Aquatic Plant Survey Guidelines

PLEON

POCONO LAKE ECOLOGICAL OBSERVATORY NETWORK

What is PLEON?

The Pocono Lake Ecological Observatory Network is a regional lake monitoring program focused on educating the public and lake associations on water quality and lake management.

Our goals:

- Empower the public to better understand and manage their fresh waters
- Create a community of scientists, students, environmental educators, and landowners to work together in improving the ecological state of Pennsylvania's lake ecosystems
- Complement a traditional lake consultant by providing ongoing monitoring data on lakes and ensuring that land owners fully understand the advantages and limitations of different lake management approaches

Why PLEON?

Lakes are ecological treasures that form the economic backbone of tourism in the Pocono region. They provide both recreational enjoyment as well as critical habitat for a variety of wildlife, including plants and animals.

Lakes are complex ecosystems, and effective management requires good data as well as an understanding of the physical, chemical, and biological characteristics of lakes and their surrounding catchments.

Despite their aesthetic, recreational, and environmental importance, we know little about water quality in our Pocono lakes. Neither the state nor regional counties offer regular surveys to provide data essential for good management of these complex ecosystems. Increasing concerns about harmful algal blooms throughout the region make responsible lake management of central importance to the health of these ecosystems and the people, pets, and wildlife that depend on them.

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Aquatic Plant Program – Items included

Survey Guidelines

Data Sheet

Sample Lake Map

Non-native invasive aquatic plants list

Common look alike and native plants

Contacts

Sources of Information

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Aquatic Plant Survey Guidelines

Thank you for your interest and involvement in the PLEON Aquatic Plant Monitoring Program. We appreciate your effort to monitor a lake or pond for non-native and native aquatic plants. The information that you gather is part of a regional effort to document the distribution and abundance of invasive plants throughout the Poconos Region. Early detection is the key to potential eradication!

A list of supplies that you may find useful during monitoring below, as well as a recommended protocol on the following pages.

-motor boat, paddleboard, canoe, or kayak

-Map of lake or pond

-Data sheet (clipboard optional)

-Paper towels

-ziplock bags

-masking tape or labels to mark bags

-pencil and/or permanent marker

-jar or baggie to view plants in for on-site viewing

-polarized sunglasses (recommended)

-plant guide or PA Sea Grant App

Optional tools

-anchor to prevent drifting

-rake toss

-net

-small ruler or magnifying lens

-view scope

-camera

-cooler

We ask that you monitor at least once during the summer between July and early-September.

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Aquatic Plant Survey Guidelines

1. Conduct monitoring on a day when the lake is fairly calm so ripples and small waves do not prevent you from seeing plants below the surface of the water. Plants will be more visible on a sunny day rather than a dark, cloudy one.
2. Know the length of the watercraft you will be using to monitor. This will provide a measurement of comparison when reporting the length and width of any aquatic plant beds.
3. Fill out the date, lake name, whether is it is private or public, the method used to conduct the survey, and your contact information on your data sheet.
4. Move slowly around the perimeter of the lake or pond, staying in waters about 15 ft deep or less. A weaving or zig-zag pattern along the shoreline will enable you to cover a larger area. Look for aquatic plant growth at or below the surface.
5. As you move around the shoreline, pay extra attention to areas where invasive plants are more likely to be found. These areas include the inlets, outlet, boat launch sites, marines, beaches, existing native plant beds, and other shallow areas.
6. When observing plants, you may want to place a sample of the plants in a baggie or jar with water to allow them to float freely for easier inspection and identification. This can be especially helpful you suspect an invasive plant.

