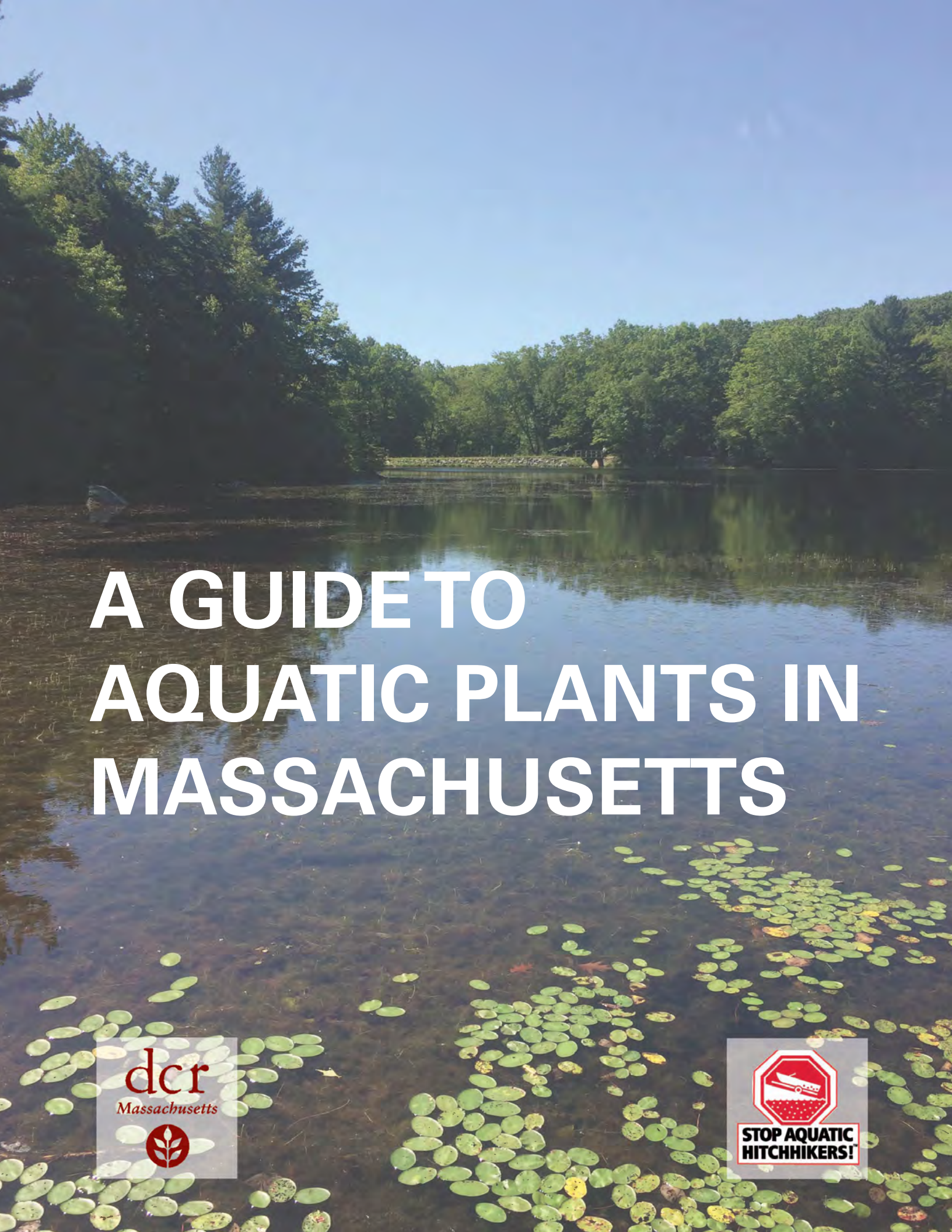

A GUIDE TO AQUATIC PLANTS IN MASSACHUSETTS

dcr
Massachusetts

STOP AQUATIC HITCHHIKERS!

Contacts:

Massachusetts Department of Conservation and Recreation,
Lakes & Ponds Program
www.mass.gov/lakesandponds

Massachusetts Department of Environmental Protection
www.mass.gov/dep

Northeast Aquatic Nuisance Species Panel
www.northeastans.org

Massachusetts Congress of Lakes & Ponds Associations (COLAP)
www.macolap.org

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2016

A Guide to Aquatic Plants in Massachusetts

* Members of the Sedge Family which are commonly referred to as “rushes”. Juncus is the only genus listed in the Rush Family. (Fassett, 1957)

Introduction—How to use this guide

This booklet is a key to the common aquatic plants found in Massachusetts. A key is simply a series of questions that will lead you to the identification of an object. This key looks at the shape, color, smell, and habitat of different plants.

There are two basic steps to follow when identifying plants:

1- Carefully observe the plant. This includes looking at several samples of the plant to get an average characterization of the plant. This will help you avoid misleading information that you might see if you happen upon the extra large or extra small version of the plant. Also be sure to notice the location of the plant as well as all parts of the plant. Root systems, flowers, seeds and stems are just as important as leaves.

2- Answer the questions in the key by using your observations of the plant. In many cases pictures and examples are included to make this process easier. Keep in mind that the illustrations try to capture the average plant so they may not match exactly.

You will find it quick and easy to arrive at a plant's common name, genus and sometimes species.

To get started, the first question concerns the area where you found the plant, its habitat. Is the plant growing underwater **(submerged), floating** or sticking up out of the water (**emergent**)? Based on your answer you will be directed to additional questions, each having two parts. If the first part (A) doesn't seem to describe the plant of interest then the answer must be in part (B). When additional questions are needed you will see references that direct you to another question and page. Because each specimen can vary from the ideal plant, there may be times when you feel uncertain as to which answer is best. In those cases, simply follow the (A) answer to the next question or picture. Many times that next question will make it more obvious whether you have chosen correctly. Keep answering the questions until you reach a question that shows an example and has no further questions referenced.

So what happens when the plant doesn't seem to fit the pictures? Massachusetts' freshwater bodies contain a great diversity of plants. Several species can only be distinguished from each other by microscopic examination of fruiting bodies and flowers. Biologists with years of experience still have difficulty. Don't be discouraged but remember that those included here are a subset identifiable with the naked eye or magnification of up to 10 times. Simple magnifying loops or hand lenses can be purchased in many children's learning or science stores and will work just fine. So, while the more common plants are included here, **it is possible that your plant may not be listed**. Two additional recommended sources, *Common Marsh, Underwater & Floating-leaved Plants of the United States and Canada* by Neil Hotchkiss and *A Manual of Aquatic Plants* by Norman Fassett, are available for purchase through stores with extensive biology sections, universities or via Internet book sellers. These texts will provide you with further detail and pictures. Both of these sources will also include many plants not found in Massachusetts. The most detailed references for the New England Region are part of a series authored by Hellquist and Crow and are listed in the reference section.

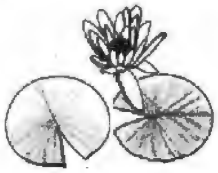
Should you need further assistance please feel free to send your plant to:

Department of Conservation & Recreation
Lakes and Parks Program
251 Causeway Street
Boston, MA 02114

Helpful Hints for Using the Guide

* **Is the plant submerged, floating-leafed or emergent?**

Submerged:
Plant is growing entirely beneath the water surface. Emerging flowers may be present. Ex. Milfoil

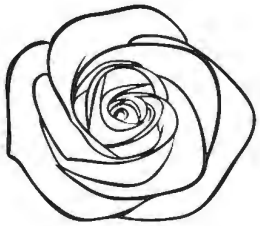


Floating Leafed:
The plant has leaves floating on the water's surface.
Ex. Lilies or Watershield

Emergent:
The plant is growing up out of the water.
Ex. Cattails

* **What are the leaves like?**

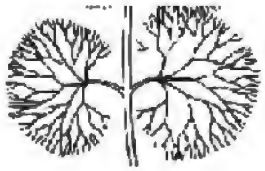
Basal Leaves:
All the leaves emerge from the base of the stem.
Ex. Quillwort



Rosettes:
New leaves in the center of the plant growing like a rosebud.

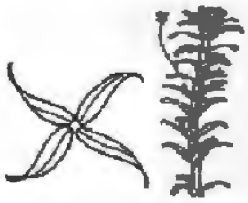
Leaves on a stem:
Individual leaves emerge from the stem, not basal.

* **How are the leaves arranged on the stem?**



Opposite/Pairs:
Single leaves emerge from the same place on the stem opposite each other.
Ex. Fanwort

Alternate/Single Leaves:
Leaves are attached one after another, individually, along the stem.
Ex. Big Leaf Pondweed



Whorled:
The leaves all emerge around the stem in the same place. Similar to umbrella or wheel spokes.
Ex. Hydrilla

* **Other distinguishing features of leaves?**

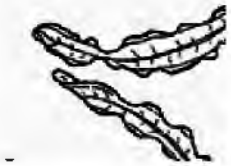
Dissected Leaves:
Feathered
Similar to a bird feather. There is one distinct main vein and small leaflets branch off of that central vein. Ex. Milfoil

Dissected Leaves:
Branched/Forked
The leaf splits and forks numerous times. No central vein present.
Ex. Fanwort

Flat Leaves:
A single leaf that is uninterrupted. There are no divisions.
Ex. Big Leaf Pondweed

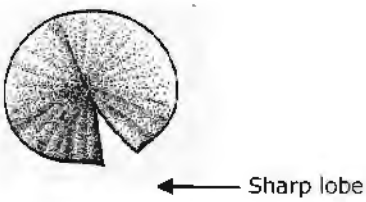
Helpful Hints for Using the Guide

Serrated:
Leaf margins are saw-like, jagged and rough.
Ex. Hydrilla

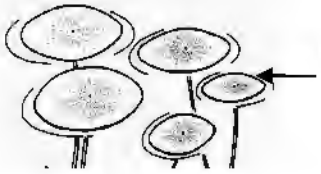


Undulating:
Leaf margins are rippled or wavy.
Ex. Curly Pondweed

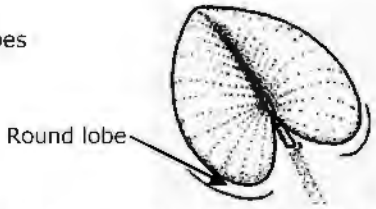
Mid-vein:
Leaf has distinct vein in the center.
Ex. Curly Pondweed



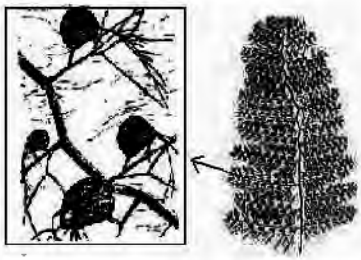
Leaf Lobes:
The leaf has a split, creating lobes below where the stem attaches.
Ex. White Lilly



Stem attached in center:
Stem attaches in the center of the plant. There are no lobes.
Ex. Water Shield

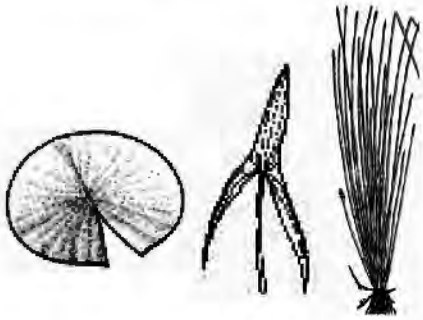


Stem attached at end:
Stem located at end of leaf, where the lobes begin.
Ex. Yellow Lilly



Bladders:
Small clear or dark air-filled sacs.
Ex. Bladderworts

Ligule:
Thin strap shaped outgrowth at junction of leaf and leaf stalk. Similar to leaves on corn stalks.
Ex. Phragmites



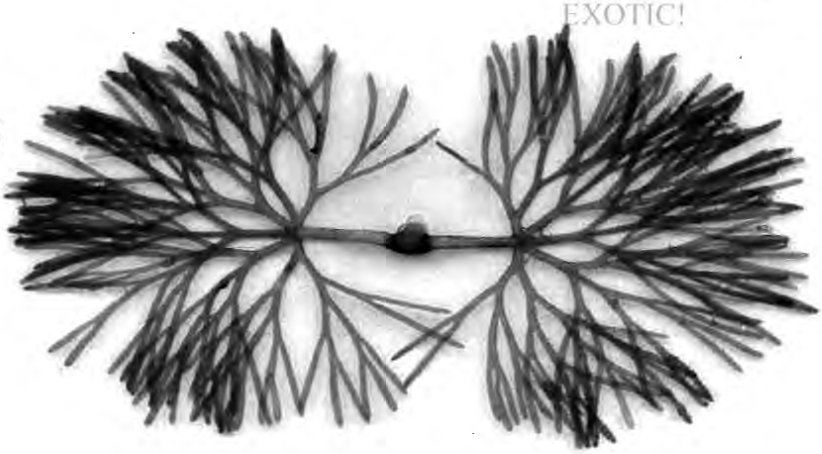
Broad, Lance Shaped or Narrow:
Broad leaves are wide. Lance-shaped are similar to an arrowhead, wide at the base and tapering to a point. Narrow leaves are very thin.

