

NH Lakes, Ponds & Rivers Infested with **Invasive Aquatic Plants**

Therese Thompson

USGS data when these **invasives** are in NH

Purple Loosestrife 1875

Yellow Iris 1965

Fanwort 1965

Variable Milfoil 1965

Curly-leaf Pondweed 1984

Eurasian Milfoil 1992

European Naiad 1992

Water Chestnut 1995

Brazilian Elodea 2001

Reed Canarygrass 2001

Flowering-rush 2020

USGS data **invasives** are **NOT** in NH

Hydrilla in MA and Maine

European Water Clover in MA, **more** than 20 locations

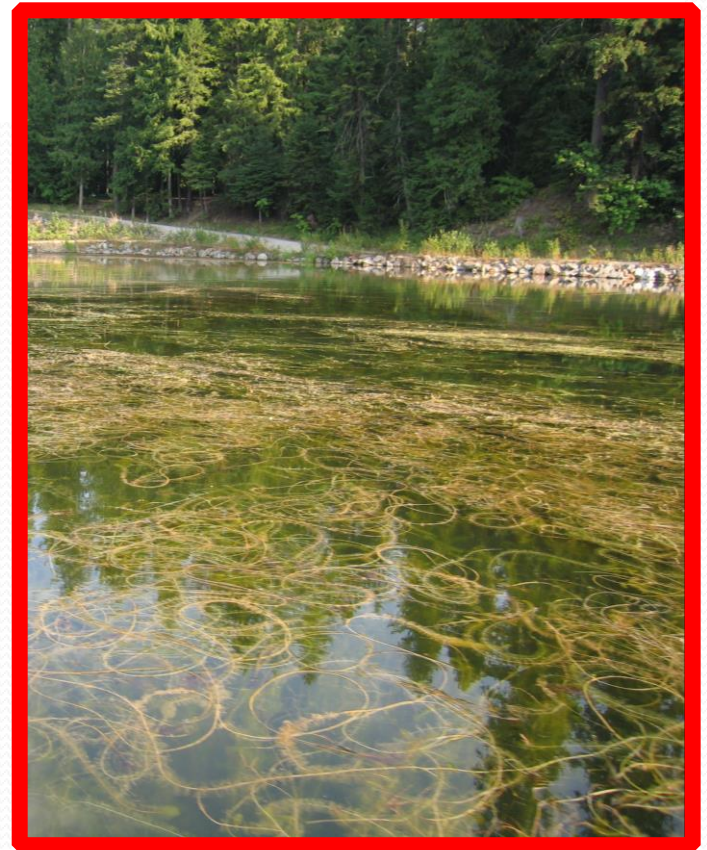
European Frog-bit in VT and Maine

Yellow Floating Heart in MA, VT, and Maine

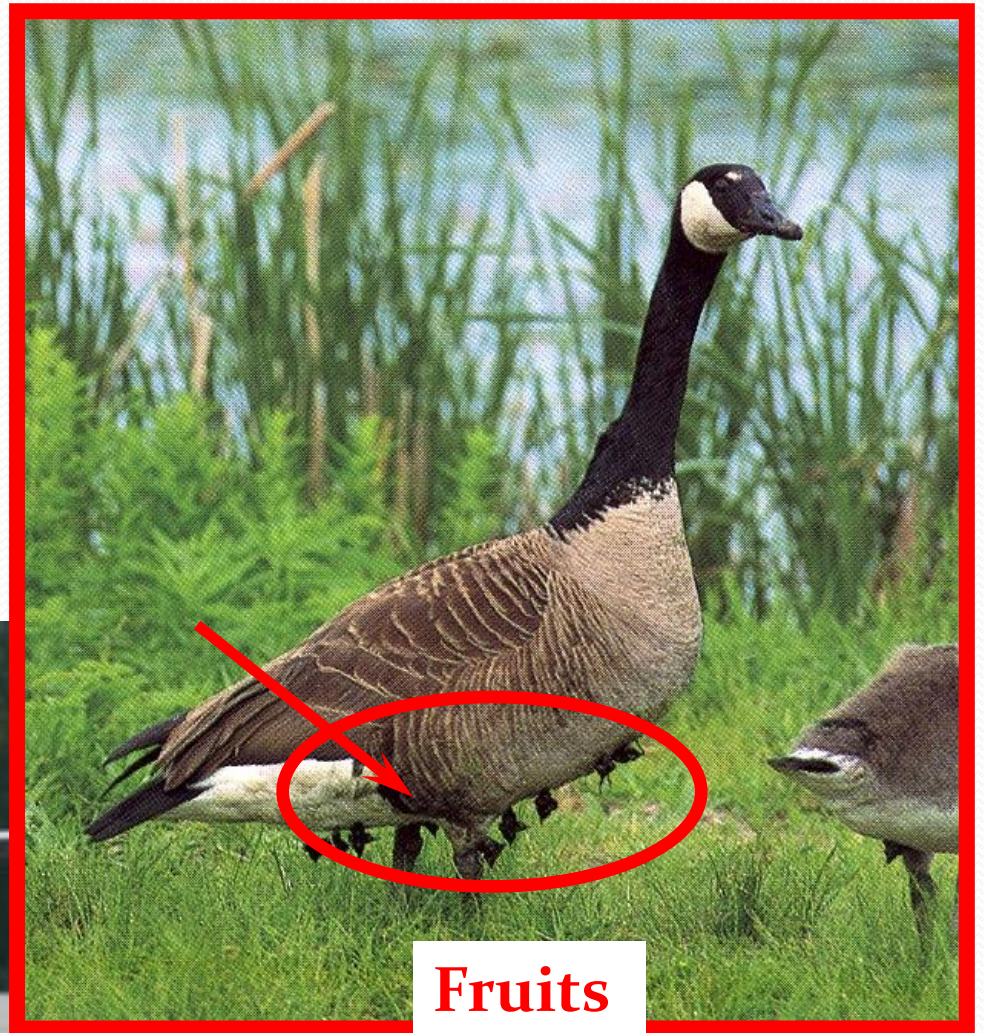
Parrot feather in MA

Identification of **Invasive** & **Native** **Aquatic** & **Shoreline** **Plants**

