A

APPENDIX A

Public Participation Materials

Horsehead Lake Comprehensive Management Plan
Project Kick-Off Meeting
June 2, 2007 9:00 AM
Sloan Community Center, Lake Tomahawk

Aquatic ecologist, Tim Hoyman of Onterra, speaks to a lake group in Waushara County about their lake management plan. Public participation will be integral part of the Horsehead Lake project.

The Horsehead Lake Protection & Rehabilitation District has received two grants from the Wisconsin Department of Natural Resources to partially fund the completion of a comprehensive management plan for Horsehead Lake. The project has two primary objectives, the first being the completion of an in-depth study including multiple plant surveys, water quality sampling, and watershed investigations; the second being the completion of a realistic management plan for the lake and its watershed. Most of the studies will be completed during this spring, summer and fall. The tasks associated with the analysis of the data will be completed during the fall and winter. The project will also incorporate opportunities for stakeholder education and input, which are both very important components of all lake management planning efforts. The first opportunity for your participation in the process will be at the Project Kick-off Meeting to be held on Saturday, June 2nd at 9:00 am at the Sloan Center, 7246 Main Street, Lake Tomahawk.

Onterra, LLC, a lake management planning firm out of De Pere, has been hired to lead the project. During the meeting Tim Hoyman, an Aquatic Ecologist with Onterra, will describe the project and its importance. His presentation will include a description of the project's components, a quick course on general lake ecology, and a breakdown of how the District's Planning Committee will be involved in the plan's completion. So, please plan on attending the meeting and do not hesitate to ask questions or make comments.

Horsehead Lake Protection & Rehabilitation District

Horsehead Lake Comprehensive Management Planning Project
Kick-off Meeting
June 2, 2007

Timothy A. Hoyman, CLM
Onterra LLC

Presentation Outline

- Introduction to Lake Ecology
- Current Lake Project
  - Goals
  - Components
  - Process

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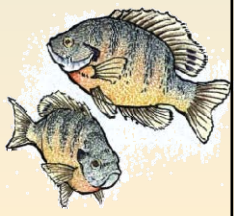
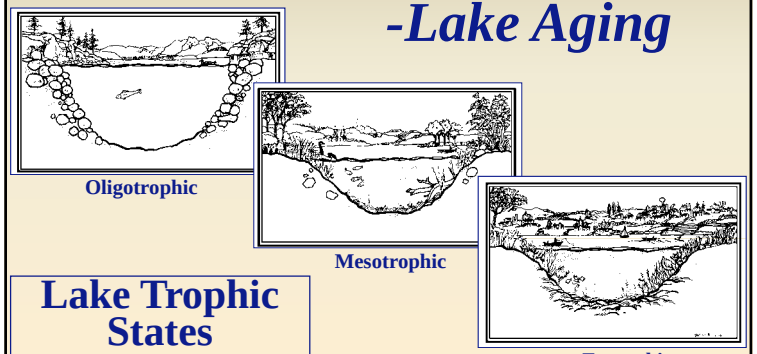
General Lake Ecology



General Lake Ecology

Eutrophication -Lake Aging



Lake Trophic States

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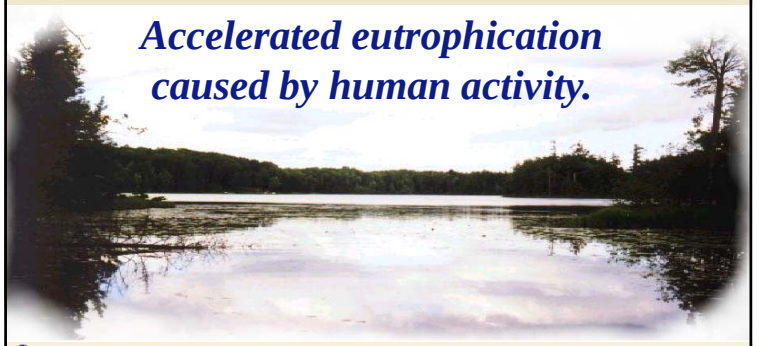
General Lake Ecology

Cultural Eutrophication

Accelerated eutrophication caused by human activity.



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General Lake Ecology

Phosphorus

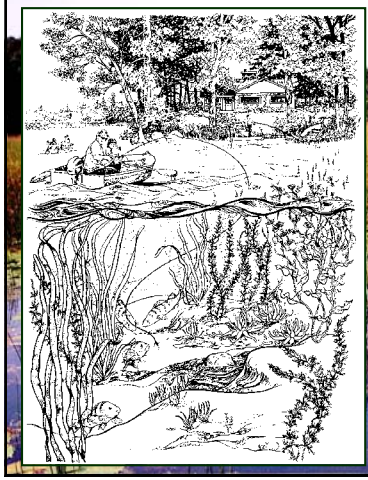
- *Limiting Nutrient*
- *Controls Plant Abundance (Productivity)*
  - *Algae*
  - *Macrophytes*

General Lake Ecology

Aquatic Plants (macrophytes)

- *Native Plants*
- *Exotic Plants (non-native)*

Native Aquatic Plants



- Base of the Food Web
- Cover (not only fish)
- Nursery
- Sediment Stabilization

General Lake Ecology

Non-native Aquatic Plants

Curly-leaf Pondweed

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General Lake Ecology

Non-native Aquatic Plants

Eurasian Water Milfoil

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General Lake Ecology

Consequences of Exotics

- Competition with Natives
  - Monotypic Community
- Decreased Recreational Value
- Decreased Property Value

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Current Project

Study and Plan Goals

- Collect & Analyze Data
- Construct Long-Term & Useable Plan

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Current Project

Study Components

- Public Participation
- Watershed Modeling
- Water Quality
- Aquatic Vegetation
  - Curly-leaf Survey
  - Comprehensive Survey
- Plan Development

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Current Project

Planning Process

Planning Committee Meetings

- Study Results (including a stakeholder survey)
- Conclusions & Initial Recommendations
- Management Goals
- Management Actions
  - Timeframe
  - Facilitator(s)

↓

Implementation Plan

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Thank You

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

Wisconsin Lakes Partnership

UWEX Extension

Wisconsin Dept. of Natural Resources

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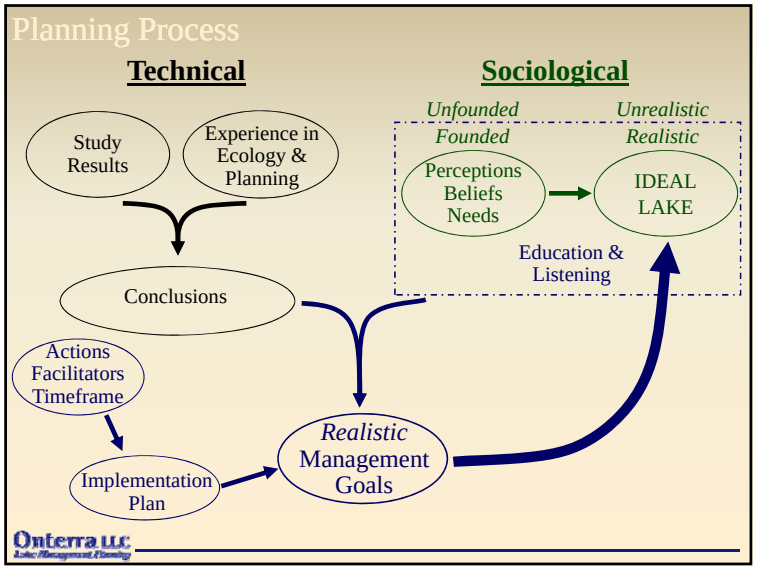
The Planning Process
…it's not as easy as you may think.


Planning Process
Technical
Sociological
Unfounded
Unrealistic
Founded
Realistic
Study Results
Experience in Ecology & Planning
Perceptions Beliefs Needs
IDEAL LAKE
Education & Listening
Conclusions
Actions Facilitators Timeframe
Realistic Management Goals
Implementation Plan
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Presentation Outline

- Lake Management Planning Project Overview
- Study Results
  - Water Quality
  - Watershed
  - Aquatic Plants
  - Miscellaneous
- "Big Picture"
- Goals and Actions Discussion

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Planning Project

Study and Plan Goals

- Collect & Analyze Data
- Construct Long-Term & Useable Plan

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Water Quality

Lillie Mason Regions

Onterra LLC

Planning Project

Water Quality

- Phosphorus (Limiting Plant Nutrient)
- Chlorophyll-*a* (Algal Abundance)
- Water Clarity (Secchi Disk)

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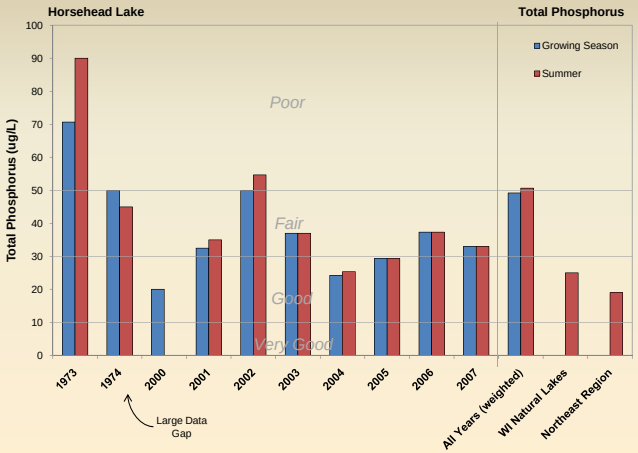
Total Phosphorus



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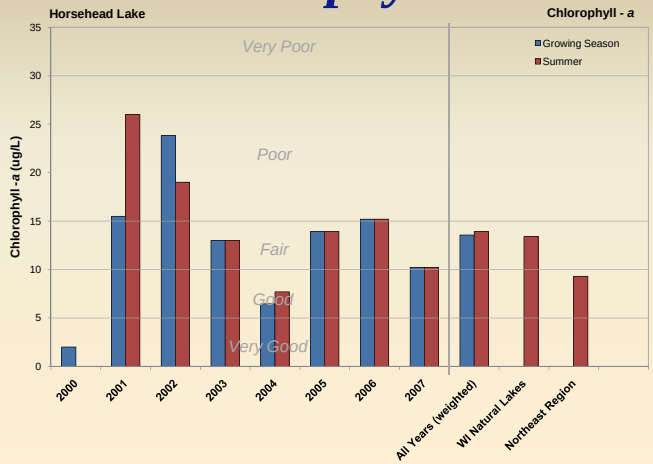
Chlorophyll-a



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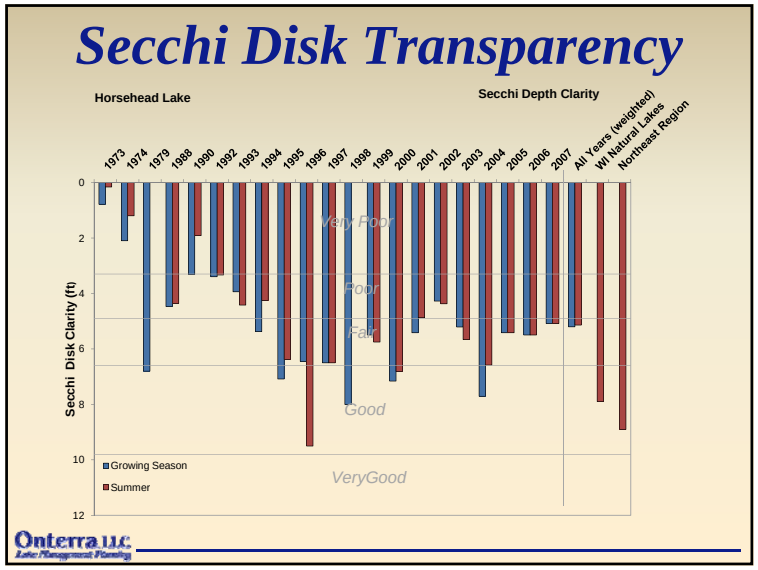
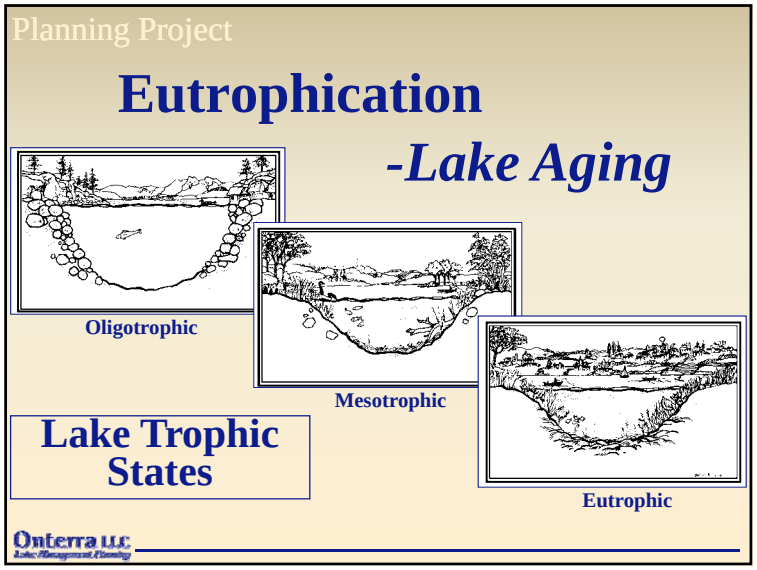
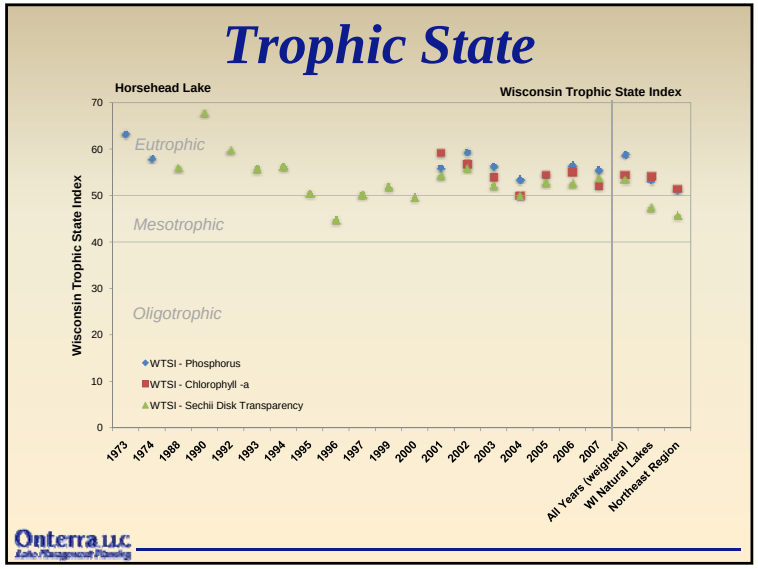

Secchi Disk Transparency
Horsehead Lake
Secchi Depth Clarity
1973
1974
1979
1988
1990
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
All Years (weighted)
WI Natural Lakes
Northeast Region
Secchi Disk Clarity (ft)
0
2
4
6
8
10
12
Very Poor
Poor
Fair
Good
VeryGood
Growing Season
Summer
Onterra LLC


Planning Project
Eutrophication
-Lake Aging
Oligotrophic
Mesotrophic
Eutrophic
Lake Trophic States
Onterra LLC


Trophic State
Horsehead Lake
Wisconsin Trophic State Index
Wisconsin Trophic State Index
0
10
20
30
40
50
60
70
Eutrophic
Mesotrophic
Oligotrophic
WTSI - Phosphorus
WTSI - Chlorophyll -a
WTSI - Sechii Disk Transparency
1973
1974
1988
1990
1992
1993
1994
1995
1996
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2000
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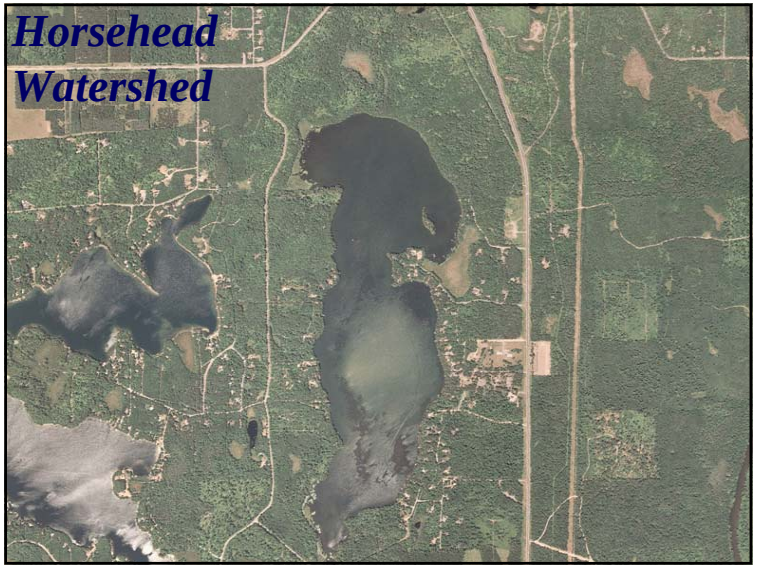
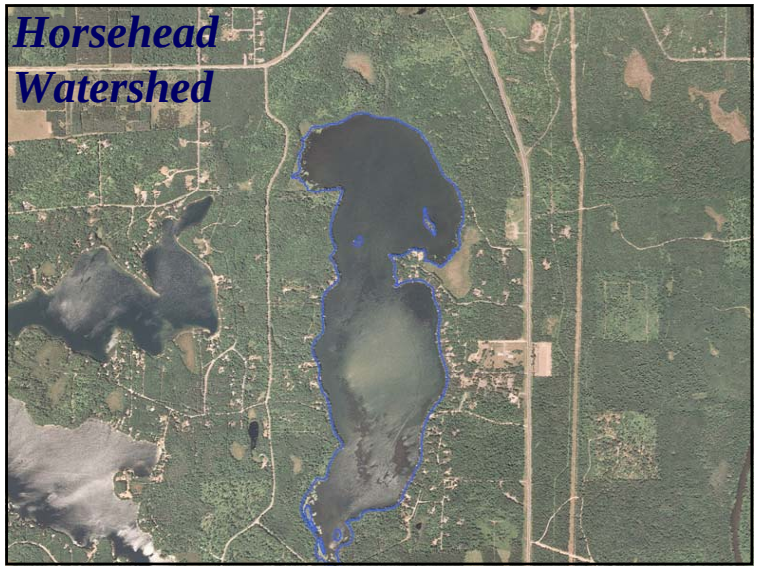
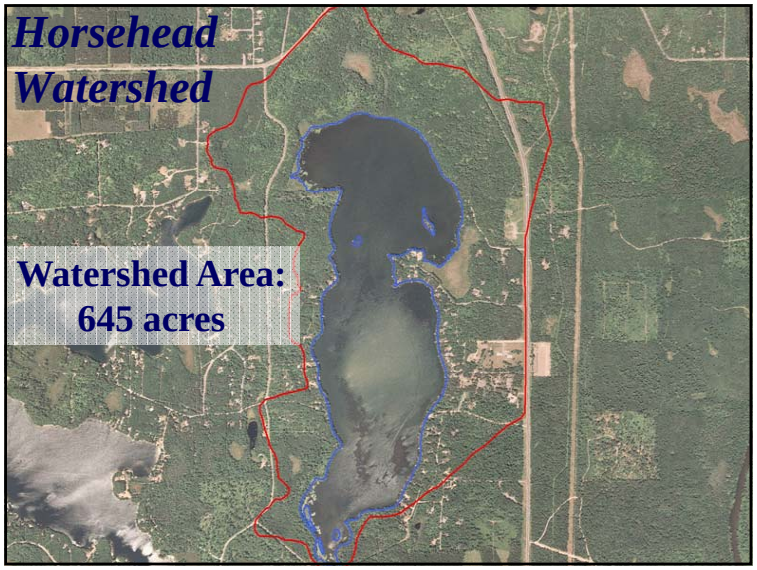
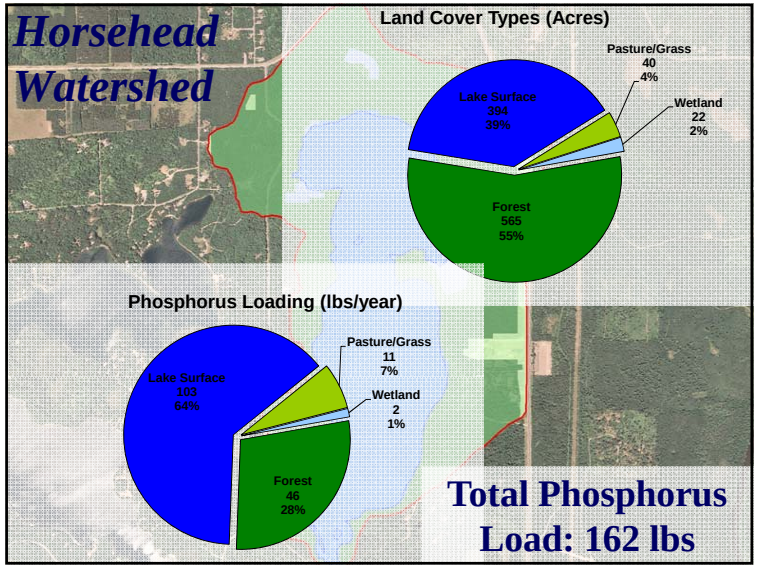
2004
2005
2006
2007
All Years (weighted)
WI Natural Lakes
Northeast Region
Onterra LLC


