



## Aquatic Plant Survey Guidelines



## ***What is PLEON?***

PLEON is a lake monitoring program focused on educating the public on water quality and lake management. PLEON is based at Lacawac Sanctuary & Biological Field Station.

### **Our goals:**

- Empower the public to better understand and manage their freshwaters.
- Create a community of scientists, students, educators, and landowners working to preserve Pennsylvania's lakes.
- Collect and communicate ecological data that help inform responsible lake management.

## ***Why PLEON?***

Lakes are the economic backbone of tourism in the Pocono region. They provide both recreational enjoyment and critical wildlife habitat.

Lakes are complex ecosystems. Responsible lake management requires understanding the physical, chemical, and biological characteristics of lakes and their catchments.



## Aquatic Plant Program – Items included

Survey Guidelines

Data Sheet

Sample Lake Map

Common look alike and native plants

Non-native invasive aquatic plants list

Contacts

Sources of Information



# 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, canoe, kayak (& anchor to prevent drifting)
- 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

## *Optional tools*

- 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.



# 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 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.



## 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 within 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!



## \*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

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



Sample Data Sheet

Adirondack Park Invasive Plant Program

Data Sheet

Lake / Pond: Meacham Lake  
 Volunteer: Hilary Oles  
 Phone: 518-576-2082  
 e-mail: holesetnc.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

- 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

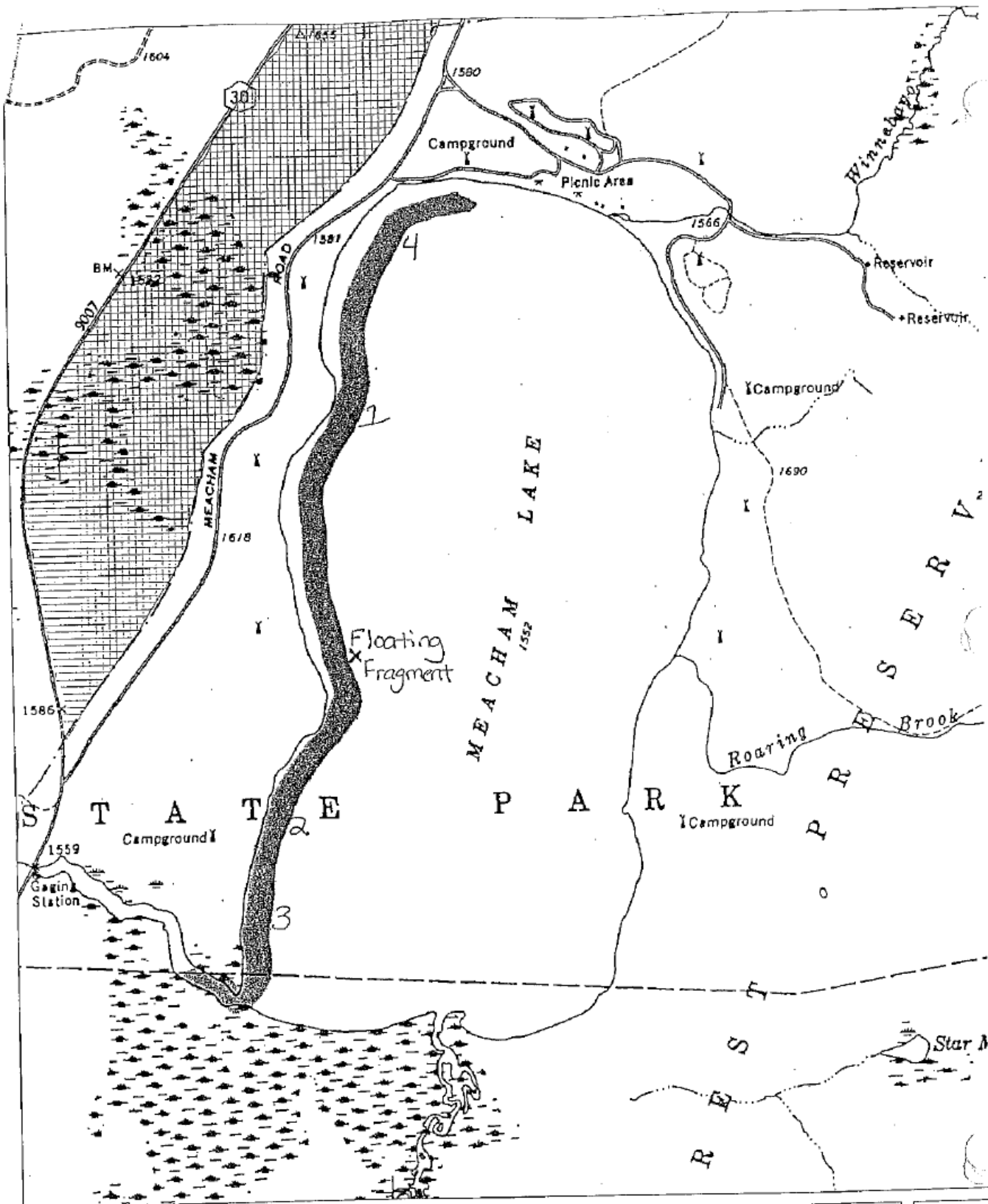
If present, how long have invasive plants been in the lake? don't know