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Aquatic Plant Survey Guidelines

7. Once you've identified a plant bed, complete the following steps on your data sheet.
   a. Assign a station number to the site and record on data sheet. Also mark the number on the map.
   b. Estimate the size of the plant bed, length and width in feet, on data sheet for "size of plant bed". Draw an outline on the map.
   c. Record the name of the plant, if known. If unsure, you can assign a letter name such as "species A".
   d. Estimate plant abundance and record on data sheet.
   e. Choose samples of any invasive or suspicious plants if possible, including stems, leaves, and flowers if present. Wrap the plants in a damp paper towel and place in a labeled plastic baggie with lake/pond name, your contact info, date, and station number.
   f. Keep all invasive or suspicious plant fragments until after the survey and dispose of them in the garbage or on dry land.
8. When monitoring is complete, highlight on your map the area of the shoreline you were able to monitor.
9. Make sure your data sheet is completed. Include any questions you may have at the bottom of the sheet.
10. When you're leaving, check your boat for any plant fragments. Remove and dispose of any plants on dry land.
11. You're done! Please mail a copy of the data sheet, map, and samples of any invasive or suspicious plants found by September 15 (plant samples are best mailed with in 2 days). **A self addressed, stamped envelope is provided at the end of the training manual.**

Thank you for your help to monitor Pocono Lakes!

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Mailing in a suspicious or invasive plant sample

If you find an aquatic plant that looks like an invasive:

1. Choose samples of the plant including stems, leaves, and flowers if present.
2. Wrap the plant in a slightly damp paper towel, and place in a sealed plastic baggie.
3. Label the baggie with the lake/pond name, your contact information, date, and station number.
4. Send in immediately (along with copy of the data sheet and map) or keep refrigerated until able to send or bring in sample.
5. Mail or Bring to:

   Elizabeth Carroll Attn: Aquatic Plant Monitoring
   Holy Family Hall
   Holy Family University
   9801 Frankford Avenue
   Philadelphia, PA 19114

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Aquatic Plant Data Sheet

Lake/Pond:	Town:	Private or Public
Volunteer:	e-mail:	Date:
Phone	Hours spent surveying:	Method: topside, rake-toss, snorkel

Please mark the station number and highlight the total area monitored on your map.

Station number	Depth (ft)	Size of plant bed	Plant species name	Abundance (A – abundant, M – moderate, S – scarce)	Number of species in bed (if more than one)

Do aquatic plants affect your use of these lake? If so describe what ways?
If present, how long have invasive plants been in the lake?
Any questions?
Please send form and any invasive or suspicious plants labeled with appropriate information to:

Elizabeth Carroll
Attn: Aquatic Plant Monitoring
Holy Family Hall
Holy Family University
9801 Frankford Avenue
Philadelphia, PA 19114
email: ecarroll2@holyfamily.edu

Sample Data Sheet

Adirondack Park Invasive Plant Program — *Data Sheet*

Lake / Pond: Meacham Lake
Volunteer: Hilary Oles
Phone: 518-576-2082
e-mail: holes@tnc.org

Town and County: Duane, Franklin
Address: PO Box 65
Keene Valley, NY 12943
Hours spent surveying: 4

Private or Public (Public)
Date: 7/12/04
Method: Topside, Rake-toss or Snorkel (Topside)

