



**Department of  
Environmental  
Conservation**

# **Invasive Species Threats to the Indian River Lakes Watershed**

**Indian River Lakes Conservancy Water Quality Conference  
June 8, 2018**

# Overview

- Aquatic invasive plants
- Aquatic invasive animals
- What to do if you think you've found an invasive species
- Management methods
- Regulatory efforts



# Aquatic Invasive Plants

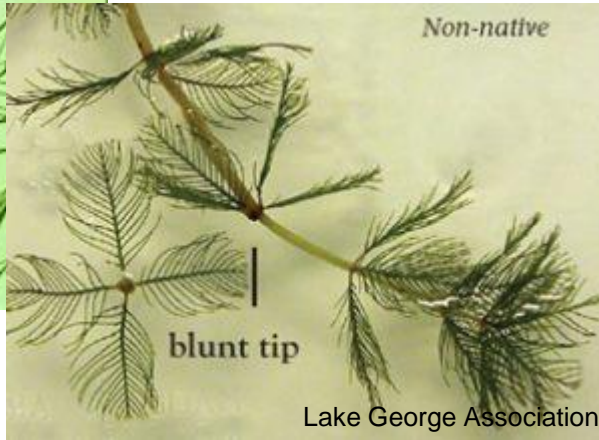
- **Eurasian watermilfoil** (*Myriophyllum spicatum*)
- **Brittle naiad** (*Najas minor*)
- **Water Chestnut** (*Trapa natans*)
- **Fanwort** (*Cabomba caroliniana*)
- **Curly leaf pond weed** (*Potamogeton crispus*)
- **European frogbit** (*Hydrocharis morsus-ranae*)
- **Hydrilla** (*Hydrilla verticillata*)



# Eurasian watermilfoil (*Myriophyllum spicatum*)



WA Dept of Ecology



Lake George Association

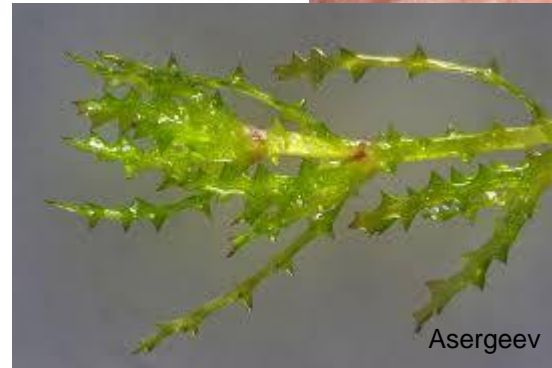
- Native to Europe, Asia, and North Africa
- Main stem with leaves with fine leaflets (feathery appearance)
- Leaves have blunt tips
- Spreads through fragmentation



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# Brittle naiad (*Najas minor*)

- Native to Europe, Asia, and North Africa
- Grows in dense clusters with highly branched stems
- Leaves are opposite, unbranched and strap-shaped
- Leaves have prominent teeth along edges
- Reproduces by fragment and seed



# Look alike?



# Water chestnut (*Trapa natans*)

- Native to Europe, Asia, and Africa
- Triangular, toothed leaves with saw-toothed margins with submerged roots
- Fruit is a sharply, barbed nutlet
- Forms dense mats of floating vegetation

