

# Lake Huron Committee Meeting

## Lake Huron Lower Food Web: Nutrients, Plankton, Benthos, Productivity

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United States Environmental Protection Agency  
Great Lakes National Program Office

March 21, 2017

# Disclaimer

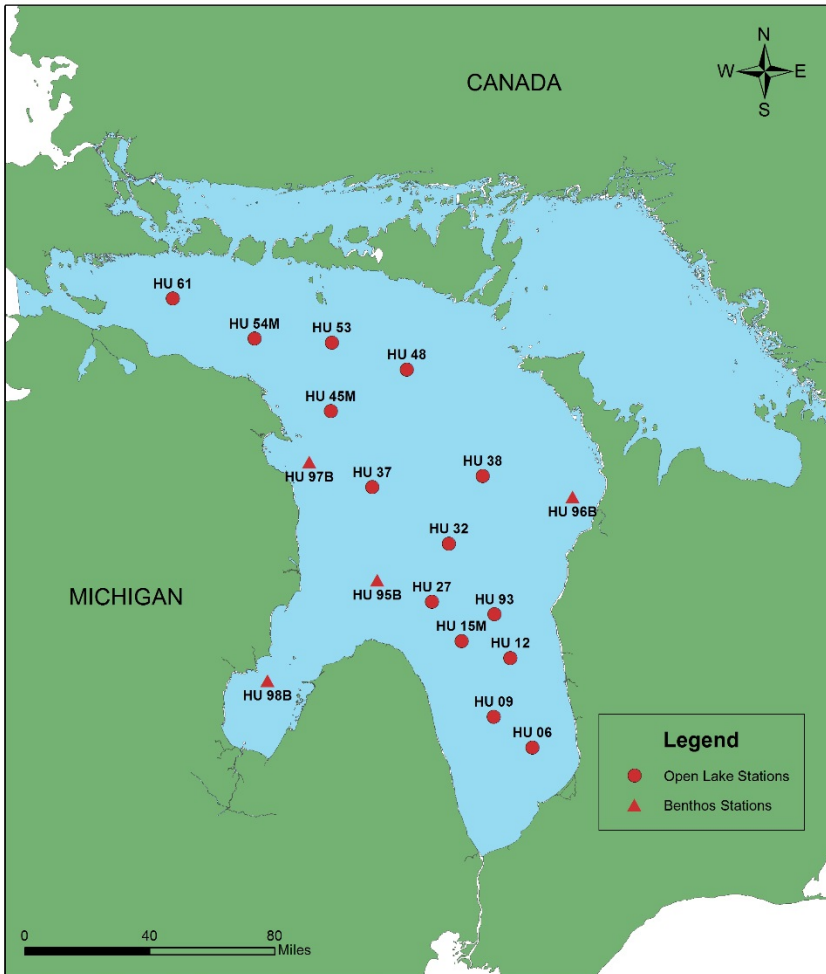
This opinions expressed here are the views of the speakers and do not necessarily reflect the views and opinions of the U.S. EPA.

# Outline

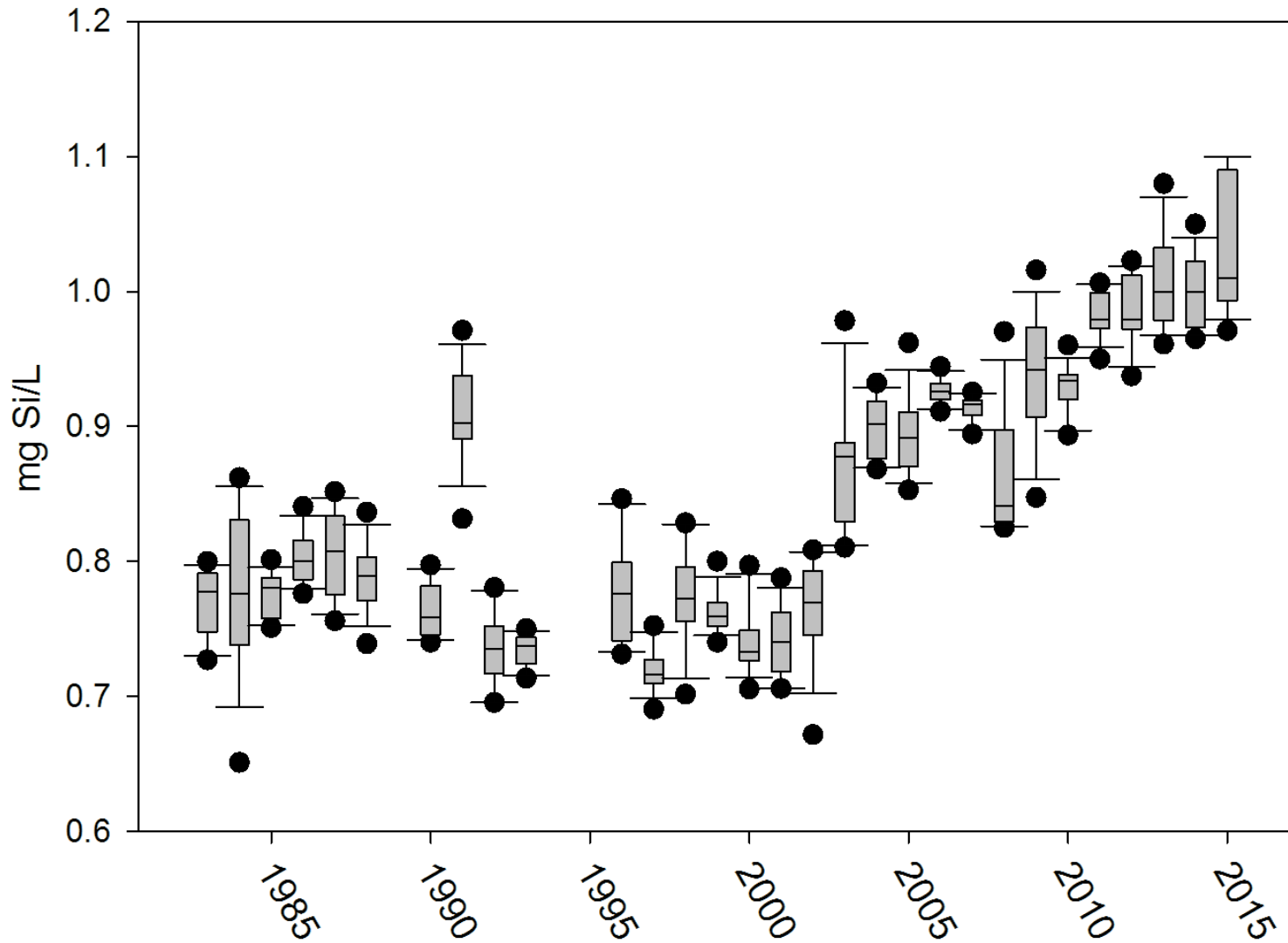
- EPA GLNPO's Open Lake Monitoring Program
- Nutrient and Water Quality Parameter Trends
- Phytoplankton Trends
- Remote Sensing Chlorophyll
- Zooplankton Trends
- Benthos Trends
- Summary

