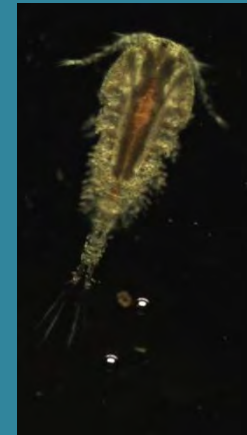


Spatial and seasonal dynamics of nonindigenous *Daphnia lumholtzi* and other crustacean zooplankton in Falls Lake (central North Carolina)



Sandra L. Cooke
Postdoctoral Fellow
Duke University
Durham, NC

s.cooke@duke.edu



Zooplankton in Falls Lake

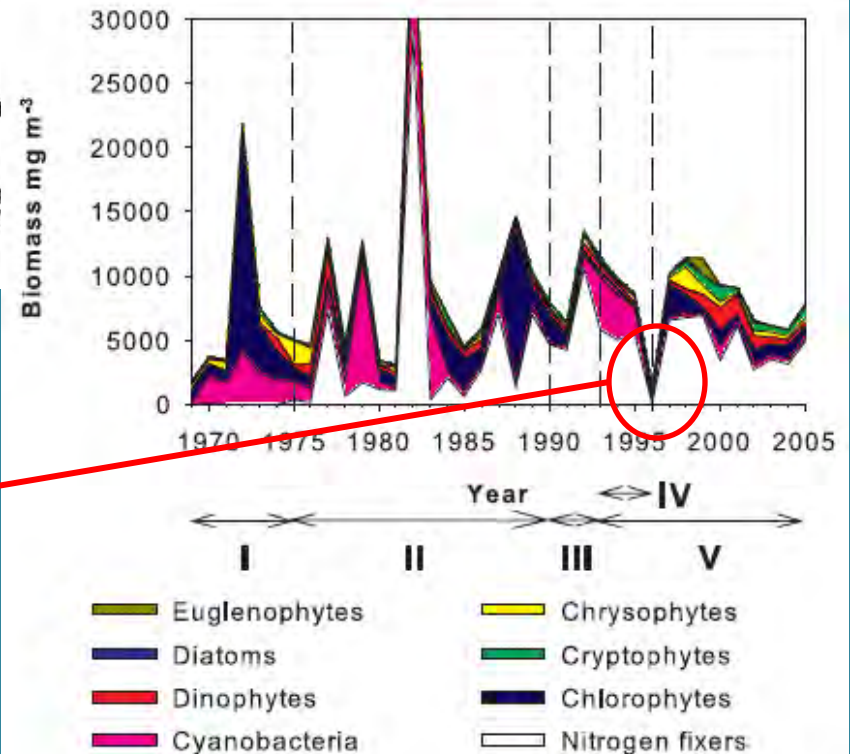
- Has not been monitored recently or regularly
- Why study zooplankton dynamics?

Eutrophication of lakes cannot be controlled by reducing nitrogen input: Results of a 37-year whole-ecosystem experiment

David W. Schindler^{*†}, R. E. Hecky[‡], D. L. Findlay[§], M. P. Stainton[§], B. R. Pai and S. E. M. Kasian[§]

^{*}Department of Biological Sciences, University of Alberta, Edmonton, AB, Canada T6G 2E9; [†]Dej Duluth, MN 55812; and [§]Freshwater Institute, Canadian Department of Fisheries and Oceans, W

Contributed by David W. Schindler, May 28, 2008 (sent for review March 25, 2008)



Zooplankton in Falls Lake

- Why study zooplankton dynamics?
 - interested in effects of climate change
 - interested in effects of drought

Objectives

- To determine macrozooplankton species composition in Falls Lake
- To determine how zooplankton community varies across seasons and sites
- To determine if these differences correlate to changes in the algal community