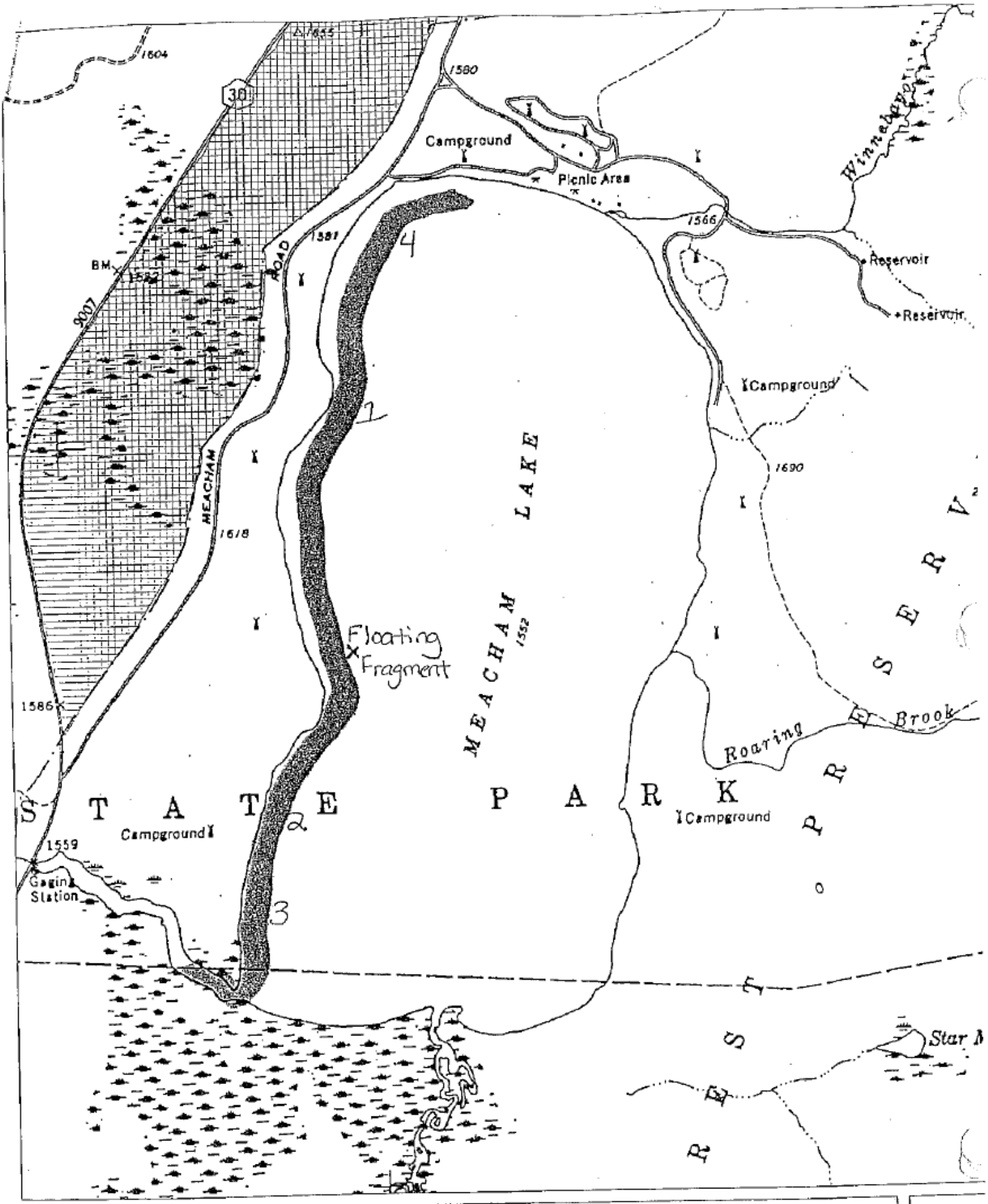
- Invasive Site Description -
Please mark the station number and highlight the total area monitored on your map

Invasive station (number)	Depth (ft)	Size of plant bed (length x width (ft))	Invasive species name	Invasive abundance (A-abundant, M-moderate, S-scarce)	Number of species
1	6	80 x 48	Eurasian milfoil (EWM)	S	6
2	6.5	64 x 32	EWM	S	3
3	6	96 x 64	EWM	M	5
4	5.5	64 x 32	EWM	S	7

Do aquatic plants affect your use of the lake? If so, please describe in what ways. n/a
Are there active plant management activities on your lake? don't know
If present, how long have invasive plants been in the lake? don't know
Is there an invasive species sign posted at boat launch site? Yes
Please provide any additional information on the back.

