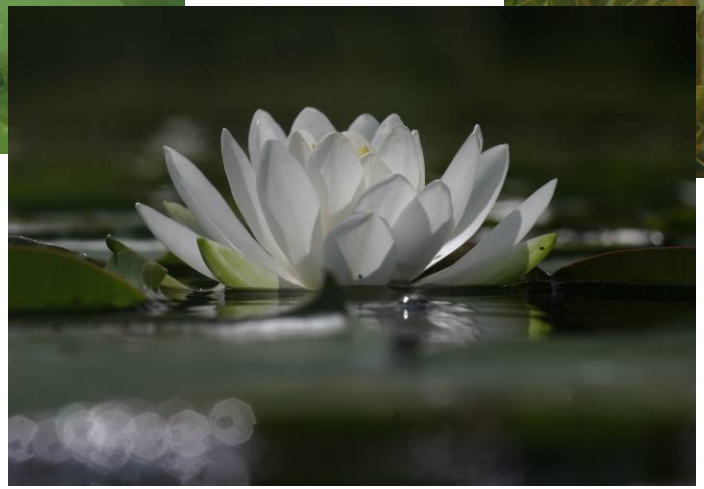
Lake Ripley, Jefferson Co.
Aquatic Plants



Michelle Nault

Wisconsin Department of Natural Resources

Bureau of Science Services

Sampling of Aquatic Plants

Goals and Applications

1) In-lake ecology and management

-Snapshot of one lake today…

and over time

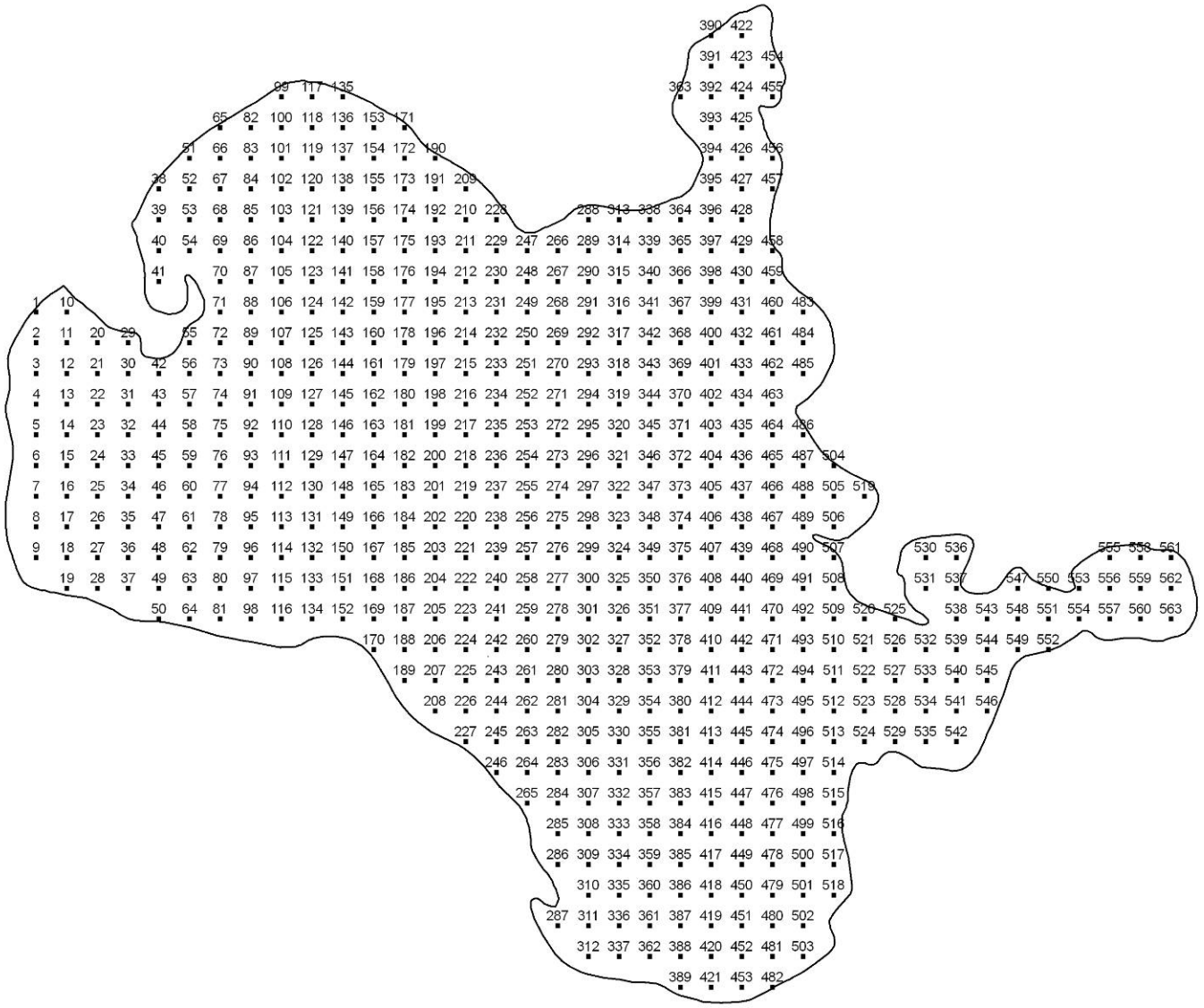
2) Regional and state-wide ecology and management

-Comparisons among many lakes today…

and over time

-Provides *CONTEXT*

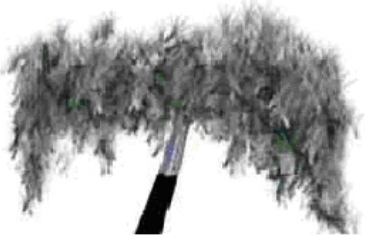
In-lake examples:
Enterprise Lake, Langlade Co.



Rake Fullness Rating


1


2


3

http://www.uwsp.edu/cnr/uwexlakes/ecology/APM/PI-Protocol-2010.pdf

Field Gear

Sampling


MERCURY
ALUMACRAFT


WS 3074 BD

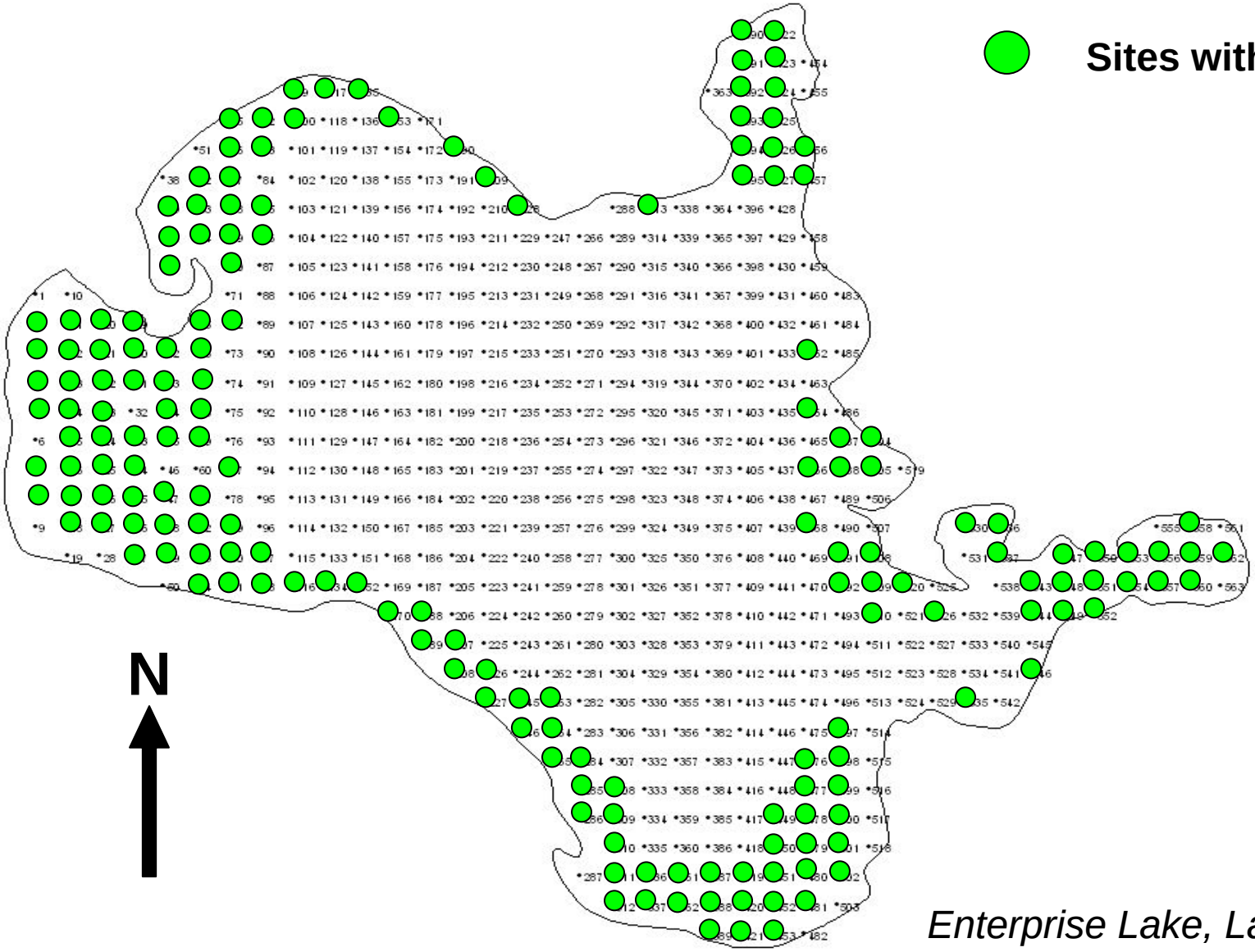

MERCURY
ALUMACRAFT


MERCURY
25

Sampling

In-lake examples:

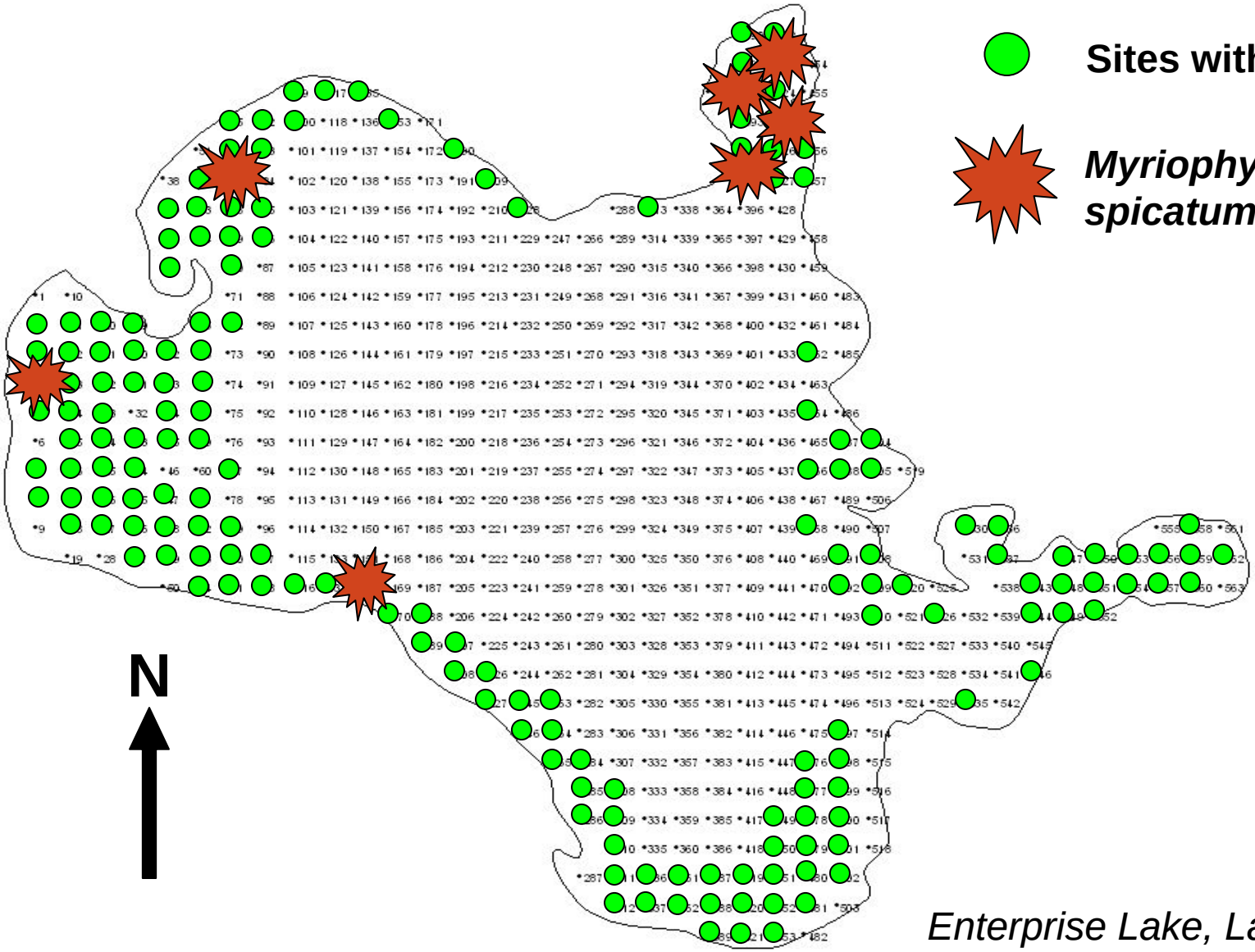
Vegetated sites



Enterprise Lake, Langlade

In-lake examples:

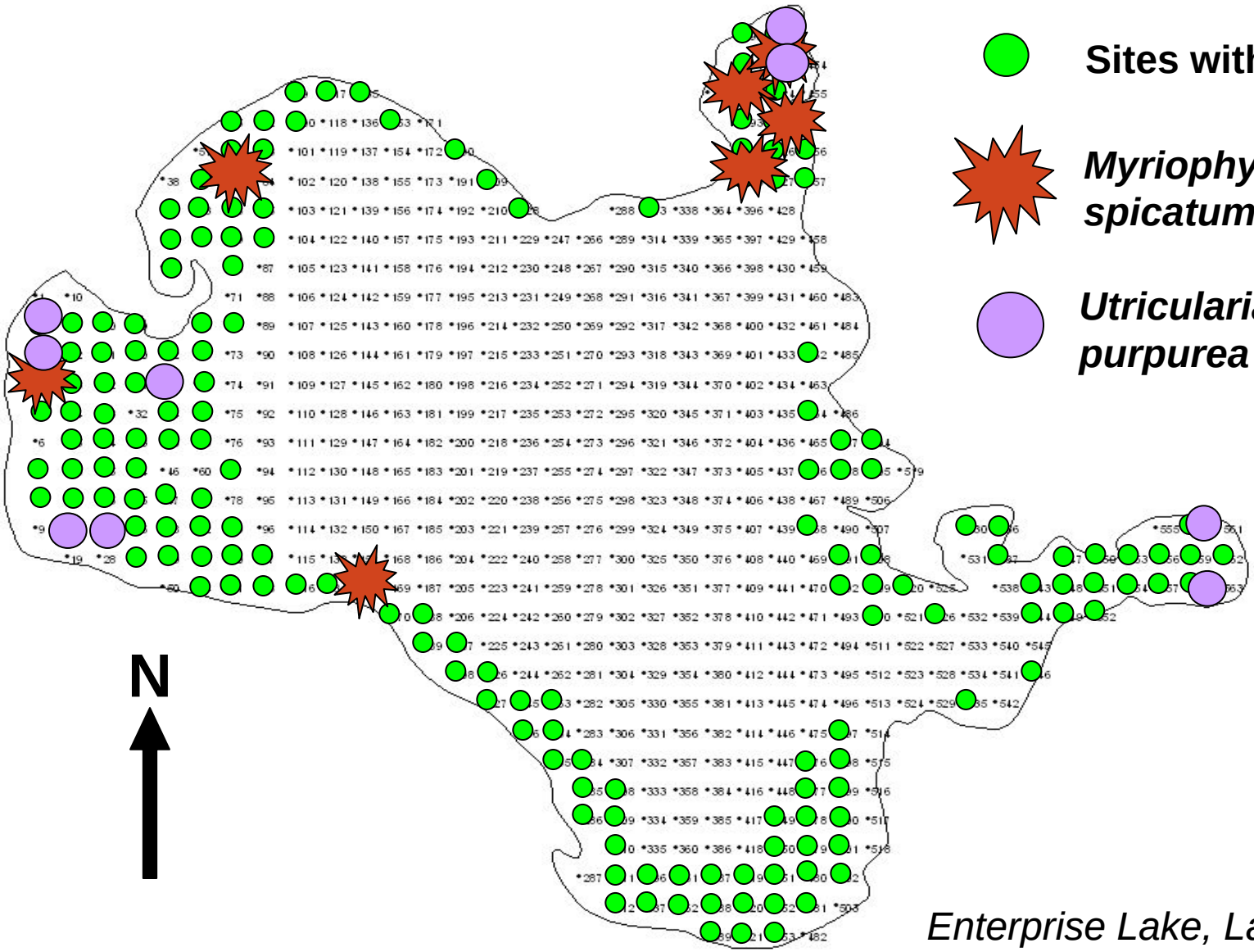
Distribution of Eurasian Watermilfoil



Enterprise Lake, Langlade

In-lake examples:

