Invasive Plants of Herring Runs

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Myriophyllum (milfoils)
Cabomba caroliniana (fanwort)
Trapa natans (water chestnut)

Myriophyllum (milfoils)

10 species in New England

7 native (4 rare)

3 non-native (2 in MA)

Identification can be difficult

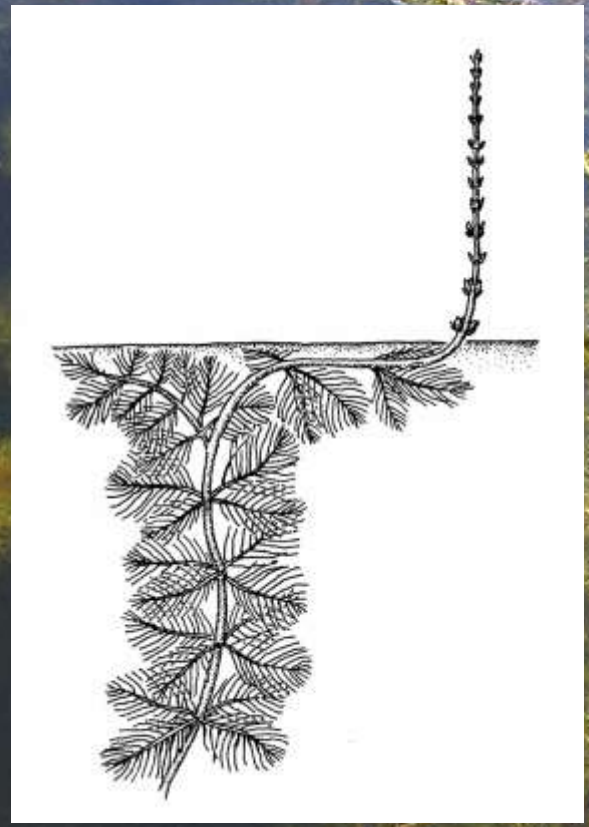
Submersed, rooted, perennials with long branching stems

Tend to branch freely near water surface

= heavy biomass at surface

Reproduce primarily vegetatively

Broken-off stem fragments root



Some species produce over-wintering turions

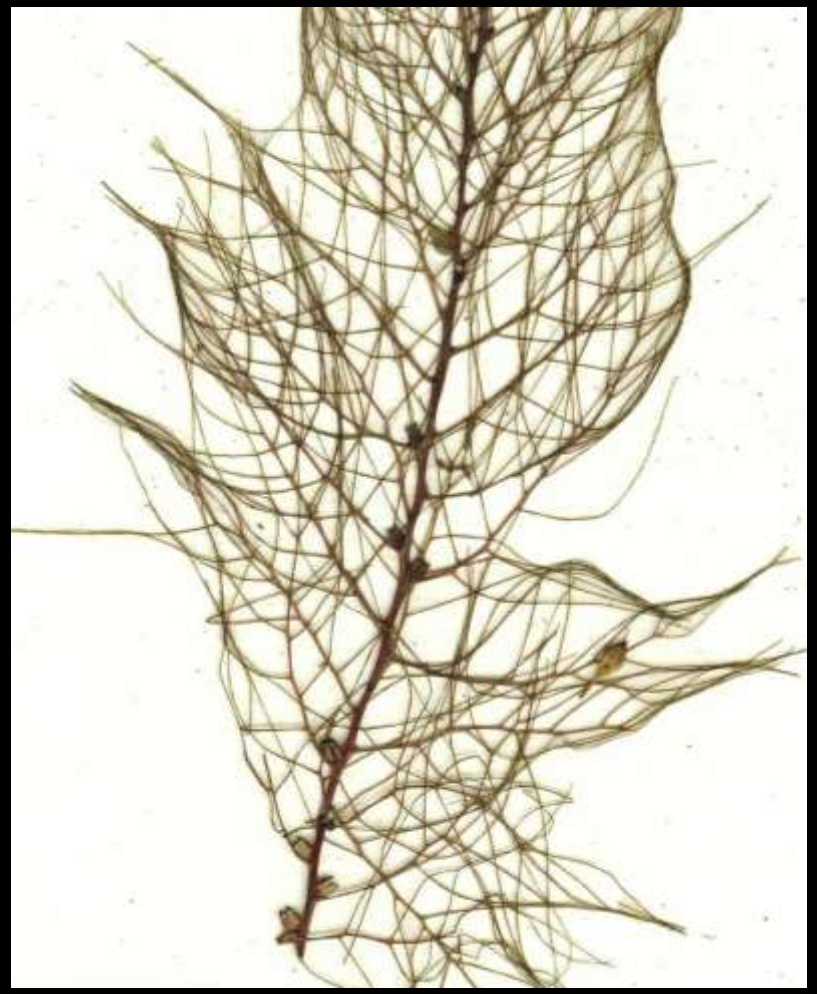
Do flower & set seed

Tolerant of wide range of water conditions:

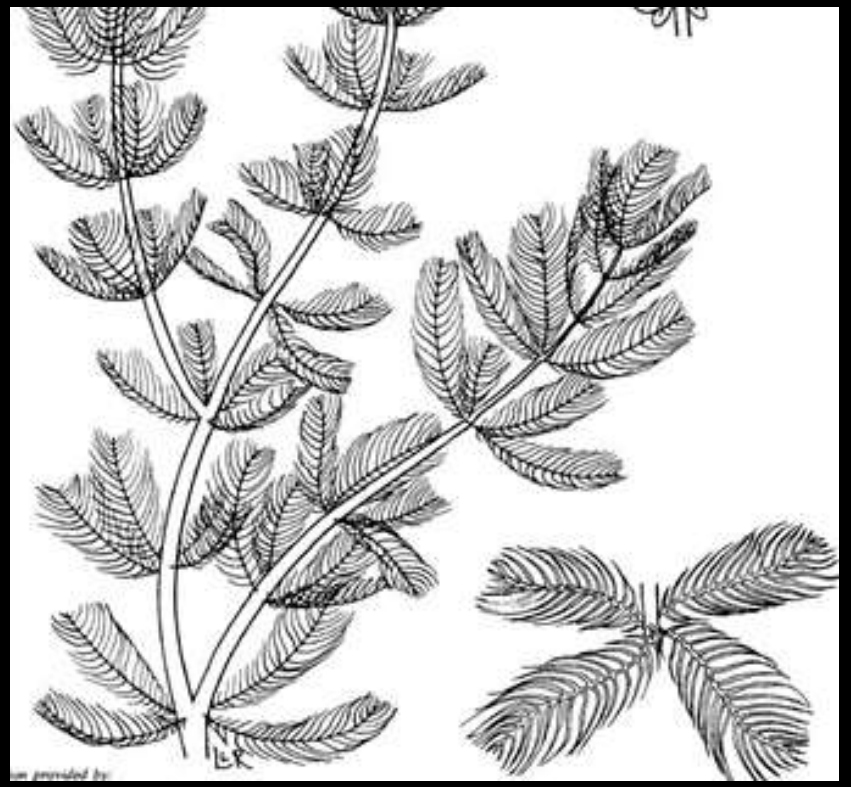
still/moving, cold/warm, fresh/brackish (10ppt salinity)