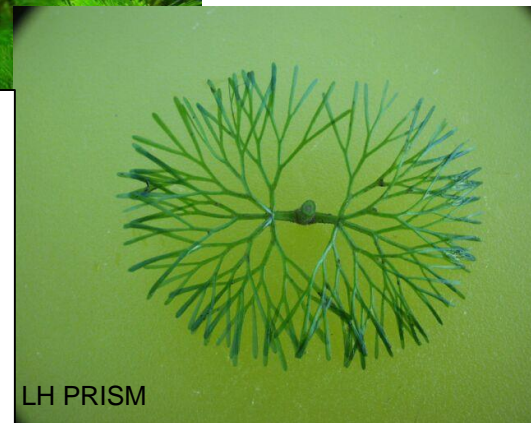
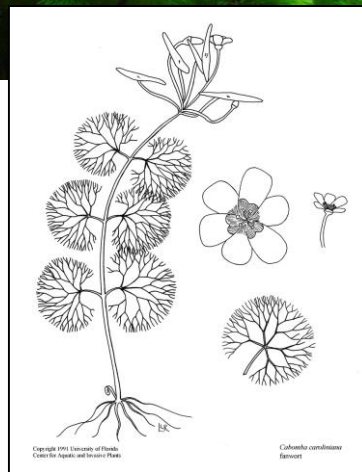


Mark Naylor, MD DNR



# Fanwort (*Cabomba caroliniana*)

- Native to South America (aquaria)
- Fanlike underwater leaves (2")
- Long branched stems and fibrous roots often rooted in soil
- Submersed leaves are arranged oppositely or in whorls
- White or pink flowers May-September



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# Curly leaf pondweed (*Potamogeton crispus*)

- Native to Eurasia, Africa, and Australia
- One of first plants to leaf out in spring
- Alternate, tooth-edged leaves stiff and crinkled
- Produces turions
- Dies off by midsummer



# European frogbit (*Hydrocharis morsus-ranae*)

- Native to Europe, Africa, and Asia
- On each stem produces single flower with three white petals and yellow center
- Leaves are small and kidney/heart shaped with purple-red undersides
- Prefers waters rich in calcium with no wave action



# Hydrilla (*Hydrilla verticillata*)

- Native to Korea
- Federally listed noxious weed, NYS prohibited (Part 575)
- Whorls of three or more leaves with serrated edges and mid-rib
- Reproduction: turions, tubers, and fragments
- Inhibits recreation; severe ecosystem impacts



# Aquatic Invasive Plants: Keep a lookout

## Plants

Starry Stonewort

Water lettuce

Water hyacinth



# Starry Stonewort (*Nitellopsis obtusa*)

- Native to Europe and W. Asia
- Large algae (ballast water)
- Whorls of 4-6 long branchlets
- Can grow over 6 feet tall
- Anchored by colorless filaments
- Reproductive structure is a star-shaped bulbil



# Water Lettuce (*Pistia stratiotes*)



- Native to S. America and Africa
- Free floating plant that resembles an open head of lettuce
- Leaves are light green with parallel veins and short white hairs
- Scattered populations reported in New York
- Documented overwintering in WI

# Water Hyacinth (*Eichhornia crassipes*)

- Native to South America
- “go to” plant for aquatic gardeners and aquaria
- Overwintering in the Midwest
- Round to oval shiny green leaves with inflated petioles
- Spikes of light purple colored flowers



# Aquatic invasive animals

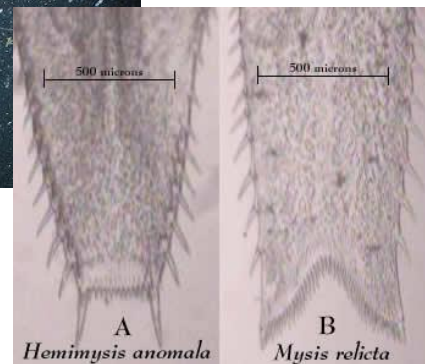
- Bloody red shrimp
- Northern snakehead
- Round goby
- Rudd
- Rusty crayfish
- Spiny and Fishhook waterflea
- Zebra mussels





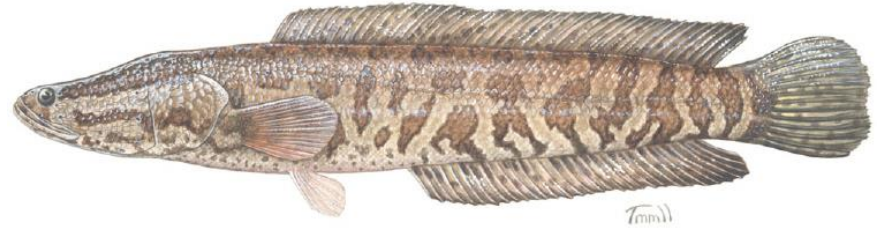
# Bloody red shrimp (*Hemimysis anomala*)

