



Great Lakes Monitoring and Surveillance Program

Paul Horvatin

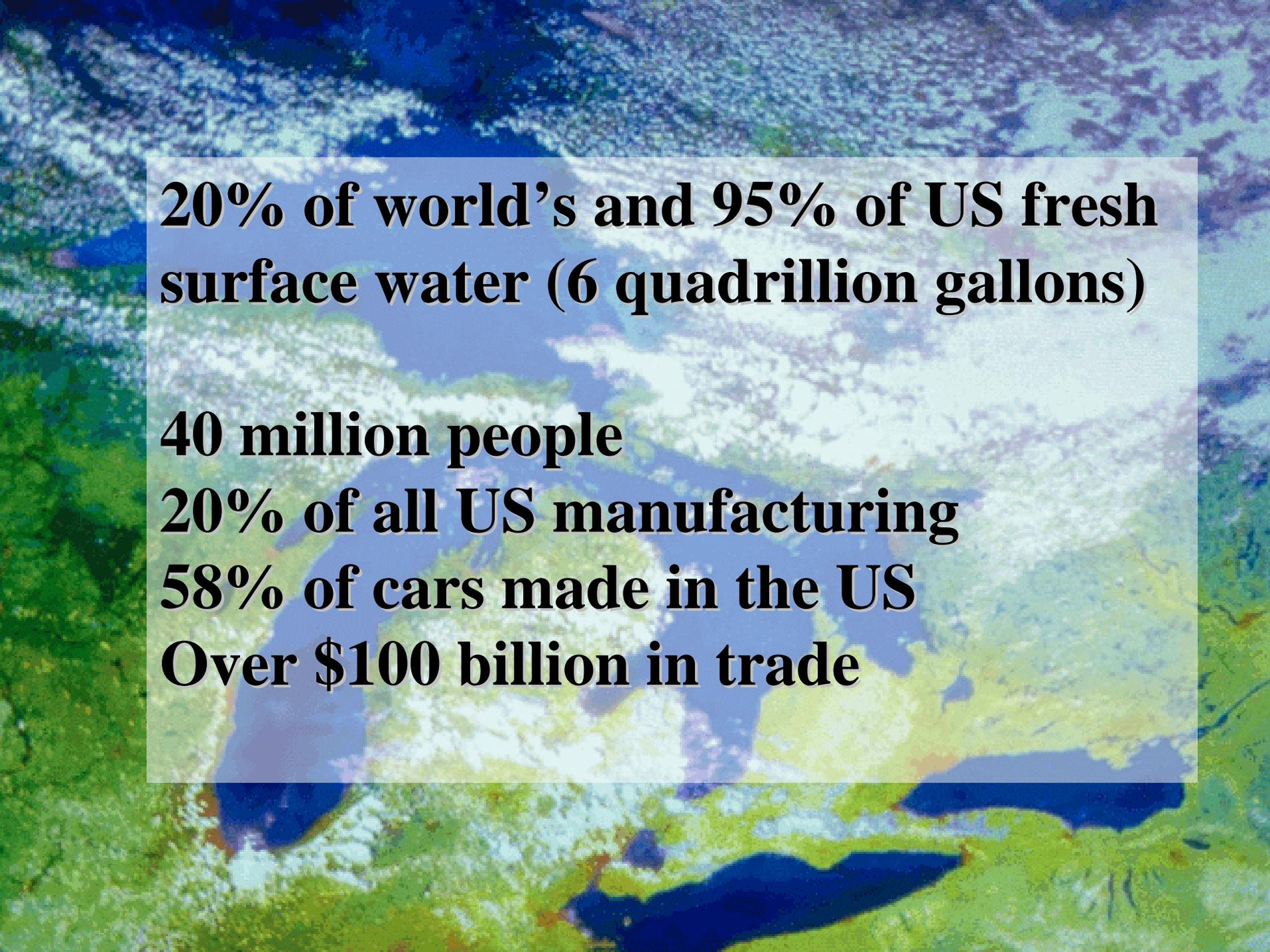
U.S. Environmental Protection Agency

Great Lakes National Program Office

(GLNPO)

The North American Great Lakes



An aerial photograph of a large, multi-lobed reservoir, likely Lake Mead, showing varying shades of blue and green water. A semi-transparent white text box is overlaid on the upper left portion of the image.

