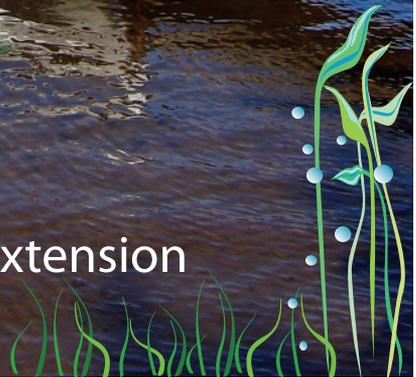


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# *A Michigan Boater's Guide to Selected Invasive Aquatic Plants*

MICHIGAN STATE  
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# *A Michigan Boater's Guide to Selected Invasive Aquatic Plants*

By

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\*Prohibited (P) and restricted (R) species (including hybrids or genetically engineered variants of the species or a fragment, including seeds) as defined in Michigan's Natural Resources and Environmental Protection Act, P.A. 451 of 1994, Section 324.41301.

P = Prohibited    R = Restricted    N = Not yet listed



# What's in This Guide?

This guide provides a quick, easy and water-resistant reference for Michigan boaters and paddlers for identifying and learning about certain invasive aquatic plants. The term “invasive” is defined by the National Invasive Species Management Plan as “a species that is not native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.”

The list of plant species in this guide is not comprehensive. Some of these plants are widespread in Michigan; others are rare or have not been found here at all. Some are listed on Michigan's prohibited and restricted species list. Those prohibited are either not naturalized or not widely distributed. The restricted species are naturalized and widely distributed.

Each of these plants, however, has the ability to outcompete native plants, degrade lake habitats and ecosystems, and create problems for lake property owners, recreationists and lake enthusiasts. If you find one of the plants listed in this guide in your lake, several options are provided for managing or removing it. For a more comprehensive list of invasive plants, please refer to “A Field Guide to Invasive Plants of Aquatic and Wetland Habitats for Michigan,” available from the Michigan Natural Features Inventory ([mnfi.anr.msu.edu/pub/publications.cfm](http://mnfi.anr.msu.edu/pub/publications.cfm)).

Invasive species reporting and mapping are critical to managing aquatic invasive plants. The plants in this guide have been identified by the state of Michigan as species of concern and, when they are sighted, should be reported using the Midwest Invasive Species Information Network (MISIN) website at [www.misin.msu.edu](http://www.misin.msu.edu). Boaters' help is important in reporting sightings of the invasive species highlighted in this guide (or any of the more than 180 species being tracked by the MISIN project). By uploading your findings, you contribute to a multistate database on invasive species. You can also review the invasive species information sheets and species identification training modules using the QR codes in this guide. Here are some things to remember when reporting your sightings:

- A GPS unit is very helpful for determining the exact location (latitude and longitude) of the sighting.
- Digital photos of individual plants are also very helpful.
- Create a user account with the MISIN project by visiting [www.misin.msu.edu](http://www.misin.msu.edu).
- iPhone users can download the MISIN app at [www.misin.msu.edu/tools/apps](http://www.misin.msu.edu/tools/apps).



# Brazilian Waterweed

(*Egeria densa* Planch)

Leslie J. Mehrhoff, University of Connecticut, Bugwood.org



**Description:** The leaves of Brazilian waterweed are up to 1.5 inches in length and oblong in shape. They grow in dense whorls, usually four to six leaves at a node on the upper portion of the stem and two to three leaves per node on the lower part of the stem. The plant generally ranges from 1 to 2 feet in length but has been reported to grow up to 20 feet. It produces a small, white flower with three petals above the water. No female plants have been found in the United States, so its mode of reproduction is through fragmentation.

It spreads via waterfowl, boats and water currents. Brazilian waterweed, also known as Brazilian elodea, is often sold as an aquarium plant, sometimes under the name *Anacharis*.

Leslie J. Mehrhoff, University of Connecticut, Bugwood.org



## Habitat and distribution:

Brazilian waterweed can grow in lakes or slow-flowing streams and prefers slightly acidic, nutrient-rich waters. If introduced into a water body, it can form unsightly mats and crowd out native vegetation that grows more slowly.

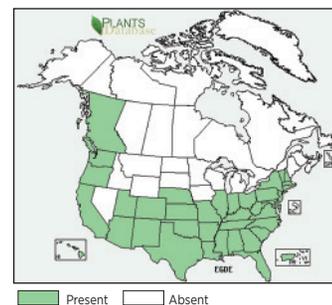
Without its flower, Brazilian waterweed resembles the native plant American waterweed (*Elodea canadensis*), and it is sometimes mistaken for the non-native hydrilla. Hydrilla, however, has one or more spines on the underside of its leaf along its midrib; the other species do not. Brazilian waterweed is native to South America but is found in many states throughout the United States. It has been reported in private ponds in Ottawa County but has not been found elsewhere in Michigan.



Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

**Control/management:** Large infestations can be controlled with herbicides. Fluridone is most effective, but mixtures with diquat or endothal salts with complexed copper mixtures can also be effective. Because it spreads through vegetative

reproduction, harvesting is not generally recommended. Water drawdown may be effective. Aquarium plants should not be discarded into or near a water body.



(On Michigan's prohibited species list)

# Curly-leaf Pondweed

(*Potamogeton crispus* L.)

Paige Filice, Michigan State University



**Description:** Curly-leaf pondweed, also called curly pondweed, is a submersed aquatic plant. It has alternate wavy, crinkled leaves with fine-toothed edges. Leaves are about 3 inches long and less than 1 inch wide with a prominent midvein. Stems are reddish brown and can grow up to 3 feet high. The plant grows rapidly in spring, forming dense mats and blocking sunlight for later growing plants. It dies back by midsummer.

**Habitat and distribution:** Curly-leaf pondweed inhabits lakes, ponds and streams. The flowers rise above the water surface in a spike on a stalk. Although the flower produces seed, the major mode of reproduction is through the production of vegetative buds called turions. The turions appear as hardened bur-like buds at the stem tip or leaf axil and are formed in late spring. They break off from the plant and float with the water current or sink to the lake bottom.

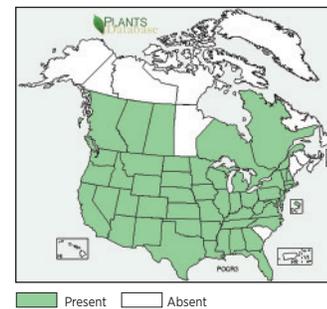
They usually remain dormant in the sediment until the following fall, but they can stay in a dormant stage for years. The plant also can grow from rhizomes or plant fragments. Curly-leaf pondweed is native to Eurasia and was introduced to North America in the mid-1800s. It is now widespread throughout Michigan and the United States.



Chris Evans, Illinois Wildlife Action Plan, Bugwood.org

**Control/management:** Removing plants before they produce turions is critical in the control of curly-leaf pondweed. Spring treatment with the herbicides diquat, endothall, fluridone or penoxsulam has been found to be effective in reducing the stems and roots and in suppressing turion production. Mechanical harvesting has been shown to be effective if the plant fragments are removed from the water.

Paige Filice, Michigan State University



(On Michigan's restricted species list)

# Eurasian Watermilfoil

(*Myriophyllum spicatum* L.)

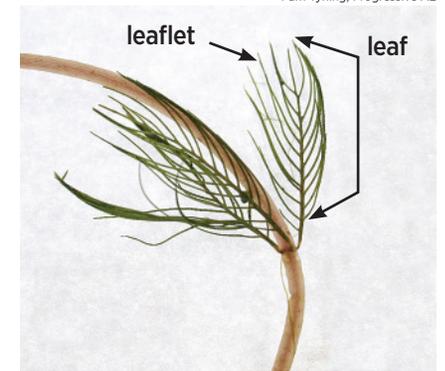
Lois Wolfson, Michigan State University



**Description:** Eurasian watermilfoil is a submersed feathery-looking plant with long stems that branch as they grow to the water surface. The plant usually has four leaves arranged in a whorl around the stem. Each leaf is finely divided into 12 to 20 leaflets, each about ½ inch long, along the leaf's central axis.

**Habitat and distribution:** Eurasian watermilfoil produces flowers on a spike above the water surface and produces seeds, but its major mode of reproduction is through fragmentation. Each broken fragment is capable of producing a new plant. This invasive milfoil can be easily confused with the native northern watermilfoil, and the two species can hybridize. It is often assumed that, if the plant has 12 or fewer pairs of leaflets along the central axis of the leaf and the leaves remain rigid when the plant is removed from the water, it is the native species. However, this mode of identification is not totally reliable for distinguishing between native, non-native and hybrid species, and genetic testing may be required.

The plant, either as whole plants or fragments, is readily moved from one lake to another by boats, boat trailers, bait buckets and wildlife. Once established, it grows quickly and creates a canopy when it reaches the water surface, shading out slower growing plants, displacing native vegetation, restricting water movement and decreasing oxygen production below the surface.

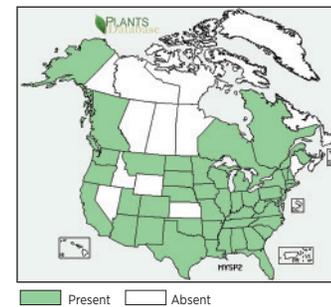


Pam Tying, Progressive AE

Eurasian watermilfoil is a native to Europe, Asia and northern Africa. An aggressive plant, it was first found in the United States in the 1940s and since then has spread to almost all states in the continental United States. It is prevalent throughout Michigan, particularly in the southern half of the Lower Peninsula.

