A Key to Common Vermont Aquatic Plant Species

Lakes and Ponds Unit
Water Quality Division
Vermont Department of Environmental Conservation

Key to Common Vermont Aquatic Plant Species

The following species are covered in this key:

Scientific Name	Common Name
Submersed Plants	
Bidens beckii	Water Marigold
Ceratophyllum demersum	Coontail
Chara sp. and *Nitella* sp.	Muskgrass
Elodea canadensis	Waterweed
Eriocaulon aquaticum	Pipewort
Myriophyllum heterophyllum ☼	Variable-leaf Watermilfoil
Myriophyllum sibiricum	Northern Watermilfoil
Myriophyllum spicatum ☼	Eurasian Watermilfoil
Najas flexilis	Common Naiad
Potamogeton amplifolius	Big-leaf Pondweed
Potamogeton crispus ☼	Curly Pondweed
Potamogeton epihydrus	Ribbonleaf Pondweed
Potamogeton gramineus	Variable Pondweed
Potamogeton natans	Floating-leaved Pondweed
Potamogeton zosteriformis	Flatstem Pondweed
Ranunculus sp.	Water Buttercup
Utricularia macrorhiza	Common Bladderwort
Vallisneria americana	Wild Celery
Zosterella dubia	Water Stargrass
Floating-leaved Plants	
Brasenia schreberi	Watershield
Hydrocharis morsus-ranae ☼	European Frogbit
Lemna minor and *Spirodela polyrhiza*	Duckweeds
Nuphar variegata	Cow Lily
Nymphaea odorata	White Water Lily
Nymphoides peltata ☼	Yellow Floating Heart
Polygonum amphibium	Water Smartweed
Sparganium sp.	Bur-reed
Trapa natans ☼	Water Chestnut
Emergent Plants	
Butomus umbellatus ☼	Flowering Rush
Cyperaceae Family	Sedge
Equisetum sp.	Horsetail
Lythrum salicaria ☼	Purple Loosestrife
Phragmites australis	Reed Grass
Pontederia cordata	Pickerel Weed
Sagittaria sp.	Arrowhead
Typha sp.	Cattail

Introduction

In this key you are asked to make a series of choices between descriptions of different plants. Eventually, by observing the plant you are trying to identify and making these choices, you will arrive at an identification of the plant.

First, go to page 3, where you are asked to decide whether the plant has a submersed, floating-leaved, or emergent growth habit. The key then directs you to a page and number, where you will again make a series of choices. In many cases you will need to look closely at the plant in order to be able to decide which description it fits. There is a glossary on page 22 should you need help with terminology.

Thirty-eight of Vermont's common aquatic plants are covered in this key. However, there are over 120 aquatic plant species in Vermont, so it is possible you are trying to identify a plant not covered by this key. Some of the plants covered in this key are considered aquatic invasive species and are labeled so with a "☼". These species threaten the natural biodiversity and water quality of Vermont's water systems. If you believe you have identified an aquatic invasive species, notify the Vermont Department of Environmental Conservation immediately. If you have questions or would like the identity of a plant confirmed, you are encouraged to send a plant sample to the Lakes and Ponds Section. Wrap the plant in damp paper towels, seal it in a plastic bag, and label it with the location where it was collected. Mail it along with your telephone number, e-mail address, and home address to:

Lakes and Ponds Section
Watershed Management Division
Department of Environmental Conservation
1 National Life Drive, Main 2
Montpelier, VT 05620

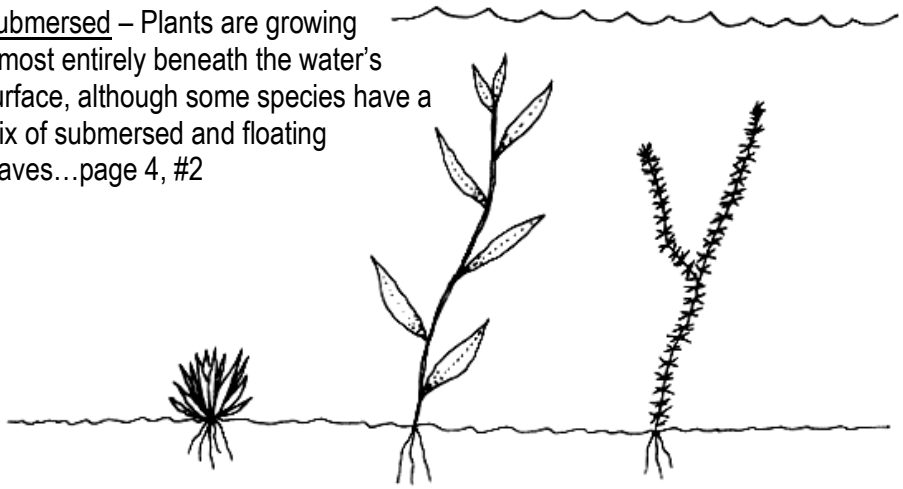
There are aquatic invasive species that are not currently in Vermont, but are of great concern if they do enter any of Vermont's water bodies. These species of concern are:

Scientific Name	Common Name
Cabomba caroliniana	Fanwort
Egeria densa	Anacharis
Hydrilla verticillata	Hydrilla
Myriophyllum aquaticum	Parrot Feather

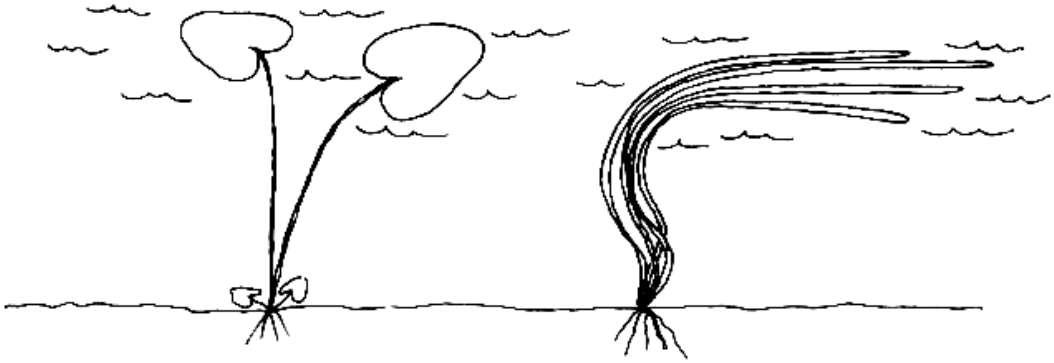
These invasive species are described on page 21. If you suspect you have discovered any of these plants, contact the Lakes and Ponds Section *as soon as possible* at 802-828-1535.

