

APPENDIX A



Public Participation Materials

**North Lakeland Discovery Center
Town of Winchester**

Phase III
**Rock, North Turtle, & South Turtle Lakes
Management Planning Project**
Kick-off Meeting
May 20, 2017

Brenton Butterfield
Onterra LLC
Lake Management Planning



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Presentation Outline

- Onterra, LLC
- Why Create a Management Plan?
- Elements of this Lake Management Planning Project
 - Data & Information
 - AIS Education & Volunteer Involvement
 - Planning Process
- Project Phasing
- Project Deliverables



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Onterra, LLC

- Founded in 2005
- Staff
 - Three full-time & one part-time ecologist
 - Four field technicians
 - Four to five summer interns
- Services
 - Science and planning
- Philosophy
 - Promote realistic planning
 - Assist, not direct



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Why create a lake management plan?

- To create a better understanding of lake's positive and negative attributes.
- To discover ways to minimize the negative attributes and maximize the positive attributes.
- Snapshot of lake's current status or health.
- Foster realistic expectations and dispel any misconceptions.



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Elements of an Effective Lake Management Planning Project

Data and Information Gathering *Environmental & Sociological* **Planning Process** *Brings it all together*



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Data and information gathering

- Study Components
 - Water Quality Analysis
 - Watershed Assessment
 - Aquatic Plant Surveys
 - Fisheries Data Integration
 - Shoreline Assessment
 - Stakeholder Survey



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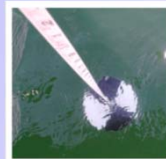
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Water Quality Analysis

↑ **Phosphorus**
Naturally occurring & essential for all life
Regulates phytoplankton biomass in most WI lakes
Most often 'limiting plant nutrient' (shortest supply)
Human development often increases P delivery to lakes

↑ **Chlorophyll-*a***
Pigment used in photosynthesis
Used as surrogate for phytoplankton biomass

↓ **Secchi Disk Transparency**
Measure of water clarity
Measured using a Secchi disk



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Watershed Assessment

- Delineation of drainage basins
- Modeling
 - Land cover
 - Phosphorus loading
 - Lakes are modeled in series
 - Scenario development

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Aquatic Plant Surveys

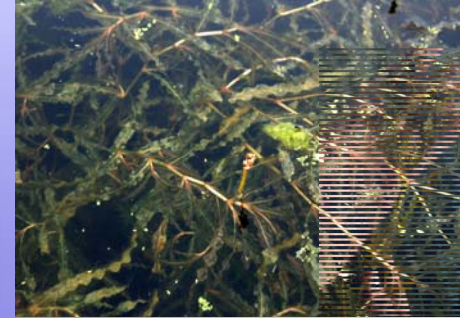
- Concerned with both native and non-native plants
- Multiple surveys used in assessment
 - Early-Season AIS Survey
 - Whole-lake point-intercept surveys
 - Bio-Acoustic Survey
 - Emergent/Floating-leaf Mapping Survey

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Non-native Aquatic Plants

Curly-leaf Pondweed



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Non-native Aquatic Plants

Eurasian Water Milfoil



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Non-native Aquatic Plants

Purple Loosestrife & Pale-yellow Iris



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Shoreland Assessment

- Shoreland area is important for buffering runoff and provides valuable habitat for aquatic and terrestrial wildlife.
- It does not look at lake shoreline on a property-by-property basis.
- Assessment ranks shoreland area from shoreline back 35 feet

Urbanized



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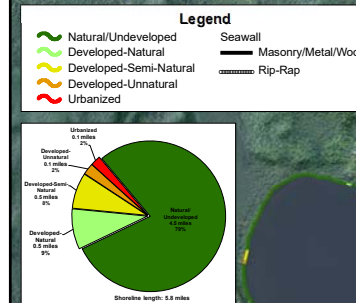


Natural



17

2015 Shoreland Condition



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Fisheries Data Integration

- No fish sampling completed
- Assemble data from WDNR, USGS, USFWS, & GLIFWC
- Fish survey results summaries (if available)
- Use information in planning as applicable

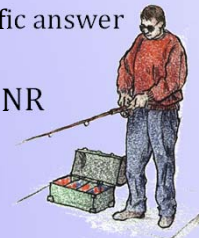


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Stakeholder Survey

- Standard survey used as base
 - Planning committee develops additional questions and options
 - Must not lead respondent to specific answer through a "loaded" question
- Survey must be approved by WDNR



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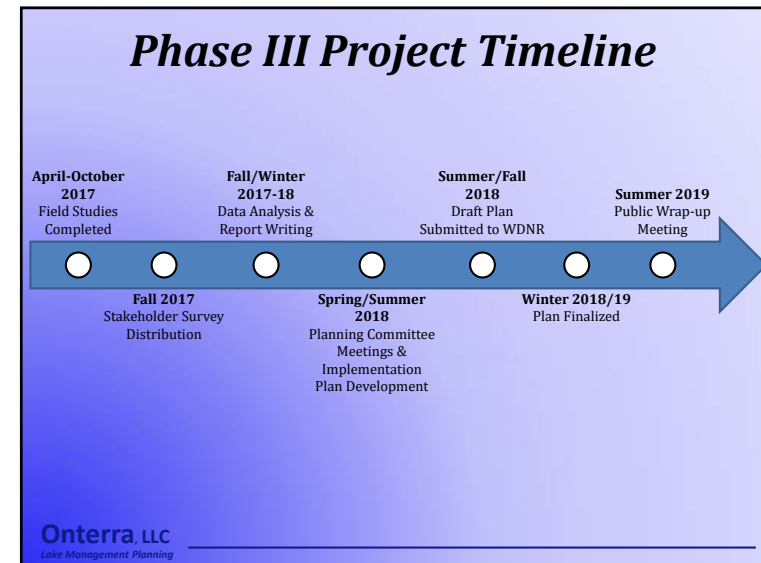
Town of Winchester Lake Management Plan Documents

- Multiple documents
- Town of Winchester Lake Management Plan
 - Town-wide Compilation
 - Lake-Specific Results and Conclusions
 - Lake-Specific Implementation Plan
 - Appendices (raw data, etc.)



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**North Lakeland Discovery Center
Town of Winchester**

Phase III
**Rock, North Turtle, & South Turtle Lakes
Management Planning Project**
Planning Meeting I
May 18, 2018

Brenton Butterfield
Onterra LLC
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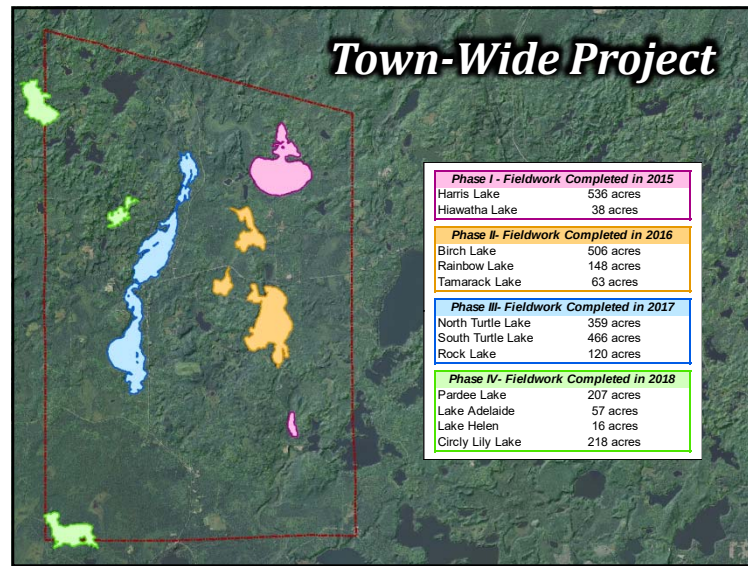
Presentation Outline

- Lake Management Planning Project Overview
- Study Results
 - Water Quality
 - Watershed
 - Shoreland Condition
 - Aquatic Plants
 - Fishery
- “Big Picture”
- Implementation Plan Development

} *Stakeholder Survey*



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Management Planning Project Overview

- Collect & analyze data – completed
 - Technical & sociological
- Construct long-term & useable plan



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Summary of Project Results

Water Quality

- Good to excellent for respective lake type, but...
- Increasing trend in phosphorus concentration in South Turtle Lake

Watershed & Immediate Shoreline

- Watersheds in excellent shape – primarily forests & wetlands
- Majority of shoreland contains little to no development, but always room for improvement

Aquatic Plant Community

- High-quality native species present
- One non-native species: Pale-yellow iris (*Iris pseudacorus*)

Fisheries

- Some survey/stocking data available
- Tribal spear-harvest records for North & South Turtle Lakes

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Introduction to Lake Water Quality



Phosphorus

Naturally occurring & essential for all life
Regulates phytoplankton biomass in most WI lakes
Most often 'limiting plant nutrient' (shortest supply)
Human development often increases P delivery to lakes



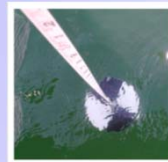
Chlorophyll-*a*

Pigment used in photosynthesis
Used as surrogate for phytoplankton biomass



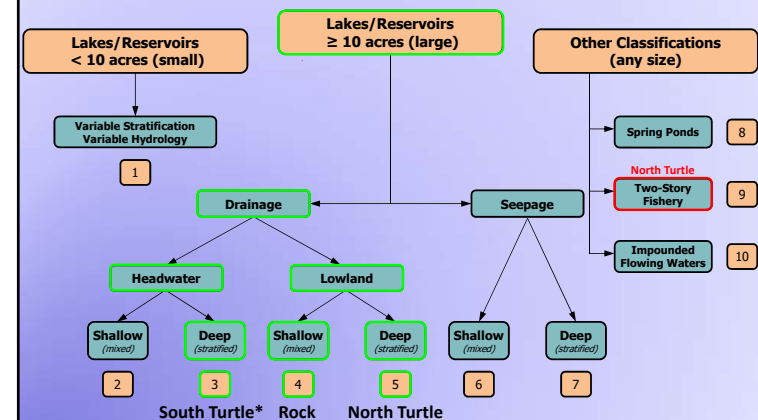
Secchi Disk Transparency

Measure of water clarity
Measured using a Secchi disk

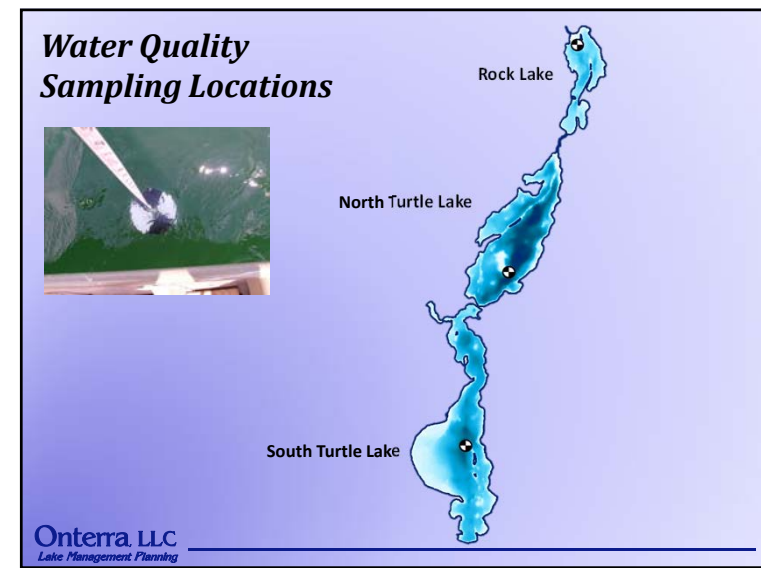
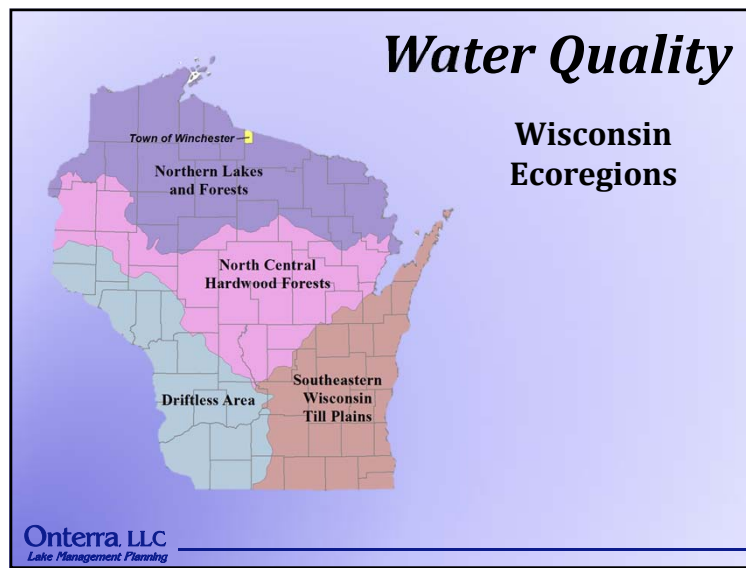
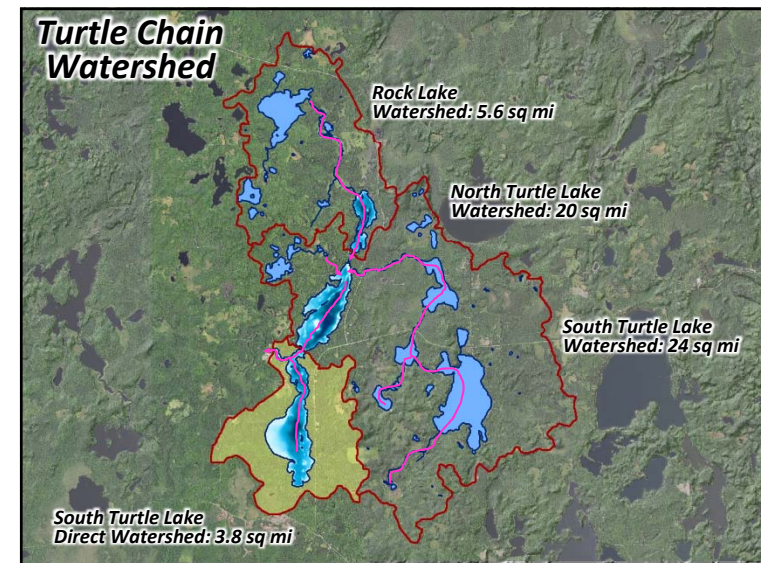
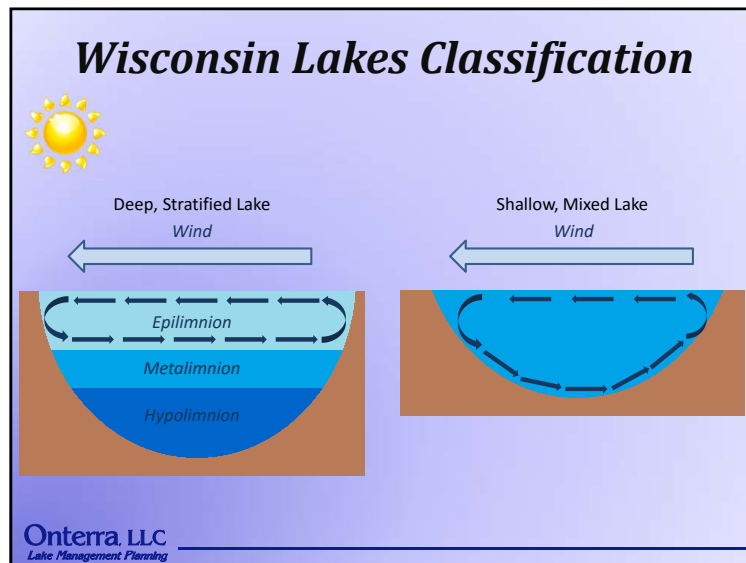


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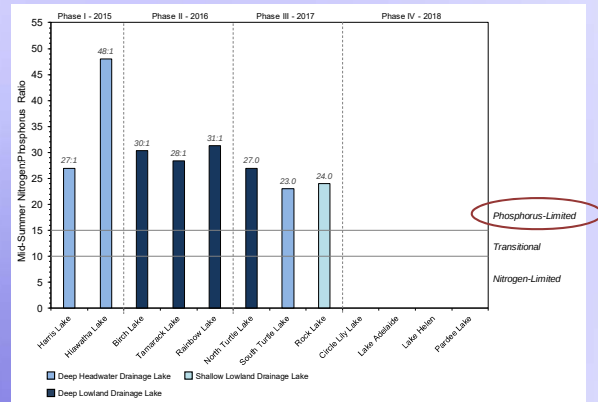
Wisconsin Lakes Natural Community Types



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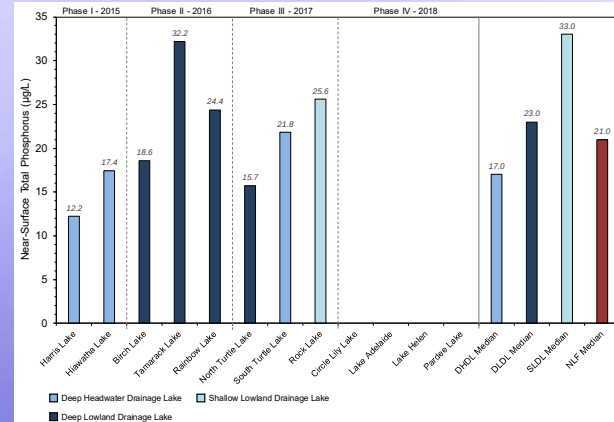


Town of Winchester Lakes Mid-Summer Nitrogen:Phosphorus Ratios



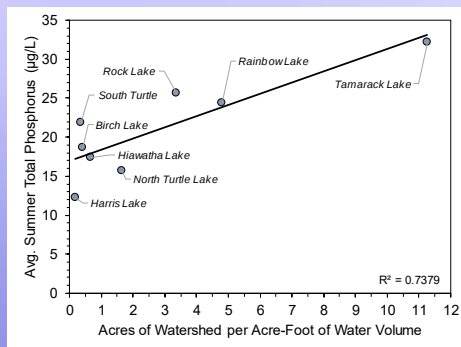
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Town of Winchester Lakes Near-Surface Summer Total Phosphorus



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Town of Winchester Lakes Near-Surface Summer Total Phosphorus



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Rock Lake Total Phosphorus

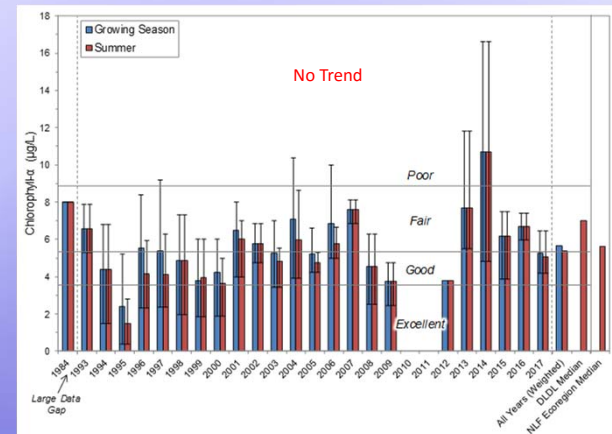


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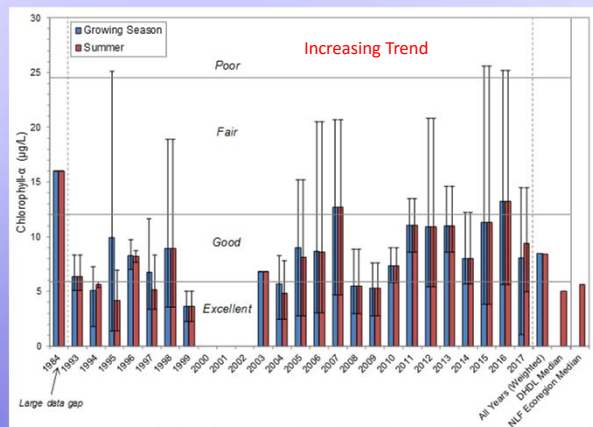


Rock Lake Chlorophyll- α 

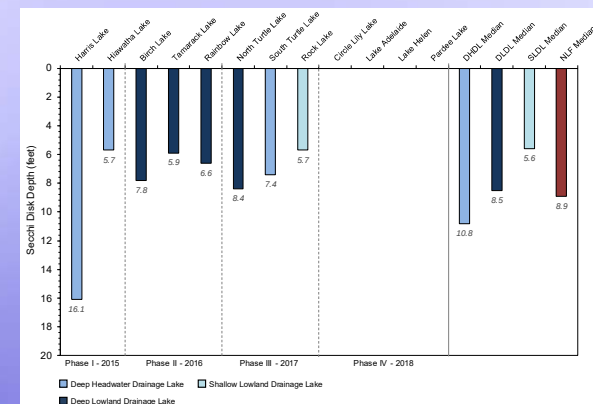
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North Turtle Lake Chlorophyll- α 

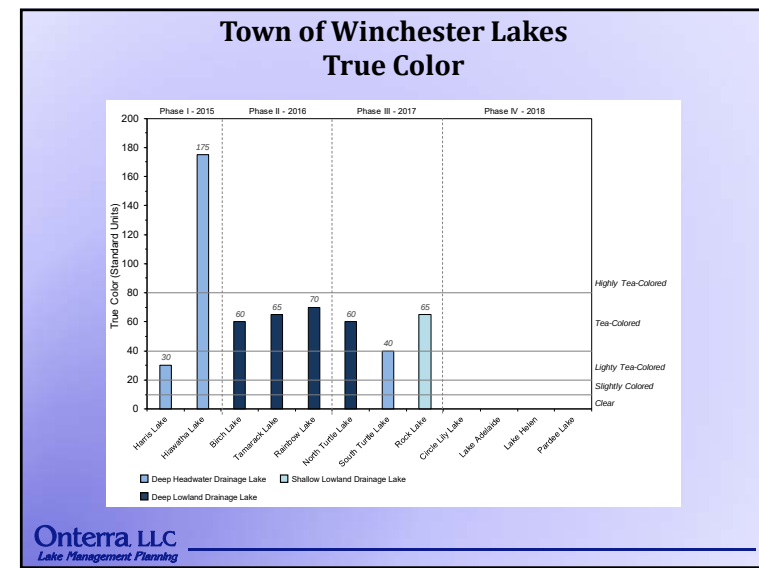
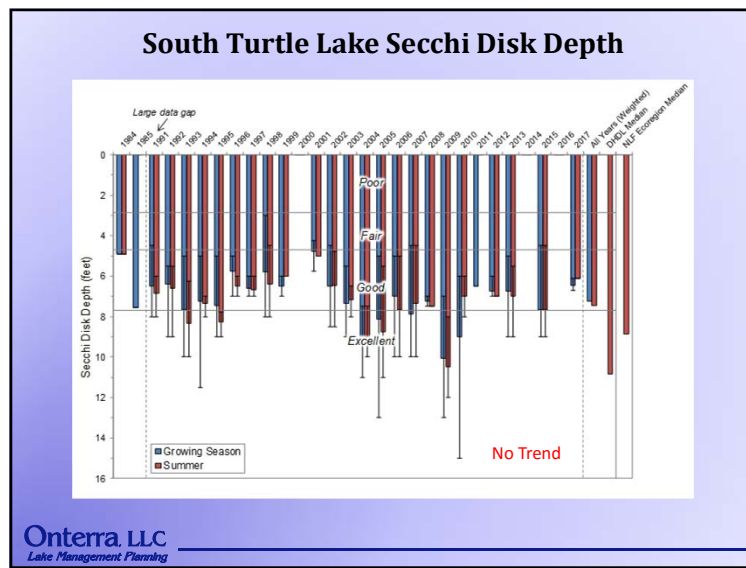
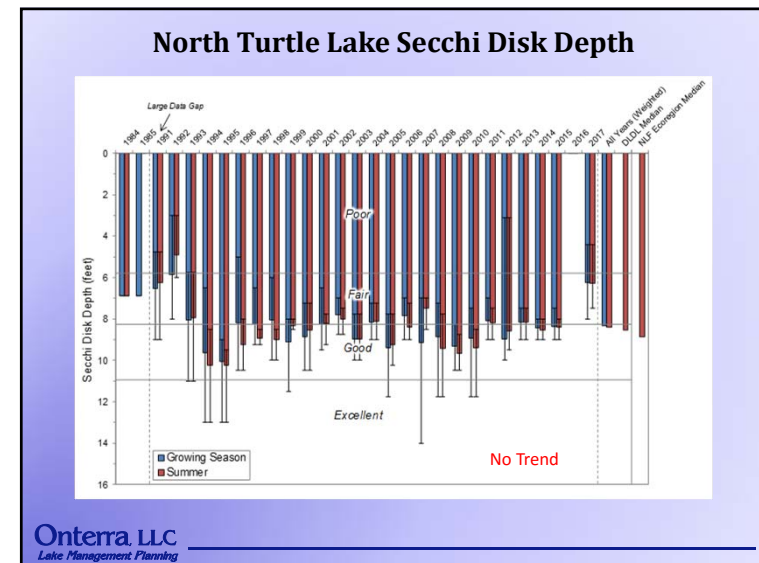
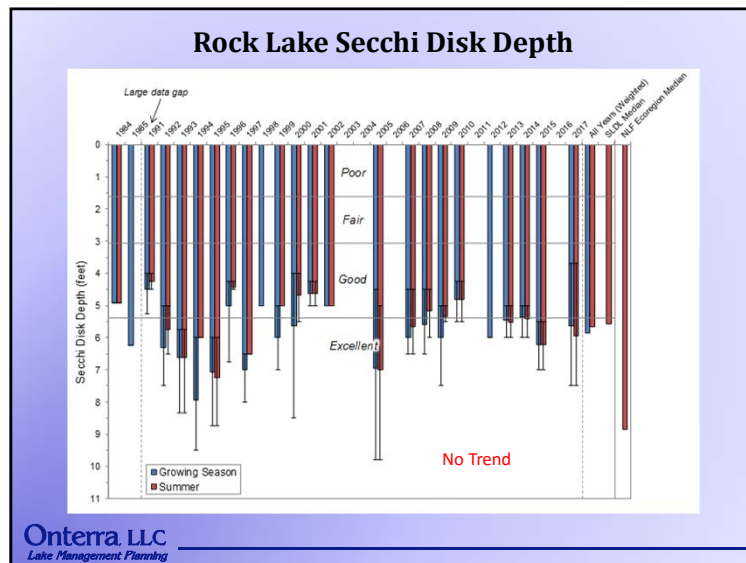
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South Turtle Lake Chlorophyll- α 

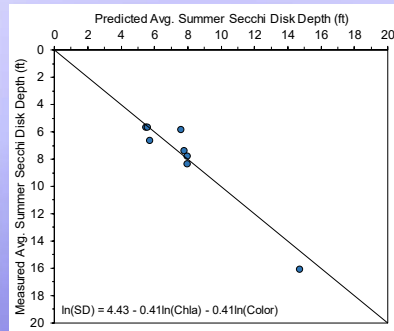
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Town of Winchester Lakes
Secchi Disk Transparency

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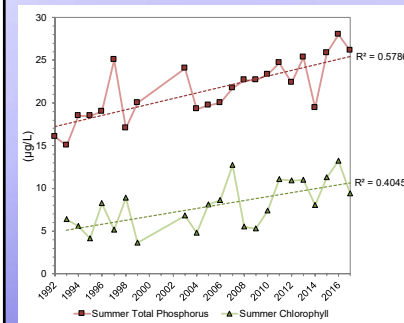
Town of Winchester Lakes True Color & Chlorophyll



True Color & Chlorophyll explain 87% of variation in water clarity between the lakes

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South Turtle Lake Water Quality Trends

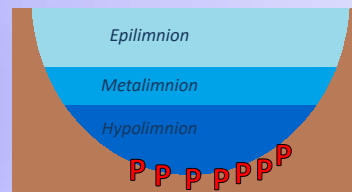


- Why is phosphorus increasing?
- Trend not observed in other lakes.
- Not correlated with precipitation.
- No apparent land-use changes within the watershed.
- Data indicate internal nutrient loading may be the cause.

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Internal Nutrient Loading

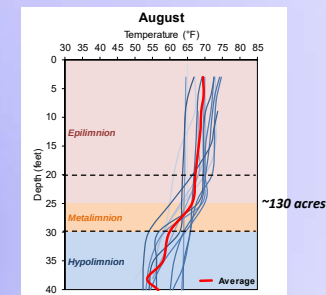
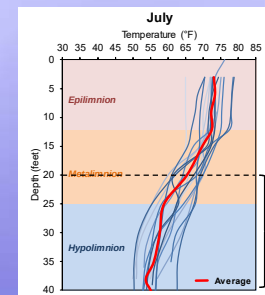
- In general, net movement of phosphorus to the sediment in lakes.
- Under certain conditions, phosphorus (and other nutrients) get released from bottom sediments into the overlying water.
- Anoxic (devoid of oxygen) conditions cause phosphorus release.
- Becomes problematic if phosphorus is mobilized to surface in summer (polymictic lakes).
- South Turtle: Phosphorus mobilized through entrainment.



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South Turtle Lake: Entrainment

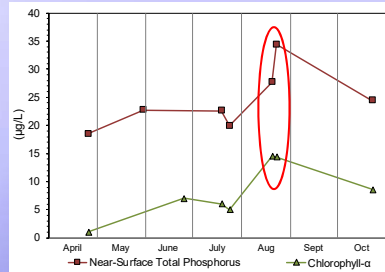
- **Entrainment:** Continual deepening of the epilimnion and erosion of the metalimnion and hypolimnion
- Acts as a nutrient pump, delivering sediment-released nutrients to the surface.



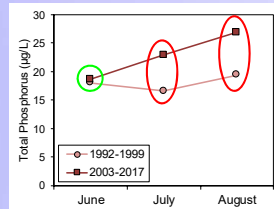
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South Turtle Lake: Entrainment

2017 Phosphorus & Chlorophyll



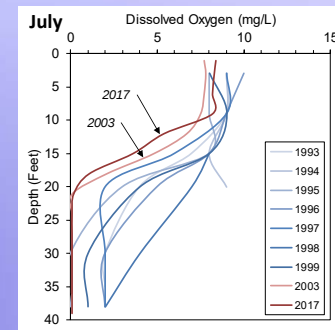
Avg. Summer Phosphorus



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Internal Nutrient Loading

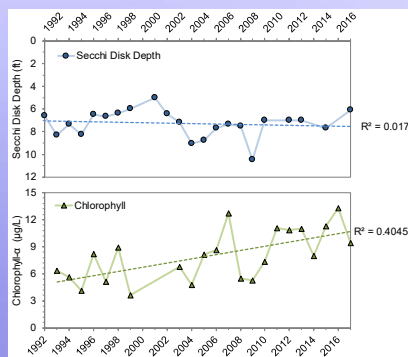
- Dissolved oxygen profiles indicate increase in productivity



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Internal Nutrient Loading

- No trend in water clarity

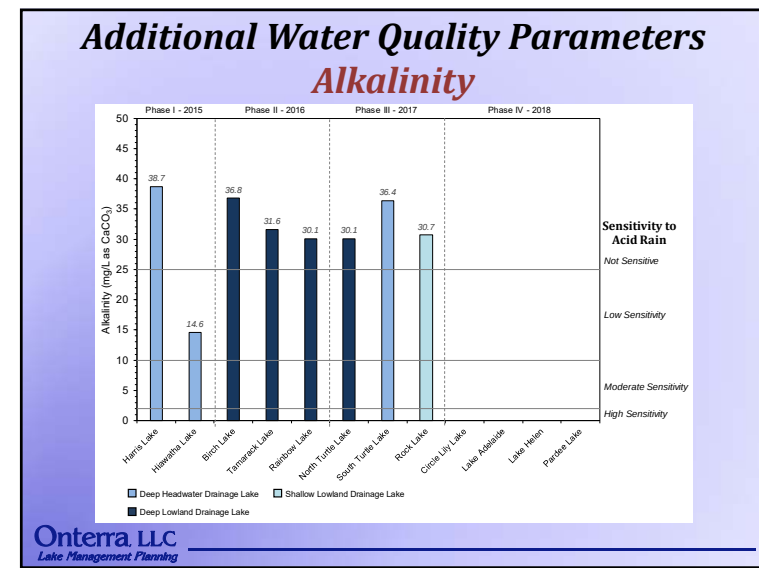
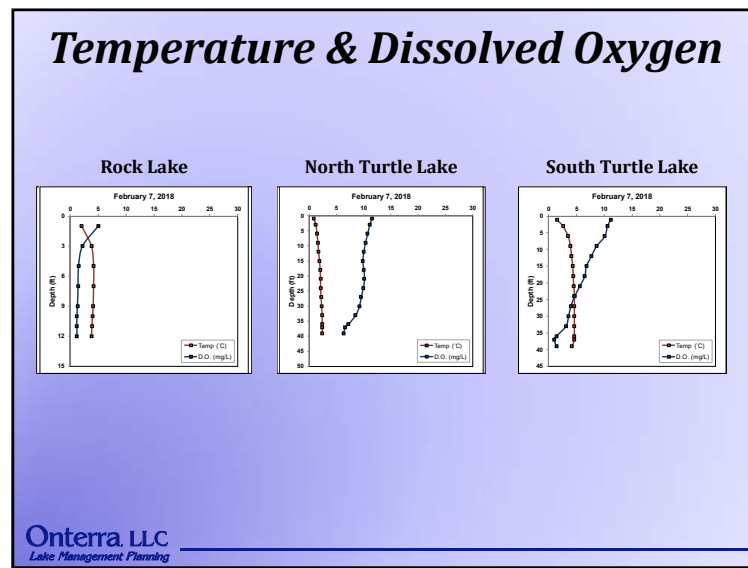
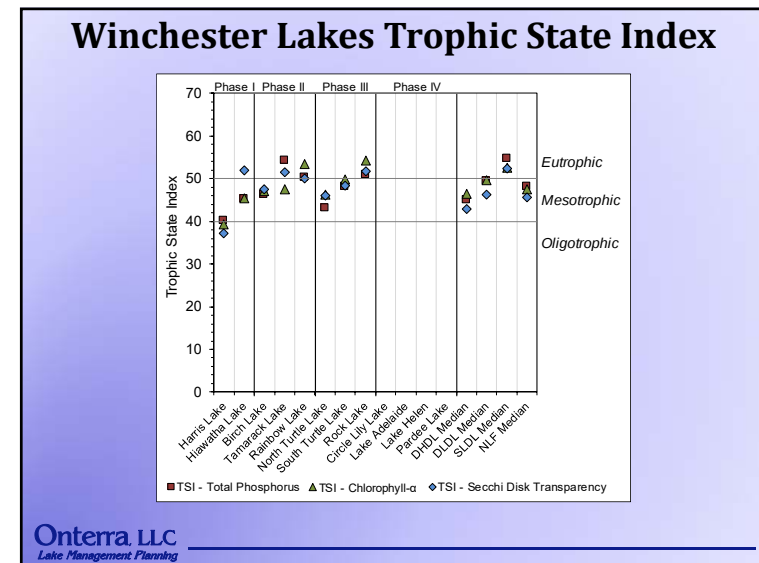
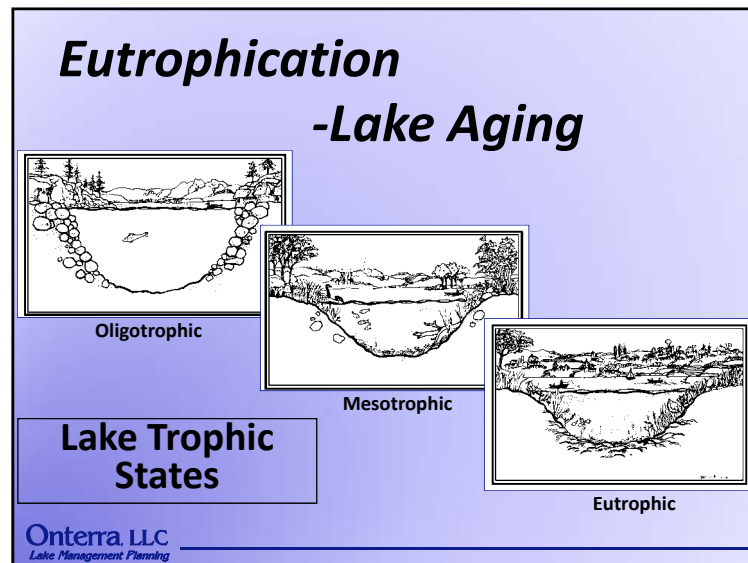


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Internal Nutrient Loading

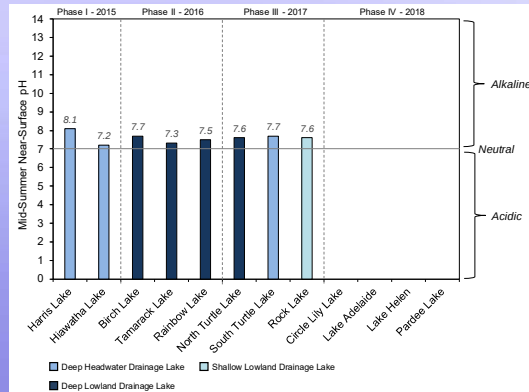
- Water quality overall still *good* in South Turtle Lake, but...
- Lake listed on 303(d) list as impaired in 2017 for chlorophyll exceeding recreational use threshold
 - >5% of days from July 15 – Sept. 15 chl-a >20 µg/L
 - WDNR classification as deep **lowland** drainage
 - Low priority waterbody for Total Maximum Daily Load (TMDL) development
- Continue CLMN monitoring to determine if phosphorus continues to increase
- Determine possible management strategies

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Additional Water Quality Parameters

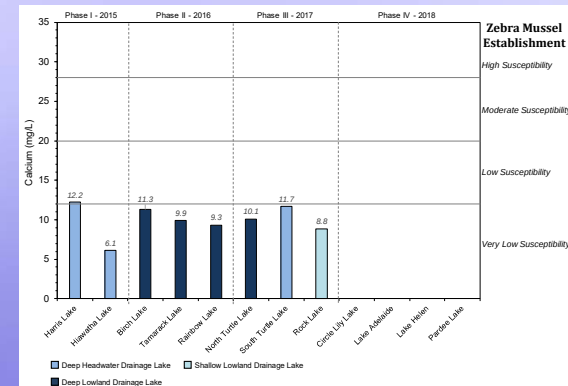
pH



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Additional Water Quality Parameters

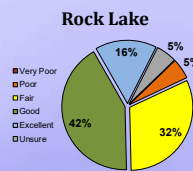
Calcium



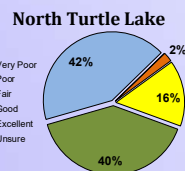
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Stakeholder Perceptions of Water Quality

How would you describe the current water quality of your lake?

