results of LMMB study to determine the important constituents and site locations
- Determined who is currently collecting the LMMB constituents, and at what locations
- Considered how to link ongoing data collection with minimal new resources to meet study objectives
- Developed several monitoring options based upon funding availability and statistical viability
- Statistically tested potential to replicate LMMB effort with significantly reduced scope

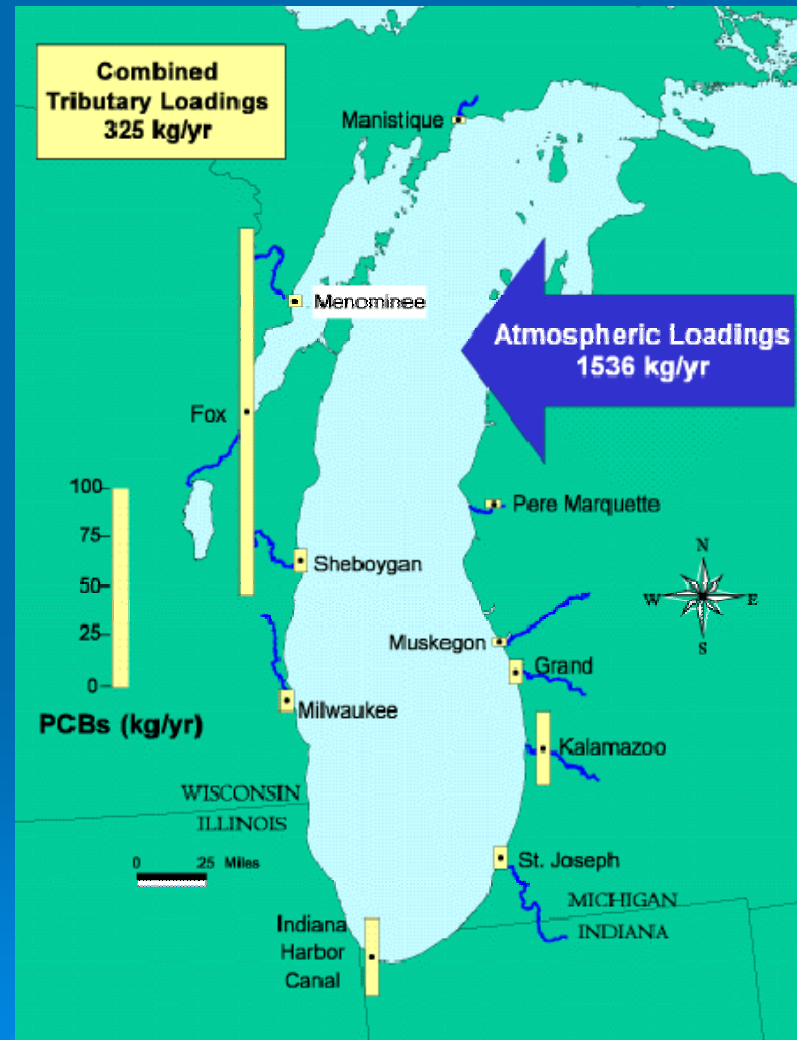
Workshop – June 2004

- Determined potential monitoring locations and parameters for “10-year LMMB snapshot”
 - Discuss details of each option
 - Finalize constituents to monitor
 - Compare specific monitoring protocols
 - Confirm sites to monitor
 - Development of final plan for 2005/2006 monitoring event