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



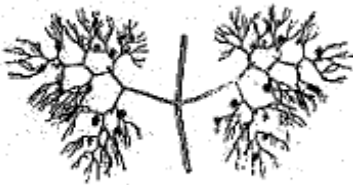
New York State  
Adirondack  
Park  
Agency  
Geographic  
Information

# SAMPLE MAP

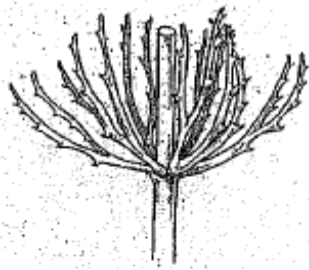


## Common Look alike plants

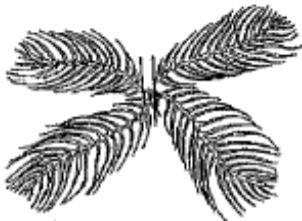
The four plants below are commonly confused. They illustrate the importance of carefully observing structural differences when distinguishing one plant from another.



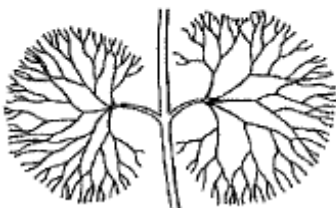
**Bladderwort:** (Native) Leaves are finely divided in a branching pattern along the main stem of the plant. Small bladders occur along the branches of the leaves.



**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.



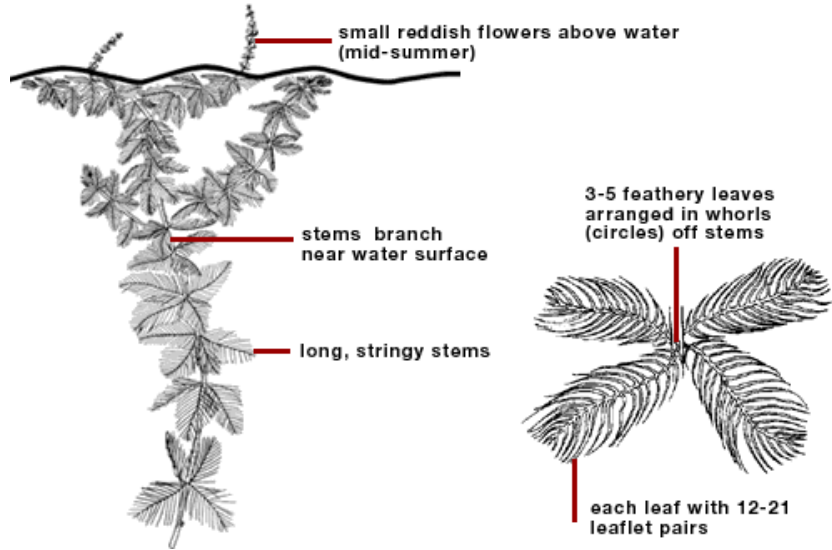
**Fanwort:** (Invasive) Leaves are arranged in opposite pairs on the main stem. A distinct petiole branches off the main stem of the plant. This petiole supports the finely divided, branched leaves that resemble a fan.

