A Key to Common Vermont Aquatic Plant Species



Lakes and Ponds Management and Protection Program



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Key to Common Vermont Aquatic Plant Species

Common Name

The following species are covered in this key:

Scientific Name

Submersed Plant	<u>s</u>
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
Najas minor 🗘	Brittle Naiad 🗘
Nitellopsis obtusa 🜣	Starry Stonewort 🗘
Potamogeton amplifolius	Big-leaf Pondweed
Potamogeton crispus 🜣	Curly-leaf Pondweed 🗘
Potamogeton epihydrus	Ribbon-leaf Pondweed
Potamogeton gramineus	Variable Pondweed
Potamogeton natans	Floating-leaved Pondweed
Potamogeton zosteriformis	Flat-stem Pondweed
Ranunculus sp.	Water Buttercup
Utricularia macrorhiza	Common Bladderwort
Vallisneria americana	Wild Celery
Zosterella dubia	Water Stargrass
Floating-leaved P	<u>lants</u>
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 🌣 Cyperaceae Family Equisetum sp. Lythrum salicaria 🌣 Phragmites australis 🌣 Pontederia cordata Sagittaria sp. Typha sp. Flowering Rush Sedge Horsetail Purple Loosestrife Reed Grass Pickerel Weed Arrowhead Cattail

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

Additional copies of the key are available upon request. Please do not copy without proper credit. Choose between 1A, 1B, or 1C below:



1B. <u>Floating-leaved</u> – Plants having at least some leaves floating on the water's surface (surface of floating leaves shed water)...see #13



1C. <u>Emergent</u> – Plants are rooted on the pond bottom and extend upright above the water's surface, see #20



SUBMERSED PLANTS



3A. Leaves entire or toothed...see #5





3B. Leaves divided...see #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 #7



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

6A. Muskgrass (Chara sp. or Nitella sp.)

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!

Isa 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.

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.



One leaf is approximately 1/8 inch wide

- Submersed plants with leaves entire or toothed arranged alternate or opposite along the stem 7.
 - 7A. Alternate leaves with no mid-vein.

Water Stargrass (Zosterella dubia)

leaves are arranged alternately along the stem 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.

and are 1/16 -

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.



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

Pondweeds are distinguished as a group by possessing a leaf midvein (look closely at the thinleaved 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 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.



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 continued...

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



Brittle Naiad (Najas minor)

⁽¹⁾ This is an invasive plant!

Leaves often recurved and noticeably toothed. Stems heavily branched and bushy near the top. Plants break apart easily.



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

- 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, #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) are present. A small yellow or white flower is produced above the water's surface.



SUBMERSED PLANTS continued...

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 #11, below

- 10B. Leaves feather divided in whorls along the stem (watermilfoil)... see #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 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*) typically 4 leaves per whorl with 5-12 leaflets on each side of the mid-stem.





side of the mid-stem.

 12C. Eurasian Watermilfoil (Myriophyllum spicatum)
 This is an invasive plant! typically 4 leaves per whorl with 12-20 leaflets on each

<image><image>

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 #7B

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



- 13C. Plants with only floating leaves on stems which are generally rooted in the pond bottom
 - Broad floating leaves ...see #14



Long, narrow, grass-like leaves...see #19



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)

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.





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 - 2½ inches wide. Plant produces small white flowers.



18C. Yellow Floating Heart (Nymphoides peltata)⁽¹⁾ 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

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



shapes

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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)

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 continued...

- 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 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
- **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.

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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 Na	ame:		Town:		
Was this samp	ole collected durin	g a boat inspection?	Yes No		
If yes , name c	of previously visite	d waterbody:			
lf no . descripti	on of the location	of collection.			
					_
Suspected ID:			Date Collecte	d:	
Suspected ID: Have you cont	tacted VT DEC?	Yes No If yes,	Date Collecte with whom did yc	d: ou speak:	_
Suspected ID: Have you cont Your Name:	tacted VT DEC?	Yes No If yes,	Date Collecte with whom did yc Phone:	d: ou speak:	_

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**