



# **Lake Michigan Mass Balance Project: Modeling Introduction and Results**

**Large Lakes Research Station  
(U.S. EPA/ORD/NHEERL/MED)  
with  
U.S. EPA Great Lakes National Program Office**

## **Goals**

**Provide a preview of what will be seen in  
the modeling presentations**

**Provide background and introduction to  
Lake Michigan multi-media modeling**

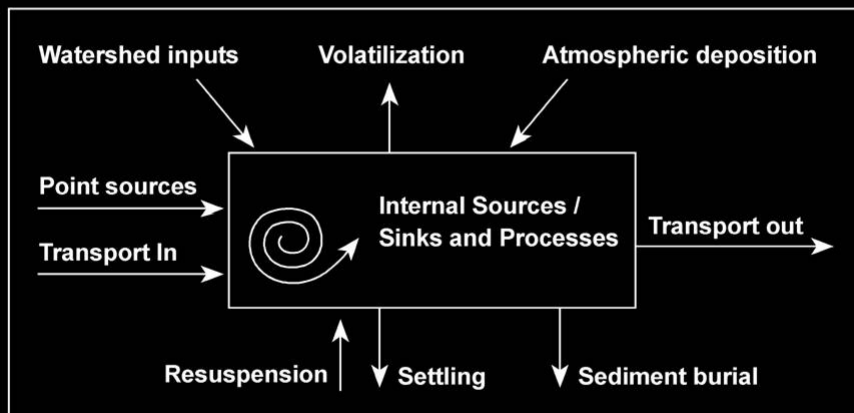
## **Major Findings**

- **Forecasted PCB concentrations in 5.5 year old lake trout may permit unlimited consumption as early as 2039 at Sturgeon Bay and 2044 at Saugatuck**
- **Most observed mercury concentrations in Lake Michigan lake trout exceed the EPA guidelines for unrestricted consumption**
- **Phosphorus loads and concentrations are low and below Great Lakes Water Quality Agreement and International Joint Commission targets**
- **Observed and forecasted concentrations of atrazine in Lake Michigan are well below present EPA biological effects thresholds**

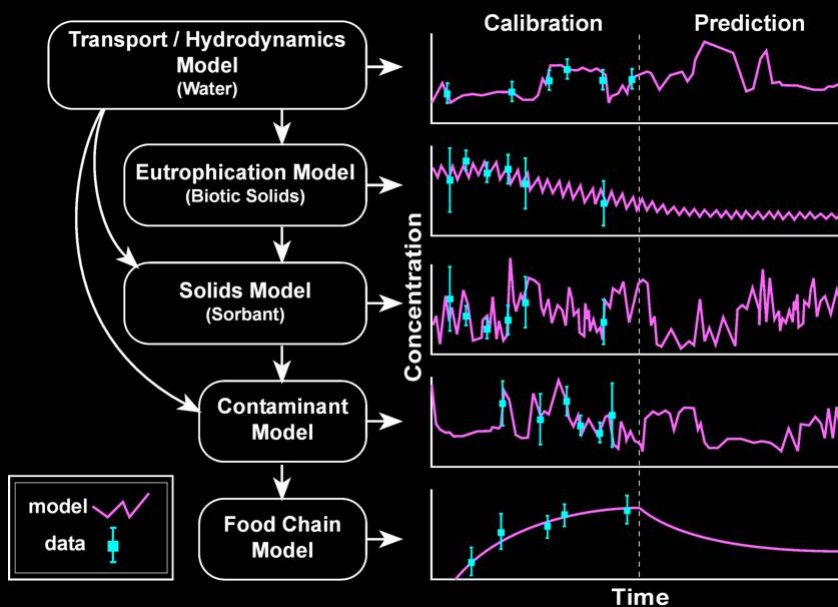
## **General Outline for Introduction, PCB, Atrazine, Nutrients, and Mercury Presentations**