Leaf arrangement?

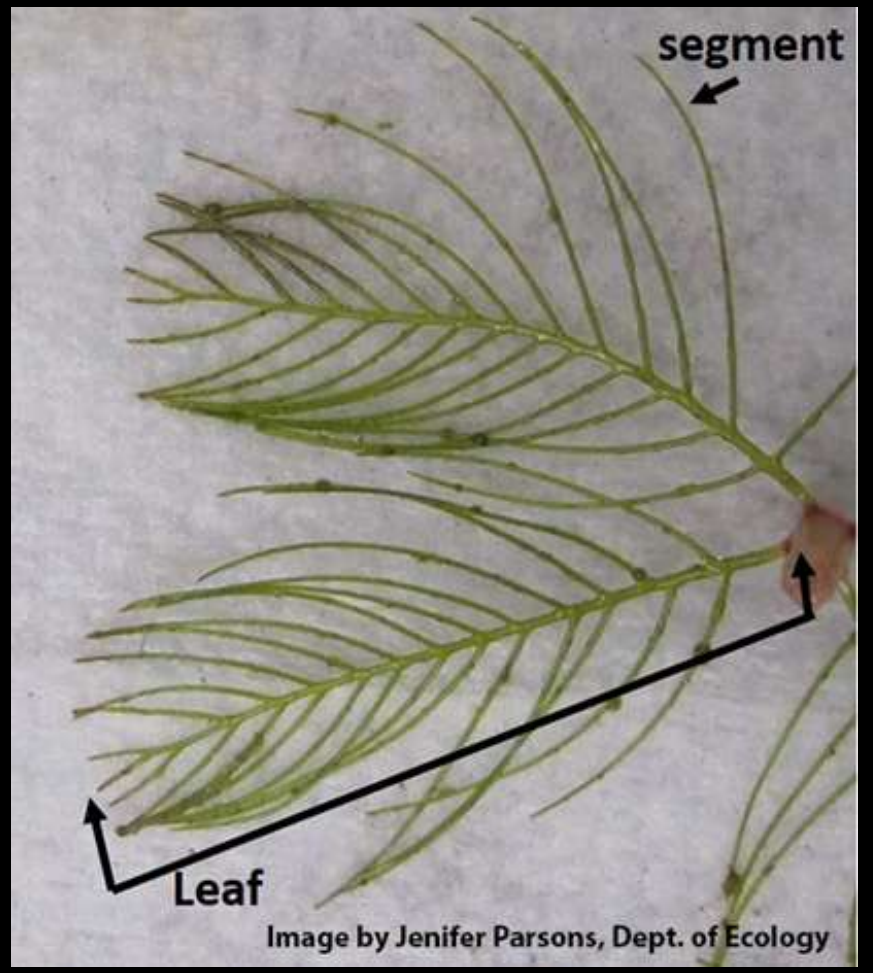
Alternate *arrangement* *(M. humile)*

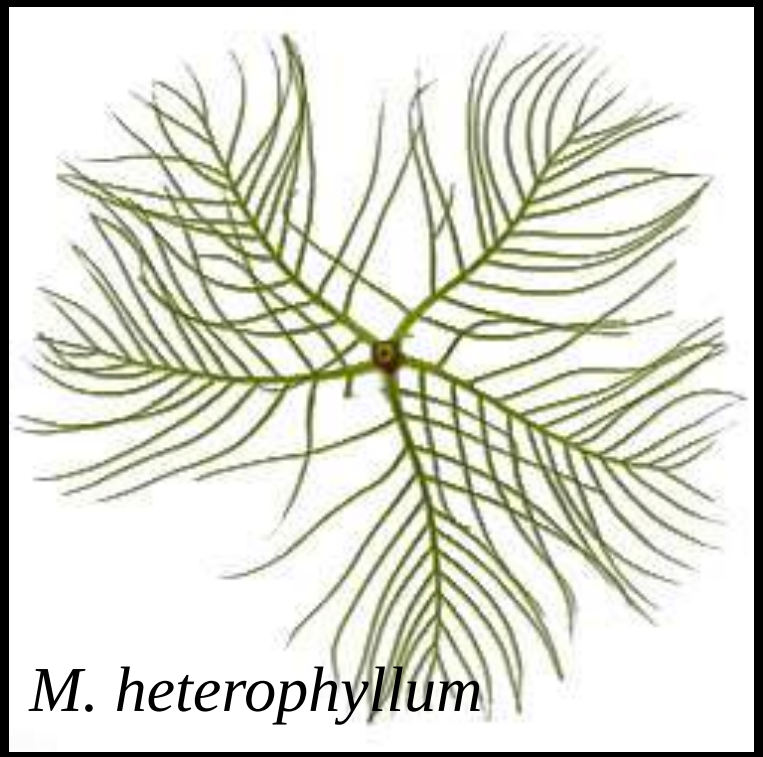


Whorled *arrangement* *(M. aquaticum and M. spicatum)*



Number of leaf divisions?