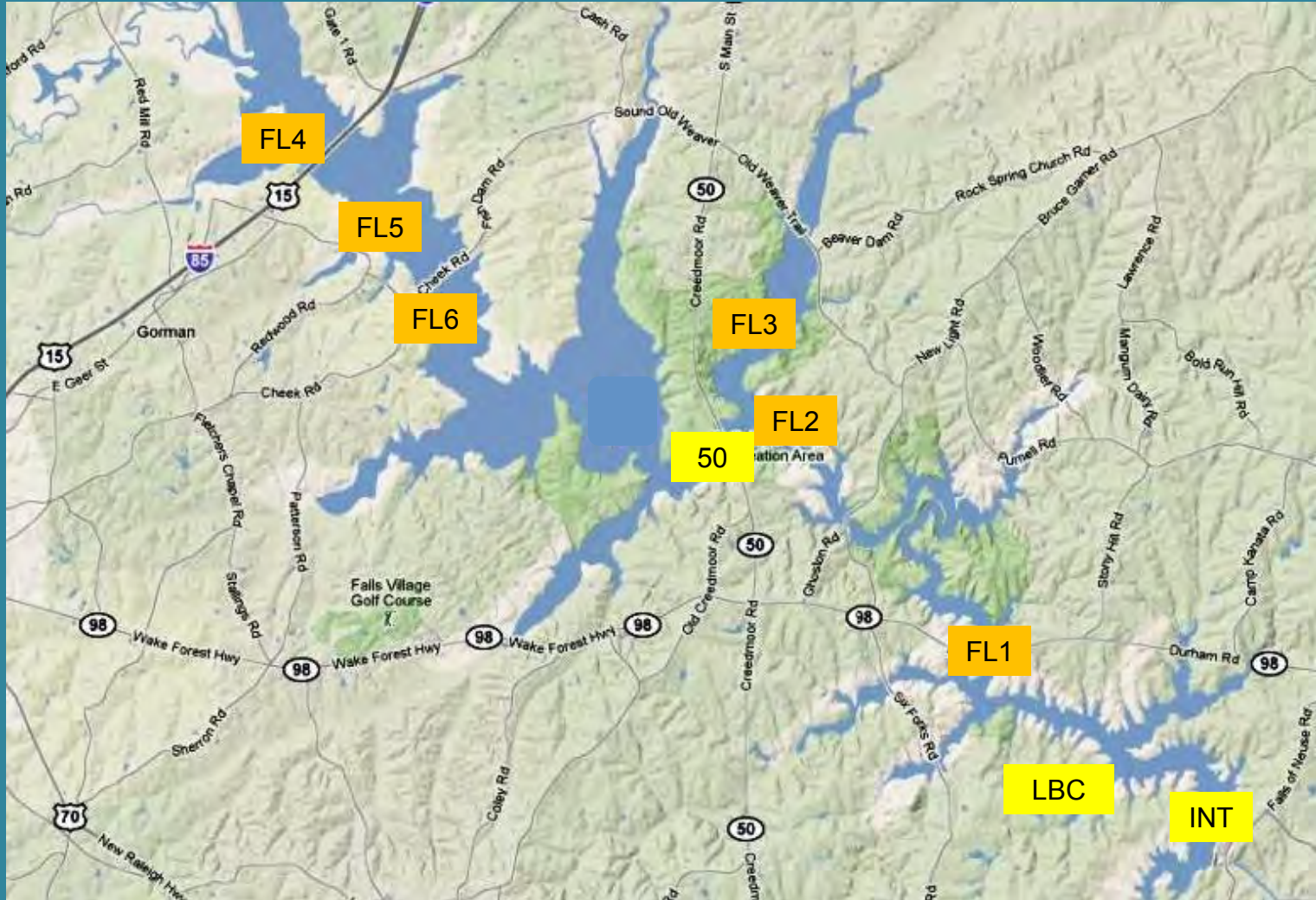
Methods

- sampled crustacean zooplankton via whole-water column net tows (48 μm)



Methods

- 3 sites visited at least 1x/month Jun 09 - Feb 10
- 6 additional sites ~1x/month Jun 09 - Oct 09



Results

- Observed the nonindigenous water flea *Daphnia lumholtzi*



- Native to tropical regions of Australia, Asia, and Africa
- Accidentally introduced to a Texas reservoir in 1991
- Found in a reservoir in western N.C. in 1996
- Found in Falls Lake in 1993 (not documented)
- Tends to thrive in large rivers and reservoirs, high temperatures (30 C)