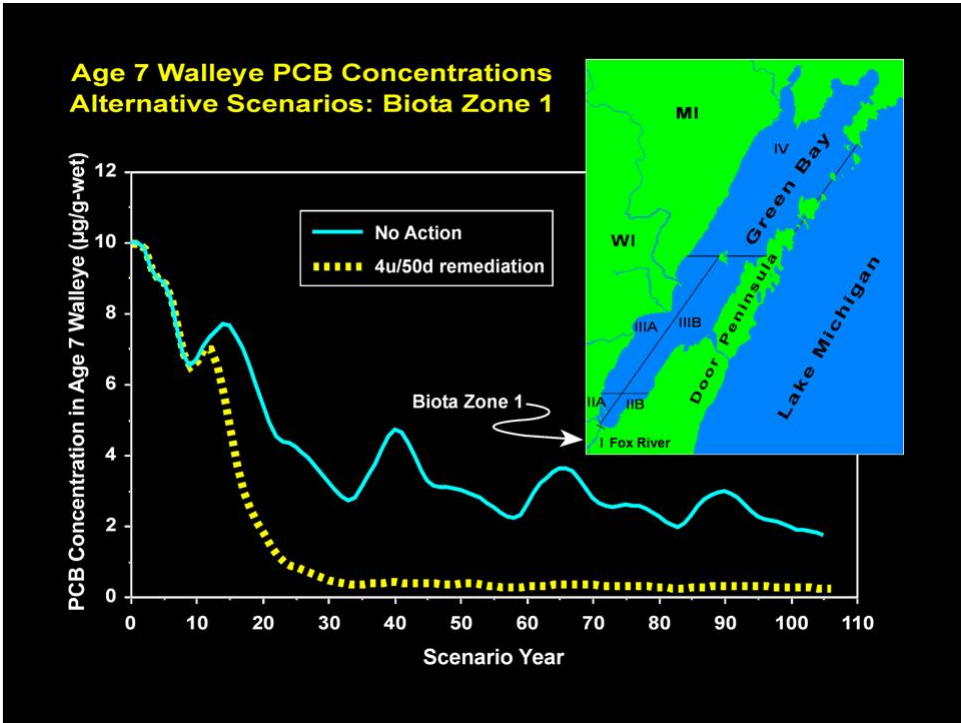
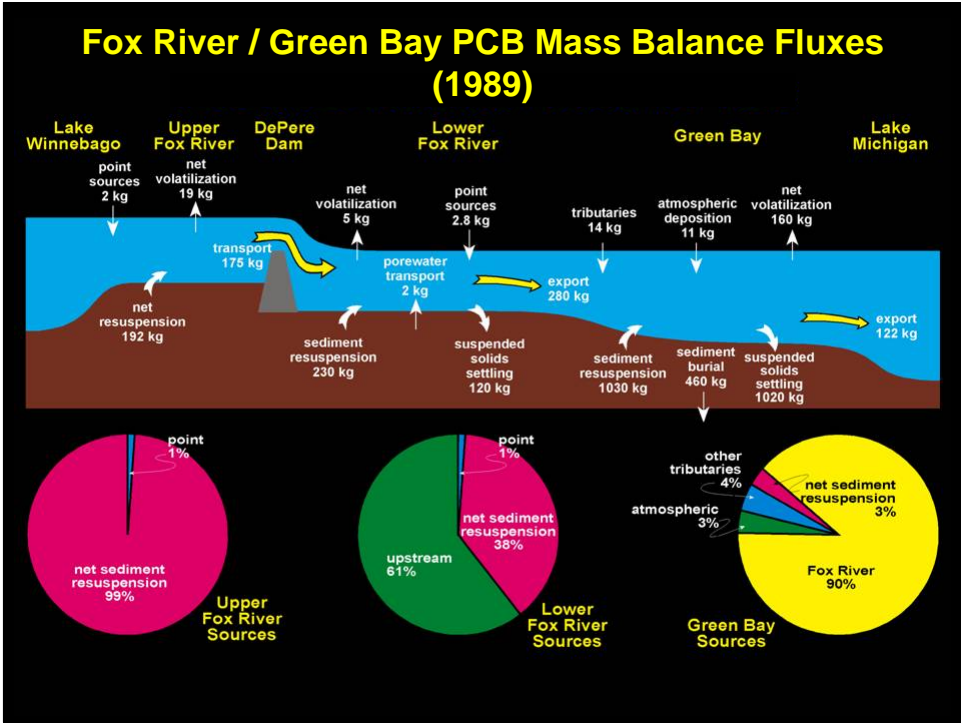
- **Goals**
- **Major findings**
- **Historical aspects and trends**
- **Chemical background and properties**
- **Observed concentrations**
- **Calculated loads**
- **Modeling framework**
- **Mass balance results**
- **Model forecasts**
- **Summary**
- **Next steps**

