

**Eradicating Water Chestnut (*Trapa natans*)
In Belleville Pond, North Kingstown, Rhode Island
And Surrounding Areas
Using a Community-Based Rapid Response System
Follow-up Report**



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NATURAL HISTORY SURVEY

Providing Ecosystem Science and Information

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INTRODUCTION

Water chestnut (*Trapa natans*) is an invasive freshwater plant native to Eurasia that causes significant ecosystem dysfunction when its populations become large. In states such as New York, Vermont, Massachusetts, and Connecticut water chestnut control efforts have become large and often extremely expensive. The population of water chestnut discovered in Belleville Pond, North Kingstown, is the first record of water chestnut found in Rhode Island. A graduate student under Professor Frank Golet discovered this plant in October 2007. The Rhode Island Natural History Survey (RINHS) organized an effort to create a community-based rapid response to an invasive species discovery. RINHS connected different local groups in North Kingstown and surrounding areas such as Friends of Hunt River Watershed, Buckeye Brook Coalition, and Land Conservancy of North Kingstown. Rhode Island Department of Environmental Management also contributed to the effort. A day called the “Big Pull” was planned where volunteers would gather in an attempt to eradicate this species from Belleville Pond before the population grows to be a problem.

THE “BIG PULL”

The “Big Pull” was conducted on Saturday, July 12, 2008. The middle of July was selected because the plants are big enough to locate easily but also have not yet dropped their seeds. Nine volunteers came to the pull day, bringing with them a total of five canoes and three kayaks to search the pond. The pull was scheduled between 9:00 a.m. and 12:00 p.m.; however most volunteers were on the pond and removing plants from 9:30 to 11:30. An estimated total of 16 person hours were spent pulling water chestnut plants on July 12. Buoys were set up at three points in the pond in order to mark the main population of water chestnut to help volunteers easily navigate to the plants. Two canoes were attached together with two two-by-fours and rope to create a raft with one paddler in each canoe. Volunteers were provided with large plastic totes that held up to an estimated 40 lbs of plant material when filled. The volunteers transported these totes to the area of the population via canoe and subsequently filled them. People using kayaks were provided with 5 gallon buckets that they held between their legs in the kayak. Some volunteers using kayaks decided to drop off their plants into a plastic tote in a nearby canoe or in the raft.

The plants were disposed of by dropping them into a 4x4 foot, 3 foot deep pit dug by North Kingstown’s Parks and Recreation Department. Nine full totes were dumped into this pit on the day of the “Big Pull,” an estimated 350 pounds of material removed from the pond. The pit was dug on the Thursday before the pull day and filled on the Monday after the pull.

THE RAFT

As mentioned above, a raft was constructed using two canoes and two two-by-fours. The raft was problematic because it had very low maneuverability in wind. Additionally, two people paddling this canoe is sometimes not enough to navigate the raft into narrow areas where the water chestnut plants were. The raft did allow for a rider to stand up in it, allowing for the person to have a better view of the surface of the water. This is useful for

scoping out patches of water chestnut amongst other floating plants. If the raft could be anchored, it would also be useful for a drop-off area of pulled plants or an area where water and snacks can be accessible to those in kayaks.



Volunteers on Belleville Pond, July 12, 2008.

CONTINUED REMOVAL

The water chestnut population was not fully removed by volunteers during the “Big Pull.” Five days later, RINHS staff went back to Belleville Pond for a follow-up removal of the plants. After three hours, totaling 6 more person hours, the staff pulled an additional tote-full of plants out of the pond. Adding this day created a total of 390 pounds of water chestnut removed from Belleville Pond. While searching for plants in Belleville Pond on this day, staff members canoed to the inlet at the upper northeast part of the pond. It was noted that the water in this area was significantly colder than the rest of the pond and although water chestnut plants were seen nearby, none were growing in the immediate area. Staff members also confirmed on this day that still more plants remained in the pond.

