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Analysis of EMAP Great Rivers zooplankton data: update and preliminary results

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Zooplankton are critical components of great rivers, linking primary production, microbial, and detrital resources to higher trophic levels. In wetland and lake ecosystems, zooplankton have proven to be useful indicators of environmental degradation. In this project, we hope to take the first steps in determining how to derive useful indicators for assessing ecological health in great rivers using zooplankton data. We divided zooplankton into two major groups: microzooplankton, which includes rotifers and copepod nauplii, and macrozooplankton, which includes cladocerans, adult and juvenile copepods. Rotifers are links to both the primary production and to microbial and detrital resources, and tend to dominate the zooplankton communities in great rivers. Crustacean zooplankton (copepods and cladocerans) are more directly linked to primary production. Separate sampling procedures were used for the two groups, as well as slightly different laboratory techniques for identification and enumeration. Our analysis of 2004 samples strongly supports our methodological decisions. Additionally, these results suggest that the majority of zooplankton studies grossly underestimate the abundance of rotifers. Patterns in species composition and community structure reveal strong longitudinal patterns in both the Upper Mississippi and Missouri rivers. These patterns appear to be correlated with major habitat alterations such as channelization and the presence of reservoirs, and land use patterns such as floodplain connectivity and the conversion of floodplain habitat to agriculture. Our preliminary results suggest that zooplankton may be useful indicators of the health and ecological integrity of Great Rivers.

John Chick is the Director of the Great Rivers Field Station for the Illinois Natural History Survey, and an Adjunct Professor in the Department of Natural Resources and Environmental Sciences at the University of Illinois in Urbana-Champaign. John has a Ph.D. in ecology from the University of Georgia, a M.S. degree in Fisheries and Aquatic Sciences from the University of Florida, and a B.S. degree in Wildlife and Fish Biology from the University of Massachusetts. The Great Rivers Field Station is one of six field stations collecting data for the Long Term Resource Monitoring Program on the Upper Mississippi River System (UMRS). In addition to working with the USGS on the LTRMP and the USPA on the Great Rivers EMAP project, John has active research projects addressing: (1) affects of invasive bighead and silver carp on native communities in the UMRS, (2) assessing spatial and temporal variability of fish community structure in the UMRS in relation to environmental factors, (3) the role of fish in seed dispersal of riparian vegetation in North American rivers, and (4) aquatic community responses to habitat projects in backwater lakes.