

SLELO PRISM's Guide To Aquatic Plants



2018

**ST. LAWRENCE EASTERN LAKE ONTARIO PARTNERSHIP
FOR REGIONAL INVASIVE SPECIES MANAGEMENT**

Created by: Megan Pistolese, SLELO E/O Coordinator. Edited by: Sarah Kirkpatrick, SLELO Early Detection Team.
With contributions from Sean A. Regalado – Adirondack Watershed Institute

To learn more about invasive species visit www.sleloinvasives.org

Invasive aquatic plants threaten our natural resources, displace native plants, wildlife & impede recreational activities. Educated and concerned volunteers **LIKE YOU** can help by keeping an eye out for these aquatic invasive plant species, reporting your observations, and being responsible stewards of our natural resources.

Learn more at www.sleloinvasive.org

Safety First

1. Always travel in pairs, use the buddy system & inform someone of your travel plans
2. Always have a first aid kit nearby
3. Wear your life jacket when on the water
4. Bring a means of communications with you, ie. cell phone or two-way radios
5. Place emergency contact numbers into your phones address book
6. Drink plenty of water on hot days and bring snacks & pace yourself

Steps You Can Take to Stop the Spread Of Invasive Species

CLEAN + DRAIN + DRY YOUR GEAR



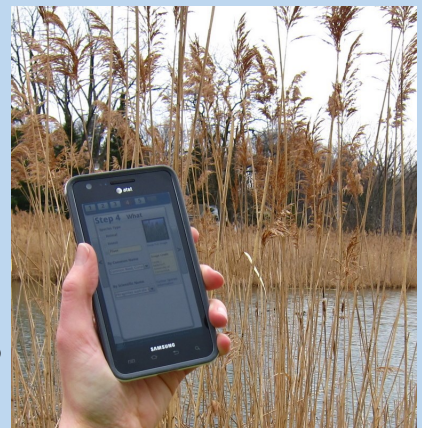
Clean Your Shoes & Hiking Gear

Choose Native Plants



Collect a Specimen/ Take a photo

- Get a close-up photo
- Put a specimen in a container and label it with date/ location/contact info
- Email photo(s) to rwilliams@tnc.org or call 315-387-3600 x 7725 for drop off location(s) near you



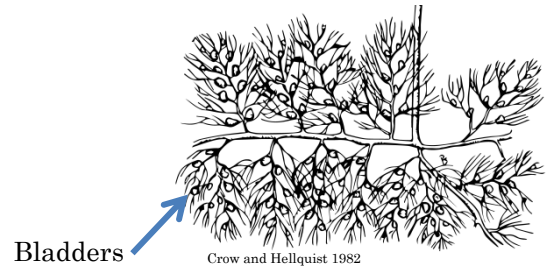
A Steward's Dichotomous Key For Aquatic Hitchhikers

