

## Emergent Plant Community



- shallowest zone
- from moist soil to knee-deep water



*Life at the water's edge can be challenging*

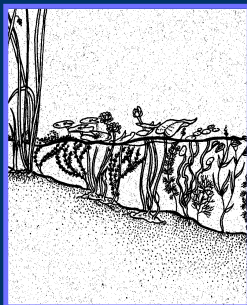
## Adaptations



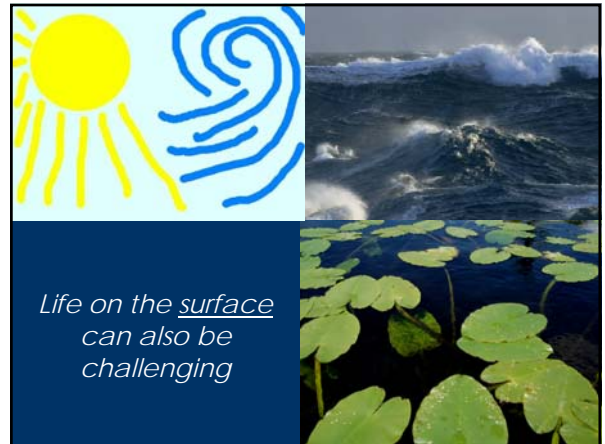
- plants can tolerate fluctuating water levels & wave action
- most have spongy, buoyant leaves and tough, interlocking roots



## Floating Leaved Plant Community



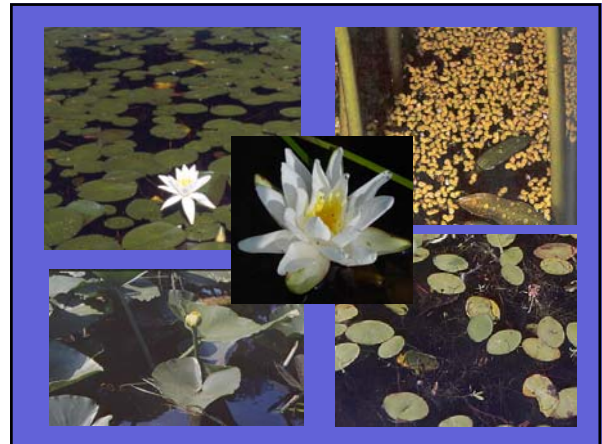
- knee-deep to chest-deep water
- submersed plants may reside under this canopy



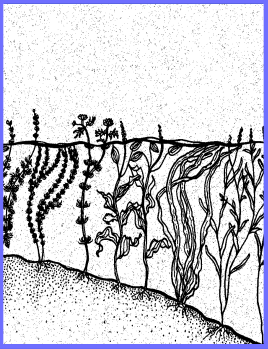
*Life on the surface can also be challenging*

## Adaptations

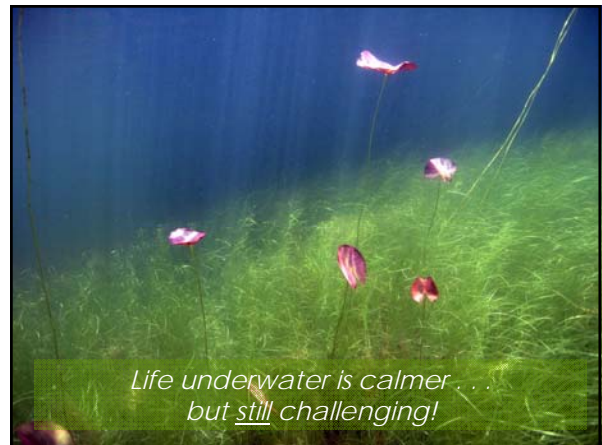
- buoyant leaves, smooth margins, leathery texture, waxy "cuticle"
- tough, elastic leaf stalks; grow rapidly to surface
- some are free floating
- reproduction from seeds, turions, rhizomes



## Submersed Plant Community



- from shoreline to several meters deep
- maximum depth is limited by:
  - ✓ species specific adaptations
  - ✓ light availability




## Adaptations

- stems and leaves often flexible, leaves adapted to maximize surface area & gas exchange, lack cuticle
- most set flowers above the surface for pollinators; heterophylly (2 leaf types) often occurs in these species
- plants overwinter as rhizomes, tubers, turions (winter buds), whole plant
- Reproduction primarily by clonal expansion, also root division, seeds