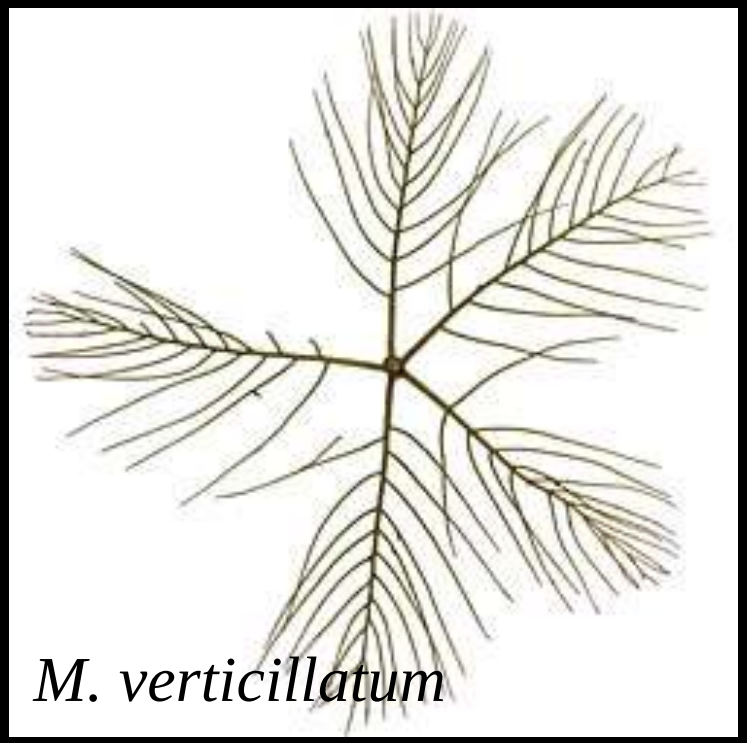


M. heterophyllum

4-10 segments/side

M. spicatum

12-20 segments/side



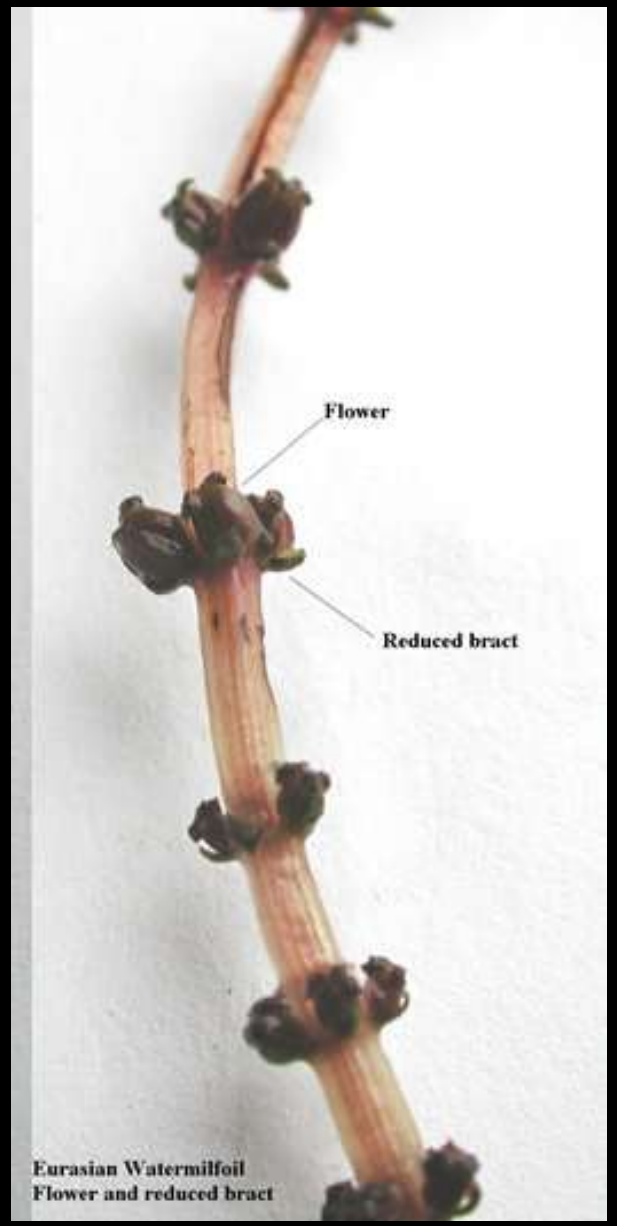
M. verticillatum

Location of flowers/fruits?

Submersed *flowers/fruits* *(M. humile)*

Emersed *flowers/fruits* *(M. verticillatum)*

Bracts under female flowers?



Turions present?

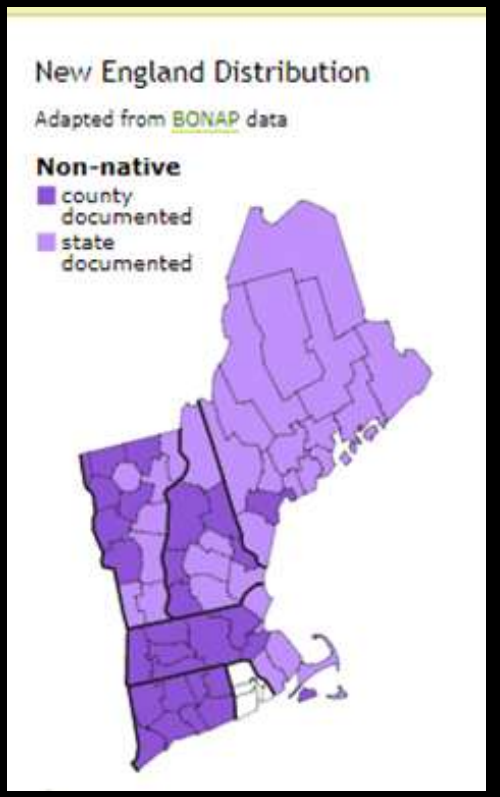
Turions *of M. sibiricum*

Turions *of M. verticillatum*

Photos provided by Louise Dery-Wells

Vaughn Street bridge, Lakeville, MA

NOT Eurasian Water Milfoil (*Myriophyllum spicatum*)

