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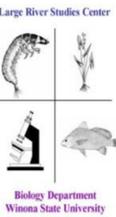
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FISH TROPHIC COMMUNITY COMPOSITION AT THE ONSET OF A CONNECTION EVENT IN A FLOODPLAIN RIVER

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Objectives

This study examined fish community structure based on feeding guilds at the start of a period of hydrological connection during a flood pulse of the Upper Mississippi River to:

- Identify similarities in fish feeding guild composition in different slackwater patches;
- Identify similarities in physical characteristics of the same slackwaters; and
- Determine linkages between feeding guild organization and physical characteristics of slackwater patches during the connection phase.

Methods

Study Area

The study was conducted on the Upper Mississippi River between Brownsville, MN and Alma, WI. This area is affected by flood pulses during the early spring. Flood pulses connect backwaters and floodplain lakes to channels which, in turn, can affect community composition within those patches. Samples for this study were collected late June – early July during the connection phase of a late flood pulse.

Sample Methods

- Ten slackwater patches, each with a different potential for hydrological connection, were sampled
- Fyke nets were set for 24 hour and fish were collected
- Boat electrofishing was used where possible
- Fish were organized into feeding guilds and sample effort was used to calculate catch per unit effort
- Cluster analysis was used to ascertain similarities in fish trophic structure and physical characteristics among the sites

Representative Study Sites

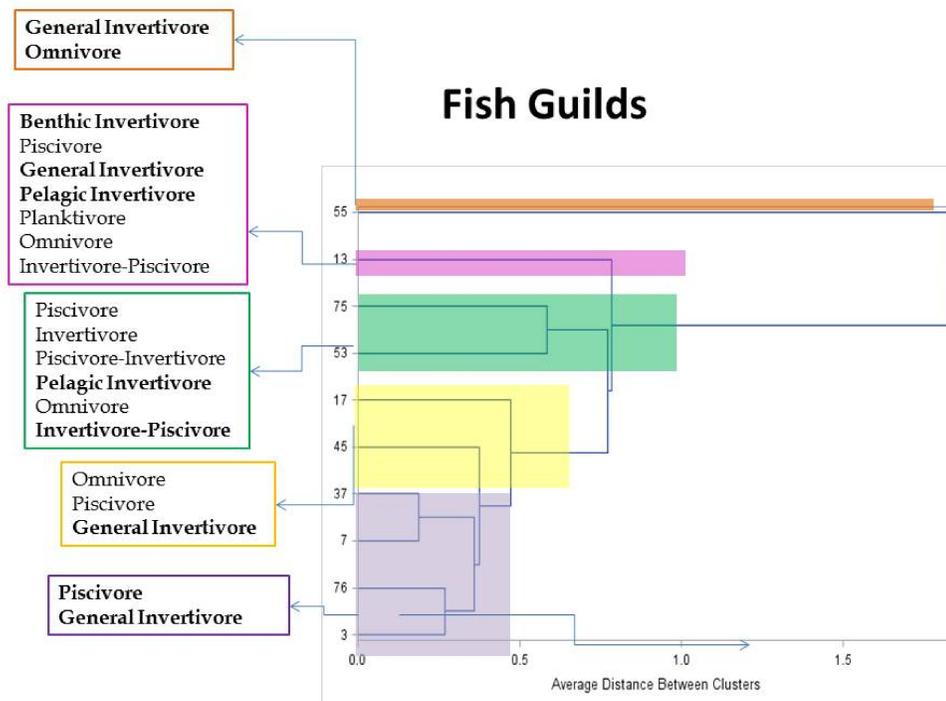


Figure 1 – Cluster analysis demonstrating similarities in fish community structure based on trophic guilds. Groupings are highlighted and text boxes identify the similarities in guild composition among sites. Guilds with greater abundance within a group of sites are in bold.

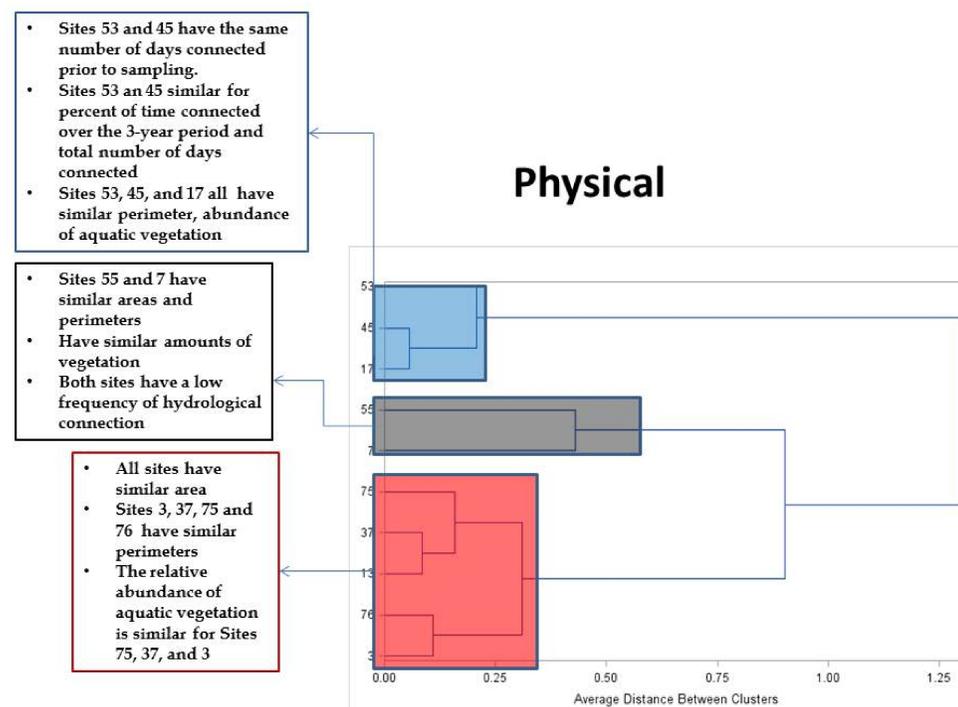


Figure 2 – Cluster analysis demonstrating similarities between physical properties. Groups are placed in matching colors. Text boxes describe common physical features for sites within a group

Results

- Neither Sites 55 nor 13 clustered with any of the other sites. Only two guilds were found at site 55 whereas, 7 guilds were found at 13 (Figure 1).
- Invertivores were most common at Sites 53 and 75 (Figure 1).
- General Invertivores was one feeding guild found in abundance in every cluster except in the cluster between the Sites 17, 45, and 37 (Figure 1).
- Pelagic Invertivores and Invertivore-Piscivores were the most common fish in Sites 53 and 17 (Figure 1).
- Members of the Invertivore-Piscivore guild were only among the most abundant in one of the clusters, as were omnivores (omnivores are classified here as species that consume both plant and animal matter).
- Area, perimeter, abundance of aquatic vegetation, and short-term and long-term measures of hydrological connection were primary factors in clustering of sites based on physical characteristics.

Conclusions

The combined results of the fish and physical data cluster analyses illustrates the general patterns of discrimination existed among sites. The grouping of sites based on physical characteristics reveal that hydrological measures and size/complexity (area, perimeter, and vegetation abundance) differs among slackwater patches but that commonalities exist. More detailed analysis may reveal how these physical characteristics shape trophic community composition in slackwaters. It is evident, however, that some patches are more robust in terms of number of trophic guilds and, based on findings (Figure 2), hydrological connection may be a driver of community structure.

Acknowledgements

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