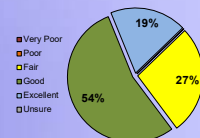


19 respondents (37%)



45 respondents (39%)

South Turtle Lake

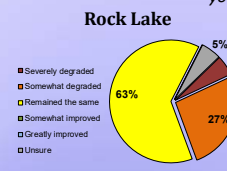


37 respondents (31%)

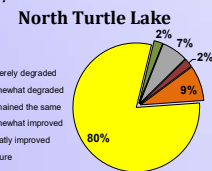
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Stakeholder Perceptions of Water Quality

How has the water quality changed in your lake since you first visited?

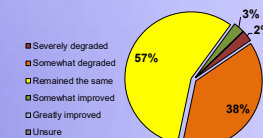


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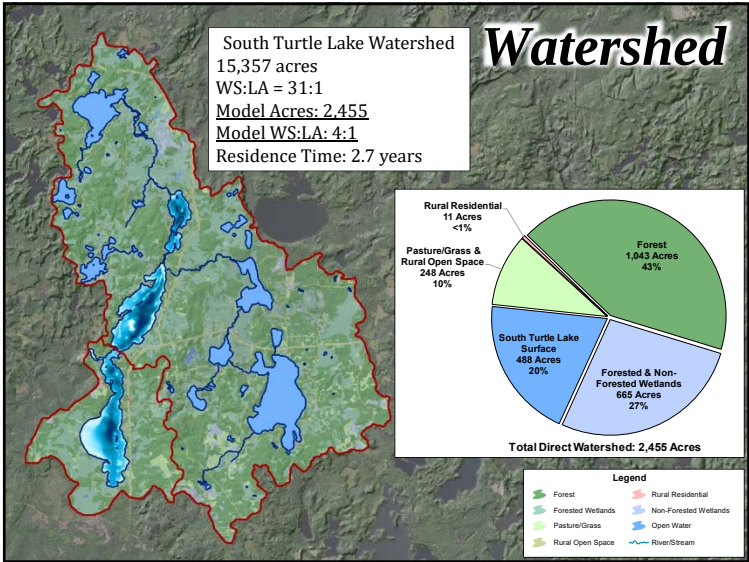
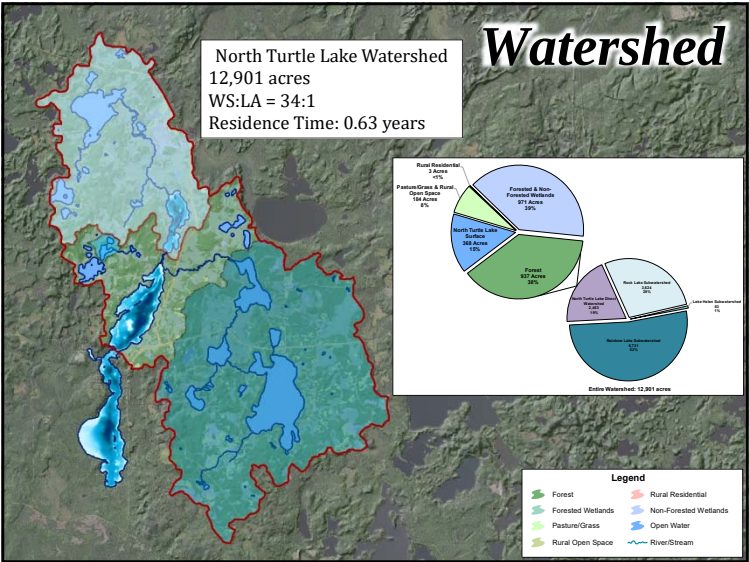
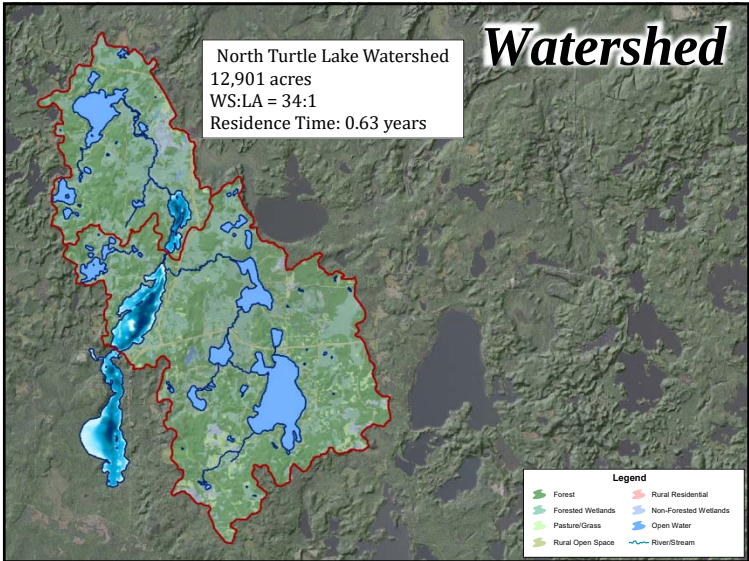
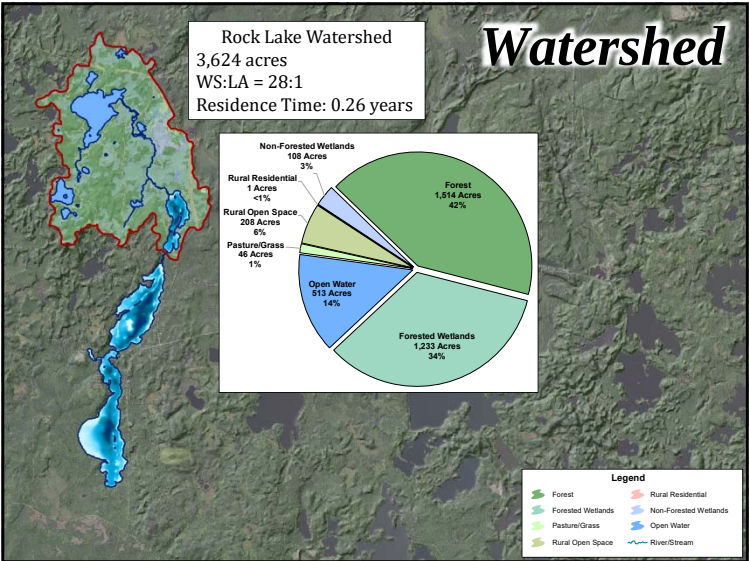
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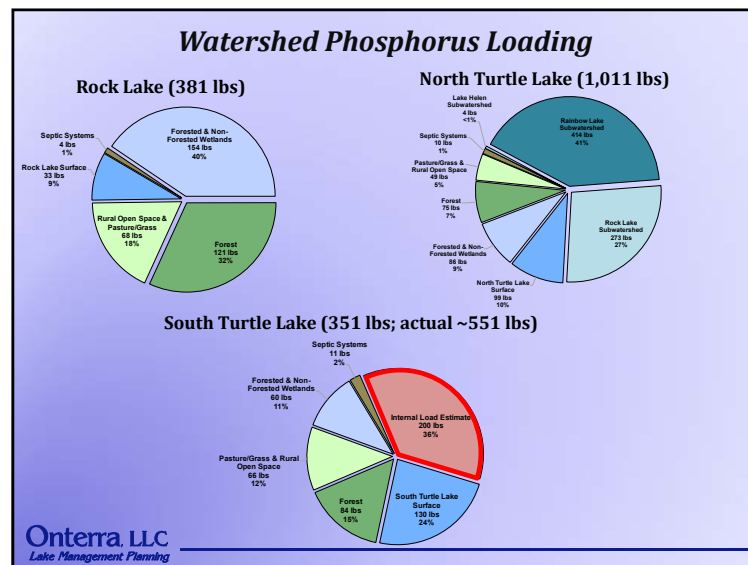
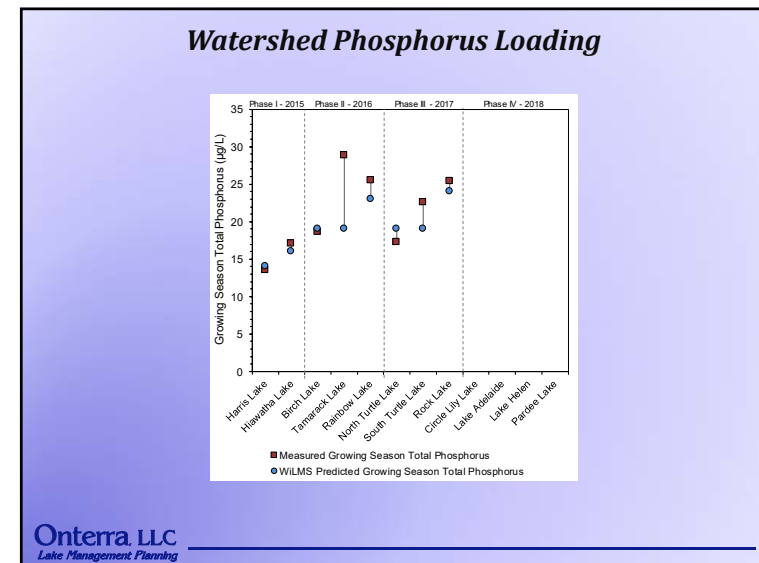
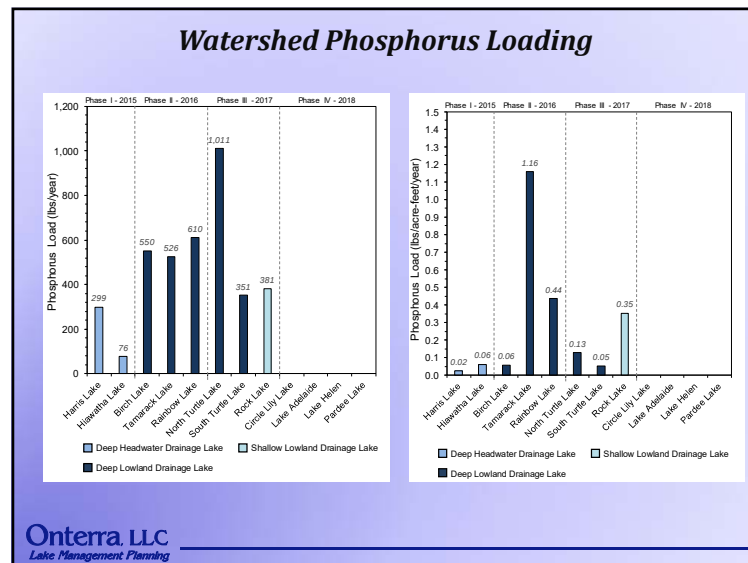
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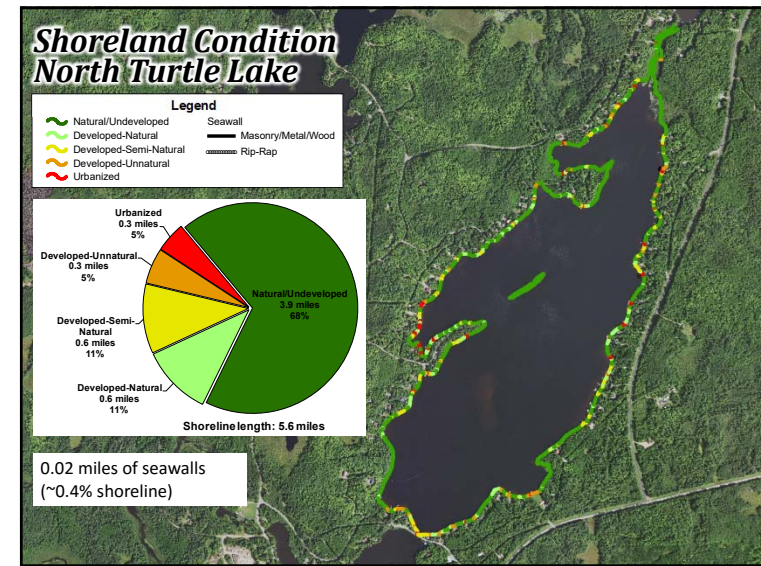
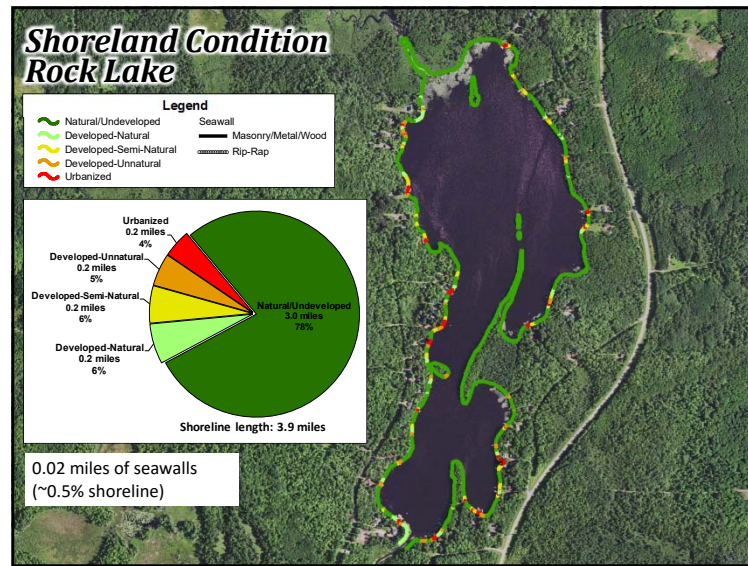
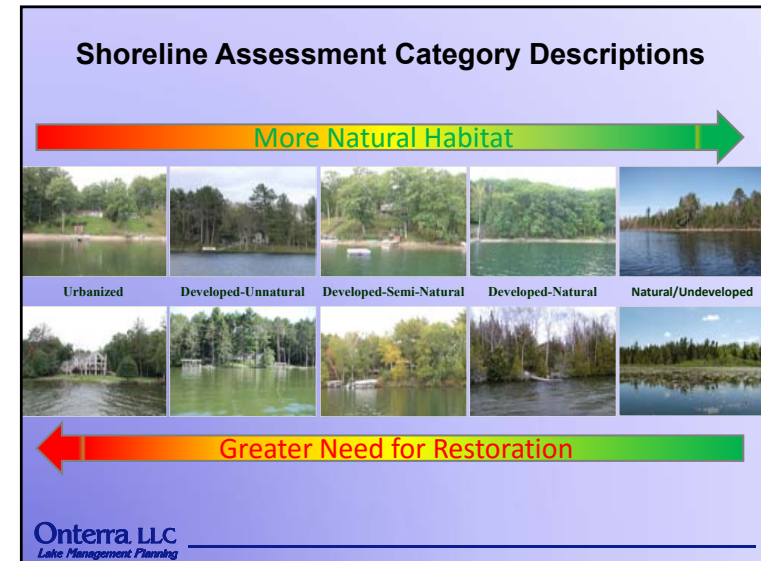


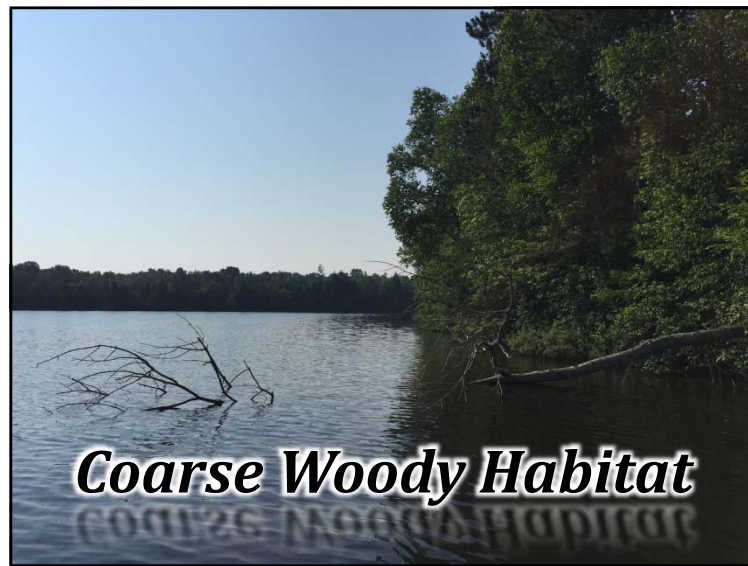
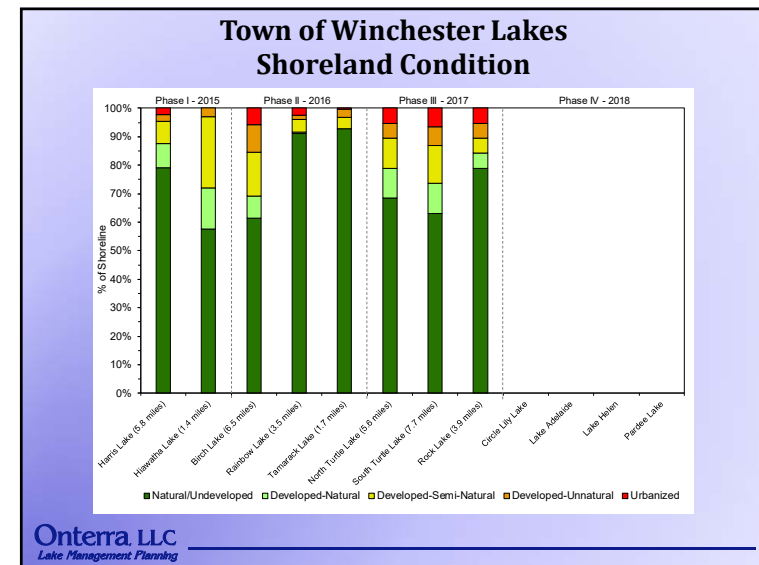
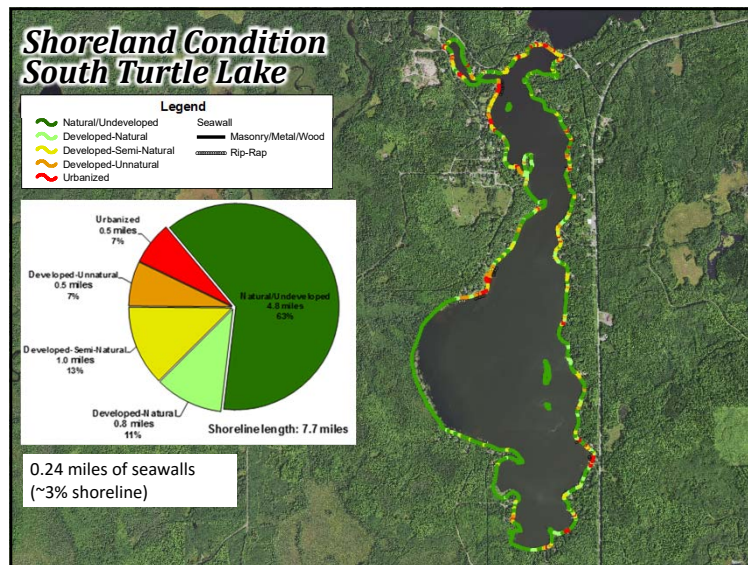
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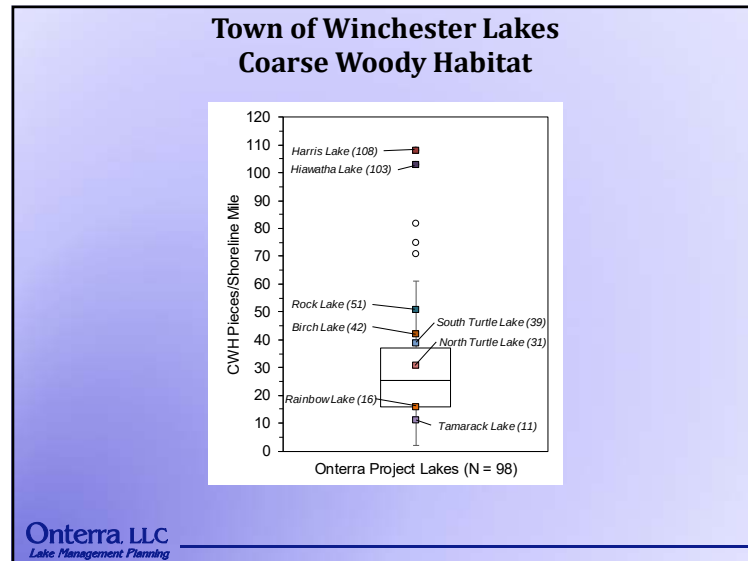




Coarse Woody Habitat

- Provides shoreland erosion control and prevents suspension of sediments.
- Preferred habitat for a variety of aquatic life.
 - Periphyton growth fed upon by insects.
 - Refuge, foraging and spawning habitat for fish.
 - Complexity of CWH important.
- Changing of logging and shoreland development practices = reduced CWH in Wisconsin lakes.
- Survey aimed at quantifying CWH in Town of Winchester Lakes

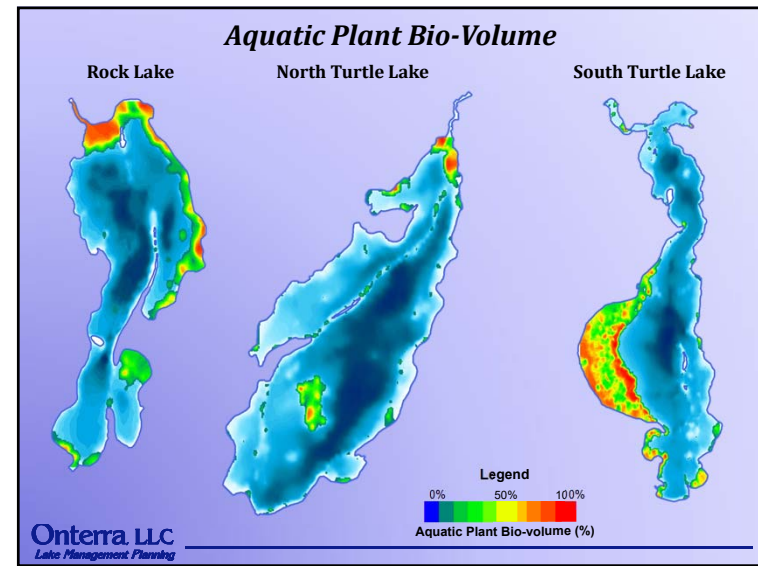


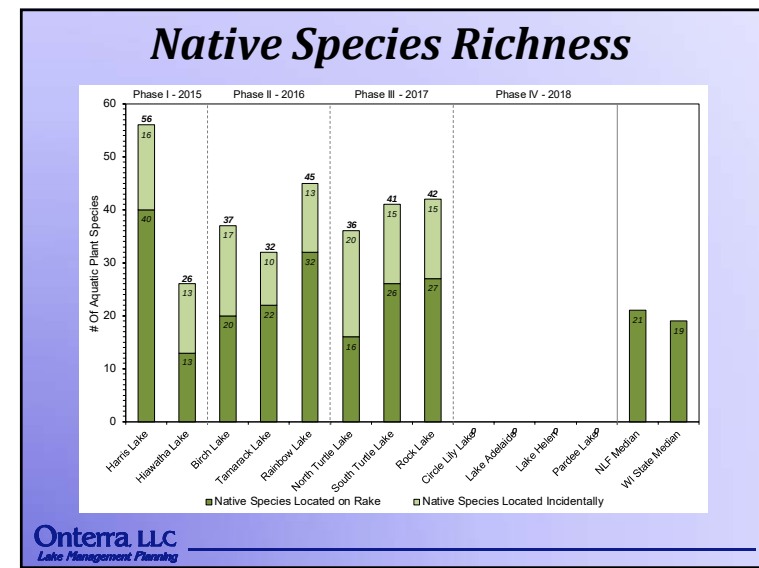
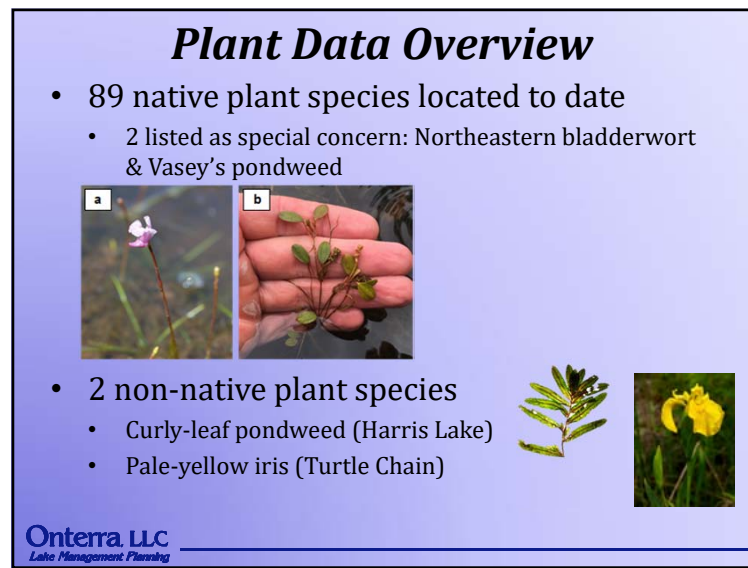
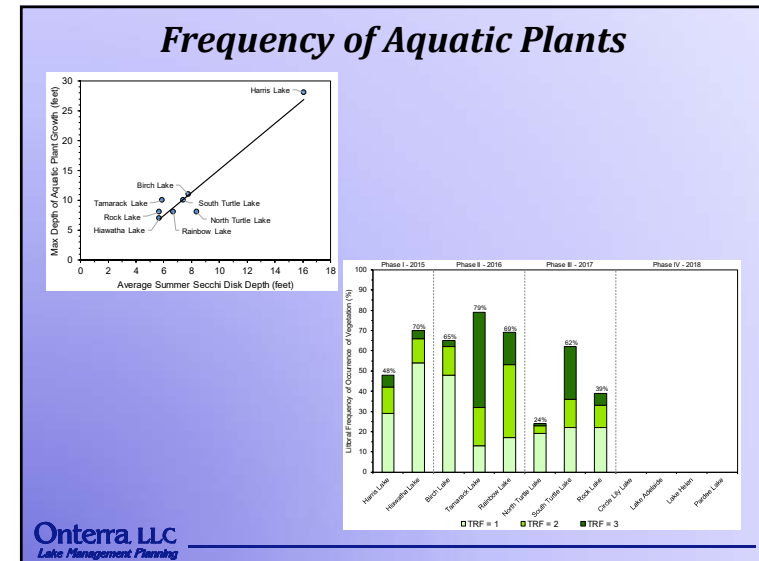
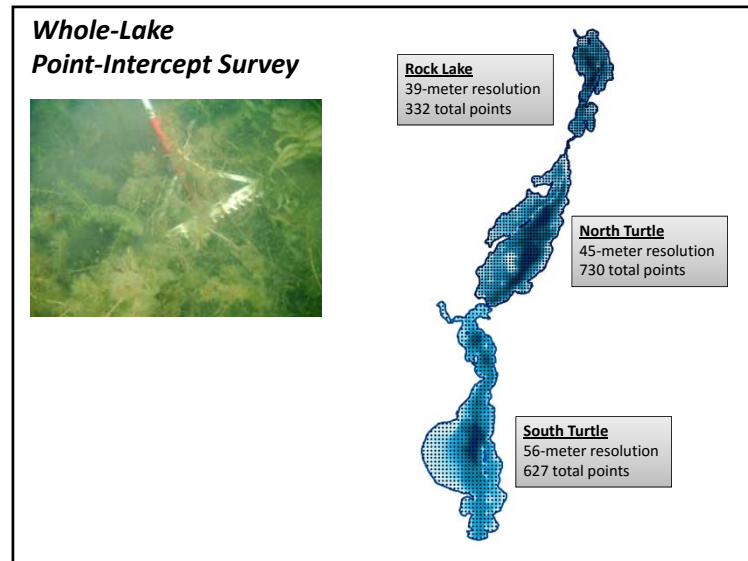


Aquatic Plant Surveys

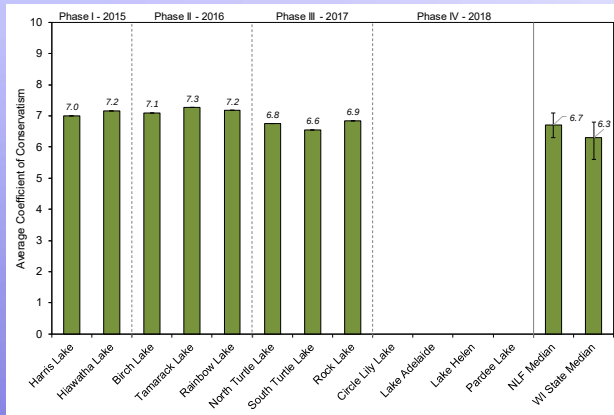
- Assess both non-native & native species
- Four surveys completed in 2017
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 - Whole-Lake Point-Intercept Survey
 - Acoustic Survey
 - Water depth (bathymetry)
 - Substrate hardness
 - Aquatic plant bio-volume
 - Emergent/Floating-Leaf Community Mapping Survey

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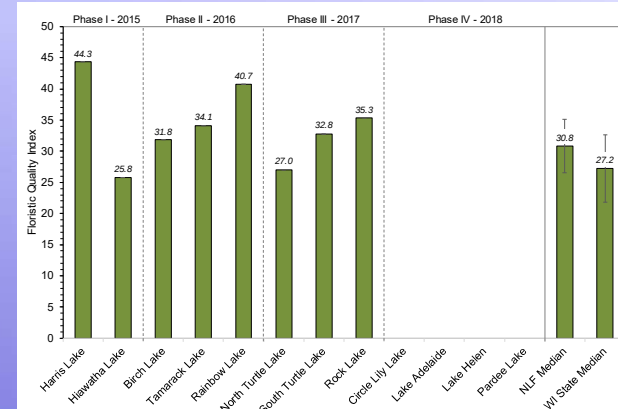


Average Conservatism



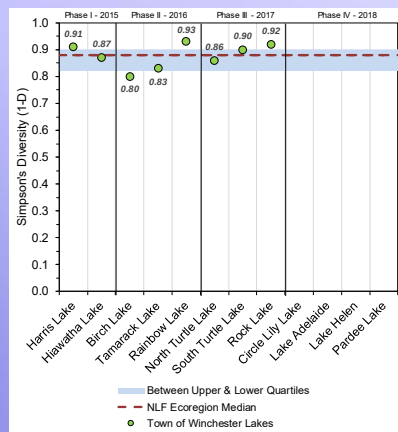
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Floristic Quality