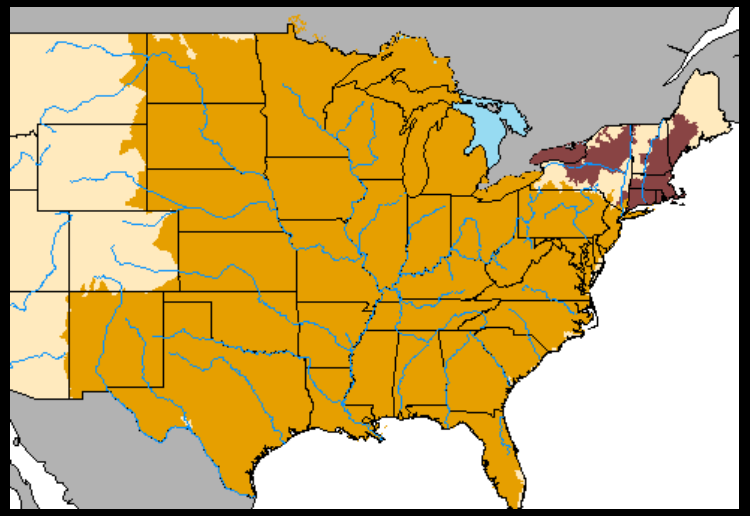


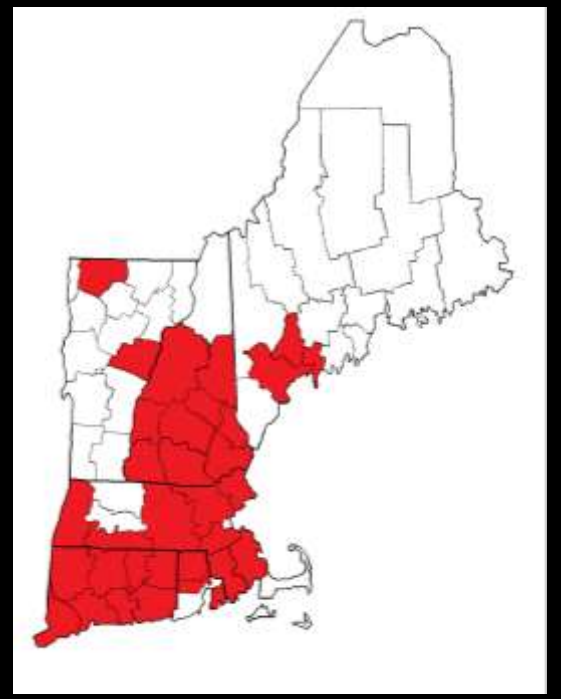
M. heterophyllum (Variable-leaved water milfoil)

Native to the southern US from Florida to central and north Texas.
Now be found as far north as North Dakota and Maine.

It is present in all the states of New England.

- Earliest New England record is from 1932 in Bridgeport, CT
- Likely intentional introduction.





Variable-leaved water-milfoil (*Myriophyllum heterophyllum*)

Non-native *M. heterophyllum*

×

Rare *M. pinnatum*

Hybrid populations exhibit invasive characteristics

Pure *M. heterophyllum* rarely exhibits invasive vigor

Populations of both coexist in New England waters

Milfoil Issues

Myriophyllum has ability to congest waterways & crowd out other aquatic plants.

Dense growth can alter water & sediment chemistry

- Create hypoxic zones by blocking sun penetration to native aquatics
- Decaying mats reduce oxygen levels
- Drastic vertical pH & DO changes

Temperature profiles can be altered

Dense growth reduces water movement

Competitively release allelopathic chemicals to inhibit algae

Creates microhabitats for juvenile fish but obstructs space for larger fish
ultimately disrupting normal feeding patterns.

At high densities, supports fewer aquatic insects which serve as a food resource for fish.