Key Definitions

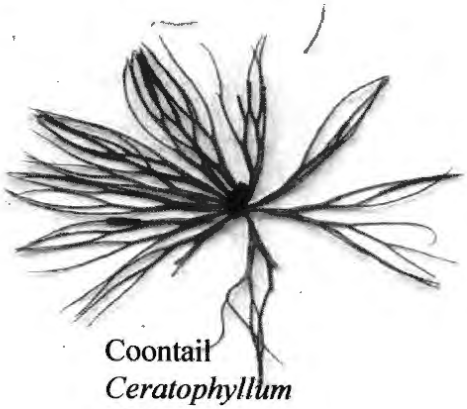
Native Species:
Native species are plants or animals that have lived in a particular region prior to human settlement. These plants and animals are part of the original flora and fauna of the area. Most native plants are beneficial to the aquatic environment, as they provide oxygen, food, nesting areas and may help to stabilize the shoreline.

Non-Native Species:
These are plants or animals that are new or alien to a geographical area. Non-native species are introduced to a new location in a variety of ways, including hitching rides on boat motors or in ballast water, and intentional or accidental escape from cultivation. Many non-native species are able to invade and disrupt or alter an ecosystem. Non-native species are more likely to become invasive since there may not be controls (such as predators) in the new region to keep their populations in check.

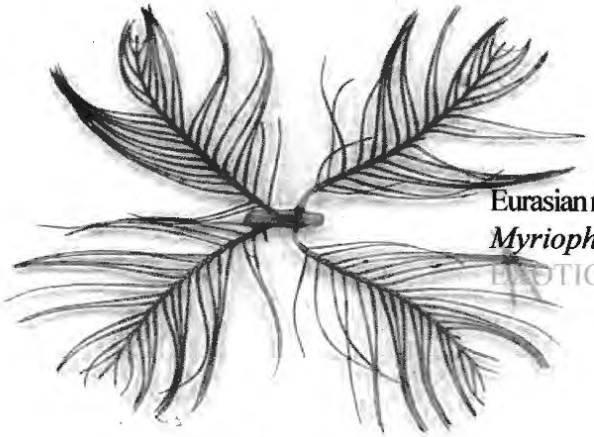
Cross sections of Look-Alike Submerged Plants with Feathery Leaves



Fanwort
Cabomba caroliniana
EXOTIC!

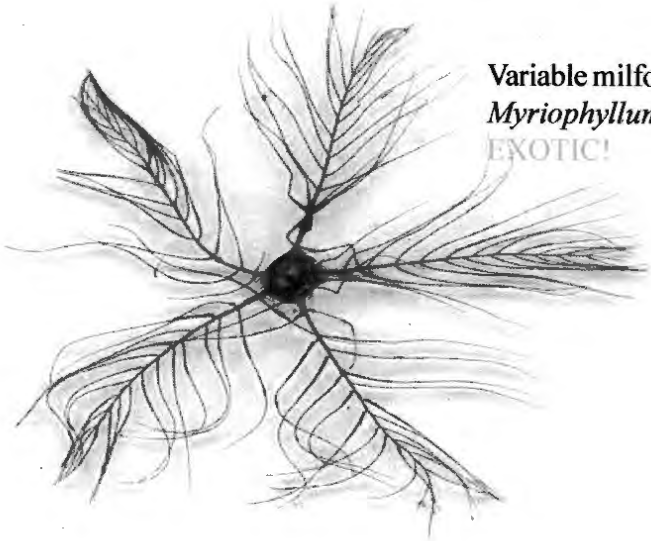


Coontail
Ceratophyllum
Native



Eurasian milfoil
Myriophyllum spicatum
EXOTIC!

Bladderwort
Utricularia
Native

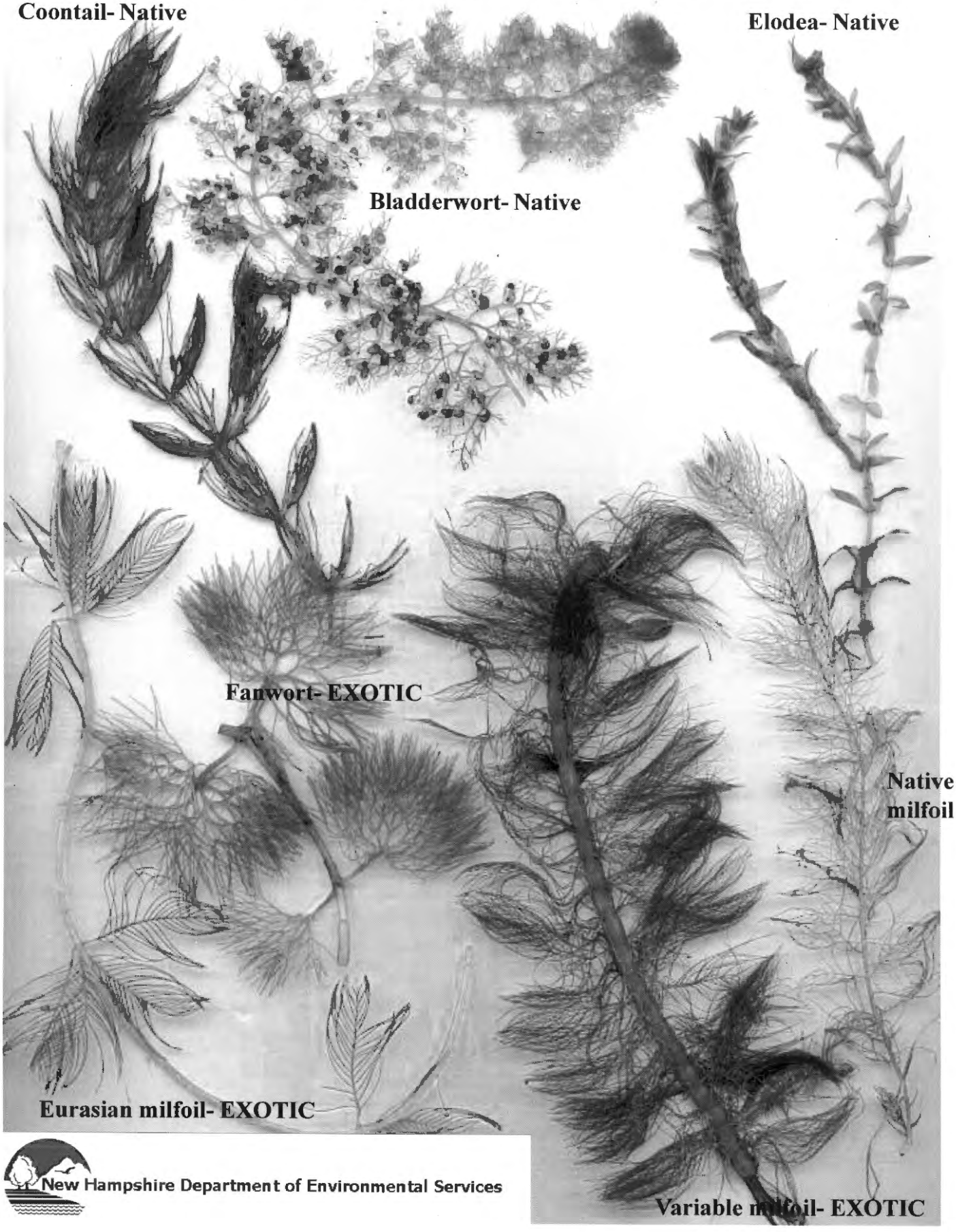


Variable milfoil
Myriophyllum heterophyllum
EXOTIC!

Waterweed
Elodea
Native

Native milfoil
Myriophyllum humile
Native

Commonly Confused Look-Alike Aquatic Plants

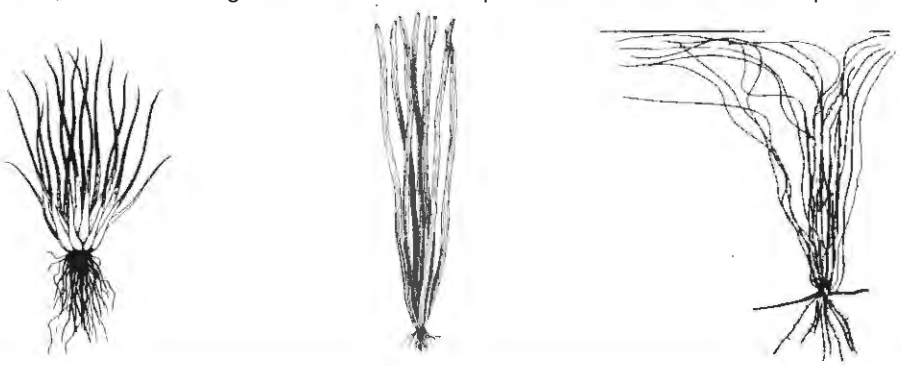


New Hampshire Department of Environmental Services

1A. Submerged	Plants growing completely beneath the water's surface. Flowers may appear above the surface floating on the water accompanied by small leaves for support. The majority of the leaves remain submerged. .....See question **2A.** page 7
1B. Floating-leaved	Plants with at least some leaves floating on the water's surface, with or without flowers ..... See question **15A.** page 19
1C. Emergent	Plants with their leaves out of the water, but still rooted to the pond bottom .....See question **22A.** page 23

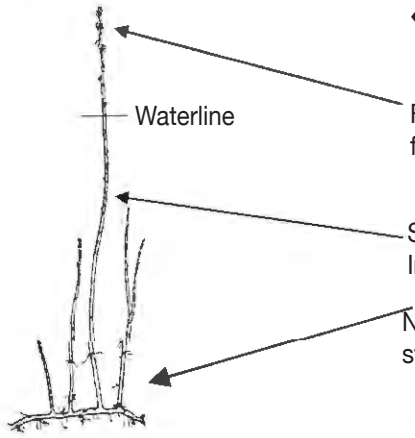
SUBMERGED PLANTS

2A. Basal leaves are present; that is, all leaves emerge from the base of the plant ..... See question **5A**. page 8



2B. Leaves are positioned on a stem, or appear as mere bumps on a stem ..... See question **3A**. page 7

3A. Leaves are mere bumps.



