A Key to Common Vermont Aquatic Plant Species

Lakes and Ponds Management and Protection Program

VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATERSHED MANAGEMENT DIVISION
LAKES & PONDS PROGRAM

Key to Common Vermont Aquatic Plant Species

INTRODUCTION

In this key, you are asked to make a series of choices between descriptions of different plants. By observing specific characteristics of 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 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.

In this key, 29 of Vermont's common native aquatic plants and 11 aquatic invasive plants known from the state are covered. Over 120 native aquatic plant species have been identified in Vermont, so you may try to identify a plant not covered by this key. The invasive plants covered in this key are labeled so with a "☼". These species threaten the natural biodiversity and water quality of Vermont's aquatic systems. If you believe you have identified an aquatic invasive plant, take a photo, collect a sample and notify the Lakes and Ponds Program as soon as possible at 802-828-1535.

If you have questions or would like the identity of a plant confirmed, you are encouraged to send a plant sample to the Department of Environmental Conservation. Use the instructions and **Aquatic Plant Sample Submission Form** on page 25

There are a number of aquatic invasive species currently not found in Vermont but of concern if or when they are introduced to water bodies in Vermont. Aquatic invasive plants not yet confirmed in Vermont and listed in this key on page 21 are:

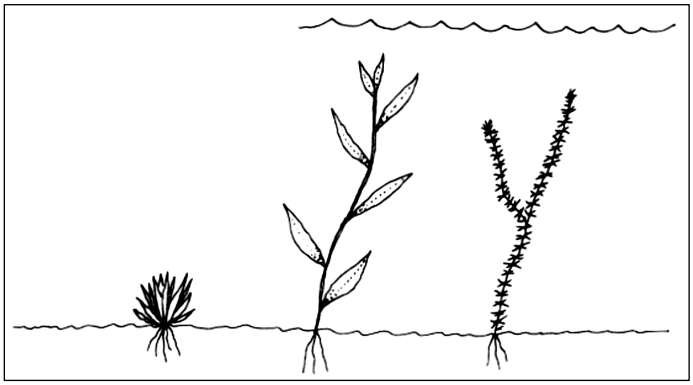
Scientific Name	***Common Name***
Cabomba caroliniana	Fanwort
Egeria densa	Brazilian Elodea
Hydrilla verticillata	Hydrilla
Myriophyllum aquaticum	Parrot Feather

If you suspect you have discovered any of these plants, contact the Lakes and Ponds Program as ***soon as possible*** at 802-828-1535

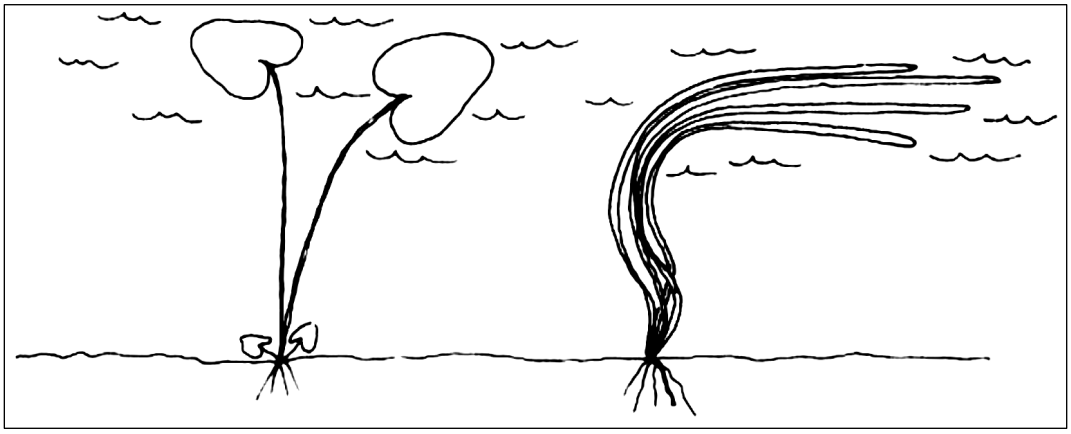
PLANT KEY

1. Where are the leaves of the plant in relation to the surface of the water?

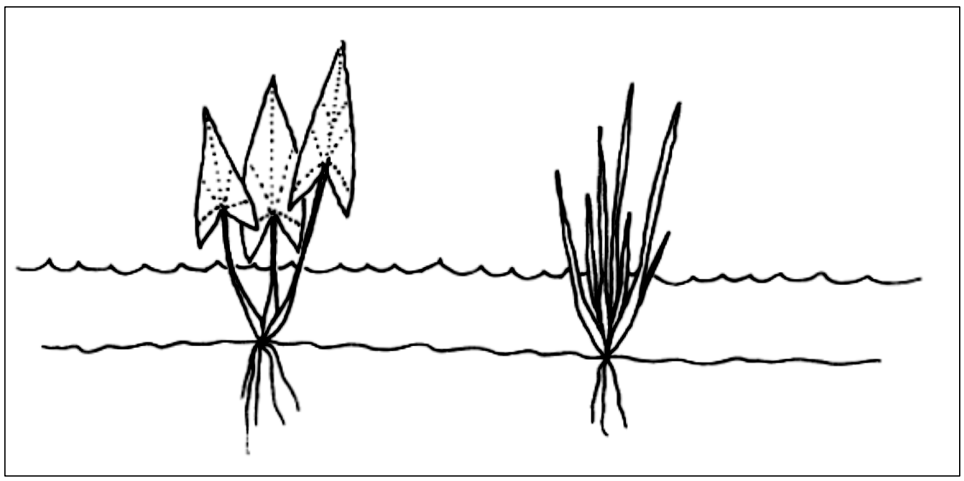
1A. **Submersed** – Plants are growing almost entirely beneath the water's surface, although some species have a mix of submersed and floating leaves…see part 2 on page 5



1B. Floating-leaved – Plants having at least some leaves floating on the water's surface (surface of floating leaves shed water) …see part 13 on page 14



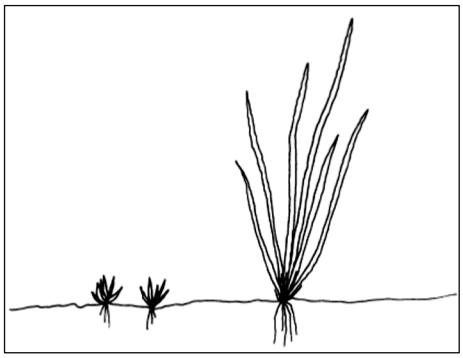
1C. **Emergent** – Plants are rooted on the pond bottom and extend upright above the water's surface…see part 20 on page 19



SUBMERSED PLANTS

2. Are the leaves basal or are the leaves connected along the stem?

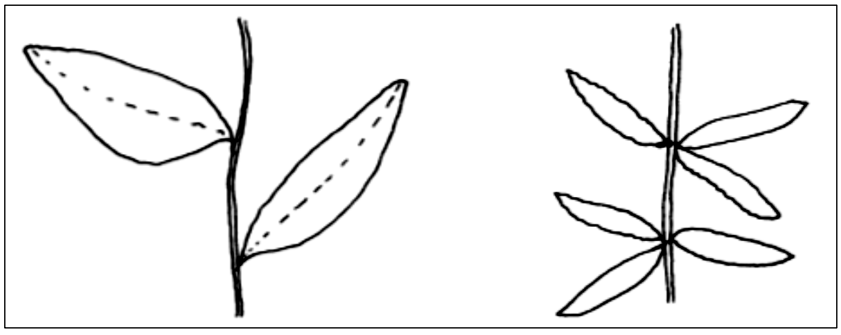
2A. **Basal Leaves** – all leaves emerge from a single point near the pond bottom…see part 4 on page 6