Invasive

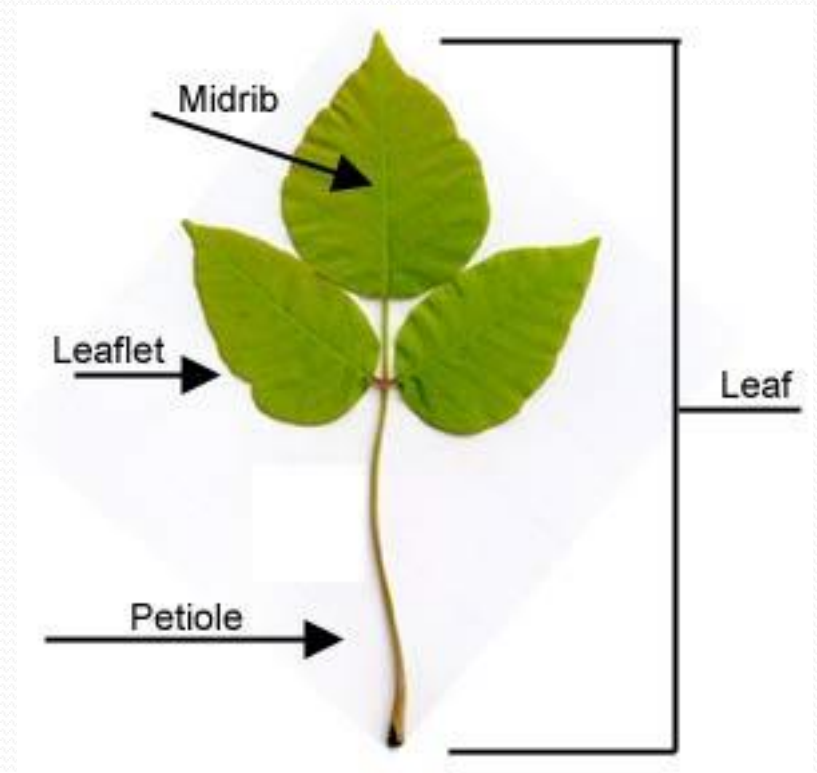
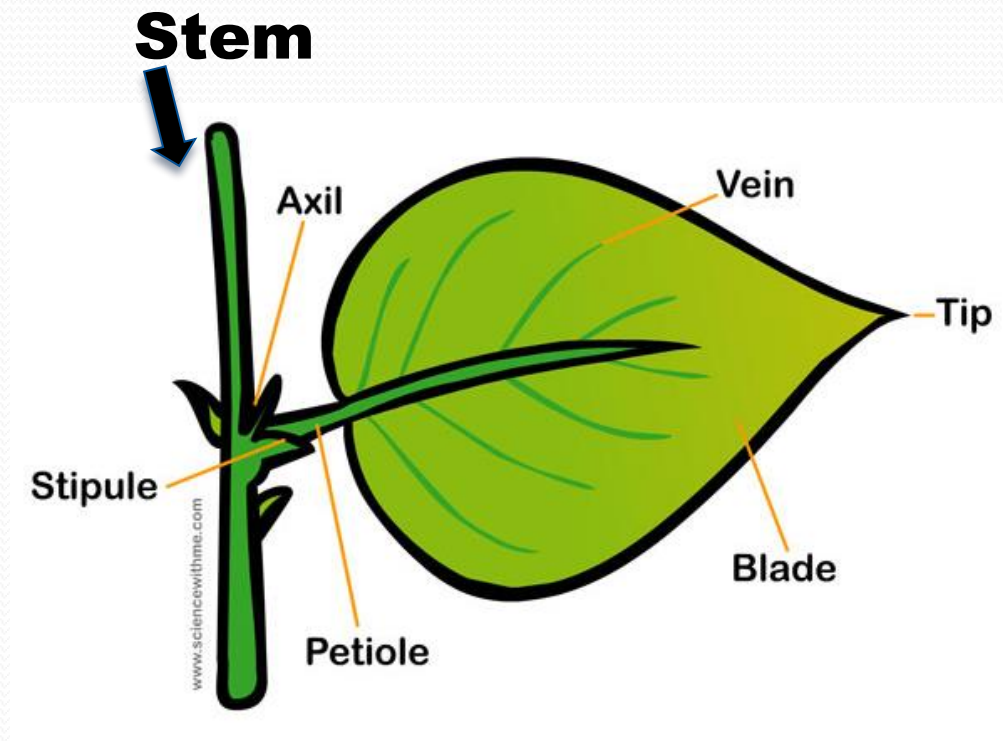