Species of Special Concern



Enterprise Lake, Langlade

In-lake examples:

Summary statistics

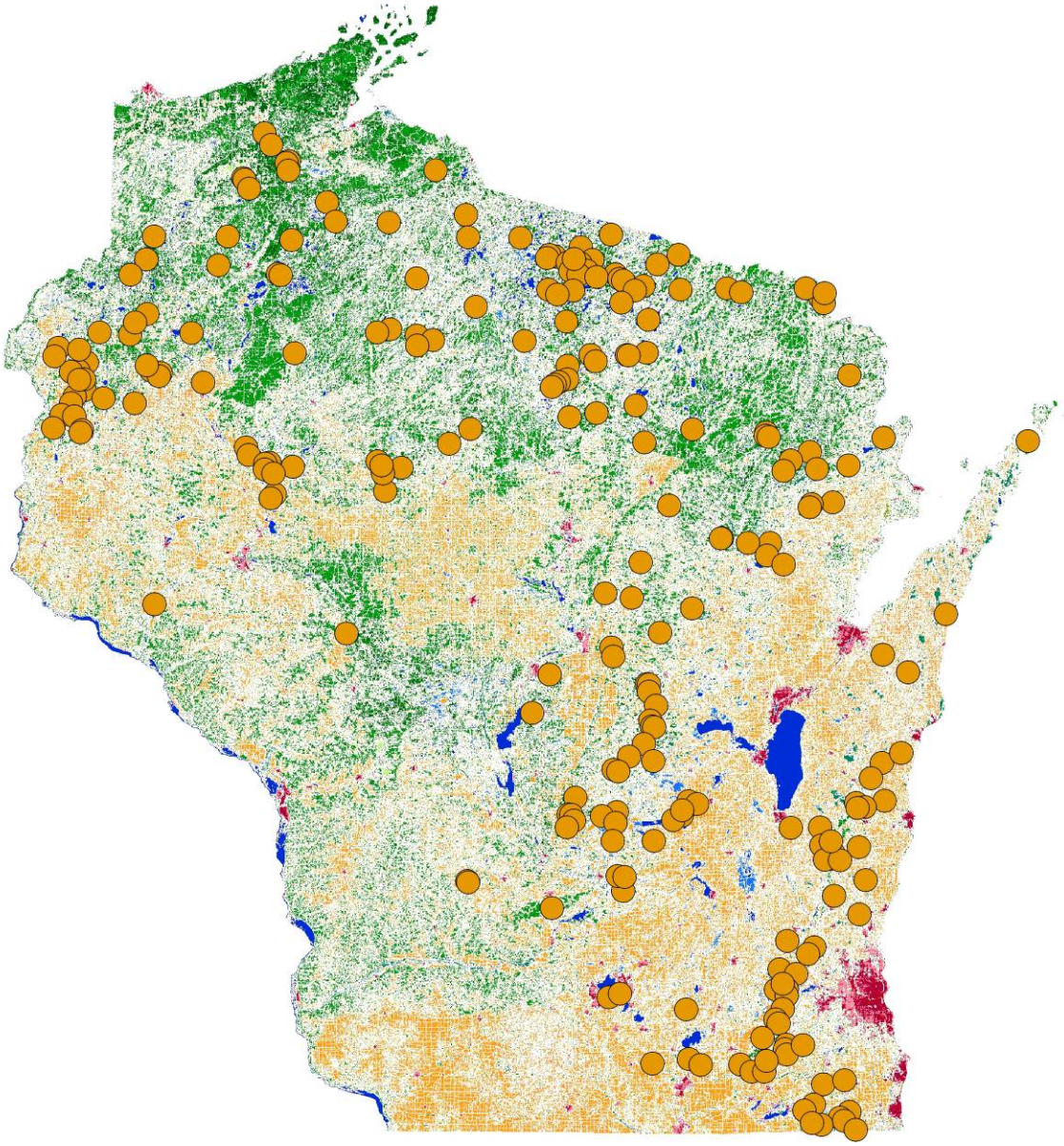
Species	Frequency of occurrence (%)	Species	Frequency of occurrence (%)
E. canadensis	45.0	*B. schreberi*	2.3
Nitella spp.	26.4	*M. tenellum*	1.9
V. americana	14.3	*Chara* spp.	1.9
P. pusillus	11.2	*Isoetes* spp.	1.9
N. flexilis	11.2	*P. amplifolius*	1.6
N. gracillima	8.1	*M. beckii*	1.6
C. demersum	7.8	*N. odorata*	1.2
P. richardsonii	4.7	*P. strictifolius*	1.2
S. fluctuans	4.7	*E. palustris*	0.8
C. demersum	4.7	*M. heterophyllum*	0.4
E. acicularis	4.3	*N. variegata*	0.4
P. robbinsii	3.9	*P. crispus*	0.4
U. purpurea	3.9		
P. spirillus	3.1		
M. spicatum	2.7		

Summary Statistics	
Total lake points	563
Number of points with plants	182
Maximum depth of plants (m)	4.1
Littoral area (% of lake)	32
Mean # species/point	1.7
Species Richness	27
Simpson's Diversity Index	0.88

Enterprise Lake, Langlade Co.

Regional/statewide examples:

Lakes Surveyed By DNR Research Crews



Questions about EWM

Ecology

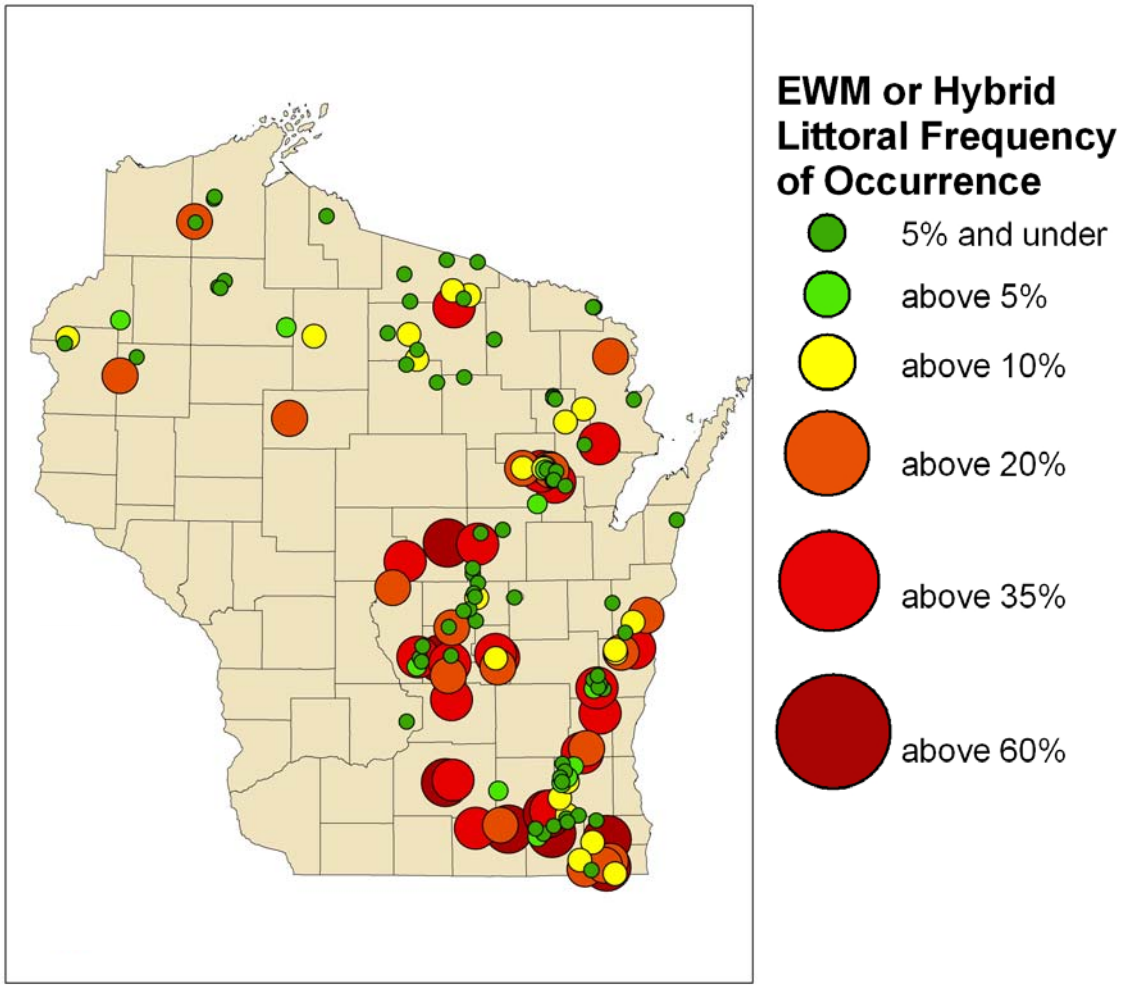
-What are the possible outcomes when EWM establishes in a lake?

-What factors contribute to different outcomes?

-Interannual variation?

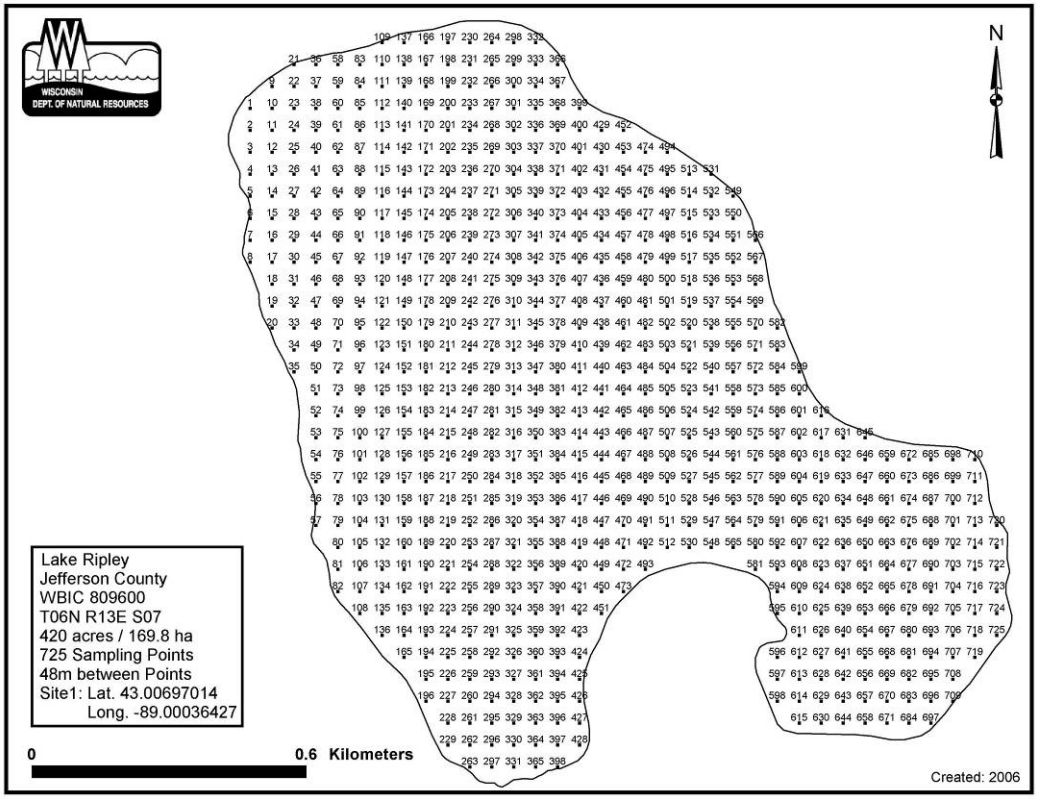
Littoral Frequency of Occurrence =

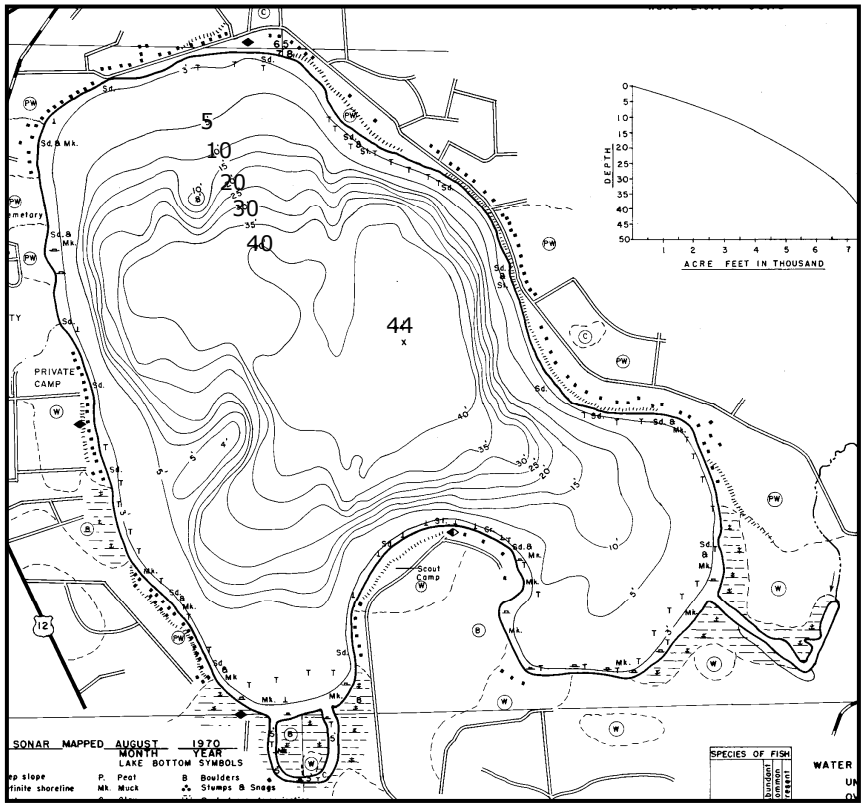
$$\frac{\text{\# of sites with plant(s)}}{\text{\# sites shallower than the maximum depth of plant colonization}} \times 100$$



