

Mechanical Removal of Aquatic Invasive Species on Jordan Lake, Adams County.

The Target

The target for mechanical removal of aquatic invasive species was Eurasian Water-Milfoil (EWM) (*Myriophyllum spicatum*). Due to operating in late summer/fall, Curly Leaf Pondweed (*Potamogeton crispus*) had died off and was not present. EWM was abundant and present throughout most of the littoral zone of Jordan Lake. We experimented with mechanical removal on both low and high density areas to get a representative sample on the effectiveness of mechanical removal on Jordan Lake.

Eurasian Water Milfoil (EWM)

EWM is a very prolific plant that doesn't spread much by seeds. It spreads mostly by fragments that can grow roots and start new plants. It may also grow shoots and runners that run along the lake bottom.

Handpulling

We conducted handpulling by snorkeling and scuba diving. We used several methods for EWM removal, which depended on the depth. We used various tools in the collection process as well. The tools used were dictated by the characteristics of the site (Depth and stem density).



We conducted visual surveys on kayak to identify potential handpulling areas.

Eurasian Water-Milfoil
(*Myriophyllum spicatum*)

Non-native



Highly invasive plant, able to form dense mats near the surface that entangle motor boat propellers and interfere with swimming. Spread by watercraft and trailers.

- Delicate feather-like leaves. Leaflets are mostly the same length.
- Leaves are usually limp when out of water.
- Leaves arranged in whorls (circles) of 3 to 5 around stem.
- Usually 12 to 21 leaflet pairs per leaf.
- Long spaghetti-like stems.

If you suspect a new infestation, report it to your local DNR service center.

Printed on Recycled Paper

LP/04

EWM collection bags; these collection bags worked perfectly when snorkeling or SCUBA diving.



Two floating containers that were used in shallow harvesting (left), a burlap sack that was also used to help strain out water from plant mass (right), and a minnow net that could be used by a person in a kayak to collect floating fragments (bottom right) are all examples of the tools we used.



Mechanical Removal Procedures

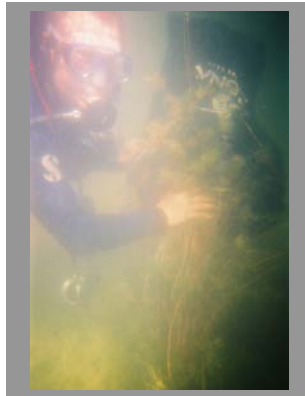


SCUBA Diving



Snorkeling

We pulled Eurasian Water-Milfoil (EWM) by snorkeling and scuba diving. Snorkeling proved to be far more effective in shallow areas (0-8ft deep). In deeper areas snorkeling became increasingly more difficult and SCUBA equipment was used. We used the same method of EWM removal for both snorkeling and SCUBA diving.



The top part of the plant is placed into a collection bag

Since EWM can propagate by fragmentation, it is best to place the plant in the collection bag before proceeding to pull to reduce lost fragments. It is also helpful to do this slowly to prevent fragmentation of the fragile plant.



The collection bag is pulled down over the plant down to where the roots start

The removal of the root mass is essential for prevention of reoccurrence. Once the top part of the plant is placed in the collection bag, follow the stems down to the lake substrate and extract the root mass. It is best to do this slowly, as fast movements increase the amount of sediment released into the water impacting visibility.



The root mass is removed by hand and shaken to remove excess sediment



Mechanical Removal Procedures

Disposal

At the end of each day the harvested EWM was laid out to dry for at least a day before loading it into heavy duty garbage bags. This cut down on weight when having to transport the EWM for disposal

We took harvested EWM to local gardeners who plan on mixing the plant material in with their compost.