# Part 2: Plant Structure


## Leaf Arrangement



Opposite




Alternate



Whorled


## Leaf Types

Elliptical




ENTIRE


Lance shaped




TOOTHED or SERRATED



DIVIDED




Heart Shaped

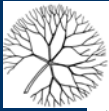


Triangular


## Divided Leaf Patterns



Forked



Branched



Feather Divided

Part 3:

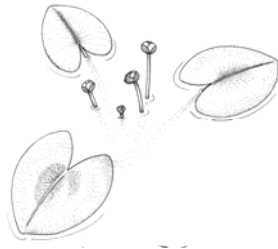


MAINE'S ELEVEN MOST UNWANTED . . .

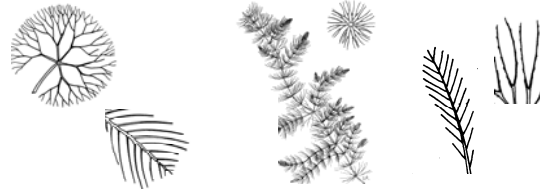
. . . and their most common native "LOOK ALIKES"



3 invaders are  
**floating leaf plants**



4 are submersed plants  
with **finely-divided leaves**  
arranged on stems



4 are submersed plants  
with **blade or strap-shaped**  
leaves arranged on stems



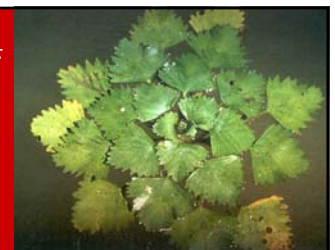
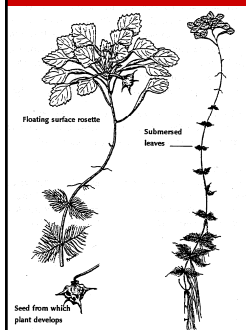
**EVERYTHING**  
**ELSE . . .**



*Floating Leaved*  
*Plants*



*Water Chestnut*  
*(Trapa natans)*



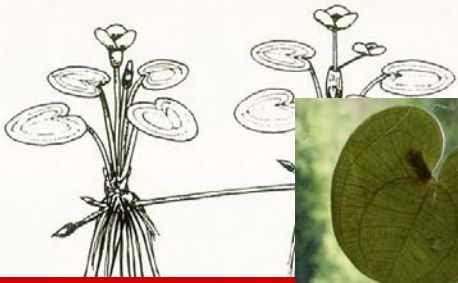






**Water Chestnut**  
 Native to Europe  
 Confirmed: CT, MA NH, NY, RI, VT,  
 Quebec



**European Frog Bit**  
*(Hydrocharis morsus-ranae)*

**European Frog Bit**




**European Frog Bit**  
 Native to Europe  
 Confirmed: NY, VT

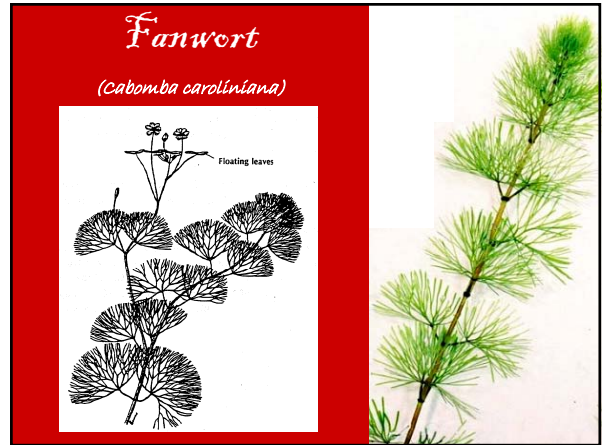
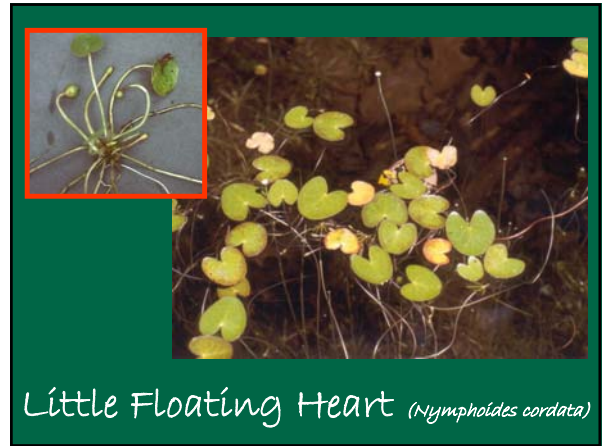