**Control/management:** Mechanical harvesting is generally not recommended for controlling Eurasian watermilfoil because of the potential fragmentation and spread. Several herbicides have been used successfully in treating the species, including fluridone. When used early in the growing season and at recommended rates, fluridone is fairly specific for this species. Other chemicals that have proven effective are 2,4-D, endothall, diquat, triclopyr and flumioxazin. Permits are usually required for these chemicals, with some requiring a certified applicator. Biological control is another

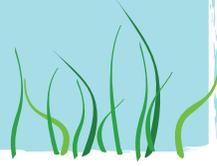
method that has been used in reducing Eurasian watermilfoil. The milfoil weevil, *Euhrychiopsis lecontei*, is a native species and appears to favor the invasive milfoil. The adult weevils feed on the leaves and lay eggs on them. The eggs hatch, and the larvae burrow into the stem, eventually causing the milfoil plant to collapse. Factors such as fish predation and lack of vegetation and leaf litter on shorelines have been shown to limit the success of the milfoil weevil.



(On Michigan's restricted species list)

# European Frog-bit

(*Hydrocharis morsus-ranae* L.)



Paige Filice, Michigan State University



**Description:** European frog-bit, also called common frog-bit, is a free-floating flowering plant. It looks similar to a miniature water lily, although the heart-shaped leaves are only 1 to 2 inches wide. It also resembles watershield, but watershield leaves have a slimy coating on their undersides; European frog-bit leaves do not. The plant has many roots that dangle in the water column. The flowers are white with three petals and appear above the water surface on stalks. They have limited seed production, and the plant spreads mainly through vegetative means, including turions (overwintering or dormant vegetative buds), underwater stem-like extensions called stolons or runners, and plant fragments.

**Habitat and distribution:** European frog-bit prefers standing water, such as ponds, canals, ditches and sheltered water bodies with little to no wave action. Once established,



Jo Latimore, Michigan State University

the plant grows quickly in dense mats, crowding out native vegetation, reducing native habitat, impairing animal movement and interfering with recreational activities. Native to Europe, European frog-bit was intentionally brought to Canada in the early 1930s and later spread to the United States. It is a relative of the native species American frog-bit (*Limnobium*) and is a popular water gardening plant. It was first reported in Michigan in 2000 in marshes in the southeastern part of the state and has spread to areas in that region and Saginaw Bay where the habitat is suitable.

**Control/management:** Control methods are not well-established, and removal by hand or harvesting is often cited as the only current solution. Because the plant is not well-established in Michigan,

prevention is the best control. As with many invasives, spread can be greatly reduced by washing boats, propellers and trailers of any plant fragments and emptying live wells and bilge water from boats before leaving the area. Also, aquarium or water garden plants should not be discarded into or near any water body.



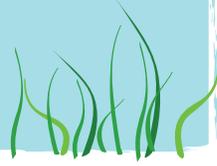
Present Absent (Sighted in Michigan)



(On Michigan's prohibited species list)

# Fanwort

(*Cabomba caroliniana* A. Gray)



Paige Filice, Michigan State University



**Description:** Fanwort is a submergent perennial plant with two types of leaves. The submersed leaves are opposite, finely divided and fan-shaped. They are attached along the stem by short stalks. The floating leaves, if present, are less than 0.5 inch long, entire and alternate on the stem. A small, white flower appears from mid- and late summer to fall.

**Habitat and distribution:** Fanwort prefers lakes, ponds, and stagnant or slow-moving streams, rivers and ditches. It is very competitive and can form dense stands. Fanwort spreads mainly through stem fragments or rhizomes, which can form entire new plants. It is a popular aquarium plant and can be spread through improper disposal of aquarium specimens. This plant can be

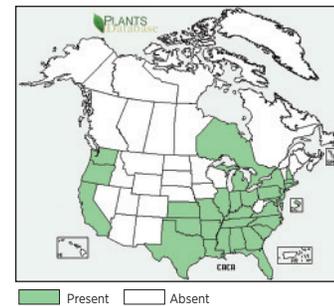
confused with water milfoil (*Myriophyllum*), coontail (*Ceratophyllum*), white water-crowfoot (*Ranunculus*) and water marigold (*Bidens*, formerly *Megalodonta*). Fanwort is native to the southeastern part of the United States and subtropical regions of South America but has spread northward to Michigan and Canada as well as along the west coast.