Choose between 1A, 1B, or 1C below:

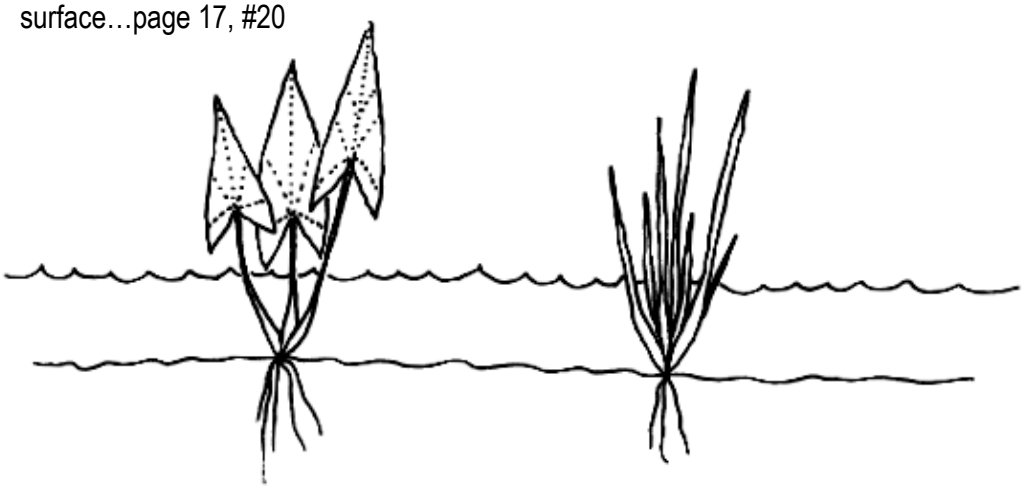
1A. Submersed – Plants are growing almost entirely beneath the water's surface, although some species have a mix of submersed and floating leaves…page 4, #2



1B. Floating-leaved – Plants having at least some leaves floating on the water's surface (surface of floating leaves shed water)…page 13, #13

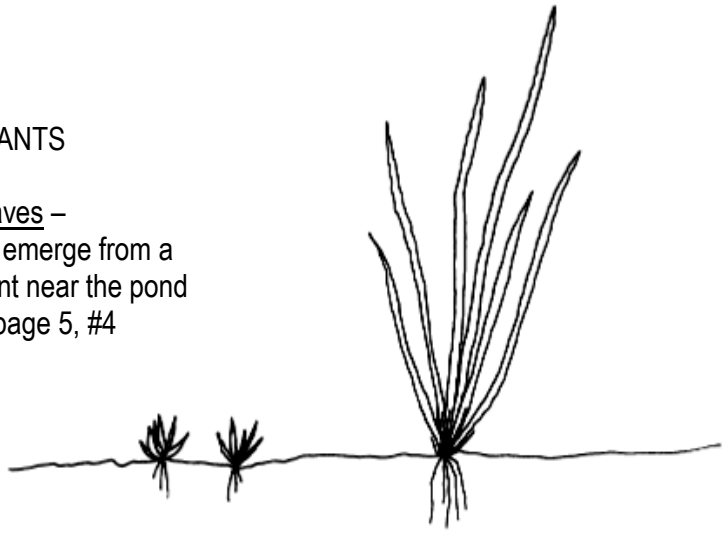


1C. Emergent – Plants are rooted on the pond bottom and extend upright above the water's surface…page 17, #20



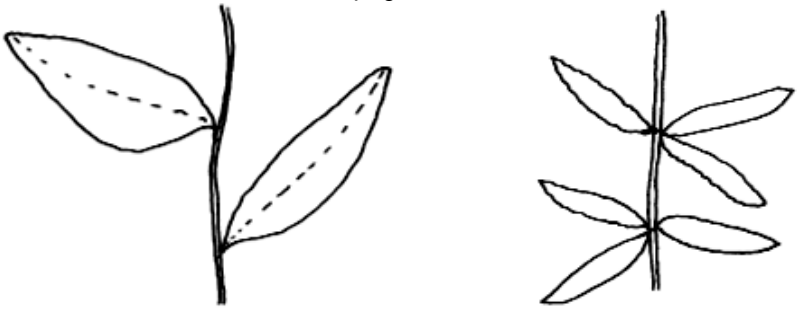
SUBMERSED PLANTS

2A. <u>Basal Leaves</u> –
all leaves emerge from a single point near the pond bottom…page 5, #4

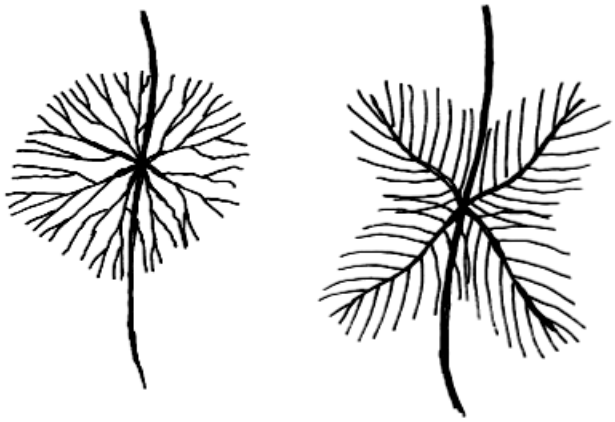


2B. <u>Leaves on the stem</u> –
leaves are positioned along the stem…#3, below

3A. Leaves entire or toothed…page 6, #5



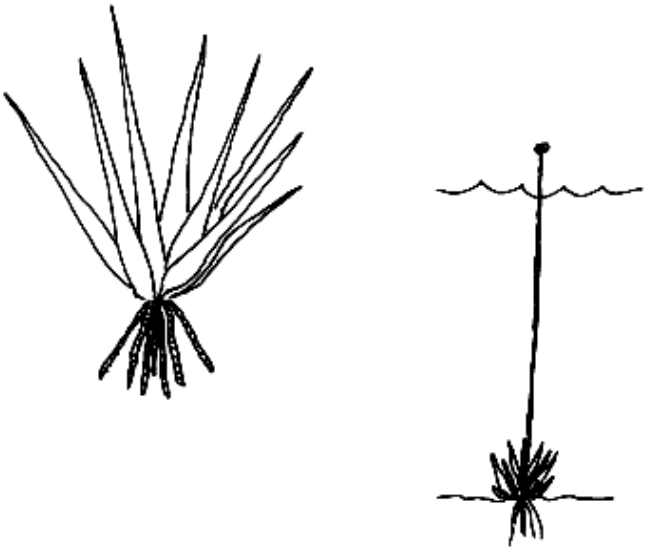
3B. Leaves divided…page 10, #8



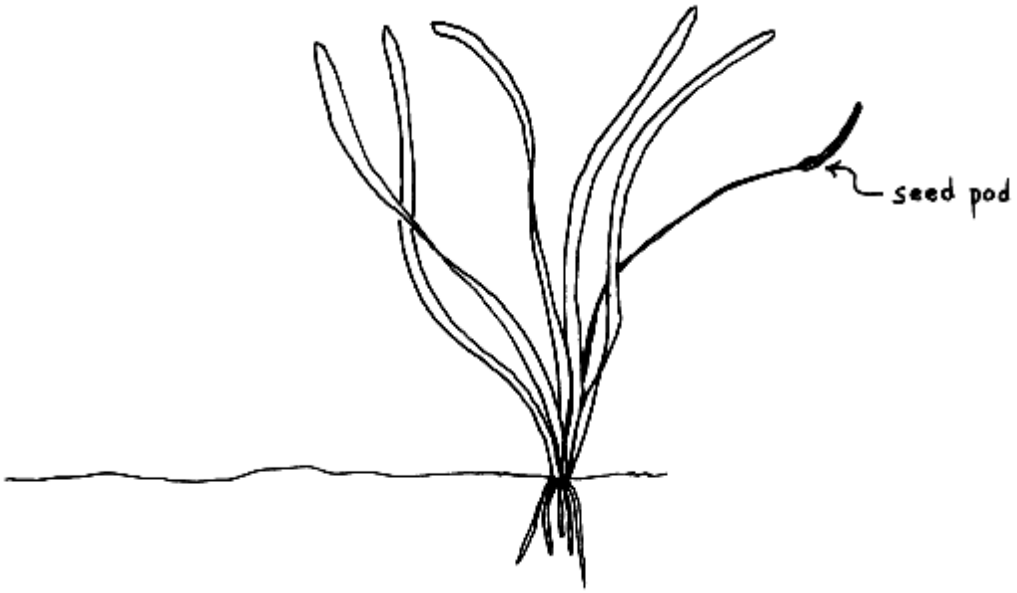
SUBMERSED PLANTS continued…

4. Submersed plants with only basal leaves

4A. **Pipewort** (*Eriocaulon aquaticum*) plants are usually 1½ - 3 inches high. In shallow water, Pipewort will grow an emergent "flower" which resembles a button.



