

Water Chestnut (*Trapa natans*)

Water chestnut is an annual plant that consists of floating leaves that are attached to the sediment by a long, tough stem. The plant produces a black, edible nut that is hard and spiny on the outside, and can remain viable for several



years. Water chestnut was introduced to North America in the late 19th century by a well-meaning botanist who thought the plant was beautiful and useful as potential wildlife food. The chestnut quickly escaped the lakes where it was introduced, becoming a nuisance in the Hudson in the 1950s. It prefers slow-moving water up to 5m deep, and once established it forms dense, impenetrable stands of roots.



Due to the thick beds that water chestnut forms, the plants become an obstacle for boaters and people who want to use the river recreationally. The main concern with water chestnut is that it has displaced native aquatic plants, specifically water celery (*Vallisneria americana*). The photo on the right shows water celery underneath the water's surface, and a water chestnut plant floating on top of the water. As water chestnut leafs out during the summer, it blocks out sunlight to the plants beneath, and oxygen decline. The roots and stems remove oxygen from the water to support respiration, while the photosynthesis that takes place happens only above the water's surface. Consequently, the water becomes anoxic (oxygen-free) during low tide, becoming replenished only when the tides change.



There may be some positive aspects related to the water chestnut, although many of these are still being investigated. Studies have shown a wide range of fish species living and thriving in the water chestnut beds despite the low oxygen conditions, and some scientists are studying the efficiency of the plant's ability to remove excess nitrate. There have been attempts to eradicate the plant, but, it is now more abundant than ever. When water chestnut first became a major problem, the Department of Environmental Conservation (DEC) attempted to manage it using a chemical herbicide and hand-pulling. Negative side-effects such as the contamination of the river lead the DEC to abandon this practice. Now, some places use an aquatic 'lawn mower', while other places use hand-pulling or



cutting, and research is taking place on the viability of using biological controls. Currently, researchers are trying to determine whether removing some of the floating plants would allow the beds to maintain enough oxygen throughout the day, regardless of the tidal flow.