

LAURENTIAN GREAT LAKES DIATOM TAXONOMY CHALLENGES

Elizabeth E. Alexson¹, Holly A. Wellard Kelly¹, Meagan N. Aliff¹, Euan D. Reavie¹, and Lisa R. Estep¹
¹Natural Resources Research Institute, University of Minnesota Duluth

Diatoms have played an important role in the management of the world's largest freshwater lake resource. Most of the early work on Laurentian Great Lakes diatoms was initiated by Gene Stoermer, Julie Wolin, and Claire Schelske as part of paleolimnology programs and other collections. The USEPA's Great Lakes National Program Office (GLNPO) pelagic long-term monitoring program has been observing diatom populations in the Laurentian Great Lakes since 1983 as part of a larger effort to better understand the lower food web. Despite previous work, diatom taxonomy in the Great Lakes remains challenging. Since 2007, we have been trying to sort out taxonomic problems and align our taxonomy with past analysts to allow for a continuous record of diatoms and other phytoplankton in the Great Lakes. Unfortunately, analyst artifacts and confusion around the taxonomy of cosmopolitan species (e.g. *Cyclotella sensu lato*, *Synedra sensu lato*, *Stephanodiscus* spp.) remain prevalent. We are now attempting to address these issues by re-analyzing archived samples from earlier GLNPO cruises and closely examining species complexes and other enigmatic taxa using microscopic imagery and morphometric analysis. Recently, we examined a group of small cyclotelloids and confirmed an undescribed species, *Pantocsekiella laurentiana* sp. nov., that is prolific in summer assemblages, especially in warmer, stratified surface waters that have been responding to recent atmospheric warming. Now, we are investigating several common species of *Synedra*: *Synedra radians*, *Synedra ostensfeldii*, and *Synedra filiformis* and its questionable variety *exilis*. SEM and LM imaging along with a morphometric analysis were conducted on samples collected aboard the EPA's R/V *Lake Guardian* from all Great Lakes. Analyses reveal differences in valve morphology that allow us to distinguish the species and provide documentation of these difficult, yet abundant, species.