20% of world's and 95% of US fresh surface water (6 quadrillion gallons)

40 million people

20% of all US manufacturing

58% of cars made in the US

Over \$100 billion in trade



GLNPO Mission

“ . . . restore and maintain the chemical, physical, and biological integrity of the waters of the Great Lakes Basin Ecosystem.”

Great Lakes Water Quality Agreement of 1978, Article II



Great Lakes National Program Office

- Established in 1978 to coordinate EPA's Great Lakes program
- First EPA office with ecological boundaries instead of political or media boundaries
- EPA's knowledge center for the Great Lakes watershed



Monitoring

- Water Quality
- Biology
- Air Toxics
- Fish Contamination
- Sediments





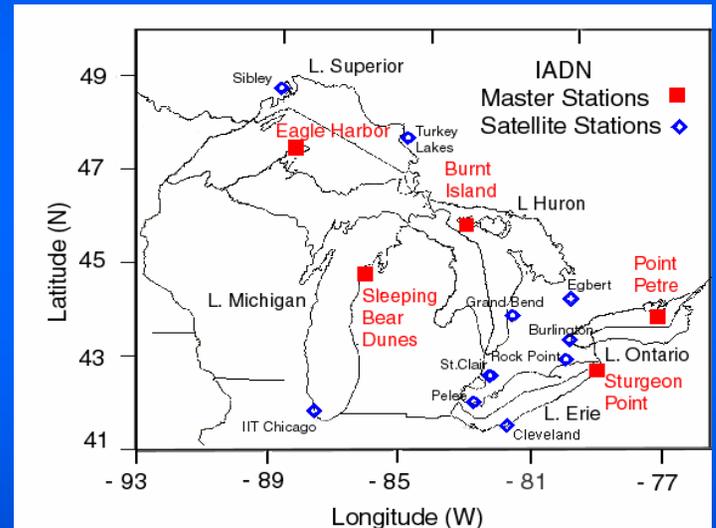
Nutrients

- ◆ Total Phosphorus
- ◆ Total Dissolved Phosphorus
- ◆ Nitrite + Nitrate
- ◆ Soluble Reactive Silica
- ◆ Particulate C,N,P



