Beaver Lake
Eurasian Watermilfoil Manual Removal
&
General Lake Survey
Summer 2018

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Introduction

As good lake stewards it is important to regularly monitor plant diversity of a lake as it directly reflects the condition and resiliency of the aquatic community to environmental changes (Dennison et al.1993). As nutrient pollution increases, the state of a lake is altered as well as its ecosystem structure. This process, known as eutrophication, is linked with plant biomass, fish production, and water clarity. By looking at these characteristics of a lake, the state of eutrophication can be determined (Dodds & Whiles 2002). Native and non-native aquatic plants play a large role in this process. One such aquatic plant, Eurasian watermilfoil (Myriophyllum spicatum), an invasive non-native species, has negatively impacted many Wisconsin lakes. Its aggressive nature and dominance over native plant species has created a nuisance for lake users and is a detriment to overall lake health. (Buchan & Padilla 2000; SWERPC 2003). Other dominant characteristics of Eurasian milfoil include its year-round ability to maintain a large biomass, its early seasonal growth which inhibits other plants' access to nutrients and sunlight, and production of phenolic compounds that restrain algal growth and deter herbivores (Madsen et al. 1991; Gross & Sutfeld 1994; Gross et al. 1996).

Existing plant management practices on Beaver Lake based on plant surveys by Cason & Associates in 2012 – 2015 and chemical treatment of Eurasian watermilfoil beds in 2014 appear to have controlled the spread of Eurasian watermilfoil. The purpose of Wisconsin Lutheran College's (WLC) project in the summer of 2018 was to manually remove any recurring Eurasian water milfoil in the areas identified in previous surveys. In addition, WLC's faculty and students performed a visual survey of the nearshore waters of Beaver Lake to obtain a perspective on plant diversity in the lake and detect additional beds of Eurasian watermilfoil.

Methods

Visual surveys of the nearshore waters of Beaver Lake were made in July and August of 2018. Surveys were made by snorkeling and very slow motoring in a small boat along the shore of the whole lake (Figure 1). In areas not specifically indicated as snorkel surveys, small boat surveys were made with frequent in-water inspection of plant beds.

Manual removal of Eurasian watermilfoil was completed in two beds near the North central part of the lake. Plants were removed by hand pulling from the roots with care to prevent fragmentation. Those pulling the plants were followed closely by other collectors to retrieve any fragments and assure all Eurasian watermilfoil plants had been removed. Plants were placed in large floating tubs and taken to shore for disposal in upland compost piles (Figure 2).

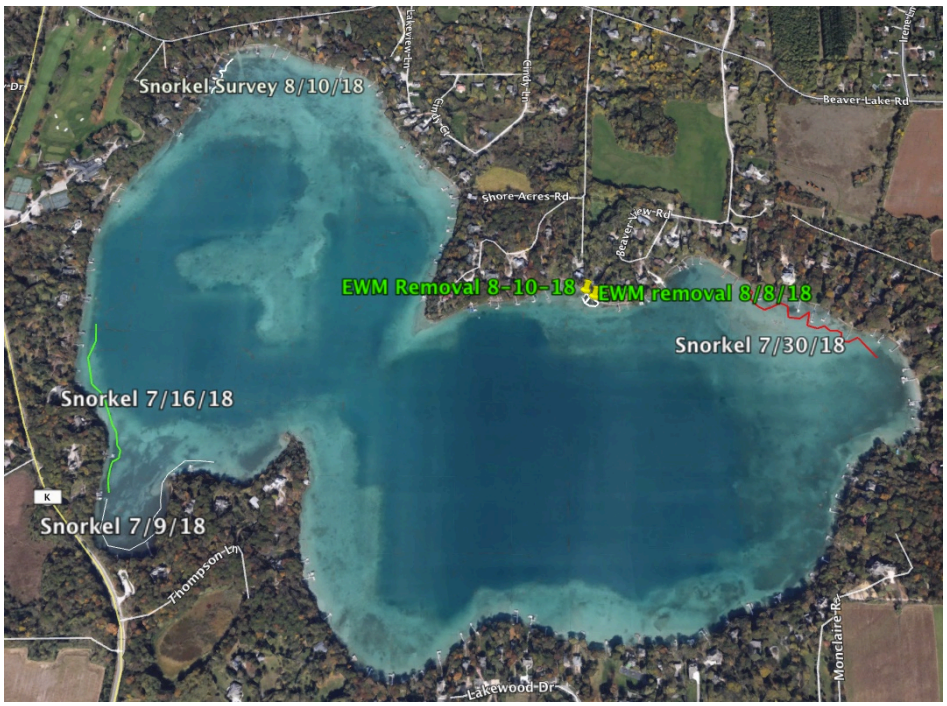

Figure 1: Beaver Lake visual survey and Eurasian watermilfoil (EWM) removal Locations during July and August 2018.

Figure 2: Eurasian watermilfoil manual removal from nearshore waters of Beaver Lake, August 2018.