Transport

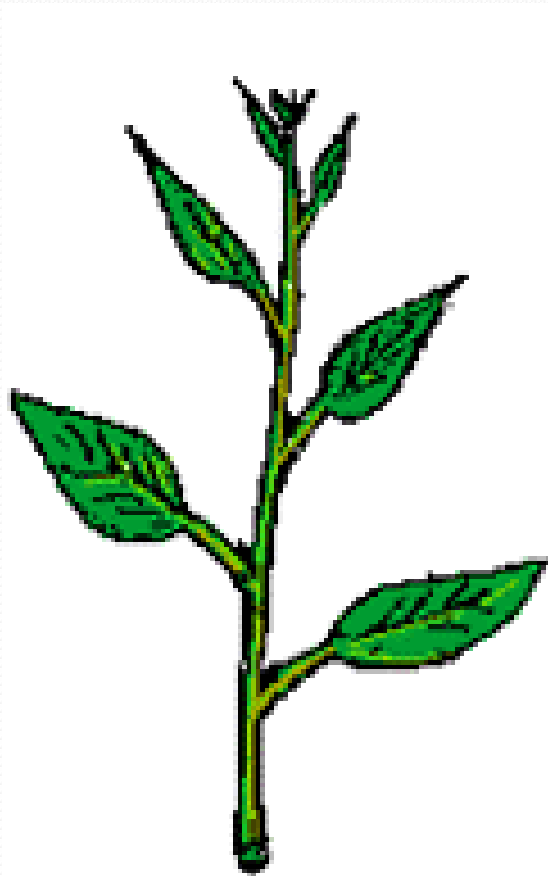


Fruits

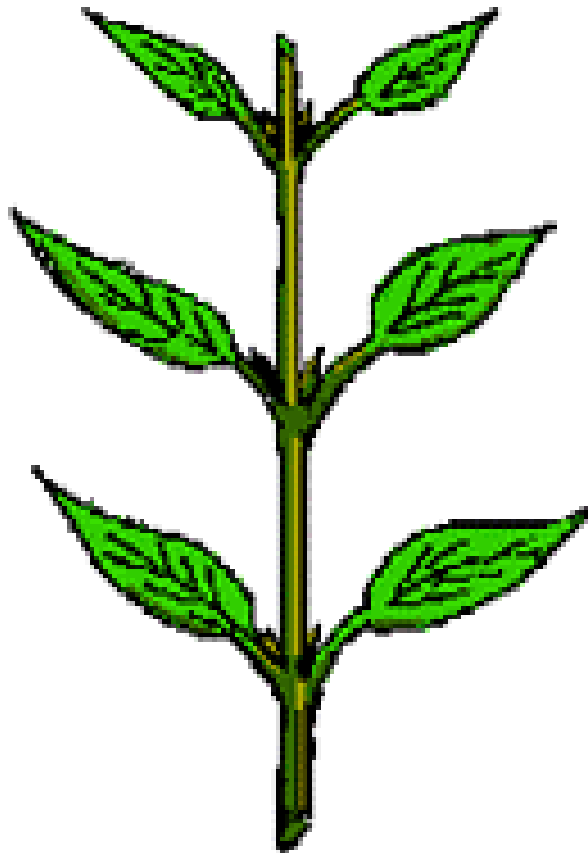
Parts of a **LEAF**



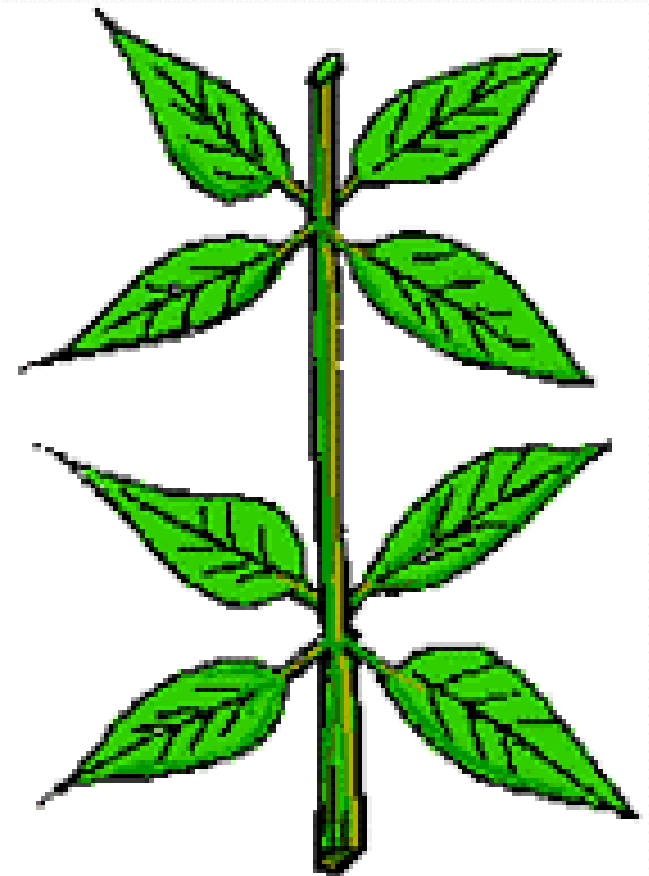
LEAF Arrangement



Alternate

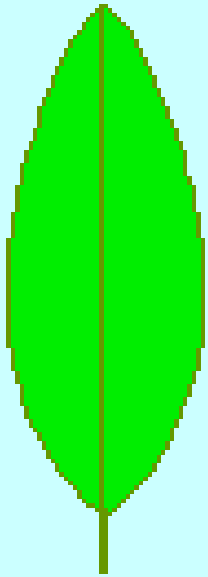


Opposite

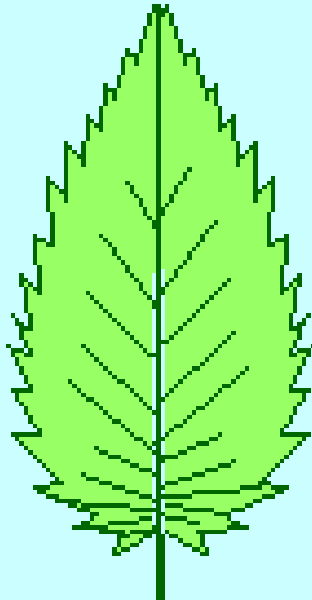


Whorled

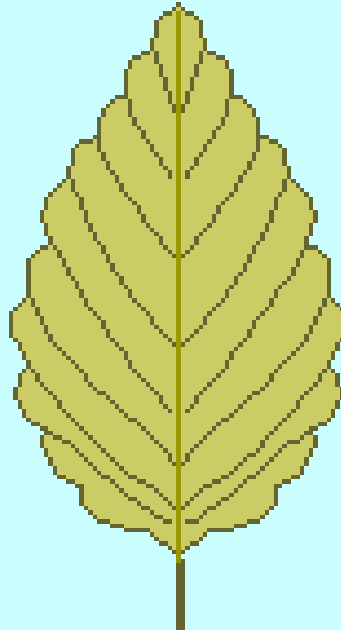
LEAF Margin



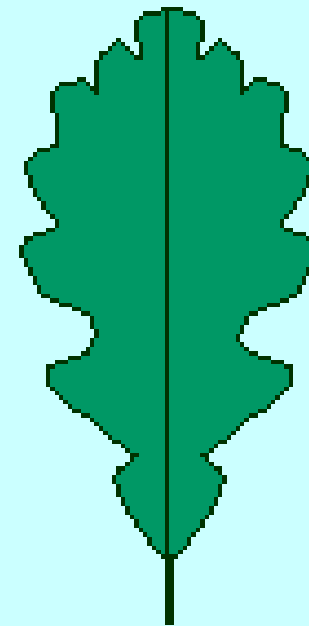
entire



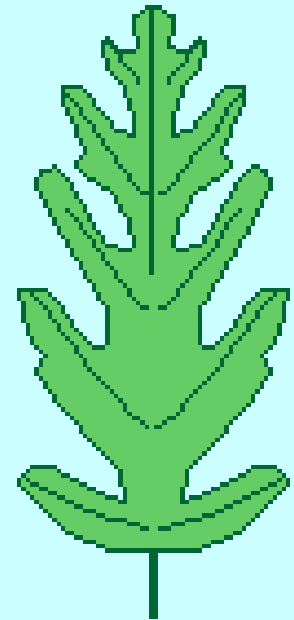
serrate



crenate



lobed



parted

Floating vs. ***Submerged*** **LEAF**



Native



Invasive



LEAF vs. Leaflets

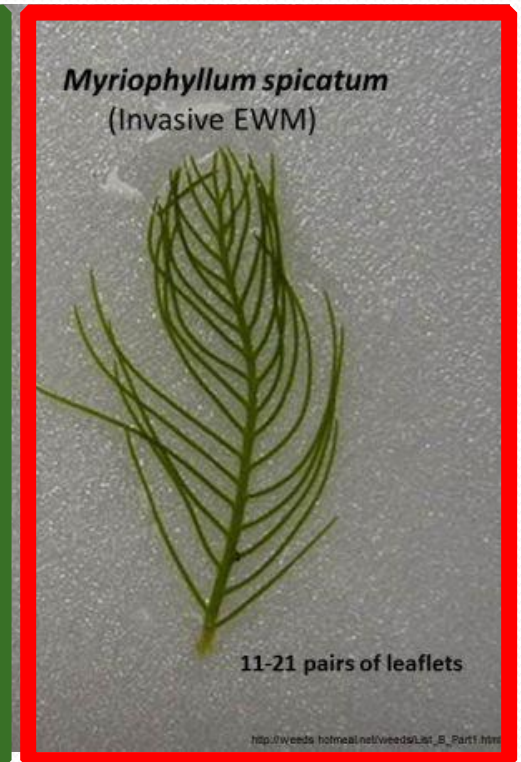
Milfoil



Curly leaf Pondweed



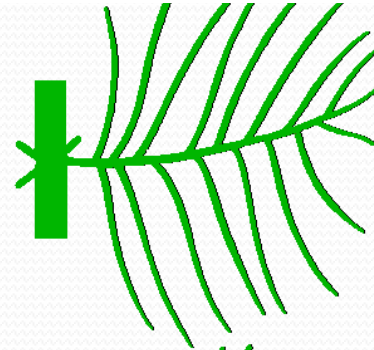
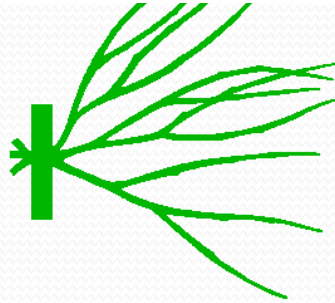
Native



Invasive

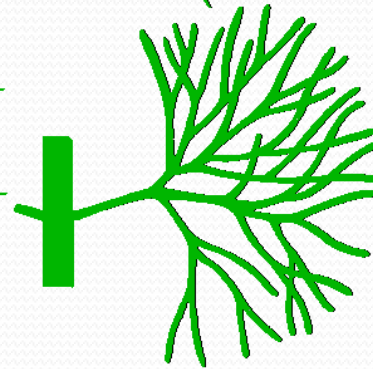
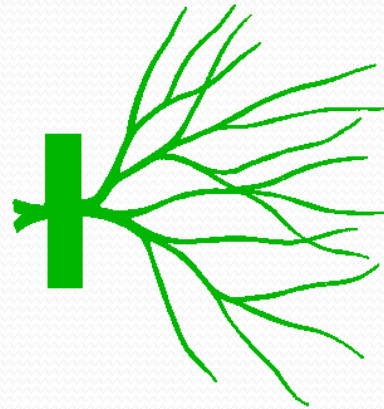
Leaflets

native



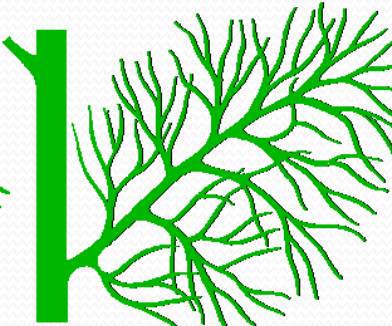
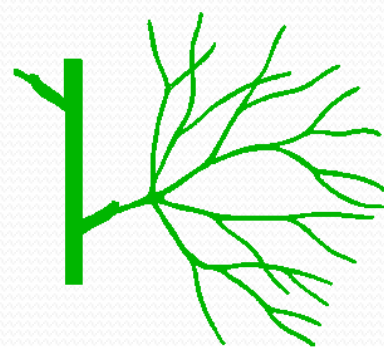
native

rare native



invasive

rare native




native


Look-Alike Submerged Plants with Feathery Leaves

Natives

Invasive




Obontail
Ceratophyllum
Native




Bladderwort
Utricularia
Native



Waterweed
Elodea
Native




Fanwort
Cabomba caroliniana
EXOTIC!