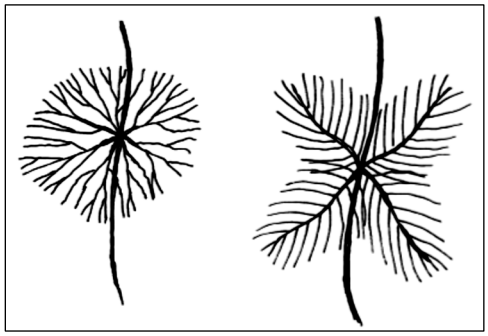
2B. **Leaves on the stem** – leaves are positioned along the stem…see part 3, below

3. **Are the leaves divided or complete?**

3A. Leaves entire or toothed…see part 5 on page 7



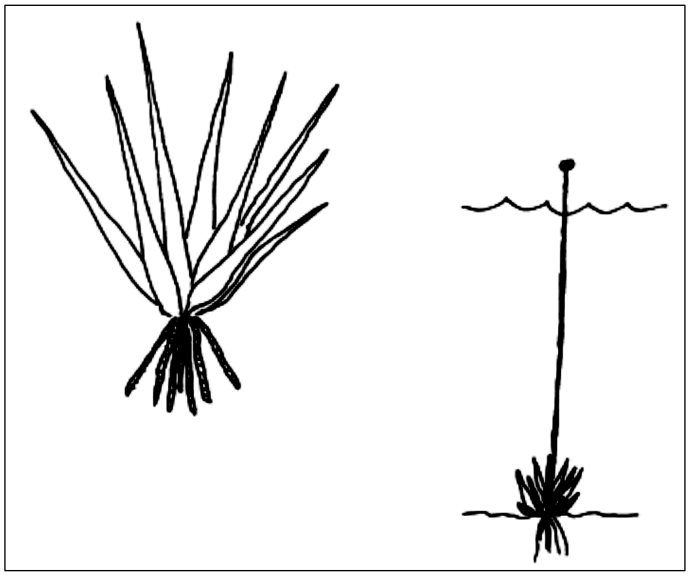
3B. Leaves divided…see part 8 on page 11



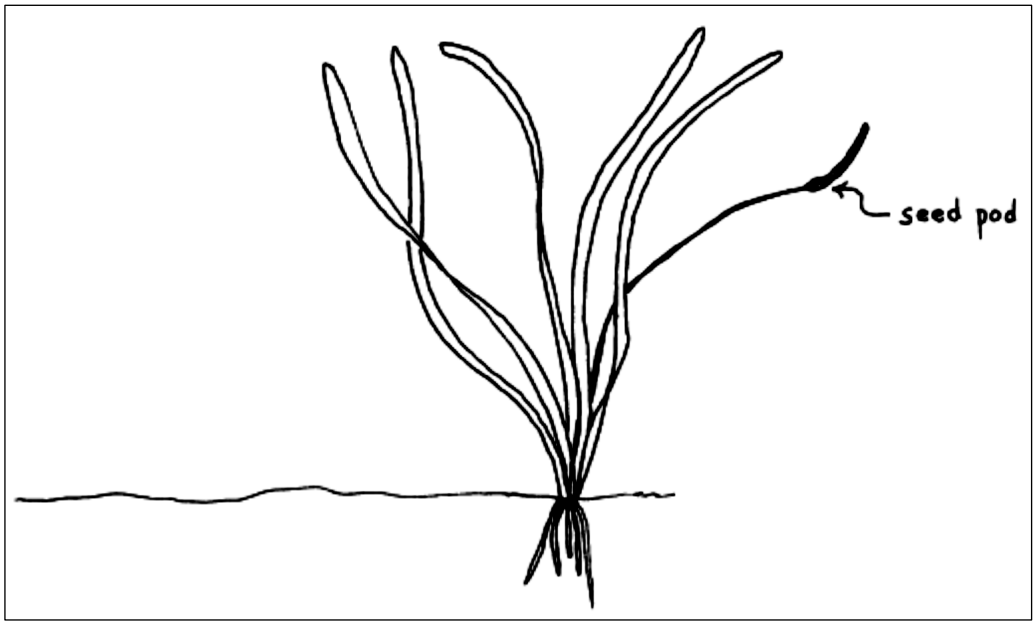
SUBMERSED PLANTS

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.



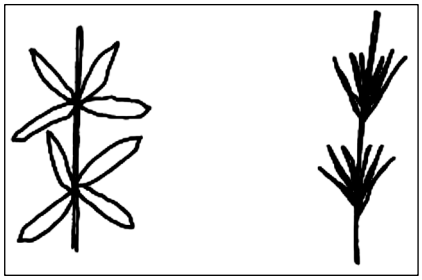
4B. **Wild Celery** (*Vallisneria americana*)
Leaves are ½ - 1 inch wide and are up to 2 feet long.



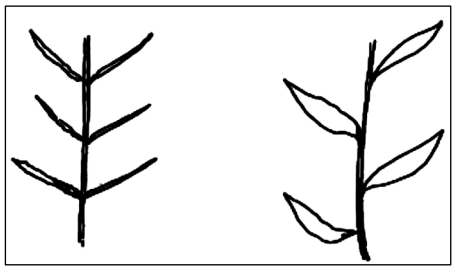
SUBMERSED PLANTS

5. Submersed plants with leaves entire or toothed

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

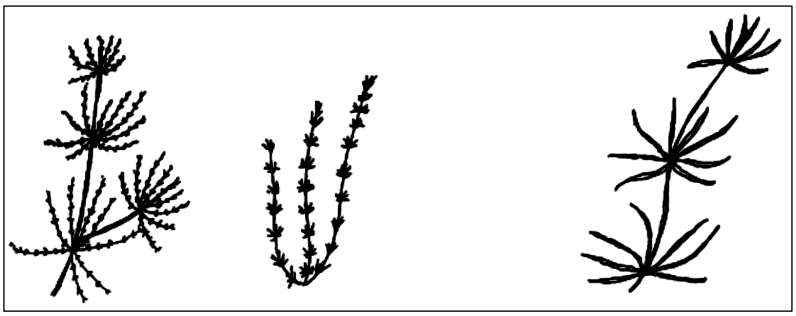


5B. **Leaves alternate or opposite along the stem**…see part 7 on page 8

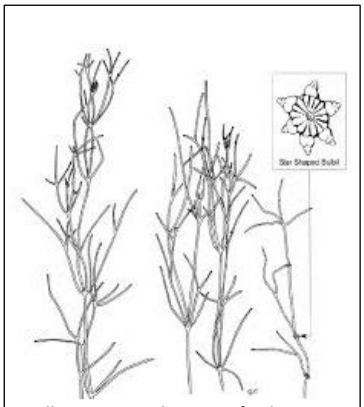


6. Submersed plants with leaves entire or toothed, whorled around the stem

6A. **Muskgrass** (*Chara* sp. or *Nitella* sp.)
These are actually large upright forms of algae. Muskgrass branchlets ("leaves") are linear. These plants usually grow in tangled masses along the pond bottom.



6B. **Starry Stonewort** (*Nitellopsis obtusa*)
☼ **This is an invasive plant!**
This is a large upright form of algae. Branchlets ("leaves") each with 1 to 2 long bract cells giving the appearance of being forked. Creamy white star-shaped bulbils may be present.

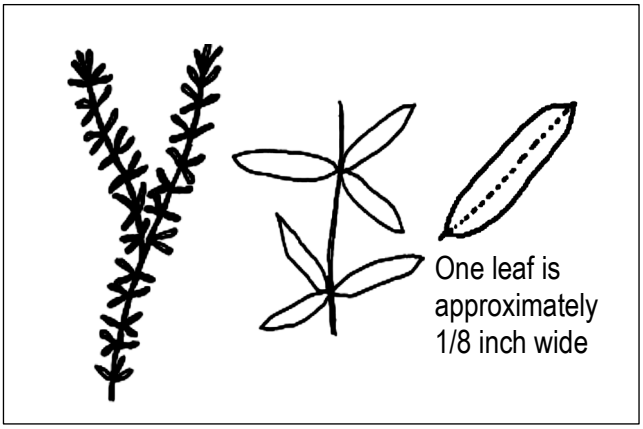


Pullman, G., and G. Crawford. 2010. A Decade of Starry Stonewort in Michigan. Lakeline. pp. 36-42.

