



Princeton Hydro

Identification Manual of Aquatic Plants in Lake Hopatcong and Potential Future Invasive Species

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Table of Contents

| | |
|---|-----------|
| INTRODUCTION | 1 |
| EURASIAN WATERMILFOIL (MYRIOPHYLLUM SPICATUM)..... | 2 |
| TAPEGRASS (VALLISNERIA AMERICANA) | 3 |
| CURLY-LEAF PONDWEED (POTAMOGETON CRISPUS) | 4 |
| BROAD-LEAVED PONDWEED (POTAMOGETON AMPLIFOLIUS) | 5 |
| COONTAIL (CERATOPHYLLUM DEMERSUM) | 6 |
| NARROW-LEAVED PONDWEEDS (POTAMOGETON SPP.) | 7 |
| COMMON WATERWEED (ELODEA CANADENSIS) | 8 |
| NAIADS (NAJAS SPP.)..... | 9 |
| STONEWORTS (NITELLA FLEXILIS) | 10 |
| DARK, BENTHIC MAT ALGAE (LYNGBYA SPP.) | 11 |
| BLADDERWORT (UTRICULARIA SPP.)..... | 12 |
| WHITE WATER LILY (NYMPHAEA ODORATA)..... | 13 |
| SPATTERDOCK (NUPHAR ADVENA)..... | 14 |
| WATERSHIELD (BRASENIA SCHREBERI)..... | 15 |
| POTENTIAL FUTURE INVASIVE SPECIES | 16 |
| WATER CHESNUT (TRAPA NATANS)..... | 17 |
| HYDRILLA (HYDRILLA VERTICILLATA) | 18 |
| FANWORT (CABOMBA CAROLINIANA) | 19 |

INTRODUCTION

Native aquatic plant species are well-adapted to local conditions, and thus provide valuable ecological and recreational benefits to Lake Hopatcong. Shallow, sunlit areas with nutrient rich sediments provides ideal habitat for aquatic plants and are important from an ecological and recreations perspective. For instance, aquatic plants provide forage, cover, and breeding habitat for wildlife and aquatic organisms. Warm water fish species such as largemouth bass are attracted to vegetated areas, and thus not only does aquatic vegetation provide habitat but it also provides fishing opportunities. Aquatic plants also aid in stabilizing shorelines, which protect soils from being eroded. In addition to stabilizing shorelines, a healthy native plant community will resist the establishment of invasive species.

Aquatic vegetation is also an important component of ecosystem-nutrient cycling since they are capable of removing pollutants as well as oxygenating the water. Without aquatic vegetation, more nutrients would be readily available for algal growth. Nuisance algal growth can degrade water quality by reducing dissolved oxygen and in some cases produce cyanotoxins.

Unlike native species, exotic, invasive species are capable of growing and spreading quickly, especially in disturbed areas. Invasive plants can grow rapidly because they do not have local predators (i.e. insects, diseases, etc.) to control their populations. Invasive plants can fill canals/ditches, reduce/destroy wildlife habitat, and reduce/prevent boating and swimming activities. Invasive species can be spread multiple ways. For example, plants can be transferred from boats to water or they can be planted intentionally because they are aesthetically pleasing. Waterfowl can also introduce invasive species. Once an invasive species is introduced it can become established quickly.

Due to the important role and impacts of aquatic plants (both native and invasive), this field guide has been created to aid in the identification of some of the more common plant species in Lake Hopatcong. This guide will be useful in the identification of harvested plant material for subsequent species-specific analyses. For example, possible changes within the lake's existing aquatic plant community can be tracked and documented on a more species specific basis. In addition, it is absolutely critical that the staff of the Lake Hopatcong Commission is familiar with the appearance of some of the more notorious invasive plant species to prevent or minimize their impacts on the lake. This includes both invasives documented to exist in Lake Hopatcong as well as those that are not in the lake at this time but could have a major impact on its ecology and recreational value.

