

# Invasive Aquatic Plants

## *The State of the State*



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*Invasive Aquatic Plant Program*



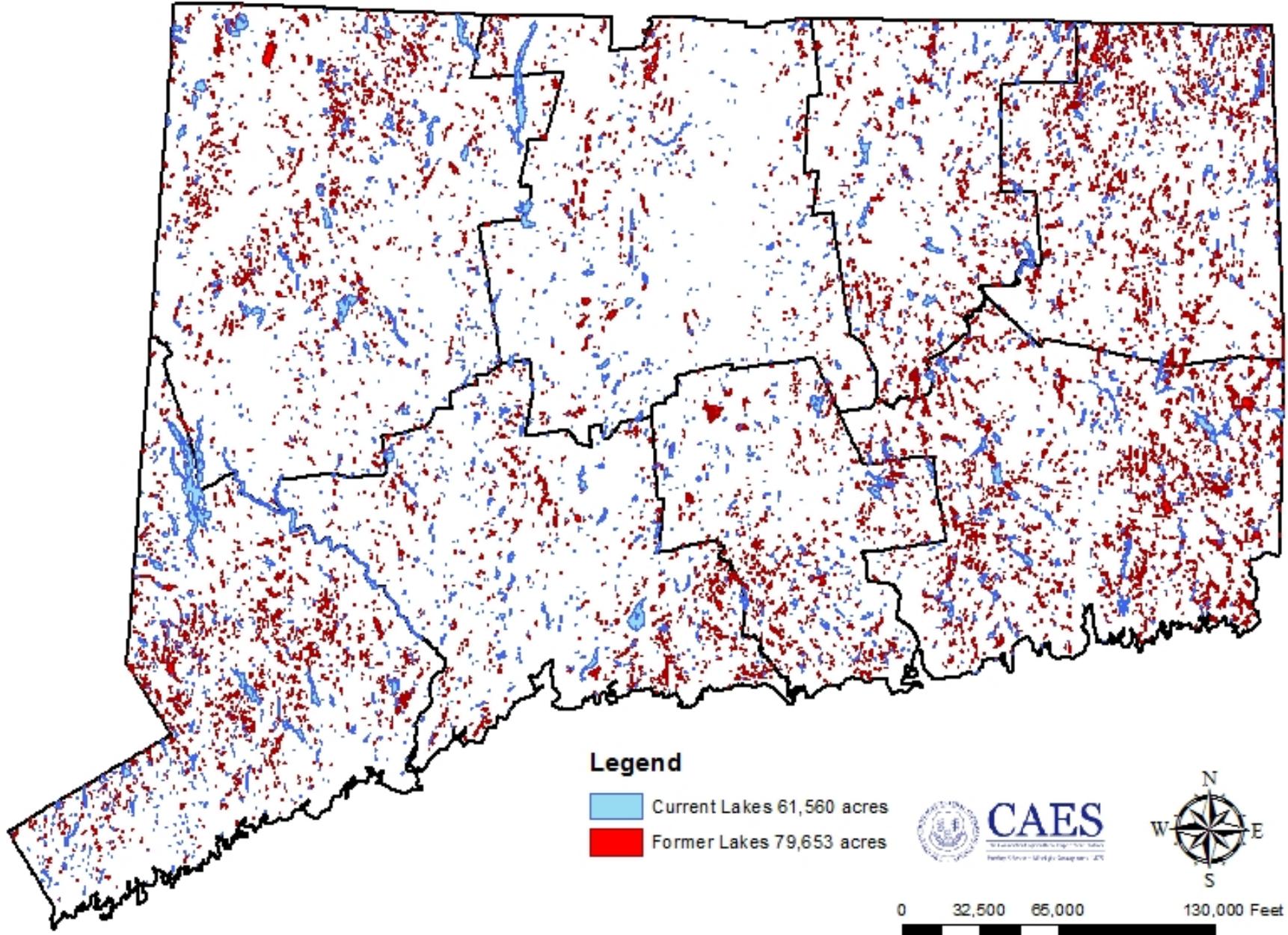
**CAES**

The Connecticut Agricultural Experiment Station

Putting Science to Work for Society since 1875

# CT Entities Involved with IAP

- CAES – surveys, research, database
- CT DEEP – permits, state listed species, inspections
- CT AG – inspections, enforcement
- UCONN – teaching, plant I.D., herbarium
- CIPWG – education, organize control projects
- IPC – advise legislation
- Private sector scientists, management specialists
- Lake groups – CFL, CLA, BLA, etc.
- Silvio Conte National Fish and Wildlife Refuge (MA)