Lake Ripley Plant Survey

PI & Bathymetry Maps

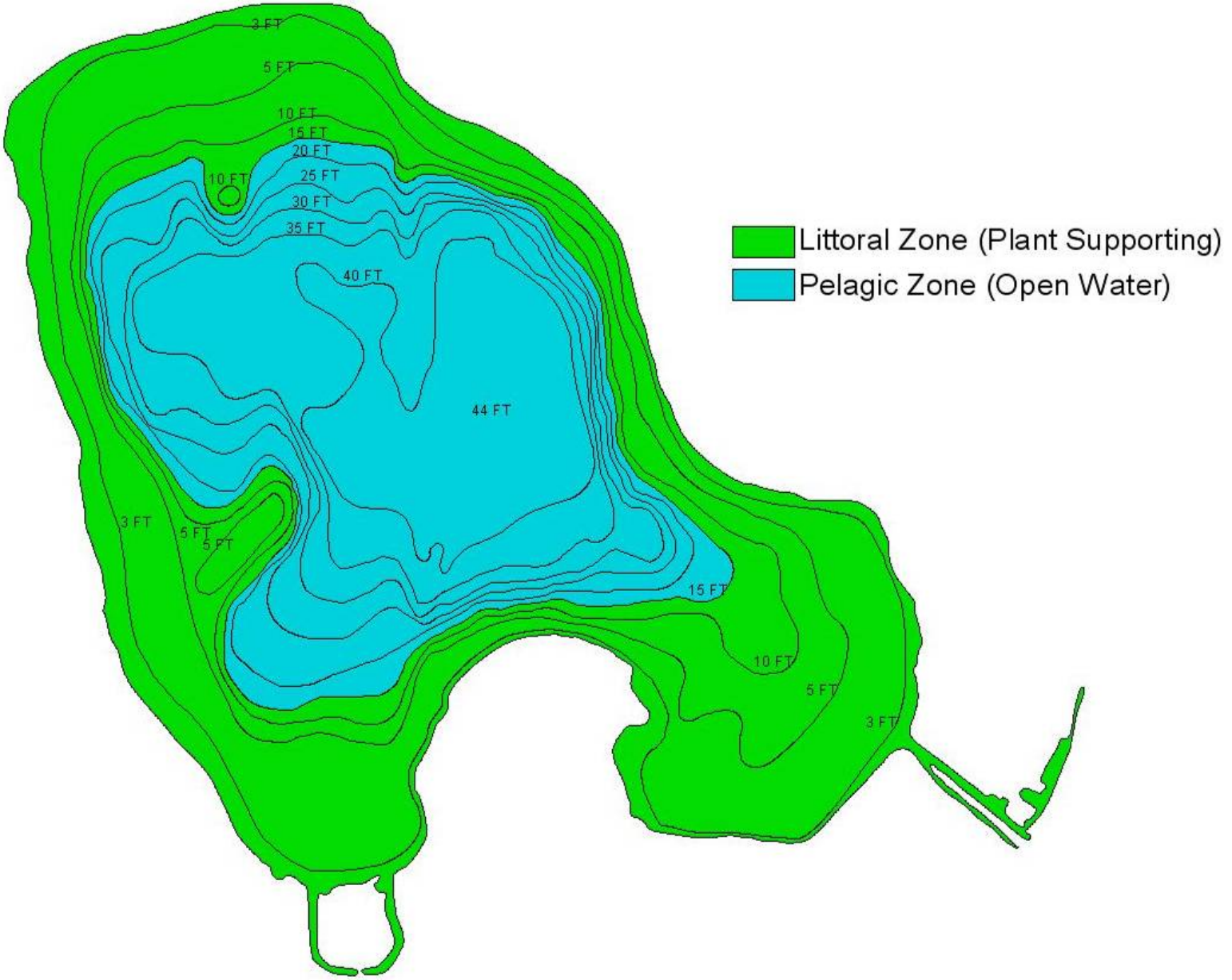




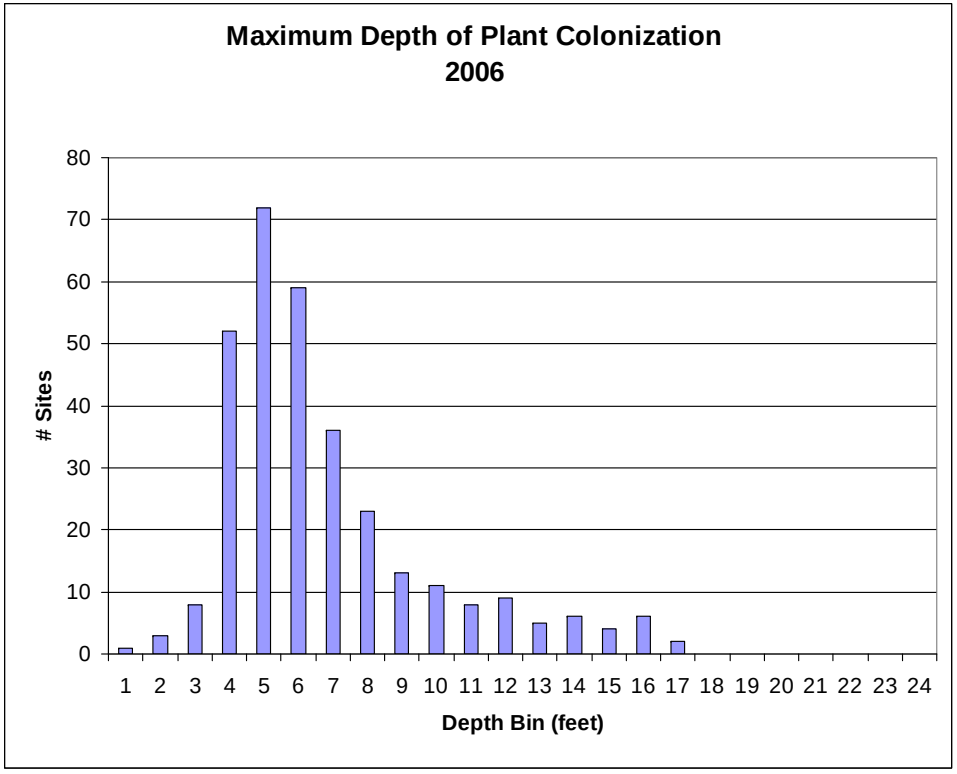
Summary Statistics

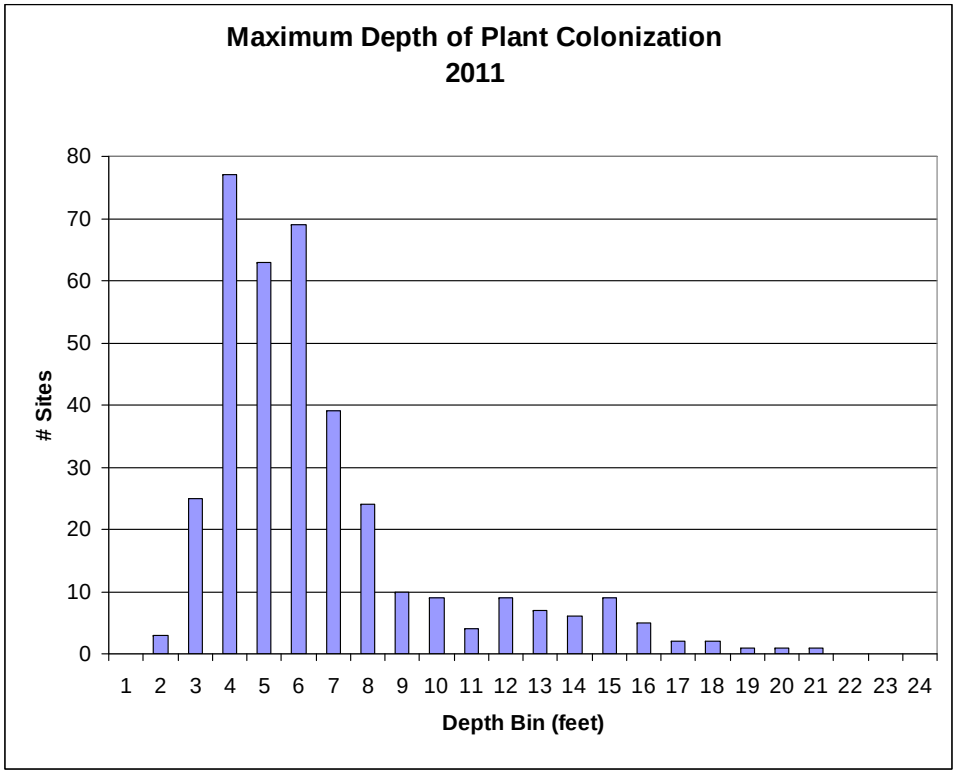
	2006	2011
# points sampled	398	421
# of sites with vegetation	313	366
littoral frequency of occurrence	84.8	89.9
simpsons diversity	0.82	0.89
avg. # species per site (littoral)	1.6	2.33
avg. # natives per site (littoral)	1.51	2.02
species richness	20	21
species richness (+ visuals)	21	23
max depth of plant growth (ft)	17	21

Littoral Zone

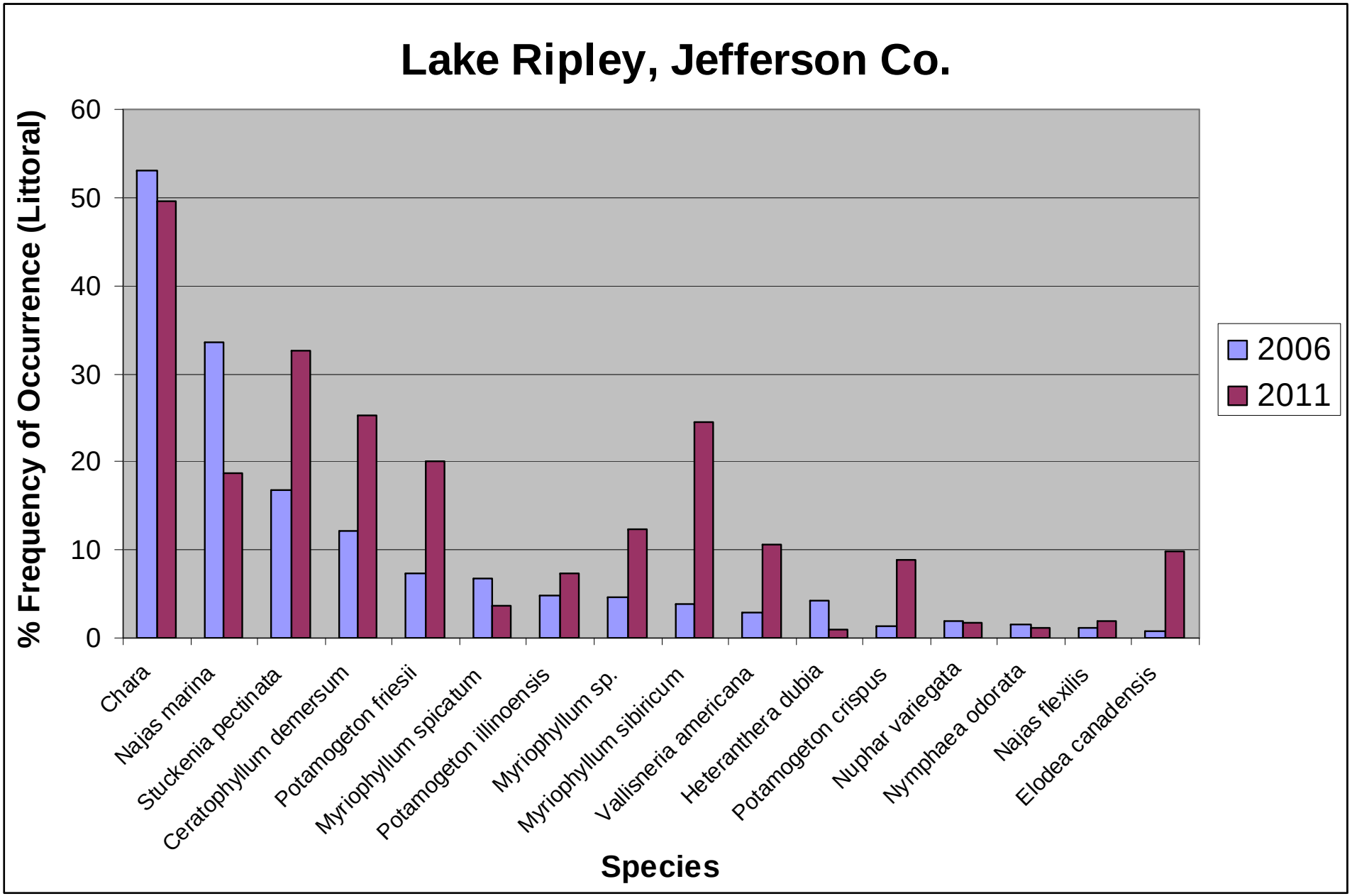


Plant Depth Distribution





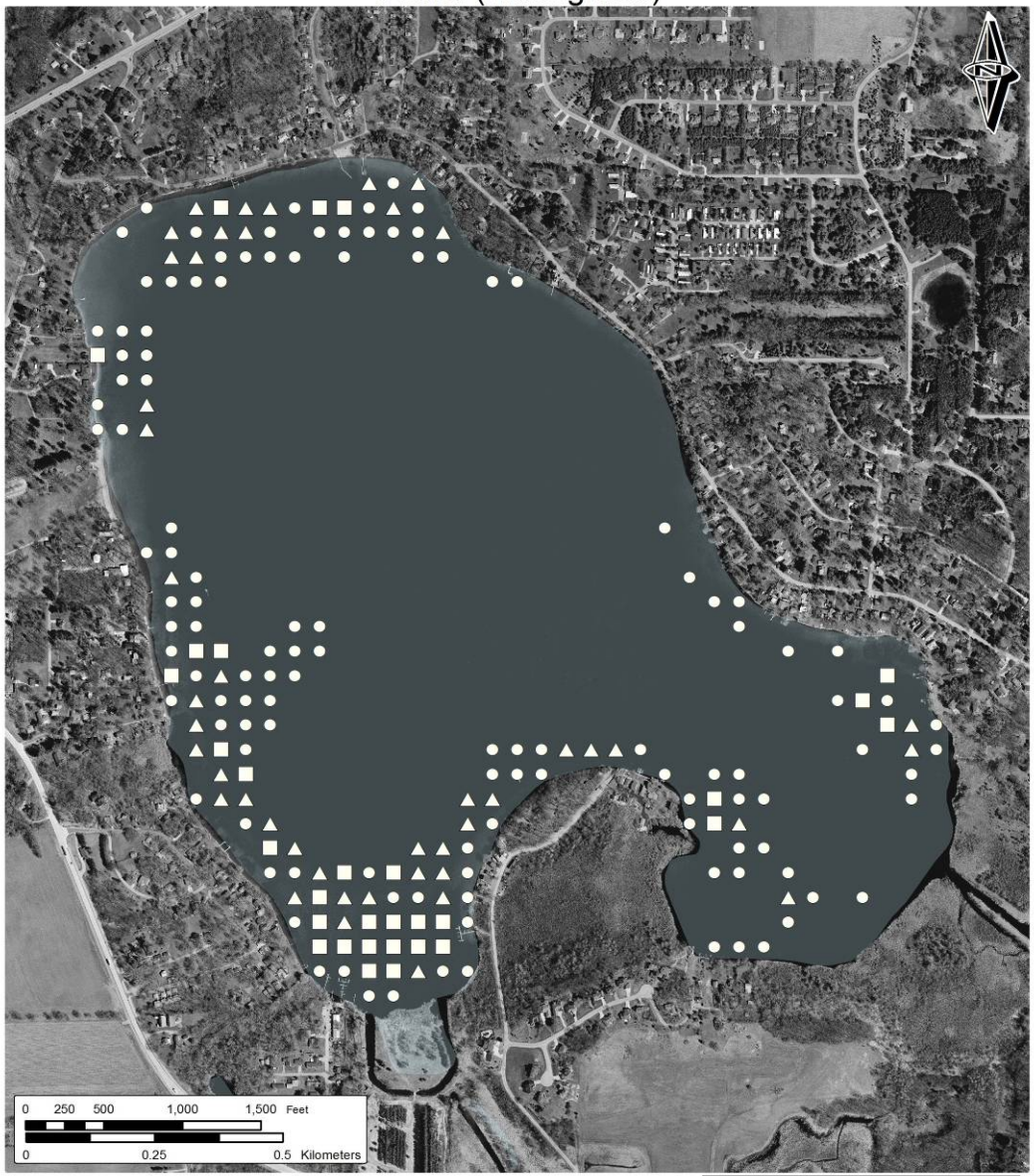
Summary Statistics



Muskgrass (*Chara* spp.)

- **NATIVE**
- Marcoalgae
- Often has strong “musk” or “skunk” like smell
- Often hard or crunchy to the touch
- Forms dense cover over lake bottom sediments, helping to stabilize
- Provides excellent habitat for fish and invertebrates and food for waterfowl

Aquatic Plant Survey
Lake Ripley - Jefferson County - June 2006
Chara (muskgrass)



Rake Fullness Rating

- 1
- 2
- 3
- Visual

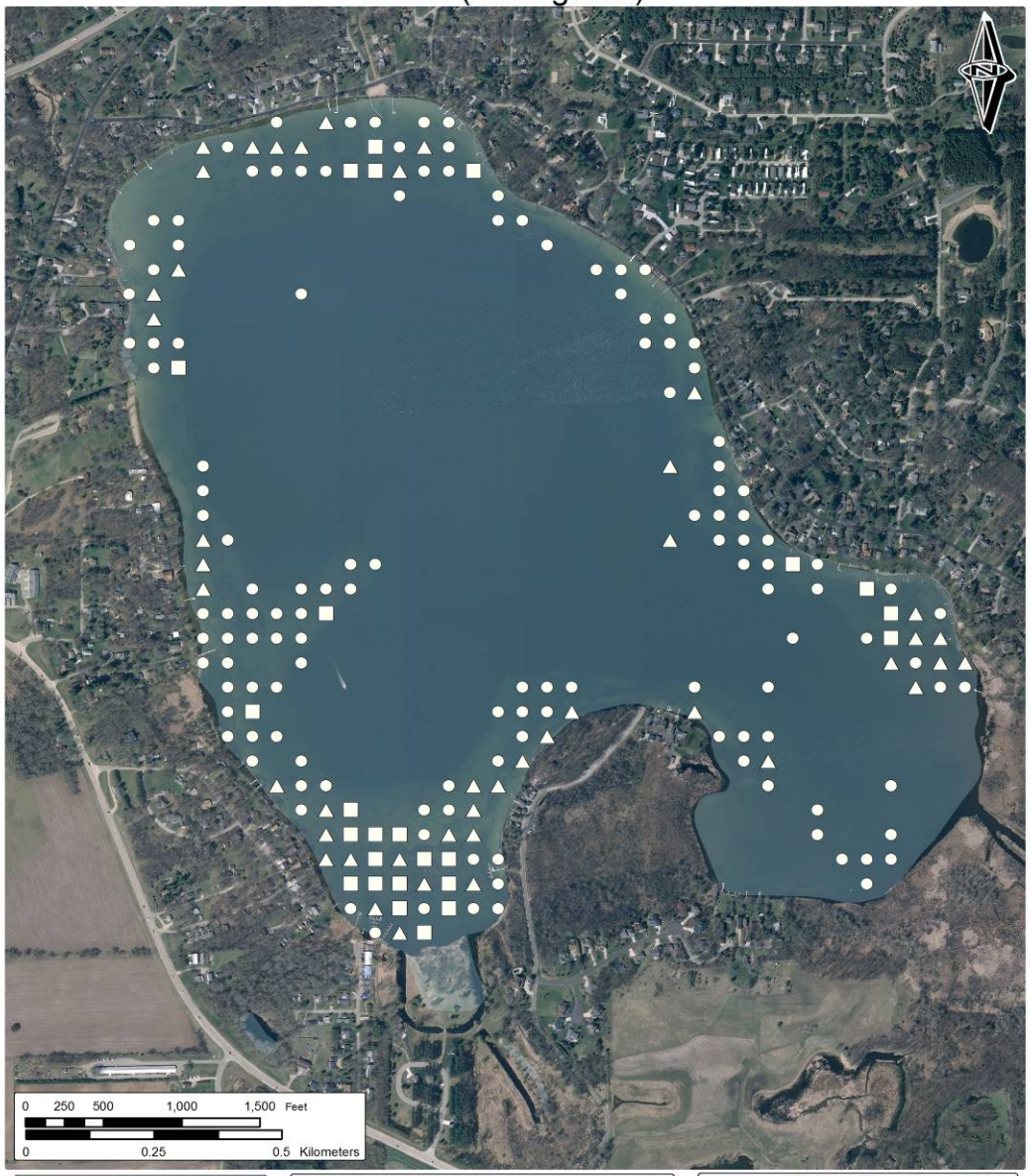
Spring 2005
Aerial

Author:
Jefferson County Land
& Water Conservation Dept

Date: 3/1/2012

Illustration of
Rake Fullness Rating

Aquatic Plant Survey
Lake Ripley - Jefferson County - June 2011
Chara (muskgrass)