- Great Lakes (ballast water)
- About a half inch long
- Translucent bodies with bright red-orange heads and tails
- Eyes large and black on extended stalks
- Tail square with two spines at end
- Avoids direct sunlight



# Northern Snakehead (*Channa argus*)

- Native to Russia, China, and Korea
- Long, thin fish with a single long dorsal fin
- Often confused with bowfin, but unlike bowfin the pelvic fins are directly behind the pectoral fins
- Introduced through aquaria



# Northern Snakehead

- Verified in two locations: Town of Wawayanda and Queens
- Aggressive predator as juvenile and adult
- Capable of breathing out of water and moving short distances on land
- Please report if you think you've found one !!



Gilbert Cameron

# Round goby (*Neogobius melanostomus*)

- Native to Western Asia (Black and Caspian Seas)
- Introduced through ballast water
- Bottom dwelling fish
- Can grow up to 10 inches in length
- Prey on native fish and native invertebrates (also eat zebra mussels)



Michigan SeaGrant

# Rudd (*Scardinius erythrophthalmus*)

- Native to western Europe and western Asia
- Deep and stocky body with green-brown back, brassy yellow sides, and near white belly
- Lengths can reach 48 cm.
- Pectoral, pelvic, and anal fins are bright red-orange
- Dorsal and caudal (tail) fins are red-brown
- Caudal fin is forked and lower lip is protruding
- Red spot on iris of the eye
- Very adaptable and tolerant of polluted water



# Rudd Look Alikes

- Golden Shiner: Unscaled ventral keel, yellow-green eyes, yellow-green fins (except in spawning adults)
- Redfin Shiner: No ventral keel, fins typically clear except in breeding males, small dark spot at anterior base of the dorsal fin



# Rusty crayfish (*Orconectes rusticus*)

- Native to Kentucky and Ohio
- Introduced as bait, in school labs
- Has dark, rusty spots on each side of its carapace (as though picked up crayfish with paint on forefinger and thumb)
- Displaces native crayfish



Doug Watkinson, DFO

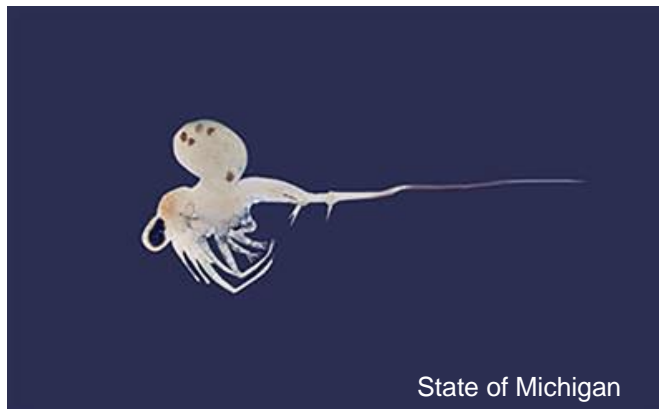


Doug Watkinson, DFO

# Spiny and Fishhook Waterfleas

(*Blythotrephese longimanus*/*Cercopagis pengoi*)

- Native to Eastern Europe and Western Asia
- Ballast introduction
- Eat smaller zooplankton
- Compete with young of year fish





# Zebra mussels (*Dreissena polymorpha*)



Amy Benson, USGS



- First documented in Lake St. Claire in 1988
- Microscopic veligers (juveniles)
- Filter feeders (1 liter per day)
- Prefer hard substrates
- Females produce 1 million eggs per year

