



HOBART AND WILLIAM SMITH COLLEGES



# Help Protect HONEOYE LAKE From Invasive Species

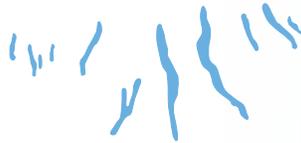
A guide to the invasive species of concern for the Honeoye valley.





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Reducing the introduction, spread and impact of invasive species within the Finger Lakes PRISM region through coordinated education, detection, prevention, and control measures.

## Finger Lakes PRISM

Finger Lakes Institute  
Hobart and William Smith Colleges  
300 Pulteney Street, Geneva, NY 14456  
(315) 781-4385

[www.fingerlakesinvasives.org](http://www.fingerlakesinvasives.org)

Funding for this project provided by:



# HELP PREVENT THE SPREAD OF INVASIVE SPECIES

Dear Friend of the Honeoye Valley,

Invasive species are bullies in this environment. Native to somewhere else, they have no natural predators here, so can reproduce rapidly and crowd out native species. We need to work together to find, identify, and report findings of invasive species in order to prevent their spread.

This booklet was produced as a cooperation of the Honeoye Valley Association and the Finger Lakes PRISM with funding from the Finger Lakes PRISM. We hope you will take the time to read through it and learn more about the invasive species that pose a threat to our area.

## HOW YOU CAN HELP.

Please report potential sightings – location, digital picture, and potential identification to:

- Local: Honeoye Lake Watershed Task Force [watershedtaskforce@gmail.com](mailto:watershedtaskforce@gmail.com)
- Regional: Finger Lakes PRISM <https://fingerlakesinvasives.org>
- Statewide notification: iMapInvasive web-based application <https://www.nyimapinvasives.org>

### **Some species are in the area, and we are especially concerned about their introduction here:**

Water Chestnut (in Canandaigua inlet)  
Hydrilla (in Cayuga Lake)  
Starry Stonewort (in Canandaigua Lake)  
Quagga Mussels (in Canandaigua Lake)

### **Some species are already here:**

Curly-Leaved Pondweed  
Eurasian Watermilfoil  
Zebra Mussels  
Emerald Ash Borer (in watershed – concerned about spread)  
Hemlock Woolly Agelid (in watershed – concerned about spread)

Many of the plants of concern are wetland species, so near shore observations are important.

## HELP US PREVENT THE INTRODUCTION OF NEW INVASIVES, AND THE EXPORT OF THOSE ALREADY HERE.

**Boats** – inspect and clean, drain, dry – both inbound and outbound.

**Firewood** – use local wood. Do not transport long distances.

**Hikers** – clean boots and clothing. Do not transport seeds or plant fragments.

**Canoeists/Kayakers** – inspect and dry equipment.

Everyone's observations are needed. We'd rather identify a known species for you than miss a new invader!!

Thank you,  
The Honeoye Valley Association



## ROUND GOBY

*Neogobius melanostomus*  
Origin: Eurasia

### INVASIVE RANKING, NYS

High

### MANAGEMENT STRATEGY

Prevention

Round Gobies are small, brown and black blotched fish with large, frog-like heads. There is a black spot on their front dorsal fin, which is a characteristic of the species. They grow to just under 30 cm in size. Round Gobies can be distinguished from native sculpins (*Cottidae*) by their fused pelvic fins, or suctorial disc, which helps them attach to surfaces in flowing water.

### HABITAT

Round Gobies are bottom dwellers of fresh or brackish water. They can thrive in a wide variety of habitat types, including open sand, dense macrophytes, and rocky substrates.

### THREAT

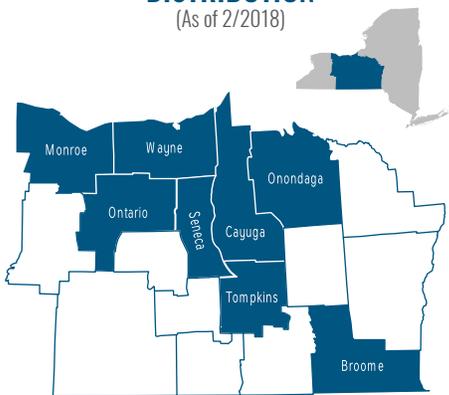
Round Gobies are aggressive fish that can outcompete native species for food, shelter, and nesting sites. They also prey on eggs of many native fish species. Round Gobies bioaccumulate many contaminants, which are then passed on to larger game fish and then potentially to humans.

### MANAGEMENT

Prevention and education are the best management strategies. Clean, drain, and dry all equipment prior to moving between waterbodies, and do not release live bait. Little can be done to eradicate populations once they are established.

### DISTRIBUTION

(As of 2/2018)



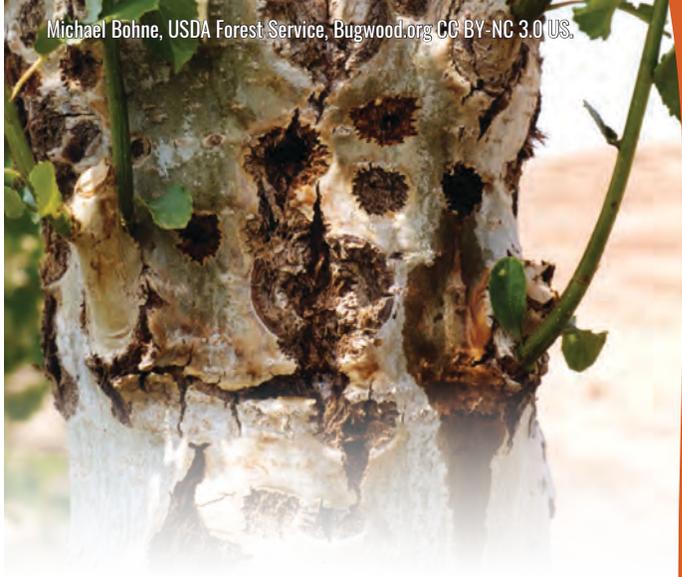
[www.fingerlakesinvasives.org](http://www.fingerlakesinvasives.org)

**REFERENCE** - Invasives Species Awareness Program. (2011). Round Goby. Retrieved from Ontario Invading Species Awareness Program: <http://www.invadingspecies.com/invaders/fish/roundgoby/>  
U.S. Geological Survey. [2017]. Nonindigenous Aquatic Species Database. Gainesville, Florida. Accessed [6/8/2017].



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female (middle), male (right) compared to cottonwood borer (left)

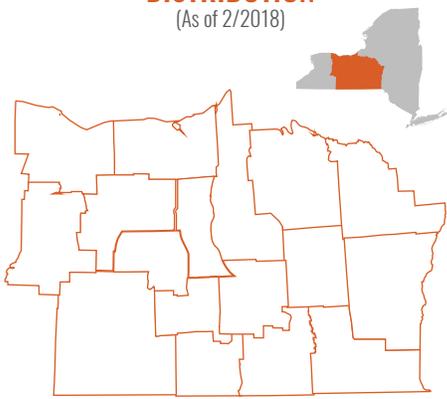
# ASIAN LONG-HORNED BEETLE

*Anoplophora glabripennis*  
Origin: Asia

**INVASIVE RANKING, NYS**  
High

**MANAGEMENT STRATEGY**  
Chemical  
Physical  
Prevention

**DISTRIBUTION**  
(As of 2/2018)



[www.fingerlakesinvasives.org](http://www.fingerlakesinvasives.org)

Asian longhorned beetles (ALB) are a forest pest with a wide range of host trees. Adult beetles are 2-4 cm in length, with jet black bodies and mottled white spots on the back. Their black-and-white-banded antennae are 1.5-2.5 times longer than the body. Beetle larvae are cream-colored, cylindrical, and up to 6 cm in length. They produce frass that looks like wood-shavings, and leave a circular exit hole about 1 cm in diameter and over 2.5 cm deep.

### HABITAT

These beetles live in a wide range of native hardwoods, but prefer maple trees. Larvae first burrow between the inner bark and the wood of the tree, forming a feeding gallery; as they mature, they move deeper, to the dense inner wood of the tree trunk.

### THREAT

Asian longhorned beetles can severely damage the physical and vascular structure of trees, interfering with uptake of vital nutrients. Continued infestation leads to tree death in six to eight years. In the US, \$669 billion worth of urban trees are at risk to this pest, and the potential damage to forest ecosystems is currently incalculable.

### MANAGEMENT

Quarantines and tree removal are the current methods of prevention and eradication. The Don't Move Firewood campaign helps prevent its spread to new locations. Annual pool surveys help monitor for new infestations. In some areas, an insecticide may be used as a preventative measure as well as a treatment, although it can be costly. Biological control methods are being researched, but are not yet available for use. Development of genetically resistant trees may be part of the long-term solution to ALB if eradication from the US is not successful.

**REFERENCE** - Meng, P. S., K. Hoover, M. A. Keena. "Asian Longhorned Beetle (Coleoptera: Cerambycidae), an Introduced Pest of Maple and Other Hardwood Trees in North America and Europe." *J. Integ. Pest Mngmt.* (2015) 6(1): 4;DOI: 10.1093/jipm/pmv003

US Forest Service. "Forest Health Protection." [www.na.fs.fed.us](http://www.na.fs.fed.us). [https://www.na.fs.fed.us/fhp/alb/ident\\_reporting/identifying.shtm](https://www.na.fs.fed.us/fhp/alb/ident_reporting/identifying.shtm). (accessed May 25, 2017).

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# EMERALD ASH BORER

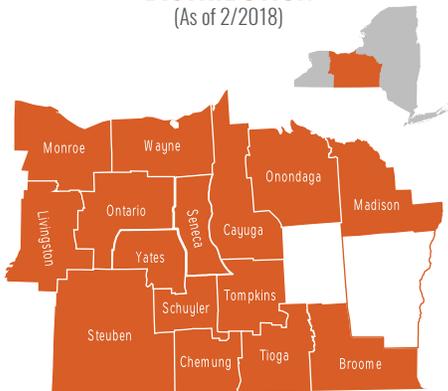
*Agrilus planipennis*  
Origin: Northern China, Korea

**INVASIVE RANKING, NYS**  
Very High

**MANAGEMENT STRATEGY**  
Chemical  
Prevention

## DISTRIBUTION

(As of 2/2018)



[www.fingerlakesinvasives.org](http://www.fingerlakesinvasives.org)



Emerald ash borer (EAB) is a wood boring beetle that feeds on and eventually kills all species of ash. Adults are about 1 cm long, with an elongated metallic green body and narrow brass colored head. Larvae are creamy white with a brown head and are flattened on top and bottom. The larvae have eight abdominal segments, with the last segment sporting two pincer-like spines. Adults emerging from trees in the spring leave a D-shaped exit hole in the bark.

## HABITAT

Emerald ash borers can be found in, on, or around ash trees (*Fraxinus* spp.) in hardwood forests.

## THREAT

Adult beetles feed on ash foliage, causing aesthetic damage. The larvae damage ash trees by feeding on the inner bark, which disrupts the transportation of water and nutrients, resulting in mortality. Destruction caused by the emerald ash borer is projected to cost \$10.7 billion by 2020 through urban tree removal, loss of ecosystem services and property value, and wholesale loss of ash plantations.