D. lumholtzi – collected and established



Potential Ecological Effects of *D. lumholtzi*

- May be more resistant to predation

vertebrate

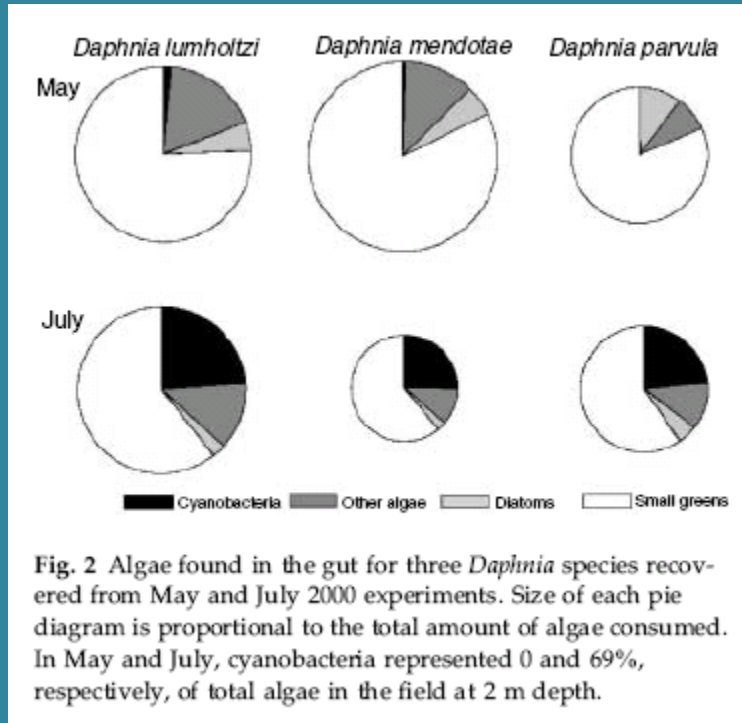


invertebrate

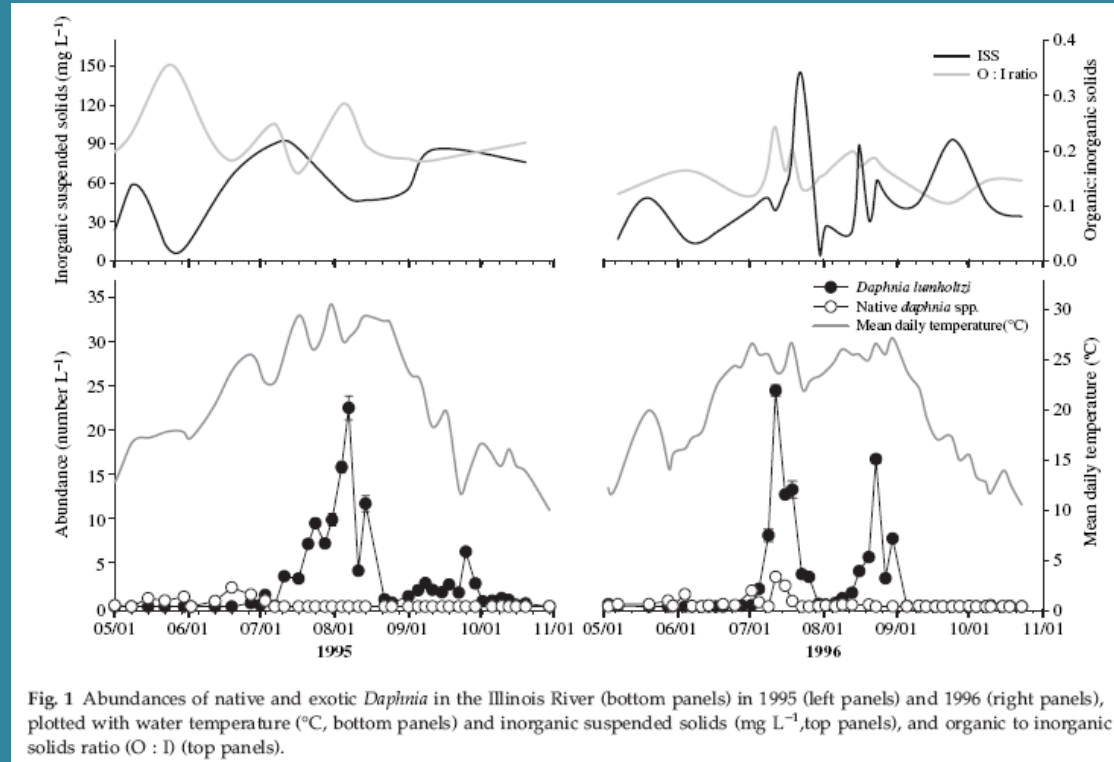