Horsehead
Watershed

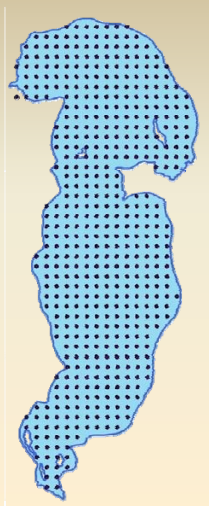

Horsehead
Watershed


Horsehead
Watershed
Watershed Area:
645 acres


Horsehead
Watershed
Land Cover Types (Acres)
Pasture/Grass
40
4%
Lake Surface
394
39%
Wetland
22
2%
Forest
565
55%
Phosphorus Loading (lbs/year)
Pasture/Grass
11
7%
Lake Surface
103
64%
Wetland
2
1%
Forest
46
28%
Total Phosphorus
Load: 162 lbs


Aquatic Plants

Point-Intercept Survey



Horsehead Lake
52-meters
494 points

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Species List

- 28 Total Species
  - 2 Non-native
    - Curly-leaf Pondweed
    - Eurasian water milfoil

Horsehead Lake

Life Form	Scientific Name	Common Name	Coefficient of Conservatism (c)
E	*Alisma triviale*	Northern water plantains	4
	Calla palustris	Water arum	9
	Carex comosa	Bristly sedge	5
	Sagittaria latifolia	Common arrowhead	3
	Schoenoplectus tabernaemontani	Softstem bulrush	4
	Typha latifolia	Broad-leaved cattail	1
FL	*Brasenia schreberi*	Watershield	7
	Nuphar variegata	Spatterdock	6
	Nymphaea odorata	White water lily	6
	Polygonum amphibium	Water smartweed	5
FL/E	*Sparganium angustifolium*	Narrow-leaf bur-reed	9
	Sparganium eurycarpum	Common bur-reed	5
Submergent	*Ceratophyllum demersum*	Coontail	3
	Elodea canadensis	Common waterweed	3
	Myriophyllum sibiricum	Northern water milfoil	7
	*Myriophyllum spicatum**	Eurasian water milfoil	Exotic
	Nitella sp.	Stoneworts	7
	Potamogeton amplifolius	Large-leaf pondweed	7
	Potamogeton crispus	Curly-leaf pondweed	Exotic
	Potamogeton gramineus	Variable pondweed	7
	Potamogeton pusillus	Small pondweed	7
	Potamogeton richardsonii	Clasping-leaf pondweed	5
	Potamogeton robbinsii	Fern pondweed	8
	Potamogeton zosteriformis	Flat-stem pondweed	6
	Stuckenia pectinata	Sago pondweed	3
	Vallisneria americana	Wild celery	6
FF	*Lemna minor*	Lesser duckweed	5
SE	*Juncus pelocarpus*	Brown-fruited rush	8

E = Emergent
FL = Floating Leaf
FL/E = Floating Leaf and Emergent
S/E = Submergent and Emergent
* = Incidental

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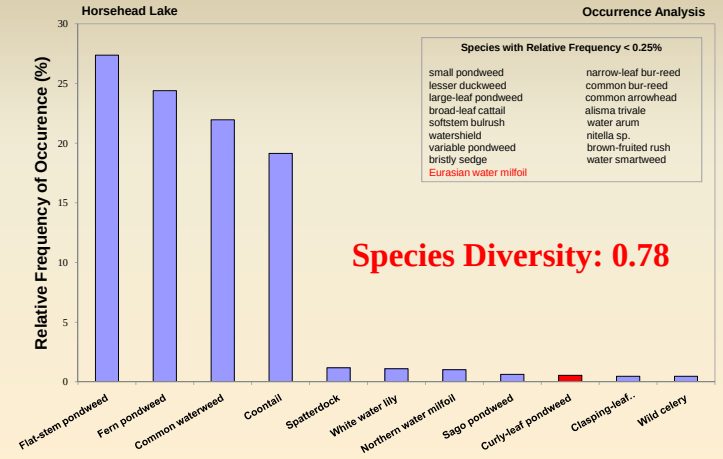
Frequency of Occurrence



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Planning Project

Aquatic Plants

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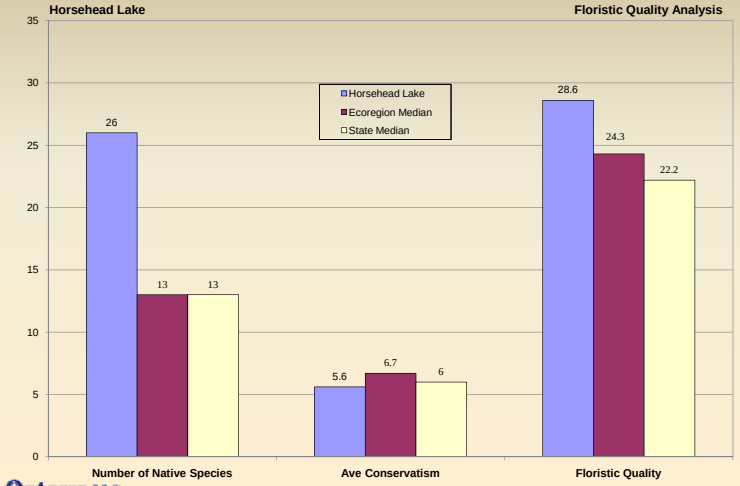
Floristic Quality Assessment



Onterra LLC Lake Management Planning

Aquatic Plant Community Mapping

- Mapped Communities
  - Floating-leaf
  - Emergent
- Important Indicators
  - Vulnerable to ecosystem changes
    - Loss of species
    - Expansion or recession

Onterra LLC Lake Management Planning

Curly-leaf Pondweed Survey

- Found to occur throughout lake
- No past data available for comparison
- Concern is warranted if it is spreading or becoming a nuisance

Onterra LLC Lake Management Planning

Additional Results

- EWM Surveys
  - A few plants located and removed from boat landing area
  - Monitoring will continue
- Fisheries Data Summary
  - Compilation completed
  - Analysis will be completed for report
- Stakeholder Survey
  - Tabulation completed (Thanks Kris!)
  - Charts will be completed for next meeting

Onterra LLC Lake Management Planning

Planning Project

Conclusions

- Water quality is *acceptable*
  - Limited historic data indicates that water quality has improved over the past two decades.
- Watershed is in great condition.
  - Land cover exports minimal phosphorus.
  - Some predictive models indicate their might be an unaccounted source of phosphorus

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Planning Project

Conclusions

- Aquatic plant community is healthy
  - Native community is of high quality
  - Curly-leaf pondweed may be a *non-issue*
  - Eurasian water milfoil has been found in very limited quantities
  - Harvesting plan needs to be developed

Onterra LLC

Thank You

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UWEX Extension

Wisconsin Dept. of Natural Resources

Onterra LLC

Presentation Outline

- Lake Management Planning Project Overview
- Study Results
  - Water Quality
  - Watershed
  - Aquatic Plants
  - Other Results
- Conclusions
- Implementation Plan

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Lake Management Planning

Water Quality

↑ Phosphorus (Limiting Plant Nutrient)

↑ Chlorophyll-*a* (Algal Abundance)

↓ Water Clarity (Secchi Disk)

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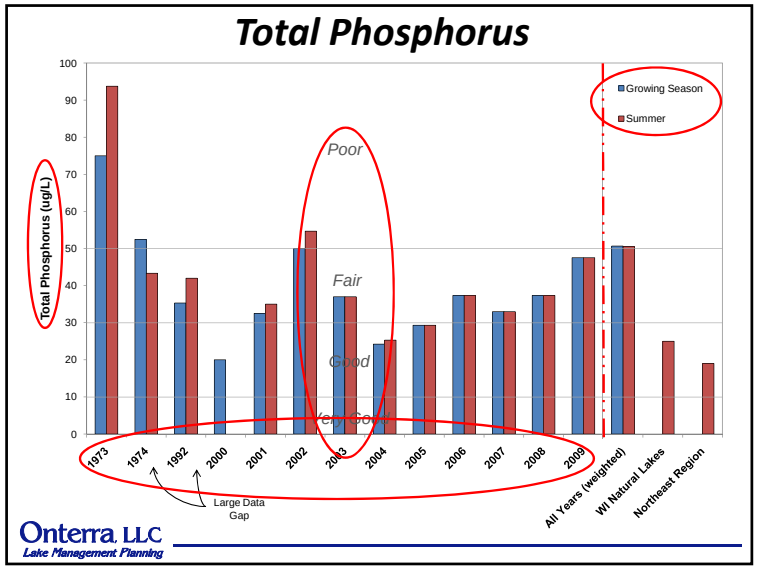
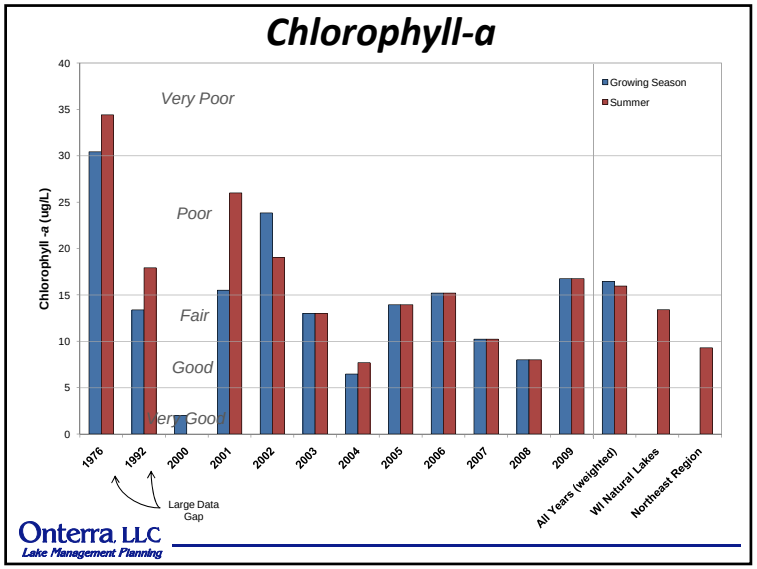
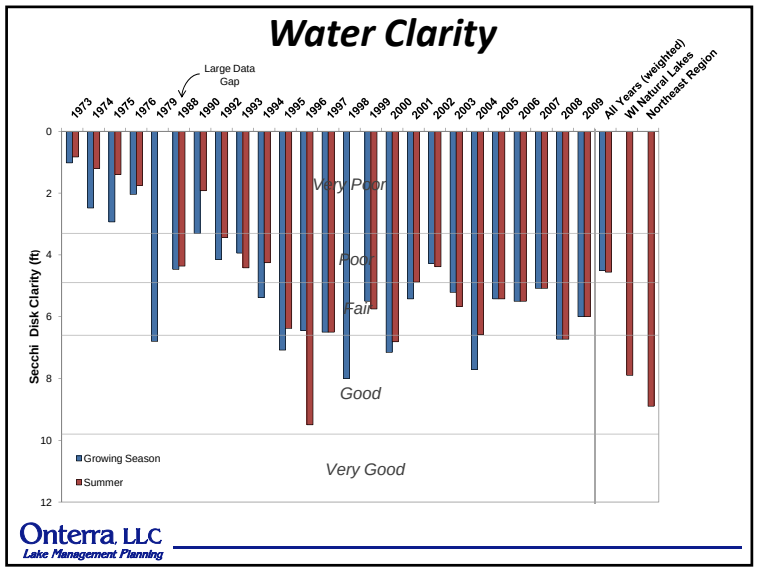
Lake Management Planning

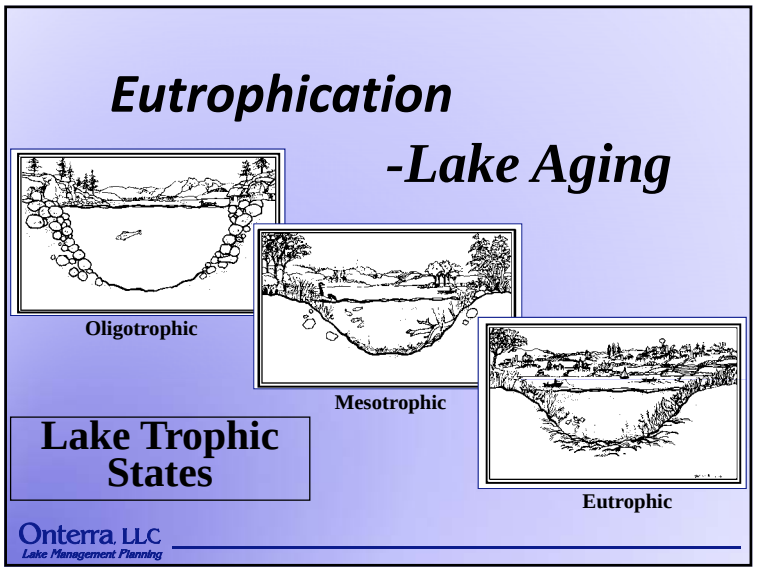
Lillie Mason Regions

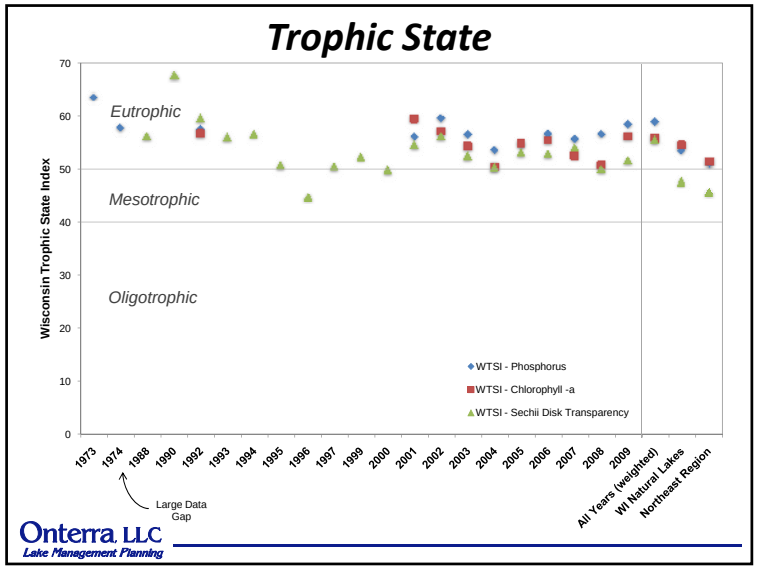
Onterra LLC
Lake Management Planning


Total Phosphorus
Total Phosphorus (ug/L)
Growing Season
Summer
Poor
Fair
Good
Very Good
Large Data Gap
All Years (weighted)
WI Natural Lakes
Northeast Region
Onterra LLC
Lake Management Planning


Chlorophyll-a
Chlorophyll -a (ug/L)
Growing Season
Summer
Very Poor
Poor
Fair
Good
Very Good
Large Data Gap
All Years (weighted)
WI Natural Lakes
Northeast Region
Onterra LLC
Lake Management Planning


Water Clarity
Secchi Disk Clarity (ft)
Large Data Gap
Growing Season
Summer
Very Poor
Poor
Fair
Good
Very Good
All Years (weighted)
WI Natural Lakes
Northeast Region
Onterra LLC
Lake Management Planning


Eutrophication
-Lake Aging
Oligotrophic
Mesotrophic
Eutrophic
Lake Trophic States
Onterra LLC
Lake Management Planning


Trophic State
Wisconsin Trophic State Index
70
60
50
40
30
20
10
0
Eutrophic
Mesotrophic
Oligotrophic
WTSI - Phosphorus
WTSI - Chlorophyll -a
WTSI - Sechii Disk Transparency
1973
1974
1988
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Onterra LLC
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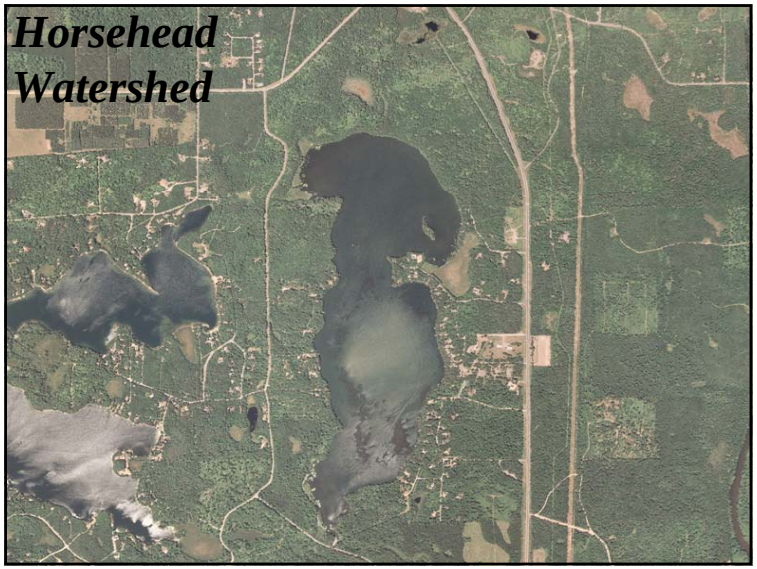
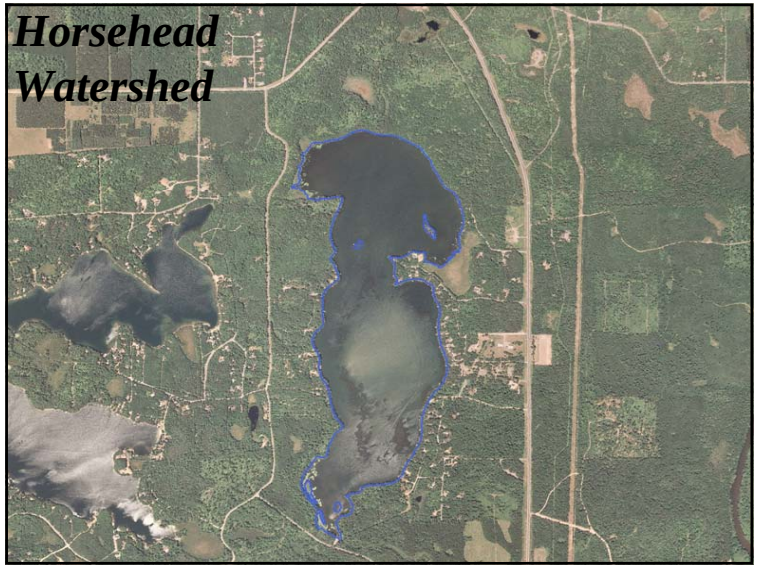

Horsehead
Watershed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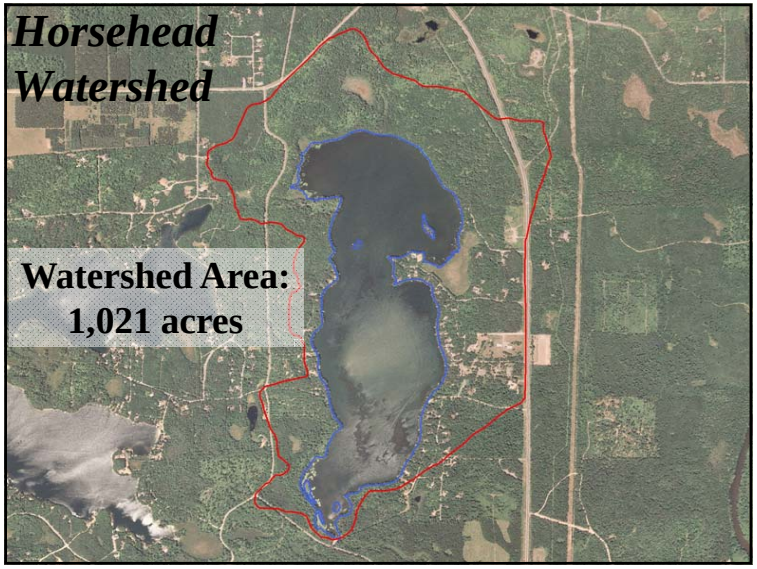
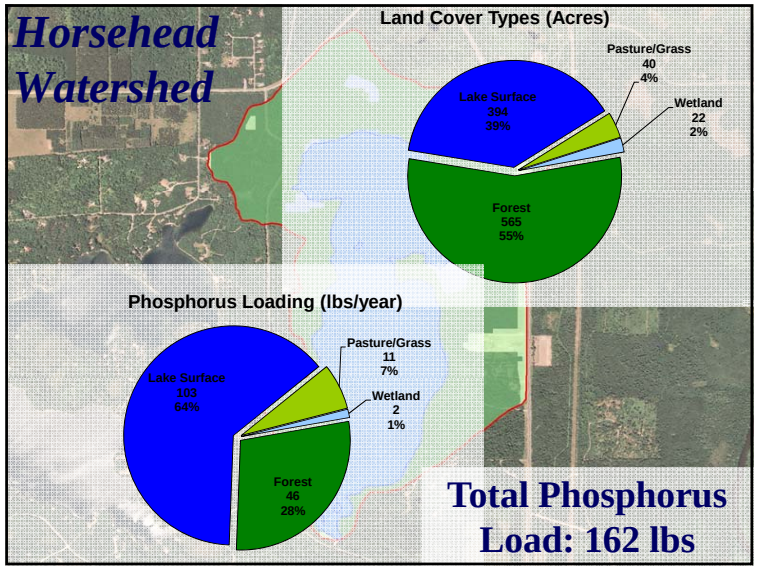
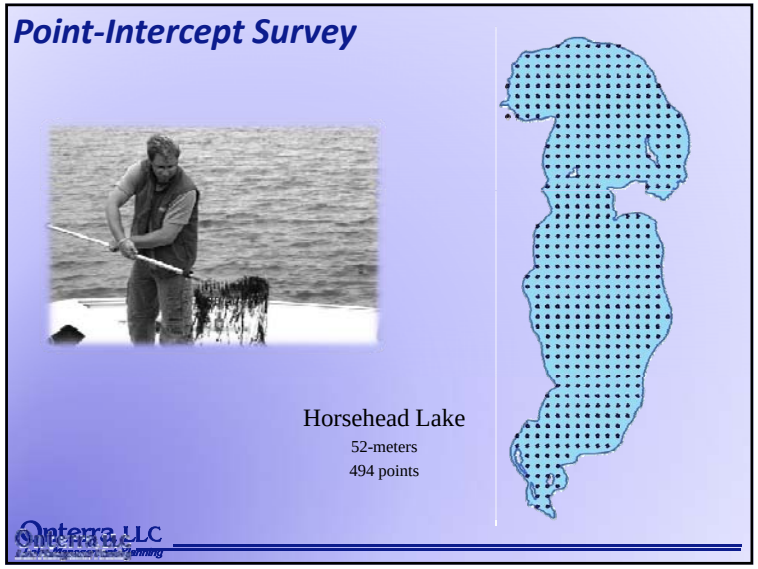
Watershed