# Connecticut's Invasive or Potentially Invasive Aquatic Plants

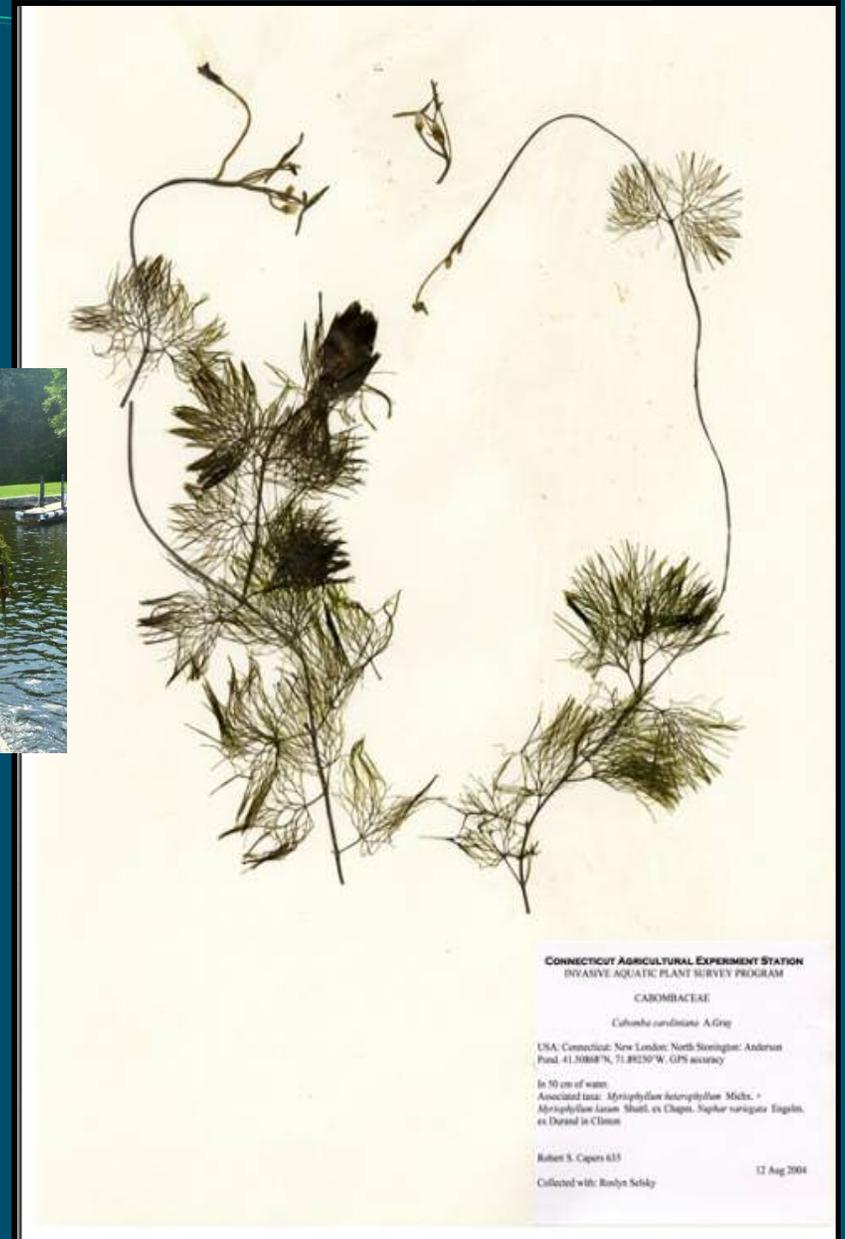
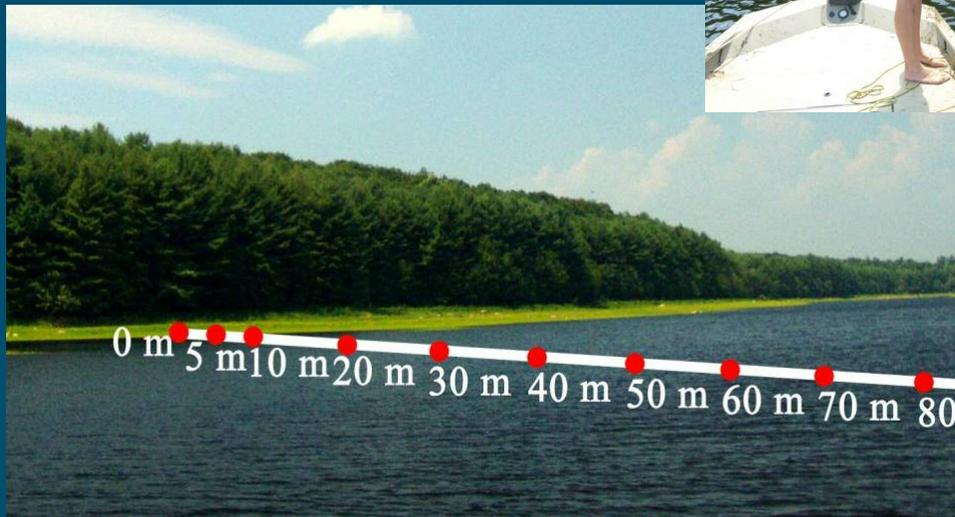
## CT State Statutes (Sec. 22a-381d)

