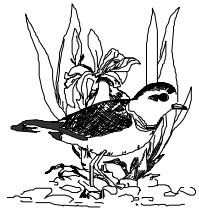


MONITORING ZOOPLANKTON POPULATIONS

Stephanie Carman



Michigan
Natural
Features
Inventory

MICHIGAN STATE
UNIVERSITY
EXTENSION

WHAT ARE ZOOPLANKTON?

- Small, free floating crustaceans
- Eat phytoplankton, bacteria, detritus and zooplankton
- Eaten by fish, zooplankton



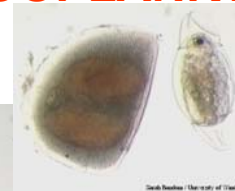
FISH



Konrad Schmidt



ZOOPLANKTON



M. Agy, NOAA, GLERL 2000

H. Vanderploeg
NOAA, GLERL 2001

PHYTOPLANKTON



NOAA, GLERL

MONITORING

- Sampling
 - seasonal
 - geographical
- Identification
 - laboratory
 - microscope



NOAA, GLERL, 1992

BENEFICIAL USE IMPAIRMENT

Degradation of Phytoplankton and
Zooplankton Populations

LISTING CRITERIA

- Zooplankton community structure significantly diverges from unimpacted control sites of comparable physical and chemical characteristics.
- Relevant, field-validated bioassays with appropriate quality assurance/quality controls confirm toxicity in ambient waters

ZOOPLANKTON AS INDICATORS

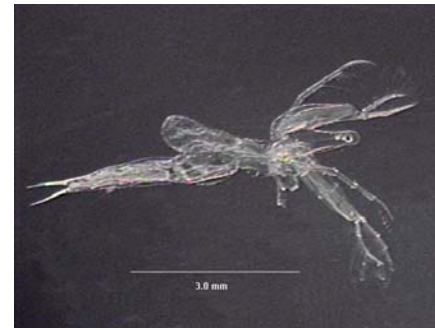
Community Structure



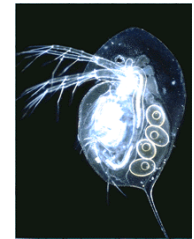
NOAA, GLERL 2000



C.Rowe & P.Hebert,
University of Guelph



Southwest Missouri State University,
Zooplankton Project



C.Rowe & P.Hebert,
University of Guelph



NOAA, GLERL 2001



H.Limen & H.Maclsaac
2001



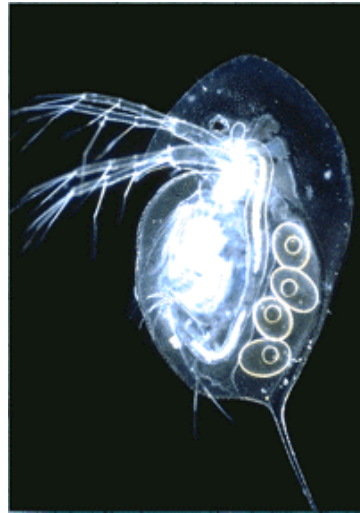
M. Agy, GLERL 2000

ZOOPLANKTON AS INDICATORS

Cladocerans : Copepods



Chad Rowe & Paul Hebert,
University of Guelph



M. Agy, NOAA, GLERL 2000

MONITORING ZOOPLANKTON

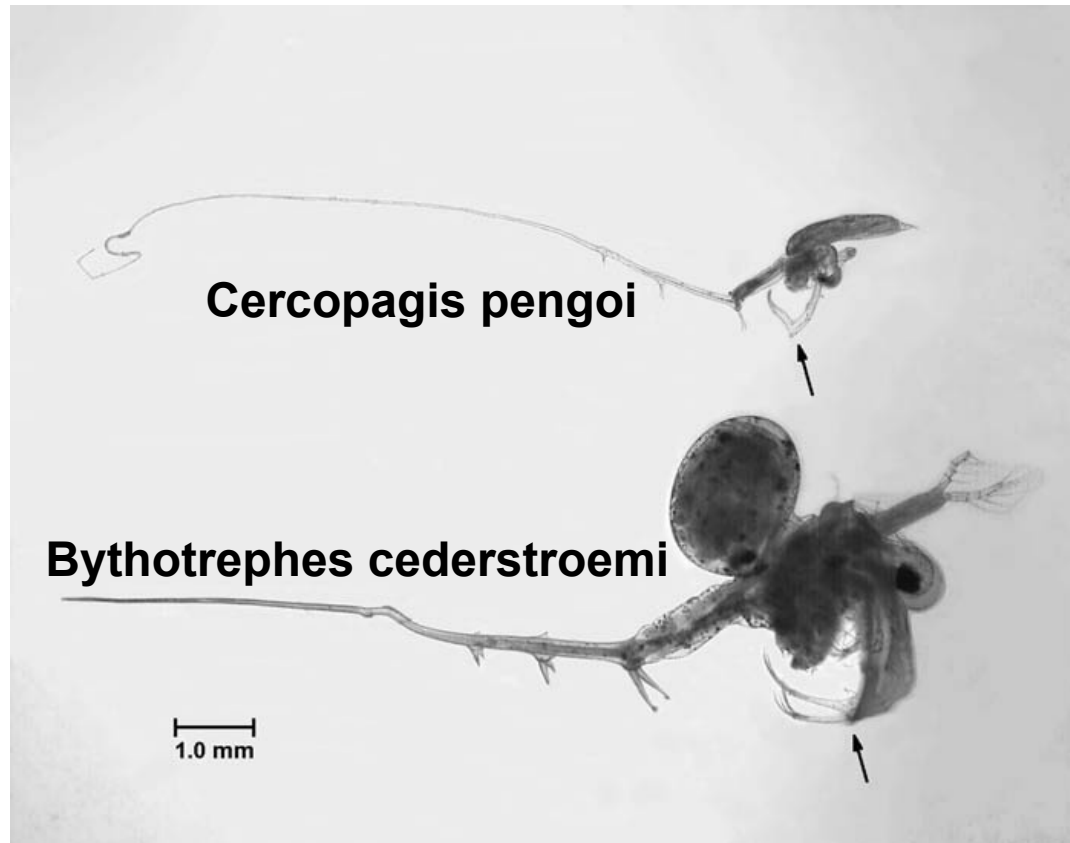
EPA GLNPO Monitoring Program

NOAA GLERL Monitoring Program

CURRENT FINDINGS

- Shift in Lake Michigan away from cladocerans to smaller copepods
 - Caused by Bythotrephes and alewife predation?
 - Affecting yellow perch populations?

EMERGING ISSUES EXOTICS



H. Vanderploeg, NOAA, GLERL 2001

EMERGING ISSUES TUMORS



University of Michigan and NOAA, GLERL

CHALLENGES

- What do the changes indicate?
 - Top down vs. bottom up
 - Environmental vs. predation pressures
- What are the control conditions?
 - Where are unimpacted areas
 - What are expected unimpacted conditions

NEARSHORE STUDY

- Comparison of zooplankton populations between impacted and unimpacted nearshore areas
- Need more information

FUTURE

- Nearshore study
- Creation of IBI for zooplankton
- Analysis of historical data