# EPA GLNPO's Open Lake Monitoring Program

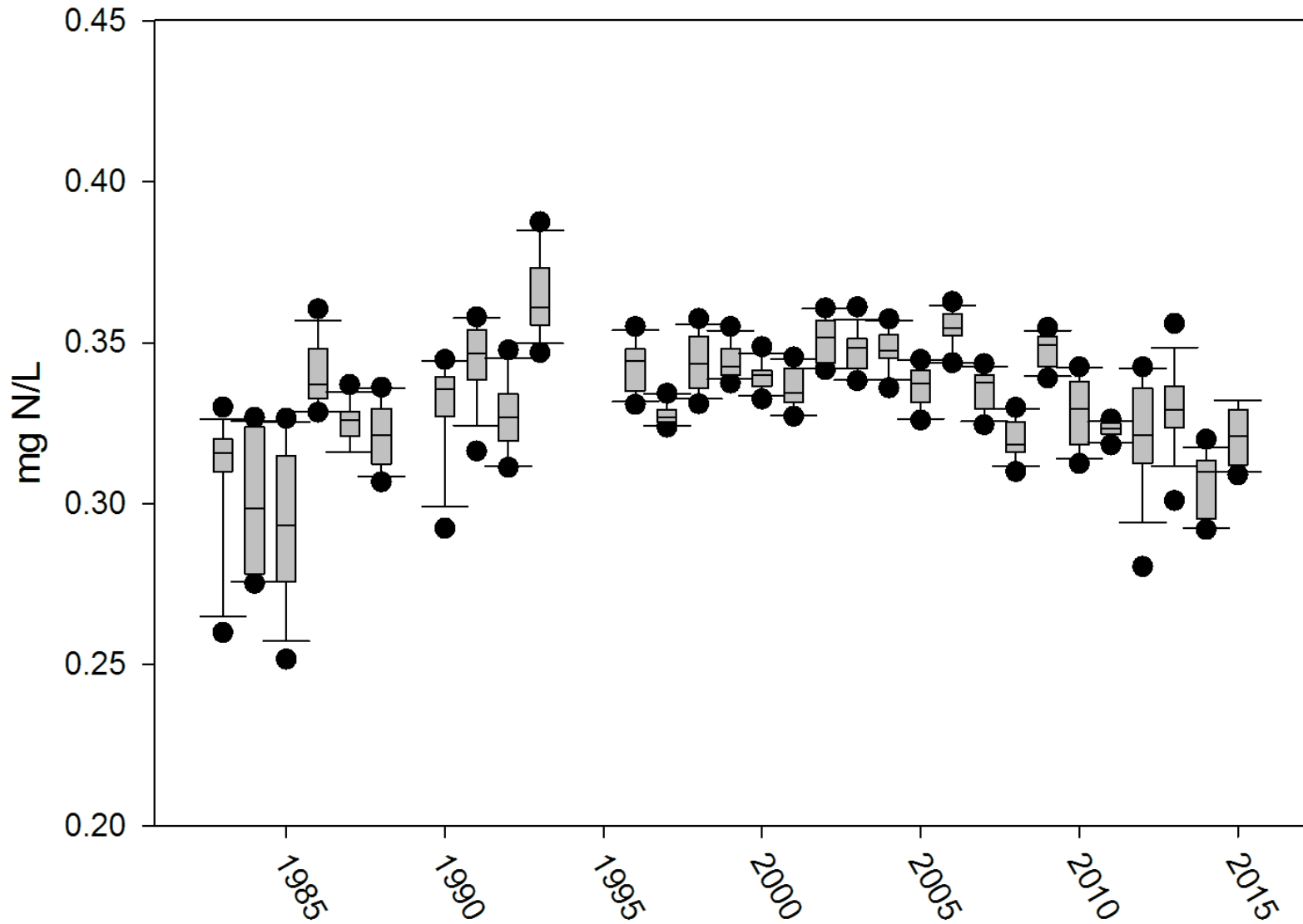
## Lake Huron Summer Sampling Stations



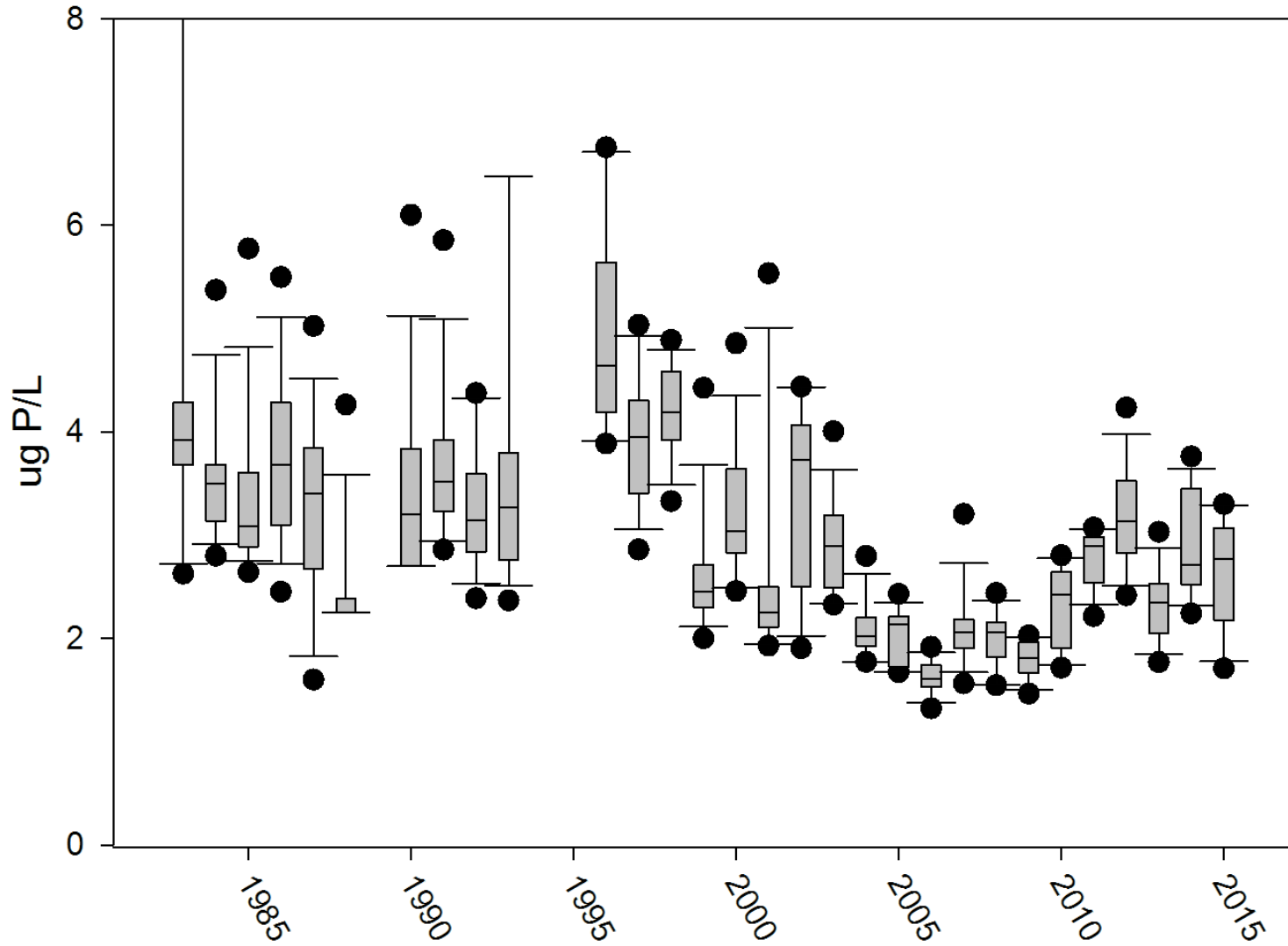
# Lake Huron Spring Open-Waters Dissolved Reactive Silica 1983-2015