Differentiating invasive and native aquatic plants with confidence

Created by: Sean A.Regalado – Adirondack Watershed Institute

1a The plant has bladders.....**Bladderwort**

1b The plant has no bladders.....2

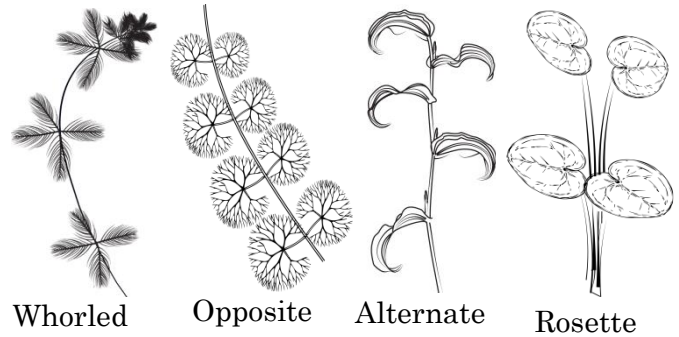


2a The plant is whorled.....3

2b The plant is opposite.....9

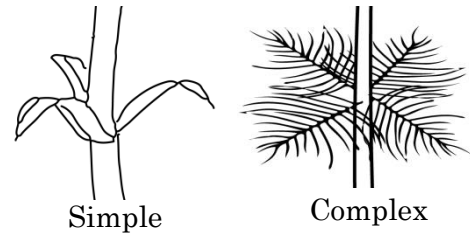
2c The plant is alternate.....10

2d The plant forms a rosette.....11



3a The leaves are simple.....4

3b The leaves are complex.....6

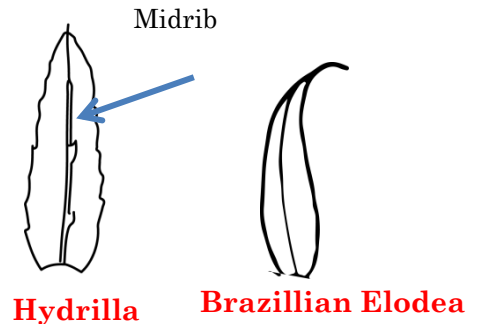


4a The whorl has exactly three simple leaves.....**Elodea**

4b The whorl has four or more simple leaves.....5

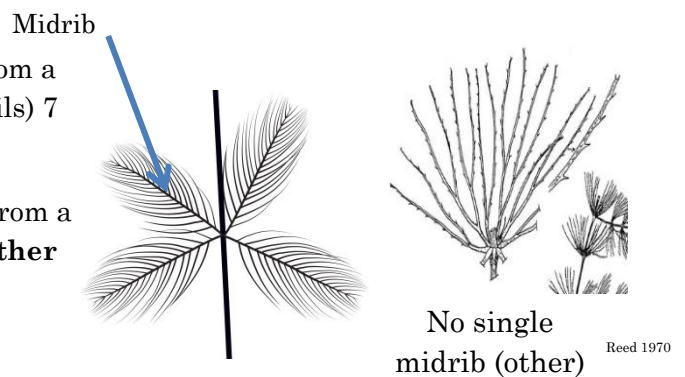
5a The simple leaves have toothed margins and midribs. Four to eight leaves per whorl.....**Hydrilla (invasive)**

5b The simple leaves are not toothed. Often only four per whorl.....**Brazilian Elodea (invasive)**



6a Each leaf is complex with many "leaflets" growing only from a midrib.....(Milfoils) 7

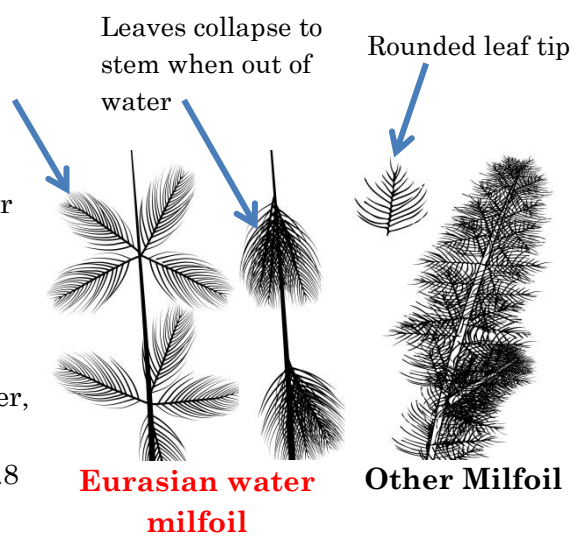
6b Each leaf is complex with each leaflet leaf NOT growing from a midrib.....**Other**



7a The tips of the complex leaves appear clipped, leaflets are 12 or more in number, leaves collapse upon the stem when out of water, and whorls are >1" apart

.....**Milfoil, Eurasian (invasive)**

7b The tips are rounded and the leaves remains bushy out of water, and whorls are <1" apart.....8



8a Stem robust, thick, and dark red and whorls slightly offset, whorls may contain 4-6 feathery leaves

.....**Milfoil, variable (invasive)**

8b Stem not robust, thick, or dark red. Often perfectly whorled with bright green leaflets.....**Milfoil, native**