SUBMERSED PLANTS

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

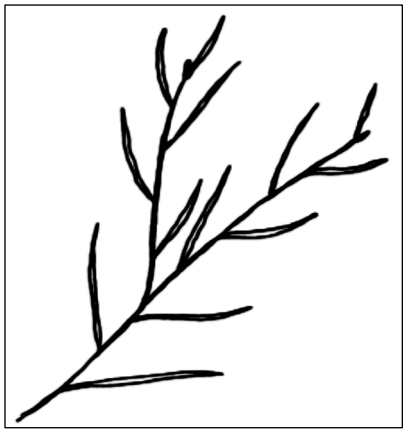
Caution! The highly invasive plant "hydrilla" (*Hydrilla verticillata*) looks similar to our native waterweed, but has toothed leaves in whorls of 3-8. See page 21 for more information.



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

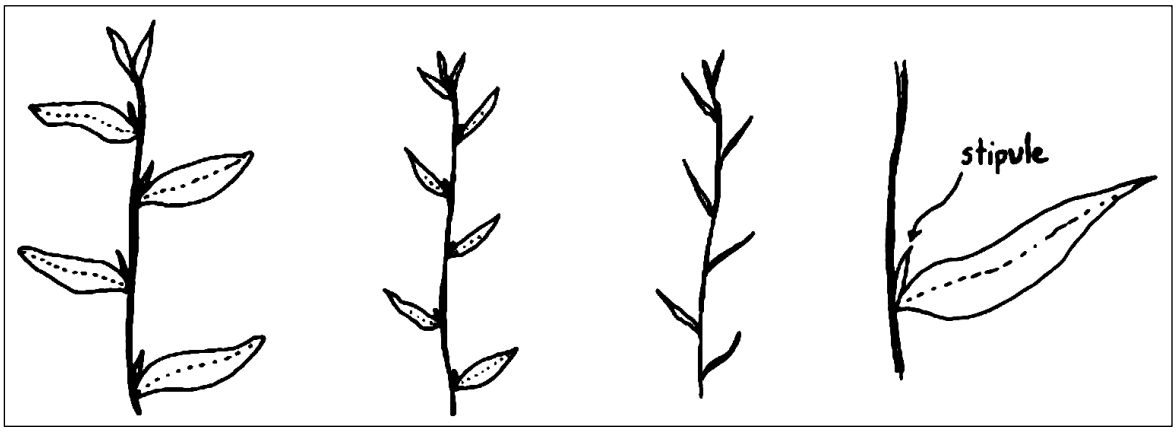
7A. Alternate leaves with no mid-vein.

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 types 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. Continued on next page…

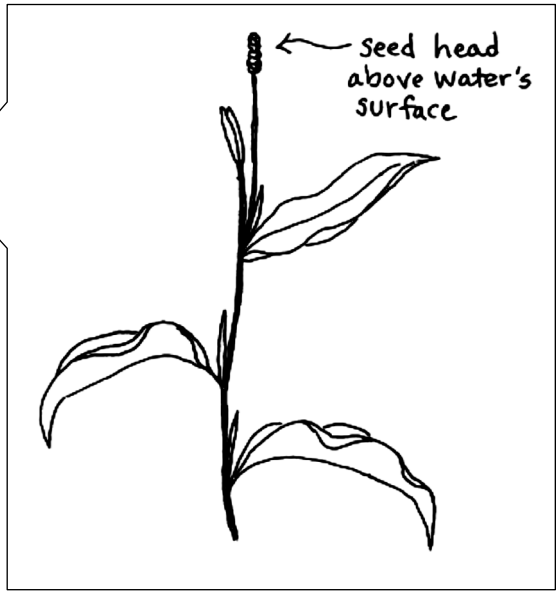


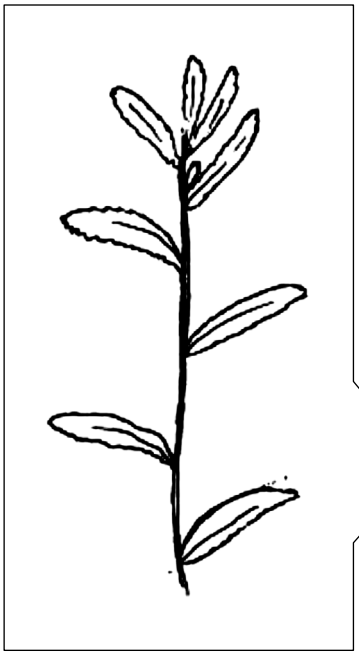
SUBMERSED PLANTS

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

Pondweeds 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.

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-leaf Pondweed (*Potamogeton crispus*)
☼ **This is an invasive plant!**
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.

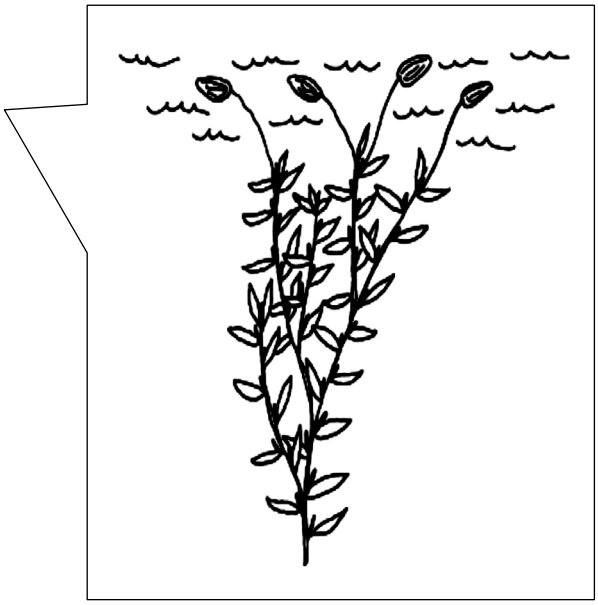
Ribbon-leaf Pondweed (*Potamogeton epihydrus*)
Submersed leaves are slender shaped up to 7 inches long; also usually with numerous floating leaves. The stem is slender, branched, and somewhat flattened growing up to 6 feet high.

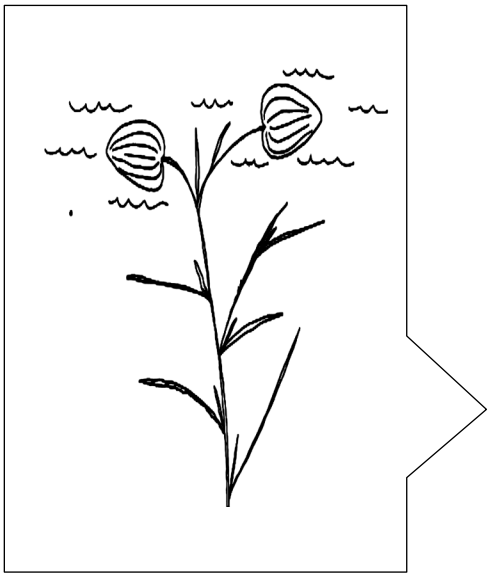
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 1: 77.