| #  | COMMON NAME                                 | SCIENTIFIC NAME                     | DISPERSAL                       |
|----|---|-------------------------------------|---------------------------------|
| 1  | American water lotus                        | <i>Nelumbo lutea</i>                | Water Gardening                 |
| 2  | Brazilian water-weed, Anacharis, Egeria     | <i>Egeria densa</i>                 | Aquariums, Boats/Trailers, Bait |
| 3  | Brittle water-nymph, Minor naiad            | <i>Najas minor</i>                  | Boats/Trailers                  |
| 4  | Common water-hyacinth*                      | <i>Eichhornia crassipes</i>         | Water Gardening                 |
| 5  | Curly leaf pondweed, Crispy-leaved pondweed | <i>Potamogeton crispus</i>          | Boats/Trailers                  |
| 6  | Eurasian watermilfoil                       | <i>Myriophyllum spicatum</i>        | Aquariums, Boats/Trailers, Bait |
| 7  | European waterclover, Water shamrock        | <i>Marsilea quadrifolia</i>         | Water Gardening, Boats/Trailers |
| 8  | Fanwort                                     | <i>Cabomba caroliniana</i>          | Aquariums, Boats/Trailers       |
| 9  | Flowering rush                              | <i>Butomus umbellatus</i>           | Water Gardening                 |
| 10 | Forget-me-not, Water scorpion-grass         | <i>Myosotis scorpioides</i>         | Water Gardening                 |
| 11 | Giant salvinia                              | <i>Salvinia molesta</i>             | Water Gardening                 |
| 12 | Hydrilla                                    | <i>Hydrilla verticillata</i>        | Aquariums, Boats/Trailers, Bait |
| 13 | Onerow yellowcress                          | <i>Rorippa microphylla</i>          | Water Gardening                 |
| 14 | Parrotfeather                               | <i>Myriophyllum aquaticum</i>       | Water Gardening, Boats/Trailers |
| 15 | Pond water-starwort                         | <i>Callitriche stagnalis</i>        | Water Gardening                 |
| 16 | Purple loosestrife                          | <i>Lythrum salicaria</i>            | Nursery Stock, Water Gardening  |
| 17 | Variable-leaf watermilfoil                  | <i>Myriophyllum heterophyllum</i>   | Aquariums, Boats/Trailers       |
| 18 | Water chestnut                              | <i>Trapa natans</i>                 | Water Gardening, Boats/Trailers |
| 19 | Water lettuce, American water lotus         | <i>Pistia stratiotes</i>            | Water Gardening                 |
| 20 | Watercress                                  | <i>Rorippa nasturtium-aquaticum</i> | Water Gardening                 |
| 21 | Yellow floating heart                       | <i>Nymphoides peltata</i>           | Water Gardening                 |
| 22 | Yellow iris, Yellow flag iris               | <i>Iris pseudacorus</i>             | Nursery Stock, Water Gardening  |