On July 22, 2008, interns from RI DEM went to Belleville Pond to observe the remaining population and to remove plants they discovered. 47 plants and 105 seed pods were pulled from the pond. These same interns returned to Belleville Pond again on July 25, 2008, to search the pond. They pulled an additional 35 plants and 4 seed pods, making a total of 82 plants and 109 seeds removed by RI DEM on these two days.

FINDING THE SOURCE

The source of the Belleville Pond population of water chestnut is still unknown. Searching surrounding water bodies will become a priority now that the “Big Pull” has occurred. One volunteer has already spent 2 hours at Secret Lake, which sits south of Belleville Pond. This volunteer did not find any plants during the time that they looked.

During the “Big Pull” and in the subsequent trips afterward, it was noted that one seed pod can produce several rosettes of varying sizes arising on multiple bifurcations of the main stem. When a main rosette is pulled, smaller rosettes some distance away can be pulled under water and become hidden or can break away from the plant entirely and survive without rooting in a substrate. On the subsequent trips, it was observed that there were many freely floating small rosettes that showed no evidence of decay. Further, one was observed to be flowering and one to be setting seed. This evidence suggests that vegetative reproduction is extremely important in the dispersal of water chestnut. These detached rosettes have the ability to drift to any part of the pond and drop viable seeds there. This observed evidence for vegetative reproduction as a means of dispersal, argues strongly that this water chestnut population came from a boat or piece of equipment associated with boats. Since the population didn’t originate at Belleville’s canoe launch, it is possible that a boat’s anchor or a piece of fishing gear held a fragment of water chestnut that was then dropped into the pond. Belleville Pond is a popular waterfowl hunting area, and the population of water chestnut is located in the area hunters are allowed.

PRACTICAL LESSONS

The water chestnut population in Belleville Pond is not in one specific patch of the pond. It is dispersed among other floating vegetation making it hard to spot. This was a problem during the “Big Pull” and also during subsequent visits from individuals. It was also observed that when kayaks or canoes move over a rosette, the rosette submerges. This makes spotting the plants even more difficult, especially if several canoes or kayaks are moving over the population at once. The submerged rosettes also did not resurface until much later, even days later, after a wind storm. Volunteers had trouble finding all the water chestnut plants due to the disturbance of other volunteers and the time it took for the rosettes to resurface.

SUGGESTIONS

Belleville Pond is owned by the town of North Kingstown, so warning signs about the spread of invasive species made and distributed during fall 2007 by Rhode Island’s Department of Environmental Management are not posted at the canoe launch. Urged by RINHS, North Kingstown’s town manager and Department of Parks and Recreation have inserted a sign provided into the bulletin board located in front of the launch area. Hopefully this sign will help deter the further spread of water chestnut and other species in Belleville Pond and beyond.

The eradication effort was originally planned to take one day of volunteer pulling along with a few monitoring visits the rest of the summer. On the day of the “Big Pull” it was discovered that the water chestnut population had grown larger than expected and had

infiltrated many areas of the pond. Eradication can still be achieved; however the amount of time this will take needs to be changed. A pull event for next summer should be planned, preferably happening on two different days with about three days between. This will ensure that many of the plants missed during the first pull have a chance to resurface, be seen, and get pulled on the second day. This also makes follow-up monitoring visits more about finding stray individuals that can start new populations rather than pulling up more plants in the known area.

CONCLUSION

With control efforts every year, the water chestnut population could stay small and not cause a loss of ecological or recreational value to Belleville Pond. If community interest is strong enough, it is possible to eradicate the population in the next few years. The control efforts proper for water chestnut are determined by the biology of the plant, in particular its ability to spread through vegetative means and the tendency of large pulling efforts to mix up floating plants and hence miss small water chestnut rosettes. Control efforts should be planned with an emphasis on many small-scale pulls separated by a week or so in time, as opposed to fewer larger scale efforts. Monitoring of the population in Belleville and further searching for other populations should continue regardless.

SUPPORT

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