Potential Ecological Effects of *D. lumholtzi*

- May be more tolerant of mid-late summer conditions in reservoirs



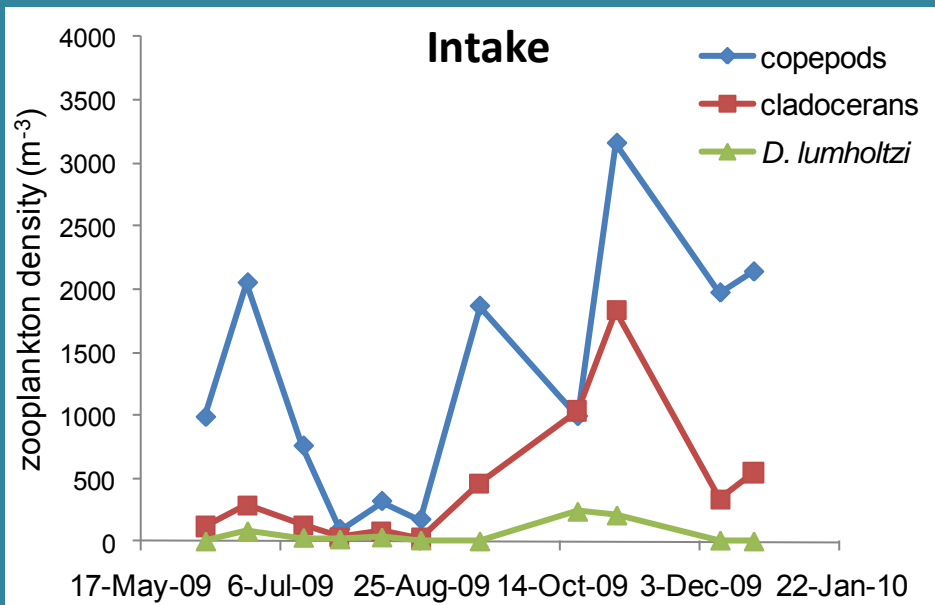
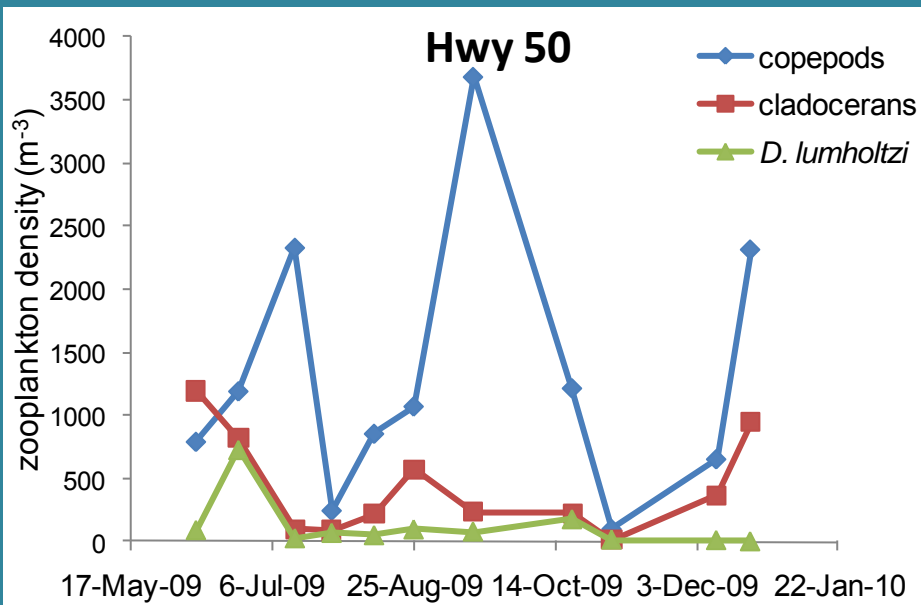
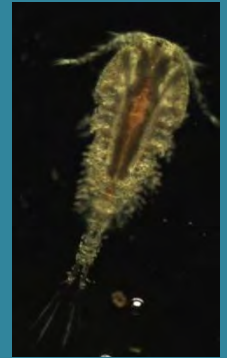
Pattinson et al. 2003