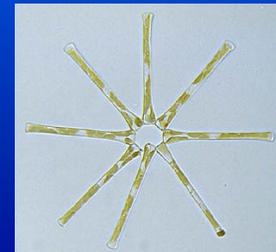
Contaminants

- ◆ IADN
- ◆ Open Water
- ◆ Fish Tissue

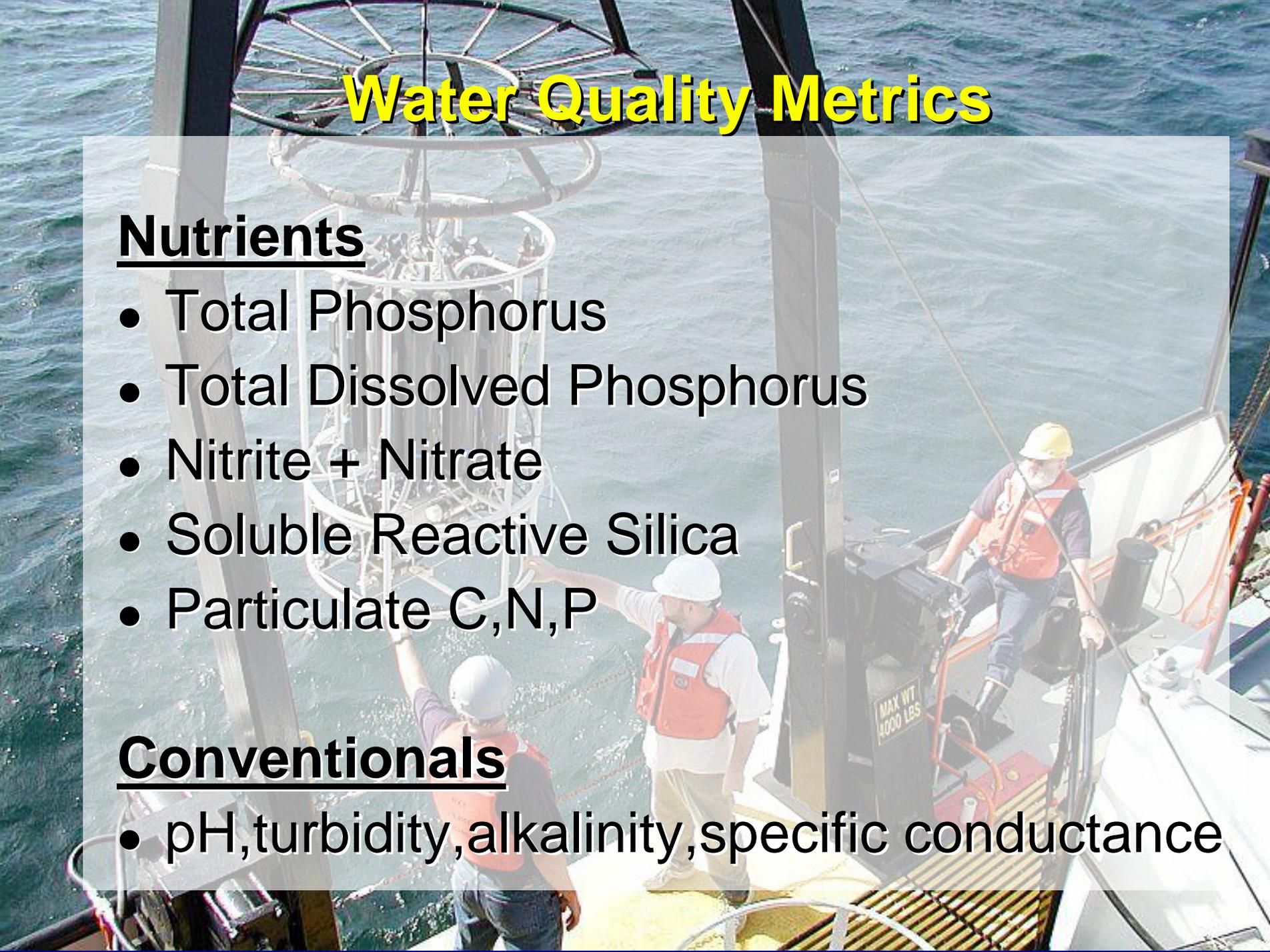


Biological Indicators Program

- ◆ Phytoplankton
- ◆ Zooplankton
- ◆ Benthic Invertebrates



Water Quality Metrics



Nutrients

- Total Phosphorus
- Total Dissolved Phosphorus
- Nitrite + Nitrate
- Soluble Reactive Silica
- Particulate C,N,P

