

Aquatic Plants in Valley Branch Watershed District (VBWD) Lakes

Silver Lake, Long Lake,
Lake DeMontreville, Lake Olson,
Lake Jane, and Lake Elmo

February 21, 2018



• JILL LUCAS • LINCOLN FETCHER • EDWARD MARCHAN • ANTHONY HAIDER • DAVE SEWELL

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Presentation Overview

- Silver Lake
- Long Lake
- Lake DeMontreville
- Lake Olson
- Lake Jane
- Lake Elmo
- EWM – Extent & Management
- CLP and Other AIS
- Native Plants
- Water Quality



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Silver Lake EWM and CLP Management

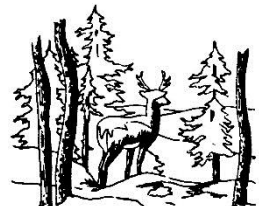
- Long history of EWM and CLP management
- Herbicide treatments to control EWM 1995-2006
- Large scale (50-60 ac) EWM and CLP treatments 2007-2008
- Large scale (60 ac) CLP treatment 2009
- Small scale EWM treatments 2012-2015 and 2017
- Small scale CLP treatments 2013 and 2016-2017



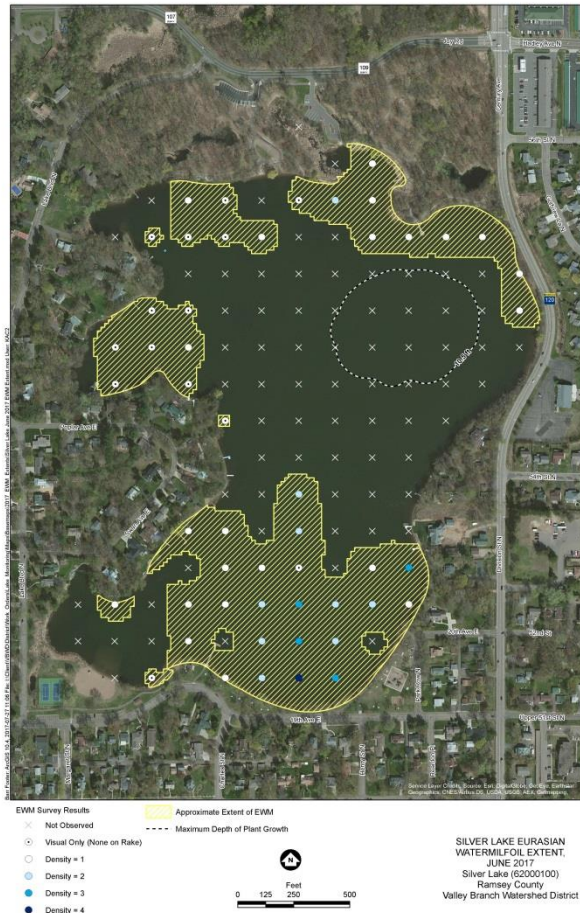
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2017 Silver Lake EWM Extent



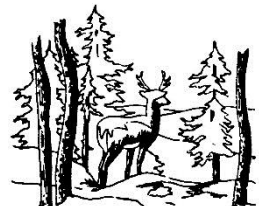
- 30.43 acres of EWM on 6/25/17 which is 43.61% of plant growth area
- Potential presence of hybrid milfoil



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Silver Lake 2017 Curly-leaf Pondweed

- 32% frequency of occurrence in June 2017
- Density was generally low (avg. of 1 on scale of 1 to 4), but 3 of 115 sampling locations observed dense patches of CLP (3 on scale of 1 to 4)



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Other AIS in Silver Lake

Reed Canary Grass

- Only observed at 1 location and not problematic



Narrow-leaved Cattail

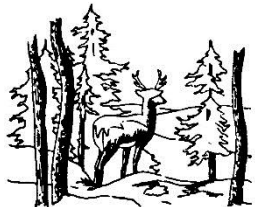
- Only observed at 1 location and not problematic



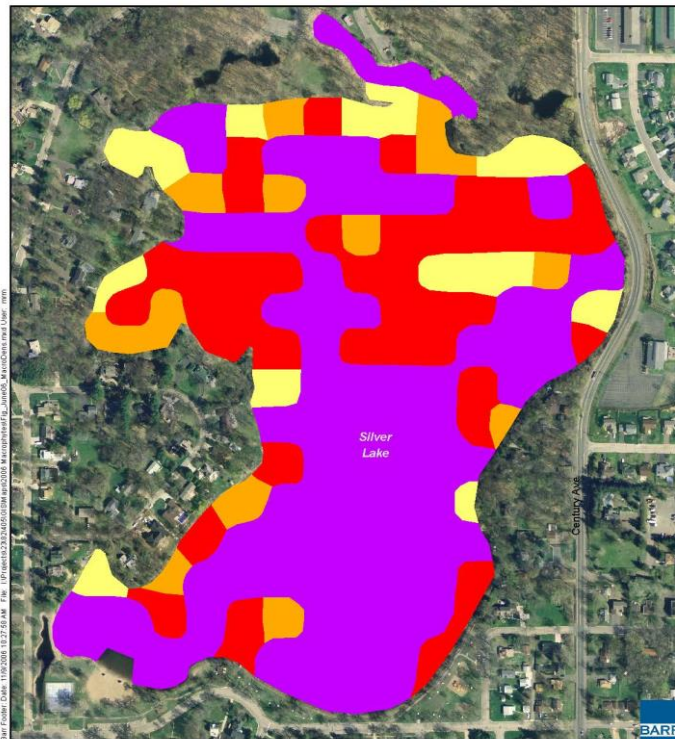
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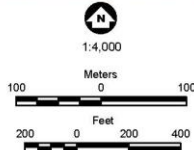
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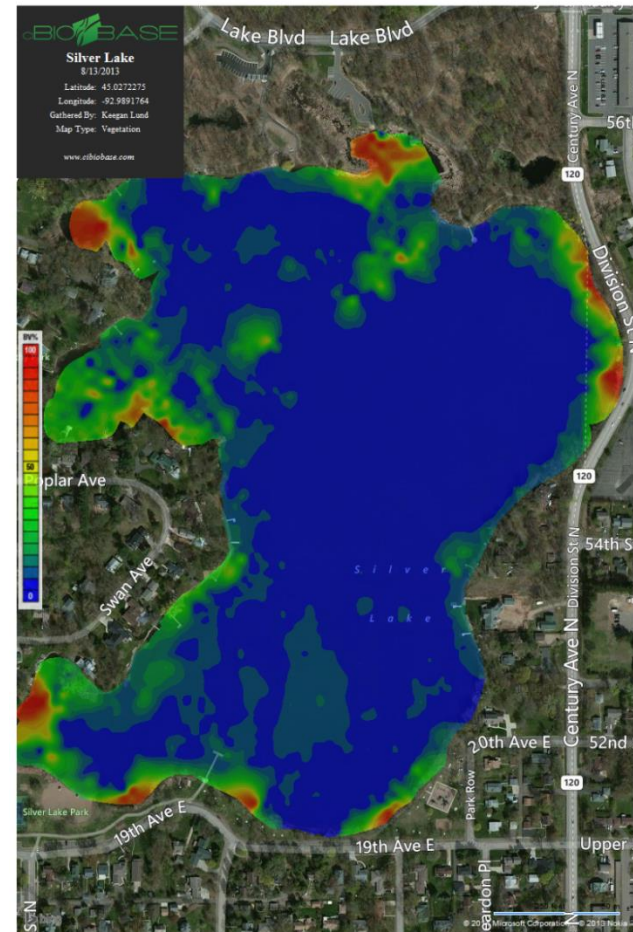
Silver Lake Plant Extent



Legend
 Macrophyte Density (Single Rake Toss)
 1 or 10% - 29% = 7.6 acres
 2 or 30% - 54% = 6.7 acres
 3 or 55% - 69% = 20.5 acres
 4 or 70% - 100% = 40.5 acres



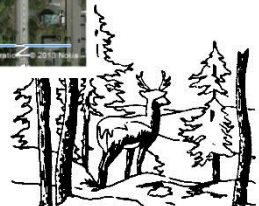
DRAFT Figure 1
 MACROPHYTE DENSITY AREAS
 Silver Lake - June 7, 2006
 Valley Branch Watershed District
 North St. Paul, MN



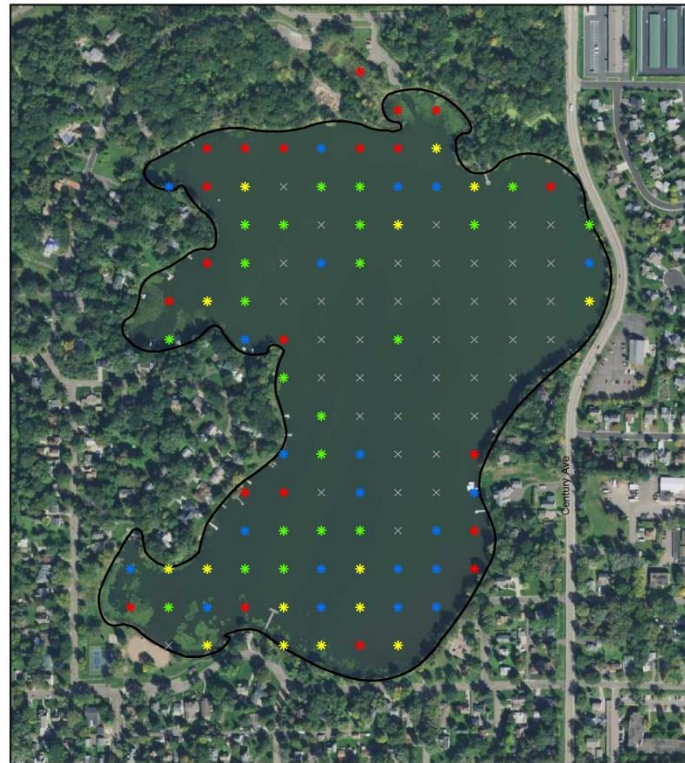
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Silver Lake Plant Extent



Rake Fullness Rating

- 1
- 2
- 3
- 4
- × None Found



0 175 350 700 Feet

Total Rake Fullness

Point-intercept Survey
Silver Lake
Ramsey County, MN
June 25, 2017

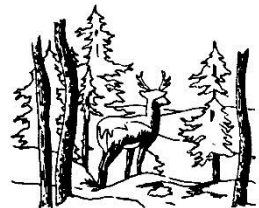
Aerial Imagery: 2015 FSA



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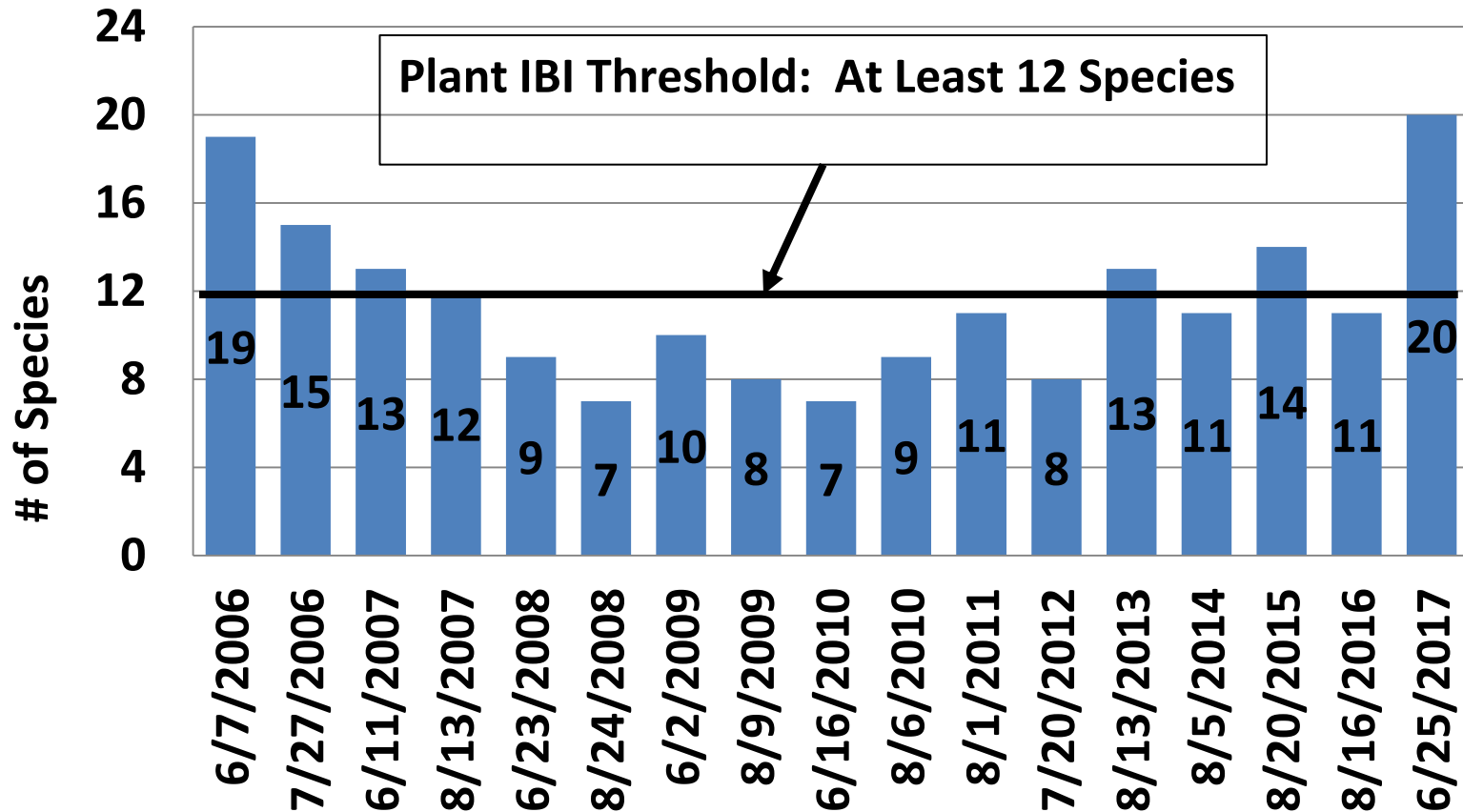
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Silver Lake Native Plants

Silver Lake Species Richness



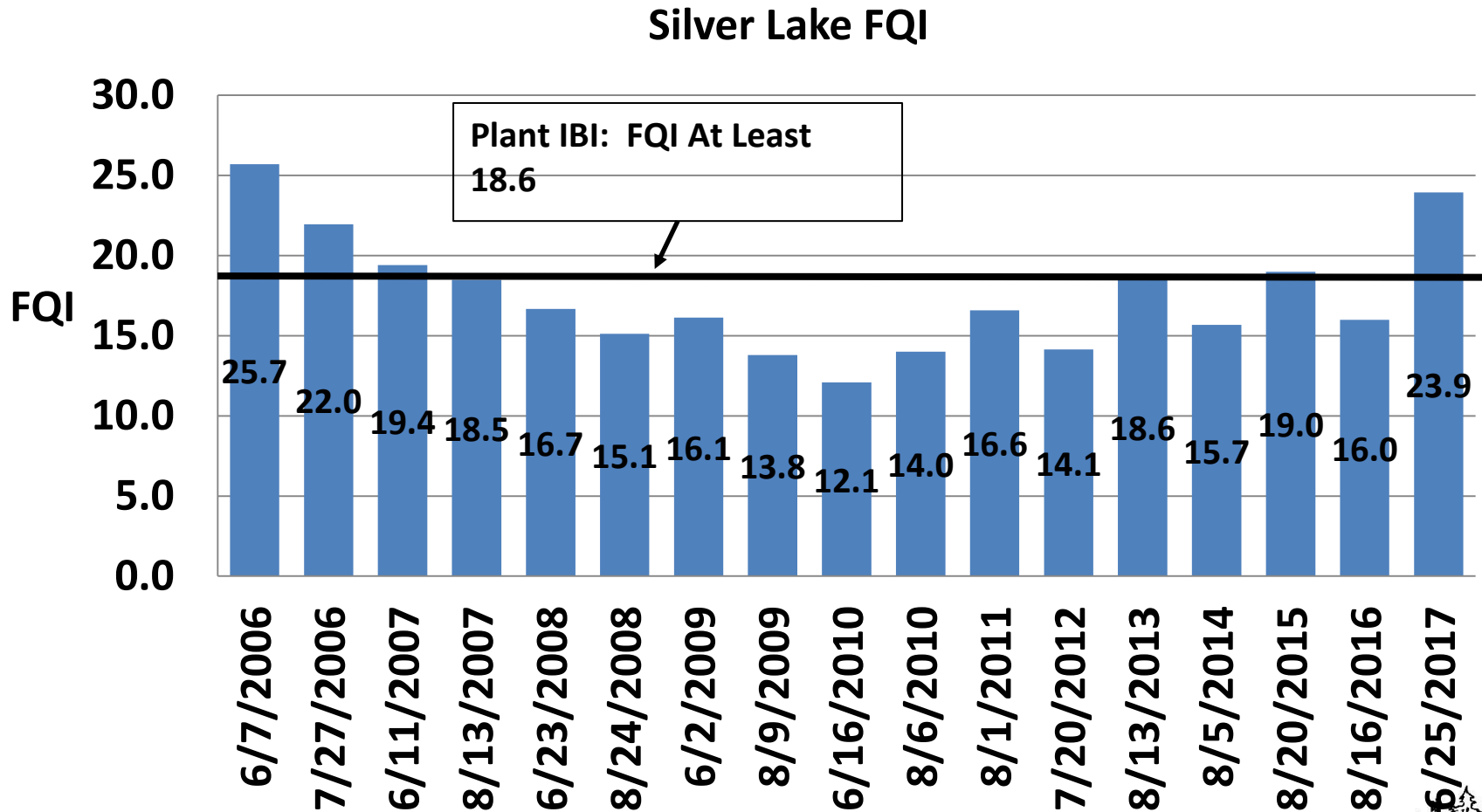
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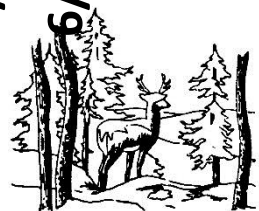
Silver Lake Native Plants



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Significant Changes in Silver Lake Plants



• Small duckweed and filamentous algae significantly increased



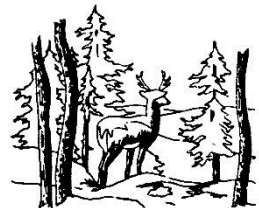
• Naiad and coontail significantly decreased



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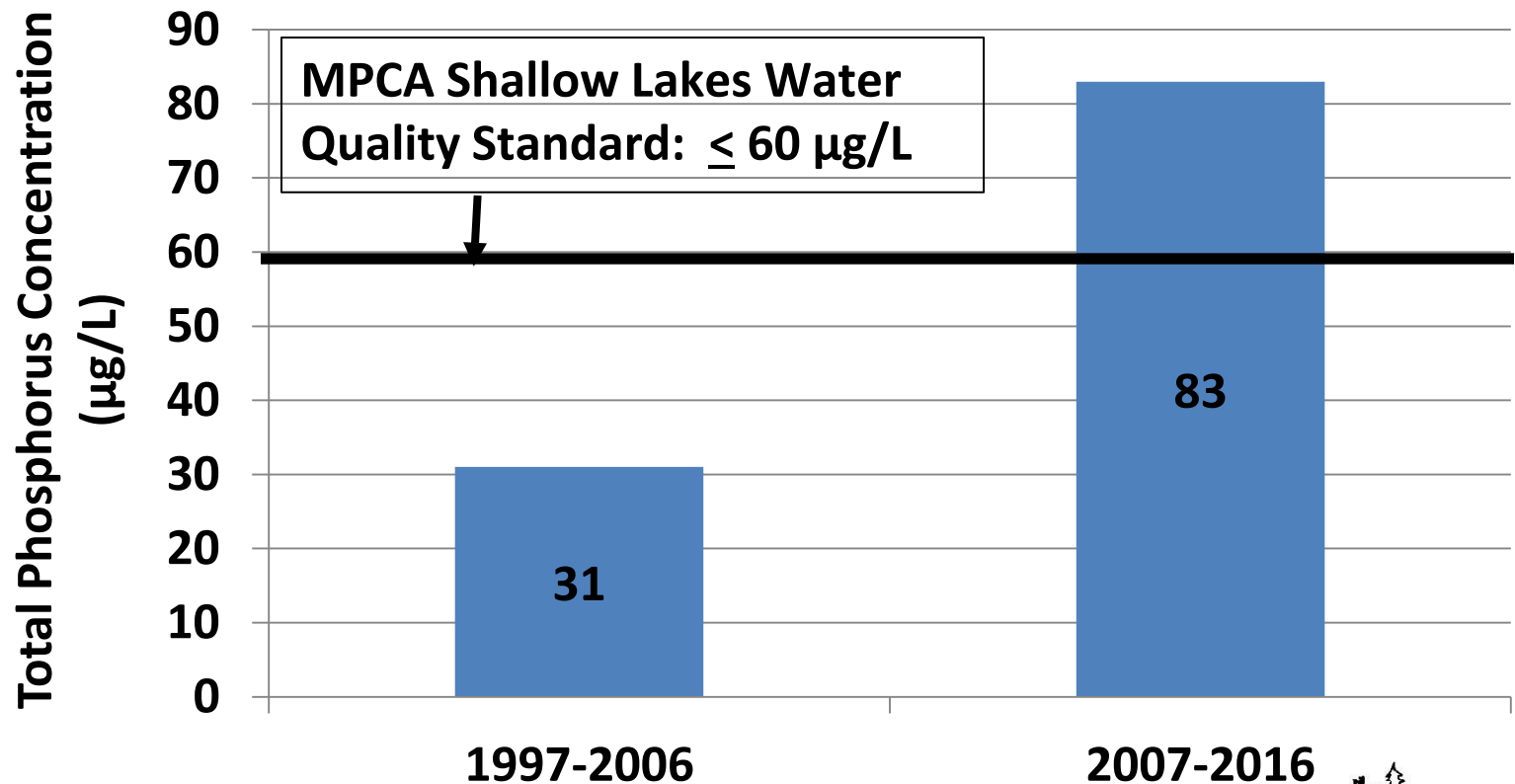
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Silver Lake Water Quality