♦ **Leafless Milfoil**
(Myriophyllum tenellum)

Found in shallow water and may emerge when flowering, although flowering is rare.

Small bumps on stems are actually leaves.
In many cases the tip of the plant is slightly curved and looks like a hook.

Note the root system which connects several stems together. It is rare to find only one stem.

3B. Leaves are more well defined.....See question **4A**. page 7

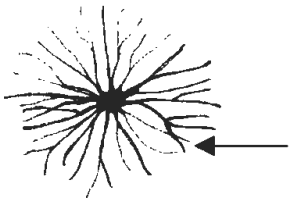
4A. Leaves are flattened and undissected, showing no divisions, but may have toothed margins. See examples below .....See question **6A.** page 10

4B. Leaves are finely dissected, that is they are made up of small divisions. These divisions can appear as spikes connected to a mid-stem or vein, much like a feather, or they can look like a tree branch without leaves. In all cases the leaves are not flat .....See question **11A**. page 15

Feathered

These divisions do not have to be exactly opposite each other.

SUBMERGED PLANTS



5A. Submerged plants with short basal leaves. Leaves are **not** limp or ribbon like.

♦ Pipewort (Eriocaulon)

Two species are present in Massachusetts.

Flowers are necessary for species identification.

Eriocaulon aouaticum is the most commonly found species.

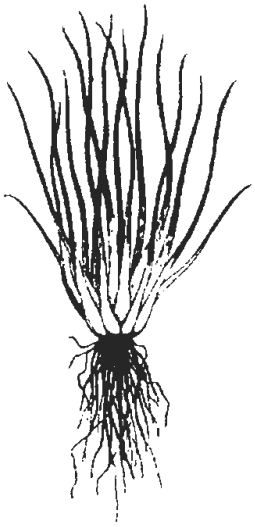
When held to the light, leaves will have cross veins.

In shallow water, Pipewort may grow an emergent button-like white flower. The separate flower stalk can grow to be 3' to 6' long.

Key feature--white roots with cross lines.

♦ Quillworts (Isoetes)

Like Pipewort
but **no** cross lining on the roots.



Leaves taper to a sharp point.

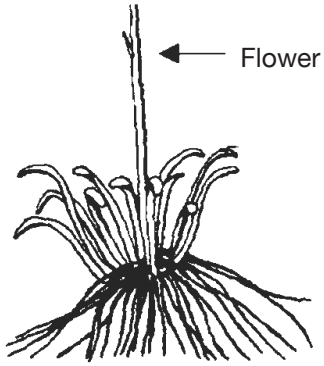
Look for an enlarged base containing spores.

Both plants have leaves that grow to be 1 1/2" — 3" high.

♦ Water Lobelia (Lobelia dortmanna)

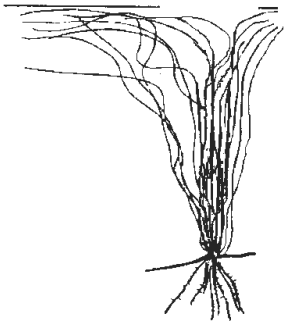
Each leaf consists of two tube like structures.

Another key feature is the curve or arch at the tip of each leaf.



5B. Submerged plants with long thread or ribbon like basal leaves.

Six different plants are included here, two thread like and four ribbon like. Many of them can be found in either a submerged or emergent form. Where applicable, pictures of each form are shown.



♦ Rush or Sedge *(Juncus or Eleocharis)*
Although listed here with the basal-leafed plants, the true leaves of this plant are really sheaths at the base of the stems. What appear to be leaves are really stems.

These plants are smaller, and many times sterile, versions of emergent plants. They appear thread-like (as opposed to ribbon-like) and limp. One difference between a Rush and a Sedge is the shape of the stem. Sedges are triangular and Rushes are round. This is difficult to observe in the submerged forms.

SUBMERGED PLANTS

Four different **ribbon-like** plants are included in this category and can be distinguished by holding the leaf up to sunlight and comparing to the samples below.

Wild Celery	Arrowhead	Pickerelweed	Burreed
			
Two distinct patterns	Central vein Broad sections	Central vein **No** broad sections	**No** central vein **No** broad section

♦ **Wild Celery** ***(Vallisneria americana)***

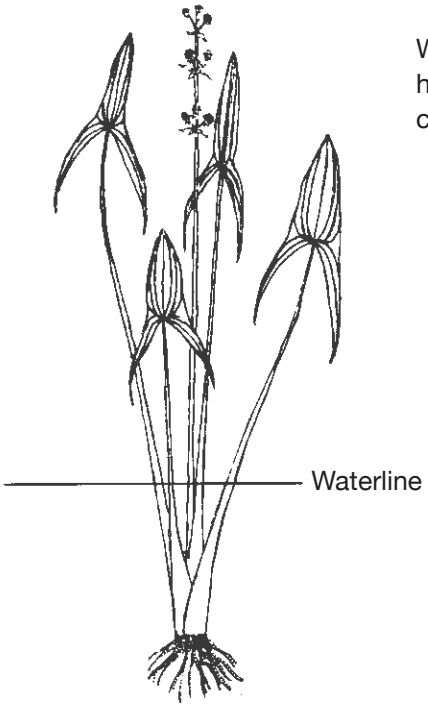
There is no emergent form but the tape-like leaves can reach the water's surface. The flowers are borne on corkscrew-like stems that reach the surface.

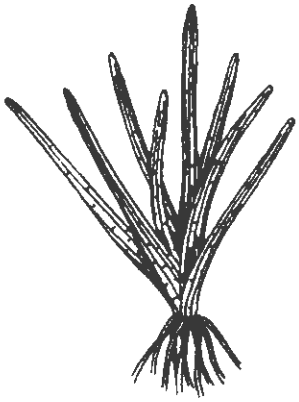
Leaves are 1/2"--1" wide.

When held up to the sunlight, two distinct patterns can be seen on the leaf.

♦ **Arrowhead** ***(Sagittaria)***

When viewed in sunlight, leaves have central a vein and broad cross sections.

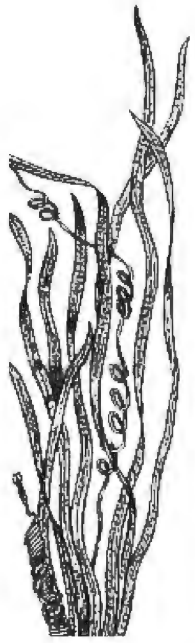




Submerged form-often a sterile form of the plant.

SUBMERGED PLANTS

♦ **Pickerelweed** ***(Pontederia cordata)***



Submerged Form

When viewed in sunlight,
leaves have a central vein
but no broad cross sections.

♦ **Burreed** ***(Sparganium)***

Submerged Form

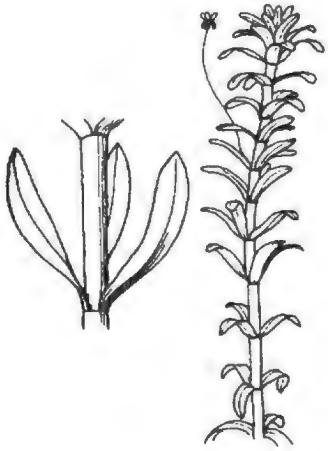
Emergent Form

When held up to the sunlight, these submerged leaves
have **no** central vein and **no** broad cross sections.

6A. Submerged plants with flattened, undissected (no divisions are present) appearing in whorls around the stem.

♦ **Waterweed** ***(Elodea)***

Two species of Waterweed are present in Massachusetts.
Each whorl has 3 leaves that are 1/2”-1” in length.

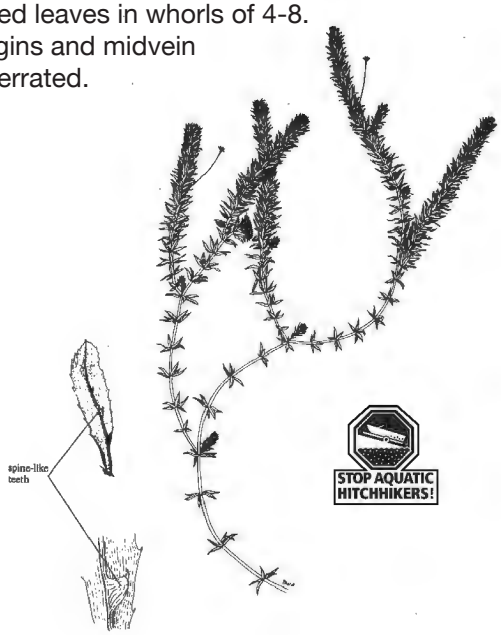


Elodea nuttallii
Leaves are 1/32”--1/16” wide
with pointed tips.

Elodea canadensis
Leaves are 1/16”--3/16” wide
with blunt tips

♦ **Hydrilla** ***(Hydrilla verticillata)***

Submersed leaves in whorls of 4-8.
Leaf margins and midvein
sharply serrated.



SUBMERGED PLANTS

♦ **South American Waterweed *(Egeria densa)***

Leaves in whorls of 4 or more around the stem.
Leaves are bright green and often 3x longer than the width.
No serrations present.

♦ Also see **Bushy Pondweed *(Najas)*** under question **8A**. page 11. This group of plants appear whorled due to the close clusters of opposite leaves -- don't be fooled.

6B. Leaves are arranged along a stem, singly or in pairs ..... See question **7A**. page 11

7A. Leaves are arranged in pairs with each leaf of a given pair on opposite sides of the stem ... See question **8A**. page 11

7B. Whole leaves arranged singly along the stem ..... See question **10A**. page 12

8A. Leaf margins have teeth which are visible under magnification. Leaves are narrow, ribbon like and enlarged at the base.

♦ **Bushy Pondweed *(Najas)***

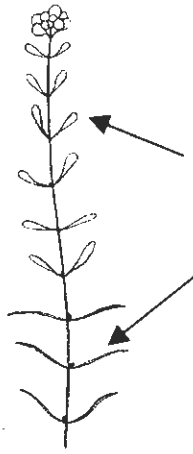
There are four species of Najas that can be found in Massachusetts. They are distinguished from each other by the shape of the leaf base and the arrangement of teeth along the leaf edge. A generalized picture of the plant is provided below along with detail pictures of each leaf type.

Leaf bases tapered.		Leaf bases lobed.	
N. guadalupensis	**N. flexilis**	**N. gracillima**	**N. minor**
			 
20 or more teeth along each margin	Leaf tapers to a long curved tip.	6-20 teeth	6-15 teeth

8B. Teeth are not visible under magnification ..... See question **9A**. page 12

SUBMERGED PLANTS

9A. Leaves are larger than 3/8” in length. (3/8”= _____) and are paddle or lance shaped.



♦ **Water Starwort *(Callitriche)***

Multiple shapes of leaves can be found on the same plant.

Nearer the surface, the leaves are paddle shaped.

The more submerged leaves are lanceshaped and about 1” long by 1/32” wide.

Water Starwort is often found as a small plant in shallow water with a rosette of leaves forming near the water’s surface.

♦ **False Loosestrife *(Ludwigia)***

This plant can be found submerged and emergent. It takes the same form in either habitat.

Opposite, paddle shaped leaves, are green to reddish in color.