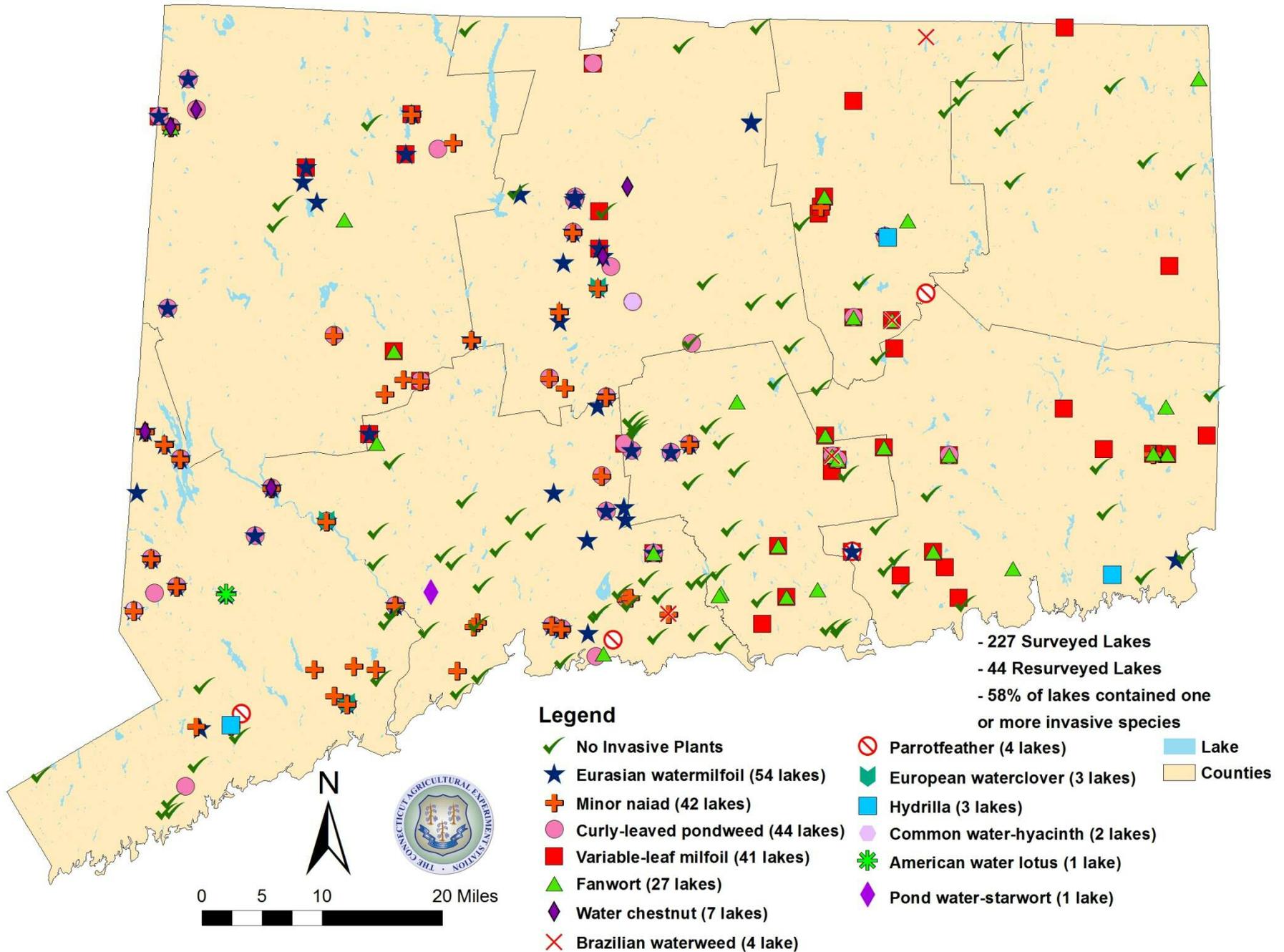
\*only plant on list that is not banned

# Aquatic Plant Surveys

- Mark locations map
- Collect each species for herbarium
- Create 1 – 80 m transect/10 acres
- Create ArcGIS® map
- Upload to website
- Water Chemistry
  - Transparency, DO, Temp, Alkalinity, pH, Conductivity, P



# Locations of Invasive Plants Found by CAES IAPP 2004-2015



# Water Chemistry Preferences

| Group | Species               | Alkalinity             | Conductivity | pH        | Phosphorus |
|-------|-----------------------|------------------------|--------------|-----------|------------|
|       |                       | mg/L CaCO <sub>3</sub> | μS/cm        |           | μg/L       |
| 1     | Fanwort               | 0 - 28                 | 39 - 107     | 5.6 - 7.0 | 1 - 27     |
|       | Variable watermilfoil |                        |              |           |            |
| 2     | Curlyleaf pondweed    | 17 - 77                | 108 - 232    | 6.3 - 8.1 | 0 - 85     |
|       | Eurasian watermilfoil |                        |              |           |            |
|       | Minor naiad           |                        |              |           |            |

June-Wells et al. 2013. *Lake and Reservoir Management*. 29:303-316



# CT Aquarium Survey 2008-2012

## Stores Selling Banned Aquatic Plants



| Year | Stores Visited | Banned Plants | Fanwort  | Brazilian Waterweed | Parrot Feather | Variable Milfoil | Unidentified Milfoil |
|------|----------------|---------------|----------|---------------------|----------------|------------------|----------------------|
| 2008 | 23             | 8 (29%)       | 4 (14%)  | 4 (14%)             | 2 (9%)         | 0                | NA                   |
| 2010 | 47             | 14 (30%)      | 11 (23%) | 5 (11%)             | 1 (2%)         | 1 (2%)           | 6 (13%)              |



- Revisited all stores in 2011 and handed out information on laws and I.D.
- Revisited most violating stores in 2012. Approx. 80% in compliance.

*June-Wells et al. 2012. Lake and Reservoir Management, 2005*

Anacharis Hygro  
102010  
\$2.99 / \$2.99  
Reg P. / Club P.

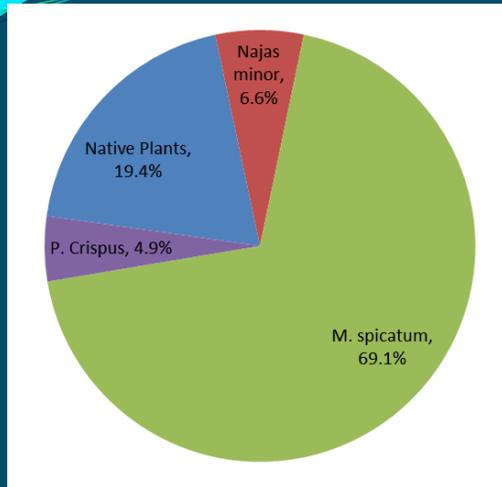
Carbon  
102426  
\$4.99 / \$3.99  
Reg P. / Club P.