Rake Fullness Rating

1
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Spring 2010
Aerial

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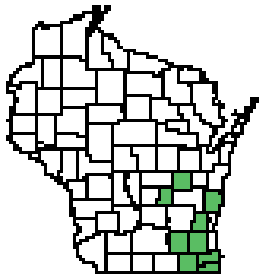
& Water Conservation Dept

Date: 2/29/2012

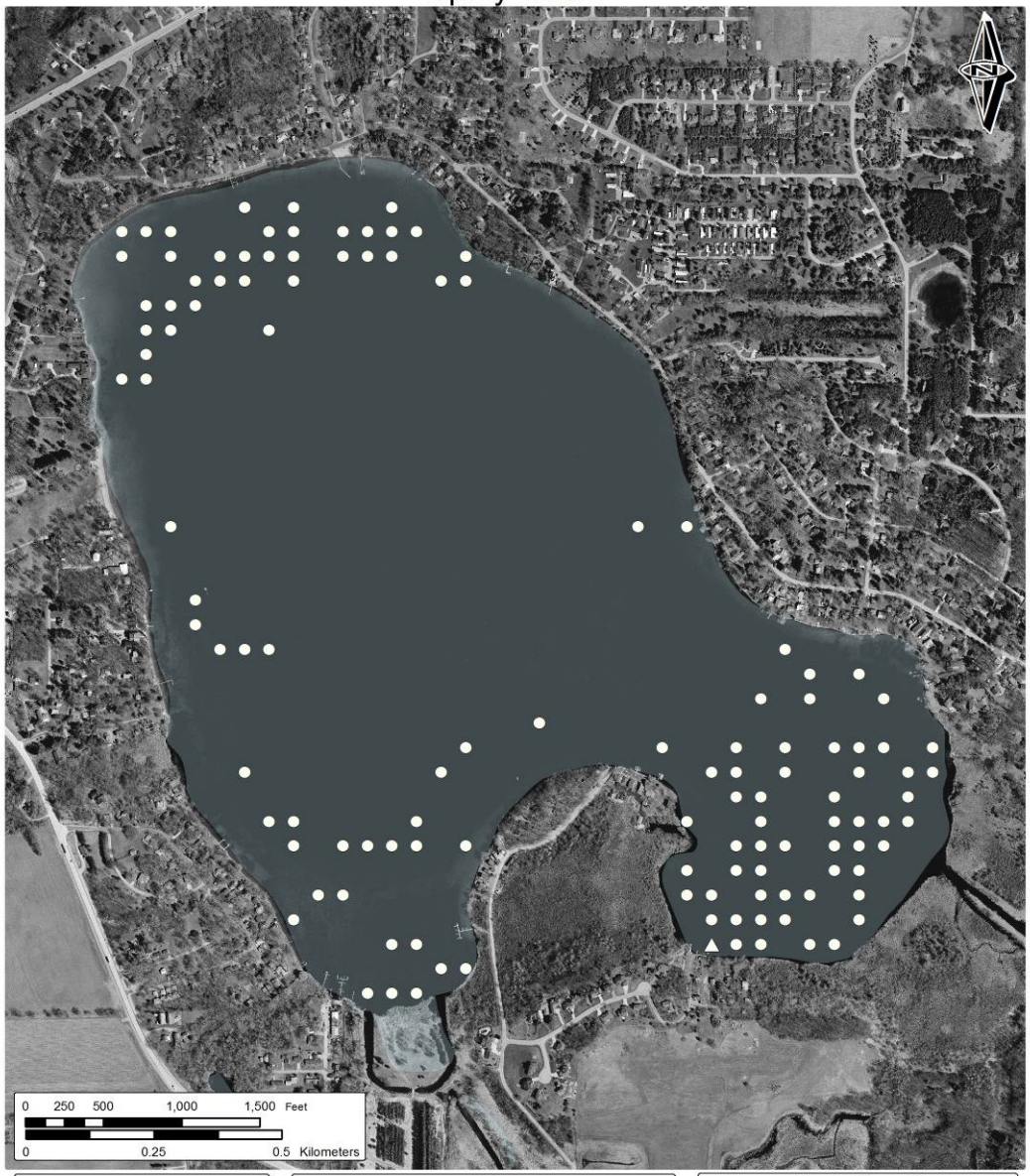
Illustration of
Rake Fullness Rating

Spiny naiad (*Najas marina*)



- **NATIVE?**
- Some debate between experts as to whether this species is native or exotic
- First recorded in the Great Lakes in 1864
- Disjunct "clumping" of populations around the U.S. and world possibly due to its affinity for brackish or highly alkaline waters
- Not known to cause significant ecological or recreational problems

Aquatic Plant Survey
Lake Ripley - Jefferson County - June 2006
Spiny naiad



Rake Fullness Rating
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Spring 2005
Aerial

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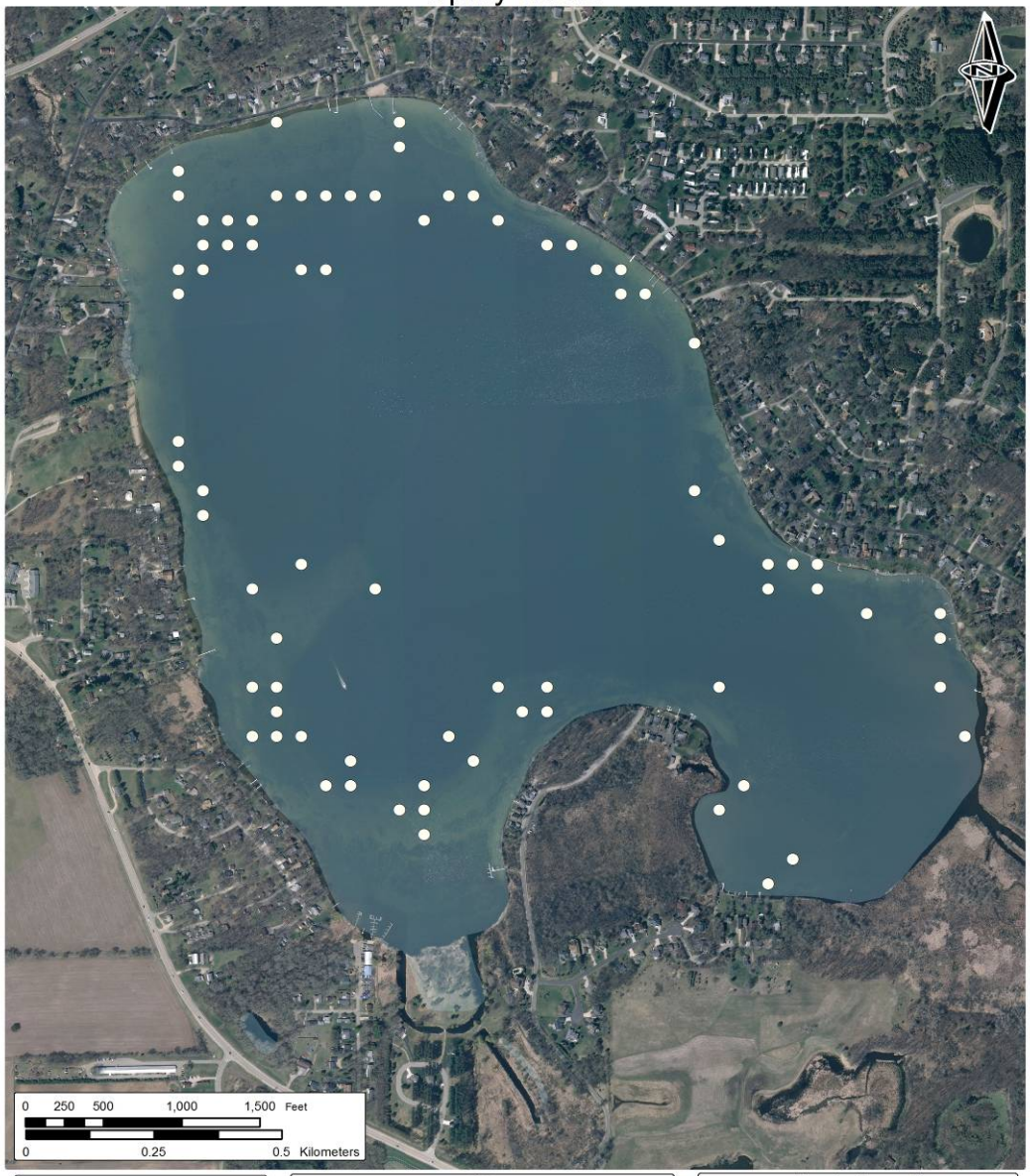
Illustration of
Rake Fullness Rating

Aquatic Plant Survey
Lake Ripley - Jefferson County - June 2011
Spiny naiad



Rake Fullness Rating

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Visual

Spring 2010
Aerial

Author:
Jefferson County Land
& Water Conservation Dept

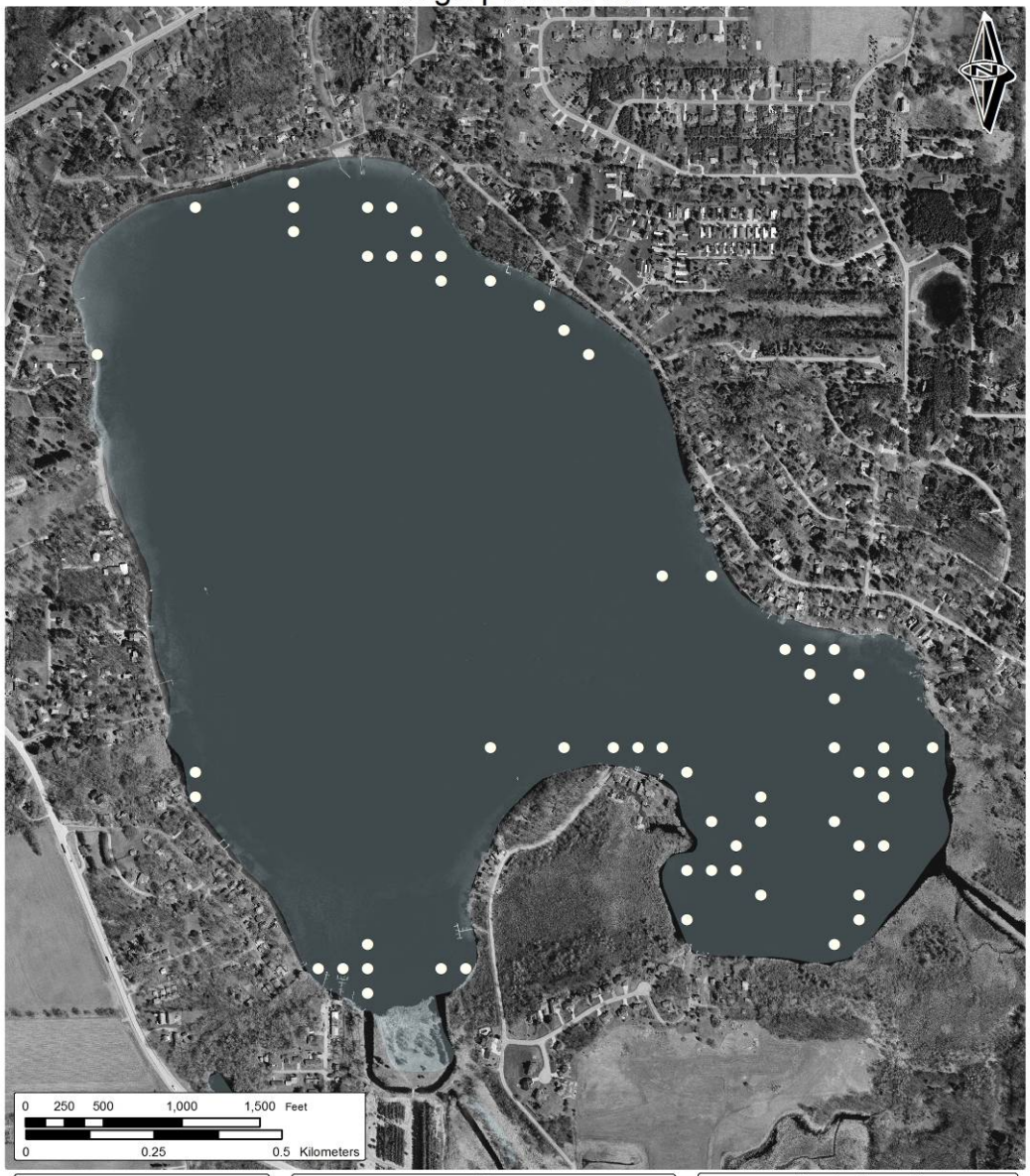
Date: 2/29/2012

Illustration of
Rake Fullness Rating

Sago (*Stuckenia pectinata*)

- **NATIVE**
- Pondweed with very thin thread-like leaves
- Appears “bushy” or “fan-like”
- Important food for waterfowl; food and shelter for young fish

Aquatic Plant Survey
Lake Ripley - Jefferson County - June 2006
Sago pondweed



Rake Fullness Rating

- 1
- 2
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Spring 2005
Aerial

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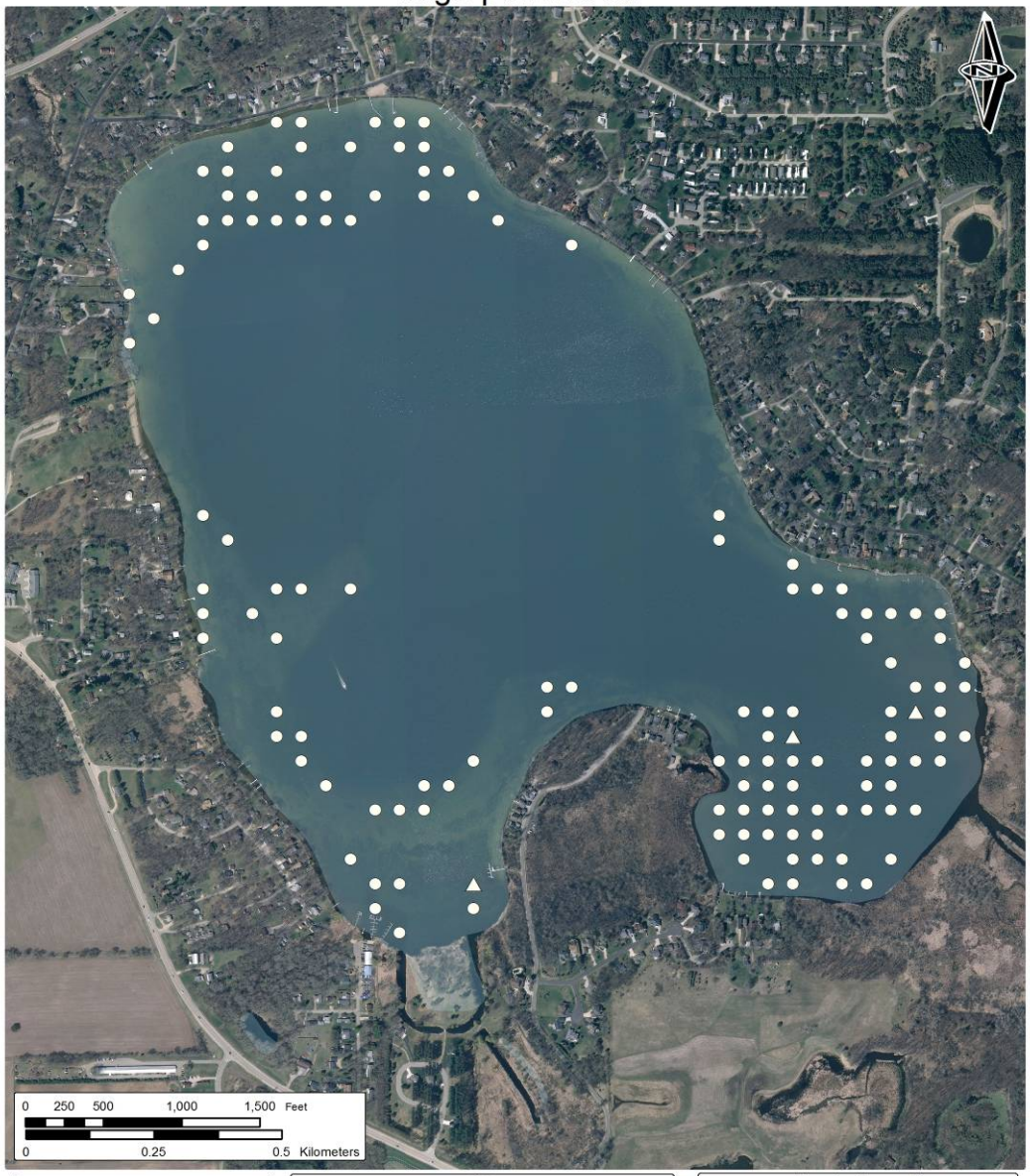
& Water Conservation Dept