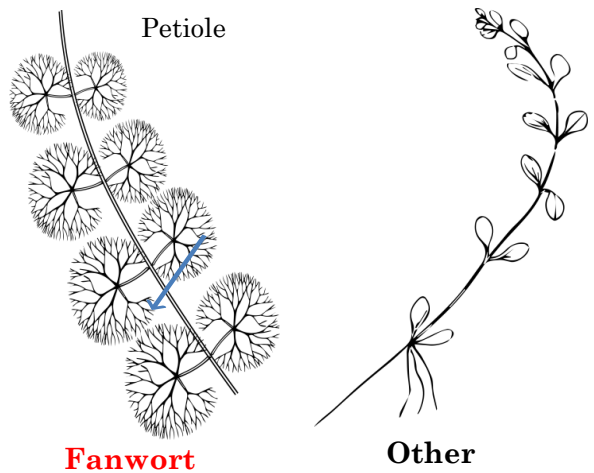
Variable leaf milfoil



Native Milfoil

9a Leaves are complex with many forked leaflets attached by a petiole to the stem.....**Fanwort**

9b Leaves are simple.....**Other**

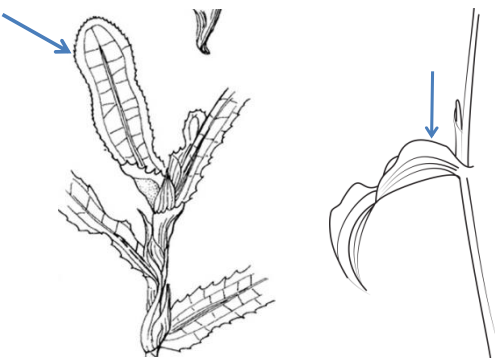


10a Leaves are generally 1/2 inch wide and 2-3 inches long with numberless small teeth along the margin of the leaf

.....**Curly leaf pondweed (invasive)**

10b Leaves without numberless small teeth along the margin of the leaf.....**Pondweed, native**

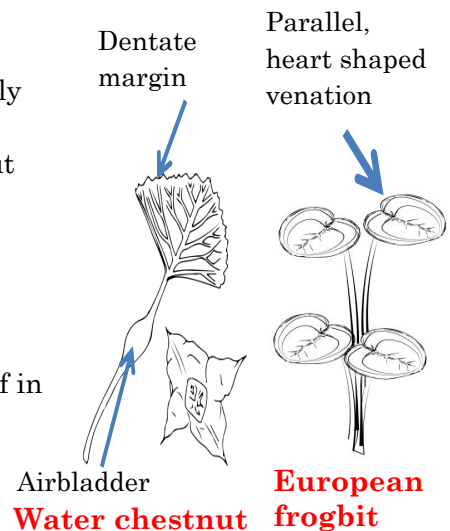
Toothed margin Smooth margin



Curly leaf pondweed Native pondweed

11a Leaves are triangle shaped, clearly dentate with airbladders on stem, and may have a hard nut with four 1/2 inch barbed spines.....**Water chestnut (invasive)**

11b Leaves are heart shaped with the venation on the underside of the leaf following the margin of the leaf in a parallel heart shape.....**European frogbit (invasive)**



Glossary of Dichotomous Key Terms

Alternate	Pertaining to an arrangement of leaves where only one leaf is born at each level of the stem.
Complex	A leaf that is divided by either many leaflets or is extremely sinuous.
Bladder	In terms of aquatic plants, this is the carnivorous sack of bladderworts that captures micro invertebrates and other small organisms. Bladders range in size from 0.2 mm to 1.2 cm.
Dentate	Pertaining to a leaf with a triangular, tooth like edge.
Leaflet	A small leaf like part of a true leaf.
Margin	The edge of a leaf.
Opposite	Pertaining to leaves occurring two at a node on opposite sides of the stem.
Petiole	The stalk of a leaf.
Rosette	The arrangement of leaves in a dense, radiating cluster forming the base of the majority of plant mass.
Simple	Pertaining to a leaf that is not divided.
Whorled	Pertaining to leaves arranged in a circle at one level of the stem.

The Dichotomous Key was created by:

Sean A. Regalado
Research Associate
Adirondack Watershed Institute
Paul Smith's College
sregalado@s.paulsmiths.edu



This portion of the guide was created by Megan Pistolese & Sarah Kirkpatrick, SLELO PRISM.