Needle Leaf Hygro  
102023  
\$3.99 R  
\$3.19 C

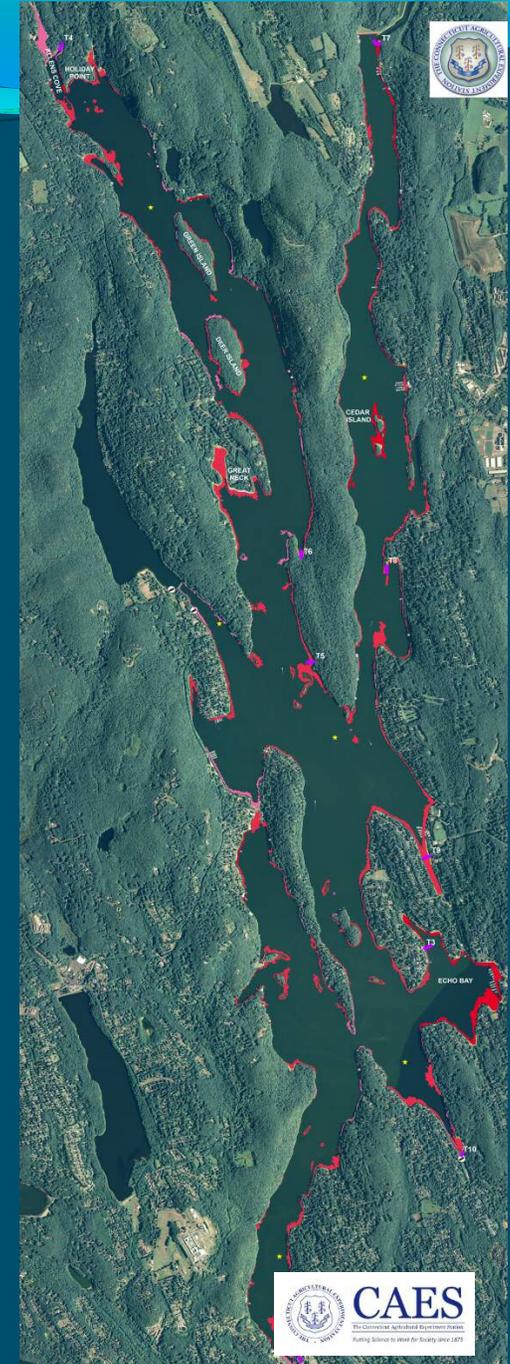


# Candlewood Lake

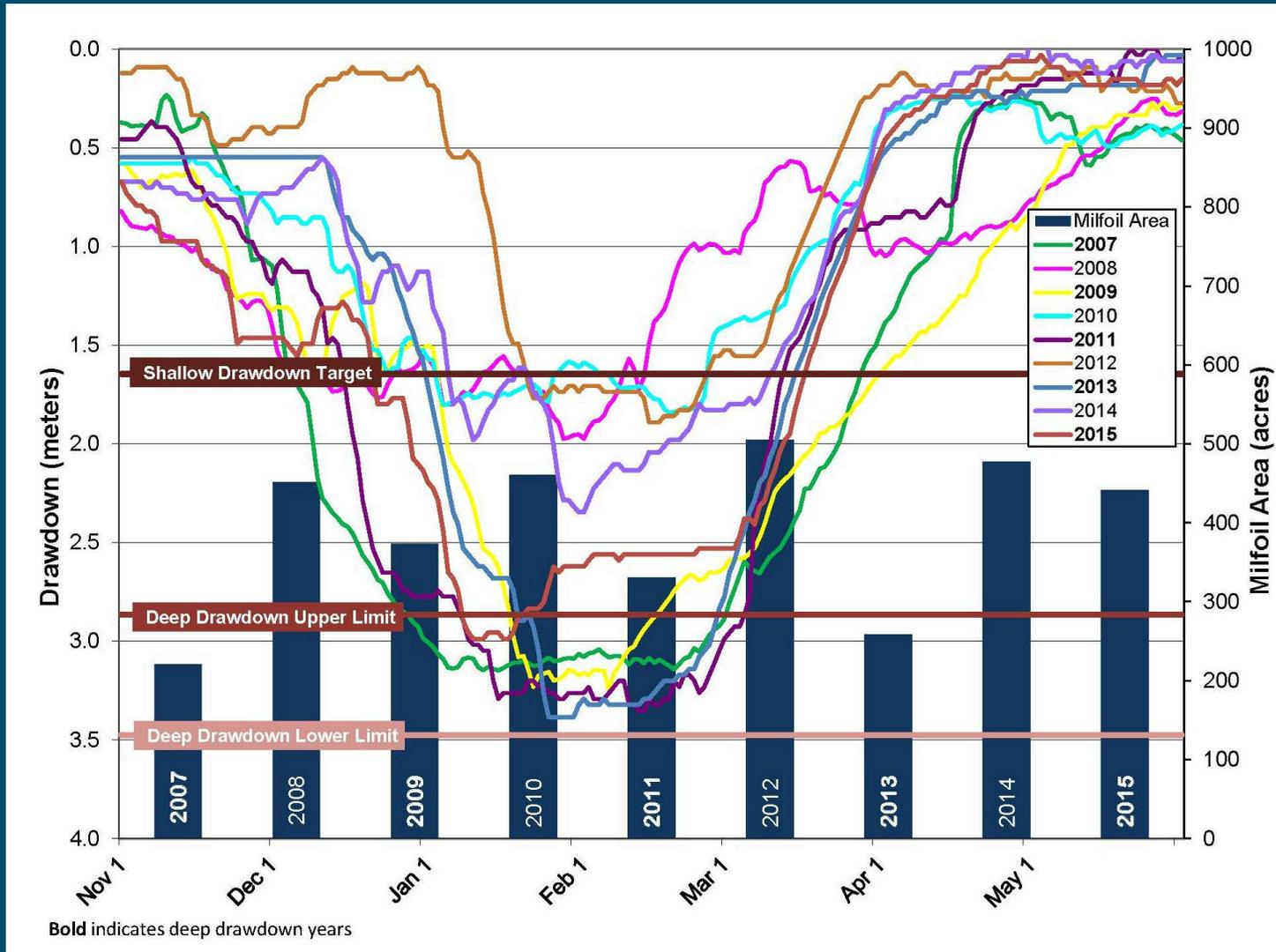