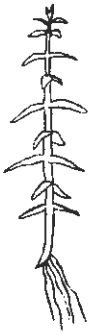
9B. Leaves are 3/8” or smaller in length. Plants are small overall.

♦ **Hedge Hyssop *(Gratiola)***

Erect, stiff plant with sharply point leaves.

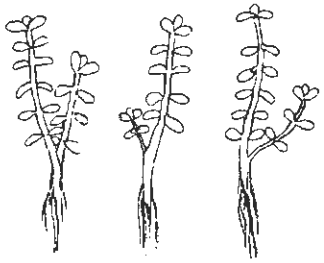
Every other pair of leaves is off set from the previous pair by 90 degrees.

Leaves are 3/16” (_____) or less in length.



♦ **Waterwort *(Elatine)***

Dwarf plant with leaves 3/8” (_____) or less in length.



10A. Leaves have no mid-vein when viewed under 10X or higher magnification.

♦ **Waterstar Grass *(Heteranthera dubia)***

Leaves are narrow measuring 1/16”-1/8” wide.
Leaves are 3”-4” long and form a sheath around the stem.
Plants can grow up to 3’ tall and are sometimes found sprawling along the mud.
Flowers are yellow when present.

♦ **Moss *(Musci)***
Found as a mat on the pond bottom or attached to rocks. Usually appears black but may have tips of green.

SUBMERGED PLANTS

10B. Leaves have a mid-vein when viewed under 10X or higher magnification.

There are 33 species of pondweeds found in Massachusetts. As a group, they can be distinguished by the presence of a mid-vein and a small fragile leaf-like structure found at the base of each regular leaf called a stipule. The leaf width varies greatly and in many cases a seed or fruit is needed to distinguish between species.

Ten species can be identified without fruits and are listed below. They are listed in order based on the average size of the submerged leaves, starting with the larger leafed species.

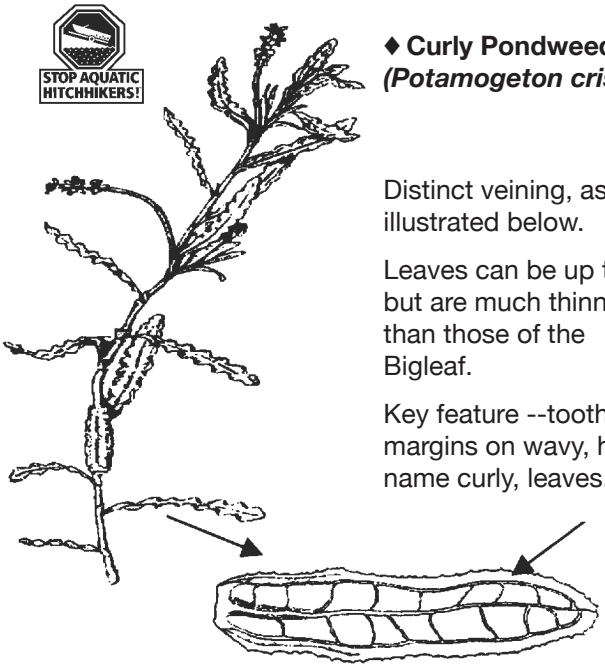
Magnification is necessary in thin leafed species, which can look like Waterstar Grass (see page 12). Only two thin leafed species are included here as examples. In most cases you will not be able to identify these beyond noting that they are a thin-leafed variety.

♦ Big-leaf Pondweed
(Potamogeton amplifolius)

Large arched leaves with wavy edges.

The leaves appear reddish brown to brown and are 3”- 4” long and up to 2” wide.

♦ Curly Pondweed
(Potamogeton crispus)



Distinct veining, as illustrated below.

Leaves can be up to 3” long but are much thinner (3/4”) than those of the Bigleaf.

Key feature --toothed margins on wavy, hence the name curly, leaves.

♦ Clasping Leaf Pondweed
(Potamogeton perfoliatis)

Look for 2”- 4” wavy edged, lance shaped leaves. Another identifying feature are the 3--7 prominent nerves found in the leaves.

♦ Heartleaf Pondweed *(Potamogeton pulcher)*

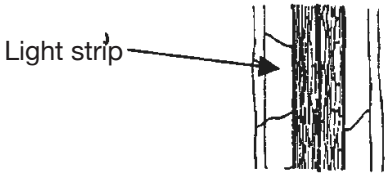
This pondweed is similar in shape to Oakes and Floating-leafed Pondweeds (page14) It’s floating leaves are the same size as Oakes (1/2” -- 2 1/2” long and up to 1” wide).

It has heart or wedge shaped floating leaves that are wider near the base then the leaf tip.

Distinguishing features are broad, flat submerged leaves that appear ragged and wrinkled. Black dots appear on the stems.

♦ **Ribbon Leaf Pondweed *(Potamogeton epihydrus)***

If floating leaves are present they are between 3/4”-3 3/16” long and up to 1 3/8” wide. A light colored center strip is present on the limp, submerged leaves which are 1/16”-3/8” wide and several inches long.



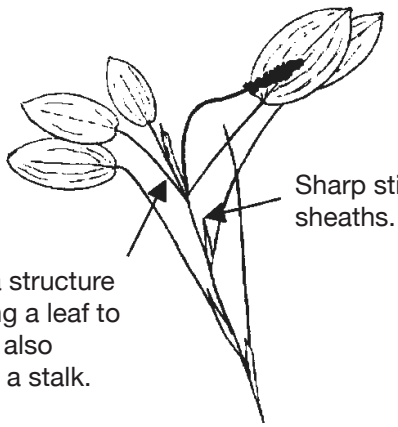
♦ **Fern Pondweed**
(Potamogeton robbinsii)

Leaves extend stiffly in opposite directions and appear flattened.

The leaf base makes a sheath around the stem.

Leaves are 1/8”-5/16” wide and several inches long. When magnified, fine serrations can be seen.

♦ **Floating-leaved Pondweed *(Potamogeton natans)***



Floating leaves are almost always present and are 2”- 3 1/2” long, 1”-2 1/2” wide, with a notched or heart shape base. Lighter coloration can be seen at the petiole and leaf junction.

Narrow, stem-like submerged leaves.

This variety is often found in 2’- 3’ of water.

The distinguishing feature is sharp stipules.

♦ **Oakes Pondweed *(Potamogeton oakesianus)***

Floating leaves taper into the petiole, the structure that connects the leaf to the stem.

Seeds with keels

Oakes Pondweed looks like a smaller version of the Floating-leafed species. The floating leaves are about half the size (1/2” –21/2” inches long and up to 1” wide.)

Narrow, stem-like submerged leaves.

This variety is often found in 2’-3’ of water.

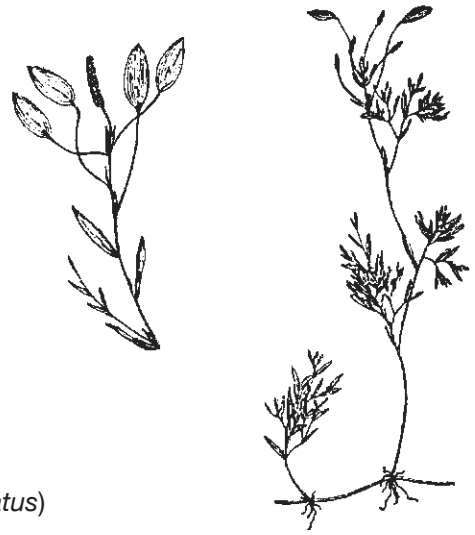
The distinguishing feature is the seed, which is obviously keeled.

SUBMERGED PLANTS

♦ **Variable Pondweed (Potamogeton gramineus)**

Leaves vary greatly and range from 1/2”-4” in length.

Plants are heavily branched with many leaves as compared to other species in this genus.



♦ **Sago Pondweed**
(Stuckenia pectinatus)
(previously known as *Potamogeton pectinatus*)

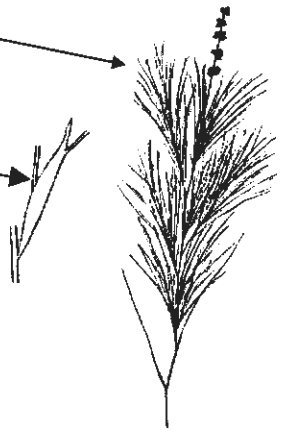
Leaves are very narrow and pointed.

Leaves are round in cross section and only 1/32” wide.

Unlike other Pondweeds, this species has bushy clusters of leaves toward the end of the stem.

This species has the usual Pondweed stipule but it forms a sheath by uniting with the leaf base.

If seeds are present, they have pointed tips



11A. Leaves are dissected (showing many divisions) and are accompanied by bladders. These bladders are round to kidney shaped structures and can be mixed in with the leaves or on separate branches.

Bladderworts *(Utricularia)* see next page for species identification.

There are several species of bladderworts in Massachusetts and only those that can be identified without microscopes are included in this key.

Leaves are actually stems. They are finely divided, with forked branching and, grow along the main stem.

Stem-like leaves have numerous small “bladders”. If for some reason the bladders are missing, this plant can be easily mistaken for Milfoil or Coontail. Look carefully and find several samples if possible.

SUBMERGED PLANTS

♦ **Common bladderwort *(Utricularia vulgaris)***

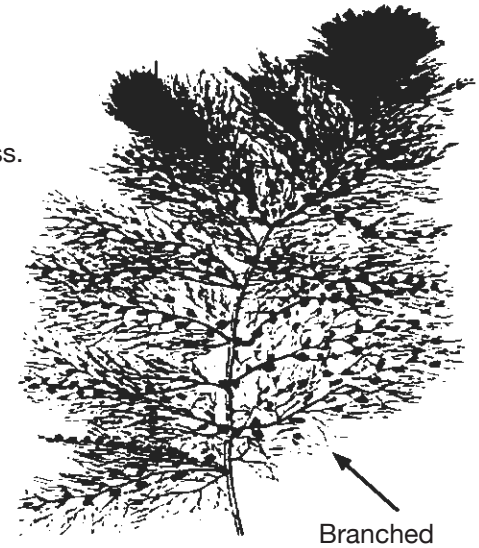
The biggest bladderwort.

It is not uncommon to find 21/2” stem-like leaves making the plant 4”-5” across.

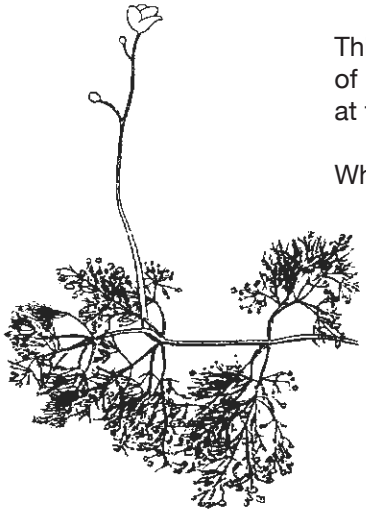
Bladders are large and the tip of the plant has a tuft of branches.

Bladders located close to leaf midvein

When present, flowers are yellow.



♦ **Purple bladderwort *(Utricularia purpurea)***



This bladderwort has clusters of branches with the bladders at the very tips of the branches.

When present, flowers are purple.

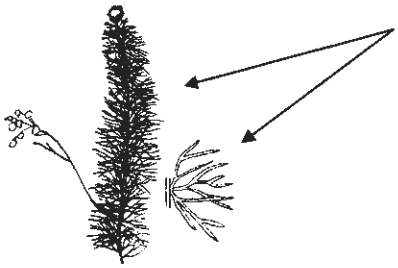
♦ **Little Floating bladderwort *(Utricularia radiata)***

Yellow flowers stand above a whorl of swollen, oblong leaves which serve as pontoons.

