Zooplankton Biodiversity Patterns Across a Novel Water Storage Complex in the NJ Pinelands

Emily Wang[1], Kathryn Mickle[2], Courtney Richmond[1], Nathan Ruhl[1]

1: Department of Biological Sciences, Rowan University, Glassboro New Jersey, USA 08028

2: College of Life Sciences, Thomas Jefferson University, East Falls Campus, Philadelphia Pennsylvania, USA 19144

Introduction:

- Humic systems display ecological dystrophy
- Whitesbog is a shallow humic complex used for water storage
- Whitesbog possess pristine water quality, but experiences hydrological disturbance in the fall

Methods:

- Aug: 2-10g of water through net then sieve
- Oct: 1 L of water through sieve
- Handheld water quality instruments
- Scaled and standardized for temporal comparisons to account for differences in sampling method
- Paired t-test, hierarchical clustering with recursive partitioning, variable-selection via step-wise regression followed by polynomial and linear regression (JMP) and NMDS (R)

Q1: Do we have the same pattern of zooplankton abundance across Whitesbog complex between sampling dates?

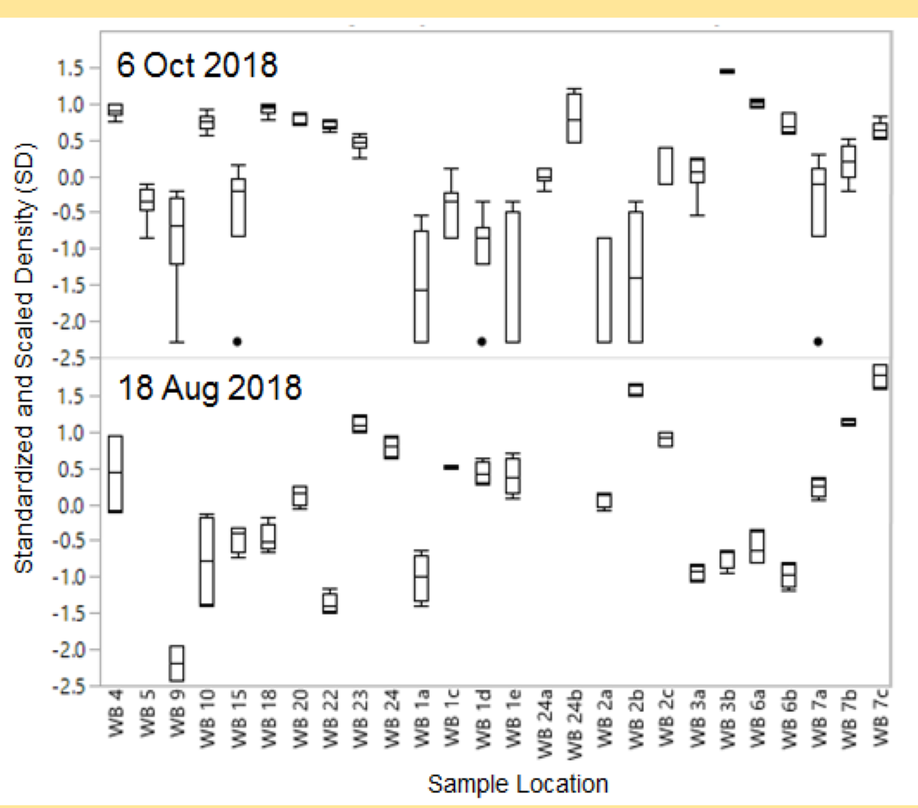

Figure 1: Scaled and standardized density across the Whitesbog complex between sampling dates (paired t-test, t=8.616, p <0.0001).

Q1. Results: There is a difference in zooplankton density between sampling trips.

The authors would like to acknowledge Carly Strickland, Pranav Patel, Alexis Piepszowski, Dominic Ruggiero, and Aaron Krivchenia for their work benefiting this project.

Q1a: Are some sites within the Whitesbog complex more similar than others between sampling dates?