# Lake Huron Spring Open-Waters Nitrite-Nitrate Nitrogen 1983-2015

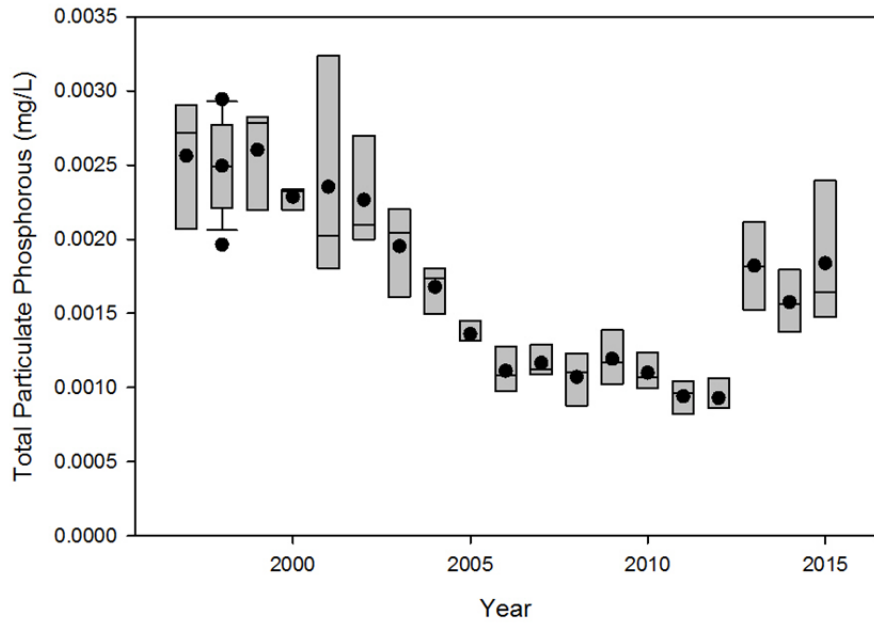


# Lake Huron Spring Open-Waters Total Phosphorus 1983-2015

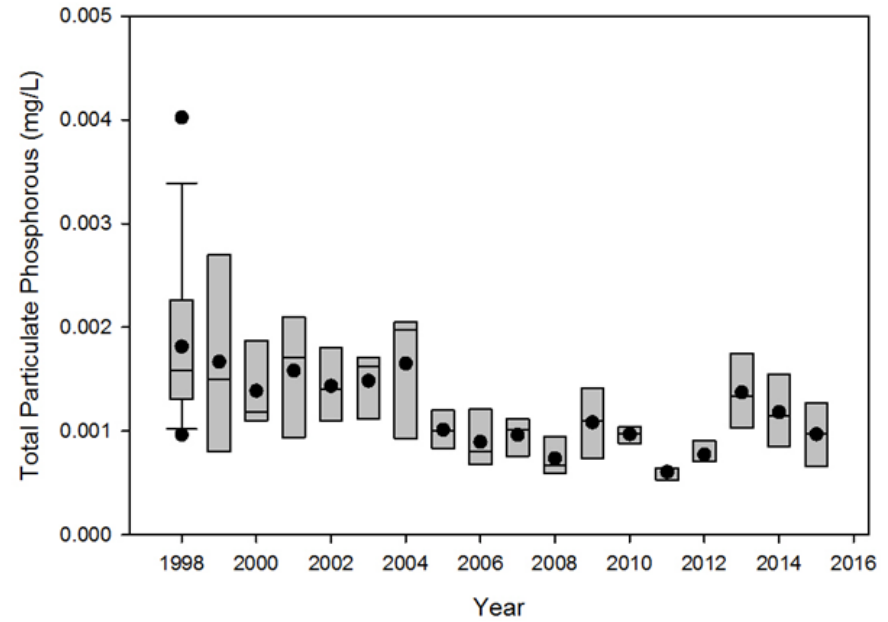


# Particulate Phosphorus

Lake Huron - Spring

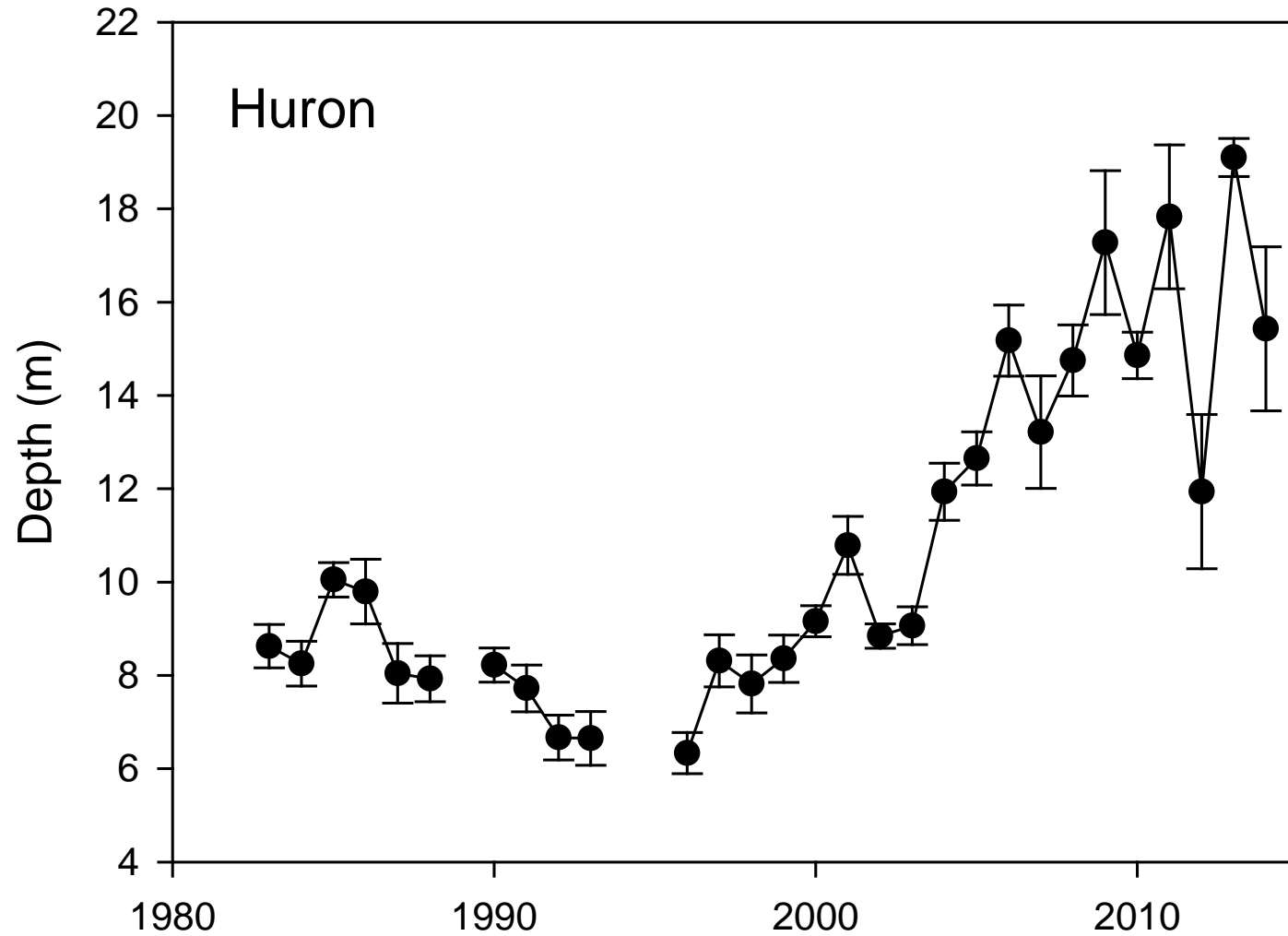


Lake Huron - INT/MEP Summer





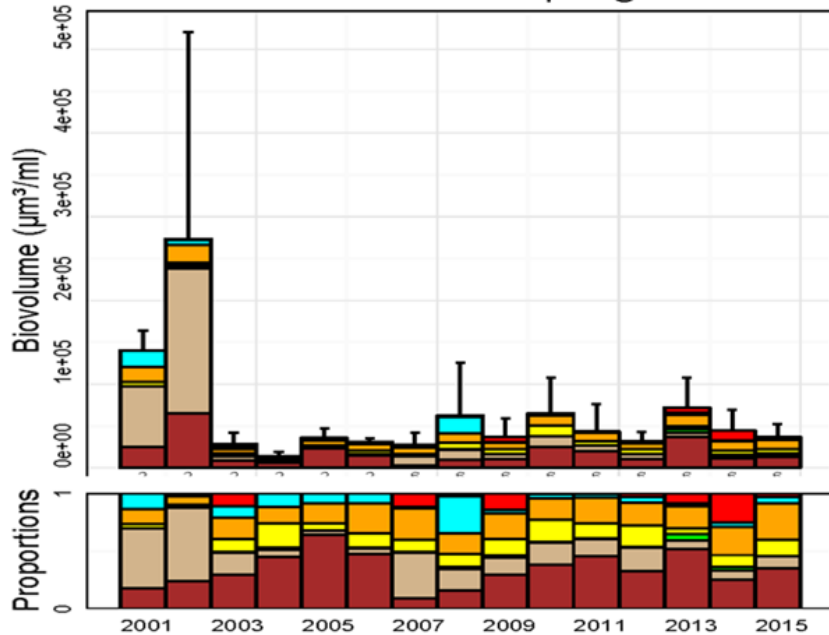
# Spring Secchi Depth



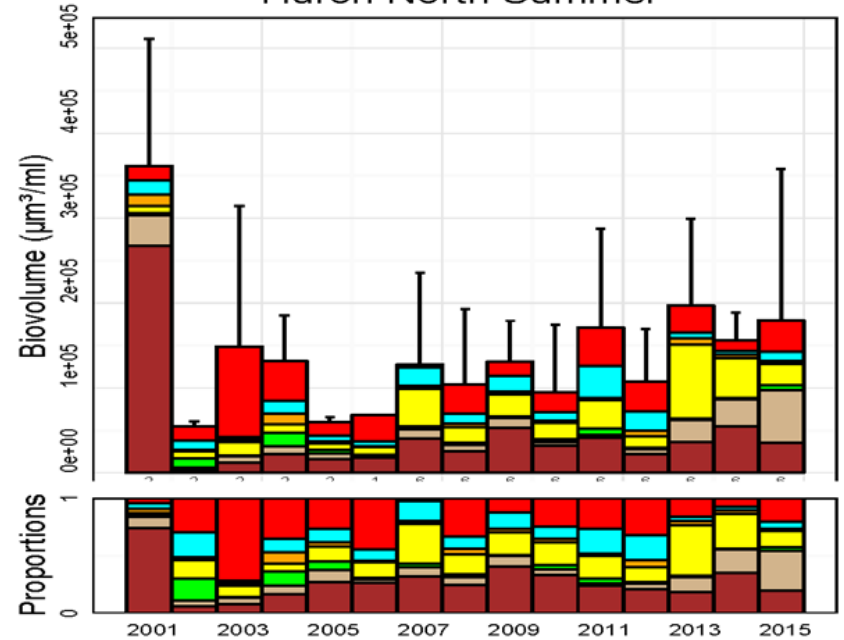
# Phytoplankton - North basin (biovolume)