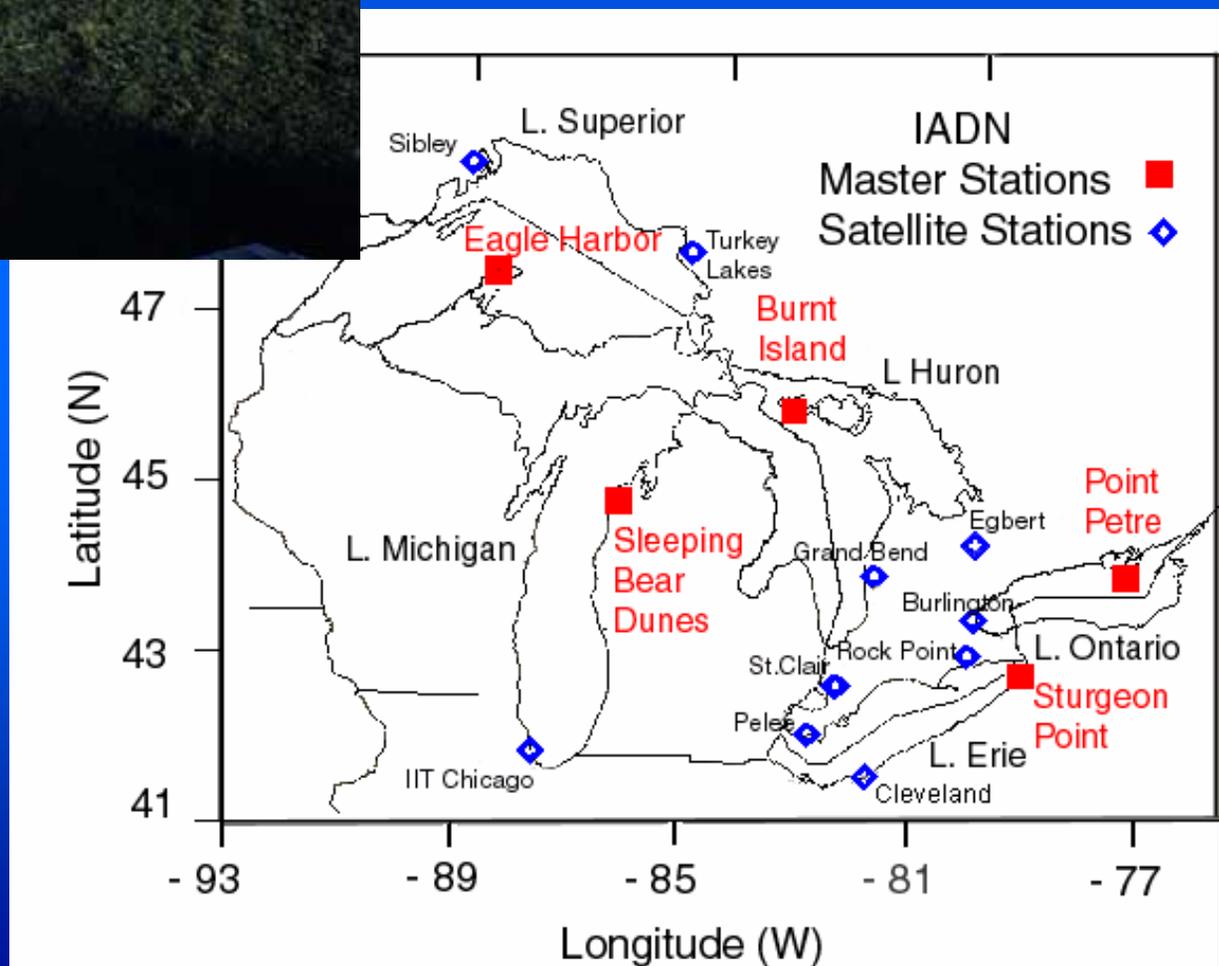
Conventionals

- pH, turbidity, alkalinity, specific conductance



GLNPO's Water Quality Survey Sampling Stations







Analytes

PCB congeners

PCB co-planars

hexachlorobenzene

Pentachlorobenzene

Octachlorostyrene

g-BHC (Lindane)