INVASIVE Hydrilla (*Hydrilla verticillate*)

INVASIVE Brazilian waterweed (*Egeria densa*)

Visible leaf serrations

Tubers



3-6 leaves less than 1in. whorled around stem

Finely serrated leaves

Smooth midrib on leaf underside

No tubers

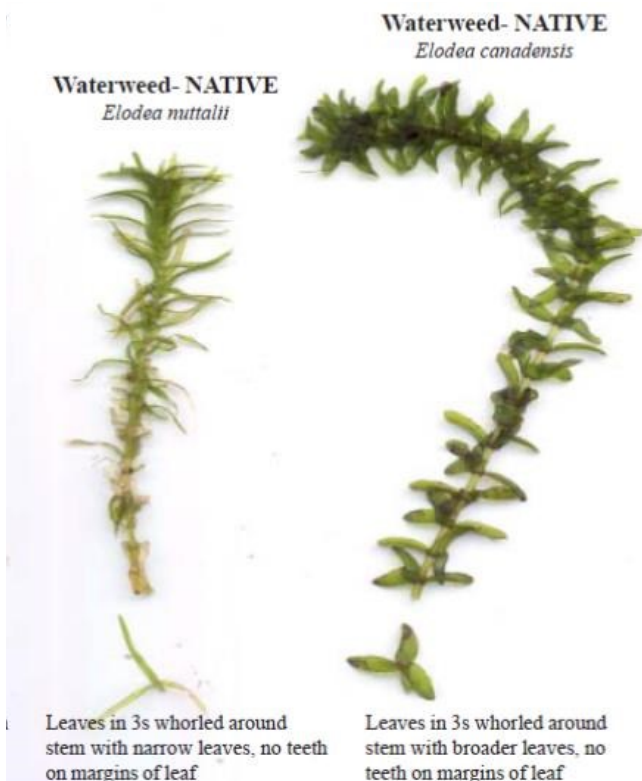
Leaves whorled in bunches of 4-8 (most often 5) around stem



Photo credits: invasive.org: <https://www.invasive.org/browse/subthumb.cfm?sub=3028>

Photo credit: invasive.org: <https://www.invasive.org/browse/subinfo.cfm?sub=3019>

NATIVE Look-a-Likes of Invasive Hydrilla & Brazilian Waterweed



Native Elodea (*Elodea spp.*)

Leaves are in whorls of 3 around stem and **do not** have serrations.

Invasive Fanwort (*Cabomba caroliniana*)

Submerged fan-shaped leaves with tips that split like a “y” + a distinctive petiole that branches off the main stem = fanwort



Photo Credit: Leslie J. Mehrhoff, University of CT, bugwood.org

Native Look-a-Likes of Invasive Fanwort

Native Buttercup (*Ranunculus*):

Submerged leaves are **alternately arranged** and attached by a **distinct petiole**.



Native Water Marigold (*Megaladonta*):

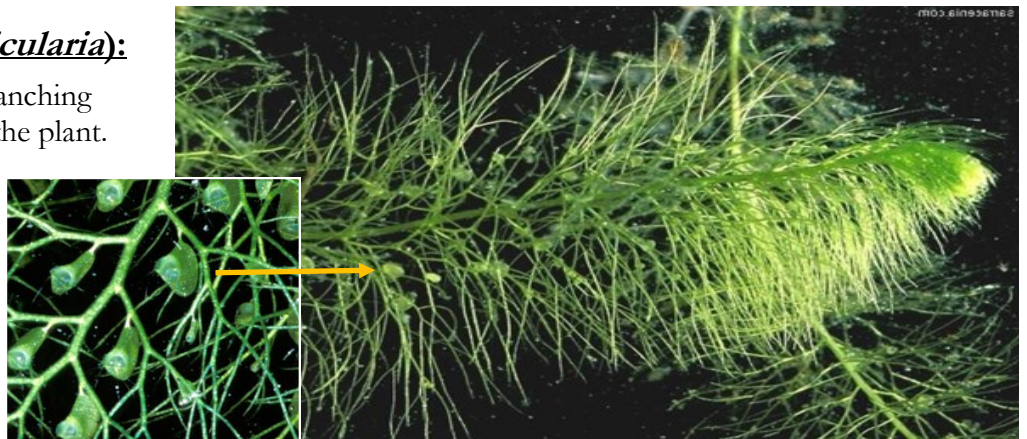
Submersed leaves **lack a petiole**, branched, arranged opposite around the stem .