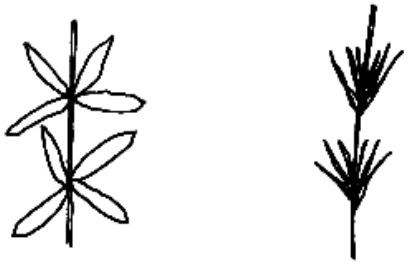
4B. **Wild Celery** (*Vallisneria americana*) leaves are ½ - 1 inch wide and are up to 2 feet long.



SUBMERSED PLANTS continued…

5. Submersed plants with leaves entire or toothed

5A. Leaves in whorls of three or more around the stem…see #6, below



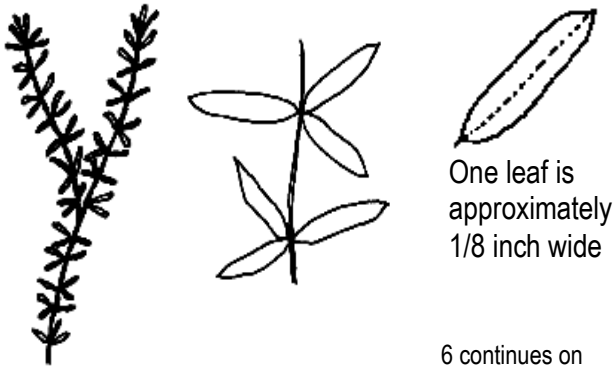
5B. Leaves alternate or opposite along the stem…see page 7, #7

6. Submersed plants with leaves entire or toothed whorled around the stem

6A. **Muskgrass** (*Chara* sp. or *Nitella* sp.) these are actually large upright forms of algae. Muskgrass usually grow in tangled masses along the pond bottom.

6B. **Waterweed** (*Elodea canadensis*) there is one other species of waterweed in Vermont. The leaves are 3-4 (usually 3) in a whorl, usually ½ - 1 inch long. Plants can vary from less than 1 foot high to up to 6 feet high.

Caution! The highly invasive plant "hydrilla" (*Hydrilla verticillata*) looks similar to our native waterweed, but has toothed leaves in whorls of 3-8. See p. 21 for more information.



One leaf is approximately 1/8 inch wide

6 continues on next page

SUBMERSED PLANTS continued…

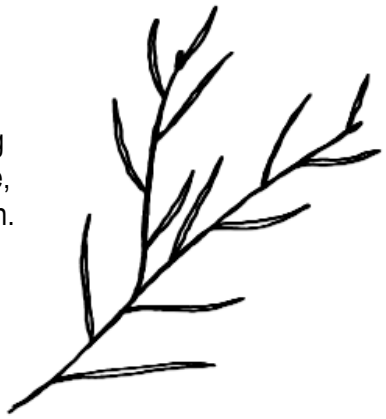
6C. **Common Naiad** (*Najas flexilis*) there are 3 other species of naiad in Vermont. The leaves are about 1 inch long, finely toothed, and tightly branched.

Plants usually grow between 1-2 feet high.

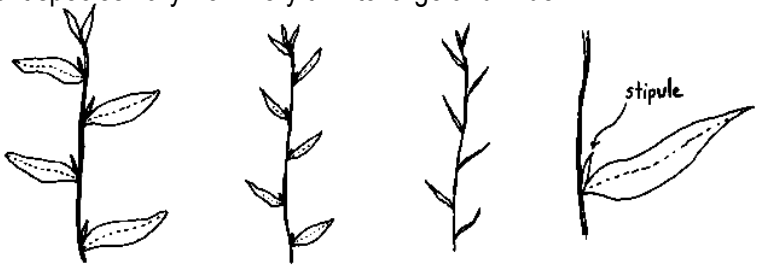
Each leaf is finely toothed

7. Submersed plants with leaves entire or toothed arranged alternate or opposite along the stem

7A. Alternate leaves with no mid-vein.
Water Stargrass (*Zosterella dubia*) leaves are arranged alternately along the stem and are 1/16 - 1/8 inch wide, 3-4 inches long and have no mid-vein. Plants can grow up to 3 feet long.



7B. Alternate leaves with a mid-vein.
Pondweeds (*Potamogeton* sp.)
There are 29 kinds of pondweeds in Vermont. Some species have only submersed leaves while others have both floating and submersed leaves. Submersed leaves of different species vary from very thin to large and wide.



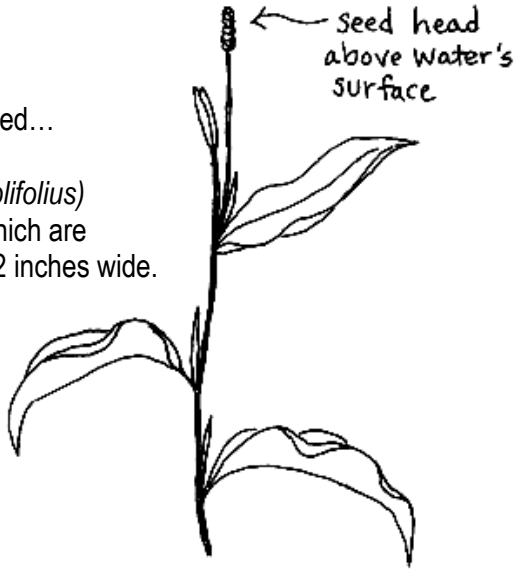
They are distinguished as a group by possessing a leaf midvein (look closely at the thin-leaved kinds). Also, pondweeds have a small fragile "leaf" (stipule) at the base of each regular leaf, although sometimes the stipule is fused to the leaf and difficult to see.

Pondweeds continue to next page

SUBMERSED PLANTS continued…

7B. **Pondweeds** (*Potamogeton* sp.) continued…

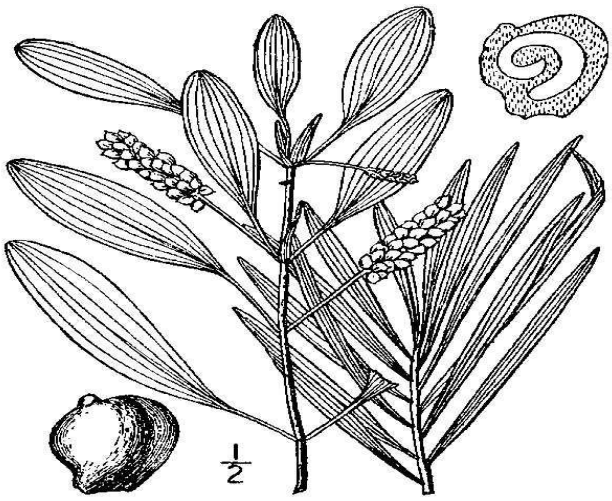
Big-leaf Pondweed (*Potamogeton amplifolius)*
large arched leaves with wavy edges which are often brown; 3-7 inches long and up to 2 inches wide. This plant can grow 6-7 feet high.



Curly Pondweed ☼ (*Potamogeton crispus*)
leaves have a distinct wavy appearance and are 3 inches long and ¾ inch wide. This is the only Pondweed with toothed edges. It can grow 4-5 feet tall.

☼ <u>This is an aquatic invasive species</u>!
If this plant is discovered, send in a sample or notify the Vermont Department of Environmental Conservation immediately for confirmation of identification.

Ribbonleaf Pondweed
(*Potamogeton epihydrus*)
submersed leaves are slender shaped up to 7 inches long; also usually with numerous floating leaves. The stem is slender, branched, and somewhat flattened growing up to 6 feet high.