## MANAGEMENT

Ash trees can be treated with an insecticide to prevent infestation; treatments last for three years. Planning for removal of untreated trees in urban areas will prevent costly emergency removals. It is also important to prevent the spread of established populations. When recreating and camping, only local firewood should be used. Biocontrol with the use of parasitic wasps is currently being deployed in a few states. This is a long-term management method rather than immediate control.

**REFERENCE** - McCullough, Debra. 2015. Pest Alert: Emerald Ash Borer. United States Department of Agriculture. USDA. June 17, 2017. [https://www.na.fs.fed.us/spfo/pubs/pest\\_al/eab/eab.pdf](https://www.na.fs.fed.us/spfo/pubs/pest_al/eab/eab.pdf)

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# SPOTTED LANTERNFLY

*Lycorma delicatula*

## What is the spotted lanternfly?

The spotted lanternfly (SLF) is an invasive pest from Asia that primarily feeds on tree of heaven (*Ailanthus altissima*) but can also feed on a wide variety of plants such as grapevine, hops, maple, walnut, fruit trees and others. This insect could impact New York's forests as well as the agricultural and tourism industries.

## Identification

Nymphs are black with white spots and turn red before transitioning into adults. They can be seen as early as April. Adults begin to appear in July and are approximately 1 inch long and ½ inch wide at rest, with eye-catching wings. Their forewings are grayish with black spots. The lower portions of their hindwings are red with black spots, and the upper portions are dark with a white stripe. In the fall, adults lay 1-inch-long egg masses on nearly anything from tree trunks and rocks to vehicles and firewood. They are smooth and brownish-gray with a shiny, waxy coating when first laid.

## Where are they located?

SLF were first discovered in Pennsylvania in 2014 and have since been found in New Jersey, Delaware and Virginia. As of spring 2018, New York has no infestations, though it's possible they are present in low numbers and have not been detected yet. Given the proximity of the Pennsylvania infestation, it is expected to be found in New York eventually.

## What is the risk to NYS?

SLF pose a significant threat to New York's agricultural and forest health. Adults and nymphs use their sucking mouthparts to feed on the sap of more than 70 plant species. Feeding by sometimes-thousands of SLF stresses plants, making them vulnerable to disease and attacks from other insects. SLF also excrete large amounts of sticky "honeydew," which attracts sooty molds that interfere with plant photosynthesis, negatively affecting the growth and fruit yield of plants. New York's annual yield of apples and grapes, with a combined value of \$358.4 million, could be impacted if SLF enters New York. The full extent of economic damage this insect could cause is unknown at this time.

Although native insects also secrete honeydew, the size of SLF and the large populations that congregate in an area result in large accumulations of it. The sticky mess and the swarms of insects it attracts can significantly hinder outdoor activities. In Pennsylvania, where SLF populations are the densest, people can't be outside without getting honeydew on their hair, clothes, and other belongings.



Adult spotted lanternfly  
Lawrence Barringer, Pennsylvania Department of  
Agriculture, Bugwood.org



Spotted lanternfly nymph  
Lawrence Barringer, Pennsylvania Department of  
Agriculture, Bugwood.org

## How do they spread to new areas?

While SLF can jump and fly short distances, they spread primarily through human activity. They often hitch rides to new areas when they lay their eggs on vehicles, firewood, outdoor furniture, stone, etc. and are inadvertently transported long distances.

## What are the signs of an infestation?

- Sap oozing or weeping from tiny open wounds on tree trunks, which appears wet and may give off fermented odors.
- One-inch-long egg masses that are brownish-gray, waxy and mud-like when new. Old egg masses are brown and scaly.
- Massive honeydew build-up under plants, sometimes with black sooty mold.



New (left) and old (right) egg masses  
Kenneth R. Law, USDA APHIS PPQ, Bugwood.org

## What is being done?

DEC is working with the NYS Department of Agriculture and Markets and the US Department of Agriculture to address SLF. Since it is less expensive and easier to deal with a pest before it becomes widespread, the goal is to find SLF early or prevent it from entering NY altogether.

A plan has been developed that describes how the agencies will prevent and detect SLF in New York. Extensive trapping surveys will be conducted in high-risk areas throughout the state as well as inspections of nursery stock, stone shipments, commercial transports, etc. from Pennsylvania. DEC and partner organizations encourage everyone to be on the lookout for this pest.

## What can I do?

- Learn how to identify SLF.
- Inspect outdoor items such as firewood, vehicles, and furniture for egg masses.
- If you visit states with SLF, be sure to check all equipment and gear before leaving. Scrape off any egg masses. Visit [www.agriculture.pa.gov](http://www.agriculture.pa.gov) for more information on SLF in PA.

If you believe you have found SLF in New York...

- Take pictures of the insect, egg masses and/or infestation signs as described above (include something for scale such as a coin or ruler).
- Note the location (address, intersecting roads, landmarks or GPS coordinates).
- Email the information to DEC (see below).
- Report the infestation to iMapInvasives at [www.NYiMapInvasives.org](http://www.NYiMapInvasives.org).



Wounds from SLF feeding are too small to spot without sap oozing out of them.  
Pennsylvania Department of Agriculture, Bugwood.org



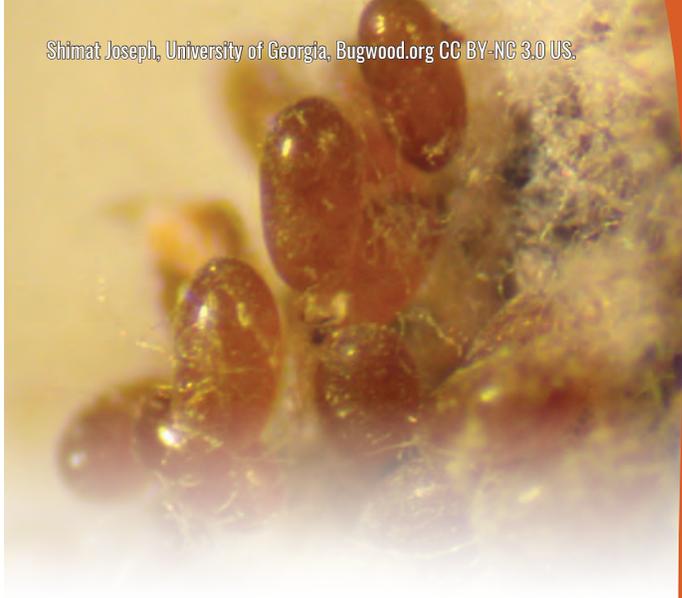
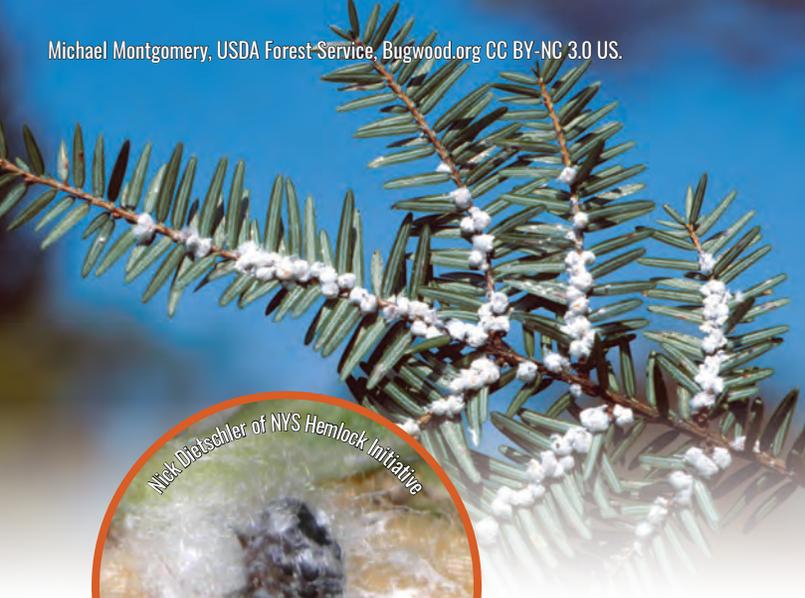
Swarm of lanternflies on a tree  
Lawrence Barringer, Pennsylvania Department of Agriculture, Bugwood.org

## CONTACT INFORMATION

**Bureau of Invasive Species and Ecosystem Health**  
Division of Lands and Forests

**New York State Department of Environmental Conservation**  
625 Broadway, Albany NY 12233  
[spottedlanternfly@dec.ny.gov](mailto:spottedlanternfly@dec.ny.gov)  
[www.dec.ny.gov](http://www.dec.ny.gov)

Updated May 1, 2018



Nick Dietschler of NYS Hemlock Initiative

# HEMLOCK WOOLLY ADELGID

*Adelges tsugae*

Origin: Asia, Southern Japan

## INVASIVE RANKING, NYS

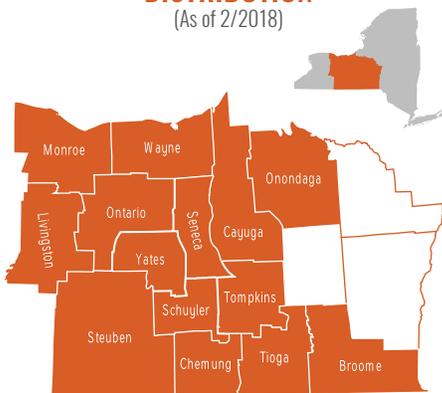
High

## MANAGEMENT STRATEGY

- Chemical
- Biocontrol
- Prevention

## DISTRIBUTION

(As of 2/2018)



[www.fingerlakesinvasives.org](http://www.fingerlakesinvasives.org)

The hemlock woolly adelgid is a small, aphid-like insect that attacks hemlock trees. They are most easily recognized by the white “woolly” masses of wax they use to protect themselves and their eggs from desiccation and predation. These ovisacs can be readily observed on the undersides of branches, at the base of the needles, from late fall to early summer. Infested trees may have gray-tinted foliage or exhibit needle loss and branch dieback.

## HABITAT

The hemlock woolly adelgids feed on native eastern hemlock (*Tsuga canadensis*), and on any ornamental species of hemlock. They are found on twigs at the base of needles.

## THREAT

Hemlock woolly adelgids use their long, sucking mouthparts to tap into the food storage of plant cells, which causes the tree to wall off the wound with scar tissue. After an intense infestation, the tree is unable to get sap to the end of its branches to produce new growth; once existing needles die, the tree cannot produce food. Dieback can occur in as little as two years, and mortality in 4-20 years depending on site characteristics and climate. Hemlock woolly adelgids reproduce asexually in the eastern US, so one insect can start a new infestation.

## MANAGEMENT

Treatment with systemic insecticides is effective and relatively inexpensive, with treatments remaining effective for up to seven years. Limiting the movement of infested nursery stock will slow its spread. Biological controls are under development and are the best long term management option.