Native Bladderwort (*Utricularia*):

Leaves are finely divided in a branching pattern along the main stem of the plant. Small round **bladders** grow along the branches of the leaves (used to capture & digest small aquatic organisms)

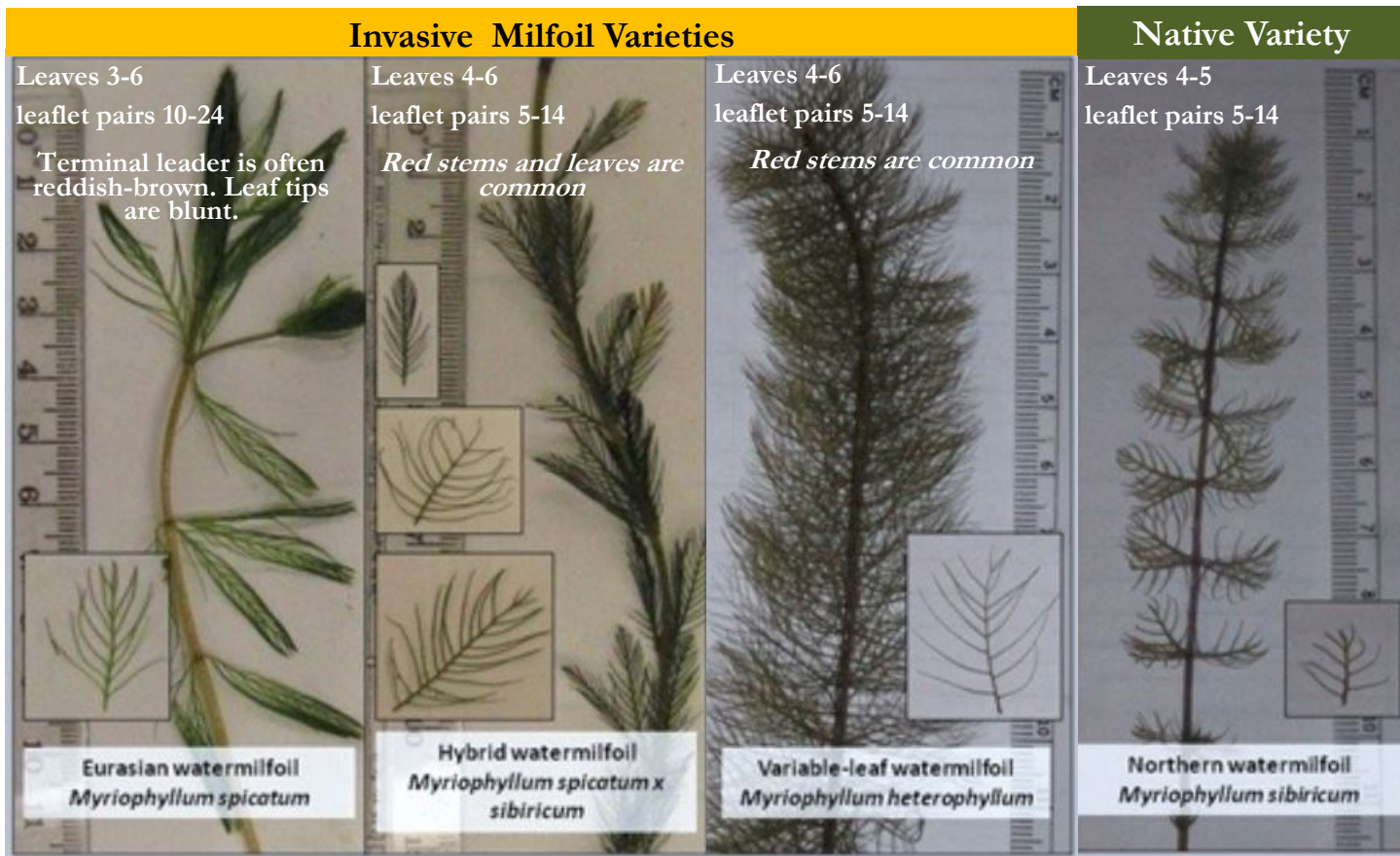
Leaves don't look like a fan.