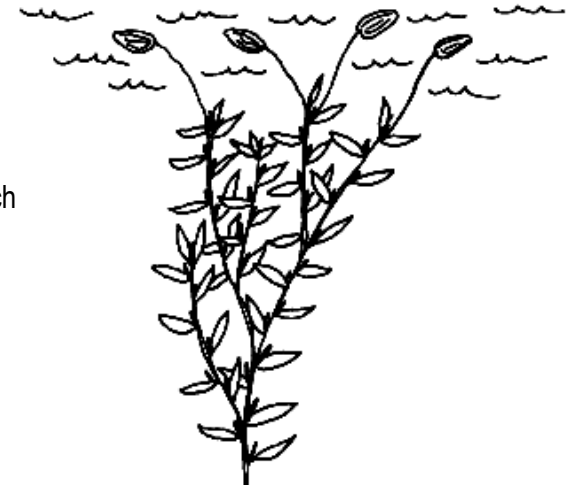


USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 1: 77.

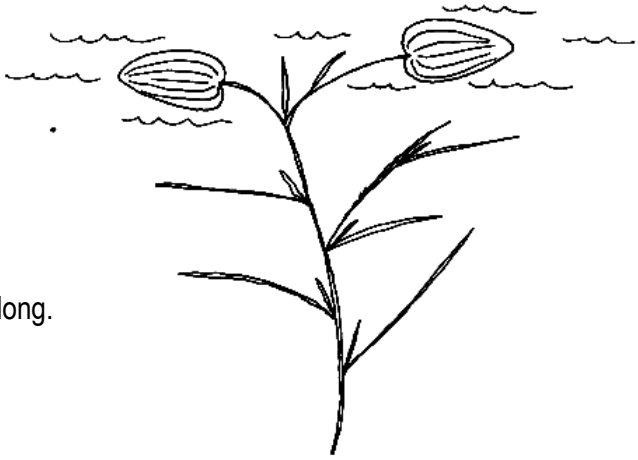
Pondweeds continue to next page

SUBMERSED PLANTS continued…

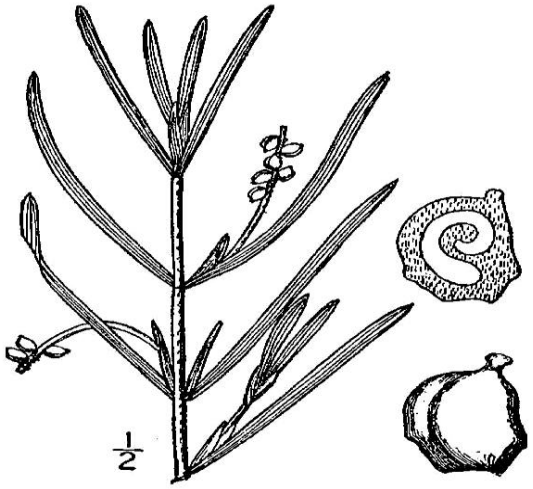
7B. **Pondweeds** (*Potamogeton* sp.) continued…



Variable-leaved Pondweed
(*Potamogeton gramineus*)
heavily branched, many leaves which are ½ - 4 inches long.
There may be small floating leaves.



Floating-leaved Pondweed
(*Potamogeton natans*)
narrow stem-like submersed leaves up to 1/8 inch wide which are usually brown.
Floating leaves are 2-3 inches long.
Commonly found growing in water 2-3 feet deep.



Flatstem Pondweed
(*Potamogeton zosteriformis*)
plant has only slender submersed leaves which are 4-7 inches long. The stem is noticeably flat.

USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 1: 81.

SUBMERSED PLANTS continued…

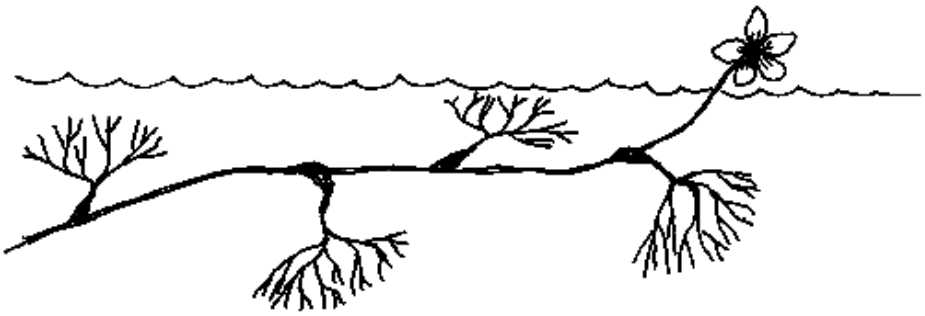
8. Submersed plants with leaves divided

8A. Divided leaves arranged alternate along the stem…see #9, below

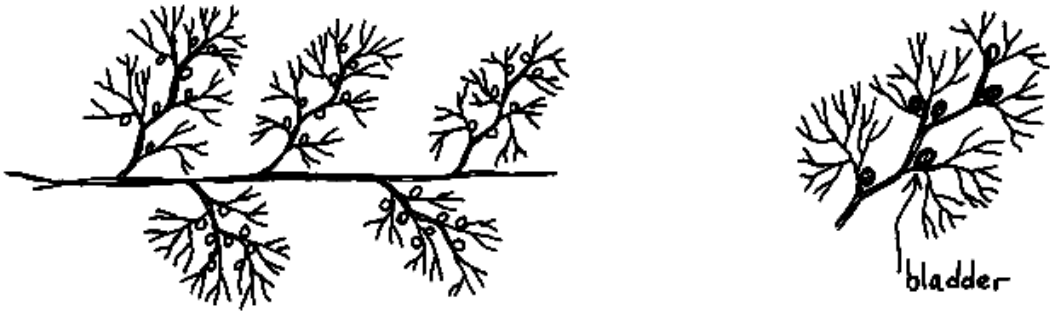
8B. Divided leaves arranged whorled along the stem…see page 11, #10

9. Divided leaves arranged alternate along the stem

9A. **Water Buttercup** (*Ranunculus* sp.) there are 3 species of aquatic buttercups in Vermont. This plant is usually a few feet long, sometimes trailing just below the water surface. Leaves are branched divided and alternate along the stem. No bladders (as in #9B below) are present. A small yellow or white flower is produced above the water's surface.



9B. **Common Bladderwort** (*Utricularia macrorhiza*) there are 7 other species of bladderworts in Vermont. Leaves are branched divided and alternate along the stem. Leaves have numerous small "bladders" attached along them. This plant is not rooted, but instead lies along the pond bottom.



SUBMERSED PLANTS continued…

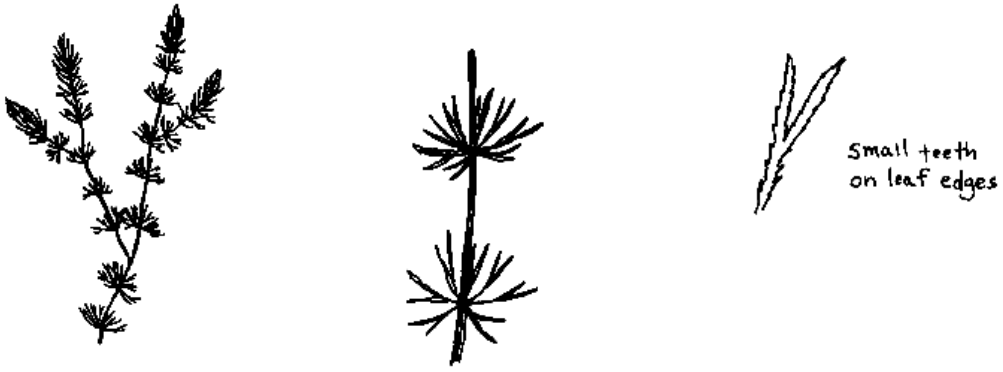
10. Submersed plants with divided leaves arranged in whorled along the stem