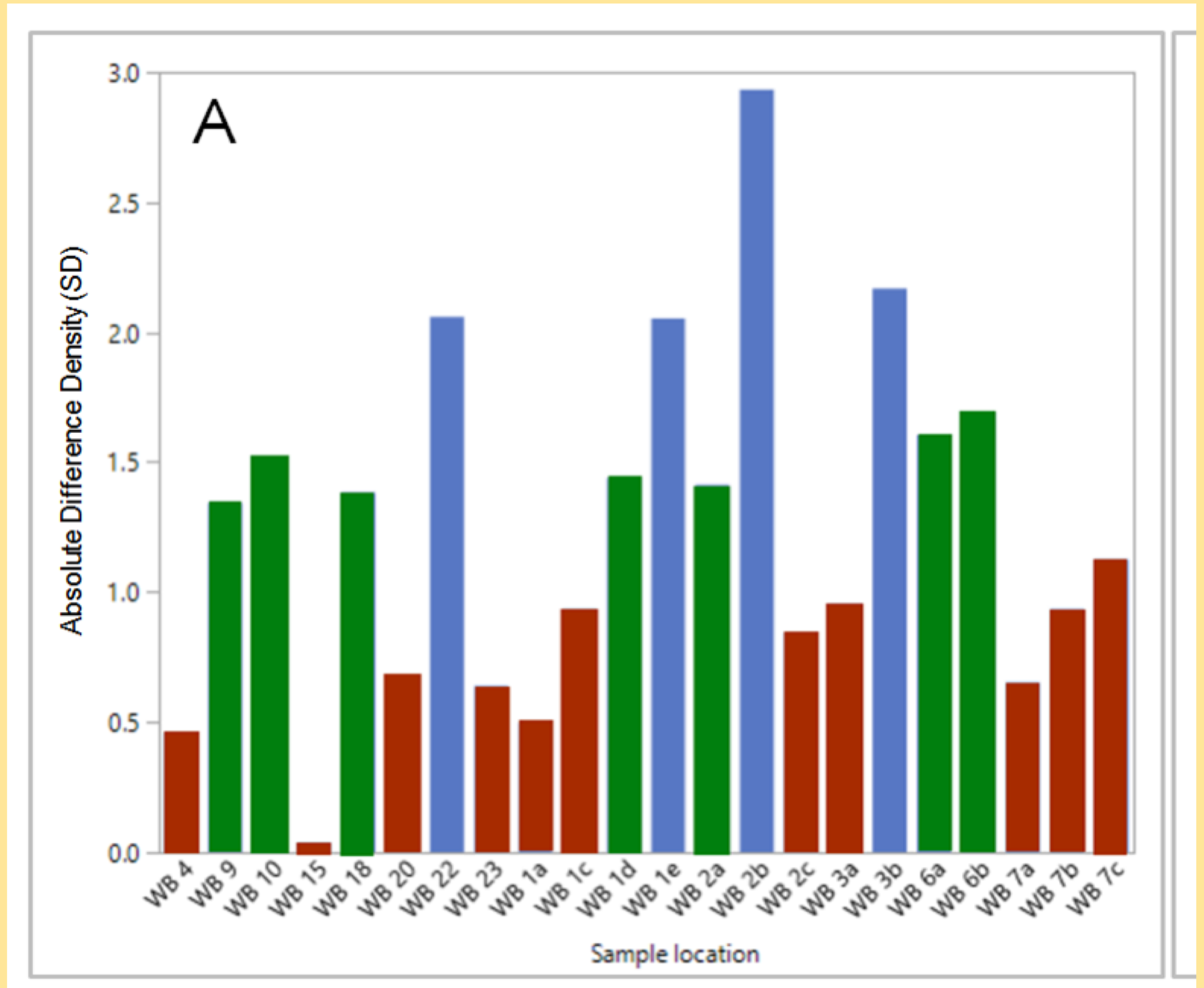

Figure 2: Temporal similarity between sites at Whitesbog displayed as raw differences in density. Recursive partitioning indicates 3 groups.

Q1a. Results: Sites 5 and 9 have higher abundances than predicted

Q2: Is zooplankton density across Whitesbog complex predicted by environmental conditions?