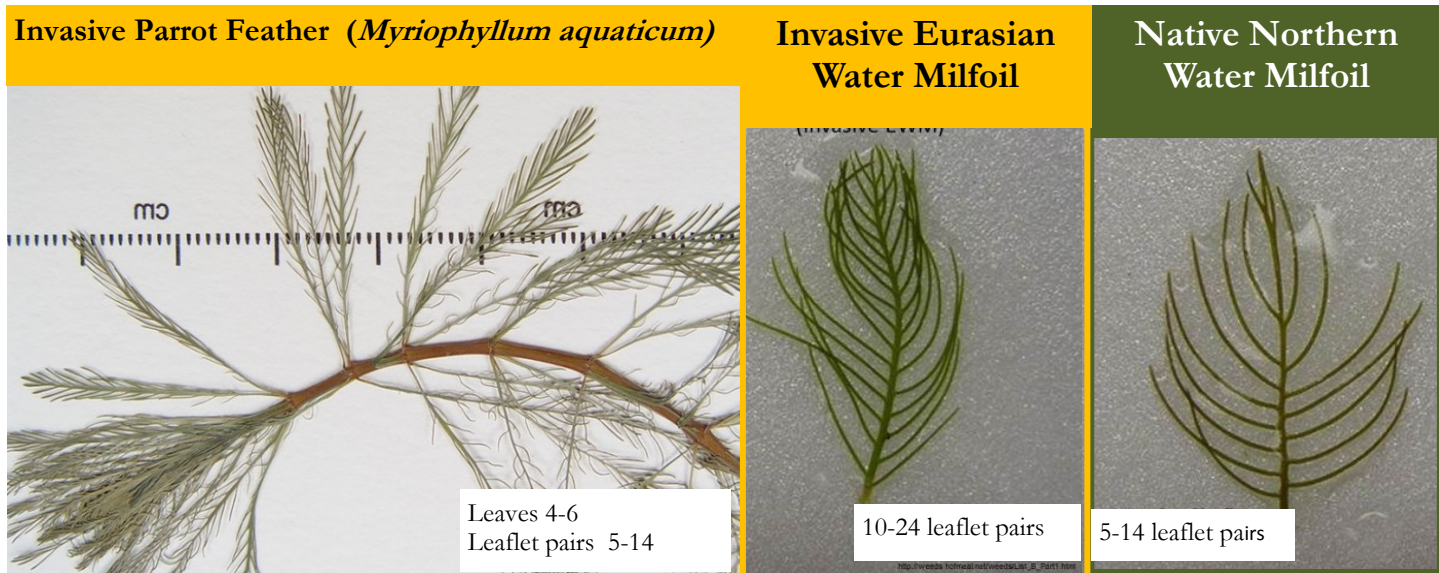
Invasive Water Milfoils Versus Native Water Milfoils

It is difficult to distinguish between native & invasive milfoil species as there are many different varieties of both. Below are some distinguishing features to look for.

(there are many more milfoil species than what is shown below, however, these are most common in our region).



Top photos, <http://shadowlakeassociation.org/identifying-eurasian-watermilfoil/>; bottom photos, <https://nas.er.usgs.gov/queries/FactSheet.aspx?speciesID=237>



Invasive Starry Stonewort (*Nitellopis obtusa*) (a type of microalgae)

A stem with 4-6 smooth branchlets that each have one or more short bracts stemming off it giving an uneven forked appearance. If branchlets go limp when squeezed, it's *N. Obtusa*.



Stem photos: <https://www.dec.ny.gov/animals/109530.html> . Bulbil photo: <https://nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=1688>

NATIVE Look-a-Likes for Invasive Starry Stonewort

Native *Chara* spp.