Date: 3/1/2012

Illustration of
Rake Fullness Rating

Aquatic Plant Survey
Lake Ripley - Jefferson County - June 2011
Sago pondweed



Rake Fullness Rating

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Visual

Spring 2010
Aerial

Author:
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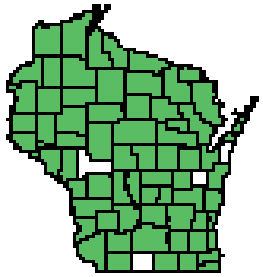
& Water Conservation Dept

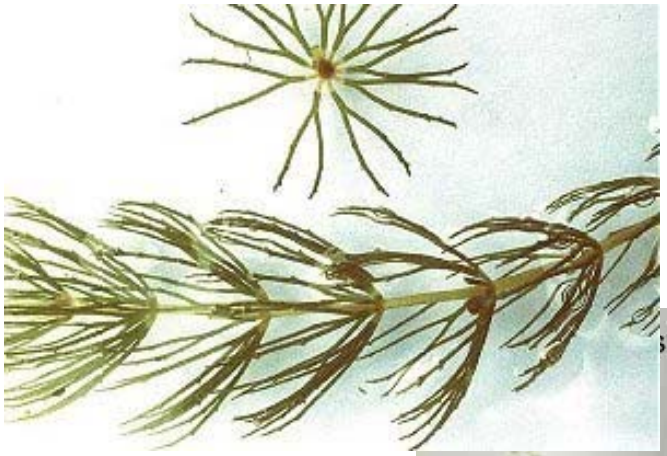
Date: 2/29/2012

Illustration of
Rake Fullness Rating

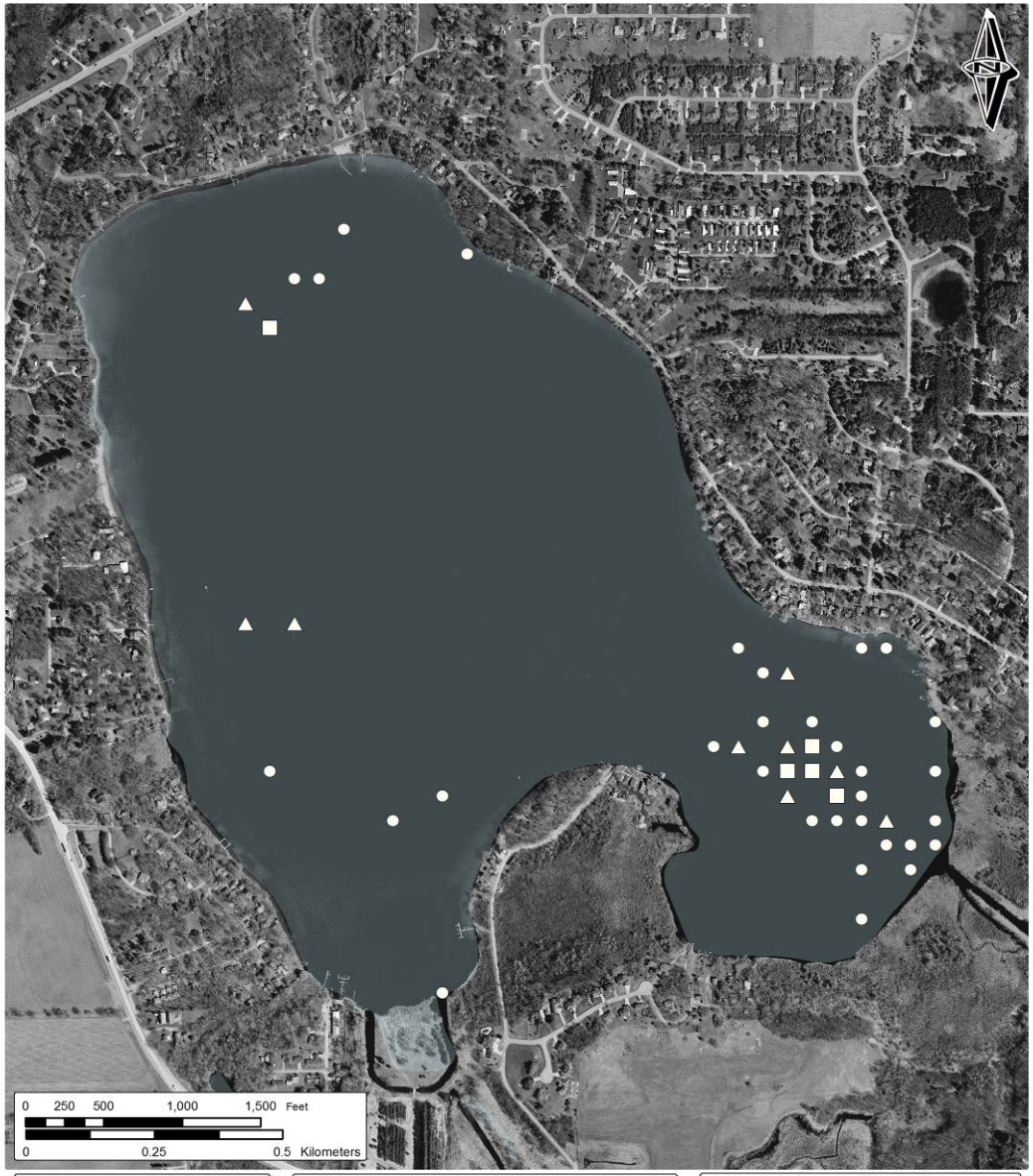
Coontail (*Ceratophyllum demersum*)



- **NATIVE**
- Leaves in whorls of 5-12 along the stem
- Each leaf is forked 1-2x, with small “teeth” along the margins
- No true roots, often loosely anchored to sediment
- Able to overwinter as a “evergreen”
- Provides habitat for fish and invertebrates and food for waterfowl



Aquatic Plant Survey
Lake Ripley - Jefferson County - June 2006
Coontail



Rake Fullness Rating
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Visual

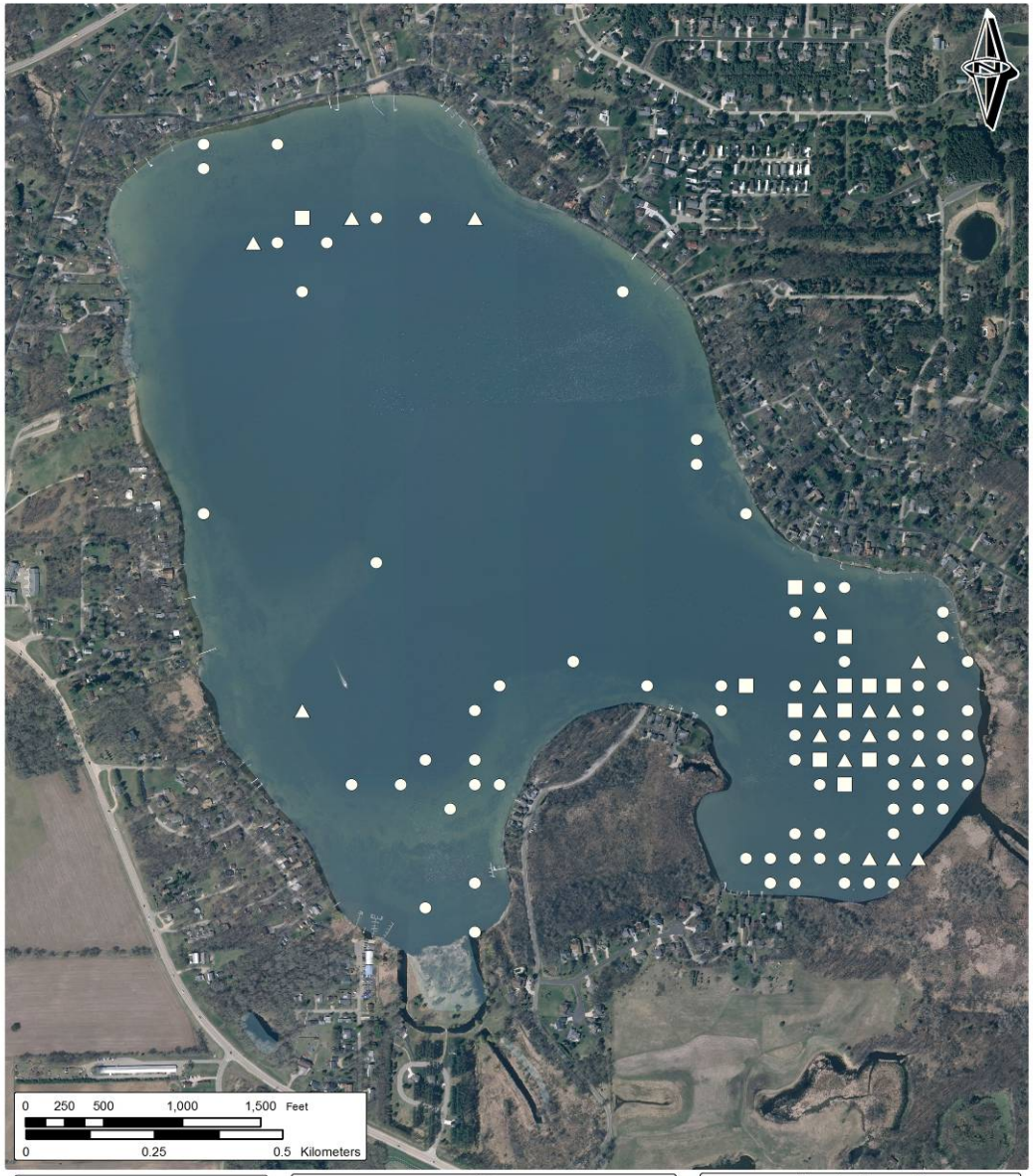
Spring 2005
Aerial

Author:
Jefferson County Land
& Water Conservation Dept

Date: 3/1/2012

Illustration of
Rake Fullness Rating

Aquatic Plant Survey
Lake Ripley - Jefferson County - June 2011
Coontail



Rake Fullness Rating

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Visual

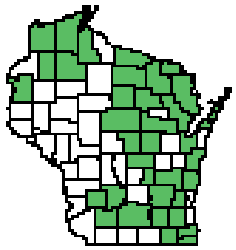
Spring 2010
Aerial

Author:
Jefferson County Land
& Water Conservation Dept

Date: 2/29/2012

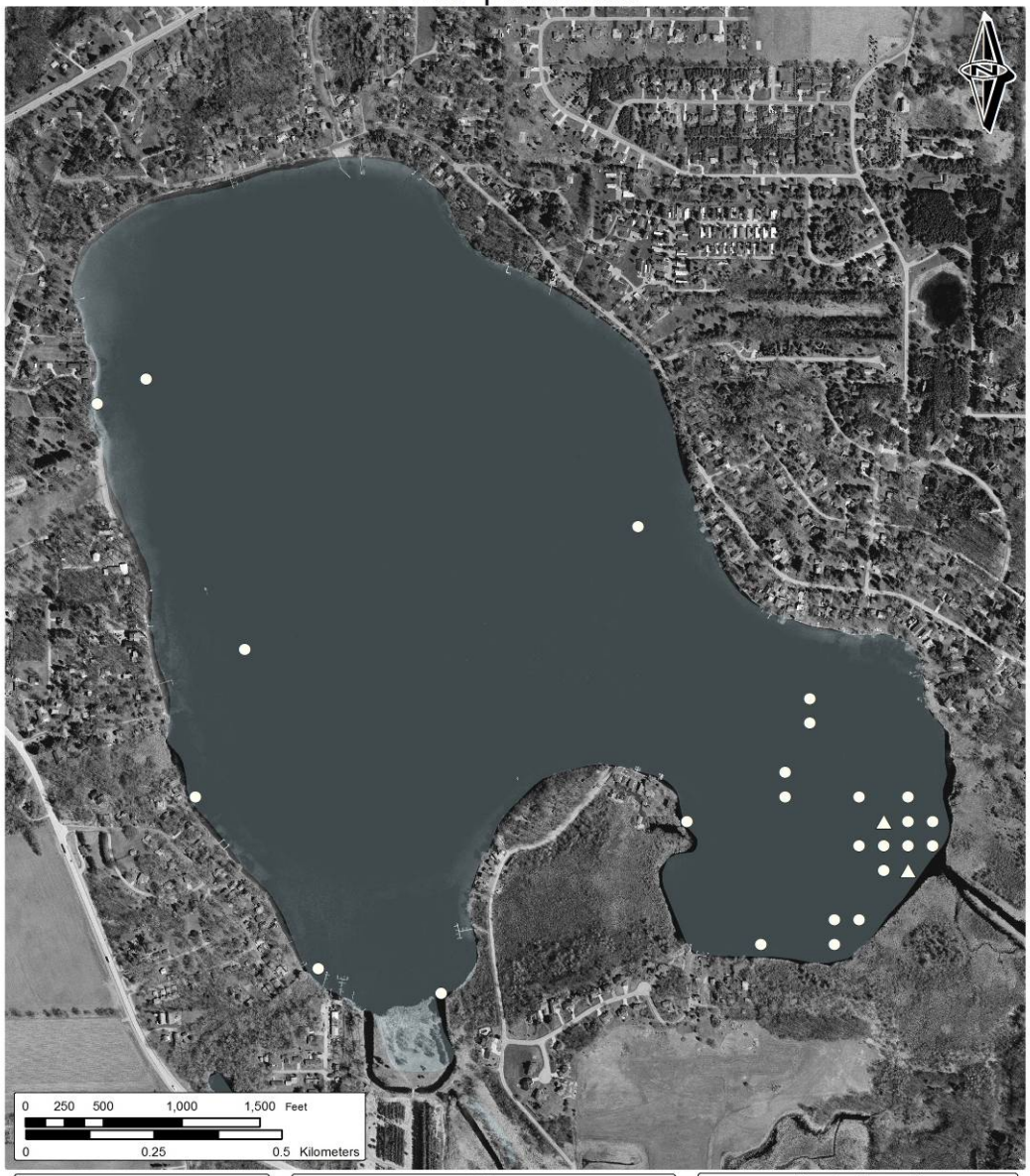
Illustration of
Rake Fullness Rating

Fries' pondweed (*Potamogeton friesii*)



- **NATIVE**
- Pondweed with thin leaves
- Leaves are somewhat stiff with 5-7 veins
- Overwintering turion in distinct "fan-shape" at a right angle to outer leaves

Aquatic Plant Survey
Lake Ripley - Jefferson County - June 2006
Fries' pondweed



Rake Fullness Rating

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Spring 2005
Aerial

Author:
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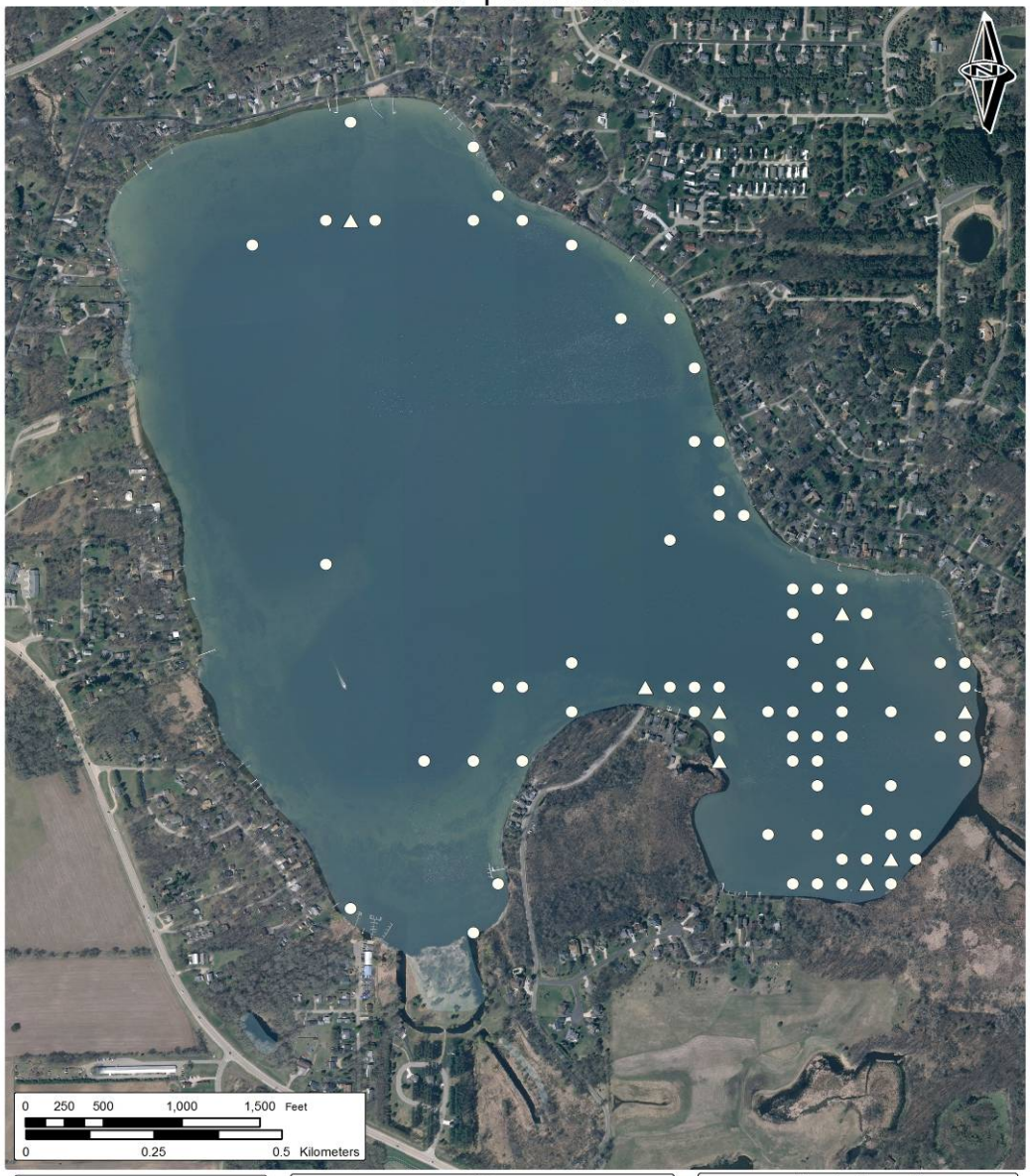
Illustration of
Rake Fullness Rating