**REFERENCE** - Childs, Robert. Hemlock Woolly Adelgid Frequently Asked Questions. <https://ag.umass.edu/landscape/fact-sheets/hemlock-woolly-adelgid-frequently-asked-questions>. DEC. Hemlock Woolly Adelgid <http://www.dec.ny.gov/animals/7250.html>. May 31, 2017.

US Forest Service. Pest Alert - Hemlock Woolly Adelgid [https://www.na.fs.fed.us/spfo/pubs/pest\\_al/hemlock/hwa05.htm](https://www.na.fs.fed.us/spfo/pubs/pest_al/hemlock/hwa05.htm). May 25, 2017.

Hemlock Woolly Adelgid, *Adelges tsugae* Factsheet. 2016. New York State Department of Environmental Conservation. [https://www.dec.ny.gov/docs/lands\\_forests\\_pdf/hwafactsheet.pdf](https://www.dec.ny.gov/docs/lands_forests_pdf/hwafactsheet.pdf).





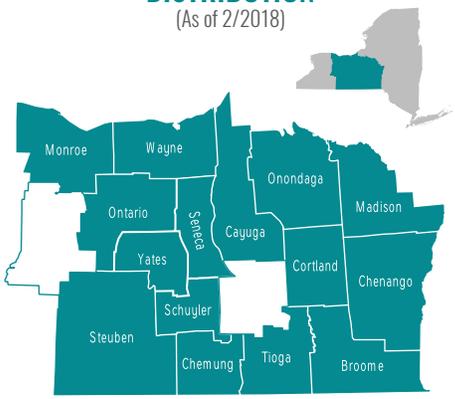
## ASIAN CLAM

*Corbicula fluminea*  
Origin: Asia

**INVASIVE RANKING, NYS**  
High

**MANAGEMENT STRATEGY**  
Chemical  
Mechanical  
Physical  
Prevention

**DISTRIBUTION**  
(As of 2/2018)



[www.fingerlakesinvasives.org](http://www.fingerlakesinvasives.org)

The Asian clam is a freshwater bivalve mollusk. The outside shells are yellow-green to brown; where color chips away, white spots can be seen underneath. The inside of the shells are white to light purple. Adults are small, usually less than 4 cm in length.

### HABITAT

The Asian clam is a filter feeder that removes particles from the water column. It can be found on or slightly buried in the sediment of freshwater water bodies. The species is cold intolerant and limited to warmer regions of freshwater systems.

### THREAT

The Asian clam displaces already threatened native mussels, resulting in biodiversity decline, an unbalanced food chain, and increased possibility of algal blooms. The Asian clam can also cause millions of dollars in damage, clogging commercial and industrial water intake pipes.

### MANAGEMENT

In closed environments such as power plants, chemical, physical, and mechanical methods can be used. In natural systems, prevention through education and stewardship is the best management strategy. As this species is most commonly spread through fishing and boating equipment, it is important to use precautions such as cleaning, draining, and drying your boat and other aquatic equipment before moving to another water body.

**REFERENCE** - Aquatic Invasive Animals. [November 2017.] Rhode Island Department of Environmental Management. Providence, RI. Accessed [5/8/2018] <http://www.dem.ri.gov/programs/benviron/water/quality/surfwq/pdfs/corflu.pdf>

U.S. Geological Survey. [2017]. Nonindigenous Aquatic Species Database. Gainesville, Florida. Accessed [6/8/2017].

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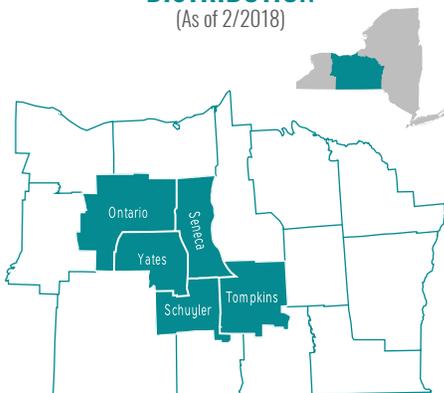
## BLOODY RED SHRIMP

*Hemimysis anomala*  
Origin: Eurasia

**INVASIVE RANKING, NYS**  
High

**MANAGEMENT STRATEGY**  
Prevention

### DISTRIBUTION (As of 2/2018)



[www.fingerlakesinvasives.org](http://www.fingerlakesinvasives.org)

Bloody red shrimp are small invertebrates that can grow to about 0.5-1.5 cm. Their coloring may range from ivory and translucent to red-orange and is variable in changing temperature and light conditions. This species has eight pairs of legs, which is a distinguishing trait. With magnification, a characteristic flat-ended tail with two prominent spikes can be seen. Bloody red shrimp display a distinctive swarming behavior that is unique in the Great Lakes. Swarms may cover several square meters. Individuals, typically males, will migrate from deeper waters to the upper water column at twilight and return to the profundal zone at dawn.

### HABITAT

Bloody red shrimp typically live in quiet areas of brackish or freshwater lakes and reservoirs, but may also establish populations in rivers and streams. This species prefers hard or rocky substrates with water temperatures of about 10-15° C. Specimens have been collected at depths ranging from 0.5-50 m, although it generally inhabits 6-10 m depths.

### THREAT

Bloody red shrimp rapidly consume a variety of zooplankton, phytoplankton, detritus, and insect larvae, putting it in direct competition with many native aquatic organisms including young fish. Zooplankton biomass and diversity may also be reduced.

### MANAGEMENT

The best management strategy is prevention through education and stewardship. As this species is most commonly spread through fishing and boating equipment, it is important to use precautions such as cleaning, draining, and drying your boat and other aquatic equipment before moving to another water body.

**REFERENCE** - U.S. Geological Survey. [2017]. Nonindigenous Aquatic Species Database. Gainesville, Florida. Accessed [6/9/2017]

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The shell of the Chinese mysterysnail is up to 6 cm tall and smooth, with light to dark olive-green vertical striping and six or seven whorls.

# CHINESE MYSTERYSNAIL

*Cipangopaludina chinensis*  
Origin: Southeast Asia

**INVASIVE RANKING, NYS**  
Very High

**MANAGEMENT STRATEGY**  
Prevention

## HABITAT

This species may inhabit a slow-moving body of water with a muddy substrate.

## THREAT

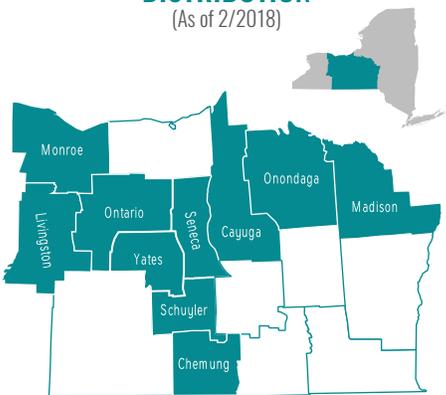
Chinese mysterysnails can be hosts for parasites that are harmful to humans. They can also outcompete native snail species for food and space.

## MANAGEMENT

The best management strategy is prevention through education and stewardship. As these species are most commonly spread through fishing and boating equipment, it is important to use precautions such as cleaning, draining, and drying your boat and other aquatic equipment before moving to another water body. If observed, they can be manually removed using hand or fishing nets. Due to the species' operculum (trap door mechanism), which seals the animal inside its shell, few chemical controls are effective; those that are effective are also likely harmful to native species. Biological controls are being investigated.

## DISTRIBUTION

(As of 2/2018)



[www.fingerlakesinvasives.org](http://www.fingerlakesinvasives.org)

**REFERENCE** - State of Indiana. "Aquatic Invasive Species: Chinese Mystery Snail." [http://www.in.gov/dnr/files/CHINESE\\_MYSTERY\\_SNAIL.pdf](http://www.in.gov/dnr/files/CHINESE_MYSTERY_SNAIL.pdf). (accessed June 1, 2017).  
TMI. "Chinese Mystery Snail, *Cipangopaludina chinensis malleatus*." <https://sites.google.com/a/rsu5.org/invasive/maine-invasive-species/chinese-mystery-snail-cipangopaludina-chinensis-malleatus>. (accessed June 1, 2017).



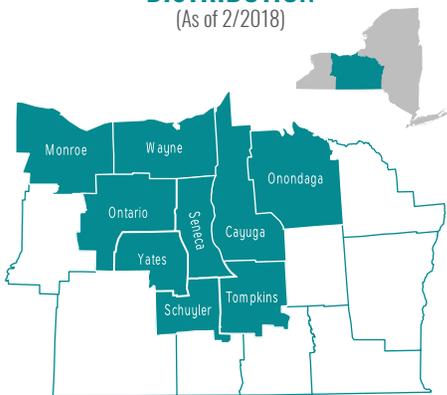
## FAUCET SNAIL

*Bithynia tentaculata*  
Origin: Europe

**INVASIVE RANKING, NYS**  
High

**MANAGEMENT STRATEGY**  
Prevention

### DISTRIBUTION (As of 2/2018)



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The faucet snail grows up to 12.5 mm but are generally smaller. Shells have four or five whorls and range from light brown to black. They are difficult to differentiate from other native snails, so photos and the specimen should always be submitted to an expert for identification.

### HABITAT

Faucets snails are commonly found in freshwater ponds, shallow lakes, and canals. They typically inhabit the bottom substrate in fall and winter and may be found attached to aquatic macrophytes in warmer months.

### THREAT

The faucet snail can outcompete native species. The species is a host for parasites that can kill waterfowl when the snail is ingested. They may also be a source of biofouling as they can clog water intake pipes and accumulate in swimming areas.

### MANAGEMENT

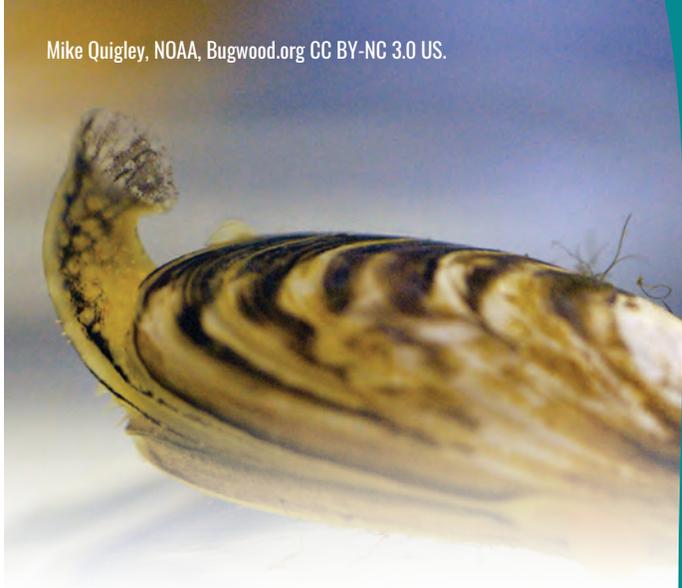
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**REFERENCE** - U.S. Geological Survey. [2017]. Nonindigenous Aquatic Species Database. Gainesville, Florida. Accessed [6/7/2017].