Eurasian milfoil
Myriophyllum spicatum
EXOTIC!



Variable milfoil
Myriophyllum heterophyllum
EXOTIC!



Native milfoil
Myriophyllum humile
Native

How do you tell the difference between good milfoil and bad milfoil? Here's how...

Northern Watermilfoil

(*Myriophyllum sibiricum*)

beneficial native offers shade, shelter and foraging opportunities for fish

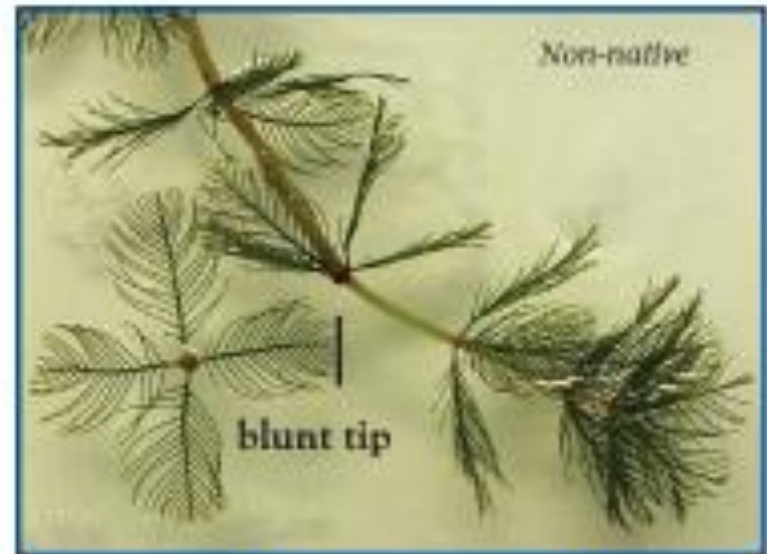


- Usually 7-10 leaflet pairs per leaf
- Leaflets are widely spaced
- Leaves are rigid around stem when out of water
- Green stem that does not branch near surface

Eurasian Watermilfoil

(*Myriophyllum spicatum*)

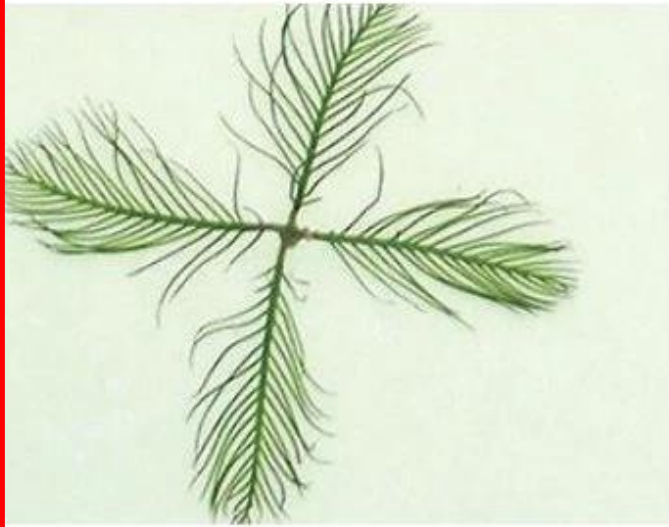
harmful invasive forms dense mats near surface that entangle boat propellers and interfere with swimming



- Usually 12-21 leaflet pairs per leaf
- Leaflets are closely spaced
- Leaves collapse around stem when out of water
- Reddish stem that branches near surface

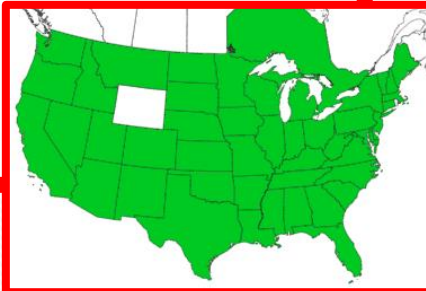
Invasive

Eurasian Watermilfoil



Invasive

12 – 21 Leaflet Pairs



Native

Northern Watermilfoil



Native

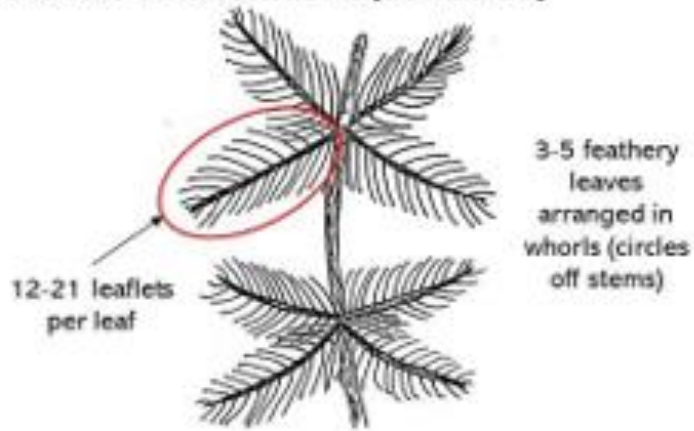
5-10 Leaflet Pairs

Invasive

Native

Eurasian Watermilfoil (invasive)

In water

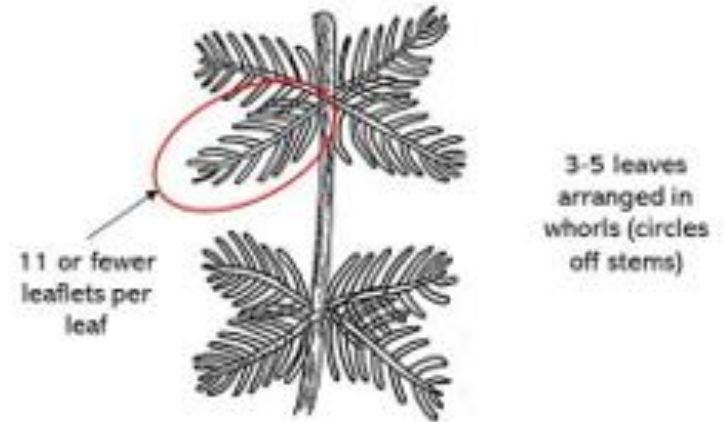


Out of Water



Hangs limp when out of water

Northern Watermilfoil (native)



Is rigid when out of water

DIAGRAM SHOWING THE PHYSICAL DIFFERENCE BETWEEN INVASIVE EURASIAN WATERMILFOIL AND NATIVE NORTHERN WATERMILFOIL. SOURCE: CARTER MARQUIS AND ANGELA VANDER DUSEN

1992

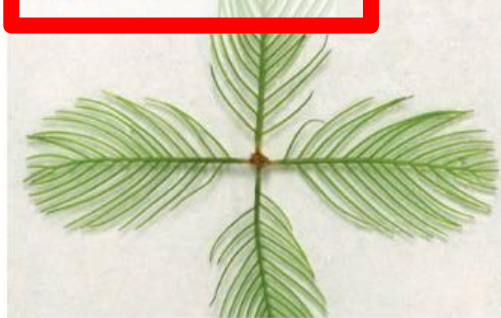
1965

Eurasian vs. Variable Milfoil

Invasive

Submerged
leaves whorled off
stem
almost no
leaf petiole

Myriophyllum spicatum
Eurasian watermilfoil
INVASIVE



Whorl

Leaf



Note: *Myriophyllum sibiricum*, northern watermilfoil, is a threatened native species that is easily confused with *M. spicatum*. *Myriophyllum sibiricum*'s distinguishing features include; less than 12 leaflet pairs per leaf, winter buds and stem tips that are usually green instead of red.