SUBMERSED PLANTS

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

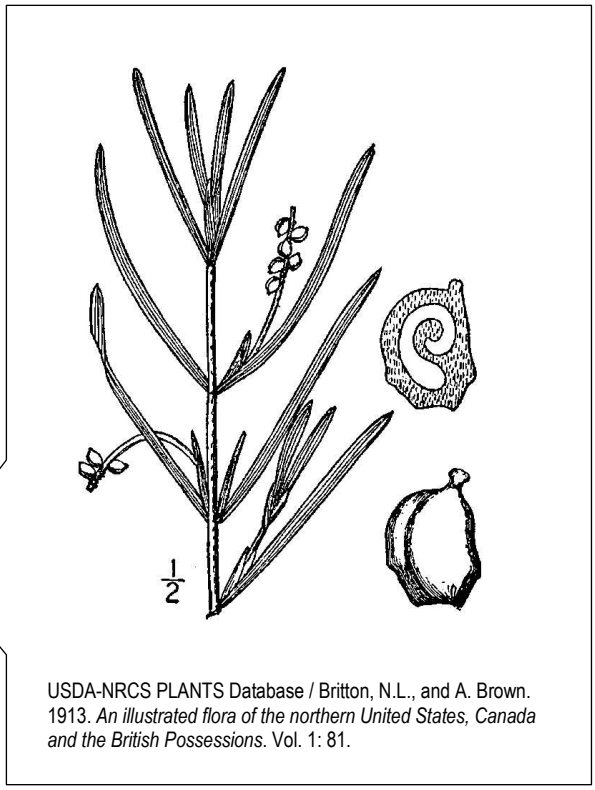
Variable-leaved Pondweed (*Potamogeton gramineus*)
Heavily branched, many leaves which are ½ - 4 inches long. There may be small floating leaves.





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.

Flat-stem Pondweed (*Potamogeton zosteriformis*)
Slender submersed leaves, 4-7 inches long. The stem is noticeably flat.

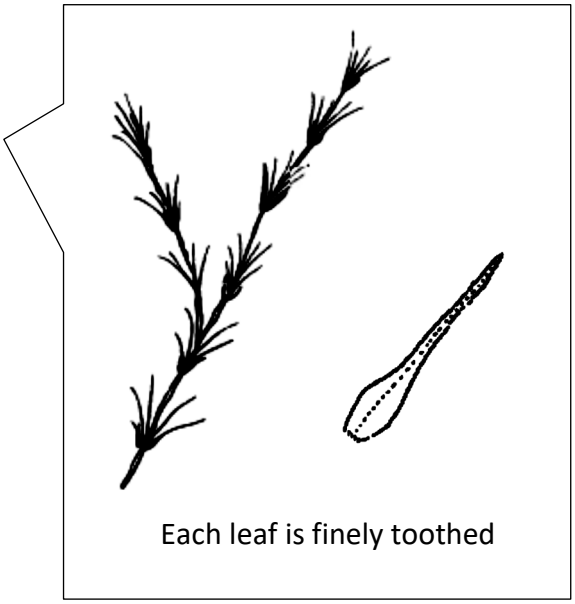


USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 1: 81.

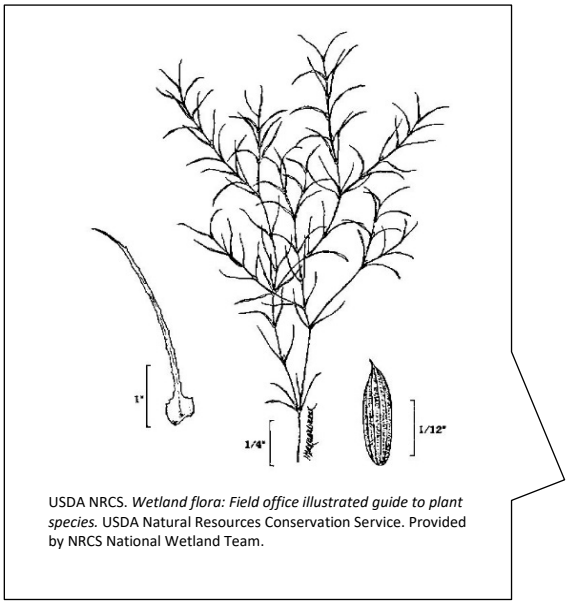
SUBMERSED PLANTS

7C. Submersed plants with leaves entire or toothed, opposite around the stem

Common Naiad (*Najas flexilis*)
There are 2 other native 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



USDA NRCS. *Wetland flora: Field office illustrated guide to plant species.* USDA Natural Resources Conservation Service. Provided by NRCS National Wetland Team.

Brittle Naiad (*Najas minor*)
☼ **This is an invasive plant!**
Leaves often recurved and noticeably toothed. Stems heavily branched and bushy near the top. Plants break apart easily.

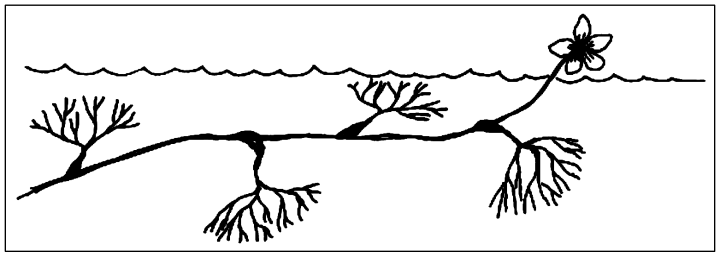
8. Submersed plants with leaves divided

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

8B. Divided leaves arranged whorled along the stem…see part 10 on page 12

9. Divided leaves arranged alternate along the stem

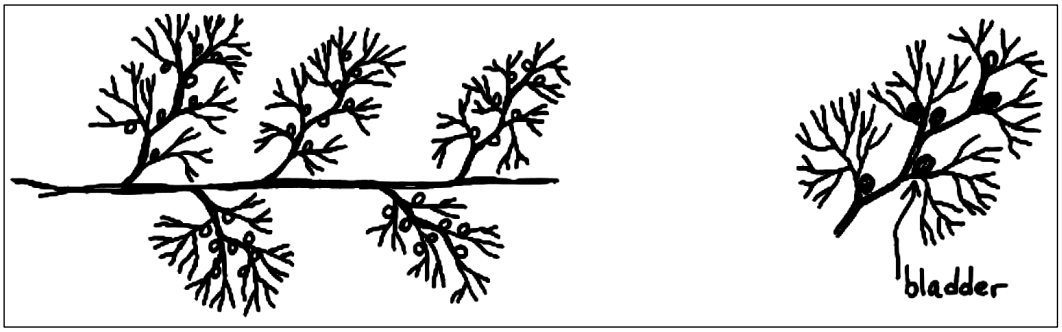
9A. Water Buttercup (*Ranunculus* sp.)
there are 3 species of aquatic buttercups in Vermont. This plant is usually a few feet long, sometimes trailing just below the water surface. Leaves are branched divided and alternate along the stem. No bladders (as in #9B) are present. A small yellow or white flower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



SUBMERSED PLANTS

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.



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

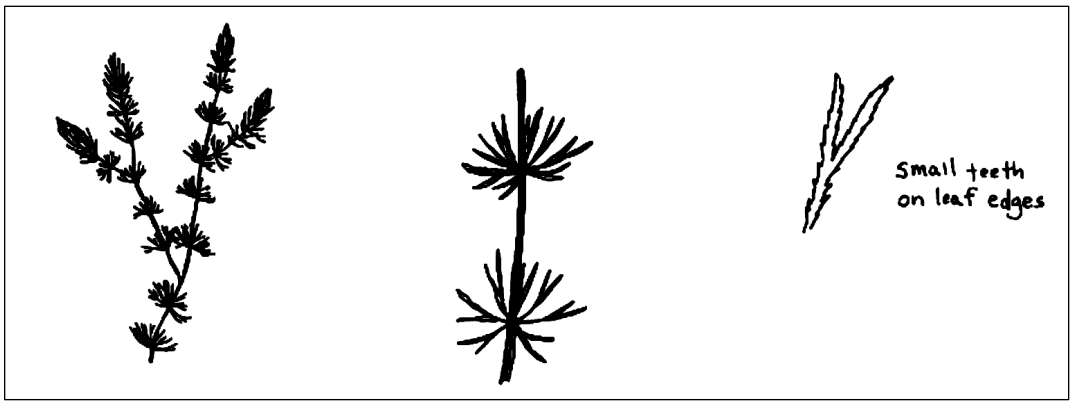
10A. Leaves branched or forked divided in whorls along the stem… see part 11, below

10B. Leaves feather divided in whorls along the stem (watermilfoil)… see part 12 on page 13

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.