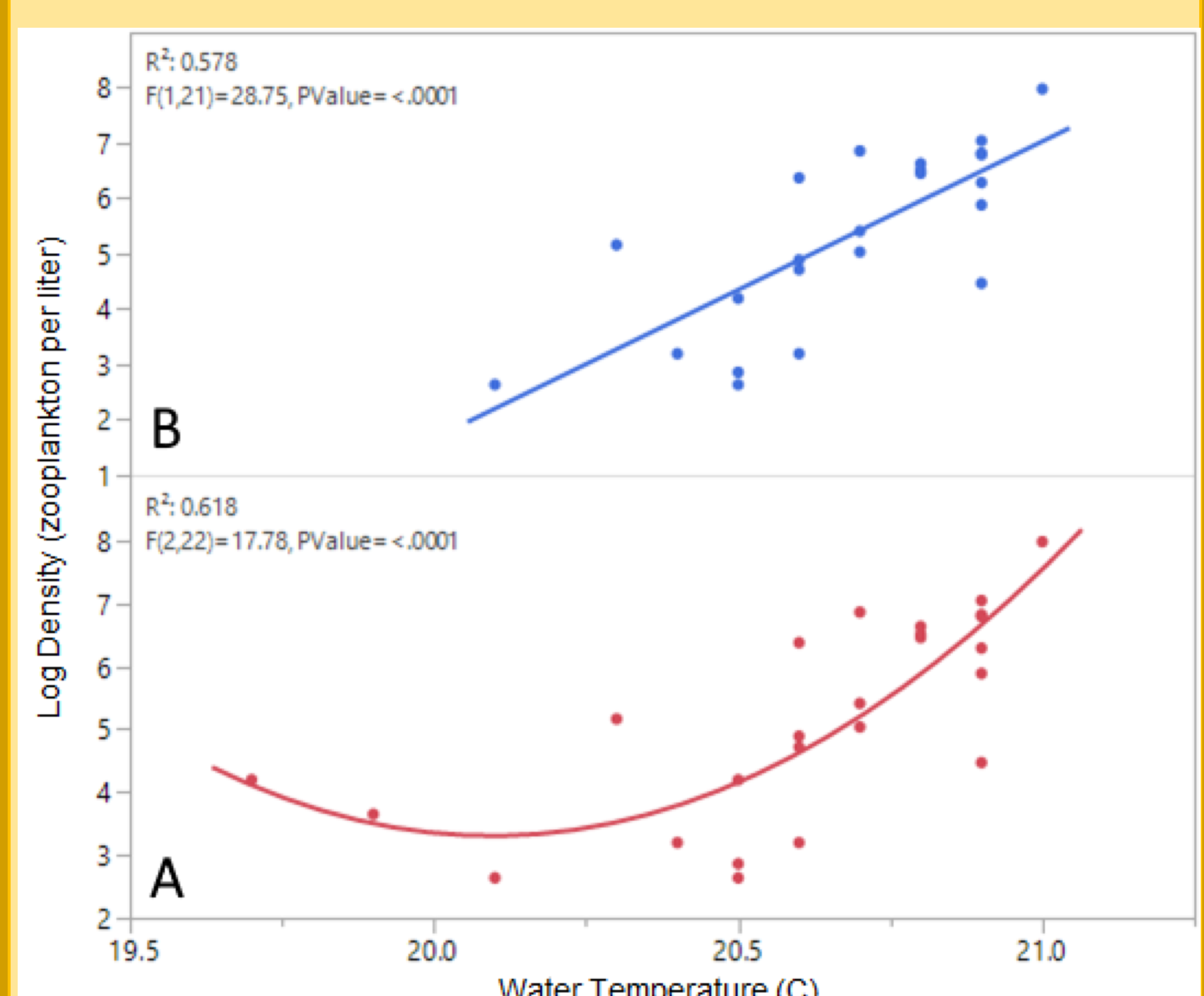

Figure 3: Regression **s**catterplots of water temperature and scaled density to all sites (A) and all sites except 5 and 9 (B). For the whole Whitesbog complex the predictive relationship was non-linear, but was linear with the removal of sites 5 and 9.