## Control/management:

Eradication of fanwort is recommended but may not be possible. Alternatively, fanwort may be particularly

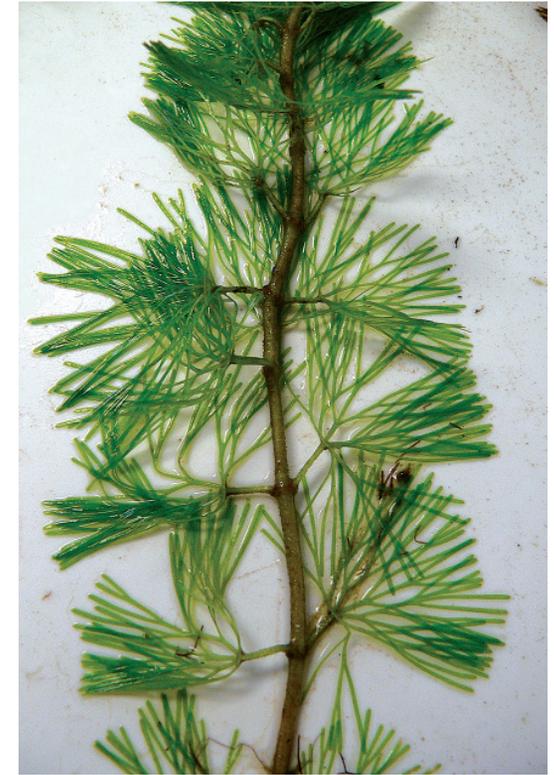
sensitive to nutrient reduction in the water. Herbicide treatment with fluridone or flumioxazin has been shown to be effective. In some cases, water level drawdowns have been used to reduce fanwort growth by

drying the plant and seeds. Because it spreads through fragmentation, harvesting is not recommended. Although some states have used grass carp as a biological control, it is not an option in Michigan because it is illegal to stock or possess grass carp. Aquarium plants should not be discarded in or near a water body.



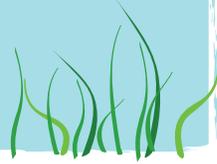
(On Michigan's prohibited species list)

Paige Filice, Michigan State University



# Hydrilla

(*Hydrilla verticillata* [L.f.] Royle)



Vic Ramey, University of Florida/IFAS Center for Aquatic and Invasive Plants



**Description:** Hydrilla is a rapidly growing submersed aquatic plant that has small leaves — about 0.5 to 0.75 inch long — occurring in whorls of four to eight around the stem. The leaves have finely toothed margins and may have one or more teeth or spines along the midrib on the underside of the leaf. The rooted plant has long stems that can grow upward from depths of 20 to 25 feet. Hydrilla looks similar to both native *Elodea* (waterweed) and non-native *Egeria* (Brazilian waterweed), but only hydrilla has spines on the underside of the leaf.

## Habitat and distribution:

Hydrilla is an aggressive plant that often outcompetes native species. It can grow under lower light conditions than most natives, so it can grow to deeper depths.

Angela De Palma-Dow, Michigan State University

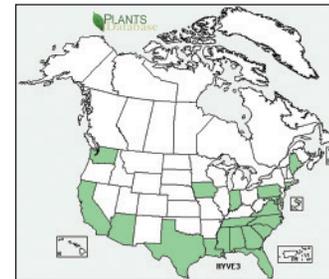


It grows rapidly and has been found to double its weight every two weeks during summer in warm climates. Although it does produce flowers, seeds apparently do not play a large role in the spread of hydrilla. Rather, hydrilla mainly spreads by plant fragmentation, turions and tubers. The turions are compact, dark green, spiny dormant buds found in the leaf axils. When they break off, they can drift long distances before they eventually sink and form new plants. Tubers, found on the terminal end of underground root-like stems called rhizomes, can remain in a dormant phase for several years but eventually produce new plants. Two varieties of hydrilla occur in the United States. One has male and female flowers on the same plant. The other variety has male and female flowers on separate plants, but only the female plant is found in the United States. The female flower in both varieties is inconspicuous and has three translucent petals. The male flower has three white or reddish petals, but it is usually seen floating on the water surface as whitish-looking debris.

Hydrilla is widespread across the southern United States and in several states along the east coast. Its origin is uncertain; it may have originated in Asia, Africa or Australia. It has been found in several inland states, including Indiana, Ohio, Wisconsin, Pennsylvania and Iowa, but has not been reported in Michigan.

**Control/management:** Preventing hydrilla establishment is the best approach for dealing with this plant species. Once established in a lake, it is extremely difficult to control because of its many modes of reproduction. Herbicides containing copper, diquat, endothall and fluridone may be used to selectively control hydrilla, depending on the other plants growing in the lake, but the herbicides do not affect dormant tubers in the sediment. Neither the tubers nor turions are affected by winter lake level drawdown. Biological control with several species of insects is currently being studied, and continued field monitoring will help provide more information on their

impact on hydrilla. Harvesting is not widely used, often because of necessary repeated harvesting, sometimes as many as six times during one season. Pond dyes may provide some control, particularly in small ponds with little or no outflow during the growing season. A combination of several management techniques may be the most effective means to treat established hydrilla.