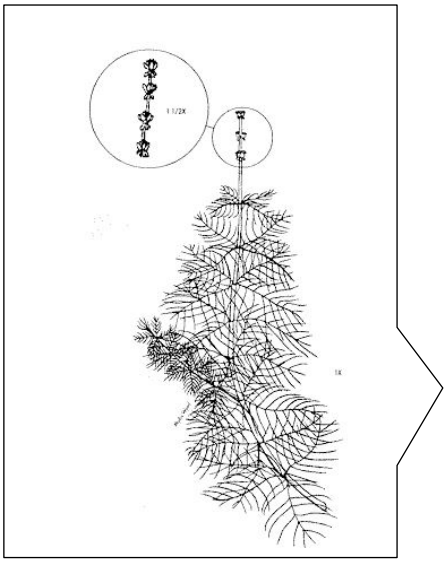
SUBMERSED PLANTS

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 page 21 for more information.

12. Watermilfoil (*Myriophyllum* sp.)
There are eight 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*)
☼ **This is an invasive plant!**
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.

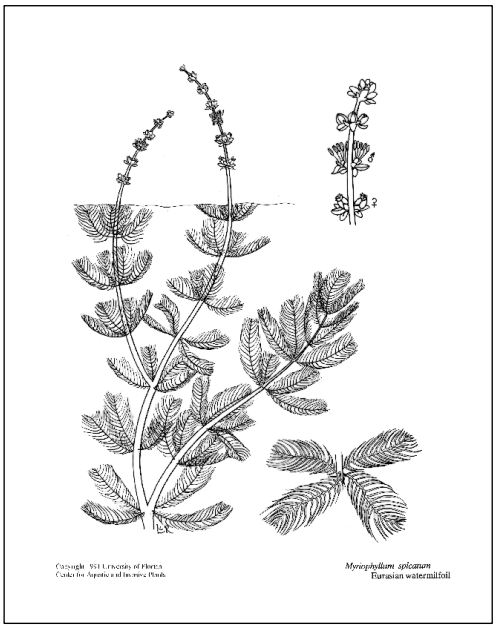


12B. **Northern Watermilfoil** (*Myriophyllum sibiricum*)
There are typically 4 leaves per whorl with 5-12 leaflets on each side of the mid-stem.

12C. **Eurasian Watermilfoil** (*Myriophyllum spicatum*)

☼ **This is an invasive plant!**

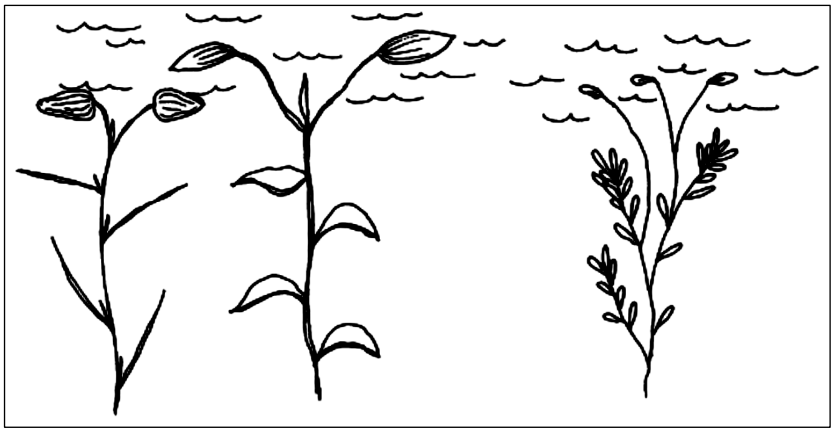
There are typically 4 leaves per whorl with 12-20 leaflets on each side of the mid-stem.



FLOATING-LEAVED PLANTS

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

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



If it looks like any of these…see part 7B on page 8

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)

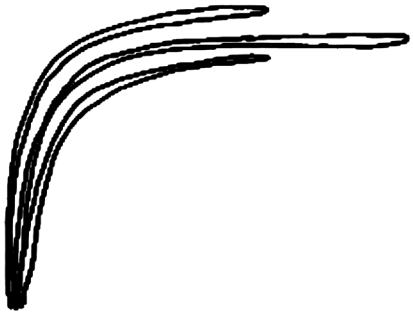
Big Duckweed (*Spirodela polyrhiza*)
(actual size)

FLOATING-LEAVED PLANTS

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

Broad floating leaves
…see part 14, below leaves

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



14. Plants with broad floating leaves

14A. Leaves rounded…see part 15, below

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

15. Plants with rounded floating leaves

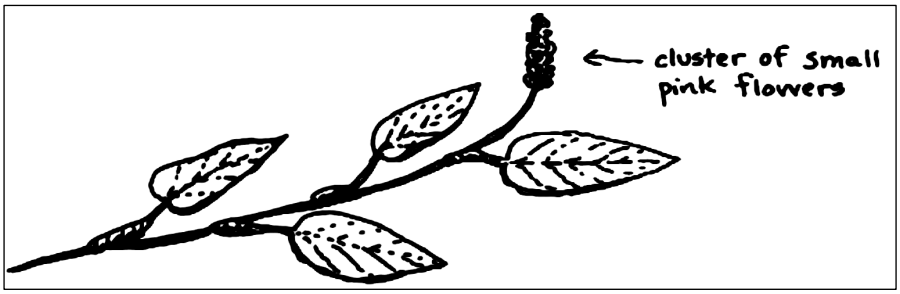
15A. Leaves radiate from a central point in the sediment…see part 17, page 16

15B. Leaves radiate from points along the stem…see part 18, page 16

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.

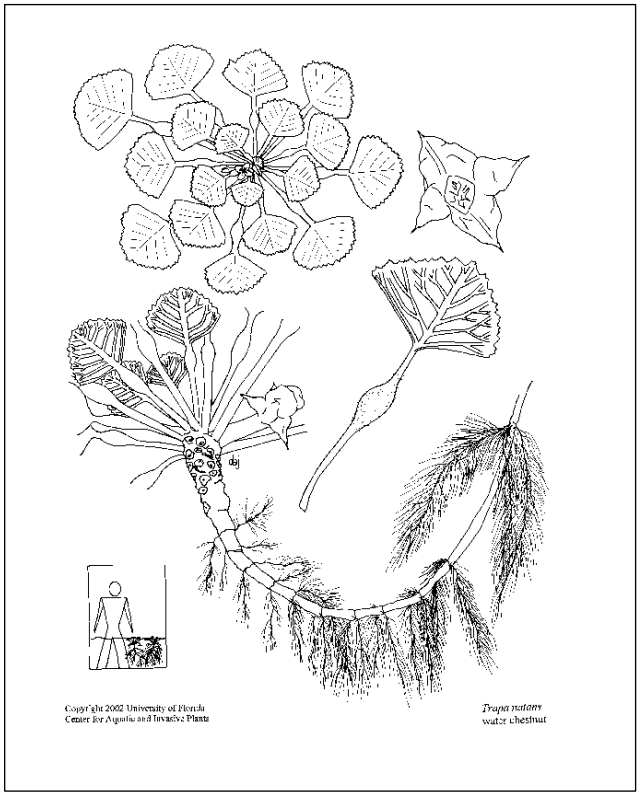


FLOATING-LEAVED PLANTS

16B. Water Chestnut (*Trapa natans*)