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## QUAGGA MUSSEL

*Dreissena rostriformis bugensis*  
Origin: Eurasia

### INVASIVE RANKING, NYS

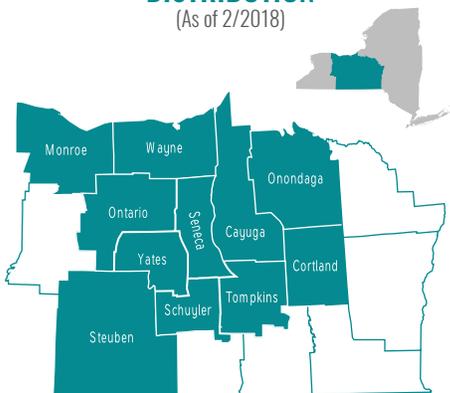
Very High

### MANAGEMENT STRATEGY

- Chemical
- Mechanical
- Physical
- Biocontrol
- Prevention

### DISTRIBUTION

(As of 2/2018)



[www.fingerlakesinvasives.org](http://www.fingerlakesinvasives.org)

Quagga mussels are filter-feeding, freshwater, bivalve mollusks. Their appearance is variable, but shells usually have dark concentric rings that fade toward the hinge. Shells can grow to about 4 cm and are rounded, with a slightly bowed bottom that causes the mussel to tip over if set on its flattest surface.

### HABITAT

Quagga mussels inhabit freshwater at varying depths depending on temperature, where they are sheltered from wave attack. They can live on a wide variety of soft and hard surfaces.

### THREAT

Quagga mussels can outcompete and crowd out native species. As filter feeders, they remove particles from the water, which affects water quality and the food chain of aquatic ecosystems. They also cover many surfaces and can be a nuisance to humans due to their sharp shells.

### MANAGEMENT

The best management strategy is prevention through education and stewardship. As these species are most commonly spread through fishing and boating equipment, it is important to use precautions such as cleaning, draining, and drying your boat and other aquatic equipment before moving to another water body. Not much can be done once established. Manual removal may be performed on small, accessible populations. In closed systems, such as water treatment plants, other control methods can be used, including chemical, thermal, electrical, and biological controls.

**REFERENCE** - U.S. Geological Survey. [2017]. Nonindigenous Aquatic Species Database. Gainesville, Florida. Accessed [6/7/2017].

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# RUSTY CRAYFISH

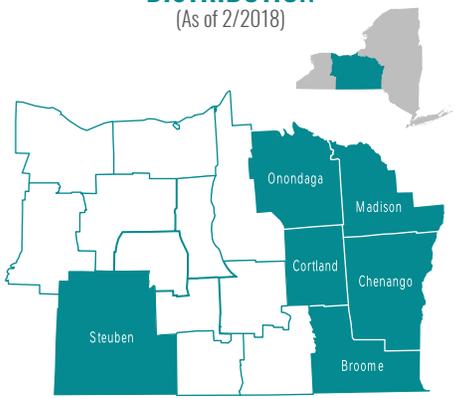
*Orconectes rusticus*  
Origin: Ohio River Basin

**INVASIVE RANKING, NYS**  
High

**MANAGEMENT STRATEGY**  
Prevention

## DISTRIBUTION

(As of 2/2018)



[www.fingerlakesinvasives.org](http://www.fingerlakesinvasives.org)

Rusty crayfish grow to about 10 cm in length and are dark brown with rust-colored spots on both sides of the carapace. It has relatively large, robust claws that are gray-green to red-brown with black bands on the tips. The moveable claw is smooth and S-shaped, forming an oval gap when the claws are closed.

## HABITAT

Rusty crayfish live in waterbodies and waterways with clear, well-oxygenated water and rocks, logs, and debris for shelter. This species prefers cobbly bottom sediment but will tolerate a variety of substrates, including silt, clay, sand, and gravel substrates.

## THREAT

Rusty crayfish are aggressive and reproduce quickly, which allows them to out-compete and displace native crayfish species. This can also negatively impact the structure and biodiversity of the aquatic community.

## MANAGEMENT

The best management strategy is prevention through education and stewardship. As this species is most commonly spread through fishing and boating equipment, it is important to use precautions such as cleaning, draining, and drying your boat and other aquatic equipment before moving to another water body.

**REFERENCE** - U.S. Geological Survey. [2017]. Nonindigenous Aquatic Species Database. Gainesville, Florida. Accessed [6/7/2017].

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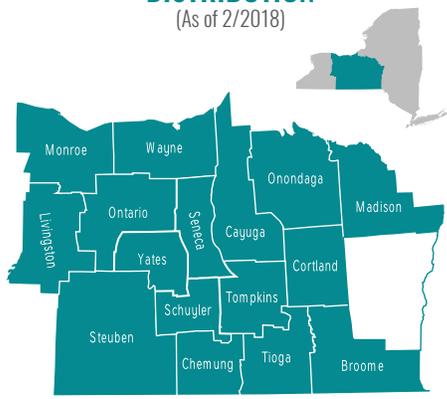
## ZEBRA MUSSEL

*Dreissena polymorpha*  
Origin: Eurasia

**INVASIVE RANKING, NYS**  
Very High

- MANAGEMENT STRATEGY**
- Chemical
  - Mechanical
  - Physical
  - Biocontrol
  - Prevention

**DISTRIBUTION**  
(As of 2/2018)



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Zebra mussels are filter-feeding, freshwater, bivalve mollusks that attach to most surfaces in aquatic environments. Zebra mussels are small, up to 3 cm long, and D-shaped with light and dark yellow to brown alternating stripes. This species is similar in appearance to the quagga mussel (*Dreissena rostriformis bugensis*), but they can be distinguished by the presence of a flattened underside. When placed on a flat surface, zebra mussels will remain upright.

### HABITAT

Zebra mussels inhabit freshwater lakes, rivers, reservoirs, streams, and ponds up to depths of widely varying depths. They attach to any stable substrate including sand, silt, cobbles, macrophytes, concrete, and metal. They do not tolerate salinity or low dissolved oxygen.

### THREAT

Zebra mussels can outcompete and displace native species. Although they have some predators, they breed faster than they can be consumed. As filter feeders, they remove particles from the water, affecting the clarity, content, and ultimately the food chain of aquatic ecosystems. They can also attach to and cover many surfaces, which can cause slippery and sharp conditions, and clog intakes or other pipes.

### MANAGEMENT

The best management strategy is prevention through education and stewardship. As this species is most commonly spread through fishing and boating equipment, it is important to use precautions such as cleaning, draining, and drying your boat and other aquatic equipment before moving to another water body. Zebra mussels are very difficult to control once established. In closed systems such as water treatment plants, chemical, thermal, electrical, and biological controls may be used.

**REFERENCE** - U.S. Geological Survey. [2017]. Nonindigenous Aquatic Species Database. Gainesville, Florida. Accessed [6/7/2017].





## BLACK SWALLOWWORT, PALE SWALLOWWORT

*Vincetoxicum nigrum*,  
*Vincetoxicum rossicum*  
Origin: Europe

### INVASIVE RANKING, NYS

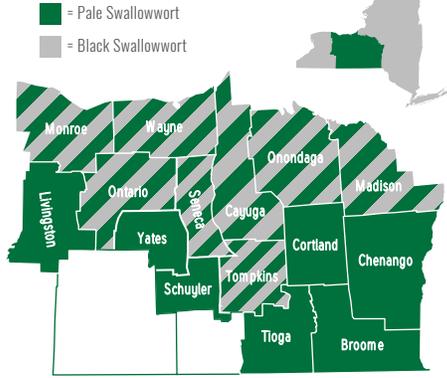
Very High

### MANAGEMENT STRATEGY

Chemical  
Physical  
Prevention

### DISTRIBUTION

(As of 2/2018)



[www.fingerlakesinvasives.org](http://www.fingerlakesinvasives.org)



Black and pale swallowwort (*Vincetoxicum nigrum* and *V. rossicum*) are invasive, herbaceous, perennial vines. Leaves are shiny, dark green, and narrowly oval or heart-shaped, with smooth edges and sharply pointed tips. The leaves are oppositely arranged. Swallowwort stems grow in a spiral pattern and are covered in tiny hairs. Swallowworts closely resemble the related common milkweed (*Asclepias syriaca*).

Swallowwort flowers are five petaled and clustered at the base of leaf stems. Pale swallowwort blooms from May through mid-July; its small flowers have petals twice as long as they are wide, ranging from pink to dark burgundy in color. Black swallowwort blooms in June and July; its flowers are small and dark purple in color, with petals covered in fine hairs and about as wide as they are long.

### HABITAT

Both swallowwort species are shade tolerant, but grow more aggressively when exposed to open areas of sunlight. They occur along roadsides, in gardens, old fields and pastures, forests, limestone rich environments with thin soil, and along the edges of low lying marshy areas. They can tolerate only brief periods of flooding.

### THREAT

Swallowworts can form dense populations that outcompete native species, and are a serious threat to monarch butterflies (*Danaus plexippus*). They crowd out milkweed patches where monarchs lay their eggs and their larvae feed and monarchs mistakenly lay eggs on swallowworts. As monarch caterpillars cannot survive on swallowwort, this further reduces monarch populations.

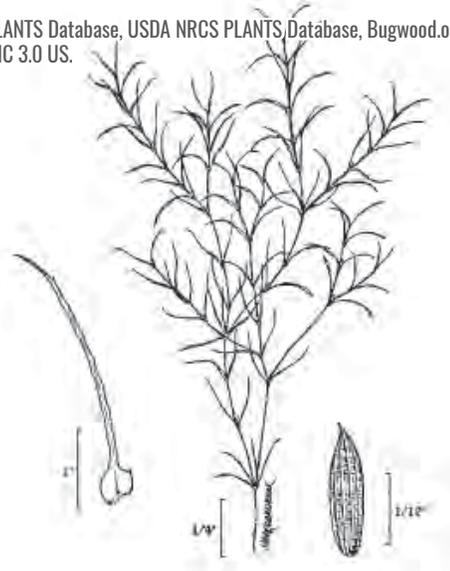
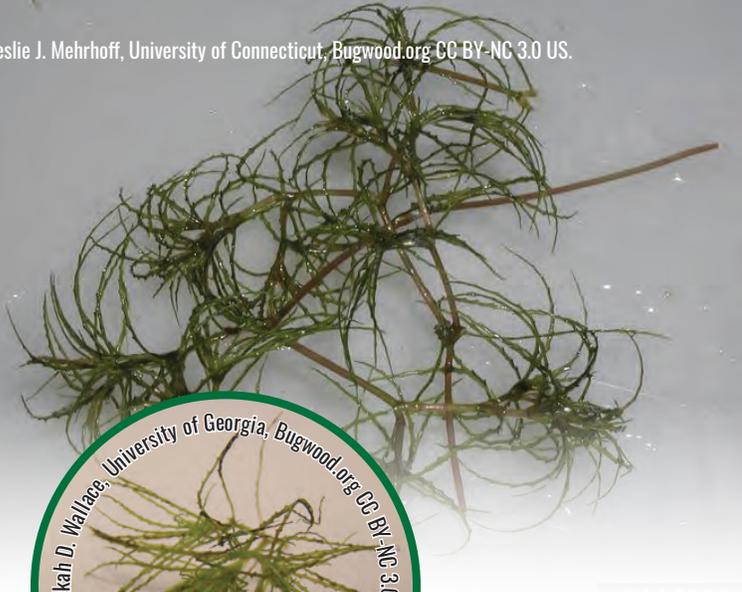
### MANAGEMENT

These plants can be physically removed by thoroughly digging up root masses prior to seed dispersal. They may also be treated with herbicides once flowering has begun. Spread of swallowworts can be reduced if mowed consistently every year before seed pods are mature, although this will not affect rhizome growth.

