Examining the relationship between zooplankton abundance and piscivorous bird richness at the Arcata Marsh

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Introduction

- Examined the relationship between zooplankton abundance and piscivorous bird richness at the Arcata Marsh
- Food web dynamics (Vander Zanden and Vadeboncoeur 2002)
- **Hypothesis**: An increase in zooplankton abundance will lead to an increase in the population of piscivorous birds

Methods

- 12 time-constrained (20 minutes) perimeter walks per body of water (3 bodies total, 36 perimeter walks)

To compare zooplankton and bird richness:

  - 10x24 binoculars; direct observations/point counts
  - Plankton tow used to collect zooplankton
  - Zooplankton counted under microscope using 100/Species method (Mack et al. 2012)

- A poisson regression model was run to test for a relationship between zooplankton abundance and bird richness

Results

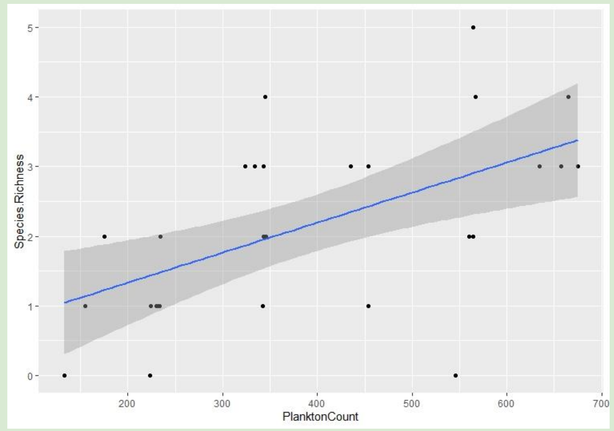

Figure 1. Total species richness counts plotted against zooplankton abundance across all study sites within the Arcata Marsh (Feb - April 2023).

Sites	Average Plankton Count	Average Species Richness
Brackish Pond	350	2.6
Klopp Lake	588.6	2.7
West Pond	218.3	1.1
Total	**385.6333333**	**2.133333333**

Table 1. Table of the average plankton count and species richness at each site(Feb - April 2023). *By City of Arcata*

Images

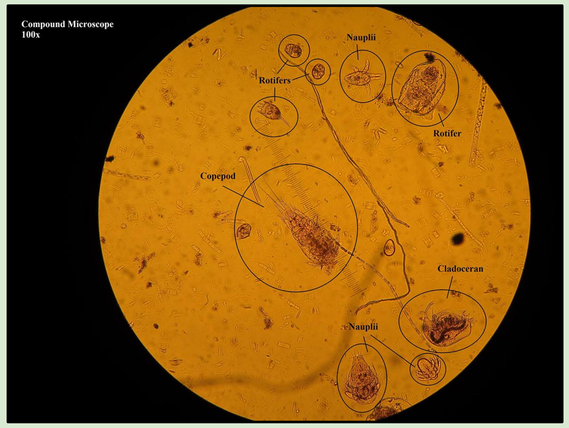

Figure 3. Microscopic image of zooplankton abundance, showing the variety of species and morphology present in the community. (Feb - April 2023). *By Illinois River Biological Station*

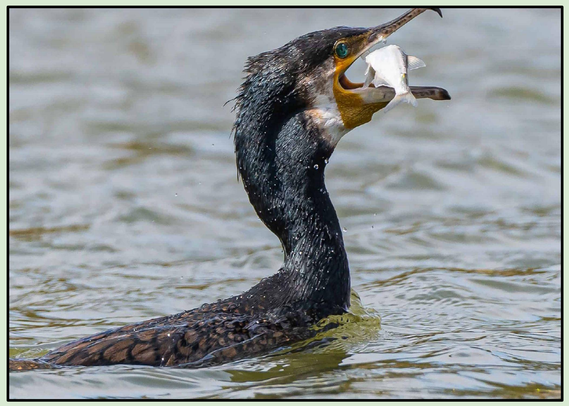

Figure 4. Piscivorous bird species include cormorants, blue herons, snowy egrets and more (Žydelis and Kontautas 2008). *By National Audobon Society*

Discussion

- Significant correlation (p=0.008) between zooplankton abundance and piscivorous bird richness in the three different ponds studied.
- Improvements:
  - Predictor variables
  - Expand sample size
  - Temporal variability

Literature Cited

- Mack, H. R., J. Conroy, K. Blocksom, R. Stein, and S. Ludsin. 1970. A comparative analysis of zooplankton field collection and sample enumeration methods. Limnology and Oceanography 10:41-53.
- Vander Zanden, M. J., & Vadeboncoeur, Y. 2002. Fishes as integrators of benthic and pelagic food webs in lakes. Ecology 83:2152-2161.
- Žydelis, R., and A. Kontautas. 2008. Piscivorous birds as top predators and fishery competitors in the lagoon ecosystem. Hydrobiologia 611: 45–54.

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