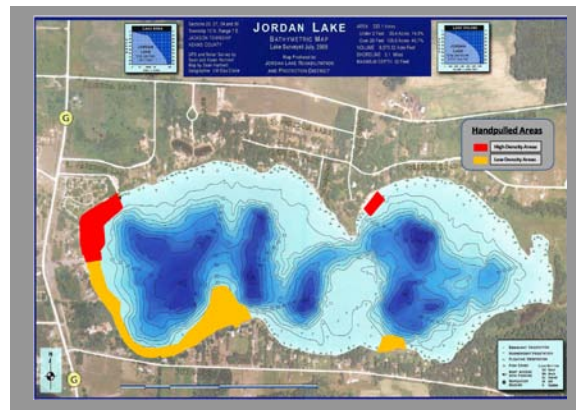
Plant material was laid out to dry before being placed into heavy duty plastic bags.



Hand Harvested EWM was taken to a local gardener to be used in compost.

Experimental Design

To our knowledge, handpulling has never been used as a method of control in Jordan Lake. Chemical treatment and weed cutting have been the only methods used. As a result, we conducted kayak and boat surveys in order to get an idea of the locations and densities of EWM. We decided to concentrate our efforts on two areas (see Lake Map below): one of low stem density (orange) and one of high stem density (red).



Approximate location of hand harvesting Jordan Lake, WI September 2009.

Results

EWM removal in the low density areas required much more searching and yielded lower amounts of biomass than did the high density area. Also, due to the amount of EWM in high density areas we are unable to cover as much area as in lower density areas.



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Results (cont.)

While we did remove a significant amount of EWM from these areas, we cannot measure the effectiveness of our efforts at this time. It is not reasonable to assume that we removed all of the stems and that no fragmentation occurred. Measures can be taken to survey these areas in future years to see if the sites were re-colonized. If no new colonization is observed, new sections of high stem density can be pulled.

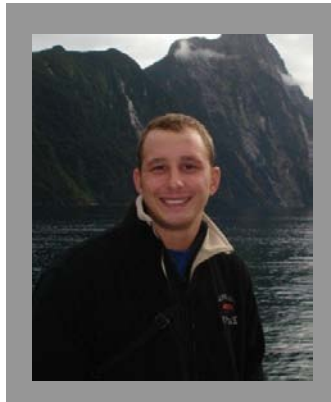
We removed a total of 3673 pounds of EWM from Jordan Lake beginning on 9 September and through 26 September 2009.

Benefits

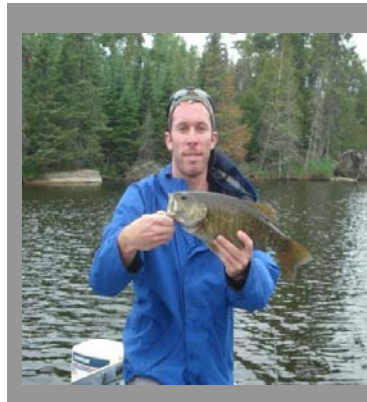
Mechanical removal of EWM via handpulling has numerous benefits. First, it allows for removal of entire plant: root mass, stem, and leaves. Individual patches and particular areas can be targeted, and any visible EWM can be completely removed.

Chemical treatment, raking, or cutting may not be as precise. Handpulling can help to reduce or eliminate the need for chemical treatment. Ultimately, this could reduce the negative effects on non-target species and the ecosystem. Lastly, a better understanding of the structure, stem density, and frequency of EWM can be gained from in water handpulling compared to above water surveys.

**“GET DOWN TO THE ROOT
OF THE PROBLEM, AND
PULL IT!”**



Zachary Strack



Ben Kramlich

Your Environmentally Friendly Aquatic Landscaping Technicians

Special thanks

We would like to acknowledge some of the people that helped make this project happen. We would like to thank the Larsons for letting us use their wide array of dive equipment, the Flanagans for their Kayak, Dive Point for discounts on tank rentals, Carol Strack for housing us and letting us use her pontoon for pulling, and lastly Karl Frickelton, Mike Backus, and Dan Schleiter who worked closely with us, and JLRPD for giving us this opportunity.