REFERENCE - April 2014. Black And Pale Swallow-worts. Invasive Species Control. Michigan Natural Features Inventory. <https://mnfi.anr.msu.edu/invasive-species/Swallow-wortBCP.pdf>

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# BRITTLE WATERNYMPH, BRITTLE NAIAD

*Najas minor*  
Origin: Eurasia & Northern Africa.

## INVASIVE RANKING, NYS

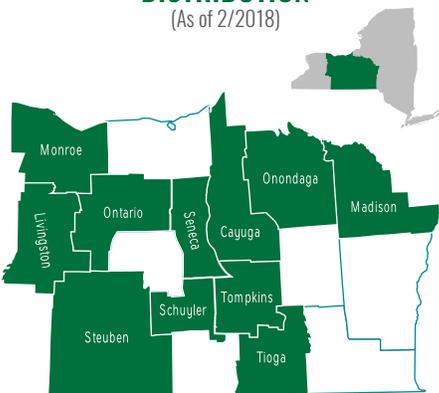
Moderate

## MANAGEMENT STRATEGY

- Chemical
- Mechanical
- Physical
- Prevention

## DISTRIBUTION

(As of 2/2018)



[www.fingerlakesinvasives.org](http://www.fingerlakesinvasives.org)

Brittle water nymph is an annual submersed aquatic plant, that is compact but bushy in appearance with thin, branching stems that can grow up to 1.5 m in length. Stems and roots can fragment easily. The leaves are oppositely arranged, stiff, curled, and pointed, with visible spines along the margins. The seeds, which grow along the stem, are slightly recurved, purplish in color, and have tiny, rectangular pits arranged in longitudinal rows. Care must be taken when identifying this species, as it is similar in appearance to native water nymph species.

## HABITAT

Brittle water nymph inhabits still or slow-moving waterbodies. This species is capable of growing in depths up to 4 m, and is more tolerant of turbidity and high-nutrient conditions than native species of the same genus.

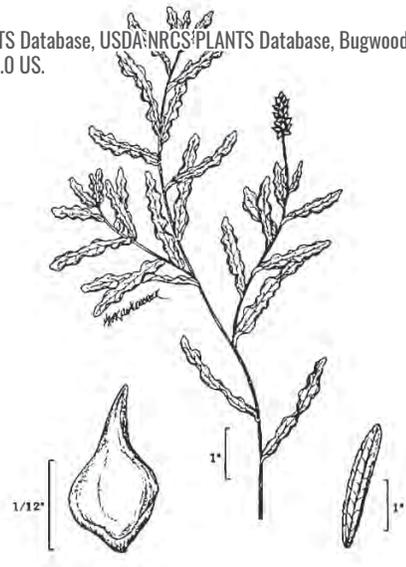
## THREAT

Brittle water nymph can form dense stands in shallow water that inhibit the growth of native aquatic macrophytes. This can also result in unfavorable habitat for fish and waterfowl. Dense infestations will also hinder swimming, fishing, boating, and other forms of recreation.

## MANAGEMENT

The best management strategy is prevention through education and stewardship. As this species is most commonly spread through fishing and boating equipment, it is important to use precautions such as cleaning, draining, and drying your boat and other aquatic equipment before moving to another water body. Small infestations may be removed manually or mechanically to reduce biomass. However, since this plant spreads very easily, it is crucial to avoid fragmentation during removal. Herbicides can be effective in controlling larger infestations.

**REFERENCE** - U.S. Geological Survey. [2017]. Nonindigenous Aquatic Species Database. Gainesville, Florida. Accessed [6/7/2017].



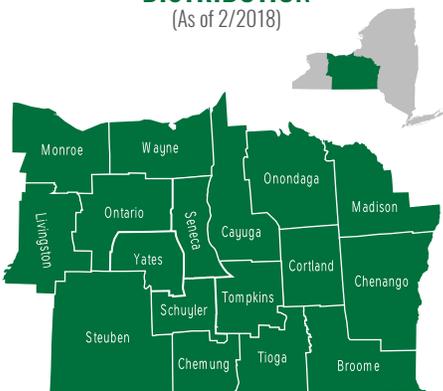
## CURLY-LEAVED PONDWEED

*Potamogeton crispus*  
Origin: Europe, Africa, and Australia

**INVASIVE RANKING, NYS**  
High

**MANAGEMENT STRATEGY**  
Chemical  
Mechanical  
Physical  
Prevention

**DISTRIBUTION**  
(As of 2/2018)



[www.fingerlakesinvasives.org](http://www.fingerlakesinvasives.org)

Curly-leaved pondweed is a submerged perennial aquatic plant that can grow to about 5 m long. It has rigid, reddish-green, oblong leaves with finely toothed, wavy margins and blunt tips, which grow in an alternate arrangement. This species produces very small greenish-red flowers on a spike above the water surface. It also reproduces using overwintering buds, called turions.

### HABITAT

Curly-leaved pondweed grows in a wide variety of environments, including shallow, deep, still, flowing, slightly brackish, or freshwater water up to a depth of about 6 m.

### THREAT

This species is one of the first to grow in the spring and can grow quickly, allowing curly-leaved pondweed to outcompete native plants for light and space thereby reducing the biodiversity and value of aquatic habitat. Curly-leaved pondweed's senescence during midsummer can cause a critical loss of dissolved oxygen. The decomposition process can result in increased levels of phosphorous, which can lead to algal blooms. Dense infestations will also inhibit boating, fishing, swimming, and other recreational activities.

### MANAGEMENT

The best management strategy is prevention through education and stewardship. As this species is most commonly spread through fishing and boating equipment, it is important to use precautions such as cleaning, draining, and drying your boat and other aquatic equipment before moving to another water body. This plant may be removed manually, provided all fragments and stem parts are also removed. Herbicides have been effective in controlling infestations.

**REFERENCE** - U.S. Geological Survey. [2017]. Nonindigenous Aquatic Species Database. Gainesville, Florida. Accessed [6/7/2017].

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# EURASIAN WATERMILFOIL

*Myriophyllum spicatum*  
Origin: Eurasia

**INVASIVE RANKING, NYS**  
Very High

- MANAGEMENT STRATEGY**
- Chemical
  - Mechanical
  - Physical
  - Biocontrol
  - Prevention

**DISTRIBUTION**  
(As of 2/2018)



[www.fingerlakesinvasives.org](http://www.fingerlakesinvasives.org)

Eurasian watermilfoil is an invasive submerged aquatic plant that can be easily mistaken for several native plants. Each leaf is blunt-tipped and finely divided into at least 12 pairs of leaflets, arranged in whorls of four on brown or green stems. The plant can grow up to 6 m in length. Tiny pink flowers may occur on emergent spikes in mid-June and again in late July. Although each plant can produce 100 seeds in a season, it reproduces more successfully via fragmentation.

## HABITAT

This invasive can be found to depths of 10 m in lakes, ponds, and quieter sections of rivers and streams. It can grow in fresh or brackish water, across a wide range of temperatures, and thrives in disturbed areas with nutrient loading, intense plant management, and/or abundant motorboat use.

## THREAT

Eurasian watermilfoil can spread very easily through fragmentation. This species forms dense mats that outcompete and displace native species, degrade habitat, and inhibit recreational activities.

## MANAGEMENT

Education about practices such as clean, drain, and dry, as well as timely reporting of sightings is an important management practice to reduce the spread of this species and prevent new infestations. Once Eurasian watermilfoil is established, it is very hard to control. Mechanical control can enhance the spread of an infestation by creating and transporting plant fragments. If extreme care is taken to prevent or remove fragments, small infestations may be mechanically or manually removed. Many herbicides can control milfoil populations. Biocontrol insects or the triploid Grass Carp (*Ctenpharyngodon idella*) may also be options for control.

**REFERENCE** - <https://nas.er.usgs.gov/queries/greatlakes/FactSheet.aspx?SpeciesID=237>  
U.S. Geological Survey. [2017]. Nonindigenous Aquatic Species Database. Gainesville, Florida. Accessed [6/7/2017].

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## EUROPEAN FROGBIT

*Hydrocharis morsus-ranae*  
Origin: Europe

### INVASIVE RANKING, NYS

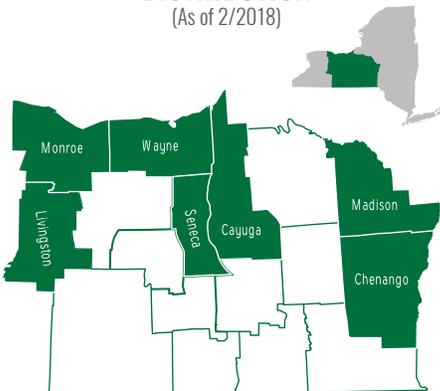
Very High

### MANAGEMENT STRATEGY

Mechanical  
Physical  
Prevention

### DISTRIBUTION

(As of 2/2018)



[www.fingerlakesinvasives.org](http://www.fingerlakesinvasives.org)

European frogbit is a free-floating annual aquatic plant. The leaves are small, kidney or heart shaped (1.5-6.5 cm long), and leathery, with undersides that may be dark purple. The plant is not anchored to bottom sediments. Three-petaled white flowers with yellow centers bloom in summer. The leaf stem of European frogbit lacks a midline groove, which distinguishes it from American frogbit (*Limnobium spongia*). European frogbit leaves, although smaller in size, may resemble those of white and yellow water lilies.

### HABITAT

European frogbit grows well in quiet, open waters including marshes, ditches, swamps, and sheltered coves. This species grows well in calcium rich waters.

### THREAT

European frogbit has rapid vegetative spread and forms dense mats, which can crowd out other macrophytes and limit light penetration into the water column. With limited light below the vegetative mats, native plants may not be able to survive, limiting native biodiversity. It can also inhibit recreational use such as swimming, fishing, or boating.

### MANAGEMENT

The best management strategy is prevention through education and stewardship. As this species is most commonly spread through fishing and boating equipment, it is important to use precautions such as cleaning, draining, and drying your boat and other aquatic equipment before moving to another water body. Hand-pulling or harvesting may be an effective management strategy for small infestations or infestations in closed systems such as ponds. High density shade treatments can reduce biomass. European frogbit is also susceptible to some herbicides.

**REFERENCE** - U.S. Geological Survey. [2017]. Nonindigenous Aquatic Species Database Gainesville, Florida. Accessed [6/8/2017].