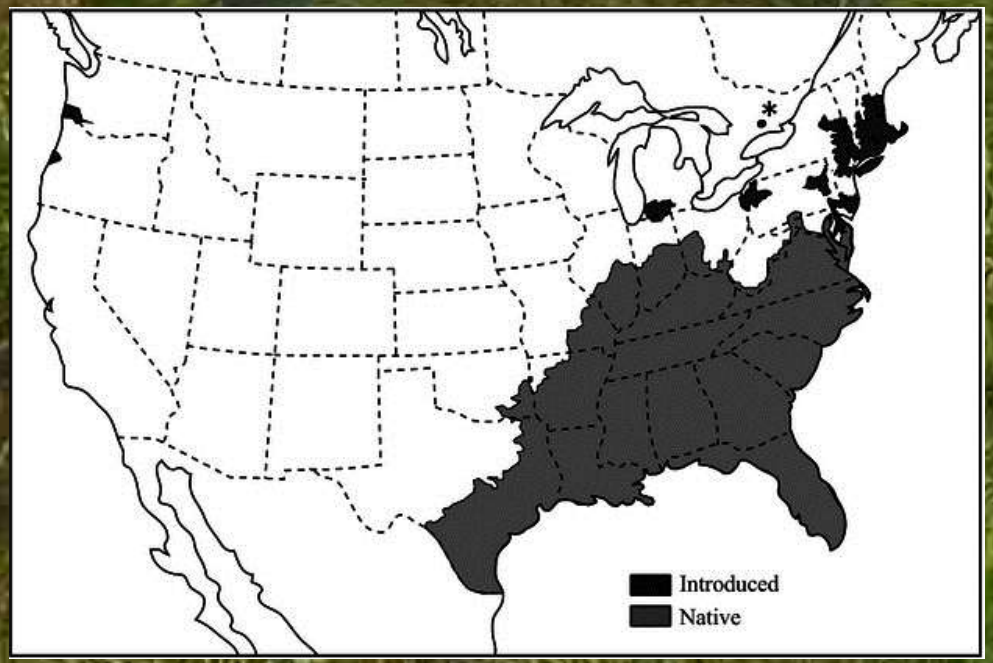
M. spicatum

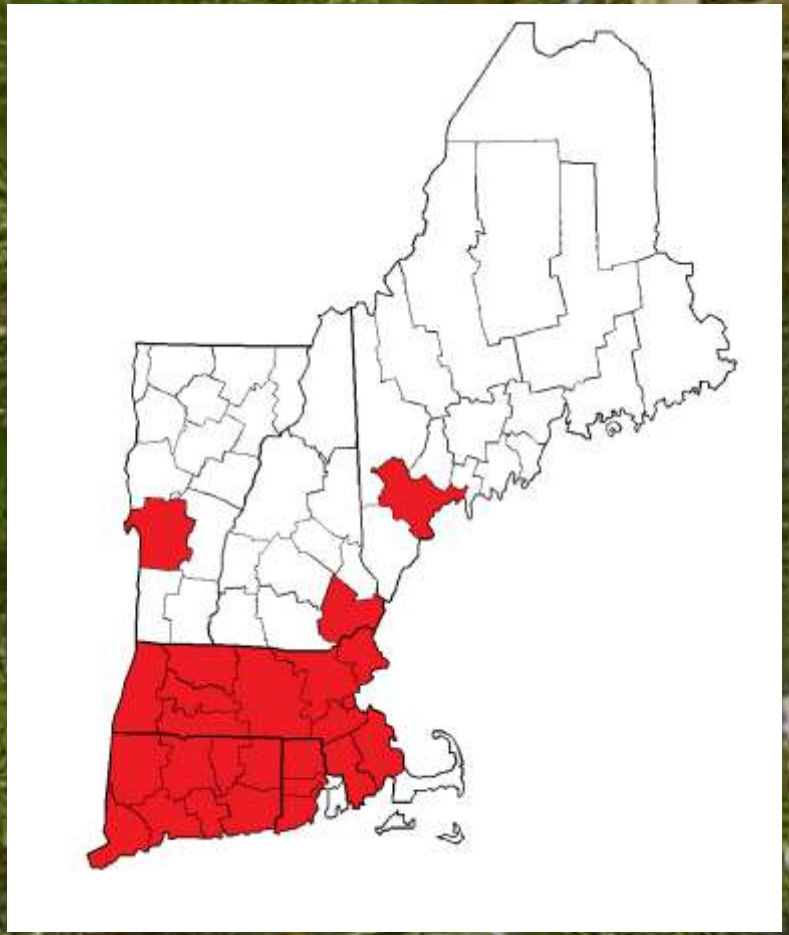
Cabomba caroliniana (Fanwort)

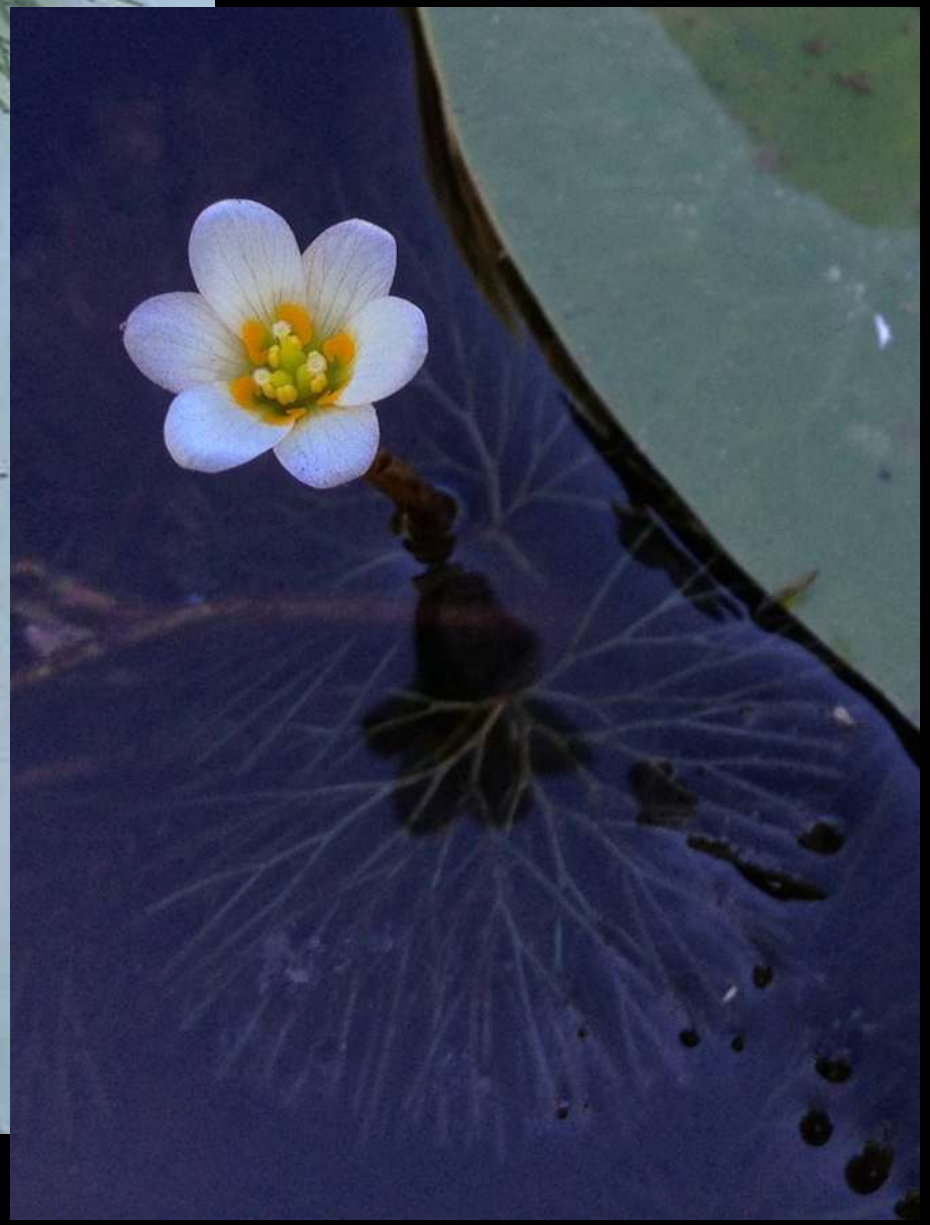
Native to the southeastern US & parts of South America.