Horsehead
Watershed
Watershed Area:
1,021 acres





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Horsehead Lake

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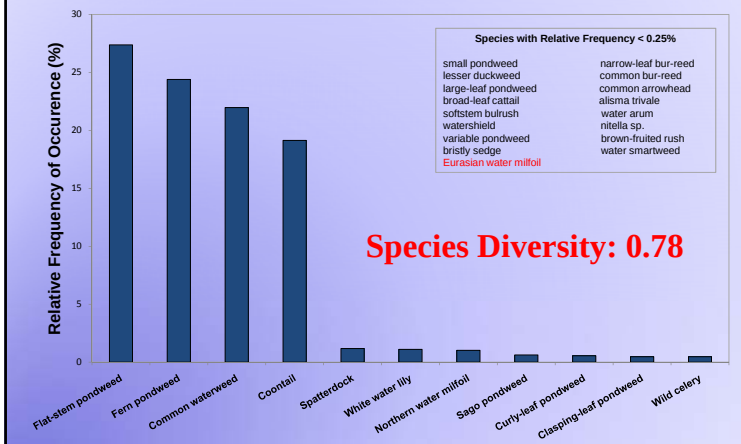
FL/E = Floating Leaf and Emergent
S/E = Submergent and Emergent
* = Incidental

Onterra LLC

Frequency of Occurrence



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Lake Management Planning

Aquatic Plants

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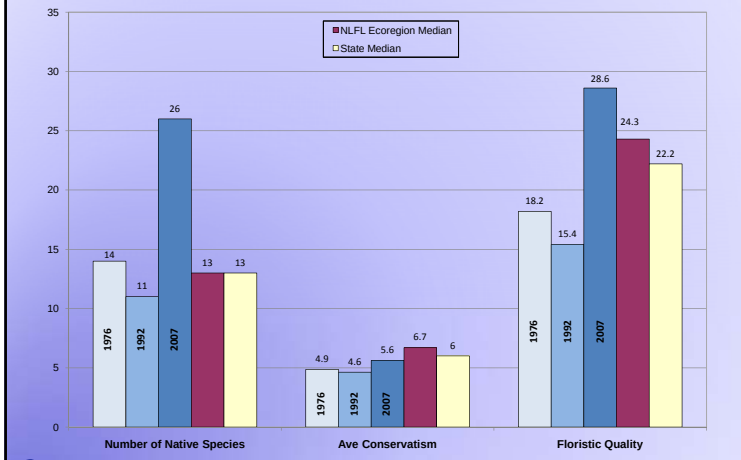
Lake Management Planning

Floristic Quality Assessment



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Lake Management Planning

Aquatic Plant Community Mapping

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  - Emergent
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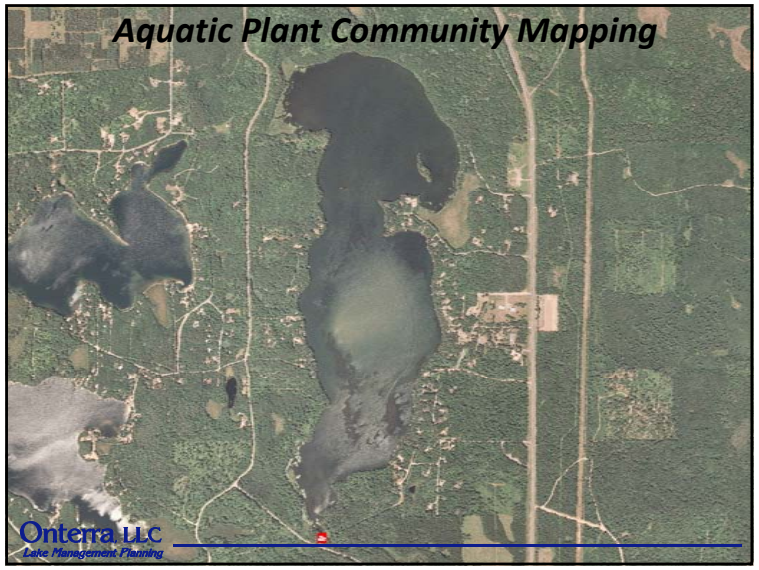
    - Loss of species
    - Expansion or recession

Onterra LLC
Lake Management Planning


Aquatic Plant Community Mapping
Onterra LLC
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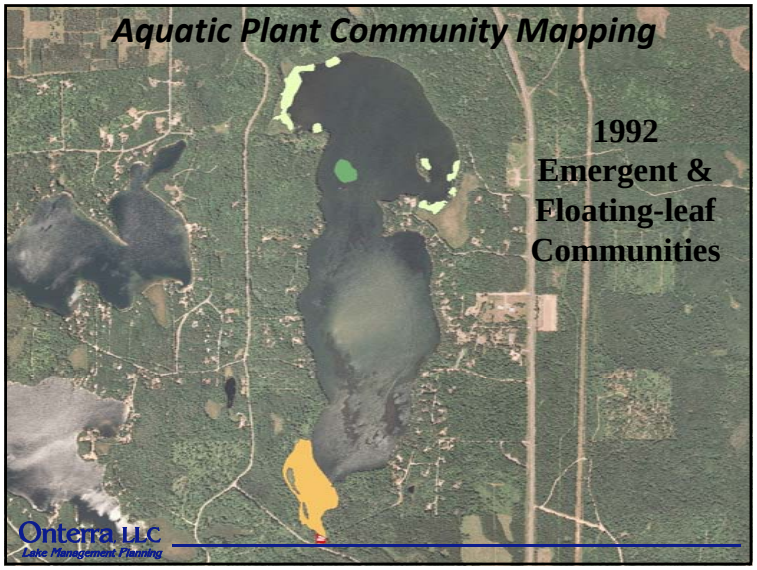
Aquatic Plant Community Mapping
1992
Emergent &
Floating-leaf
Communities
Onterra LLC
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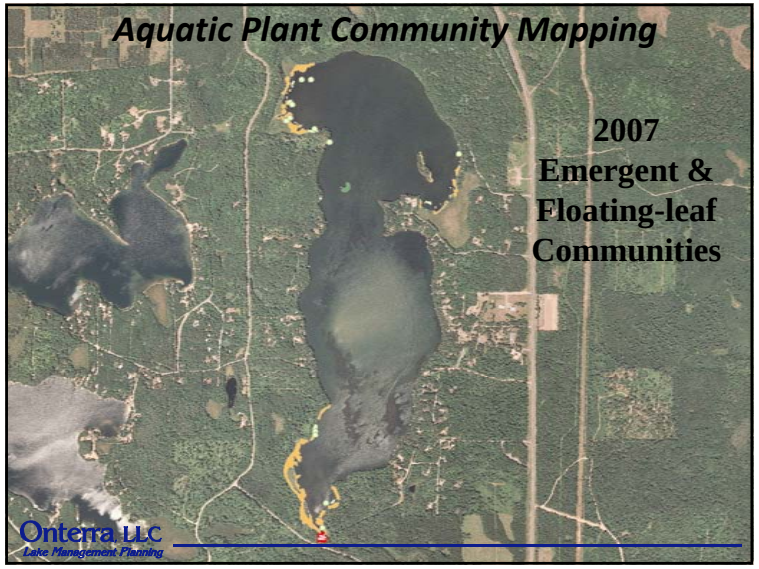
Aquatic Plant Community Mapping
2007
Emergent &
Floating-leaf
Communities
Onterra LLC
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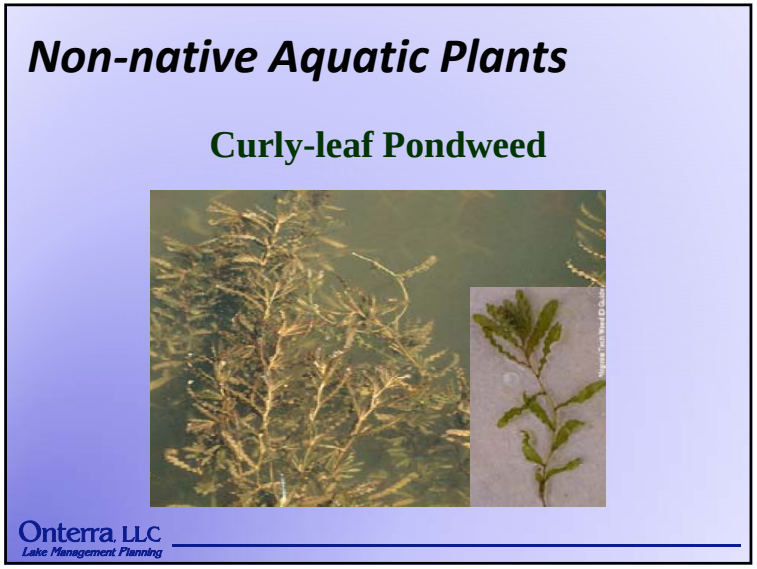
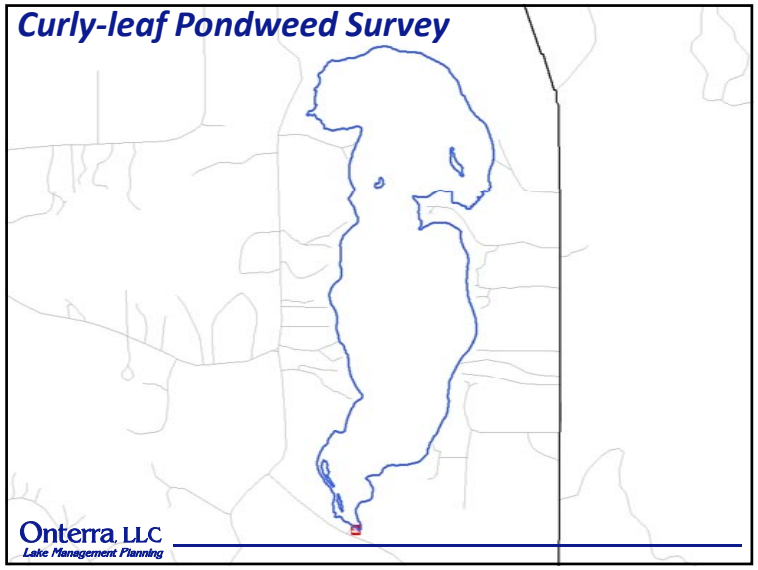
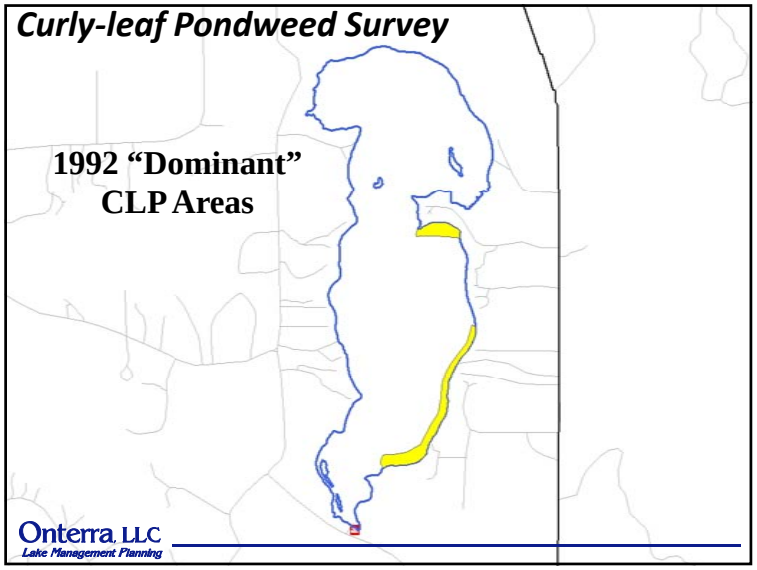
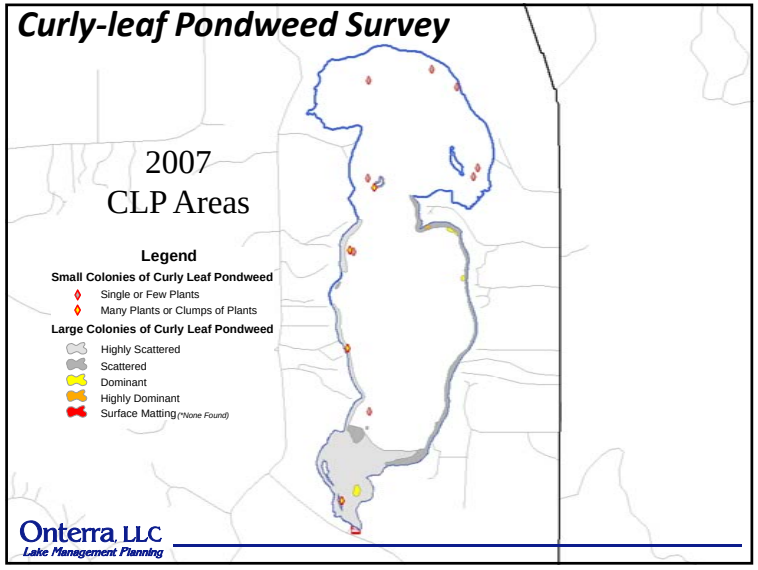

Non-native Aquatic Plants
Curly-leaf Pondweed
Onterra LLC
Lake Management Planning


Curly-leaf Pondweed Survey
Onterra LLC
Lake Management Planning


Curly-leaf Pondweed Survey
1992 "Dominant"
CLP Areas
Onterra LLC
Lake Management Planning


Curly-leaf Pondweed Survey
2007
CLP Areas
Legend
Small Colonies of Curly Leaf Pondweed
Single or Few Plants
Many Plants or Clumps of Plants
Large Colonies of Curly Leaf Pondweed
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting (*None Found)
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Non-native Aquatic Plants
Eurasian Water Milfoil
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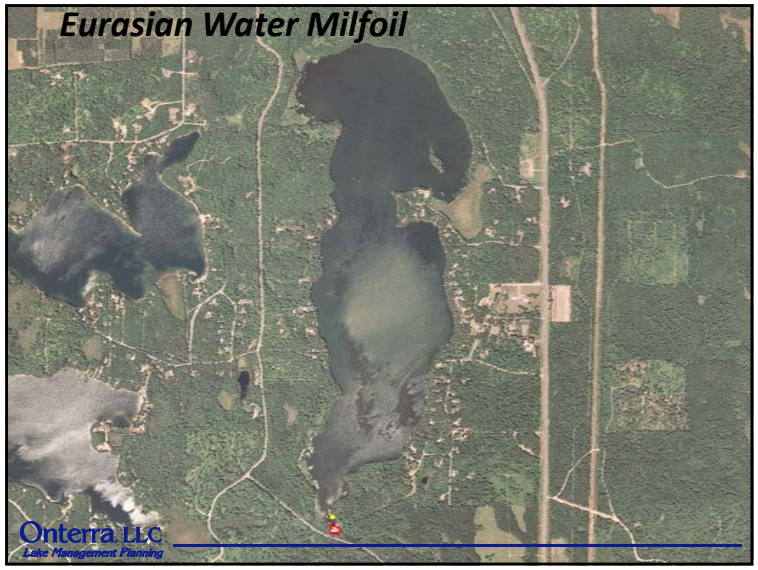

Additional Results

- Fisheries Data Summary
  - Not a great deal of fishery information available
  - No fish spearing reported
  - Have not stocked fish since 1993
  - Last WDNR fish study: 1975
  - Next study: 2010 (scheduled)

87% - fishing fair to poor
58% - fishing has worsened

- Stakeholder Survey
  - 55% response rate
  - Many interesting comments (many on plants and algae)
  - Over 56% of respondents have owned property on lake 10 years or less.

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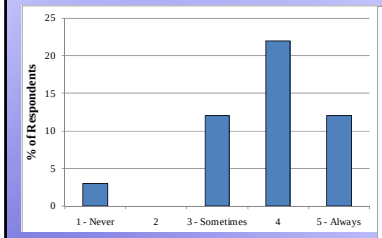
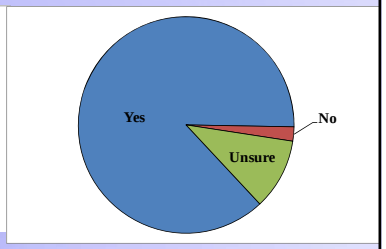
Additional Results

- Stakeholder Survey
  - Top 3 concerns:
    1. Excessive aquatic plant growth
    2. Water quality degradation/pollution
    3. Algae blooms
  - Impacts and control of aquatic plant growth





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Conclusions

- Watershed is in great condition.
  - Land cover exports minimal phosphorus.
  - Some predictive models indicate their might be an unaccounted source of phosphorus
    - Could be internal loading (nutrient recycling from sediment)
    - Past studies and improved/steady water quality indicate septic systems are likely not an issue (must be cautious)
  - Most *improvable* area of watershed is shoreland properties.

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Conclusions

- Water quality is *acceptable*
  - Historic data indicates that water quality has improved over the past two decades.
    - Likely related to increase in macrophyte densities.

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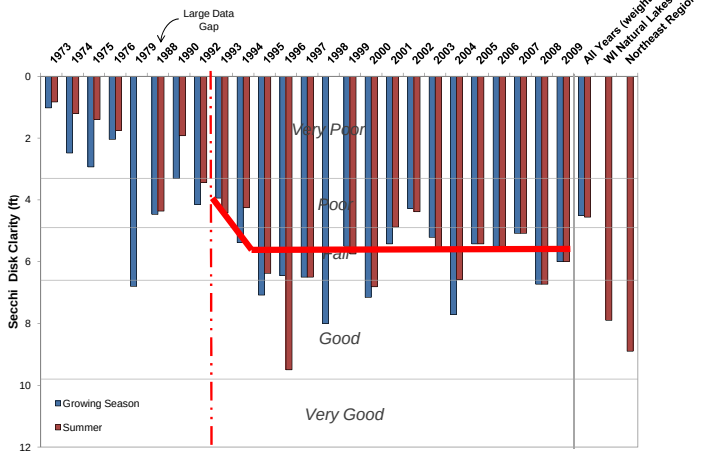
Water Clarity



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Conclusions

- Water quality is *acceptable*
  - Historic data indicates that water quality has improved over the past two decades.
    - Likely related to increase in macrophyte densities.
  - Filamentous algae blooms are an issue.
    - Unfortunately these types of plants are often common in eutrophic systems with good water clarity.

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Conclusions

- Aquatic plant community is healthy
  - Native community is of high quality.
    - Best defense against algae blooms and invasive species
  - Curly-leaf pondweed may be a *non-issue.*
  - Eurasian water milfoil has been found in very limited quantities.
  - Best method for controlling native plants is through mechanical harvesting.

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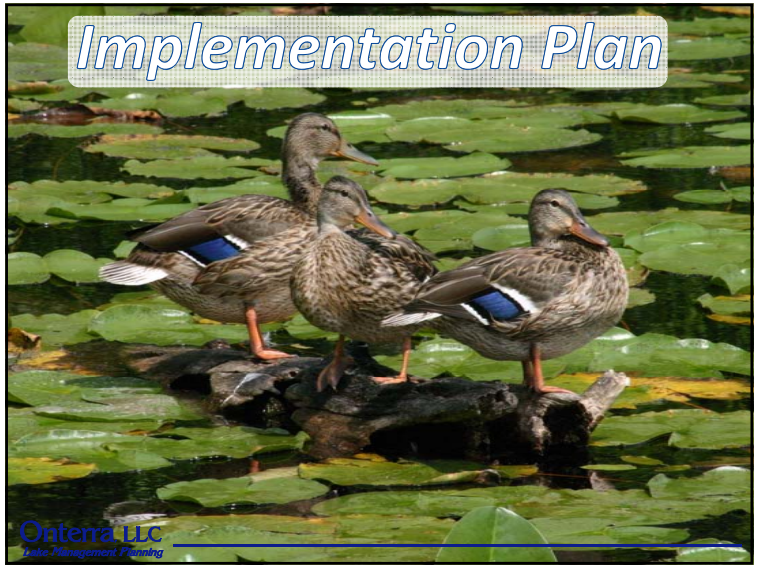

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Goal 1: Maintain Current Water Quality Conditions

Management Actions

1. Continue water quality monitoring through WDNR Citizen Lake Monitoring Network.
2. Reduce phosphorus and sediment loads from shoreland watershed to Horsehead Lake (educational initiative).
3. Gain an understanding of filamentous algae with Horsehead Lake (further study).