Eurasian watermilfoil (*Myriophyllum spicatum*)

Invasive Species



Source: <http://www.invasive.org/browse/detail.cfm?imgnum=5330050>

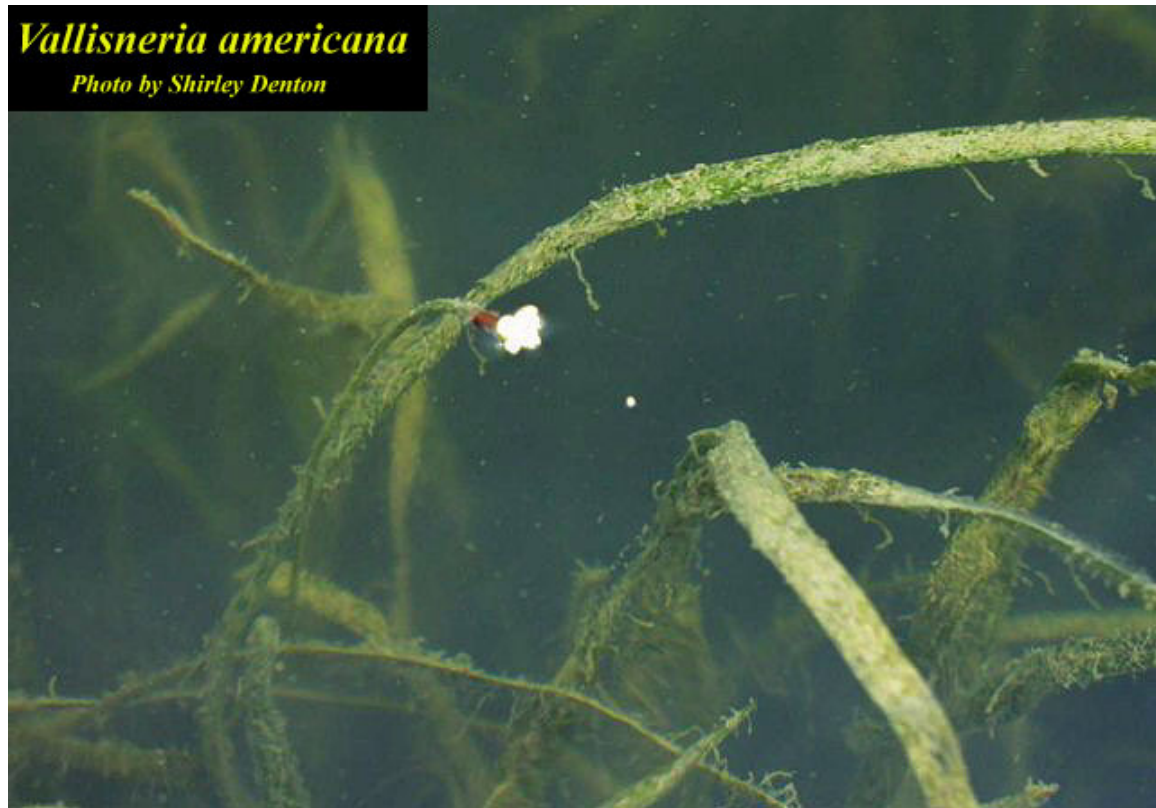
Description: Eurasian watermilfoil is an exotic invasive submersed plant with feather-like leaves in whorls of four to five. The stems can be up to two meters in length and often branch out more at the surface of the water. The leaves have 14-20 pairs of leaflets; this helps in identifying whether the plant is Eurasian water milfoil or a native milfoil species which will have less than 14 pairs of leaflets.

Unlike other, native species of watermilfoil, Eurasian watermilfoil tends to have a thick, ropey main stem that is reddish or purple in color. In addition Eurasian watermilfoil tends to grow and flower right to the surface as a “column” of plant biomass. Native species of milfoil tend to be smaller, lighter in color and grow lower in the water column.

Eurasian water milfoil prefers fine inorganic sediment and can often be found growing where stormwater pipes enter a waterbody. This plant can grow in low light conditions where total suspended solids (TSS) are elevated (typically after storm events and near stormwater pipes).

Eurasian water milfoil is one of the two dominant species of submerged aquatic plants found in Lake Hopatcong; it can be found throughout the lake and is commonly responsible for “floating mats” seen on the lake.