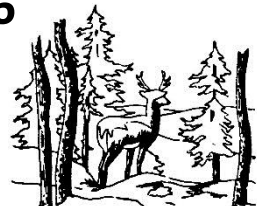
Silver Lake 10-Year Average Summer Total Phosphorus Concentration



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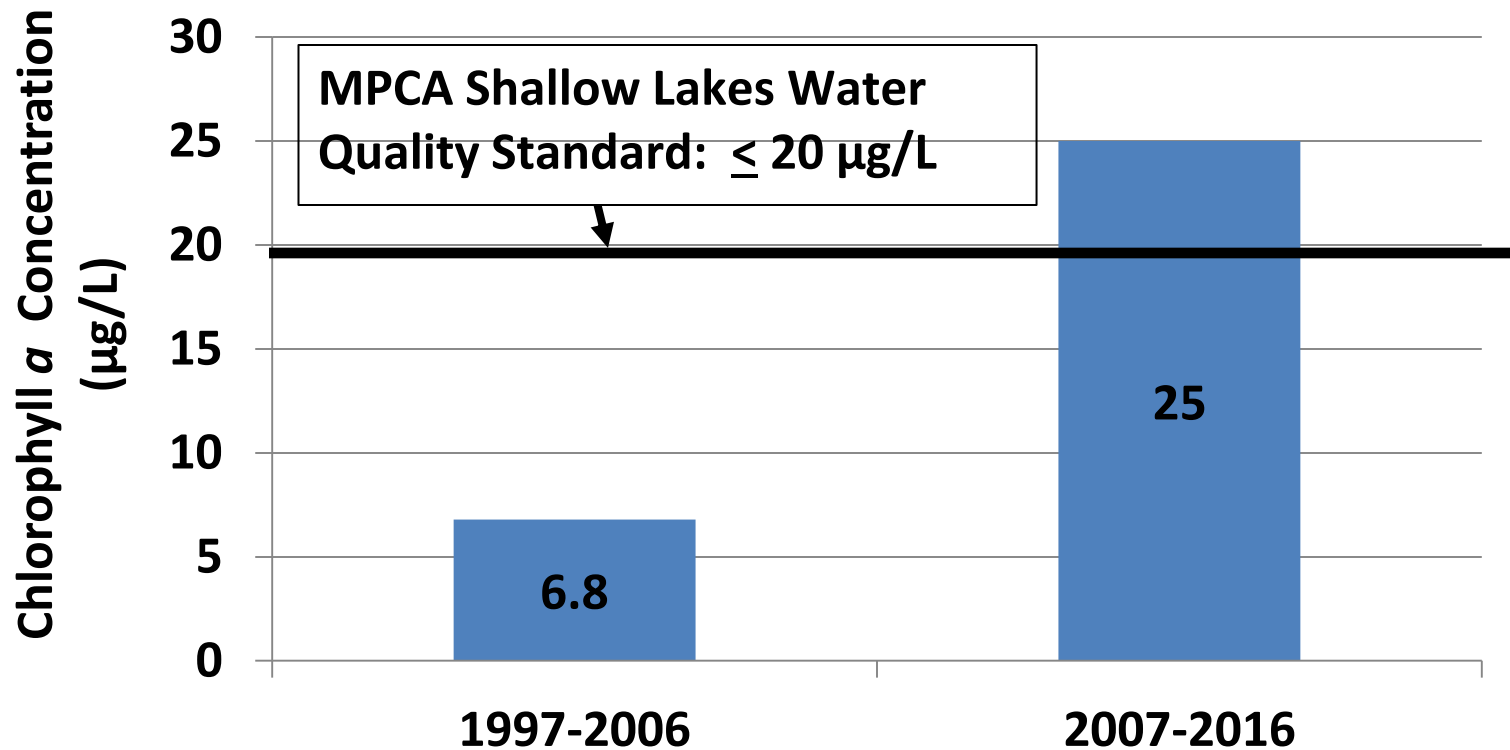
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Silver Lake Water Quality

Silver Lake 10-Year Average Summer Chlorophyll *a* Concentration



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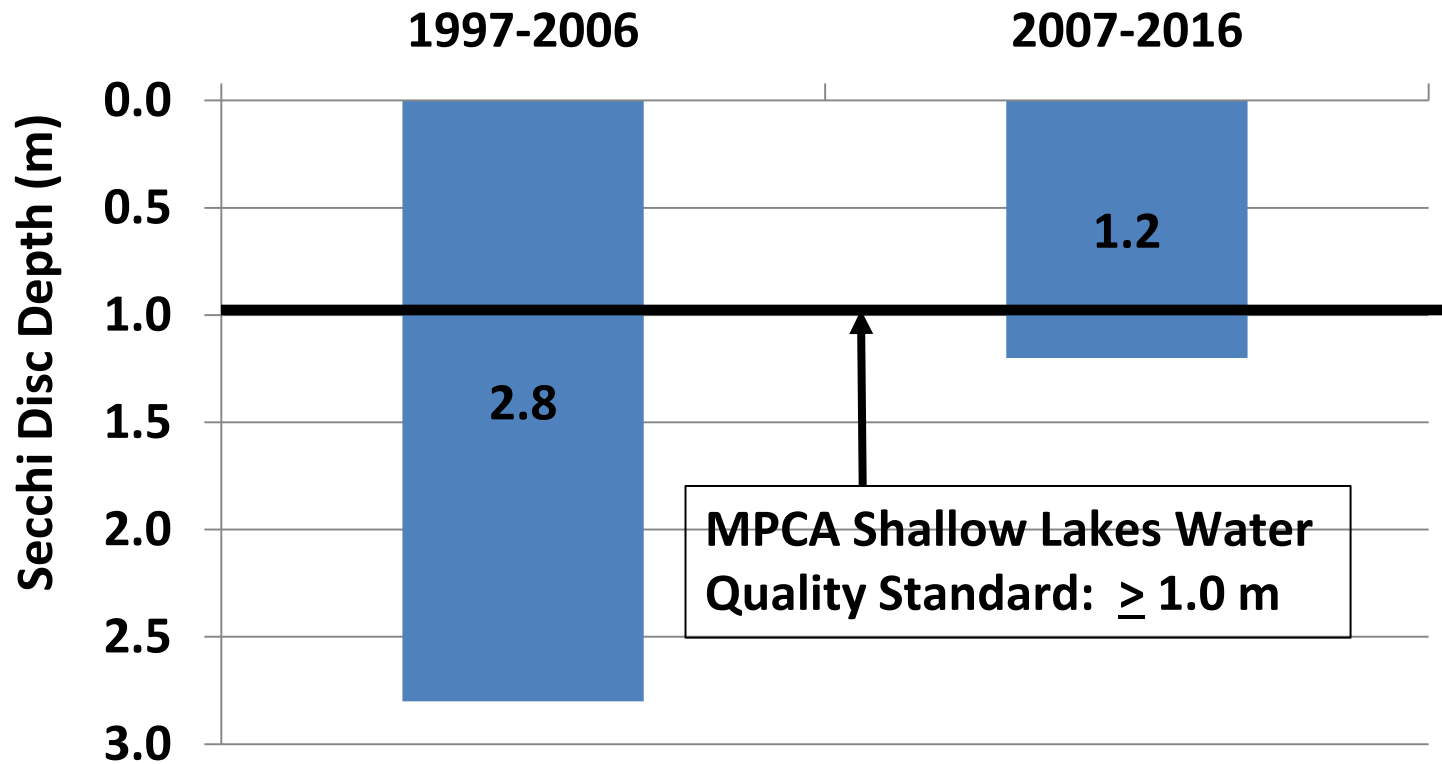
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Silver Lake Water Quality

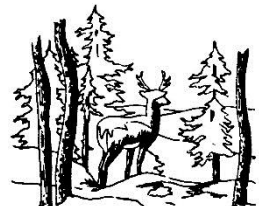
Silver Lake 10-Year Average Summer Secchi Disc Depth



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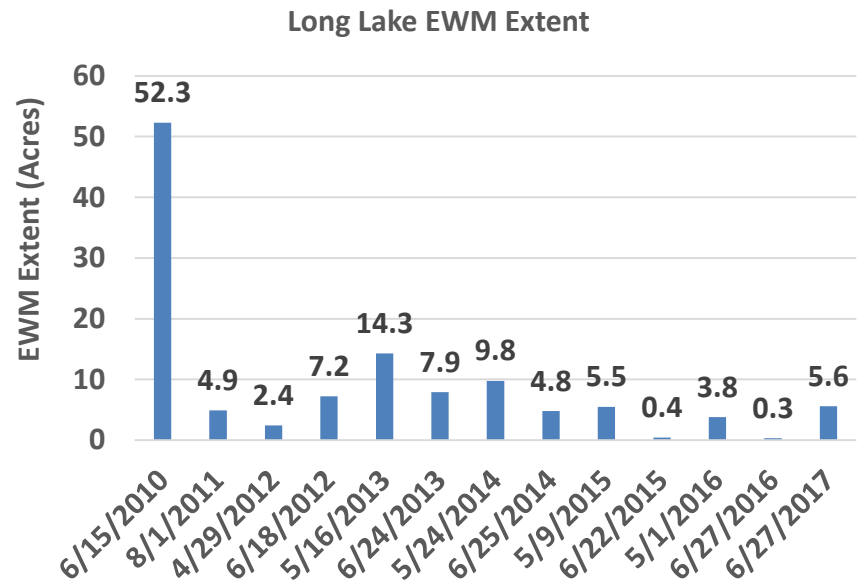
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Long Lake EWM Management

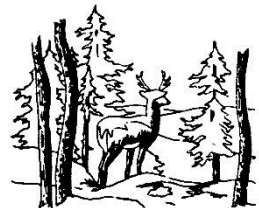
- Treated 58.5 ac in 2011
- Treated 28.4 ac in 2013
- Treated 22.2 ac in 2014
- Treated 20.1 ac in 2015
- Treated 9.18 ac in 2016



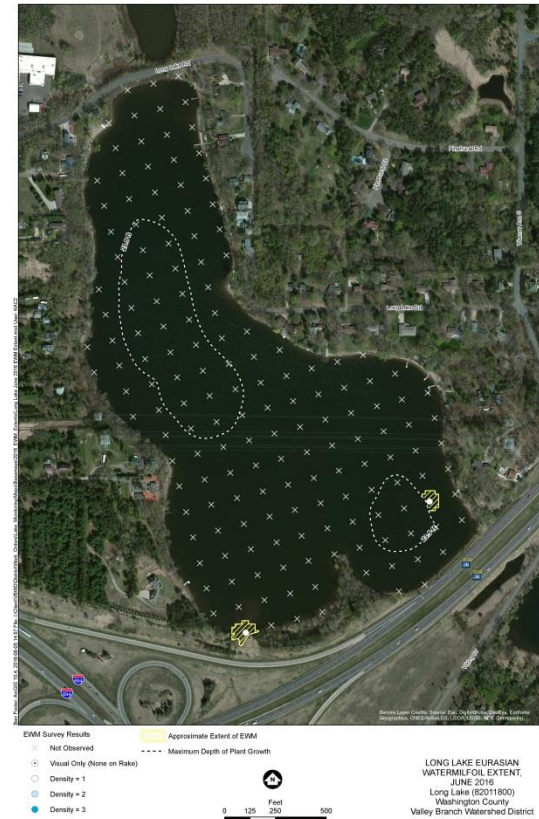
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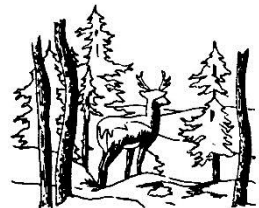
2010 & 2016 Long Lake EWM Extent



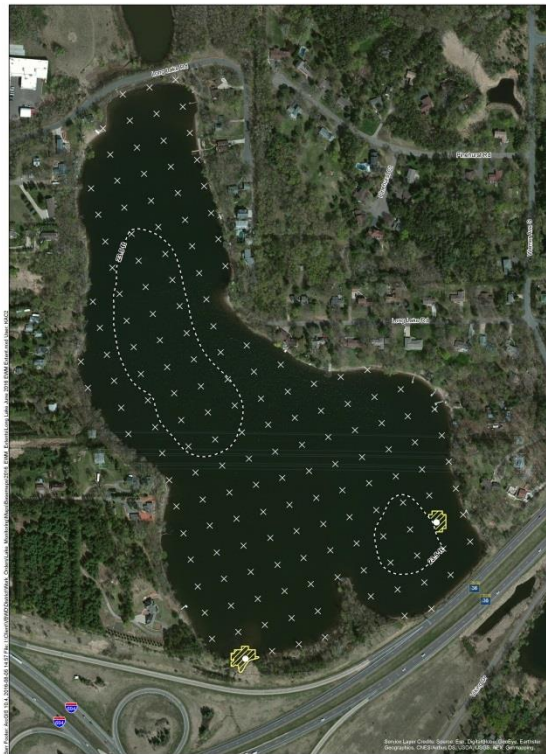
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2016 & 2017 Long Lake EWM Extent



EWM Survey Results
x Not Observed
o Visual Only (None on Rake)
● Density = 1
● Density = 2
● Density = 3
● Density = 4

Approximate Extent of EWM
--- Maximum Depth of Plant Growth

Feet
0 125 250 500

LONG LAKE EURASIAN
WATERMILFOIL EXTENT,
JUNE 2016
Long Lake (82011800)
Washington County
Valley Branch Watershed District



EWM Survey Results
x Not Observed
o Visual Only (None on Rake)
● Density = 1
● Density = 2
● Density = 3
● Density = 4

Approximate Extent of EWM
--- Maximum Depth of Plant Growth

Feet
0 125 250 500

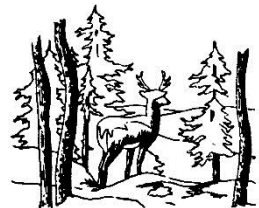
LONG LAKE EURASIAN
WATERMILFOIL EXTENT,
JUNE 2017
Long Lake (82011800)
Washington County
Valley Branch Watershed District



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2017 EWM Extent in Katherine Abbott Pond

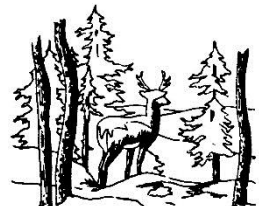
- EWM present in 98% of Katherine Abbott Pond
- Katherine Abbott Pond a source of EWM to Long Lake



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Long Lake 2017 Curly-leaf Pondweed

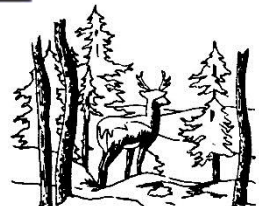
- 17% frequency of occurrence in June 2017
- Density was generally low (avg. of 1 on scale of 1 to 4)
- No significant change in frequency between 2016 and 2017



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Other AIS in Long Lake

Reed Canary Grass

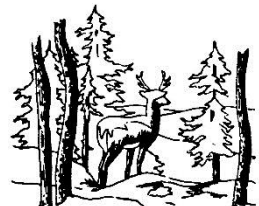
- At 1 location, not problematic



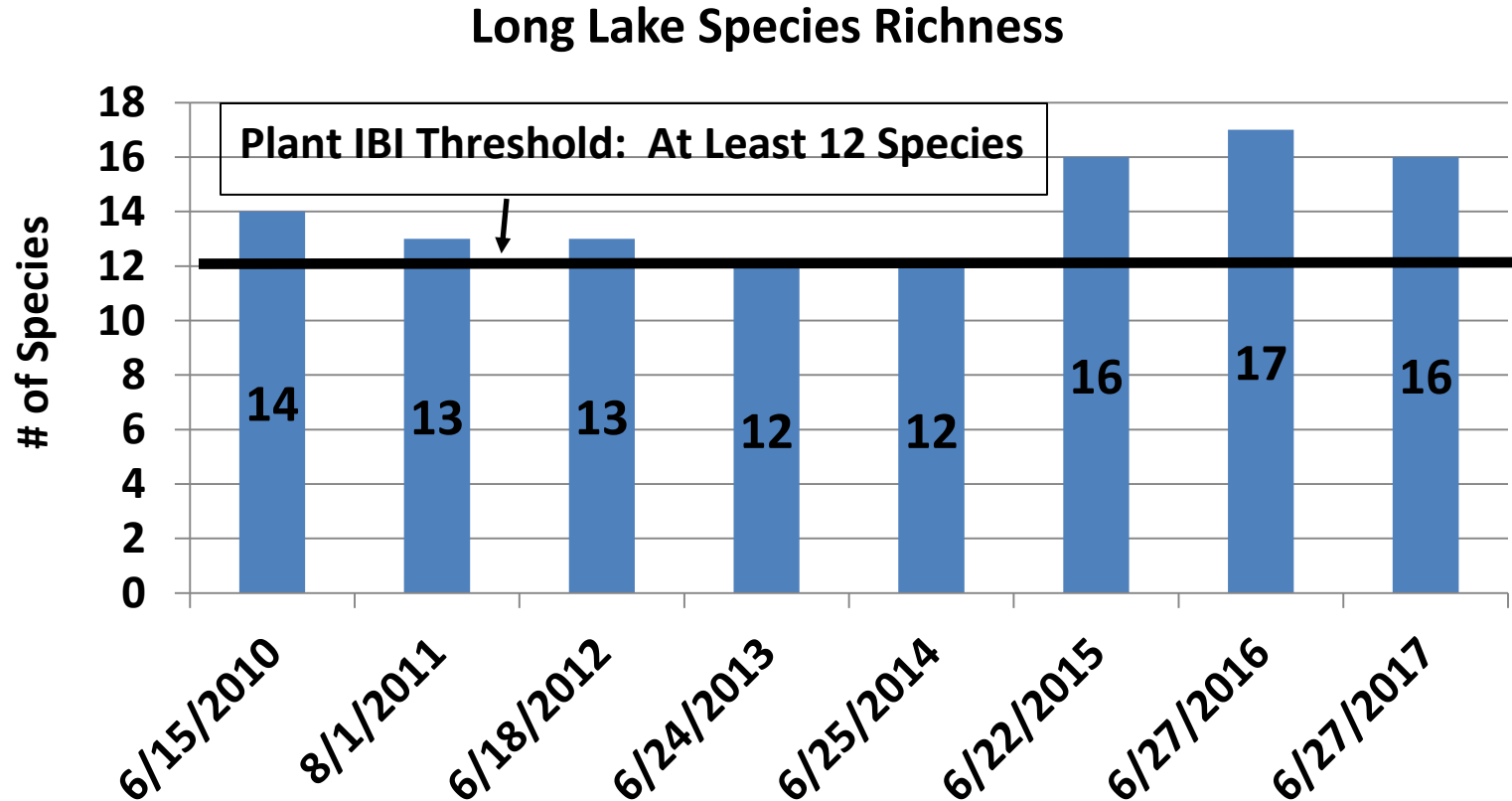
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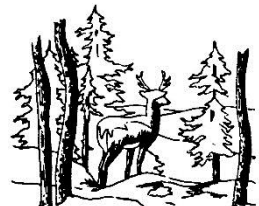
Long Lake Native Plants



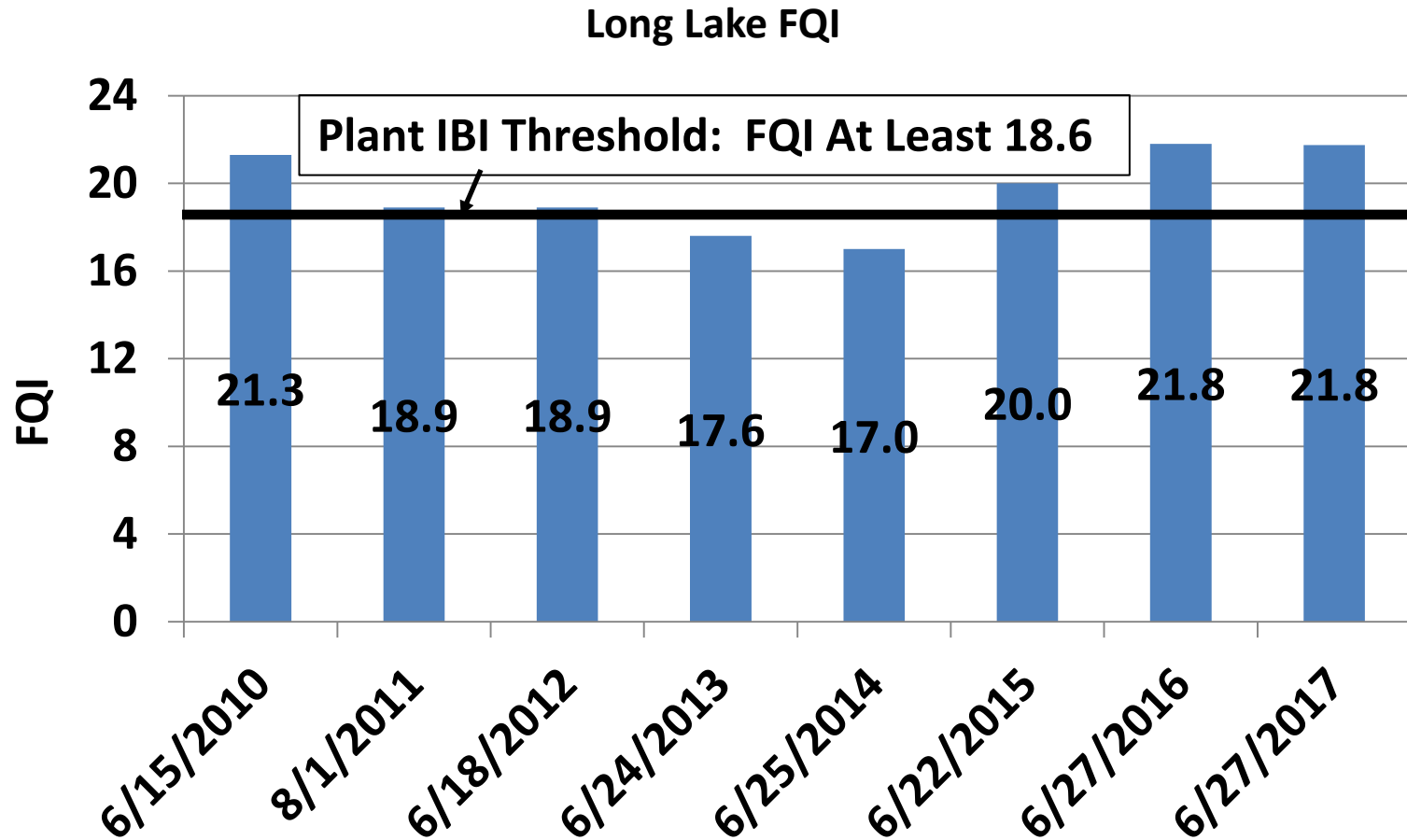
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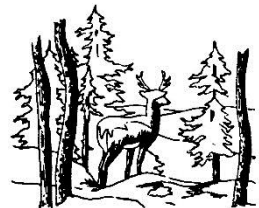
Long Lake Native Plants