Please send form and invasive or suspicious plant labeled with appropriate information to:

Hilary Oles, APIPP
c/o Adirondack Nature Conservancy
PO Box 65 Keene Valley, NY 12943



New York State Adirondack Park Agency Geographic Information

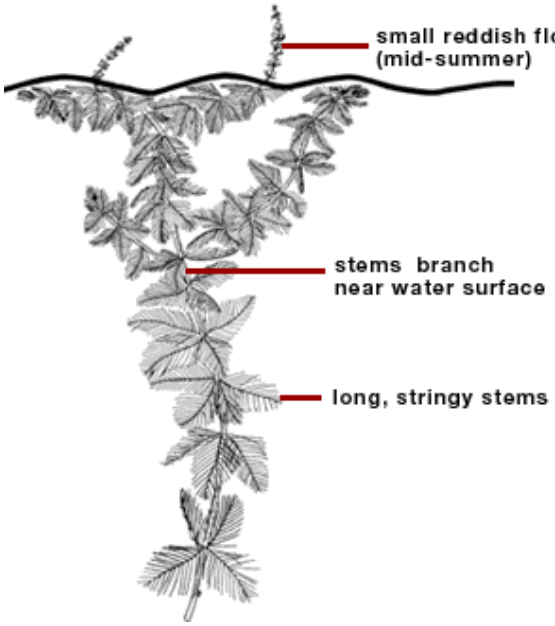
SAMPLE MAP

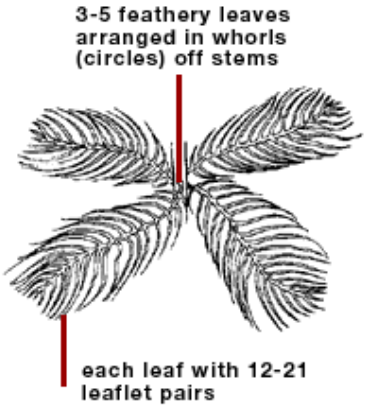
Eurasian watermilfoil

Myriophyllum spicatum

PA Invasive Plant Profile

- Without fruits or flowers, it is nearly impossible to distinguish Eurasian watermilfoil from the native northern milfoil.
- Counting leaflets can provide helpful identification clues.
- Does not rely on seeds for reproduction, but instead reproduces by fragmentation. Plant fragments break off and float via water currents, allowing it to disperse long distances and hitchhike on boats, boat trailers, motors, and fishing equipment.
- Needs to be hand-pulled from the root for removal

