Temporal and Spatial Variability of Aquatic Insect Emergence in Pool 8 of the Upper Mississippi River

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OBJECTIVES

- Quantify temporal and spatial variability in aquatic insect emergence rates and biomass in the Upper Mississippi River (UMR).
- Determine if inundation duration and distance from main channel affect the emergence rates of aquatic insects.

INTRODUCTION

Aquatic insect life cycle and importance

- Aquatic insects spend much of their life in the aquatic ecosystem. Later emerging into the terrestrial ecosystem.
- Emerging Aquatic insects provide food for organisms such as fish (4, 6), birds, (3), bats (2), spiders (1), and lizards (5).
- Recent evidence suggests up to an 88% decline in adult mayflies on the UMR (7).

Knowledge gaps

- Spatial and temporal variability of aquatic insect emergence has limited data available.
- Drivers for aquatic insect emergence have little research.
- Not many studies have looked at the overall emergence of aquatic insects on the UMR.

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Worked Cited

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METHODS

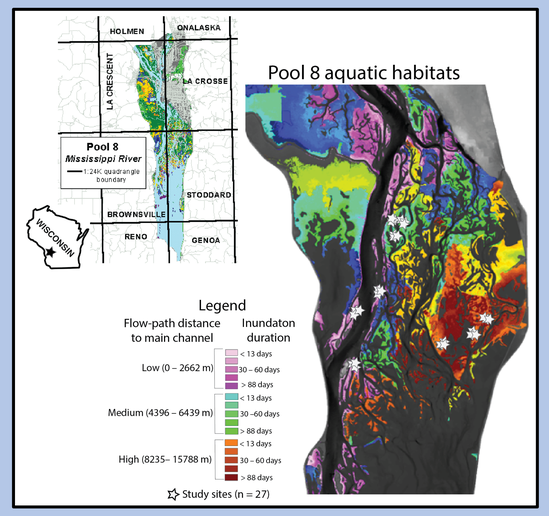

Figure 1: Map showing the distance from the main navigable channel and inundation duration area in Pool 8. Map was provided by Molly Van Appledorn and revised by Ross Vander Vorste.

Study Design

- Total sites 27
- Three sites for each distance class (Low , Mid, and High) and at each of those sites there was three different inundation levels (Low, Mid, and High)(Figure 1).
- Samples taken in June, July, and August
- Total of 99 samples taken

Field Methods

- Insect traps were placed in each site and left for 5 days (Figure 2). Each trap was visited every 1 to 3 days.
- Physicochemical data was collected to determine if this effected the emergence rate.

Figure 2: Photos of traps placed on the Mississippi River

Lab Methods

- Insects were frozen to prevent organic compounds from leaching out and affecting the dry weight of the insects.
- Insects will be identified down to family, and dried to determine the biomass.

RESULTS

Preliminary Results

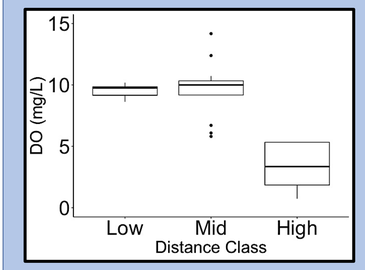

Figure 3: DO levels at each distance class.

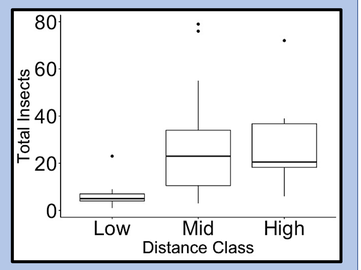

Figure 4: Total insects at each distance class.

As sample sites moved from the main channel the emergence increased (Figure 4). However, The high distance sites had very low DO levels possibly causing higher emergence rates of high tolerance taxa such as Dipterans (Figure 3). Which could cause reversed results with biomass measurements. There was no change in seen with inundation duration.

DISCUSSION

What does this information mean?

Spatial variability in insect emergence was influenced by a site's flow-path distance from the main channel. However, preliminary results showed no influence of inundation duration.
Emergence hotspots can occur at high distances away from the main river channel. Identifying these hotspots can help managers protect habitats key to sustaining aquatic-terrestrial linkages.

Future work

My study will be looking at samples taken in July and August to quantify temporal variability in emergence. Biomass measurements will be taken after identification.