



~~Twelve~~ Ten ~~Twelve~~ Least Wanted  
A Whirlwind Tour of the ~~Ten~~  
Worst Invasive ~~Exotic~~ Aquatic  
Plants in NYS

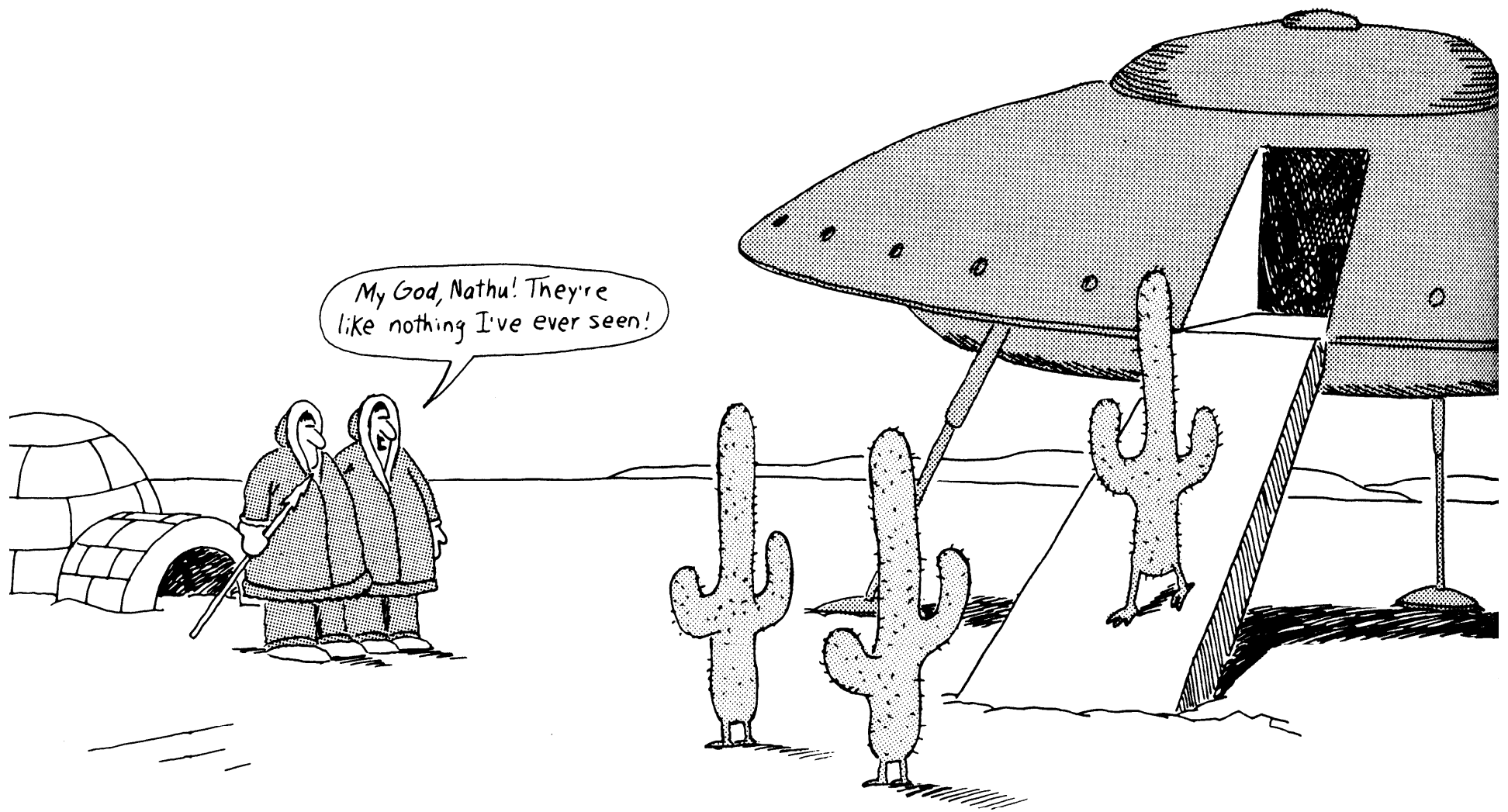
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A person wearing waders and a hat stands in a lake, surrounded by dense aquatic plants. The water is a deep blue-green color, and the plants are various shades of green and yellow. The person is holding a large bundle of plants. The background is a dense field of similar plants, creating a textured, almost abstract pattern of green and blue.

# **Dirty Dozen: Twelve (Give or Take) Aquatic Plants You Don't Want in Your Lake**

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# Invasive Aquatics Issues Usually Focus on Exotic Plants



Larson

# Water Chestnut (*Trapa natans*)

Origin:

Intro to US:

Intro to NYS:

Eurasia

1874

1882 (Scotia)

Plant Type:

Floating

Leaf Type:

Submersed:

Floating:

Leaf Arrangement:

Pinnate

Palmate

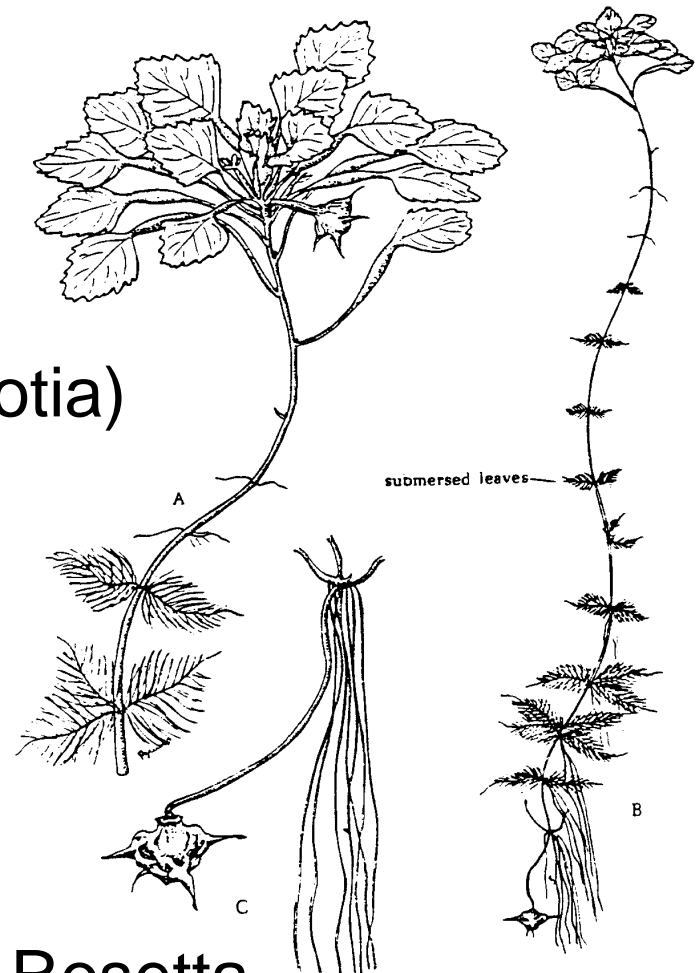
Whorled, Rosetta

Leaf Shape:

Triangle

Leaf Margin:

Serrated



# Water Chestnut (*Trapa natans*)

## Habitat:

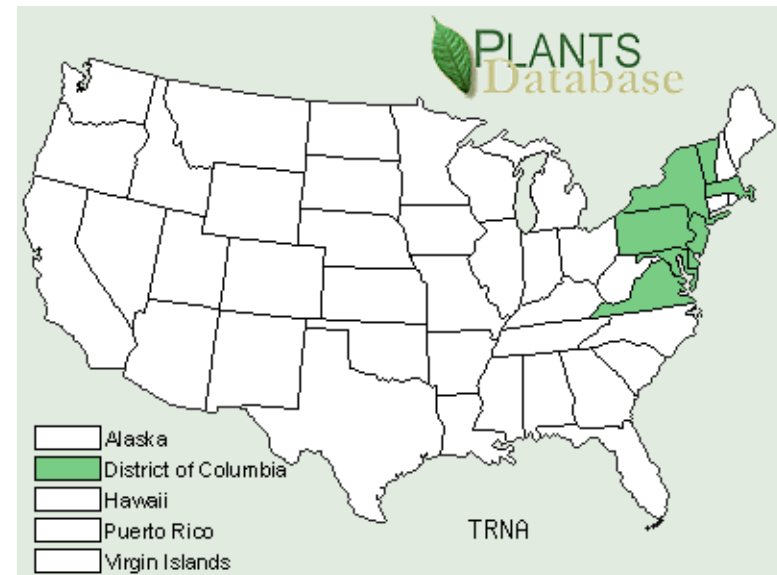
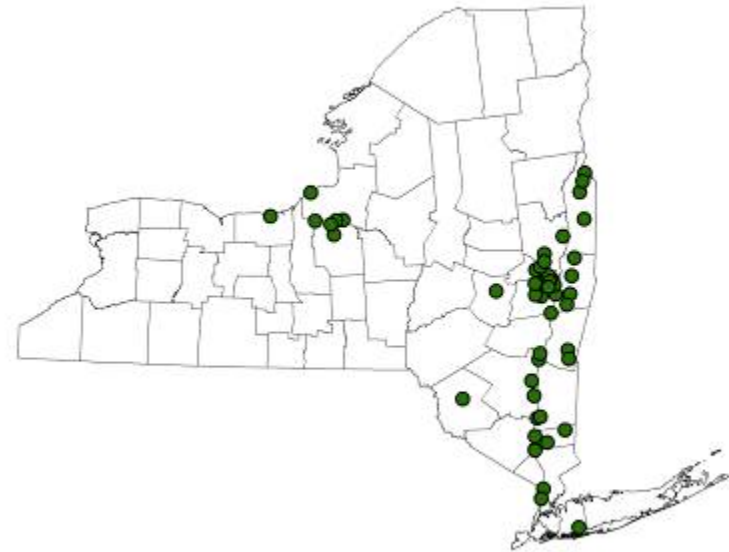
- Sluggish Rivers / Shallow Portions of Lakes
- Muddy Sediment