# What do I do if I think I've found an invasive species?

## Take a photo

- Take several photos with your phone or digital camera
- Add in a detail for scale
- The photos should be of plant samples out of the water on a light (preferably white) background



# What do I do if I think I've found an invasive species?

## Take a sample

- Place your sample in a ziploc bag with a moistened paper towel
- Write out a label with location, data, collector information in pencil and put in bag
- Put the sample in the refrigerator



# What do I do if I think I've found an invasive species?

- Take coordinates of location found and record in an easily accessed location
- Many cell phones or computers have GPS tracking ability
- Could also put a pin on Google maps to get estimated coordinates



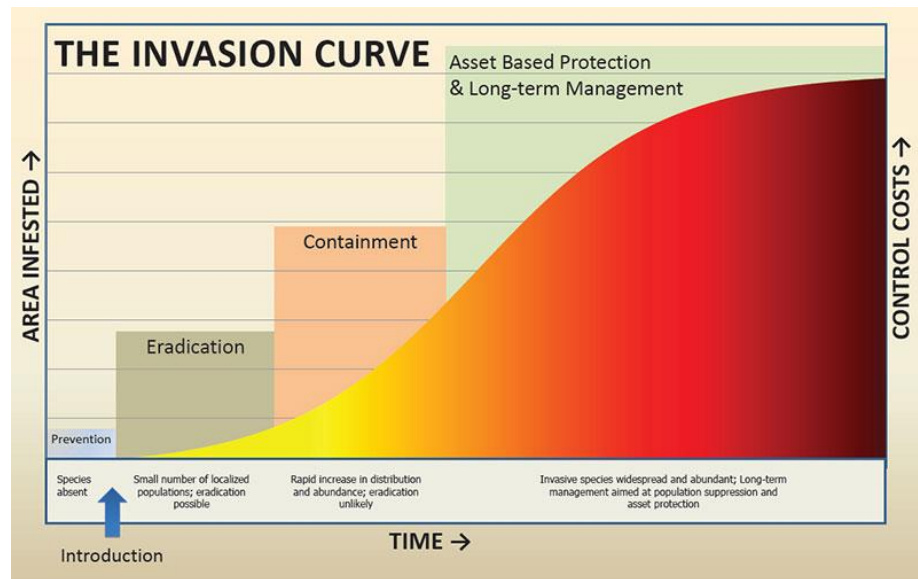
# What do I do if I think I've found an invasive species?

- Submit a report to iMapInvasives.org and include the coordinates and photos

The screenshot shows the iMapInvasives.org web application. The browser address bar displays <https://login.imapinvasives.org/ny/mi/map/>. The page title is "New York Invasive Species Map". The interface includes a search bar at the top with the text "Search by Species, Location, or ID #". On the left side, there are several panels: "Zoom" with a yellow callout "Open 'Summary Data' to create County Distribution Maps"; "Base Layers" with a yellow callout "Change Base Map - Select preferred base map"; "Overlays" with a yellow callout "Add Layers - Scroll down for additional layers"; "Infestation" with "Infestation Management"; and "Invasive Species Alerts". The main map area shows a satellite view of New York State and surrounding regions. A yellow callout points to the search bar with the text "Type in: Species or City/Town/Park". Another yellow callout points to a location on the map with the text "Click HERE to hide this help text". A third yellow callout points to a mouse cursor on the map with the text "Mouse Coordinates - Click to open Center Point Info - Locator Map". The bottom of the screen shows a Windows taskbar with the date "Tuesday, November 23, 2017" and time "8:43 AM".