Soeken-Gittenger et al. 2009

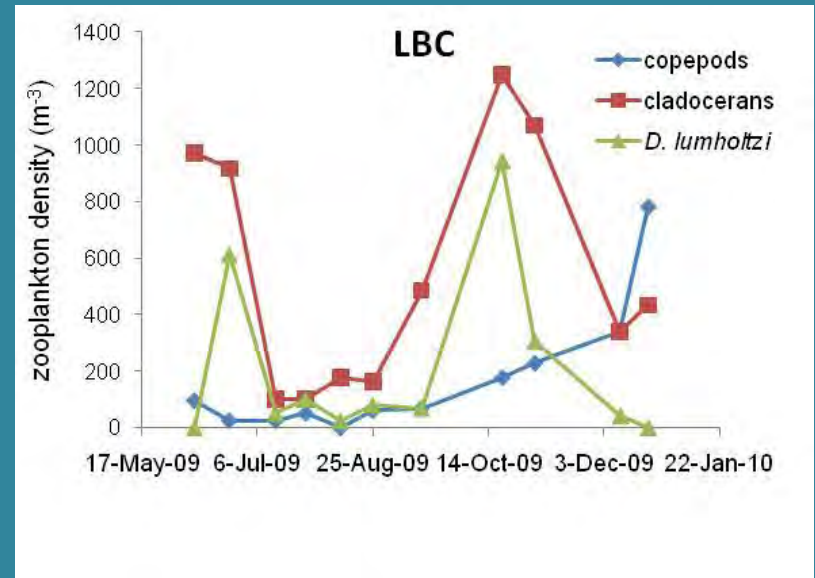
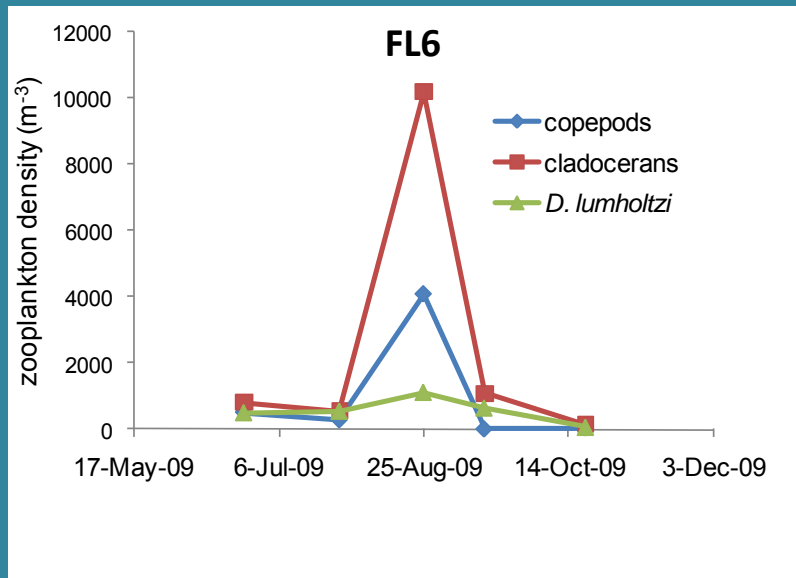
More Results

