

## **M.L. 2017 Minnesota Aquatic Invasive Species Research Center Subproject Abstract**

For the Period Ending June 30, 2021

**SUBPROJECT TITLE:** MAISRC Subproject 12.2: Historical analyses of spiny water flea invasion patterns

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**FUNDING SOURCE:** Environment and Natural Resources Trust Fund (ENRTF)

**LEGAL CITATION:** M.L. 2017, Chp. 96, Sec. 2, Subd. 06a

**SUBPROJECT BUDGET AMOUNT:** \$53,795

**AMOUNT SPENT:** \$53,795

**AMOUNT REMAINING:** \$0

### **Sound bite of Project Outcomes and Results**

After spiny water flea was first recorded in North America in the 1980s, sediment core analysis was heralded as a method to document the timing of lake invasions with implications for understanding and managing spread and threats. Our study casts concern on the method, revealing limitations to pinpoint early detection.

### **Overall Subproject Outcome and Results**

Spiny water fleas threaten Minnesota's lakes, including walleye health, but we do not understand how many years it takes for the threats to manifest once they invade. This project was a continuation of Subproject 12 where we sought to use evidence in lake sediments to determine the timeline of first presence and growth of spiny water fleas in Lake Kabetogama and Lake Mille Lacs. The results of Subproject 12 demonstrated that spiny water fleas have been present in both lakes continuously since the early 1900s. This timeline conflicts with data on first sightings that do not place spiny water fleas in either lake until the early 2000s. This gap of about 100 years suggests that our sediment analysis methods are biased. With Subproject 12.2, our main objective was to conduct two additional lines of inquiry to determine the suitability of our methods by 1) measuring natural rates of mixing in surface sediments of Lake Kabetogama and Lake Mille Lacs, and 2) searching sediment cores that were collected before first sightings of spiny water fleas in Lake Kabetogama. The results demonstrate that 1) natural rates of sediment mixing are not sufficient to explain the early presence of spiny water flea body remains in Lake Kabetogama or Lake Mille Lacs sediments, and 2) there is no evidence in historical core material that places spiny water fleas in Lake Kabetogama before their reported year of first detection in the water. We combined our results with results from scientists at Queen's University (Canada) who have recently used similar methods to ask similar questions, into a forthcoming publication in the Journal of Paleolimnology. In that publication we review our findings and caution the use of our methods to pinpoint early detection of spiny water fleas in lakes until further study of the methods is conducted.

### **Subproject Results Use and Dissemination**

We widely disseminated the results of Phase I of Subproject 12 (M.L. 2013) but we have not thus far disseminated any of the results in Phase II for two reasons. First, the COVID pandemic limited our opportunities. Second, the controversial nature of our results led to a hesitancy among us to share them until we had fully

analyzed all evidence and lines of inquiry, both in our data set and the data set contributed by our collaborating scientists at Queen's University. Peer-reviewed publications are in process and presentations on results will be given as a part of the MAISRC Showcase.