10A. Leaves branched or forked divided in whorls along the stem… see #11, below

10B. Leaves feather divided in whorls along the stem (watermilfoil)… see page 12, #12

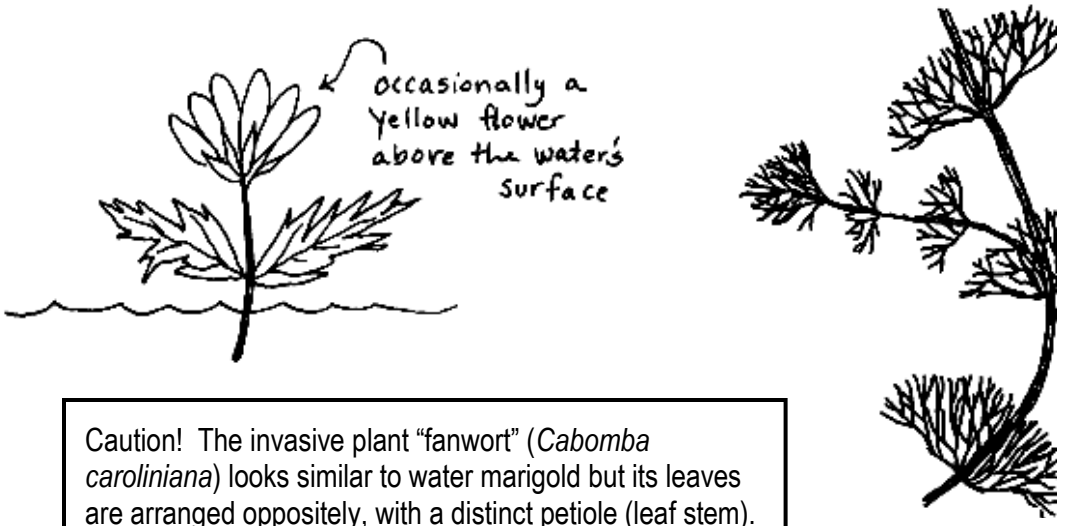
11. Leaves branched or forked divided in whorls along the stem

11A. **Coontail** (*Ceratophyllum demersum*) there is 1 other species of Coontail in Vermont. Leaves are forked divided in a whorl around the stem.



Leaf whorls are clustered at the ends of the branches, giving the plant the appearance of a raccoon's tail.

11B. **Water Marigold** (*Bidens beckii*) branched divided leaves in whorls around the stem. Each leaf divides repeatedly.



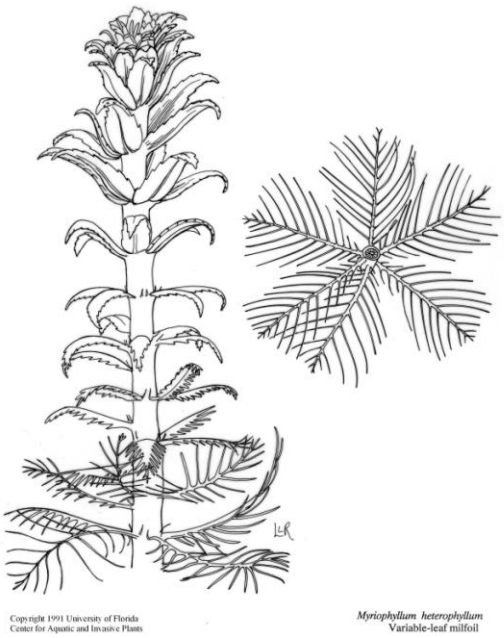
Caution! The invasive plant "fanwort" (*Cabomba caroliniana*) looks similar to water marigold but its leaves are arranged oppositely, with a distinct petiole (leaf stem). See p. 21 for more information.

SUBMERSED PLANTS continued…

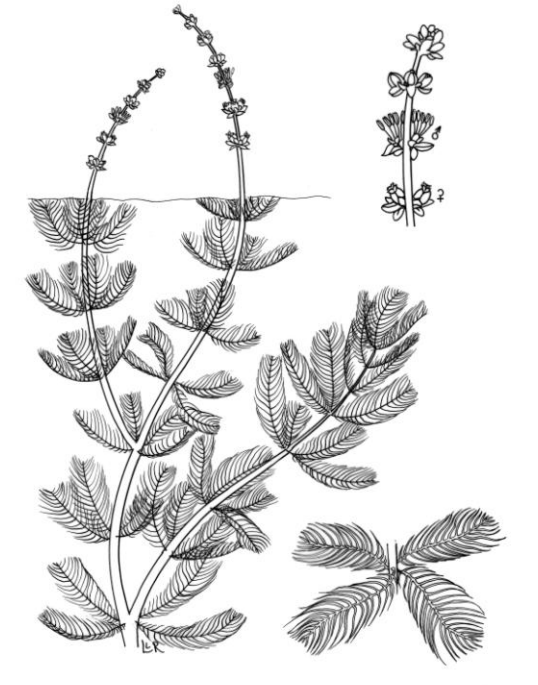
12. **Watermilfoil** (*Myriophyllum* sp.) there are 8 species of watermilfoil in Vermont. Each leaf has a mid-stem with leaflets arranged along it, similar to a feather. Number of leaves per whorl and number of leaflets per leaf vary depending on the species.

12A. **Variable-leaved Watermilfoil** ☼ (*Myriophyllum heterophyllum*) 4-6 leaves per whorl with each leaf feather divided with 6-14 leaflets on each side of the mid-stem. Plant has an emergent flower spike that has 4-6 leaves per whorl. Each of these leaves is ½ inch long, entire, and minutely serrated.

☼ <u>This is an aquatic invasive species</u>! If this plant is discovered, send in a sample or notify the Vermont Department of Environmental Conservation immediately for confirmation of identification.



12B. **Northern Watermilfoil** (*Myriophyllum sibiricum*) typically 4 leaves per whorl with 5-12 leaflets on each side of the mid-stem.



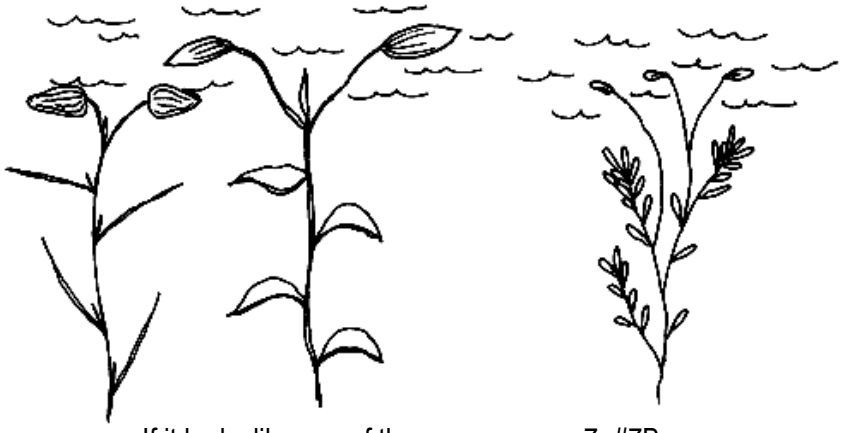
12C. **Eurasian Watermilfoil** ☼ (*Myriophyllum spicatum*) typically 4 leaves per whorl with 12-20 leaflets on each side of the mid-stem.

☼ <u>This is an aquatic invasive species</u>! If this plant is discovered, send in a sample or notify the Vermont Department of Environmental Conservation immediately for confirmation of identification.

FLOATING-LEAVED PLANTS

13. Plants with floating leaves. Choose between 13A, B, or C below:

13A. Plants with both floating leaves and submersed leaves on a stem



If it looks like any of these…see page 7, #7B

13B. Very small floating plants not rooted to the pond bottom.
Each plant has a small root or roots hanging from underneath.