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Long Lake Plants

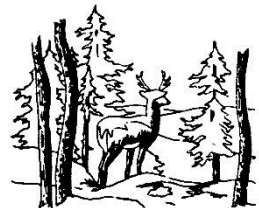
- No significant changes in frequency in 2017
- Filamentous algae significantly declined in 2017
- Bearded stonewort, a good plant, observed for first time in 2017



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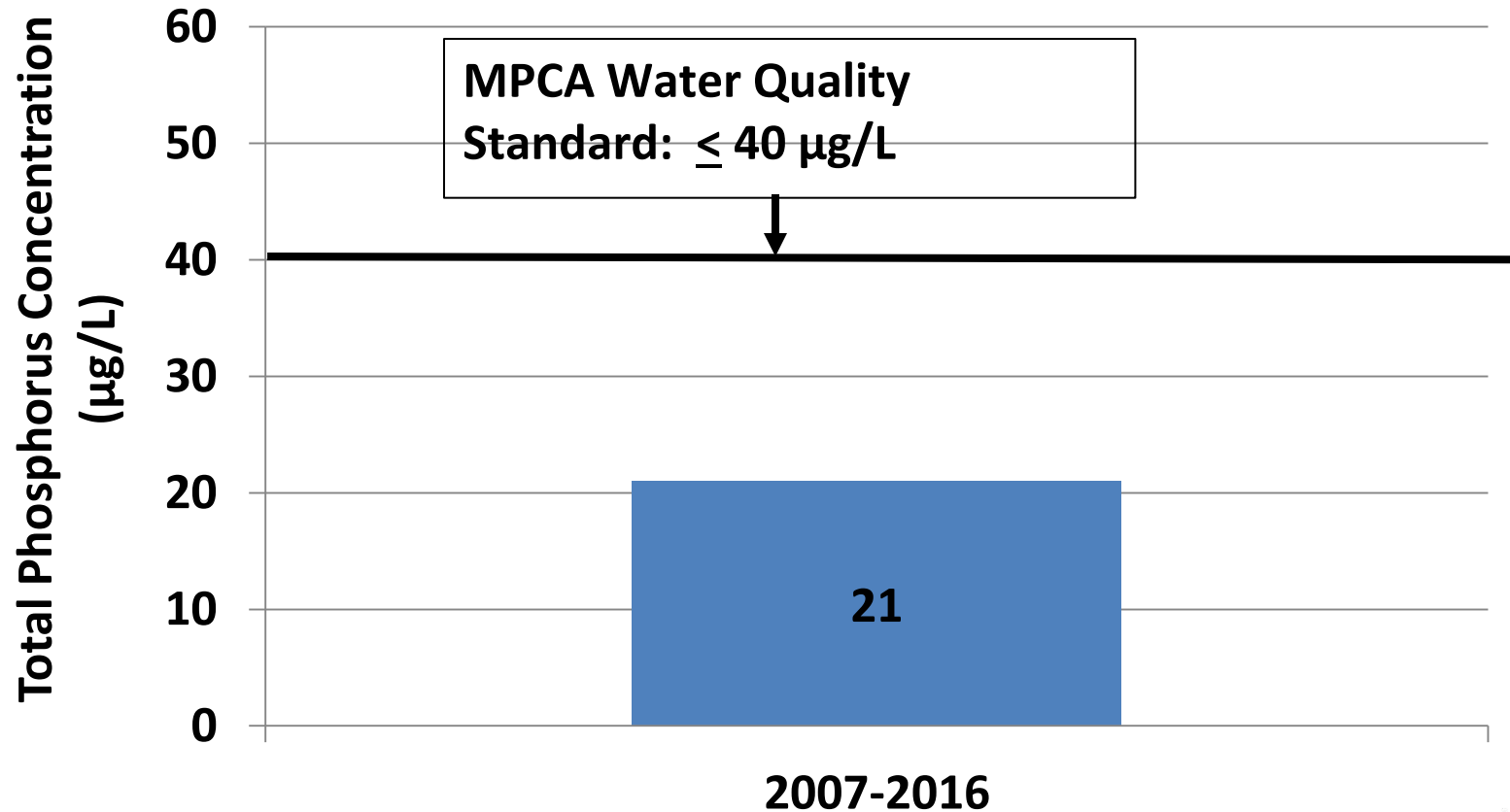
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Long Lake Water Quality

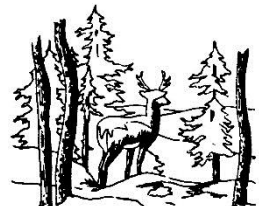
Long Lake 10-Year Average Summer Total Phosphorus Concentration



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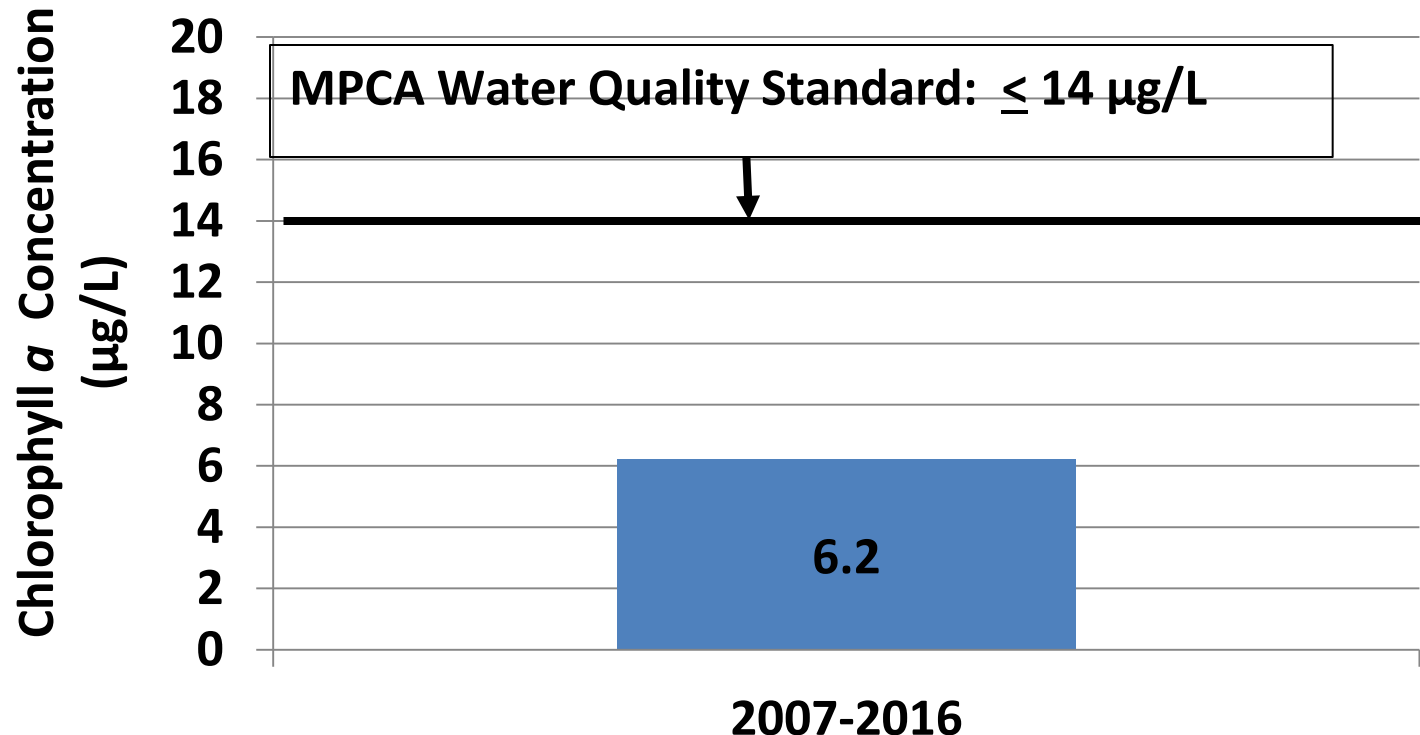
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Long Lake Water Quality

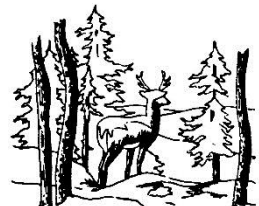
Long Lake 10-Year Average Summer Chlorophyll *a* Concentration



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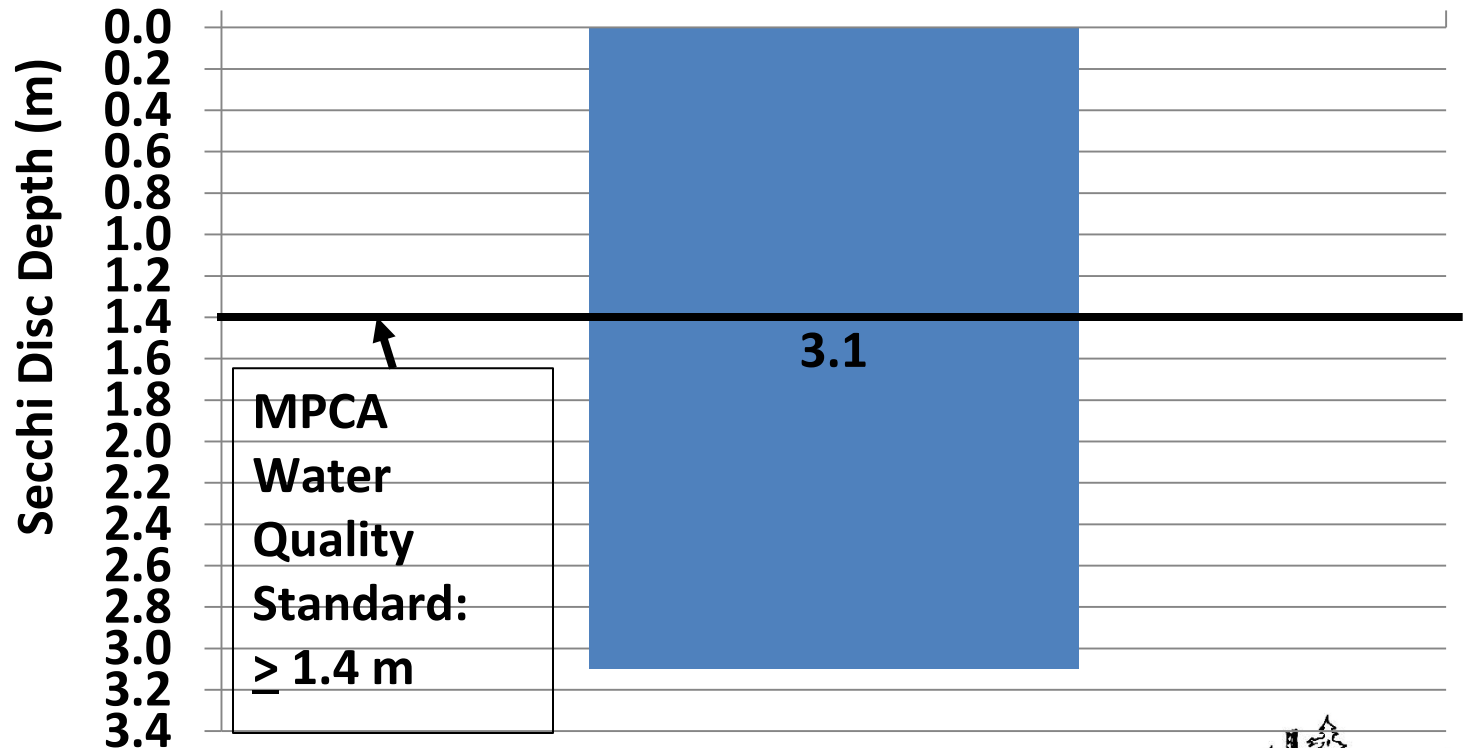
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Long Lake Water Quality

Long Lake 10-Year Average Summer Secchi Disc
Depth

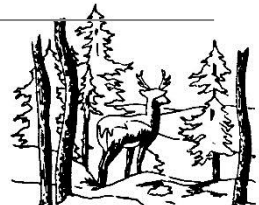
2007-2016



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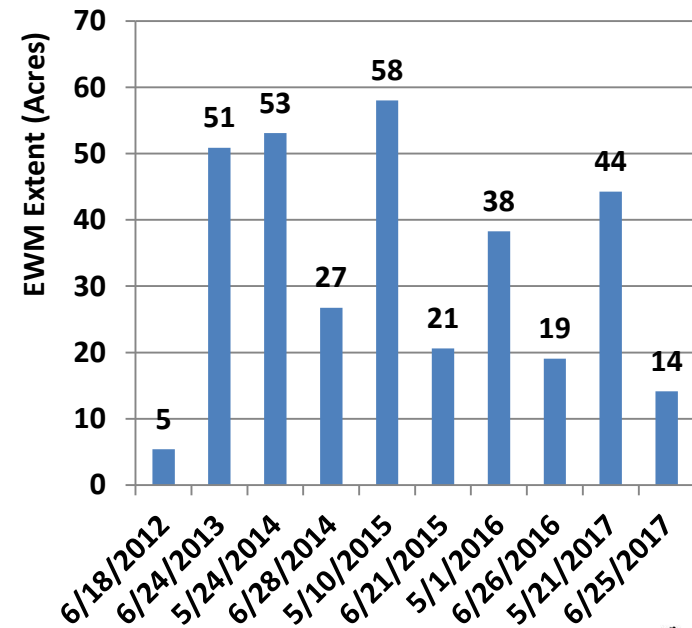
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Lake DeMontreville EWM Management

- Treated 4.3 ac in 2014
- Treated 14.3 ac in 2015
- Treated 14.3 ac in 2016
- Treated 16.1 ac in 2017

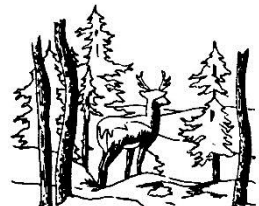
Lake DeMontreville EWM
Extent



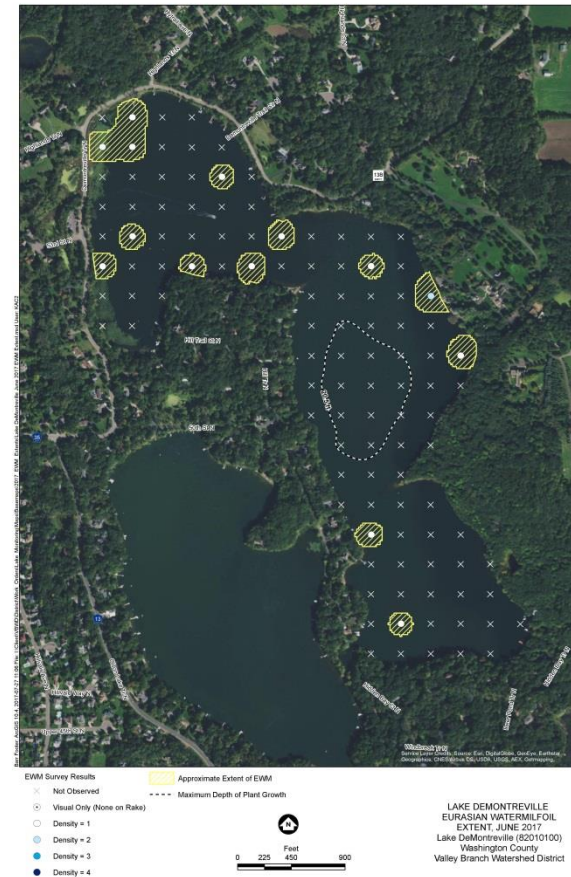
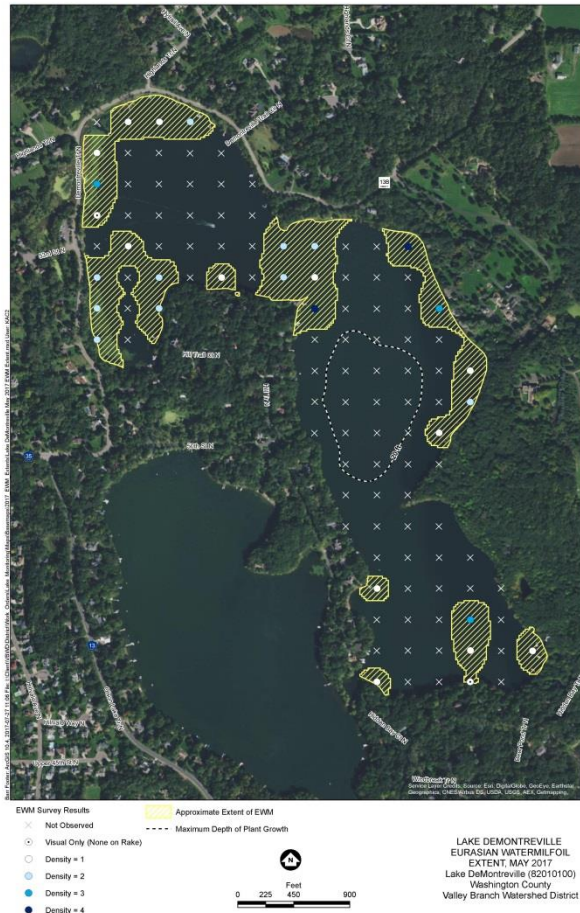
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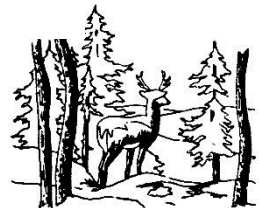
Lake DeMontreville May and June 2017 EWM Extent



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Lake DeMontreville 2017 Curly-leaf Pondweed

- 17% frequency of occurrence in June 2017
- Density was generally low (avg. of 1 on scale of 1 to 4)
- Annually fluctuations in frequency between 2012-2017, ranging from 2%-49%, including increase from 2% in 2016 to 17% in 2017.