Aquatic Plant Survey
Lake Ripley - Jefferson County - June 2011
Fries' pondweed



Rake Fullness Rating

1
2
3
Visual

Spring 2010
Aerial

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& Water Conservation Dept

Date: 3/1/2012

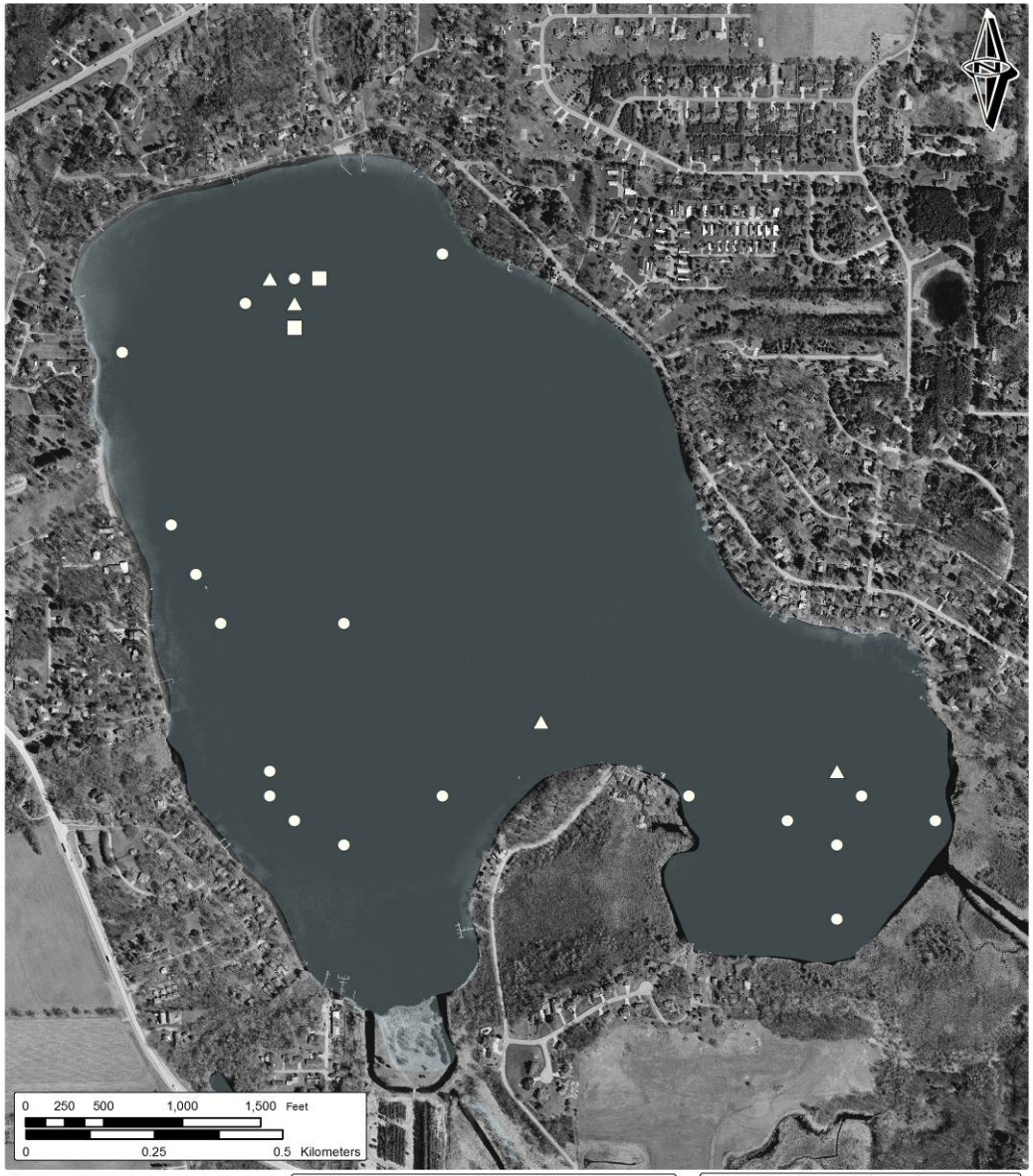
Illustration of
Rake Fullness Rating

Eurasian watermilfoil (*Myriophyllum spicatum*)

Eurasian watermilfoil (*Myriophyllum spicatum*)

- **EXOTIC**
- Groups of four featherlike leaves whorled around a long stem
- Each leaf has 12-20 pairs of threadlike leaflets
- Leaves often limp when pulled out of water
- First recorded in Lake Ripley in 1989
- In some lakes, forms dense monocultures that displace native species and diminishes recreational and aesthetic value

Aquatic Plant Survey
Lake Ripley - Jefferson County - June 2006
Eurasian watermilfoil



Rake Fullness Rating

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Spring 2005
Aerial

Author:
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& Water Conservation Dept

Date: 3/1/2012

Illustration of
Rake Fullness Rating

Aquatic Plant Survey
Lake Ripley - Jefferson County - June 2011
Eurasian watermilfoil

Rake Fullness Rating

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- 2
- 3
- Visual

Spring 2010
Aerial

Author:
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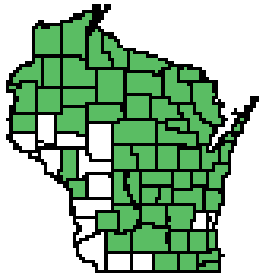
& Water Conservation Dept

Date: 2/29/2012

Illustration of
Rake Fullness Rating

Northern watermilfoil (*Myriophyllum sibiricum*)



- **NATIVE**
- Groups of four featherlike leaves whorled around a long stem
- Each leaf has 7-10(12) pairs of threadlike leaflets
- Leaves often stiff when pulled out of water
- Can hybridize with EWM

Aquatic Plant Survey
Lake Ripley - Jefferson County - June 2006
Northern watermilfoil

Rake Fullness Rating
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- Visual

Spring 2005
Aerial

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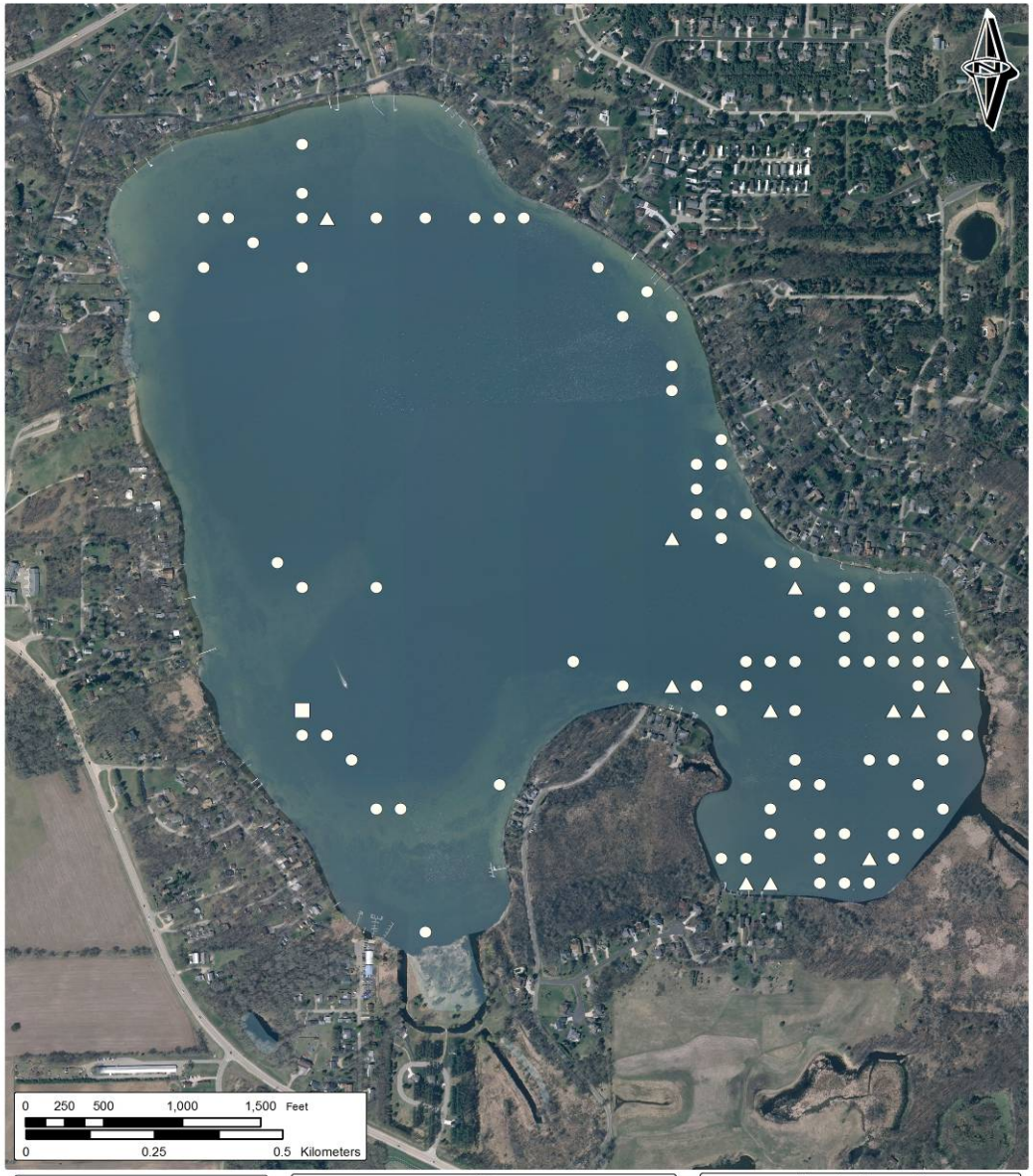
Illustration of
Rake Fullness Rating

Aquatic Plant Survey
Lake Ripley - Jefferson County - June 2011
Northern watermilfoil



Rake Fullness Rating

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3
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Spring 2010
Aerial

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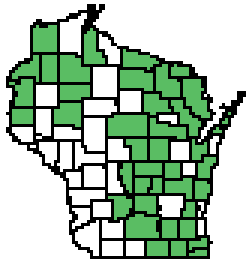
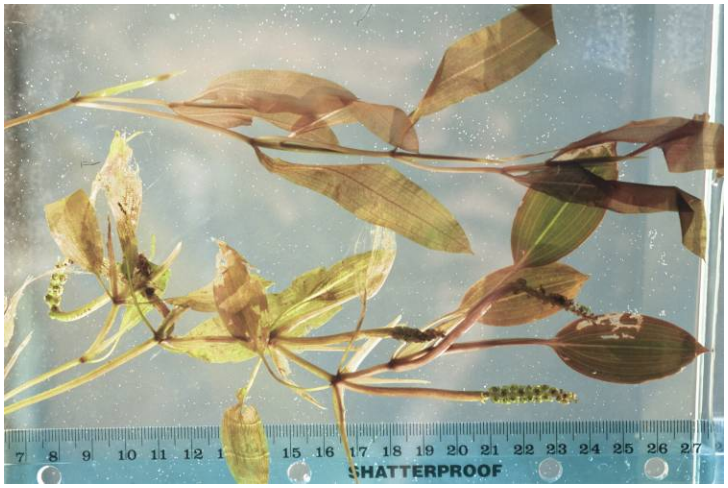
Illustration of
Rake Fullness Rating

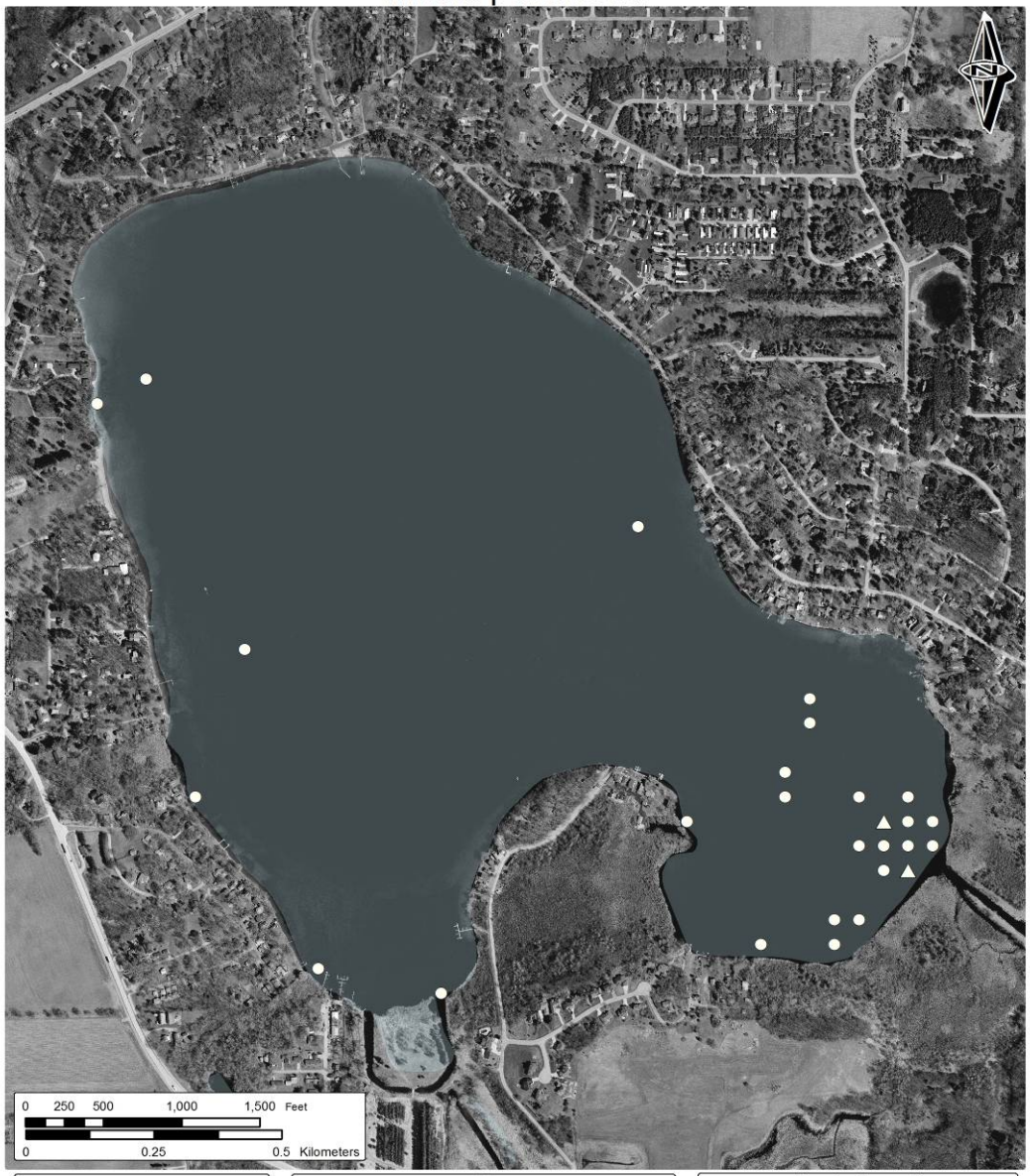
Illinois pondweed (*Potamogeton illinoensis*)



- **NATIVE**
- Long lance shaped leaves with a sharp tip
- Produces flower that emerges from the water; can also produce floating leaves
- Excellent shade and cover for fish and invertebrates; food for waterfowl



Aquatic Plant Survey
Lake Ripley - Jefferson County - June 2006
Illinois pondweed



Rake Fullness Rating
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- 2
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- Visual

Spring 2010
Aerial

Author:
Jefferson County Land
& Water Conservation Dept

Date: 3/1/2012

Illustration of
Rake Fullness Rating

Aquatic Plant Survey
Lake Ripley - Jefferson County - June 2011
Illinois pondweed