☼ **This is an invasive plant!**

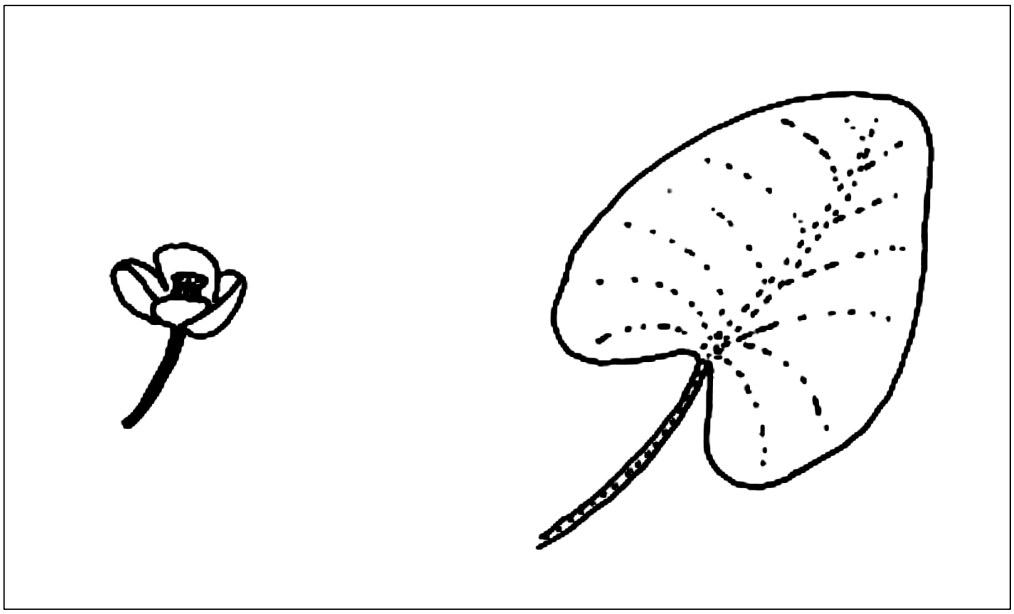
Leaves are toothed and triangular in shape. The leaves radiate off of the stem to form a circular rosette around a middle point.



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

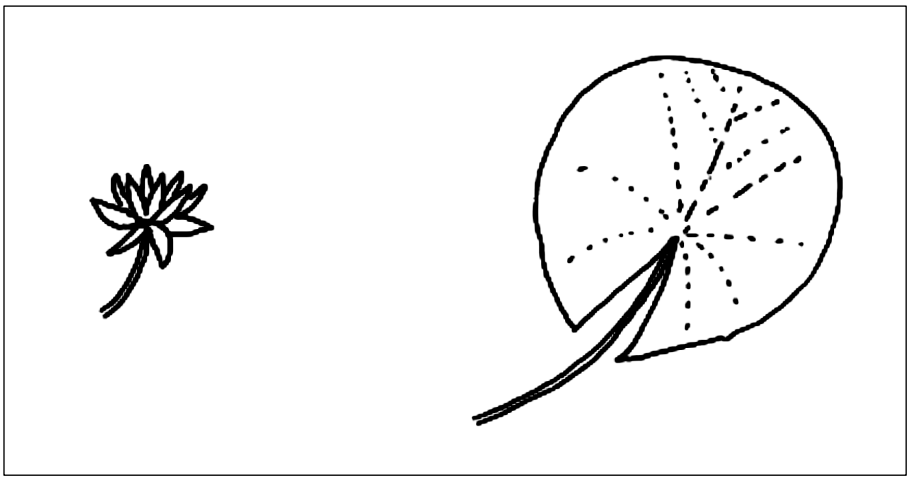
17A. Cow Lily (*Nuphar variegata*)

Large round floating leaves with round lobes and yellow flowers. There are 2 other species of cow lily in Vermont.



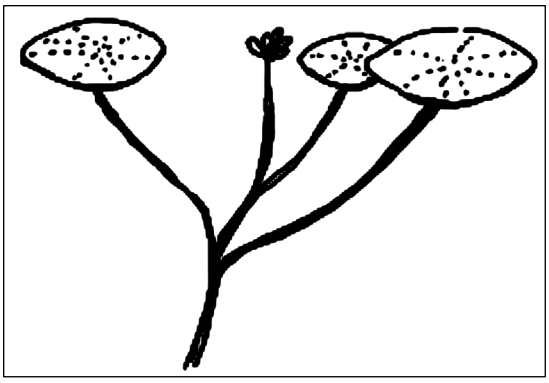
FLOATING-LEAVED PLANTS

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.

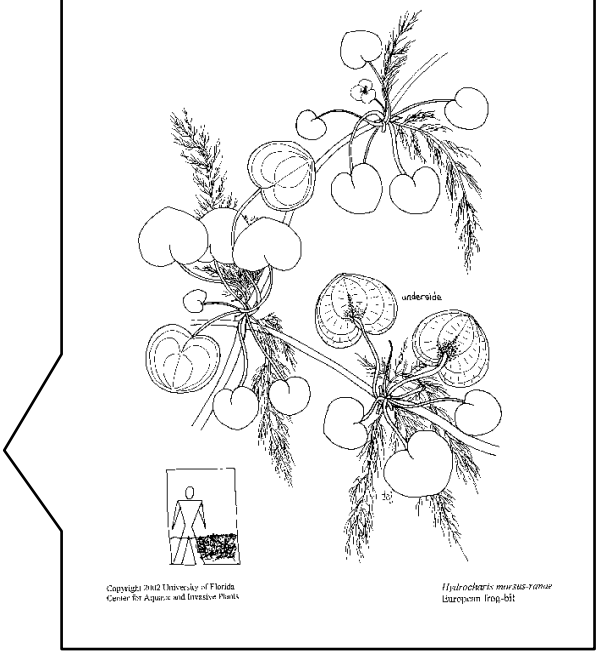


18. Plants with floating rounded leaves radiating from points along the stem

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.



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

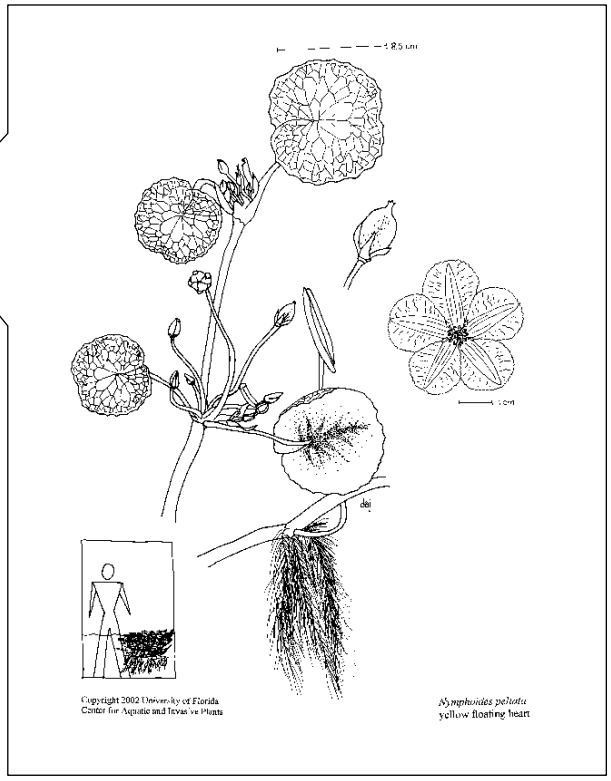


FLOATING-LEAVED PLANTS

18C. **Yellow Floating Heart** (*Nymphoides peltata*)

☼ **This is an invasive plant!**

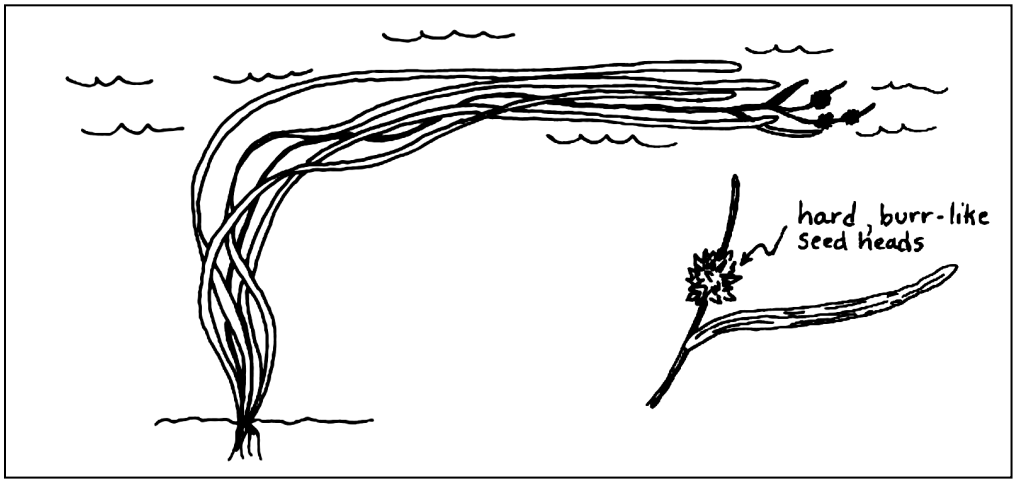
Leaves are 2-6 inches wide and long. The leaf margin is entire, but has a wavy appearance. Plant produces yellow flowers.