# GIANT HOGWEED

*Heracleum mantegazzianum*  
Origin: Eurasia

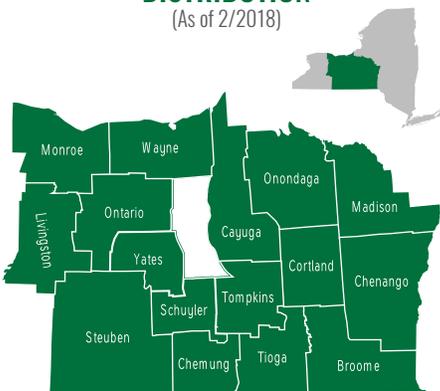
## INVASIVE RANKING, NYS

High

## MANAGEMENT STRATEGY

Chemical  
Physical  
Prevention

## DISTRIBUTION (As of 2/2018)



[www.fingerlakesinvasives.org](http://www.fingerlakesinvasives.org)

Giant hogweed is a monocarpic (blooms only once) perennial herb that typically grows to 3-4 m in height. The stems are hollow, covered in bristles, and have dark reddish-purple blotches when flowering. The leaves are deeply lobed and serrated, with one to three leaflets, and may grow to 1.5 m in width. The flower can grow to about 80 cm in diameter and is composed of a broad, umbrella-shaped cluster of small white florets.

## HABITAT

The species is common along railroads, roadsides, rights-of-ways, vacant lots, streams, rivers, uncultivated or waste lands and agricultural areas.

## THREAT

Giant hogweed sap contains a substance that, when touched, causes skin to become sensitive to ultraviolet light. This can result in severe burns when the affected areas become exposed to sunlight, producing swelling and severe, painful blistering. Giant hogweed is also an aggressive competitor; because of its size and rapid growth, it out-competes native plant species and reduces the amount of suitable habitat available for wildlife. It dies back during the winter months, leaving bare ground that can lead to increases in soil erosion on riverbanks and steep slopes.

## MANAGEMENT

If seen, report this plant to the giant hogweed information line at 845-256-3111 or [ghogweed@dec.ny.gov](mailto:ghogweed@dec.ny.gov). Be sure to provide photos, location, and an estimated number of plants. Follow proper safety precautions when working around giant hogweed. Care should be taken to not allow skin to come into contact with any part of the plant. Wash skin and equipment after control. Cut the taproot 15 cm below ground level using a spade with a sharp blade, remove the cut part of the plant from the soil, and leave it to decompose. Apply systemic herbicides, such as glyphosate and triclopyr, through mid-October as long as giant hogweed plants are still green and not dying back. To prevent spread, flower/seed heads should be removed and placed in clear plastic bags and left to sit in the sun for at least one week prior to disposal. Start control early, it is easier to work safely around giant hogweed plants when they are small.

**REFERENCE** - USDA Forest Service. 2005. Giant Hogweed. Weed Of The Week. [https://www.na.fs.fed.us/fhp/invasive\\_plants/weeds/giant-hogweed.pdf](https://www.na.fs.fed.us/fhp/invasive_plants/weeds/giant-hogweed.pdf). June 12, 2017

Giant Hogweed Identification. New York State Department of Conservation. <https://www.dec.ny.gov/animals/72766.html>.

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## HYDRILLA

*Hydrilla verticillata*  
Origin: Asia

### INVASIVE RANKING, NYS

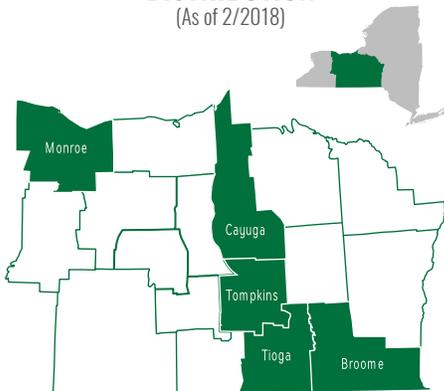
Very High

### MANAGEMENT STRATEGY

Chemical  
Mechanical  
Physical  
Biocontrol  
Prevention

### DISTRIBUTION

(As of 2/2018)



[www.fingerlakesinvasives.org](http://www.fingerlakesinvasives.org)

Hydrilla is a submerged herbaceous perennial plant with visibly serrated leaves that grow in whorls of three to eight, often five. The undersides of Hydrilla leaves can be spiny and the midrib of each leaf is often reddish. Hydrilla can spread by seeds, tubers (which resemble tiny bulbs in the sediment), plant fragments, and turions (overwintering buds located on the stems). This invasive plant looks similar to American or Canadian waterweed (*Elodea canadensis*), a common native and aquarium aquatic plant, which has smooth leaves usually arranged in whorls of three and no tubers or turions.

### HABITAT

Hydrilla inhabits freshwater lakes, ponds, rivers, impoundments, and canals. Hydrilla is shade-tolerant and can thrive in a wide range of nutrient conditions and depths.

### THREAT

Hydrilla spreads quickly, and once established, forms dense stands that crowd out native species and disrupt aquatic habitats. Hydrilla can also clog waterways and restrict water flow, which may damage water control structures and inhibit recreational activities such as swimming, boating, and fishing.

### MANAGEMENT

Several techniques have been used to manage Hydrilla. Mechanical removal can be effective only if all parts of the plant are removed including the long-lasting tubers. Herbicides and physical barriers, such as benthic mats, are also effective. Biological agents can also be a successful management strategy, although they are not widely used in NY. The best management strategy is prevention through education and stewardship. As this species is most commonly spread through fishing and boating equipment, it is important to use precautions such as cleaning, draining, and drying your boat and other aquatic equipment before moving to another water body.

**REFERENCE** - U.S. Geological Survey. [2017]. Nonindigenous Aquatic Species Database. Gainesville, Florida. Accessed [6/7/2017].

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## JAPANESE KNOTWEED

*Fallopia japonica*  
Origin: Eastern Asia  
(Japan, China, Korea)

### INVASIVE RANKING, NYS

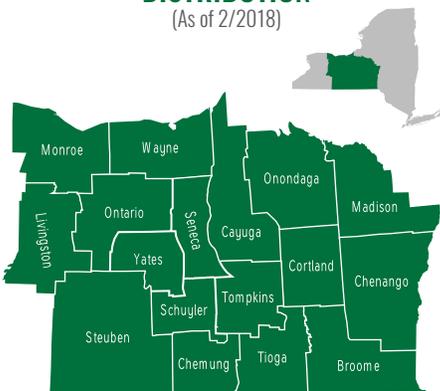
Very High

### MANAGEMENT STRATEGY

Chemical  
Physical  
Prevention

### DISTRIBUTION

(As of 2/2018)



[www.fingerlakesinvasives.org](http://www.fingerlakesinvasives.org)

Japanese knotweed is a tall, shrubby, herbaceous perennial that forms dense patches up to 3 m tall. Stems are hollow and ‘bamboo-like’, with purple speckles. Leaves are broadly triangular in shape, about 15 cm long and 7-12 cm wide, coming to a sharply pointed tip. They emerge alternately from the swollen internodes, producing a ‘zig-zag’ appearance. In late summer, Japanese knotweed produces small, creamy white flowers in spikes up to 10 cm in length.

### HABITAT

This species can tolerate a wide range of light conditions, temperatures, nutrients, and other environmental conditions. It is commonly found along streams and rivers, in low-lying areas, and in disturbed areas.

### THREAT

This species spreads rapidly, forming dense populations that crowd and shade out native vegetation resulting in reduced species diversity, altered ecosystems, and negatively impacted wildlife habitat. Japanese knotweed grows aggressively in riparian and previously disturbed areas and can have detrimental effects on infrastructure.

### MANAGEMENT

Rhizomes must be controlled in order to manage Japanese knotweed populations. Manual removal of established plants is usually ineffective due to the easily fragmented rhizomes. A range of chemical control methods, used alone or in conjunction with cutting, have been proven effective on smaller infestations, including foliar spray, cut-and-wipe, and stem injection. If plant materials are to be removed from the site, they should be bagged and disposed of; any root fragment or stem fragment containing an internode can start a new plant. Treatment of large infestations rarely results in the eradication of knotweed from the site, but can suppress the population and prevent spread.

**REFERENCE** - Japanese Knotweed. Michigan Department of Natural Resources. [http://www.michigan.gov/documents/dnr/knotweed\\_BCP\\_372280\\_7.pdf](http://www.michigan.gov/documents/dnr/knotweed_BCP_372280_7.pdf) November 10, 2017

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# JAPANESE STILTGRASS

*Microstegium vimineum*  
Origin: Asia

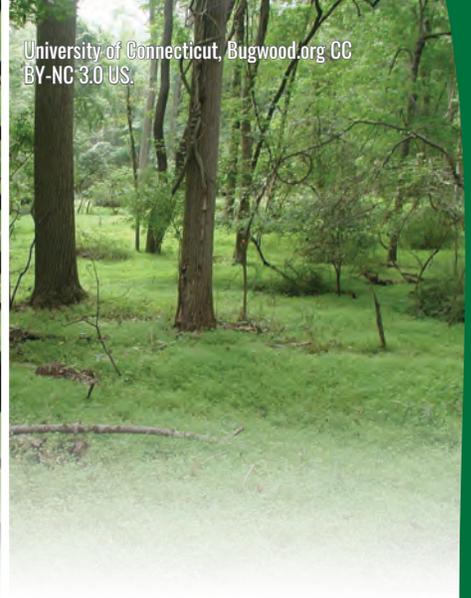
**INVASIVE RANKING, NYS**  
Very High

**MANAGEMENT STRATEGY**  
Chemical  
Mechanical  
Physical  
Prevention

**DISTRIBUTION**  
(As of 2/2018)



[www.fingerlakesinvasives.org](http://www.fingerlakesinvasives.org)



Japanese stiltgrass is an annual grass that is adapted to low light levels. It grows in a sprawling habit up to 1 m in height. The leaves are 3-13 cm long, asymmetrical with an off-center mid-rib, and are alternately arranged on the stalk. The leaves feel smooth, although each leaf has a line of silvery hairs on the upper surface. Japanese stiltgrass blooms in the late summer and early fall. Flowers are arranged in one or two delicate spikes at the top of each stem. Roots are weak, but can form at stem nodes.

## HABITAT

Japanese stiltgrass grows in a wide range of habitats, from roadsides to undisturbed forest understory. It is most often associated with moist, acidic to neutral soils that are high in nitrogen. Japanese stiltgrass readily takes advantage of disturbed areas.

## THREAT

Japanese stiltgrass grows densely, crowding out native vegetation. This results in decreased biodiversity and wildlife value, as well as disrupted ecosystem functioning.

## MANAGEMENT

Prevent infestations by limiting disturbance and quickly remediating disturbed areas. Hand pulling, mowing, and soil tilling of small infestations can be effective before the seeds set in late summer. Herbicides can be used to control larger Japanese stiltgrass infestations.