Rake Fullness Rating

- 1
- 2
- 3
- Visual

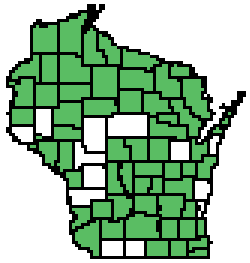
Spring 2010
Aerial

Author:
Jefferson County Land
& Water Conservation Dept

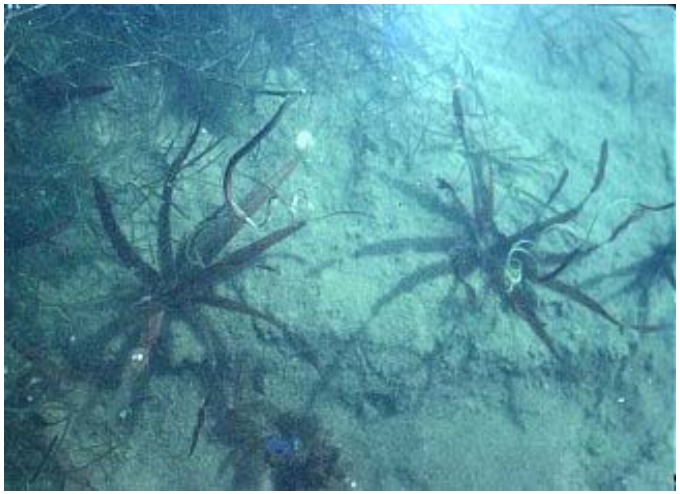
Date: 2/29/2012

Illustration of
Rake Fullness Rating

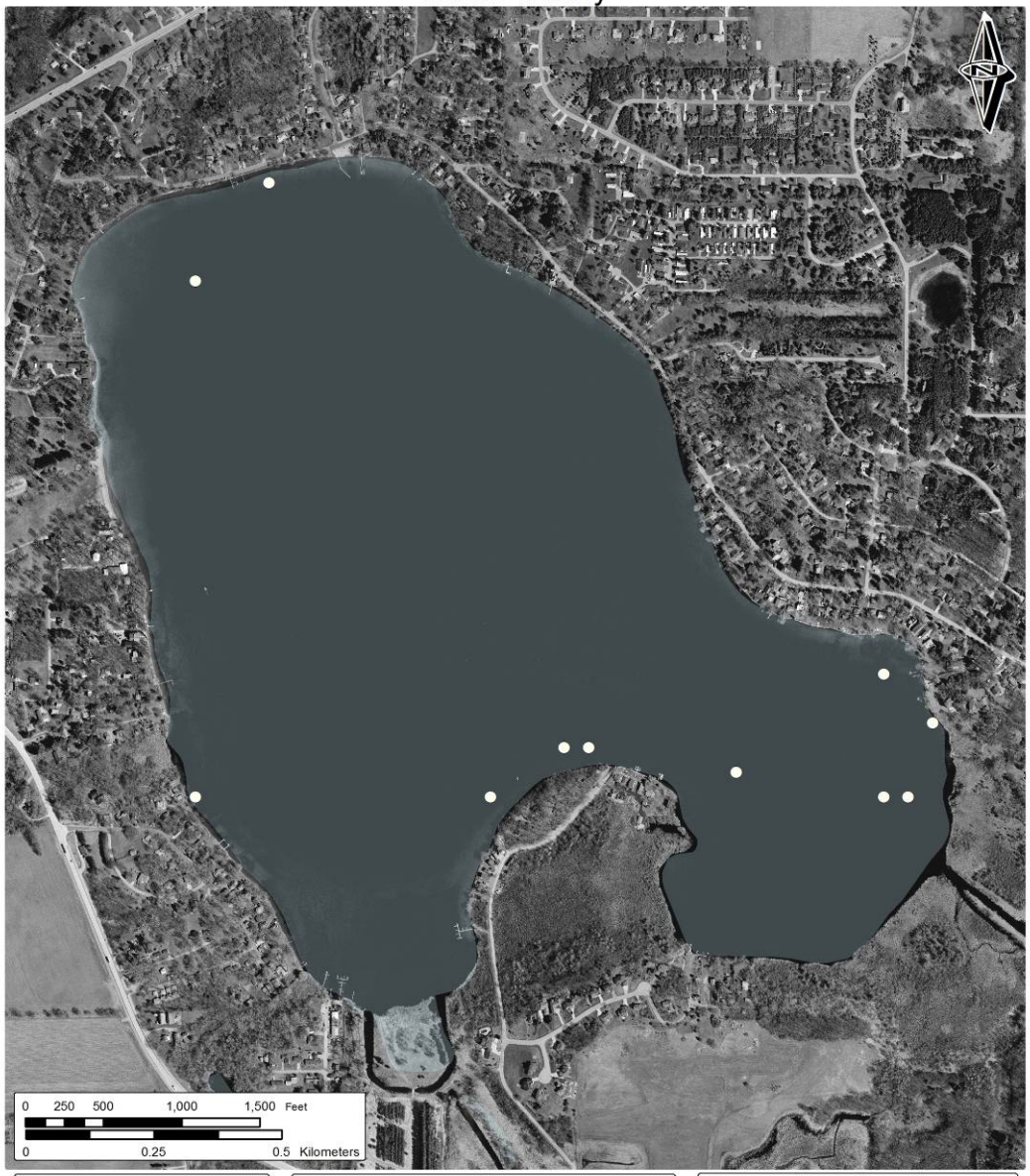
Wild celery (*Vallsneria americana*)



- **NATIVE**
- Long “ribbon-like” leaves with prominent central stripe
- Often produces spiral-coiled flower stalks
- Excellent food source for waterfowl and shore birds; good habitat for fish



Aquatic Plant Survey
Lake Ripley - Jefferson County - June 2006
Water celery



Rake Fullness Rating

- 1
- 2
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Spring 2005
Aerial

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Illustration of
Rake Fullness Rating

Aquatic Plant Survey
Lake Ripley - Jefferson County - June 2011
Wild celery

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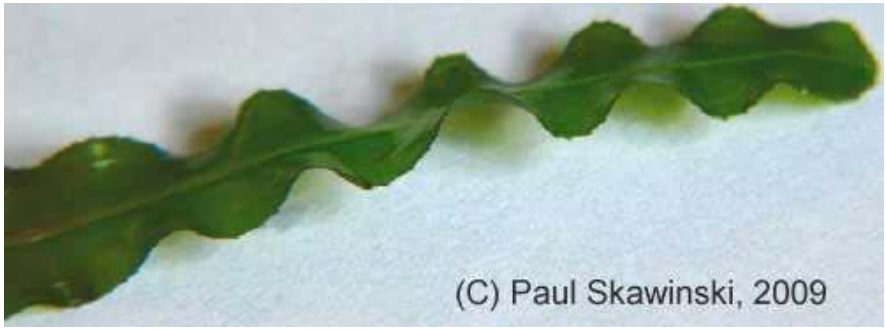
Illustration of
Rake Fullness Rating

Curly-leaf pondweed (*Potamogeton crispus*)

Curly-leaf pondweed (*Potamogeton crispus*)

- **EXOTIC**
- Wavy “lasagna noodle” leaves are serrate along the margin
- Forms hard “pine cone” like overwintering turions
- Emerges very early in the season, often beginning its growth under the ice
- Dies back by mid-summer as water temperatures rise
- Rapid die-off releases nutrients into the water, which can trigger algal blooms
- First reported in Lake Ripley in 1989



Aquatic Plant Survey
Lake Ripley - Jefferson County - June 2006
Curly-leaf pondweed

Rake Fullness Rating

1
2
3
Visual

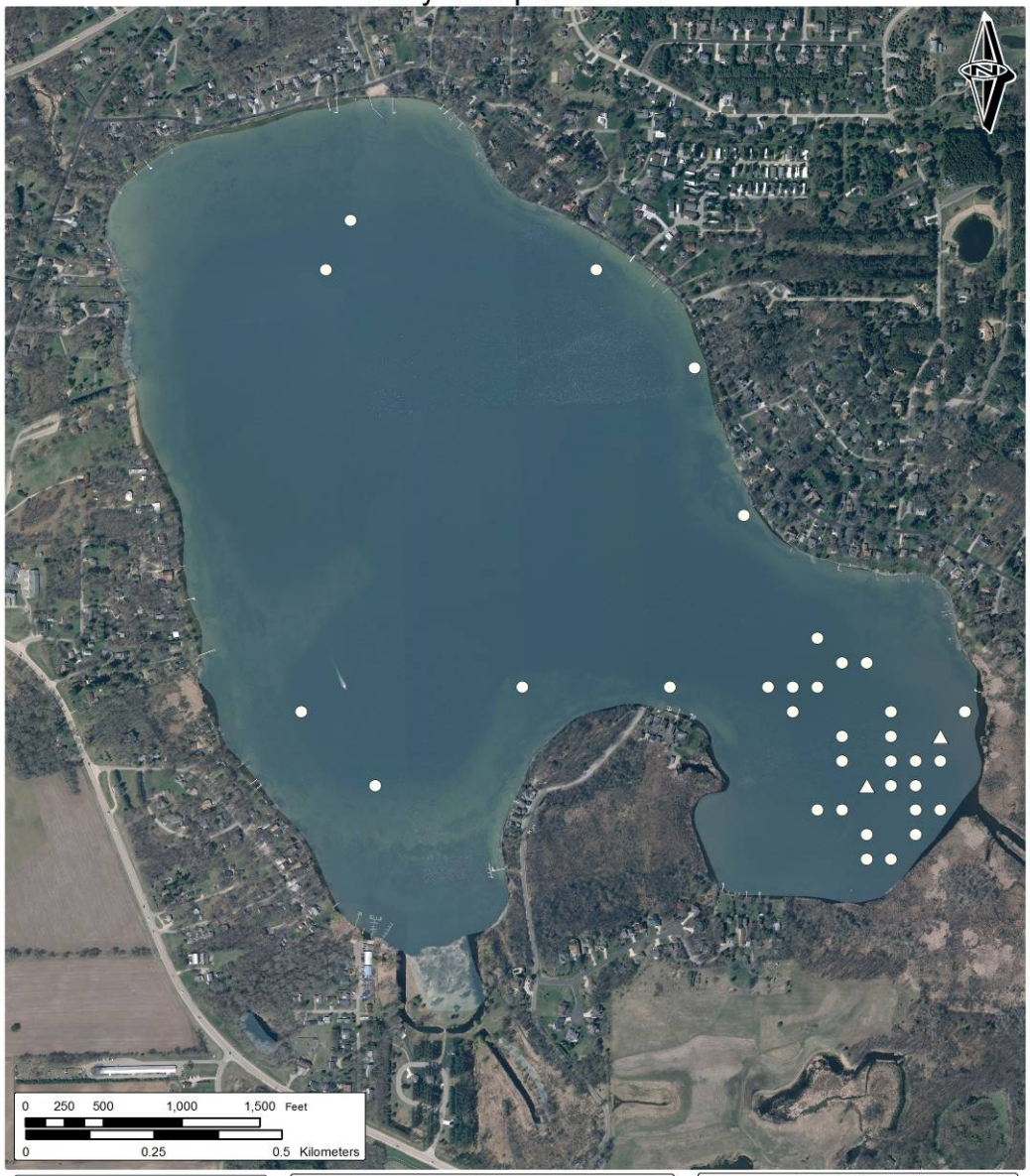
Spring 2005
Aerial

Author:
Jefferson County Land
& Water Conservation Dept

Date: 3/1/2012

Illustration of
Rake Fullness Rating

Aquatic Plant Survey
Lake Ripley - Jefferson County - June 2011
Curly-leaf pondweed



Rake Fullness Rating

- 1
- 2
- 3
- Visual

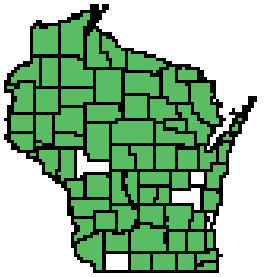
Spring 2010
Aerial

Author:
Jefferson County Land
& Water Conservation Dept

Date: 2/29/2012

Illustration of
Rake Fullness Rating

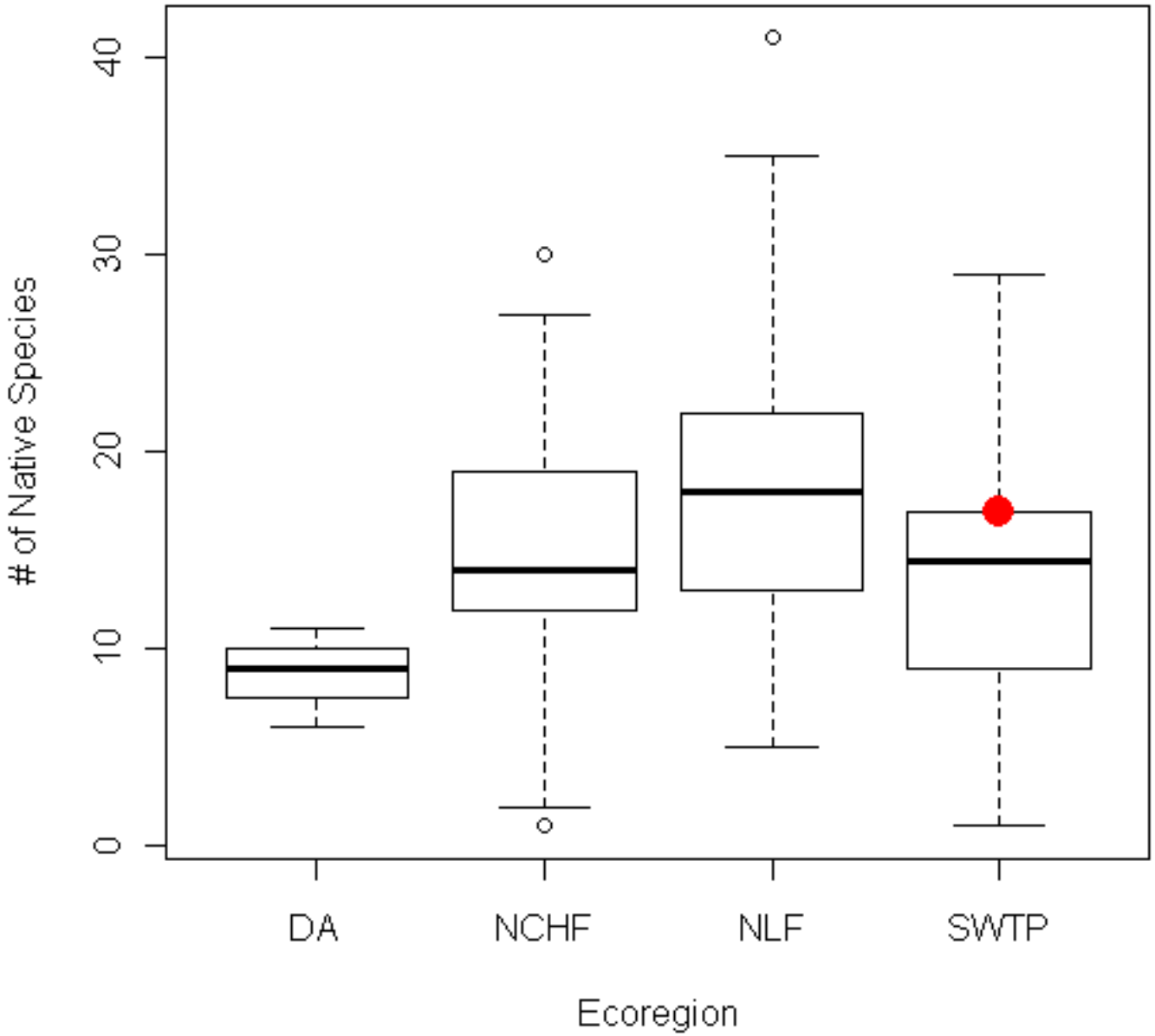
Common waterweed (*Elodea canadensis*)



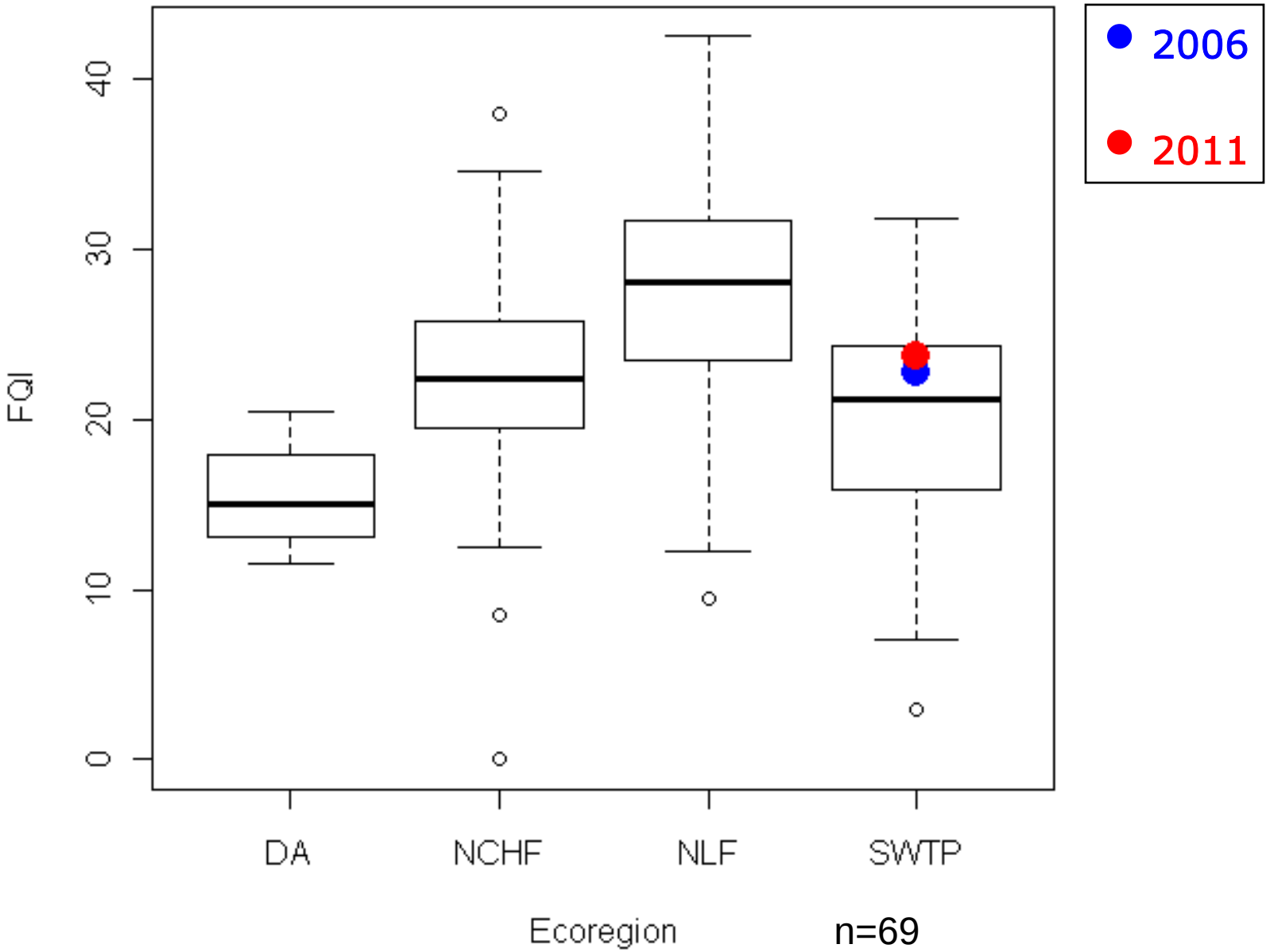
- **NATIVE**
- Leaves in whorls of 3 along slender stems
- May branch several times
- Able to overwinter as an “evergreen”
- Provides habitat and food source for fish, small mammals, waterfowl, and invertebrates

