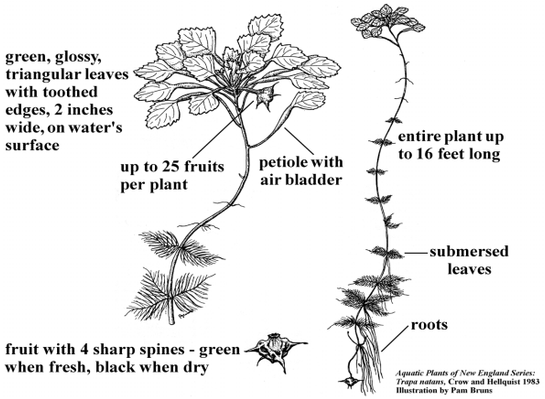

For more information or to report a new water chestnut infestation, go to: *www.northeastans.org/chestnut.asp* or call:

Connecticut Dept. of Environmental Protection: 860-424-3589
Maine Dept. of Environmental Protection: 207-287-6110
Massachusetts Dept. of Environmental Management: 617-626-1411
New Hampshire Dept. of Environmental Services: 603-271-2248
New York State Dept of Environmental Conservation: 518-402-8282
Rhode Island Natural History Survey: 401-874-5800
Vermont Dept. of Environmental Conservation: 802-241-3777
Quebec Societe de la faune et des parcs du Quebec: 450-928-7607 ext. 270

Mature, viable water chestnut seed with sharp spines.

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Vermont Department of Environmental Conservation
Lakeside Sports, Benson, Vermont
Pixie Caney, Benson, Vermont
The Nature Conservancy, Southern Lake Champlain Valley Office

Handpulling Water Chestnut

Techniques for Improving Management Efficiency

Introduction

This pamphlet is a gathering of ideas developed by several groups that have had extensive experience handpulling water chestnut (*Trapa natans),* a nuisance aquatic plant.

Water chestnut originates from Europe and was first brought to the United States in the 1800s. Water chestnut is an annual species, which reproduces only by seeds. These bright green floating plants produce seeds which can lie dormant but viable on a lake bottom for 10+ years. Persistent removal of plants prior to seed drop via handpulling can dramatically reduce a population over time.

Currently, water chestnut invades much of southern Lake Champlain, both in Vermont and New York. It is also found in inland waterbodies in both states as well as in New Hampshire, Massachusetts, and Connecticut. Water chestnut is also located outside New England in New Jersey, Pennsylvania, Maryland, Delaware and Virginia.

Used individually or collectively, the techniques presented here will help maximize the effectiveness of personnel and equipment in a water chestnut handpulling program.

A. Surveying for Water Chestnut

Surveying is an important tool for controlling a water chestnut infestation. Identifying populations of water chestnut early, while only a few plants exist, saves a lot of future work. Surveys for water chestnut infestations should begin in early to mid-June, and continue until September. Although boats or canoes are usually used for surveying, an airboat can be very effective for surveying very shallow marshy areas without disturbing native plants. From the relatively high vantage point of the airboat operator's seat, it is easy to look down into aquatic vegetation and spot water chestnut plants.

B. How to Handpull Water Chestnut

When pulling a water chestnut plant by hand, try to reach down as far as possible to get the whole stem and root. This will preclude development of small rosettes that are growing on the same plant, but have not yet reached the water's surface. It is easier to pull plants and roots earlier in the season while they are small. **ALWAYS** recheck a water chestnut site a month after handpulling and pull any regrowth before mature seeds develop. It is essential that water chestnut plants be pulled by August, when mature seeds begin to drop off the

plants. Late season plants with fully mature sharply spiked seeds, should be pulled gently and flipped upside down while retrieving them, to prevent seeds from falling into the water. Spoils should be dumped well above the high water mark, as far away from a waterbody as possible.