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Other AIS in Lake DeMontreville

Reed Canary Grass

- Only observed at 1 location and not problematic



Hybrid Cattail

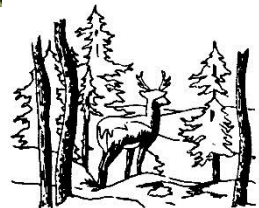
- Only observed at 1 location and not problematic



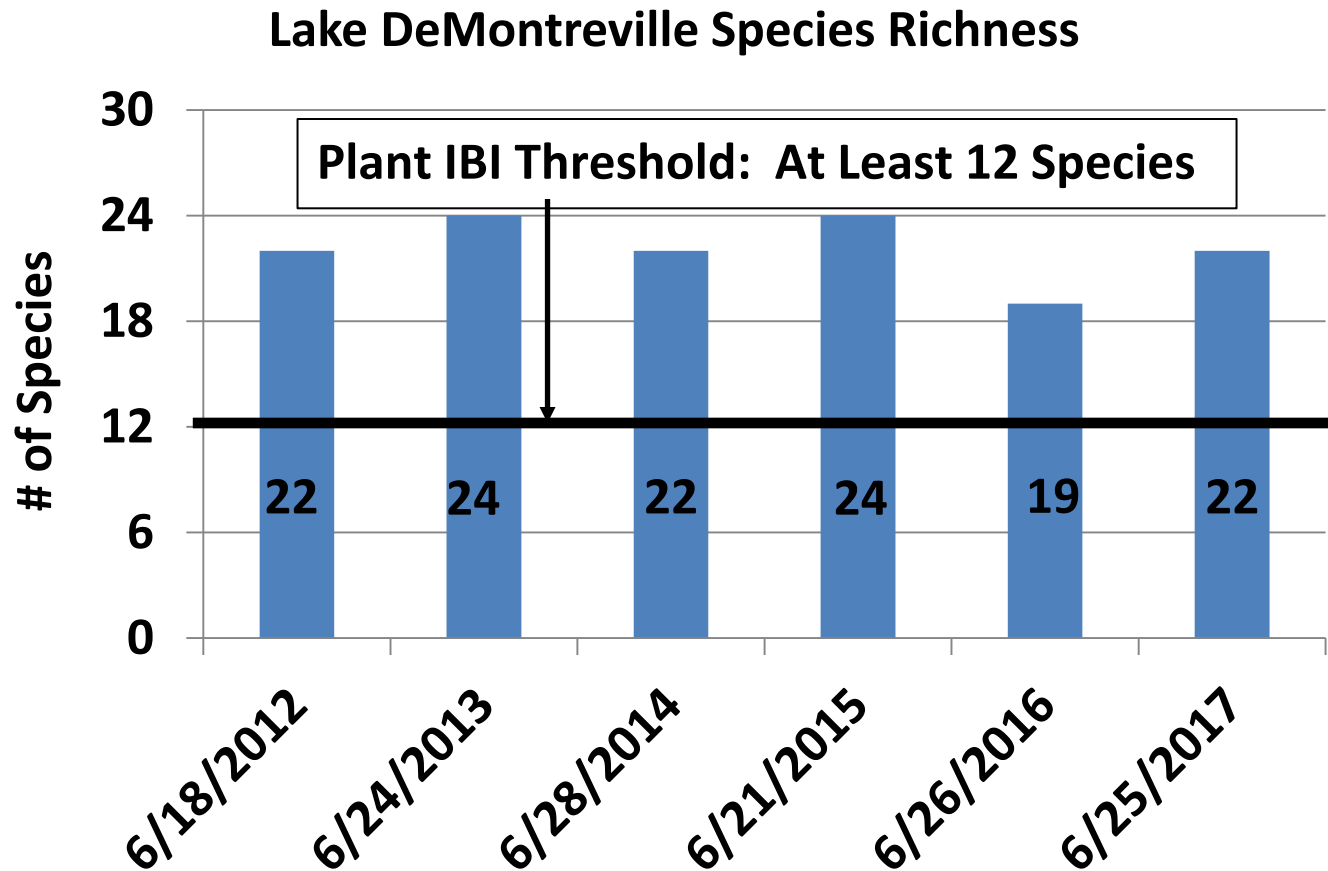
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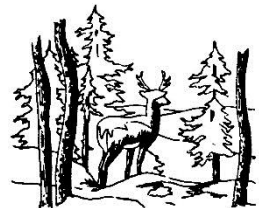
Lake DeMontreville Native Plants



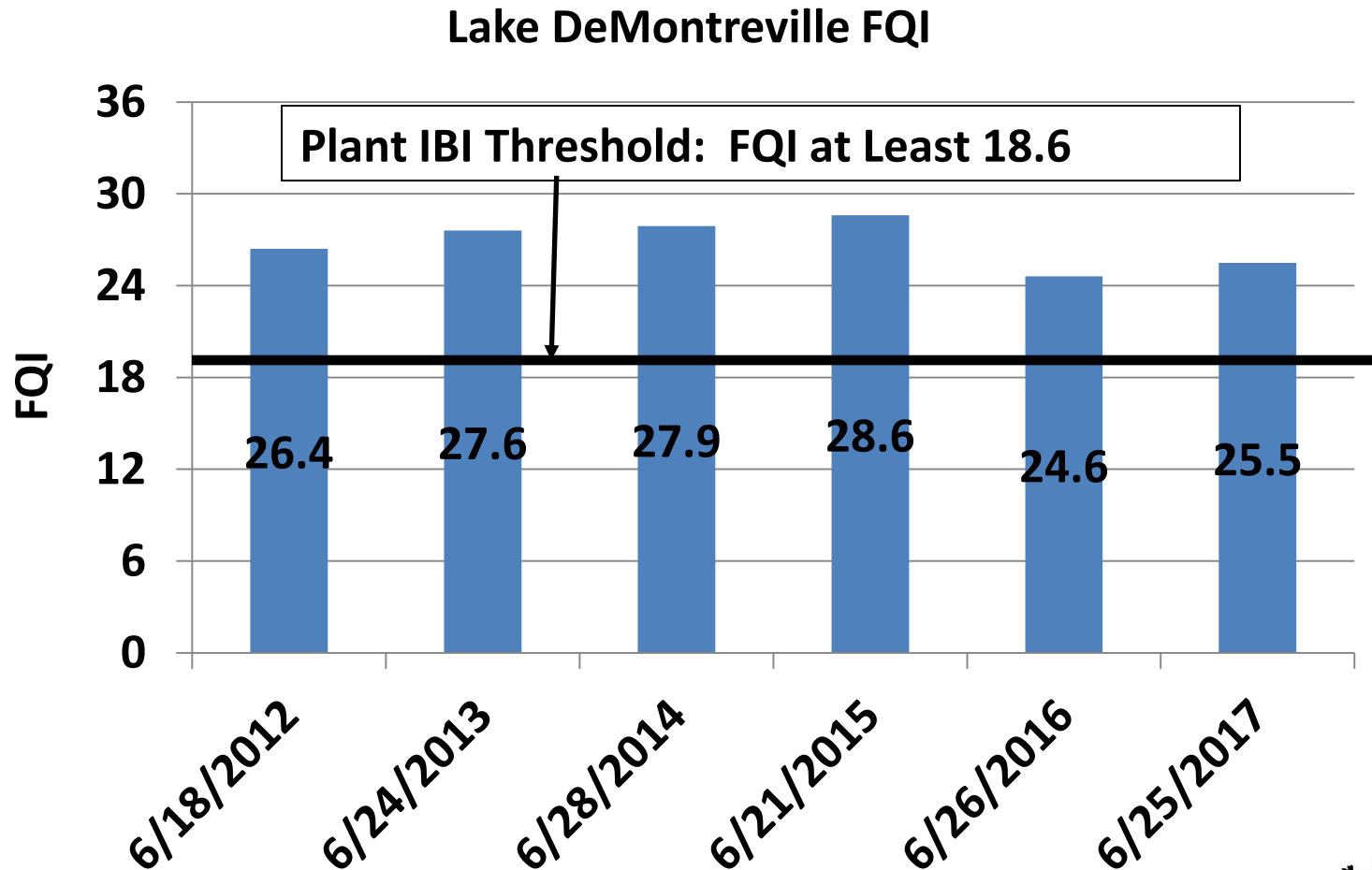
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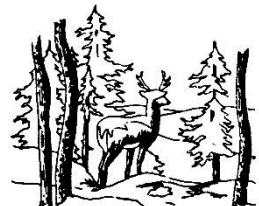
Lake DeMontreville Native Plants



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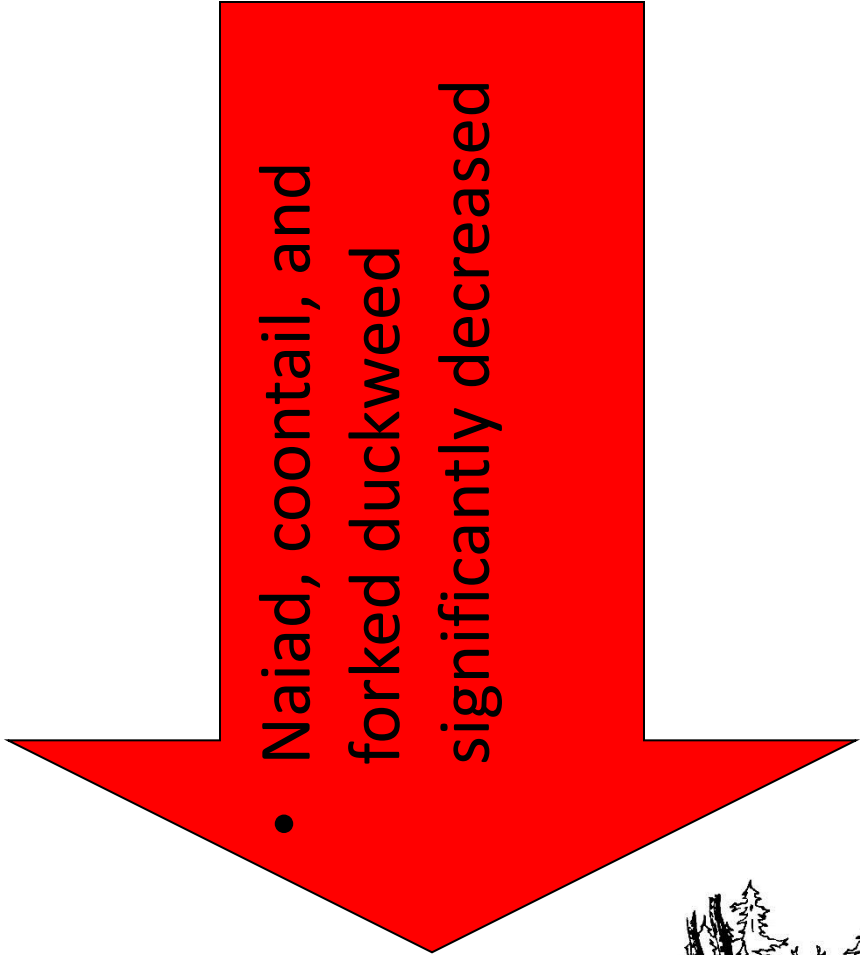
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Significant Changes in Lake DeMontreville Native Plants



• Flat-stem pondweed
and small pondweed
significantly increased



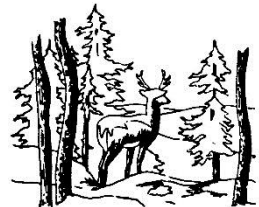
• Naiad, coontail, and
forked duckweed
significantly decreased



• JILL LUCAS • LINCOLN FETCHER • EDWARD MARCHAN • ANTHONY HAIDER • DAVE SEWELL

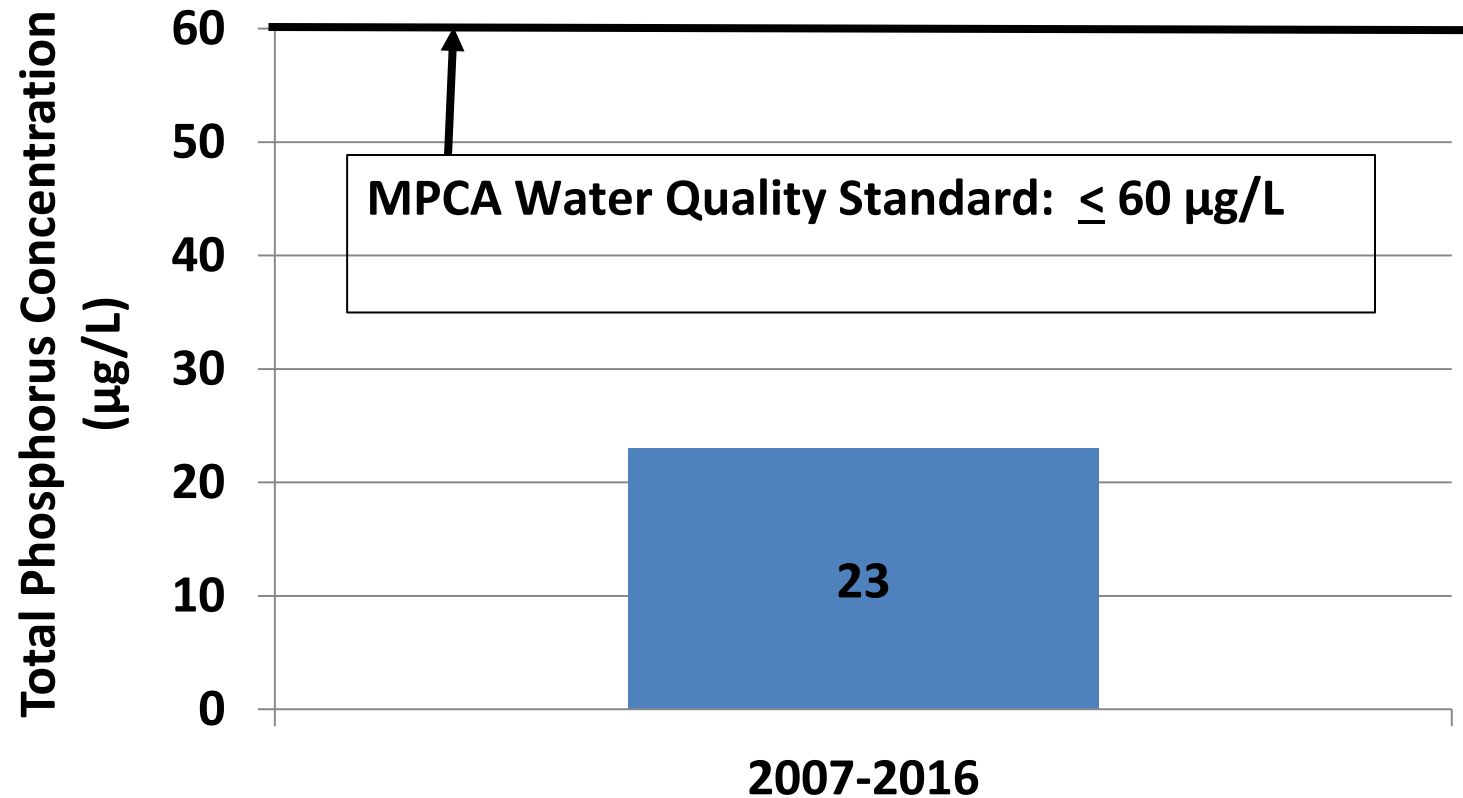
VALLEY BRANCH WATERSHED DISTRICT • P.O. BOX 838 • LAKE ELMO, MINNESOTA 55042-0538

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Lake DeMontreville Water Quality

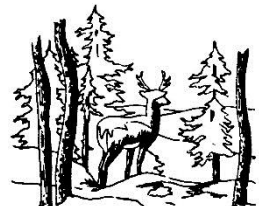
Lake DeMontreville 10-Year Average Summer Total Phosphorus Concentration



• JILL LUCAS • LINCOLN FETCHER • EDWARD MARCHAN • ANTHONY HAIDER • DAVE SEWELL

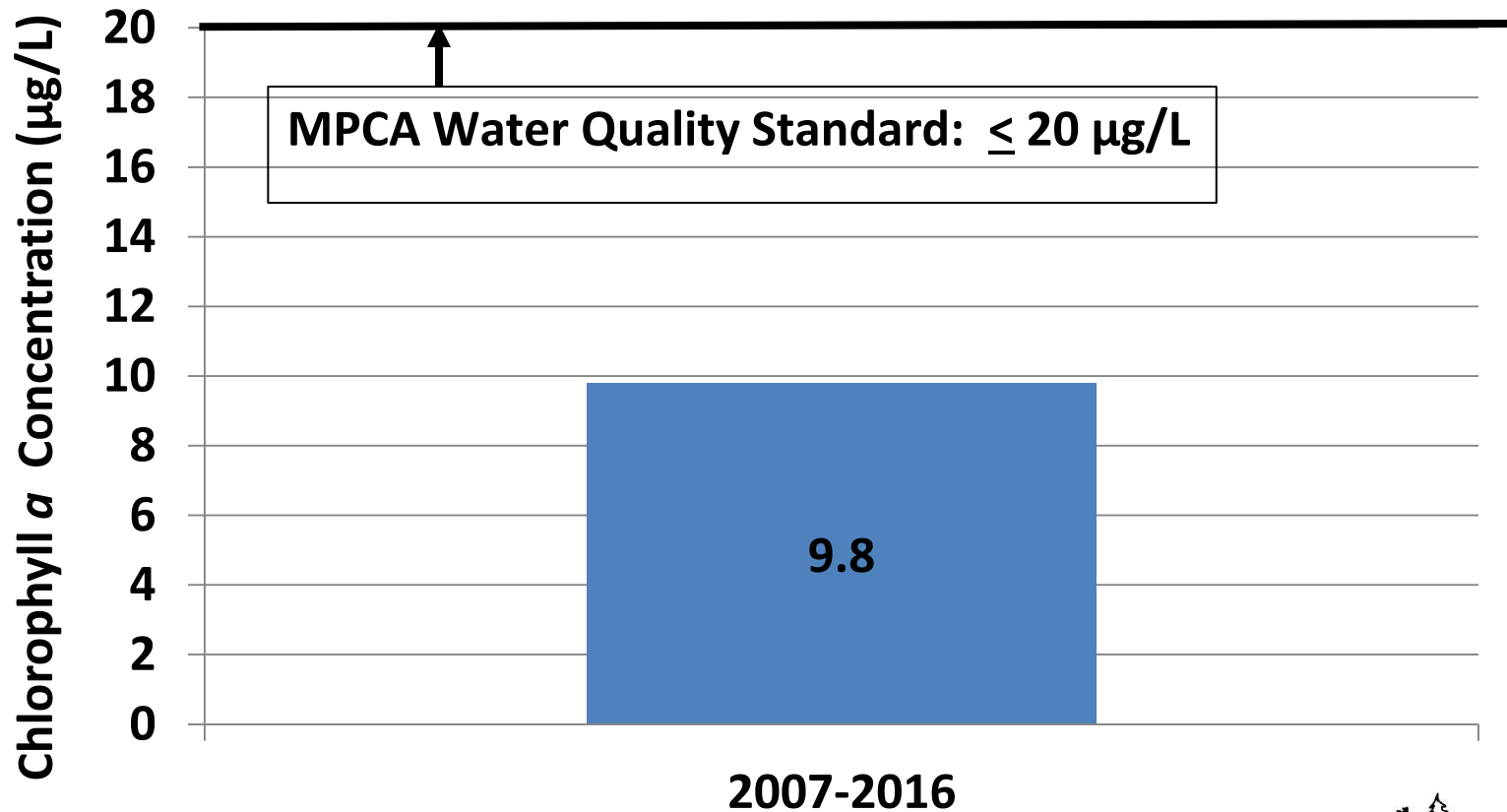
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Lake DeMontreville Water Quality

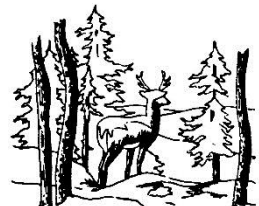
Lake DeMontreville 10-Year Average Summer Chlorophyll *a* Concentration



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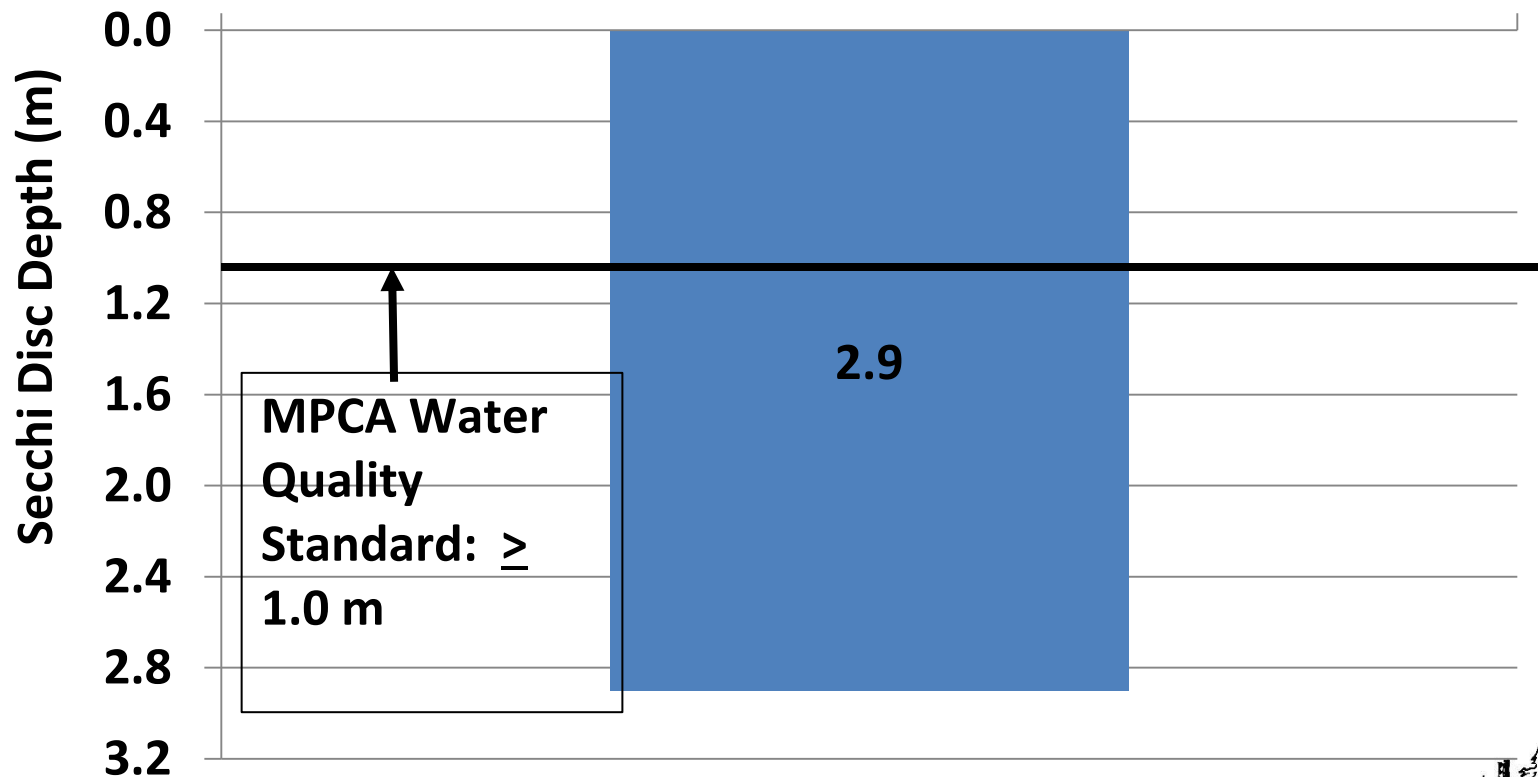
www.vbwd.org