- open water sites dominated by cyclopoid copepods



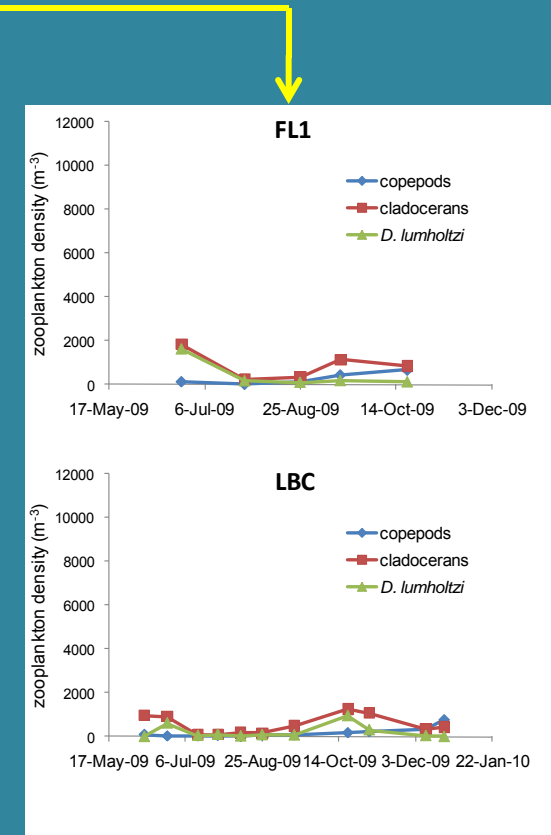
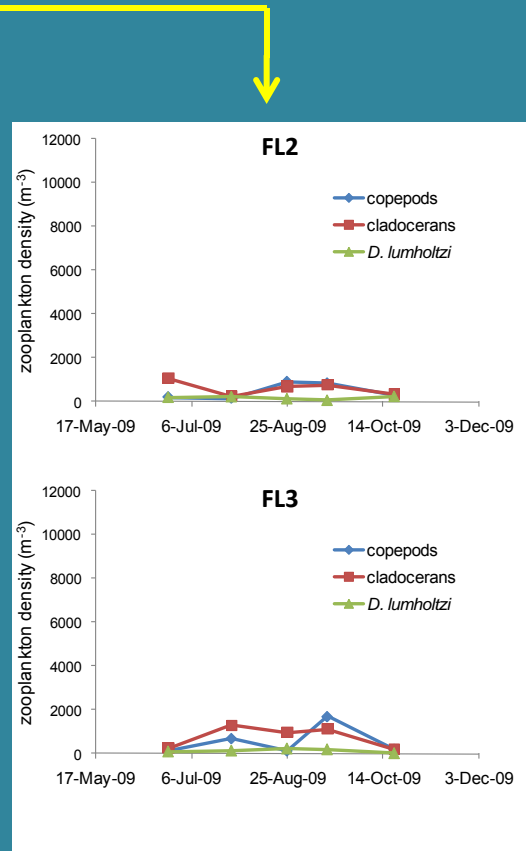
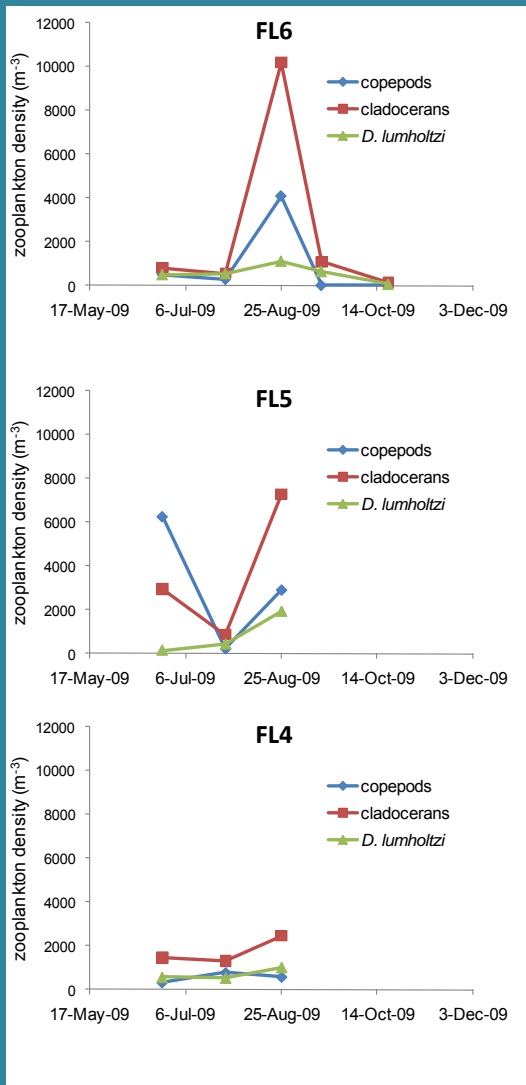
More Results

- shallower, nearshore sites dominated by cladocerans



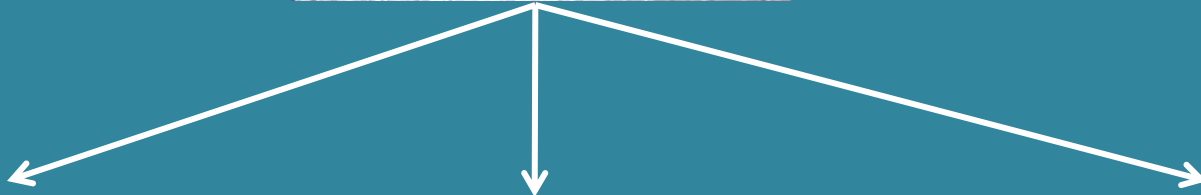
More Results

- Shallow, turbid, upstream sites tended to have more zooplankton



Future Work

- Do juvenile fishes feed less efficiently on *D. lumholtzi*?



Future Work

- Is *D. lumholtzi* presence and abundance significantly related to transparency/ turbidity/ light levels in Falls Lake? If so, is this due to:
 - Food quality (e.g., Wang et al. 2009)
 - Interference w/ foraging (e.g., Shulze et al. 2006)
 - Predation pressure
 - Avoiding visual feeders (planktivorous fishes)
 - Suspended solids interfere w/ foraging by tactile invertebrate predators (*Chaoborus*)

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