### Huron North Spring

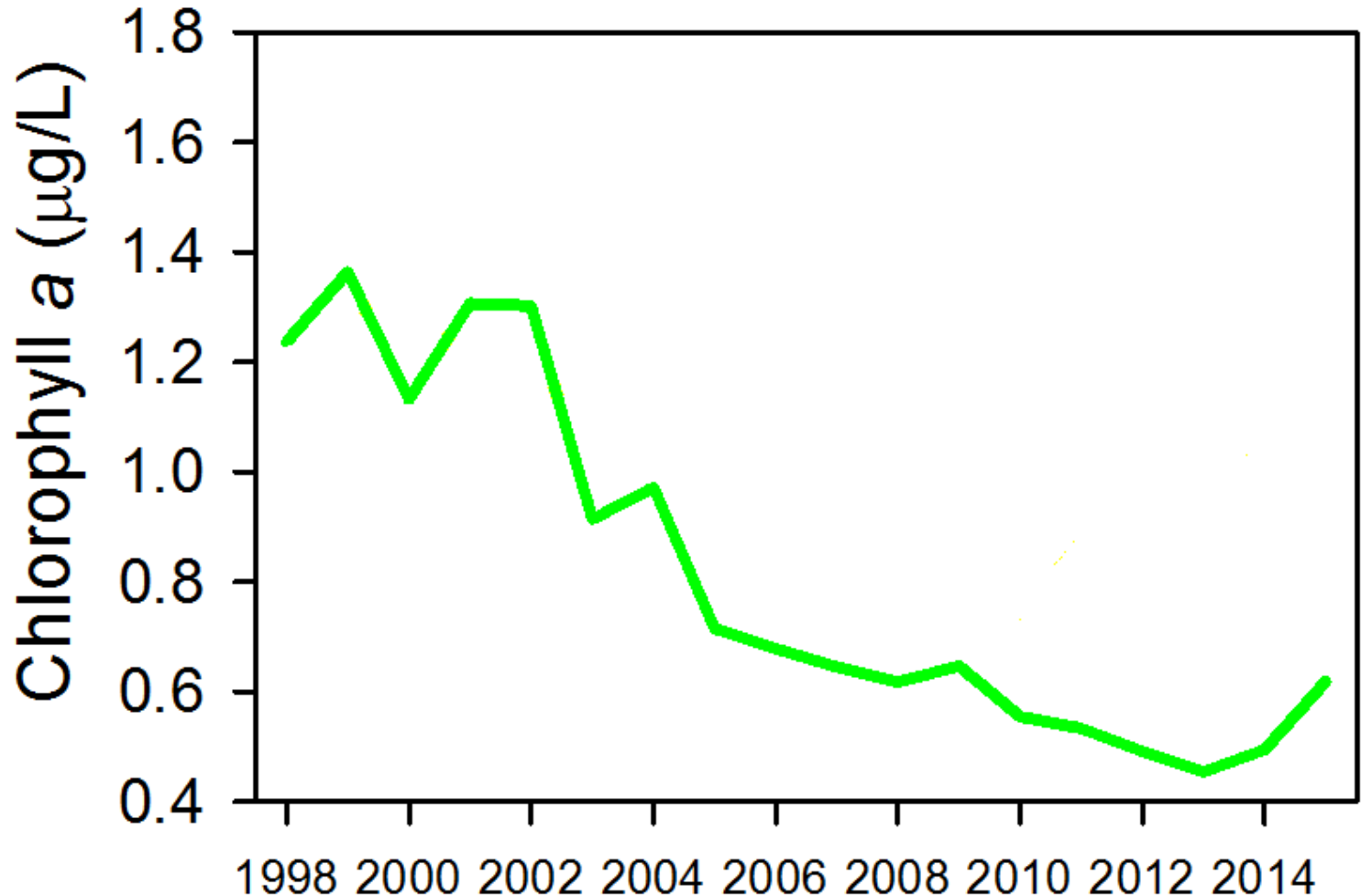


### Huron North Summer

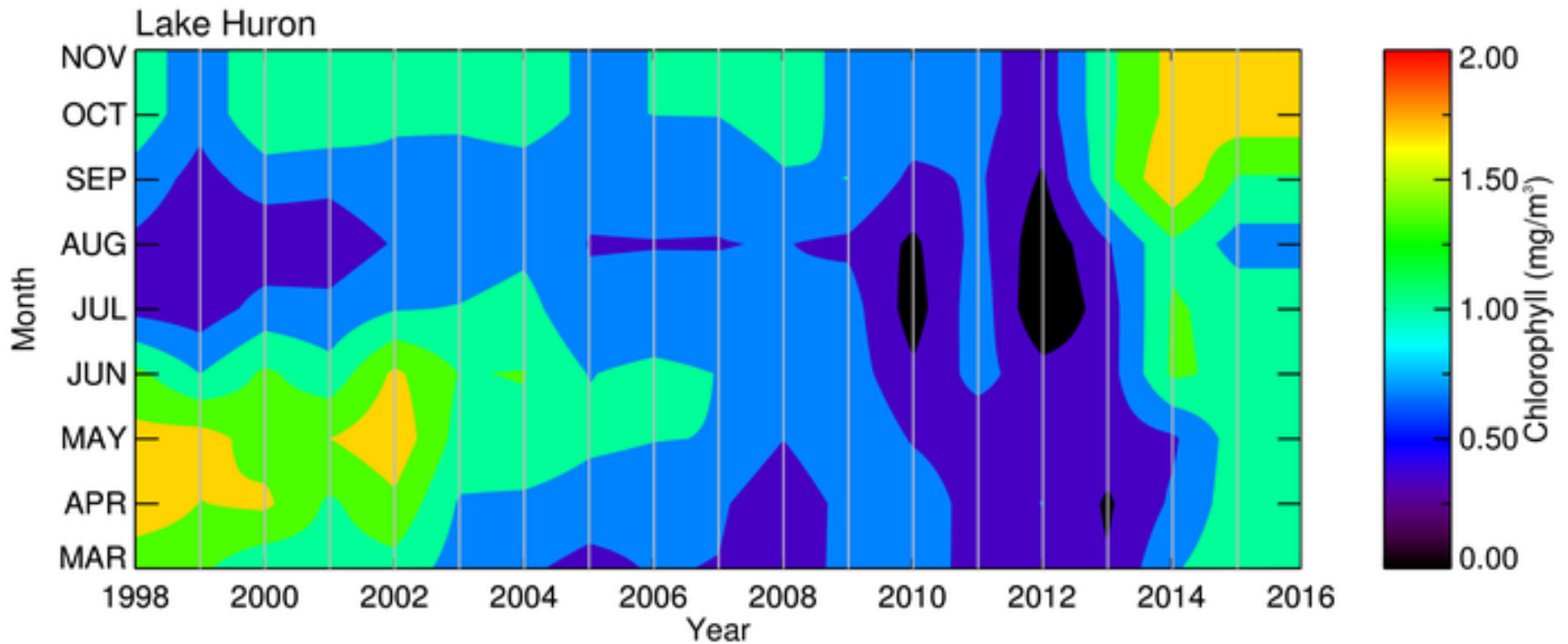


# May Chlorophyll *a*

(GLF: SeaWiFS 1998-2007; MODIS 2008-2012)

