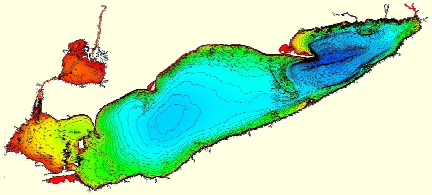


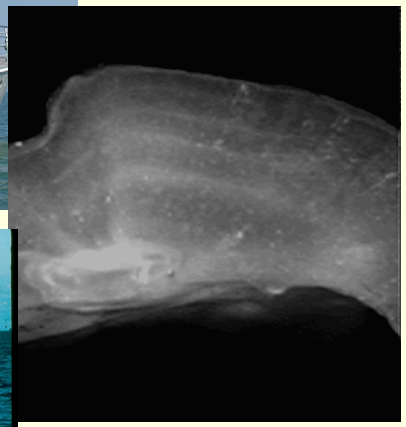
Status of Lake Erie's Western Basin Fish Populations: *Trends and Environmental Conditions*

Jeff Tyson

Ohio Department of Natural Resources
Ohio Division of Wildlife

Status of the Lake Erie's Western Basin Fish Populations
Sampling Programs

- Ohio harvest assessment programs
- Ohio gillnet sampling
- Ohio trawling programs
- Acoustic sampling program
- Other programs
  - Lower trophic level
  - Diet assessment



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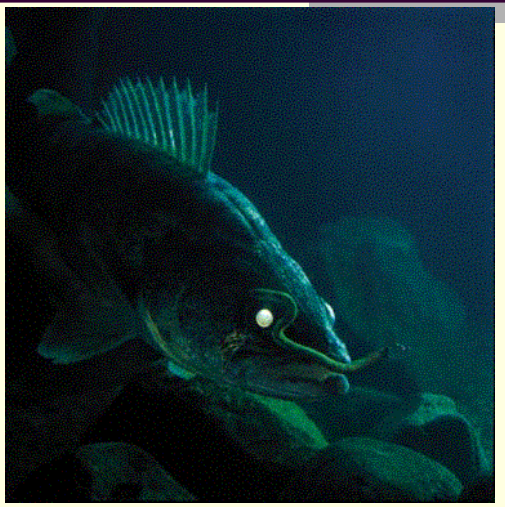
Lake Erie Committee

Status of the Lake Erie's Western Basin Fish Populations
Outline

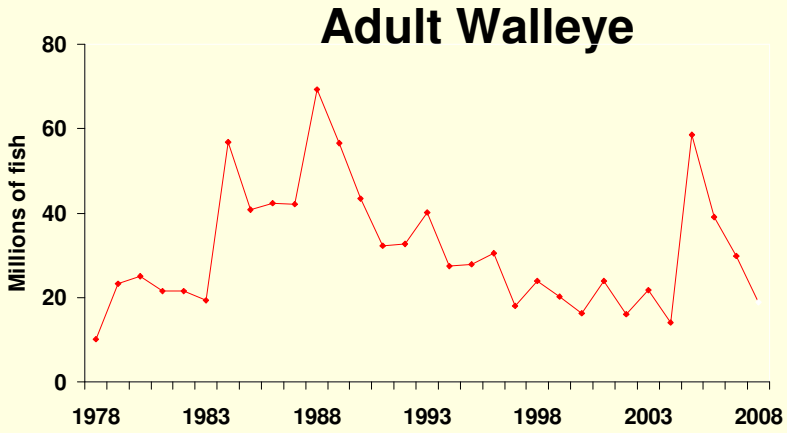
- Status of Predators
- Status of Forage
- Status of Lower Trophic Levels
- Environmental Conditions

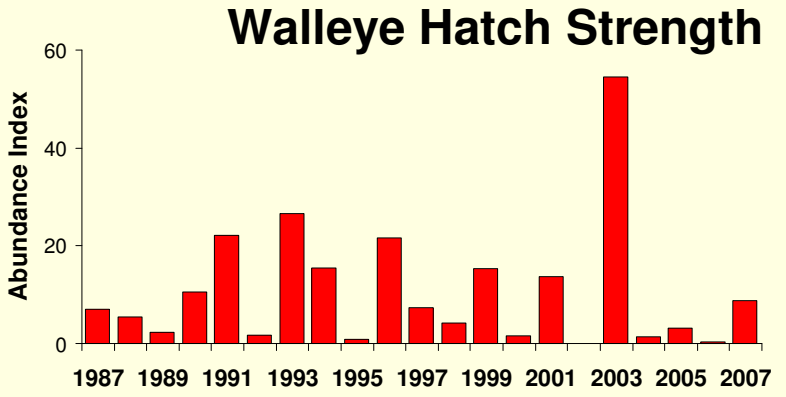


Status of the Lake Erie's Western Basin Fish Populations

Predators

- Walleye abundance has declined
- Highly variable recruitment
- Large 2003 year-class
- Extremely poor year-classes in more recent years
- Changes in distribution
- Growth stable





