Talmadge Creek and the Kalamazoo River

Common Invasive Aquatic Plants in Michigan Lakes: The Usual Suspects

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Foreword

Our inland lakes have been vulnerable to invasions from invasive, exotic aquatic plants for many decades. Exotic aquatic plants are not native to a particular site, but are introduced by some biotic (living) or abiotic (non-living) vector. Such vectors include the transfer of aquatic plant seeds and fragments by boats and trailers (especially if the lake has public access sites), waterfowl, or by wind dispersal. In addition, exotic species may be introduced into aquatic systems through the release of aquarium or water garden plants into a water body. An aquatic exotic species may have profound impacts on the aquatic ecosystem. Many Michigan lakes have already experienced severe declines in recreational activities, navigation, aesthetics, and waterfront property values. Fortunately, there are effective tools available for successful management of these invasives. The summaries below offer brief educational introductions and photographs of common invasive aquatic plants currently thriving in many of our once pristine inland lakes.

Eurasian Watermilfoil and Hybrid Watermilfoil

Eurasian Watermilfoil (*Myriophyllum spicatum*; *Figure 1*) is an exotic aquatic macrophyte first documented in the United States in the 1880's (Reed 1997), although other reports (Couch and Nelson 1985) suggest it was first found in the 1940's. Eurasian Watermilfoil has since spread to thousands of inland lakes in various states through the use of boats and trailers, waterfowl, seed dispersal, and intentional introduction for fish habitat. Eurasian Watermilfoil is a major threat to the ecological balance of an aquatic ecosystem through causation of significant declines in favorable native vegetation within lakes (Madsen et al. 1991), and may limit light from reaching native aquatic plant species (Newroth 1985; Aiken et al. 1979). Additionally, Eurasian Watermilfoil can alter the macroinvertebrate populations associated with particular native plants of certain structural architecture (Parsons and Matthews 1985).

Hybridization of watermilfoil occurs when native species of watermilfoil cross-breed with Eurasian (exotic) Watermilfoil. In many of the cases, the hybrid watermilfoil will contain a thicker reddish stem when compared to native watermilfoils. Hybrid watermilfoil is a serious problem in Michigan inland lakes since the canopies are often more robust. A similar watermilfoil species that is considered to be exotic by some scientists (*Myriophyllum heterophyllum*) in New Hampshire was found to have significant impacts on waterfront property values (Halstead et al., 2003). Moody and Les (2007) were among the first to determine a means of genotypic and phenotypic identification of the hybrid watermilfoil variant and further warned of the potential difficulties in the management of hybrids relative to the parental genotypes. It is commonly known that hybrid vigor is likely due to increased ecological tolerances relative to parental genotypes (Anderson 1948), which would give hybrid watermilfoil a distinct advantage to earlier growth, faster growth rates, and increased robustness in harsh environmental conditions. In regard to impacts on native vegetation, hybrid milfoil possesses a faster growth rate than Eurasian watermilfoil or other plants and thus may effectively displace other vegetation (Les and Philbrick 1993; Vilá et al. 2000).

FIGURE 1: Eurasian Watermilfoil stem, whorls of leaves, and seed head © Restorative Lake Sciences

Curly-leaf Pondweed

Curly-leaf Pondweed (*Potamogeton crispus*; Figure 2) is an exotic, submersed, rooted aquatic plant that was introduced into the United States in 1807 but was abundant by the early 1900's. Curly-leaf Pondweed is easily distinguished from other native pondweeds by its wavy leaf margins. Curly-leaf Pondweed grows early in the spring and as a result may prevent other favorable native aquatic species from germinating. The plant reproduces by the formation of fruiting structures called turions. The plant does not reproduce by fragmentation like the Eurasian Watermilfoil; however, the turions may be deposited in the lake sediment and germinate during following seasons. Fortunately, the plant naturally declines around mid-summer in most lakes and thus may not always be prolific throughout an entire growing season. Curly-leaf Pondweed is a pioneering aquatic plant species and specializes in colonizing disturbed habitats. It is highly invasive in aquatic ecosystems with low biodiversity and unique sediment characteristics.