## Occurrence by Species



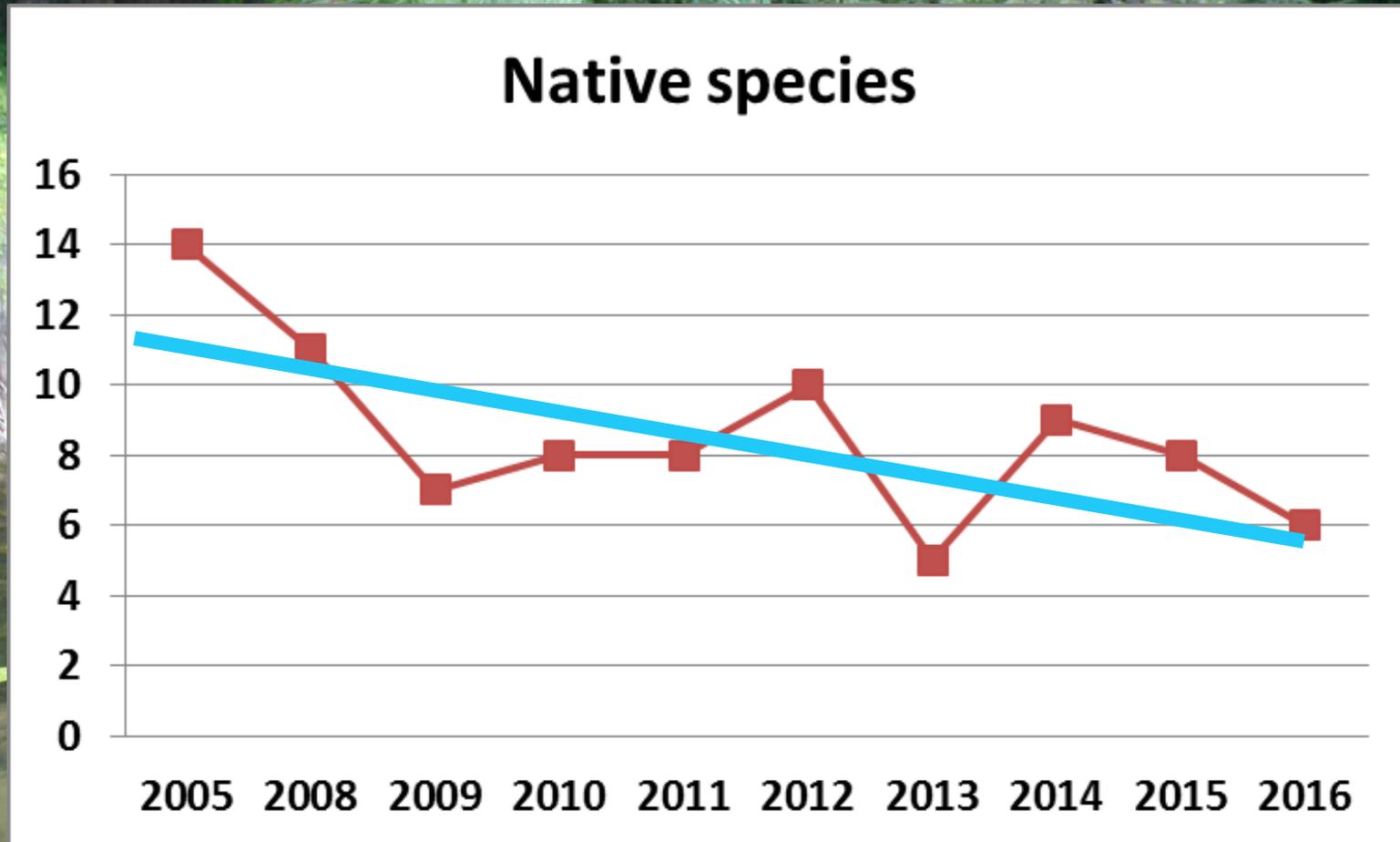
Eurasian watermilfoil (*Myriophyllum spicatum*)