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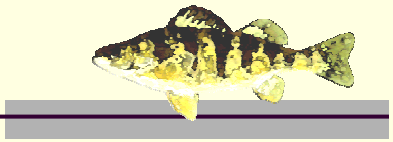
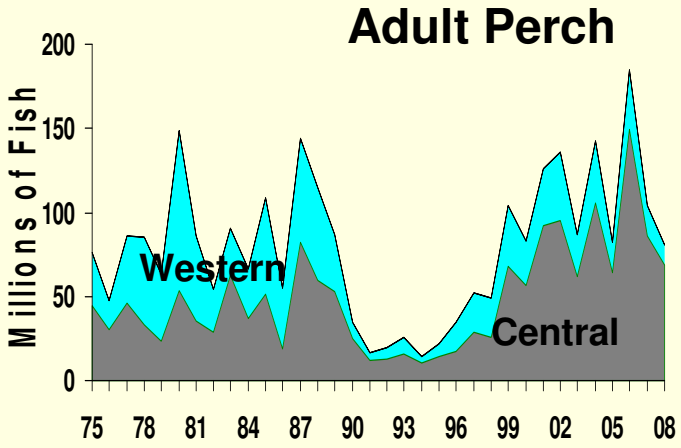
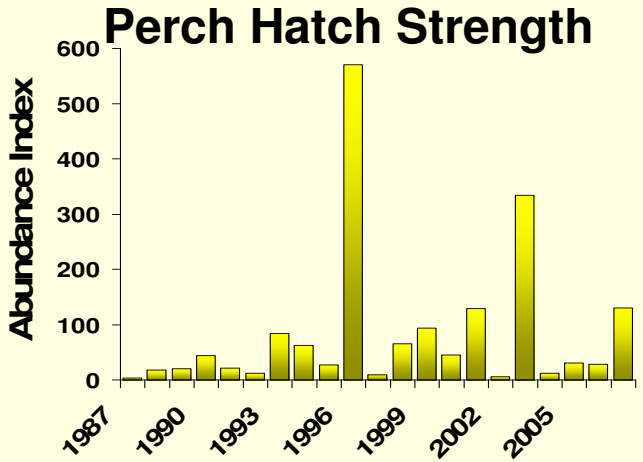
Status of the Lake Erie's Western Basin Fish Populations

Predators



- Yellow perch abundance has increased
- Year-class strength highly variable
- Large 1996 and 2003 year-classes, average 2007 year-class
- Increased growth (due to increased benthos)