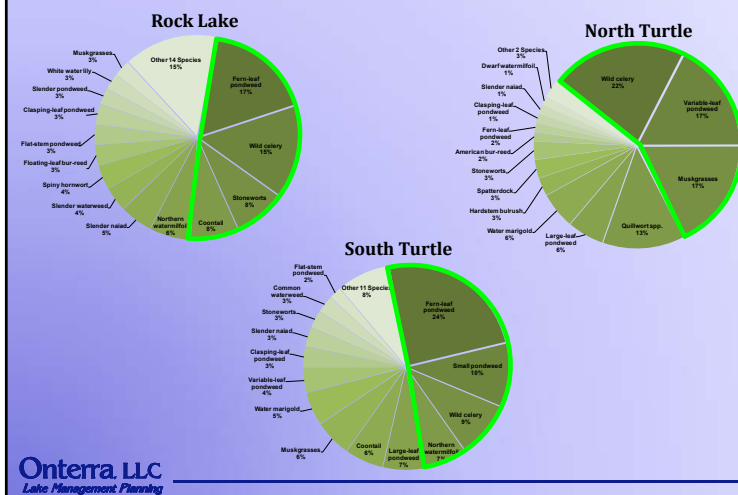
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Simpson's Diversity Index

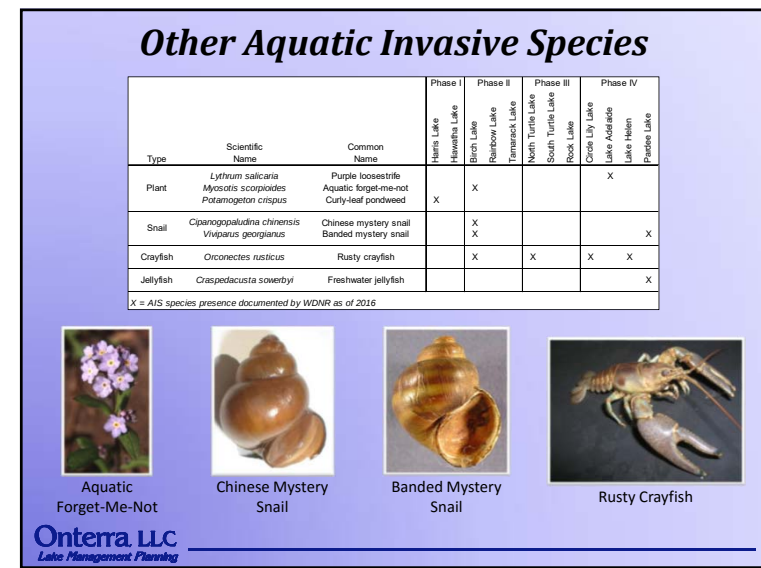
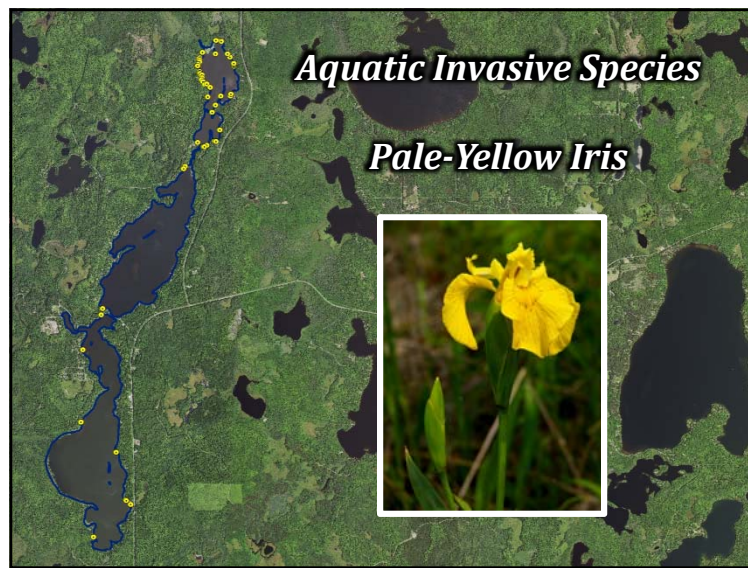
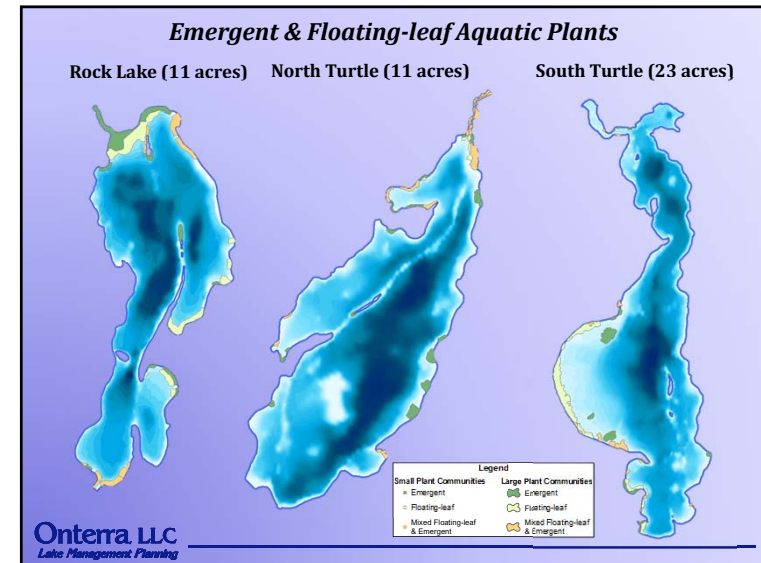
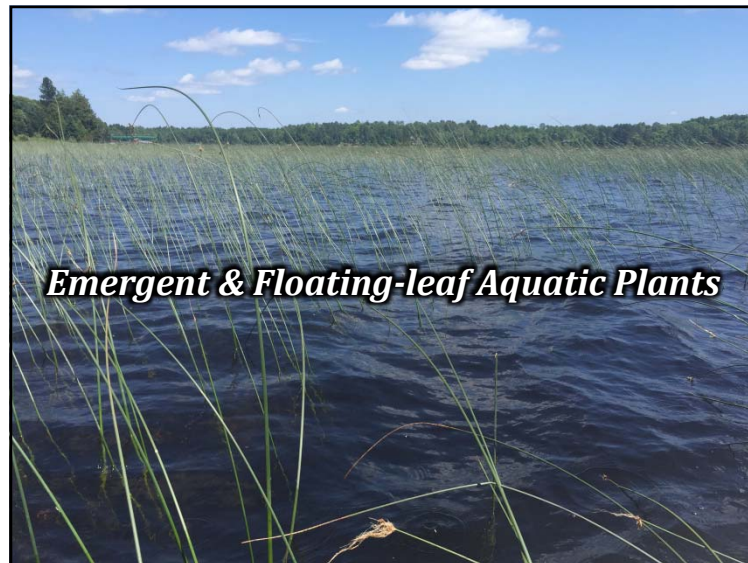


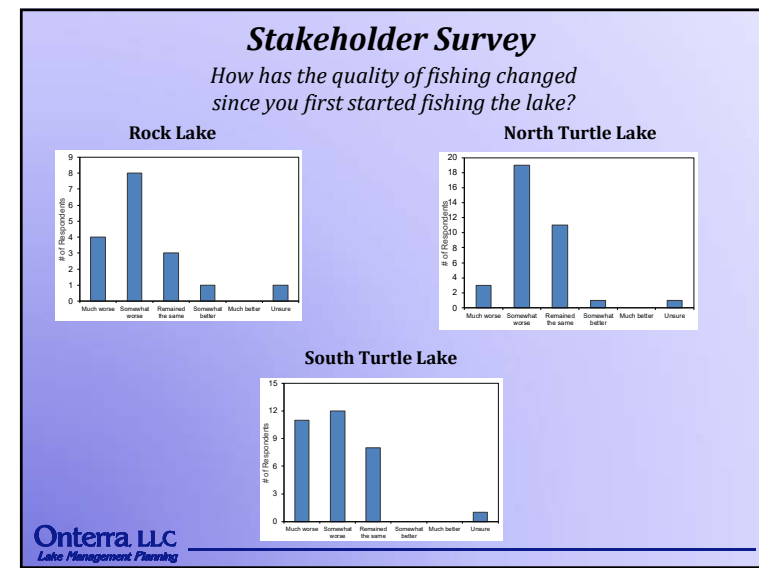
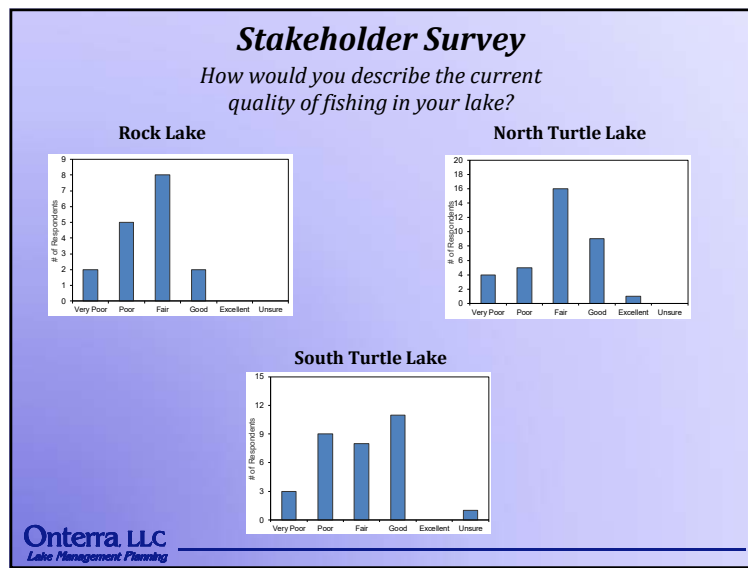
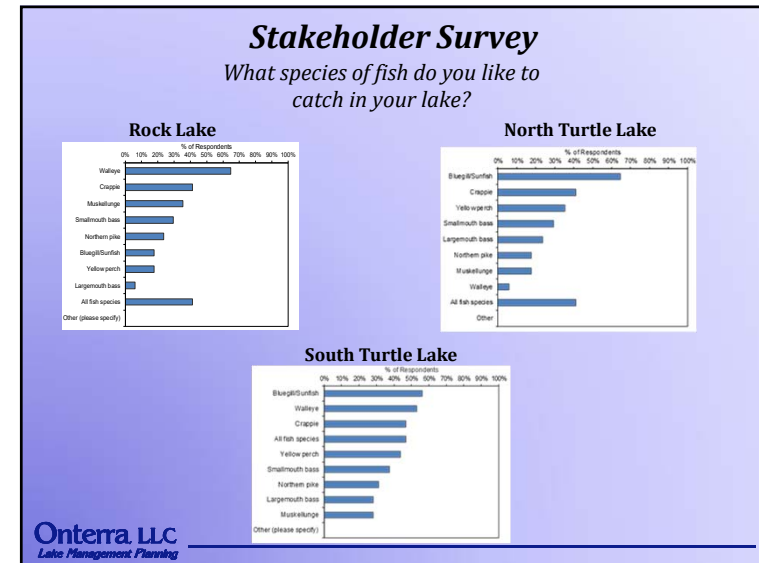
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Relative Occurrence



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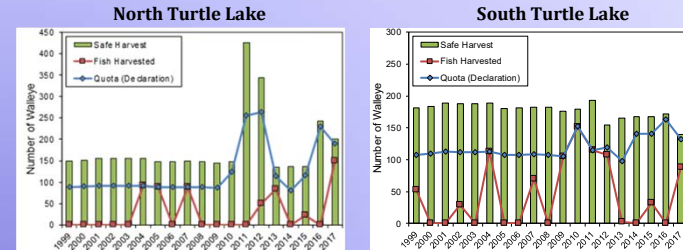
Native American Spear Harvest

- Town is within Treaty of 1842
- Tribal and State authorities establish *total allowable catch* based on population estimates (typically 35% for walleye & 27% for muskellunge)
- The total allowable catch number may be reduced based on confidence in population estimates: *safe harvest level*
- Tribal community claims percentage of safe harvest level, or *declaration*
- Bag limits for hook and line anglers set to accommodate declaration
- Can only harvest two walleye over 20 inches per night – one between 20 and 24" and one any size over 20"



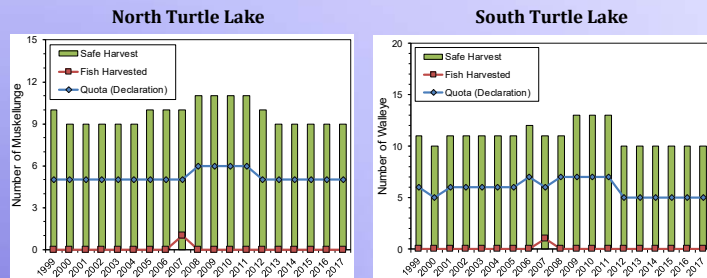
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North & South Turtle Walleye Spear Harvest



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North & South Turtle Muskellunge Spear Harvest



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Conclusions

Water Quality

- Good to excellent for respective lake type, but...
- Increasing trend in phosphorus concentration in South Turtle Lake

Watershed & Immediate Shoreline

- Watersheds in excellent shape – primarily forests & wetlands
- Majority of shoreland contains little to no development, but always room for improvement

Aquatic Plant Community

- High-quality native species present
- One non-native species: Pale-yellow iris (*Iris pseudacorus*)

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Thank You

Many of the graphics used in this presentation were supplied by:



Wisconsin
Lakes
Partnership



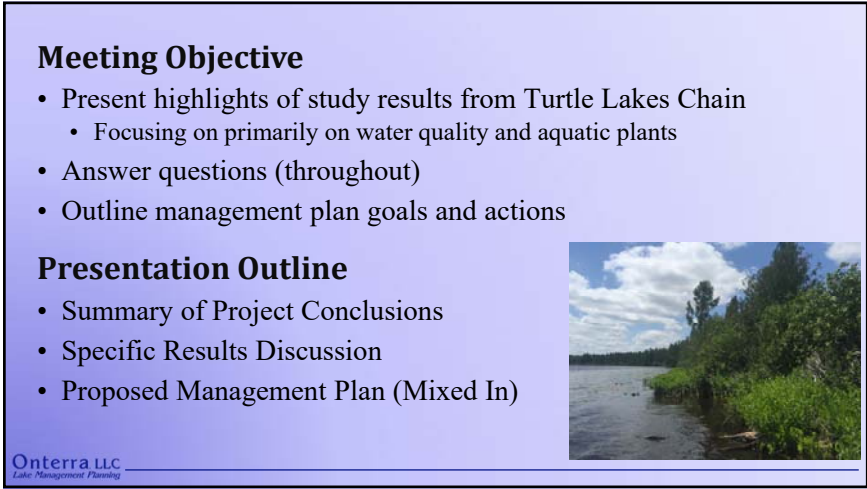


WISCONSIN
DEPT. OF NATURAL RESOURCES

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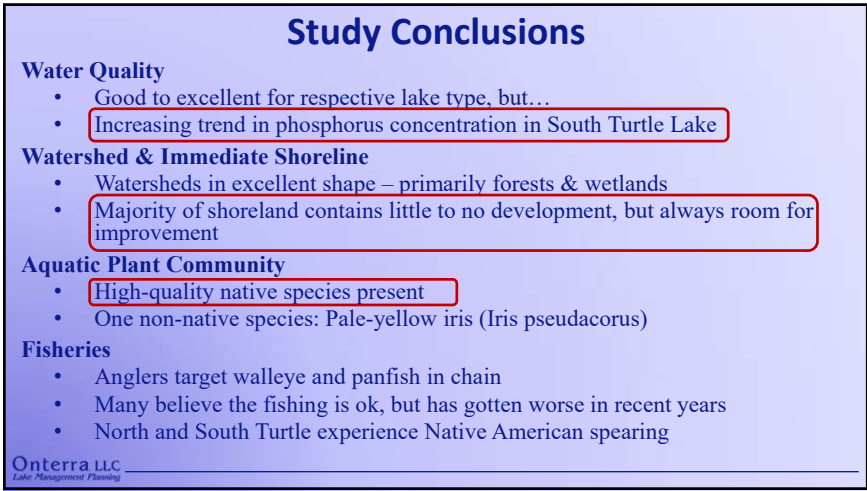
1



2



3



4

Lake Water Quality - Trophic Parameters

↑

Phosphorus

Naturally occurring & essential for all life
Regulates phytoplankton biomass in **most** WI lakes
Most often 'limiting plant nutrient' (shortest supply)
Human activity often increases P delivery to lakes

↑

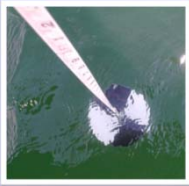
Chlorophyll-a

Pigment used in photosynthesis
Used as surrogate for phytoplankton biomass

↓

Secchi Disk Transparency

Measure of water clarity
Measured using a Secchi disk

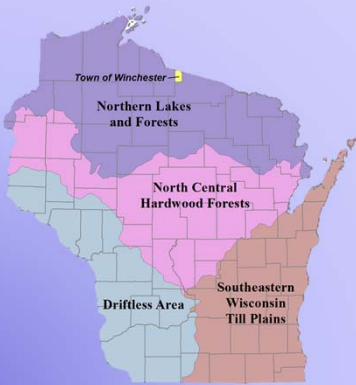


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Water Quality - Comparables



Wisconsin

Ecoregions

An area containing similar
geology, physiography,
hydrology, climate, and soils.
As well as common terrestrial
and aquatic fauna.

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Water Quality - Comparables

Wisconsin Lakes Natural Community Types

Lakes/Reservoirs < 10 acres (small)

Variable Stratification
Variable Hydrology

1

Lakes/Reservoirs ≥ 10 acres (large)

Drainage

Seepage

Headwater

Lowland

Shallow (mixed)

Deep (stratified)

Shallow (mixed)

Deep (stratified)

Shallow (mixed)

Deep (stratified)

2

3

4

5

6

7

South Turtle*

Rock

North Turtle

Other Classifications (any size)

Spring Ponds

North Turtle Two-Story Fishery

Impounded Flowing Waters

8

9

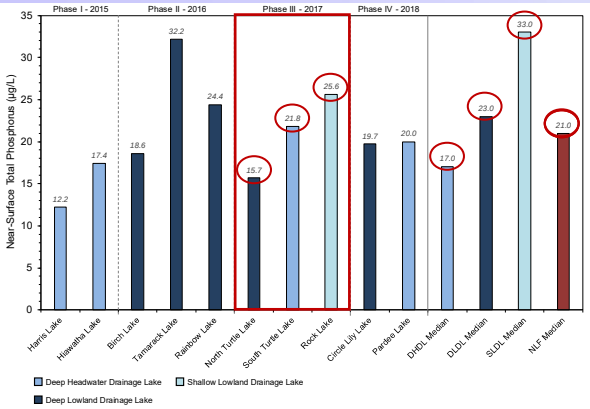
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Total Phosphorus



Lake	Phase I - 2015	Phase II - 2016	Phase III - 2017	Phase IV - 2018
Harris Lake	12.2			
Hawanna Lake	17.4			
Birch Lake	18.6			
Tamarack Lake		32.2		
Rusk Lake		24.4		
North Turtle Lake			15.7	
South Turtle Lake			21.8	
Rock Lake			25.6	
Cokesby Lake				19.7
Potosi Lake				20.0
DNDL Median				17.0
DLDL Median				23.0
SLDL Median				33.0
NLF Median				21.0

Deep Headwater Drainage Lake

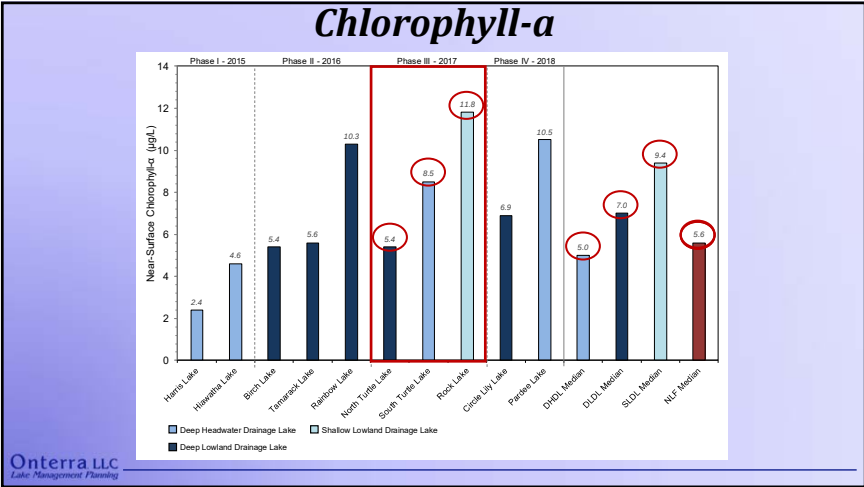
Shallow Lowland Drainage Lake

Deep Lowland Drainage Lake

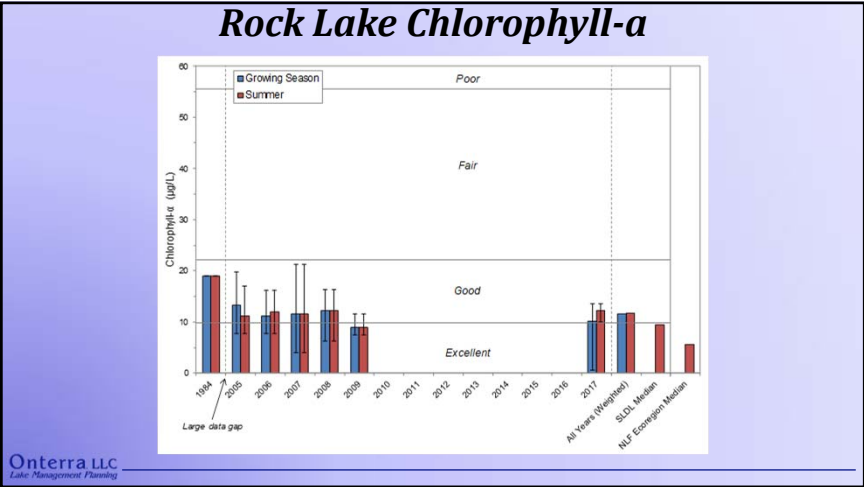
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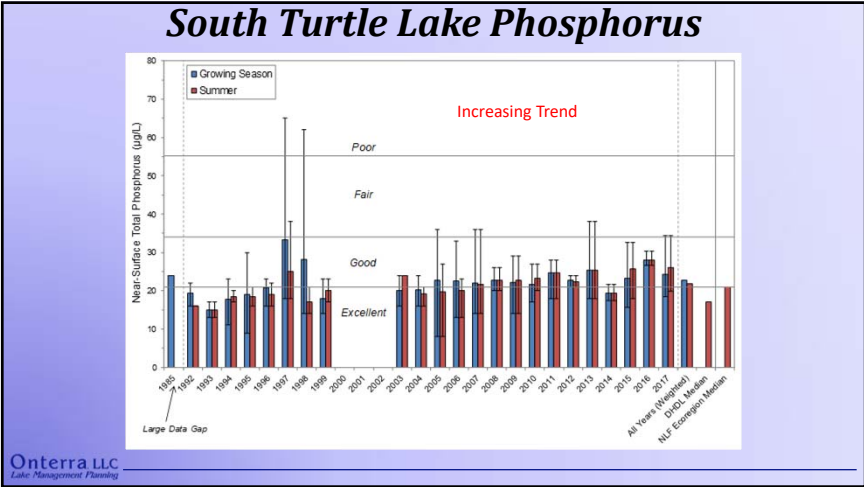
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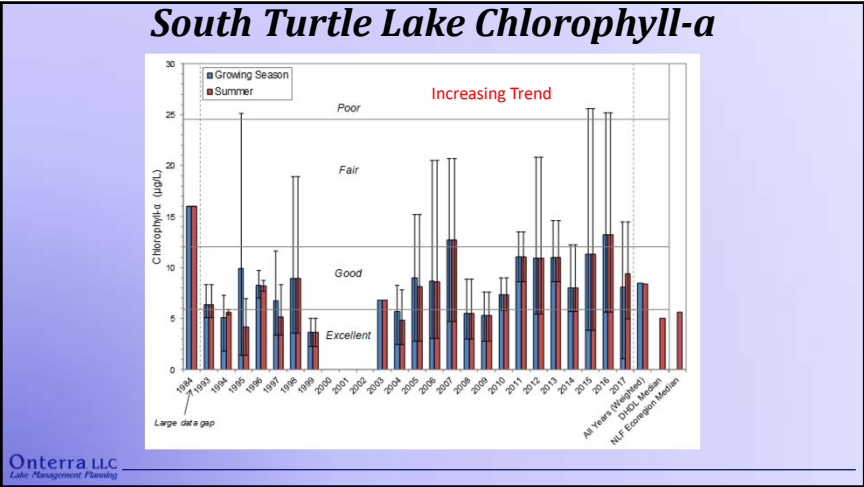
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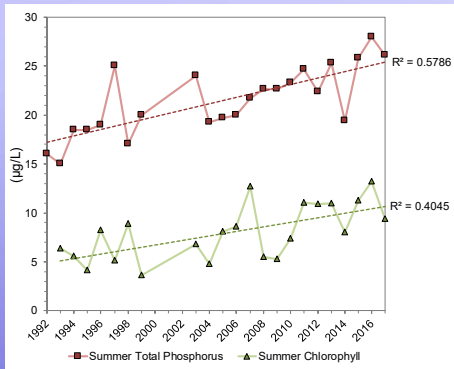


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12

South Turtle Lake Water Quality Trends

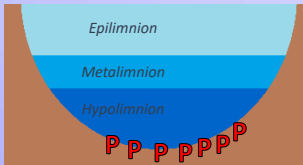


- Why is phosphorus increasing?
- Trend not observed in other lakes.
- Not correlated with precipitation.
- No apparent land-use changes within the watershed.
- Data indicate internal nutrient loading may be the cause.

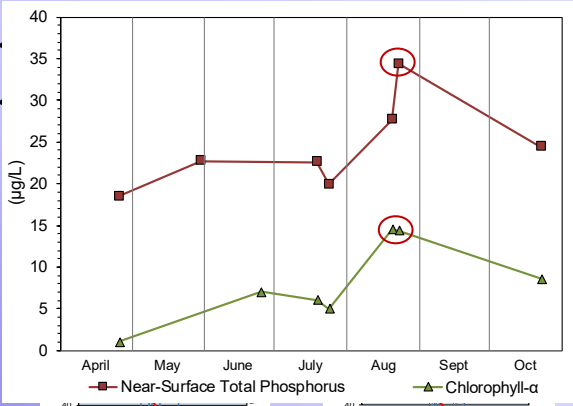
South Turtle Lake Water Quality Trends

Internal Nutrient Loading

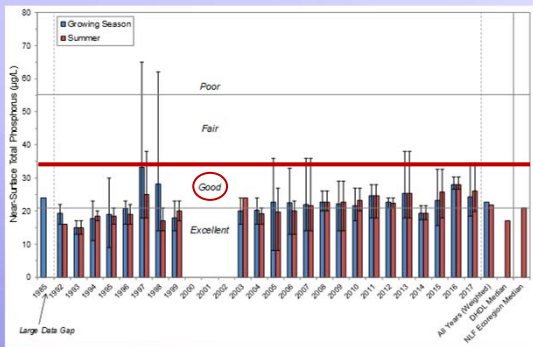
- In general, net movement of phosphorus to the sediment in lakes.
- Under certain conditions, phosphorus (and other nutrients) get released from bottom sediments into the overlying water.
- Anoxic (devoid of oxygen) conditions cause phosphorus release.

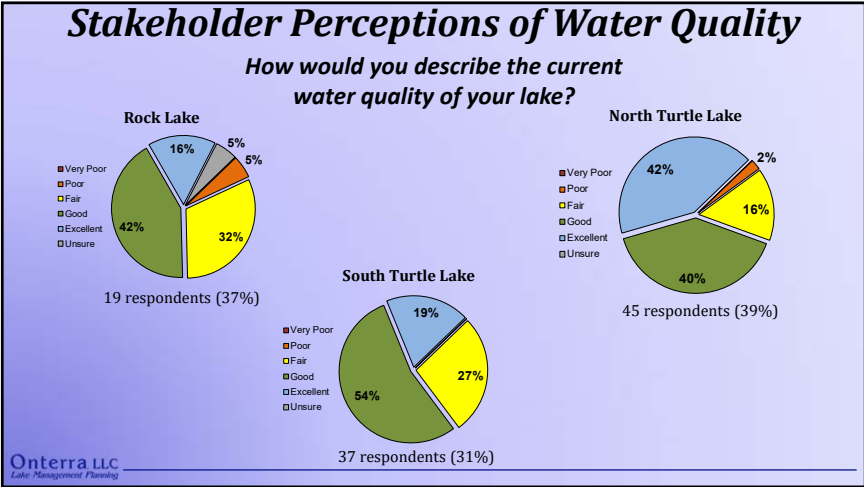


South Turtle Lake Water Quality Trends

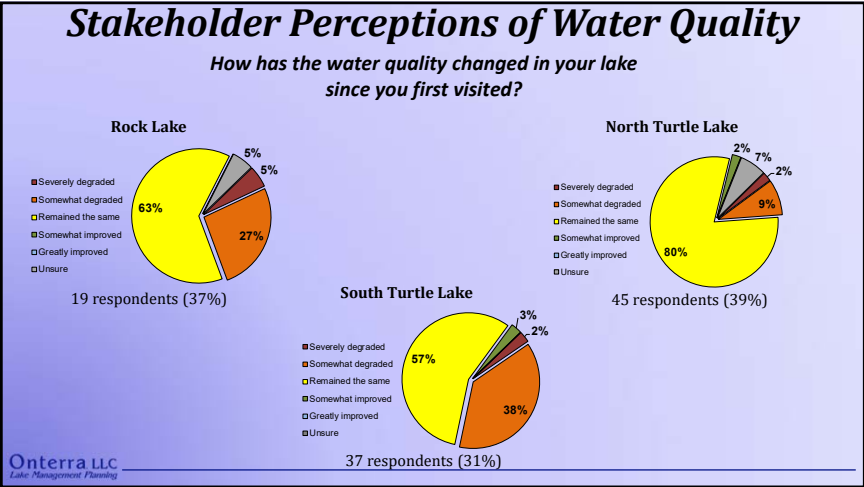


South Turtle Lake Phosphorus





17



18

Management Goal:
Maintain Current Water Quality Conditions

Management Actions

1. Continue monitoring of Turtle Lakes Chain water quality through the WDNR Citizens Lake Monitoring Network (CLMN).

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Shoreland Assessment

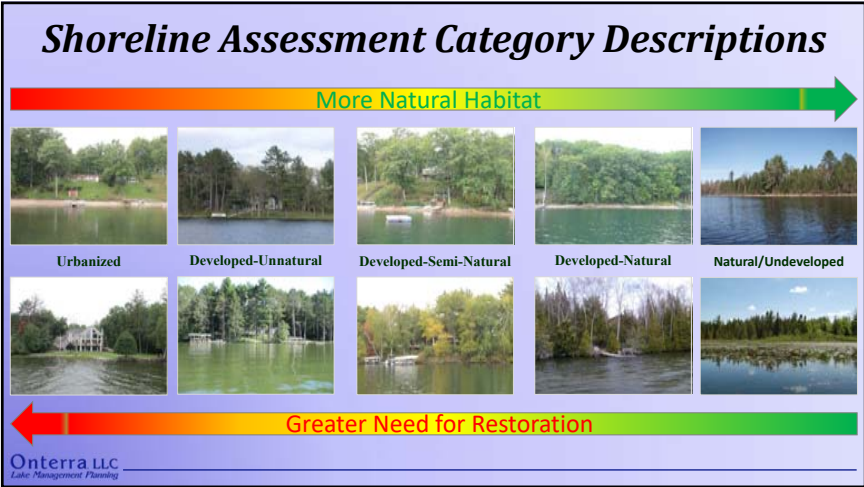
- Shoreland area is important for buffering runoff and provides valuable habitat for aquatic and terrestrial wildlife.
- EPA National Lakes Assessment results indicate shoreland development has greatest negative impact to health of our nation's lakes.
- It does not look at lake shoreline on a property-by-property basis.
- Assessment ranks shoreland area from shoreline back 35 feet

Urbanized → **Natural**

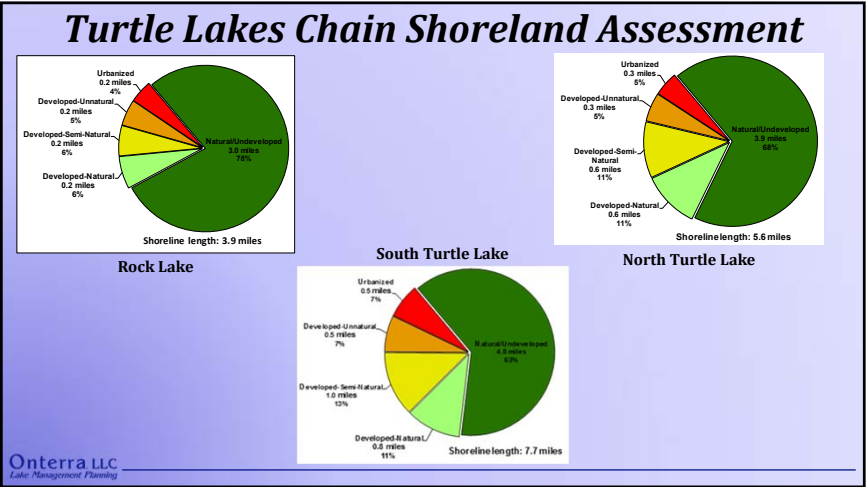
Range

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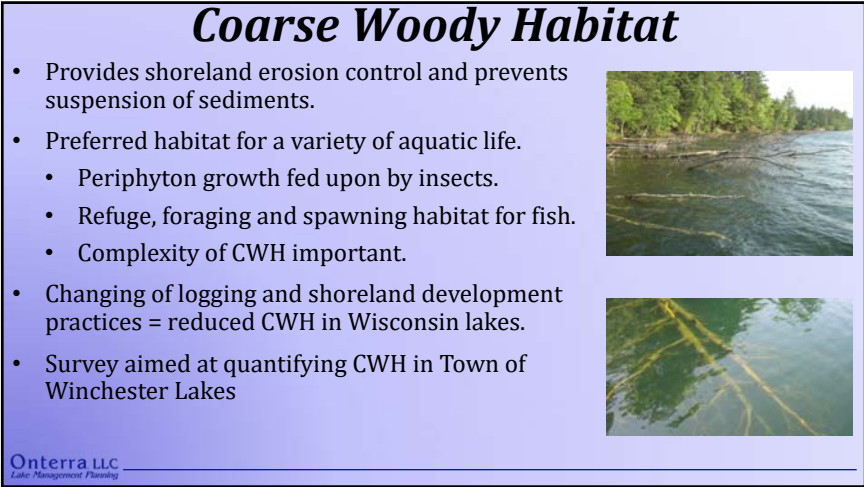
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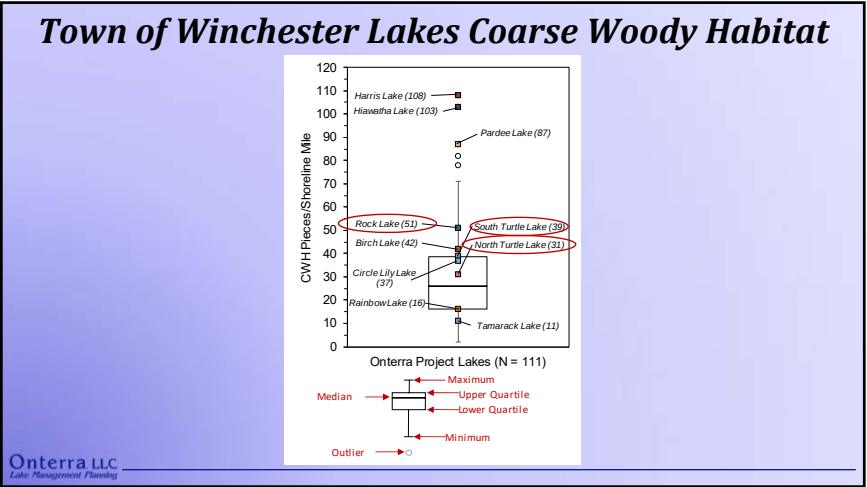
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22