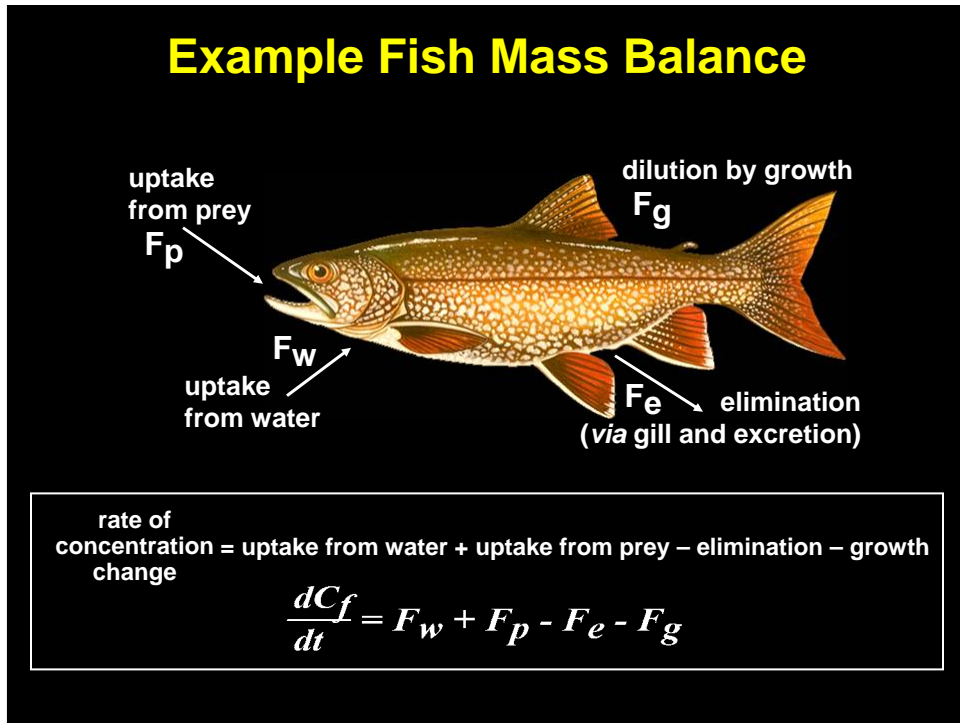
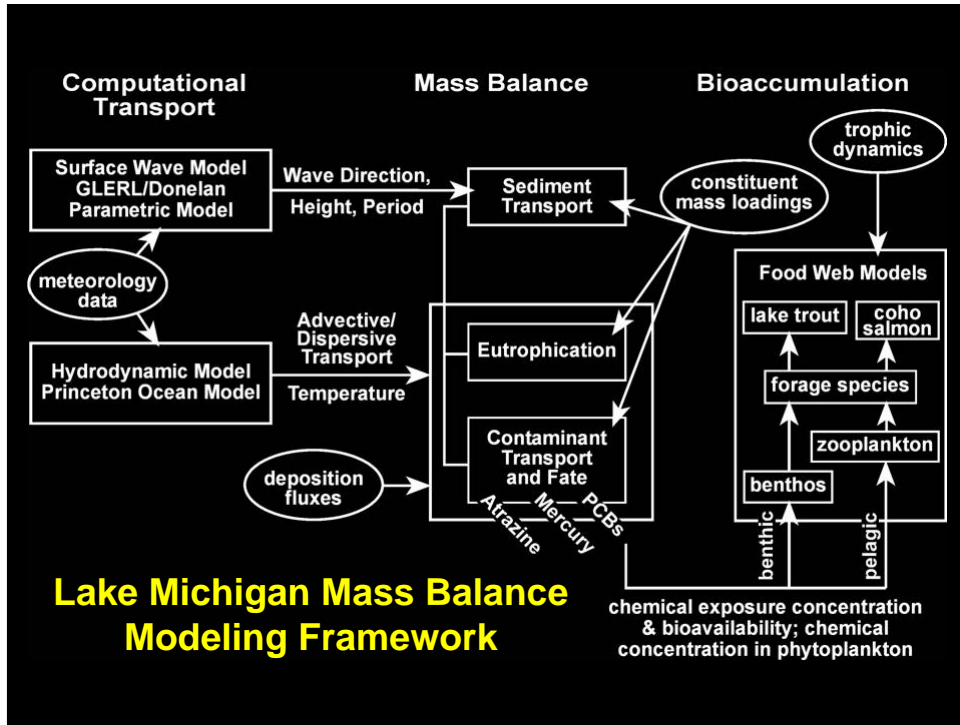
## Example Lake Mass Balance



