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 B: factors influencing selective herbicide control of curlyleaf pondweed

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APPROPRIATION AMOUNT: $194,415
Amount for this Activity: $27,335

Overall Project Outcomes and Results

Curlyleaf pondweed (*Potamogeton crispus*) is one of the most widespread and problematic invasive aquatic plants in Minnesota. It sprouts from turions (winter buds) in the fall and winter and grows rapidly to the surface in the spring before senescing in early summer. Selective control can be attained with early-season herbicide treatments.

To provide an analysis of factors affecting curlyleaf abundance in untreated and herbicide-treated lakes, we collated pre-existing data from a variety of agencies and researchers; we analyzed data on curlyleaf pondweed frequency of occurrence and relative density from 60 lakes across Minnesota. The lakes had surveys conducted in May (pretreatment timing) or June (peak curlyleaf coverage) between 2006-2015; several lakes had data for all ten years. Forty-nine lakes had data for years not treated with herbicide, with one to eight years of data from each (mean of three years). Twenty-two lakes had data associated with curlyleaf pondweed herbicide treatments (one to nine years of treatment; mean of 3.8 years).

For the untreated lakes, productivity (as indicated by prior summer Secchi depth) and over-winter conditions (snow cover or ice duration) were important predictors of curlyleaf with greater curlyleaf abundance in lakes with higher productivity and milder overwinter conditions (shorter duration of ice cover and lesser snow depth). For herbicide treated lakes, consecutive years of treatment was also important; early season abundance decreased with more years of prior treatment. There were diminishing returns from repeated treatment and curlyleaf abundance can rebound quickly once treatment stops. June density and frequency appeared less affected by overwinter conditions and more by spring growing conditions and the effect of treatment that year. Mild winters will likely result in

more abundant populations that spring, and managers should plan for more extensive treatments following mild winters. Repeated treatments will decrease curlyleaf frequency and abundance, but must be sustained.

Project Results Use and Dissemination

Information on curlyleaf pondweed ecology and control has been provided on the MAISRC website and at the MAISRC showcase. The results of the curlyleaf pondweed analysis were presented at the 56th Annual meeting of the Aquatic Plant Management Society in Grand Rapids, MI and a summary of the analysis 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 State of Waters Conference. We plan to develop and submit a manuscript on the curlyleaf pondweed responses to a peer-reviewed journal by July 2017. The data set assembled and organized will also be used by a graduate student to further assess the response of native plants to curlyleaf pondweed abundance and control.