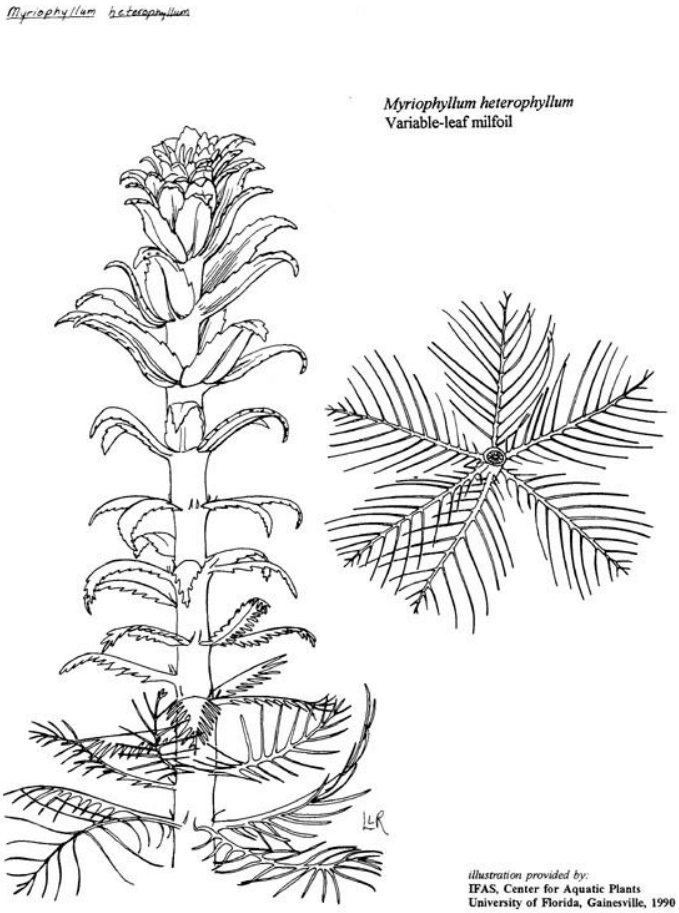




Variable-leaf milfoil
Myriophyllum heterophyllum

PA Invasive Plant Profile

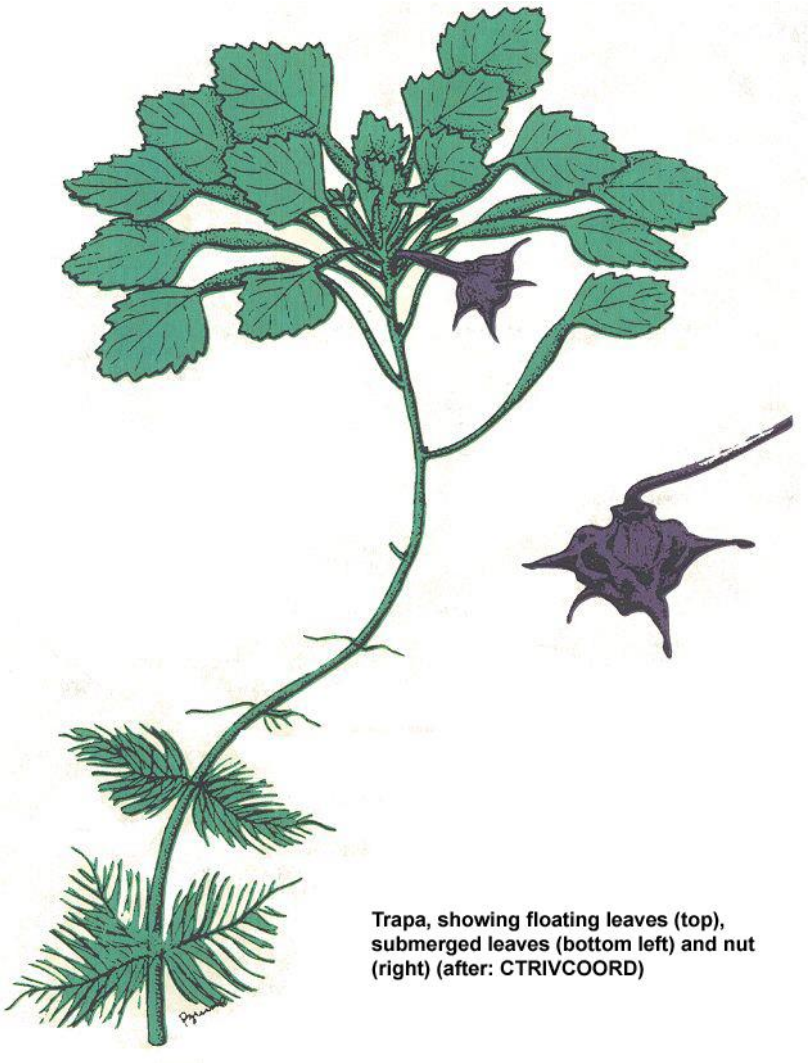
- This extremely well-adapted plant can thrive in freshwater ponds, lakes, ditches, and other still or flowing aquatic systems, and even survives under ice.
- Spread Reproduction is primarily through vegetative fragments, which can hitchhike on boats, trailers, and fishing equipment. It may also reproduce via seed production, but probably to a lesser extent



Water chestnut
Trapa natans

PA Invasive Plant Profile

- Fast growing, floating aquatic plant.
- Leaves are triangular and toothed.
- Flowers with 4 white petals are produced in July.
- Thorny, black nutlets with terminal barbs mature in late July and are easily dispersed by water.
- Mats can cover large expanses of water. Submerged native aquatic plants are reduced due to shading. Infestations can make boating, fishing, and swimming difficult or impossible.