# Why an emphasis on prevention?

- Best method for dealing with *any* invasive species
- Avoid ecological impacts
- Reduce economic impacts
- But not 100% foolproof



North American Invasive Species Network



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# Potential sources of these infestations



**“It doesn’t seem to be covered in our invasive species management plan.”**

- Transport on watercraft and/or equipment
- Accidental planting of hitchhiking aquatic plants
- Aquaria dumping
- Waterfowl transport
- Bait
- Water containers

# Preventive Measures

- AIS disposal station
- “Protect Your Waters” sign

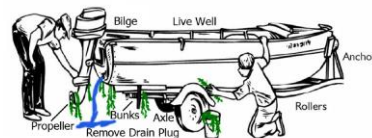


## PROTECT YOUR WATERS!

### Prevent the Spread of Invasive Species

**Invasive Plants and Animals Can Impact Boating, Fishing, Swimming and the Environment**

**REMOVE** any visible mud, plants, fish or animals before transporting equipment.



**ELIMINATE** water from equipment before transporting.

**CLEAN & DRY** anything that comes into contact with water (boats, trailers, waders, equipment, dogs, etc.).

**NEVER** release plants, fish or animals into a body of water unless they came out of that body of water.



**STOP AQUATIC HITCHHIKERS!**  
www.ProtectYourWaters.net

For further information scan this QR code with a smartphone, or visit:  
[www.dec.ny.gov/animals/48221.html](http://www.dec.ny.gov/animals/48221.html)



NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION  
625 BROADWAY, ALBANY, NY 12233-4753  
[www.dec.ny.gov](http://www.dec.ny.gov)

**STOP THE SPREAD OF AQUATIC INVASIVE SPECIES AND FISH DISEASES!**  
Non-native plants, animals and diseases can clog waterways, threaten native species, cause serious economic and environmental damage, and harm human health.

**AFTER TRAVELING ON ANY WATERWAY:**

CLEAN	DRAIN	DRY
<b>ALWAYS</b> Remove mud, plants and animals from your boat and gear. Dispose of them in a trash container or on land away from waterbodies.	<b>ALWAYS</b> Drain water from hatches, boat wells, bags and ballers while still at the waterbody you are leaving to avoid transporting plant fragments and animals.	<b>ALWAYS</b> Dry your boat and gear. Aquatic invasive plants and animals need moisture to survive. If you use a towel, stow it and clean it later.
<b>IF POSSIBLE</b> Rinse your boat inside and out, including rubber, paddles and other gear. Use hot water when available.		<b>IF POSSIBLE</b> Alternate between pairs of shoes when paddling on different waterways. Tread, straps and boots can harbor invasive organisms not visible to the naked eye. When you're done, thoroughly clean and dry footwear.
<p>For information about invasive species regulations, visit: <a href="http://www.dec.ny.gov/animals/99141.html">www.dec.ny.gov/animals/99141.html</a></p>		



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# More preventive measures



- Boat steward
- Decontamination station



# What you can do as a NYS resident

- Clean, drain, and treat your watercraft and fishing gear
- Keep up to date about what AIS are problematic in your region and in your lake
- Learn to identify those AIS and to report them



# What you can do as a NYS resident

- Learn which plants are recommended for aquatic gardens
- Don't dump your aquarium and its inhabitants in public or private waters
- Be aware that aquatic plant purchases can have hitchhikers



# What you can do as a NYS resident

- Engage in control or management of AIS when possible
- Consider a lake management plan
- Spread the word!



Truesdale Lake, Photo by HKA

# Regulatory Efforts

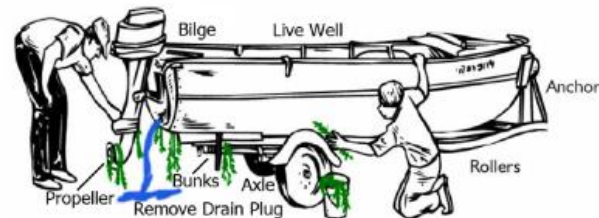
- Amendment to Article 3 of the Navigation Law – “AIS spread prevention signs at public boat launches”
- 6 NYCRR Part 59.4 (DEC) & 9 NYCRR Part 377.1 (Parks) – “AIS spread prevention regulations for boat launching/retrieving at DEC and Parks-owned sites”