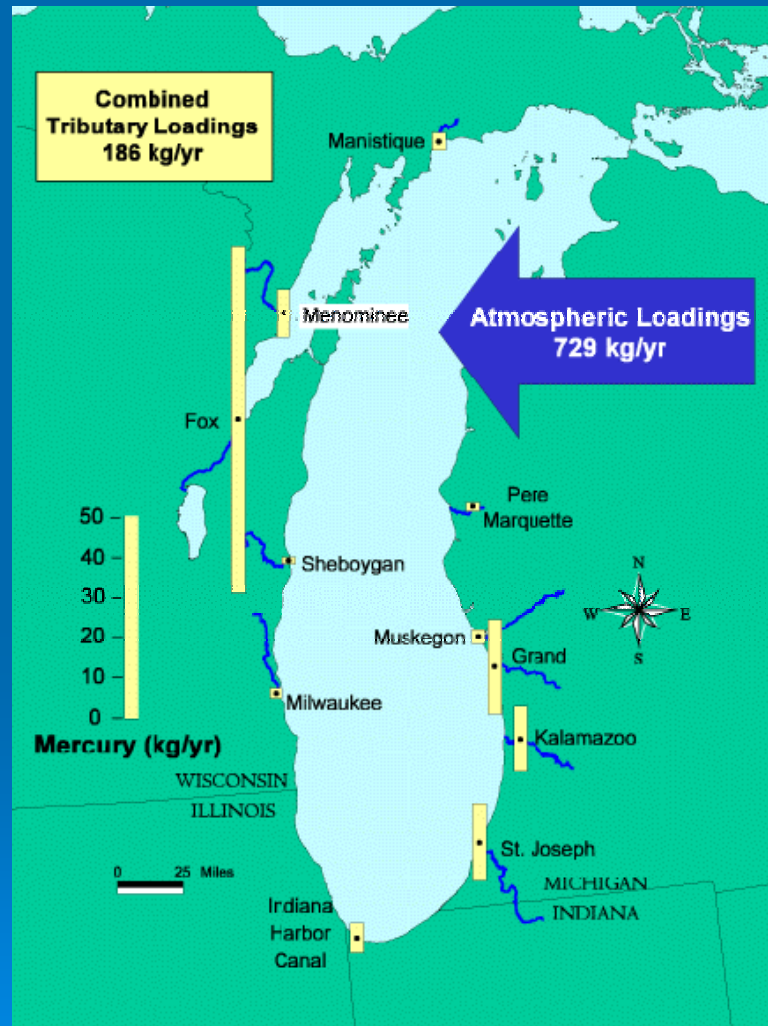
1994 – 1995 Lake MI Mass Balance Tributary Monitoring Stations