Results and Discussion

Visual surveys revealed that the aquatic plant community is dominated by muskgrasses (*Chara spp*.) (Figure 3), with occurrences of slender naiad (*Najas flexilis*) (Figure 4), spiny naiad (*Najas marina*) (Figure 5), a small number of pondweed (*Potamogeton spp.*) (Figures 6 & 7) and wild celery (*Vallisneria americana*) (Figure 8). In many areas vegetation was quite sparse and in some areas forming a low lying mat of vegetation (Figure 9). Few areas provided the diversity of plant species that would provide habitat structure to encourage development of a diverse aquatic community. A review of plant surveys performed by Casson and Associates 2012-2015

Figure 3: Beaver Lake muskgrasses.

Figure 4: Slender naiad.

Figure 5: Spiny naiad.

Figure 6: Sago pondweed.

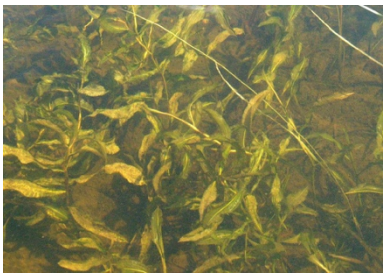

Figure 7: Variable pondweed.

Figure 8: Beaver Lake water celery

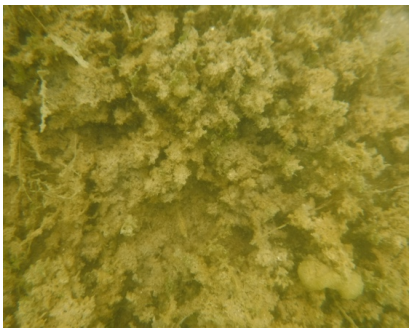

Figure 9: Beaver Lake plant mat.

revealed a decline in plant diversity from 15 to 10 species. This does not appear to be a result of dominance by an overabundant plant species but a decline in plant abundance around the lake. Plant diversity is a key component of a healthy aquatic community. Plants provide places for young fish to hide from predators as well as structure where aquatic insects and other invertebrates can attach and hide. Near shore waters of a lake with a vibrant plant community of underwater and emergent plants (Figure 10) not only provides good habitat but helps to prevent erosion and absorbs excess nutrients which assist in keeping the water clear. This type of natural shoreline can add beauty to lakefront property enhancing value while improving the lake ecosystem (Figure 11).

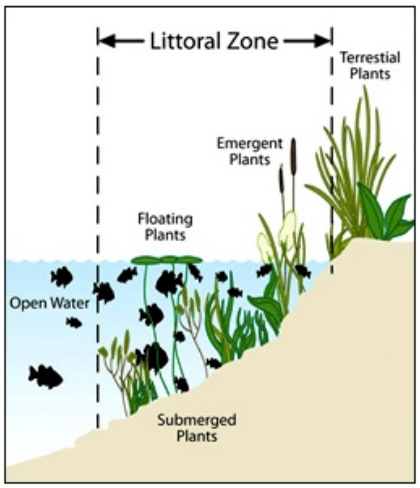

Figure 10: Aquatic plant Community

Figure 11: Shoreline plant community (LLA 2018)

Although it is important to encourage aquatic plant growth in lakes it is important to maintain a diversity of species. Aquatic insects and fish depend upon the diversity of the plants. Certain insects are able to thrive better on finely-dissected leaves found on coontail (*Ceratophyllum demersum*) or water milfoil (*Myriophyllum sibiricum*), while others prefer the flat leaves of eel grass (*Vallisnera americana*) or the broad leaves of large leaf pondweed (*Potamogeton amplifolius*) (Cheruvelil 2002). If one species of plant becomes dominant, the lake ecosystem may be thrown off-balance. Once introduced, an exotic species, such as Eurasian water milfoil (*Myriophyllum spicatum*), has been known to overtake many areas of a lake. It has the ability to grow up to the water's surface and form a canopy, thereby limiting the amount of sunlight that reaches the native aquatic plants on the bottom of the lake (Boylen et al. 1999). The decrease in light caused by the canopy not only reduces its competition, it also encourages its own stem elongation (Barko & Smart 1981). In this manner Eurasian water milfoil can severely reduce native plant diversity as well as reducing light and oxygen in the water column (AERF 2005).

The visual survey and manual removal of Eurasian watermilfoil during August of 2018 was done to prevent reestablishment and spread of Eurasian watermilfoil. Only two patches of Eurasian watermilfoil were found in the lake. Both patches were on the north central shore (Figure 1). A total of eight 30-gallon tubs of these invasive plants were removed and composted away from the

shore. Care was taken to remove the full plant including roots and to collect any fragments. Careful regular removal of recurring Eurasian milfoil plants should allow control of this invasive species without further chemical treatment.

Establishment of a more diverse plant community can be encouraged as more lake property owners establish shoreline plant communities. This type of shoreline reduces sediment erosion caused by wave action and may encourage growth of a greater variety of aquatic plants.

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