## Growth Patterns

- Dense Surface Mats

## Competitive Advantage

- Surface Canopy
- Mucky Sediment
- Shallow /Sluggish Water



# Water Chestnut (*Trapa natans*)

## NYS Control Agent(s)

- Mechanical Harvesting
- Hand Cutting
- Herbicides

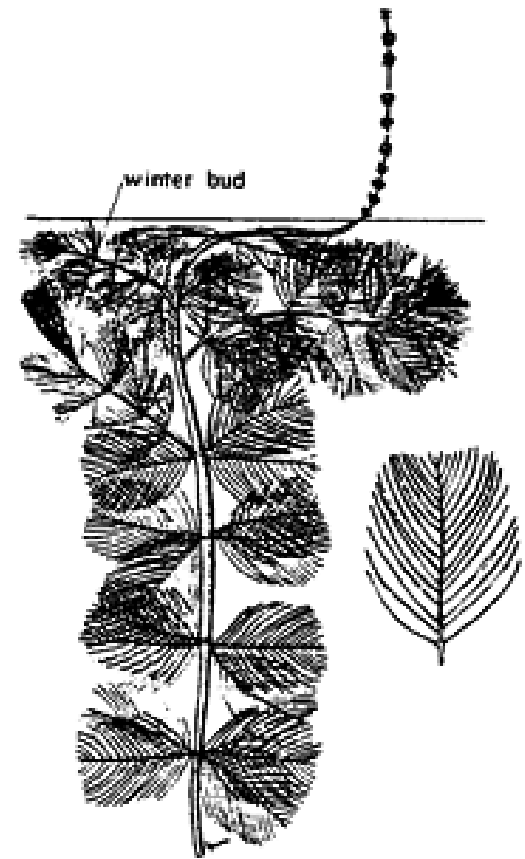
## NYS Control Projects

- Lake Champlain (Essex)
- Kinderhook Lake (Columbia)
- Tomahawk Lake (Orange)



# Eurasian Watermilfoil (*Myriophyllum spicatum*)

Origin:	Eurasia
Intro to US:	1940?
Intro to NYS:	1940s
Plant Type:	Submerged
Leaf Type:	Pinnate
Submersed:	None (Spike)
Floating:	None (Spike)
Leaf Arrangement:	Whorled
Leaf Shape:	Thread
Leaf Margin:	Smooth



# Eurasian Watermilfoil (*Myriophyllum spicatum*)

## Habitat:

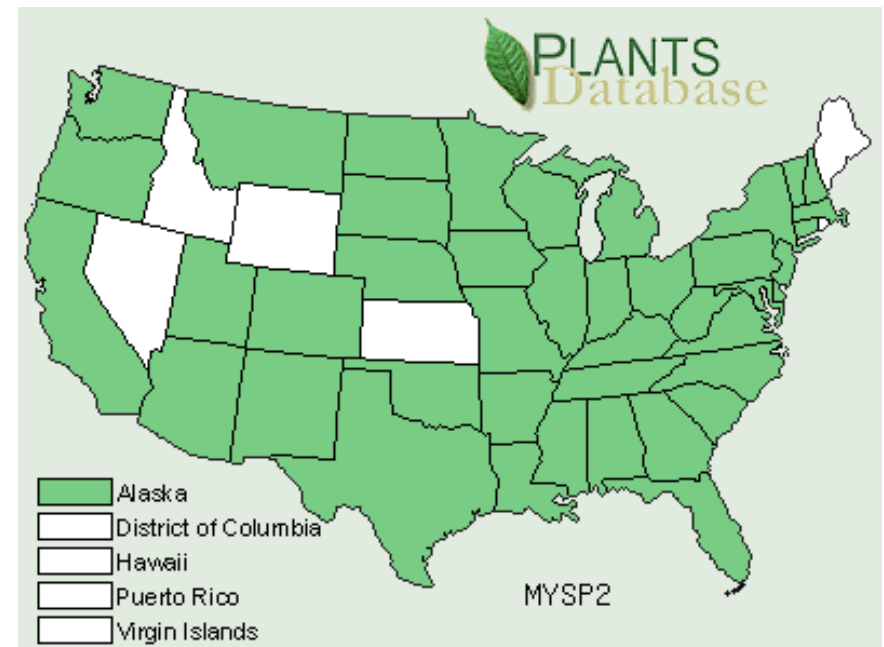
- Highly Variable
- Highly Adaptable
- Generally 3-12 Feet

## Growth Patterns

- Large Submergent Architecture
- Dense Surface Mats

## Competitive Advantage

- Opportunistic Generalist
- Surface Canopies
- Auto Fragments





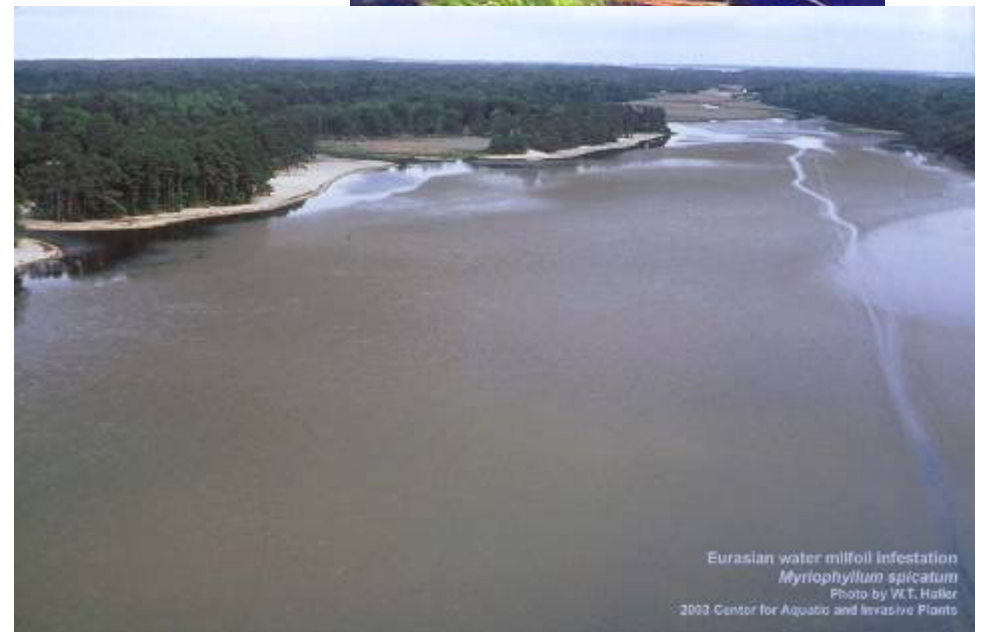
# Eurasian Watermilfoil (*Myriophyllum spicatum*)

## NYS Control Agent(s)

- Mechanical Harvesting
- Hand Pulling
- Drawdown
- Herbicides
- Grass Carp
- Herbivorous Insects

## NYS Control Projects

- Saratoga Lake (Saratoga)
- Upper Saranac Lake (Franklin)
- Galway Lake (Saratoga)
- Waneta Lake (Schuyler)
- Lake Mahopac (Putnam)
- Cayuga Lake (Cayuga)



# Curly-Leaved Pondweed (*Potamogeton crispus*)

Origin: Eurasia  
Intro to US: early 1880s  
Intro to NYS: 1890s?

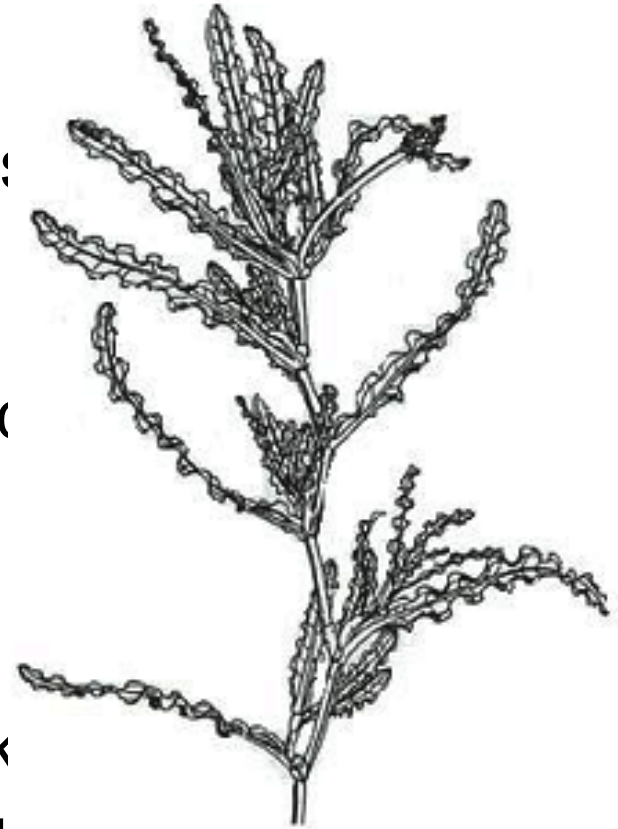
Plant Type: Submerged

Leaf Variation:  
Submersed: Ribbon  
Floating: None (Spik

Leaf Arrangement: Alternating

Leaf Shape: Oblong, Rounded Tip

Leaf Margin: Serrated



# Curly-Leaved Pondweed (*Potamogeton crispus*)

## Habitat:

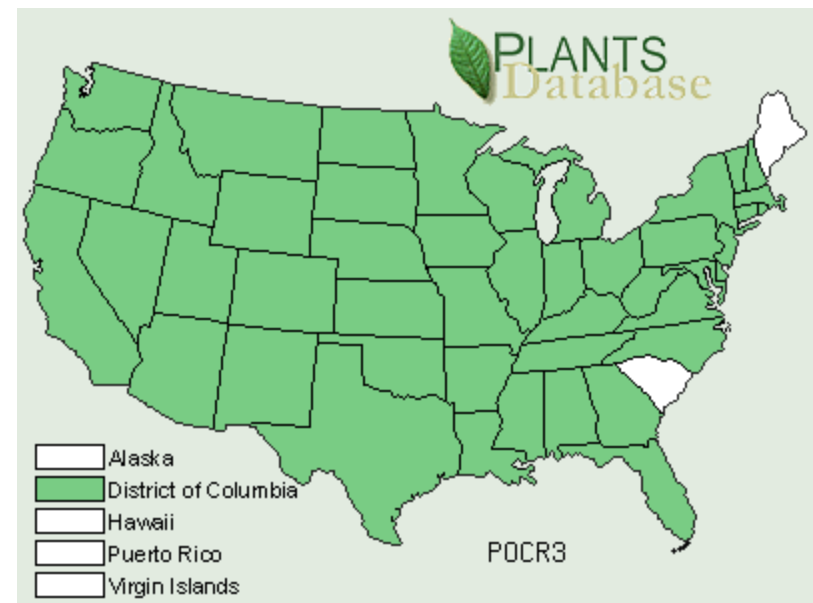
- Variety of Lake Depths
- Rocky to Sandy Sediment

## Growth Patterns

- Occasional Surface Mats
- Spring to Early Summer Peak Growth

## Competitive Advantage

- Growing Season
- Floating Turions



# Curly-Leaved Pondweed (*Potamogeton crispus*)

## NYS Control Agent(s)

- Mechanical Harvesting
- Dredging
- Herbicides
- Grass Carp

## NYS Control Projects

- Saratoga Lake
- Collins Lake (Schenectady)
- Burden Second Lake (Rensselaer)
- Plymouth Reservoir (Chenango)



# Yellow Floating Heart (*Nymphoides peltata*)

Origin: Asia  
Intro to US: 1882 (MA)  
Intro to NYS: 1950s?