1994 – 1995 LMMB PCB Loads

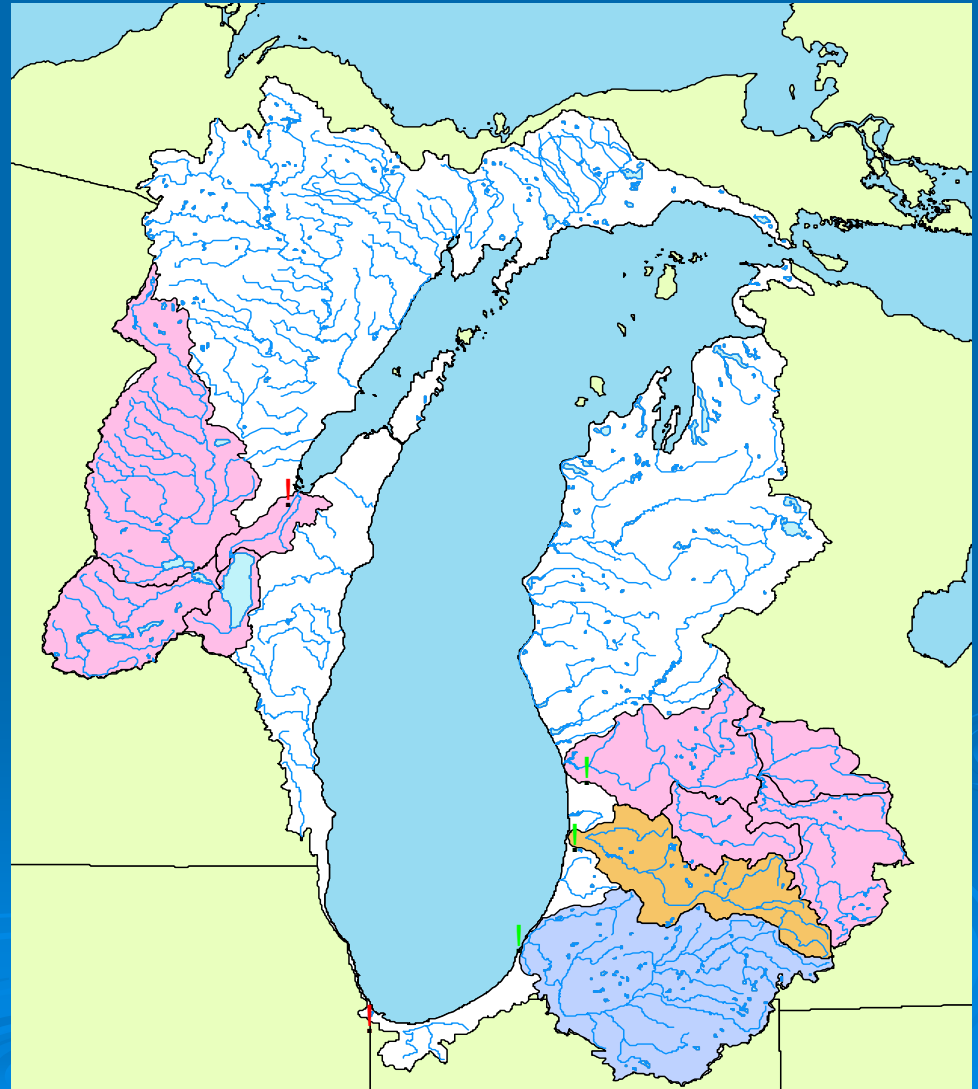


1994 – 1995 LMMB Mercury Loads



2005-2006 Lake MI Tributary Monitoring Project Sites

- Lower Fox (WI)
- Indiana Harbor Canal (IN)
- St. Joseph (MI)
- Kalamazoo (MI)
- Grand (MI)



Analytes

Constituents:

- Total PCB congeners (dissolved and particulate for Indiana and Wisconsin Sites)
 - Total Mercury (particulate and dissolved, total and methylmercury, Fox River only)
 - Nutrients and solids
 - ~~➤ Atrazine~~
 - ~~➤ *trans*-Nonachlor~~
- ELIMINATED TO MINIMIZE
TOTAL PROJECT COST**

Sample Collection and Timing

Collect 12 samples from each tributary (36 were collected during 1994 – 1995 LMMB study)

Sample Timing:

- **Indiana Ship Canal: 100% scheduled**
- **Fox River: 33% base flow / 66% high flow**
- **St. Joseph, Kalamazoo, and Grand:
33% base flow / 66% high flow**

Progress to Date (April 2006)

- Fox River: 7 samples / 1 duplicate / 1 blank
- Indiana Ship Canal: 6 samples/ 1 duplicate / 1 blank
- St. Joseph, Kalamazoo, and Grand: 12 samples (complete)
- Sampling at the Indiana and Wisconsin sites will be completed by the end of July, 2006

Coordinated Tributary Monitoring Project Funding

- Project Planning and Management
 - In kind funding - USEPA, GLC, MI DEQ, USGS WI WSC
- Michigan DEQ Monitoring
 - November, 1998: Clean Michigan Initiative
 - For 2005, priorities realigned to allow 12 PCB and Mercury samples from 3 tributaries
- USGS Monitoring, Data Analyses and Report
 - EPA GLNPO funds via Great Lakes Commission
 - USGS Cooperative Water Program funds
 - Wisconsin and Michigan Water Science Centers

