



## Community Preservation Committee Littleton, Massachusetts

The CPC was established by Town Meeting in 2007. The CPC has the powers and responsibilities specified by Massachusetts General Law Chapter 44B, section 5(b), the Community Preservation Act.

### Community Preservation Application for Funding

Date: 03.15.24

**Project Title:** Invasive Water Chestnut Harvesting in Doleful Pond

**Name of Applicant:** Jonathan Folsom, CLC Chair

**Name of Organization:** Clean Lakes Committee (CLC)

**Address:** c/o Littleton Water Department, 39 Ayer Rd, Littleton MA 10460

**Telephone:** (978)501-6173

**Email:** jfolsom56@gmail.com

**CPA Category** (circle all that apply):

**Open Space**

**Historic Preservation**

**Recreation**

**Community Housing**

**CPA Funding Requested:** \$1,600

**Total Project Cost:** \$1,600

Please attach answers to the following questions. Include supporting materials as necessary.

1. **Project Description:** Please give a detailed project description, including specific objectives.
2. **Goals:** How does this project accomplish the goals of the Community Preservation Plan for Littleton? (See Guidelines for Project Submission for general criteria)
3. **Timeline:** What is the schedule for project implementation, including a timeline for all critical milestones? Will this be a multi-year project?
4. **Budget:** Please provide a full budget including the following information, as applicable. (NOTE: CPA funds may not be used for maintenance):
  - a. Total amount of the project cost, with itemization of major components.
  - b. Additional funding sources. Please include those that are available, committed, or under consideration.
  - c. Describe the basis for your budget and the sources of information you used.



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5. **Support:** Have the appropriate Town Boards and Commissions expressed support and/or approved the project? What is the nature and level of community support for this project?

Submit this form and accompanying materials to:

Community Preservation Committee  
c/o Town Clerk Office  
Town Offices  
37 Shattuck Street  
P.O. Box 1305  
Littleton, MA 01460  
978-540-2401  
townclerk@littletonma.org

Please provide one paper copy as well as an electronic (pdf) file.

The Clean Lakes Committee thanks you, the members of the Community Preservation Committee, for considering our request to fund efforts to improve Littleton's important water resources. Without continued stewardship and attention we risk losing these irreplaceable community assets.

Jonathan Folsom CLC Chair

### **Invasive Water Chestnut Harvesting in Doleful Pond**

Located in the Newtown Hill Conservation Area off Newtown Rd near Tahattawan Road, Doleful Pond is surprisingly secluded for its proximity to Route 2. While not a well-known location to most people, the CLC has dealt with Doleful Pond for years due to the periodic recurrence of invasive Water Chestnut.

Water Chestnut is an aggressive aquatic plant that forms a dense mat of vegetation. It impedes everything from aquatic wildlife to man. Water Chestnut plants produce nuts, which contain seeds. The nuts have sharp barbs that have been known to attach themselves to waterfowl, spreading the aggressively invasive aquatic plant to wherever the birds travel. Once established, Water Chestnut is highly resistive to removal – their seeds drop to the bottom of the pond they're in and remain viable for 12 years. Our plan is to restrict Water Chestnut to Doleful Pond.

CPC funding would provide \$1,600 to survey and harvest Water Chestnut in Doleful Pond. The work would be done by a licensed environmental firm under contract with the Littleton Water Department.



Figure 1 Doleful Pond, Littleton MA

Google Maps

## **PROJECT: HARVESTING INVASIVE WATER CHESTNUT IN DOLEFUL POND**

**TARGET:** Invasive Water Chestnut. (See attached cut sheet.) There are no natural controls on this aggressively invasive aquatic plant. Without active management it will proliferate, generating a dense mat of vegetation across the surface of the pond. It is a threat to the ecosystem wherever it is established. That threat is compounded by the risk of its spread. Water Chestnut produces barbed nuts that can easily attach themselves to waterfowl, potentially introducing the invasive wherever ducks and geese land.

**HISTORY:** The CLC has monitored Water Chestnut in Doleful Pond for 20 years, harvesting new growth when it is found. It occurs elsewhere as well. It is present and is being managed in both the Concord and Assabet rivers.

Attention to this invasive species is crucial this year since budget restrictions prevented the CLC from conducting a survey in 2023.

**PROCESS:** Water Chestnut is best removed by hand, although there has been some success with herbicides. It is easiest to pull in late spring but can be harvested deep into summer. The best course of action will be determined by the environmental firm who wins the contract.

**SCOPE, DURATION & BUDGET:** The extent of the work will be determined by a pond survey. The requested funding of \$1,600 is based on past quotes. It is expected that the bulk of the work will be completed in 1 day.