Plant Type: Floating

Leaf Type:  
Submersed: None  
Floating: Cordate

Leaf Shape: Heart Shaped  
Leaf Margin: Shallowly scalloped



# Yellow Floating Heart (*Nymphoides peltata*)

## Habitat:

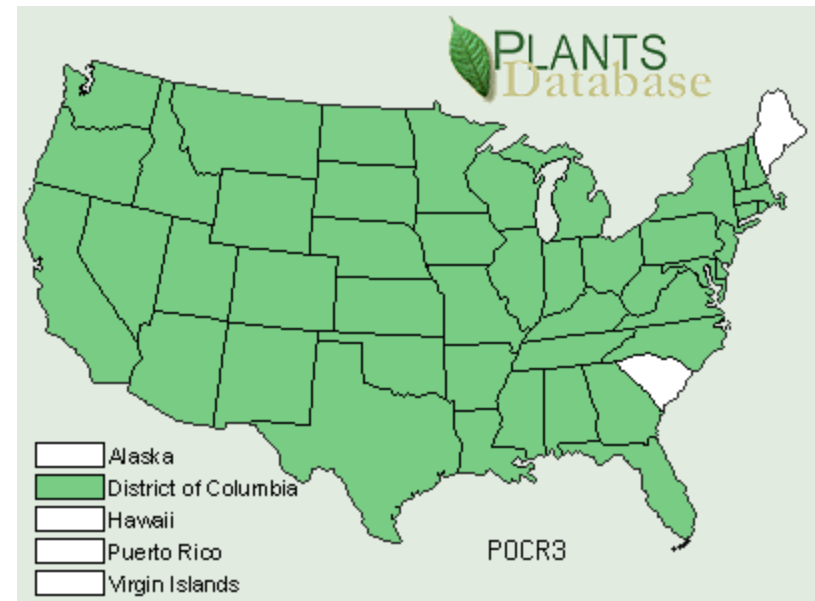
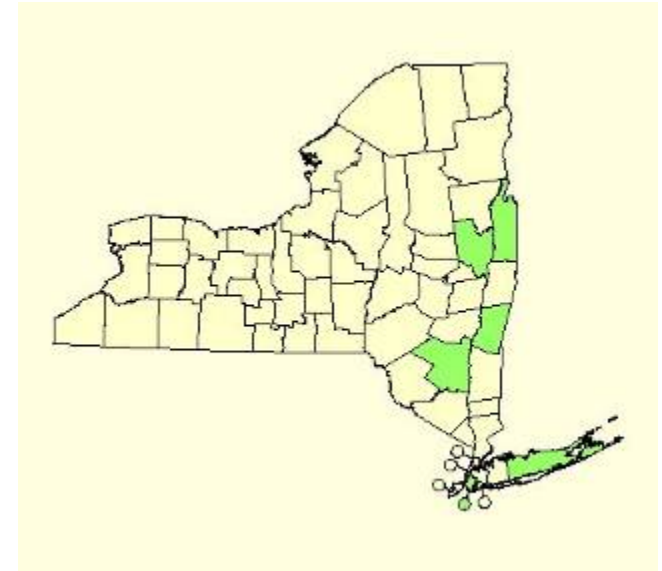
- Shallow Water
- Mucky to Sandy Sediment

## Growth Patterns

- Dense Surface Mats

## Competitive Advantage

- Surface Light Inhibition
- Grows in Turbid Water



# Yellow Floating Heart (*Nymphoides peltata*)

- **NYS Control Agent(s)**

- None Yet

- **NYS Control Projects**

- None Yet



# Brittle Naiad (*Najas minor*)

Origin: Europe  
Intro to US: 1930s  
Intro to NYS: 1940s?

Plant Type: Submerged

Leaf Type: Thread-Like  
Submersed: Thread-Like  
Floating: None

Leaf Arrangement: Opposite

Leaf Shape: Thread

Leaf Margin: Coarsely Serrated





# Brittle Naiad (*Najas minor*)

## Habitat:

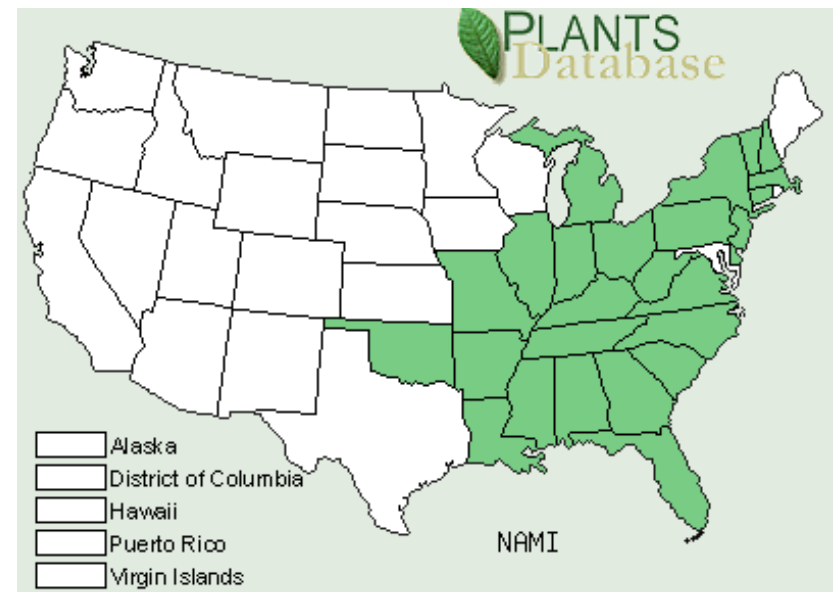
- Shallow Water (<2m)
- Sandy to Mucky Sediment

## Growth Patterns

- Post-Disturbance  
Pioneering Plant
- Grows in Bushels

## Competitive Advantage

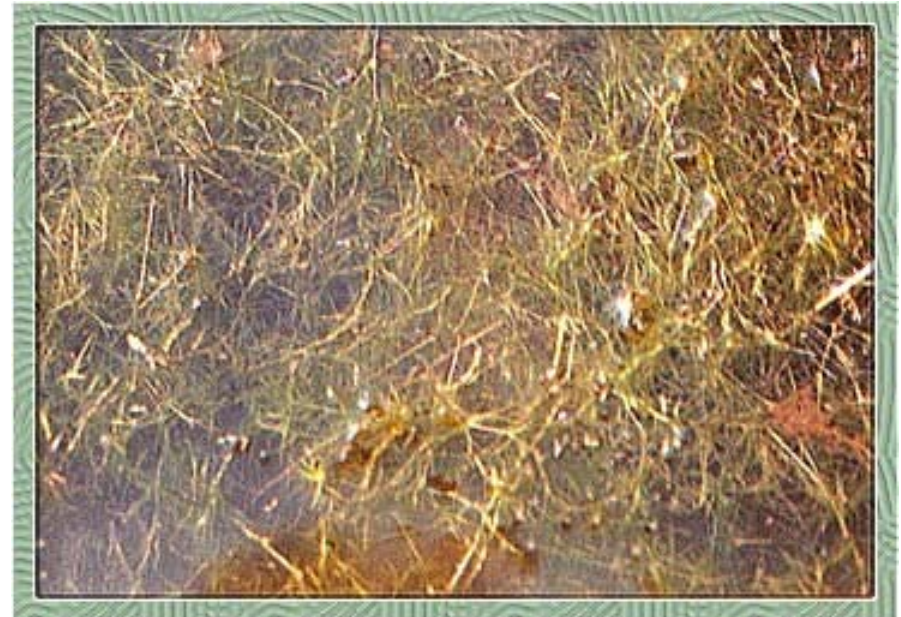
- Seeds Insensitive to  
Drawdown / Herbicides
- Breaks Off / Floats



# **Brittle Naiad (*Najas minor*)**

**NYS Control Agent(s)**  
– Herbicides

**NYS Control Projects**  
– Snyders Lake  
(Rensselaer)



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

Origin: Europe to Canada  
Intro to US: 1982?  
Intro to NYS: 1986?

Plant Type: Floating

Leaf Type:  
Submersed: None  
Floating: Ovate

Leaf Arrangement: Basal

Leaf Shape: Heart

Leaf Margin: Smooth



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

## Habitat:

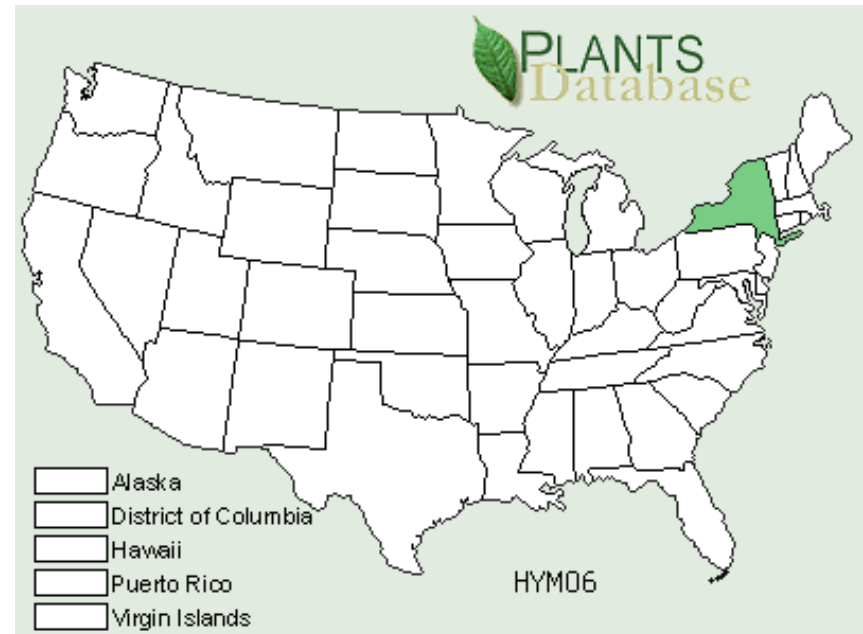
- Quiet Edges Rivers and Lakes
- Open Marshes

## Growth Patterns

- Free Floating
- Forms Dense Tangles

## Competitive Advantage

- Shading/Light Inhibition
- ???



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

## NYS Control Agent(s)

- Hand Harvesting

## NYS Control Projects

- Grasse River  
(St. Lawrence)



European frogbit  
*Hydrocharis morsus-ranae*  
Photo by Robin Scribalto  
Copyright 2002 Purdue Univ.