Other species

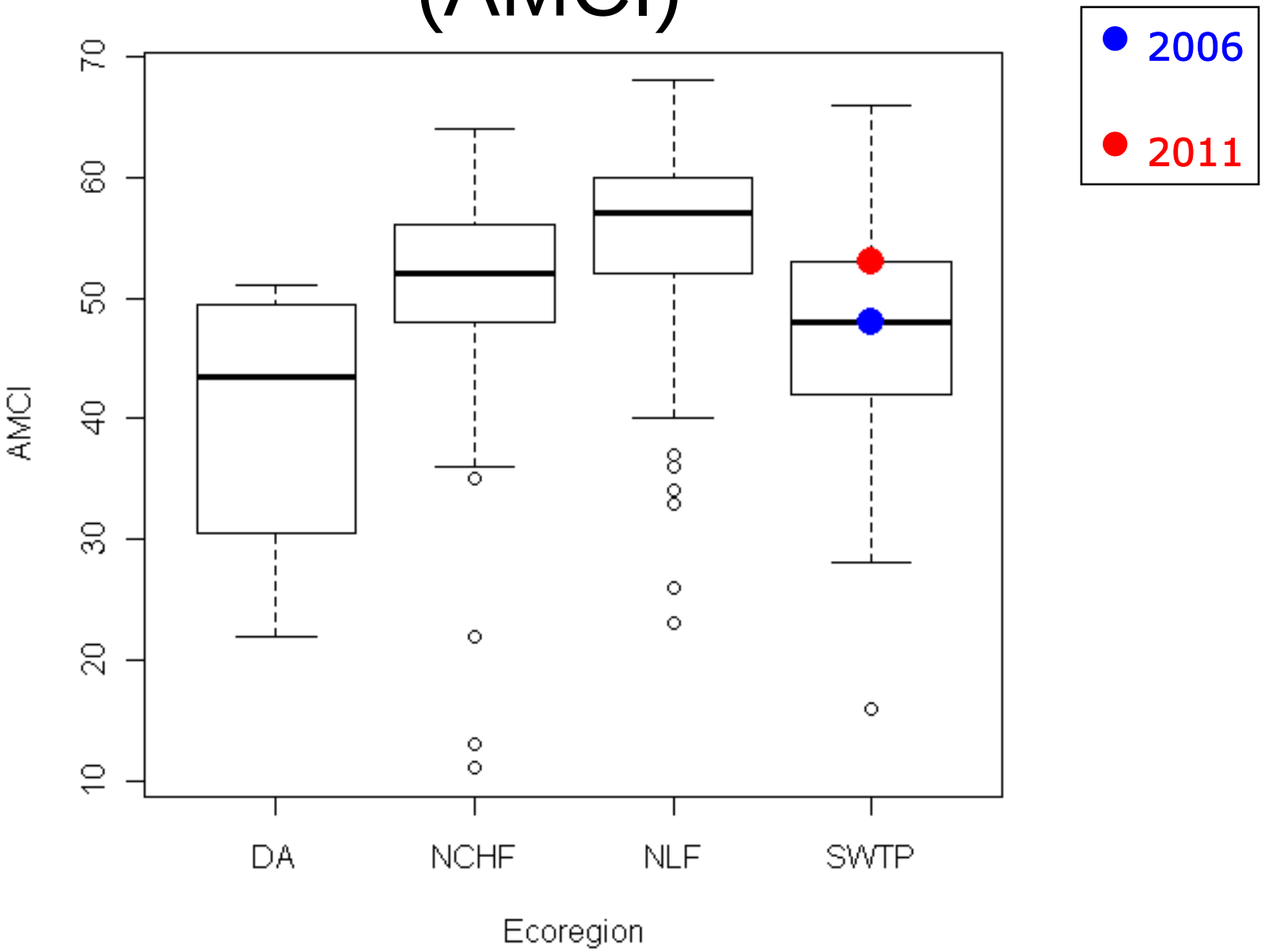
Native Species



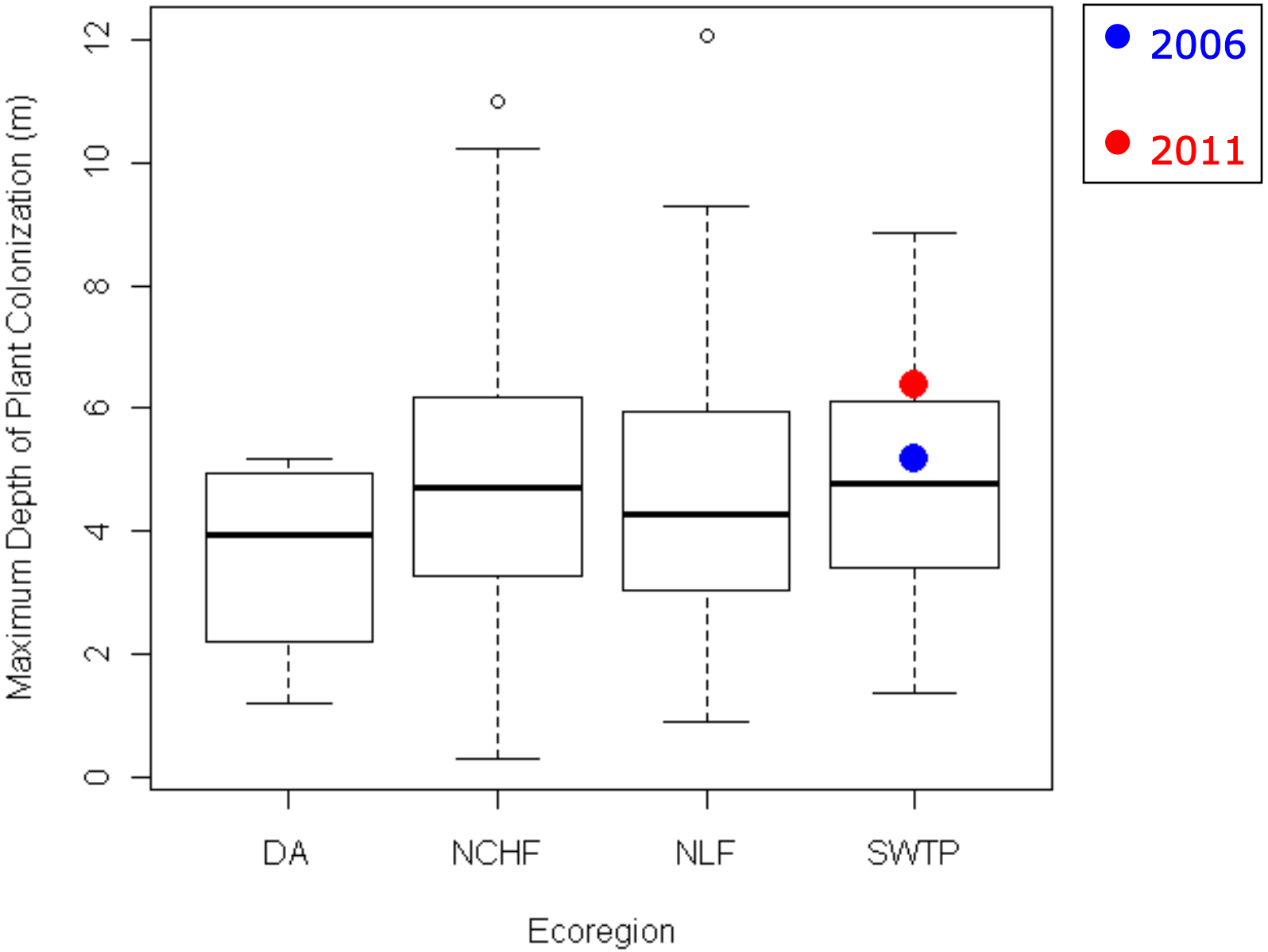
Floristic Quality Index (FQI)



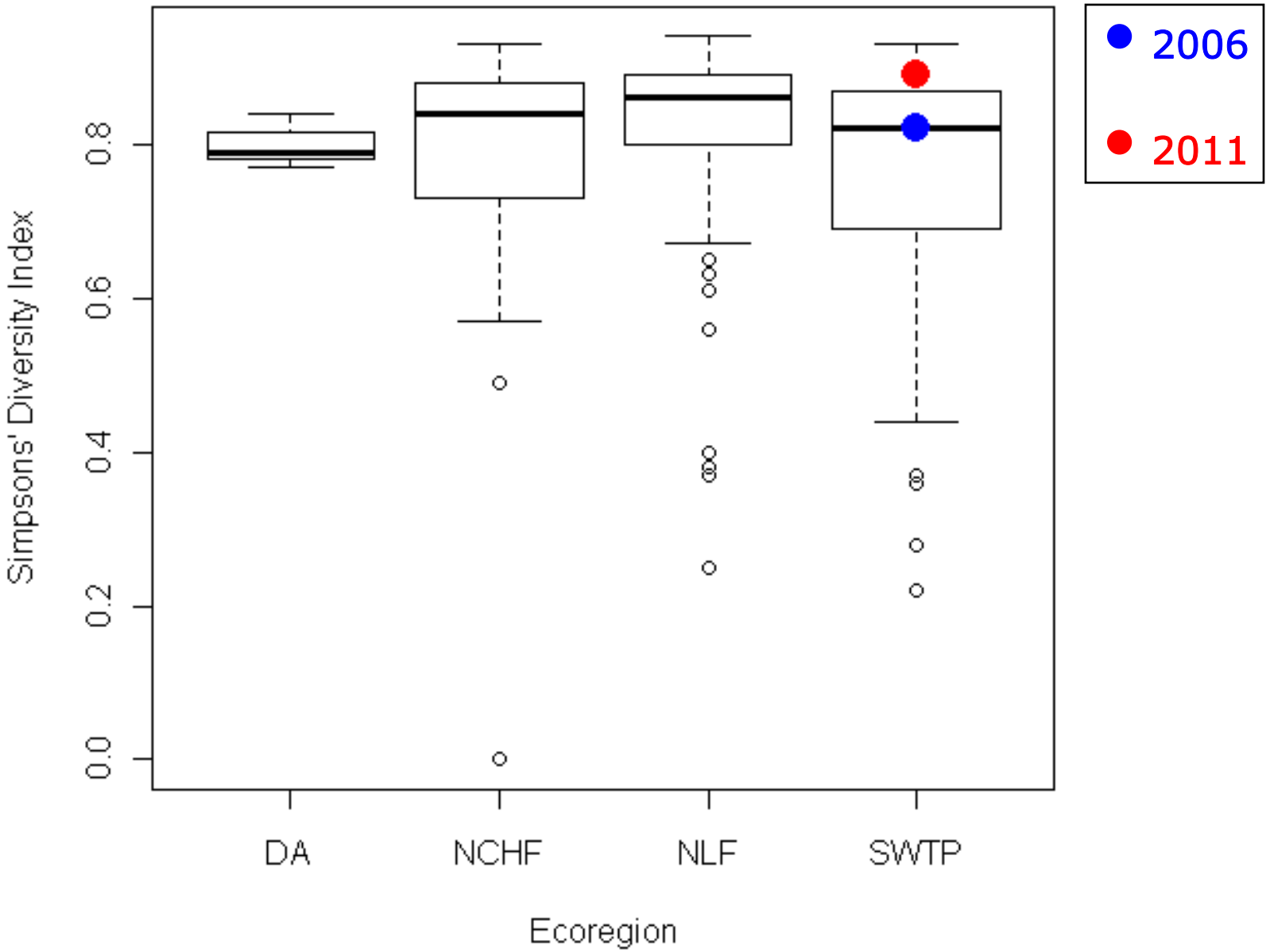
Aquatic Macrophyte Community Index (AMCI)



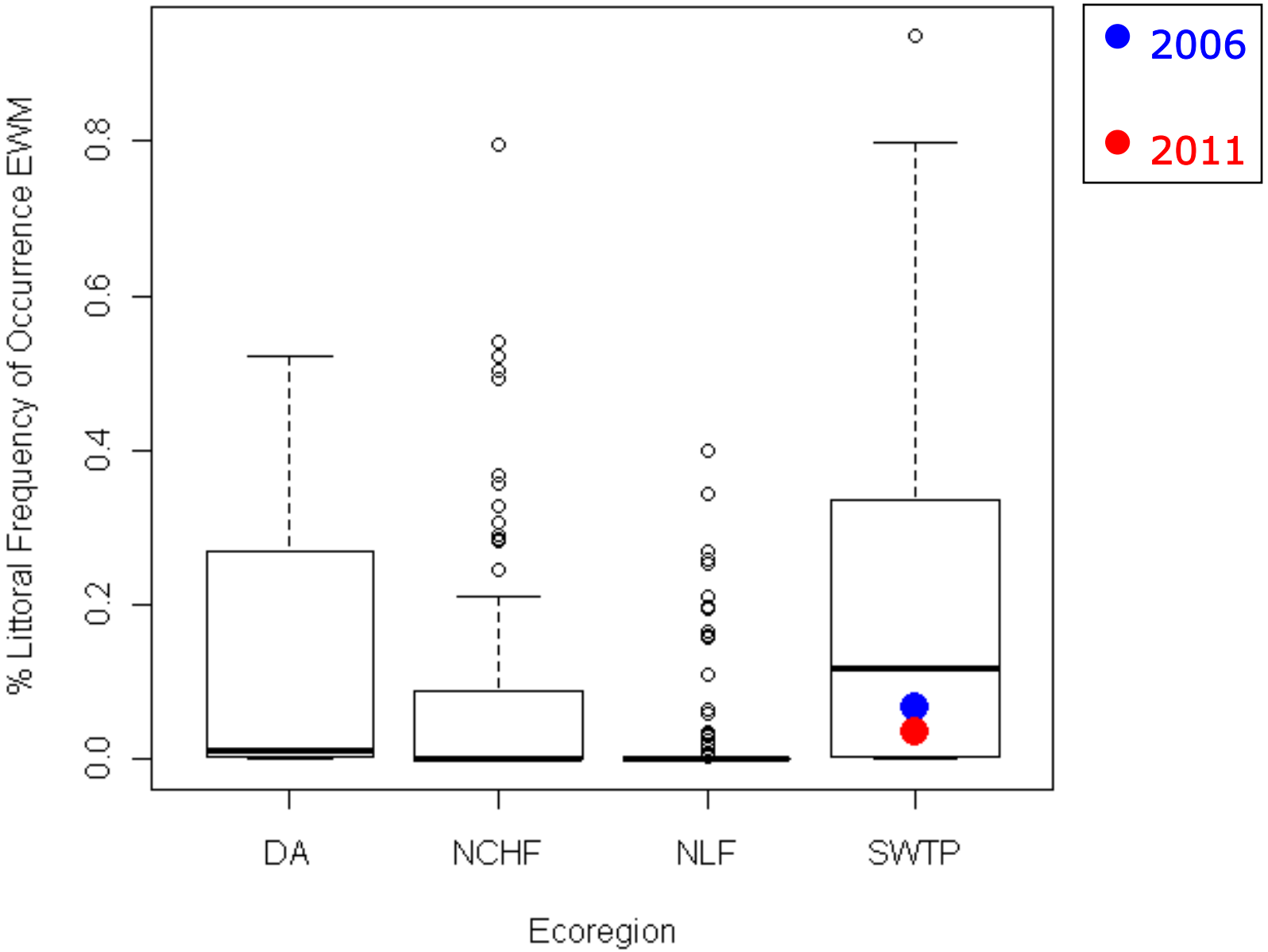
Maximum Depth of Plant Growth



Simpsons' Diversity Index



% Eurasian Water Milfoil (EWM)



DISCUSSION

Questions?

Comments?

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