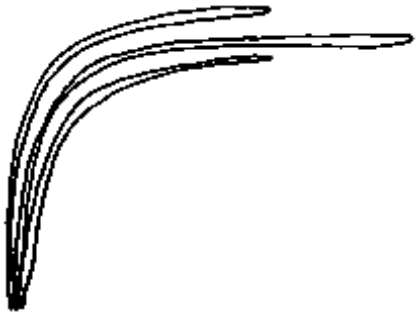
Duckweed (*Lemna minor*)
(actual size)

Big Duckweed (*Spirodela polyrhiza*)
(actual size)

13C. Plants with only floating leaves on stems which are generally rooted in the pond bottom

Broad floating leaves
…see page 14, #14

Long, narrow, grass-like
leaves…see page 17, #19



FLOATING-LEAVED PLANTS continued…

14. Plants with broad floating leaves

    14A. Leaves rounded…see below, #15

    14B. Leaves come to a point…see below, #16

15. Plants with rounded floating leaves

    15A. Leaves radiate from a central point in the sediment…see page 15, #17

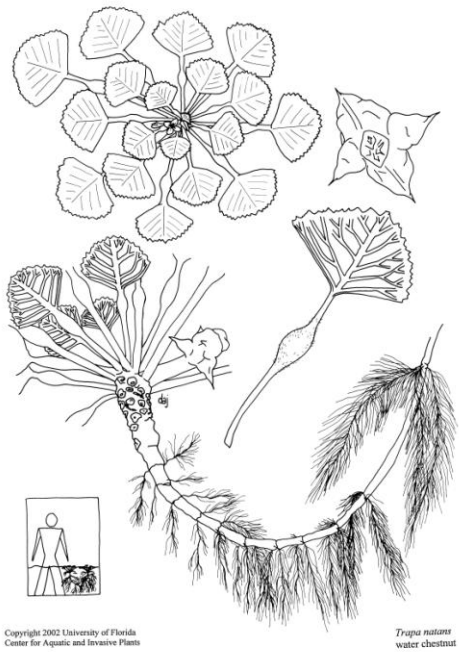
    15B. Leaves radiate from points along the stem…see page 15, #18

16. Plants with floating leaves that comes to a point

    16A. **Water Smartweed** (*Polygonum amphibium*) Leaves are entire and are alternately arranged along the stem. The stem is tipped with a cluster of small pink flowers. This is the only aquatic smartweed in Vermont.

    16B. **Water Chestnut** ☼ (*Trapa natans*) Leaves are toothed and triangular in shape. The leaves radiate off of the stem to form a circular rosette around a middle point.

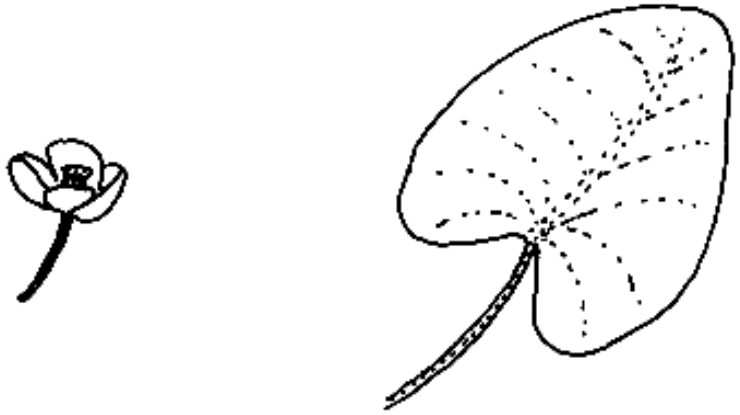
    ☼ <u>This is an aquatic invasive species</u>! If this plant is discovered, send in a sample or notify the Vermont Department of Environmental Conservation immediately for confirmation of identification.



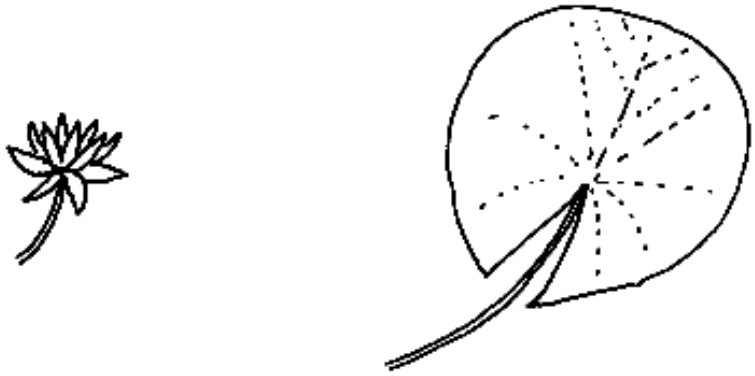
FLOATING-LEAVED PLANTS continued…

17. Plants with floating rounded leaves radiating from a central point in the sediment

17A. **Cow Lily** (*Nuphar variegata*) Large round floating leaves with round lobes and yellow flowers. There are 2 other species of cow lily in Vermont.



17B. **White Water Lily** (*Nymphaea odorata*) Large round floating leaves with pointed lobes and white flowers. There are 2 other species of white water lily in Vermont.



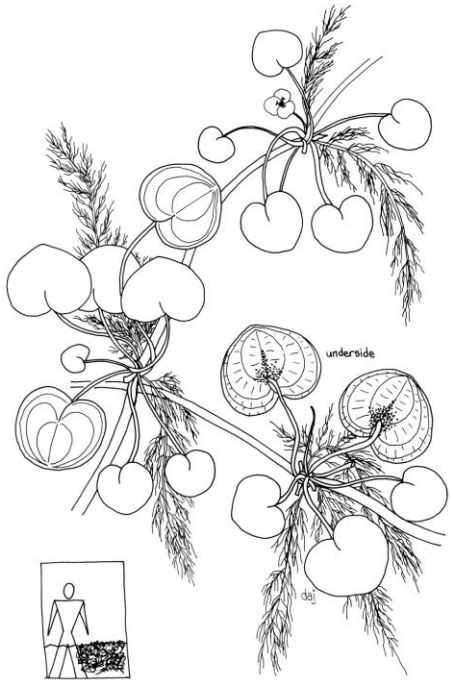
18. Plants with floating rounded leaves radiating from points along the stem

18A. **Watershield** (*Brasenia schreberi*) Elliptical shaped leaves with the stem attached to the middle of the leaf. Leaves are usually 2-3 inches long. The stem and underside of the leaf is often covered with a clear jelly-like material.

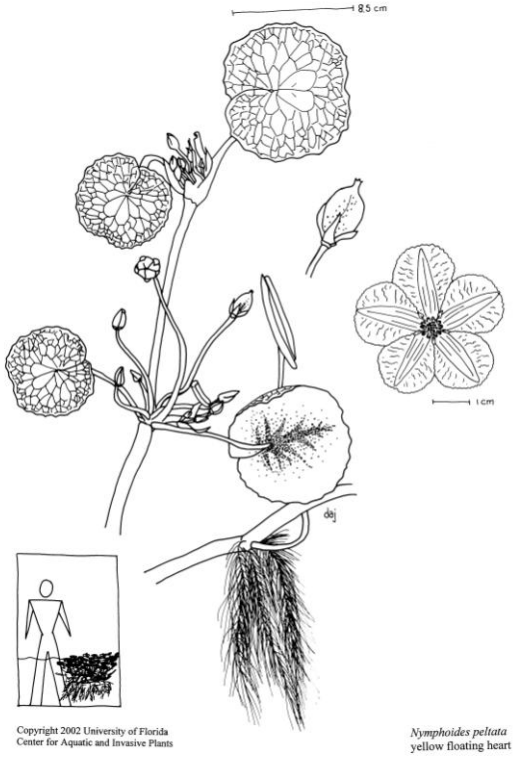
18 continues
on next page

18B. **European Frogbit** ☼ (*Hydrocharis morsus-ranae*) Plant not rooted to the pond bottom (free floating). Leaves are ½ - 2 ½ inches wide. Plant produces small white flowers.