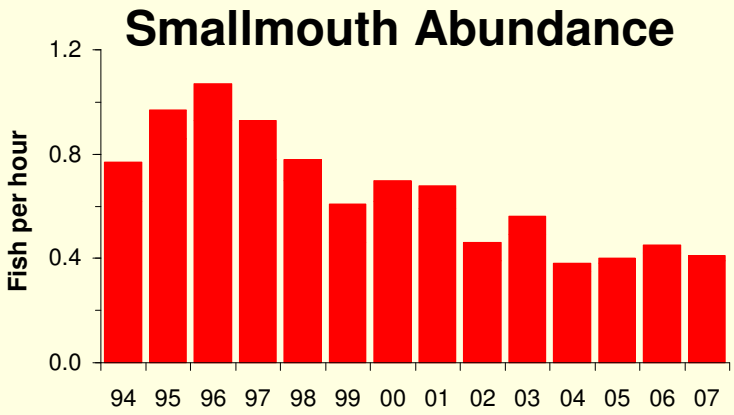




Great Lakes Fishery Commission
Lake Erie Committee

Status of the Lake Erie's Western Basin Fish Populations
Predators

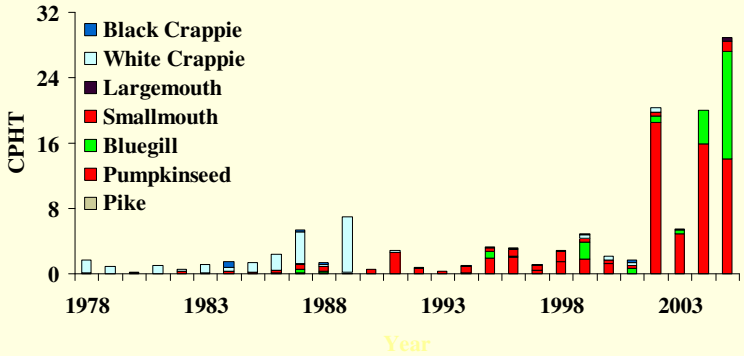
- Declining smallmouth bass abundance in west
- Round goby effect on spawning success
- Potential cormorant depredation
- Increasing in abundance in other systems (due to warming)



Great Lakes Fishery Commission
Lake Erie Committee

Status of the Lake Erie's Western Basin Fish Populations
Predators

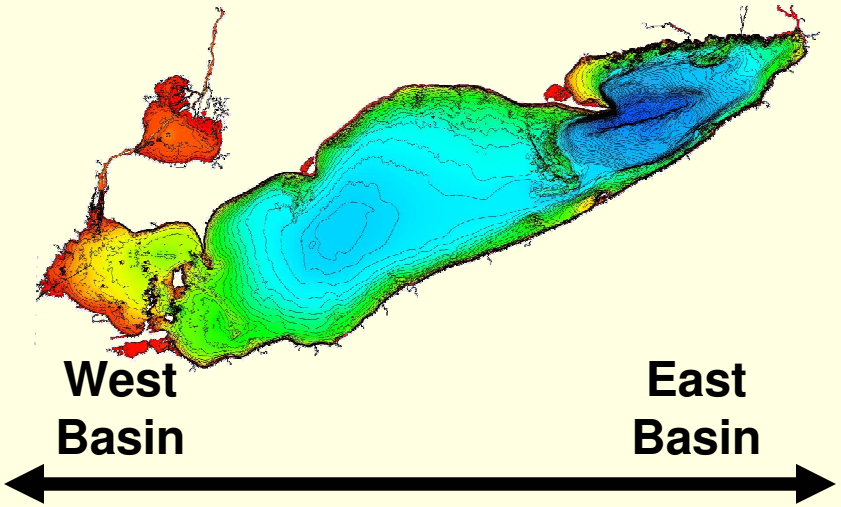
- Increases in number of phytophilic species
- Associated with more extensive submerged aquatic beds
- Increased number of lake sturgeon, particularly in survey gear

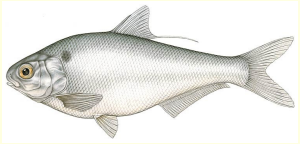


Great Lakes Fishery Commission
Lake Erie Committee

Status of the Lake Erie's Western Basin Fish Populations
Forage

- Gradient in prey fish community west to east
  - Higher diversity west
  - Lower diversity east
- Clupeids, shiners dominate in west
- Rainbow smelt dominate in east