# Brazilian Elodea (*Egeria densa*)

Origin:	South America
Intro to US:	1893
Intro to NYS:	1893 (Millneck)
Plant Type:	Submerged
Leaf Type:	Ribbon
Submersed:	Barely Flower
Floating:	Whorled (4+)
Leaf Arrangement:	Strap
Leaf Shape:	Finely Serrated
Leaf Margin:	



# Brazilian Elodea (*Egeria densa*)

## Habitat:

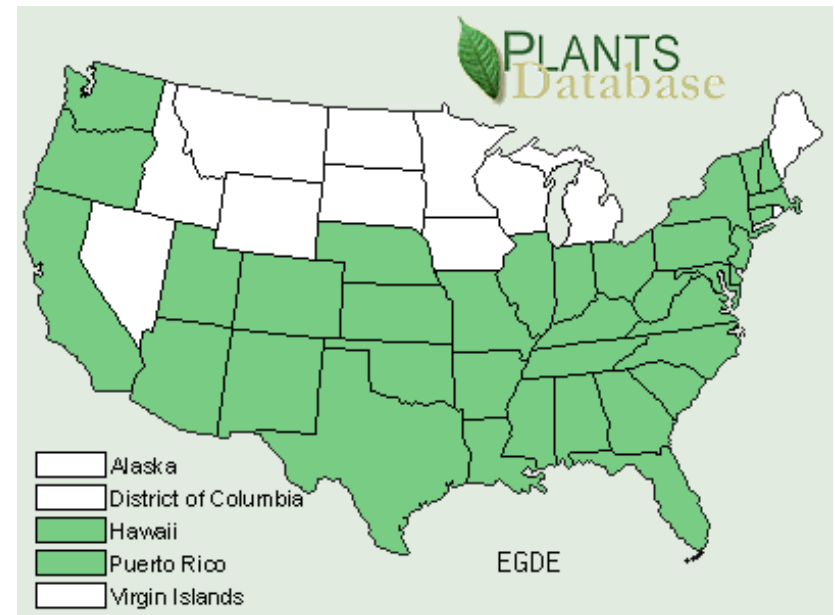
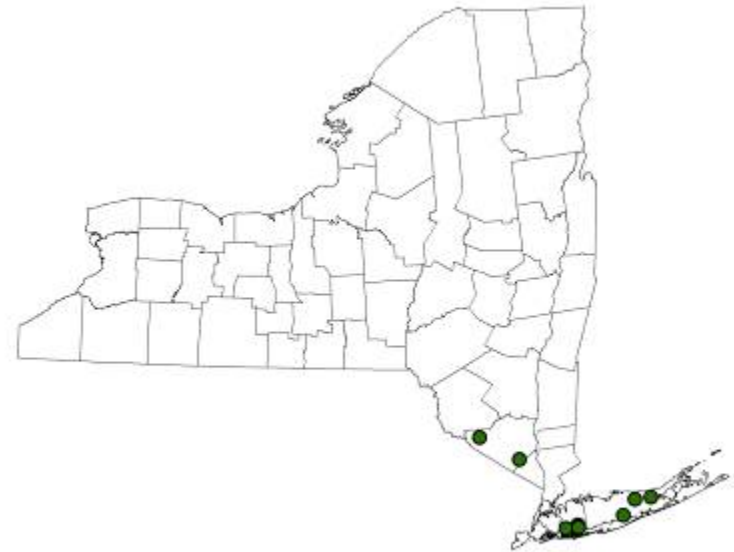
- Shallow and Deep Water

## Growth Patterns

- Dense Bottom Cover
- Surface Tangles

## Competitive Advantage

- Adaptable to Coldwater Environment
- Easily Moves By Fragmentation



# **Brazilian Elodea** **(*Egeria densa*)**

## **NYS Control Agent(s)**

- None Yet

## **NYS Control Projects**

- None Yet
- May Be Controlled at  
Lake Guymard (Orange)





# Parrotfeather

## *(Myriophyllum aquaticum)*

Origin: South America

Intro to US: 1890

Intro to NYS: early 1900s

Plant Type: Submerged

Leaf Type:

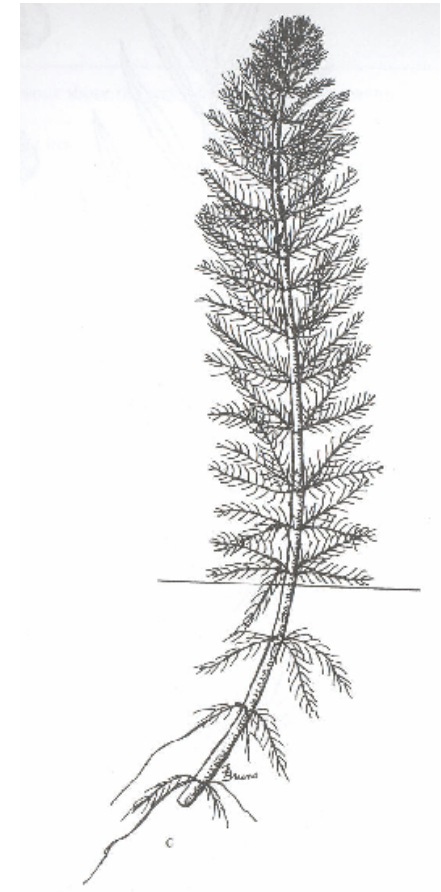
Submersed: Pinnate

Floating: None (Spike)

Leaf Arrangement: Whorled

Leaf Shape: Thread

Leaf Margin: Smooth



# Parrotfeather (*Myriophyllum aquaticum*)

## Habitat:

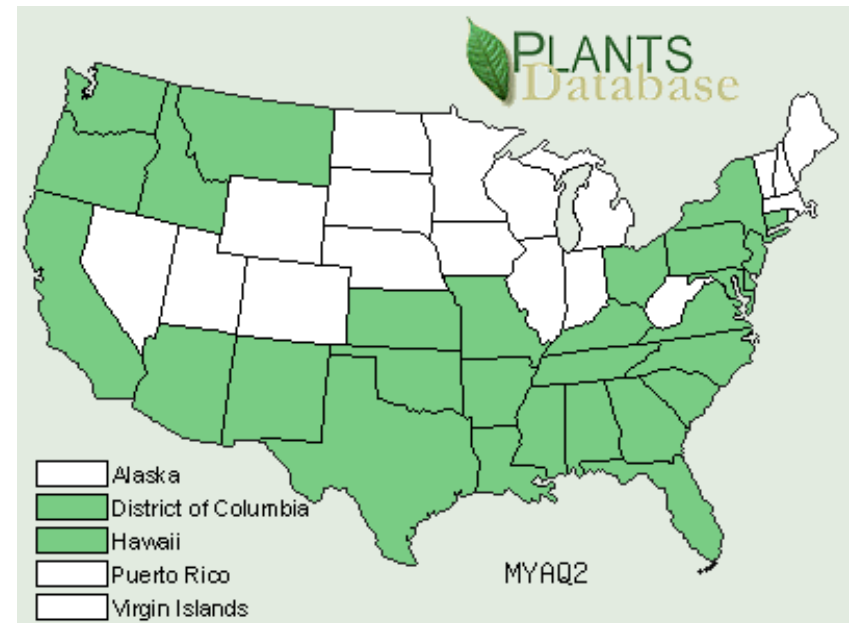
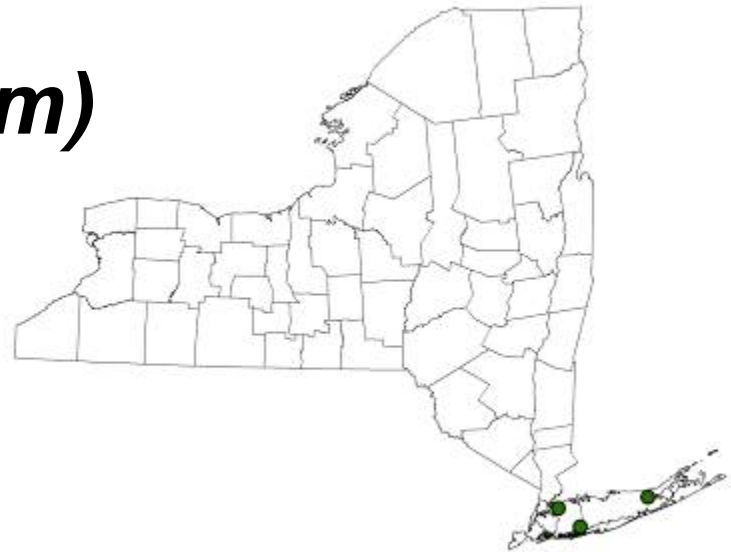
- Shallow Water
- Sandy or Mucky Bottom