Lake DeMontreville Water Quality

Lake DeMontreville 10-Year Average Summer Secchi
Disc Depth

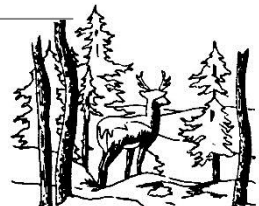
2007-2016



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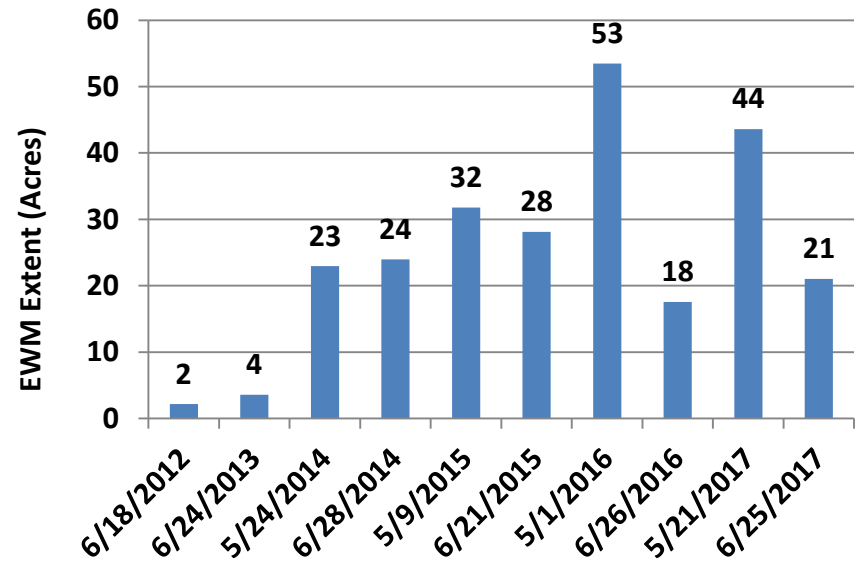
www.vbwd.org



Lake Olson EWM Management

- Treated 4.7 ac in 2014
- Treated 7.0 ac in 2015
- Treated 6.85 ac in 2016
- Treated 8.7 ac in 2017

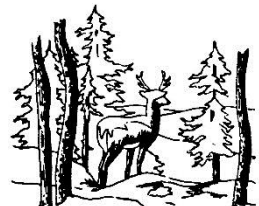
Potential presence of hybrid milfoil



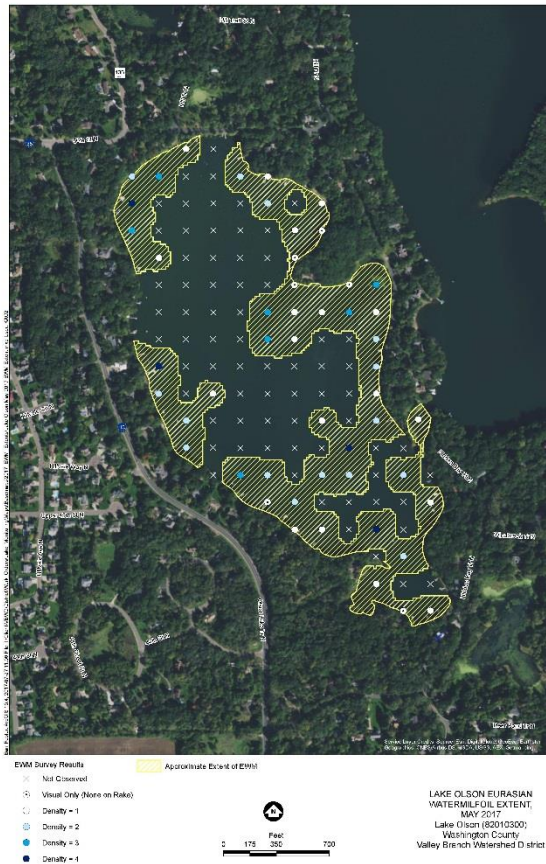
• JILL LUCAS • LINCOLN FETCHER • EDWARD MARCHAN • ANTHONY HAIDER • DAVE SEWELL

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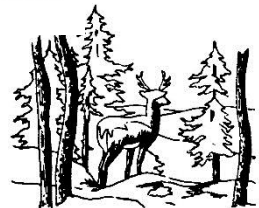
Lake Olson May and June 2017 EWM Extent



• JILL LUCAS • LINCOLN FETCHER • EDWARD MARCHAN • ANTHONY HAIDER • DAVE SEWELL

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Lake Olson 2017 Curly-leaf Pondweed

- 5% frequency of occurrence in June 2017
- Density was generally low (avg. of 1 on scale of 1 to 4)
- Was 28% in 2012 and 43% in 2013; declined to 3% in 2014 and has ranged from 1% to 5% since 2014.



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Other AIS in Lake Olson

Reed Canary Grass

- Only observed at 1 location and not problematic



Yellow Iris

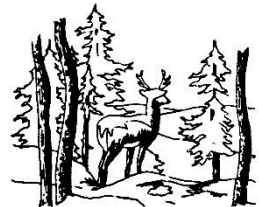
- Only observed at 1 location and not problematic



• JILL LUCAS • LINCOLN FETCHER • EDWARD MARCHAN • ANTHONY HAIDER • DAVE SEWELL

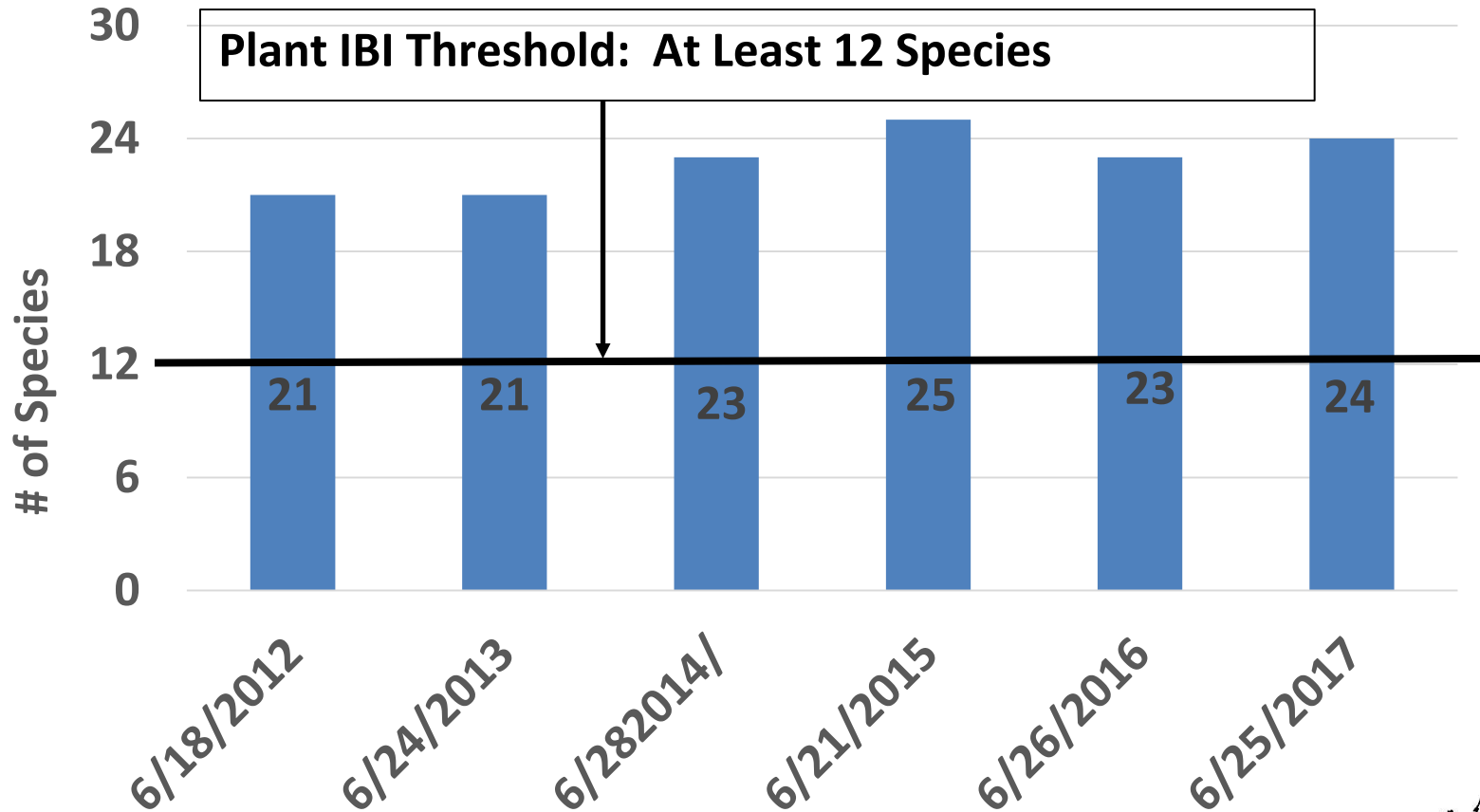
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Lake Olson Native Plants

Lake Olson Species Richness



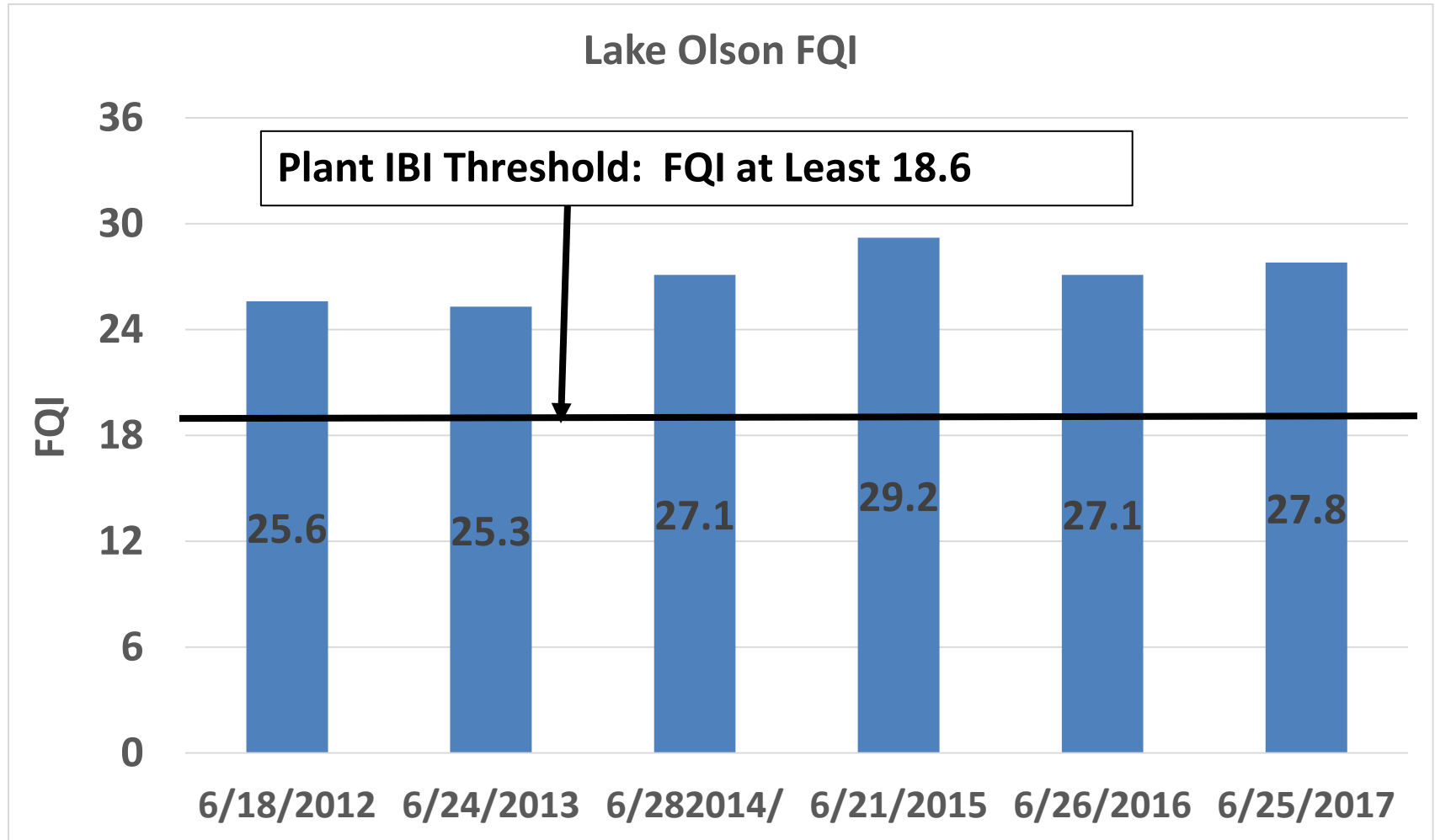
• JILL LUCAS • LINCOLN FETCHER • EDWARD MARCHAN • ANTHONY HAIDER • DAVE SEWELL

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Lake Olson Native Plants



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Significant Changes in Lake Olson Native Plants



• Illinois pondweed and
southern naiad
significantly increased



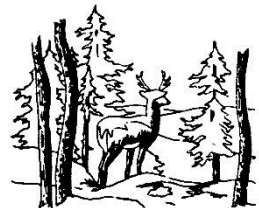
• Slender naiad
significantly decreased



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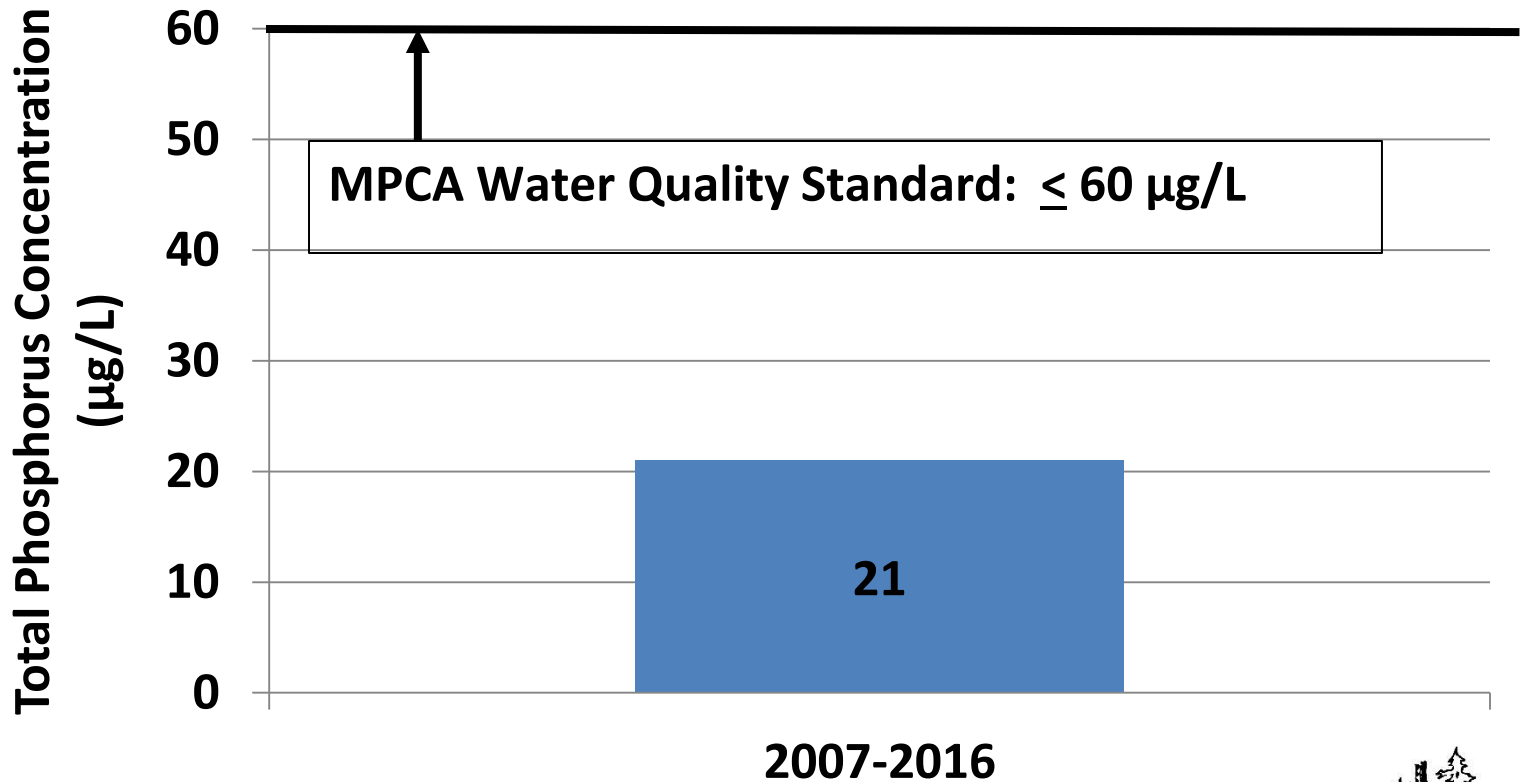
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Lake Olson Water Quality

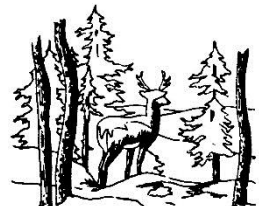
Lake Olson 10-Year Average Summer Total Phosphorus Concentration



• JILL LUCAS • LINCOLN FETCHER • EDWARD MARCHAN • ANTHONY HAIDER • DAVE SEWELL

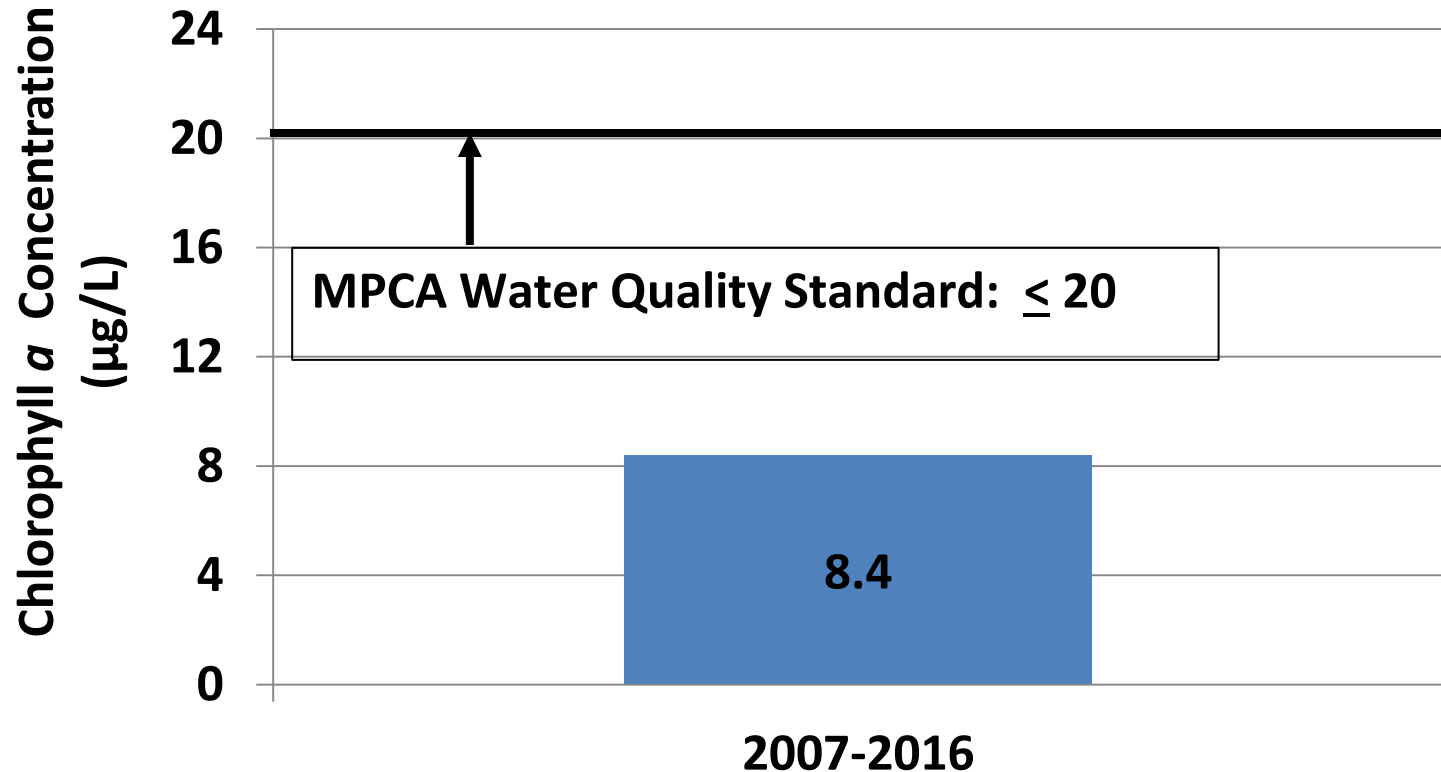
VALLEY BRANCH WATERSHED DISTRICT • P.O. BOX 838 • LAKE ELMO, MINNESOTA 55042-0538

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Lake Olson Water Quality

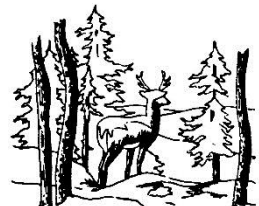
Lake Olson 10-Year Average Summer Chlorophyll *a* Concentration