23



24

Management Goal:
Improve Turtle Lakes Chain Ecological Health and Fishery Resource

Management Actions

1. Educate stakeholders on the importance of shoreland condition and shoreland restoration on Turtle Lakes Chain.
2. Coordinate with WDNR and private landowners to expand coarse woody habitat in Turtle Lakes Chain

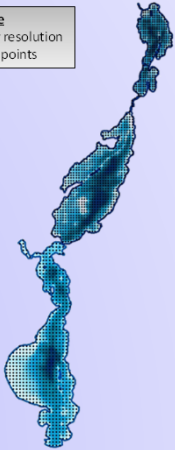
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Aquatic Plant Surveys

- Assess both non-native & native species
- Four surveys completed in 2017
 - Early-Season AIS Survey
 - Whole-Lake Point-Intercept Survey
 - Acoustic Survey
 - Water depth (bathymetry)
 - Substrate hardness
 - Aquatic plant bio-volume
 - Emergent/Floating-Leaf Community Mapping Survey

26

Whole-Lake Point-Intercept Survey



Rock Lake
39-meter resolution
332 total points

North Turtle
45-meter resolution
730 total points

South Turtle
56-meter resolution
627 total points

27

Plant Data Overview

- 98 native plant species located to date
 - 2 listed as special concern: Northeastern bladderwort & Vasey's pondweed
- 2 non-native plant species
 - Curly-leaf pondweed (Harris Lake)
 - Pale-yellow iris (Turtle Chain, Pardee Lake)
 - Aquatic Forget Me Not (Pardee Lake)

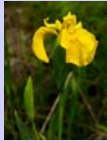
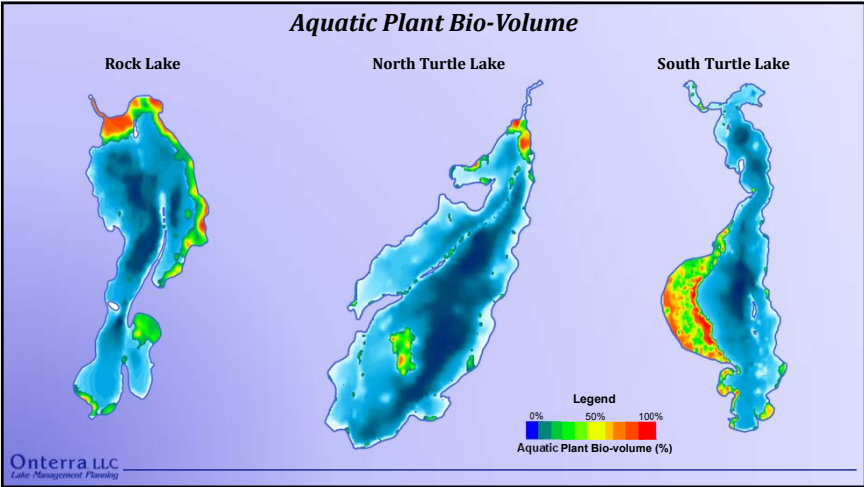
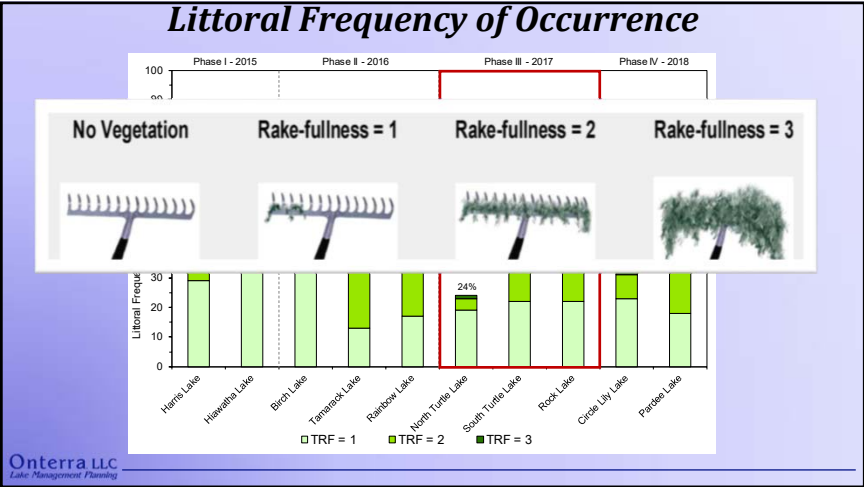


Photo by Richard Bauer

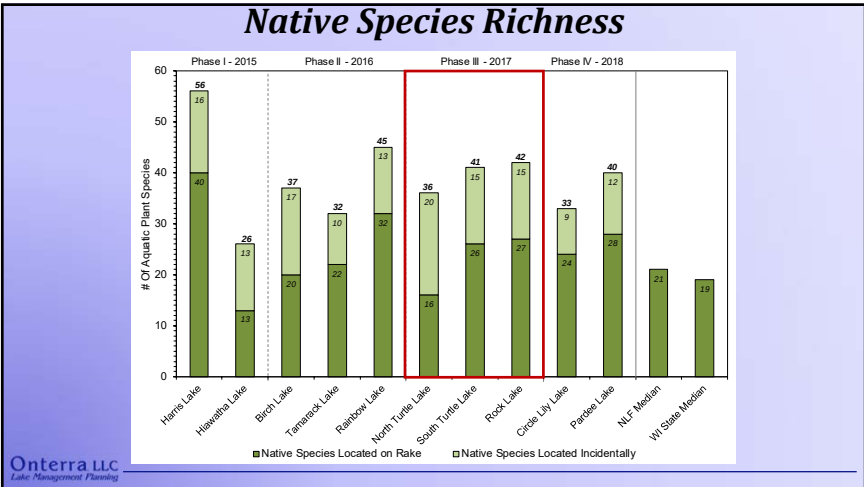
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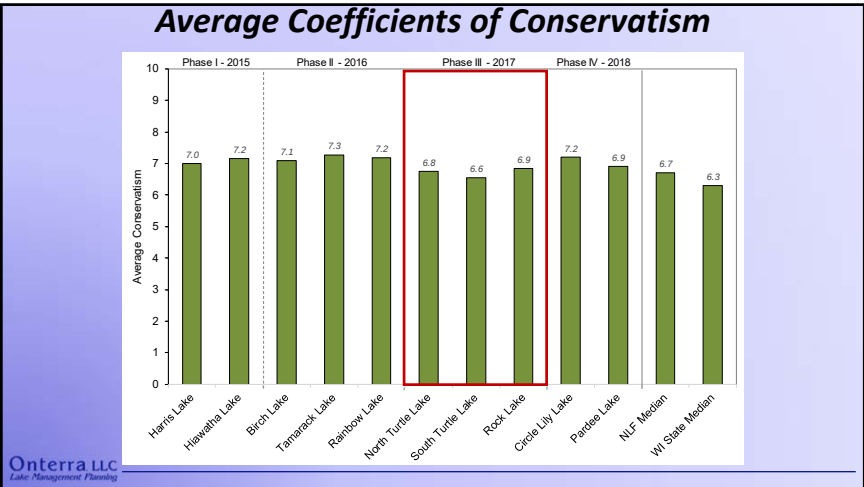
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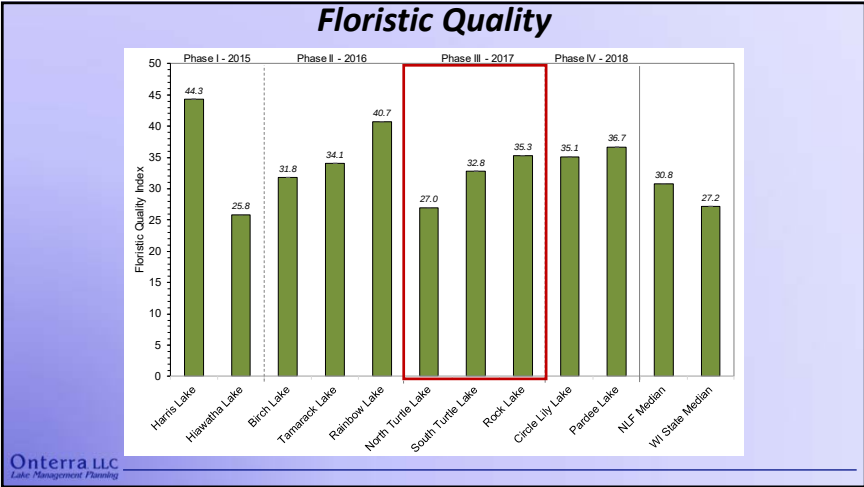
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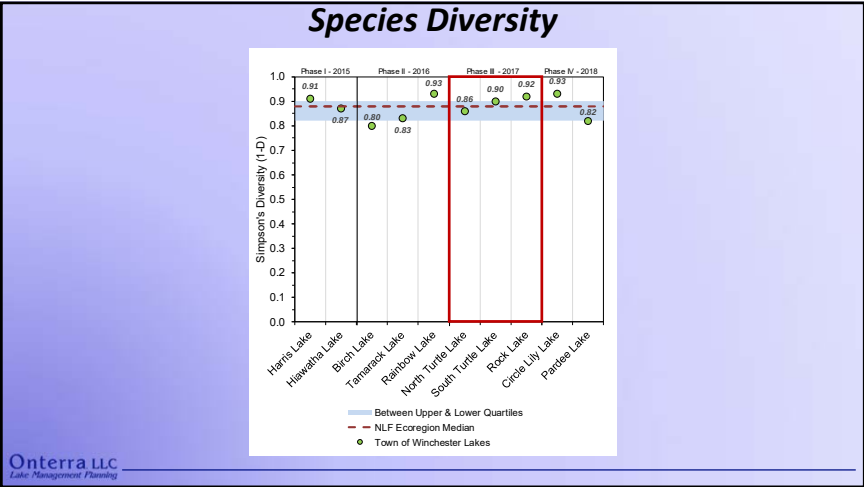
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32



33



34

Aquatic Invasive Plant Species

No curly-leaf pondweed or Eurasian watermilfoil
Pale-yellow iris located throughout chain.



35

Management Goal:
Control Existing AIS in the Turtle Lakes Chain and Prevent Further AIS Introductions

Management Actions

1. Continue Clean Boats Clean Waters watercraft inspections at Turtle Lakes Chain public access sites.
2. Coordinate annual volunteer monitoring for Aquatic Invasive Species in the Turtle Lakes Chain.
Pale-yellow iris harvesting with NLDC
AIS Alert section added to www.thetlca.org
3. Initiate rapid response plan following detection of new AIS

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Management Goal:

Increase the TLCA’s Capacity to Communicate with Lake Stakeholders and Facilitate Partnerships with Other Management Entities

Management Actions

1. Promote lake protection and enjoyment through stakeholder education
2. Continue TLCA’s involvement with other entities that have responsibilities in managing (management units) the Turtle Lakes Chain

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Thank You

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.....



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B

APPENDIX B

Stakeholder Survey Response Charts and Comments

Turtle Lakes Chain - Anonymous Stakeholder Survey

Surveys Distributed: 288

Surveys Returned: 101

Response Rate: 35%

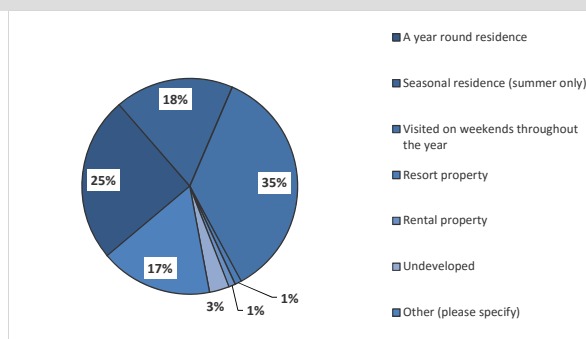
Turtle Lakes Chain Property

1. Which of the Turtle Chain Lakes do you reside on?

Answer Options	Response Percent	Response Count
North Turtle Lake	44.6%	45
South Turtle Lake	36.6%	37
Rock Lake	18.8%	19
answered question		101
skipped question		0

2. How is your property on your lake utilized?

Answer Options	Response Percent	Response Count
A year round residence	24.8%	25
Seasonal residence (summer only)	17.8%	18
Visited on weekends throughout the year	35.6%	36
Resort property	1.0%	1
Rental property	1.0%	1
Undeveloped	3.0%	3
Other (please specify)	16.8%	17
answered question		101
skipped question		0



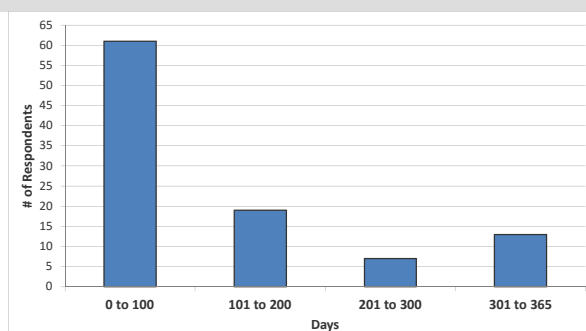
Number Other (please specify)

- 1 Summer plus weekends throughout year
- 2 Throughout the year
- 3 A year round residence, half the time, i. e. 50%
- 4 seasonal (winter & summer) as well as various weekends throughout the year
- 5 Visited frequently throughout the year
- 6 spring/summer/fall
- 7 used both weekends and weekdays throughout the year
- 8 we camp seasonally
- 9 Seasonal Residence (spring, summer, fall)
- 10 use year round but not residence
- 11 Visited every other week all year
- 12 3 months on average throughout the year
- 13 Seasonal(summer) and Thanksgiving, X-Mas, maybe Easter
- 14 visited frequently throughout the year (much more than weekends)
- 15 Seasonal Summer and several weeks around Christmas
- 16 7-10 day random visits
- 17 visited year around, not just weekends

3. How many days each year is your property used by you or others?

Answer Options	Response Count
	100
answered question	100
skipped question	1

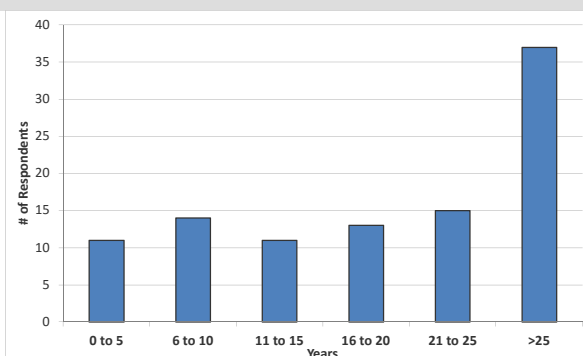
Category (# of days)	Responses
0 to 100	61 61.0%
101 to 200	19 19.0%
201 to 300	7 7.0%
301 to 365	13 13.0%



4. How long have you owned your property on your lake?

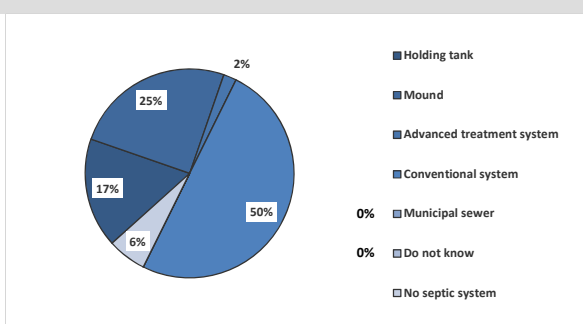
Answer Options	Response Count
	101
<i>answered question</i>	101
<i>skipped question</i>	0

Category (# of years)	Responses	% Response
0 to 5	11	10.9%
6 to 10	14	13.9%
11 to 15	11	10.9%
16 to 20	13	12.9%
21 to 25	15	14.9%
>25	37	36.6%



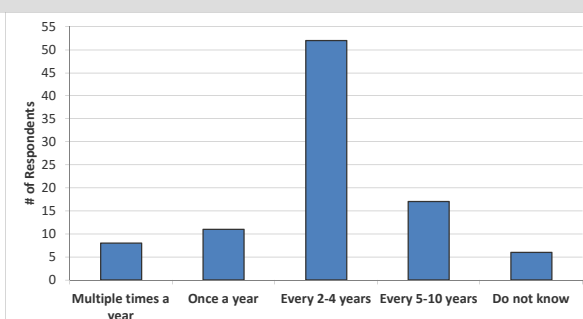
5. What type of septic system does your property utilize?

Answer Options	Response Percent	Response Count
Holding tank	17.0%	17
Mound	25.0%	25
Advanced treatment system	2.0%	2
Conventional system	50.0%	50
Municipal sewer	0.0%	0
Do not know	0.0%	0
No septic system	6.0%	6
<i>answered question</i>		100
<i>skipped question</i>		1



6. How often is the septic system on your property pumped?

Answer Options	Response Percent	Response Count
Multiple times a year	8.5%	8
Once a year	11.7%	11
Every 2-4 years	55.3%	52
Every 5-10 years	18.1%	17
Do not know	6.4%	6
<i>answered question</i>		94
<i>skipped question</i>		7

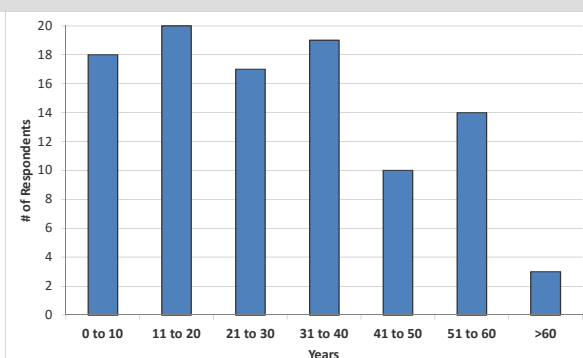


Recreational Activity on the Turtle Lakes Chain

7. How many years ago did you first visit your lake?

Answer Options	Response Count
	101
<i>answered question</i>	101
<i>skipped question</i>	0

Category (# of days)	Responses	% Response
0 to 10	18	17.8%
11 to 20	20	19.8%
21 to 30	17	16.8%
31 to 40	19	18.8%
41 to 50	10	9.9%
51 to 60	14	13.9%
>60	3	3.0%



8. Which, if any, of the chain lakes do you fish on?

Answer Options	Response Percent	Response Count
North Turtle Lake	72.3%	73
South Turtle Lake	72.3%	73
Rock Lake	62.4%	63
I do not fish on the Turtle Lakes Chain	16.8%	17
answered question		101
skipped question		0

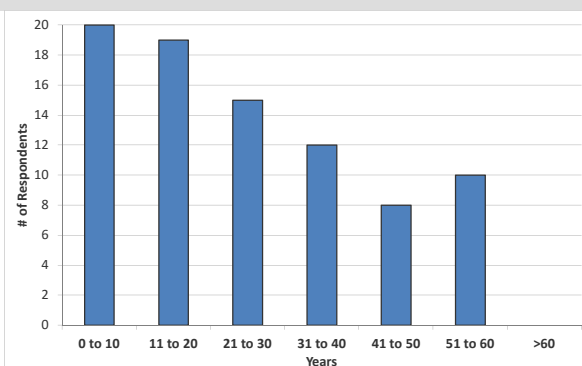
9. Which lake do you fish most often?

Answer Options	Response Percent	Response Count
North Turtle Lake	40.5%	34
South Turtle Lake	41.7%	35
Rock Lake	17.9%	15
answered question		84
skipped question		17

10. For how many years have you fished the lake you indicated in Question 9?

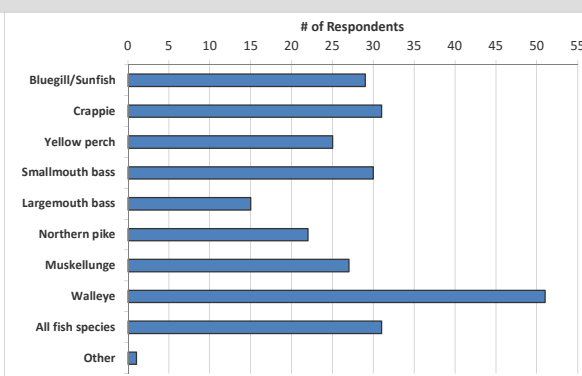
Answer Options	Response Count
	84
answered question	84
skipped question	17

Category (# of years)	Responses	% Response
0 to 10	20	23.8%
11 to 20	19	22.6%
21 to 30	15	17.9%
31 to 40	12	14.3%
41 to 50	8	9.5%
51 to 60	10	11.9%
>60	0	0.0%



11. What species of fish do you like to catch on the lake you indicated in Question 9?

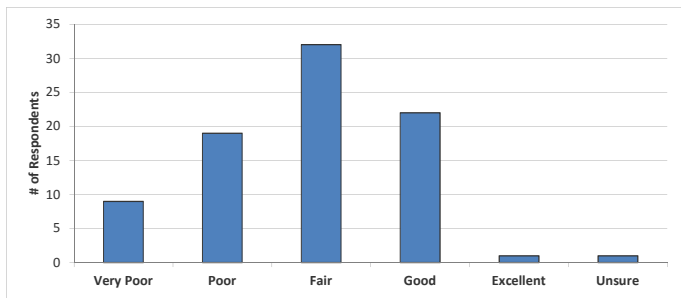
Answer Options	Response Percent	Response Count
Bluegill/Sunfish	34.5%	29
Crappie	36.9%	31
Yellow perch	29.8%	25
Smallmouth bass	35.7%	30
Largemouth bass	17.9%	15
Northern pike	26.2%	22
Muskellunge	32.1%	27
Walleye	60.7%	51
All fish species	36.9%	31
Other (please specify)	1.2%	1
answered question		84
skipped question		17



Number	Other (please specify)
1	Do not catch many.

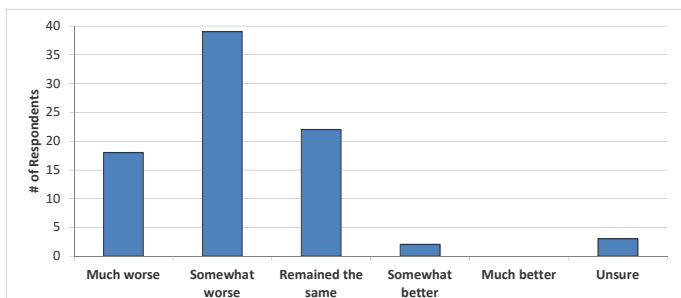
12. How would you describe the current quality of fishing on your lake?

Answer Options	Very Poor	Poor	Fair	Good	Excellent	Unsure	Response Count
	9	19	32	22	1	1	84
<i>answered question</i>							84
<i>skipped question</i>							17



13. How has the quality of fishing changed on your lake since you have started fishing the lake?

Answer Options	Much worse	Somewhat worse	Remained the same	Somewhat better	Much better	Unsure	Response Count
	18	39	22	2	0	3	84
<i>answered question</i>							84
<i>skipped question</i>							17



14. What types of watercraft do you currently use on your lake?

Answer Options	Response Percent	Response Count
Paddleboat	33.7%	34
Sailboat	5.0%	5
Canoe / kayak	67.3%	68
Rowboat	23.8%	24
Jet ski (personal water craft)	18.8%	19
Jet boat	0.0%	0
Motor boat with 25 hp or less motor	23.8%	24
Motor boat with greater than 25 hp motor	55.5%	56
Pontoon	54.5%	55
Do not use watercraft on my lake	0.0%	0
Do not use watercraft on any waters	1.0%	1
<i>answered question</i>		101
<i>skipped question</i>		0

15. Do you use your watercraft on waters other than the Turtle Lakes Chain (i.e. remove your boat from the chain and relaunch elsewhere)?

Answer Options	Response Percent	Response Count
Yes	28.0%	28
No	72.0%	72
<i>answered question</i>		100
<i>skipped question</i>		1

16. What is your typical cleaning routine after using your watercraft on waters other than the Turtle Lakes Chain?

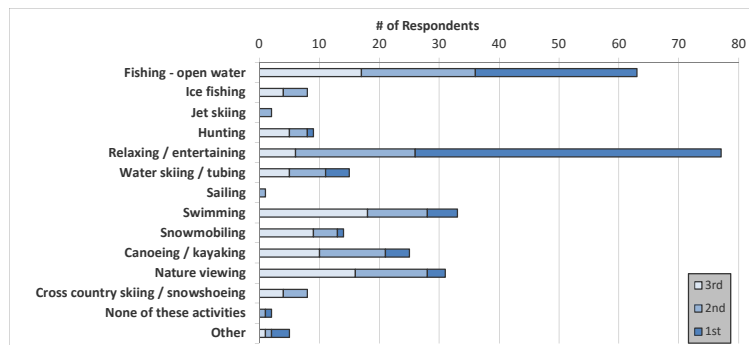
Answer Options	Response Percent	Response Count
Remove aquatic hitch-hikers (ex. - plant material, clams, mussels)	85.7%	24
Drain bilge	82.1%	23
Rinse boat	39.3%	11
Power wash boat	7.1%	2
Apply bleach	10.7%	3
Do not clean boat	7.1%	2
Other (please specify)		3
answered question		28
skipped question		73

Number	Other (please specify)
1	kayaks stay pretty clean!
2	this is for jetski
3	Boat stays out of water until dry.

17. For the list below, rank your top three activities that are important reasons for owning your property on your lake, with 1 being the most important activity.

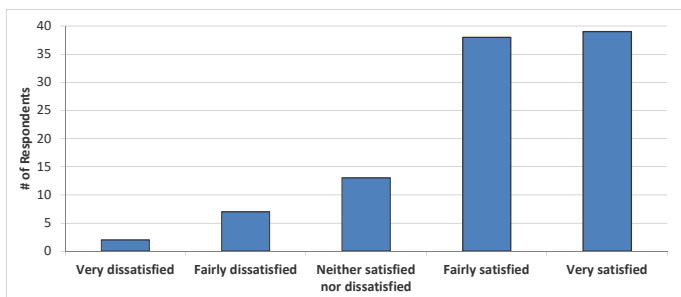
Answer Options	1st	2nd	3rd	Rating Average	Response Count
Fishing - open water	27	19	17	1.84	63
Ice fishing	0	4	4	2.50	8
Jet skiing	0	2	0	2.00	2
Hunting	1	3	5	2.44	9
Relaxing / entertaining	51	20	6	1.42	77
Water skiing / tubing	4	6	5	2.07	15
Sailing	0	1	0	2.00	1
Swimming	5	10	18	2.39	33
Snowmobiling	1	4	9	2.57	14
Canoeing / kayaking	4	11	10	2.24	25
Nature viewing	3	12	16	2.42	31
Cross country skiing / snowshoeing	0	4	4	2.50	8
None of these activities are important to me	1	1	0	1.50	2
Other (please specify below)	3	1	1	1.60	5
answered question					100
skipped question					1

Number	"Other" responses
1	pontoon boating
2	biking
3	BIKING
4	atv
5	Mushroom hunting



18. Overall, how satisfied are you with your recreational experiences on your lake?

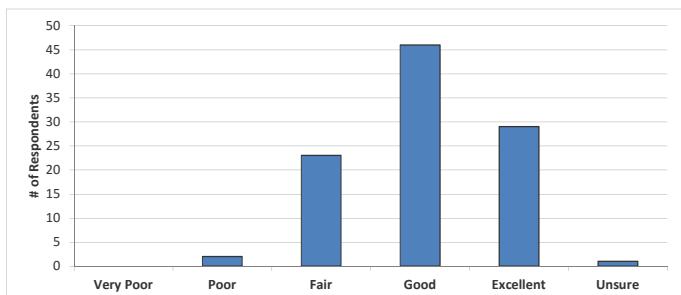
Answer Options	Very dissatisfied	Fairly dissatisfied	Neither satisfied nor dissatisfied	Fairly satisfied	Very satisfied	Response Count
	2	7	13	38	39	99
	<i>answered question</i>					99
	<i>skipped question</i>					2



Turtle Lakes Chain Current and Historic Condition, Health and Management

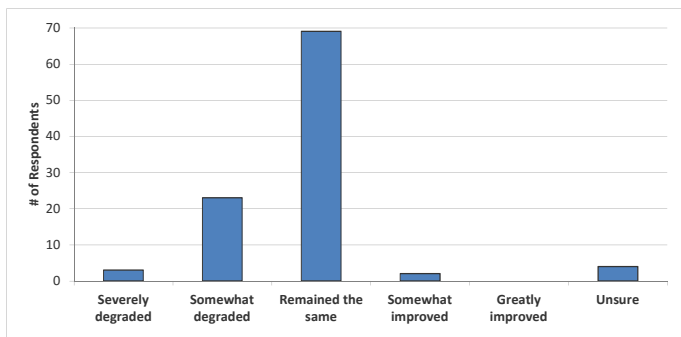
19. How would you describe the current water quality of your lake?