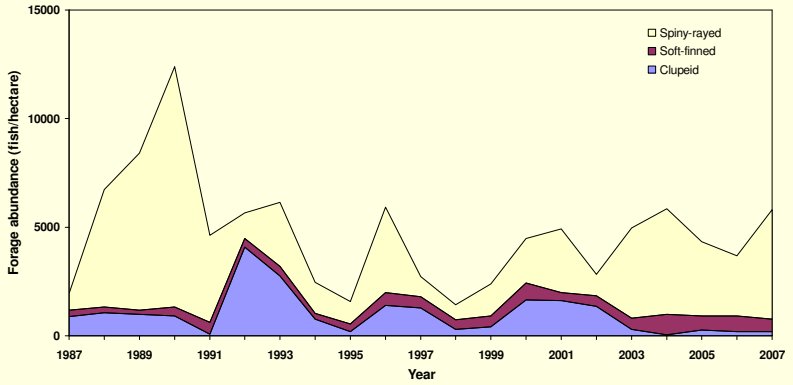


Great Lakes Fishery Commission
Lake Erie Committee

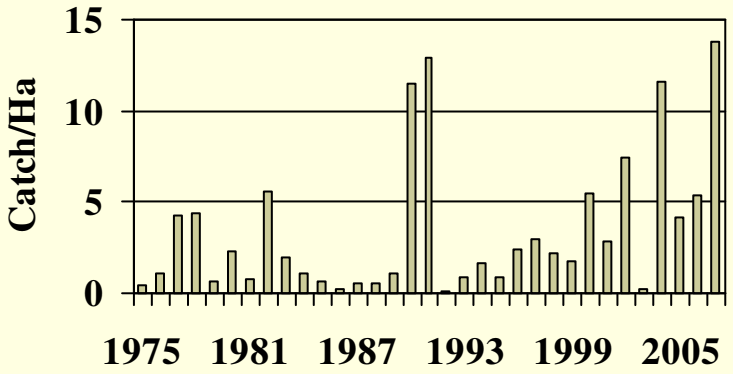
Status of the Lake Erie's Western Basin Fish Populations
Forage

- Functional forage groups
- Large decreases in age-0 white perch
- Decreases in clupeids
- Increases in shiners

West Basin Forage



Emerald Shiners



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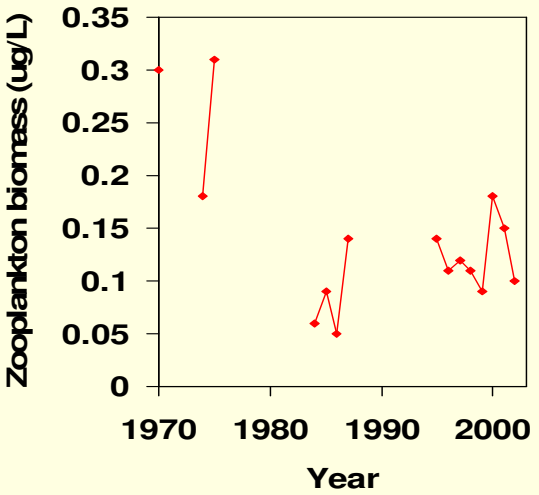
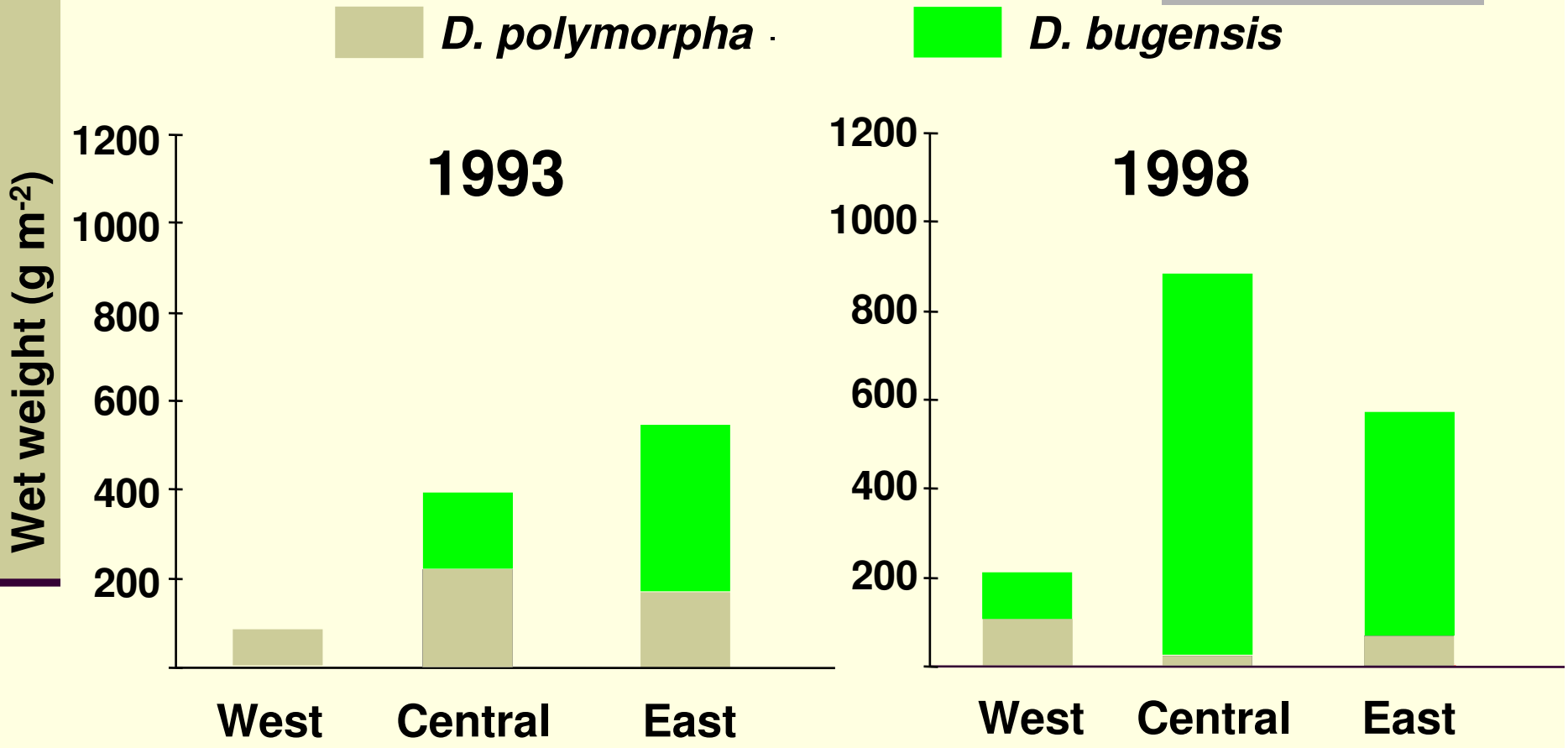
Status of the Lake Erie's Western Basin Fish Populations
Lower Trophic Levels