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Goal 2: Control & Prevent Aquatic Invasive Species within Horsehead Lake

Management Actions

1. Volunteer monitoring of Eurasian water milfoil within Horsehead Lake (professionals used if necessary).
2. Professional monitoring of curly-leaf pondweed in Horsehead Lake.

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Goal 3: Maintain Navigation in Open Water and Near-Shore Areas on Horsehead Lake

Management Actions

1. Use contracted harvesting services to maintain reasonable navigation on Horsehead Lake (new plan developed).

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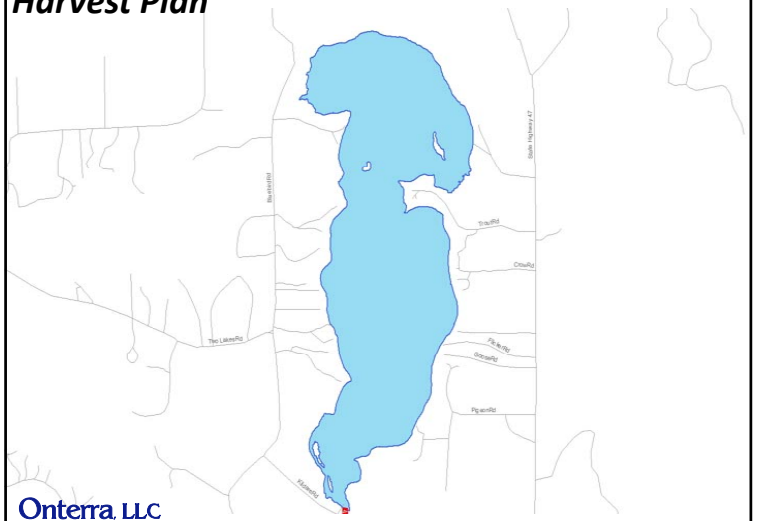
Harvest Plan



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Harvest Plan

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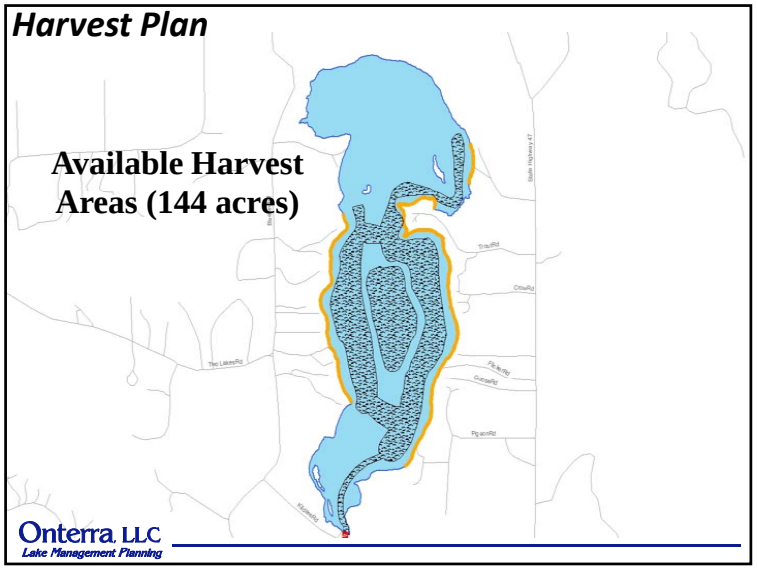
Harvest Plan

Available Harvest Areas (144 acres)



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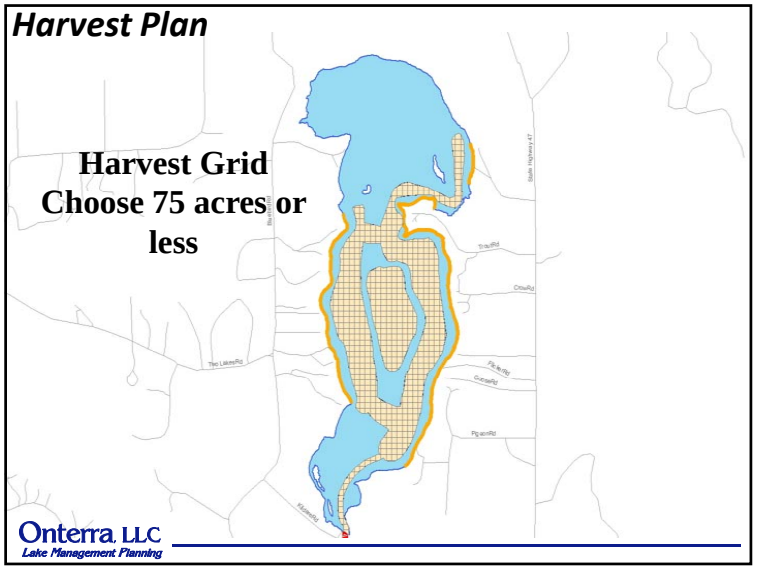
Harvest Plan

Harvest Grid Choose 75 acres or less



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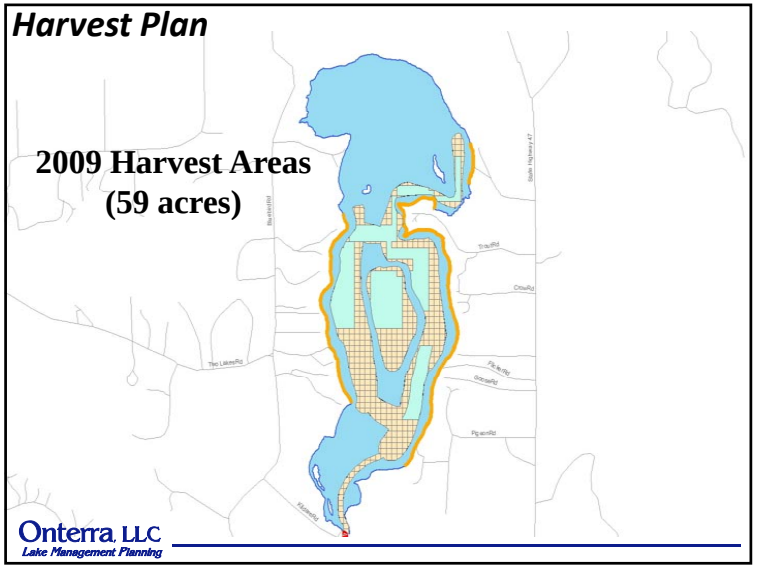
Harvest Plan

2009 Harvest Areas (59 acres)



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Thank You

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

Wisconsin Lakes Partnership

UWEX Extension

Wisconsin Dept. of Natural Resources

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B

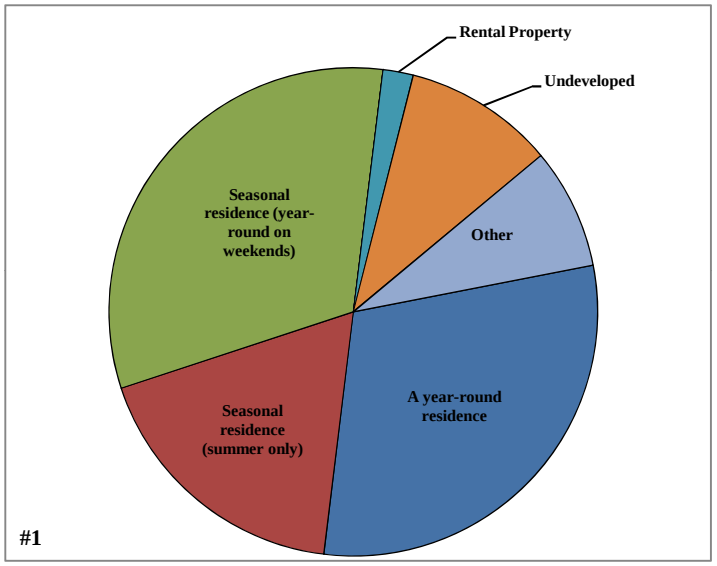
APPENDIX B

Stakeholder Survey Response Charts and Comments

Returned Surveys	55
Sent Surveys	100
Response Rate (%)	55.0

#1 What type of property do you own on Horsehead Lake?

	Total	%
A year-round residence	15	*30.0*
Seasonal residence (summer only)	9	*18.0*
Seasonal residence (year-round on weekends)	16	*32.0*
Resort	0	*0.0*
Rental Property	1	*2.0*
Undeveloped	5	*10.0*
Other	4	*8.0*
	50	

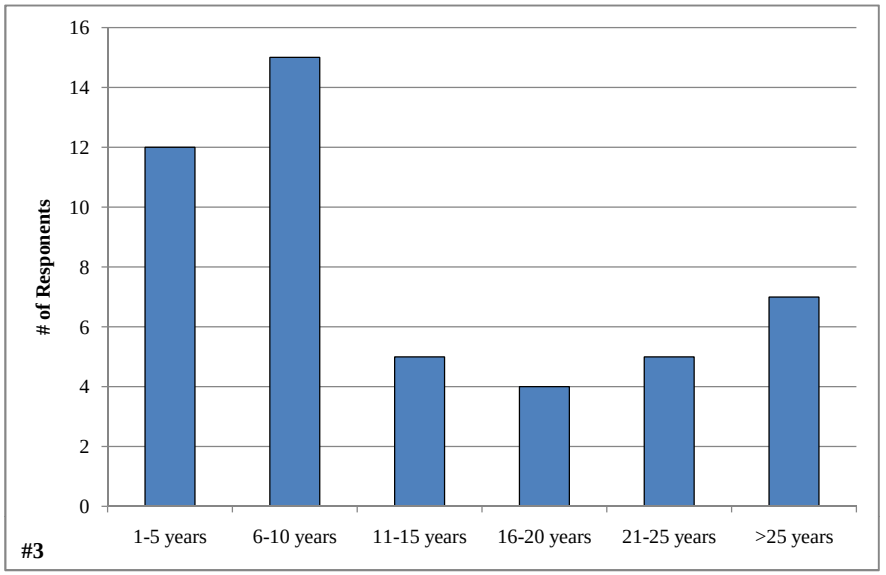


#2 If you are not a year-round resident, how many days each year is your property used by you or others?

Answered Question	29
Average	80.7
Standard deviation	75.5

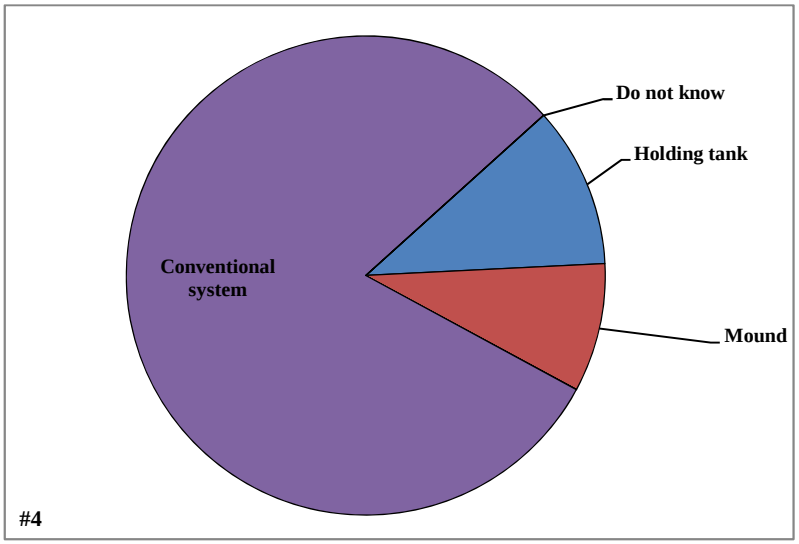
#3 How many years have you owned property on Horsehead Lake?

	Total	%
1-5 years	12	*25.0*
6-10 years	15	*31.3*
11-15 years	5	*10.4*
16-20 years	4	*8.3*
21-25 years	5	*10.4*
>25 years	7	*14.6*
	48	



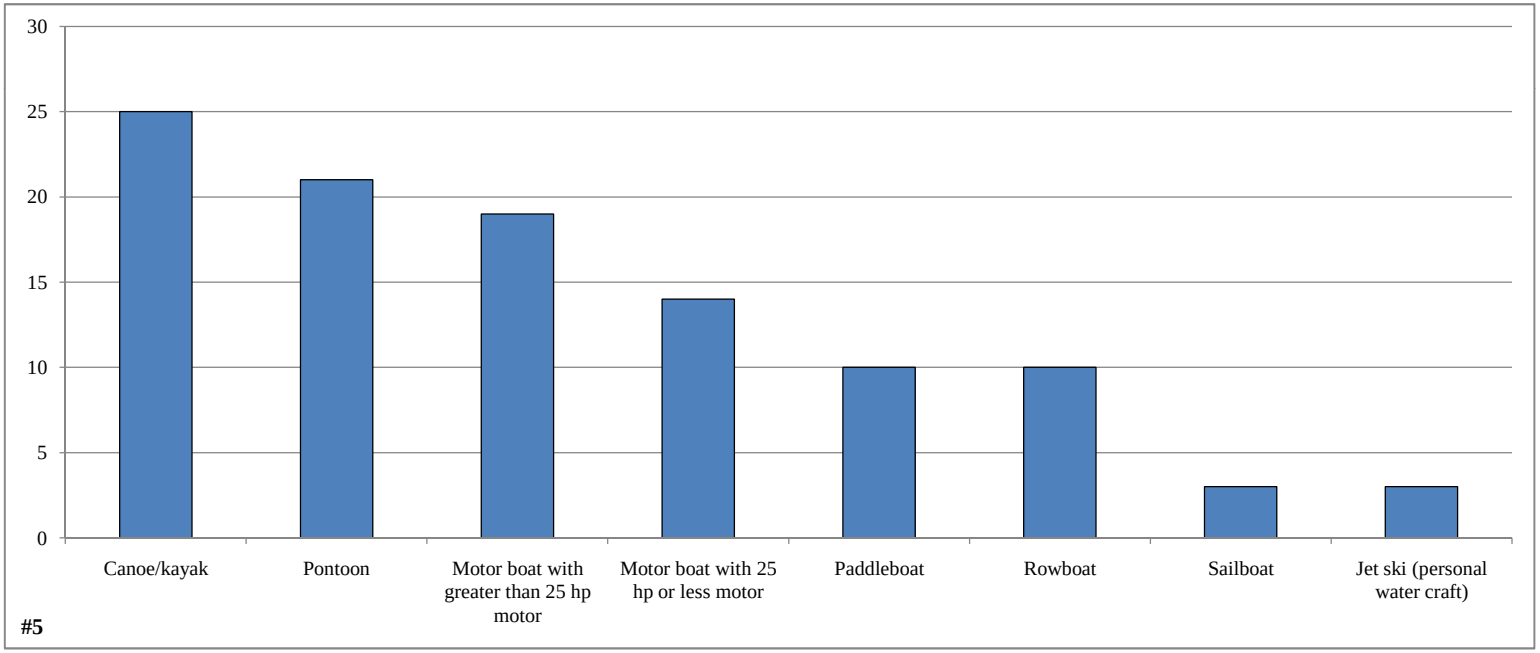
#4 What type of septic system does your property utilize?

	Total	%
Holding tank	5	*10.9*
Mound	4	*8.7*
Advanced treatment system	0	*0.0*
Conventional system	37	*80.4*
Do not know	0	*0.0*
	46	



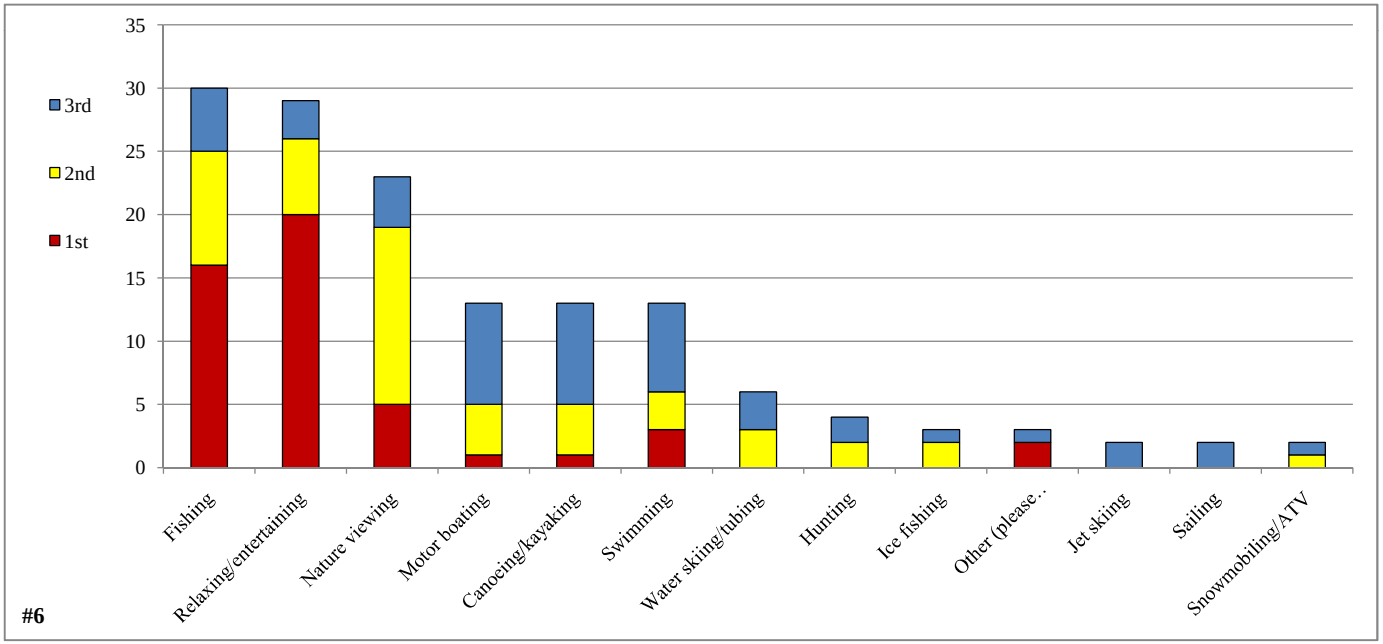
#5 What types of watercraft do you currently use on Horsehead Lake?

	Total
Canoe/kayak	25
Pontoon	21
Motor boat with greater than 25 hp motor	19
Motor boat with 25 hp or less motor	14
Paddleboat	10
Rowboat	10
Sailboat	3
Jet ski (personal water craft)	3
	105



#6 Please rank the activities below that are the most important or enjoyable to you on Horsehead Lake?

	1st	2nd	3rd	*% ranked*
Fishing	16	9	5	*20.8*
Relaxing/entertaining	20	6	3	*20.1*
Nature viewing	5	14	4	*16.0*
Motor boating	1	4	8	*9.0*
Canoeing/kayaking	1	4	8	*9.0*
Swimming	3	3	7	*9.0*
Water skiing/tubing	0	3	3	*4.2*
Hunting	0	2	2	*2.8*
Ice fishing	0	2	1	*2.1*
Other (please specify):	2	0	1	*2.1*
Jet skiing	0	0	2	*1.4*
Sailing	0	0	2	*1.4*
Snowmobiling/ATV	0	1	1	*1.4*
	48	48	47	

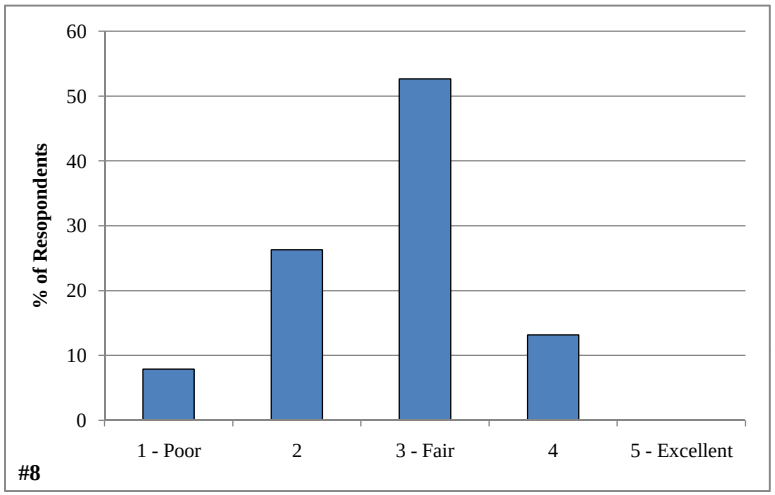


#7 Have you fished on Horsehead Lake in the past 3 years?

	Total	%
Yes	36	*70.6*
No	15	*29.4*
	51	

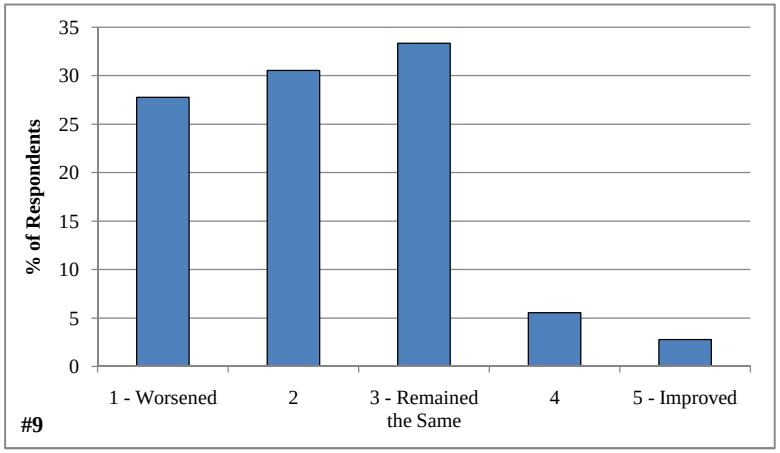
#8 How would you describe the current quality of fishing on Horsehead Lake?