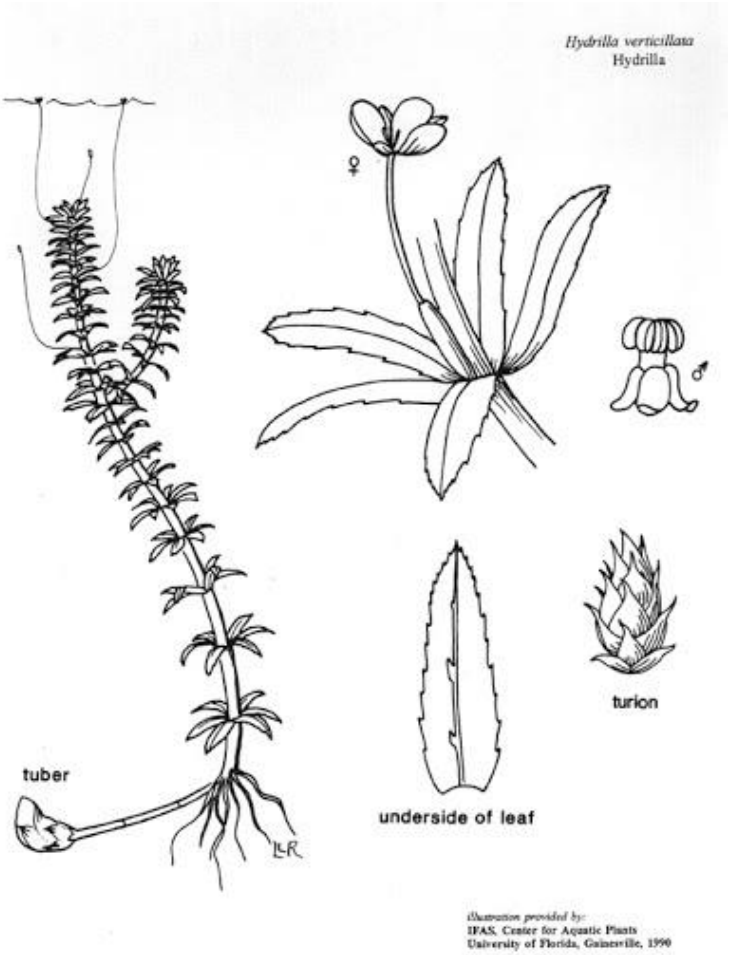


Trapa, showing floating leaves (top), submerged leaves (bottom left) and nut (right) (after: CTRIVCOORD)

PA Invasive
Plant Profile

Hydrilla
Hydrilla verticillata

- Submerged aquatic plant
- Leaves are whorled in bunches of three to eight, but most often with five.
- Fruits are cylindrical and contain up to five seeds
- Forms dense floating mats that can restrict native vegetation.
- Late in the season herbicide-resistant tubers form allowing for rapid recolonization.