Answer Options	Very Poor	Poor	Fair	Good	Excellent	Unsure	Response Count
	0	2	23	46	29	1	101
	<i>answered question</i>						101
	<i>skipped question</i>						0



20. How has the water quality changed in your lake since you first visited the lake?

Answer Options	Severely degraded	Somewhat degraded	Remained the same	Somewhat improved	Greatly improved	Unsure	Response Count
	3	23	69	2	0	4	101
	<i>answered question</i>						101
	<i>skipped question</i>						0



21. Is there a natural vegetative buffer (i.e. shrubs, trees, wetland plants, etc.) between your lawn and the lake?

Answer Options	Response Percent	Response Count
Yes	82.8%	82
I think so but am not certain	2.0%	2
No	8.1%	8
I do not have a lawn adjacent to the lake	7.1%	7
answered question		99
skipped question		2

23. Before reading the statement above, had you ever heard of aquatic invasive species?

Answer Options	Response Percent	Response Count
Yes	98.0%	98
No	2.0%	2
answered question		100
skipped question		1

22. Do you fertilize your lakeside lawn?

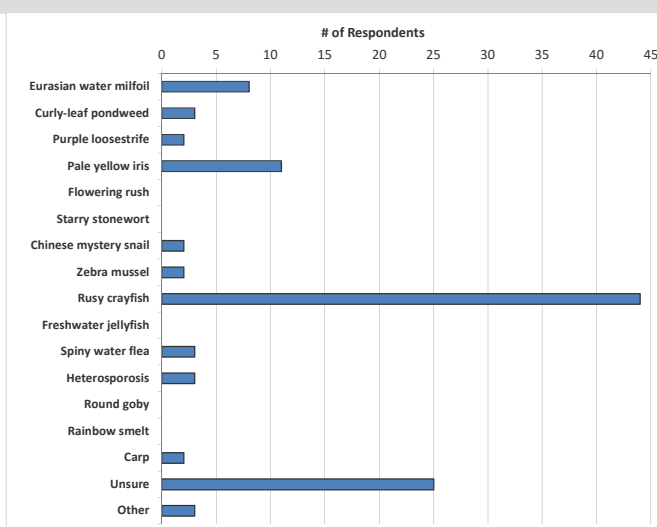
Answer Options	Response Percent	Response Count
Yes	8.5%	8
I think so but am not certain	0.0%	0
No	91.5%	86
answered question		94
skipped question		7

24. Do you believe aquatic invasive species are present within your lake?

Answer Options	Response Percent	Response Count
Yes	41.4%	41
I think so but am not certain	36.4%	36
No	22.2%	22
answered question		99
skipped question		2

25. Which aquatic invasive species do you believe are in your lake?

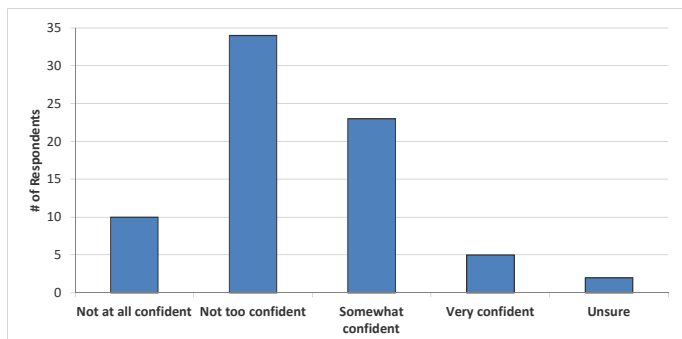
Answer Options	Response Percent	Response Count
Eurasian water milfoil	10.7%	8
Curly-leaf pondweed	4.0%	3
Purple loosestrife	2.7%	2
Pale yellow iris	14.7%	11
Flowering rush	0.0%	0
Starry stonewort	0.0%	0
Chinese mystery snail	2.7%	2
Zebra mussel	2.7%	2
Rusy crayfish	58.7%	44
Freshwater jellyfish	0.0%	0
Spiny water flea	4.0%	3
Heterosporosis (Yellow perch parasite)	4.0%	3
Round goby	0.0%	0
Rainbow smelt	0.0%	0
Carp	2.7%	2
Unsure but presume AIS to be present	33.3%	25
Other (please specify)	4.0%	3
answered question		75
skipped question		26



Number	"Other" responses
1	Not sure
2	weeds but not certain which types
3	RUSTY CRAYFISH

26. How confident are you that you could identify an aquatic invasive species in your lake?

Answer Options	Not at all confident	Not too confident	Somewhat confident	Very confident	Unsure	Response Count
	10	34	23	5	2	74
<i>answered question</i>						74
<i>skipped question</i>						27



27. Have you ever taken the time to look for aquatic invasive species in your lake during open water season?

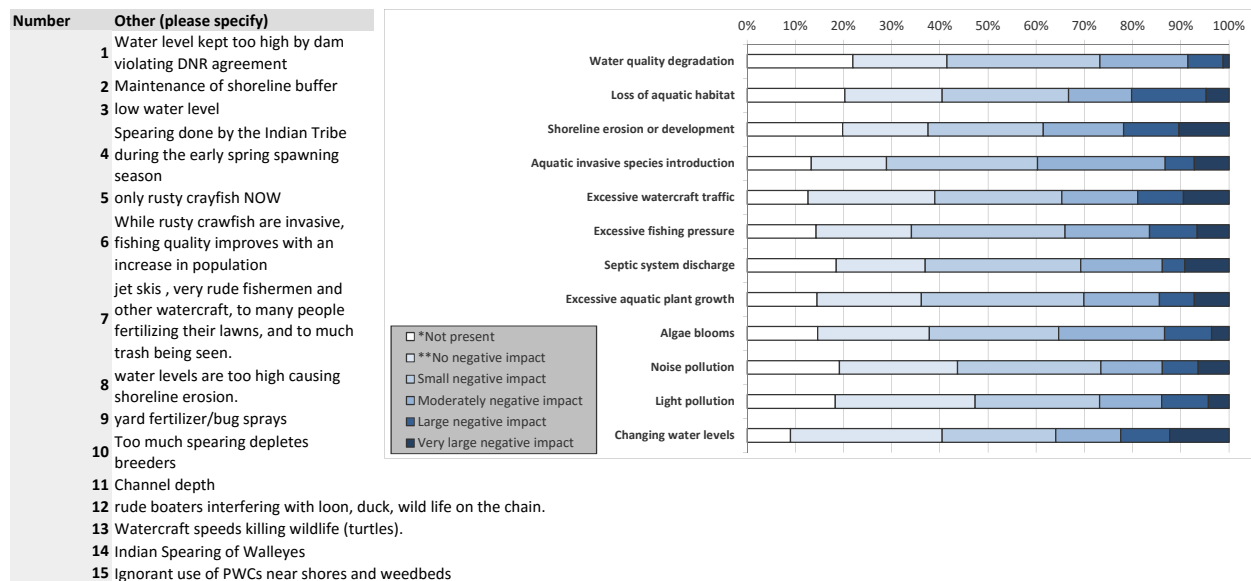
Answer Options	Response Percent	Response Count
Yes, but only a few times each year	39.0%	30
Yes, at least once a month	6.5%	5
Yes, at least once a week	3.9%	3
No	50.7%	39
<i>answered question</i>		77
<i>skipped question</i>		24

28. To what level do you believe each of the following factors may currently be negatively impacting your lake?

*** Not present means that you believe the issue does not exist on your lake.**

**** No impact means that the issue may exist on your lake but it is not negatively impacting the lake.**

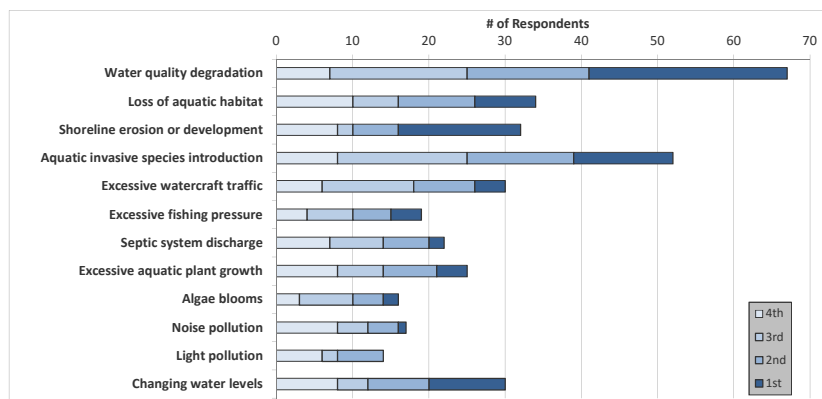
Answer Options	*Not present	**No negative impact	Small negative impact	Moderately negative impact	Large negative impact	Very large negative impact	Unsure: Need more information	Rating Average	Response Count
Water quality degradation	18	16	26	15	6	1	15	0.80	97
Loss of aquatic habitat	17	17	22	11	13	4	13	1.02	97
Shoreline erosion or development	19	17	23	16	11	10	2	1.31	98
Aquatic invasive species introduction	11	13	26	22	5	6	13	1.14	96
Excessive watercraft traffic	12	25	25	15	9	9	2	1.22	97
Excessive fishing pressure	13	18	29	16	9	6	6	1.15	97
Septic system discharge	12	12	21	11	3	6	29	0.81	94
Excessive aquatic plant growth	12	18	28	13	6	6	14	0.99	97
Algae blooms	12	19	22	18	8	3	13	0.99	95
Noise pollution	18	23	28	12	7	6	2	1.01	96
Light pollution	17	27	24	12	9	4	4	0.94	97
Changing water levels	8	28	21	12	9	11	6	1.22	95
Other (please specify)	2	2	1	1	4	8	5	2.04	23
Other (please specify)									15
answered question									99
skipped question									2



29. From the list below, please rank your top four concerns regarding your lake, with 1 being your greatest concern.

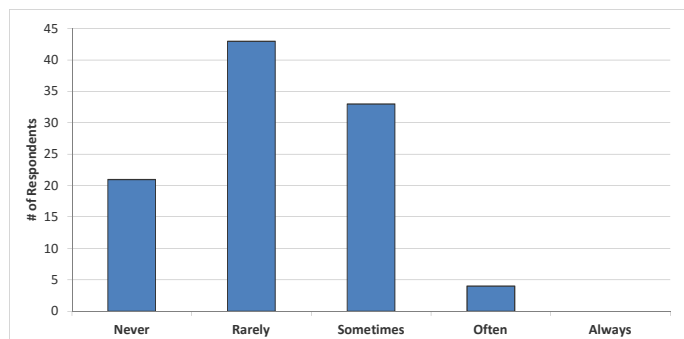
Answer Options	1st	2nd	3rd	4th	Response Count
Water quality degradation	26	16	18	7	67
Loss of aquatic habitat	8	10	6	10	34
Shoreline erosion or development	16	6	2	8	32
Aquatic invasive species introduction	13	14	17	8	52
Excessive watercraft traffic	4	8	12	6	30
Excessive fishing pressure	4	5	6	4	19
Septic system discharge	2	6	7	7	22
Excessive aquatic plant growth	4	7	6	8	25
Algae blooms	2	4	7	3	16
Noise pollution	1	4	4	8	17
Light pollution	0	6	2	6	14
Changing water levels	10	8	4	8	30
Other (please specify)	5	1	1	1	8
answered question					95
skipped question					6

Number	"Other" responses
1	spearing
2	Maintenance of shoreline buffer
3	Spearing of spawning walleye in early spring
4	Too many B.S. regulations ie "LIGHT POLLUTION"
5	Irritating neighbors
6	attempting to remove rusty crawfish
7	the water level needs to lower, high water causing erosion.
8	All of the above
8	Spearing depletes fish reducing size and amount of fish
8	Degraded Walleye Fishing is #1
8	Too many walleyes so they are stunted



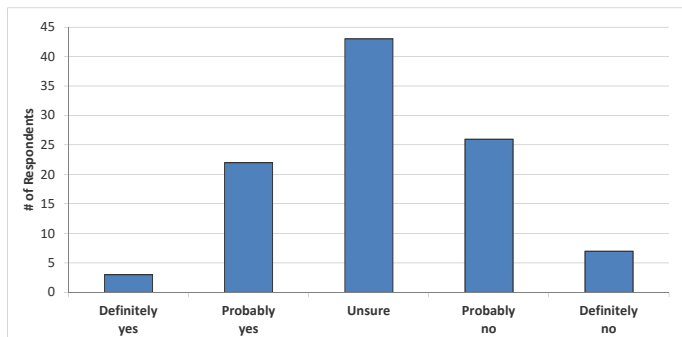
30. During open water season how often does aquatic plant growth, including algae, negatively impact your enjoyment of your lake?

Answer Options	Never	Rarely	Sometimes	Often	Always	Response Count
	21	43	33	4	0	101
answered question						101
skipped question						0



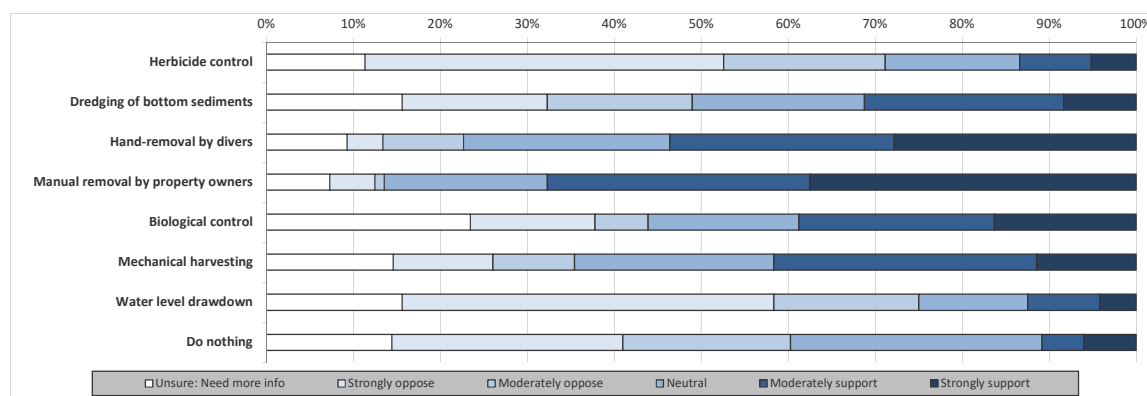
31. Considering your answer to the question above, do you believe aquatic plant control is needed on your lake?

Answer Options	Definitely yes	Probably yes	Unsure	Probably no	Definitely no	Response Count
	3	22	43	26	7	101
answered question						101
skipped question						0



32. Aquatic plants can be managed using many techniques. Please tell us if you oppose or support the *responsible* use of the following techniques on your lake.

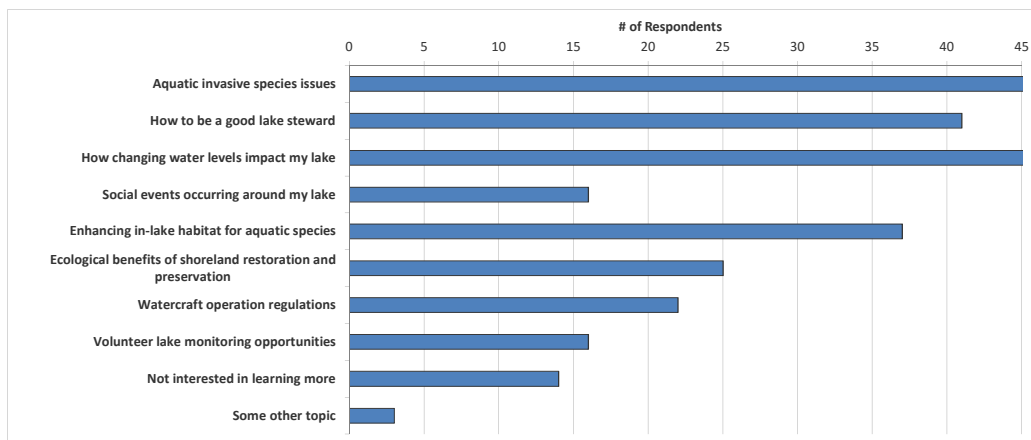
Answer Options	Strongly oppose	Moderately oppose	Neutral	Moderately support	Strongly support	Unsure: Need more info	Rating Average	Response Count
Herbicide (chemical) control	40	18	15	8	5	11	1.84	97
Dredging of bottom sediments	16	16	19	22	8	15	2.43	96
Hand-removal by divers	4	9	23	25	27	9	3.36	97
Manual removal by property owners	5	1	18	29	36	7	3.72	96
Biological control (milfoil weevil, loosestrife beetle, etc)	14	6	17	22	16	23	2.50	98
Mechanical harvesting	11	9	22	29	11	14	2.77	96
Water level drawdown	41	16	12	8	4	15	1.68	96
Do nothing (do not manage plants)	22	16	24	4	5	12	2.01	83
answered question								99
skipped question								2



33. Stakeholder education is an important component of every lake management planning effort. Which of these subjects would you like to learn more about?

Answer Options	Response Percent	Response Count
Aquatic invasive species issues	50.5%	48
How to be a good lake steward	43.2%	41
How changing water levels impact my lake	57.9%	55
Social events occurring around my lake	16.8%	16
Enhancing in-lake habitat (not shoreland or adjacent wetlands) for aquatic species	39.0%	37
Ecological benefits of shoreland restoration and preservation	26.3%	25
Watercraft operation regulations – lake specific, local and statewide	23.2%	22
Volunteer lake monitoring opportunities	16.8%	16
Not interested in learning more on any of these subjects	14.7%	14
Some other topic (please specify)	3.2%	3
answered question		95
skipped question		6

Number	Other (please specify)
1	I would like other people to leave the shoreline as natural as possible
2	How to stop algae bloom
3	Depositing fish cribs



Turtle Lakes Chain Association (TLCA)

34. Before receiving this mailing, had you ever heard of the TLCA?

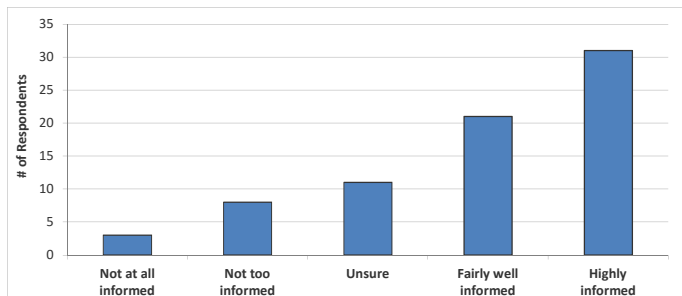
Answer Options	Response Percent	Response Count
Yes	96.0%	96
No	4.0%	4
answered question		100
skipped question		1

35. What is your membership status with the TLCA?

Answer Options	Response Percent	Response Count
Current member	55.9%	52
Former member	21.5%	20
Never been a member	22.6%	21
answered question		93
skipped question		8

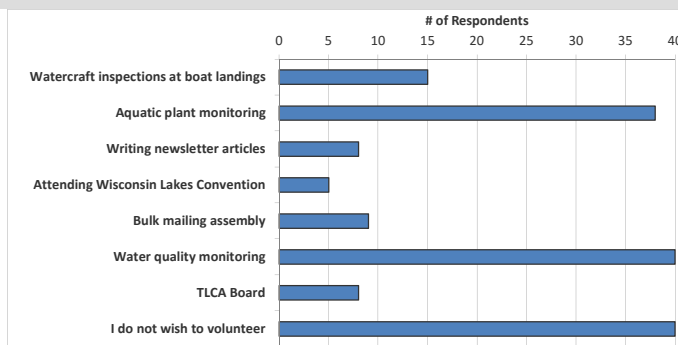
36. How informed has (or had) the TLCA kept you regarding issues with your lake and its management?

Answer Options	Not at all informed	Not too informed	Unsure	Fairly well informed	Highly informed	Response Count
	3	8	11	21	31	74
answered question						74
skipped question						27



37. The effective management of your lake will require the cooperative efforts of numerous volunteers. Please circle the activities you would be willing to participate in if the TLCA requires additional assistance.

Answer Options	Response Percent	Response Count
Watercraft inspections at boat landings	15.6%	15
Aquatic plant monitoring	39.6%	38
Writing newsletter articles	8.3%	8
Attending Wisconsin Lakes Convention	5.2%	5
Bulk mailing assembly	9.4%	9
Water quality monitoring	41.7%	40
TLCA Board	8.3%	8
I do not wish to volunteer	41.7%	40
answered question		96
skipped question		5



38. Please feel free to provide written comments concerning your lake, its current and/or historic condition and its management.

Answer Options	Response Count
	42
answered question	42
skipped question	59

Number	Response Text
1	Currently not able to use our property as much as we had previously due to health issues
2	Because of my age and physical difficulties I have not been able to volunteer for many of the TLCA water management activities. I do attend the yearly meeting and I feel the board has done an excellent job in informing us about the lake.
3	I believe education is the key to sustaining our lakes. Keep dollars going towards mailings, local newspapers, TLCA/Lake Link/and other types of outdoors websites, and state wide campaigns to encourage proper ecological practices. Reward those who follow good practices that benefit our lakes.(I know this is a very general statement but there could be tax incentives as one example). However, I feel very strongly that property owners are the ones who ultimately should decide how they want to use their property. I also wanted to add a footnote to question #19 and any other questions regarding water quality. I believe our water quality is very poor when you consider the mercury warnings for fish consumption on most Wisconsin lakes. I did not take this into account, when answering the questions in this survey.
4	Shoreline erosion has been a primary problem around the lake. Water level has been kept high and allowed to rise above agreed to levels when the dam on Turtle River was installed. Repeated calls to the DNR result in no action against the Town who manages the dam. Need to consider motor restrictions on the lake. There's no need for 115hp boats on the lake. Consider no wake zones all along the shoreline to try and prevent further erosion.
5	Please get rid of the "Canada Geese"! We have served in all the areas above for volunteering
6	Maintenance of shoreline buffers and littoral zone coarse woody habitat is critical in the long term health of our lakes...many property owners do not buy in to these concepts.
7	I wish the water level were a couple of inches higher.
8	We love our lake chain and appreciate all that the TLCA is doing to help keep the lakes healthy
9	I do not know the status of my TLCA membership. Do not know who to contact. Library has no info, nor does the Winchester town hall. Have not received a newsletter for two years. Poorly advertised. Also the Rusty Crayfish did a marvelous job of controlling aquatic vegetation, until someone felt them to be too destructive. Now we are examining treatment of aquatic vegetation. DUH! Time to pull our heads out of our behinds!

Number	Response Text
10	I am concerned about the increase of jet ski operation on the lakes. The volunteer times of operation are not being observed
11	Was told this was a world class musky lake and had amazing walleye fishing. I don't musky fish but ever year we catch less walleye and nothing of great size. I hear the same from many of my friends around the lake. I'd like to see our fishing return to the great stories of catching them off our docks nightly
12	As for noise pollution I have no problem with fire works displays during the week of the fourth but every weekend from the middle of June to august is excessive and being up there all last week 2 nights during the week there were displays from a couple of residences during the week which carried over late into the evening when many of the local people are trying to get some sleep to go to work the next morning. This I believe is totally unexceptable. The weeds on the south end of South Turtle are another issue. Over the last 30 years I have watch the large reed patches we had get smaller and smaller and reced towards the shoreline. They used to project into the lake a good distance and supplied good fish habitat. You can say the ice is totally responsible but My thought is the verying water levels and the increased boat traffic through them going to Lake cabins that At one time would never have been allowed to be built there in the first place. Also because of those residences located there and the many more now on the lake that have to have their well fertilized lawns the submergent vegetation has exploded from the run off. Most of what I see are the same native plants that have always been there but now are being way over fed from all the extra heavily fertilized run off. The same people that were crying for weed cutting when I was a member of the lake association are the same ones that are doing the most fertilizing because they want things to be just like the home they came from in the south. Weed cutting does nothing in the south except destroy what fish habitat we have left and make a small number of water skiers and a couple of property owners happy. the same result would be found if done on the turtle chain. The water skiers seem to do just fine on the rest of the lake. Only issue with that is the increased boat traffic but all boaters have to be aware of each other. I have noticed the fishing for walleyes has dramatically fallen off since the DNR changed the management of the lake from class A walleye to Class A musky. The spearing has taken a large toal of spawning fish as well but of course this is my opinion and for the time being has to be tolerated with a grain of salt. Panfish populations have taken a heavy hit as well but mostly from the heavy fishing pressure. I have to include myself in that. I for one would like to see a smaller bag on the panfish. Maybe drop the limit to 15 per day but go further with a 10 inch size limit on crappies. I could except to go as low as 10 per day but 5 such as are on some other lakes is foolish and most people would fish else where and hurt any of the resort and rental properties on the lakes.
13	I have not noticed much difference in the quality of the lake or its aquatic flora and fauna except for the crayfish, the control of which I believe is very important based on what I've seen in other lakes. Navigational hazards need better marking on all three lakes. Lake users need to be better educated regarding boating close to piers, etc. We have a problem on priest point with boats coming way too close to our shoreline and pier, placing swimmers and dogs at risk, damaging the shoreline and pounding our boats at the dock. Thank you!
14	Our lake appears to have better quality than other lakes we have seen in our travels.
15	In the process of phase 3 of lake management studies
16	I have been on this chain in some capacity for over 50 years. while the fishing quality has gradually declined over the years, I noticed significant improvement during 16 years when rusty crawfish were abundant. When we have crawfish trapping programs, the fishing drops off significantly and water quality seems to deteriorate. PLEASE don't push that program.
17	I feel "and not to get political " The turtle lake chain has gradually degraded due to jet skis , rude musky and bass fisherman , loud stereos . Over 55 years i have noticed plant and algae growth growing exponentially due to everyone fertilizing lawns. Phosphate free does not help this situation at all. Nitrogen is nitrogen case closed. In the last few years i can absolutely with no doubt tell you since the u-line lady has moved in and destroyed the whole manitowish waters area things have become worse and getting worse at a faster rate. 17 Make sure you realize one has to set aside politics and money with her destroying the winchester area. Between garbage being thrown out on north turtle drive , gas from boats being stolen , rude out of town people on vacation, the land up rooted you name it. This is something winchester has to keep OUT !! Among the things on the survey this is one of the biggest negative impacts i have seen in 55 years. Rumor has it she is going to buy the wilderness and i KNOW that will be a major negative impact. I would rather have my taxes doubled than let her do anything in the town of winchester. The historic condition is important and should stay that way !! We do not need to end up like another Minocqua. Manitowish waters is already headed that way !!
18	water levels are too high causing too much shoreline damage.
19	Our property is on Rock Lake in a bay. It was always to our knowledge that the bay had a no wake by boats and other motorcraft that people needed to follow. Within the last year or so we have notice speedboats, jet skiers, and pontoon boats not abiding by this rule. I'm not sure because there are new property owners and also kids with the jet ski's unaware of the no wake. This is eroding our shoreline.
20	Thanks for all the Lake Association does.
21	I am pleased that we have an active lake association. It is difficult for us to be active, so I appreciate all that our association does for the lake community.
22	Re: No 28, No 29, and No 32 All points covered have the potential to effect the 3 lakes and water quality. Not possessing a scientific background, I must yield to someone who does. We all have read or seen stories concerning these issues which have (due to negligence/carelessness or total disregard of others interests) created a situation that potentially produce big problems. (witness the seaways effect on Lake Michigan's health and Chicago and the carp, these can be irreversible). Living in Milwaukee, I have to cede to others the right to address these problems. A broad approach based on research and observation can be a successful possibility and by virtue of what is indicated in this survey. A lot has been put on the table. At this point, my contribution is moral support and belief in TCLA's charter and stewardship goals.
23	We have lost nearly 2 feet of shoreline at various points along our property over the past 22 years. Shoreline material appears to be layering out making area adjacent to edge of water more shallow and thus less productive for fish and fishing(especially with lower summer water levels). We have seen a significant decrease in walleye, smallmouth bass and northern pike but have seen an increase in panfish and now largemouth bass.
24	Septic inspection system is inadequate. County should REQUIRE septic pumping every 2 years.
25	remarkably good condition, but we can't wait to start acting, especially since the dnr no longer has scientists, and the state has interfered with local zoning.
26	I wish to thank all members and members of the Board of the TLCA for their work.
27	I am in my 80s and consider my cabin built in 1922 with spectacular view and my favorite place in ALL USA. Granted it was better back in the 50s but time marches on
28	I am most concerned about the amount of aquatic plant life in our lake , noting the significant increase over the years, resulting in the effect of our swimming and skiing areas.
29	Here over 50 years, not much real change
30	One thing not addressed is burning barrels

Number	Response Text
	Fishing quality has degraded over the past several years. There have been occasions of going several days of fishing without a fish bite or catch. This was not the case several years ago where bag limits could be reached.
31	Water level variation has created unpredictability when navigating the channel with boats with deeper drafts. Dredging the middle of the channel by a foot to allow for easier access to rock lake would make the lake far more enjoyable for all.
32	I tested the lake for the DNR for 16 years and could not get anyone from the tlca to help !
33	We love the Turtle Lakes. It is a nice environment for kids and families. I'd like to encourage more family activities and fewer drinking activities.
34	I have been an active member of TLCA since it's beginnings and I am currently involved.
35	love sand bar
36	Thanks for the opportunity to participate.
37	The biggest problem on the Turtle Chain right now is a small handful of people are trying to change the chain to what they feel is "right". There should be less do as I say, and more do as I do.
38	The water levels need to be RAISED NOT lowered, the lake is too low now. Most residents want the level left alone or raised but there is an effort by a few, who don't care about the lake residents, who continually push to lower the lake levels against the vast majority of the lake residents.
39	no wake distances from shorelines need to be better posted and followed.
40	The fishing on the chain has drastically degraded in the last 16 years. Muskie and Walleye specifically. I think the Lake Association should be supplement the DNR's stocking program. I would be willing to help with this and would fully support it.
41	There is NO QUESTION that spearing and the high release rate of musky fishermen, along with discourteous boaters and jet-skiers has hurt the walleye fishery. It may never come back to what it was even 10-12 yrs. ago, and before that. The walleye fishery is what brought fishing families and vacationers to the lake chain. Not any more. Now it's rude, fast musky fishermen, jet skiers and people running boats that have absolutely no clue what they are doing. These lake users are what the DNR and restaurant owners apparently want. Along with snowmobilers, of course. The rest of us no longer exist in their eyes. I don't know if the lake association can do anything about the walleye disappearance, or if they even want to.
42	Mike is doing a great job as pres of the association

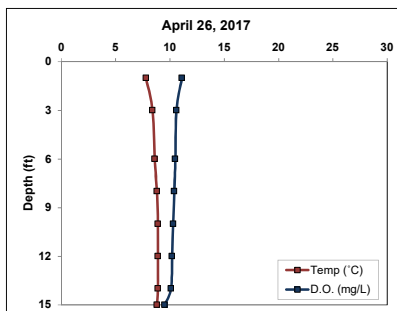
C

APPENDIX C

Water Quality Data

Date: 4/26/2017
Time: 10:30
Weather: 100% clouds, 56F, 12 mph wind
Entry: EEH

Max Depth: 16.5
ROKS Depth (ft): 3.0
ROKB Depth (ft): 14.0
Secchi Depth (ft): 4.3

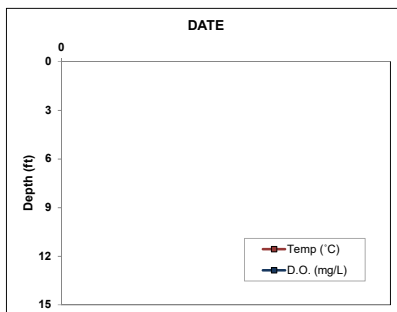
[illegible]

Parameter	ROKS	ROKB
Total P (µg/L)	28.30	29.30
Dissolved P (µg/L)	NA	NA
Chl-a (µg/L)	0.61	NA
TKN (µg/L)	NA	NA
NO ₃ ⁻ + NO ₂ ⁻ (µg/L)	NA	NA
NH ₄ ⁺ -N (µg/L)	NA	NA
Total N (µg/L)	531.00	543.00
Lab Cond. (µS/cm)	66.30	65.20
Lab pH	7.27	7.24
Alkalinity (mg/L CaCO ₃)	28.90	28.20
Total Susp. Solids (mg/L)	2.50	2.00
Calcium (mg/L)	8.79	NA
Magnesium (mg/L)	2.51	NA
Hardness (mg/L)	32.30	NA
Color (SU)	60.00	NA
Turbidity (NTU)	NA	NA

Data collected by JMB (Onterra).

Date: 6/26/2017
Time:
Weather:
Entry:

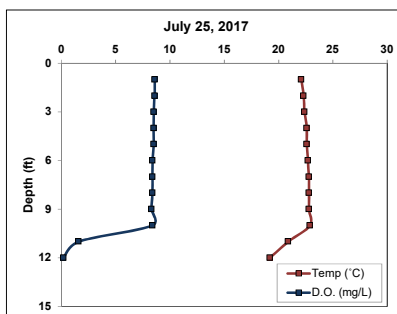
Max Depth:
ROKS Depth (ft):
ROKB Depth (ft):
Secchi Depth (ft):

[illegible]

Parameter	ROKS	ROKB
Total P (µg/L)	30.30	NA
Dissolved P (µg/L)	NA	NA
Chl-a (µg/L)	9.97	NA
TKN (µg/L)	NA	NA
NO ₃ ⁻ + NO ₂ ⁻ (µg/L)	NA	NA
NH ₄ ⁺ (µg/L)	NA	NA
Total N (µg/L)	588.00	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkalinity (mg/L CaCO ₃)	NA	NA
Total Susp. Solids (mg/L)	NA	NA
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	NA	NA
Turbidity (NTU)	NA	NA

Date: 7/25/2017
Time: 10:30
Weather: 95% clouds
Entry: EEH

Max Depth: 12.0
ROKS Depth (ft): 3.0
ROKB Depth (ft): 10.0
Secchi Depth (ft): 3.7

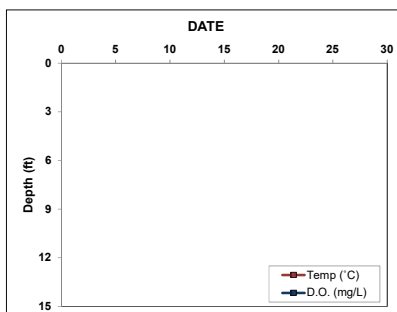
[illegible]

Parameter	ROKS	ROKB
Total P ($\mu\text{g/L}$)	28.50	30.30
Dissolved P ($\mu\text{g/L}$)	NA	NA
Chl-a ($\mu\text{g/L}$)	13.40	NA
TKN ($\mu\text{g/L}$)	NA	NA
$\text{NO}_3^- + \text{NO}_2^-$ ($\mu\text{g/L}$)	NA	NA
NH_4^+ ($\mu\text{g/L}$)	NA	NA
Total N ($\mu\text{g/L}$)	686.00	NA
Lab. Cond. ($\mu\text{S/cm}$)	72.00	71.50
Lab. pH	7.62	7.59
Alkalinity (mg/L CaCO_3)	32.50	32.50
Total Susp. Solids (mg/L)	NA	NA
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	70.00	NA
Turbidity (NTU)	NA	NA

Data collected by JMB & AMS (Onterra).