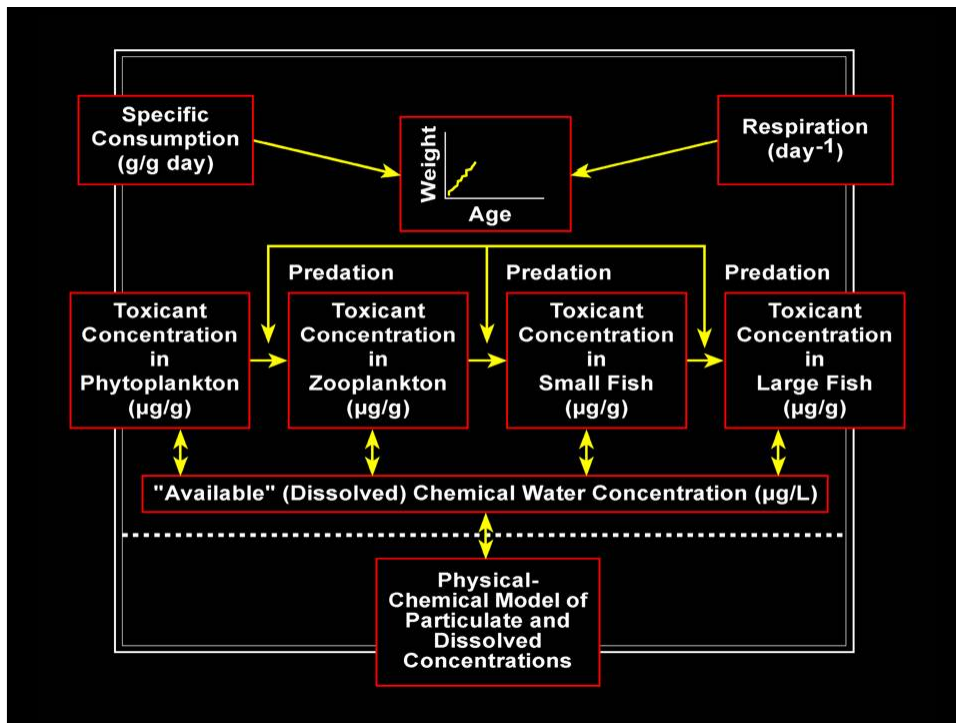
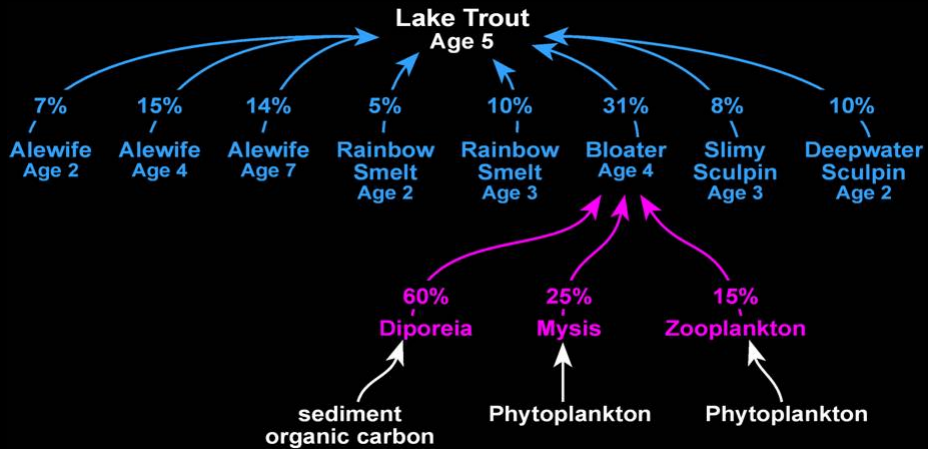
## General Mass Balance Model Calibration and Prediction Process