**REFERENCE** - Japanese Stiltgrass. New York Invasive Species Information. Cornell University Cooperative Extension. [http://www.nyis.info/index.php?action=invasive\\_detail&id=32](http://www.nyis.info/index.php?action=invasive_detail&id=32)



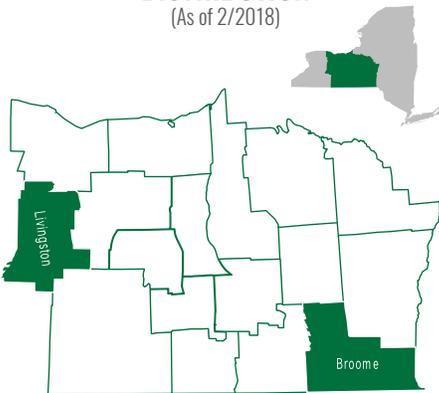
## MILE-A-MINUTE VINE

*Persicaria perfoliata*  
Origin: India & Eastern Asia

**INVASIVE RANKING, NYS**  
Very High

**MANAGEMENT STRATEGY**  
Chemical  
Mechanical  
Physical  
Biocontrol  
Prevention

**DISTRIBUTION**  
(As of 2/2018)



[www.fingerlakesinvasives.org](http://www.fingerlakesinvasives.org)



Mile-a-minute vine is an annual herbaceous vine with distinct triangular leaves and prickly stems. Leaves are 5-7 cm wide and 7-9 cm long, alternate in arrangement, and light green with barbs on the underside. Vines are narrow and covered in small, curved spines; older vines are reddish and woody. The flowering structure of mile-a-minute vine has a distinctive leafy, cup-shaped ocrea at its base. Small white flowers bloom in early summer. Berries are pale green when immature and ripen to a deep purple-blue from mid July until the first frost.

### HABITAT

Mile-a-minute vine is generally found colonizing disturbed and open areas, including along the edges of woods, streams, wetlands, and roads. While it will grow in drier soils, mile-a-minute vine prefers wet environments with poor soil structure. The plant is most aggressive in full sun, but minimal shade can be tolerated. Using its specially adapted recurved barbs, mile-a-minute weed can reach maximum sunlight by growing over shrubs and trees.

### THREAT

Extremely rapid growth of up to 15 cm per day allows mile-a-minute vine to form dense populations that smother tree seedlings and native plants. New outbreaks can occur great distances from the original source due to seed distribution by birds, small rodents, and water.

### MANAGEMENT

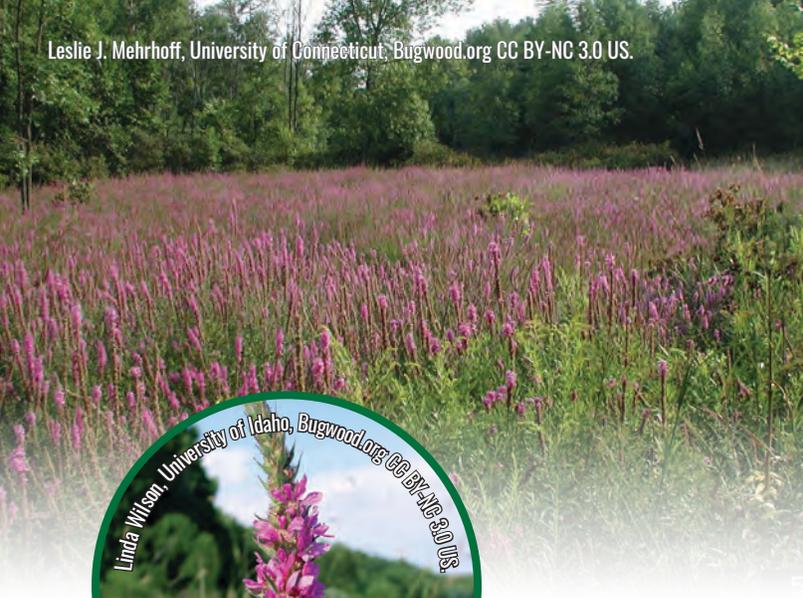
Biological, mechanical, physical and chemical control are options for the removal and management of mile-a-minute vine. The vines can be mowed, cut, or removed by hand and disposed of in plastic bags before seeds are produced. Vines should be allowed to dry prior to disposal. Low-growing infestations may be repeatedly cut or mowed to reduce flowering and seed production. Biological control is available through the use of mile-a-minute weevils (*Rhinoncomimus latipes*). Herbicides have also proven effective against this species.

**REFERENCE** - Abbey, Tim. Mile-A-Minute or Devil's Tearthumb. May 2000. Connecticut Invasive Plant Working Group. [http://www.hort.uconn.edu/cipwg/pdfs/mile\\_a\\_minute.pdf](http://www.hort.uconn.edu/cipwg/pdfs/mile_a_minute.pdf). June 6, 2017.  
Mile-A-Minute (*Persicaria perfoliate*). New York Invasive Species Information: Cornell University Corporate Extension. [http://nyis.info/index.php?action=invasive\\_detail&id=31](http://nyis.info/index.php?action=invasive_detail&id=31). June 6, 2017.

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# PURPLE LOOSESTRIFE

*Lythrum salicaria*  
Origin: Eurasia

## INVASIVE RANKING, NYS

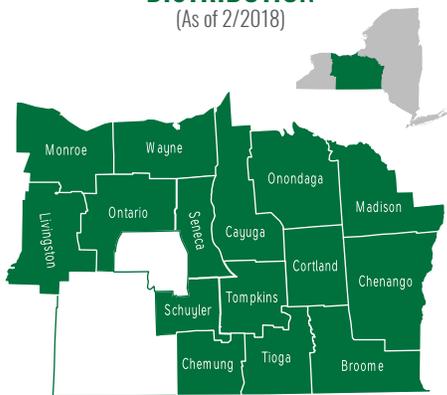
Very High

## MANAGEMENT STRATEGY

- Chemical
- Physical
- Biocontrol
- Prevention

## DISTRIBUTION

(As of 2/2018)



[www.fingerlakesinvasives.org](http://www.fingerlakesinvasives.org)

Purple loosestrife is a showy wetland plant that grows up to 2.5 m tall. Leaves are 5-14 cm long, sword-shaped, and oppositely arranged. Stems are square and hairy, with an upright growth habit. Purple flowers have five to seven petals and grow in pairs or clusters on tall spikes; flowering starts in June and lasts into early fall. Older plants can have many woody stems growing from a single root crown.

## HABITAT

Purple loosestrife will grow in wet meadows, tidal and non-tidal marshes, the edges of waterways and ponds, and in ditches. It can tolerate a wide range of conditions, including shading and flooding, but prefers moist, organic soils.

## THREAT

Once established, purple loosestrife outcompetes and replaces native wetland species, which decreases biodiversity. This reduces the quality of habitat and food sources important to wetland wildlife, such as marsh birds and waterfowl. Dense stands of purple loosestrife also alter biogeochemical and hydrological processes in wetlands.

## MANAGEMENT

Small infestations can be pulled by hand, though this must be completed before seeds are produced. Care must be taken to completely remove the root crown. The soil should not be overly disturbed when removing plants in case it releases seeds from the seedbank. All plant parts should be bagged and removed, and may be burned. Herbicides approved for aquatic use, preferably broadleaf-specific, can also effectively control small stands. Biocontrol options include: *Galerucella* spp. beetles, which eat the leaves and target the area of the plant that produces seeds; *Hylobius transversovittatus*, a root-mining weevil; and seed-eating beetles *Nanophyes marmoratus* and *N. brevis*. These insects can suppress populations to non-significant levels, although they do not eradicate them.

**REFERENCE** - New York Invasive Species Information. Purple Loosestrife. Cornell University Corporate Extension. [http://www.nyis.info/index.php?action=invasive\\_detail&id=64](http://www.nyis.info/index.php?action=invasive_detail&id=64)

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## STARRY STONEWORT

*Nitellopsis obtusa*  
Origin: Eurasia

### INVASIVE RANKING, NYS

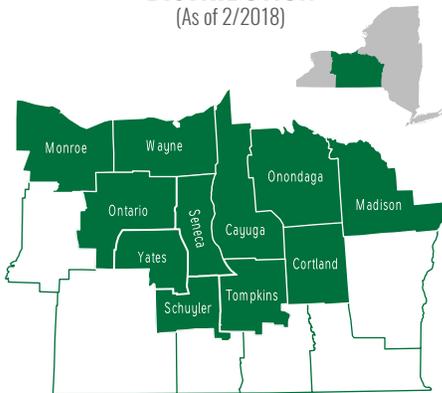
Not Applicable

### MANAGEMENT STRATEGY

Chemical  
Physical  
Mechanical  
Prevention

### DISTRIBUTION

(As of 2/2018)



[www.fingerlakesinvasives.org](http://www.fingerlakesinvasives.org)

Starry stonewort is a macroalgae that is easily spread by fragmentation. It is anchored to the sediment by clear root-like structures (*rhizoids*), and can grow more than 2 m long with whorls of four to six long, blunt-tipped branchlets. While it is similar to native stoneworts, it can be identified by production of white, star-shaped bulbils, asymmetrical branching structure, and orange structures (antheridium) at the branchlet and rhizoid nodes in low oxygen conditions.

### HABITAT

Starry stonewort grows at depths up to 9 m in a broad range of slow-moving aquatic habitats, including low light and low nutrient conditions. It is adapted to both fresh and brackish habitats.

### THREAT

Starry stonewort forms dense ‘pillows’ of vegetation, which outcompete aquatic plants and interfere with human and fish movement. Dense infestations are correlated with low abundance and diversity of plant species, and can completely block fish spawning.

### MANAGEMENT

The best management strategy is prevention through education and stewardship. As this species is most commonly spread through fishing and boating equipment, it is important to use precautions such as cleaning, draining, and drying your boat and other aquatic equipment before moving to another water body. Once established, the algae spreads readily through its easily dislodged bulbils and fragments, making manual or mechanical control challenging. Manual or mechanical control is more likely to succeed if the infestation is small and detected early. Starry stonewort’s response to copper-based algacides and herbicides is mixed and requires further research, although this may be a feasible management option.