Has a skunky smell and feels rough



<https://microscopesandmonsters.wordpress.com/tag/chara/>

Native *Nitella* spp.

Has no odor and feels smooth



<https://lakestewardsofmaine.org/mciap/FieldGuide.pdf>

INVASIVE Brittle (European) Naiad (*Najas minor*)

Leaves have 7-15 spines (visible without magnification). Leaves may appear to be opposite, in whorls, or in clumps.



NATIVE Look-a-Likes for Invasive Brittle Naiad

Native Thread-like naiad (*Najas gracillima*)

Slender, flimsy thread-like leaves that have 13-17 spines (*visible with hand lens*)



Native Slender naiad (*Najas flexilis*)

Fine, stiff, slender leaves with 20-100 minute spines. When mature, leaves tend to arch backwards. (*Strong magnification needed*)



Invasive Water Soldier (*Stratiotes aloides*)

Floating sword shaped serrated leaves that form a rosette

(looks similar to an aloe plant or the top of a pineapple)



Left & Center Photo Credit: [Jakob Katzenberger](#), [Dietmar Zacharias](#), pollinationecology.org

Right Photo Credit: [Jiri Novak](http://www.biolib.cz/), <http://www.biolib.cz/>. Bottom photos: bugwood.org

Invasive Water Hyacinth (*Eichhornia crassipes*)

Rounded floating leaves with thick, waxy, spongy petioles. Showy blue-purple flowers that grow on spikes. Each flower has six petals with the uppermost having a yellow patch.



Invasive European Water Chestnut (*Trapa natans*)

Triangular, tooted leaves that form a floating rosette connected to a submerged stem by inflated petioles. Sharp pointed nutlets develop mid summer and are attached to the rosette.



Left Photo Credit: Leslie J. Mehrhoff, University of CT, bugwood.org , Right Photo Credit: http://www.starnewsdaily.com/media/starnewsdaily/images/1ce77976fc5_6064cdfa5c83b284ba296.jpg

Invasive European frog-bit (*Hydrocharis morsus-ranae*)

Small (20-60mm), thick, waxy, heart shaped floating leaves with smooth edges and spongy, purplish-red undersides . Long, unbranched stems dangle from undersides of each floating leaf. Flowers are white with three petals and yellow centers that grow on spikes above water.



Frog's bit
Limnobium spongia
Photo by Jeff Schardt
© 2009 FWC Invasive Plant Management Section

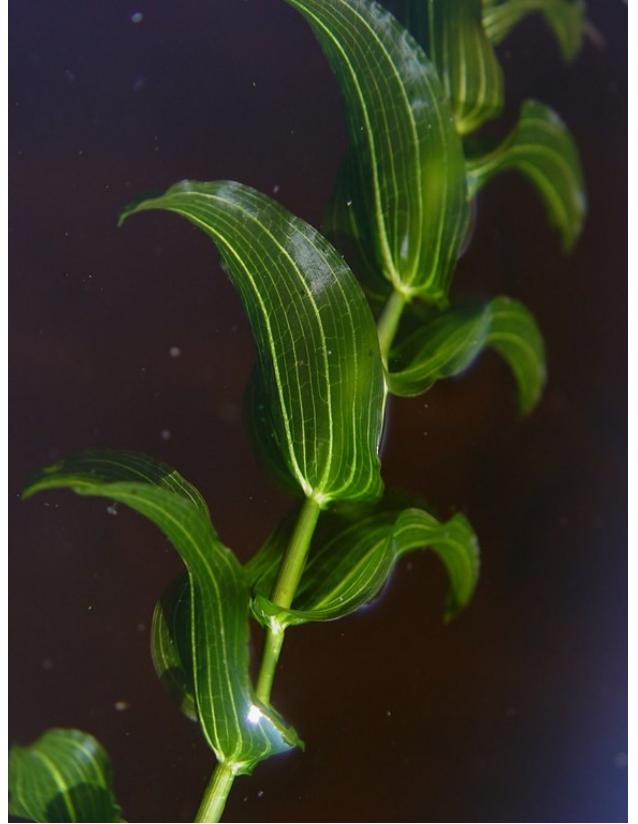


INVASIVE Curly-Leaf Pondweed Versus Native Look-a-Likes

Invasive Curly-Leaf Pondweed
(*Potamogeton crispus*)