C. Kayaks vs. Canoes

Using kayaks for water chestnut handpulling maximizes the use of available personnel, especially when searching areas of dense aquatic plant growth for small pockets of water chestnut. Only one person is needed to propel a kayak as well as handpull. Kayaks are highly maneuverable making them the best vessels to search in cattails or dense reeds. Kayaks are easier than canoes to move through dense algal growths which often coat the water's surface in water chestnut locations. Loads of water chestnut spoils may be carried on the front of a kayak in a plastic laundry basket (see section D). Each time a basket is filled, it can be exchanged for an empty one stored on the deck of a pontoon boat service vehicle (see section E). Kayaks are easier to load and unload than canoes, and are also easier to haul into remote sites. Canoes while needing two people for steering and propulsion, can carry more water chestnut spoils than a kayak, and are more useful in situations where spoils offloading sites are not close by. Kayaks are used most efficiently in conjunction with a pontoon boat unloading platform (see section E) for close service. Using maneuverable kayaks for searching, and canoes for carrying large water chestnut loads might be a good combination when offloading sites are not close by. A typical canoe with two people onboard can also carry approximately 180 pounds of water chestnut spoils.

D. Laundry Basket Collection System

Plastic laundry baskets are great for water chestnut plant gathering and transport because they are inexpensive, lightweight and waterproof. Additionally, they drain well, are easy to handle when full, and can be quickly secured to a kayak with small bungee cords. Roughly six baskets per handpuller is ideal for the pontoon boat collection system (see section E).

E. Pontoon Boat for Service Platform

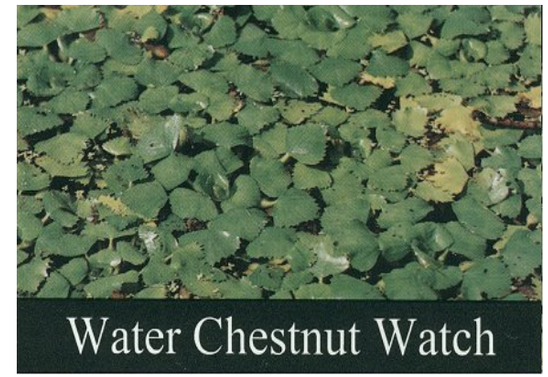
The use of a pontoon boat as a service platform for a handpulling operation is very effective when access to a water chestnut handpulling site is limited. The shallow draft of a pontoon boat, approximately one foot not including the outboard motor, allows it to be used in shallow areas to carry personnel, kayaks, and baskets full of spoils. When outfitting a pontoon boat for handpulling duties, everything on deck except for essential equipment can be removed. This leaves an open deck for pulled water chestnut and storage of handpulling equipment, such as laundry baskets. Typically a stripped pontoon boat can carry 1,000 lbs of water chestnut spoils.

F. Leaf Tip Bags for Spoils Transport

For a canoe-based handpulling operation leaf-tip bags are effective for transport and shoreland unloading of water chestnut spoils. The two-handled plastic tub-shaped bags are sold in gardening supply stores for approximately $35 each. Their flexibility makes them easy to dump and drag. Typically a leaf-tip bag full of water chestnut spoils can weigh 90 lbs. Since these containers are uniform in size, plant count or weights can be averaged and recorded to monitor the amount of plants pulled per site. A hanging scale with a 100 lb limit is handy for gathering weight information. If there is no access to a scale, plants can be counted and averaged per bag. Yearly tables of recorded weights or plant counts can be used to track reductions in water chestnut populations as a result of control activities.

G. Water Chestnut Volunteers

Techniques for procuring volunteers have been successfully developed by The Nature Conservancy (TNC). On a volunteer work day, TNC transports canoes to the handpulling site and provides sturdy handpulling bags for collection. TNC also appoints a competent activity leader who gives a brief history of the water chestnut problem in the area. Volunteers then understand the importance of controlling this aquatic nuisance plant. Work becomes fun when educational lectures are provided on site, watching and identifying wildlife is encouraged, and snacks and beverages are provided to volunteers.



H. Inform the Public

Distribute water chestnut educational literature to inform the public about this aquatic nuisance plant and its impacts and to gain support for management efforts. The enlistment of volunteer water chestnut watchers is also a vital tool in the early detection of new water chestnut populations. Fortunately, water chestnut is an easy plant to identify and an observant citizen can easily spot the plant with the aid of this brochure or a water chestnut watch card.