a-BHC

Aldrin

Dieldrin

Heptachlor epoxide a

Heptachlor epoxide b

Cis-chlordane

Trans-chlordane

Cis-nonachlor

Trans-nonachlor

Oxychlordane

pp, op-DDT

pp, op-DDE

pp, op-DDD

Endrin

Mirex

Toxaphene&homologs

PCDD/Fs

PBDEs

Dacthal

PBB-153

benzo[b]fluoranthene

benzo[k]fluoranthene

benzo[a]pyrene

indeno[1,2,3-cd]pyrene

phenanthrene

pyrene

Hg

PFOS

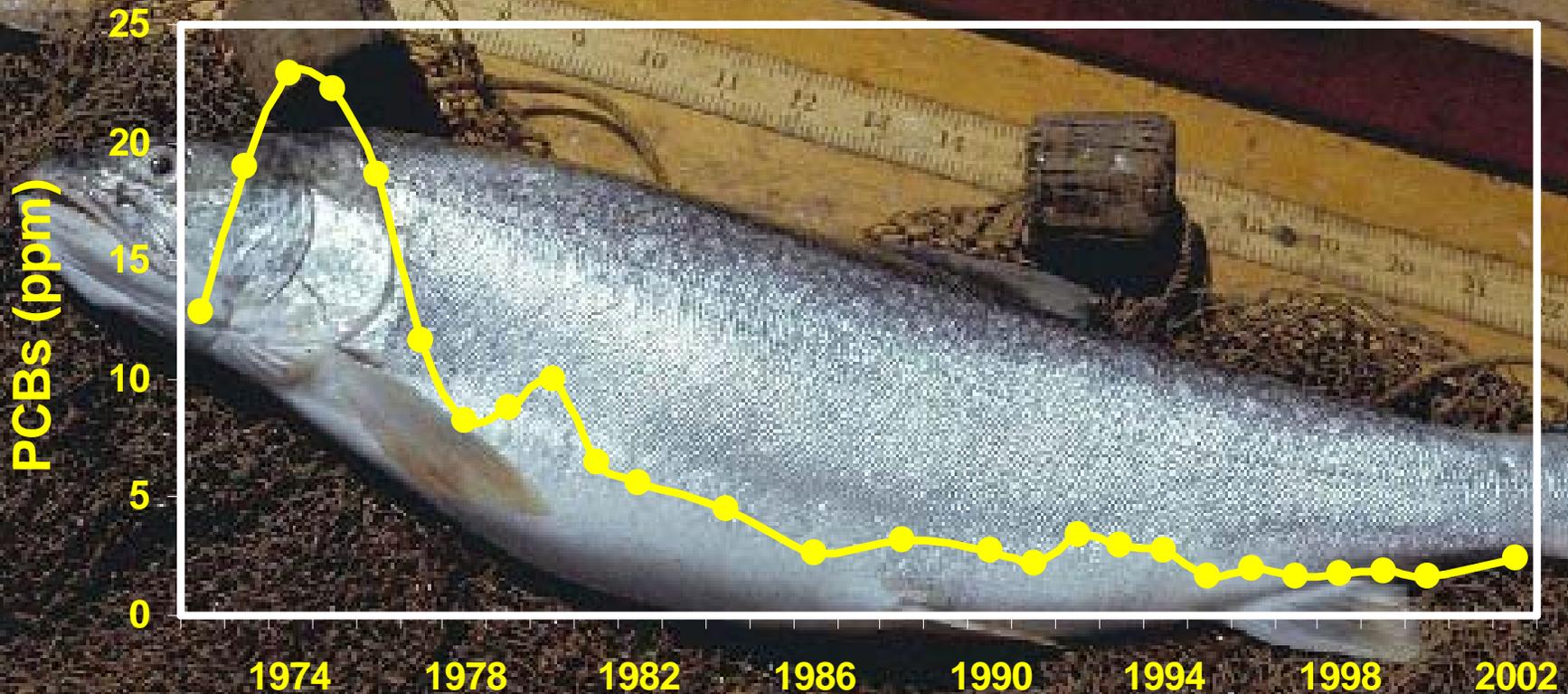
PFOA

TSM