Most likely introduced in the northern part of US as an aquarium plant.

First northeastern report from Hatfield, MA in 1930.
Reported from RI in 1936, and collected in CT since 1937.







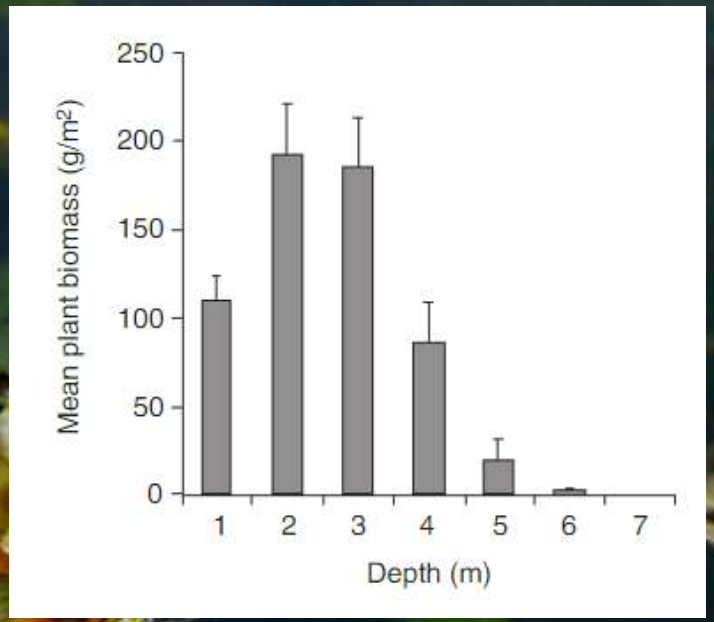
Environmental factors with greatest effect on abundance include:

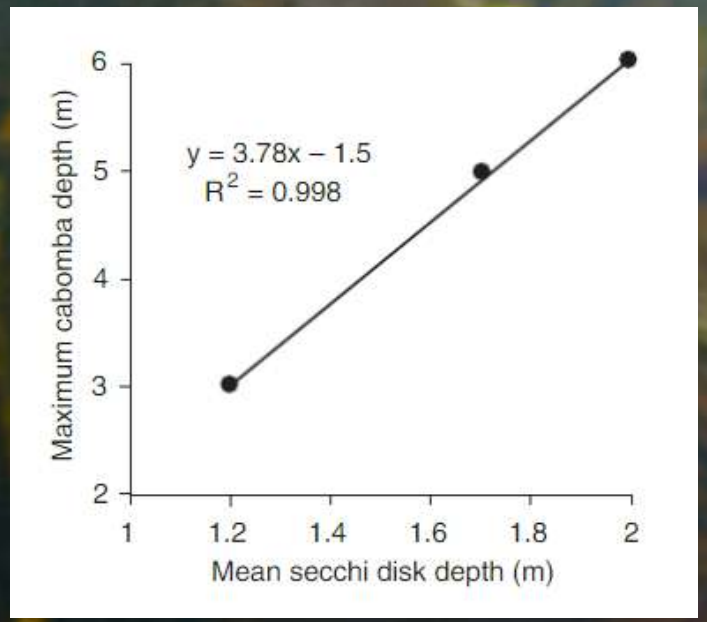
substrate type, water movement, turbidity, dissolved CO_2, and pH.

***Cabomba* prefers fine and soft sediments.**

In clayey or sandy soils the hair-like roots struggle to anchor plants.

Thin roots also limit *Cabomba* to areas with slow-moving water such as lakes & ponds



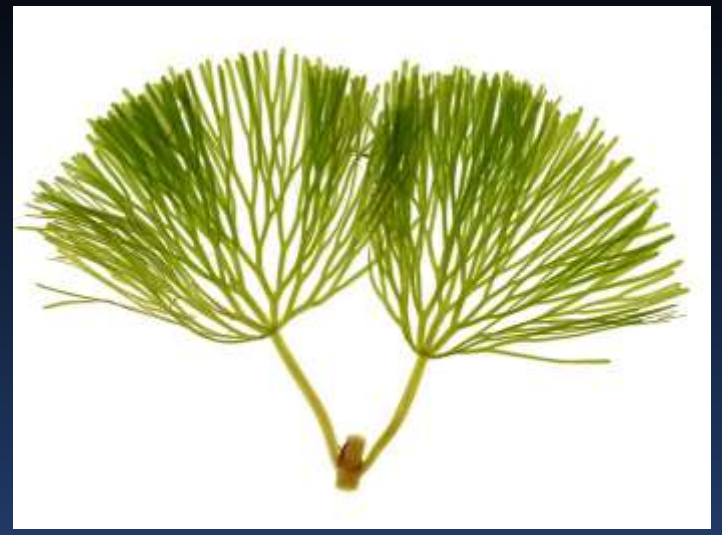


Wide tolerance of nutrient levels & pH

(prefers acidic waters, pH 4-6)

Once a plant is established, population spreads in 3 ways:
viable seeds, **broken fragments**, or **attached stems.**

Seeds sink to the sediment after maturing
& remain viable for at least 2 years
(drying stimulates germination)



Plants lose buoyancy & turn brittle in the autumn and winter.
-- increases **fragmentation**
-- fragments settle on sediment & grow the following spring.