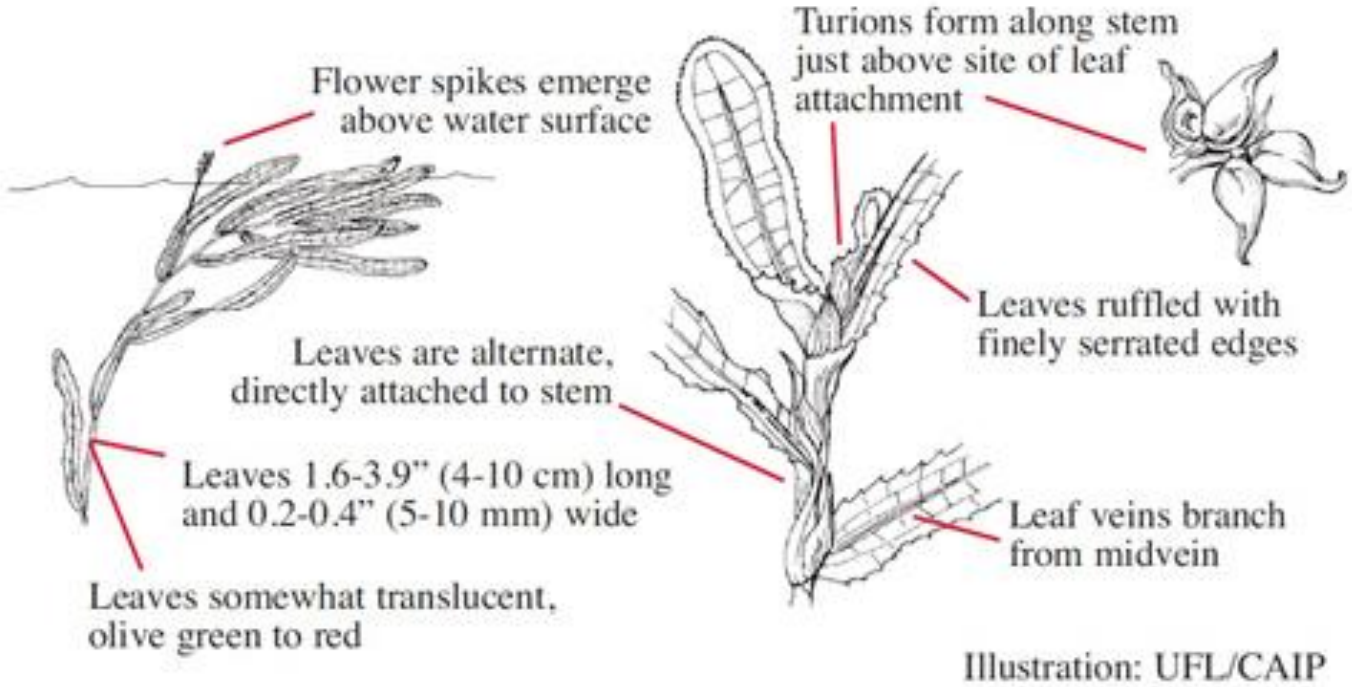
Leslie J. Mehrhoff, Univ. of Connecticut, Bugwood.org

Robert Vidéki, Doronicum Kft., Bugwood.org

Curly-leaf pondweed
Potamogeton crispus

PA Invasive Plant Profile

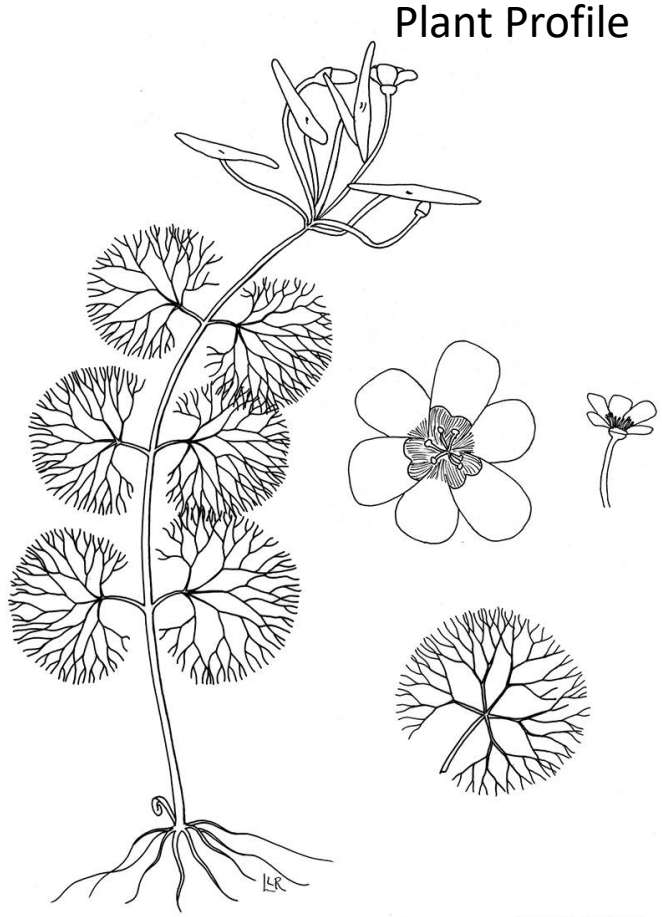
- Has only submerged leaves.
- Other pondweeds also lack the tiny but visible serrations along the edges of the leaves.
- Curly-leaf pondweed prefers soft substrates and shallow water depths in alkaline and high nutrient waters.