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# Regulatory Efforts

## 6 NYCRR Part 575

“Regulated and Prohibited Plants and Animals”

## 6 NYCRR Part 576

“Reasonable Precautions to Prevent Spread of AIS”



# New Part 576 – Reasonable Precautions

- Effective Memorial Day weekend 2016
- Sunsets June 2019



# The Details: Part 576

- Cleaning, draining, and treating (i.e. drying and rinsing) must be done before launching a watercraft into a public waterbody
- ECO's have discretionary authority to enforce the law
- Watercraft and floating docks are exempted when re-launched from **same** waterbody without having been launched in another waterbody





## The Details: Part 576 “Public waters”

“Waters” or “waters of the state” shall be construed to include lakes, bays, sounds, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic ocean within the territorial limits of the state of New York and all other bodies of surface or underground water, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters which do not combine or effect a junction with natural surface or underground waters), which are wholly or partially within or bordering the state or within its jurisdiction. ECL 17-0105(2)



## Answers to some FAQs

1. Boat steward programs are not required by law
2. Part 576 applies to all public waterbodies
3. Definition of public waterbodies
4. All watercraft operators and floating dock owners are required to follow protocol
5. Definition of watercraft
6. If watercraft or dock is only launched or placed in one water body (does not leave site) no protocol required



# Resources

NYS website:

Invasive Species Regulations-

<http://www.dec.ny.gov/animals/99141.html>

Prevent the Spread of Aquatic Invasive Species-

<http://www.dec.ny.gov/animals/48221.html>

Aquatic Invasive Species Boat Steward Programs-

<http://www.dec.ny.gov/animals/107807.html>



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and Historic  
Preservation

# Resources

New York State Invasive Species  
Research Institute:

Eurasian watermilfoil review

New York Invasive Species  
Clearinghouse

[http://www.nyis.info/index.php?action=invasive\\_detail&id=27](http://www.nyis.info/index.php?action=invasive_detail&id=27)

A Review of the Science and Management  
of Eurasian Watermilfoil:  
Recommendations for Future Action in  
New York State



*Holly Menninger, PhD*

*Coordinator, New York Invasive Species Research Institute*

*Cornell University*

*August 8, 2011*

*Revised: November 11, 2011*

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# Resources

Aquatic Pesticide Permits (including SPDES)

<http://www.dec.ny.gov/chemical/8530.html>

Aquatic Pesticide Purchase Permit

<http://www.dec.ny.gov/chemical/33127.html>

Freshwater Wetlands Permit

<http://www.dec.ny.gov/permits/6058.html>



# Resources

## Education and Outreach Materials:

**STOP THE INVASION**  
PROTECT NEW YORK FROM INVASIVE SPECIES

ATTENTION  
BOATERS



New regulations protect the waters you enjoy from aquatic invasive species.

Aquatic invasive species (AIS) are non-native plants and animals that spoil boating and fishing, threaten native plants and animals, and destroy habitat. They are difficult and costly to remove, so let's keep them out!

**All boaters in New York State must**

- Inspect floating docks, watercraft, trailers and equipment, and remove visible plant and animal material.
- Drain, and if possible, flush your boat's bilge, live well, bait well and other water-holding compartments after use.

More about preventing the spread of AIS:  
[www.dec.ny.gov/animals/48221.html](http://www.dec.ny.gov/animals/48221.html)



**Examples of AIS in NY**

**Water Chestnut**



- Fan-shaped leaves with toothed edges
- Sharp-edged seeds can cut feet
- Dense floating mats impede boating, fishing and swimming

H. Smith, APFP

**Zebra Mussel**



- Tiny D-shaped or oval striped shells
- Can cover hard surfaces like docks and mooring lines
- Shells can cut feet