## Growth Patterns

- Lime Colored Emerging Tips
- Sub-Surface Individual Stems

## Competitive Advantage

- Adaptable to Coldwater Environment
- Easily Moves By Fragmentation



# Parrotfeather (*Myriophyllum aquaticum*)

## NYS Control Agent(s)

– None Yet

## NYS Control Projects

– None Known



# Floating Water Primrose (*Ludwigia peploides*)

Origin: South America  
Intro to US: Native/Naturalized  
Intro to NYS: 2003

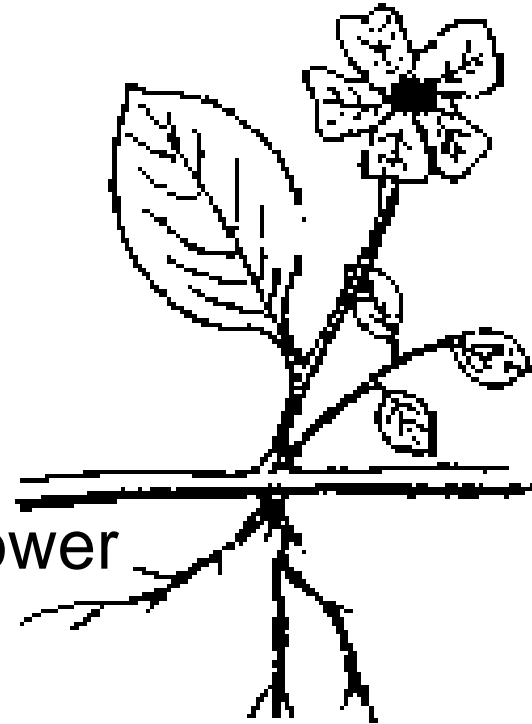
Plant Type: Floating

Leaf Type:  
Submersed: None  
Floating: Rosetta/Flower

Leaf Arrangement: Alternate

Leaf Shape: Elliptic

Leaf Margin: Smooth



# Floating Water Primrose (*Ludwigia peploides*)

## Habitat:

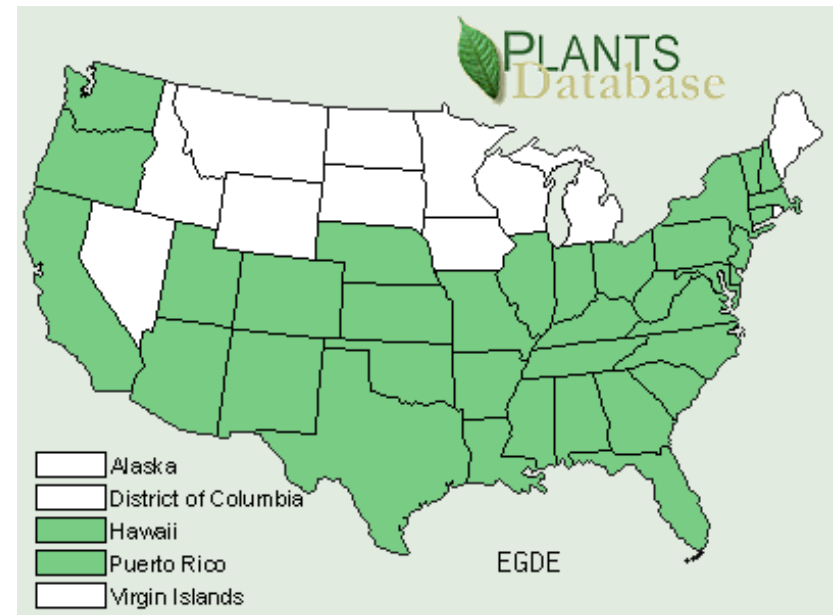
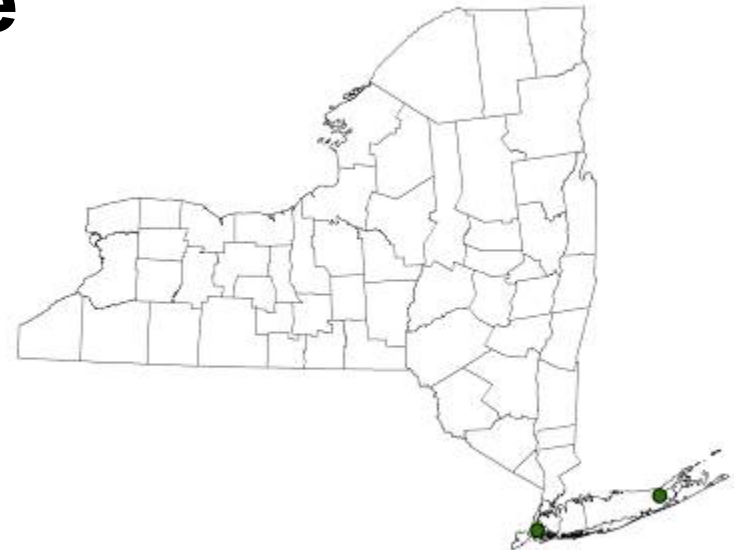
- Quiet Edges Rivers and Lakes
- Open Marshes

## Growth Patterns

- Free Floating
- Forms Dense Tangles

## Competitive Advantage

- Shading/Light Inhibition
- ???



# Floating Water Primrose (*Ludwigia peploides*)

## NYS Control Agent(s)

– Hand Pulling

## NYS Control Projects

– Peconic River (Suffolk)



# Fanwort

## (*Cabomba caroliniana*)

Origin: SE USA  
Intro to US: Native  
Intro to NYS: 1940s?

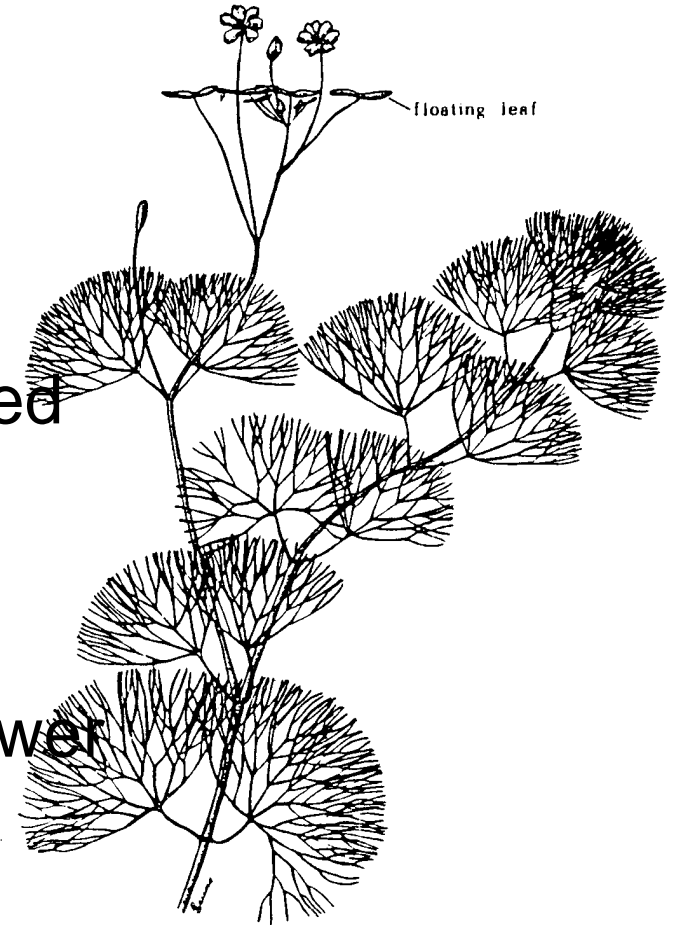
Plant Type: Submerged

Leaf Type: Pinnate  
Submersed: Small Flower

Leaf Arrangement: Opposite

Leaf Shape: Thread

Leaf Margin: Smooth



# Fanwort (*Cabomba caroliniana*)

## Habitat:

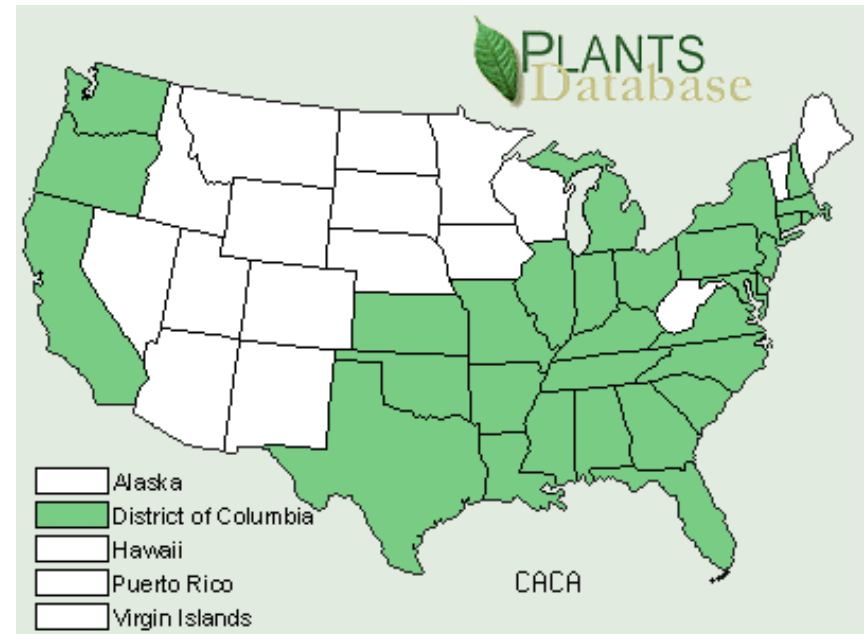
- Long Island: Shallow Ponds
- Update: Deep Coldwater Lakes

## Growth Patterns

- Dense Subsurface Busheling
- Surface Flowering

## Competitive Advantage

- Adaptable to Multiple Environment
- Easily Moves By Fragmentation





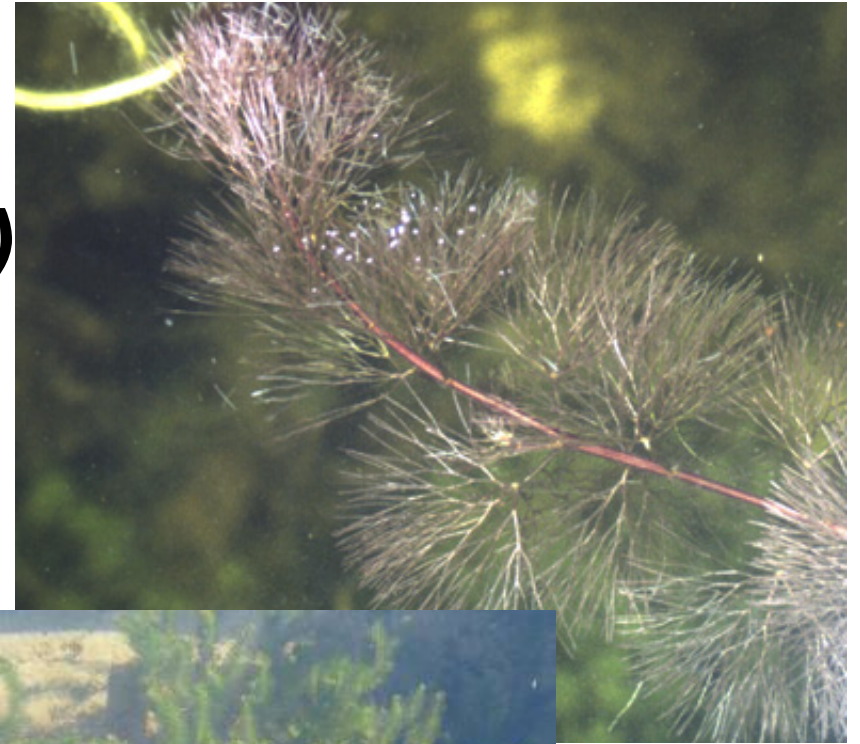
# Fanwort (*Cabomba caroliniana*)

## NYS Control Agent(s)

- Mechanical Harvesting
- Drawdown
- Herbicides
- Grass Carp

## NYS Control Projects

- Silver Lake (Dutchess)
- Mill Pond (Saratoga)
- Donahue Pond (Suffolk)
- Canaan Lake (Suffolk)



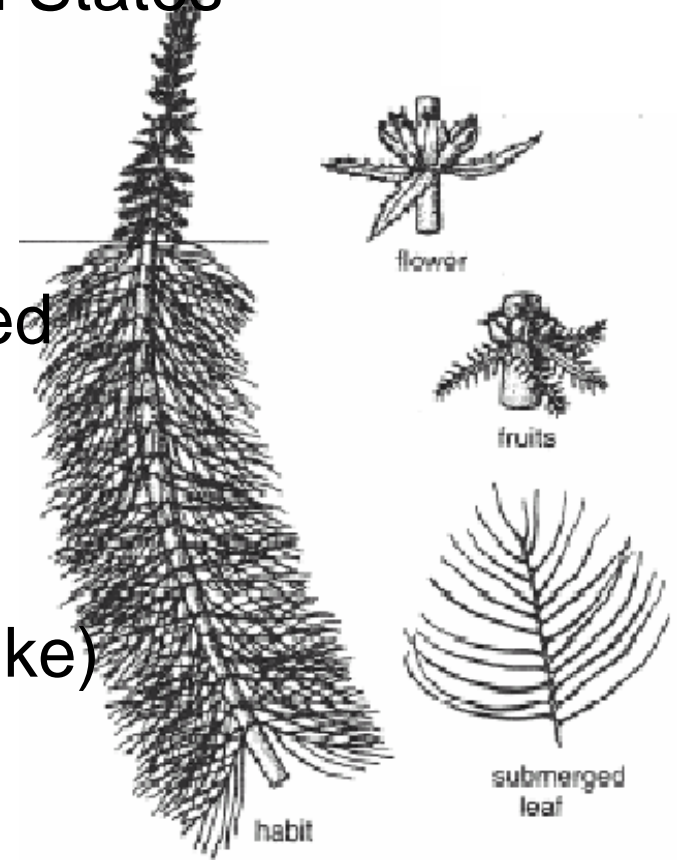
# Variable Watermilfoil

## *(Myriophyllum heterophyllum)*

Origin: SE United States  
Intro to US: Native  
Intro to NYS: Native?