The underwater portion resembles Common Bladderwort but the leaf forks are more zigzag.

Bladders only appear on underwater leaves.

♦ **Flatleaf bladderwort *(Utricularia intermedia)***

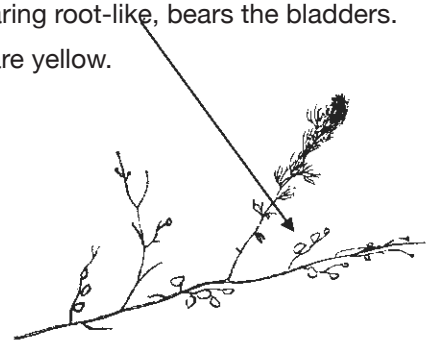


Two types of branches appear.

One is thickly branched, forked and blunt tipped.

The second type, appearing root-like, bears the bladders.

When present, flowers are yellow.

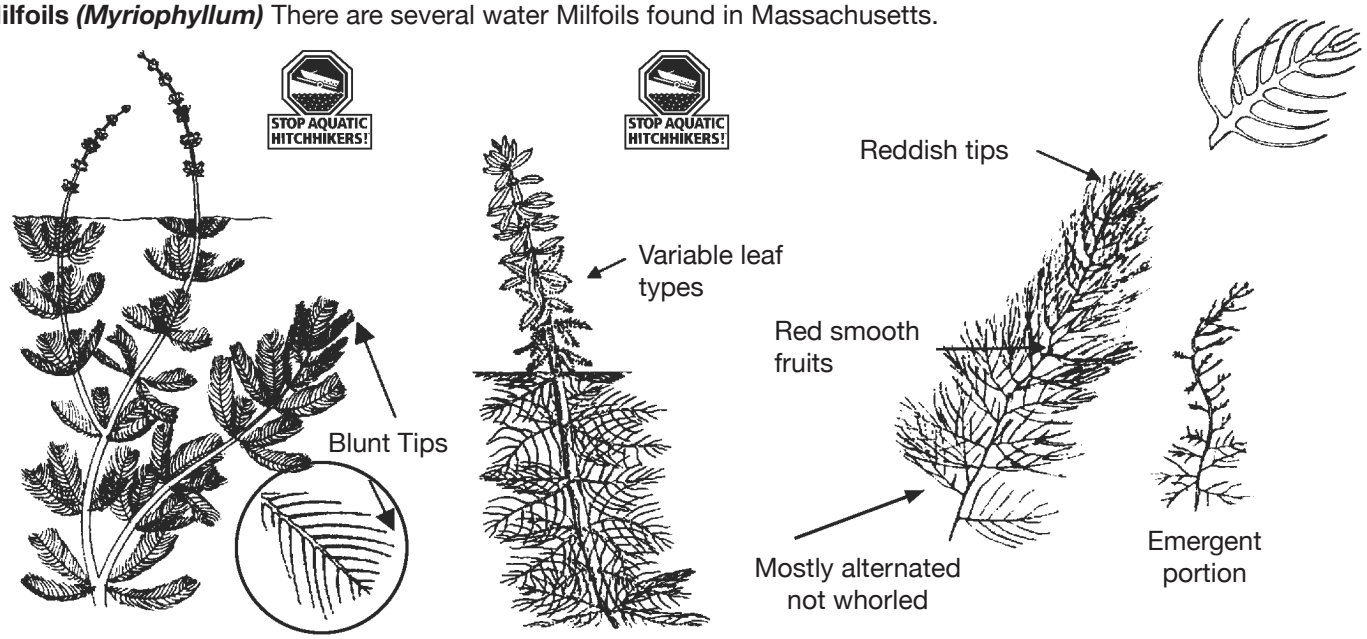


SUBMERGED PLANTS

11B. Leaves are dissected (showing many divisions) and are not accompanied by bladders. Look carefully at all the characteristics of the plants listed. Bladderworts sometimes lose their bladders and can be confused with Milfoil or Coontail..... See question **12A**. page 17

12A. Leaves look like a feather with each leaf made up of leaflets coming off a main rib.

♦ **Milfoils *(Myriophyllum)*** There are several water Milfoils found in Massachusetts.



♦ **Eurasian Milfoil**
(Myriophyllum spicatum)

Leaves are blunt-ended as if cut by a scissor and can be up to 2" in length.

Each leaf has 11 leaflets per. side.

Leaves are in whorls of 3-6.

Plants appear red tipped.

♦ **Variable Milfoil**
(Myriophyllum heterophyllum)

Stems are often thick and red, with multiple leaf forms on one stem.

Submerged leaves are 2" long and 1" wide.

Leaves are in whorls of 4-6.

♦ **Low Water Milfoil**
(Myriophyllum humile)

Stem thinly covered with limp leaves.

Smooth reddish fruits in the axils of the submerged leaves.

Leaves are in whorls of 4-6.

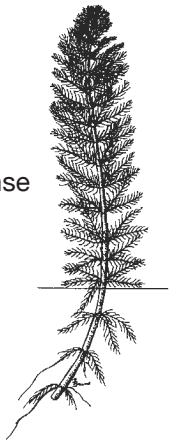
Plant may appear red tipped.

When emergent, tiny green lobed leaves will appear above the water.

♦ **Parrot Feather**
(Myriophyllum aquaticum)

Upper portion of plant with dense emersed leaves

Bright green, extending above the water 2-6 inches



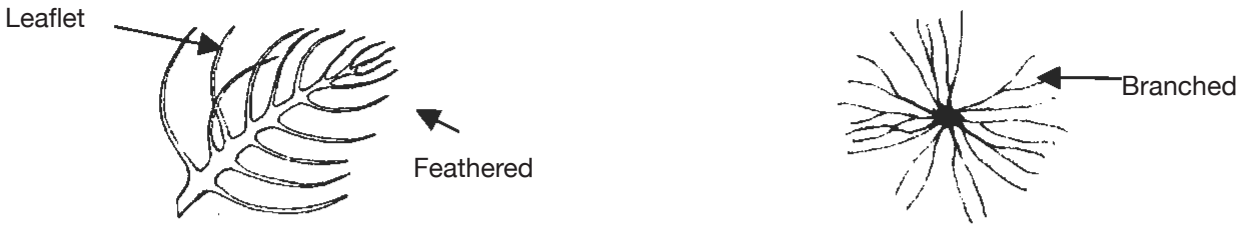
♦ **Mermaid Weed**
(Proserpinaca palustris)

These plants are noted for their variety of leaf forms on the same plant. Submerged leaves are deeply divided while the emergent leaves are not divided but do have serrations.

If emergent leaves are not present this can resemble Milfoils which are members of the same family. The key difference is the arrangement of leaves—Mermaid Weed leaves are alternate and not whorled.

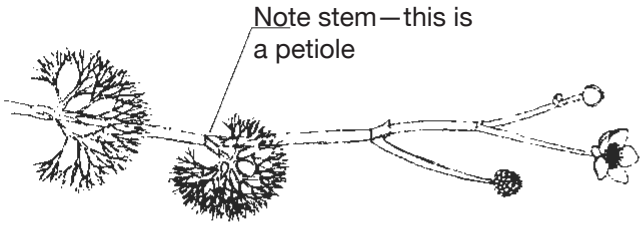
SUBMERGED PLANTS

12B. Leaves are not feather like but are branched ..... See question **13A**. page 18



13A. Leaves appear singly along the plant's main stem.

♦ **Water Buttercup *(Ranunculus)*** There are 3 species of water buttercups in Massachusetts.



This plant can be found trailing just below the surface and can be several feet long.

At the base of each leaf there is a small stem or stalk before the leaf begins.

Flowers are white.

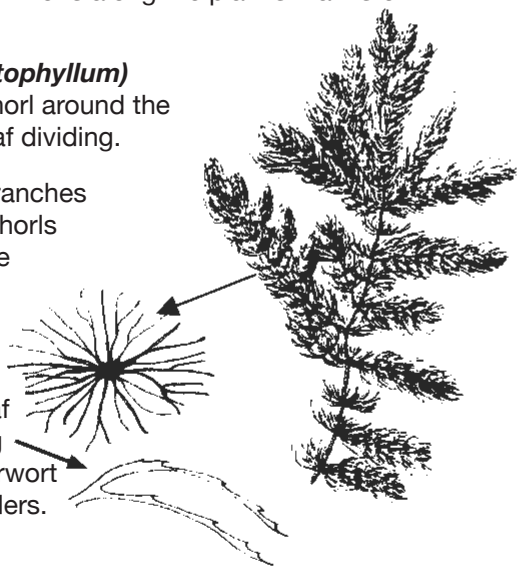
13B. Leaves appear in pairs or whorls along the plant's main stem ..... See question **14A**. page 18

14A. Leaves are in whorls along the plant's main stem.

♦ **Coontail *(Ceratophyllum)***
Leaves are in a whorl around the stem with each leaf dividing.

The ends of the branches have clusters of whorls giving the plant the appearance of a raccoon's tail.

Look for teeth on one side of the leaf to avoid confusing this with a Bladderwort that has few bladders.



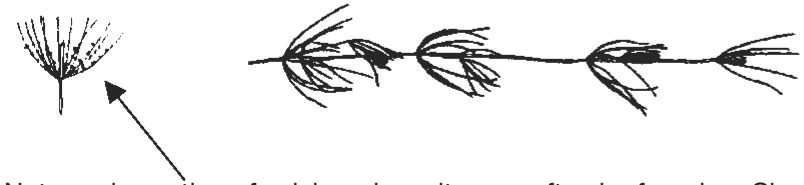
♦ **Water Marigold *(Megalodonta beckii)***

The leaf divides repeatedly and no petioles are present.

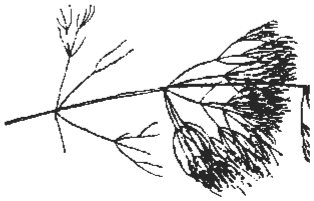
See the Water Buttercup above for an example of a petiole.

This plant can grow several feet tall and may emerge, showing a yellow flower.

♦ **Stonewarts *(Nitella) or Muskgrass (Chara)***
These are forms of algae and are found in tangled mats along the pond or lake bottom. They have the same general appearance. Chara has a distinctive musky odor and is brittle to the touch while Nitella is smooth and flexible



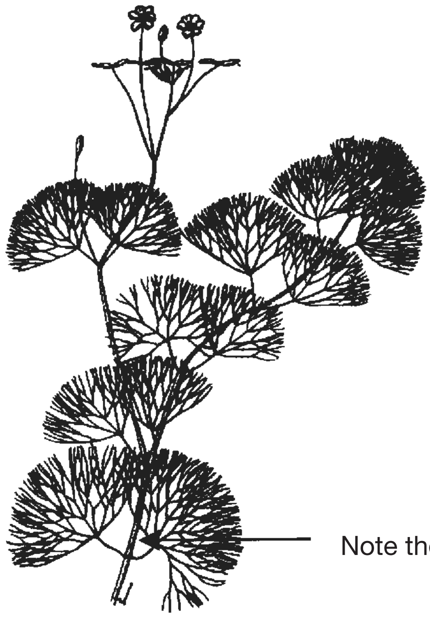
Note scaly coating of calcium deposits may often be found on Chara.
Chara *(Muskgrass)*



Nitella

SUBMERGED/FLOATING-LEAVED PLANTS

14B. Leaves are in pairs, with each leaf in a pair opposite the other.