Tapegrass (*Vallisneria americana*)



Description: Tapegrass (also known as wild celery or eel-grass) is a native submersed plant that is easily identified by its grass-like form. The leaves are up to two meters long and have a central stripe. No other plant in Lake Hopatcong looks similar to tape grass. The plant literally looks like long strips of green tape; the reproductive structure and flow looks like a “curly-q” green filament.

Tape grass is a highly valuable plant for refuge for aquatic organisms and a source of forward for wildlife, including desirable waterfowl (i.e. ducks). Additionally, tap grass can aid in stabilizing both the sediments and the nearshore habitats, minimizing the re-suspension of sediments into the water column. While tapegrass attains nuisance conditions in the lake from mid-June through the end of the season, it does not reach the nuisance levels produced by Eurasian watermilfoil.

Tapegrass is one of the two dominant species in Lake Hopatcong, with the other being the invasive species Eurasian watermilfoil. Tape grass is another species that can be a component of the “floating mats” observed on the lake. Obviously, since it is a native plant, it is the preferred species over Eurasian watermilfoil.

Curly-leaf pondweed (*Potamogeton crispus*)

Invasive Species



Curlyleaf Pondweed

Source: www.lwtf.org/curlyleaf2.jpg

Description: Curly-leaf pondweed is an invasive exotic submersed plant that is easily identified by its curly and wave-like leaves. The margins of the leaves are very finely serrated and are 3-8 cm in length. Curly-leaf pondweed is one of the first submersed plants to appear in temperate lakes and will start to emerge in March or early April soon after the lake ice melts. During years with milder winters when the ice is thinner and there is less snow pack, sunlight is able to reach the sediments in shallow areas and stimulate growth as early as February.

Curly-leaf pondweed is a prolific species that reproduces by turions more so than by seeds. Turions are vegetative buds that form along the stem of the plant. As many as 1,600 turions were found in a square meter plot, with 60-80% of turions successfully germinating (Nichols 1986).

This invasive species is known to exist in Lake Hopatcong and can be found sporadically throughout the littoral (shallow, near shore) areas of the lake, but it is generally not a major nuisance. This is at least the case from May and through the growing season. If Curly-leaf pondweed is found in Lake Hopatcong, it tends to be identified in May and is typically growing in Crescent Cove and the East Shore Estates area.

Broad-leaved pondweed (*Potamogeton amplifolius*)



Edward G. Voss @ USDA-NRCS PLANTS Database / USDA NRCS. 1995. *Northeast wetland flora: Field office guide to plant species*. Northeast National Technical Center, Chester.

Description: Broad-leaved pondweed is a native submersed macrophyte that is distinguished from other pondweeds by its larger curved submersed leaves. The floating leaves are also larger than those of other pondweeds. All pondweeds can be identified by the prominent midvein of the leaves.

Broad-leaved pondweed is a desirable species and although abundant in some areas of Lake Hopatcong, it does not tend to attain nuisance densities like those associated with Eurasian water milfoil. Broad-leaved pondweed also tends to inhabit deeper areas relative to many other submerged plants.

In Lake Hopatcong substantial stands of Broad-leaved pondweed can be found in channel to the northeast of Raccoon Island. While these stands can be large it, does not tend to be a major nuisance such as those areas infested with Eurasian watermilfoil.

Coontail (*Ceratophyllum demersum*)



Description: Coontail is a native submersed plant with finely-divided leaves and long, trailing stems and has no roots. Each leaf is forked once or twice and is arranged in whorls of 5-12 per node. The raccoon tail appearance is a result of the whorls of leaves being more closely spaced toward the end of the branch.

Because Coontail is not rooted and is tolerant of low light levels, it can be found at various depths in the water column. Coontail can reach nuisance densities, but since it is a very effective filterer of nutrients, tends to grow along the sediments and offers good habitat, it should not be eradicated from a water body. However, it commonly grows among stands of Eurasian water milfoil and is subsequently harvested.

Coontail is typically not observed in sizeable amounts in Lake Hopatcong until June. It is rarely an abundant species in Lake Hopatcong. However, at times it can be one of the dominant plants in the River Styx / Crescent Cove section of the lake.

Narrow-leaved pondweeds (*Potamogeton* spp.)