	Total	%
1 - Poor	3	*7.9*
2	10	*26.3*
3 - Fair	20	*52.6*
4	5	*13.2*
5 - Excellent	0	*0.0*
	38	



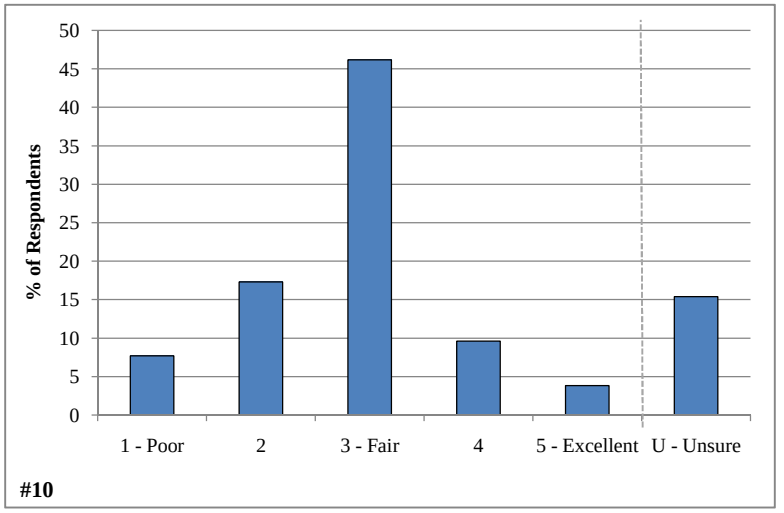
#9 How has the quality of fishing changed on Horsehead Lake since you obtained your property?

	Total	%
1 - Worsened	10	*27.8*
2	11	*30.6*
3 - Remained the Same	12	*33.3*
4	2	*5.6*
5 - Improved	1	*2.8*
	36	



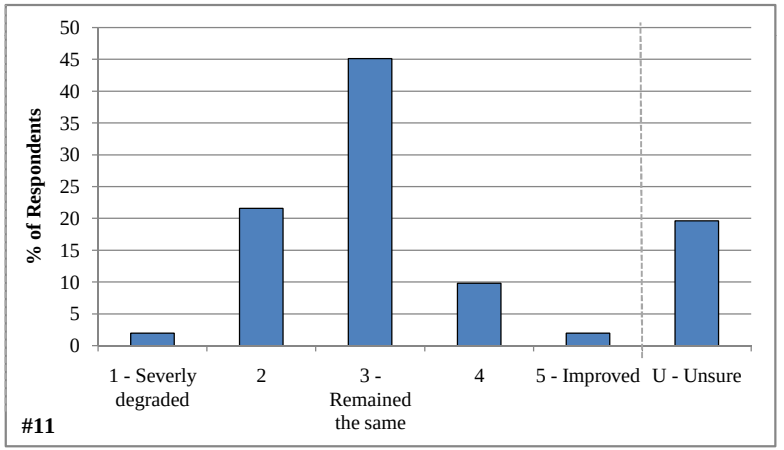
#10 How would you describe the current water quality of Horsehead Lake?

	Total	%
1 - Poor	4	*7.7*
2	9	*17.3*
3 - Fair	24	*46.2*
4	5	*9.6*
5 - Excellent	2	*3.8*
U - Unsure	8	*15.4*
	52	



#11 How has the water quality changed in Horsehead Lake since you obtained your property?

	Total	%
1 - Severly degraded	1	*2.0*
2	11	*21.6*
3 - Remained the same	23	*45.1*
4	5	*9.8*
5 - Improved	1	*2.0*
U - Unsure	10	*19.6*
	51	



#12 Have you ever heard of aquatic invasive species?

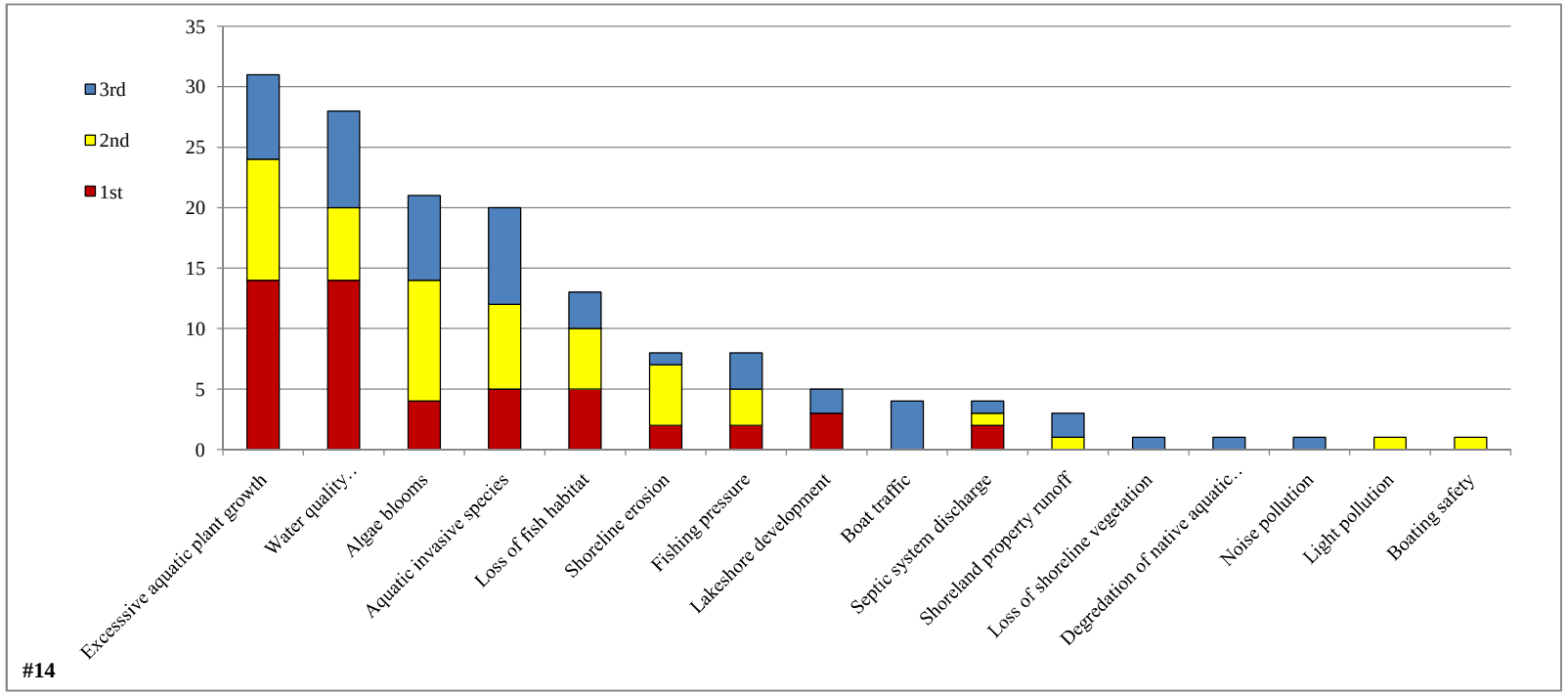
	Total	%
Yes	51	*98.1*
No	1	*2.0*
	52	

#13 Are you aware of aquatic invasive species on Horsehead Lake?

	Total	%
Yes	31	*63.3*
No	18	*36.7*
	49	

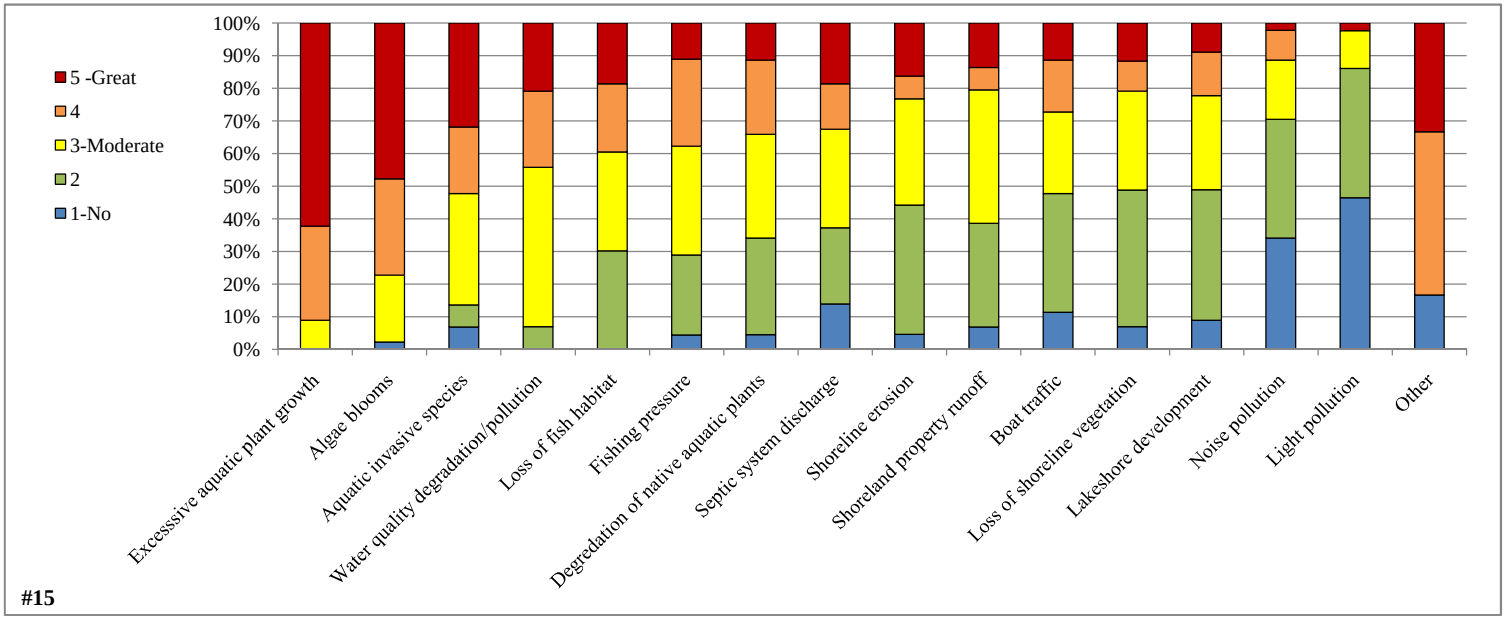
#14 From the list below, please rank your top three concerns regarding Horsehead Lake?

	1st	2nd	3rd	*% Ranked*
Excesssive aquatic plant growth	14	10	7	*62.0*
Water quality degradation/pollution	14	6	8	*56.0*
Algae blooms	4	10	7	*42.0*
Aquatic invasive species	5	7	8	*40.0*
Loss of fish habitat	5	5	3	*26.0*
Shoreline erosion	2	5	1	*16.0*
Fishing pressure	2	3	3	*16.0*
Lakeshore development	3	0	2	*10.0*
Boat traffic	0	0	4	*8.0*
Septic system discharge	2	1	1	*8.0*
Shoreland property runoff	0	1	2	*6.0*
Loss of shoreline vegetation	0	0	1	*2.0*
Degredation of native aquatic plants	0	0	1	*2.0*
Noise pollution	0	0	1	*2.0*
Light pollution	0	1	0	*2.0*
Boating safety	0	1	0	*2.0*
	51	50	49	



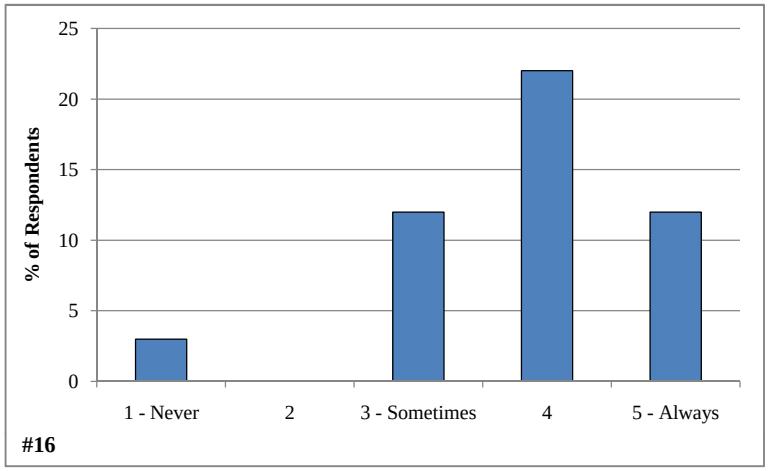
#15 To what level do you believe each the following factors are negatively impacting Horsehead Lake?

	1-No	2	3-Moderate	4	5 -Great	*Total*	*Average*
Excesssive aquatic plant growth	0	0	4	13	28	*45*	*4.5*
Algae blooms	1	0	9	13	21	*44*	*4.2*
Aquatic invasive species	3	3	15	9	14	*44*	*3.6*
Water quality degradation/pollution	0	3	21	10	9	*43*	*3.6*
Loss of fish habitat	0	13	13	9	8	*43*	*3.3*
Fishing pressure	2	11	15	12	5	*45*	*3.2*
Degredation of native aquatic plants	2	13	14	10	5	*44*	*3.1*
Septic system discharge	6	10	13	6	8	*43*	*3.0*
Shoreline erosion	2	17	14	3	7	*43*	*2.9*
Shoreland property runoff	3	14	18	3	6	*44*	*2.9*
Boat traffic	5	16	11	7	5	*44*	*2.8*
Loss of shoreline vegetation	3	18	13	4	5	*43*	*2.8*
Lakeshore development	4	18	13	6	4	*45*	*2.7*
Noise pollution	15	16	8	4	1	*44*	*2.1*
Light pollution	20	17	5	0	1	*43*	*1.7*
Other	1	0	0	3	2	*6*	*3.8*



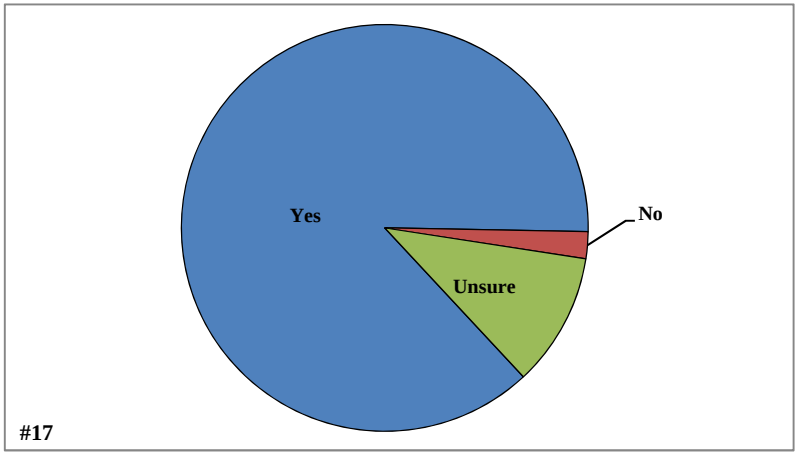
#16 How often does aquatic plant growth impact your recreational use of Horsehead Lake?

	Total	%
1 - Never	3	*6.1*
2	0	*0.0*
3 - Sometimes	12	*24.5*
4	22	*44.9*
5 - Always	12	*24.5*
	49	



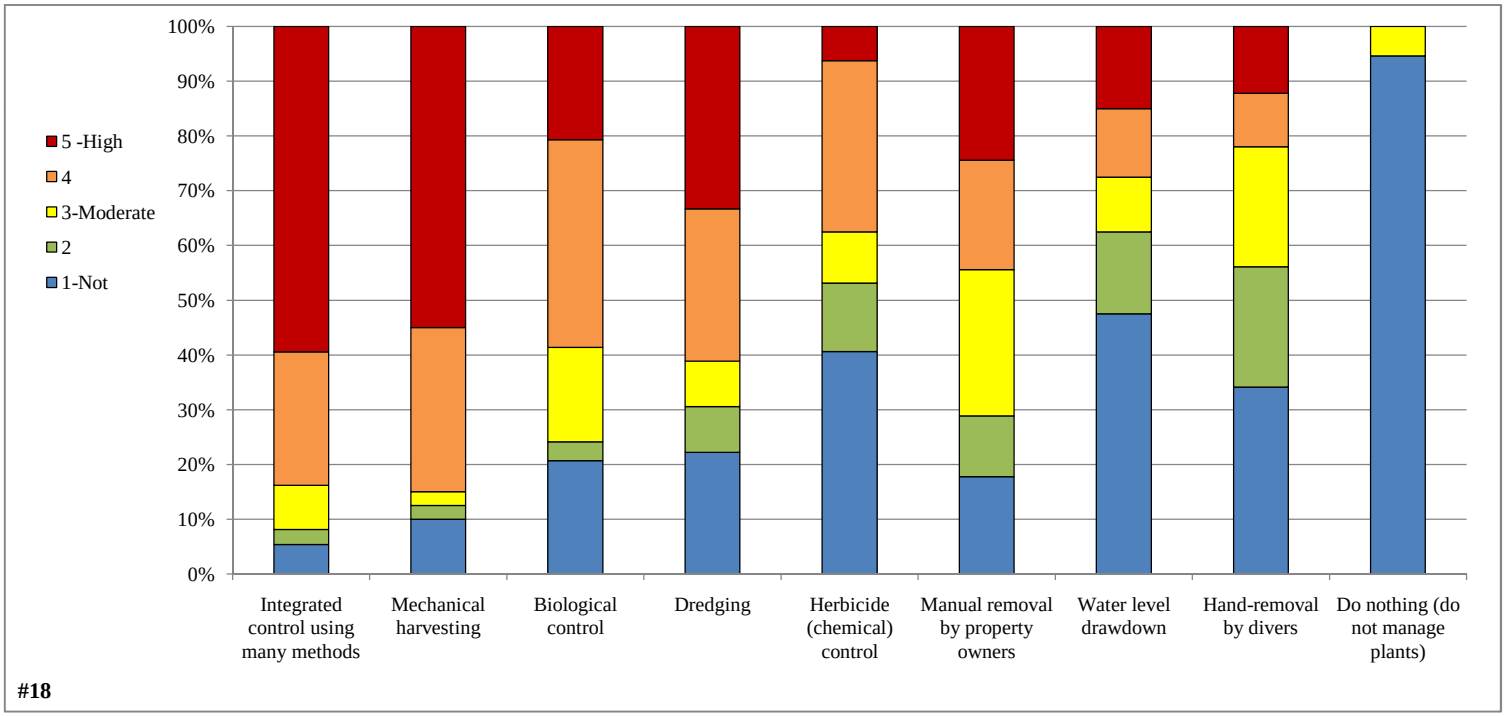
#17 Considering your answer to the question above, do you believe aquatic plant control is needed on Horsehead Lake?

	Total	%
Yes	41	*87.2*
No	1	*2.1*
Unsure	5	*10.6*
	47	



#18 What is your level of support for the responsible use of the following techniques on Horsehead Lake?