♦ **Fanwort *(Cabomba caroliniana)***

The key feature is fan like leaves appearing on the stem in pairs.

In late summer this plant will surface and produce tiny white flowers with oval floating leaves.

Fanwort produces long stems that are found floating just under the water's surface and is often found in shallow water in thick mats.

Often appear bright green.

Note the opposite arrangement of leaves.

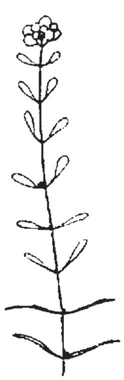
FLOATING-LEAVED PLANTS

15A. Plants with floating and submerged leaves, each leaf type with a different shape. .... See question **16A**. page 19

15B. Plants with only floating leaves, or leaves that appear to be floating and submerged but are of identical shapes .... See question **18A**. page 20

16A. Floating leaves form a rosette.

♦ **Water Starwort (Callitriche)**

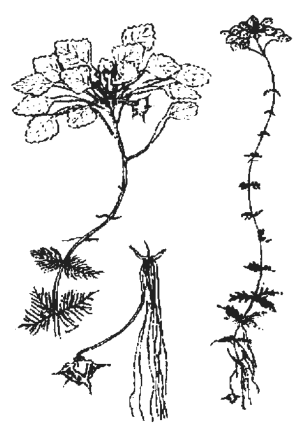


Thin leaves in pairs and tiny round leaves at the surface.

Leaves near the surface are paddle shaped.

♦ **Water Chestnut (Trapa natans)**

STOP AQUATIC HITCHHIKERS!



Rosettes of floating leaves with shiny upperside and fine hairs on underside.

Submerged leaves are feather¬like and whorled around the stem. A four barbed, one inch fruit may
be attached.

16B. Floating leaves do not form a rosette ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, See question **17A**. page 20

FLOATING-LEAVED PLANTS

17A. Emergent and floating leaves are serrated or deeply lobed.

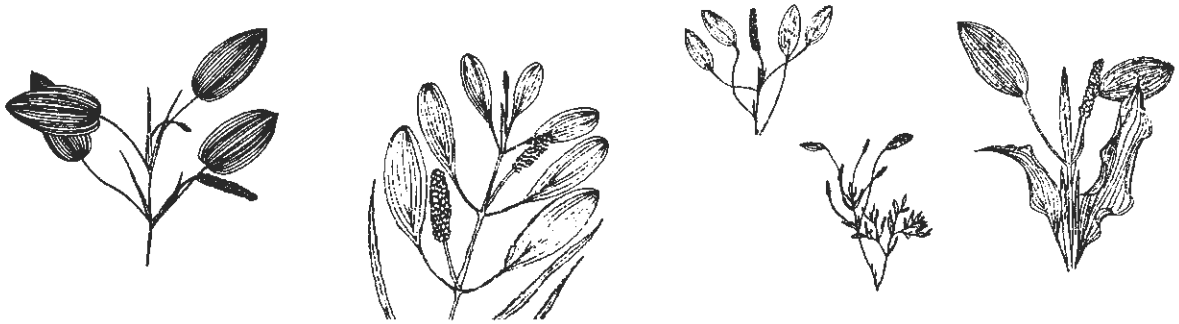
♦ **Mermaid Weed *(Proserpinaca palustris)***

These plants are noted for their variety of leaf forms on the same plant. Submerged leaves are deeply divided while the emergent leaves are not divided but do have serrations.

If emergent leaves are not present this can resemble Milfoils which are members of the same family. The key difference is the arrangement of leaves—Mermaid Weed leaves are alternate and not whorled.

17B. Floating leaves are not serrated and plants look like those below.

These leaves can be 1/2" – 4" long ..... See question **10B**. page 13

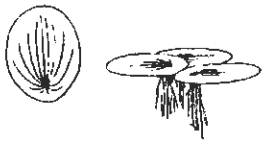


18A. Plants are not rooted to the bottom of the pond or lake.

Very small floating plants, not rooted to the pond bottom.

♦ **Duckweed**
(Lemna)
Only one root on underside.
Green on underside.

Size range: 1/32"-1/16"



♦ **Big Duckweed**
(Spirodela polyrhiza)
Several roots on underside.
Distinctive red spot on each leaf
Underside is also red.

Size range: 1/8"-3/8"

♦ **Watermeals**
(Wolffia)
No roots present.
Feels gritty like coarse sand or corn meal when rubbed between fingers.

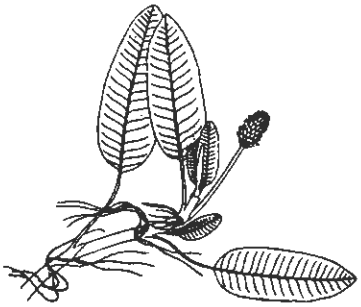
Size range: 1/16"-3/16"

18B. Plants are rooted to the bottom of the pond or lake ..... See question **19A**. page 20

19A. Leaves are ribbon-like and extend from the pond bottom to the water's surface.. .See question **5B**. page 8

19B. Leaves are not ribbon-like but are on stems that are rooted to the bottom. ..... See question **20A**. page 21

FLOATING-LEAVED PLANTS



20A. Leaves are lance-shaped.
♦ **Smartweed *(Polygonum)***

Lance-shaped, alternating leaves attached at swollen joints on stem.

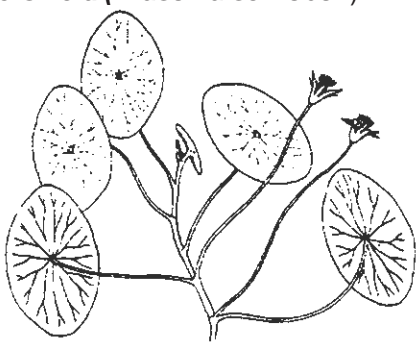
Leaf lengths are less than 10X the leaf width.

When present, flowers are small, pink and appear in a cluster.

20B. Leaves are broad or elliptical ..... See question **21A**. page 21

21A. Stems are attached to the middle of the leaf and the leaf is without any cuts that form lobes or a heart shape.

♦ **Watershield *(Brasenia schreberi*)**



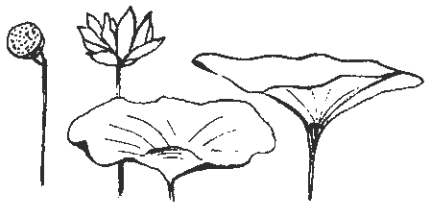
Leaves are 2”--3” long with a jelly-like substance on the underside and stem of the plant.

Dull red flowers may be present.

♦ **American lotus *(Nelumbo lutea)***

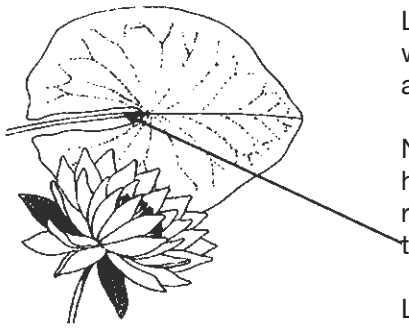
Large, typically 6”--24” wide, circular leaves.

When present, flowers are yellow.



21B. Stem is attached closer to the lobed end of the leaf . The leaves are also cut to form lobes or a heart shape.

♦ **White Water Lily *(Nymphaea odorata*)**

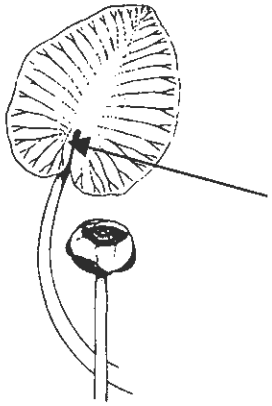


Large round leaves with pointed lobes and white flowers.

Nymphaea has veins that radiate from where the stem attaches.

Lobes rarely overlap.

♦ **Yellow Water Lily *(Nuphar variegata*)**
(also known as Cow Lily and Spatterdock)



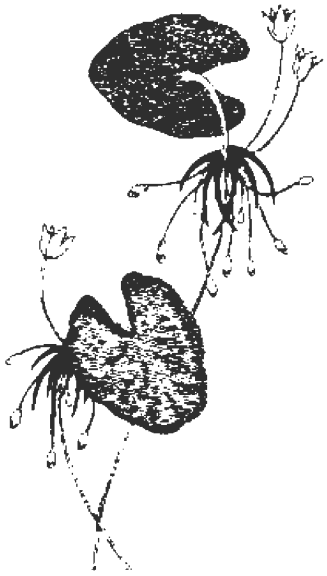
Large, 63/4”-7 5/8” round leaves with round lobes and yellow flowers.

Lobes often overlap.

A center vein is prominent in *Nuphar*.

FLOATING-LEAVED PLANTS

♦ **Little Floating Heart *(Nymphoides cordata)***

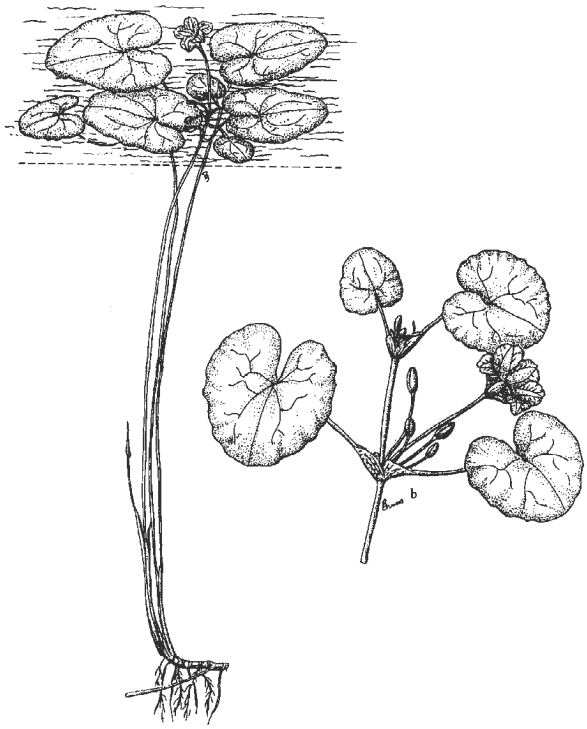


Leaves are the size of a silver dollar.

White flowers are much smaller than the White Water Lily.

Roots may be found in a bunch on the stem just below the waters surface.

♦ **Yellow Floating Heart *(Nymphoides peltata)***



Flower Yellow; stems lacking root clusters at water's surface

EMERGENT PLANTS

Plants that are rooted to the bottom of the pond or lake and have leaves that extend out of the water.
Since many of these plants grow near the water's edge, they can be completely out of the water during drought conditions. This section includes the rushes, grasses, and sedges. These are among the most difficult to distinguish at the species level. The more obvious ones are included here but beware that you will encounter many plants that are not included here.

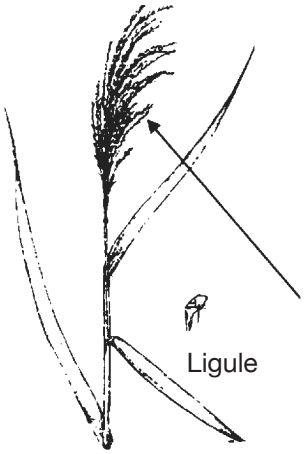
22A. Leaves are long and narrow or non existent ..... See question **23A**. page 23

22B. Leaves are broad or lance shaped ..... See question **29A**. page 27

23A. Leaves are long and narrow ..... See question **24A**. page 23

23B. Leaves are non existent ..... See question **28A**. page 25

24A. A ligule (appendage at the site where a leaf joins the stem) is present



♦ **Common Reed *(Phragmites australis)***

Found in colonies, this reed ranges from 6'-12' tall.