- Trends in Dreissenids
- Zooplankton Biomass
- Total Phosphorus



Status of the Lake Erie's Western Basin Fish Populations

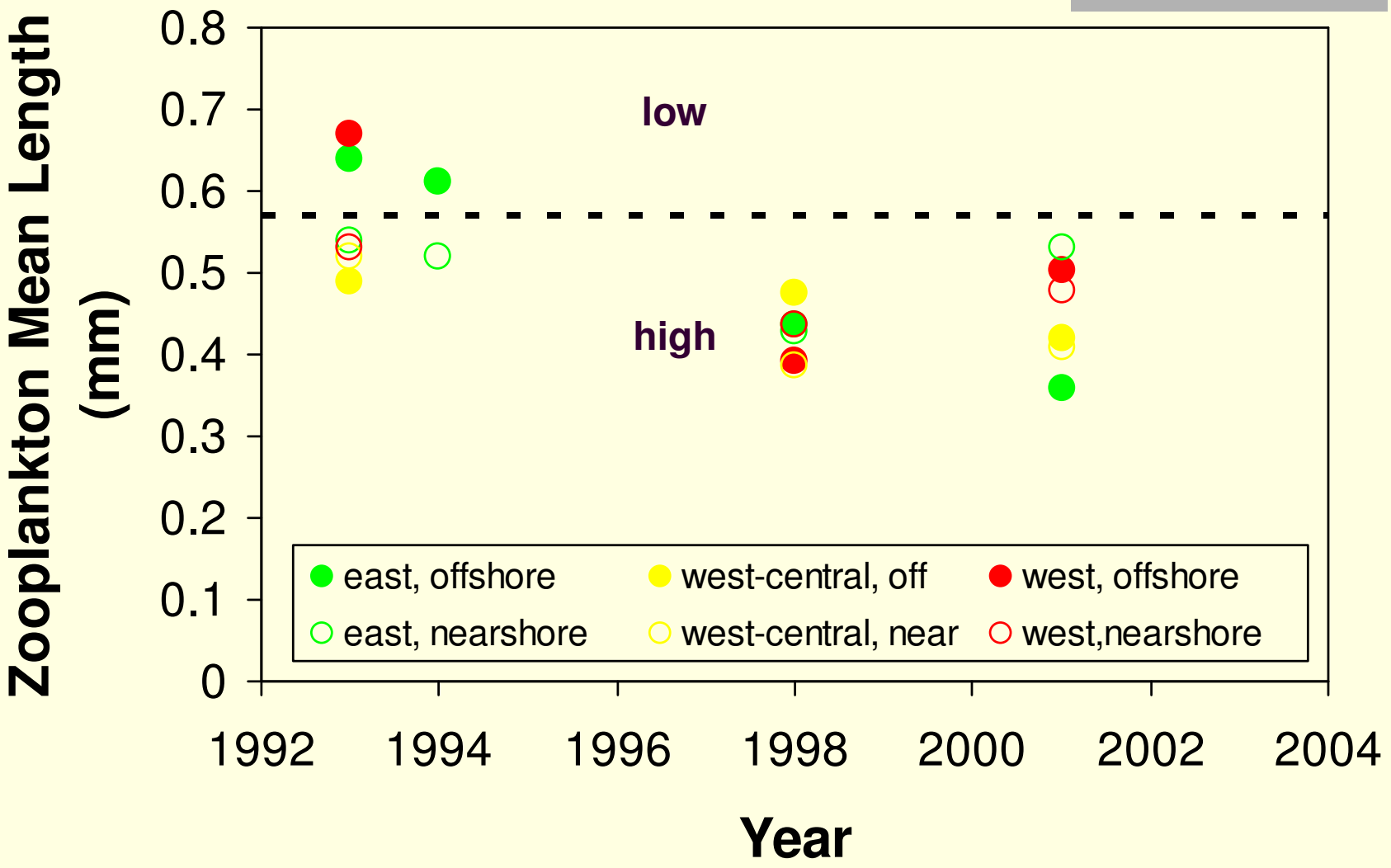