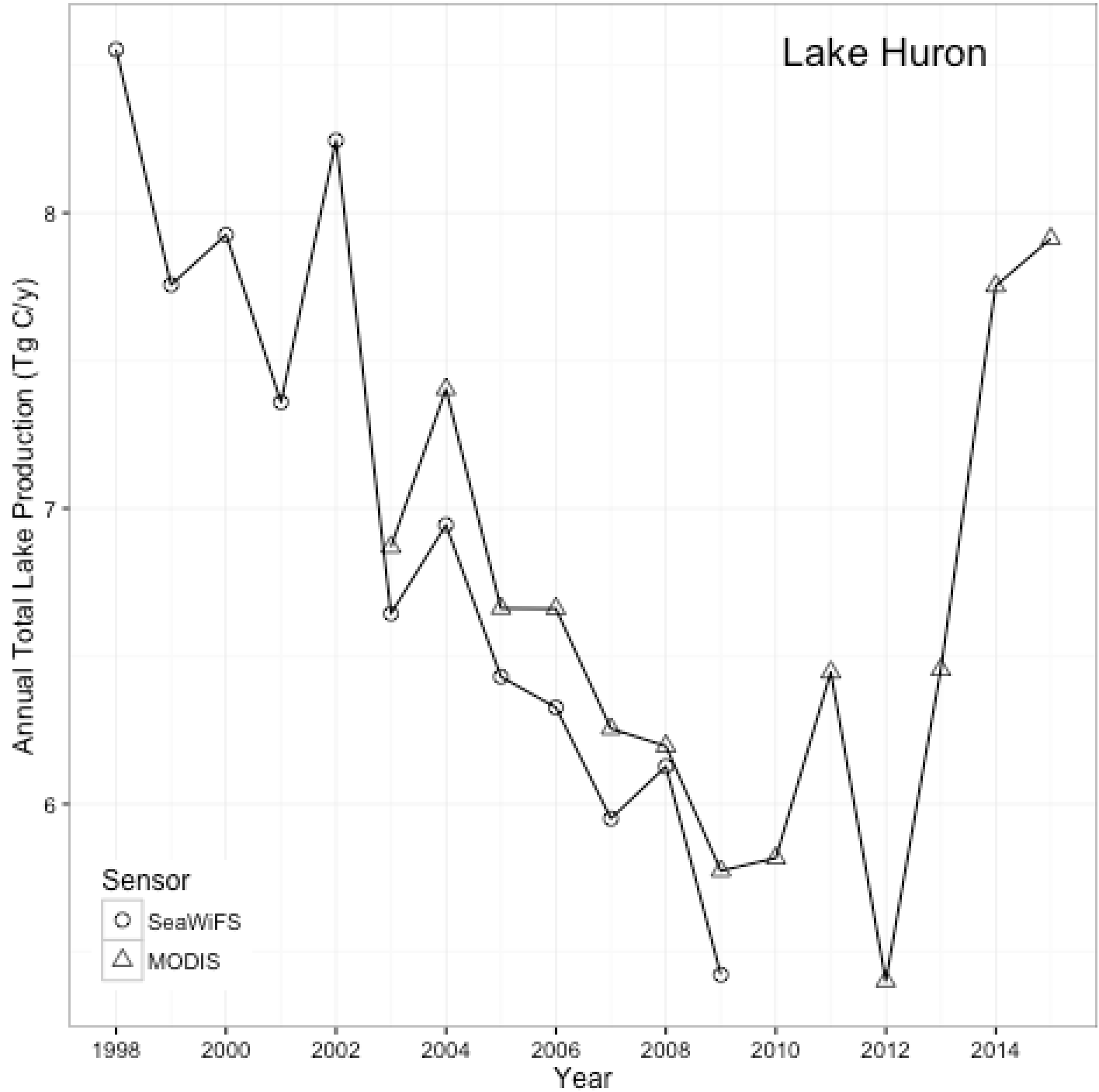


# Chlorophyll Concentration from Remote Sensing

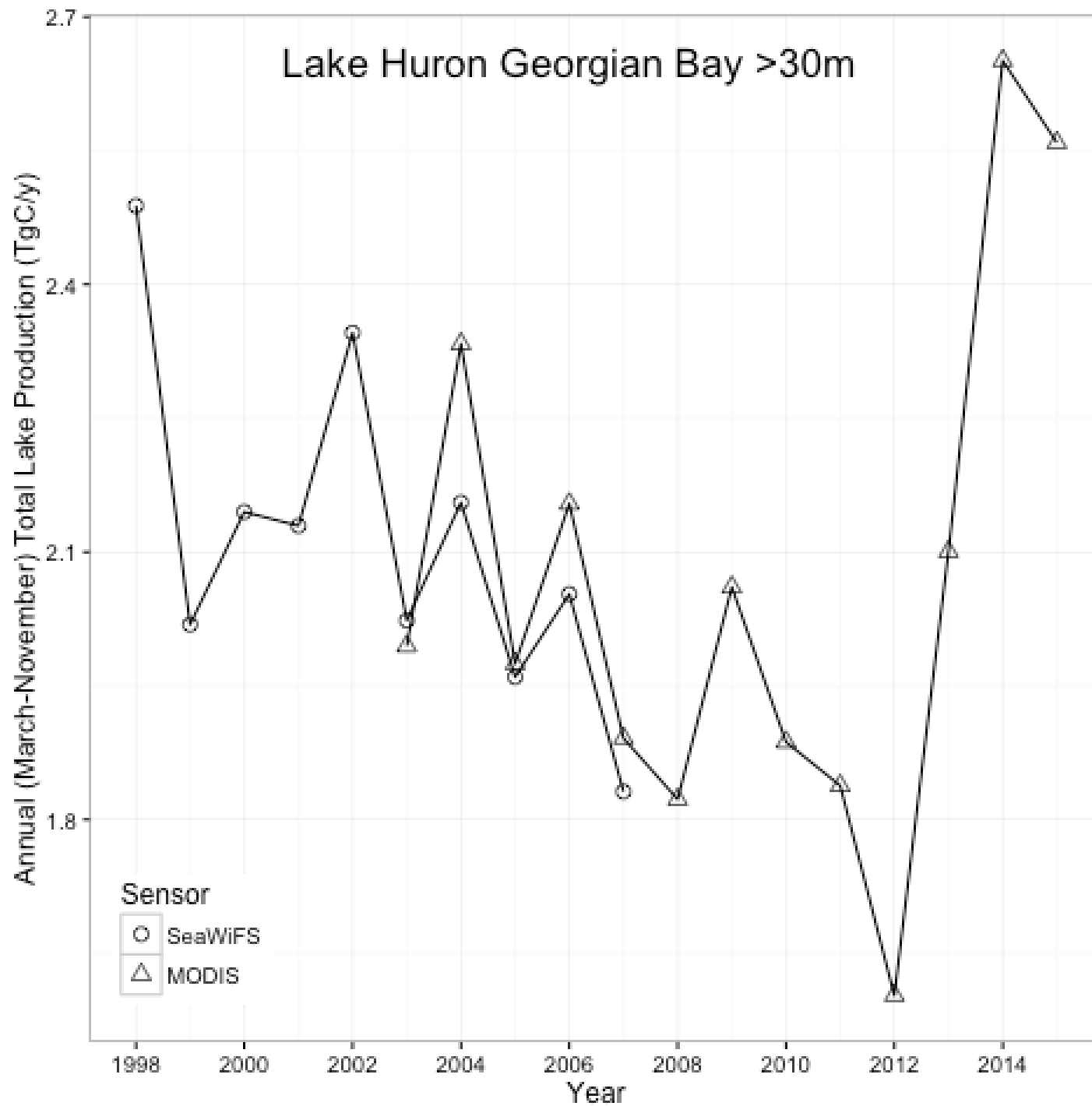




# Lake Huron



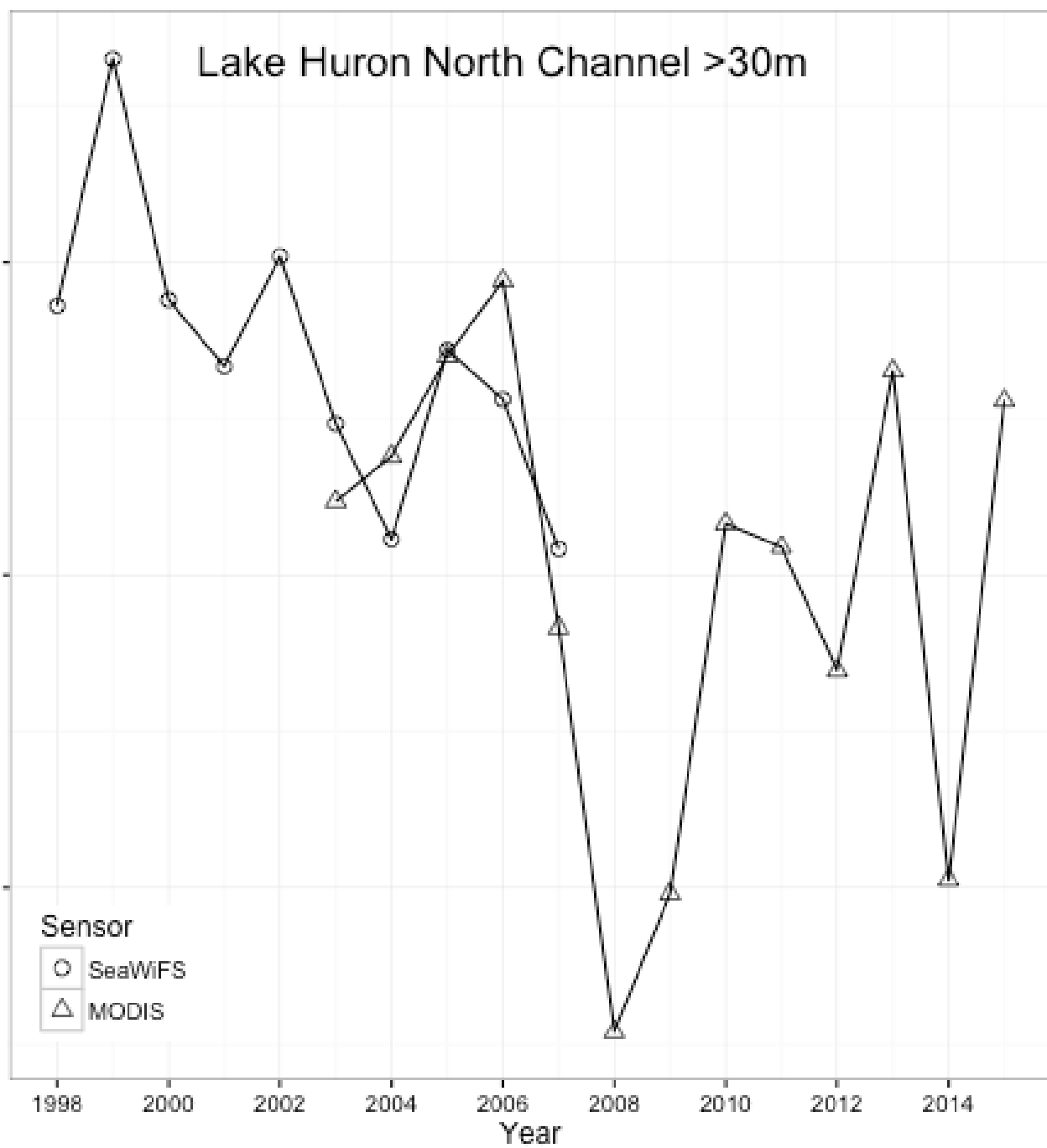
# Lake Huron Georgian Bay >30m



# Lake Huron North Channel >30m

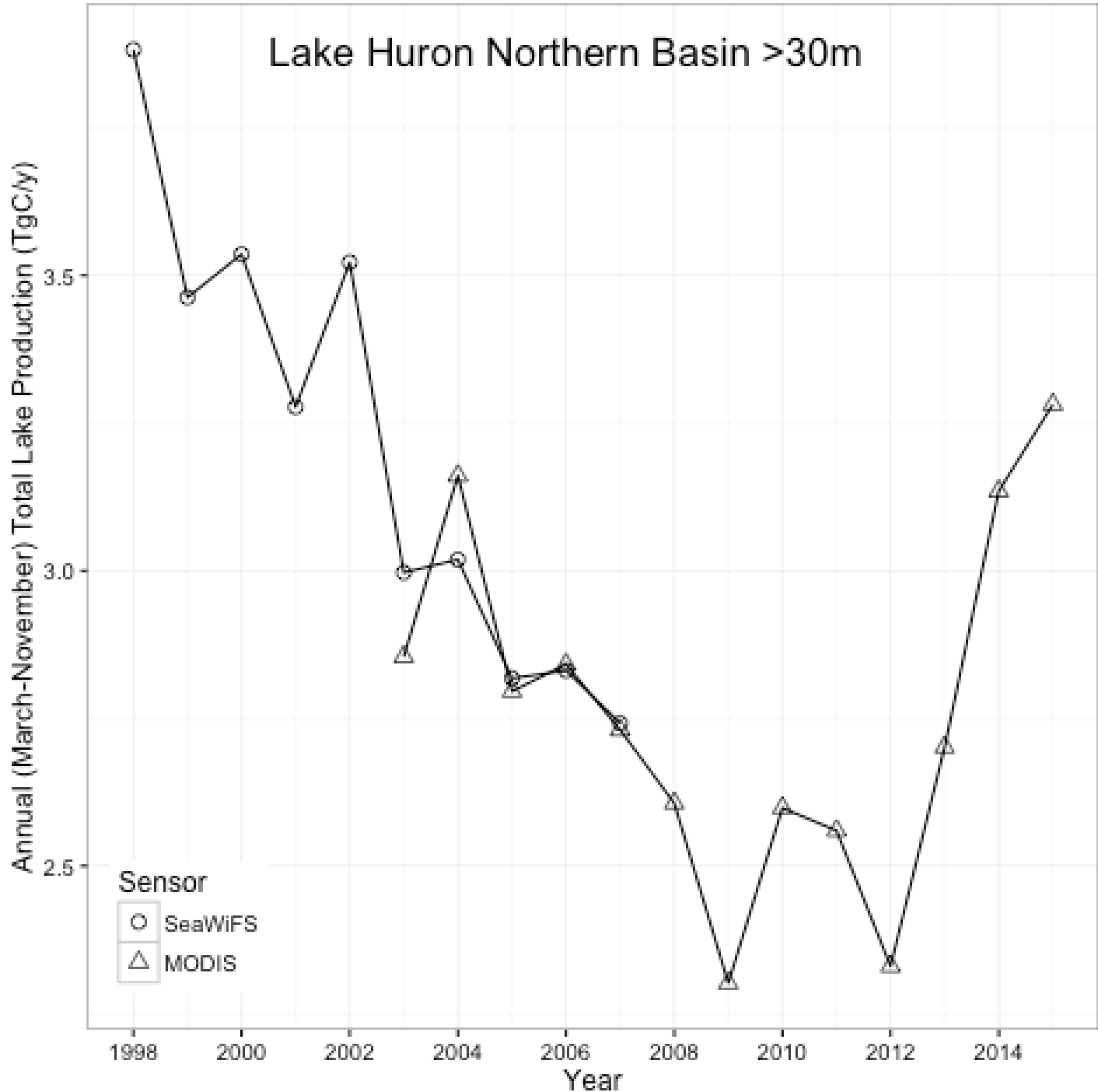
Annual (March–November) Total Lake Production (TgC/y)