Q2. Results: Water temperature was best predictor of abundance and biodiversity, but turbidity also important

Conclusion:

- Zooplankton density and biodiversity varies across complex
- Significant temporal complexity

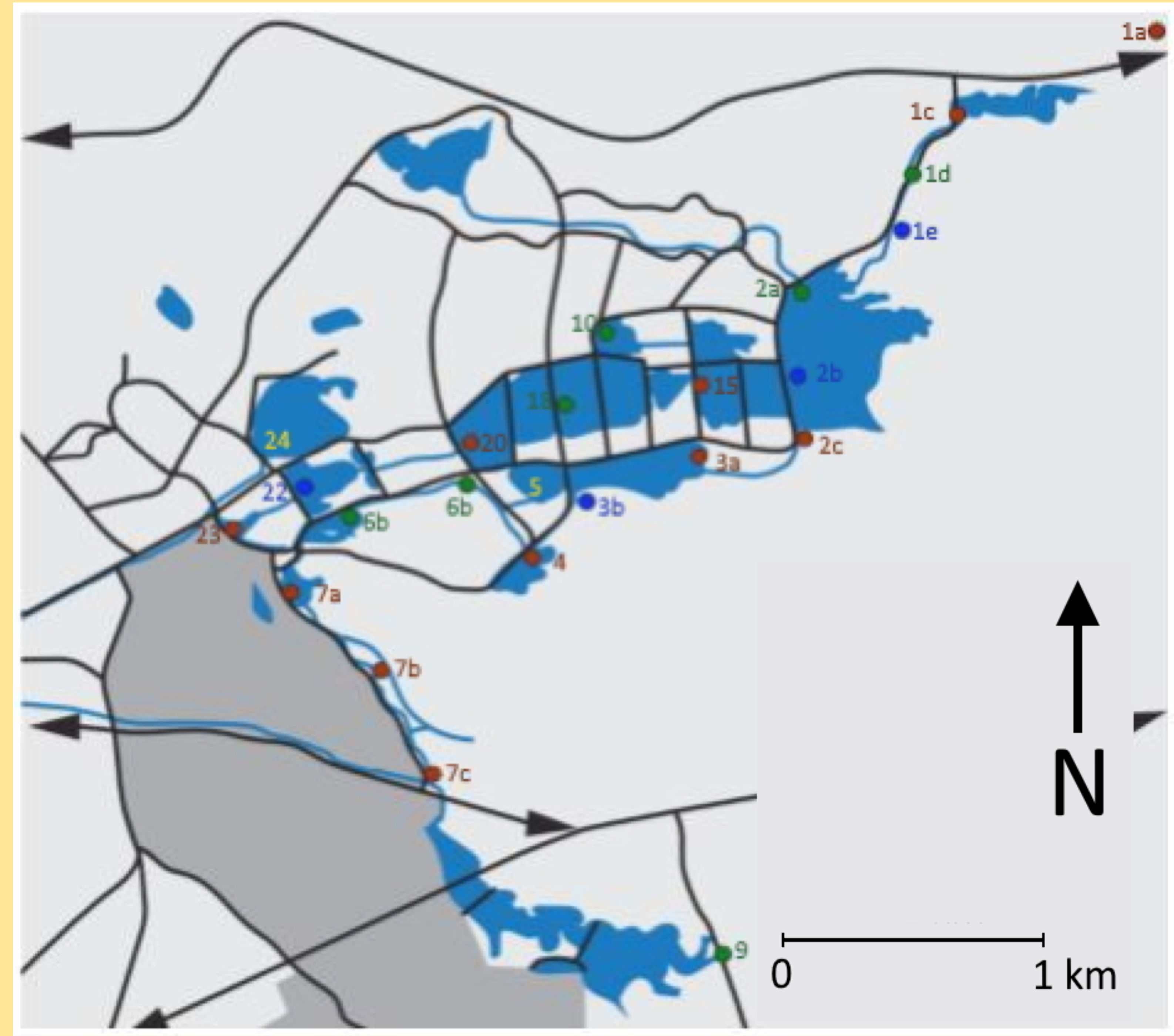

Figure 2a: Hydrological flow map with color codes representing groupings from **Figure 2**. Shaded area represents active agricultural area.

Q3: Is zooplankton biodiversity across Whitesbog complex predicted by environmental conditions?