	1-Not	2	3-Moderate	4	5 -High	*Total*	*Average*
Integrated control using many methods	2	1	3	9	22	*37*	*4.7*
Mechanical harvesting	4	1	1	12	22	*40*	*4.5*
Biological control	6	1	5	11	6	*29*	*4.4*
Dredging	8	3	3	10	12	*36*	*4.1*
Herbicide (chemical) control	13	4	3	10	2	*32*	*3.8*
Manual removal by property owners	8	5	12	9	11	*45*	*3.5*
Water level drawdown	19	6	4	5	6	*40*	*3.1*
Hand-removal by divers	14	9	9	4	5	*41*	*3.0*
Do nothing (do not manage plants)	35	0	2	0	0	*37*	*1.6*

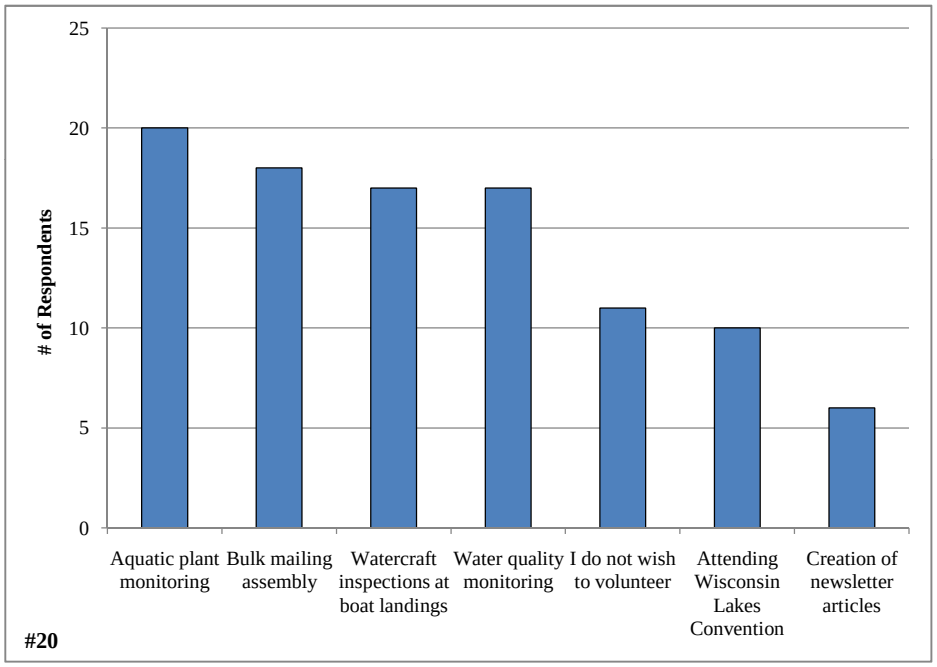


#19 Before receiving this mailing, have you ever heard of the Horsehead Lake P&R District

	Total	%
Yes	43	*82.7*
No	9	*17.3*
	52	

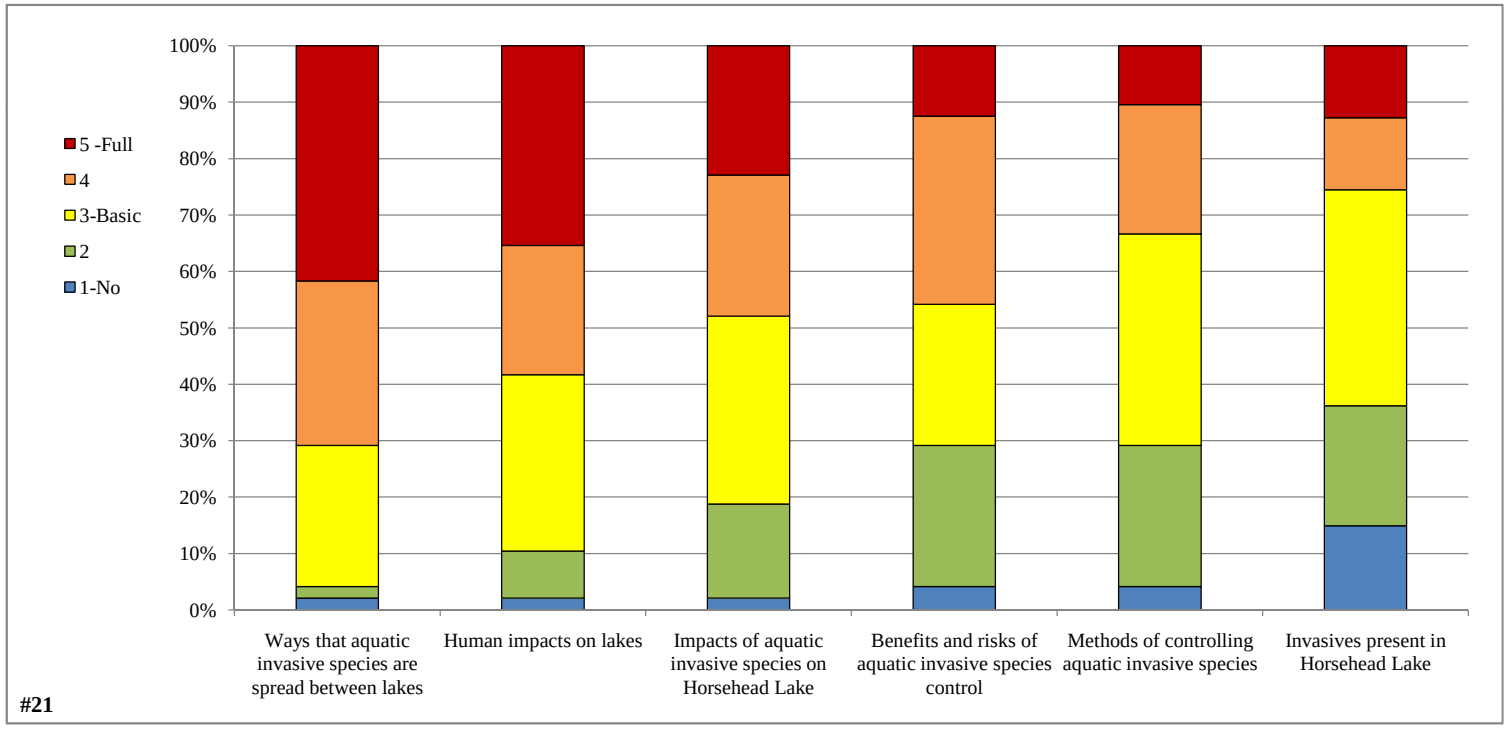
#20 Please circle the activities you would be willing to participate in if called upon.

	Total
Aquatic plant monitoring	20
Bulk mailing assembly	18
Watercraft inspections at boat landings	17
Water quality monitoring	17
I do not wish to volunteer	11
Attending Wisconsin Lakes Convention	10
Creation of newsletter articles	6
	99



21. Please describe your level of understanding of each of the following lake management issues.

	1-No	2	3-Basic	4	5 -Full	*Total*	*Average*
Ways that aquatic invasive species are spread between lakes	1	1	12	14	20	*48*	*4.1*
Human impacts on lakes	1	4	15	11	17	*48*	*3.8*
Impacts of aquatic invasive species on Horsehead Lake	1	8	16	12	11	*48*	*3.5*
Benefits and risks of aquatic invasive species control	2	12	12	16	6	*48*	*3.3*
species	2	12	18	11	5	*48*	*3.1*
Invasives present in Horsehead Lake	7	10	18	6	6	*47*	*2.9*



#21

Survey Number	Comment	Question Specific Comments
1		
2		#15p: Too many weeds
3	Again the extensive weed problem is really a concern to me. It seems that increasing the water depth by 5 to 10 feet would really help. I know the DNR doesn't like dredging but I would hope they'd take a rational and logical approach and see that's the best answer. It seens only a mater of time before the lake sucumbs to the over whelming quantity of the weeds and becomes a dead lake.	
4	Our concerns are mainly with weed growth and water clarity. We would like to do more slow leisurely boating and some swimming but those two concerns severely limit us from boating and swimming. We are truly grateful for the effort being put forth to help our lake be the best it can be. You're heading in the right direction. Good job! To protect my investment, I'd pay more to have the weeds controlled.	
5		
6		
7		
8	There has been a great increase of weeds in shoreline since we have not had draw downs. Shoreline erosion has also been effected.	#15p: Water level More water will help the lake
9	My feeling is the past practice of draining down the lake and leaving the water level low (because some property owners on the Board refuse to protect their own shoreline) has brought about the current situation. We need to fix the problem and it is going to cost money. Let's get a plan together and implement it. Make a special assessment to pay for it. Get the lake level up and let's dredge out the crap on the bottom so we have some depth. Thank you!	
10		
11		
12		
13		
14		#1g: year-round resident w/o lake access or frontage
15		
16		
17		
18		
19	Since we do not own property on Horsehead Lake we do not use it. Since we are in the P&R district we are taxed the same - a few years ago taxes were voted to increase. We were a minority against it. It is a joke to be taxed for a lake we do not use, yet dozens outside the district use, as evidenced by overflow at the launch when fish are biting. We are concerned about lake issues in Oneida/Vilas county but please do not think of raising P&R taxes again.	
20	Education regarding the variability of natural biospheres and the year over year changes that are within acceptable ranges is a necessary part of a program such as this. We are looking for long term positive change or at least preventing additional negative changes in water quality.	
21		#15p: high lake level
22	Thank you for all you do for the lake.	#6m: a,c,d,e,f,g,h,j,k, were all circled
23	Thank you for asking our opinion and keeping owners informed.	
24		#6m: pontoon #15p: level of water should be max!
25	Weed growth, algae bloom, color and odor of lake is worse in the heat of the summer because of the shallow water levels. Thank you fro doing all this work to improve our lake!	
26	It seems that the quality of fishing has deteriorated in recent years. I would like to see is lower limit level set on pan fish to provide better fishing opportunities for years to come.	
27	My opinion and I know everyone has one but I feel that a certain group of stakeholders want to control the lake as their own little lake. The part timers are treated like 2nd rate citizens -some people want no wake- and half the lake for kayaking etc. We bought this property for our children and grandchildren to enjoy, such as watersking, tubing, fishing - not just to look at. These people should buy a picture of the lake hang it on the wall and look at it. What fun!	
28	I have not been on lake for 30 years and I don't know nothing about it.	
29		#15p: Winter kill/virus

Survey Number	Comment	Question Specific Comments
30	I have two major concerns that affect my family's enjoyment of the lake. But let me start by saying that I love the lake and we enjoy it very much. Major concerns: Even a moderately warm summer seems to mean relatively cloudy and weedy conditions in the lake. Of course, this stems partly from our lake being rather shallow. This also creates the strong probability of significant winter kill. these factors tell me that we need to actively and sometimes aggressively manage the lake. The other issue relates to fishing. I am concerned about the size distribution of the pan fish on the lake. There are lots of fish and I don't think that pressure is to blame, although it may be a factor. I understand that in many ways the lake is "young" as currently defined with the construction of the dam. Yet the changes over the last 15 years to the fishery are quite extreme. (I fished on the lake before owning property). I hope that the lake study can provide some indications as to the issues. The species on the lake seem to be, if anything, more in balance than before. The northern numbers are down a bit, along with bass due to winter kill. Maybe that has led to an over abundance of "stunted" pan fish? I don't know. there still seem to be plenty of predator fish. I'm sure it's a complicated issue, but I hope to catch more "keepers" in future years. They have been so few lately that I don't keep any so as not to deplete the few that are out there.	
31		
32	I do not live on the lake, cannot see the lake or have I ever used the lake.	
33	Thank you for your commitment to our lake and taking time to put this survey	#6m: ski or snowshoe on the ice in winter
34	Water quality has increased since the weeds were cut last summer	
35	In June the water is clear and weed free. By August it resembles a swamp! We harvest already but doesn't seem to help. It was never like this years ago. What has caused it? Could it be the aerators?!	
36	Thank you for doing this survey and for coordinating the management and protection of Horsehead Lake! Please keep up the good work you have been doing.	
37	In my years of Horsehead Lake the biggest thing that always comes to mind is always the weeds and then water clarity. I would really like to see a major impact to clean up of these two issues.	
38		
39		
40		
41		#15p: shallow lake -big motor boat traffic very harmful
42	1. The lake needs some deep holes and a few more islands. 2. Management of fishing should focus on ways to increase pan fish size, the N. Pike and bass fishing is fine. The pan fish have been stunted since the late 80's. 3. The dam across Horsehead Creek should be replaced with a bottom emptying dam, this would help the siltation problem. 4. Public lands on north and south ends of lake need to be protected, not sold or traded to the town.	
43	Our sincere gratitude and accolades for Kris and Dennis Bathclelet's efforts.	
44	Thank you for all your time concerning this issue - it is very important that the lake is managed by people who have a concern for the present and future. When the time comes we will be moving there and we can be of more help to everyone.	
45		
46	Every year it is different with the conditions of the lake. It depends on how many sunny days we have - temps- how early is ice out. The aerator system has helped with the fish population. We haven't had a big fish kill for some time. The present level of the lake is much better for shoreline erosion. The water study done about 15+ years ago showed that we didn't have pollution from septic systems. We have great fish habitat.	#6m: trout stream fishing #15p: full time resident property owners
47	Many dollars have been spent over the years with absolutely no results. *Horsehead Lake is a man made flowage. *Removed the dam and return it to it's natural state.	
48	1. Use crayfish to control weeds? 2. Can we put some other species of fish in the lake? (walleye) 3. Put a limit on the croppies and pan fish that can be harvested on our lake that will allow them to grow bigger and we can all enjoy nice big fish. Limit 10 per day per person.	
49		
50		
51	We think Horsehead Lake is a wonderful lake. Our only complaint would be how weedy it is. Keep up the good work!	

C

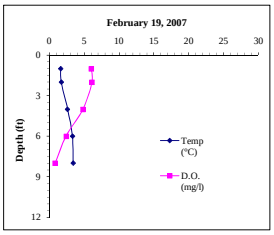
APPENDIX C

Water Quality Data

Horsehead

Date: 02-19-07 | **Max Depth (ft):** 10.1
Time: 10:30 | **HHLS Depth (ft):** 3.0
Weather: clouds, 20° F | **SILB Depth (ft):**
Ent: BTB **Verf:** | **Secchi Depth (ft):** 4.8

Depth (ft)	Temp (°C)	D.O. (mg/l)	pH	Sp. Cond (µS/cm)
1.0	1.6	6.0	7.3	154
2.0	1.7	6.1	7.3	155
4.0	2.6	4.8	7.2	155
6.0	3.3	2.4	7.1	154
8.0	3.4	0.8	7.0	183



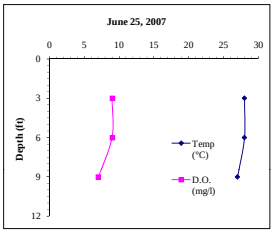
Parameter	HHLS	HHLB
Total P (µg/L)	28.000	
Dissolved P (µg/L)	3.000	
Chl a (µg/L)		
TKN (µg/L	620.00	
NO3+NO2-N (µg/L)	23.000	
NH3-N (µg/L)	208.000	
Total N (µg/L)	643.00	
Lab Cond. (µS/cm)	155	
Lab pH	7.30	
Alkal (mg/l CaCO3)		
Total Susp Sol (mg/l)	ND	
Calcium (mg/l)		

Samples collected by EJH and TAH, ICE = 1 foot

Horsehead

Date: 06-25-07 | **Max Depth (ft):**
Time: | **HHLS Depth (ft):**
Weather: | **HHLB Depth (ft):**
Ent: BTB **Verf:** | **Secchi Depth (ft):**

Depth (ft)	Temp (°C)	D.O. (mg/l)	pH	Sp. Cond (µS/cm)
3.0	28.0	9		
6.0	28.0	9		
9.0	27.0	7		



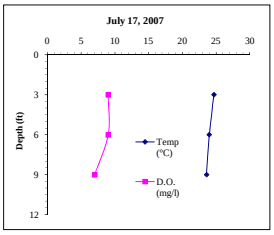
Parameter	HHLS	HHLB
Total P (µg/L)	29.000	
Dissolved P (µg/L)	3.000	
Chl a (µg/L)	5.19	
TKN (µg/L	600.00	
NO3+NO2-N (µg/L)	ND	
NH3-N (µg/L)	ND	
Total N (µg/L)	600.00	
Lab Cond. (µS/cm)	112	
Lab pH	8.76	
Alkal (mg/l CaCO3)	44	
Total Susp Sol (mg/l)		
Calcium (mg/l)	12.1	

CLMN Program

Horsehead

Date: 07-17-07 | **Max Depth (ft):**
Time: | **HHLS Depth (ft):**
Weather: | **HHLB Depth (ft):**
Ent: **Verf:** | **Secchi Depth (ft):**

Depth (ft)	Temp (°C)	D.O. (mg/l)	pH	Sp. Cond (µS/cm)
3.0	24.7	9		
6.0	24	9		
9.0	23.6	7		



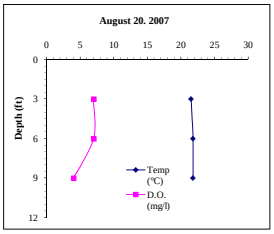
Parameter	HHLS	HHLB
Total P (µg/L)	35.000	
Dissolved P (µg/L)	3.000	
Chl a (µg/L)	11.50	
TKN (µg/L	860.00	
NO3+NO2-N (µg/L)	ND	
NH3-N (µg/L)	ND	
Total N (µg/L)	860.00	
Lab Cond. (µS/cm)	108	
Lab pH	8.78	
Alkal (mg/l CaCO3)	41	
Total Susp Sol (mg/l)		
Calcium (mg/l)		

CLMN Program

Horsehead

Date: 08-20-07 **Max Depth (ft):**
Time: **HHLS Depth (ft):**
Weather: **HHLB Depth (ft):**
Ent: BTB **Verf:** **Secchi Depth (ft):**

Depth (ft)	Temp (°C)	D.O. (mg/l)	pH	Sp. Cond (µS/cm)
3.0	21.5	7.0		
6.0	21.8	7.0		
9.0	21.8	4.0		



Parameter	HHLS	HHLB
Total P (µg/L)	35.00	
Dissolved P (µg/L)		
Chl a (µg/L)	14.00	
TKN (µg/L	1160.00	
NO3+NO2-N (µg/L)	ND	
NH3-N (µg/L)	30.000	
Total N (µg/L)	1160.00	
Lab Cond. (µS/cm)		
Lab pH		
Alkal (mg/l CaCO3)		
Total Susp Sol (mg/l)		
Calcium (mg/l)		

CLMN Program

Water Quality Data

2007	Surface		Bottom	
Parameter	Count	Mean	Count	Mean
Secchi Depth (feet)	6	5.1		
Total P (µg/L)	3	33.000		
Dissolved P (µg/L)	3	3.000		
Chl a (µg/L)	3	10.230		
TKN (µg/L	4	810.000		
NO3+NO2-N (µg/L)	1	23.000		
NH3-N (µg/L)	2	119.000		
Total N (µg/L)	4	815.750		
Lab Cond. (µS/cm)	3	125.000		
Lab pH	3	8.280		
Alkal (mg/l CaCO3)	2	42.400		
Total Susp Sol (mg/l)	ND			
Calcium (µg/L)	1	12.1		

Wisconsin Trophic State Index (WTSI)

Year		TP	Chla	SD
1973		63.48		79.82
1974		57.47		74.50
1975				72.28
1976			61.30	69.06
1979				
1988				55.90
1990				67.73
1992		57.23	56.41	59.32
1993				55.70
1994				56.27
1995				50.41
1996				44.67
1997				50.14
1998				
1999				51.91
2000				49.47
2001		55.81	59.20	54.28
2002		59.28	56.85	55.83
2003		56.24	54.00	52.11
2004		53.29	50.07	49.97
2005		54.43	54.52	52.76
2006		56.31	55.17	52.55
2007		55.35	52.20	53.70
2008		56.31	50.36	49.64
2009		58.19	55.90	51.30
All Years (weighted)		58.67	55.54	55.27
WI Natural Lakes		53.19	54.23	47.33
Northeast Region		51.05	51.49	45.61

Morphological / Geographical Data

Parameter	Value
Acreage	366.54
Volume (acre-feet)	2739.99
Perimeter (miles)	4.99
Shoreland Development	
Maximum Depth (feet)	11
County	Oneida County
WBIC	1588000
Lillie Mason Region(1983)	Northeast Region
Nichols Ecoregion(1999)	NLFL

Watershed Data

WiLMS Class	Acreage	kg/yr	lbs/yr
Forest			
Open Water			
Pasture/Grass			
Row Crops			
Urban - Rural Residential			
Wetland			

Watershed to Lake Area

	Secchi (feet)				Chlorophyll a (µg/L)				Phosphorus (µg/L)				Phosphorus (µg/L)				Nitrogen (µg/L)			
	Growing Season		Summer		Growing Season		Summer		Growing Season				Spring Turnover		Fall Turnover		Spring Turnover		Fall Turnover	
Year	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean
1973	6	1.0	2	0.8					18	75.0	8	93.8								
1974	5	2.5	2	1.2					8	52.5	3	43.3								
1975	3	2.9	1	1.4																
1976	27	2.0	13	1.8	7	30.42	3	34.42												
1979	1	6.8																		
1988	9	4.5	7	4.4																
1990	4	3.3	3	1.9																
1992	8	4.2	5	3.4	3	13.39	2	17.93	3	35.33	2	42.00								
1993	4	3.9	3	4.4																
1994	4	5.4	2	4.3																
1995	3	7.1	2	6.4																
1996	5	6.5	2	9.5																
1997	2	6.5	2	6.5																
1998	1	8.0																		
1999	7	5.5	6	5.8																
2000	11	7.2	8	6.8	1	2.0			1	20.0										
2001	6	5.4	2	4.9	2	15.5	1	26.0	2	32.5	1	35.0								
2002	9	4.3	6	4.4	4	23.8	3	19.0	5	50.0	3	54.7								
2003	6	5.2	3	5.7	2	13.0	2	13.0	2	37.0	2	37.0								
2004	6	7.7	3	6.6	4	6.5	3	7.7	4	24.3	3	25.3								
2005	3	5.4	3	5.4	3	13.9	3	13.9	3	29.3	3	29.3								
2006	3	5.5	3	5.5	3	15.2	3	15.2	3	37.3	3	37.3								
2007	6	5.1	6	5.1	3	10.2	3	10.2	3	33.0	3	33.0								
2008	3	6.7	3	6.7	3	8.0	3	8.0	3	37.3	3	37.3								
2009	2	6.0	2	6.0	2	16.8	2	16.8	2	47.5	2	47.5								
All Years (weighted)		4.5		4.6		16.5		16.0		50.7		50.5								
WI Natural Lakes				7.9				13.4				25.0								
Northeast Region				8.9				9.3				19.0								

Mid Summer N:P 24.5714

D

APPENDIX D

Watershed Analysis WiLMS Results

Date: 7/7/2008 Scenario: Horsehead Lake Current

Lake Id: Horsehead Lake
Watershed Id: Horsehead

Hydrologic and Morphometric Data

Tributary Drainage Area: 632.0 acre
Total Unit Runoff: 12.2 in.
Annual Runoff Volume: 642.5 acre-ft
Lake Surface Area <As>: 389 acre
Lake Volume <V>: 2740 acre-ft
Lake Mean Depth <z>: 7.0 ft
Precipitation - Evaporation: 5.8 in.
Hydraulic Loading: 830.5 acre-ft/year
Areal Water Load <qs>: 2.1 ft/year
Lake Flushing Rate <p>: 0.30 1/year
Water Residence Time: 3.30 year
Observed spring overturn total phosphorus (SPO): 29 mg/m^3
Observed growing season mean phosphorus (GSM): 37.7 mg/m^3
% 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	40	0.10	0.30	0.50	6.6	2	5	8
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)	0.0	0.05	0.10	0.25	0.0	0	0	0
Wetlands	27	0.10	0.10	0.10	1.5	1	1	1
Forest	565	0.05	0.09	0.18	27.9	11	21	41
Lake Surface	389.0	0.10	0.30	1.00	64.0	16	47	157