Grayish green leaves are up to 24" long and 2" wide.

Flower head is purplish when young, turning white and fluffy when older.

This is the only member of the Grass family included. It is a species that is easily identified and is of importance due to its rapid growth. For additional grasses, see the keys referenced at the end of this key.

24B. A ligule (appendage at the site where a leaf joins the stem) is absent ..... See question **25A**. page 23

25A. Stem is round ..... See question **26A**. page 23

25B. Stem is triangular ..... See question **27A**. page 24

26A. Round stems that are hollow and jointed

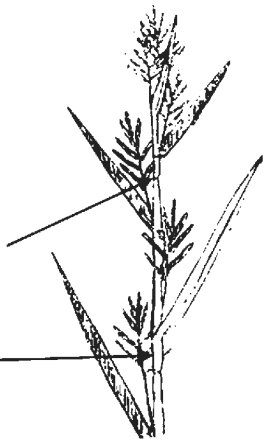
♦ **Three Way Sedge *(Dulichium arundinaceum)***

Plants grow to 3' tall with stiff flat leaves coming off three sides of the stem. This is easier to see if you look down on the top of the plant.

Leaves are 2"-5" long and less than 3/8" wide.

Flowers appear in July and August, hidden in the linear spikelets in the upper leaf axils (place where the leaves meet the stem).

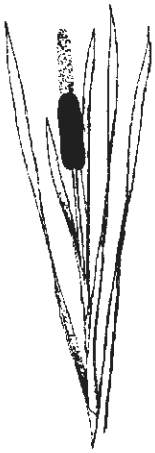
Notice the conspicuous sheath on the stems.



EMERGENT PLANTS

26B. Round solid stems

♦ **Cat Tail *(Typha)***



Cat tails are recognized by the brown cylinders found on the stems. These are the fruits.

It is difficult to distinguish specific species. Two species *(Typha latifolia and T.angustifolia*) are common and have been known to hybridize to form a third species. Their differences are indistinguishable by the naked eye

♦ **Canada Rush *(Juncus canadensis)***

The leaves of this particular Rush are round in cross section.

This species grows to 3' tall and is found in small groups.

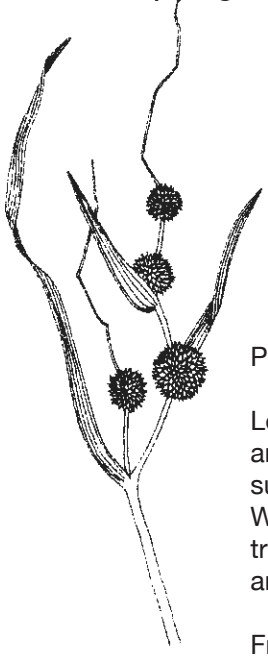
27A. Spikes of scales/flowers or burrs growing in a ball shape

♦ **Sedges *(Carex)***

Three types of sedges

Notice the variation in the spikes. In all cases spikes are elongated. Compare these to the shorter more compact spikelets of the Canada Rush shown above or the Twig Rush on the following page.

♦ **Burreed *(Sparganium)***



Plants can grow to 4' tall.

Leaves can be submerged and emergent. When submerged they are limp. When emergent they are triangular in cross section and keeled along the back.

Fruits are needed to identify to species level.

EMERGENT PLANTS

27B. Spikelets are found on a triangular stem.

Leaves 8" long

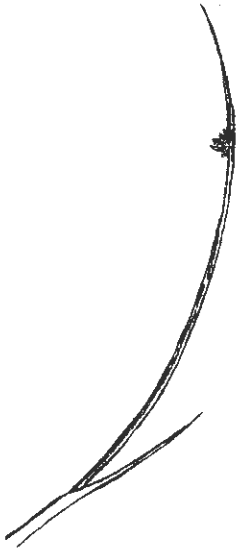
♦ **Twig Rush *(Cladium)***

The key to this identification is the groove found on the base of the leaf. The tips of the leaves may by rolled inward.

Leaves 16"-18" long

With sharp tip

♦ **American Bulrush *(Scirpus pungens)***



This triangular stem has sharp angles as well as a sharp tip. The leaves are long and ribbon like at the base but shorter when found higher up on the stem.

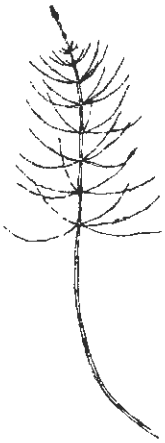
Without sharp tip

♦ **Wool grass Bulrush *(Scirpus cyperinus*)**

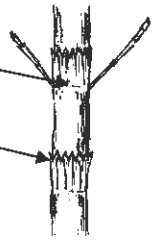
Oval woolly spikelets give this plant its common name. The leaves are
long, narrow and rigid.

28A. Leaves non existent and branches are in whorls.

♦ **Horsetail *(Equisetum)***



Hollow stems with conspicuous joints and toothed sheath



Branches can curve up or down.

EMERGENT PLANTS

28B. Leaves are non existent and branches are not in a whorl.

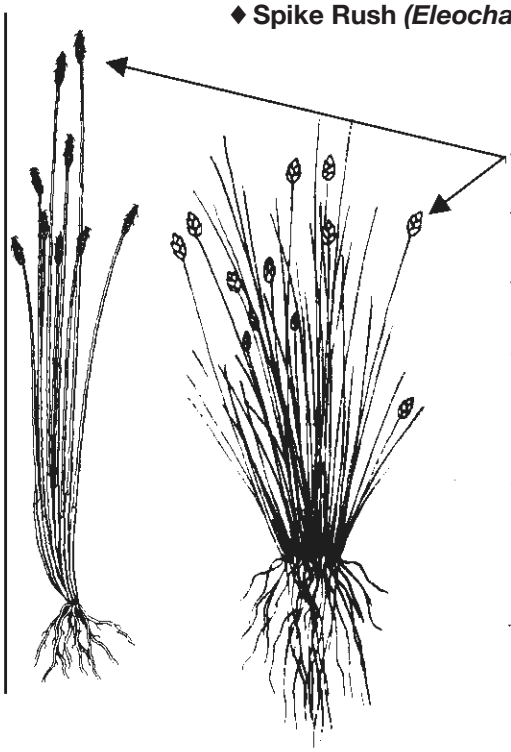
♦ **Rush *(Juncus)***

Look for a round stem, 3/8”--1” thick with vertical lines or ribs.

A single cluster of flowers appears 1/3 of the way down the stem.

This plant often grows in a dense cluster called a tussock.

♦ **Spike Rush *(Eleocharis)***

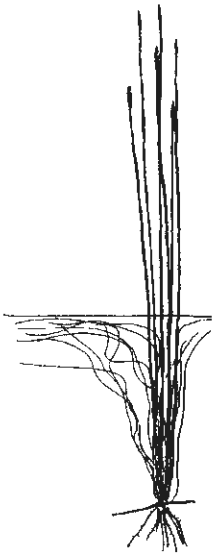


Soft green stems grow in clumps.

Oval spikelets are found on stem tips.

Two species are shown. The taller, Beaked Spike-rush can grow to 31/2’ tall. The second, Dwarf Spike-rush, is usually less than 3” tall.

Many more species can be found in Massachusetts. Detailed inspection of the spikelet is needed to identify the plant to species level.

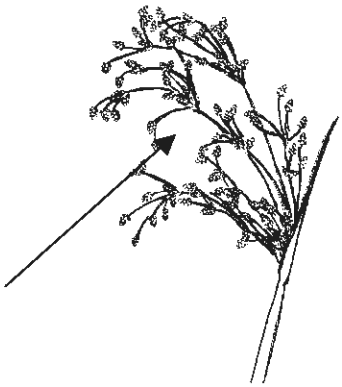


Both **Juncus** and **Eleochari**s have submerged and emergent forms depending on the individual species.

The picture to the left illustrates a typical plant exhibiting both forms.

♦ **Softstem Bulrush *(Scirpus tabemaemontanii)***

Round soft stems grow to be 8’ tall and 3/4” thick. Look for drooping oval spikelets appearing in clusters.



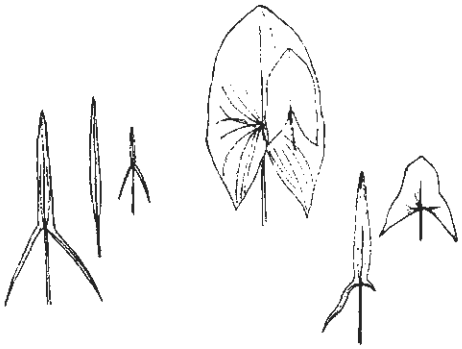
EMERGENT PLANTS

29A. Leaves broad with lobes.

♦ **Arrowhead *(Sagittaria)***
Key feature—pointed triangular lobes and veins radiating from one point and curve up and down.

Different species have different leaf shapes. They are often arrowhead shaped or elliptical. A few variations are illustrated here.

Flowers are white.



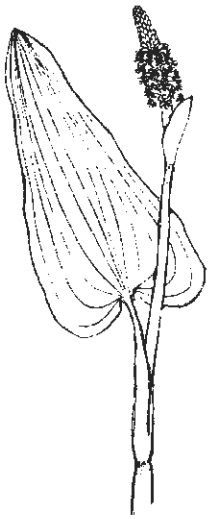
♦ **Arrow Arrum**
(Peltandra virginica)

Key feature—rounded triangular lobes and veins radiating from a central vein **not** a central point.

A vein outlines the leaf.

Like Arrowhead, the leaves can take various forms but always have the key features mentioned above.

Flowers are green.



♦ **Pickerelweed**
(Pontederia cordata)

Rounded lobes with veins radiating from one point and curving upward.

EMERGENT PLANTS

29B. Leaves are broad but not lobed. Leaves can be alternating, opposite or whorled

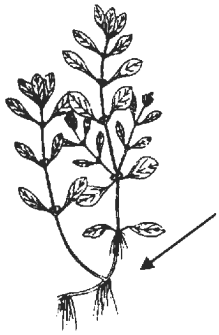
♦ **Smartweed *(Polygonum)***

Leaves are alternating, lance shaped, 4”--6” long and 1-- 13/4” wide.

Flowers are found in spikes and are white or pink.

Several species have pinhole size glands on the leaves. Others will also have spines on the stems.

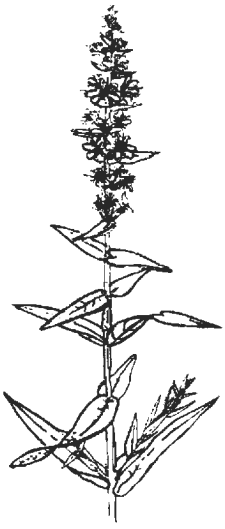
♦ **False Loosestrife *(Ludwigia*)**



Leaves are opposite, paddle shaped leaves that are green to reddish in color.

Leaves can be found submerged and emerging. This is due to the roots found along the stem which cause the plant to sprawl and form mats.