**Yellow Floating Heart**  
*(Nymphoides peltata)*





**Yellow Floating Heart**  
 Native to Europe  
 Confirmed: CT, MA, NY, RI, VT



*Variable Water-milfoil*  
(*Myriophyllum heterophyllum*)

Emergent flower  
Close-up of flower

variable water-milfoil

variable water-milfoil

Native to Europe & parts of US  
Confirmed: CT, ME, NH, NY, MA, RI, VT

Hybrid Milfoil  
(*M. heterophyllum* x  
*M. laxum*)

*Eurasian Water-milfoil*  
(*Myriophyllum spicatum*)

Flower stalk  
Whorl of leaves

Eurasian water-milfoil infestation, Kirk Lake NY



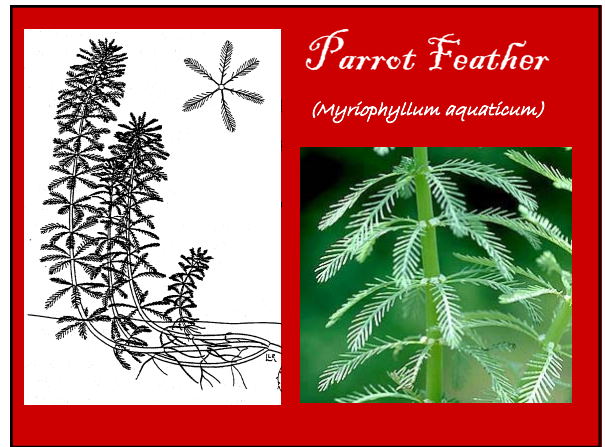


Eurasian  
Water-milfoil



Eurasian Water-milfoil

Native to Europe  
Confirmed: CT,  
MA, ME, NH, NY,  
RI, VT



Parrot Feather  
(*Myriophyllum aquaticum*)



Parrot  
Feather



Parrot Feather

Native to South America  
Confirmed: CT, NY

## Maine has six lake-friendly native milfoils

- *Alternate-flower*
- *Farwell's*
- *Low*
- *Northern*
- *Whorled*
- *Dwarf (leafless)*



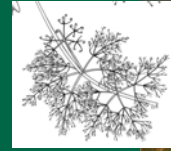
## Bladderworts

(*Utricularia* spp.)

Large Purple



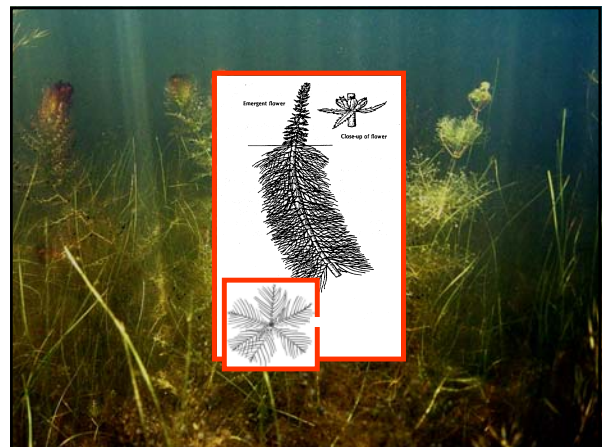
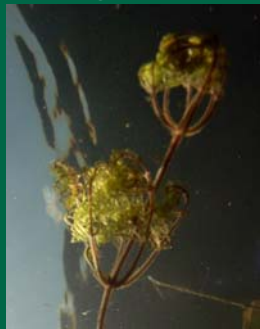
Common



Common

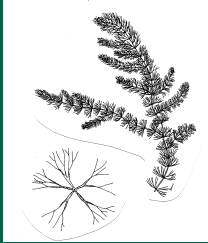

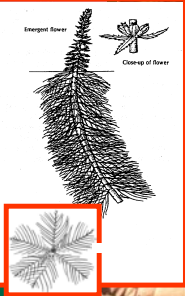


Large Purple



# Hornworts

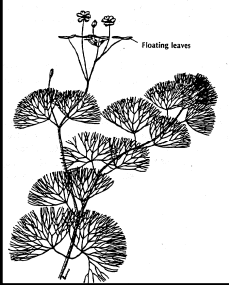
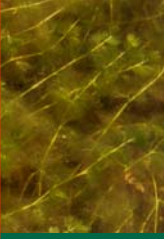

(*Ceratophyllum* sp.)