Plant Type: Submerged

Leaf Type:  
Submersed: Pinnate  
Floating: None (Spike)  
Leaf Arrangement: Whorled  
Leaf Shape: Thread  
Leaf Margin: Smooth



# Variable Watermilfoil (*Myriophyllum heterophyllum*)

## Habitat:

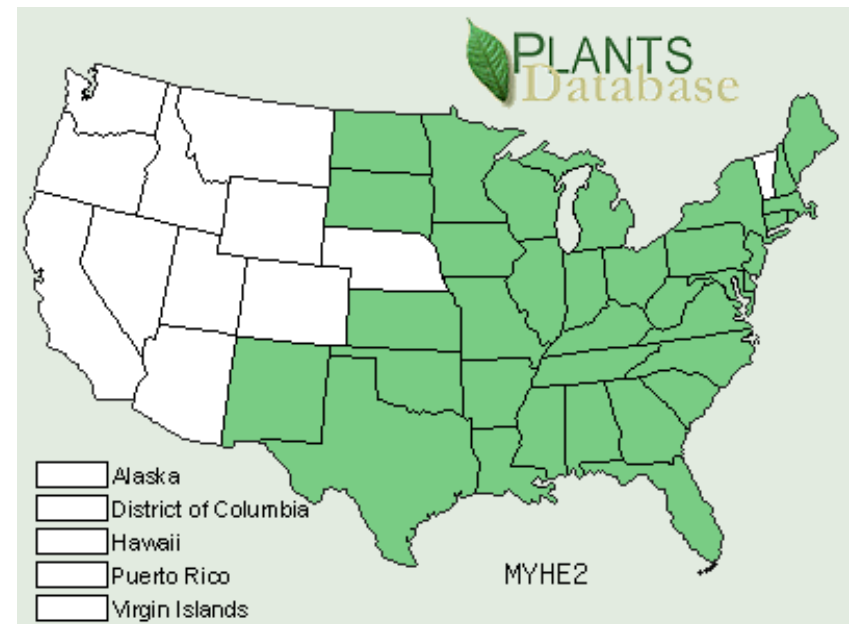
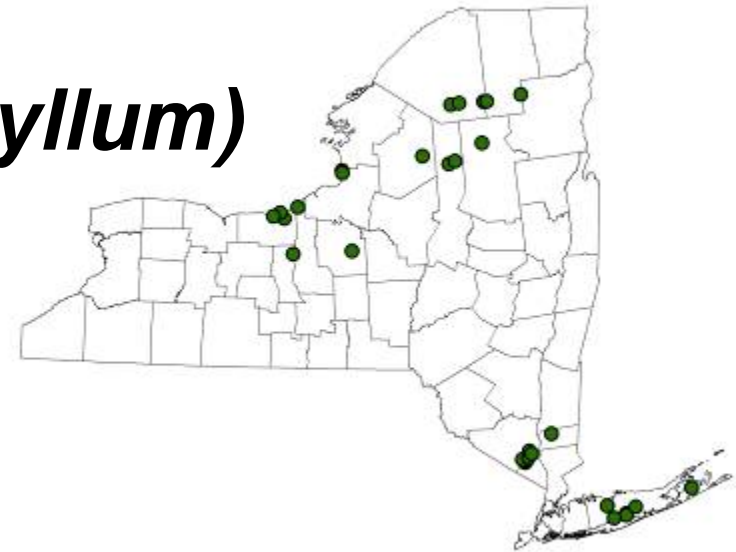
- Highly Variable

## Growth Patterns

- Occasionally Very Dense Surface Stems
- Thick Subsurface Canopies

## Competitive Advantage

- Shading/Light Inhibition
- Easily Moves By Fragmentation



# Variable Watermilfoil (*Myriophyllum heterophyllum*)

## NYS Control Agent(s)

– None Yet

## NYS Control Projects

– None Yet



# Swollen Bladderwort (*Utricularia inflata*)

Origin: SE United States  
Intro to US: Native  
Intro to NYS: Native

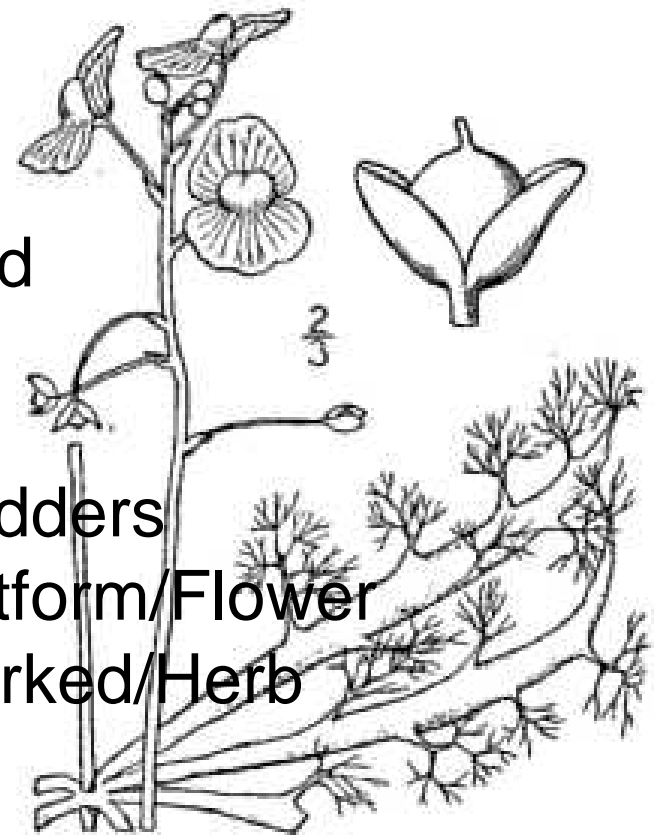
Plant Type: Submerged

Leaf Type: Submersed:  
Floating: Stems/Bladders  
Wheel Platform/Flower

Leaf Arrangement: Basally Forked/Herb

Leaf Shape: Thread

Leaf Margin: Smooth



# Swollen Bladderwort (*Utricularia inflata*)

## Habitat:

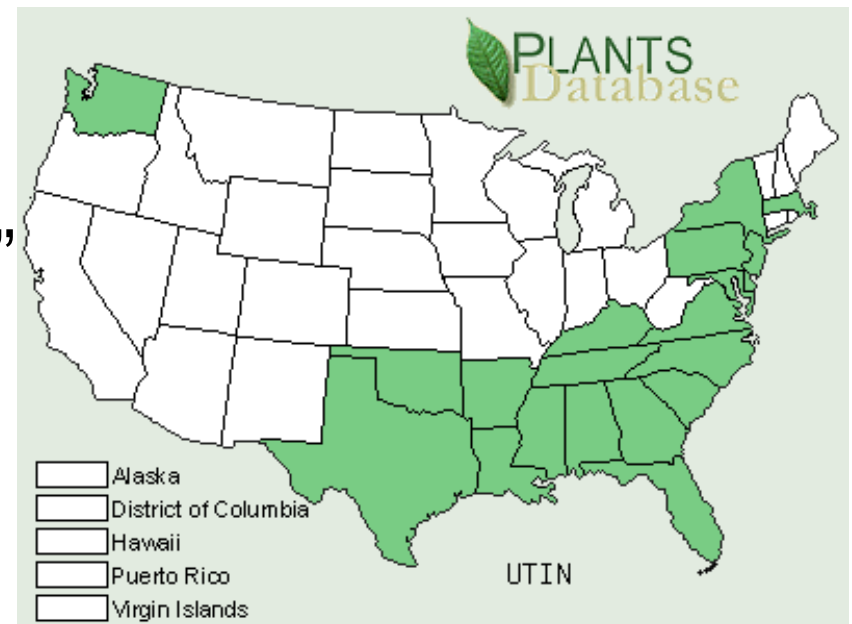
- Weakly Acidic, Softwater Lakes
- Weakly Rooted

## Growth Patterns

- Occasionally Dense Surface Pinwheels and Flowers
- Considered “Endangered”

## Competitive Advantage

- Thrives in Acidic, Poor Substrate Environments



# Swollen Bladderwort (*Utricularia inflata*)

## NYS Control Agent(s)

– None Yet

## NYS Control Projects

– None Yet



A person wearing waders and a hat stands in a lake, surrounded by dense aquatic plants. The water is a deep blue-green color, and the plants are a mix of green and brown. The person is holding a large bundle of plants. The background is a dense field of similar plants stretching to the horizon.

# Unlucky 13: Thirteen (Give or Take) Aquatic Plants You Don't Want in Your Lake

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# Hydrilla

## *(Hydrilla verticillatum)*

Origin: Eurasia  
Intro to US: 1980  
Intro to NYS: Not Yet?