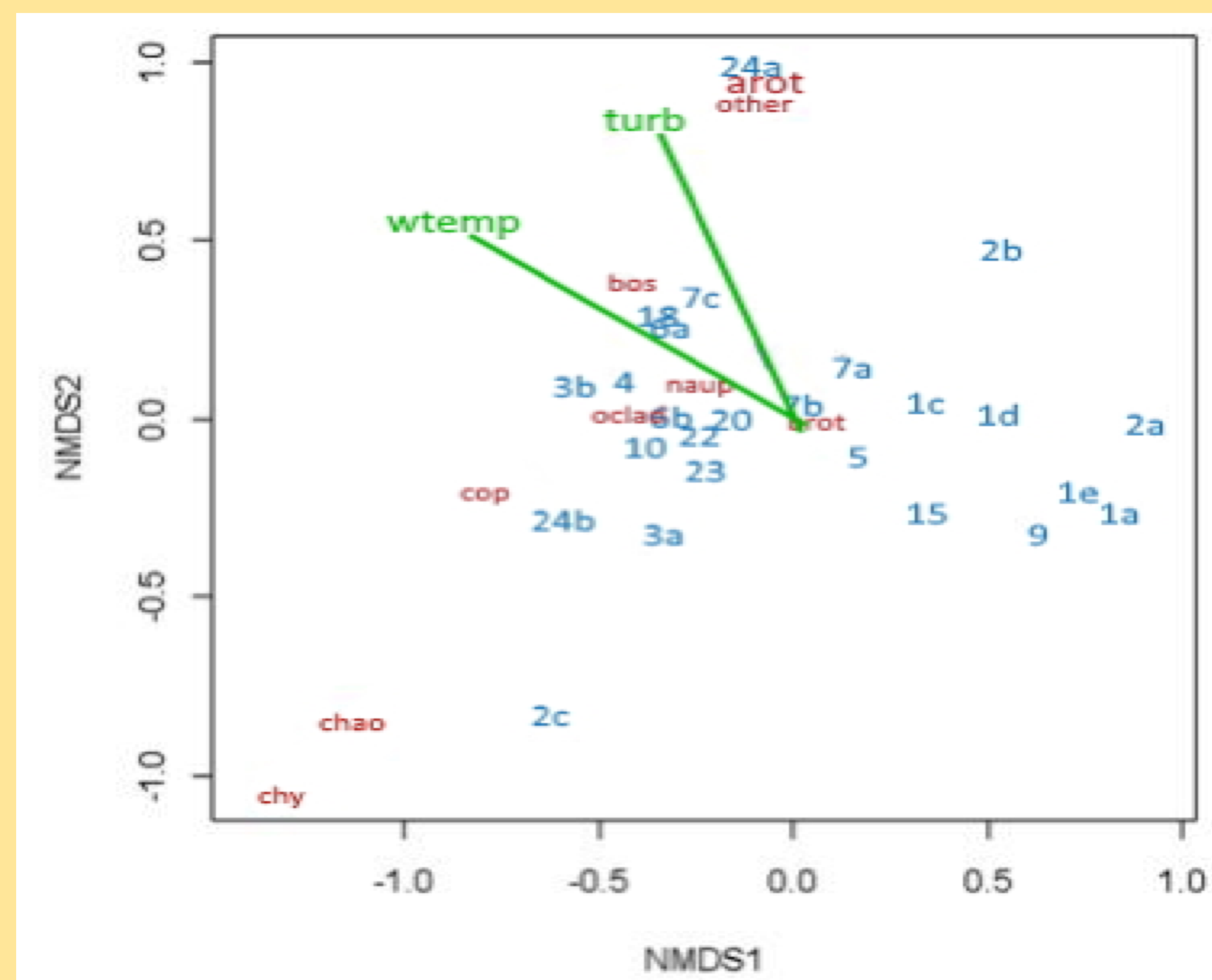

Figure 4: Non-metric Multi-Dimensional Scaling bi-plot of zooplankton biodiversity at Whitesbog on 6 October 2018 with significant environmental vectors fit to the ordination.

Q3. Results: Environmental predictors do not describe a major variation axis in zooplankton biodiversity

Future Work:

- Need to increase suite of environmental predictors (e.g. hydrology)
- Weekly sampling to bracket Cranberry Harvest; targeting Fall 2020