Date: 8/21/2017
Time:
Weather:
Entry: FFH

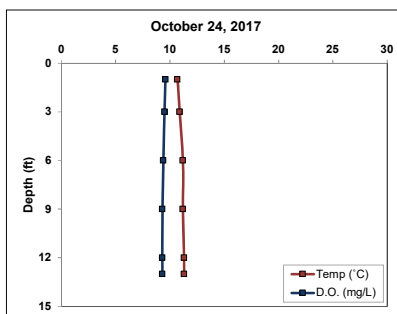
Max Depth:
ROKS Depth (ft):
ROKB Depth (ft):
Secchi Depth (ft):

[illegible]

Parameter	ROKS	ROKB
Total P (µg/L)	30.50	NA
Dissolved P (µg/L)	NA	NA
Chl-a (µg/L)	13.50	NA
TKN (µg/L)	NA	NA
NO ₃ + NO ₂ -N (µg/L)	NA	NA
NH ₄ -N (µg/L)	NA	NA
Total N (µg/L)	634.00	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkalinity (mg/L CaCO ₃)	NA	NA
Total Susp. Solids (mg/L)	NA	NA
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SIU)	NA	NA
Turbidity (NTU)	NA	NA

Rock Lake

Max Depth: 14.7
ROKS Depth (ft): 3.0
ROKB Depth (ft): 12.0
Secchi Depth (ft): 4.7

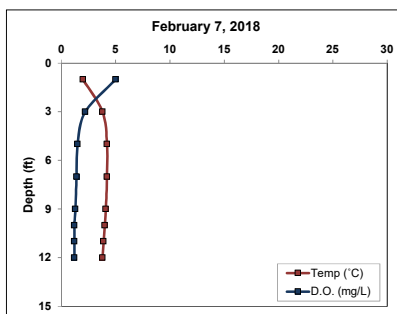
[illegible]

Parameter	ROKS	ROKB
Total P (µg/L)	34.30	31.20
Dissolved P (µg/L)	NA	NA
Chl-a (µg/L)	12.80	NA
TKN (µg/L)	NA	NA
NO ₃ + NO ₂ -N (µg/L)	NA	NA
NH ₄ -N (µg/L)	NA	NA
Total N (µg/L)	NA	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkalinity (mg/L CaCO ₃)	NA	NA
Total Susp. Solids (mg/L)	3.00	2.75
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	NA	NA
Turbidity (NTU)	NA	NA

Data collected by TAH & PJG (Onterra)

Rock Lake

Max Depth: 12.8
ROKS Depth (ft): 3.0
ROKB Depth (ft): 10.0
Secchi Depth (ft): 3.9

[illegible]

Parameter	ROKS	ROKB
Total P (µg/L)	16.00	23.80
Dissolved P (µg/L)	2.70	4.70
Chl-a (µg/L)	NA	NA
TKN (µg/L)	NA	NA
NO ₃ + NO ₂ -N (µg/L)	NA	NA
NH ₄ -N (µg/L)	NA	NA
Total N (µg/L)	700.00	693.00
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkalinity (mg/L CaCO ₃)	NA	NA
Total Susp. Solids (mg/L)	NA	NA
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	NA	NA
Turbidity (NTU)	NA	NA

Data collected by TWH and JMB (Onterra). Ice thickness = 1.5 feet

Water Quality Data

2017-2018 Parameter	Surface		Bottom	
	Count	Mean	Count	Mean
Secchi Depth (feet)	4	4.2	NA	NA
Total P (µg/L)	6	28.0	4	28.7
Dissolved P (µg/L)	1	2.7	1	4.7
Chl a (µg/L)	5	10.1	0	NA
TKN (µg/L)	0	NA	0	NA
NO ₃ +NO ₂ -N (µg/L)	0	NA	0	NA
NH ₃ -N (µg/L)	0	NA	0	NA
Total N (µg/L)	5	627.8	2	618.0
Lab Cond. (µS/cm)	2	69.2	2	68.4
Alkal (mg/l CaCO ₃)	2	30.7	2	30.4
Total Susp. Solids (mg/l)	2	2.8	2	2.4
Calcium (mg/L)	1	8.8	0	NA
Magnesium (mg/L)	1	2.5	0	NA
Hardness (mg/L)	1	32.3	0	NA
Color (SU)	2	65.0	0	NA
Turbidity (NTU)	0	NA	0	NA

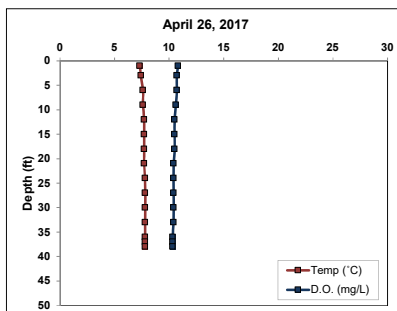
Trophic State Index (TSI)

Year	TP	Chl-a	Secchi
1984		59.5	54.2
1985			
1991			56.3
1992			51.9
1993			49.9
1994			51.3
1995			48.6
1996			55.7
1997			50.1
1998			
1999			53.9
2000			54.9
2001			55.1
2002			53.9
2003			
2004			
2005	49.8	54.3	49.1
2006	50.0	54.9	
2007	52.7	54.7	52.1
2008	49.6	55.1	53.5
2009	49.7	52.1	53.0
2010			54.5
2011			
2012			
2013			52.5
2014			52.8
2015			50.8
2016			
2017	53.1	55.2	51.4
All Years (Weighted)	51.0	54.3	51.8
SLDL Median	54.6	52.6	52.4
NLF Ecoregion Median	48.1	47.5	45.7

Year	Secchi (feet)				Chlorophyll-a (µg/L)						Total Phosphorus (µg/L)					
	Growing Season		Summer		Growing Season		Summer				Growing Season		Summer			
	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean
1984	1	4.9	1	4.9	1	19.0	1	19.0			1	31.0				
1985	1	6.2	0													
1991	4	4.5	2	4.3												
1992	5	6.3	2	5.8												
1993	3	6.6	3	6.6												
1994	3	7.9	1	6.0												
1995	4	7.1	3	7.3												
1996	5	5.0	3	4.4												
1997	3	7.0	2	6.5												
1998	1	5.0	0													
1999	4	6.0	2	5.0												
2000	4	5.6	3	4.7												
2001	2	4.6	2	4.6												
2002	3	5.0	2	5.0												
2003	0		0													
2004	0		0													
2005	9	6.9	6	7.0	4	13.3	3	11.2	5	25.4			3.0	23.7		
2006	0		0		4	11.1	3	12.0	4	23.3			3.0	24.0		
2007	5	6.0	3	5.7	3	11.6	3	11.6	4	27.3			3.0	29.0		
2008	5	5.6	3	5.2	3	12.2	3	12.2	4	23.5			3.0	23.3		
2009	5	6.0	3	5.3	3	8.9	3	8.9	4	22.2			3.0	23.5		
2010	4	4.8	4	4.8	0		0		0				0.0			
2011	0		0		0		0		0				0.0			
2012	1	6.0	0		0		0		0				0.0			
2013	13	5.5	9	5.5	0		0		0				0.0			
2014	11	5.4	6	5.4	0		0		0				0.0			
2015	10	6.2	6	6.2	0		0		0				0.0			
2016	0		0		0		0		0				0.0			
2017	9	5.6	7	6.0	5	10.1	3	12.3	5	30.4			3.0	29.8		
All Years (Weighted)		5.9		5.7		11.5		11.8		25.7				25.6		
SLDL Median				5.6				9.4						33.0		
NLF Ecoregion Median				8.9				5.6						21.0		

Date: 4/26/2017
Time: 9:25
Weather: 100% clouds, 8mph winds, 53F, rainy
Entry: EEH

Max Depth: 38.9
NTLS Depth (ft): 3.0
NTLB Depth (ft): 36.0
Secchi Depth (ft): 5.9

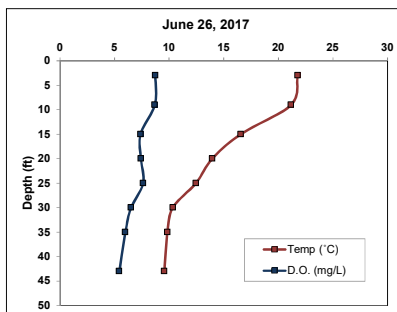
[illegible]

Parameter	NTLS	NTLB
Total P ($\mu\text{g/L}$)	29.90	21.50
Dissolved P ($\mu\text{g/L}$)	2.40	2.30
Chl-a ($\mu\text{g/L}$)	ND	NA
TKN ($\mu\text{g/L}$)	NA	NA
$\text{NO}_3^- + \text{NO}_2^- \text{N}$ ($\mu\text{g/L}$)	NA	NA
$\text{NH}_4^+ \text{N}$ ($\mu\text{g/L}$)	NA	NA
Total N ($\mu\text{g/L}$)	624.00	568.00
Lab. Cond. ($\mu\text{S/cm}$)	71.20	58.30
Lab pH	7.27	7.08
Alkalinity (mg/L CaCO_3)	29.70	21.20
Total Susp. Solids (mg/L)	ND	3.40
Calcium (mg/L)	ND	NA
Magnesium (mg/L)	10.74	NA
Hardness (mg/L)	36.40	NA
Color (SU)	80.00	NA
Turbidity (NTU)	NA	NA

Max depth is listed as 58 ft. WQ point needs to be moved - EEH

Date: 6/26/2017
Time:
Weather:
Entry: EEH

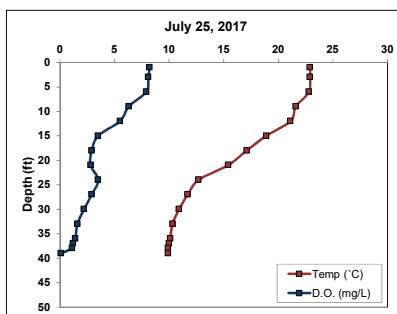
Max Depth:
NTLS Depth (ft):
NTLB Depth (ft):
Secchi Depth (ft):

[illegible]

Parameter	NTLS	NTLB
Total P ($\mu\text{g/L}$)	17.20	NA
Dissolved P ($\mu\text{g/L}$)	NA	NA
Chl-a ($\mu\text{g/L}$)	4.84	NA
TKN ($\mu\text{g/L}$)	NA	NA
$\text{NO}_3^- + \text{NO}_2^- \text{N}$ ($\mu\text{g/L}$)	NA	NA
$\text{NH}_4^+ \text{N}$ ($\mu\text{g/L}$)	NA	NA
Total N ($\mu\text{g/L}$)	499.00	NA
Lab Cond. ($\mu\text{S/cm}$)	NA	NA
Lab pH	NA	NA
Alkalinity (mg/L CaCO_3)	NA	NA
Total Susp. Solids (mg/L)	NA	NA
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SIU)	NA	NA
Turbidity (NTU)	NA	NA

Date: 7/25/2017
Time: 9:50
Weather: 90% clouds, 75F, 12 mph wind
Entry: EEH

Max Depth: 39.2
NTLS Depth (ft): 3.0
NTLB Depth (ft): 36.0
Secchi Depth (ft): 4.4

[illegible]

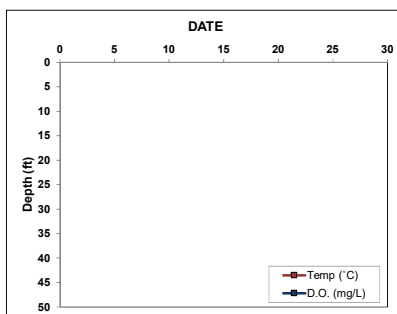
Parameter	NTLS	NTBLB
Total P ($\mu\text{g/L}$)	16.90	35.70
Dissolved P ($\mu\text{g/L}$)	NA	NA
Chl-a ($\mu\text{g/L}$)	4.78	NA
TKN ($\mu\text{g/L}$)	NA	NA
$\text{NO}_3^- + \text{NO}_2^-$ ($\mu\text{g/L}$)	NA	NA
NH_4^- ($\mu\text{g/L}$)	NA	NA
Total N ($\mu\text{g/L}$)	452.00	NA
Lab. Cond. ($\mu\text{S/cm}$)	NA	NA
Lab pH	7.60	7.00
Alkalinity (mg/L CaCO_3)	307.40	317.00
Total Susp. Solids (mg/L)	NA	NA
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	60.00	NA
Turbidity (NTU)	NA	NA

Data collected by JMB & AMS (Onterra).

North Turtle Lake

Date: 8/21/2017
Time:
Weather:
Entry: EEH

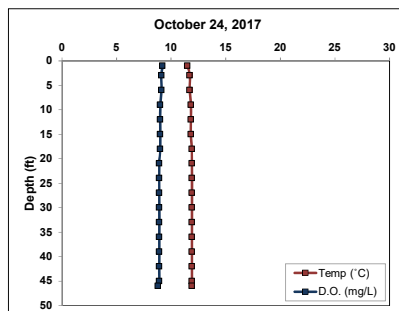
Max Depth:
NTLS Depth (ft):
NTLB Depth (ft):
Secchi Depth (ft):

[illegible]

Parameter	NTLS	NTLB
Total P ($\mu\text{g/L}$)	13.80	NA
Dissolved P ($\mu\text{g/L}$)	NA	NA
Chl-a ($\mu\text{g/L}$)	6.45	NA
TKN ($\mu\text{g/L}$)	NA	NA
$\text{NO}_3^- + \text{NO}_2^- \text{N}$ ($\mu\text{g/L}$)	NA	NA
$\text{NH}_4^+ \text{N}$ ($\mu\text{g/L}$)	NA	NA
Total N ($\mu\text{g/L}$)	431.00	NA
Lab. Cond. ($\mu\text{S/cm}$)	NA	NA
Lab pH	NA	NA
Alkalinity (mg/L CaCO_3)	NA	NA
Total Susp. Solids (mg/L)	NA	NA
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	NA	NA
Turbidity (NTU)	NA	NA

Date: 10/24/2017
Time: 11:00
Weather: 37F, windy, rain, 100% clouds
Entry: EEH

Max Depth: 46.5
NTLS Depth (ft): 3.0
NTLB Depth (ft): 44.0
Secchi Depth (ft): 4.8

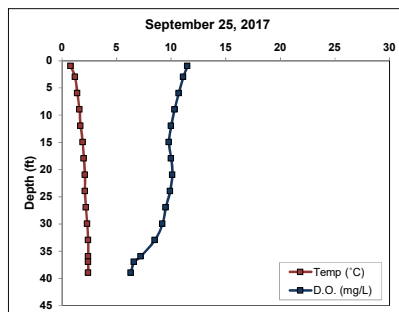
[illegible]

Parameter	NTLS	NTLB
Total P ($\mu\text{g/L}$)	20.20	21.20
Dissolved P ($\mu\text{g/L}$)	NA	NA
Chl-a ($\mu\text{g/L}$)	5.96	NA
TKN ($\mu\text{g/L}$)	NA	NA
$\text{NO}_3^- + \text{NO}_2^-$ ($\mu\text{g/L}$)	NA	NA
NH_4^- ($\mu\text{g/L}$)	NA	NA
Total N ($\mu\text{g/L}$)	NA	NA
Lab Cond. ($\mu\text{S/cm}$)	NA	NA
Lab pH	NA	NA
Alkalinity (mg/L CaCO_3)	NA	NA
Total Susp. Solids (mg/L)	ND	ND
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	NA	NA
Turbidity (NTU)	NA	NA

Data collected by TAH & PJG (Onterra).

Date: 2/7/2018
Time: 10:30
Weather: 10% clouds, 5F
Entry: EEH

Max Depth: 39.9
NTLS Depth (ft): 3.0
NTLB Depth (ft): 37.0
Secchi Depth (ft): 4.8

[illegible]

Parameter	NTLS	NTLB
Total P ($\mu\text{g/L}$)	14.00	19.60
Dissolved P ($\mu\text{g/L}$)	4.30	6.20
Chl-a ($\mu\text{g/L}$)	NA	NA
TKN ($\mu\text{g/L}$)	NA	NA
$\text{NO}_3^- + \text{NO}_2^- \text{N}$ ($\mu\text{g/L}$)	NA	NA
$\text{NH}_4^+\text{-N}$ ($\mu\text{g/L}$)	NA	NA
Total N ($\mu\text{g/L}$)	474.00	499.00
Lab Cond. ($\mu\text{S/cm}$)	NA	NA
Lab pH	NA	NA
Alkalinity (mg/L CaCO_3)	NA	NA
Total Susp. Solids (mg/L)	NA	NA
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	NA	NA
Turbidity (NTU)	NA	NA

Data collected by TWH and JMB (Onterra). Ice thickness = 1.4 feet

Water Quality Data

2017-2018 Parameter	Surface		Bottom	
	Count	Mean	Count	Mean
Secchi Depth (feet)	4	5.0	NA	NA
Total P (µg/L)	6	18.7	4	24.5
Dissolved P (µg/L)	2	3.4	2	4.3
Chl a (µg/L)	5	5.5	0	NA
TKN (µg/L)	0	NA	0	NA
NO ₃ +NO ₂ -N (µg/L)	0	NA	0	NA
NH ₃ -N (µg/L)	0	NA	0	NA
Total N (µg/L)	5	496.0	2	533.5
Lab Cond. (µS/cm)	1	71.2	1	58.3
Alkal (mg/l CaCO ₃)	2	30.1	2	26.5
Total Susp. Solids (mg/l)	2	ND	2	3.4
Calcium (mg/L)	1	10.1	0	NA
Magnesium (mg/L)	1	2.7	0	NA
Hardness (mg/L)	1	36.4	0	NA
Color (SU)	2	60.0	0	NA
Turbidity (NTU)	0	NA	0	NA

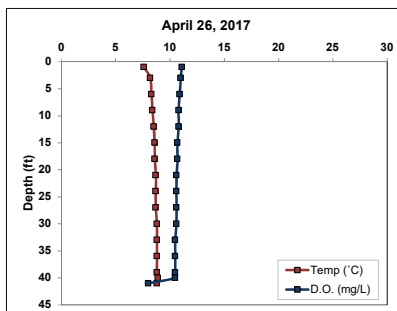
Trophic State Index (TSI)

Year	TP	Chl-a	Secchi
1984		51.0	49.3
1985			
1991			50.7
1992			54.2
1993	42.9	49.1	47.2
1994	40.4	45.1	43.6
1995	38.7	34.4	43.6
1996	39.4	44.5	45.1
1997	49.6	44.5	45.6
1998	40.8	46.1	45.5
1999	42.2	44.1	46.6
2000	42.9	43.3	46.2
2001	47.3	48.2	46.8
2002	42.2	47.8	47.2
2003	44.8	46.0	45.5
2004	42.5	48.1	46.9
2005	42.2	45.9	45.1
2006	47.1	47.8	46.4
2007	44.7	50.5	48.1
2008	44.1	45.5	44.8
2009	42.2	43.6	44.4
2010			44.9
2011			46.8
2012	38.7	43.7	46.2
2013	41.4	50.6	46.9
2014	43.9	53.9	46.2
2015	47.9	48.5	46.4
2016	45.3	49.2	
2017	45.4	46.5	50.6
All Years (Weighted)	43.2	46.3	46.1
DLDL Median	49.4	49.7	46.2
NLF Ecoregion Median	48.1	47.5	45.7

Year	Secchi (feet)				Chlorophyll-a (µg/L)						Total Phosphorus (µg/L)					
	Growing Season		Summer		Growing Season		Summer				Growing Season		Summer			
	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean
1984	1	6.9	1	6.9	1	8.0	1	8.0			1	22.0				
1985	1	6.9	0													
1991	11	6.5	8	6.3												
1992	5	5.9	3	4.9												
1993	7	8.0	6	8.0	2	6.6	2	6.6			3	14.7		3.0	14.7	
1994	6	9.6	5	10.3	3	4.4	3	4.4			3	12.3		3.0	12.3	
1995	6	10.0	5	10.3	4	2.4	3	1.5			4	12.8		3.0	11.0	
1996	4	8.2	2	9.3	4	5.5	2	4.1			4	14.8		2.0	11.5	
1997	5	8.3	3	8.9	4	5.4	3	4.1			5	25.0		3.0	23.3	
1998	5	8.1	3	9.0	3	4.8	3	4.8			4	15.3		3.0	12.7	
1999	5	9.1	3	8.3	4	3.8	3	3.9			5	15.0		3.0	14.0	
2000	8	8.8	5	8.6	4	4.2	3	3.6			5	15.8		3.0	14.7	
2001	9	8.3	6	8.2	4	6.5	3	6.0			5	21.0		3.0	20.0	
2002	7	7.8	5	8.0	3	5.8	2	5.8			5	18.2		3.0	14.0	
2003	10	9.0	7	9.0	5	5.3	4	4.8			7	16.7		4.0	16.8	
2004	6	8.2	4	8.1	4	7.1	3	6.0			5	17.8		3.0	14.3	
2005	7	9.4	5	9.3	4	5.2	3	4.8			5	15.2		3.0	14.0	
2006	5	7.9	3	8.4	4	6.8	3	5.8			5	20.6		3.0	19.7	
2007	5	9.2	3	7.5	3	7.6	3	7.6			4	16.5		3.0	16.7	
2008	4	8.9	3	9.4	3	4.5	3	4.5			4	16.5		3.0	16.0	
2009	4	9.3	3	9.7	3	3.8	3	3.8			4	16.0		3.0	14.0	
2010	13	8.9	8	9.4	0		0				0			0.0		
2011	13	8.1	8	8.2	0		0				0			0.0		
2012	15	9.0	9	8.6	1	3.8	1	3.8			1	11.0		1.0	11.0	
2013	7	8.1	6	8.2	3	7.7	3	7.7			4	15.1		3.0	13.2	
2014	11	8.4	6	8.5	3	10.7	3	10.7			4	18.7		3.0	15.8	
2015	10	8.4	6	8.4	3	6.2	3	6.2			4	20.9		3.0	20.8	
2016	0		0		3	6.7	3	6.7			4	18.6		3.0	17.4	
2017	7	6.3	4	6.3	5	5.2	4	5.1			7	19.2		4.0	17.5	
All Years (Weighted)		8.3		8.4		5.6		5.4				17.3			15.7	
DLDL Median				8.5				7.0							23.0	
NLF Ecoregion Median				8.9				5.6							21.0	

Date: 4/26/2017
Time: 8:00
Weather: 100% clouds, 10mph winds, 53F, rainy
Entry: EEH

Max Depth: 42.0
STLS Depth (ft): 3.0
STLB Depth (ft): 39.0
Secchi Depth (ft): 6.6

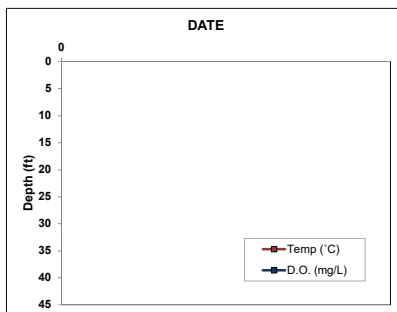
[illegible]

Parameter	STLS	STLB
Total P (µg/L)	18.50	19.40
Dissolved P (µg/L)	2.10	ND
Chl-a (µg/L)	1.04	NA
TKN (µg/L)	NA	NA
NO ₃ + NO ₂ -N (µg/L)	NA	NA
NH ₄ -N (µg/L)	NA	NA
Total N (µg/L)	492.00	530.00
Lab Cond. (µS/cm)	83.50	84.70
Lab pH	7.41	7.38
Alkalinity (mg/L CaCO ₃)	35.80	35.90
Total Susp. Solids (mg/L)	ND	ND
Calcium (mg/L)	11.70	NA
Magnesium (mg/L)	3.19	NA
Hardness (mg/L)	42.40	NA
Color (SIU)	40.00	NA
Turbidity (NTU)	NA	NA

Data collected by JMB (Onterra).

Date: 6/26/2017
Time:
Weather:
Entry:

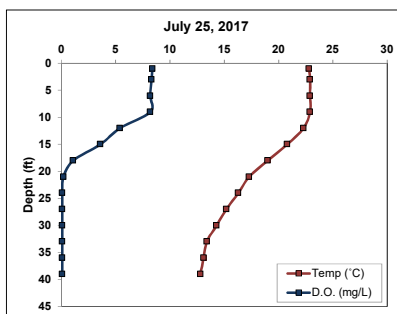
Max Depth:
STLS Depth (ft):
STLB Depth (ft):
Secchi Depth (ft):

[illegible]

Parameter	STLS	STLB
Total P (µg/L)	NA	NA
Dissolved P (µg/L)	NA	NA
Chl-a (µg/L)	7.04	NA
TKN (µg/L)	NA	NA
NO ₃ + NO ₂ -N (µg/L)	NA	NA
NH ₄ -N (µg/L)	NA	NA
Total N (µg/L)	442.00	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkalinity (mg/L CaCO ₃)	NA	NA
Total Susp. Solids (mg/L)	NA	NA
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SIU)	NA	NA
Turbidity (NTU)	NA	NA

Date: 7/25/2017
Time: 8:50
Weather: 60% Clouds, 75F, 12mph
Entry: JMB

Max Depth: 40.9
STLS Depth (ft): 3.0
STLB Depth (ft): 36.0
Secchi Depth (ft): 6.1

[illegible]

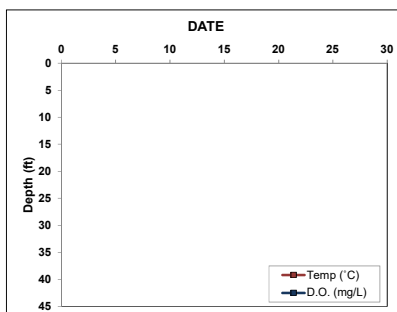
Parameter	STLS	STLB
Total P ($\mu\text{g/L}$)	19.90	52.20
Dissolved P ($\mu\text{g/L}$)	NA	NA
Chl-a ($\mu\text{g/L}$)	4.98	NA
TKN ($\mu\text{g/L}$)	NA	NA
$\text{NO}_3^- + \text{NO}_2^- \text{N}$ ($\mu\text{g/L}$)	NA	NA
$\text{NH}_4^+ \text{N}$ ($\mu\text{g/L}$)	NA	NA
Total N ($\mu\text{g/L}$)	466.00	NA
Lab Cond. ($\mu\text{S/cm}$)	NA	NA
Lab pH	7.73	6.96
Alkalinity (mg/L CaCO_3)	46.30	46.30
Total Susp. Solids (mg/L)	NA	NA
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	40.00	NA
Turbidity (NTU)	NA	NA

Data collected by JMB (Onterra).

South Turtle Lake

Date: 8/21/2017
Time:
Weather:
Entry: FFH

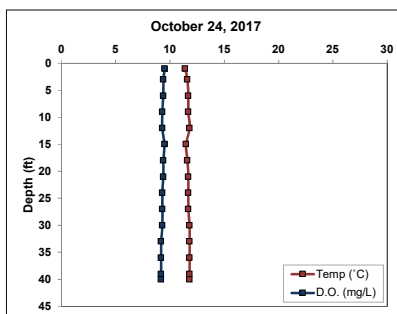
Max Depth:
STLS Depth (ft):
STLB Depth (ft):
Secchi Depth (ft):

[illegible]

Parameter	STLS	STLB
Total P ($\mu\text{g/L}$)	27.70	NA
Dissolved P ($\mu\text{g/L}$)	NA	NA
Chl-a ($\mu\text{g/L}$)	14.50	NA
TKN ($\mu\text{g/L}$)	NA	NA
$\text{NO}_3^- + \text{NO}_2^- \text{N}$ ($\mu\text{g/L}$)	NA	NA
$\text{NH}_4^+ \text{N}$ ($\mu\text{g/L}$)	NA	NA
Total N ($\mu\text{g/L}$)	523.00	NA
Lab Cond. ($\mu\text{S/cm}$)	NA	NA
Lab pH	NA	NA
Alkalinity (mg/L CaCO_3)	NA	NA
Total Susp. Solids (mg/L)	NA	NA
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	NA	NA
Turbidity (NTU)	NA	NA

Date: 10/24/2017
Time: 9:15
Weather: Rain, windy, 39F, 100% clouds
Entry: EEH

Max Depth: 41.2
STLS Depth (ft): 3.0
STLB Depth (ft): 38.0
Secchi Depth (ft): 6.7

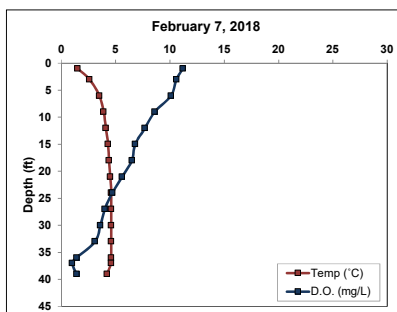
[illegible]

Parameter	STLS	STLB
Total P ($\mu\text{g/L}$)	24.40	25.20
Dissolved P ($\mu\text{g/L}$)	NA	NA
Chl-a ($\mu\text{g/L}$)	8.58	NA
TKN ($\mu\text{g/L}$)	NA	NA
$\text{NO}_3^- + \text{NO}_2^- \text{N}$ ($\mu\text{g/L}$)	NA	NA
$\text{NH}_4^+ \text{N}$ ($\mu\text{g/L}$)	NA	NA
Total N ($\mu\text{g/L}$)	NA	NA
Lab. Cond. ($\mu\text{S/cm}$)	NA	NA
Lab pH	NA	NA
Alkalinity (mg/L CaCO_3)	NA	NA
Total Susp. Solids (mg/L)	ND	ND
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	NA	NA
Turbidity (NTU)	NA	NA

Data collected by TAH & PJG (Onterra)

Date: 2/7/2018
Time: 10:00
Weather: 10% clouds, -1 F
Entry: EEH

Max Depth: 39.7
STLS Depth (ft): 3.0
STLB Depth (ft): 37.0
Secchi Depth (ft): 5.0

[illegible]

Parameter	STLS	STLB
Total P ($\mu\text{g/L}$)	13.40	22.00
Dissolved P ($\mu\text{g/L}$)	4.70	9.20
Chl-a ($\mu\text{g/L}$)	NA	NA
TKN ($\mu\text{g/L}$)	NA	NA
$\text{NO}_3^- + \text{NO}_2^-$ ($\mu\text{g/L}$)	NA	NA
NH_4^+ ($\mu\text{g/L}$)	NA	NA
Total N ($\mu\text{g/L}$)	552.00	613.00
Lab Cond. ($\mu\text{S/cm}$)	NA	NA
Lab pH	NA	NA
Alkalinity (mg/L CaCO_3)	NA	NA
Total Susp. Solids (mg/L)	NA	NA
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	NA	NA
Turbidity (NTU)	NA	NA

Data collected by TWH and JMB (Onterra).

Water Quality Data

2017-2018 Parameter	Surface		Bottom	
	Count	Mean	Count	Mean
Secchi Depth (feet)	4	6.1	NA	NA
Total P (µg/L)	5	20.8	4	29.7
Dissolved P (µg/L)	2	3.4	2	9.2
Chl a (µg/L)	5	7.2	0	NA
TKN (µg/L)	0	NA	0	NA
NO ₃ +NO ₂ -N (µg/L)	0	NA	0	NA
NH ₃ -N (µg/L)	0	NA	0	NA
Total N (µg/L)	5	495.0	2	571.5
Lab Cond. (µS/cm)	1	83.5	1	84.7
Alkal (mg/l CaCO ₃)	2	36.4	2	41.0
Total Susp. Solids (mg/l)	2	ND	2	ND
Calcium (mg/L)	1	11.7	0	NA
Magnesium (mg/L)	1	3.2	0	NA
Hardness (mg/L)	1	42.4	0	NA
Color (SU)	2	40.0	0	NA
Turbidity (NTU)	0	NA	0	NA

Trophic State Index (TSI)

Year	TP	Chl-a	Secchi
1984		57.8	54.2
1985			
1991			49.4
1992	44.1		49.9
1993	43.2	48.7	46.6
1994	46.2	47.5	48.4
1995	46.2	44.5	46.7
1996	46.6	51.3	50.1
1997	50.6	46.6	49.8
1998	45.0	52.0	50.4
1999	47.3	43.3	51.3
2000			
2001			53.9
2002			50.2
2003	50.0	49.4	48.7
2004	46.8	46.0	45.3
2005	47.1	51.1	45.9
2006	47.3	51.7	47.8
2007	48.6	55.5	48.4
2008	49.2	47.3	48.1
2009	49.2	47.0	43.2
2010	49.6	50.2	49.1
2011	50.4	54.2	
2012	48.9	54.0	49.1
2013	50.8	54.1	49.1
2014	46.9	51.0	
2015	51.0	54.4	47.8
2016	52.2	55.9	
2017	51.2	52.6	51.1
All Years (Weighted)	48.1	49.9	48.3
DHDL Median	45.0	46.4	42.8
NLF Ecoregion Median	48.1	47.5	45.7

Year	Secchi (feet)				Chlorophyll-a (µg/L)				Total Phosphorus (µg/L)			
	Growing Season		Summer		Growing Season		Summer		Growing Season		Summer	
	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean
1984	1	4.9	1	4.9	1	16.0	1	16.0				
1985	1	7.5	0									
1991	8	6.5	6	6.8					1	24.0		0.0
1992	8	6.4	5	6.6					3	19.3	1.0	16.0
1993	5	7.7	4	8.3	3	6.3	3	6.3	3	15.0	3.0	15.0
1994	6	7.3	3	7.3	4	5.1	2	5.6	4	17.8	2.0	18.5
1995	4	7.4	3	8.3	4	9.9	2	4.1	4	19.0	2.0	18.5
1996	4	5.8	2	6.5	4	8.3	2	8.2	4	20.8	2.0	19.0
1997	5	6.6	3	6.7	4	6.8	3	5.1	5	33.4	3.0	25.0
1998	7	5.8	5	6.4	3	8.9	3	8.9	4	28.3	3.0	17.0
1999	2	6.5	1	6.0	2	3.6	2	3.6	3	18.0	2.0	20.0
2000	0		0		0		0		0		0.0	
2001	6	4.8	1	5.0	0		0		0		0.0	
2002	12	6.5	7	6.5	0		0		0		0.0	
2003	12	7.3	9	7.2	1	6.8	1	6.8	2	20.0	1.0	24.0
2004	12	9.1	7	9.1	4	5.7	3	4.8	5	20.2	4.0	19.3
2005	12	8.1	6	8.8	4	9.0	3	8.1	5	22.8	3.0	19.7
2006	8	7.0	6	7.7	5	8.7	4	8.6	5	22.6	4.0	20.0
2007	8	7.9	6	7.3	4	12.7	4	12.7	5	22.0	4.0	21.8
2008	2	7.3	1	7.5	3	5.5	3	5.5	3	22.7	3.0	22.7
2009	7	10.1	4	10.5	3	5.3	3	5.3	4	22.3	3.0	22.7
2010	4	9.0	3	7.0	3	7.4	3	7.4	4	21.8	3.0	23.3
2011	1	6.5	0		2	11.0	2	11.0	3	24.7	3.0	24.7
2012	4	6.8	3	7.0	3	10.9	3	10.9	4	22.8	3.0	22.3
2013	8	6.8	7	7.0	3	11.0	3	11.0	4	25.4	4.0	25.4
2014	0		0		4	8.0	4	8.0	3	19.4	3.0	19.4
2015	7	7.6	6	7.7	3	11.3	3	11.3	4	23.3	3.0	25.8
2016	0		0		3	13.2	3	13.2	3	28.0	3.0	28.0
2017	3	6.5	1	6.1	7	8.1	5	9.4	7	24.3	4.0	26.1
All Years (Weighted)		7.2		7.4		8.5		8.4		22.7		21.8
DHDL Median				10.8				5.0				17.0
NLF Ecoregion Median				8.9				5.6				21.0

D

APPENDIX D

Watershed Analysis WiLMS Results

Date: 10/27/2017 Scenario: Rock Lake Current

Lake Id: Rock Lake

Watershed Id: 0

Hydrologic and Morphometric Data

Tributary Drainage Area: 3498.0 acre

Total Unit Runoff: 14 in.

Annual Runoff Volume: 4081.0 acre-ft

Lake Surface Area <As>: 126 acre

Lake Volume <V>: 1078 acre-ft

Lake Mean Depth <z>: 8.6 ft

Precipitation - Evaporation: 5.5 in.