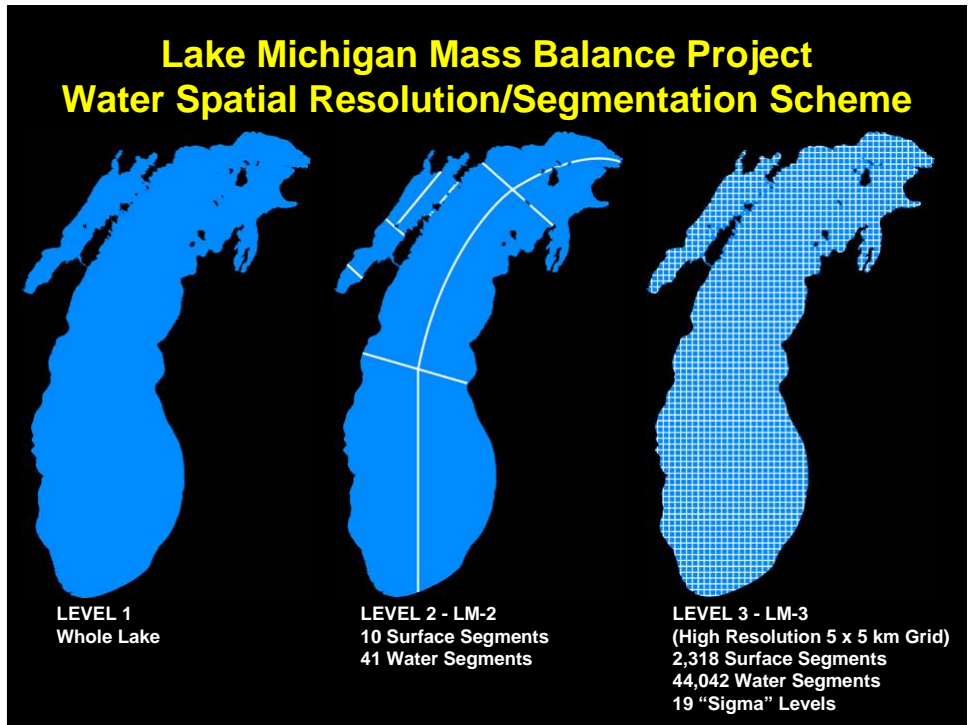
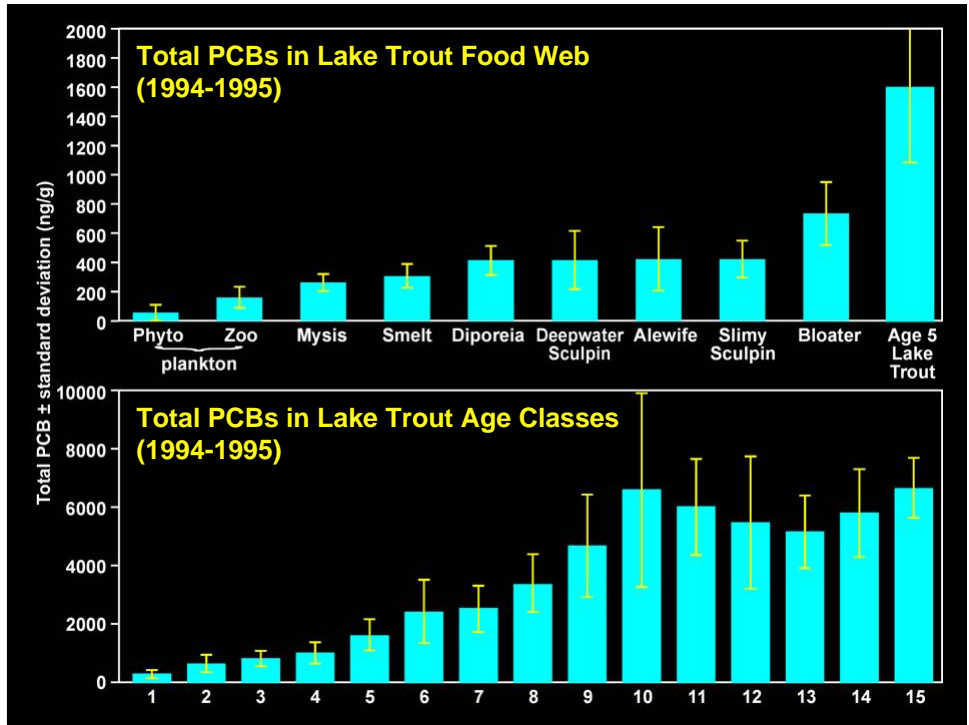