Whorl

Leaf



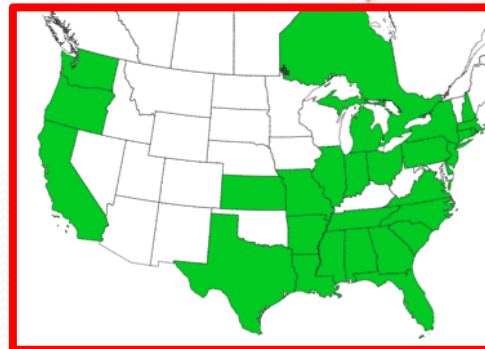
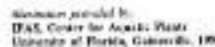
Myriophyllum heterophyllum
variable water milfoil
INVASIVE

water line

Invasive

Fanwort

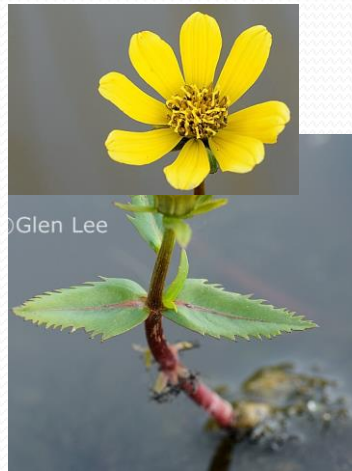
Submerged
leaves **opposite**
& held at stem
by **long slender**
leaf petiole



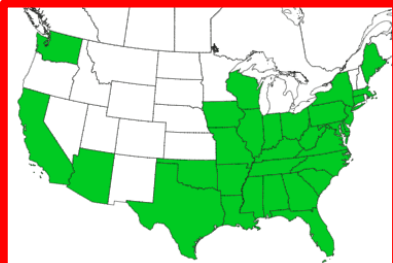
Native

Coontail / Hornwort Water Marigold

B



Submerged leaves



INVASIVE

more than 3



Mich
Deve

MA & ME

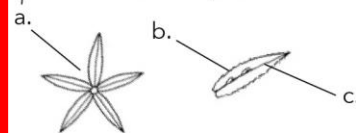


HYDRILLA

Hydrilla verticillata

INVASIVE

- a. whorls of **more than** 3 leaves
- b. leaves often have **visibly toothed** edge
- c. leaf vein often has **small visible spines**



Christian Fischer, ww

2001

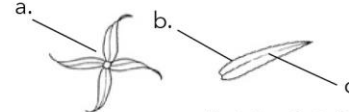


BRAZILIAN ELODEA

Egeria densa

INVASIVE

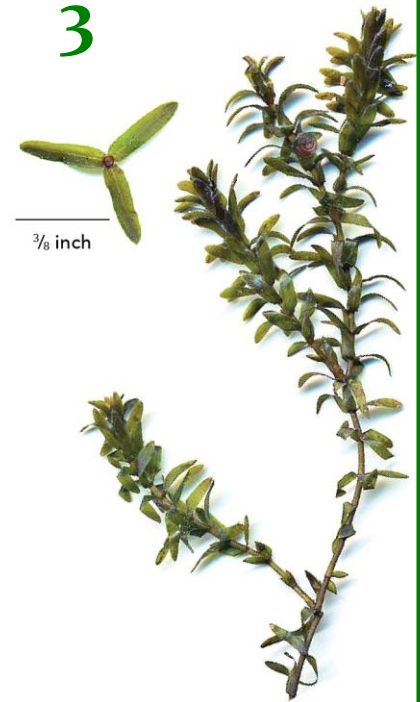
- a. whorls of **more than** 3 leaves
- b. leaves do **not** have visibly toothed edge
- c. leaf vein is **smooth** underneath