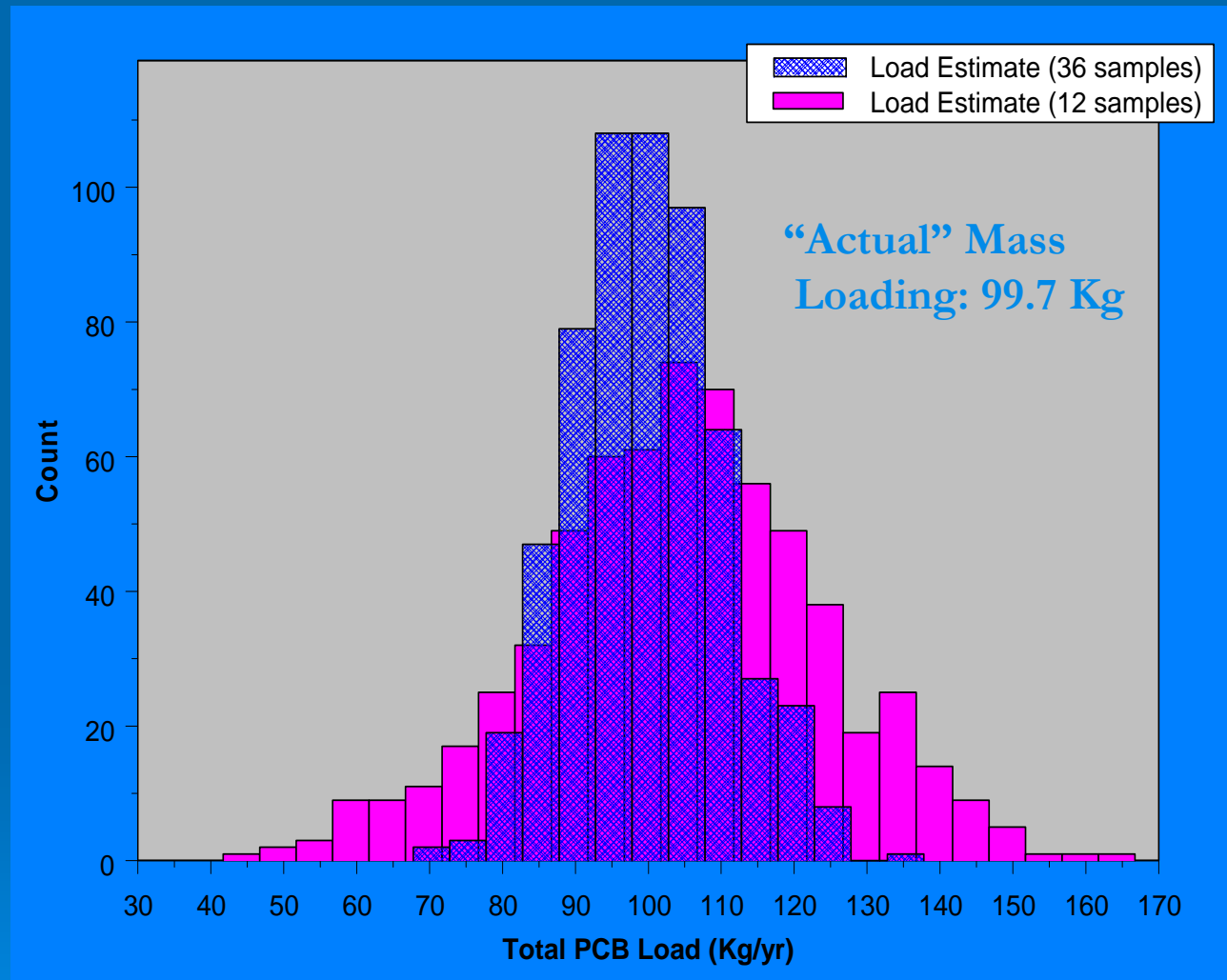
Coordinated Tributary Monitoring Timeline

- Project design (April 2004 – March 2005)
- Sample collection (April 2005-July 2006)
- Sample analysis (July 2005-October 2006)
- Data analysis (August 2006-April 2007)
- Draft report (June 2007)

Future Work

- Estimate mass loading for each of the five sampled Lake Michigan tributaries
- Estimate the uncertainty associated with each of the loading estimates
- Compare concentration and loading estimates with the 1994-1995 Lake Michigan Mass Balance project concentrations and loading estimates

Effect of Sample Size: Simulated 2005 PCB Load Estimates (Unstratified Beale Ratio Estimator)



Lessons Learned

- It is possible to coordinate sampling between individual monitoring programs to meet additional objectives
- Partners must be willing to compromise
- Creative funding solutions, combining in-kind contributions with additional funding sources, can be developed

For More Information

- LMMCC website
 - <http://wi.water.usgs.gov/lmmcc/>
- John Hummer (GLC)
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Questions?



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