• JILL LUCAS • LINCOLN FETCHER • EDWARD MARCHAN • ANTHONY HAIDER • DAVE SEWELL

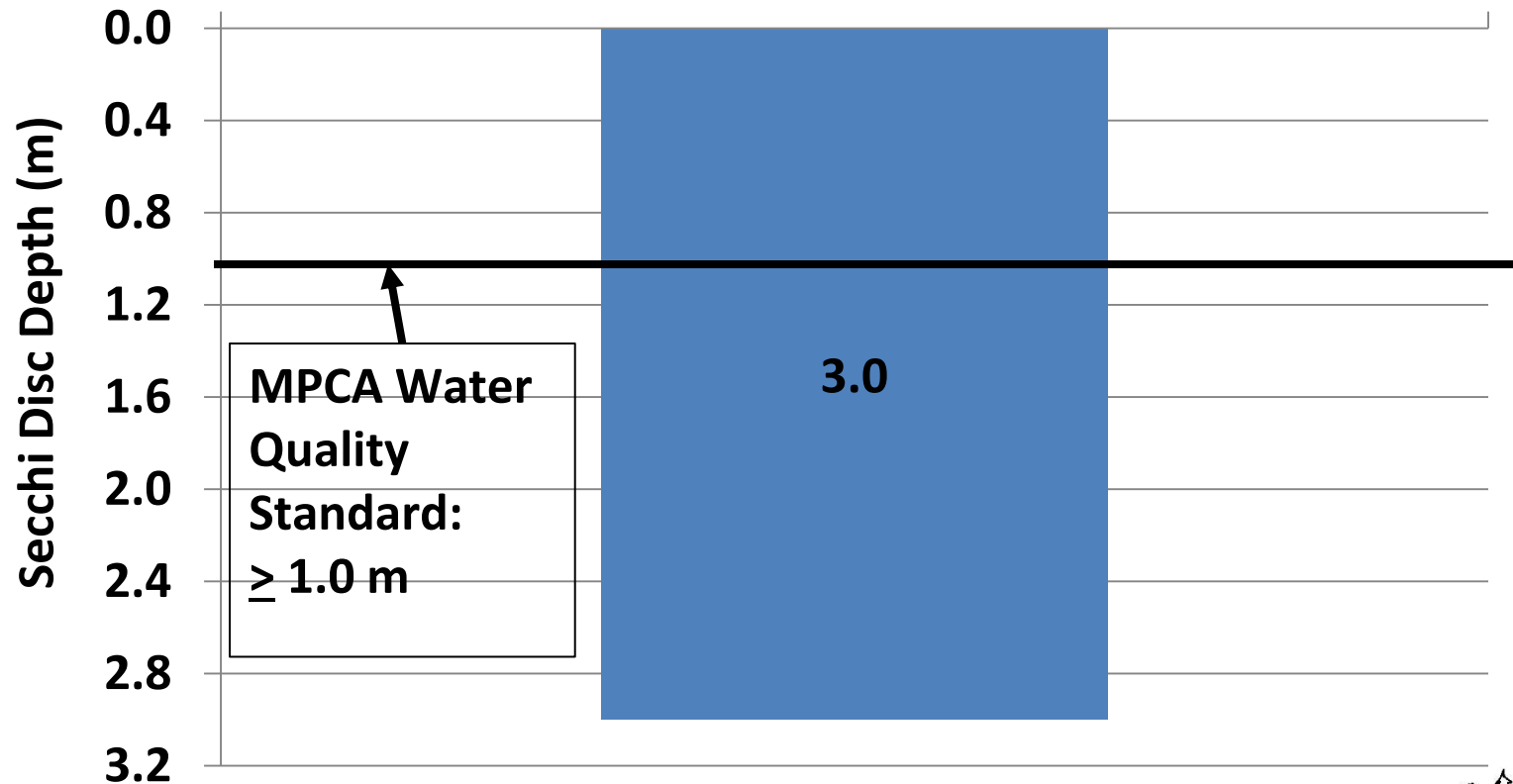
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Lake Olson Water Quality

Lake Olson 10-Year Average Summer Secchi Disc Depth
2007-2016



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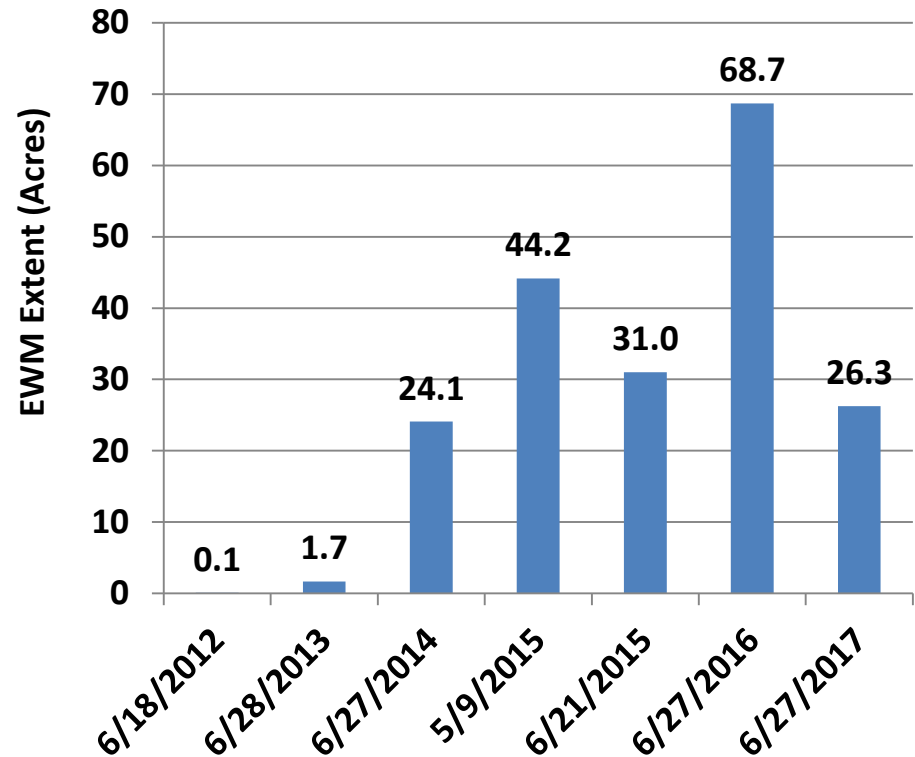
www.vbwd.org



Lake Jane EWM Management

- Treated 7.9 acres in 2015
- Treated 11.1 acres in June of 2017

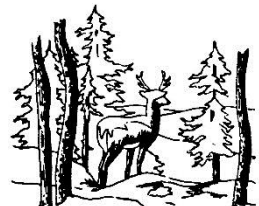
Potential presence of hybrid milfoil



• JILL LUCAS • LINCOLN FETCHER • EDWARD MARCHAN • ANTHONY HAIDER • DAVE SEWELL

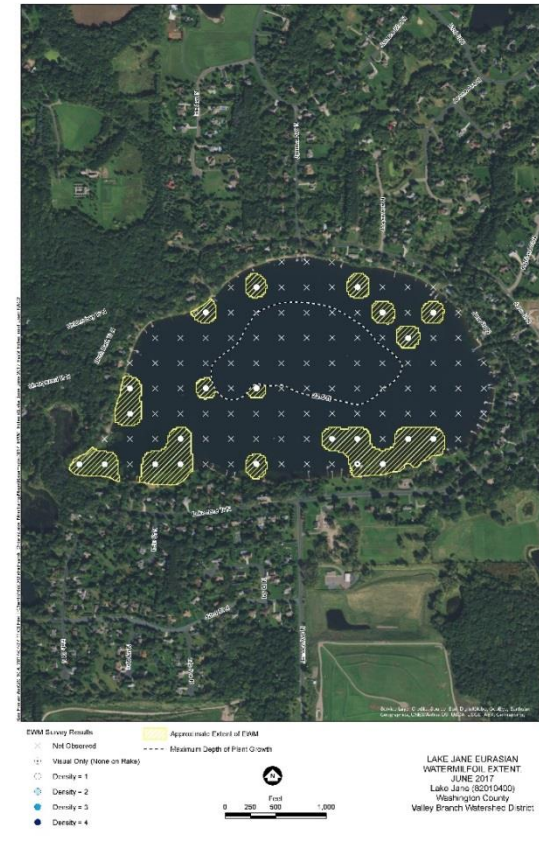
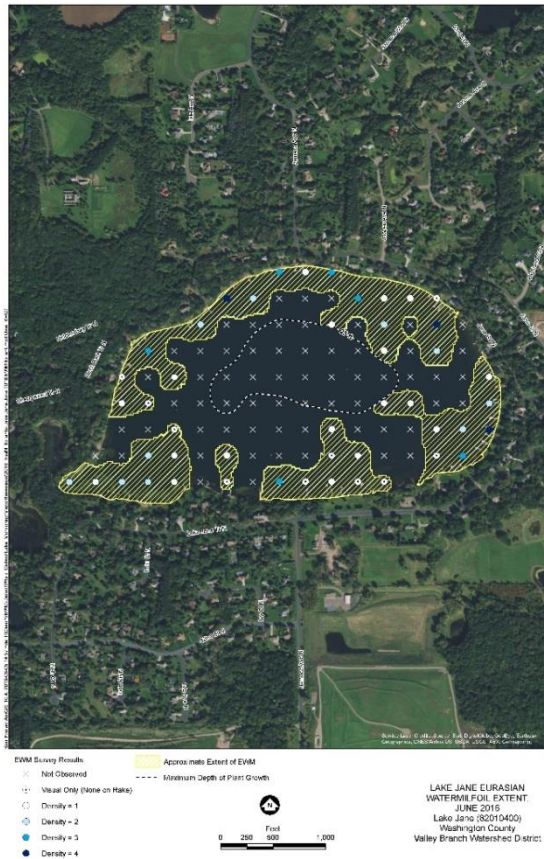
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Lake Jane June 2016 and June 2017

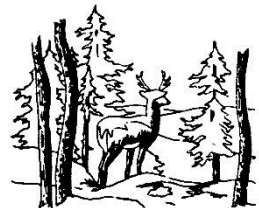
EWM Extent



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Lake Jane 2017 Curly-leaf Pondweed

- 17% frequency of occurrence in June 2017
- Density was generally low (avg. of 1 on scale of 1 to 4)
- Fluctuated annually during 2012-2017: declined from 16% in 2012 to 8% in 2014, increased to 11% in 2015, increased to 18% in 2016.



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Other AIS in Lake Jane

Reed Canary Grass

- Only observed at 1 location and not problematic



Purple Loosestrife

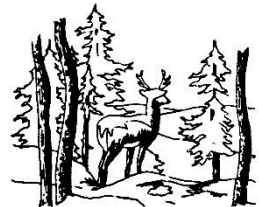
- Only observed at 1 location and not problematic



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Other AIS in Lake Jane

Narrow-leaved Cattail

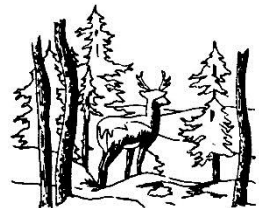
- Only observed at 1 location and not problematic



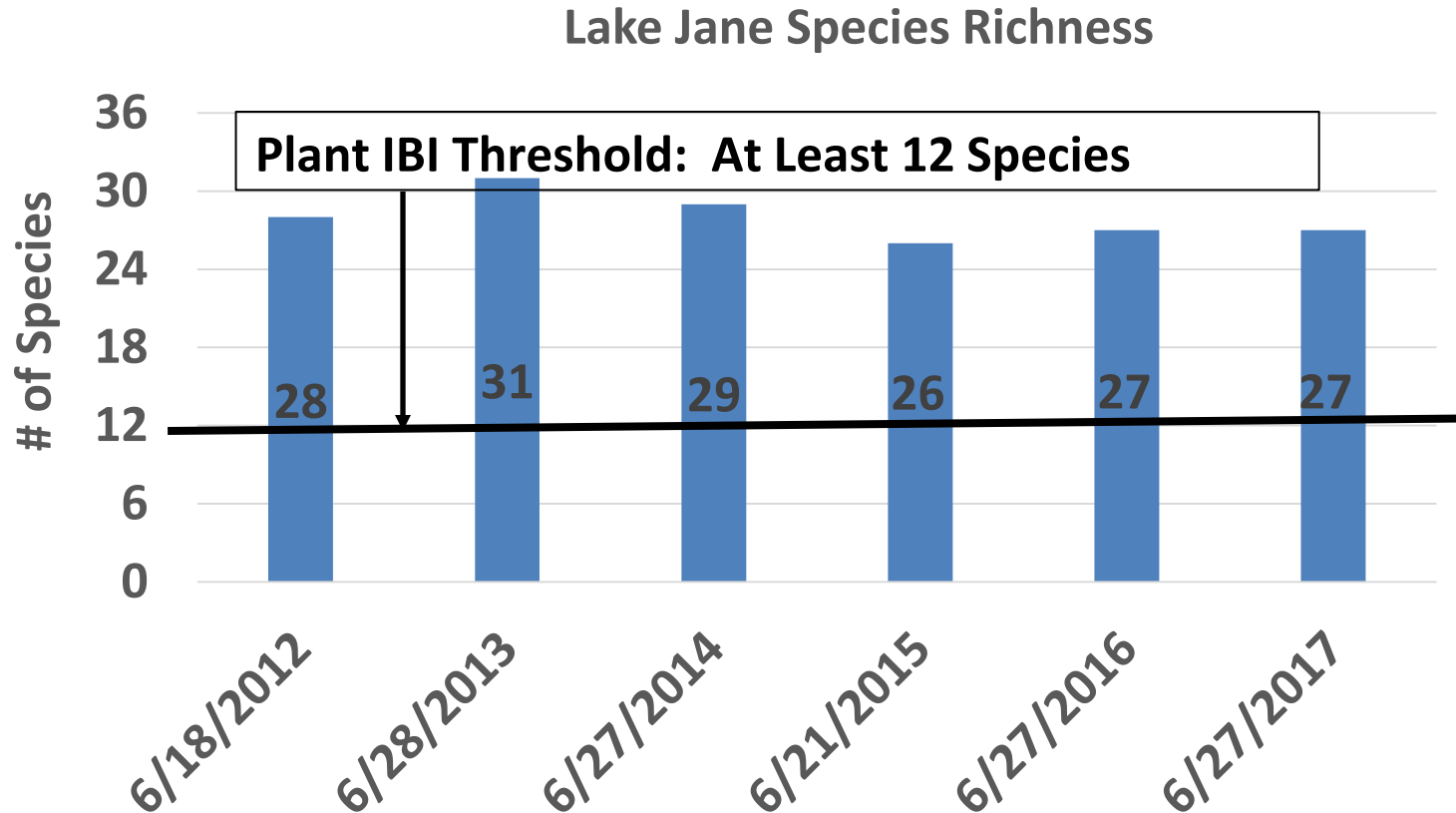
• JILL LUCAS • LINCOLN FETCHER • EDWARD MARCHAN • ANTHONY HAIDER • DAVE SEWELL

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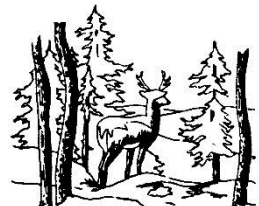
Lake Jane Native Plants



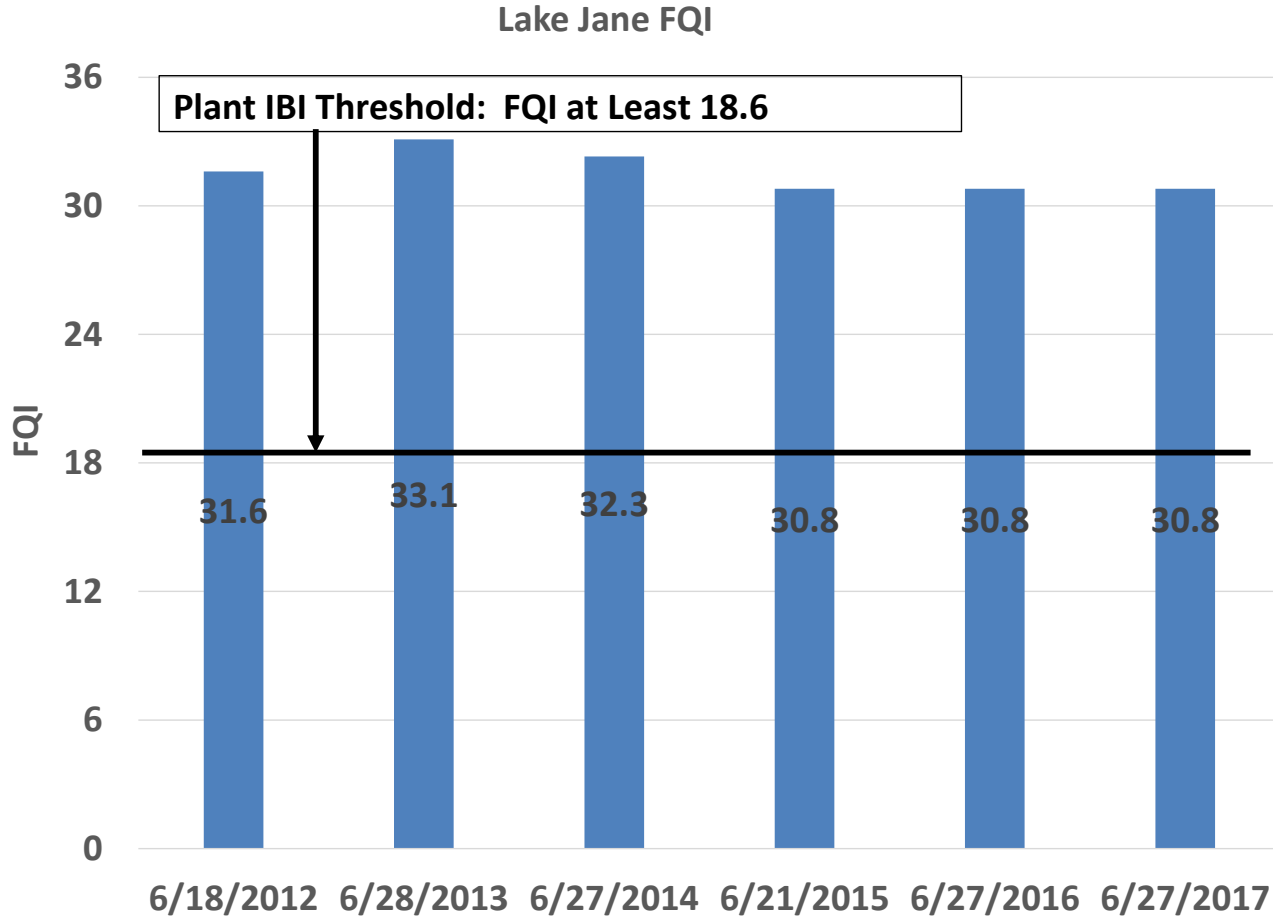
• JILL LUCAS • LINCOLN FETCHER • EDWARD MARCHAN • ANTHONY HAIDER • DAVE SEWELL

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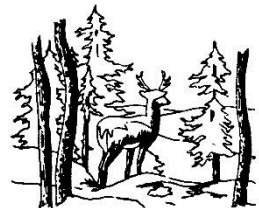
Lake Jane Native Plants



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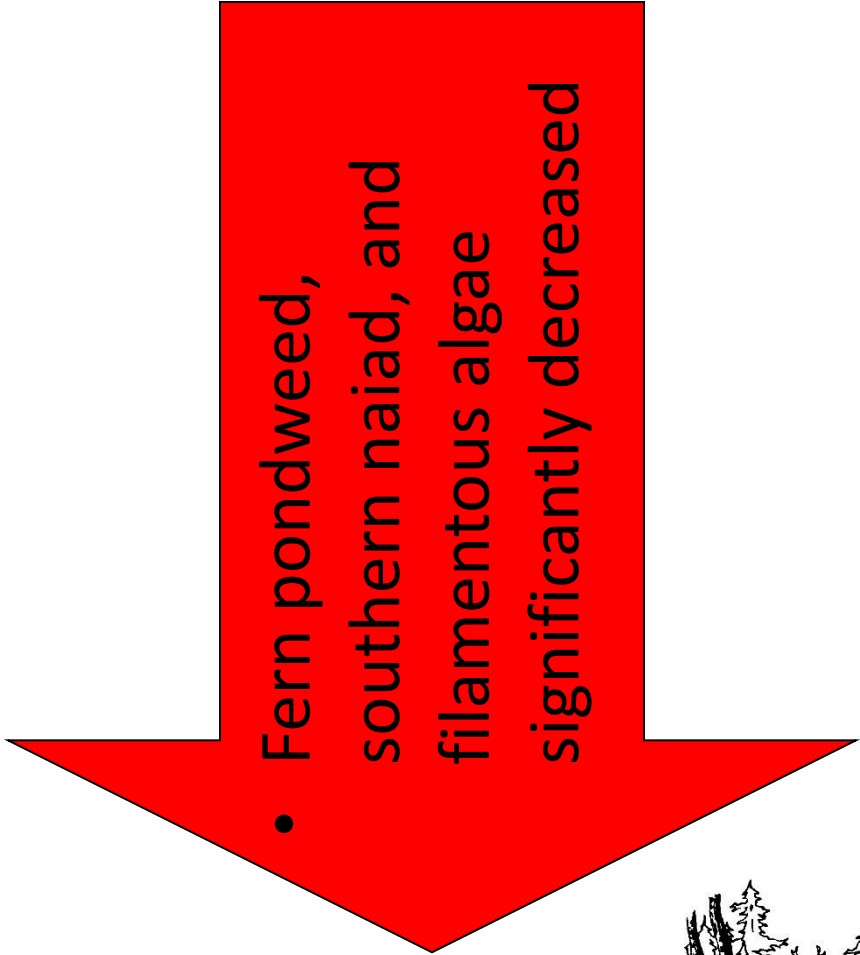
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Significant Changes in Lake Jane Plants



• Elodea significantly increased



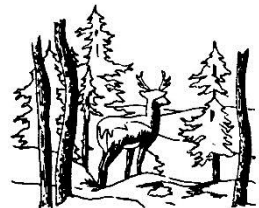
• Fern pondweed, southern naiad, and filamentous algae significantly decreased