Illustrations: Center for Aquatic and Invasive Plants, University of Florida

NATIVE

3



$\frac{3}{8}$ inch

Paul Skawinski, Aquatic Plants of the Upper Midwest

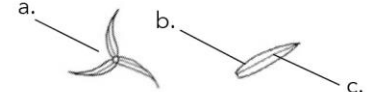


AMERICAN ELODEA

Elodea canadensis

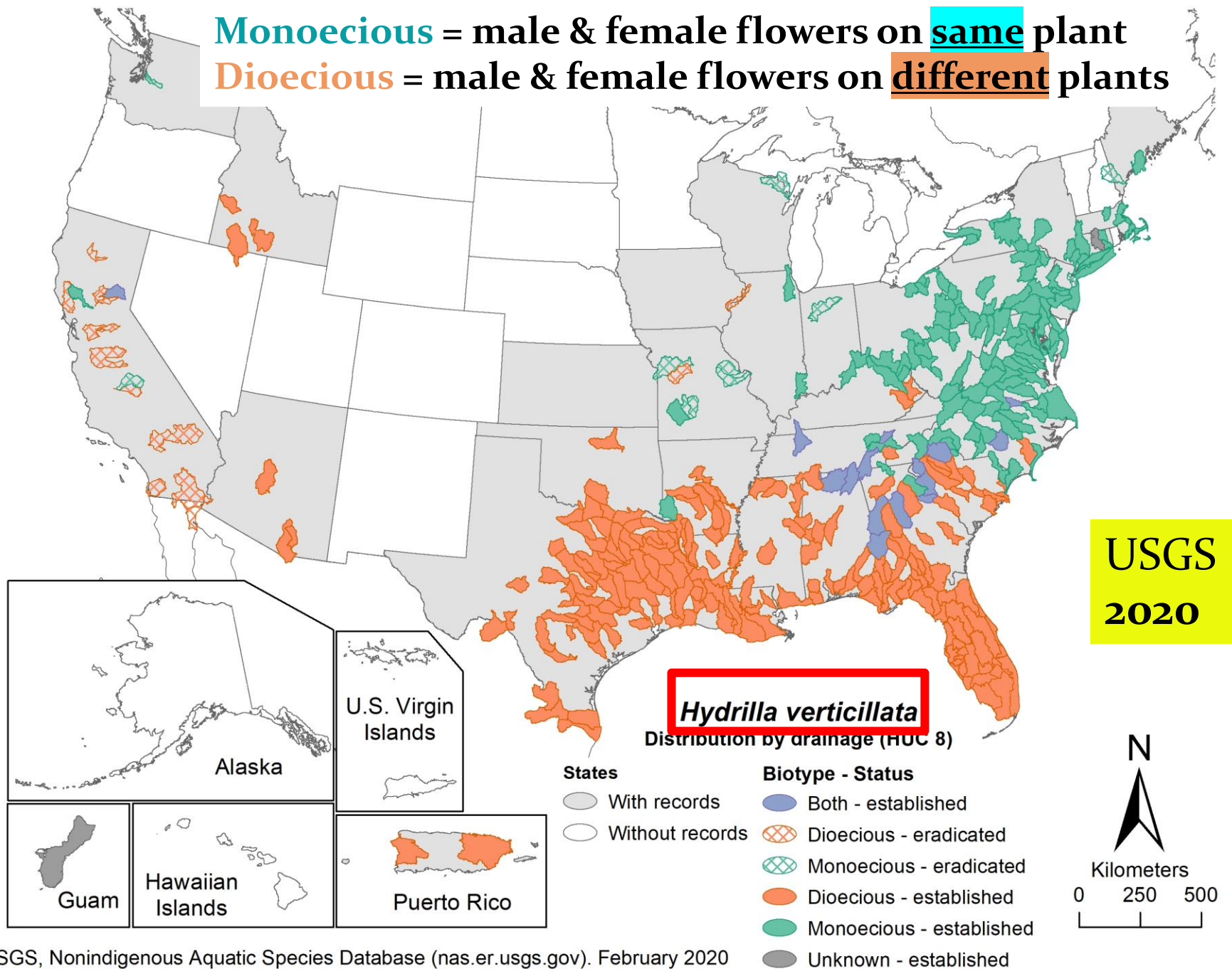
NATIVE

- a. whorls of **exactly** 3 leaves
- b. leaves do **not** have visibly toothed edge
- c. leaf vein is **smooth** underneath

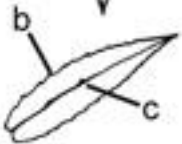
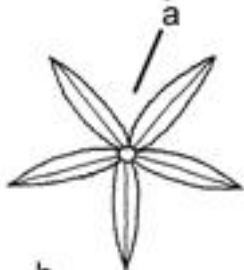
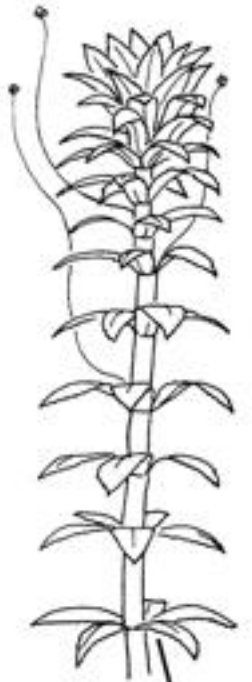


Monoecious = male & female flowers on **same** plant

Dioecious = male & female flowers on **different** plants



HYDRILLA



Native

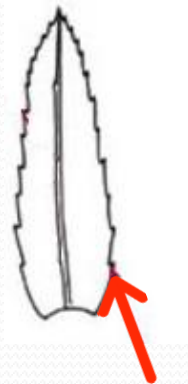
Elodea canadensis

has whorls of **3**
smooth-edged leaves

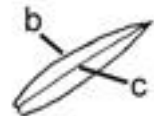
Invasive

Brazilian Elodea

whorls of **4 to 10** leaves
serrated leaf margins



ELODEA



Swamp morning-glory

Water Spinach

Invasive



Native

Waterweed



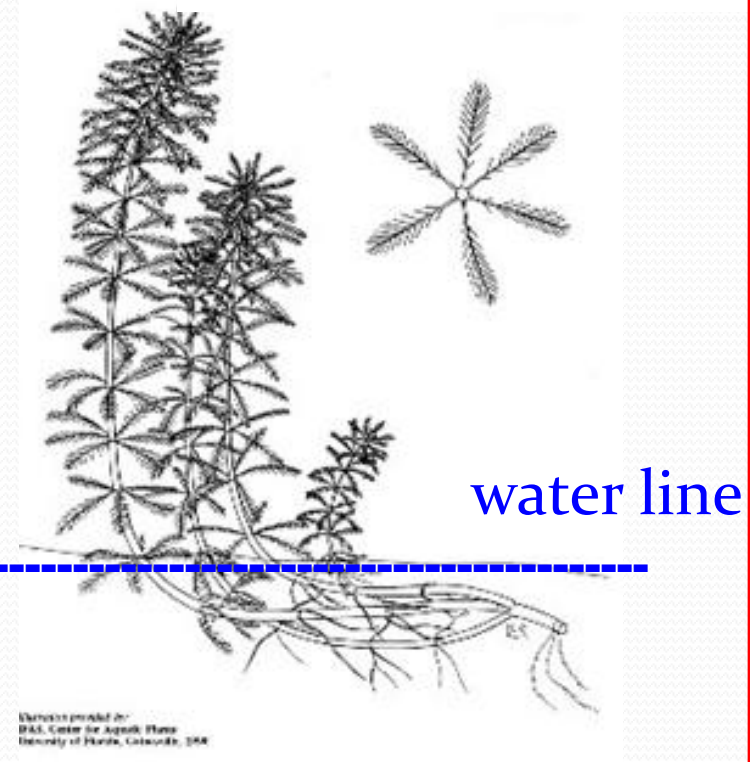
Parrot Feather

Brazilian watermilfoil

Invasive

MA

Leaves **whorled** off
stem
almost *no*
leaf petiole



1992

European Naiad

Brittle Waternymph

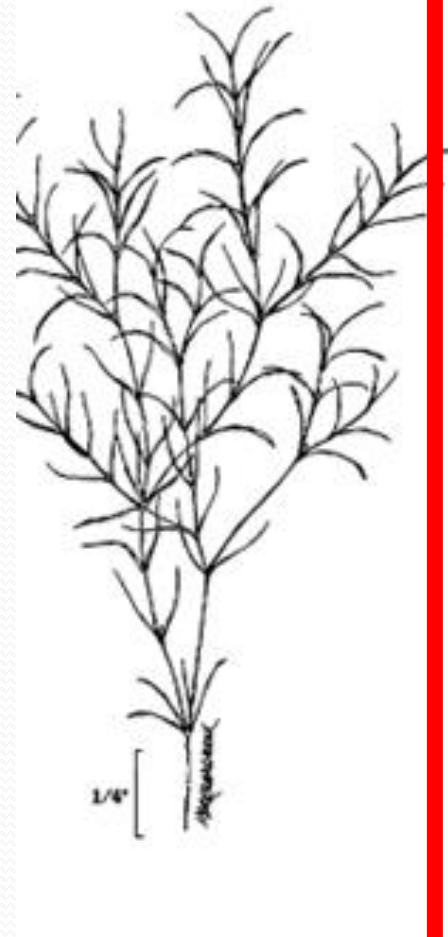
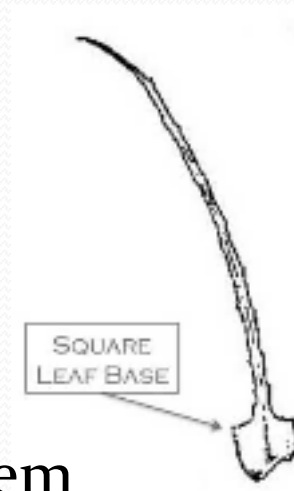
Invasive