Emergent flower  
Close-up of flower

# Crowfoot



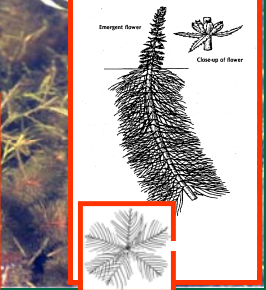
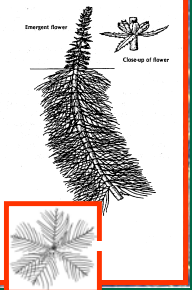
(*Ranunculus* sp.)

Floating leaves

# Water Marigold

(*Megalodonta beckii*, *Bidens beckii*)

Emergent flower  
Close-up of flower

Floating leaves

# Submersed Plants with Blade or Strap-shaped Leaves Attached to Stems

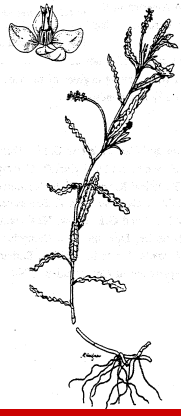



Brazilian elodea infestation, Nepean River, New South Wales, Australia



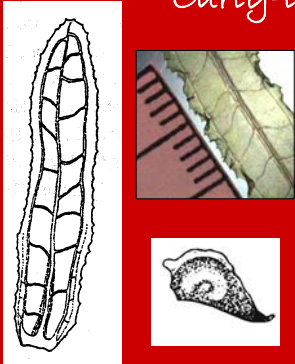

# Curly-leaf Pondweed

(*Potamogeton crispus*)


curly-leaf pondweed infestation, West Pond, ME

### Curly-leaf Pondweed


### Curly-leaf Pondweed



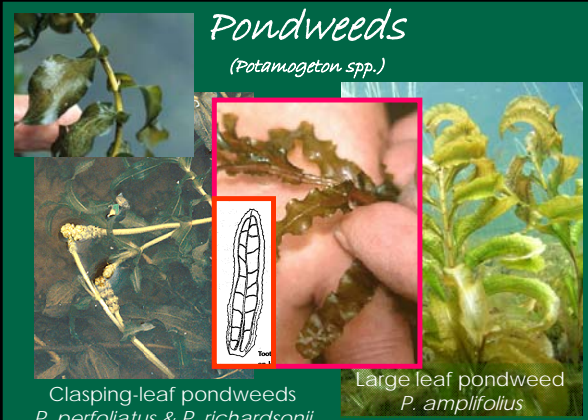
Turions



Native to Europe  
Confirmed: CT, MA, ME, NH, NY, RI, VT

### Pondweeds

(Potamogeton spp.)



Clasp-leaf pondweeds  
*P. perfoliatus* & *P. richardsonii*

Large leaf pondweed  
*P. amplifolius*

### European Naiad

(*Najas minor*)





### European Naiad





Native to Europe  
Confirmed: CT, MA, ME, NH, NY, VT

**Naiads**  
(*Najas* sp.)

European





**Brazilian Elodea**

*Egeria densa* (South American Waterweed, Anacharis)





Brazilian elodea is a common aquarium plant

**Brazilian Elodea**




Native to South America  
CT, NH, MA, NY, VT

**Common Waterweed**  
(*Elodea canadensis*)  
and  
**Slender Waterweed**  
(and *Elodea nuttallii*)






**Hydrilla**  
(*Hydrilla verticillata*)





### Form and Habit

### Form Comparison

Theirs

Ours

### Hydrilla's Edge

- Thrives in low light
- Grows to depths exceeding 30 ft
- Extreme rapid growth
- Wide tolerance range
- Propagates by clonal expansion

### The Clinchers!

Turions

Tubers

### Tubers and Turions are Resilient to ...

- Ingestion by waterfowl
- Ice cover
- Drying
- Herbicides
- Time! (Tubers remain dormant for years in the sediment)