Our request for full funding of this project from the Community Preservation Committee arises from a lack of alternative resources. As a result of an April 2021 decision by the Massachusetts Department of Revenue regarding the proper use of enterprise accounts, the CLC can no longer access the monies that were originally earmarked for committee use. For many years profits from a cell tower on Littleton Water Department (LWD) land provided our funds. In fact, those profits should be for LWD use only – i.e. providing clean drinking water to their customers. While the Littleton Water Commissioners have been more than generous during our transition, the CLC must find new partners to help provide our services.

**PROJECT OBJECTIVES:** The CLC's first objective is to preserve the ecology of Doleful Pond. By monitoring and harvesting existing invasive Water Chestnut we encourage the success of native aquatic plants. We also help stabilize conditions for local wildlife. Second, we aim to prevent the spread of Water Chestnut to Fort Pond and Long Lake. The ease of this occurring is alarming, and the consequences would require an even greater effort to somehow control.

**HOW HARVESTING WATER CHESTNUT ACCOMPLISHES LITTLETON'S CPA GOALS:** Lakes and ponds enhance our open space and provide a crucial habitat for wildlife. More than that, they are key to the whole network of regional water resources. It is vital that we ensure their preservation. The community and the CPC could help us address this cause. Furthermore, we recognize that the problems that threaten the waterbodies we treasure are often caused by us. Nutrient imbalances and pollution – even infestations of invasive plants – are largely attributable to man. It's reported that invasive Water Chestnut was first introduced in the United States around 1900 by a gardener who thought it would be good to plant it in Fresh Pond in Cambridge. It has since spread as far as Virginia.

# Water Chestnut: An Exotic Invasive Aquatic Plant

*Trapa natans*



## Description

- Water Chestnut is an annual, rooted floating leaved non-native plant that can form dense impenetrable mats at the water's surface.
- The green triangular 2-4 cm wide floating leaves form rosettes, which are attached to the main stem by an inflated petiole (leaf stem). The upper side of the leaves is waxy and shiny and the underside is coated with fine hairs. An air bladder is located at the base of the floating leaves, and the leaf margins are wavy.
- The submerged leaves are feathered and whorled around the stem.
- The slender stems can reach lengths of 15 feet.
- Small white flowers with 4 petals develop from July until the first frost.
- Nuts are 3 cm large and armed with 4 very sharp ½" barbs.

## Water Chestnut

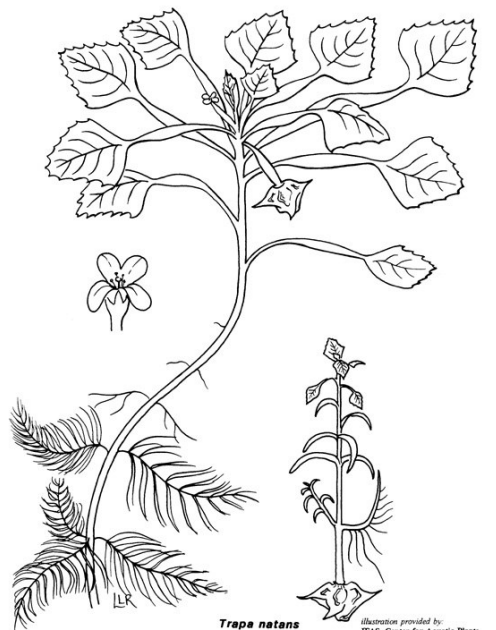


illustration provided by:  
IFAS, Center for Aquatic Plants  
University of Florida, Gainesville, 1996

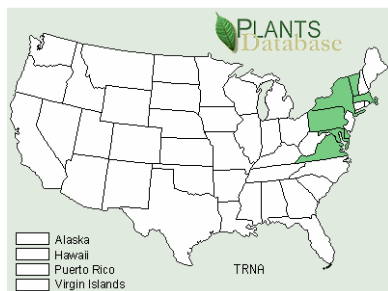
## Habitat

Water Chestnut is a very hardy species that is well established in the Concord River and Charles River systems and continues to spread across the state.

- Prefers quiet, nutrient rich water bodies but can occasionally be found in slow moving water.
- Can withstand a pH range of 6.7-8.2 and can over-winter in the frozen lakes of northern climates.

## Distribution Map

### *Trapa natans*



states with Water Chestnut infestations

## Reproduction

Water Chestnut reproduces primarily via the production of nuts.

- Each nut can produce 10-15 plants and each of these plants may produce up to 20 seeds.
- The 6 gram nuts are released in the fall and quickly sink into the sediments, where they can remain viable for up to 12 years. Nuts have also been observed attached to the feathers of waterfowl, and are possibly spread to new locations if the birds travel.
- *T. natans* seeds can float downstream or attach to wildlife to disperse and begin new colonies.

## Impacts and Threats Posed by Water Chestnut

Water Chestnut is a highly competitive plant that is capable of rapid growth and spread. Water Chestnut displaces native species, reduces biodiversity, hampers recreational uses, reduces real estate value and diminishes aesthetic values.