• JILL LUCAS • LINCOLN FETCHER • EDWARD MARCHAN • ANTHONY HAIDER • DAVE SEWELL

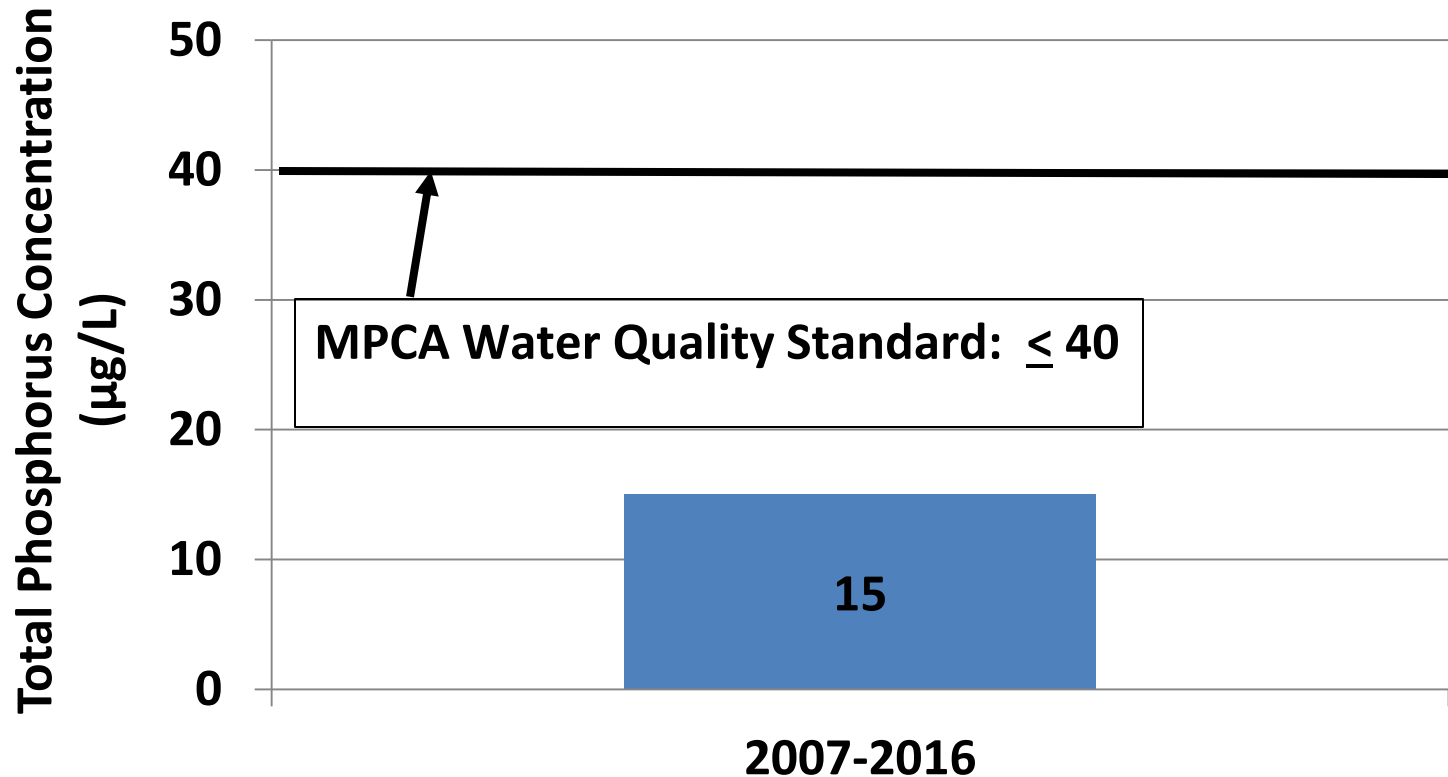
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Lake Jane Water Quality

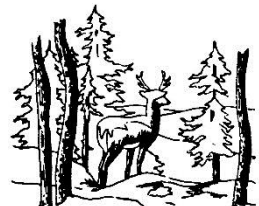
Lake Jane 10-Year Average Summer Total Phosphorus Concentration



• JILL LUCAS • LINCOLN FETCHER • EDWARD MARCHAN • ANTHONY HAIDER • DAVE SEWELL

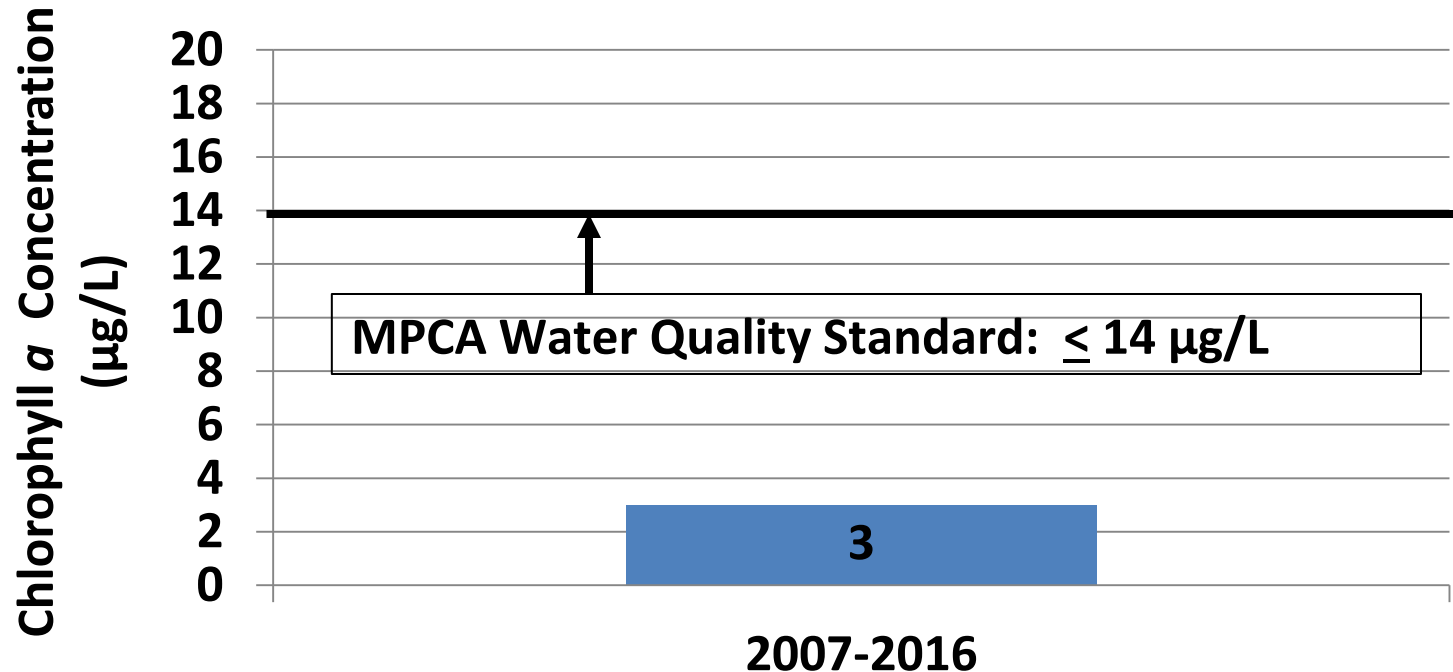
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Lake Jane Water Quality

Lake Jane 10-Year Average Summer Chlorophyll *a* Concentration



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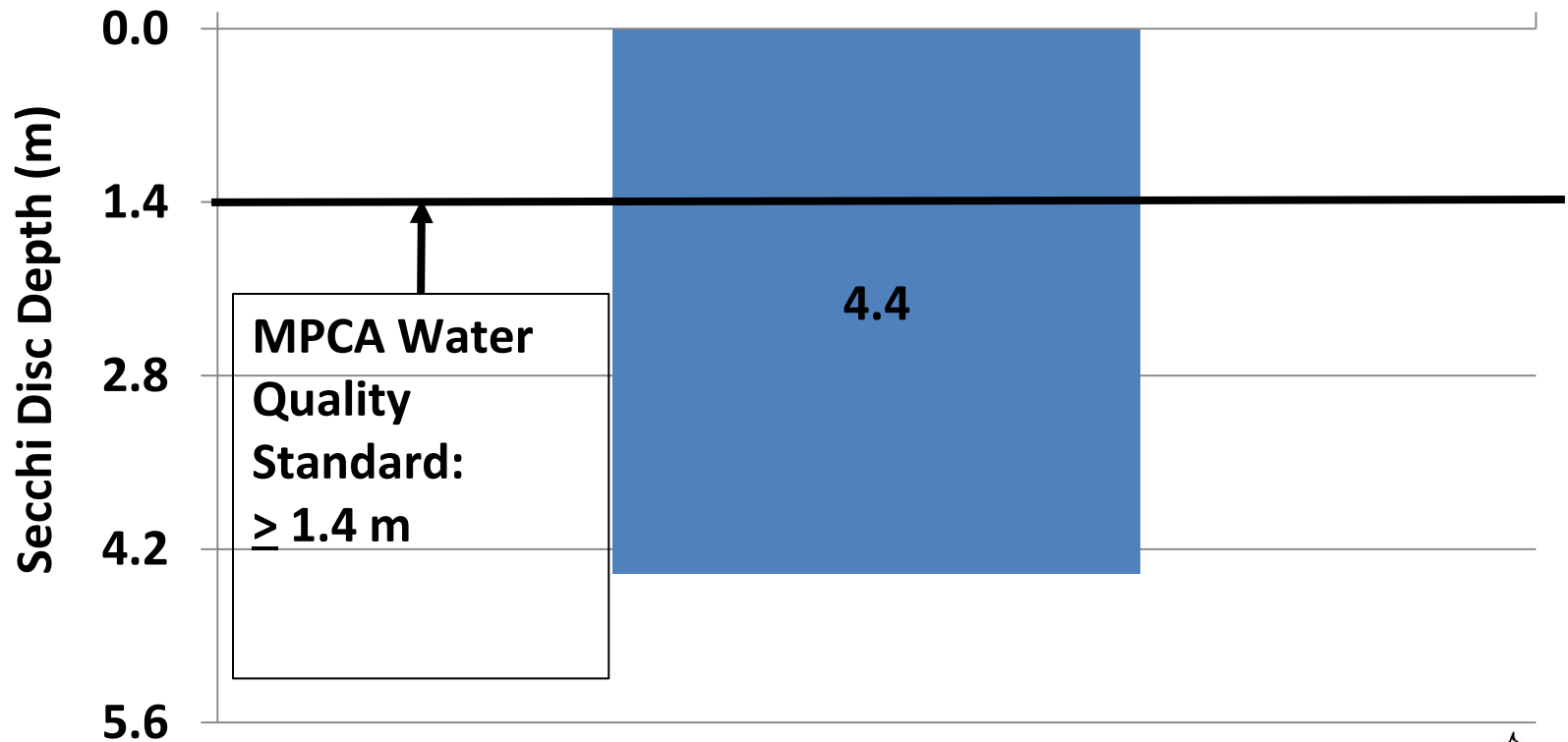
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Lake Jane Water Quality

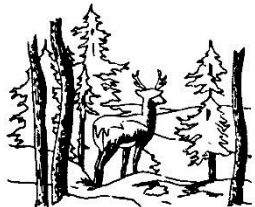
Lake Jane 10-Year Average Summer Secchi Disc Depth 2007-2016



• JILL LUCAS • LINCOLN FETCHER • EDWARD MARCHAN • ANTHONY HAIDER • DAVE SEWELL

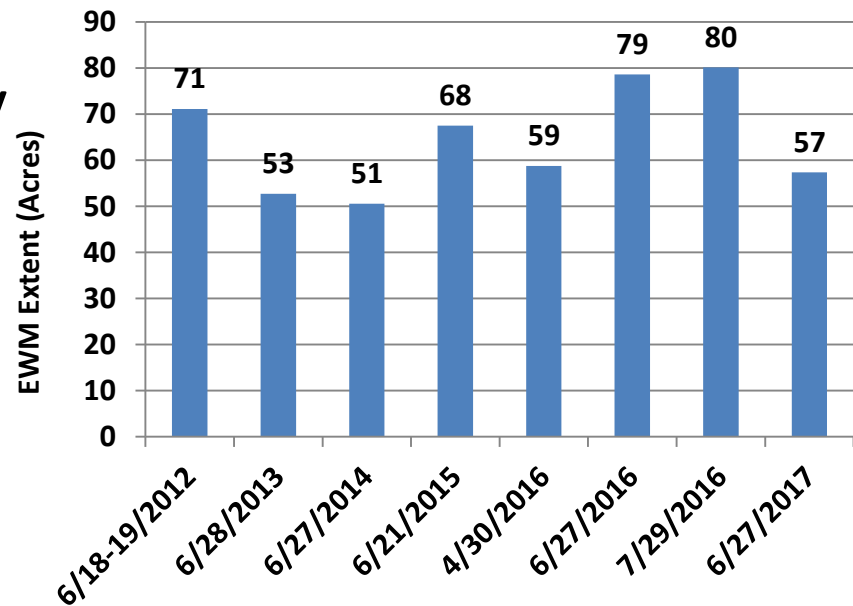
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Lake Elmo EWM Management

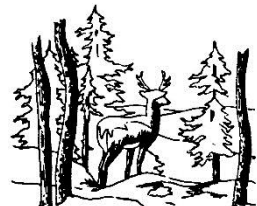
- Manual removal of less than an acre of EWM by divers in 2015
- Removal of 10 acres of EWM by mechanical harvesting in 2016
- Removal 4 acres in of EWM by mechanical harvesting in 2017.



• JILL LUCAS • LINCOLN FETCHER • EDWARD MARCHAN • ANTHONY HAIDER • DAVE SEWELL

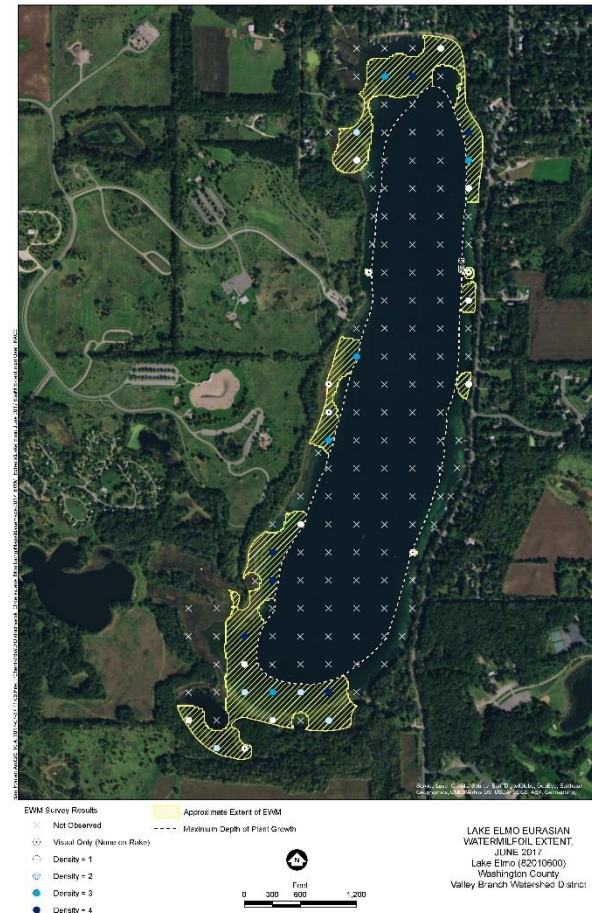
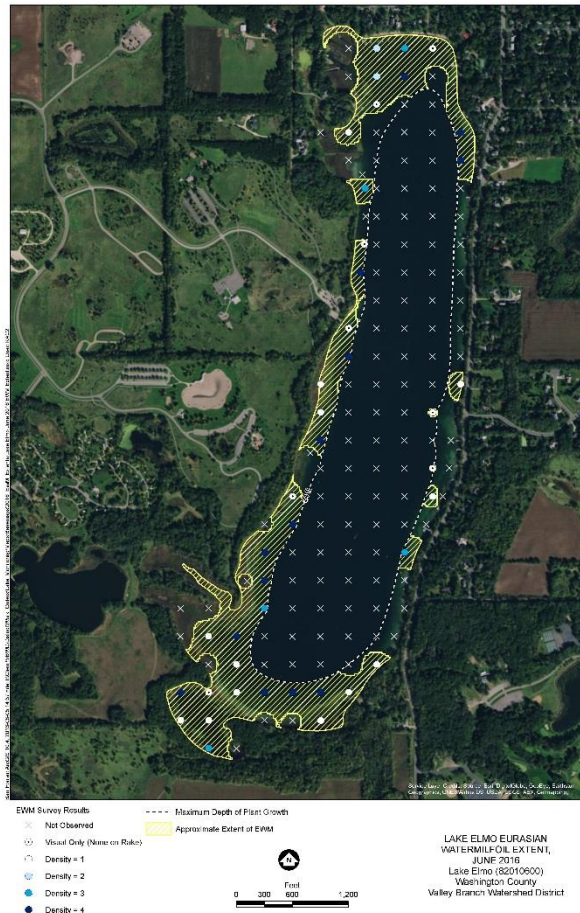
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Lake Elmo June 2016 and June 2017

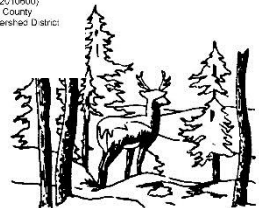
EWM Extent



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Lake Elmo 2017 Curly-leaf Pondweed

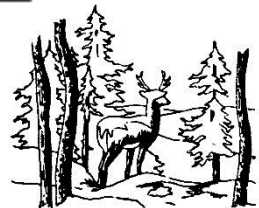
- 3% frequency of occurrence in June 2017
- Density was generally low (avg. of 1 on scale of 1 to 4)
- Low frequency 2012-2017 (ranging from 1-3%)