water line



Submerged leaves serrated

Base of leaf, at stem



Native

Quillwort



Robbins Pondweed



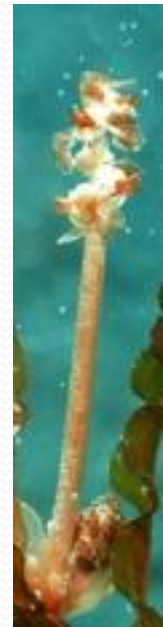


1984

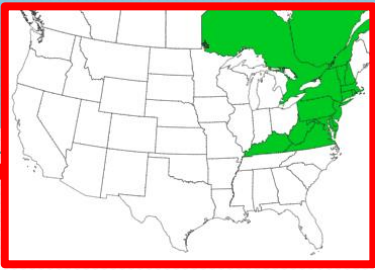
Curly-leaf Pondweed

Invasive

Only **1** leaf type
Submerged leaves
wavy
lasagna noodle-like



Flowers
above water



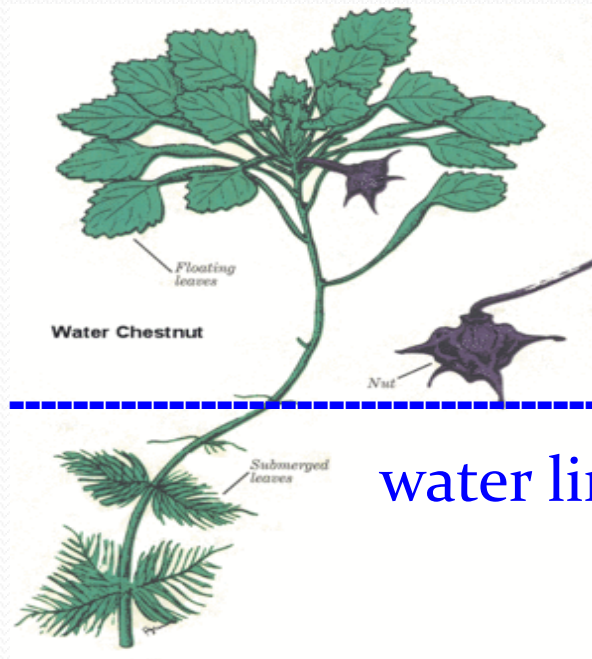
1995

Invasive

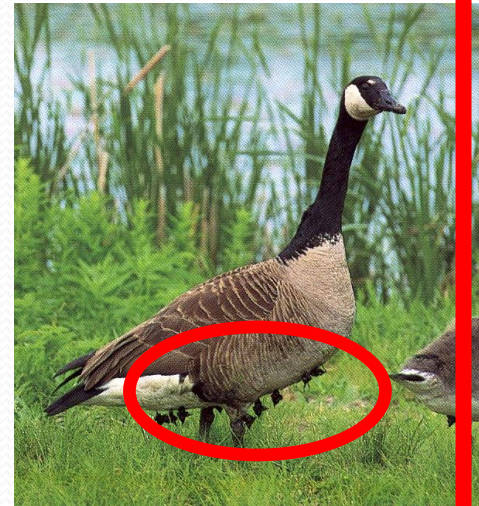
Water Chestnut



Floating leaves:
in a rosette with
toothed margin,
triangular shaped leaves



Submerged leaves:
feather-like



Fruits



Invasive

2017 Lake in PA Water Chestnut



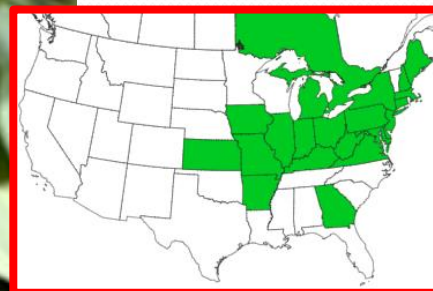
Can't swim, fish, *nor* boat in this lake



MA, more than 20 locations

European Water Clover

Invasive



UGA5273008



Population Status:

- Established
- Extirpated
- Collected or Other

Spatial Accuracy:

- Accurate
- Approximate
- Centroid

1925

VT & ME

Floating leaves

Native

European Frog-bit

Invasive



Native

Floating Heart



purple
undersides
of leaf

White Water Lily

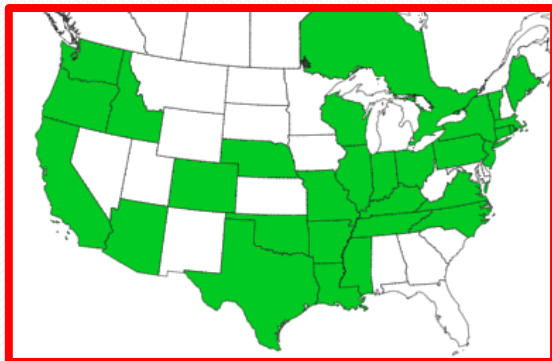


MA, ME, VT

Floating leaves

Yellow Floating Heart

Invasive



Native

Yellow Water Lily



Native

Pondweed

Water Knotweed

Water

Shield



purple
undersides
of **leaf**

Native

Tape Grass / Wild Celery



tiny white flowers spiral to the surface

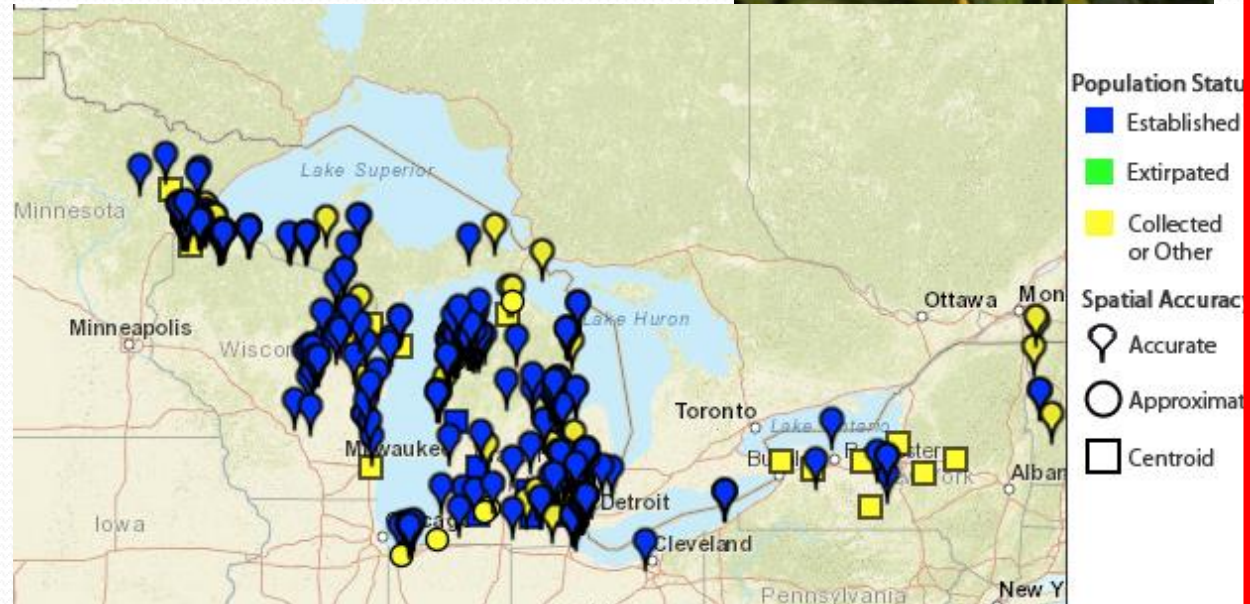


flat **leaf** with parallel veins in center

1965

Invasive

Yellow Iris



Late 1880's



European common reed *Phragmites*

Invasive

Native



Character	Non-native	Native
Stem color	dull tan	shiny reddish
Leaf persistence	persists	fall off easily
Leaf color	bluish green	green
Ligule length	0.1-0.4 mm	0.4-1.0 mm
Lower glume length	2.6-4.2 mm	4-7 mm
Density	dense stands	scattered stems
Growing Season	longer	shorter