# How Effective is the Drawdown?



# Native Species Richness

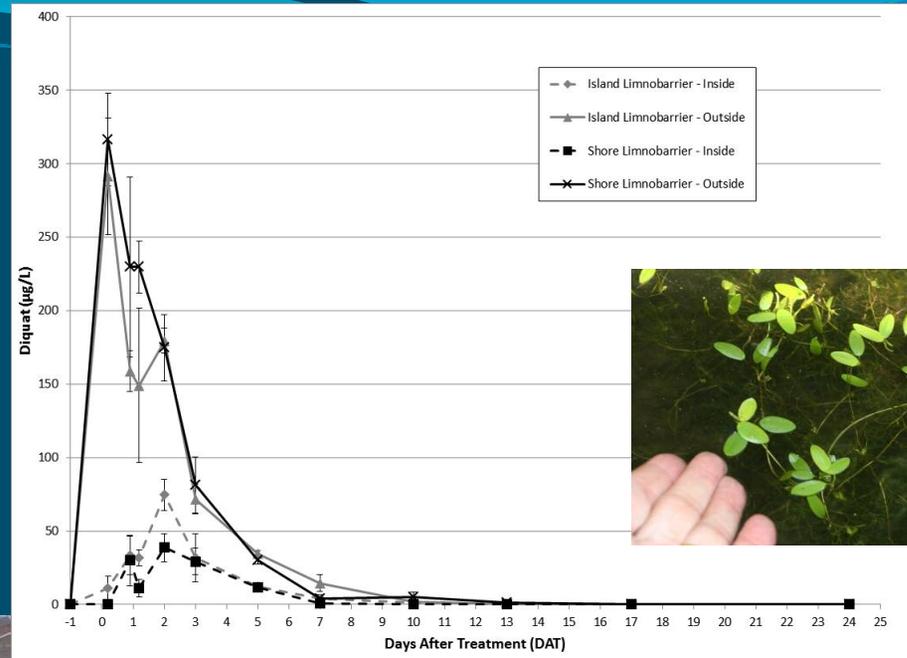


# Control of Variable Watermilfoil with 2,4-D



Bugbee et al. 2003. *J. Aquat. Plant Manage.* 41:18-25

# Installation of Limnobarriers to Protect State Listed Plant From Herbicide *(Potamogeton vaseyi)*



Robb et al. 2014. *J. Aquat Plant Manage.* 52:39-46

*Brazilian Waterweed*

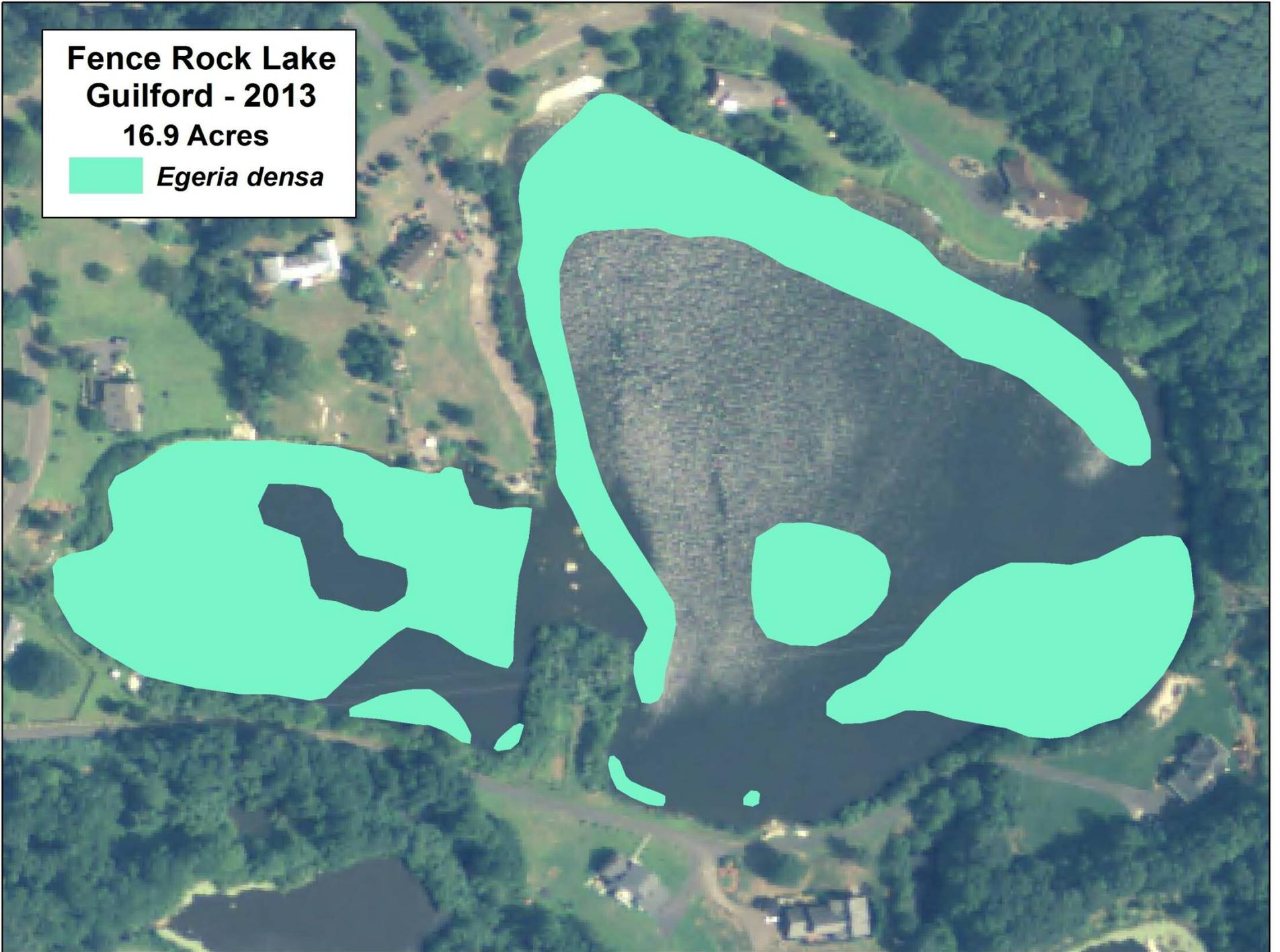
*Fence Rock Lake  
Guilford*