☼ <u>This is an aquatic invasive species</u>! If this plant is discovered, send in a sample or notify the Vermont Department of Environmental Conservation immediately for confirmation of identification.



Hydrocharis morsus-ranae
European frog-bit



Nymphoides peltata
yellow floating heart

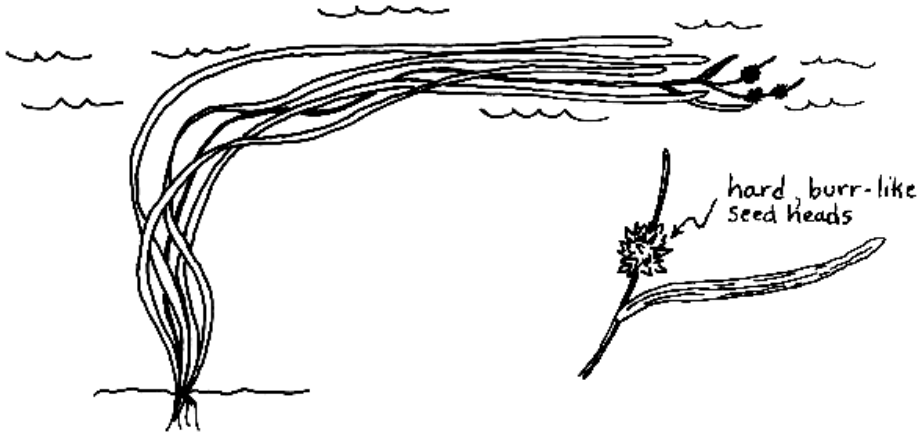
18C. **Yellow Floating Heart** ☼ (*Nymphoides peltata*) leaves are 2-6 inches wide and long. The leaf margin is entire, but has a wavy appearance. Plant produces yellow flowers.

☼ <u>This is an aquatic invasive species</u>! If this plant is discovered, send in a sample or notify the Vermont Department of Environmental Conservation immediately for confirmation of identification.

FLOATING-LEAVED PLANTS continued…

19. Plants with long, narrow, grass like floating leaves

Bur-reed (*Sparganium* sp.) There are 3 species of bur-reed with floating leaves in Vermont. Leaves reach the surface and float horizontally along it.



EMERGENT PLANTS

20. Plants which are rooted on the pond bottom with leaves that extend upright above the water's surface.

20A. Leaves broad…see page 18, #21

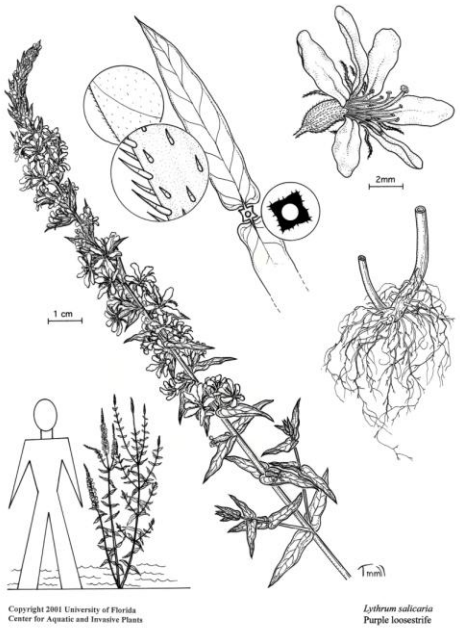
20B. Leaves long and narrow, may be round or triangular in cross-section …see page 19, #22

EMERGENT PLANTS continued…

21. Emergent plants with broad leaves. These plants are all found in shallow water or wet fields.

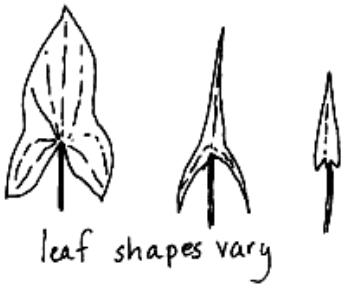
21A. **Purple Loosestrife** ☼
(*Lythrum salicaria*)
leaves are opposite along the stem with a dense spike of purple flowers at the top.

☼ This is an aquatic invasive species! If this plant is discovered, send in a sample or notify the Vermont Department of Environmental Conservation immediately for confirmation of identification.



21B. **Pickerel weed** (*Pontederia cordata*) leaves with pointed lobes. Small purple flowers in a cluster. Plants are usually 1-2 feet tall.

21C. **Arrowhead** (*Sagittaria* sp.) there are 4 species of arrowhead in Vermont.

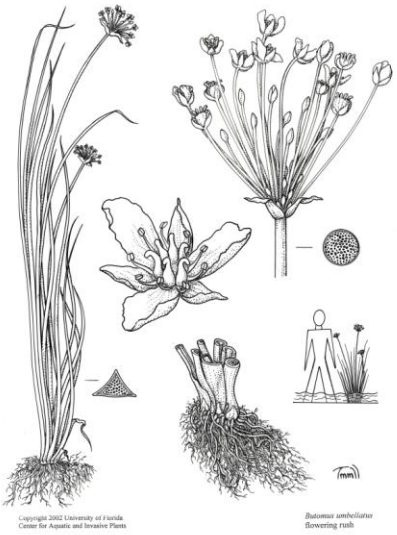


EMERGENT PLANTS continued…

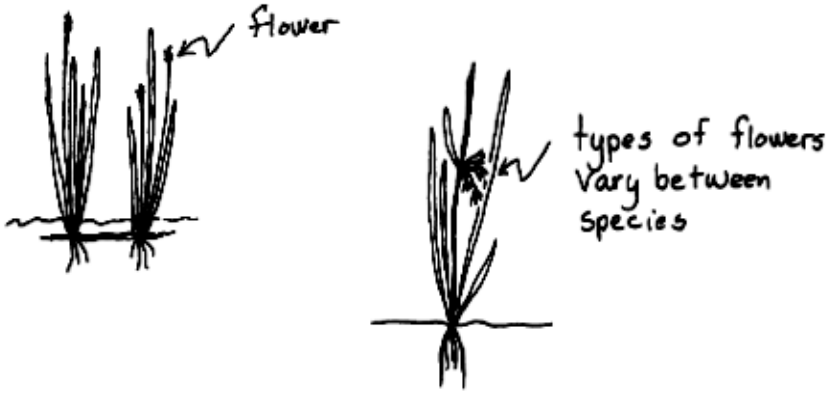
22. Emergent plants with long narrow leaves or may be round or triangular in cross-section. These plants are all found in shallow water or wet fields.

22A. **Flowering Rush** ☼ (*Butomus umbellatus*) leaves are sword-shaped and triangular in cross-section. There are numerous rose-colored flowers in an umbel. Commonly found along muddy shores growing 1-4 feet high.