Attached stem tips that lose buoyancy (autumn) can settle to substrate and these nodes will root & produce new plants

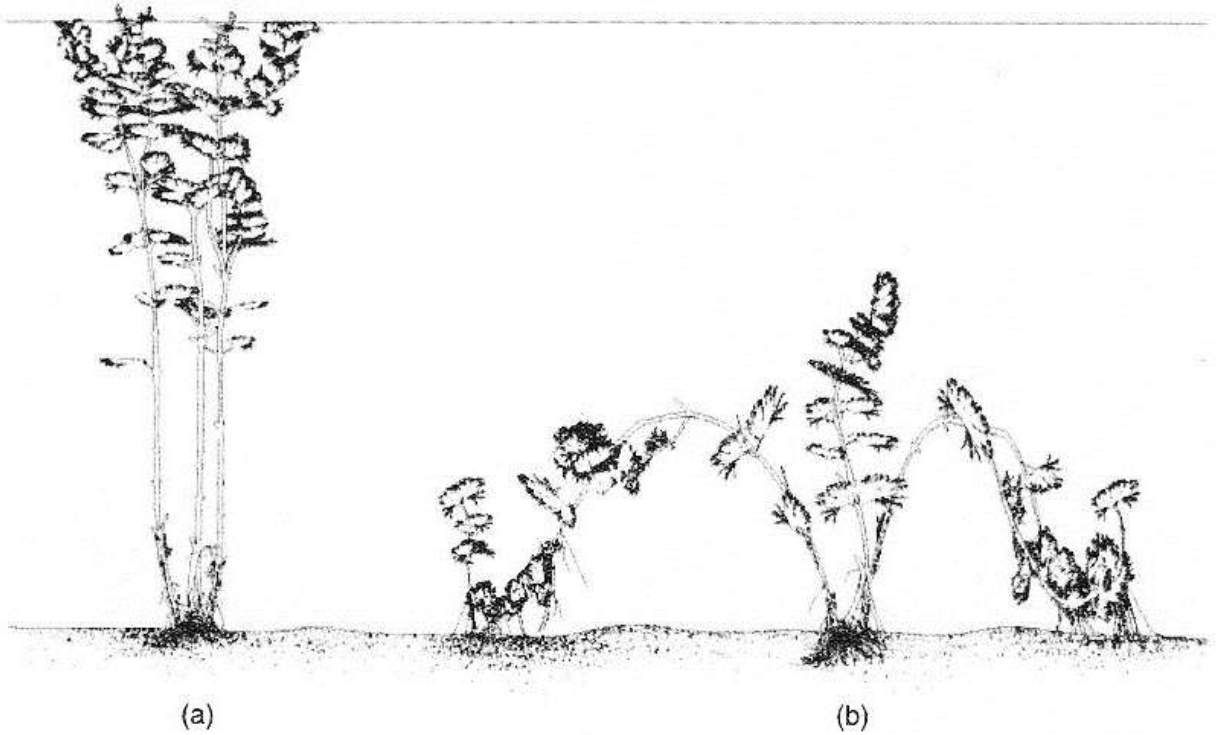


Fig. 6.4 Illustration of the clonal spread of cabomba by attached stems. (a) In the summer the buoyant stems keep the tips in a vertical position. (b) Stem tips lose buoyancy during the winter and drop to the sediment. In the spring, nodes near the tip then form roots and a new growing tip. Eventually the connecting stem disintegrates, separating the mother from the daughter plants.

Fanwort Issues

Rapid growth can form extremely dense stands

Infestations trap detritus, increase sedimentation, and impede flow

Significantly reduce light penetration

Large infestations can affect DO concentrations, pH, and organic content of water & soil

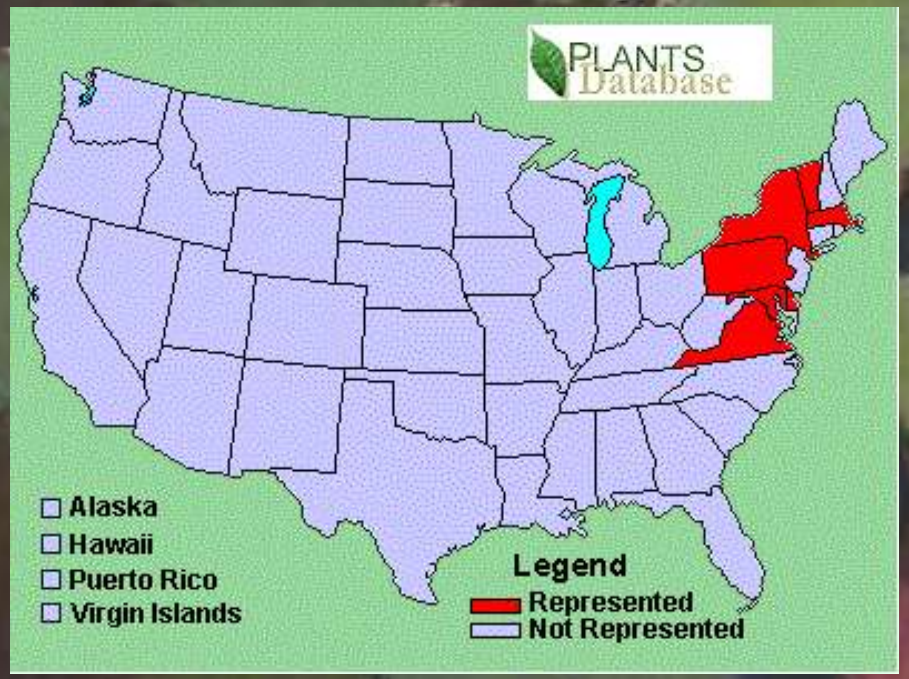
Trapa natans (water chestnut)