Present Absent



(On Michigan's prohibited species list)

# Parrot Feather Watermilfoil

(*Myriophyllum aquaticum* [Vell.] Verdc.)

Leslie J. Mehrhoff, University of Connecticut, Bugwood.org



**Description:** A close relative of Eurasian watermilfoil, parrot feather has leaves arranged in whorls of four to six around a thick stem. The oblong leaves are 0.5 to 1.5 inches long with deeply cut, bright blue-green, feathery leaflets. It is one of the few submerged aquatic plants whose stems and leaves extend above the surface. Heavy infestations resemble a forest of tiny fir trees across the surface. Underwater leaves are feathery, limp and reddish. Stems can be 5 feet in length, trailing along the bottom and forming dense mats before turning upright to emerge above the water. In contrast, Eurasian watermilfoil stems and leaves do not extend above the water, although its flowers and seeds do.

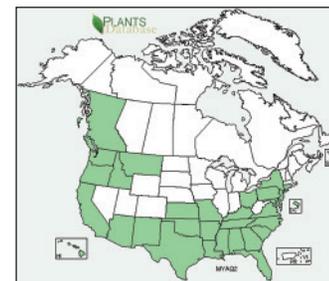
## Habitat and distribution:

Parrot feather prefers lakes, ponds, and slow-moving streams and ditches. Dense mats covering the surface of shallow waters can contribute to flooding. The plant's tough stems interfere with recreation. A popular aquaria and water gardening plant, parrot feather is spread by release and by improper disposal of unwanted plants. Once established, it spreads by fragmentation, water currents and boat trailers. Indigenous to South America, parrot feather was first reported in the United States in the Washington, D.C., area in 1890. Parrot feather has been found in 31 states, including neighboring Ohio. Unconfirmed sightings in Michigan have been reported.



Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

**Control/management:** Parrot feather is difficult to control. Submerged and emergent foliage impede effective herbicide delivery, and the waxy coating on emergent stems and leaves inhibits herbicide uptake. Harvesting and other mechanical controls produce fragments that help spread the plant. Aquarium and water garden specimens should not be discarded into or near water bodies.



Present Absent



(On Michigan's prohibited species list)

# Starry Stonewort

(*Nitellopsis obtusa* [N.A.Desvaux] J.Groves)



Pam Tynning, Progressive AE



**Description:** Although it looks like a higher vascular plant, starry stonewort is a macro-alga in the same class as native *Chara*. The plant is light green. Like *Chara*, the plant has whorls of leaf-like branches around its stem. Unlike *Chara*, starry stonewort produces a very small, star-shaped, creamy-white reproductive structure called a bulbil. The presence of bulbils, which may appear at any time during the year, is one way to distinguish starry stonewort from *Chara*.

**Habitat and distribution:** Unlike the beneficial *Chara* species, starry stonewort forms dense mats and can reduce native species and interfere with recreation. It has been found to form a physical barrier along the lake bottom, impeding access to the substrate where fish may nest and eliminating spawning activity

where it is growing. It is found in deeper waters than *Chara* and can grow to greater heights, as much as 7 feet. Starry stonewort is native to Europe and western Asia and was first found in the St. Lawrence River in 1978 and then in the Lake St. Clair/Detroit River system in 1983. It was not positively identified in any Michigan inland lake until 2006. By 2011, it had been reported in 119 water bodies in 31 counties.

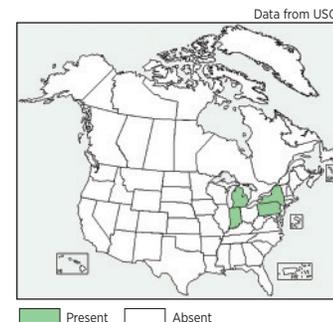


Paige Filice, Michigan State University

## Control/management:

Being an alga, the plant is sensitive to copper compounds and amine salts of endothalls, although some reports indicate that the chemicals burn only the upper surfaces of the mat, leaving the bottom portion of the plant unaffected. Flumioxazin has also been used for treatment. Mechanical harvesting may also be effective because the plant can easily

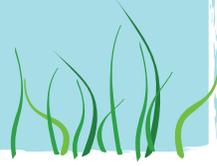
be dislodged from the bottom, but its growth pattern and lack of distinct up-growing stalks can make harvesting labor-intensive. No biological controls are known for this species.



(On Michigan's prohibited species list)

# Water Chestnut

(*Trapa natans* L.)