Sensor  
○ SeaWiFS  
△ MODIS



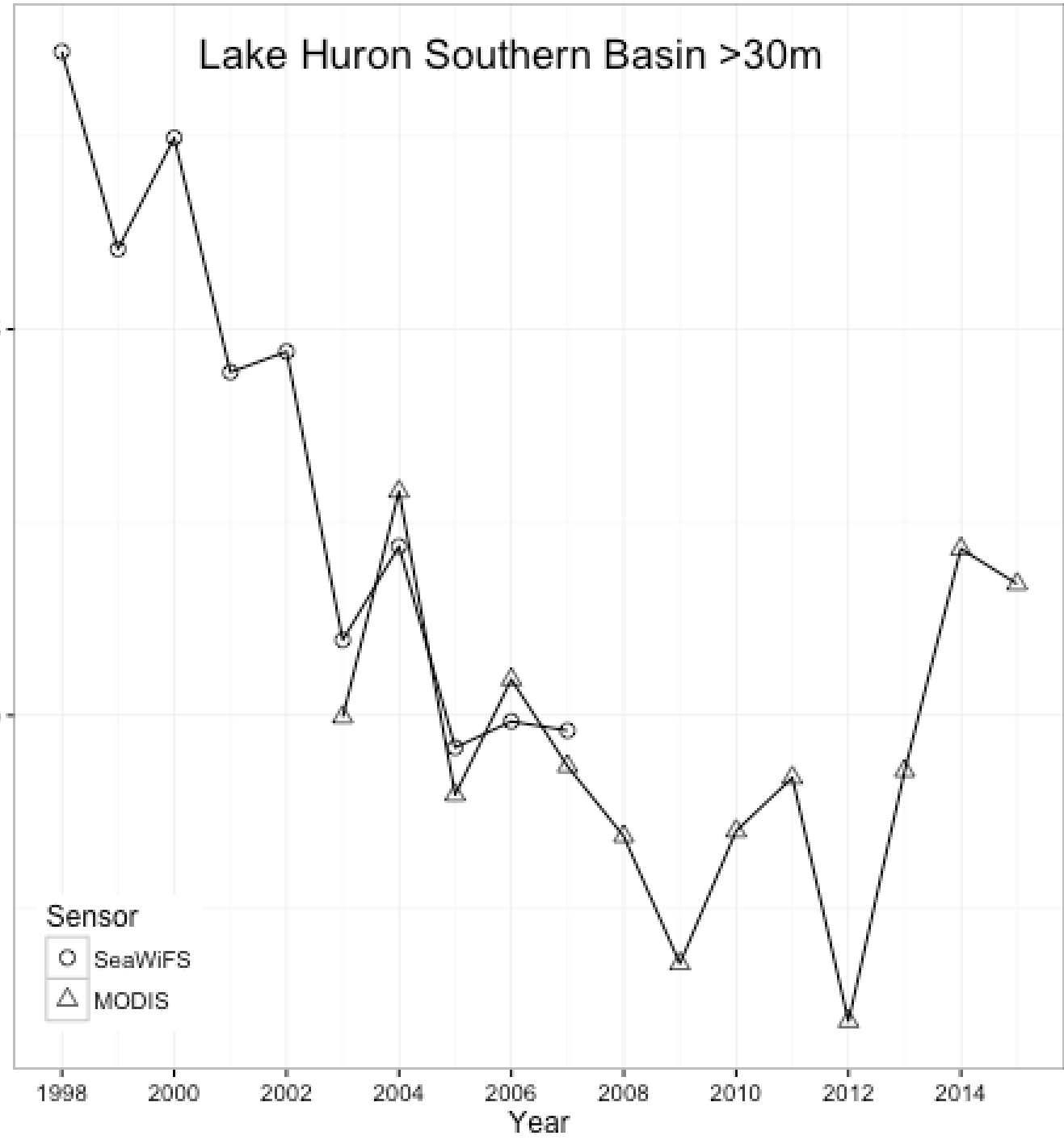


# Lake Huron Northern Basin >30m



# Lake Huron Southern Basin >30m

Annual (March–November) Total Lake Production (TgC/yr)



Sensor  
○ SeaWiFS  
△ MODIS

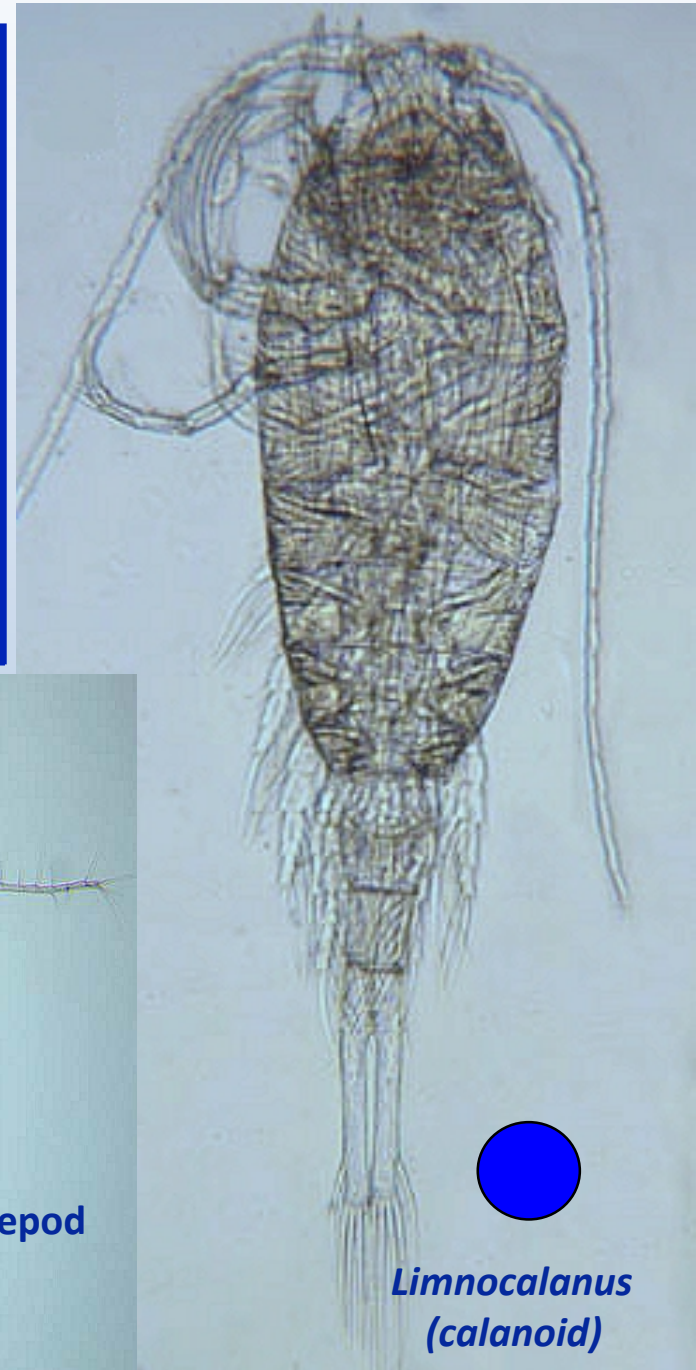
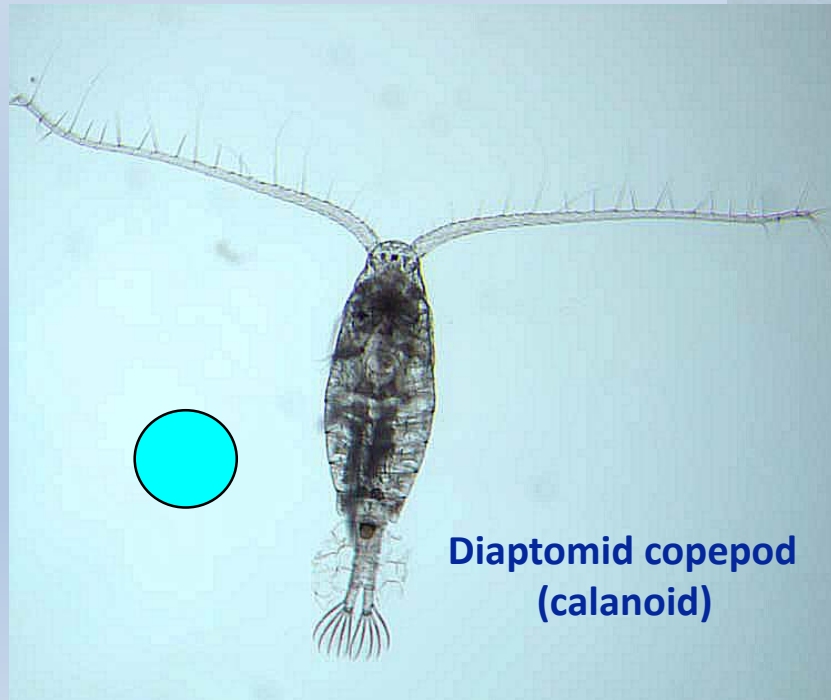
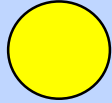
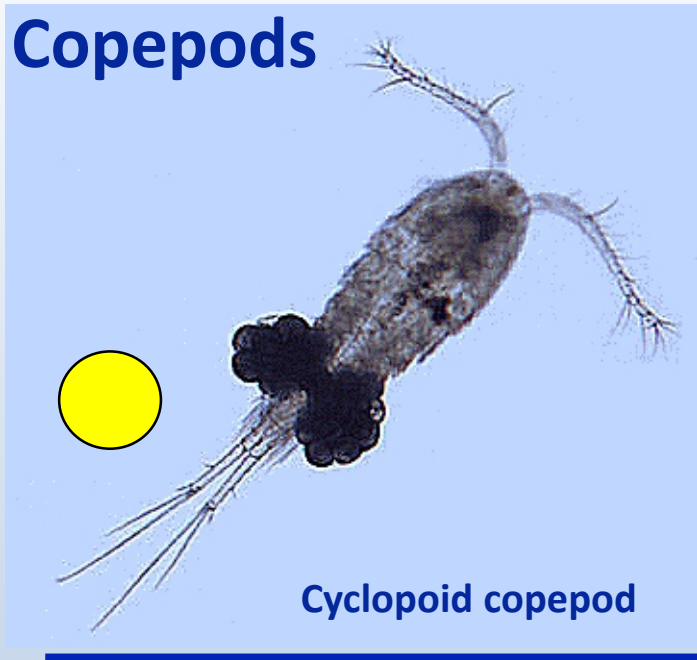
# Cladocerans