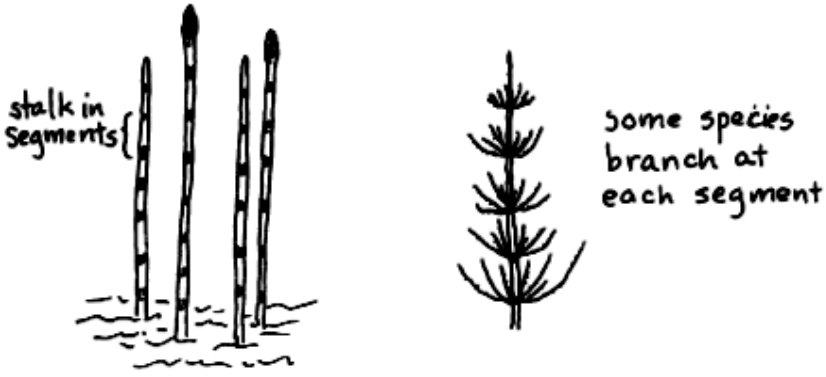
☼ <u>This is an aquatic invasive species</u>! If this plant is discovered, send in a sample or notify the Vermont Department of Environmental Conservation immediately for confirmation of identification.



22B. **Sedge** (Cyperaceae Family) there are many species of sedges in Vermont. Different species stems can vary between sharply 3 sided to nearly round. They can vary in height between a few inches to several feet high.



22C. **Horsetail** (*Equisetum* sp.) there are 3 species of aquatic horsetail in Vermont. Plant consists of round, hollow stalks often 1-2 feet high; rough in texture.



22 continues on next page

EMERGENT PLANTS continued…

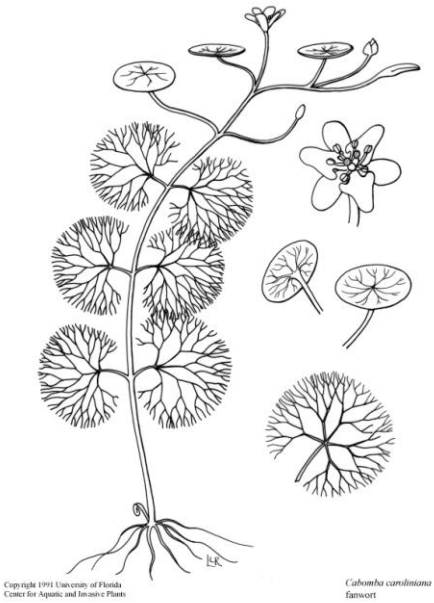
22D. **Reed Grass** ☼ (*Phragmites australis*) over 6 feet tall with a large plume at the top. Usually grows in dense stands in water or damp soil.

☼ <u>This is an aquatic invasive species</u>! If this plant is discovered, send in a sample or notify the Vermont Department of Environmental Conservation immediately for confirmation of identification.

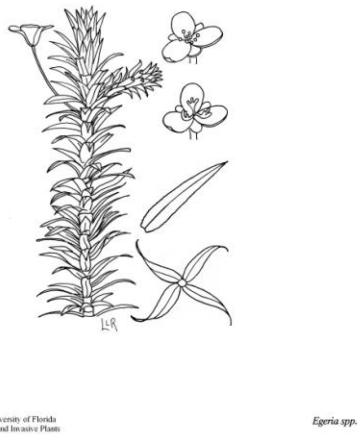
22E. **Cattail** (*Typha* sp.) there are two species of cattail in Vermont. Leaves are up to 5 feet tall. Dark brown "catkins" are 5-6 inches long.

AQUATIC INVASIVE SPECIES OF CONCERN BUT NOT IN VERMONT…YET

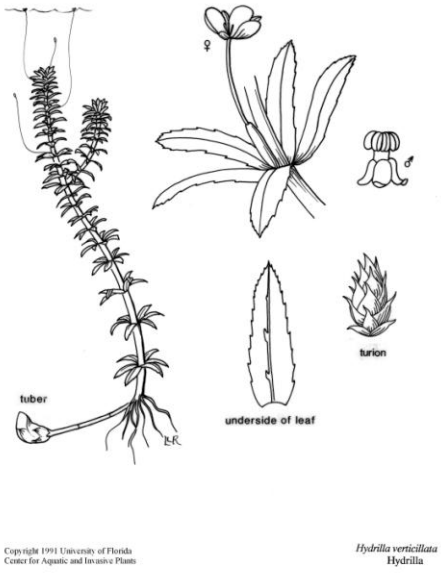
Fanwort ☼ (*Cabomba caroliniana*) submersed leaves branched divided with leaf stalks arranged opposite along the stem. There may be a few small floating leaves which are linear-elliptic in shape. Plant has white flowers.



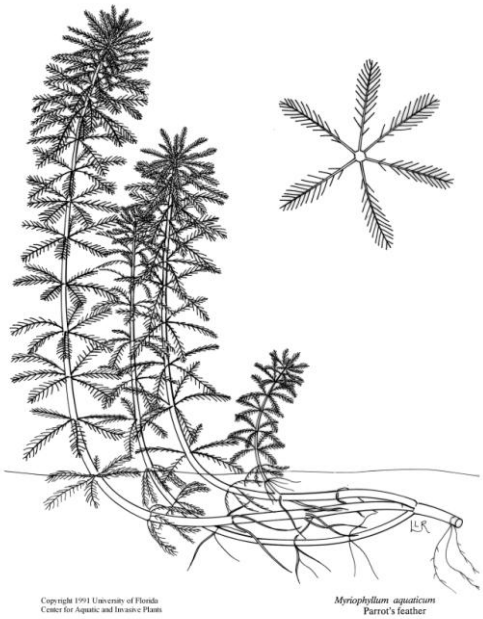
Brazilian Elodea ☼ (*Egeria densa*) 4-6 leaves per whorl with each leaf shaped broadly linear ½ -1½ inches long with minute serrations.



Hydrilla ☼ (*Hydrilla verticillata*) 3-8 leaves per whorl with each leaf up to 1 inch long with serrations. Hydrilla also has small white tubers that are visible if the plant is uprooted.



Parrot Feather ☼ (*Myriophyllum aquaticum*) 4-6 leaves per whorl with each leaf feather divided with 10-18 leaflets per side of the med-stem. Plant can emerge to stand 1 foot above the surface of the water.



GLOSSARY

Alternate – leaves situated singly from a point along the stem

Axil – the junction between a stem and a leaf or branch

Divided leaf – a leaf which is cut into small divisions
- **Branched divided** – a leaf that divides repeatedly
- **Feather divided** – a leaf with leaflets lining a mid-stem which resembles a feather
- **Forked divided** – a leaf that divides 2 to 3 times into divisions of more or less equal size

Entire – leaves with a continuous unbroken margin

Lobe – a partial division of a leaf

Marl – an encrustation of lime on the surface of a plant, resulting in a plant which is rough to the touch

Midvein – the main or central vein of a leaf; not all plants have leaves with midveins

Opposite – leaves situated across from each other from the same point along the stem

Petiole – small stalk attaching a leaf blade to the stem

Stipule – a small leaf-like structure borne in the axil of leaves in some species

Toothed – serrations along the leaf margin

Whorl – a circle of three or more leaves arising from the same point on a stem

Additional References

Plant keys:

Fassett, Norman C. A Manual of Aquatic Plants. University of Wisconsin Press. Madison, 1957.

A key to aquatic plants. A good reference for getting beyond the beginner level. It is somewhat out of date and is no longer highly accurate down to the species level, but excellent for identifying family and genus.

Hellquist, C.B., and G.E. Crow. Aquatic Vascular Plants of New England – Parts 1-8. New Hampshire Agricultural Experiment Station. University of New Hampshire, 1980-1985.

Technical key to New England's aquatic plants. To use these keys, you must already know the family to which the plant belongs.

Hotchkiss, Neil. Common Marsh, Underwater and Floating-leaved Plants of the United States and Canada. Dover Publications, Inc. New York, 1972.

Not a plant key:

Magee, Denis W. Freshwater Wetlands – A Guide to Common Indicator Plants of the Northeast. University of Massachusetts Press. Amherst, 1981.

Covers marsh and swamp plants primarily, with some pond plants also. Contains a key and many pages of good illustrations.

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