FIGURE 2: Curly-leaf Pondweed apical stem and leaves © Restorative Lake Sciences

Starry Stonewort

Starry Stonewort (*Nitellopsis obtusa*; Figure 3) is an invasive macro alga that has invaded many inland lakes of Michigan and was originally discovered in the St. Lawrence River in 1986. The "leaves" appear as long, smooth, angular branches of differing lengths. In very clear, deep lakes, the alga has been observed in dense beds at depths beyond several meters and can grow to heights in excess of a few meters. It prefers clear, alkaline waters and has been shown to cause significant declines in fishery spawning habitat. In late summer the macro alga produces distinct, hardened, white star-shaped bulbils that can serve as a propagation organ for future growth. The alga closely resembles the native macro alga Chara which has significantly smaller whorls with significantly shorter stem internodes.

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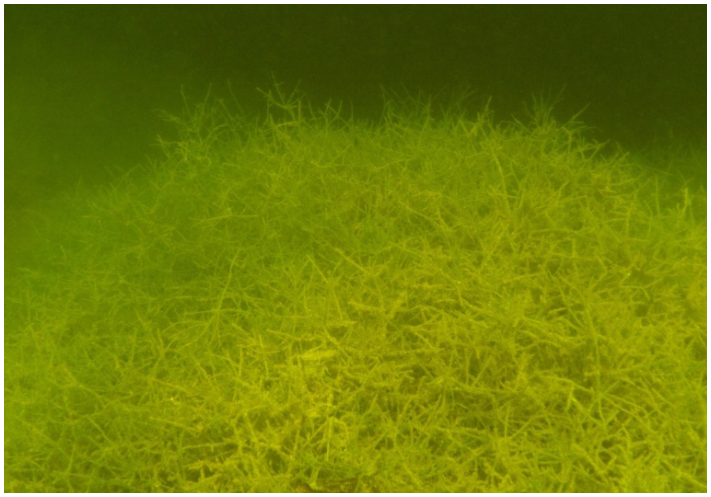

FIGURE 3: Starry Stonewort underwater colony © Michigan Lake and Stream Associations

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Purple Loosestrife

Purple loosestrife (*Lythrum salicaria*; Figure 4) is an invasive, exotic emergent aquatic plant that inhabits wetlands and shoreline areas. It has showy magenta-colored flowers that bloom in mid-July through late September. The seeds are highly resistant to tough environmental conditions and may reside in the ground for extended periods of time. It exhibits rigorous growth and may out-compete other favorable native emergents such as cattails (*Typha latifolia*) or native swamp loosestrife (*Decodon verticillatus*) and thus reduce the biological diversity of wetland and shoreline ecosystems. The plant is spreading rapidly across the United States and is converting diverse wetland habitats to monocultures with substantially lower biological diversity.

FIGURE 4: Purple Loosestrife flowering stem © Restorative Lake Sciences

FIGURE 5: Phragmites stem and seed head © Restorative Lake Sciences

Phragmites

Giant Common Reed (*Phragmites australis*; Figure 5) has a tall "sugar cane" appearance and may grow to heights of up to 18 feet. The plant is an imminent threat to the surface area and shallows of especially shallow lakes since it may grow submersed in water depths of ≤ 2 meters (Herrick and Wolf, 2005), thereby drying up wetland habitat and reducing lake surface area. In addition, large, dense stands of *Phragmites* accumulate sediments, reduce habitat variability, and impede natural water flow (Wang et al., 2006). It primarily outcompetes native emergent aquatic plants such as cattails and bulrushes and is difficult to control once established since it also reproduces via seed and through underground runners that quickly develop new viable shoots.

Concluding Remarks:

Although all of the aforementioned invasive aquatic plant species cause harm to our inland waters, there are alternatives for their management. Lake management professionals are able to recommend specific adaptive management treatment plans for particular infestations on a specific inland lake. For the emergent invasives there are alternative methods available such as the use of herbicides, mechanical removal, biological control, or hand-removal. For the submersed invasives, control methods consist of the use of aquatic herbicides and algaecides, mechanical removal, aeration/bio augmentation, dredging, or lake drawdown. At times, more than one of these methods may be used in a single lake to effectively address all of the invasives in the most ecological manner and for the best long-term results.

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