Description: Narrow-leaved pondweeds are distinguished from other pondweeds by having much narrower and more slender leaves. Like the other pondweeds, narrow-leaved pondweeds can be identified by the prominent midvein on the leaves.

Narrow-leaved pondweeds do not reach nuisance densities in Lake Hopatcong and provide good habitat for invertebrates and fish. These species tend to be found sporadically located throughout Lake Hopatcong and are typically found among stands of tapegrass.

Common waterweed (*Elodea canadensis*)

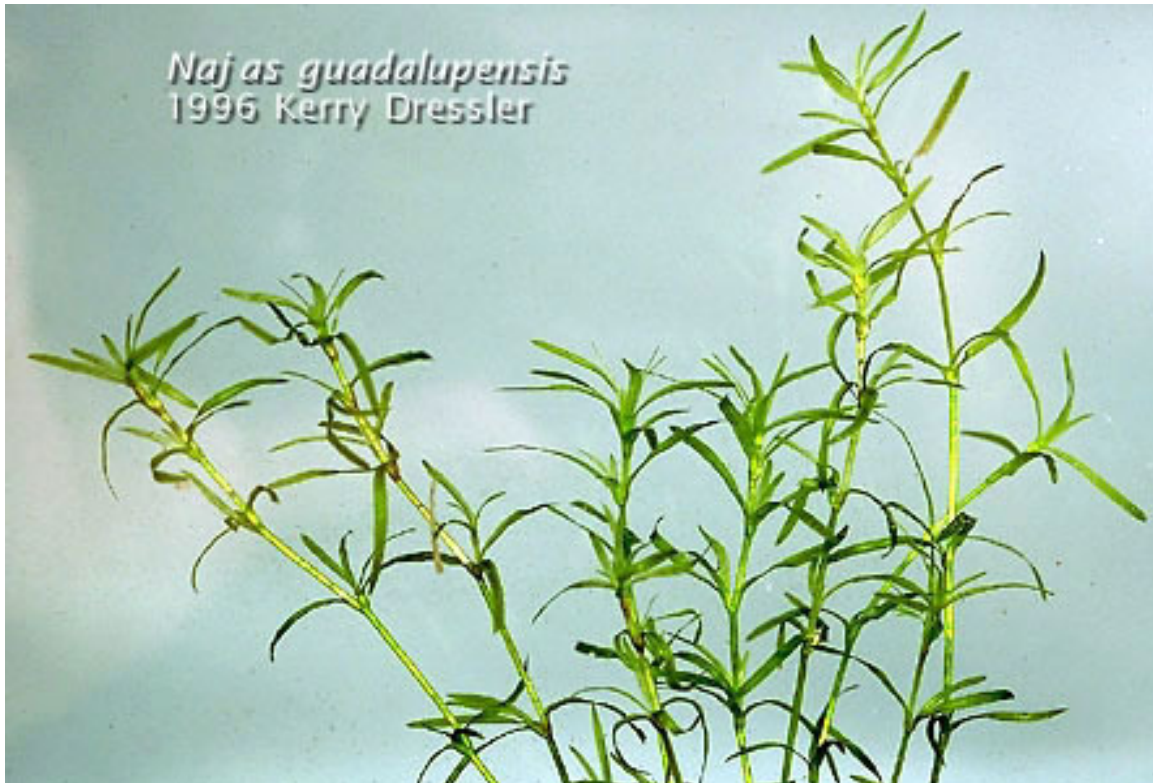


Description: Common waterweed is a native submersed plant with small leaves (1-2 cm in length) that are attached directly to the stem of the plant. The leaves are in whorls of three and are closer together toward the tip of the stem. It tends to have three leaves per whorl and the plant is easily confused with the highly invasive species *Hydrilla verticillata*. The branching nature of the plant makes it a potential nuisance species since it bunches together and forms dense mats under the surface of the water. However, common waterweed is generally not a major nuisance species in Lake Hopatcong.

Common waterweed is most common in fine sediments with lots of organic matter and can grow in water depths up to several meters. The plant reproduces and spreads mostly by fragmentation of the stem rather than by seed.