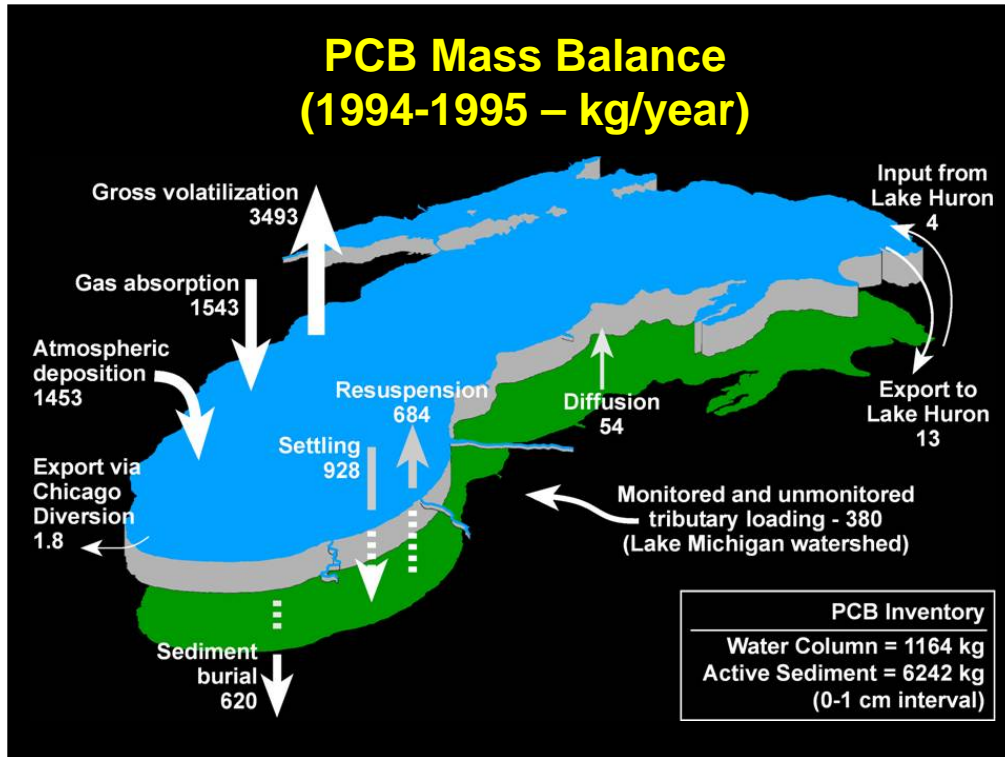




## Predator-Prey Feeding Interactions for Age 5 Lake Trout at Saugatuck



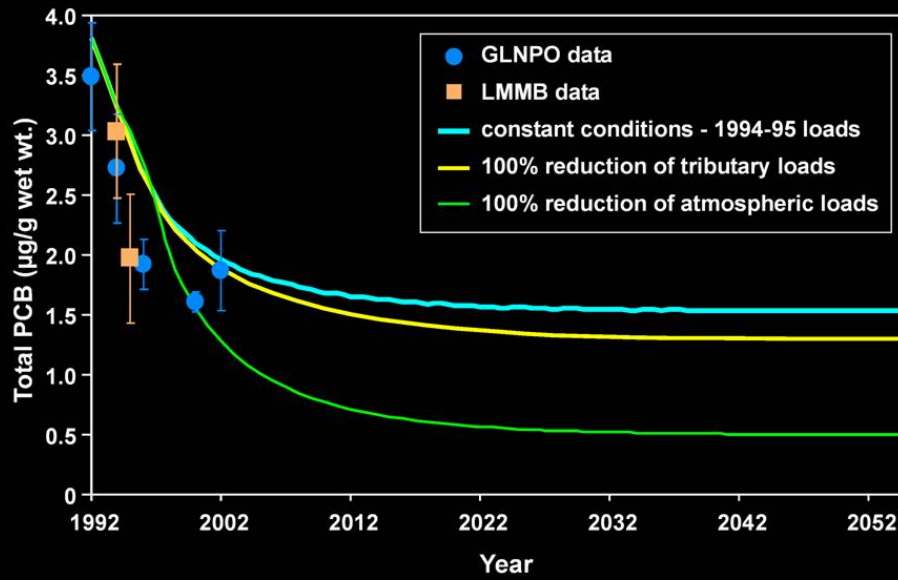




This graphic contains provisional information and data which are subject to further evaluation and revision.



## Example Predicted PCB Concentrations in Age 5.5 Lake Michigan Lake Trout



This graphic contains provisional information and data which are subject to further evaluation and revision.

## **Summary**

**The Lake Michigan models are world class predictive models**

**These models are the most robust and integrated that exist for the Great Lakes**

**They can be used for Lake Michigan for many years to come, and given sufficient multi-media data can be used for other contaminants**

**This modeling construct can be applied to the other Great Lakes and implemented given the availability of multi-media data for calibration**

## **Next Steps**

**Journal publications and EPA reports**

**Additional forecasts?**

**State visits**

**Post-audit with 2005 sampling results**

**Pursue the highest resolution models for PCBs and mercury**

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