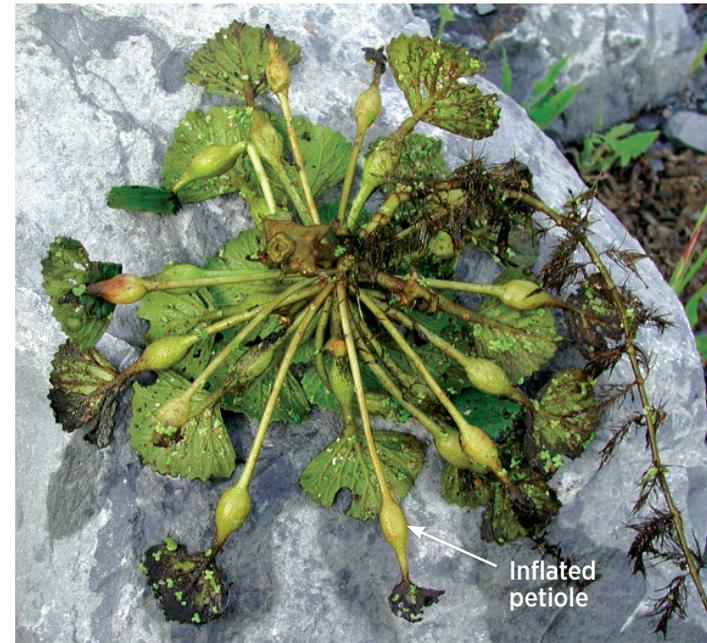
Leslie J. Mehrhoff, University of Connecticut, Bugwood.org



**Description:** This bottom-rooting species consists of a rosette of floating triangular leaves with toothed margins and submersed leaves that are feathery-looking and occur in whorls around the stem. An inflated petiole keeps the upper leaves afloat, where they can form dense mats at the water surface. Water chestnut produces small, inconspicuous four-petaled white flowers. The extremely sharp four-horned nut-like fruits fall to the sediments and can germinate the following spring or remain viable for up to 12 years.

**Habitat and distribution:** Water chestnut prefers standing enriched waters but can be found in slow-moving streams. It forms extremely dense patches, impedes a wide range of recreational activities and prevents light penetration to lower depths. Water chestnut is an aggressive plant that outcompetes native vegetation. It is of limited or no value to wildlife. A popular water gardening plant,

Leslie J. Mehrhoff, University of Connecticut, Bugwood.org



water chestnut is native to Western Europe, Africa and parts of Asia. It was introduced to the United States in the late 1800s and has been found in 11 northeastern states as well as portions of Canada. It is on the Michigan prohibited species list but has not yet been sighted in the state.

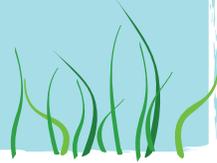
**Control/management:** The most commonly used methods to treat water chestnut are mechanical and hand removal. Because the plants are fairly easy to uproot, these methods have been effective in small areas but, like any short-term treatment, must be repeated regularly. Herbicide treatment has not been widely used. Although several species have been tested, no suitable biological control has been found for use in the United States. Water garden specimens should not be discarded into or near water bodies.



(On Michigan's prohibited species list)

# Water Hyacinth

(*Eichhornia crassipes* [Mart.] Solms)



Suzan Campbell, Michigan Natural Features Inventory

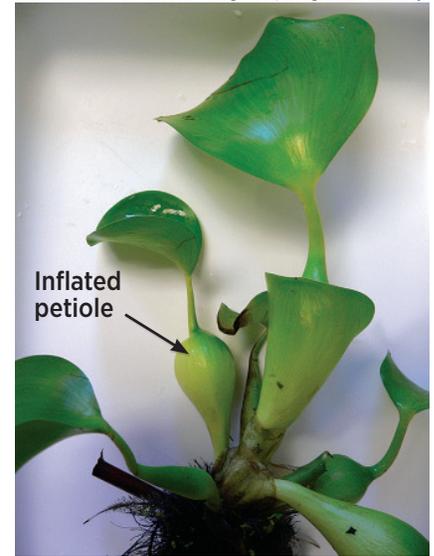


**Description:** Water hyacinth is a free-floating plant that can grow to 3 feet in height. Leaves are glossy, nearly 6 inches wide and round to oval. They curve inward at the edges. The leaves are attached to a spongy and inflated-looking petiole. The plant produces large purplish flowers with six petals on a terminal spike. The roots are thick, branched and dark-colored.