Native Clasping-Leaf Pondweed
(*Potamogeton perfoliatus*)



Native Broadleaf Pondweed
(*Potamogeton amplifolius*)



Native White-Stemmed Pondweed
(*Potamogeton praelongus*)



Common Native Aquatic Plants

Common Duckweed
(*Lemna minor*)



Coontail
(*Ceratophyllum demersum*)



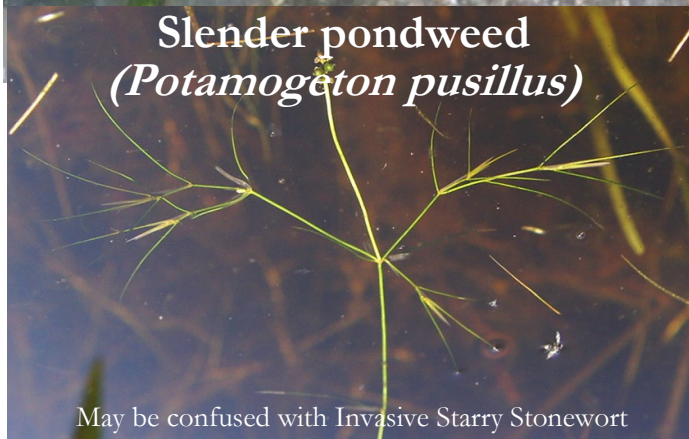
Eel grass
(*Zostera marina*)



Pickereel weed
(*Pontederia cordata*)



Slender pondweed
(*Potamogeton pusillus*)



May be confused with Invasive Starry Stonewort

Aquatic moss



Common Native Aquatic Plants

Floating pondweed
(*Potamogeton natans*)



Long-leaved pondweed
(*Potamogeton nodosus*)



Yellow pond lily
(*Nuphar variegata*)



Arrow arum
(*Peltandra virginica*)



Waterlily
(*Nymphaea odorata*)



Water Shield
(*Brasenia schreberi*)



PARTNERSHIPS FOR REGIONAL INVASIVE SPECIES MANAGEMENT



Division of
Lands and
Forests

New York State PRISMs

Invasive species means a species that is nonnative to the ecosystem under consideration, and whose introduction causes or is likely to cause harm to the environment, the economy, or the health of humans.

What are PRISMs?

Partnerships for Regional Invasive Species Management (PRISMs), comprising diverse stakeholder groups, were created to address threats posed by invasive species across New York State. PRISMs are key to New York's integrated approach to invasive species management. Partners include federal and state agencies, resource managers, non-governmental organizations, industry, recreationists, and interested citizens. The New York State Department of Environmental Conservation provides financial support, via the Environmental Protection Fund, to the host organizations that coordinate each of the eight PRISMs, resulting in statewide coverage.

What Do PRISMs Do?

- Plan regional invasive species management activities
- Implement invasive species prevention programs
- Conduct surveillance and mapping of invasive species infestations
- Detect new infestations early and respond rapidly
- Implement control projects
- Implement habitat restoration and monitoring
- Educate stakeholders on invasive species and their impacts
- Coordinate PRISM partners
- Recruit and train volunteers
- Support research through citizen science in collaboration with the Invasive Species Research Institute <http://www.nyisri.org/>
- Report observations to iMapInvasives <http://www.nyimainvasives.org/>
- Act as regional communication hubs



If you are interested in helping NY “stop the invasion,” PRISMs are a great way to get involved by volunteering for monitoring, outreach, or management projects. All are welcome to participate in statewide PRISM monthly conference calls to hear excellent presentations. **Learn of upcoming events and receive updates by joining a PRISM Listserv.** **Contact a PRISM leader for more information, or visit WWW.NYIS.INFO**

STOP THE INVASION – PROTECT NEW YORK FROM INVASIVE SPECIES