# 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

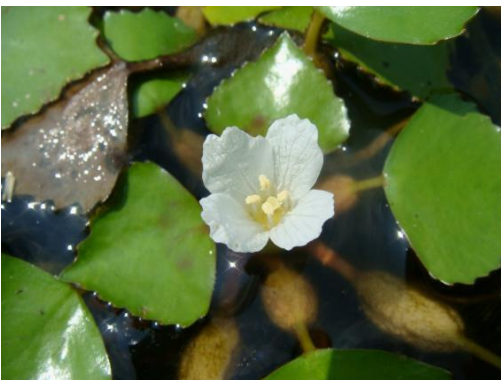


# Water chestnut

## *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)



# Variable-leaf milfoil

PA Invasive  
Plant Profile

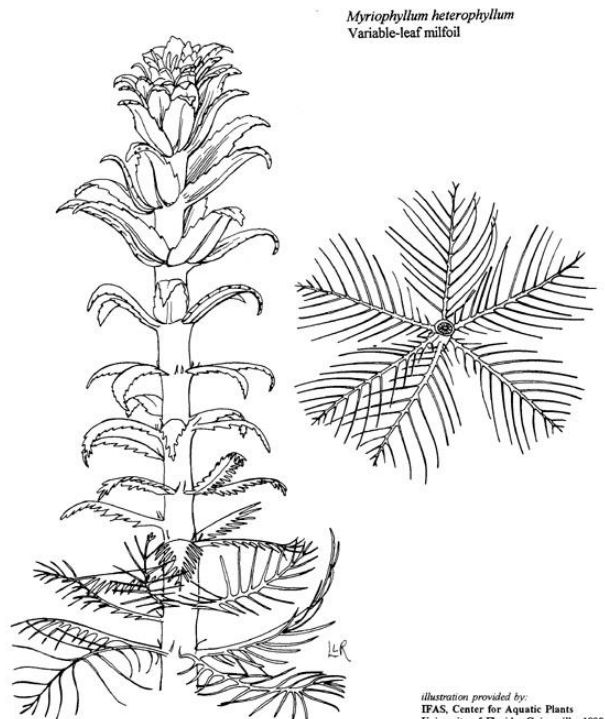
## *Myriophyllum heterophyllum*

- 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



Source: Roberta Hill, VLMP © 2007

*Myriophyllum heterophyllum*



*Myriophyllum heterophyllum*  
Variable-leaf milfoil

illustration provided by:  
IFAS, Center for Aquatic Plants  
University of Florida, Gainesville, 1990