Fanwort
Cabomba caroliniana

PA Invasive Plant Profile

- Two types of leaves include submersed and floating.
- Submersed leaves are delicate, fan-shaped, and usually green in color.
- Finely divided and arranged in opposite pairs along the stem.
- Floating leaves, which are not always present, are narrow, small oval to diamond in shape, and arranged in an alternating pattern.
- Small white, pink, or purple flowers.



Cabomba caroliniana
fanwort

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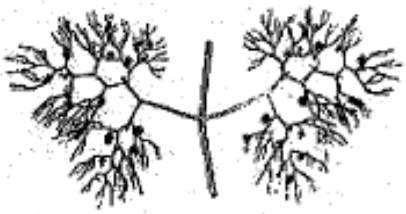
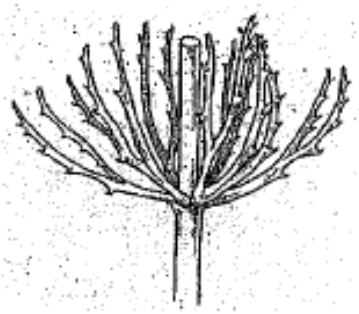
Common Look alike plants

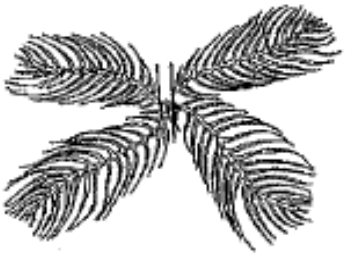
The four plants below are commonly confused. They illustrate the importance of carefully observing structural differences when distinguishing one plant from another.



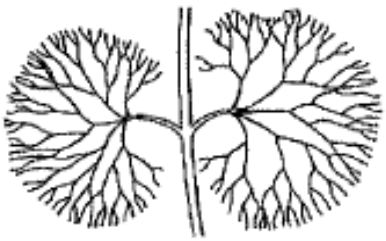
Bladderwort: (Native) Leaves are finely divided in a branching pattern along the main stem of the plant. Small bladders occur along the branches of the leaves.



Coontail: (Native) Forked leaves are arranged in whorls along the stem. The leaves may be forked once or twice, and the leaf margins are usually finely toothed.



Eurasian watermilfoil: (Invasive) Leaves are arranged in whorls of three to six, with usually >12 pairs of thread-like leaflets on each leaf. Tips of leaves typically blunt, or "snipped" in appearance.



Fanwort: (Invasive) Leaves are arranged in opposite pairs on the main stem. A distinct petiole branches off the main stem of the plant. This petiole supports the finely divided, branched leaves that resemble a fan.

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Sources of information

Crow, G.E. and B.C. Hellquist, 2000. Aquatic and Wetland Plants of Northeaster North America. University of Wisconsin Press, Madison. *Myriophyllum sp., Trapa natans, and Potamogeton crispus,* Bladderwort leaf.

University of Florida, Center for Aquatic Plants. 1990. *Myriophyllum spicatum.*

Wisconsin Lakes Partnership, University of Wisconsin-Cooperative Extension and the Wisconsim Department of Natural resources, Stevens Point, Wisconsin. 1997. *Through the Looking Glass – A field guide to aquatic plants.* Coontail leaf.

Oles, Hilary. Adirondack Park Invasive Plant Program (APIPP), Plant monitoring survey guidelines. adkinvasives.com

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

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