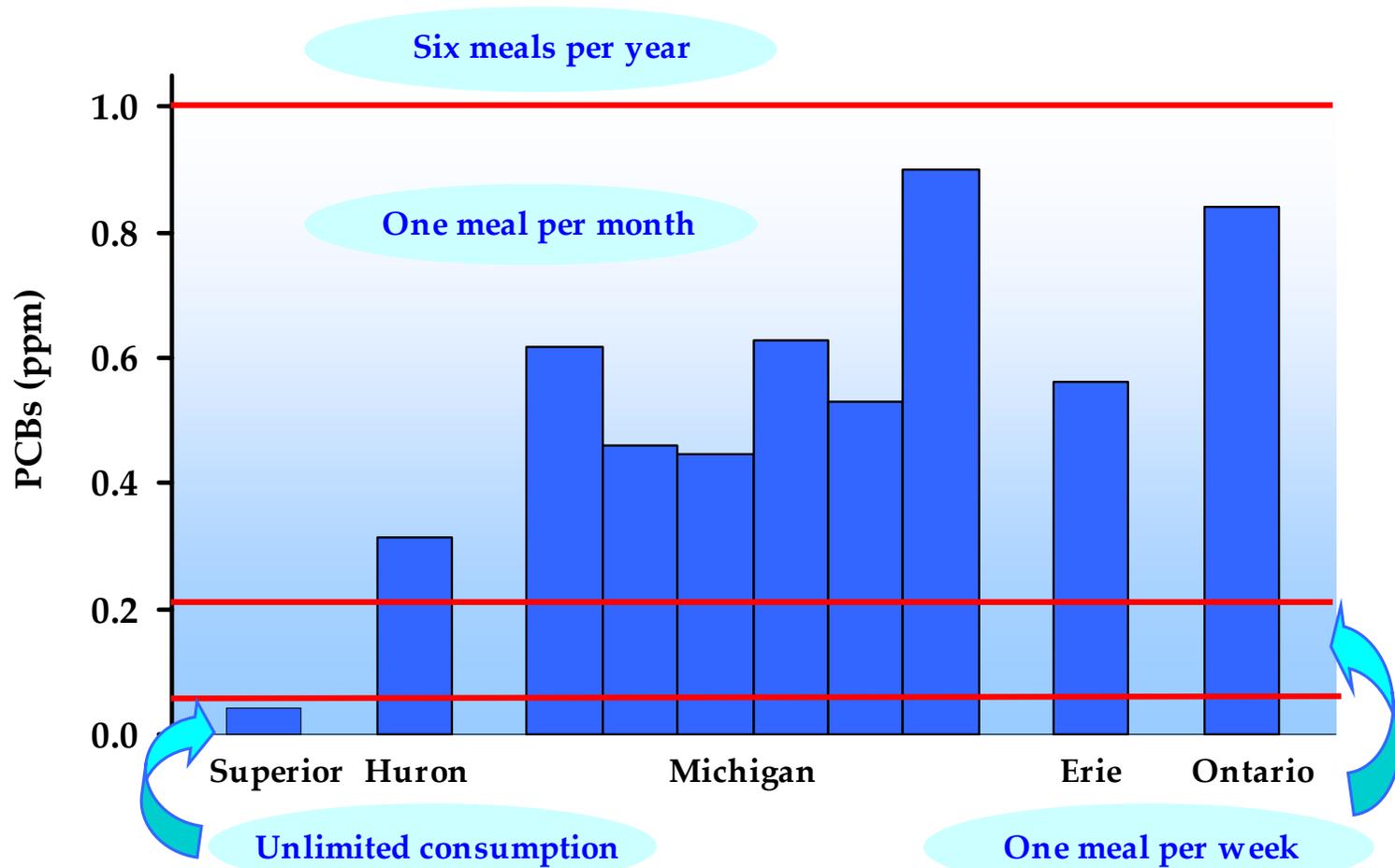


Toxics Reduced Ten-Fold

PCBs in Lake Michigan Lake Trout



Application of a uniform fish consumption advisory for PCB concentrations in coho salmon (2002)





Biological Monitoring

- Currently sample for:
 - phytoplankton,
 - crustacean zooplankton,
 - rotifers,
 - benthos

Decline of *Diporeia* in Lake Michigan

Diporeia Density





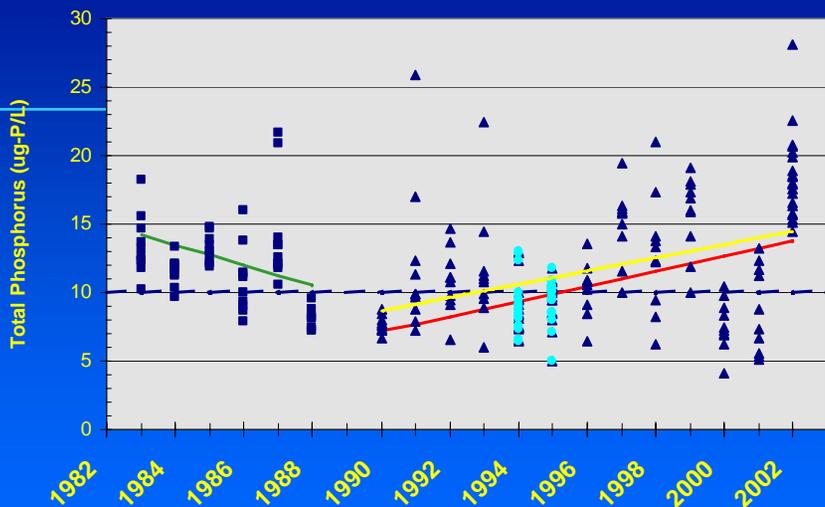
Lake Erie “Dead Zone”