# 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.

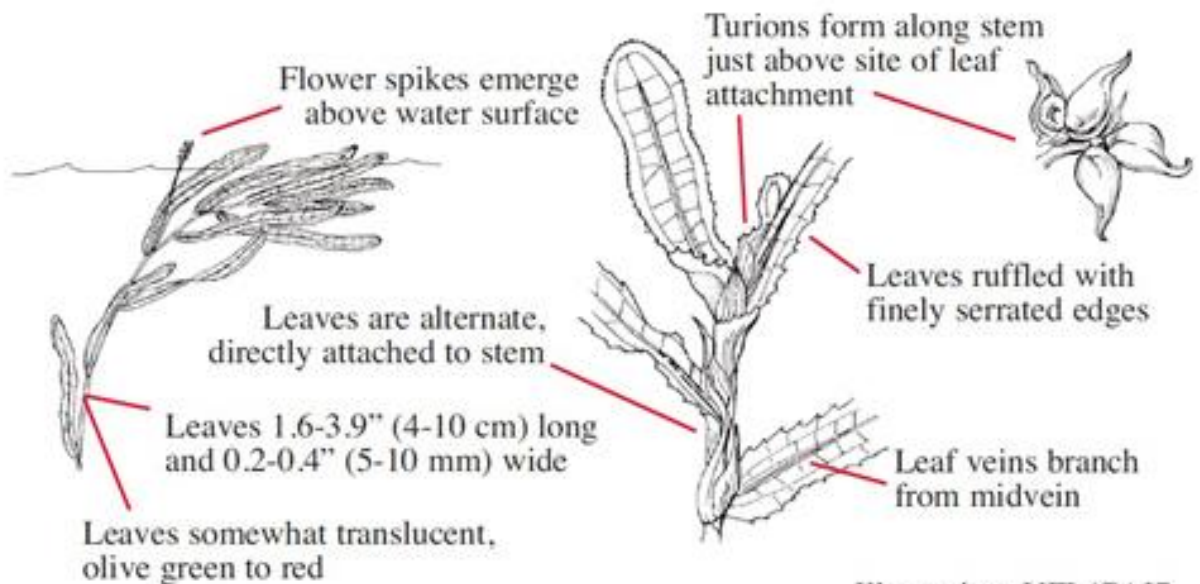


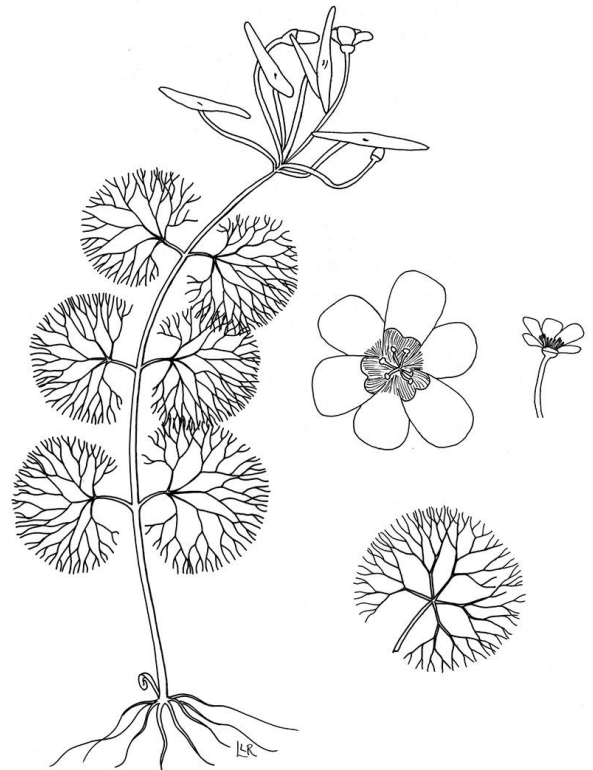
Illustration: UFL/CAIP

# 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.



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Center for Aquatic and Invasive Plants

*Cabomba caroliniana*  
fanwort







## *Sources of information*

Crow, G.E. and B.C. Hellquist, 2000. Aquatic and Wetland Plants of Northeast 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 Wisconsin 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](http://adkinvasives.com)



## *PLEON Scientists*

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## *PLEON Funding Sources*





***Interested in learning more about the water quality of your lake or the ecology of lakes in the Poconos? Have a lake-related topic that you would like to see addressed in a PLEON workshop?***

***We would love to hear from you!***

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***More information about PLEON programs is on our website:***

[www.lacawac.org/pleon](http://www.lacawac.org/pleon)