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

19A. 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

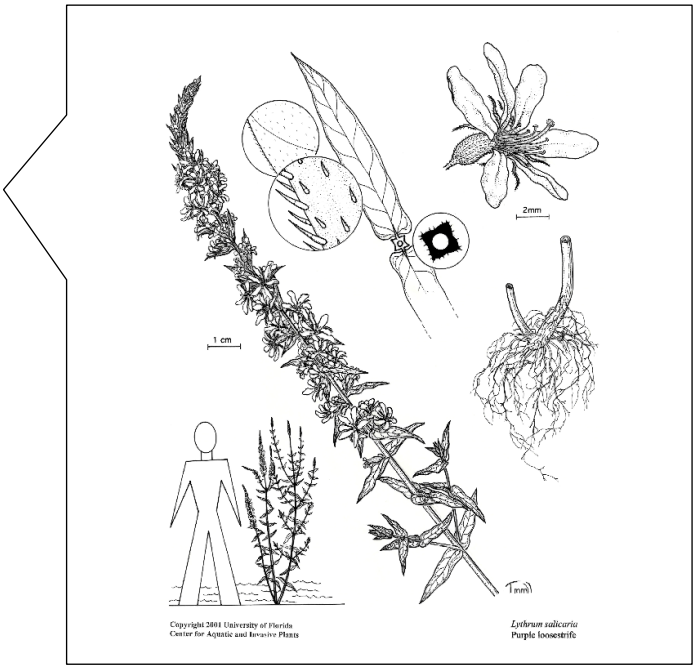
20. Plants which are rooted on the pond bottom with leaves that extend upright above the water's surface.

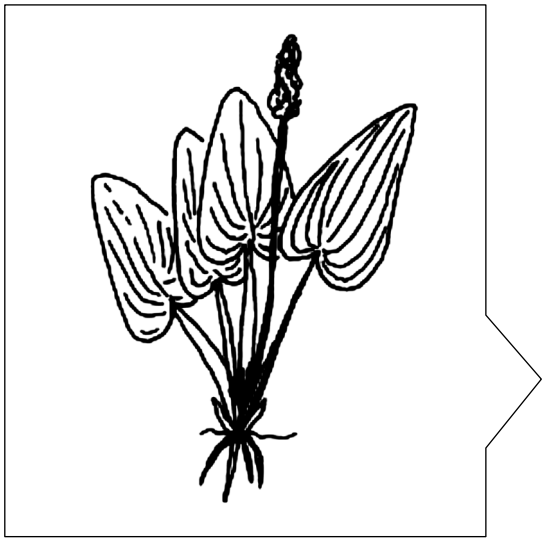
20A. Leaves broad…see part 21, below

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

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

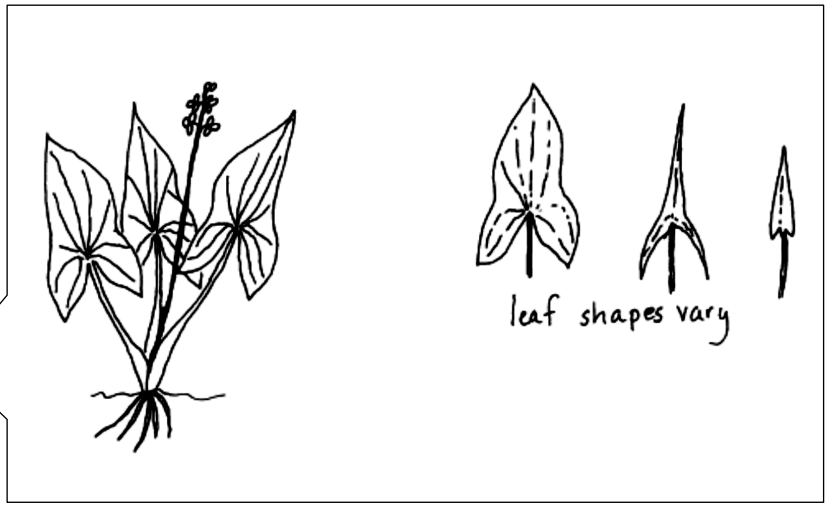
21A. Purple Loosestrife (*Lythrum salicaria*)
☼ **This is an invasive plant!**
Leaves are opposite along the stem with a dense spike of purple flowers at the top.





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.



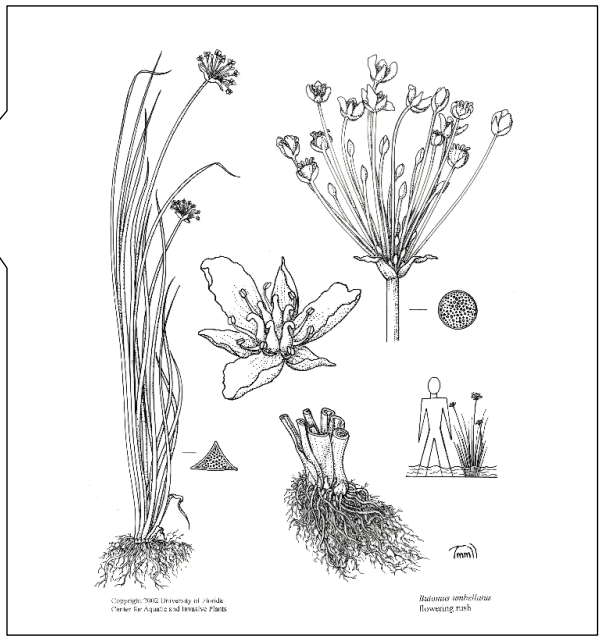
EMERGENT PLANTS

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*)

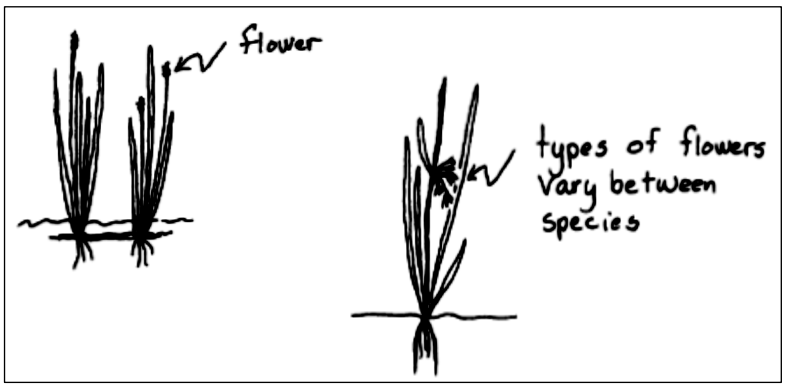
☼ **This is an invasive plant!**

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.