- *T. natans* can negatively impact native vegetation and fish populations by forming large dense mats of vegetation on the water surface, thus intercepting sunlight to the exclusion of other submerged plants.
- The thick mats greatly impede boaters, fisherman, water skiers and swimmers, and these limitations on water use can negatively impact real estate values.
- *T. natans* can deplete the available oxygen in the water, and the resulting low oxygen condition (anoxia) can lead to fish kills and harm other aquatic organisms.
- The sharp ½" barbs can penetrate shoes with leather soles and pose a hazard to swimmers and beach visitors.
- *T. natans* can trap organic matter (which creates breeding grounds for mosquitoes) and silt (leading to increased sediment level).



Sharp barbed nut

## Management Methods

Management methods currently include mechanical removal, drawdowns and herbicides. No known biological controls exist.

- Hand pulling and mechanical harvesting are suitable removal techniques. These methods should be performed before the nutlets are released in the fall.
- Drawdowns can be an effective mode of Water Chestnut control if the drawdown is of adequate time and depth to prevent re-growth from seeds. Drawdowns may affect fish, reptiles, amphibians, aquatic organisms and downstream conditions.
- Herbicides, such as 2,4-D have been used to control Water Chestnut.



*T. natans* leaves



Hand pulling *T. natans*



*T. natans*

## Other Information

- Water Chestnut is on the Massachusetts Prohibited Plant List (as of January 1, 2006)
- For more information on hand pulling visit: <http://www.northeastans.org/docs/waterchestnutpull.pdf>
- Water Chestnut is native to Eurasia and was planted intentionally in Fresh Pond, Cambridge MA (and a few other ponds) in 1897 by a gardener. The plant rapidly spread into nearby rivers and ponds, and reached western portions of the state by 1920.
- Water Chestnut is considered rare in many of its original native regions.
- The fruits of *T. natans* have been used in liniments for treating sunburns and sores.
- Over 3 million dollars have been spent on Lake Champlain, VT from 1982-2000 to remove Water Chestnut.
- During a single season, one acre of Water Chestnut can produce enough seeds to cover 100 acres the following year.
- Informational websites:
  - <http://infoweb.magi.com/~ehaber/factnut.html> (Invasive Exotic Plants of Canada)
  - <http://www.anr.state.vt.us/dec/waterq/ans/wcpage.htm> (Vermont State Web site)
  - [www.ProtectYourWaters.net](http://www.ProtectYourWaters.net) (Aquatic Nuisance Species web site)
  - [http://www.ipcnys.org/ipc\\_twentytn.html](http://www.ipcnys.org/ipc_twentytn.html) (Invasive Plant Council of NY)
  - <http://aquat1.ifas.ufl.edu/> (Center for Aquatic and Invasive Species)
- There are no plants that Water Chestnut can be easily confused with.

## References:

- 1) <http://webapps.lib.uconn.edu/ipane/browsing.cfm?descriptionid=25> (Invasive Plant Atlas of NE)  
<http://www.anr.state.vt.us/dec/waterq/ans/wcpage.htm> (Vermont State Web Site)  
<http://infoweb.magi.com/~ehaber/factnut.html> (Invasive Exotic Plants of Canada)  
[http://www.ipcnys.org/ipc\\_twentytn.html](http://www.ipcnys.org/ipc_twentytn.html) (Invasive Plant Council of NY)
- 2) Photographs were obtained from:
  - Unknown (Cover photo)
  - <http://www.des.state.nh.us/factsheets/bb/bb-43.htm> (line drawing of Water Chestnut)
  - [http://www.dnr.state.md.us/bay/sav/water\\_chestnut.html](http://www.dnr.state.md.us/bay/sav/water_chestnut.html) (Water Chestnut nutlet)
  - <http://www.anr.state.vt.us/dec/waterq/ans/ans-index.htm> (*T. natans* leaves)
  - Michelle Robinson DEM Lakes and Ponds (*T. natans* hand pulling)
  - <http://www.anr.state.vt.us/dec/waterq/ans/wcpage.htm> (*T. natans* complete plant)
- 3) The *T. natans* distribution map was taken from:  
[http://plants.usda.gov/cgi\\_bin/plant\\_profile.cgi?symbol=TRNA](http://plants.usda.gov/cgi_bin/plant_profile.cgi?symbol=TRNA) (USDA Plant Data Base)

## For more information please contact:

D.C.R. Office of Water Resources, Lakes and Ponds Program

Michelle Robinson at: [michelle.robinson@state.ma.us](mailto:michelle.robinson@state.ma.us)

Or visit the Lakes and Ponds web site at: [www.mass.gov/lakesandponds](http://www.mass.gov/lakesandponds)

Prepared by Michelle Robinson October 2002