



Comparison of Great Lakes Zooplankton Communities



The large, deep-living crustacean zooplankton *Limnocalanus macrurus*, an indicator species of oligotrophic conditions and a historical dominant in the Great Lakes. Credit: USGS Great Lakes Science Center.

(July 25, 2019) A new paper published in the *Journal of Great Lakes Research*, authored by U.S. EPA contract scientists Rick Barbiero and Barry Lesht and Cornell University researchers Lars Rudstam and Jim Watkins, offers an unprecedented look at zooplankton communities across the Great Lakes during a period of great change in the lakes.

The study used data on open water zooplankton communities across all five lakes from 1997-2016 collected by the U.S. EPA Great Lakes National Program Office Biology Monitoring Program. The shifts in zooplankton community size and structure in lakes Huron, Michigan and Ontario documented by this study show that these communities are moving closer to the zooplankton community structure of Lake Superior, the least impacted of the lakes.

Zooplankton are a main conduit of energy from phytoplankton, such as algae, to higher trophic levels, such as fish, in the Laurentian Great Lakes. Thus, zooplankton are of great interest to both water quality and fisheries managers. In the nearly 20 years since the last published systematic survey of zooplankton across all five Great Lakes, the lower food webs in the Great Lakes have undergone rapid and dramatic changes. These changes have

included the expansion of dreissenid mussels into deep waters of the lakes, accompanied by the dramatic decline of the once-dominant benthic invertebrate *Diporeia* from substantial portions of the lakes.



(<https://www.glri.us/sites/default/files/zpnettow-lakeguardian.jpg>)

Zooplankton net tow from aboard the EPA research vessel, the R/V Lake Guardian on Lake Superior.

The new research showed that differences in summer zooplankton communities across lakes Superior, Huron, Michigan and Ontario have narrowed sharply in the past 20 years.

This paper represents, to our knowledge, the first presentation of comparative zooplankton community data across all five Laurentian Great Lakes using consistent sampling and analysis procedures. The U.S. EPA GLNPO Biology Monitoring Program is unique amongst Great Lakes monitoring programs in that it samples zooplankton in all five lakes on an annual basis. Sampling is conducted by one agency, and samples from each year are analyzed by one laboratory, so analytical methods and taxonomy remain largely consistent both across the lakes and over time. Funding is provided under the Great Lakes Restoration Initiative.

- [EPA's Great Lakes Zooplankton Monitoring \(https://www.epa.gov/great-lakes-monitoring/great-lakes-zooplankton-monitoring\)](https://www.epa.gov/great-lakes-monitoring/great-lakes-zooplankton-monitoring)

- [Zooplankton Monitoring Program: A Primer \(https://www.glri.us/node/145\)](https://www.glri.us/node/145)
- Download zooplankton data from the Great Lakes Environmental Database through [EPA's Central Data Exchange \(https://cdx.epa.gov/\)](https://cdx.epa.gov/)
- [Read and download a copy of the article \(https://authors.elsevier.com/a/1ZARx1MRgTbJD9\)](https://authors.elsevier.com/a/1ZARx1MRgTbJD9) (at no charge through July 25, 2019)
Barbiero, R.P., Rudstam, L.G., Watkins, J. M., Lesht, B. M. 2019. *A cross-lake comparison of crustacean zooplankton communities in the Laurentian Great Lakes, 1997-2016*. Journal of Great Lakes Research 45(3): 672-690.