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Other AIS in Lake Elmo

Hybrid cattail

- Frequency of 1%



Narrow-leaved cattail

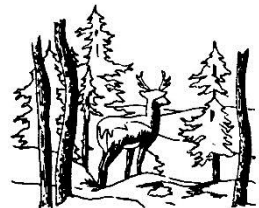
- Frequency of 13%



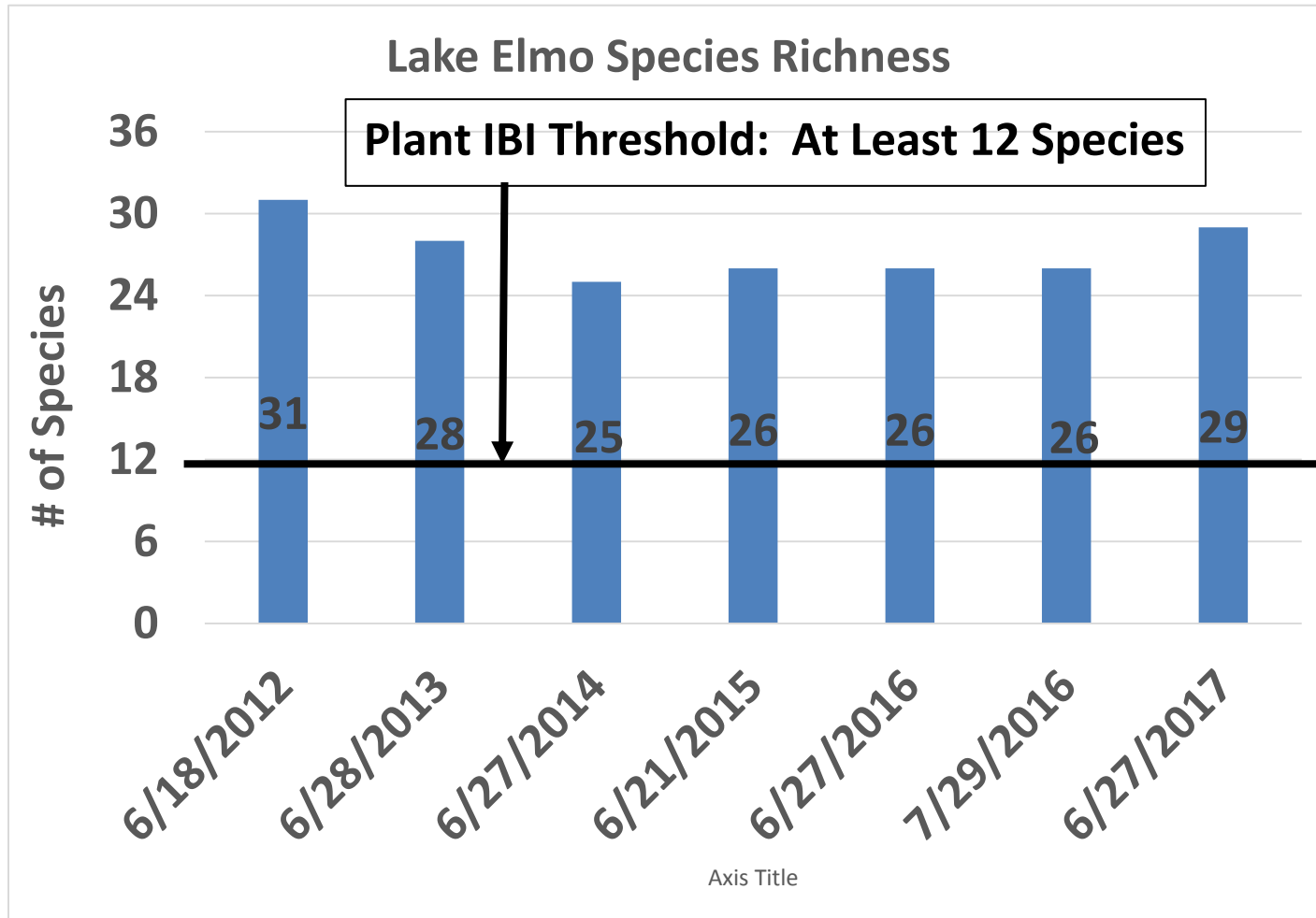
• JILL LUCAS • LINCOLN FETCHER • EDWARD MARCHAN • ANTHONY HAIDER • DAVE SEWELL

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Lake Elmo Native Plants



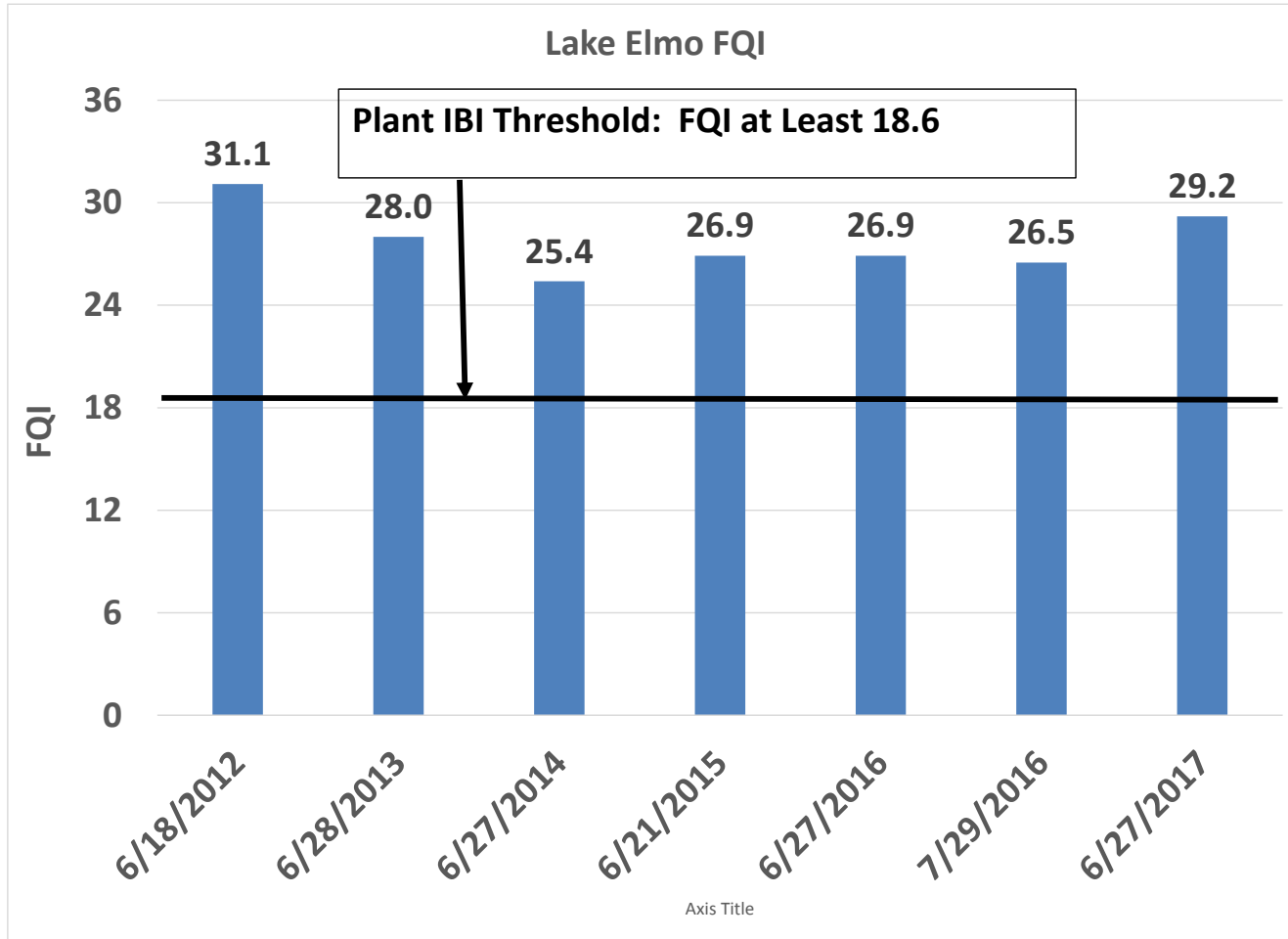
• JILL LUCAS • LINCOLN FETCHER • EDWARD MARCHAN • ANTHONY HAIDER • DAVE SEWELL

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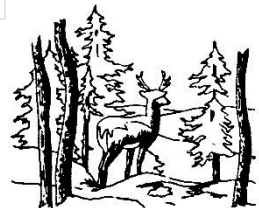
Lake Elmo Native Plants



• JILL LUCAS • LINCOLN FETCHER • EDWARD MARCHAN • ANTHONY HAIDER • DAVE SEWELL

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Significant Changes in Lake Elmo Native Plants

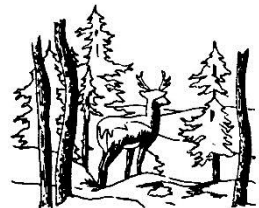
None



• JILL LUCAS • LINCOLN FETCHER • EDWARD MARCHAN • ANTHONY HAIDER • DAVE SEWELL

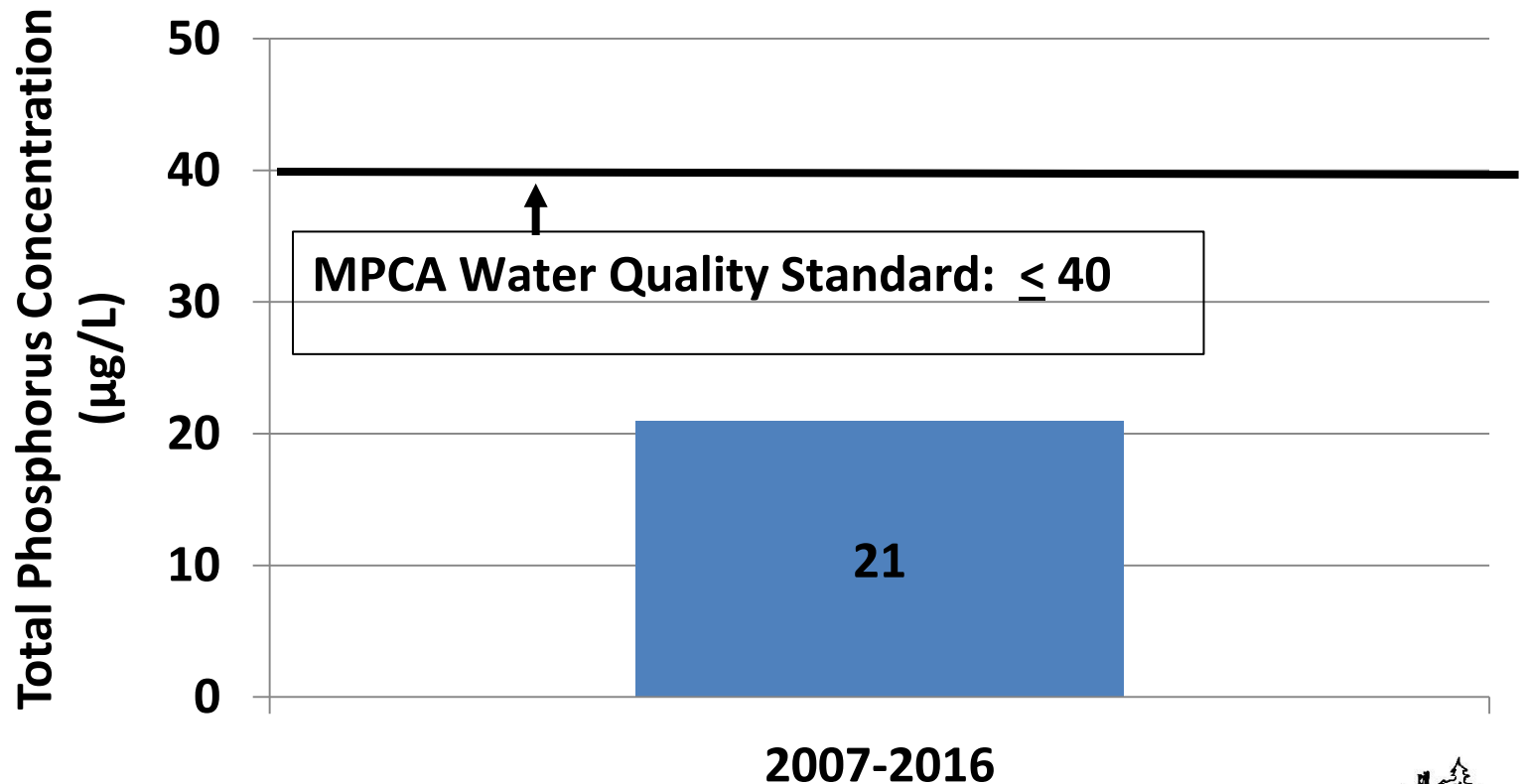
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Lake Elmo Water Quality

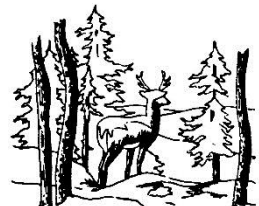
Lake Elmo 10-Year Average Summer Total Phosphorus Concentration



• JILL LUCAS • LINCOLN FETCHER • EDWARD MARCHAN • ANTHONY HAIDER • DAVE SEWELL

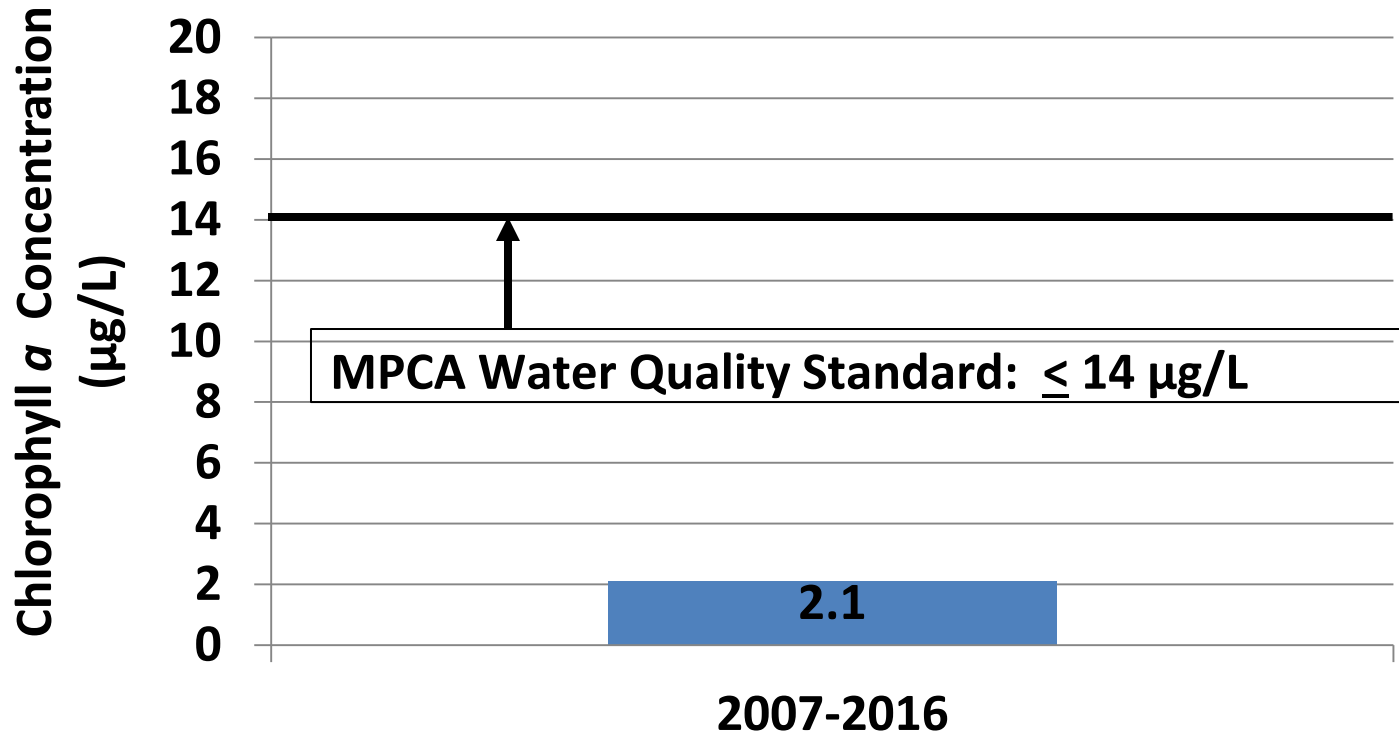
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Lake Elmo Water Quality

Lake Elmo 10-Year Average Summer Chlorophyll *a* Concentration



• JILL LUCAS • LINCOLN FETCHER • EDWARD MARCHAN • ANTHONY HAIDER • DAVE SEWELL

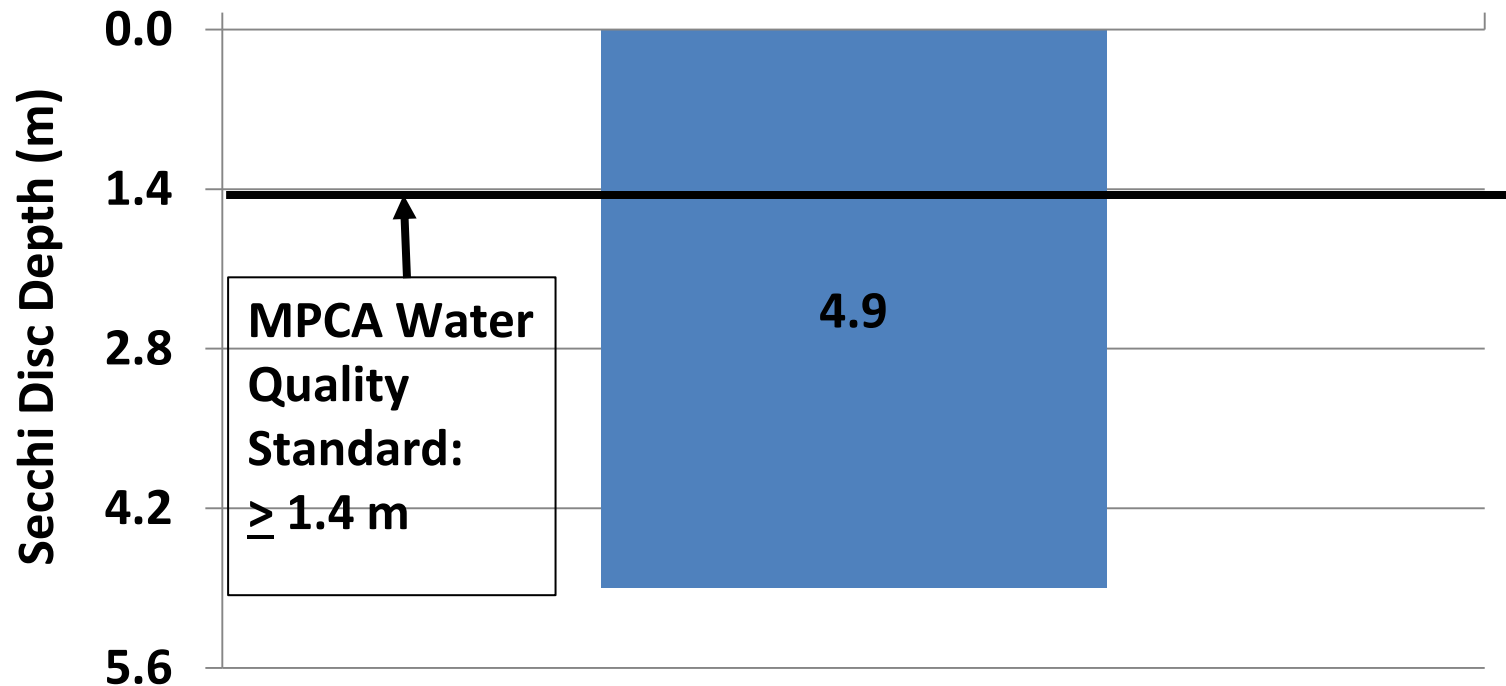
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Lake Elmo Water Quality

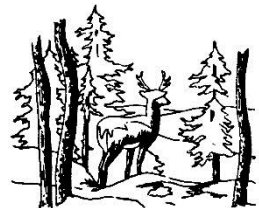
Lake Elmo 10-Year Average Summer Secchi Disc Depth 2007-2016



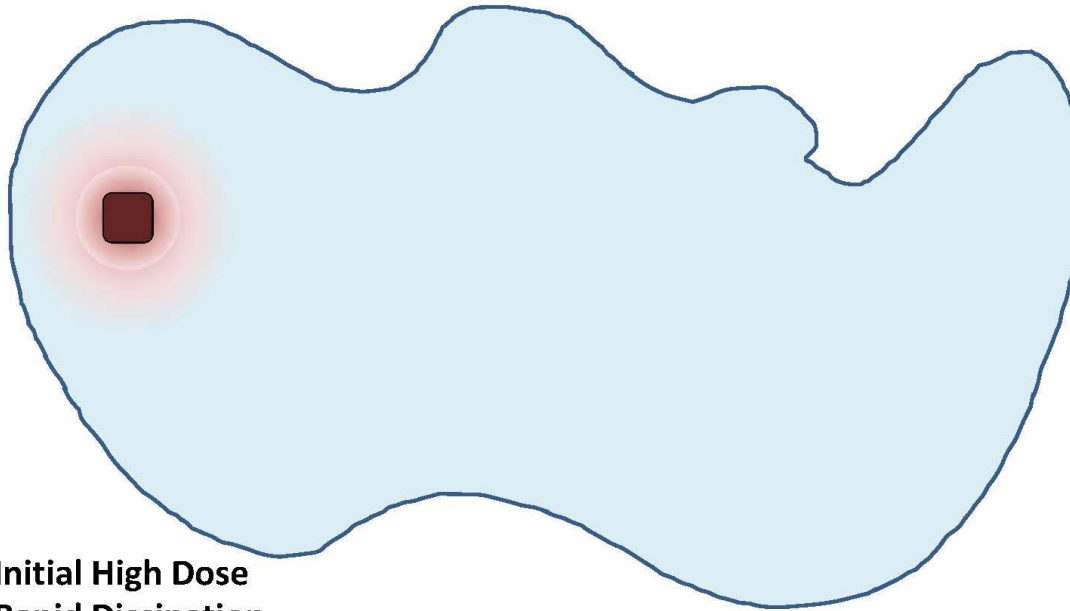
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Spot Treatment Use Pattern



Initial High Dose

Rapid Dissipation

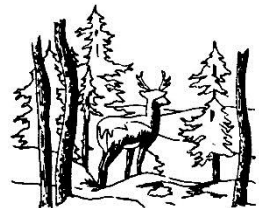
Herbicide concentrations too low outside of Treatment Area to cause impact



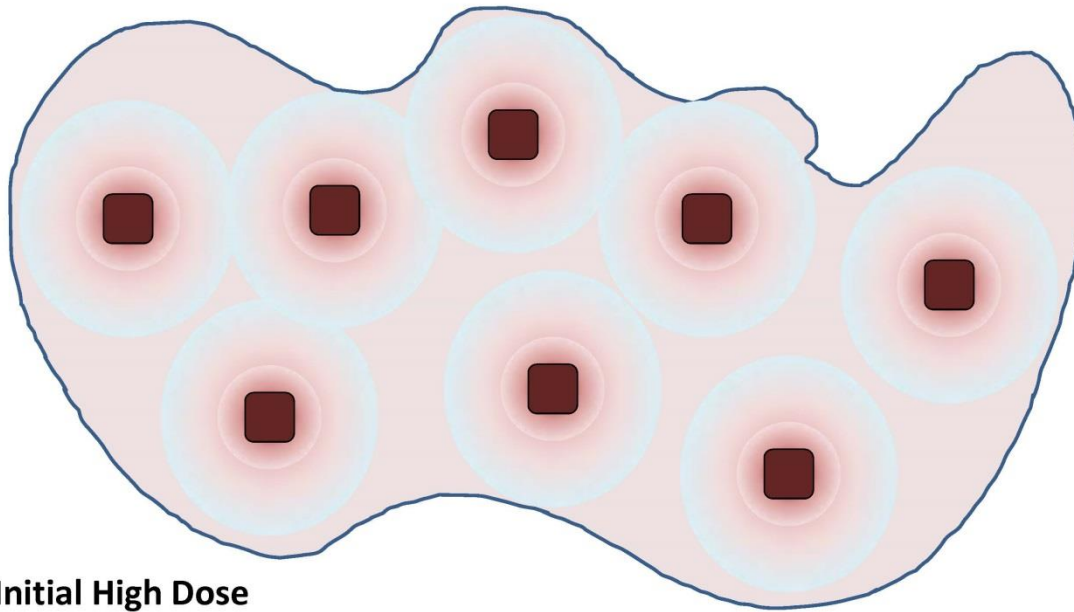
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Whole-lake Use Pattern



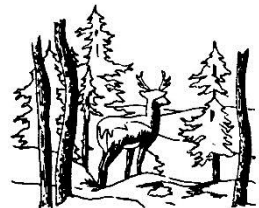
Initial High Dose
Rapid Dissipation
Low-dose lake-wide concentration significant to cause impact (control)



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Tri-Lakes Treatment Areas at Deep, Shallow, and Middle Depths Compared with Treatment Areas Allowed by MDNR

Lake	Treatment Scenario	Average Depth of Treatment Area (feet)	Treatment Area (acres)	Treatment Area Allowed by MDNR (15% of Littoral Area) (acres)
DeMontreville	Deep	13.43	10.53	21.39
	Middle Depth	9.73	14.70	
	Shallow	8.66	16.33	
Olson	Deep	15.60	4.60	13.11
	Middle Depth	11.00	6.64	
	Shallow	5.80	12.27	
Jane	Deep	17.00	7.81	16.46
	Middle Depth	10.00	13.31	
	Shallow	6.00	21.96	

Questions?

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