Hydraulic Loading: 4138.8 acre-ft/year

Areal Water Load <qs>: 32.8 ft/year

Lake Flushing Rate <p>: 3.84 1/year

Water Residence Time: 0.26 year

Observed spring overturn total phosphorus (SP0): 23.7 mg/m³

Observed growing season mean phosphorus (GSM): 25.4 mg/m³

% NPS Change: 0%

% PS Change: 0%

NON-POINT SOURCE DATA

Land Use	Acre	Low	Most Likely	High	Loading %	Low	Most Likely	High
	(ac)	Loading (kg/ha-year)				Loading (kg/year)		
Row Crop AG	0.0	0.50	1.00	3.00	0.0	0	0	0
Mixed AG	0.0	0.30	0.80	1.40	0.0	0	0	0
Pasture/Grass	255	0.10	0.30	0.50	17.9	10	31	52
HD Urban (1/8 Ac)	0.0	1.00	1.50	2.00	0.0	0	0	0
MD Urban (1/4 Ac)	0.0	0.30	0.50	0.80	0.0	0	0	0
Rural Res (>1 Ac)	1	0.05	0.10	0.25	0.0	0	0	0
Wetlands	1728	0.10	0.10	0.10	40.4	70	70	70
Forest	1514	0.05	0.09	0.18	31.9	31	55	110
Lake Surface	126.0	0.10	0.30	1.00	8.8	5	15	51

POINT SOURCE DATA

Point Sources	Water Load	Low	Most Likely	High	Loading %
	(m ³ /year)	(kg/year)	(kg/year)	(kg/year)	

SEPTIC TANK DATA

Description	Low	Most Likely	High	Loading %
Septic Tank Output (kg/capita-year)	0.3	0.5	0.8	
# capita-years	34			
% Phosphorus Retained by Soil	98	90	80	
Septic Tank Loading (kg/year)	0.20	1.70	5.44	1.0

TOTALS DATA

Description	Low	Most Likely	High	Loading %
Total Loading (lb)	256.2	381.6	635.7	100.0
Total Loading (kg)	116.2	173.1	288.4	100.0
Areal Loading (lb/ac-year)	2.03	3.03	5.05	0.0
Areal Loading (mg/m ² -year)	227.91	339.43	565.51	0.0
Total PS Loading (lb)	0.0	0.0	0.0	0.0
Total PS Loading (kg)	0.0	0.0	0.0	0.0
Total NPS Loading (lb)	244.5	344.1	511.3	99.0
Total NPS Loading (kg)	110.9	156.1	231.9	99.0

Phosphorus Prediction and Uncertainty Analysis Module

Date: 10/27/2017 Scenario: 146

Observed spring overturn total phosphorus (SP0): 23.7 mg/m³Observed growing season mean phosphorus (GSM): 25.4 mg/m³Back calculation for SP0 total phosphorus: 0.0 mg/m³Back calculation GSM phosphorus: 0.0 mg/m³

% Confidence Range: 70%

Nurnberg Model Input - Est. Gross Int. Loading: 0 kg

Lake Phosphorus Model	Low	Most Likely	High	Predicted	% Dif.
	Total P	Total P	Total P	-Observed	
	(mg/m³)	(mg/m³)	(mg/m³)	(mg/m³)	
Walker, 1987 Reservoir	16	23	39	-2	-8
Canfield-Bachmann, 1981 Natural Lake	17	24	38	-1	-4
Canfield-Bachmann, 1981 Artificial Lake	16	22	33	-3	-12
Rechow, 1979 General	10	14	24	-11	-43
Rechow, 1977 Anoxic	19	29	48	4	16
Rechow, 1977 water load<50m/year	15	22	36	-3	-12
Rechow, 1977 water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977 General	16	23	39	-1	-4
Vollenweider, 1982 Combined OECD	14	20	30	-5	-20
Dillon-Rigler-Kirchner	10	15	25	-9	-38
Vollenweider, 1982 Shallow Lake/Res.	11	16	25	-9	-37
Larsen-Mercier, 1976	15	22	37	-2	-8
Nurnberg, 1984 Oxid	11	16	26	-9	-35

Lake Phosphorus Model	Confidence	Confidence	Parameter Fit?	Back	Model Type
	Lower Bound	Upper Bound		Calculation (kg/year)	
Walker, 1987 Reservoir	15	36	FIT	0	GSM
Canfield-Bachmann, 1981 Natural Lake	7	69	FIT	1	GSM
Canfield-Bachmann, 1981 Artificial Lake	7	63	FIT	1	GSM
Rechow, 1979 General	9	22	FIT	0	GSM
Rechow, 1977 Anoxic	19	44	FIT	0	GSM
Rechow, 1977 water load<50m/year	14	34	FIT	0	GSM
Rechow, 1977 water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977 General	13	40	FIT	0	SPO
Vollenweider, 1982 Combined OECD	11	35	FIT	0	ANN
Dillon-Rigler-Kirchner	10	23	FIT	0	SPO
Vollenweider, 1982 Shallow Lake/Res.	9	28	FIT	0	ANN
Larsen-Mercier, 1976	15	33	P Pin	0	SPO
Nurnberg, 1984 Oxic	9	26	FIT	0	ANN

Water and Nutrient Outflow Module

Date: 10/27/2017 Scenario: 107

Average Annual Surface Total Phosphorus: 25.4mg/m³

Annual Discharge: 4.14E+003 AF => 5.11E+006 m³

Annual Outflow Loading: 273.6 LB => 124.1 kg

Date: 10/27/2017 Scenario: North Turtle Lake Current

Lake Id: North Turtle Lake

Watershed Id: 0

Hydrologic and Morphometric Data

Tributary Drainage Area: 2095.0 acre

Total Unit Runoff: 14 in.

Annual Runoff Volume: 2444.2 acre-ft

Lake Surface Area <As>: 368 acre

Lake Volume <V>: 7813 acre-ft

Lake Mean Depth <z>: 21.2 ft

Precipitation - Evaporation: 5.5 in.

Hydraulic Loading: 12385.2 acre-ft/year

Areal Water Load <qs>: 33.7 ft/year

Lake Flushing Rate <p>: 1.59 1/year

Water Residence Time: 0.63 year

Observed spring overturn total phosphorus (SP0): 20.3 mg/m³Observed growing season mean phosphorus (GSM): 17.3 mg/m³

% NPS Change: 0%

% PS Change: 0%

NON-POINT SOURCE DATA

Land Use	Acre	Low	Most Likely	High	Loading %	Low	Most Likely	High
	(ac)	Loading (kg/ha-year)				Loading (kg/year)		
Row Crop AG	0.0	0.50	1.00	3.00	0.0	0	0	0
Mixed AG	0.0	0.30	0.80	1.40	0.0	0	0	0
Pasture/Grass	184	0.10	0.30	0.50	4.9	7	22	37
HD Urban (1/8 Ac)	0.0	1.00	1.50	2.00	0.0	0	0	0
MD Urban (1/4 Ac)	0.0	0.30	0.50	0.80	0.0	0	0	0
Rural Res (>1 Ac)	3	0.05	0.10	0.25	0.0	0	0	0
Wetlands	971	0.10	0.10	0.10	8.6	39	39	39
Forest	937	0.05	0.09	0.18	7.4	19	34	68
Lake Surface	368.0	0.10	0.30	1.00	9.7	15	45	149

POINT SOURCE DATA

Point Sources	Water Load	Low	Most Likely	High	Loading %
	(m ³ /year)	(kg/year)	(kg/year)	(kg/year)	
Rock Lake Subwatershed	5110000	0.0	124	0.0	27.0
Lake Helen Subwatershed	104000	0.0	2	0.0	0.4
Tamarack Lake Subwatershed	6840000	0.0	188	0.0	41.0

SEPTIC TANK DATA

Description		Low	Most Likely	High	Loading %
Septic Tank Output (kg/capita-year)		0.3	0.5	0.8	
# capita-years	89				
% Phosphorus Retained by Soil		98	90	80	
Septic Tank Loading (kg/year)		0.53	4.45	14.24	1.0

TOTALS DATA

Description	Low	Most Likely	High	Loading %
Total Loading (lb)	179.0	1011.9	679.6	100.0
Total Loading (kg)	81.2	459.0	308.3	100.0
Areal Loading (lb/ac-year)	0.49	2.75	1.85	0.0
Areal Loading (mg/m ² -year)	54.52	308.22	206.99	0.0
Total PS Loading (lb)	0.0	692.2	0.0	68.4
Total PS Loading (kg)	0.0	314.0	0.0	68.4
Total NPS Loading (lb)	145.0	211.4	319.9	30.6
Total NPS Loading (kg)	65.8	95.9	145.1	30.6

Phosphorus Prediction and Uncertainty Analysis Module

Date: 10/27/2017 Scenario: 148

Observed spring overturn total phosphorus (SP0): 20.3 mg/m³

Observed growing season mean phosphorus (GSM): 17.3 mg/m³

Back calculation for SP0 total phosphorus: 0.0 mg/m³

Back calculation GSM phosphorus: 0.0 mg/m³

% Confidence Range: 70%

Nurnberg Model Input - Est. Gross Int. Loading: 0 kg

Lake Phosphorus Model	Low Total P (mg/m ³)	Most Likely Total P (mg/m ³)	High Total P (mg/m ³)	Predicted -Observed (mg/m ³)	% Dif.
Walker, 1987 Reservoir	3	17	11	0	0
Canfield-Bachmann, 1981 Natural Lake	4	19	13	2	12
Canfield-Bachmann, 1981 Artificial Lake	4	18	13	1	6
Rechow, 1979 General	2	13	9	-4	-23
Rechow, 1977 Anoxic	4	24	16	7	40
Rechow, 1977 water load<50m/year	3	16	11	-1	-6
Rechow, 1977 water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977 General	3	18	12	-2	-10
Vollenweider, 1982 Combined OECD	4	16	11	-3	-16
Dillon-Rigler-Kirchner	2	14	9	-6	-30
Vollenweider, 1982 Shallow Lake/Res.	3	12	9	-7	-37
Larsen-Mercier, 1976	3	17	11	-3	-15
Nurnberg, 1984 Oxid	2	14	9	-3	-17

Lake Phosphorus Model	Confidence	Confidence	Parameter	Back	Model
	Lower Bound	Upper Bound	Fit?	Calculation (kg/year)	Type
Walker, 1987 Reservoir	7	24	FIT	0	GSM
Canfield-Bachmann, 1981 Natural Lake	6	55	FIT	1	GSM
Canfield-Bachmann, 1981 Artificial Lake	6	52	FIT	1	GSM
Rechow, 1979 General	5	19	FIT	0	GSM
Rechow, 1977 Anoxic	10	33	FIT	0	GSM
Rechow, 1977 water load<50m/year	7	23	FIT	0	GSM
Rechow, 1977 water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977 General	6	29	FIT	0	SPO
Vollenweider, 1982 Combined OECD	6	27	FIT	0	ANN
Dillon-Rigler-Kirchner	6	20	FIT	0	SPO
Vollenweider, 1982 Shallow Lake/Res.	5	20	FIT	0	ANN
Larsen-Mercier, 1976	8	23	P Pin	0	SPO
Nurnberg, 1984 Oxidic	5	22	FIT	0	ANN

Water and Nutrient Outflow Module

Date: 10/27/2017 Scenario: 109

Average Annual Surface Total Phosphorus: 17.3mg/m³

Annual Discharge: 1.24E+004 AF => 1.53E+007 m³

Annual Outflow Loading: 557.8 LB => 253.0 kg

Date: 1/3/2018 Scenario: South Turtle Watershed Current

Lake Id: South Turtle Lake_DirectWS_Only

Watershed Id: 0

Hydrologic and Morphometric Data

Tributary Drainage Area: 1967.0 acre

Total Unit Runoff: 14.00 in.

Annual Runoff Volume: 2294.8 acre-ft

Lake Surface Area <As>: 488.0 acre

Lake Volume <V>: 6794.0 acre-ft

Lake Mean Depth <z>: 13.9 ft

Precipitation - Evaporation: 5.5 in.

Hydraulic Loading: 2518.5 acre-ft/year

Areal Water Load <qs>: 5.2 ft/year

Lake Flushing Rate <p>: 0.37 1/year

Water Residence Time: 2.70 year

Observed spring overturn total phosphorus (SP0): 24.0 mg/m³

Observed growing season mean phosphorus (GSM): 22.6 mg/m³

% NPS Change: 0%

% PS Change: 0%

NON-POINT SOURCE DATA

Land Use	Acre	Low	Most Likely	High	Loading %	Low	Most Likely	High
	(ac)	---- Loading (kg/ha-year) ----				----- Loading (kg/year) -----		
Row Crop AG	0.0	0.50	1.00	3.00	0.0	0	0	0
Mixed AG	0.0	0.30	0.80	1.40	0.0	0	0	0
Pasture/Grass	248.0	0.10	0.30	0.50	18.9	10	30	50
HD Urban (1/8 Ac)	0.0	1.00	1.50	2.00	0.0	0	0	0
MD Urban (1/4 Ac)	0.0	0.30	0.50	0.80	0.0	0	0	0
Rural Res (>1 Ac)	11.0	0.05	0.10	0.25	0.3	0	0	1
Wetlands	665.0	0.10	0.10	0.10	16.9	27	27	27
Forest	1043.0	0.05	0.09	0.18	23.8	21	38	76
Lake Surface	488.0	0.10	0.30	1.00	37.1	20	59	197

POINT SOURCE DATA

Point Sources	Water Load (m ³ /year)	Low (kg/year)	Most Likely (kg/year)	High (kg/year)	Loading %
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SEPTIC TANK DATA

Description		Low	Most Likely	High	Loading %
Septic Tank Output (kg/capita-year)		0.30	0.50	0.80	
# capita-years	100.0				
% Phosphorus Retained by Soil		98.0	90.0	80.0	
Septic Tank Loading (kg/year)		0.60	5.00	16.00	3.1

TOTALS DATA

Description	Low	Most Likely	High	Loading %
Total Loading (lb)	173.3	352.1	810.6	100.0
Total Loading (kg)	78.6	159.7	367.7	100.0
Areal Loading (lb/ac-year)	0.36	0.72	1.66	
Areal Loading (mg/m ² -year)	39.81	80.87	186.18	
Total PS Loading (lb)	0.0	0.0	0.0	0.0
Total PS Loading (kg)	0.0	0.0	0.0	0.0
Total NPS Loading (lb)	128.5	210.4	339.9	96.9
Total NPS Loading (kg)	58.3	95.5	154.2	96.9

Phosphorus Prediction and Uncertainty Analysis Module

Date: 1/3/2018 Scenario: 76

Observed spring overturn total phosphorus (SP0): 24.0 mg/m³

Observed growing season mean phosphorus (GSM): 22.6 mg/m³

Back calculation for SP0 total phosphorus: 0.0 mg/m³

Back calculation GSM phosphorus: 0.0 mg/m³

% Confidence Range: 70%

Nurenberg Model Input - Est. Gross Int. Loading: 0 kg

Lake Phosphorus Model	Low Total P (mg/m ³)	Most Likely Total P (mg/m ³)	High Total P (mg/m ³)	Predicted -Observed (mg/m ³)	% Dif.
Walker, 1987 Reservoir	12	24	55	1	4
Canfield-Bachmann, 1981 Natural Lake	11	19	34	-4	-18
Canfield-Bachmann, 1981 Artificial Lake	12	19	31	-4	-18
Rechow, 1979 General	3	6	14	-17	-75
Rechow, 1977 Anoxic	16	32	75	9	40
Rechow, 1977 water load<50m/year	6	11	26	-12	-53
Rechow, 1977 water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977 General	11	22	52	-2	-8
Vollenweider, 1982 Combined OECD	10	18	35	-5	-21
Dillon-Rigler-Kirchner	6	13	29	-11	-46
Vollenweider, 1982 Shallow Lake/Res.	7	14	29	-9	-39
Larsen-Mercier, 1976	10	19	45	-5	-21
Nurnberg, 1984 Oxic	6	12	28	-11	-49

Lake Phosphorus Model	Confidence	Confidence	Parameter Fit?	Back	Model Type
	Lower Bound	Upper Bound		Calculation (kg/year)	
Walker, 1987 Reservoir	14	45	Tw	0	GSM
Canfield-Bachmann, 1981 Natural Lake	6	55	FIT	1	GSM
Canfield-Bachmann, 1981 Artificial Lake	6	55	FIT	1	GSM
Rechow, 1979 General	3	11	FIT	0	GSM
Rechow, 1977 Anoxic	19	60	FIT	0	GSM
Rechow, 1977 water load<50m/year	7	21	FIT	0	GSM
Rechow, 1977 water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977 General	11	44	FIT	0	SPO
Vollenweider, 1982 Combined OECD	9	34	FIT	0	ANN
Dillon-Rigler-Kirchner	7	24	L	0	SPO
Vollenweider, 1982 Shallow Lake/Res.	7	27	FIT	0	ANN
Larsen-Mercier, 1976	12	36	P Pin	0	SPO
Nurnberg, 1984 Oxic	6	24	FIT	0	ANN

E

APPENDIX E

Aquatic Plant Survey Data

2017	Onterra, LLC
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Point Number	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	ID	Lake Name	County	Date	Field Crew	Point Number	Depth (ft)	Sediment	Pole; Rope	Comments	Notes	Nuisance	Total Lake Fullness	Bident beckii	Ceratophyllum demersum	Chara spp.	Isotetes lacustris	Myriophyllum sibiricum	Myriophyllum tenellum	Najas flexilis	Nitella spp.	Nuphar variegata	Potamogeton amplifolius	Potamogeton gramineus	Potamogeton richardsonii	Potamogeton robbinsii	Scheuchzeria palustris	Sparganium americanum	Vallisneria spiralis	Freshwater sponge
1	46.250980	-89.875464	224	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	1	0			TERRESTRIAL																				
2	46.250576	-89.876049	223	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	2	0			SHALLOW																				
3	46.250171	-89.876050	175	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	3	2	Muck	Pole	SAMPLED			0																	
4	46.249766	-89.876051	222	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	4	0			TERRESTRIAL																				
5	46.248957	-89.876636	221	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	5	0			TERRESTRIAL																				
6	46.248552	-89.877221	173	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	6	3	Muck	Pole	SAMPLED			1										1						1	
7	46.248552	-89.876637	174	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	7	3	Muck	Pole	SAMPLED			1	1	1											1				
8	46.248148	-89.877806	176	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	8	4	Rock	Pole	SAMPLED			0																	
9	46.248147	-89.877222	172	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	9	6	Muck	Pole	SAMPLED			1																1	
10	46.248147	-89.876638	171	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	10	5	Muck	Pole	SAMPLED			0																1	
11	46.248146	-89.876054	170	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	11	2	Muck	Pole	SAMPLED			1																1	
12	46.247743	-89.878390	177	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	12	6	Rock	Pole	SAMPLED			0																	
13	46.247743	-89.877807	178	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	13	13	Muck	Pole	SAMPLED			0																	
14	46.247742	-89.877223	167	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	14	14	Muck	Pole	SAMPLED			0																	
15	46.247742	-89.876639	168	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	15	4	Muck	Pole	SAMPLED			1													1			1	
16	46.247741	-89.876055	169	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	16	3	Muck	Pole	SAMPLED			1											1						
17	46.247338	-89.878391	180	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	17	11	Muck	Pole	SAMPLED			0																	
18	46.247338	-89.877807	179	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	18	21			DEEP																				
19	46.247337	-89.877224	166	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	19	19			DEEP																				
20	46.247337	-89.876640	165	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	20	2	Sand	Pole	SAMPLED			0																	
21	46.247336	-89.876056	164	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	21	0			SHALLOW																				
22	46.246934	-89.878976	181	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	22	8	Rock	Pole	SAMPLED			0																	
23	46.246933	-89.878392	182	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	23	18			DEEP																				
24	46.246933	-89.877808	183	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	24	20			DEEP																				
25	46.246932	-89.877225	161	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	25	27			DEEP																				
26	46.246932	-89.876641	162	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	26	4	Rock	Pole	SAMPLED			1										1						1	
27	46.246931	-89.876057	163	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	27	2	Rock	Pole	SAMPLED			0																	
28	46.246530	-89.880144	198	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	28	4	Rock	Pole	SAMPLED			0																	
29	46.246530	-89.879561	197	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	29	3	Rock	Pole	SAMPLED			0																	
30	46.246529	-89.878977	190	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	30	12	Muck	Pole	SAMPLED			0																	
31	46.246528	-89.878393	189	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	31	18			DEEP																				
32	46.246528	-89.877809	184	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	32	24			DEEP																				
33	46.246527	-89.877226	160	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	33	28			DEEP																				
34	46.246527	-89.876642	159	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	34	15	Muck	Pole	SAMPLED			0																	
35	46.246526	-89.876058	158	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	35	4	Muck	Pole	SAMPLED			1																1	
36	46.246125	-89.880145	199	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	36	11	Muck	Rope	SAMPLED			0																	
37	46.246125	-89.879561	196	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	37	11	Muck	Pole	SAMPLED			0																	
38	46.246124	-89.878978	191	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	38	17			DEEP																				
39	46.246123	-89.878394	0	North Turtle Lake	Vilas			39	0			DEEP																				
40	46.246123	-89.877810	185	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	40	20			DEEP																				
41	46.246122	-89.877226	155	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	41	17			DEEP																				
42	46.246122	-89.876643	156	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	42	12	Rock	Pole	SAMPLED			0																	
43	46.246121	-89.876059	157	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	43	6	Rock	Pole	SAMPLED			0																	
44	46.245723	-89.882481	208	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	44	5	Muck	Pole	SAMPLED			0																	
45	46.245722	-89.881897	209	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	45	7	Muck	Pole	SAMPLED			0																	
46	46.245722	-89.881313	210	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	46	5	Muck	Pole	SAMPLED			1																1	
47	46.245721	-89.880730	211	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	47	10	Muck	Pole	SAMPLED			0																	
48	46.245720	-89.880146	200	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	48	11	Muck	Pole	SAMPLED			0																	
49	46.245720	-89.879562	195	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	49	15	Muck	Pole	SAMPLED			0																	
50	46.245719	-89.878979	192	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	50	17			DEEP																				
51	46.245718	-89.878395	188	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	51	17			DEEP																				
52	46.245718	-89.877811																														

Point Number	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	ID	Lake Name	County	Date	Field Crew	Point Number	Depth (ft)	Sediment	Pole, Rope	Comments	Notes	Native	Total Rare Fullness	Bidens beckii	Ceratophyllum demersum	Chara spp.	Isoetes lacustris	Myriophyllum albidum	Myriophyllum tenellum	Najas flexilis	Nitella spp.	Najas flexilis	Potamogeton amplifolius	Potamogeton gramineus	Potamogeton richardsonii	Potamogeton robbinsii	Scheuchzeria palustris	Sparganium angustifolium	Vallisneria spiralis	Freshwater sponge
60	46.245315	-89.880147	201	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	60	8	Muck	Pole	SAMPLED			0																	
61	46.245315	-89.879563	194	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	61	6	Muck	Pole	SAMPLED			0																	
62	46.245314	-89.878979	193	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	62	5	Rock	Pole	SAMPLED			0																	
63	46.245313	-89.878396	187	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	63	13	Muck	Pole	SAMPLED			0																	
64	46.245313	-89.877812	148	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	64	21			DEEP																				
65	46.245312	-89.877228	149	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	65	8	Rock	Pole	SAMPLED			0																	
66	46.245312	-89.876644	150	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	66	26			DEEP																				
67	46.245311	-89.876061	151	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	67	4	Rock	Pole	SAMPLED			0																	
68	46.244913	-89.882483	206	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	68	2	Muck	Pole	SAMPLED			1																	
69	46.244912	-89.881899	205	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	69	4	Muck	Pole	SAMPLED			0																	
70	46.244909	-89.878980	220	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	70	3	Rock	Pole	SAMPLED			0																	
71	46.244908	-89.878397	212	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	71	17			DEEP																				
72	46.244908	-89.877813	147	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	72	17			DEEP																				
73	46.244907	-89.877229	0	North Turtle Lake	Vilas			73	0			DEEP																				
74	46.244907	-89.876645	146	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	74	31			DEEP																				
75	46.244906	-89.876062	145	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	75	7	Rock	Pole	SAMPLED			0																	
76	46.244504	-89.878981	219	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	76	6	Muck	Pole	SAMPLED			0																	
77	46.244503	-89.878397	213	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	77	18			DEEP																				
78	46.244503	-89.877814	143	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	78	28			DEEP																				
79	46.244502	-89.877230	142	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	79	24			DEEP																				
80	46.244502	-89.876646	0	North Turtle Lake	Vilas			80	0			DEEP																				
81	46.244501	-89.876063	144	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	81	5	Rock	Pole	SAMPLED			0																	
82	46.244104	-89.883652	329	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	82	2	Sand	Pole	SAMPLED			1										1							
83	46.244100	-89.879566	340	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	83	3	Rock	Pole	SAMPLED			0																	
84	46.244099	-89.878982	218	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	84	20			DEEP																				
85	46.244098	-89.878398	214	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	85	26			DEEP																				
86	46.244098	-89.877815	141	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	86	27			DEEP																				
87	46.244097	-89.877231	0	North Turtle Lake	Vilas			87	0			DEEP																				
88	46.244097	-89.876647	140	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	88	34			DEEP																				
89	46.244096	-89.876063	139	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	89	0			SHALLOW																				
90	46.243699	-89.883653	328	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	90	4	Sand	Pole	SAMPLED			0																	
91	46.243698	-89.883069	330	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	91	7	Sand	Pole	SAMPLED			0																	
92	46.243698	-89.882485	333	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	92	2	Sand	Pole	SAMPLED			1																	
93	46.243697	-89.881902	334	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	93	3	Sand	Pole	SAMPLED			0																	
94	46.243695	-89.879567	339	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	94	11	Sand	Pole	SAMPLED			0																	
95	46.243694	-89.878983	217	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	95	30			DEEP																				
96	46.243693	-89.878399	215	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	96	23			DEEP																				
97	46.243693	-89.877816	137	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	97	23			DEEP																				
98	46.243692	-89.877232	0	North Turtle Lake	Vilas			98	0			DEEP																				
99	46.243692	-89.876648	138	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	99	31			DEEP																				
100	46.243294	-89.883654	327	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	100	7	Sand	Pole	SAMPLED			0																	
101	46.243293	-89.883070	331	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	101	13	Muck	Pole	SAMPLED			0																	
102	46.243293	-89.882486	332	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	102	12	Sand	Pole	SAMPLED			0																	
103	46.243292	-89.881902	335	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	103	11	Sand	Pole	SAMPLED			0																	
104	46.243292	-89.881319	336	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	104	4	Sand	Pole	SAMPLED			0																	
105	46.243290	-89.880151	337	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	105	4	Rock	Pole	SAMPLED			0																	
106	46.243290	-89.879568	338	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	106	26			DEEP																				
107	46.243289	-89.878984	216	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	107	17			DEEP																				
108	46.243288	-89.878400	136	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	108	22			DEEP																				
109	46.243288	-89.877816	0	North Turtle Lake	Vilas			109	0			DEEP																				
110	46.243287	-89.877233	135	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	110	23			DEEP																				
111	46.243287	-89.876649	134	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	111	12	Rock	Pole	SAMPLED			0																	
112	46.242890	-89.884238	326	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	112	3	Rock	Pole	SAMPLED			0																	
113	46.242889	-89.883654	325	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	113	11	Sand	Pole	SAMPLED			0																	
114	46.242888	-89.883071	324	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	114	7	Rock	Pole	SAMPLED			0																	
115	46.242888	-89.882487	323	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	115	17			DEEP																				
116	46.242887	-89.881903	322	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	116	20			DEEP																				
117	46.242887	-89.881320	321	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	117	23			DEEP																				
118	46.242886	-89.880736	320	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	118	24			DEEP																				

Point Number	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	ID	Lake Name	County	Date	Field Crew	Point Number	Depth (ft)	Sediment	Pole, Rope	Comments	Notes	Nullance	Total Rate Fullness	Bidens beckii	Ceratophyllum demersum	Chara spp.	Isoetes lacustris	Myriophyllum albidum	Myriophyllum tenellum	Najas flexilis	Nitella spp.	Najas variegata	Potamogeton amplifolius	Potamogeton gramineus	Potamogeton richardsonii	Potamogeton robbinsii	Scheuchzeria palustris	Sparganium angustifolium	Vallisneria spiralis	Freshwater sponge
119	46.242885	-89.880152	319	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	119	25			DEEP																				
120	46.242885	-89.879568	318	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	120	20			DEEP																				
121	46.242884	-89.878985	317	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	121	8	Rock	Pole	SAMPLED			0																	
122	46.242883	-89.878401	131	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	122	22			DEEP																				
123	46.242883	-89.877817	0	North Turtle Lake	Vilas			123	0			DEEP																				
124	46.242882	-89.877234	0	North Turtle Lake	Vilas			124	0			DEEP																				
125	46.242882	-89.876650	132	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	125	18			DEEP																				
126	46.242881	-89.876066	133	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	126	2	Rock	Pole	SAMPLED			0																	
127	46.242485	-89.884823	307	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	127	5	Rock	Pole	SAMPLED			0																	
128	46.242485	-89.884239	308	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	128	13	Sand	Pole	SAMPLED			0																	
129	46.242484	-89.883655	309	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	129	14	Muck	Pole	SAMPLED			0																	
130	46.242483	-89.883072	310	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	130	10	Rock	Pole	SAMPLED			0																	
131	46.242483	-89.882488	311	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	131	19			DEEP																				
132	46.242482	-89.881904	312	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	132	31			DEEP																				
133	46.242482	-89.881320	313	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	133	33			DEEP																				
134	46.242481	-89.880737	314	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	134	32			DEEP																				
135	46.242480	-89.880153	315	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	135	19			DEEP																				
136	46.242480	-89.879569	316	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	136	18			DEEP																				
137	46.242479	-89.878986	130	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	137	27			DEEP																				
138	46.242478	-89.878402	0	North Turtle Lake	Vilas			138	0			DEEP																				
139	46.242478	-89.877818	0	North Turtle Lake	Vilas			139	0			DEEP																				
140	46.242477	-89.877235	129	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	140	22			DEEP																				
141	46.242477	-89.876651	128	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	141	10	Muck	Pole	SAMPLED			0																	
142	46.242476	-89.876067	127	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	142	2	Sand	Pole	SAMPLED			0																	
143	46.242081	-89.885407	306	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	143	9	Sand	Pole	SAMPLED			0																	
144	46.242080	-89.884824	305	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	144	15	Muck	Pole	SAMPLED			0																	
145	46.242080	-89.884240	304	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	145	19			DEEP																				
146	46.242079	-89.883656	303	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	146	19			DEEP																				
147	46.242078	-89.883072	302	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	147	20			DEEP																				
148	46.242078	-89.882489	301	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	148	32			DEEP																				
149	46.242077	-89.881905	300	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	149	34			DEEP																				
150	46.242077	-89.881321	299	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	150	20			DEEP																				
151	46.242076	-89.880738	298	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	151	22			DEEP																				
152	46.242075	-89.880154	297	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	152	39			DEEP																				
153	46.242075	-89.879570	125	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	153	38			DEEP																				
154	46.242074	-89.878987	0	North Turtle Lake	Vilas			154	0			DEEP																				
155	46.242073	-89.878403	0	North Turtle Lake	Vilas			155	0			DEEP																				
156	46.242073	-89.877819	0	North Turtle Lake	Vilas			156	0			DEEP																				
157	46.242072	-89.877235	126	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	157	6	Rock	Pole	SAMPLED			0																	
158	46.241677	-89.886576	286	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	158	4	Sand	Pole	SAMPLED			0																	
159	46.241676	-89.885992	287	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	159	3	Sand	Pole	SAMPLED			0																	
160	46.241676	-89.885408	288	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	160	10	Sand	Pole	SAMPLED			0																	
161	46.241675	-89.884824	289	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	161	18			DEEP																				
162	46.241675	-89.884241	290	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	162	21			DEEP																				
163	46.241674	-89.883657	291	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	163	24			DEEP																				
164	46.241673	-89.883073	292	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	164	33			DEEP																				
165	46.241673	-89.882490	293	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	165	33			DEEP																				
166	46.241672	-89.881906	294	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	166	16			DEEP																				
167	46.241672	-89.881322	295	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	167	14	Rock	Pole	SAMPLED			0																	
168	46.241671	-89.880739	296	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	168	44			DEEP																				
169	46.241670	-89.880155	124	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	169	46			DEEP																				
170	46.241670	-89.879571	0	North Turtle Lake	Vilas			170	0			DEEP																				
171	46.241669	-89.878987	0	North Turtle Lake	Vilas			171	0			DEEP																				
172	46.241668	-89.878404	0	North Turtle Lake	Vilas			172	0			DEEP																				
173	46.241668	-89.877820	123	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	173	17			DEEP																				
174	46.241667	-89.877236	122	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	174	3	Rock	Pole	SAMPLED			0																	
175	46.241272	-89.887160	285	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	175	6	Rock	Pole	SAMPLED			0																	
176	46.241272	-89.886576	284	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	176	12	Sand	Pole	SAMPLED			0																	
177	46.241271	-89.885993	283	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	177	11	Sand	Pole	SAMPLED			0																	

2017

Point Number	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	ID	Lake Name	County	Date	Field Crew	Point Number	Depth (ft)	Sediment	Pole, Rope	Comments	Notes	Nilianoe	Total Rate Fullness	Bidens beckii	Ceratophyllum demersum	Chara spp.	Isotetes lacustris	Myriophyllum albidum	Myriophyllum tenellum	Najas flexilis	Nitella spp.	Najas flexilis	Potamogeton amplifolius	Potamogeton gramineus	Potamogeton richardsonii	Potamogeton robbinsii	Scheuchzeria palustris	Sparganium angustifolium	Vallisneria spiralis	Freshwater sponge
237	46.240057	-89.8871625	231	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	237	17			DEEP																				
238	46.240057	-89.8865789	232	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	238	17			DEEP																				
239	46.240056	-89.8859952	233	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	239	16	Rock	Pole	SAMPLED			0																	
240	46.240056	-89.8854115	234	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	240	20			DEEP																				
241	46.240055	-89.8848278	235	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	241	25			DEEP																				
242	46.240055	-89.8842441	236	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	242	20			DEEP																				
243	46.240053	-89.8830768	249	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	243	26			DEEP																				
244	46.240053	-89.8824931	250	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	244	36			DEEP																				
245	46.240052	-89.8819094	251	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	245	43			DEEP																				
246	46.240052	-89.8813257	112	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	246	49			DEEP																				
247	46.240051	-89.880742	0	North Turtle Lake	Vilas			247	0			DEEP																				
248	46.24005	-89.8801584	0	North Turtle Lake	Vilas			248	0			DEEP																				
249	46.24005	-89.8795747	0	North Turtle Lake	Vilas			249	0			DEEP																				
250	46.240049	-89.878991	111	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	250	18			DEEP																				
251	46.240048	-89.8784073	110	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	251	17			DEEP																				
252	46.240048	-89.8778236	109	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	252	14	Muck	Pole	SAMPLED			0																	
253	46.240047	-89.87724	108	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	253	6	Rock	Pole	SAMPLED			0																	
254	46.239655	-89.8894981	226	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	254	11	Muck	Pole	SAMPLED			0																	
255	46.239654	-89.8889144	225	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	255	14	Muck	Pole	SAMPLED			0																	
256	46.239654	-89.8883307	224	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	256	17			DEEP																				
257	46.239653	-89.887747	223	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	257	17			DEEP																				
258	46.239652	-89.8871634	222	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	258	17			DEEP																				
259	46.239652	-89.8865797	221	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	259	18			DEEP																				
260	46.239651	-89.885996	220	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	260	20			DEEP																				
261	46.239651	-89.8854123	219	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	261	23			DEEP																				
262	46.23965	-89.8848287	218	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	262	9	Rock	Pole	SAMPLED			0																	
263	46.23965	-89.884245	248	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	263	5	Rock	Pole	SAMPLED			0																	
264	46.239649	-89.8836613	247	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	264	28			DEEP																				
265	46.239648	-89.8830776	246	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	265	37			DEEP																				
266	46.239648	-89.8824939	245	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	266	42			DEEP																				
267	46.239647	-89.8819103	103	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	267	39			DEEP																				
268	46.239647	-89.8813266	0	North Turtle Lake	Vilas			268	0			DEEP																				
269	46.239646	-89.8807429	0	North Turtle Lake	Vilas			269	0			DEEP																				
270	46.239645	-89.8801592	0	North Turtle Lake	Vilas			270	0			DEEP																				
271	46.239645	-89.8795756	0	North Turtle Lake	Vilas			271	0			DEEP																				
272	46.239644	-89.8789919	104	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	272	10	Rock	Pole	SAMPLED			0																	
273	46.239643	-89.8784082	105	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	273	8	Rock	Pole	SAMPLED			0																	
274	46.239643	-89.8778245	106	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	274	13	Muck	Pole	SAMPLED			0																	
275	46.239642	-89.8772409	107	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	275	3	Rock	Pole	SAMPLED			0																	
276	46.23925	-89.8900826	210	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	276	6	Sand	Pole	SAMPLED			0																	
277	46.23925	-89.8894989	211	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	277	13	Muck	Pole	SAMPLED			0																	
278	46.239249	-89.8889152	212	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	278	13	Muck	Pole	SAMPLED			0																	
279	46.239249	-89.8883315	213	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	279	15	Muck	Pole	SAMPLED			0																	
280	46.239248	-89.8877479	214	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	280	17			DEEP																				
281	46.239247	-89.8871642	215	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	281	17			DEEP																				
282	46.239247	-89.8865805	216	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	282	18			DEEP																				
283	46.239246	-89.8859968	217	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	283	21			DEEP																				
284	46.239245	-89.8848295	240	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	284	26			DEEP																				
285	46.239245	-89.8842458	241	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	285	35			DEEP																				
286	46.239244	-89.8836622	242	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	286	37			DEEP																				
287	46.239243	-89.8830785	243	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	287	40			DEEP																				
288	46.239243	-89.8824948	244	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	288	43			DEEP																				
289	46.239242	-89.8819111	102	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	289	43			DEEP																				
290	46.239242	-89.8813275	0	North Turtle Lake	Vilas			290	0			DEEP																				
291	46.239241	-89.8807438	0	North Turtle Lake	Vilas			291	0			DEEP																				
292	46.23924	-89.8801601	0	North Turtle Lake	Vilas			292	0			DEEP																				
293	46.23924	-89.8795765	0	North Turtle Lake	Vilas			293	0			DEEP																				
294	46.239239	-89.8789928	0	North Turtle Lake	Vilas			294	0			DEEP																				
295	46.239238	-89.8784091	101	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	295	19			DEEP																				