Plant Type: Submerged

Leaf Type:  
Submersed: Ribbon  
Floating: Barely Flower  
Leaf Arrangement: Whorled (4-8)  
Leaf Shape: Strap  
Leaf Margin: Saw Toothed



# Hydrilla (*Hydrilla verticillatum*)

## Habitat:

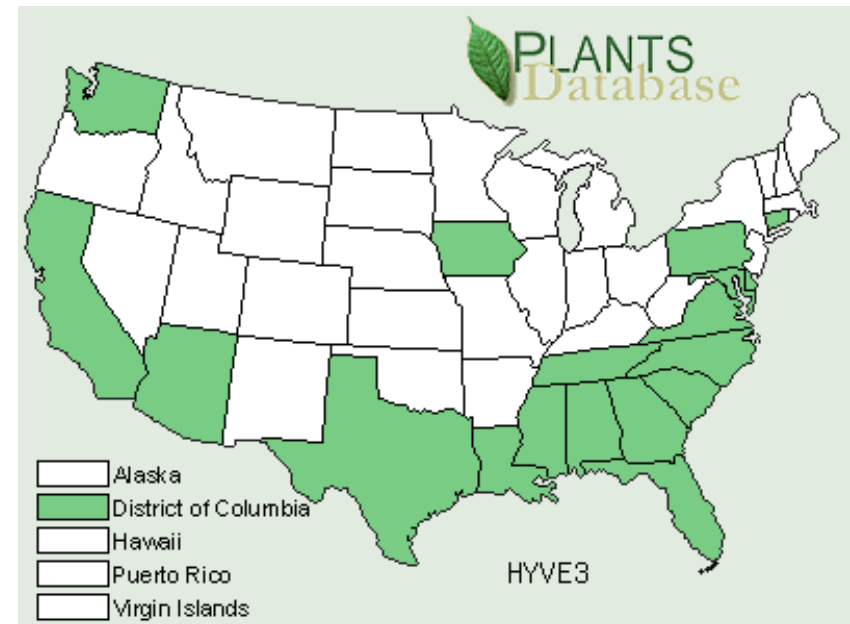
- Shallow and Deep Water

## Growth Patterns

- Dense Bottom Cover
- Surface Tangles

## Competitive Advantage

- Adaptable to Coldwater Environment
- Easily Moves By Fragmentation



# Hydrilla (*Hydrilla verticillatum*)

## NYS Control Agent(s)

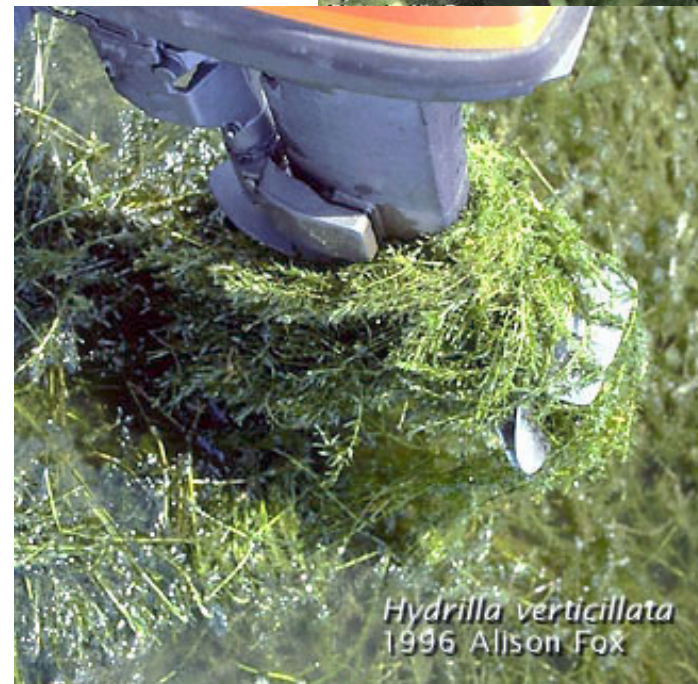
– None Yet

## NYS Control Projects

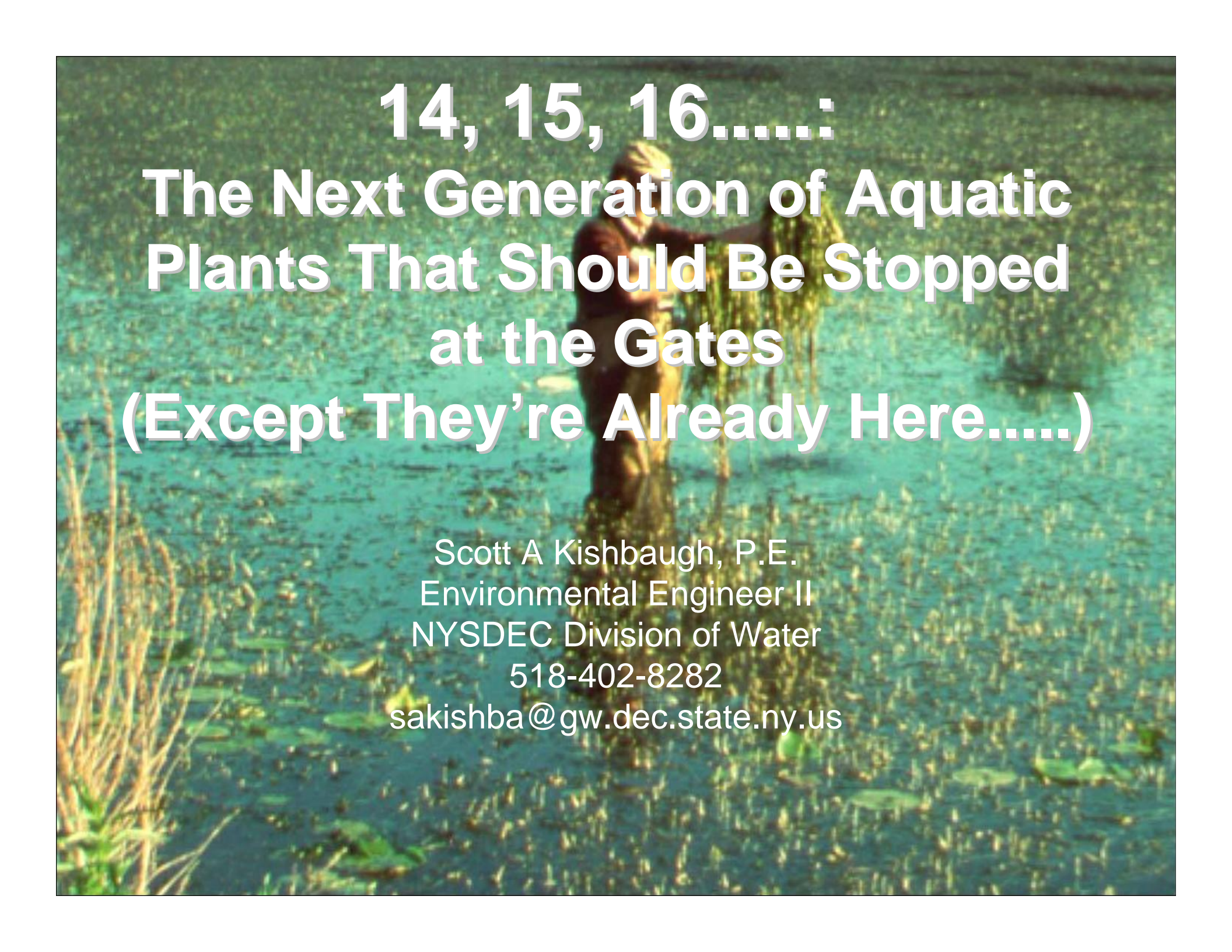
– None Yet



Hydrilla  
*Hydrilla verticillata*



*Hydrilla verticillata*  
1996 Allison Fox

A person wearing a hat and dark clothing is standing in a field of dense, green aquatic plants. The person is holding a large bundle of plants. The background is a vast expanse of similar plants under a bright sky.

**14, 15, 16.....:**  
**The Next Generation of Aquatic**  
**Plants That Should Be Stopped**  
**at the Gates**  
**(Except They're Already Here.....)**

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# Starry Stonewort (*Nitellopsis obtusa*)

Origin: Eurasia  
Intro to US: 1978 (St. Lawrence R)  
Intro to NYS: 1981 (Lake Ontario)

Plant Type: Submerged

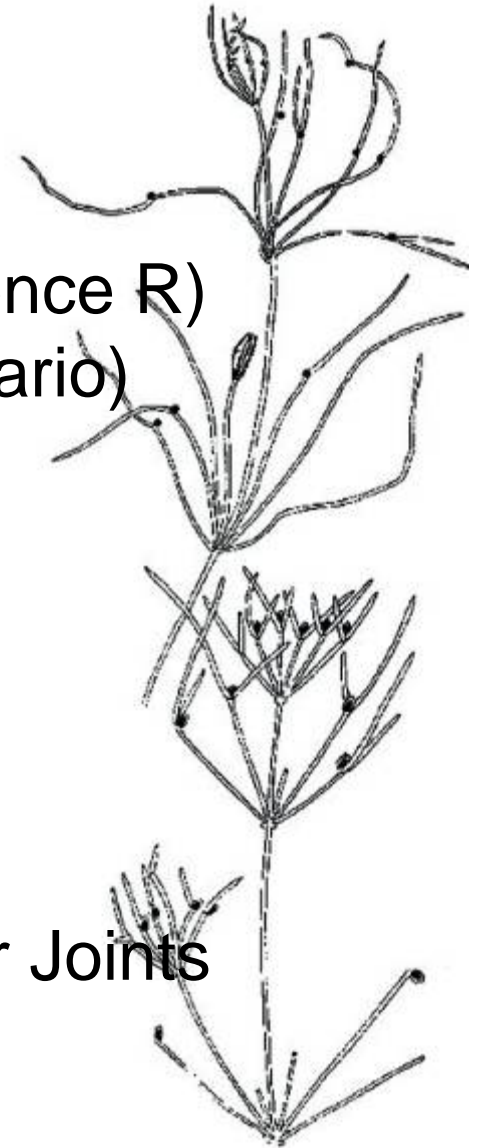
Leaf Type:  
Submersed: Filaments

Floating: None

Leaf Arrangement: Uneven Angular Joints

Leaf Shape: Thread

Leaf Margin: Smooth



# Starry Stonewort (*Nitellopsis obtusa*)

## Habitat:

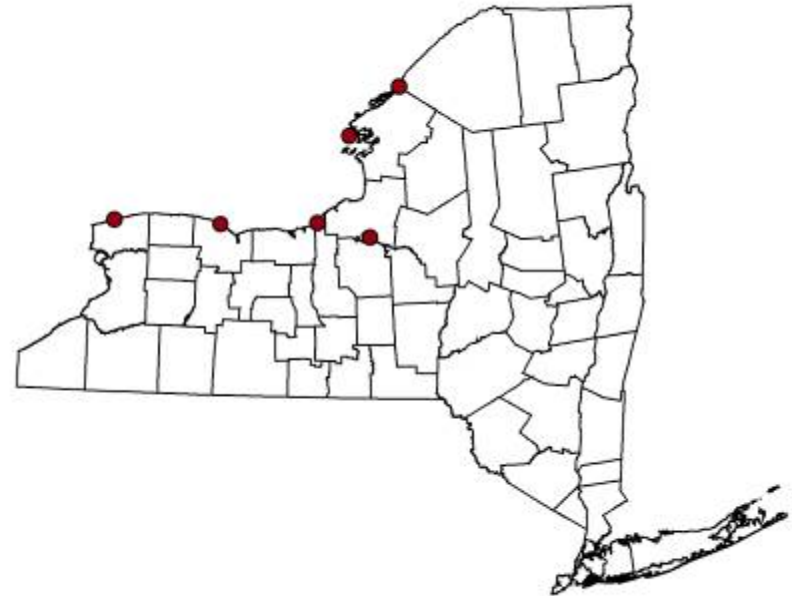
- Deep Water
- Saline to Hardwater

## Growth Patterns

- Dense Bottom Coverage

## Competitive Advantage

- Bottom Coverage



SPACE FOR RENT

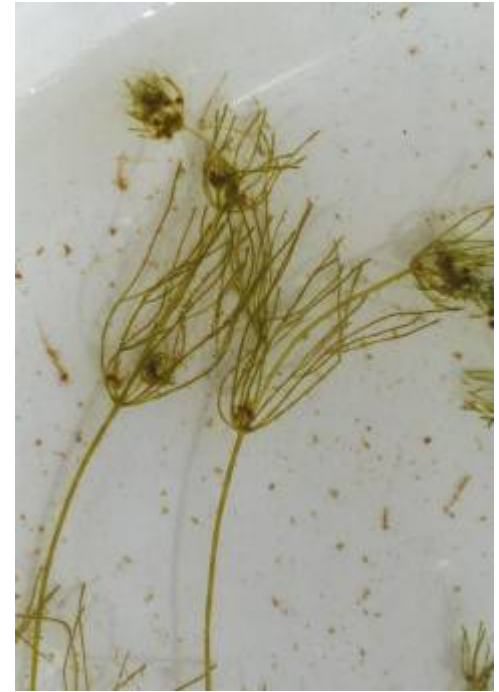
# **Starry Stonewort (*Nitellopsis obtusa*)**