**Habitat and distribution:** Water hyacinth is often described as one of the worst aquatic weeds in the world. The plant reproduces through both vegetative means and seed. It forms dense mats that impede recreational activities, clog waterways and irrigation channels, hamper flood mitigation operations, interfere

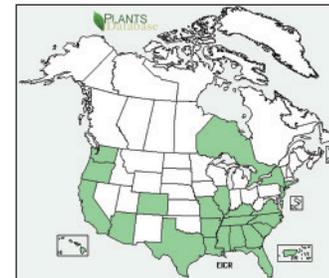
with wildlife and increase siltation rates. The plant cover prevents sunlight from penetrating into the water, thus impeding growth of submersed plant species. It is easily distributed by water currents, winds and boats. A popular water gardening plant, water hyacinth was introduced from South America in the 1880s and has invaded much of the southern portion of the United States. It has been found in only a few lakes in southeastern Michigan, including Lake Erie Metropark, where it has persisted for years even though it should not have been able to survive cold Michigan winters.

Paige Filice, Michigan State University



**Control/management:** Control mechanisms for water hyacinth include mechanical harvesting, herbicide treatment and biological control. Biological control, which has met with limited to substantial success, has included two species of weevils, a moth species and a water mite. Adult weevils and larval moths feed on the petiole and leaves; the mite sucks juices from the plant. The combination of biological control and herbicide treatment has produced mixed results, in part because of the reduction in the insects' food supply. When water hyacinth was grown in controlled pots, the herbicide imazapyr resulted

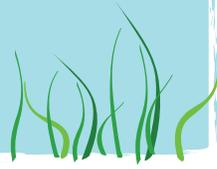
in reduction in biomass and complete control. Further studies have been suggested for identifying more compatible methods using a combination of herbicide application and biological control agents. Care should be taken to dispose of the plant properly and not transfer it from water gardens or aquaria into water bodies.



(Not as yet listed in Michigan)

# Water Lettuce

(*Pistia stratiotes* L.)



Graves Lovell, Alabama Department of Conservation and Natural Resources, Bugwood.org



**Description:** Water lettuce is a distinctive floating aquatic plant not easily confused with any native floating aquatic plants. It resembles a head of lettuce — its thick leaves are a dull light green with prominent ridges and soft, velvety hairs. Roots are rarely attached to the substrate and can extend 32 inches down into the water column. The plant grows in a rosette up to 18 inches in diameter, with no stems or leaf stalks and small, inconspicuous flowers. The fruit is a small berry, similar in color to the leaves.

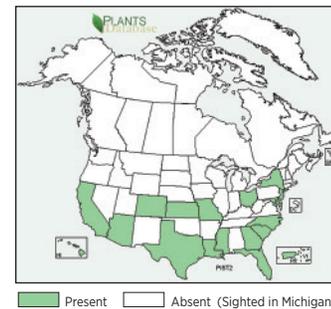
**Habitat and distribution:** Water lettuce spreads through release and improper disposal. Once established, it spreads via boats, waterfowl and water currents. It is known to form large infestations in lakes, rivers and canals, and it can prevent boating, fishing and other uses of waterways. Water lettuce is of concern because of its



popularity as a water gardening plant and availability through retail and Internet sources. This perennial persists in Florida and other southern states. Some experts believe the plant's origins are in Africa, although its first documentation in Florida dates to the 1700s. Water lettuce is not considered winter-hardy but has been reported in a southeastern Michigan marsh as well as the Detroit River, and has been sighted in a few other areas of the state. As of this printing, water lettuce appears on the federal list of prohibited plants but not on Michigan's list of prohibited plants.

## Control / management:

Small infestations can be readily controlled by pulling, bagging and landfilling (do not compost). Large infestations reportedly have responded to mechanical harvesting. The plant can spread by fragmentation, so other methods should be explored. Treatment with herbicides such as diquat or glyphosate has been shown to provide temporary control. Water garden specimens should not be discarded into or near water bodies.



(Not as yet listed in Michigan)

# Prevention and Monitoring

The introduction and spread of invasive plant species to inland waterways pose threats to lake ecosystems, native species, critical habitats, property values and recreation. Many of these invasive plants have multiple modes of reproduction and often outcompete native vegetation. Preventing their introduction is an important strategy to adopt. Cleaning boats and trailers, emptying live wells and bilge areas, cleaning bait buckets, and properly disposing of aquarium and water garden plants reduce the chances of invasive species introduction. Monitoring your lake for possible introduction of invasive species is another good way to prevent their establishment. Immediate action and rapid response should occur anytime these plants are discovered.

All plants require nutrients, particularly phosphorus and nitrogen. Phosphorus is frequently limiting in aquatic ecosystems, and its input often results in excessive plant growth. Therefore, preventing its release to water bodies helps deter excessive growth of both native and invasive species, especially those species that are not rooted in phosphorus-rich sediments. If an invasive species is already established in the lake, a combination of long-term nutrient reduction and short-term control strategies may be the best

way to keep the plant from spreading further. Many short-term treatment methods require a permit from the Michigan Department of Environmental Quality. To determine if the activity you are considering requires a permit, go to the Aquatic Invasive Species Information Center at [www.michigan.gov/invasivespecies](http://www.michigan.gov/invasivespecies) and click on "invasive species contacts." For information on the proper disposal of aquaria and water garden plants and animals, visit the national Habitattitude website ([habitattitude.net](http://habitattitude.net)).