**Fence Rock Lake  
Guilford - 2013**

**16.9 Acres**

 *Egeria densa*

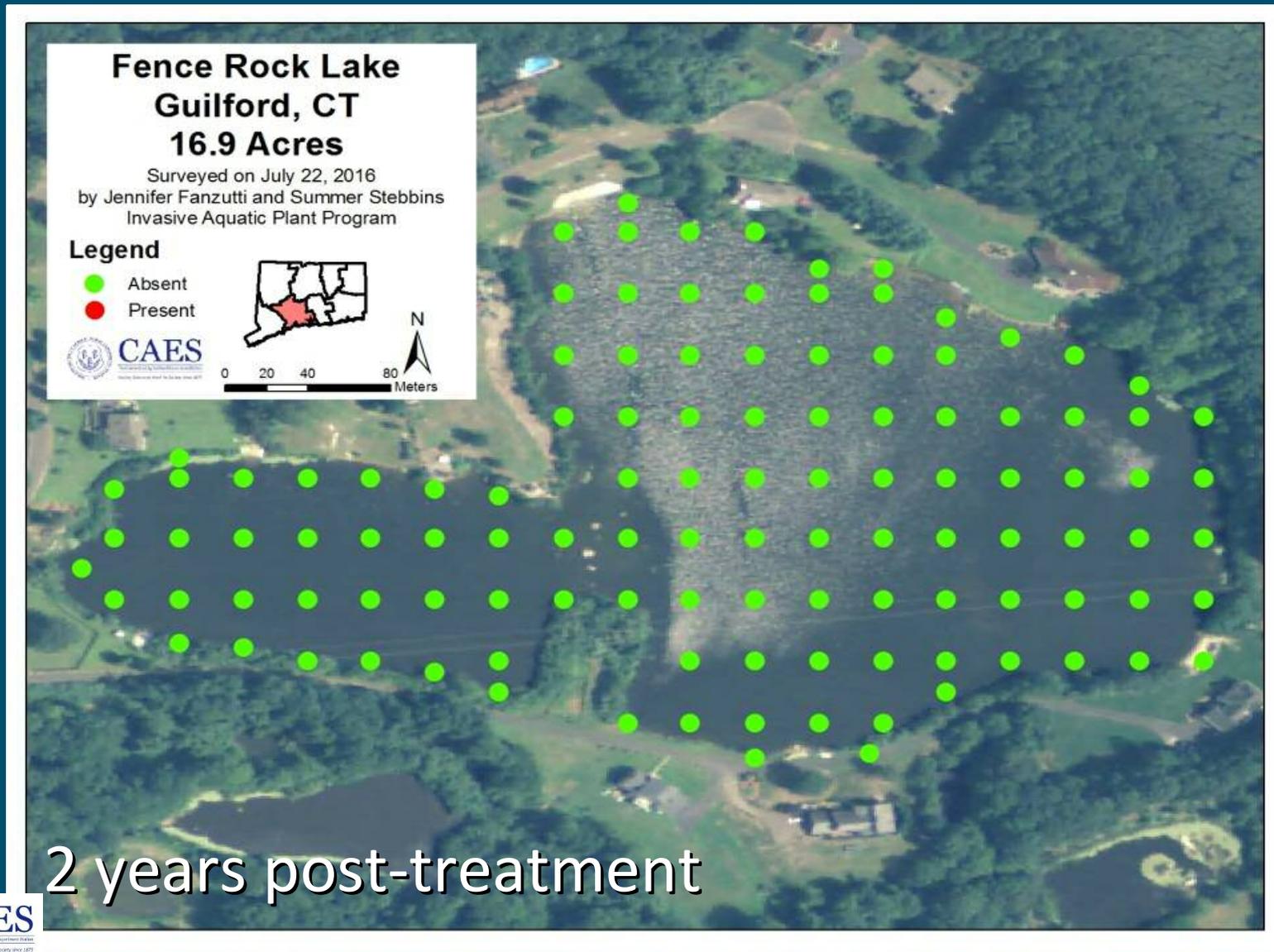


July 21, 2015





# Treatment of Fence Rock Lake



# Searching for Biocontrols



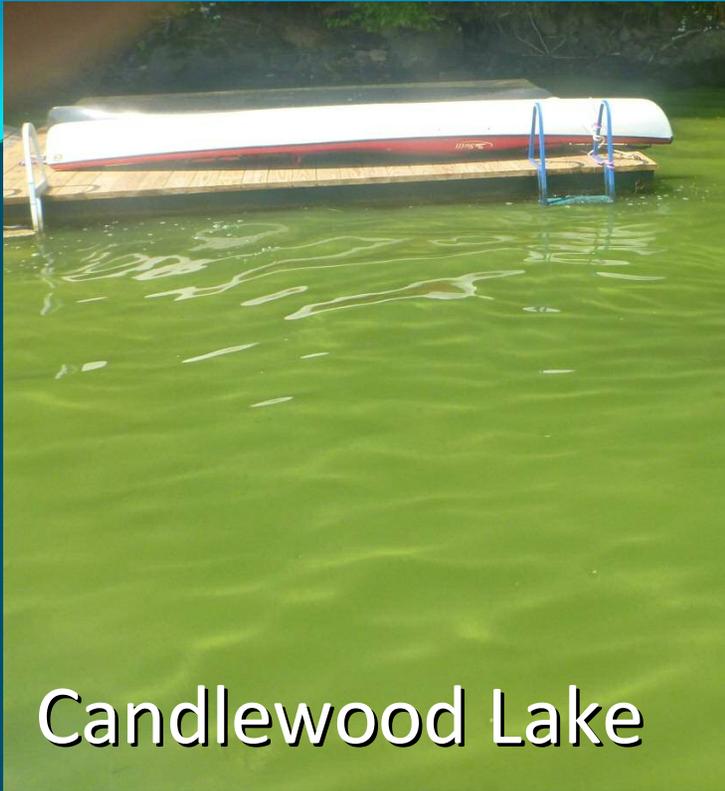
# Milfoil Weevils in Candlewood Lake





# Introduction of Grass Carp into Candlewood Lake 2015

# HAB's



Candlewood Lake



Lake Zoar



Bashan Lake



Elizabeth Park Pond

# Questions?

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