## **NYS Control Agent(s)**

– None Yet

## **NYS Control Projects**

– None Yet



# European Waterclover (*Marsilea quadrifolia*)

## Origin and Habitat:

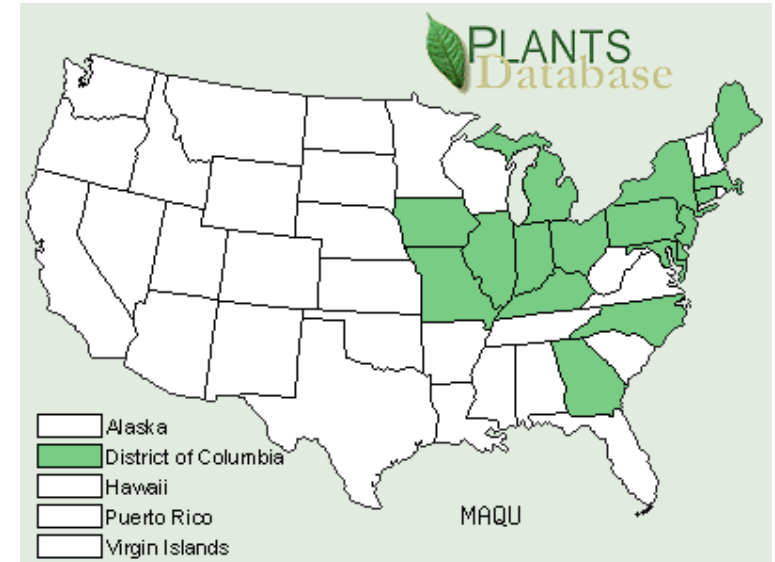
- Introduced from Europe
- Submergent or Emergent

## Growth Patterns

- Usually Bottom Cover

## Why It's Not Yet Well Established in New York State

- Not Known
- Common Aquaria Plant





# Water Hyacinth (*Eichhornia crassipes*)

## Origin and Habitat:

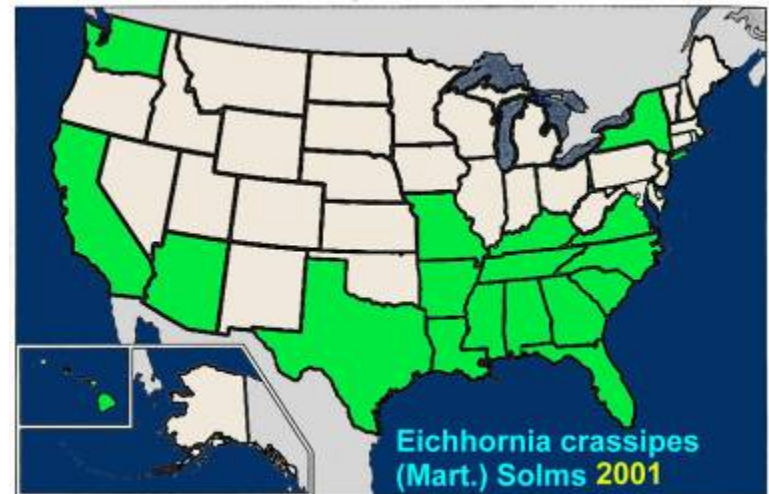
- Native to Brazil
- Introduced 1884 (New Orleans Exposition)
- Shallow Water Lakes / Rivers

## Growth Patterns

- VERY Dense Mats- 200 tons per acre

## Why It's Not Yet Well Established in New York State

- Minimum Growth Temperature = 54°F
- Plants Found on Long Island



# Water Lettuce (*Pistia stratiotes*)

## Origin and Habitat:

- ID in US by 1765 in Florida
- Shallow Water Lakes and Rivers

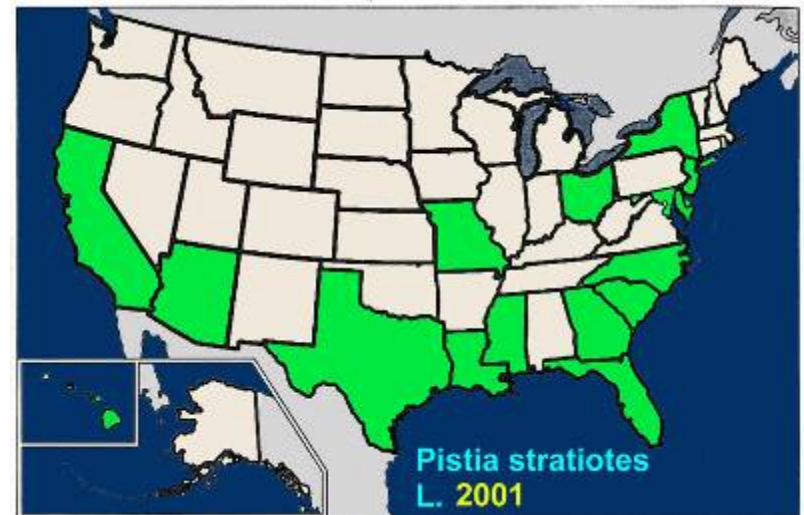
## Growth Patterns

- Dense Mats via Linked Plants

## Why It's Not Yet Well

## Established in New York State

- Minimum Growth Temperature = 59°F
- Global Warming Hasn't Yet Raided Temperatures Enough
- Plants Found in Canal near Buffalo



# Indian Swampweed (*Hygrophilia polysperma*)

## Origin and Habitat:

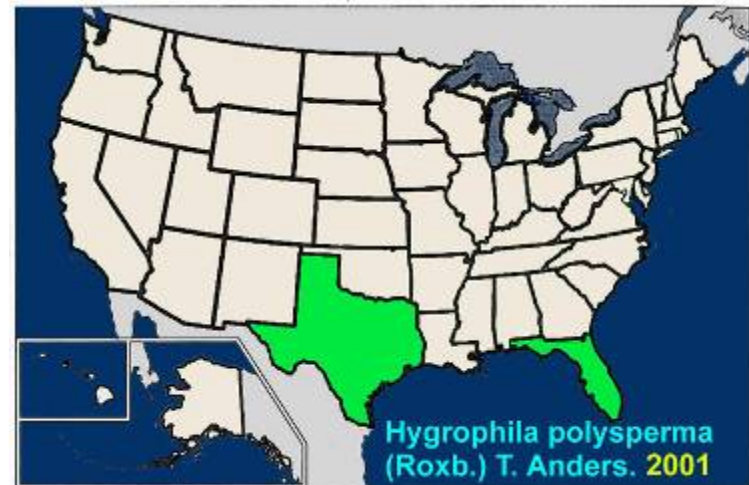
- Native to East Indies
- Introduced to U.S. Via Aquaria Trade in 1945
- Up to 10 Feet in Depth or Creeping Along Shore

## Growth Patterns

- Dense Subsurface to Surface Mats

## Why It's Not Yet Well Established in New York State

- Not Yet Found in NYS
- Frequently Cultured as Aquarium Plant



# Asian Swampweed (*Limnophila sessiliflora*)

## Origin and Habitat:

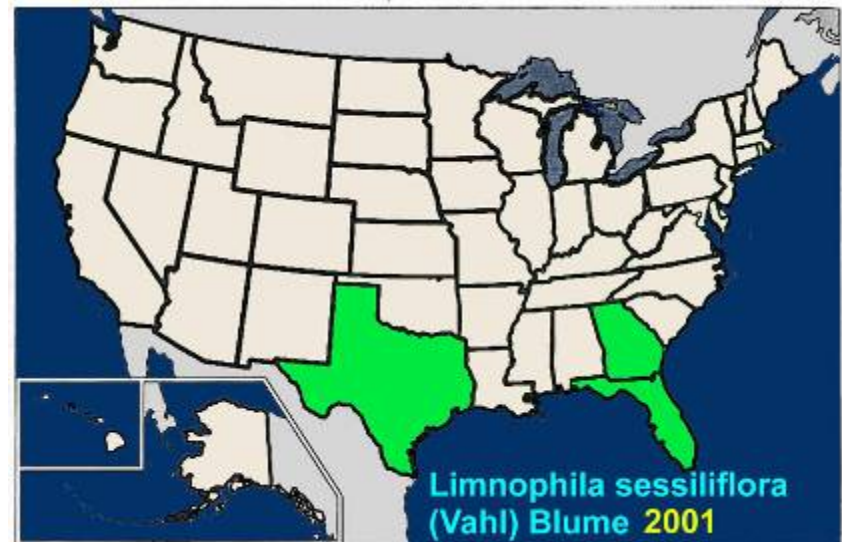
- Native to India
- Introduced to U.S. Via Aquaria Trade in 1965
- Up to 12 Feet in Depth

## Growth Patterns

- Dense Stands of Stems in Water

## Why It's Not Yet Well Established in New York State

- Not Yet Found in NYS
- Minimum Growth Temperature = 59°F
- Frequently Cultured as Aquarium Plant



# Where We're Looking (Statewide Inventories)

- **High Exposure Regions**
  - Long Island- follow up to 2005 / 06 Survey in 2008
- **Epicenters**
  - Eastern Nassau County / Wantagh (DEC LCI)
  - Harriman State Park (OPR / DEC LCI)
- **Places We Have a Chance to Make a Difference**
  - **Adirondacks**
    - Parkwide = APIPP
    - Champlain/Black River Region = DEC LCI 2008 / 09
    - St. Lawrence Region = DEC LCI 2009 / 10
- **Sparsely Surveyed Regions/Waterbodies- DEC LCI**
  - Lake Erie/Niagara River Region 2006 / 07
  - Chemung River Region 2007 / 08
  - Susquehanna River Region 2008 / 09
  - Delaware River and Genesee River Regions 2009 /10