Common waterweed tends to be sporadically located throughout Lake Hopatcong and has been observed during both the late spring and late summer seasons.

Naiads (*Najas* spp.)



Description: Two species of naiads can be found in Lake Hopatcong: slender naiad (*Najas flexilis*) and southern naiad (*Najas guadalupensis*). Naiads are native submersed plants that are characterized by fine flexible stems that are often branching. The leaves are 1-4 cm long with very finely serrated margins. The main difference between *guadalupensis* and *flexilis* is that the leaves of *flexilis* are narrower (up to 1 cm) and taper to a more defined tip than *guadalupensis*.

Naiads often grow in association with tape grass. These species provide excellent food for waterfowl. Naiads do not attain nuisance densities in Lake Hopatcong although it can be the dominant species in select areas of the lake, particularly during the mid- to late summer season.

Stoneworts (*Nitella flexilis*)



Source: http://aquaplant.tamu.edu/database/algae/nitella_pics.htm

Description: *Nitella* is actually a macroalga that looks more like a typical submersed macrophyte. *Nitella* is identified by its translucent green stems and branches that occur in whorls.

Nitella tends to prefer cleaner waters and grows along the bottom. This macroalga is an excellent refuge for small aquatic animals and is also an important source of food for various waterfowl. Large beds of this macroalga can also provide refuge for smaller fishes.

Nitella rarely attains nuisance densities in waterbodies the size and morphometry of Lake Hopatcong. Typically, the distribution of *Nitella* within Lake Hopatcong is limited to the northeast Canals, located in the Township of Jefferson.

Dark, benthic mat algae (*Lyngbya* spp.)



Source: [http:// www.healthywaterways.org/FileLibrary/lyngbyab.jpg](http://www.healthywaterways.org/FileLibrary/lyngbyab.jpg)

Description: *Lyngbya* is a benthic blue-green (cyanobacteria) mat alga that tends to grow along the bottom of moderately deep sections of the lake (> 4-5 ft). In Lake Hopatcong it is typically not a nuisance since it tends to remain along the bottom. This alga should not be confused with the various genera of filamentous green algae (i.e. *Spirogyra*, *Ulothrix*, and *Cladophora*) that grow in nearshore areas of the lake and over stands of Eurasian watermilfoil, creating nuisance mats.

Again *Lyngbya* tends to prefer moderately deep waters that receive lower amounts of sunlight. While it has the potential to create nuisance mats, such conditions rarely occur at Lake Hopatcong. However, with enough algal mats along the bottom and a strong enough summer storm, this alga can be transported to the surface and produce nuisance surface mats. The alga has little wildlife or fishery value although since it tends to remain along the bottom it can aid in preventing the colonization of such locations with more nuisance species such as Eurasian watermilfoil.

Up until a few years ago, the distribution of *Lyngbya* in Lake Hopatcong was limited to the Woodport area and to the east of Liffy Island. However, over the last few years the distribution of *Lyngbya* has expanded and this benthic alga has been identified in the southern end of the lake; specifically around Point Pleasant. This recent increase in distribution of this alga may be due to the mild winters experienced over the last few years. *Lyngbya* is also a component of the “floating mats” observed on the lake, particularly in the northern end.

Bladderwort (*Utricularia* spp.)



Description: Bladderwort is a small rootless plant that grows along the sediments in still water areas. It has bladders that are used to capture small aquatic animals. While it can be a nuisance in shallow waterbodies, particularly in southern New Jersey it is generally not a nuisance in Lake Hopatcong.

Bladderwort is of little or no importance as a source of food for waterfowl and other wildlife. The plant may provide some cover for small aquatic animals. However, bladderwort can be a source of food / cover for smaller fish.

In Lake Hopatcong bladderwort is typically limited to the Jefferson Township Canals, located in the northeastern section of the lake.

White water lily (*Nymphaea odorata*)



Description: White water lily, or fragrant water lily, is most easily identified by its large white flower and round leaves. The leaves are red or purple underneath, with a narrow division called a sinus. The leaves tend to be flush with the surface of the water.

Seeds of white water lily are a source of food for waterfowl and the rootstock can be a source of food for wildlife. This plant provides refuge and habitat for a variety of aquatic organisms, however, the value of this habitat declines as plant densities increase.