A. Simon, USGS, Bugwood.org

**Eurasian Watermillfoil**



- 4-6 feathery leaves around stem, blunt-tipped, as if snipped off
- New plants sprout from fragments
- Most common and widely distributed AIS in NY
- Dense plants impede boating, fishing and swimming

G. Lovell, ADCHS, Bugwood.org

**Spiny Waterflea**



- Tiny crustacean with long, barbed tail
- Competes with small fish for food
- Can clog guides of fishing rods

P. Sabath, LGA

**Hydrilla**



- 4-8 blade-like, slightly toothed leaves around stem
- Dense plants impede boating, fishing and swimming
- Tolerates both fresh and brackish water

Tim Egan, Cleveland Museum of Natural History

More information about AIS:  
[www.dec.ny.gov/animals/99141.html](http://www.dec.ny.gov/animals/99141.html)

**STOP THE INVASION**  
PROTECT NEW YORK FROM INVASIVE SPECIES

UNWANTED:  
Hydrilla verticillata

An invasive aquatic plant recently found in several counties, hydrilla could impact New York's fishing, boating, swimming, and waterfront property values. Early detection of hydrilla could save the state millions in control costs.

HELP IDENTIFY THIS PLANT BEFORE POPULATIONS ARE TOO LARGE TO ERADICATE OR MANAGE

Keep this card in your boat or tackle box and let us know right away if you think you've found hydrilla. To learn more about this plant, visit <http://www.dec.ny.gov/animals/104790.html>



### STOP THE INVASION PROTECT NEW YORK FROM INVASIVE SPECIES



## WATER CHESTNUT

### *Trapa natans*

Water chestnut is an aquatic invasive plant that is native to Eurasia and Africa. Introduced in the United States in the mid-1800s as an ornamental plant, water chestnut was soon found growing in Collins Lake near Scotia, NY. Water chestnut colonizes areas of freshwater lakes, ponds and slow-moving streams and rivers where it negatively impacts aquatic ecosystems and water recreation.

#### Where is water chestnut found?

Water chestnut is found in forty-three counties in New York. Many of the infestations are reported in or near the Hudson River. No water chestnut has been reported in the following counties: Allegany, Cortland, Delaware, Franklin, Fulton, Genesee, Hamilton, Herkimer, Kings, Lewis, Livingston, New York, Orleans, Queens, Richmond, St. Lawrence, Tioga, Warren, and Wyoming.



#### How do I identify water chestnut?

Water chestnut is an annual plant with a submerged stem 12-15 feet long with fine roots that anchor it to the soil. Its floating leaves are triangular with saw-toothed edges and hollow, air-filled stems. Leaves form a rosette around a central point. Its four petalled, white flowers bloom in June. The fruits are hard nuts with four-inch barbed spines. Seeds within these fruits can remain viable for up to 12 years.

#### How does it spread?

Water chestnut spreads by rosette and fruits detaching from the stem and floating to another area on currents. They also spread by clinging to floating objects, including recreational watercraft, the pads of boat trailers, and fishing equipment.

#### What are its impacts?

Water chestnuts form dense mats of rooted vegetation that can be very difficult to get through in a boat, kayak, canoe, or when swimming. Water chestnut fruits are often found along the shoreline and bottom of waterways; their very sharp spines can cause painful wounds when stepped on. The dense mats of vegetation shade out native aquatic plants that provide food and shelter to native fish, waterfowl, and insects. Decomposition of these mats reduces dissolved oxygen levels and may impact fish. Property values along shorelines of infested waters may decrease.



Mike Naylor, Maryland Department of Natural Resources

For more information, or to sign-up for email updates from NYSDEC, visit our website: [www.dec.ny.gov](http://www.dec.ny.gov)



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# Thank you!

**Cathy McGlynn**  
AIS Coordinator  
Invasive Species Coordination Section  
Bureau of Invasive Species and Ecosystem Health  
[catherine.mcglynn@dec.ny.gov](mailto:catherine.mcglynn@dec.ny.gov)



J. Clayton, NYSDEC



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