Invasive

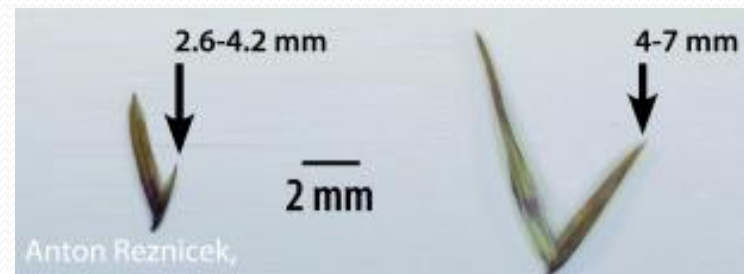
Native



Ligule

Invasive

Native



Glume: leaf-like below flower

Reed Canarygrass

2001

Invasive



Cross section of stems



Grass



have joints



Sedge



have edges



Rush



are round

Native

Sedge

3-way Sedge



Spike Rush



Bulrush



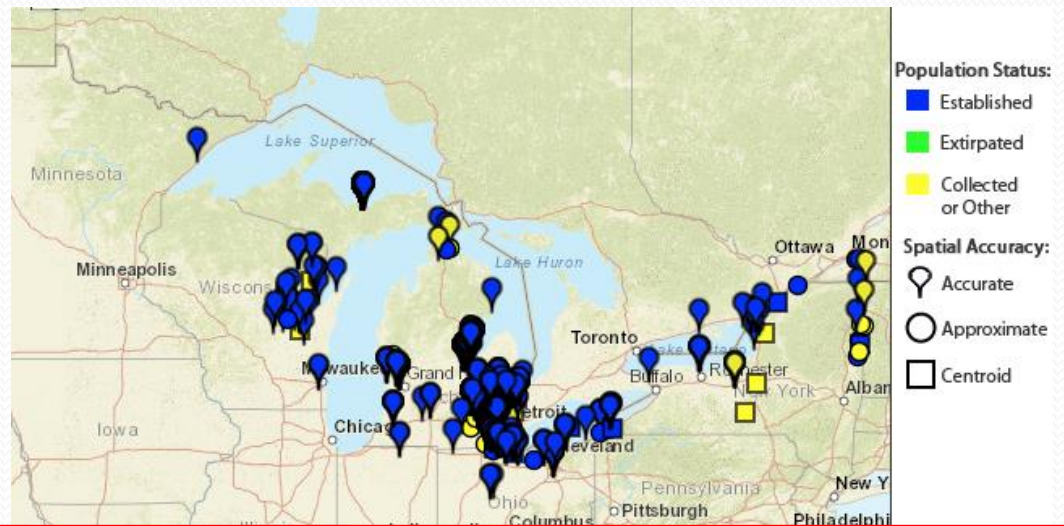
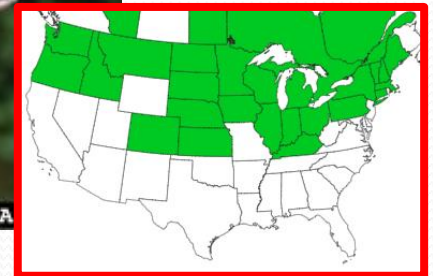
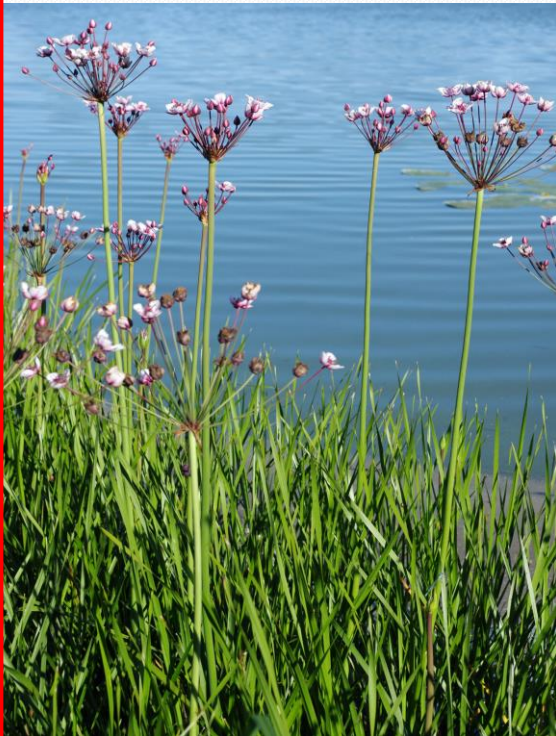
Spike
Rush

Bulrush

2020

Flowering-rush

Invasive



1875

Invasive

Purple Loosestrife

flowers mid June, square stem



plant



flower



has mostly one **Opposite** leaf off the stem



Native

Showy Tick-trefoil



flowers
mid summer
round stem

leaves come off the stem in groups of three
and are **Alternate** off the stem



flower

Seaman's Point Road

Pickeral Weed:

Pontederia cordata
Flowers 2-lipped,
spikes 3"-4"; leaves
heart shaped, single;
in water, 1' to 3'

**False Dragonhead:**

Physalopsis virginiana

Tubular flowers, dissimilar petals; toothed
leaves, 1' to 5' (Other large mint family
plants: Hedge Nettle, Giant Hyssop)

**Fireweed:**

Chamerion angustifolium
Fat (2"-4") spikes of 4-petaled,
stalked flowers; alternate,
toothed leaves; northern plant
of drier areas, 2' to 6'

**Smartweed:**

Persicaria sp.
(*PolYGONUM* sp.)
(many native species)

Tiny flowers, skinny
spikes 1' to 4';
alternate leaves clasp
stem at base; stems
jointed, 1' to 6'

**Blue Vervain:**

Verbena hastata
(+ other *Verbena* sp.)

Flowers tiny, pencil thin in
spikes; toothed, oval,
stalked leaves; moist to
dry places, 2' to 6'

**Steeplebush:**

Spiraea tomentosa
Tiny flowers, conical
set of flower spikes;
alternate, oval
leaves; woody stem
1' to 4'

**Smooth Phlox:**

Phlox glaberrima
(+ other *Phlox* sp.) - Flowers tubular,
flat topped, petals alike, in loose round
arrangement; often woody settings;
1' to 4' (Other tubular, flat petalled flowers
may not be native, e.g. Dame's Rocket)

**Gayfeather, Blazing Star:**

Liatris pycnostachya
(+ other *Liatris* sp.)

Shorter flower spike of tufted flower heads,
many skinny petals; grasslike leaves, 2' to 4'

**Look-alikes****Swamp Loosestrife:**

Decodon verticillatus
Stems usually arching,
1' to 3' flowers; bunched
at well-separated leaf
bases; leaves whorled in
3s or 4s

**Lupine:**

Lupinus perennis
Pea-like flowers; alternate,
palm-like leaves; dry, sandy
places, 2' to 4'

**Winged Loosestrife:**

Lythrum alatum
Smaller, single flowers at
well-separated leaf bases;
upper leaves single;
southern prairies, 2' to 3'

**Joe-Pye Weed:**

Eutrochium maculatum
Flower heads in flat-topped
clusters; whorls of 3 to 6
toothed leaves, 3' to 5'
(Other flat-topped, native
flowers: Ironweed, Marsh Milkweed)



Native

Arrowhead Pickerelweed Buttonbush



shrub

Native

Bur-Reed



Pipewort



Native

Cattail



fruit



long straight **leaves**

Identify **Plants**

- Native Plant Trust
- Use Go Botany

<https://gobotany.nativeplanttrust.org/>

<https://www.eddmaps.org/distribution/>

<https://nas.er.usgs.gov/>

<https://www.maine.gov/dep/water/invasives/index.html>