

2013 Project Abstract

For the Period Ending December 31, 2016

PROJECT TITLE: Aquatic Invasive Species Research Center Sub-Project 5: Developing and evaluating new techniques to selectively control invasive plants phase I A: manipulating sunfish to enhance milfoil weevils

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LEGAL CITATION: M.L. 2013, Chp. 52, Sec. 2, Subd. 06a

APPROPRIATION AMOUNT: \$194,415

Amount for this Activity: \$167,080

Overall Project Outcomes and Results

Eurasian watermilfoil (*Myriophyllum spicatum*) is one of the most widespread and problematic invasive aquatic plants in Minnesota. Approaches to improve its management are needed to reduce economic and ecological costs of invasive control. We focused on assessing factors that limit biological control of Eurasian watermilfoil by the native milfoil weevil and other herbivores.

Enclosure experiments to assess the effect of sunfish predation on herbivore and milfoil abundance were largely unsuccessful. Weevil populations developed in the enclosures but there were no differences in weevil or milfoil abundance due to fish stocking. We failed to recover stocked fish from the enclosures and suspect that predation by herons removed the fish. Realistic enclosure experiments in natural lakes may not be feasible and experimental manipulations might be better conducted in small natural or artificial ponds or in large tanks.

We assessed herbivore abundance in metro lakes and found milfoil weevils in 12 of the 19 lakes surveyed. Herbivore abundance was higher in 2015 than 2016, but abundance during both years was lower than some prior years. Only 1 weevil was found in over 450 sunfish stomachs examined, in part due to low milfoil weevil density in many lakes. Milfoil weevil abundance was negatively correlated ($r=-0.44$) with sunfish abundance; lakes with high sunfish populations (> 50 sunfish/trapnet) will likely not support sufficient herbivore populations and biological control should not be considered in these lakes until sunfish are reduced.

However, some lakes with low sunfish populations also have low herbivore densities and factors other than sunfish are apparently limiting herbivores and biocontrol in these lakes. Possible limiting factors

include lack of access to shoreline overwinter habitat, extensive mechanical harvesting or herbicidal control, and poor water or plant quality. Further work that also accounts for environmental variability is needed to identify factors limiting milfoil herbivores and biocontrol.

Project Results Use and Dissemination

Information on milfoil ecology and biological control has been provided on the MAISRC website and twice at the MAISRC showcase. A summary of the project was presented at the Upper Midwest Invasive Species Conference in La Crosse, WI. We provided overviews of our work to Ramsey-Washington Lake Association and the Minnesota Invasive Species Advisory Council.