Dreissena Biomass



R.Dermott, DFO

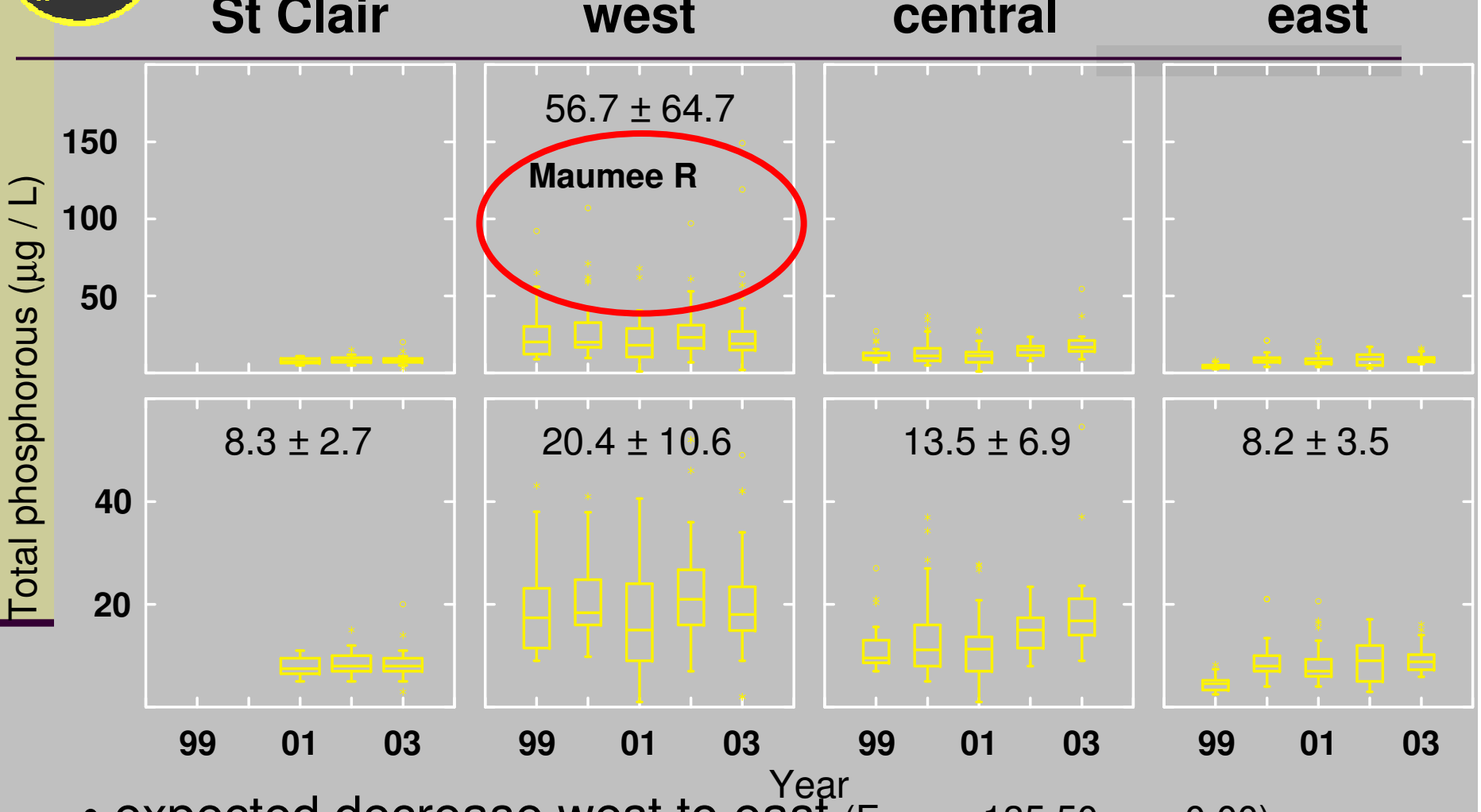
Status of the Lake Erie's Western Basin Fish Populations