♦ **Purple Loosestrife *(Lythrum salicaria)***

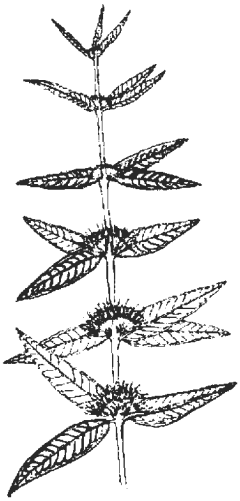


Leaves are opposite but sometimes found in whorls of three.

Up to 4” long, the leaves are heart shaped at their base. Stems are waist high and are covered with fine hairs.

Flowers are purple.

♦ **Swamp Loosestrife *(Decodon verticillatu*s)**



Leaves are opposite or in whorls of three

Up to 4” long, the leaves taper to a point. These can be distinguished from Purple Loosestrife by the absence of a heart shaped base and the presence of a short petiole (stalk at the base of the leaf).

The pink flowers appear in the axils (joints) of the leaves and **not** in a spike at the branch tip.

The stem, at the water line and below, is spongy

References:

Crow, G.E. and C.B. Hellquist. 1981. *Aquatic Vascular Plants of New England: Part 2. Typhaceae and Sparganiaceae.* New Hampshire Agricultural Experiment Station, University of New Hampshire, Durham, New Hampshire. Station Bulletin 517.

Crow, G.E. and C.B. Hellquist. 1982. *Aquatic Vascular Plants of New England: Part 4. Juncaginaceae, Scheuchzeriaceae, Butomaceae, Hydrocharitaceae.* New Hampshire Agricultural Experiment Station, University of New Hampshire, Durham, New Hampshire. Station Bulletin 520.

Crow, G.E. and C.B. Hellquist. 1983. *Aquatic Vascular Plants of New England: Part 6. Trapaceae, Haloragaceae, Hippuridaceae.* New Hampshire Agricultural Experiment Station, University of New Hampshire, Durham, New Hampshire. Station Bulletin 524.

Crow, G.E. and C.B. Hellquist.1985. *Aquatic Vascular Plants of New England: Part 8. Lentibulariaceae.* New Hampshire Agricultural Experiment Station, University of New Hampshire, Durham, New Hampshire. Station Bulletin 528.

Fassett, N. 1957. *A Manual of Aquatic Plants.* The University of Wisconsin Press, Madison, Wisconsin.

Hellquist, C.B. and G.E. Crow. 1980. A*quatic Vascular Plants of New England: Part 1. Zosteraceae, Potamogetonaceae, Zannichelliaceae, Najadaceae.* New Hampshire Agricultural Experiment Station, University of New Hampshire, Durham, New Hampshire. Station Bulletin 515.

Hellquist, C.B. and G.E. Crow. 1981. *Aquatic Vascular Plants of New England: Part 3. Alismataceae.* New Hampshire Agricultural Experiment Station, University of New Hampshire, Durham, New Hampshire. Station Bulletin 518.

Hellquist, C.B. and G.E. Crow. 1982. *Aquatic Vascular Plants of New England: Part 5. Araceae, Lemnaceae, Xyridaceae, Eriocaulaceae, and Pontederiaceae.* New Hampshire Agricultural Experiment Station, University of New Hampshire, Durham, New Hampshire. Station Bulletin 523.

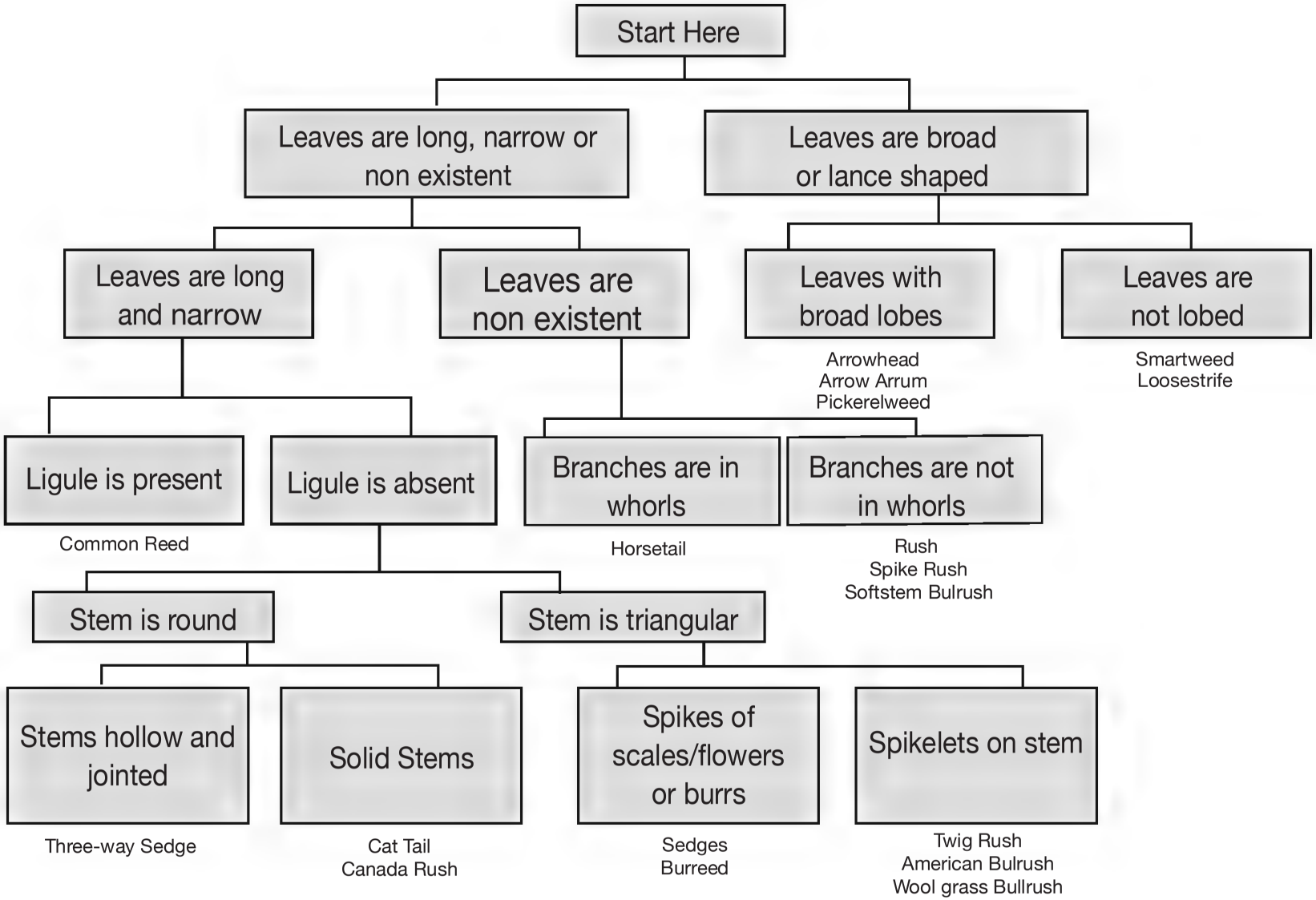
Hellquist, C.B. and G.E. Crow. 1984. *Aquatic Vascular Plants of New England: Part 7. Cabombaceae, Nymphaeaceae, Nelumbonaceae, and Ceratophyllaceae.* New Hampshire Agricultural Experiment Station, University of New Hampshire, Durham, New Hampshire. Station Bulletin 527.

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

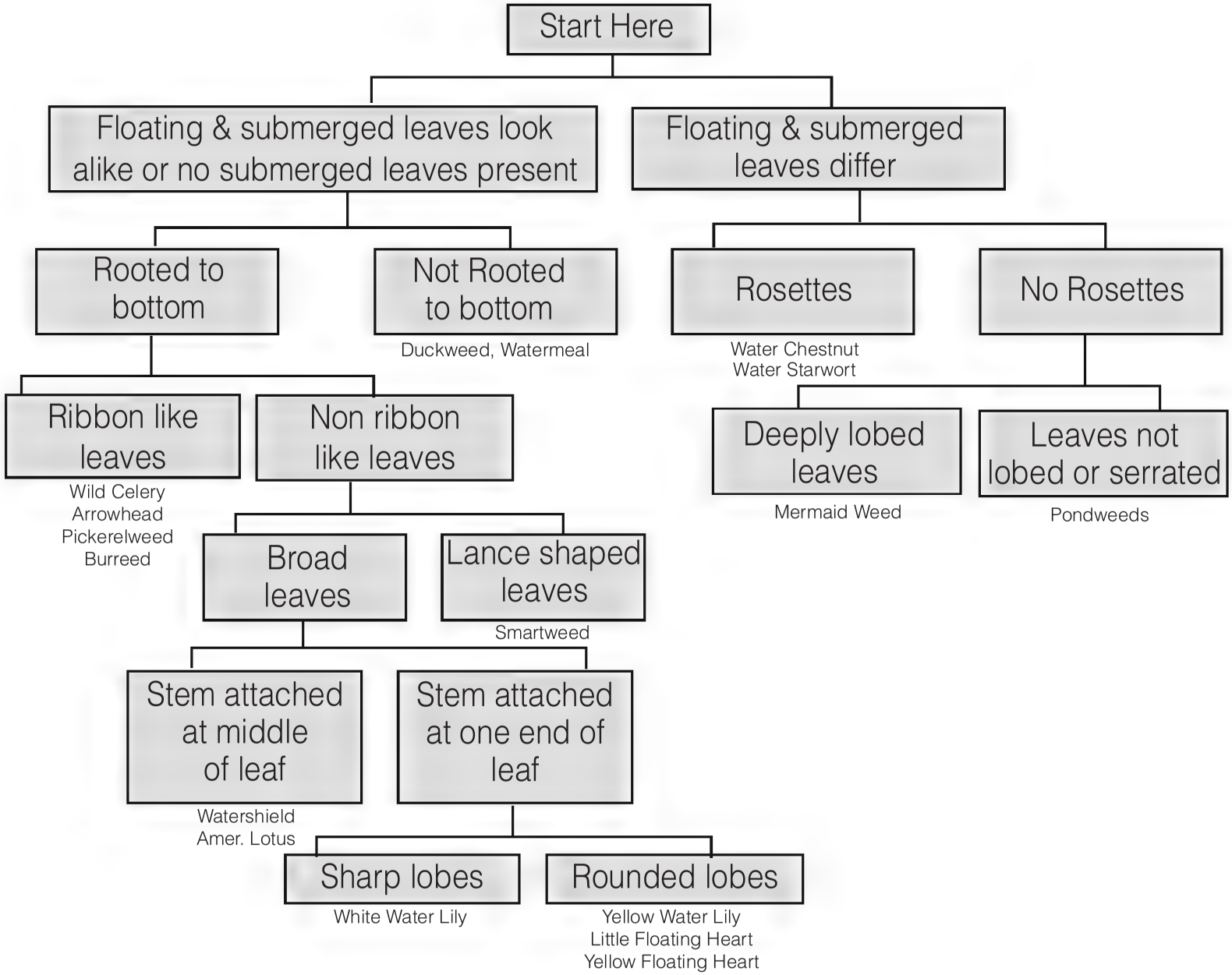
Magee, D. 1981. *Freshwater Wetlands, A guide to Common Indicator Plants of the Northeast.* University of Massachusetts Press, Amherst, MA.

Tiner, R. W. Jr. 1987. *A Field Guide to Coastal Wetiand Plants of the Northeastern United States.* University of Massachusetts Press, Amherst, MA.

Quick Reference Chart
Emergent Plants



Quick Reference Chart
Floating Leaved Plants



Quick Reference Chart Submerged Plants