While small patches of white water lily can be found throughout the nearshore areas of Lake Hopatcong, this floating-leaved plant tends to be relatively common in the shallow waters of the Canals, located in the northeastern section of the lake and in the Landing Channel.

Spatterdock (*Nuphar advena*)



Source: http://aquat1.ifas.ufl.edu/nupadv_ec2.jpg

Description: Spatterdock is distinguished from white water lily by its more spade-like shaped leaves and yellow flower. The flower never actually fully opens and the leaves tend to protrude from the surface of the water more so than the leaves of white water lily.

Seeds of spatterdock can be a source of food for waterfowl and leaves, stems and flowers may be eaten by other wildlife. The floating leaves can provide shade and shelter habitat for a variety of aquatic and semi-aquatic organisms.

Similar to white water lily, spatterdock tends to be found in the northeastern Canals within the Township of Jefferson.

Watershield (*Brasenia schreberi*)



Source: <http://www.loon-lake.org>

Description: Watershield is easily identified as not a lily since the floating leaves are smaller in size and the stem rising from the sediment is connected to the center of the leaf. Additionally, the stem tends to have a slimy, gelatinous coat.

Watershield can be a source of food for waterfowl. The floating leaves can provide shade and shelter habitat for a variety of aquatic organisms.

Similar to white water lily and spatterdock, in Lake Hopatcong watershield tends to be found in the northeastern Canals within the Township of Jefferson.

Potential Future Invasive Species

The following plants are exotic invasives species that have huge ecological and economic impacts on other lakes and waterways throughout the United States. While these species are not known to be in Lake Hopatcong at this time, their introduction can have devastating impacts on the lake and its associated natural resources. Thus, if these species are found in the lake, the sooner they are removed, the higher the chance of complete eradication.

These invasive species can enter the lake as fragments on boats / trailers as well as on the feet / feathers of waterfowl. Thus, the Commission staff and local stakeholders should become familiar with these species and if they are suspected to be in the lake, the New Jersey Department of Environmental Protection and the Lake Hopatcong Commission should be immediately notified.

Water Chestnut (*Trapa natans*)
Invasive Species



Source: tncweeds.ucdavis.edu/photos/trana01.jpg

Description: Water chestnut is an aggressive, invasive, exotic species that is easily identified by its triangular shaped leaves (no more than two inches wide) that float on the water's surface with severely serrated margins. Water chestnut is spread by seed; the seeds are dark brown and have four spikes on them. They are viable in the sediments for up to five years.

The spiked seed is of little value as food for wildfowl, although it may be a source of food for small aquatic animals. It can provide shade and cover for fish, however, it is a very aggressive plant and can out shade and compete with more desirable species. The plant impacts boating and fishing and the spiked seeds can wash up on beaches having a substantial negative impact on recreational use.

Hydrilla (*Hydrilla verticillata*)

Invasive Species



Description: Hydrilla is often confused with common waterweed (*Elodea canadensis*). It can be distinguished from common waterweed by counting the number of leaves in each whorl: hydrilla generally has five to eight leaves per whorl and common waterweed has three leaves per whorl.

In the southeastern United States Hydrilla causes major problems with navigation in waterways. In some instances entire stretches of rivers and lakes are completely choked with the plant and beneficial native plants are out competed. Hydrilla is difficult to manage once it attains nuisance densities and every effort should be made to keep this invasive plant out of Lake Hopatcong.

Fanwort (*Cabomba caroliniana*)

Invasive Species



Description: Fanwort is easily identified by its highly branched and dissected leaves that tend to “fan out” from the stem and form a circular shape. The plant produces a few floating leaves in July-August, but most of the multi-stemmed plant’s biomass is located underwater. Fanwort produces a small white and yellow flower that is approximately one half inch in diameter.

Fanwort is native to the Southeastern U.S., but it is highly invasive in the Mid-Atlantic States. It can easily out-compete other aquatic plants, creating a mono-culture of plants from the sediments to the water’s surface.

While it can provide cover and structure for fish at lower densities, it is sparingly used by waterfowl as a source of food.