Zooplanktivory



Status of the Lake Erie's Western Basin Fish Populations

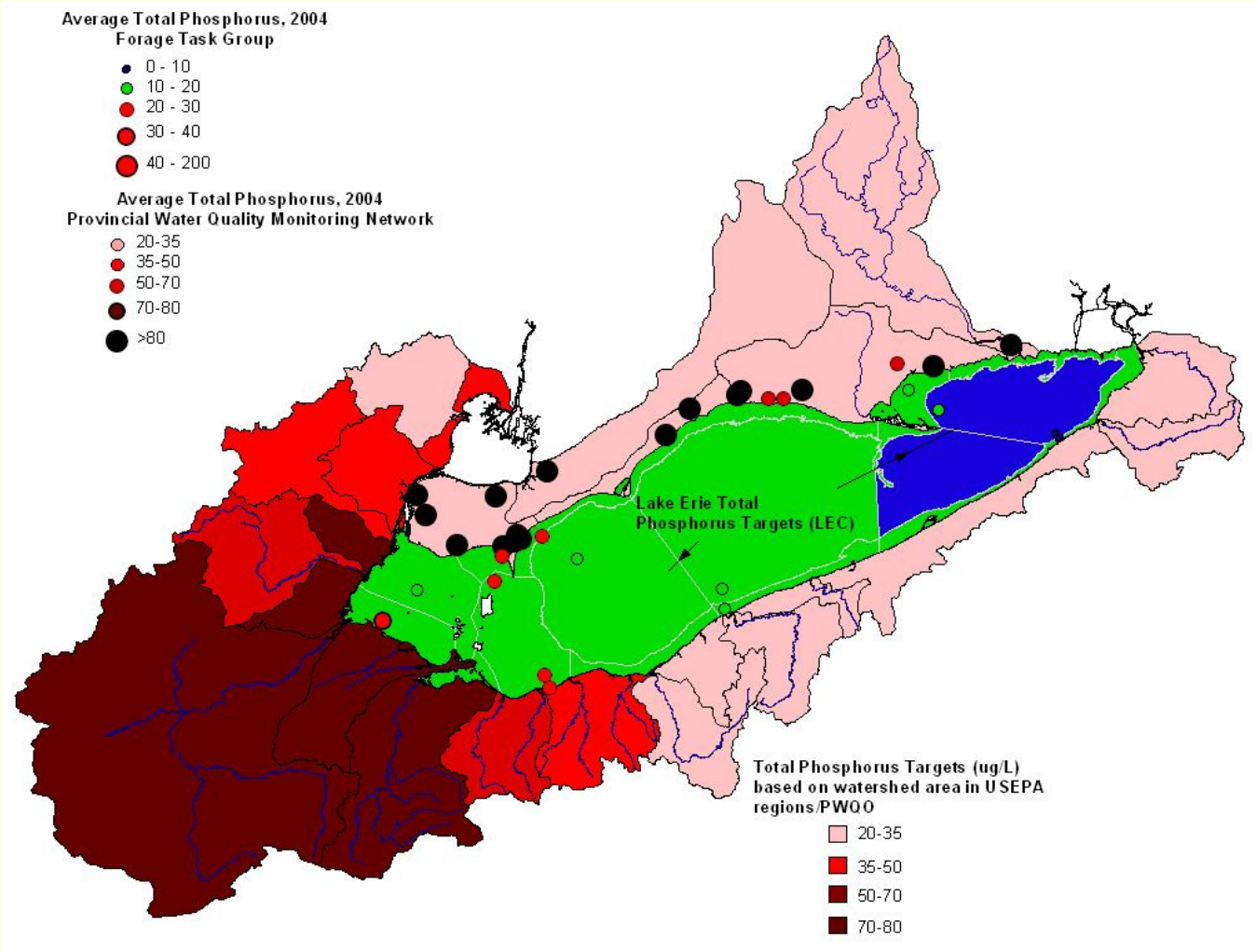
Total Phosphorus



- expected decrease west to east ($F_{2,580} = 135.50$, $p = 0.00$)
- increasing trend with time (2001 low) ($F_{4,580} = 7.76$, $p = 0.00$)