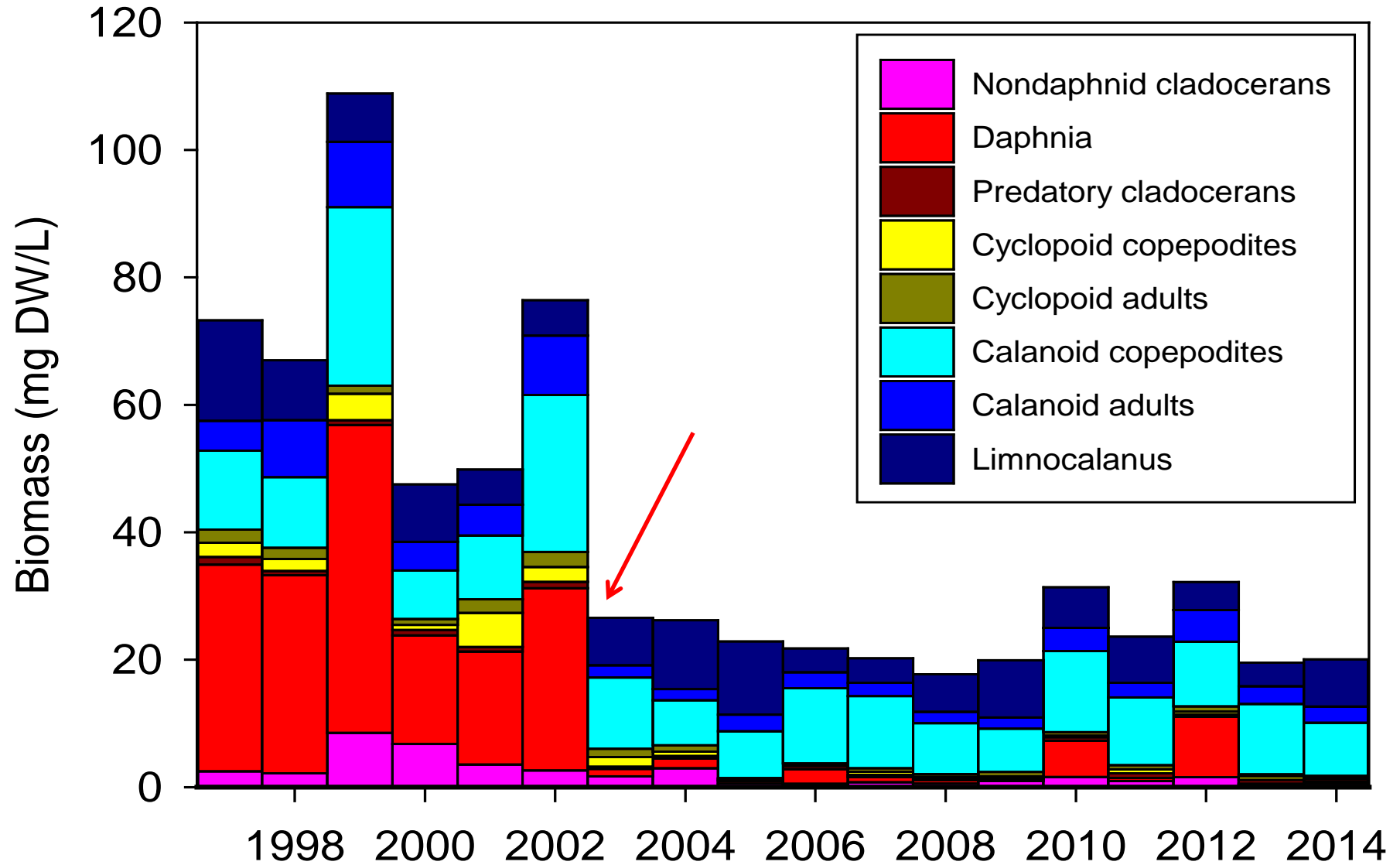
*Bosmina*



# Copepods

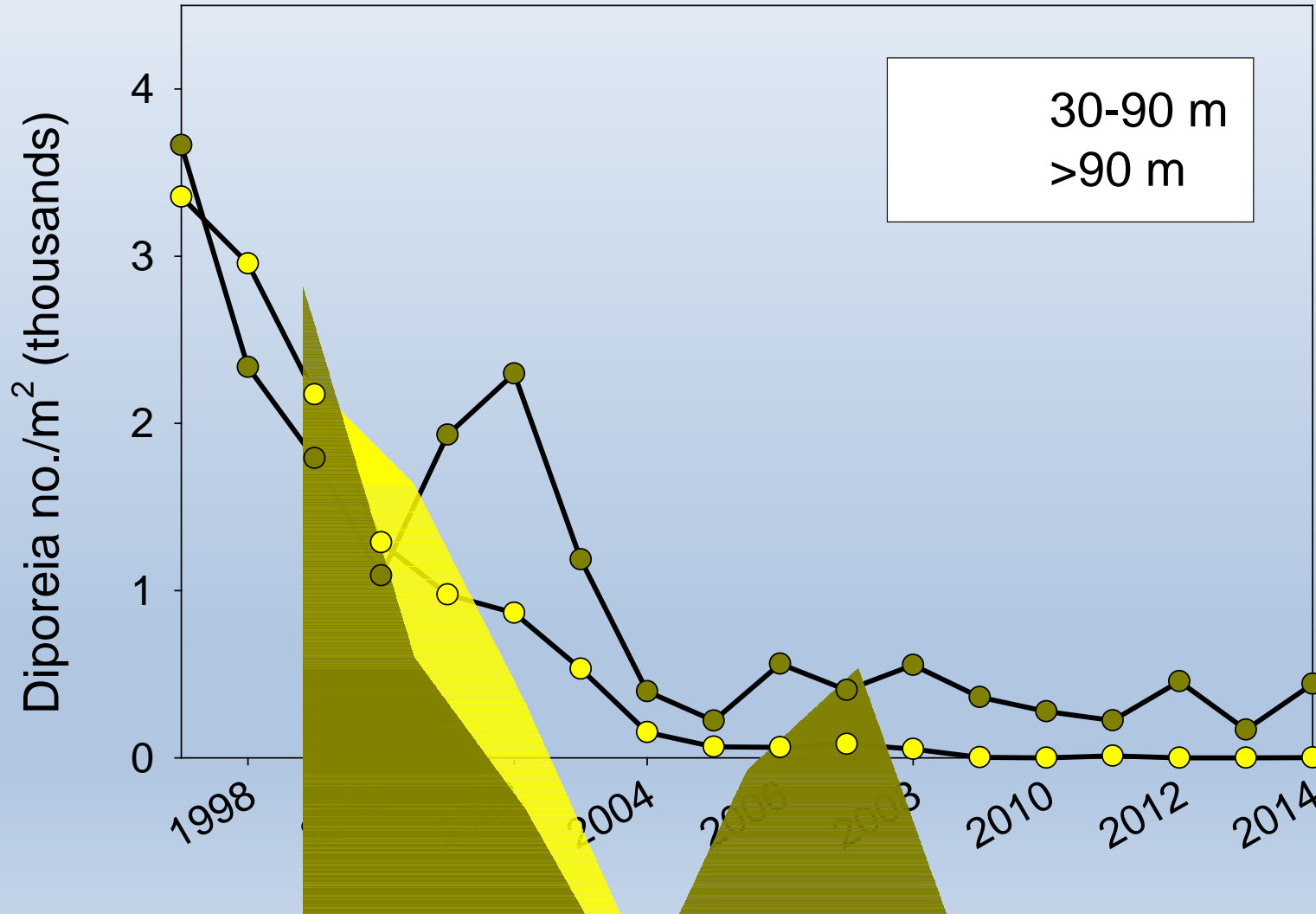


# Summer Crustacean Zooplankton

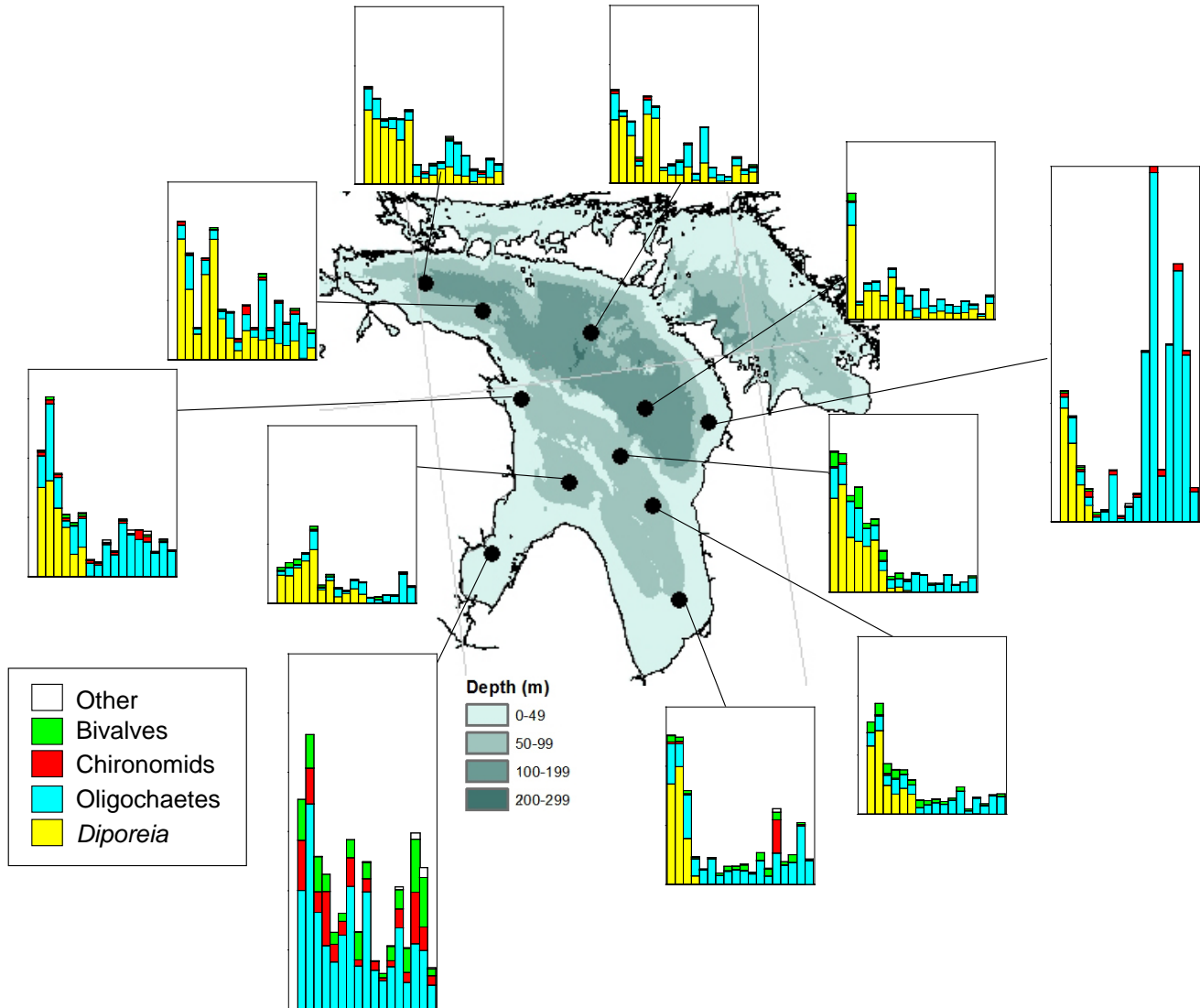


# Summer Diporeia Abundance

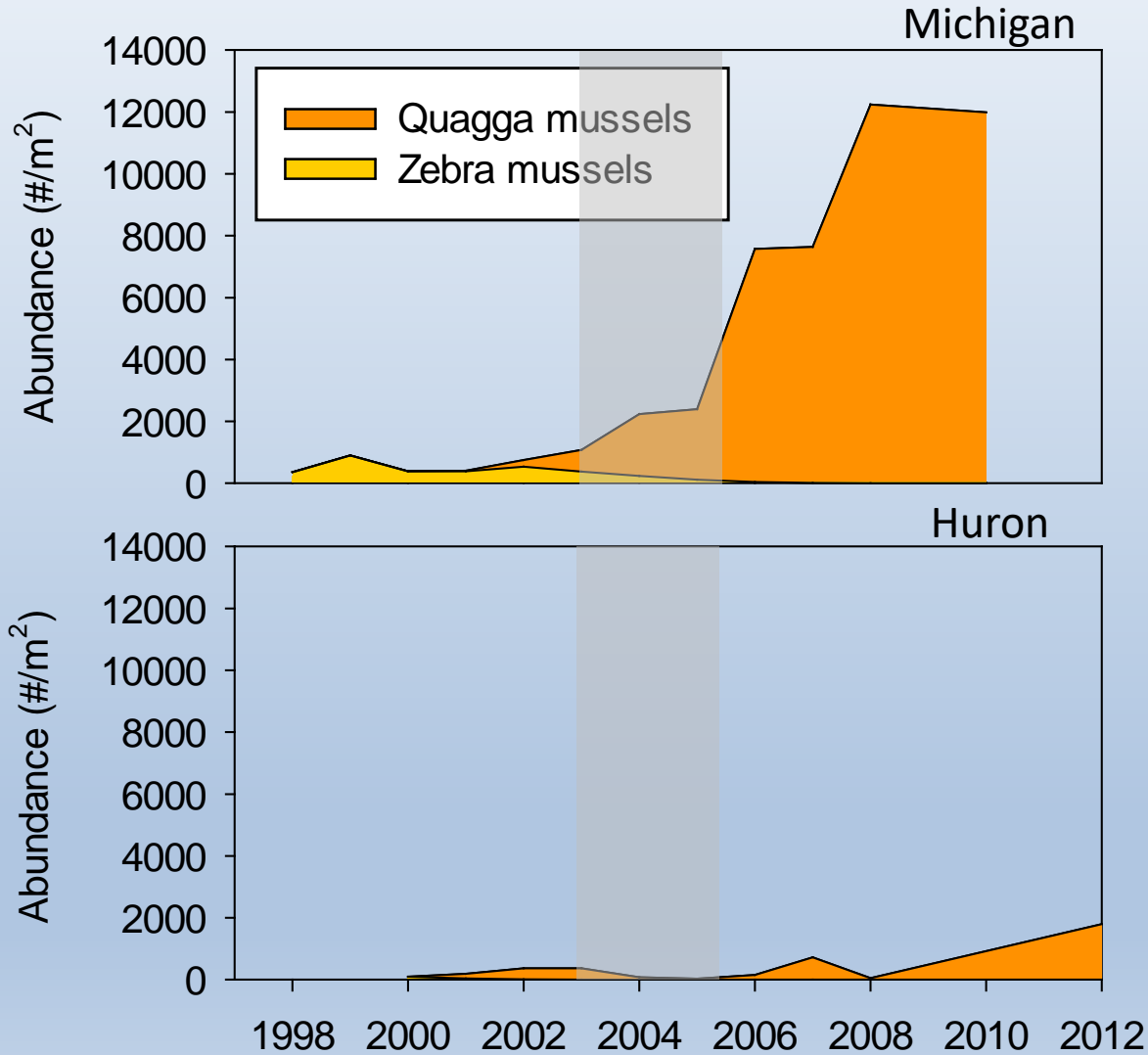
Huron



# Summer Benthos Abundances 1997-2014



# *Dreissena* Abundances



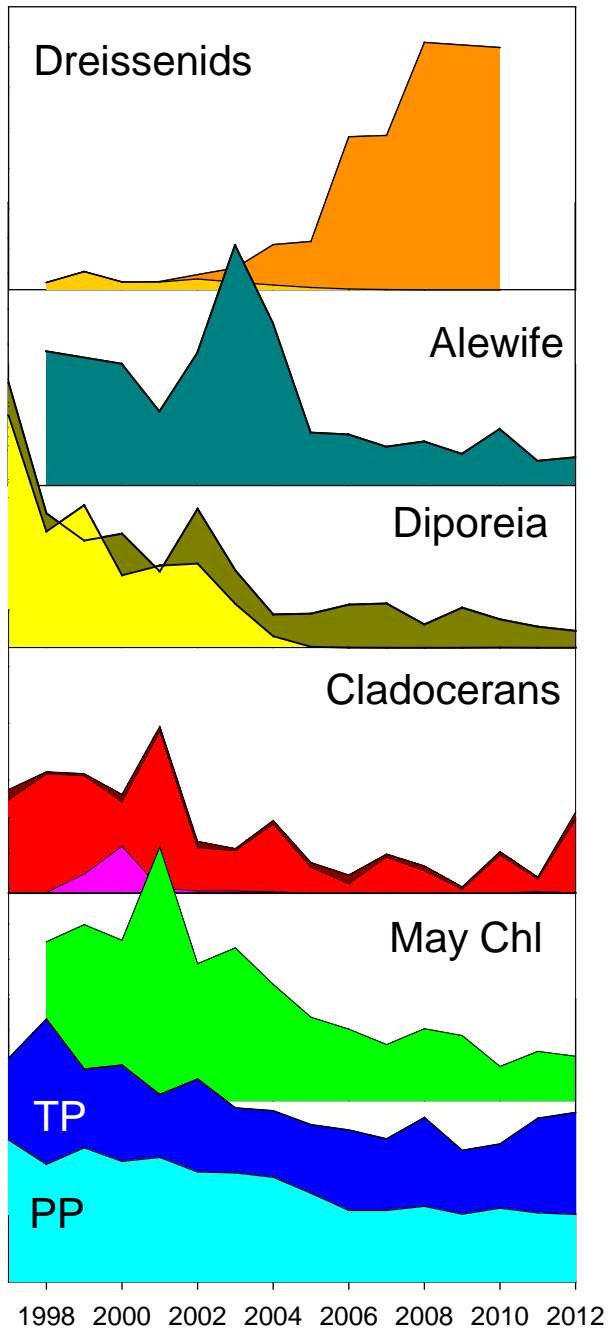
Data from: Dave Warner, USGS

# Summary

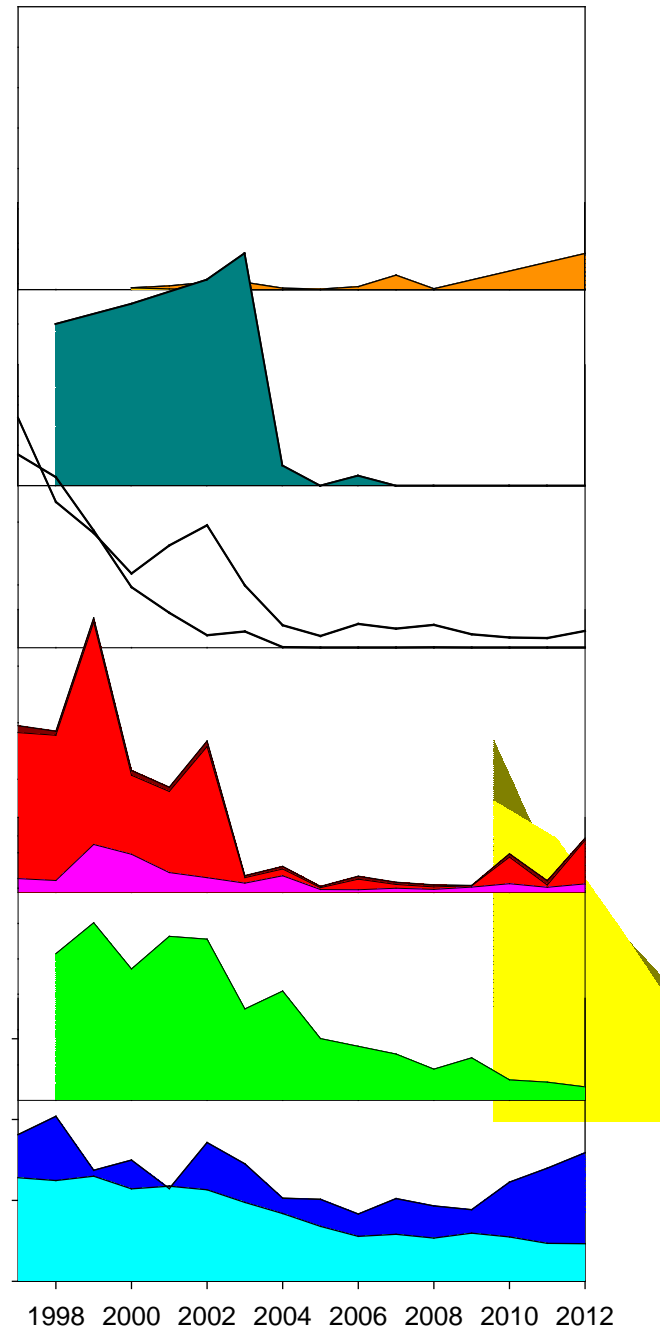
- TP declines since early 2000s
  - maybe an uptick in recent years
- Spring chlorophyll bloom gone
  - Concentrations below Lake Superior
  - Increasing productivity in recent years
- Zooplankton Biomass Declines
  - Loss of cladocerans, shift to calanoids
  - Likely due to decreased productivity
- Diporeia
  - Disappeared from < 90 m sites by mid 2000s
  - Initial declines, but stable at > 90 m since mid 2000s



# Michigan



# Huron



# Questions?