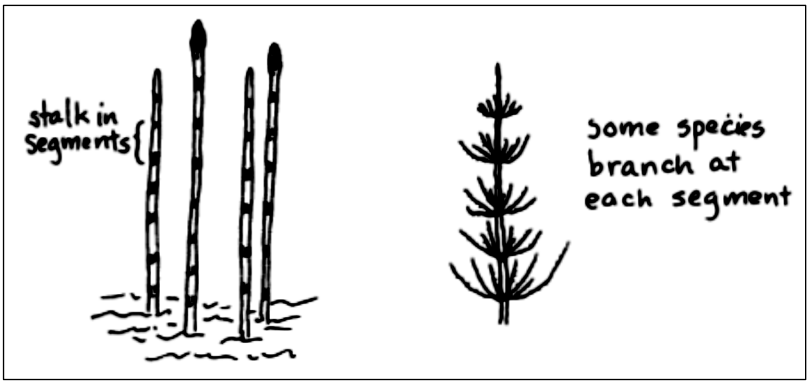
22B. **Sedge** (Cyperaceae Family)

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.

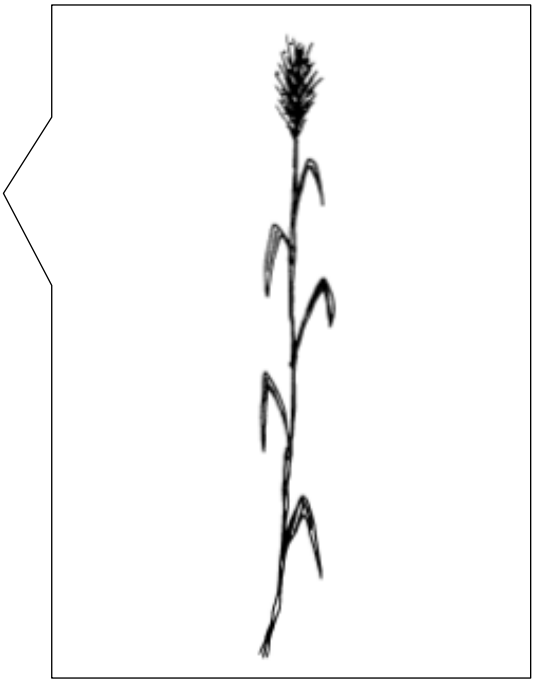


EMERGENT PLANTS

22D. **Reed Grass** (*Phragmites australis*)

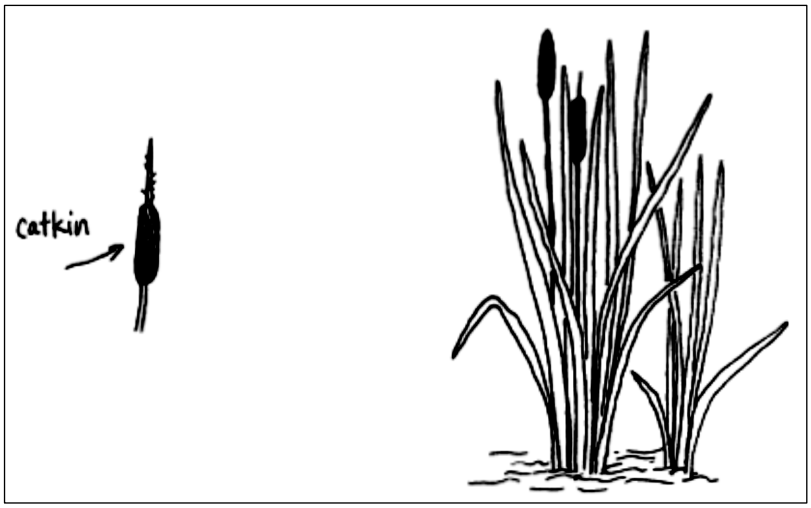
☼ **This is an invasive plant!**

Over 6 feet tall with a large plume at the top. Usually grows in dense stands in water or damp soil.



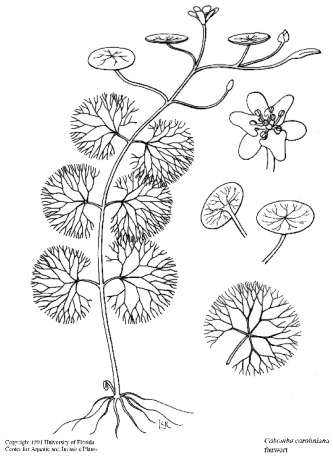
22E. **Cattail** (*Typha* sp.)

There are two species of cattail in Vermont. Leaves are up to 5 feet tall. Dark brown "catkins" are 5-6 inches long.

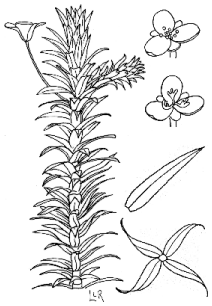


AQUATIC INVASIVE PLANTS OF CONCERN but not in Vermont … yet.

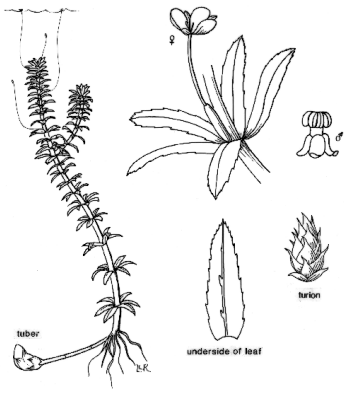
Fanwort (*Cabomba caroliniana*) ☼
submersed leaves branched divided with leaf stalks arranged opposite along the stem. There may be a few small floating leaves which are linear-elliptic in shape. Plant has white flowers.



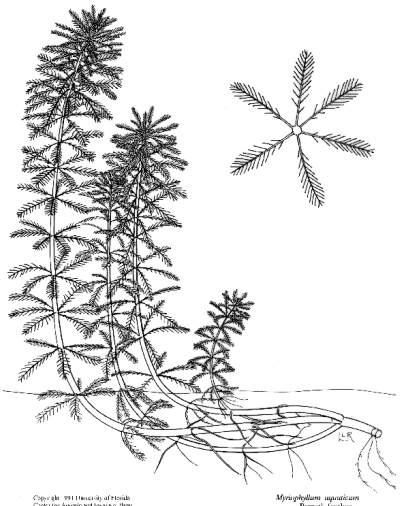
Brazilian Elodea (*Egeria densa*) ☼
4-6 leaves per whorl with each leaf shaped broadly linear ½ -1½ inches long with minute serr



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

bulbil– a small bulblike structure, especially in the axil of a leaf or at the base of a stem, that may form a new plant.

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 two to three 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.

Other:

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.

Aquatic Plant Sample Submission Form

Keep the sample in a cool place until it is mailed, then mail this completed form with the sample (Monday – Wednesday only) to: ATTN: Plant Sample, VT DEC – Watershed Management Division, 1 National Life Drive, 2 Main, Montpelier, VT 05620-3522. Questions? Call (802) 828-1535.

Are you a: ☐**VIP** ☐**Greeter** ☐**Other**_____

Waterbody Name: _____ **Town:** _____

Was this sample collected during a boat inspection? **Yes** **No**

If **yes**, name of previously visited waterbody: _____

If **no**, description of the location of collection: _____

_____

Suspected ID: _____ Date Collected: _____

Have you contacted VT DEC? **Yes** **No** If **yes**, with whom did you speak: _____

Your Name: _____ Phone: _____

Email Address: _____

Packaging your sample:

- Please wrap a representative piece (collect 8 – 12 inches of a plant specimen, including any flowers or fruit, if possible) in a wet paper towel and place it into a sealable plastic bag.
- If there is more than one species obtained per waterbody, individually wrap them.
- If there are samples from more than one waterbody, divide the samples into separate plastic bags and clearly mark the different locations on the bags.
- Place the plastic bags in a manila envelope and mail the sample to the address above, or use the mailing label below.

_____

_____

_____

ATTN: Plant Sample
VT DEC – Watershed Management Division
1 National Life Drive, Main 2
Montpelier, VT 05620-3522

Are you a: ☐**VIP** ☐**Greeter** ☐**Other**