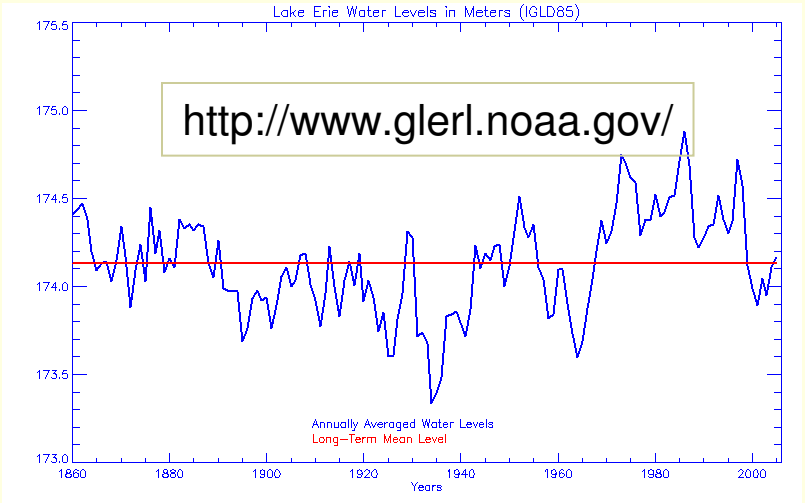
Total Phosphorus

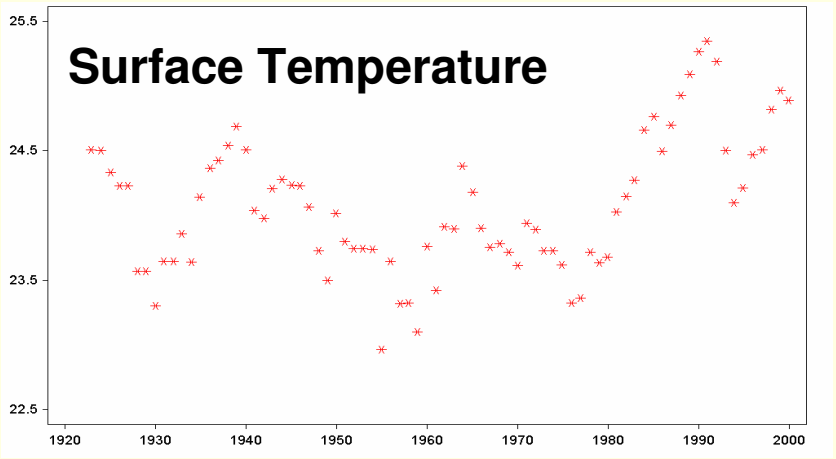
Tributary Loads and Open Water Values



Status of the Lake Erie's Western Basin Fish Populations
Environmental Conditions

- **Water Clarity**
  - Walleye
  - Aquatic Vegetation
- **Water quality**
  - Blue-green algal blooms
  - Dissolved oxygen
  - Dreissenids
- **Water Level Changes**
- **Climate variability/change**
- **Exotic introductions**
- **Habitat degradation**





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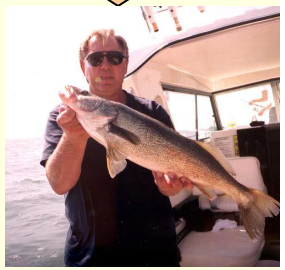
Fish Population Health

Fish Population Health

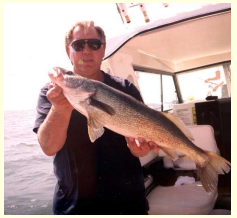


Fish Population Health

Management Levers

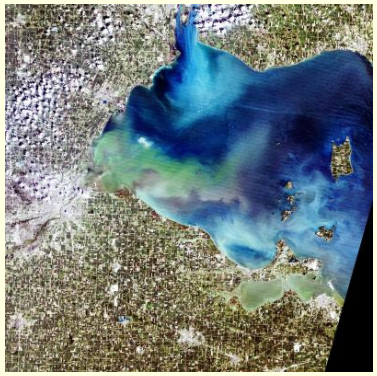
Fish Population Health

Fish Population Health



Fish Population Health

Management Levers - Environment



Conclusions

- Instability pervasive – predators, forage, lower trophics, habitat
- Fisheries Managers manage "at the end of the pipe"
  - Assessment
  - Exploitation (harvest) management
- Production management?