The MSU Extension publication "A Citizen's Guide for the Identification, Mapping and Management of the Common Rooted Aquatic Plants of Michigan Lakes" (WQ55) can accompany this guide to help distinguish between native and invasive species that resemble each other ([bookstore.msue.msu.edu](http://bookstore.msue.msu.edu)). Training on aquatic plant identification and monitoring is available through the Michigan Clean Water Corps (MiCorps) program ([www.micorps.net](http://www.micorps.net)). Your local Sea Grant Extension office ([www.miseagrant.umich.edu/about/regions/](http://www.miseagrant.umich.edu/about/regions/)) can help with questions on aquatic invasive species. Also, MISIN ([www.misin.msu.edu](http://www.misin.msu.edu)) has educational modules available on invasive species and also accepts observation data if you find an invasive species in your lake.

# Plant Terminology

**Leaf axil** – the angle between the upper side of the leaf and a stem, where a bud often occurs.

**Node** – the place on a plant stem where a leaf is attached.

**Perennial** – plants that live for more than one growing season.

**Petiole** – the stalk of a leaf that attaches the leaf blade to the stem.

**Rhizome** – a modified root-like stem that is usually found underground.

**Rosette** – arrangement of leaves in a circular pattern at a similar height.

**Stolon** – stems (often called runners) that grow at or below the sediment surface and form roots.

**Tuber** – root or stem structures produced to store nutrients, survive harsh conditions or asexually reproduce.

**Turion** – a vegetative dormant bud.

**Whorl** – leaves or other plant parts that radiate from a single point and surround or wrap around the stem.

Pam Tynning, Progressive AE



Eurasian watermilfoil in a Michigan lake.

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Jo Latimore, Michigan State University



# Website References

The following websites have listings, descriptions and other pertinent information on a variety of invasive aquatic plant species.

AquaPlant: A Pond Manager Diagnostic Tool, Texas A&M AgriLife Extension  
[aquaplant.tamu.edu/plant-identification/alphabetical-index/](http://aquaplant.tamu.edu/plant-identification/alphabetical-index/)

Center for Aquatic and Invasive Plants, University of Florida, IFAS  
[plants.ifas.ufl.edu/seagrant/eicra2.html#hphow](http://plants.ifas.ufl.edu/seagrant/eicra2.html#hphow)

Grand Valley State University Annis Water Resources Institute – Milfoil Identifications  
[www.gvsu.edu/wri/thum/milfoil-identifications-13.htm](http://www.gvsu.edu/wri/thum/milfoil-identifications-13.htm)

Indiana Department of Natural Resources Aquatic Invasive Species – Plants  
[www.in.gov/dnr/6347.htm](http://www.in.gov/dnr/6347.htm)

Michigan Department of Environmental Quality – Aquatic Invasive Species  
[www.michigan.gov/aquaticinvasives](http://www.michigan.gov/aquaticinvasives)

Michigan Department of Natural Resources – Invasive Species  
[www.michigan.gov/invasivespecies](http://www.michigan.gov/invasivespecies)

Michigan Department of Natural Resources – Photos of Prohibited and Restricted Invasive Species  
[www.michigan.gov/documents/dnr/Photos\\_of\\_Invasives\\_388943\\_7.pdf](http://www.michigan.gov/documents/dnr/Photos_of_Invasives_388943_7.pdf)

Michigan Inland Lakes Partnership  
[michiganlakes.msue.msu.edu/michiganlakes/aquatic\\_invasive\\_species](http://michiganlakes.msue.msu.edu/michiganlakes/aquatic_invasive_species)

Midwest Invasive Species Information Network  
[www.misin.msu.edu/](http://www.misin.msu.edu/)

USDA Natural Resources Conservation Service – Plants Database  
[plants.usda.gov/search\\_tips.html](http://plants.usda.gov/search_tips.html)

Washington State Department of Ecology – Non-native, Invasive Freshwater Plants  
[www.ecy.wa.gov/programs/wq/plants/weeds/](http://www.ecy.wa.gov/programs/wq/plants/weeds/)

Wisconsin Department of Natural Resources – Aquatic Invasive species  
[dnr.wi.gov/topic/Invasives/species.asp?filterBy=Aquatic&filterVal=Y](http://dnr.wi.gov/topic/Invasives/species.asp?filterBy=Aquatic&filterVal=Y)



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European frog-bit

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