**REFERENCE** - P. Douglas Pullman and Crawford, Gary. 2010. A Decade of Starry Stonewort in Michigan. *Lakeline*. Accessed [12/16/2017].  
Sleith, R.S., Havens, A.J., Stewart, R.A. et al. 2015. Distribution of *Nitellopsis obtusa* (Characeae) in New York, U.S.A. *Brittonia* 67: 166  
State of Michigan’s Status and Strategy for Starry Stonewort (*Nitellopsis obtusa* (Desv. in Loisel.) J. Groves) Management. Updated August 2017; accessed [12/16/17]. [http://www.michigan.gov/documents/deq/wrd-ais-nitellopsis-obtusa-strategy\\_499687\\_7.pdf](http://www.michigan.gov/documents/deq/wrd-ais-nitellopsis-obtusa-strategy_499687_7.pdf)



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## VARIABLE-LEAF WATERMILFOIL

*Myriophyllum heterophyllum*  
Origin: Eastern Asia

### INVASIVE RANKING, NYS

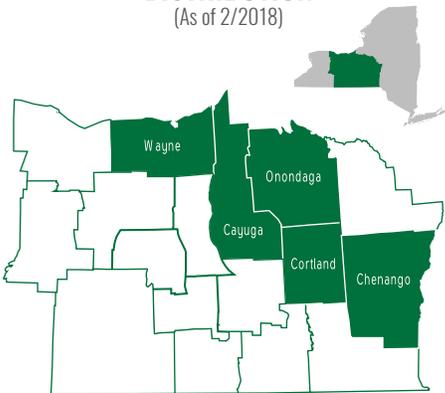
Very High

### MANAGEMENT STRATEGY

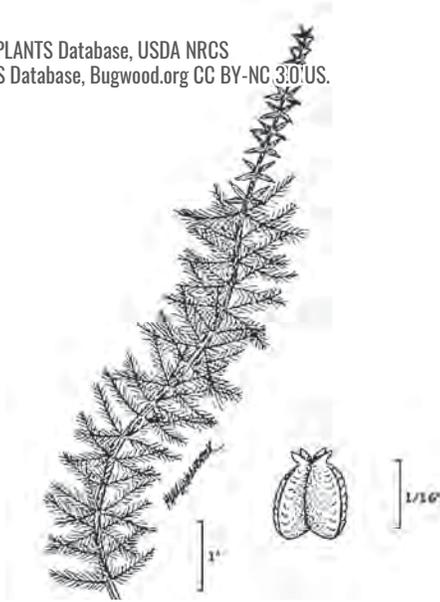
Chemical  
Mechanical  
Physical  
Prevention

### DISTRIBUTION

(As of 2/2018)



[www.fingerlakesinvasives.org](http://www.fingerlakesinvasives.org)



Variable-leaf watermilfoil is an invasive, rooted aquatic plant with both submerged and emergent leaves. Submerged leaves are feather-like, with 5-14 pairs of green to reddish leaflets, and are arranged in whorls of 4-6 around red-brown stems. Emergent parts can grow to 15-20 cm above the water; leaves are highly variable bracts that are stiff, usually toothed, and may reach 2.5 cm in length. Flowers grow in spikes 7-15 cm tall in late June to August.

### HABITAT

Variable-leaf watermilfoil grows in lakes, ponds, and pools in streams up to depths of about 1.8 m, occasionally deeper. This species prefers clear and neutral to slightly acidic water.

### THREAT

Variable-leaf watermilfoil is an aggressive plant competitor that can outcompete and displace native vegetation, which can alter habitats for fish, waterfowl, and aquatic organisms. Dense growth inhibits recreational activities including boating, fishing, and swimming.

### MANAGEMENT

The best management strategy is prevention through education and stewardship. As this species is most commonly spread through fishing and boating equipment, it is important to use precautions such as cleaning, draining, and drying your boat and other aquatic equipment before moving to another water body. Small infestations can be managed using a variety of manual or mechanical control options, but fragments may spread the infestation so care must be taken to remove all parts of the plant. Plants should be disposed of away from the water. Some herbicides have also been effective.

**REFERENCE** - Rook, Earl. 2002. Two Leaf Milfoil. <http://www.rook.org/earl/bwca/nature/aquatics/myriophyllumhet.html>. June 12, 2017.  
New Hampshire Department of Environmental Services. 2010. Variable Milfoil. Environmental Fact Sheet. <https://www.des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb-23.pdf>. June 12, 2017.  
Washington Invasive Species Council. 2016. Variable-Leaf Watermilfoil. Stop The Invasion. <http://www.invasivespecies.wa.gov/documents/priorities/VariableLeafMilfoilFactsheet.pdf>. June 12, 2017.  
King County Noxious Weed Control Program BEST MANAGEMENT PRACTICES: Eurasian and variable-leaf milfoil. Published January 2010; accessed Dec 17, 2017. [https://www.nwcb.wa.gov/images/weeds/Milfoil\\_Myriophyllum\\_control\\_King.p](https://www.nwcb.wa.gov/images/weeds/Milfoil_Myriophyllum_control_King.p).

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## WATER CHESTNUT

*Trapa natans*  
Origin: Eurasia

### INVASIVE RANKING, NYS

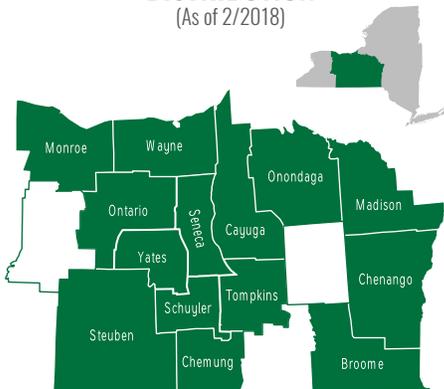
Very High

### MANAGEMENT STRATEGY

Chemical  
Mechanical  
Physical  
Prevention

### DISTRIBUTION

(As of 2/2018)



[www.fingerlakesinvasives.org](http://www.fingerlakesinvasives.org)



Water chestnut is a floating-leaved, annual, aquatic plant. Linear, oppositely arranged submersed leaves are replaced by feathery adventitious roots early in the growing season. On the water surface, the plant forms a rosette of green, glossy, triangular floating leaves with toothed edges and inflated petioles. Plant stems are cord-like and can grow up to 5 m. Small, white, four-petaled flowers bloom from the center of the rosette during the summer, eventually producing large, four-spined seeds.

### HABITAT

Water chestnut grows best in quiet, shallow, high nutrient water bodies with a soft bottom substrate. They prefer waters with an alkaline or neutral pH.

### THREAT

Populations of this species can form very dense mats of interlocking and stacking rosettes. These thick mats completely shade the water column and suppress most other aquatic plant growth in the area. Dense mats also inhibit boating, swimming, and fishing. The seeds are painful when stepped upon.

### MANAGEMENT

Small populations can be controlled by hand pulling the plants prior to seed maturation. Large infestations have been controlled by the use of mechanical harvesters or the application of aquatic herbicides. Biocontrol options are in development. As always, the best management strategy is prevention through education and stewardship. As this species is most commonly spread through fishing and boating equipment, it is important to use precautions such as cleaning, draining, and drying your boat and other aquatic equipment before moving to another water body.

**REFERENCE** - U.S. Geological Survey. [2017]. Nonindigenous Aquatic Species Database. Gainesville, Florida. Accessed [6/8/2017].



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# Healthy Lawns, Healthy Lake

Protect the water quality of Honeoye Lake and your property values by practicing healthy lawn care

A healthy lawn can improve water quality by **filtering, purifying and reducing** stormwater runoff.

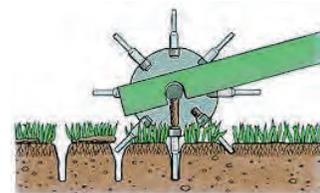
**Test Before You Treat.** A soil test can determine whether fertilizer is needed. Cornell University surveys indicate that only 1 in 10 lawns actually needs fertilizing. If fertilizer is necessary, apply in late May to early June or late August to early September. Use only fertilizers with slow-release nitrogen and zero phosphorous if possible. Follow all label directions and safety precautions. 1 lb. of phosphorus in the lake spurs the growth of 500 lbs. of aquatic plants.



**Check The Weather And Local Laws.** Don't apply fertilizer or other chemicals if rain is imminent; it will wash off in surface runoff. Don't let fertilizer or chemicals fall on sidewalks or driveways where it will wash into our waterways. The Town of Richmond has a local law prohibiting the application of pesticides and fertilizer within 50 feet of the lake or a lake tributary.

**Know The Pests.** Inspect regularly for pests to find problems early. Decide which species you can live with, and which you need to control. Try the many non-chemical alternatives to pesticides first, such as manual removal, biocontrol with other organisms or Integrated Pest Management (IPM). If you use chemical pesticides, follow the directions printed on the label. **Remember, not all bugs are bad.**

**Manage Thatch.** Thatch is a layer of decomposing plant tissue made up mostly of stems and roots, not grass clippings. A thin layer of thatch (up to 1/2 in.) above the soil is beneficial. A thick layer leads to increased disease and insect problems, drought stress, and winter injury. Thick thatch usually occurs on lawns that have been heavily fertilized and watered for constant lush growth. Compacted, poorly drained and acidic soil contributes to thatch problems. The use of pesticides can reduce or eliminate microorganisms that break down thatch. Mechanical removal works temporarily. Core aeration and topdressing are effective means of managing thatch.



**Promote Dense, Healthy Growth.** Plant disease-resistant seed, cut grass no less than 3 inches in height, and keep mower blades sharp; shredding grass blade tips invites disease. Leave grass clippings on the lawn for a natural fertilizer. You can mow over your leaves in the fall a few times in order to break them up. This will add nutrients to your yard naturally. Water early in the morning, not in the evening.



**Consider Planting Ground Covers Other Than Grass.** For example, White Dutch Clover was traditionally included in seed mixtures to "feed" the grass, as it fixes atmospheric nitrogen into the soil. Dutch clover grows only about 4" high, reducing the need to mow. Clover is durable, soft to walk on, and doesn't "dog spot." The deep roots of clover hold soil in place better than turf grass.

**Manage Your Stormwater With A Rain Garden.** Encourage infiltration of runoff water from your roof and driveway. Direct down spouts to a rain garden or infiltration point where vegetation will filter nutrients from the water. Drainage from your driveway or landscaping projects can carry pollutants. Rain gardens are beautiful and can create an inviting habitat for birds and butterflies. The native plants used in rain gardens are perennials that require less frequent care after establishment. No pesticides or fertilizers are required.



**Clean Up After Pets.** Animal feces contain nutrients, bacteria, and parasites that can contaminate the lake. Discard pet waste in your garbage collection.



**Maintain Wastewater Systems.** Although the shoreline of Honeoye Lake is serviced by sewers, residences farther away influence nutrient flow to the lake. Septic tanks should be pumped every 3-5 years to remove sludge that will not decompose. NYS Department of Health estimates a life span of 25 to 30 years for a properly maintained and serviced onsite wastewater system. Don't buy septic tank additives. They have never been proven to reduce or eliminate the need for pumping.

**Manage Your Stormwater.** Install a rain barrel to collect and store rainwater from your roof that would otherwise be lost to runoff and diverted to storm drains or streams. This will minimize the runoff of pollutants into our waterways and conserve treated drinking water. The water from your barrel can be used for watering gardens and lawns, topping off swimming pools, cleaning sidewalks, cleaning outdoor furniture, and the list goes on!





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Find us on Facebook!



The Honeoye Valley Association is a not-for-profit, volunteer organization that works in a variety of ways to protect and preserve the environmental quality of the Honeoye Lake watershed.

Become a member TODAY to help the HVA tackle conservation issues related to Honeoye Lake and help make a positive impact in your community.

## **HVA Membership Application**

Name: \_\_\_\_\_ Phone #: \_\_\_\_\_

Home Address: \_\_\_\_\_

Lake Address: \_\_\_\_\_

Email Address: \_\_\_\_\_

**Type of Membership:**

\_\_\_ Individual (\$20/yr)

\_\_\_ Family (\$30/yr)

\_\_\_ Business (\$50/yr)

Mail to: Honeoye Valley Association PO Box 165 Honeoye, New York 14471

**Or, join online at: [www.hvaweb.org](http://www.hvaweb.org)**