WiLMS Data - Current

POINT SOURCE DATA

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

SEPTIC TANK DATA

Description		Low	Most Likely	High	Loading %
Septic Tank Output (kg/capita-year)		0.3	0.5	0.8	
# capita-years	0.0				
% Phosphorus Retained by Soil		98	90	80	
Septic Tank Loading (kg/year)		0.00	0.00	0.00	0.0

TOTALS DATA

Description	Low	Most Likely	High	Loading %
Total Loading (lb)	65.9	162.6	458.1	100.0
Total Loading (kg)	29.9	73.8	207.8	100.0
Areal Loading (lb/ac-year)	0.17	0.42	1.18	0.0
Areal Loading (mg/m^2-year)	18.99	46.85	131.98	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)	31.2	58.5	111.0	100.0
Total NPS Loading (kg)	14.1	26.5	50.3	100.0

Phosphorus Prediction and Uncertainty Analysis Module

Date: 7/7/2008 Scenario: **Horsehead Lake Current**

Observed spring overturn total phosphorus (SPO): 29.0 mg/m^3
Observed growing season mean phosphorus (GSM): 37.7 mg/m^3
Back calculation for SPO total phosphorus: 0.0 mg/m^3
Back calculation GSM phosphorus: 0.0 mg/m^3
% 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	15	37	103	-1	-3
Canfield-Bachmann, 1981 Natural Lake	12	23	45	-15	-40
Canfield-Bachmann, 1981 Artificial Lake	12	22	39	-16	-42
Rechow, 1979 General	2	4	11	-34	-90
Rechow, 1977 Anoxic	17	43	120	5	13
Rechow, 1977 water load<50m/year	5	12	34	-26	-69
Rechow, 1977 water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977 General	12	30	84	1	3
Vollenweider, 1982 Combined OECD	11	22	52	-11	-33
Dillon-Rigler-Kirchner	7	17	47	-12	-41
Vollenweider, 1982 Shallow Lake/Res.	8	18	44	-15	-45
Larsen-Mercier, 1976	10	26	72	-3	-10
Nurnberg, 1984 Oxic	6	14	40	-24	-64

Lake Phosphorus Model	Confidence Lower Bound	Confidence Upper Bound	Parameter Fit?	Back Calculation (kg/year)	Model Type
Walker, 1987 Reservoir	20	79	Tw	0	GSM
Canfield-Bachmann, 1981 Natural Lake	7	66	FIT	1	GSM
Canfield-Bachmann, 1981 Artificial Lake	7	63	FIT	1	GSM
Rechow, 1979 General	2	9	L qs	0	GSM
Rechow, 1977 Anoxic	24	92	FIT	0	GSM
Rechow, 1977 water load<50m/year	6	26	FIT	0	GSM
Rechow, 1977 water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977 General	14	67	FIT	0	SPO
Vollenweider, 1982 Combined OECD	10	46	FIT	0	ANN

WiLMS Data - Current

Dillon-Rigler-Kirchner	9	36	P L qs	0	SPO
Vollenweider, 1982 Shallow Lake/Res.	8	38	FIT	0	ANN
Larsen-Mercier, 1976	14	55	P Pin	0	SPO
Nurnberg, 1984 Oxic	7	31	FIT	0	ANN

E

APPENDIX E

2007 Aquatic Plant Survey Data

Number	Latitude (decimal degrees)	Longitude (decimal degrees)	Depth (ft)	Sediment type (M=muck, S=Sand, R=Rock)	Rope (R); Pole (P); Visual (V)	Comments	*Myriophyllum spicatum*	*Potamogeton crispus*	Brasenia schreberi	Calla palustris	Carex comosa	Ceratophyllum demersum	Elodea canadensis	Free-floating species	Juncus pelocarpus	Myriophyllum sibiricum	Nitella sp.	Nuphar variegata	Nymphaea odorata	Polygonum amphibium	Potamogeton amplifolius	Potamogeton gramineus	Potamogeton pusillus	Potamogeton richardsonii	Potamogeton robbinsii	Potamogeton zosteriformis	Sagittaria graminea	Sagittaria latifolia	Schoenoplectus tabernaemontani	Sparganium angustifolium	Sparganium eurycarpum	Stuckenia pectinata	Typha latifolia	Vallisneria americana
3	45.77530	-89.59223	1	M	V													3	1															
4	45.79122	-89.59212	1	M	V						2	2							3						3								2	
5	45.79171	-89.59212																																
6	45.79221	-89.59211	2	M	V							1	2					1	1						3	1								
7	45.79271	-89.59211	2	M	V																				3	1								
8	45.79320	-89.59210	2	M	V								1												3									
9	45.79370	-89.59210	2	M	V								1					2	1						3									
10	45.77331	-89.59154	2	M	V													1			3				3									
11	45.77381	-89.59154	2	M	V							1	1					2	2						3									
12	45.77430	-89.59153	2	M	V																				3									
13	45.77480	-89.59153	4	M	V								1												3	2								
14	45.77530	-89.59152	2	M	V								1												3	2								
15	45.77580	-89.59152	3	M	V																				3									
16	45.78276	-89.59147	2	M	V							1							2						3	2							1	
17	45.78326	-89.59147	3	M	P																				3	1								
18	45.79121	-89.59141	2	M	P																				3	2								
19	45.79171	-89.59140	1	M	V							1	1					1	3						3							1		
20	45.79221	-89.59140	2	M	V								2												3							2		
21	45.79271	-89.59140	3	M	V																				3	1								
22	45.79320	-89.59139	3	M	V																				3									
23	45.79370	-89.59139	3	M	V								1												3									
24	45.79420	-89.59139	2	M	V								2					1							3							2		
25	45.77182	-89.59084	3	M	V							2	1					3	3						1									
26	45.77231	-89.59084	2	M	V				2			2	2	1			3	2	2						2	2								
27	45.77281	-89.59083	3	M	V							1	3												1	1								
28	45.77331	-89.59083	4	M	P								3												2	1								
29	45.77381	-89.59082	3	M	P																				1	1								
30	45.77430	-89.59082	5	M	V							1	1												3	1								
31	45.77480	-89.59082	4	M	V							1	1												3	1								
32	45.77530	-89.59081	5	M	V							1	1												3	2								
33	45.77579	-89.59081	5	M	V								1												3	2								
34	45.78077	-89.59077	3	M	P							1													3									
35	45.78126	-89.59077	5	M	P																				3									
36	45.78176	-89.59077	5	M	P								1												3									
37	45.78226	-89.59076	6	M	P								2												3	1								
38	45.78276	-89.59076	5	M	P							1	1												3									
39	45.78325	-89.59076	6	M	P								1												3	2								
40	45.78375	-89.59075	5	M	P							1													3	2								
41	45.78425	-89.59075	3	M	P																				3									
42	45.78475	-89.59074	4	M	P							2														2									1
43	45.78524	-89.59074	3	M	P																				3	1								
44	45.78574	-89.59074	4	M	P																				3	1								
45	45.79121	-89.59070	2	M	P																				2	2								
46	45.79171	-89.59069	1	M	V							1	1			1		1							3	1						1		
47	45.79221	-89.59069	3	M	P								2												3									
48	45.79270	-89.59069	3	M	V								2												3	1								
49	45.79320	-89.59068	4	M	P																				3	1								
50	45.79370	-89.59068	5	M	P																2				3									
51	45.79419	-89.59068	5	M	P								1					1							3	1								
52	45.77181	-89.59013	3	M	V								1							1					3									
53	45.77231	-89.59012	3	M	V								2	1				3					2	2			1	2				2		
54	45.77281	-89.59012	1	M	V					2		1	2	2					1					3	2						3				
55	45.77331	-89.59012	4	M	P								3												3	1								
56	45.77380	-89.59011	3	R	V							1	3												2	2								
57	45.77430	-89.59011	5	M	P								2												1	2								
58	45.77480	-89.59011	4	M	V							1	1												3	1								
59	45.77529	-89.59010	5	M	V							2													3	2								
60	45.77579	-89.59010	6	M	P							1	1												3							1		
61	45.77629	-89.59010	5	M	P							1	2													2								
62	45.77679	-89.59009	5	M	P							2													1	2								
63	45.77728	-89.59009	4	M	P							1													3	1								
64	45.77927	-89.59007	1	M	P																				3	1								
65	45.77977	-89.59007	4	M	P																				3	1								
66	45.78027	-89.59007	6	M	P							2													3									
67	45.78076	-89.59006	6	M	P							3														2								
68	45.78126	-89.59006	6	M	P							1	3												1	1								
69	45.78176	-89.59006	8	M	P							2	1													2								
70	45.78226	-89.59005	6	M	P							1													3	1								
71	45.78275	-89.59005	6	M	P							1	1													3									
72	45.78325	-89.59004	8	M	P							1	1													2									
73	45.78375	-89.59004	7	M	P							2													2	2								
74	45.78425	-89.59004	6	M	P							2	1													2									
75	45.78474	-89.59003	6	M	P							1	2												1	2								
76	45.78524	-89.59003	5	M	P							1													3									
77	45.78574	-89.59003	4	M	P								1												3									
78	45.78773	-89.59001	4	M	P								1												3	1								
79	45.78872	-89.59000	3	M	P																				2	2								
80	45.78922	-89.59000	4	M	P																				2	1								
81	45.78972	-89.59000	4	M	P																				3									
82	45.79171	-89.58998	3	M	V								1												3	2								
83	45.79220	-89.58998	5	M	P																				3	1								
84	45.79270	-89.58998	4	M	P																				3	1								
85	45.79320	-89.58997	5	M	P																				3	2								
86	45.79369	-89.58997	5	M	P								1												3	3								
87	45.79419	-89.58996	5	M	P								2												3									
88	45.77281	-89.58941	3	M	P																				3	1								
89	45.77330	-89.58941	2	M	V							1	2					2	1				1		3									
90	45.77380	-89.58940	3	M	V								1												3	1								
91	45.77430	-89.58940	1	S	V							1	2		2										2	1								1
92	45.77479	-89.58940	4	M	P								1												3									
93	45.77529	-89.58939	5	M	P							2	2												2	2								
94	45.77579	-89.58939	7	M	P							1	1												2	3								
95	45.77629	-89.58938	5	M	P							2	2												1	2								
96	45.77678	-89.58938	5	M	P							1												1	1	2								
97	45.77728	-89.58938	6	M	P							2	1													3								
98	45.77778	-89.58937	8	M	P							2													1	1								
99	45.77828	-89.58937	3	M	P																				2	1								

Number	Latitude (decimal degrees)	Longitude (decimal degrees)	Depth (ft)	Sediment type (M=muck, S=Sand, R=Rock)	Rope (R); Pole (P); Visual (V)	Comments	*Myriophyllum spicatum*	*Potamogeton crispus*	Brasenia schreberi	Calla palustris	Carex comosa	Ceratophyllum demersum	Elodea canadensis	Free-floating species	Juncus pelocarpus	Myriophyllum sibiricum	Nitella sp.	Nuphar variegata	Nymphaea odorata	Polygonum amphibium	Potamogeton amplifolius	Potamogeton gramineus	Potamogeton pusillus	Potamogeton richardsonii	Potamogeton robbinsii	Potamogeton zosteriformis	Sagittaria graminea	Sagittaria latifolia	Schoenoplectus tabernaemontani	Sparganium angustifolium	Sparganium eurycarpum	Stuckenia pectinata	Typha latifolia	Vallisneria americana
100	45.77877	-89.58937	8	M	P								3													2								
101	45.77927	-89.58936	7	M	P							1	3												1	1								
102	45.77977	-89.58936	6	M	P							2	2													2								
103	45.78026	-89.58936	8	M	P							2	2													2								
104	45.78076	-89.58935	8	M	P							2													2									
105	45.78126	-89.58935	8	M	P							3														1								
106	45.78176	-89.58934	8	M	P							2													1	2								
107	45.78225	-89.58934	8	M	P								1													1								
108	45.78275	-89.58934	8	M	P							1	1													2								
109	45.78325	-89.58933	8	M	P							1	1												1	1								
110	45.78375	-89.58933	8	M	P							3														2								
111	45.78424	-89.58933	6	M	P							2													2	2								
112	45.78474	-89.58932	8	M	P								1													3								
113	45.78524	-89.58932	6	M	P							2													2	2								
114	45.78574	-89.58932	6	M	P							2	2													3								
115	45.78623	-89.58931	6	M	P							1	1												3	1								
116	45.78673	-89.58931	6	M	P							1	3												3	2								
117	45.78723	-89.58930	6	M	P								2												2	2								
118	45.78772	-89.58930	6	M	P							1	1												3									
119	45.78822	-89.58930	5	M	P								2												3									
120	45.78872	-89.58929	3	M	P							3													1	1								
121	45.78922	-89.58929	4	M	P																				3	1								
122	45.78971	-89.58929	4	M	P																				3									
123	45.79021	-89.58928	5	M	P																				3									
124	45.79071	-89.58928	5	M	P																				3									
125	45.79121	-89.58928	4	M	P								1												1	1								
126	45.79170	-89.58927	5	M	P								1												3									
127	45.79220	-89.58927	7	M	P																				2									
128	45.79270	-89.58926	5	M	P																				3	1								
129	45.79319	-89.58926	5	M	P								1												3	3								
130	45.79369	-89.58926	5	M	P								2												2	3								
131	45.79419	-89.58925	5	M	P								1												3	3								
132	45.79469	-89.58925	4	M	P								1												3	1								
133	45.77429	-89.58869	1	M	V							1	2												3									
134	45.77479	-89.58869	5	M	P								1												3									
135	45.77529	-89.58868	6	M	V							2	2												2	2								
136	45.77579	-89.58868	7	M	P							3	2												1	2								
137	45.77628	-89.58867	6	M	P							1	1													3								
138	45.77678	-89.58867	6	M	P							3	2													2								
139	45.77728	-89.58867	10	M	P								1																					
140	45.77778	-89.58866	8	M	P								2												1	2								
141	45.77827	-89.58866	9	M	P							2														2								
142	45.77877	-89.58866	8	M	P							3	2													1								
143	45.77927	-89.58865	8	M	P								1																					
144	45.77976	-89.58865	8	M	P							2	2													2								
145	45.78026	-89.58864	8	M	P								2										2			2								
146	45.78076	-89.58864	8	M	P							2	1													2								
147	45.78126	-89.58864	8	M	P							1														1								
148	45.78175	-89.58863	8	M	P																													
149	45.78225	-89.58863	8	M	P																													
150	45.78275	-89.58863	8	M	P																					2								
151	45.78325	-89.58862	8	M	P																					1								
152	45.78374	-89.58862	8	M	P							2													1	2								
153	45.78424	-89.58862	7	M	P							3														1								
154	45.78474	-89.58861	8	M	P																				3									
155	45.78524	-89.58861	8	M	P							1	1												1	1								
156	45.78573	-89.58860	7	M	P							1	1													2								
157	45.78623	-89.58860	8	M	P							3	3												1	2								
158	45.78673	-89.58860	6	M	P							1	1												3	2								
159	45.78722	-89.58859	6	M	P							1	1												2	1								
160	45.78772	-89.58859	6	M	P							2	1												2	3								
161	45.78822	-89.58859	6	M	P								1												3									
162	45.78872	-89.58858	3	M	P																								3					
163	45.78921	-89.58858	5	M	P																				3									
164	45.78971	-89.58858	5	M	P																				3									
165	45.79021	-89.58857	6	M	P																				3									
166	45.79071	-89.58857	5	M	P																				3									
167	45.79120	-89.58856	5	M	P																				3									
168	45.79170	-89.58856	5	M	P																				3	1								
169	45.79220	-89.58856	7	M	P																				1	1								
170	45.79269	-89.58855	6	M	P								3												1	3								
171	45.79319	-89.58855	5	M	P							1													3	3								
172	45.79369	-89.58855	5	M	P								1												3	3								
173	45.79419	-89.58854	5	M	P								1												3	3								
174	45.79468	-89.58854	5	M	P																				3	2								
175	45.77479	-89.58797	3	M	P								1												1	2								
176	45.77529	-89.58797	6	M	V							2	1												2	2								
177	45.77578	-89.58797	8	M	P							1	1													1								
178	45.77628	-89.58796	7	M	P							3	1													1								
179	45.77678	-89.58796	6	M	P							2	1												2	2								
180	45.77728	-89.58796	9	M	P							3	1																					
181	45.77777	-89.58795	8	M	P							1	3													1								
182	45.77827	-89.58795	8	M	P							2														1								
183	45.77877	-89.58795	9	M	P								2													2								
184	45.77927	-89.58794	9	M	P								2													2								
185	45.77976	-89.58794	8	M	P							1	1													3								
186	45.78026	-89.58793	7	M	P							2	2													2								
187	45.78076	-89.58793	8	M	P																													
188	45.78125	-89.58793	8	M	P							2	1													1								
189	45.78175	-89.58792	10	M	P																													
190	45.78225	-89.58792	10	M	P							1													1									
191	45.78275	-89.58792	8	M	P							2														1								
192	45.78324	-89.58791	10	M	P							2																						
193	45.78374	-89.58791	10	M	P							2														3								
194	45.78424	-89.58790	8	M	P							2	1													3								
195	45.78474	-89.58790	10	M	P								1																					
196	45.78523	-89.58790	8	M	P							1														1								

Number	Latitude (decimal degrees)	Longitude (decimal degrees)	Depth (ft)	Sediment type (M=muck, S=Sand, R=Rock)	Rope (R); Pole (P); Visual (V)	Comments	*Myriophyllum spicatum*	*Potamogeton crispus*	Brasenia schreberi	Calla palustris	Carex comosa	Ceratophyllum demersum	Elodea canadensis	Free-floating species	Juncus pelocarpus	Myriophyllum sibiricum	Nitella sp.	Nuphar variegata	Nymphaea odorata	Polygonum amphibium	Potamogeton amplifolius	Potamogeton gramineus	Potamogeton pusillus	Potamogeton richardsonii	Potamogeton robbinsii	Potamogeton zosteriformis	Sagittaria graminea	Sagittaria latifolia	Schoenoplectus tabernaemontani	Sparganium angustifolium	Sparganium eurycarpum	Stuckenia pectinata	Typha latifolia	Vallisneria americana
197	45.78573	-89.58789	8	M	P																				2	2								
198	45.78623	-89.58789	9	M	P							1	1													3								
199	45.78672	-89.58789	6	M	P							3	3													2								
200	45.78722	-89.58788	8	M	P								2													2								
201	45.78772	-89.58788	6	M	P								3													3								
202	45.78822	-89.58788	6	M	P								2													2								
203	45.78871	-89.58787	4	M	P							1													3									
204	45.78921	-89.58787	5	M	P																				2									
205	45.78971	-89.58786	7	M	P								1												2	1								
206	45.79021	-89.58786	6	M	P																				3									
207	45.79070	-89.58786	6	M	P							1													2									
208	45.79120	-89.58785	6	M	P																				3	1								
209	45.79170	-89.58785	5	M	P																				3									
210	45.79219	-89.58785	6	M	P																				3	1								
211	45.79269	-89.58784	6	M	P							1	1												3	3								
212	45.79319	-89.58784	7	M	P							1													3	1								
213	45.79369	-89.58784	6	M	P								1												3	3								
214	45.79418	-89.58783	5	M	P								2												3	3								
215	45.79468	-89.58783	6	M	P																				3									
216	45.77479	-89.58726	5	M	P								1												3	1								
217	45.77528	-89.58726	6	M	V							1	1												3	2								
218	45.77578	-89.58726	7	M	P							2	2													2								
219	45.77628	-89.58725	8	M	P							2	2													2								
220	45.77678	-89.58725	8	M	P							2														2								
221	45.77727	-89.58725	9	M	P							2	1													2								
222	45.77777	-89.58724	10	M	P								2												1	2								
223	45.77827	-89.58724	9	M	P								3													1								
224	45.77877	-89.58723	9	M	P							1	1													3								
225	45.77926	-89.58723	9	M	P								2													1								
226	45.77976	-89.58723	8	M	P							2														3								
227	45.78026	-89.58722	8	M	P							2																						
228	45.78075	-89.58722	10	M	P							1														1								
229	45.78125	-89.58722	10	M	P							2														1								
230	45.78175	-89.58721	10	M	P							3	1																					
231	45.78225	-89.58721	10	M	P							3														1								
232	45.78274	-89.58721	10	M	P							2	1													1								
233	45.78324	-89.58720	10	M	P							2														1								
234	45.78374	-89.58720	10	M	P							2	1													2								
235	45.78424	-89.58719	10	M	P																													
236	45.78473	-89.58719	9	M	P																													
237	45.78523	-89.58719	9	M	P								1												1									
238	45.78573	-89.58718	8	M	P							1	1													1								
239	45.78622	-89.58718	8	M	P							2	1													2								
240	45.78672	-89.58718	8	M	P							2													2	2								
241	45.78722	-89.58717	8	M	P							2														2								
242	45.78772	-89.58717	8	M	P								1												2	1								
243	45.78821	-89.58716	6	M	P							2	2												2	2								
244	45.78871	-89.58716	6	M	P							1	1												3	1								
245	45.78921	-89.58716	6	M	P																				3									
246	45.78971	-89.58715	6	M	P							2	1												1	1								
247	45.79020	-89.58715	7	M	P																				3	2								
248	45.79070	-89.58715	6	M	P							1	1													3								
249	45.79120	-89.58714	6	M	P																				3									
250	45.79170	-89.58714	6	M	P								2												2	3								
251	45.79219	-89.58714	6	M	P								1												3	3								
252	45.79269	-89.58713	6	M	P																				3	3								
253	45.79319	-89.58713	6	M	P																				3	1								
254	45.79368	-89.58712	7	M	P							1	1												2	3								
255	45.79418	-89.58712	5	M	P								1												3	3								
256	45.79468	-89.58712	5	M	P								1												3	1								
257	45.77478	-89.58655	5	M	P								1												3	1								
258	45.77528	-89.58655	5	M	V							1													3	2								
259	45.77578	-89.58655	5	M	P							2	2													2								
260	45.77628	-89.58654	8	M	P								2													2								
261	45.77677	-89.58654	9	M	P								2											1		3								
262	45.77727	-89.58653	11	M	P								2												1	1								
263	45.77777	-89.58653	8	M	P							1	1												1	2								
264	45.77827	-89.58653	9	M	P							2	1													3								
265	45.77876	-89.58652	9	M	P							1	2													3								
266	45.77926	-89.58652	9	M	P							1	2													2								
267	45.77976	-89.58652	8	M	P							1	1													3								
268	45.78025	-89.58651	9	M	P							2														2								
269	45.78075	-89.58651	8	M	P							2													1	1								
270	45.78125	-89.58651	8	M	P							3														2								
271	45.78175	-89.58650	8	M	P							3																						
272	45.78224	-89.58650	8	M	P							2	2													2								
273	45.78274	-89.58649	8	M	P							3														1								
274	45.78324	-89.58649	8	M	P							3																						
275	45.78374	-89.58649	9	M	P							3													1									
276	45.78423	-89.58648	8	M	P							1	1													2								
277	45.78473	-89.58648	8	M	P																					1								
278	45.78523	-89.58648	8	M	P							3													2									
279	45.78572	-89.58647	8	M	P																					2								
280	45.78622	-89.58647	9	M	P							2	1													3								
281	45.78672	-89.58646	8	M	P																													
282	45.78722	-89.58646	6	M	P							2	2												1	2								
283	45.78771	-89.58646	6	M	P							2														3								
284	45.78821	-89.58645	8	M	P							3	1												1									
285	45.78871	-89.58645	8	M	P								1												3	1								
286	45.78921	-89.58645	8	M	P								3													3								
287	45.78970	-89.58644	7	M	P							2	1												3									
288	45.79020	-89.58644	7	M	P							1													3	1								
289	45.79070	-89.58644	5	M	P							1													1	3								
290	45.79120	-89.58643	6	M	P								2												2	2								
291	45.79169	-89.58643	6	M	P																				3	1								
292	45.79219	-89.58642	6	M	P								1												3									
293	45.79269	-89.58642	6	M	P							1	2												3	3								