- Area of no-oxygen in Central Basin getting worse again
- Original problem largely solved through phosphorus control programs
- Non-native invasive zebra and quagga mussels implicated but other factors also possible

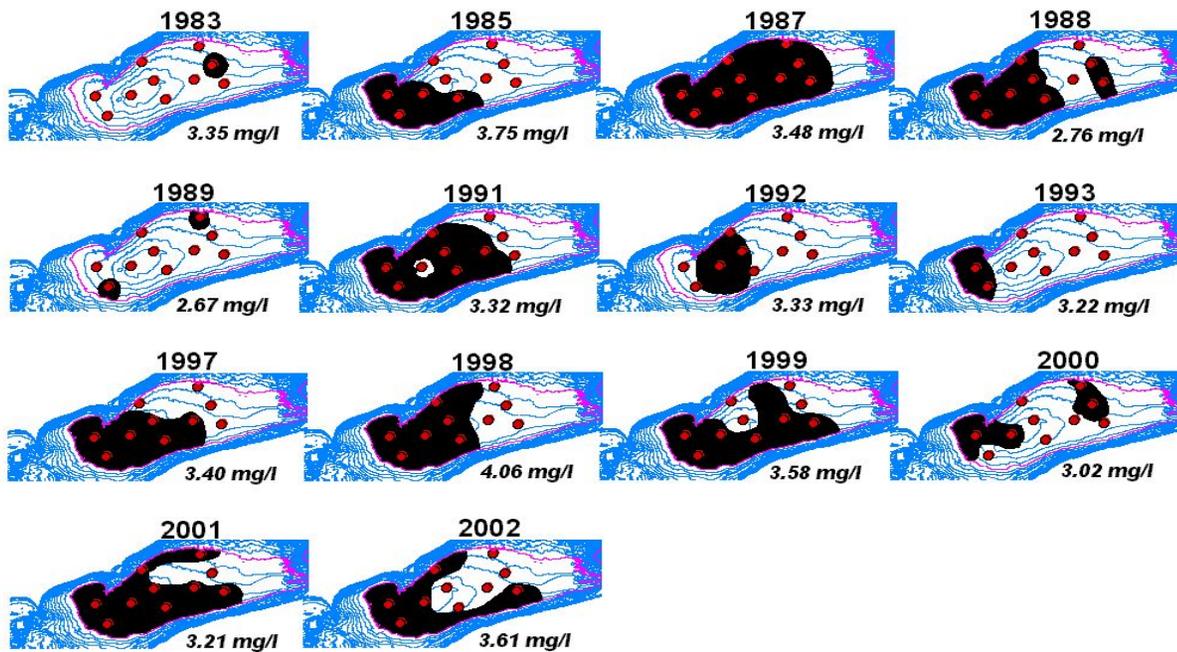




Central Lake Erie Total Phosphorus Spring Station Means



Lake Erie Central Basin Dead Zone and DO Depletion Rate





COORDINATED MONITORING INITIATIVE

Coordinated Monitoring Initiative Schedule: Canadian Research Vessel Limnos, and the U.S. Research Vessel Lake Guardian

- 2003 – Lake Ontario
- 2004 – Lake Erie
- 2005 – Lake Superior (Canada), Lake Michigan (US)
- 2006 – Lake Superior – Joint
- 2007 – Lake Huron
- 2008 – Lake Ontario
- 2009 – Lake Erie



R/V MUDPUDDY





State of the Lakes Ecosystem Conference (SOLEC)

- Biennial, binational report on progress toward meeting goals of the Great Lakes Water Quality Agreement
- Target Audiences:
 - Environmental managers
 - Decision-makers
 - Upper administration
 - Public



An aerial photograph of a lush green landscape with a prominent blue river winding through it. The text "Keep 'Em Great!" is overlaid in a large, 3D, multi-colored font (yellow, orange, and red) with a blue shadow effect. The text is positioned across the middle of the image, partially covering the river and the surrounding greenery.

Keep 'Em Great!