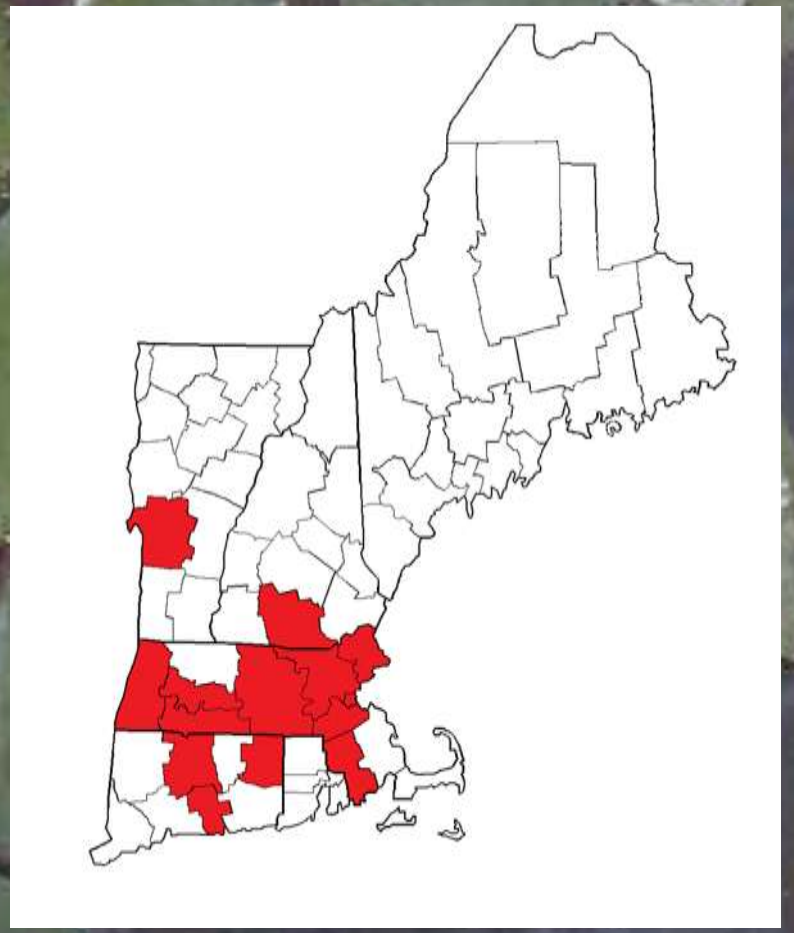
Before 1879, planted in Fresh Pond, Cambridge, MA. & pond near the Sudbury River.

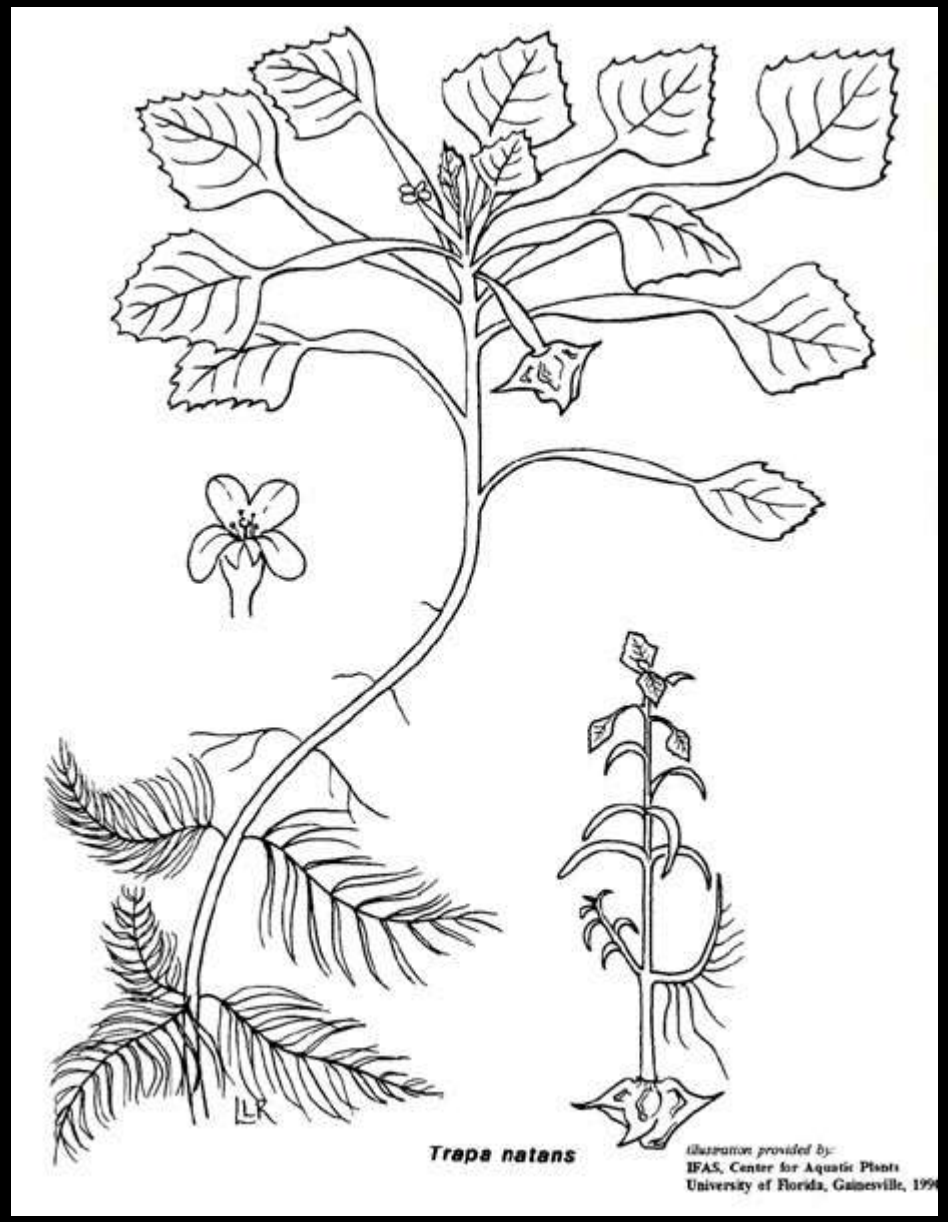
By 1899, it was extremely invasive there

By 1920, had reached western Massachusetts.

Since then, it has spread to Lake Champlain in VT,
Nashua River in NH (1998) and then Connecticut River






Trapa natans
illustration provided by:
IFAS, Center for Aquatic Plants
University of Florida, Gainesville, 199


Water Chestnut (*Trapa natans*)
Nutlets
Twan Leen

Fruits sink (6 g) to bottom of lakes & can remain viable for up to 12 years.

Each seed can give rise to 10-15 rosettes

Each rosette may produce as many as 20 seeds.

May also disperse by **fragmentation**.

Plant fragments carried by water, waterfowl and boats to new locations