Number	Latitude (decimal degrees)	Longitude (decimal degrees)	Depth (ft)	Sediment type (M=muck, S=Sand, R=Rock)	Rope (R); Pole (P); Visual (V)	Comments	*Myriophyllum spicatum*	*Potamogeton crispus*	Brasenia schreberi	Calla palustris	Carex comosa	Ceratophyllum demersum	Elodea canadensis	Free-floating species	Juncus pelocarpus	Myriophyllum sibiricum	Nitella sp.	Nuphar variegata	Nymphaea odorata	Polygonum amphibium	Potamogeton amplifolius	Potamogeton gramineus	Potamogeton pusillus	Potamogeton richardsonii	Potamogeton robbinsii	Potamogeton zosteriformis	Sagittaria graminea	Sagittaria latifolia	Schoenoplectus tabernaemontani	Sparganium angustifolium	Sparganium eurycarpum	Stuckenia pectinata	Typha latifolia	Vallisneria americana
294	45.79318	-89.58642	5	M	P							1	2											1	3	3								
295	45.79368	-89.58641	5	M	P								2												3	3									
296	45.79418	-89.58641	5	M	P								1												3	3									
297	45.79468	-89.58641	5	M	P																				3	2									
298	45.77478	-89.58584	3	M	V								1												3	1									
299	45.77528	-89.58584	3	M	V							1				1									2	2									3
300	45.77578	-89.58584	7	M	P							2	2													2									
301	45.77627	-89.58583	8	M	P							2	2													2									
302	45.77677	-89.58583	8	M	P								2													2									
303	45.77727	-89.58582	9	M	P								3												1										
304	45.77777	-89.58582	8	M	P								2													2									
305	45.77826	-89.58582	9	M	P								3													1									
306	45.77876	-89.58581	10	M	P							3																							
307	45.77926	-89.58581	9	M	P							2	2													2									
308	45.77975	-89.58581	10	M	P							1	1													1									
309	45.78025	-89.58580	9	M	P							2														2									
310	45.78075	-89.58580	10	M	P							2													2										
311	45.78125	-89.58579	10	M	P							3													1	1									
312	45.78174	-89.58579	10	M	P							1																							
313	45.78224	-89.58579	10	M	P																														
314	45.78274	-89.58578	8	M	P							2														1									
315	45.78324	-89.58578	8	M	P							3																							
316	45.78373	-89.58578	9	M	P							2																							
317	45.78423	-89.58577	8	M	P							2													2	2									
318	45.78473	-89.58577	8	M	P							3	1																						
319	45.78523	-89.58577	8	M	P							2	1												2	1									
320	45.78572	-89.58576	8	M	P							2	2												1	1									
321	45.78622	-89.58576	6	M	P							2	2												1	1									
322	45.78672	-89.58575	3	M	P																				3	2									
323	45.78721	-89.58575	3	M	P							1													2	1									
324	45.78821	-89.58574	3	M	P							1	1												2										
325	45.78871	-89.58574	6	M	P								2												3	2									
326	45.78920	-89.58574	6	M	P																				3										
327	45.78970	-89.58573	7	M	P							1	1													3									
328	45.79020	-89.58573	8	M	P								2												3										
329	45.79070	-89.58572	6	M	P							1	1											1	1	2									
330	45.79119	-89.58572	6	M	P																				3	1									
331	45.79169	-89.58572	6	M	P								1			2									1	3									
332	45.79219	-89.58571	5	M	P							3	3													1									
333	45.79268	-89.58571	6	M	P																				3	3									
334	45.79318	-89.58571	5	M	P								3												3	3									
335	45.79368	-89.58570	5	M	P								2												3	2									
336	45.79418	-89.58570	5	M	P								1												3	2									
337	45.79467	-89.58570	5	M	P																				3	1									
338	45.77528	-89.58513	3	M	V							1	1												3	1									
339	45.77577	-89.58512	2	M	V							1													2	2									2
340	45.77627	-89.58512	6	M	P							2	2													2									
341	45.77677	-89.58512	8	M	P							1																							
342	45.77727	-89.58511	9	M	P								2													2									
343	45.77776	-89.58511	8	M	P								2																						
344	45.77826	-89.58511	8	M	P			1				2	1																						
345	45.77876	-89.58510	11	M	P			1				2														1									
346	45.77925	-89.58510	11	M	P							1																							
347	45.77975	-89.58509	8	M	P							2														3									
348	45.78025	-89.58509	10	M	P							1	2												1	1									
349	45.78075	-89.58509	10	M	P																														
350	45.78124	-89.58508	8	M	P							2														2									
351	45.78174	-89.58508	10	M	P																														
352	45.78224	-89.58508	9	M	P							1														2									
353	45.78274	-89.58507	8	M	P							1														1									
354	45.78323	-89.58507	10	M	P							1													2										
355	45.78373	-89.58507	10	M	P																														
356	45.78423	-89.58506	6	M	P							2	1													1									
357	45.78473	-89.58506	9	M	P																					2									
358	45.78522	-89.58505	8	M	P							1														1									
359	45.78572	-89.58505	8	M	P							2	1																						
360	45.78821	-89.58503	8	M	P							1													1	2									
361	45.78870	-89.58503	6	M	P																				3										
362	45.78920	-89.58502	5	M	P																				3										
363	45.78970	-89.58502	7	M	P								2												2	2									
364	45.79020	-89.58502	6	M	P								3													3									
365	45.79069	-89.58501	6	M	P								1												3	3									
366	45.79119	-89.58501	7	M	P							1	1											1	1	3									
367	45.79169	-89.58501	6	M	P							1	1												1	2									
368	45.79218	-89.58500	5	M	P								3												11	3									
369	45.79268	-89.58500	6	M	P							2	2												2	3									
370	45.79318	-89.58500	5	M	P								3												2	3									
371	45.79368	-89.58499	5	M	P								2												3	3									
372	45.79417	-89.58499	5	M	P																				3										
373	45.79467	-89.58498	5	M	P																				3										
374	45.77627	-89.58441																																	
375	45.77677	-89.58441	3	M	P							2														3									
376	45.77726	-89.58440	6	M	P								1													3									
377	45.77776	-89.58440	7	M	P								2													2									
378	45.77826	-89.58440	10	M	P								2													3									
379	45.77875	-89.58439	10	M	P								2																						
380	45.77925	-89.58439	11	M	P			1																											
381	45.77975	-89.58438	10	M	P							1													1	2									
382	45.78025	-89.58438	10	M	P							1	1													2									
383	45.78074	-89.58438	10	M	P																					2									
384	45.78124	-89.58437	10	M	P							2	1													2									
385	45.78174	-89.58437	10	M	P																														
386	45.78224	-89.58437	9	M	P							2	1													1									
387	45.78273	-89.58436	10	M	P																					1									
388	45.78323	-89.58436	10	M	P																														
389	45.78373	-89.58435	10	M	P																														
390	45.78423	-89.58435	10	M	P																														

Number	Latitude (decimal degrees)	Longitude (decimal degrees)	Depth (ft)	Sediment type (M=muck, S=Sand, R=Rock)	Rope (R); Pole (P); Visual (V)	Comments	*Myriophyllum spicatum*	*Potamogeton crispus*	Brasenia schreberi	Calla palustris	Carex comosa	Ceratophyllum demersum	Elodea canadensis	Free-floating species	Juncus pelocarpus	Myriophyllum sibiricum	Nitella sp.	Nuphar variegata	Nymphaea odorata	Polygonum amphibium	Potamogeton amplifolius	Potamogeton gramineus	Potamogeton pusillus	Potamogeton richardsonii	Potamogeton robbinsii	Potamogeton zosteriformis	Sagittaria graminea	Sagittaria latifolia	Schoenoplectus tabernaemontani	Sparganium angustifolium	Sparganium eurycarpum	Stuckenia pectinata	Typha latifolia	Vallisneria americana
391	45.78472	-89.58435	9	M	P							1																						
392	45.78522	-89.58434	8	M	P							2	1													3								
393	45.78572	-89.58434	8	M	P							2	2													2								
394	45.78621	-89.58434	6	M	P								1													3								
395	45.78820	-89.58432	3	M	P							2	2												2	2								
396	45.78870	-89.58432	4	M	P																				3									
397	45.78920	-89.58431	6	M	P																				3									
398	45.78970	-89.58431	5	M	P								1												3									
399	45.79019	-89.58431	5	M	P							1	2													2								
400	45.79069	-89.58430	6	M	P								1												3	1								
401	45.79119	-89.58430	6	M	P								1												3	1								
402	45.79168	-89.58430	6	M	P								2												2	2								
403	45.79218	-89.58429	5	M	P							2	2												2	2								
404	45.79268	-89.58429	6	M	P																				3	3								
405	45.79318	-89.58428	5	M	P								3												2	3								
406	45.79367	-89.58428	5	M	P																				3									
407	45.79417	-89.58428	5	M	P																				3	1								
408	45.77726	-89.58369	3	M	P								1												3	3								
409	45.77776	-89.58369	2	M	V			1																	3	3								
410	45.77826	-89.58368	2	M	V							1				1									3	3								
411	45.77875	-89.58368	2	M	V			1				1				1									1	3								
412	45.77925	-89.58368	5	M	P								2																					
413	45.77975	-89.58367	8	M	P			1					1												1									
414	45.78024	-89.58367	9	M	P																					2								
415	45.78074	-89.58367	8	M	P							1	1													3								
416	45.78124	-89.58366	9	M	P							1														2								
417	45.78174	-89.58366	10	M	P																													
418	45.78223	-89.58365	10	M	P							1																						
419	45.78273	-89.58365	10	M	P																					1								
420	45.78323	-89.58365	9	M	P																													
421	45.78373	-89.58364	10	M	P							1														2								
422	45.78422	-89.58364	8	M	P																					2								
423	45.78472	-89.58364	8	M	P								2												1	2								
424	45.78522	-89.58363	8	M	P							3													2									
425	45.78571	-89.58363	7	M	P							1	1												1	3								
426	45.78621	-89.58363	6	M	P							2	3													2								
427	45.78820	-89.58361	2	M	P							2													3	2								2
428	45.78870	-89.58361	4	M	P																				3									
429	45.78920	-89.58360	5	M	P								1												3									
430	45.78969	-89.58360	4	M	P																				3									
431	45.79019	-89.58360	5	M	P																				3									
432	45.79069	-89.58359	5	M	P								1												3									
433	45.79118	-89.58359	7	M	P								3			1									3									
434	45.79168	-89.58358	6	M	P								1												3									
435	45.79218	-89.58358	6	M	P								1												3	1								
436	45.79268	-89.58358	7	M	P								2												3	3								
437	45.79317	-89.58357	5	M	P																				3									
438	45.79367	-89.58357	4	M	P																				3									
439	45.77974	-89.58296	4	M	P																				3	1								
440	45.78024	-89.58296	4	M	P																				3	1								
441	45.78074	-89.58296	6	M	P								3													2								
442	45.78124	-89.58295	7	M	P							2														2								
443	45.78173	-89.58295	8	M	P							2														2								
444	45.78223	-89.58294	9	M	P							2	1													2								
445	45.78273	-89.58294	8	M	P								1													2								
446	45.78323	-89.58294	10	M	P							1														1								
447	45.78372	-89.58293	9	M	P							1	1													2								
448	45.78422	-89.58293	9	M	P							2													2	2								
449	45.78472	-89.58293	8	M	P							2	2													2								
450	45.78521	-89.58292	8	M	P							1	2													2								
451	45.78571	-89.58292	8	M	P							1	3													1								
452	45.78770	-89.58290	6	M	P							2	2													2								
453	45.78820	-89.58290	1	M	V							1	1					1	1						3	1								
454	45.78870	-89.58290	5	M	P																				3									
455	45.78919	-89.58289	3	M	P																				3	1								
457	45.79019	-89.58288	3	M	P								1			3									3									
458	45.79069	-89.58288	6	M	P								3												3									
459	45.79118	-89.58288	5	M	P							1													3	1								
460	45.79168	-89.58287	5	M	P								1												3									
461	45.79218	-89.58287	6	M	P								1												3	1								
462	45.79267	-89.58287	5	M	P								1												3	1								
463	45.79317	-89.58286	3	M	V							1	1												3	3								
464	45.78024	-89.58225	3	M	P							1				1									3	3								
465	45.78074	-89.58224	6	M	P							2	2												2	2								
466	45.78123	-89.58224	7	M	P								2													2								
467	45.78173	-89.58224	6	M	P							2	1													3								
468	45.78223	-89.58223	5	M	P							3	1													1								
469	45.78273	-89.58223	6	M	P							2													2	2								
470	45.78322	-89.58223	1	S	P							1														1								
471	45.78372	-89.58222	2	S	P							1	1												1	2								
472	45.78422	-89.58222	2	M	V							2				1									2	3								
473	45.78471	-89.58221	3	M	V							2													3	3								2
474	45.78770	-89.58219	1	M	V							1	1						1						3	1								
475	45.78820	-89.58219	6	M	P								2												2	3								
476	45.78869	-89.58219	2	M	V							1	2			1			2						3	1					2			
477	45.78969	-89.58218	3	M	P																				3									
478	45.79019	-89.58217	4	M	P								1												3									
479	45.79068	-89.58217	5	M	P								3												2	2								
480	45.79118	-89.58217	5	M	P								1												3									
481	45.79168	-89.58216	5	M	P																				3									
482	45.79217	-89.58216	2	M	V								2												3	2								
483	45.79267	-89.58216				On Shore																												
484	45.78123	-89.58153	2	S	P			1				2													2									
485	45.78770	-89.58148	1	M	V							1	1												3	1								
486	45.78819	-89.58148	2	M	V								2												3	3						2		
487	45.78869	-89.58147	3	M	V								1												3	2								
488	45.78919	-89.58147	3	M	P																				3	1								

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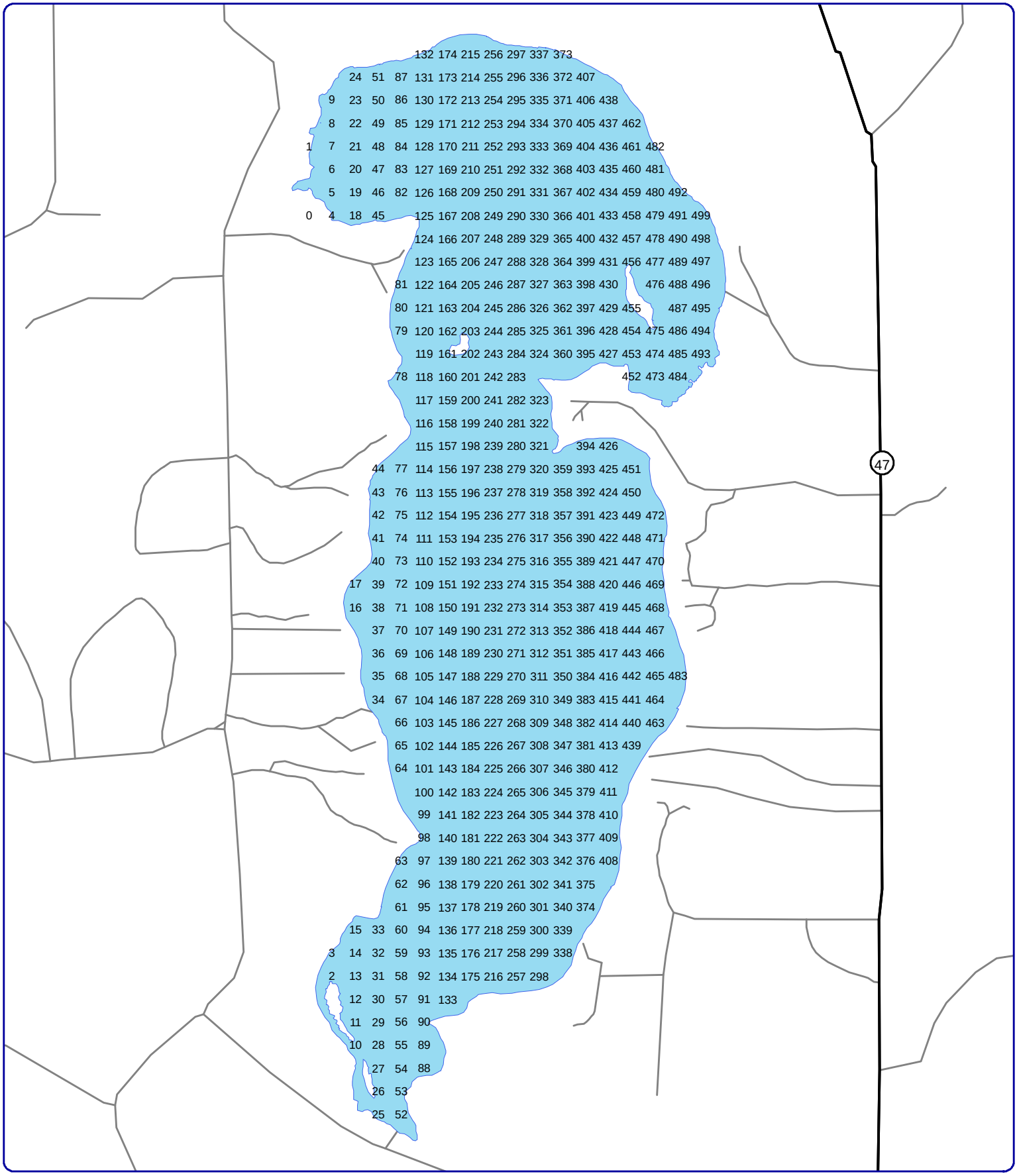
489	45.78969	-89.58147	3	M	P											1									3									
490	45.79018	-89.58146	4	M	P								2												3									
491	45.79068	-89.58146	4	M	P								1												3									
492	45.79118	-89.58146	5	M	P								1												3									
493	45.79167	-89.58145	1	M	V								1												3	1								
494	45.78819	-89.58077	2	M	V							2	2												3	2								
495	45.78869	-89.58076	2	M	V							1	2			1		2							3	1								
496	45.78919	-89.58076	2	M	V								1												3	1								
497	45.78968	-89.58076	3	M	P								1												3	2								
498	45.79018	-89.58075	3	M	P								1												3	1								
499	45.79068	-89.58075	3	M	P							1													3									
500	45.79117	-89.58074	2	M	V							1	1			1									3	1								



N
W E
S

1,000
Feet

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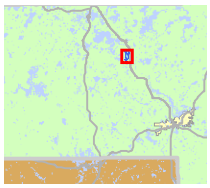
Sources:
Roads and Hydro: WDNR
PI locations: Onterra, 2007

Map Date: Date



Extent of large map shown in red.

Legend

\# Point-intercept Sample Location

Appendix E
Horsehead Lake
Oneida County, Wisconsin

Point-intercept Sample Locations