Point Number	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	ID	Lake Name	County	Date	Field Crew	Point Number	Depth (ft)	Sediment	Pole, Rope	Comments	Notes	Nutrient	Total Rate Fullness	Bidens beckii	Ceratophyllum demersum	Chara spp.	Isotria medeolae	Myriophyllum albidum	Myriophyllum tenellum	Najas flexilis	Nitella spp.	Najas flexilis	Potamogeton amplifolius	Potamogeton gramineus	Potamogeton richardsonii	Potamogeton robbinsii	Scheuchzeria palustris	Sparganium angustifolium	Vallisneria spiralis	Freshwater sponge
296	46.239238	-89.8778254	100	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	296	4	Rock	Pole	SAMPLED			0																	
297	46.238846	-89.890667	195	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	297	4	Sand	Pole	SAMPLED			0																	
298	46.238845	-89.890834	194	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	298	8	Sand	Pole	SAMPLED			0																	
299	46.238845	-89.8894997	193	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	299	11	Muck	Pole	SAMPLED			0																	
300	46.238844	-89.888916	192	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	300	11	Muck	Pole	SAMPLED			0																	
301	46.238844	-89.8883324	191	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	301	10	Sand	Pole	SAMPLED			0																	
302	46.238843	-89.8877487	190	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	302	14	Muck	Pole	SAMPLED			0																	
303	46.238842	-89.887165	187	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	303	17			DEEP																				
304	46.238842	-89.8865814	186	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	304	18			DEEP																				
305	46.238841	-89.8859977	185	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	305	11	Rock	Pole	SAMPLED			0																	
306	46.238841	-89.885414	184	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	306	25			DEEP																				
307	46.23884	-89.8848303	183	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	307	31			DEEP																				
308	46.23884	-89.8842467	182	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	308	37			DEEP																				
309	46.238839	-89.883663	181	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	309	42			DEEP																				
310	46.238838	-89.8830793	180	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	310	43			DEEP																				
311	46.238838	-89.8824957	179	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	311	43			DEEP																				
312	46.238837	-89.881912	97	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	312	39			DEEP																				
313	46.238837	-89.8813283	0	North Turtle Lake	Vilas			313	0			DEEP																				
314	46.238836	-89.8807447	0	North Turtle Lake	Vilas			314	0			DEEP																				
315	46.238835	-89.880161	0	North Turtle Lake	Vilas			315	0			DEEP																				
316	46.238835	-89.8795773	0	North Turtle Lake	Vilas			316	0			DEEP																				
317	46.238834	-89.8789937	0	North Turtle Lake	Vilas			317	0			DEEP																				
318	46.238833	-89.87841	98	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	318	20			DEEP																				
319	46.238833	-89.8778263	99	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	319	2	Rock	Pole	SAMPLED			0																	
320	46.238441	-89.8906678	196	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	320	5	Sand	Pole	SAMPLED			0																	
321	46.23844	-89.8900842	197	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	321	10	Muck	Pole	SAMPLED			0																	
322	46.23844	-89.8895005	198	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	322	11	Muck	Pole	SAMPLED			0																	
323	46.238439	-89.8889168	199	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	323	11	Muck	Pole	SAMPLED			0																	
324	46.238439	-89.8883332	200	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	324	12	Muck	Pole	SAMPLED			0																	
325	46.238438	-89.8877495	189	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	325	12	Muck	Pole	SAMPLED			0																	
326	46.238437	-89.8871659	188	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	326	14	Sand	Pole	SAMPLED			0																	
327	46.238437	-89.8865822	172	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	327	7	Rock	Pole	SAMPLED			0																	
328	46.238436	-89.8859985	173	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	328	25			DEEP																				
329	46.238436	-89.8854149	174	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	329	30			DEEP																				
330	46.238435	-89.8848312	175	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	330	34			DEEP																				
331	46.238435	-89.8842475	176	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	331	38			DEEP																				
332	46.238434	-89.8836639	177	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	332	42			DEEP																				
333	46.238433	-89.8830802	178	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	333	45			DEEP																				
334	46.238433	-89.8824965	96	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	334	42			DEEP																				
335	46.238432	-89.8819129	0	North Turtle Lake	Vilas			335	0			DEEP																				
336	46.238432	-89.8813292	0	North Turtle Lake	Vilas			336	0			DEEP																				
337	46.238431	-89.8807456	0	North Turtle Lake	Vilas			337	0			DEEP																				
338	46.23843	-89.8801619	0	North Turtle Lake	Vilas			338	0			DEEP																				
339	46.23843	-89.8795782	0	North Turtle Lake	Vilas			339	0			DEEP																				
340	46.238429	-89.8789946	0	North Turtle Lake	Vilas			340	0			DEEP																				
341	46.238428	-89.8784109	95	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	341	17			DEEP																				
342	46.238036	-89.8906686	204	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	342	7	Sand	Pole	SAMPLED			0																	
343	46.238035	-89.890085	203	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	343	8	Muck	Pole	SAMPLED			0																	
344	46.238035	-89.8895013	202	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	344	9	Sand	Pole	SAMPLED			0																	
345	46.238034	-89.8889177	201	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	345	3	Rock	Pole	SAMPLED			0																	
346	46.238032	-89.886583	171	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	346	20			DEEP																				
347	46.238031	-89.8859994	170	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	347	27			DEEP																				
348	46.238031	-89.8854157	169	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	348	30			DEEP																				
349	46.23803	-89.884832	168	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	349	31			DEEP																				
350	46.23803	-89.8842484	167	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	350	35			DEEP																				
351	46.238029	-89.8836647	166	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	351	40			DEEP																				
352	46.238028	-89.8830811	91	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	352	40			DEEP																				
353	46.238028	-89.8824974	0	North Turtle Lake	Vilas			353	0			DEEP																				
354	46.238027	-89.8819137	0	North Turtle Lake	Vilas			354	0			DEEP																				

2017

Point Number	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	ID	Lake Name	County	Date	Field Crew	Point Number	Depth (ft)	Sediment	Pole, Rope	Comments	Notes	Nullance	Total Rate Fullness	Bidens beckii	Ceratophyllum demersum	Chara spp.	Isoetes lacustris	Myriophyllum albidum	Myriophyllum tenellum	Najas flexilis	Nitella spp.	Najas flexilis	Potamogeton amplifolius	Potamogeton gramineus	Potamogeton richardsonii	Potamogeton robbinsii	Scheuchzeria palustris	Sparganium angustifolium	Vallisneria spiralis	Freshwater sponge
414	46.236811	-89.8807491	82	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	414	24			DEEP																				
415	46.23681	-89.8801654	81	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	415	12	Rock	Pole	SAMPLED			0																	
416	46.23681	-89.8795818	80	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	416	3	Sand	Pole	SAMPLED			0																	
417	46.236415	-89.8895046	137	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	417	17			DEEP																				
418	46.236414	-89.8889209	136	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	418	11	Sand	Pole	SAMPLED			0																	
419	46.236414	-89.8883373	135	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	419	13	Sand	Pole	SAMPLED			0																	
420	46.236413	-89.8877536	134	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	420	23			DEEP																				
421	46.236412	-89.88717	133	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	421	25			DEEP																				
422	46.236412	-89.8865864	132	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	422	23			DEEP																				
423	46.236411	-89.8860027	131	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	423	25			DEEP																				
424	46.236411	-89.8854191	130	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	424	28			DEEP																				
425	46.23641	-89.8848354	129	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	425	35			DEEP																				
426	46.23641	-89.8842518	75	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	426	46			DEEP																				
427	46.236409	-89.8836681	0	North Turtle Lake	Vilas			427	0			DEEP																				
428	46.236408	-89.8830845	0	North Turtle Lake	Vilas			428	0			DEEP																				
429	46.236408	-89.8825009	0	North Turtle Lake	Vilas			429	0			DEEP																				
430	46.236407	-89.8819172	0	North Turtle Lake	Vilas			430	0			DEEP																				
431	46.236407	-89.8813336	0	North Turtle Lake	Vilas			431	0			DEEP																				
432	46.236406	-89.8807499	78	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	432	20			DEEP																				
433	46.236405	-89.8801663	76	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	433	5	Sand	Pole	SAMPLED			0																	
434	46.236405	-89.8795827	77	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	434	6	Muck	Pole	SAMPLED			0																	
435	46.236404	-89.878999	79	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	435	0			SHALLOW																				
436	46.23601	-89.890089	120	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	436	5	Rock	Pole	SAMPLED			0																	
437	46.23601	-89.8895054	121	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	437	17			DEEP																				
438	46.236009	-89.8889217	122	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	438	18			DEEP																				
439	46.236009	-89.8883381	123	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	439	19			DEEP																				
440	46.236008	-89.8877545	124	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	440	22			DEEP																				
441	46.236007	-89.8871708	125	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	441	12	Sand	Pole	SAMPLED			0																	
442	46.236007	-89.8865872	126	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	442	17			DEEP																				
443	46.236006	-89.8860036	127	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	443	23			DEEP																				
444	46.236006	-89.8854199	128	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	444	28			DEEP																				
445	46.236005	-89.8848363	74	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	445	30			DEEP																				
446	46.236005	-89.8842526	0	North Turtle Lake	Vilas			446	0			DEEP																				
447	46.236004	-89.883669	0	North Turtle Lake	Vilas			447	0			DEEP																				
448	46.236003	-89.8830854	0	North Turtle Lake	Vilas			448	0			DEEP																				
449	46.236003	-89.8825017	0	North Turtle Lake	Vilas			449	0			DEEP																				
450	46.236002	-89.8819181	0	North Turtle Lake	Vilas			450	0			DEEP																				
451	46.236002	-89.8813345	0	North Turtle Lake	Vilas			451	0			DEEP																				
452	46.236001	-89.8807508	73	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	452	23			DEEP																				
453	46.236	-89.8801672	72	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	453	13	Muck	Pole	SAMPLED			0																	
454	46.236	-89.8795835	71	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	454	4	Muck	Pole	SAMPLED			0																	
455	46.235606	-89.8906735	119	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	455	5	Sand	Pole	SAMPLED			0																	
456	46.235605	-89.8900898	118	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	456	17			DEEP																				
457	46.235605	-89.8895062	117	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	457	17			DEEP																				
458	46.235604	-89.8889226	116	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	458	19			DEEP																				
459	46.235604	-89.8883389	115	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	459	14	Sand	Pole	SAMPLED			0																	
460	46.235603	-89.8877553	114	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	460	4	Sand	Pole	SAMPLED			1																	
461	46.235602	-89.8871717	113	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	461	3	Sand	Pole	SAMPLED			2		2	1		1												
462	46.235602	-89.886588	112	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	462	3	Sand	Pole	SAMPLED			2	1	2									1						
463	46.235601	-89.8860044	111	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	463	11	Sand	Pole	SAMPLED			0																	
464	46.235601	-89.8854208	110	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	464	27			DEEP																				
465	46.2356	-89.8848371	68	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	465	38			DEEP																				
466	46.2356	-89.8842535	0	North Turtle Lake	Vilas			466	0			DEEP																				
467	46.235599	-89.8836699	0	North Turtle Lake	Vilas			467	0			DEEP																				
468	46.235598	-89.8830862	0	North Turtle Lake	Vilas			468	0			DEEP																				
469	46.235598	-89.8825026	0	North Turtle Lake	Vilas			469	0			DEEP																				
470	46.235597	-89.881919	0	North Turtle Lake	Vilas			470	0			DEEP																				
471	46.235597	-89.8813353	0	North Turtle Lake	Vilas			471	0			DEEP																				
472	46.235596	-89.8807517	0	North Turtle Lake	Vilas			472	0			DEEP																				

Point Number	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	ID	Lake Name	County	Date	Field Crew	Point Number	Depth (ft)	Sediment	Pole, Rope	Comments	Notes	Nutrient	Total Rate Fullness	Bidens beckii	Ceratophyllum demersum	Chara spp.	Isotria medeolae	Myriophyllum albidum	Myriophyllum tenellum	Najas flexilis	Nitella spp.	Najas flexilis	Potamogeton amplifolius	Potamogeton gramineus	Potamogeton richardsonii	Potamogeton robbinsii	Scheuchzeria palustris	Sparganium angustifolium	Vallisneria spiralis	Freshwater sponge
473	46.235595	-89.8801681	69	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	473	6	Muck	Pole	SAMPLED			0																	
474	46.235595	-89.8795844	70	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	474	2	Sand	Pole	SAMPLED			0																	
475	46.235201	-89.8912579	99	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	475	4	Sand	Pole	SAMPLED			0																	
476	46.235201	-89.8906743	100	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	476	8	Sand	Pole	SAMPLED			0																	
477	46.2352	-89.8900906	101	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	477	17			DEEP																				
478	46.2352	-89.889507	102	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	478	17			DEEP																				
479	46.235199	-89.8889234	103	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	479	15	Sand	Pole	SAMPLED			0																	
480	46.235199	-89.8883398	104	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	480	15	Sand	Pole	SAMPLED			0																	
481	46.235198	-89.8877561	105	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	481	4	Sand	Pole	SAMPLED			2											1					1	
482	46.235197	-89.8871725	106	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	482	3	Sand	Pole	SAMPLED			1		1	1														
483	46.235197	-89.8865889	107	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	483	3	Sand	Pole	SAMPLED			2		1									2					1	
484	46.235196	-89.8860052	108	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	484	10	Sand	Pole	SAMPLED			0																	
485	46.235196	-89.8854216	109	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	485	25			DEEP																				
486	46.235195	-89.884838	67	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	486	45			DEEP																				
487	46.235195	-89.8842543	0	North Turtle Lake	Vilas			487	0			DEEP																				
488	46.235194	-89.8836707	0	North Turtle Lake	Vilas			488	0			DEEP																				
489	46.235193	-89.8830871	0	North Turtle Lake	Vilas			489	0			DEEP																				
490	46.235193	-89.8825035	0	North Turtle Lake	Vilas			490	0			DEEP																				
491	46.235192	-89.8819198	0	North Turtle Lake	Vilas			491	0			DEEP																				
492	46.235192	-89.8813362	66	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	492	31			DEEP																				
493	46.235191	-89.8807526	65	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	493	17			DEEP																				
494	46.23519	-89.8801689	64	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	494	4	Muck	Pole	SAMPLED			0																	
495	46.234796	-89.8912587	98	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	495	8	Sand	Pole	SAMPLED			0																	
496	46.234796	-89.8906751	97	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	496	7	Rock	Pole	SAMPLED			0																	
497	46.234795	-89.8900914	96	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	497	17			DEEP																				
498	46.234795	-89.8895078	95	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	498	17			DEEP																				
499	46.234794	-89.8889242	94	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	499	13	Sand	Pole	SAMPLED			0																	
500	46.234794	-89.8883406	93	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	500	13	Sand	Pole	SAMPLED			0																	
501	46.234793	-89.8877569	92	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	501	8	Sand	Pole	SAMPLED			1	1																
502	46.234792	-89.8871733	91	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	502	3	Sand	Pole	SAMPLED			2			2	1							1					1	
503	46.234792	-89.8865897	90	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	503	4	Sand	Pole	SAMPLED			1			1	1							1					1	
504	46.234791	-89.8860061	89	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	504	24			DEEP																				
505	46.234791	-89.8854224	88	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	505	32			DEEP																				
506	46.23479	-89.8848388	60	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	506	45			DEEP																				
507	46.23479	-89.8842552	0	North Turtle Lake	Vilas			507	0			DEEP																				
508	46.234789	-89.8836716	0	North Turtle Lake	Vilas			508	0			DEEP																				
509	46.234788	-89.8830879	0	North Turtle Lake	Vilas			509	0			DEEP																				
510	46.234788	-89.8825043	0	North Turtle Lake	Vilas			510	0			DEEP																				
511	46.234787	-89.8819207	0	North Turtle Lake	Vilas			511	0			DEEP																				
512	46.234787	-89.8813371	61	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	512	20			DEEP																				
513	46.234786	-89.8807534	62	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	513	10	Muck	Pole	SAMPLED			0																	
514	46.234785	-89.8801698	63	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	514	2	Muck	Pole	SAMPLED			0																	
515	46.234392	-89.8918431	77	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	515	2	Sand	Pole	SAMPLED			1															1		
516	46.234391	-89.8912595	78	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	516	13	Sand	Pole	SAMPLED			0																	
517	46.234391	-89.8906759	79	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	517	16	Sand	Pole	SAMPLED			0																	
518	46.23439	-89.8900923	80	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	518	17			DEEP																				
519	46.23439	-89.8895086	81	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	519	14	Sand	Pole	SAMPLED			0																	
520	46.234389	-89.888925	82	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	520	15	Sand	Pole	SAMPLED			0																	
521	46.234389	-89.8883414	83	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	521	16			DEEP																				
522	46.234388	-89.8877578	84	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	522	13	Sand	Pole	SAMPLED			0																	
523	46.234387	-89.8871742	85	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	523	3	Sand	Pole	SAMPLED			1	1										1						
524	46.234387	-89.8865905	86	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	524	3	Sand	Pole	SAMPLED			1			1	1							1						
525	46.234386	-89.8860069	87	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	525	25			DEEP																				
526	46.234386	-89.8854233	59	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	526	31			DEEP																				
527	46.234385	-89.8848397	0	North Turtle Lake	Vilas			527	0			DEEP																				
528	46.234385	-89.884256	0	North Turtle Lake	Vilas			528	0			DEEP																				
529	46.234384	-89.8836724	0	North Turtle Lake	Vilas			529	0			DEEP																				
530	46.234383	-89.8830888	0	North Turtle Lake	Vilas			530	0			DEEP																				
531	46.234383	-89.8825052	0	North Turtle Lake	Vilas			531	0			DEEP																				

Point Number	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	ID	Lake Name	County	Date	Field Crew	Point Number	Depth (ft)	Sediment	Pole, Rope	Comments	Notes	Notes	Total Rate Fullness	Bidens beckii	Ceratophyllum demersum	Chara spp.	Isotetes lacustris	Myriophyllum albidum	Myriophyllum tenellum	Najas flexilis	Nitella spp.	Najas flexilis	Potamogeton amplifolius	Potamogeton gramineus	Potamogeton richardsonii	Potamogeton robbinsii	Scheuchzeria palustris	Sparganium angustifolium	Vallisneria spiralis	Freshwater sponge
532	46.234382	-89.8819216	58	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	532	21			DEEP																				
533	46.234382	-89.8813379	57	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	533	11	Muck	Pole	SAMPLED			0																	
534	46.234381	-89.8807543	56	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	534	3	Sand	Pole	SAMPLED			0																	
535	46.233988	-89.8930111	76	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	535	2	Sand	Pole	SAMPLED			0																	
536	46.233988	-89.8924275	75	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	536	6	Sand	Pole	SAMPLED			0																	
537	46.233987	-89.8918439	74	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	537	11	Sand	Pole	SAMPLED			0																	
538	46.233986	-89.8912603	73	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	538	14	Sand	Pole	SAMPLED			0																	
539	46.233986	-89.8906767	72	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	539	14	Sand	Pole	SAMPLED			0																	
540	46.233985	-89.8900931	71	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	540	18			DEEP																				
541	46.233985	-89.8895094	70	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	541	17			DEEP																				
542	46.233984	-89.8889258	69	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	542	18			DEEP																				
543	46.233984	-89.8883422	68	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	543	19			DEEP																				
544	46.233983	-89.8877586	67	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	544	14	Sand	Pole	SAMPLED			1		1															
545	46.233982	-89.887175	66	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	545	3	Sand	Pole	SAMPLED			1		1	1														
546	46.233982	-89.8865914	65	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	546	3	Sand	Pole	SAMPLED			1		1	1				1				1					1	
547	46.233981	-89.8860077	51	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	547	17			DEEP																				
548	46.233981	-89.8854241	52	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	548	24			DEEP																				
549	46.23398	-89.8848405	0	North Turtle Lake	Vilas			549	0			DEEP																				
550	46.23398	-89.8842569	0	North Turtle Lake	Vilas			550	0			DEEP																				
551	46.233979	-89.8836733	0	North Turtle Lake	Vilas			551	0			DEEP																				
552	46.233978	-89.8830897	0	North Turtle Lake	Vilas			552	0			DEEP																				
553	46.233978	-89.8825061	0	North Turtle Lake	Vilas			553	0			DEEP																				
554	46.233977	-89.8819224	53	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	554	21			DEEP																				
555	46.233977	-89.8813388	54	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	555	7	Muck	Pole	SAMPLED			0																	
556	46.233976	-89.8807552	55	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	556	2	Sand	Pole	SAMPLED			0																	
557	46.233583	-89.8930119	54	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	557	4	Sand	Pole	SAMPLED			0																	
558	46.233583	-89.8924283	55	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	558	10	Sand	Pole	SAMPLED			0																	
559	46.233582	-89.8918447	56	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	559	13	Sand	Pole	SAMPLED			0																	
560	46.233581	-89.8912611	57	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	560	17			DEEP																				
561	46.233581	-89.8906775	58	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	561	13	Sand	Pole	SAMPLED			0																	
562	46.23358	-89.8900939	59	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	562	19			DEEP																				
563	46.23358	-89.8895103	60	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	563	19			DEEP																				
564	46.233579	-89.8889266	61	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	564	20			DEEP																				
565	46.233579	-89.888343	62	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	565	21			DEEP																				
566	46.233578	-89.8877594	63	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	566	18			DEEP																				
567	46.233577	-89.8871758	64	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	567	3	Sand	Pole	SAMPLED			1			1								1						
568	46.233577	-89.8865922	50	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	568	2	Muck	Pole	SAMPLED			1		1									1						1
569	46.233576	-89.8860086	49	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	569	10	Muck	Pole	SAMPLED			0																	
570	46.233576	-89.885425	0	North Turtle Lake	Vilas			570	0			DEEP																				
571	46.233575	-89.8848414	0	North Turtle Lake	Vilas			571	0			DEEP																				
572	46.233575	-89.8842578	0	North Turtle Lake	Vilas			572	0			DEEP																				
573	46.233574	-89.8836741	0	North Turtle Lake	Vilas			573	0			DEEP																				
574	46.233573	-89.8830905	0	North Turtle Lake	Vilas			574	0			DEEP																				
575	46.233573	-89.8825069	48	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	575	20			DEEP																				
576	46.233572	-89.8819233	47	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	576	12	Muck	Pole	SAMPLED			0																	
577	46.233572	-89.8813397	46	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	577	4	Sand	Pole	SAMPLED			0																	
578	46.233178	-89.8930127	53	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	578	5	Sand	Pole	SAMPLED			0																	
579	46.233178	-89.8924291	52	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	579	11	Sand	Pole	SAMPLED			0																	
580	46.233177	-89.8918455	51	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	580	13	Muck	Pole	SAMPLED			0																	
581	46.233176	-89.8912619	50	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	581	17			DEEP																				
582	46.233176	-89.8906783	49	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	582	5	Rock	Pole	SAMPLED			0																	
583	46.233175	-89.8900947	48	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	583	20			DEEP																				
584	46.233175	-89.8895111	47	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	584	20			DEEP																				
585	46.233174	-89.8889275	46	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	585	20			DEEP																				
586	46.233174	-89.8883439	45	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	586	23			DEEP																				
587	46.233173	-89.8877603	44	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	587	26			DEEP																				
588	46.233172	-89.8871766	41	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	588	26			DEEP																				
589	46.233172	-89.886593	0	North Turtle Lake	Vilas			589	0			DEEP																				
590	46.233171	-89.8860094	0	North Turtle Lake	Vilas			590	0			DEEP																				

Point Number	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	ID	Lake Name	County	Date	Field Crew	Point Number	Depth (ft)	Sediment	Pole, Rope	Comments	Notes	Native	Total Rare Fullness	Bidens beckii	Ceratophyllum demersum	Chara spp.	Isotria medeolae	Myriophyllum albidum	Myriophyllum tenellum	Najas flexilis	Nitella spp.	Najas flexilis	Potamogeton amplifolius	Potamogeton gramineus	Potamogeton richardsonii	Potamogeton robbinsii	Scheuchzeria palustris	Sparganium angustifolium	Vallisneria spiralis	Freshwater sponge
591	46.233171	-89.8854258	0	North Turtle Lake	Vilas			591	0			DEEP																				
592	46.23317	-89.8848422	0	North Turtle Lake	Vilas			592	0			DEEP																				
593	46.23317	-89.8842586	0	North Turtle Lake	Vilas			593	0			DEEP																				
594	46.233169	-89.883675	0	North Turtle Lake	Vilas			594	0			DEEP																				
595	46.233168	-89.8830914	43	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	595	21			DEEP																				
596	46.233168	-89.8825078	44	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	596	19			DEEP																				
597	46.233167	-89.8819242	45	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	597	3	Rock	Pole	SAMPLED			0																	
598	46.232773	-89.8930135	35	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	598	5	Sand	Pole	SAMPLED			0																	
599	46.232773	-89.8924299	36	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	599	6	Rock	Pole	SAMPLED			0																	
600	46.232772	-89.8918463	37	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	600	16	Sand	Pole	SAMPLED			0																	
601	46.232771	-89.8912627	38	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	601	17			DEEP																				
602	46.232771	-89.8906791	39	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	602	12	Sand	Pole	SAMPLED			0																	
603	46.23277	-89.8900955	40	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	603	20			DEEP																				
604	46.23277	-89.8895119	41	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	604	21			DEEP																				
605	46.232769	-89.889283	42	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	605	22			DEEP																				
606	46.232769	-89.8883447	43	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	606	24			DEEP																				
607	46.232768	-89.8877611	42	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	607	21			DEEP																				
608	46.232767	-89.8871775	0	North Turtle Lake	Vilas			608	0			DEEP																				
609	46.232767	-89.8865939	0	North Turtle Lake	Vilas			609	0			DEEP																				
610	46.232766	-89.8860103	0	North Turtle Lake	Vilas			610	0			DEEP																				
611	46.232766	-89.8854267	0	North Turtle Lake	Vilas			611	0			DEEP																				
612	46.232765	-89.8848431	0	North Turtle Lake	Vilas			612	0			DEEP																				
613	46.232765	-89.8842595	40	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	613	27			DEEP																				
614	46.232764	-89.8836759	39	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	614	22			DEEP																				
615	46.232763	-89.8830922	38	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	615	15	Muck	Pole	SAMPLED			0																	
616	46.232763	-89.8825086	0	North Turtle Lake	Vilas			616	0			NO INFORMATION																				
617	46.232368	-89.8924307	34	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	617	14	Sand	Pole	SAMPLED			0																	
618	46.232367	-89.8918471	33	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	618	17			DEEP																				
619	46.232366	-89.8912635	32	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	619	16	Muck	Pole	SAMPLED			0																	
620	46.232366	-89.8906799	31	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	620	8	Rock	Pole	SAMPLED			0																	
621	46.232365	-89.8900963	30	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	621	20			DEEP																				
622	46.232365	-89.8895127	29	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	622	23			DEEP																				
623	46.232364	-89.8889291	28	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	623	23			DEEP																				
624	46.232364	-89.8883455	35	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	624	22			DEEP																				
625	46.232363	-89.8877619	36	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	625	25			DEEP																				
626	46.232362	-89.8871783	0	North Turtle Lake	Vilas			626	0			DEEP																				
627	46.232362	-89.8865947	0	North Turtle Lake	Vilas			627	0			DEEP																				
628	46.232361	-89.8860111	0	North Turtle Lake	Vilas			628	0			DEEP																				
629	46.232361	-89.8854275	0	North Turtle Lake	Vilas			629	0			DEEP																				
630	46.23236	-89.8848439	0	North Turtle Lake	Vilas			630	0			DEEP																				
631	46.23236	-89.8842603	0	North Turtle Lake	Vilas			631	0			DEEP																				
632	46.232359	-89.8836767	37	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	632	13	Rock	Pole	SAMPLED			0																	
633	46.231963	-89.8924315	22	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	633	16	Muck	Pole	SAMPLED			0																	
634	46.231962	-89.8918479	23	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	634	19			DEEP																				
635	46.231961	-89.8912643	24	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	635	7	Rock	Pole	SAMPLED			0																	
636	46.231961	-89.8906807	25	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	636	15	Muck	Pole	SAMPLED			0																	
637	46.23196	-89.8900971	26	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	637	21			DEEP																				
638	46.23196	-89.8895135	27	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	638	23			DEEP																				
639	46.231959	-89.8889299	34	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	639	18			DEEP																				
640	46.231959	-89.8883463	33	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	640	10	Muck	Pole	SAMPLED			0																	
641	46.231958	-89.8877627	0	North Turtle Lake	Vilas			641	0			DEEP																				
642	46.231958	-89.8871791	0	North Turtle Lake	Vilas			642	0			DEEP																				
643	46.231957	-89.8865955	0	North Turtle Lake	Vilas			643	0			DEEP																				
644	46.231956	-89.8860119	0	North Turtle Lake	Vilas			644	0			DEEP																				
645	46.231956	-89.8854283	0	North Turtle Lake	Vilas			645	0			DEEP																				
646	46.231955	-89.8848448	32	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	646	24			DEEP																				
647	46.231955	-89.8842612	31	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	647	9	Rock	Pole	SAMPLED			0																	
648	46.231558	-89.8930159	21	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	648	9	Rock	Pole	SAMPLED			0																	
649	46.231558	-89.8924323	20	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	649	17			DEEP																				

Point Number	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	ID	Lake Name	County	Date	Field Crew	Point Number	Depth (ft)	Sediment	Pole, Rope	Comments	Notes	Nutrient	Total Rate Fullness	Bidens beckii	Ceratophyllum demersum	Chara spp.	Isoetes lacustris	Myriophyllum sibiricum	Myriophyllum tenellum	Najas flexilis	Nitella spp.	Nuphar variegata	Potamogeton amplifolius	Potamogeton gramineus	Potamogeton richardsonii	Potamogeton robbinsii	Scheuchzeria palustris	Sparganium angustifolium	Vallisneria spiralis	Freshwater sponge
709	46.230338	-89.887766	0	North Turtle Lake	Vilas			709	0			DEEP																				
710	46.230338	-89.8871825	13	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	710	18			DEEP																				
711	46.229938	-89.893019	1	North Turtle Lake	Vilas	7/18/2017	TB, LJS & NL	711	1	Sand	Pole	SAMPLED			0																	
712	46.229937	-89.8918519	10	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	712	4	Rock	Pole	SAMPLED			0																	
713	46.229936	-89.8912683	11	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	713	27			DEEP																				
714	46.229936	-89.8906847	0	North Turtle Lake	Vilas			714	0			DEEP																				
715	46.229935	-89.8901011	0	North Turtle Lake	Vilas			715	0			DEEP																				
716	46.229935	-89.8895176	0	North Turtle Lake	Vilas			716	0			DEEP																				
717	46.229934	-89.888934	0	North Turtle Lake	Vilas			717	0			DEEP																				
718	46.229934	-89.8883504	0	North Turtle Lake	Vilas			718	0			DEEP																				
719	46.229933	-89.8877669	12	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	719	24			DEEP																				
720	46.229531	-89.8912691	9	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	720	24			DEEP																				
721	46.229531	-89.8906855	0	North Turtle Lake	Vilas			721	0			DEEP																				
722	46.22953	-89.890102	0	North Turtle Lake	Vilas			722	0			DEEP																				
723	46.22953	-89.8895184	8	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	723	35			DEEP																				
724	46.229529	-89.8889348	7	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	724	24			DEEP																				
725	46.229529	-89.8883512	5	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	725	17			DEEP																				
726	46.229528	-89.8877677	6	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	726	0			TERRESTRIAL																				
727	46.229126	-89.8912699	1	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	727	12	Rock	Pole	SAMPLED			0																	
728	46.229126	-89.8906863	2	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	728	20			DEEP																				
729	46.229125	-89.8901028	3	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	729	25			DEEP																				
730	46.229125	-89.8895192	4	North Turtle Lake	Vilas	7/18/2017	JMB & AMS	730	5	Rock	Pole	SAMPLED			0																	

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