A

APPENDIX A

Public Participation Materials

Presentation Outline

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

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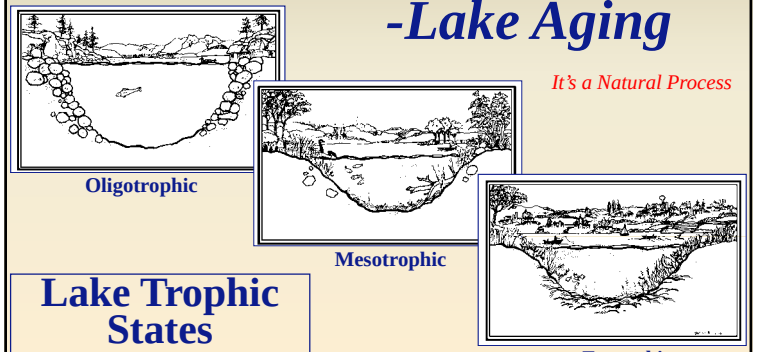
Introduction to Lake Ecology

General Lake Ecology

Eutrophication -Lake Aging

It's a Natural Process



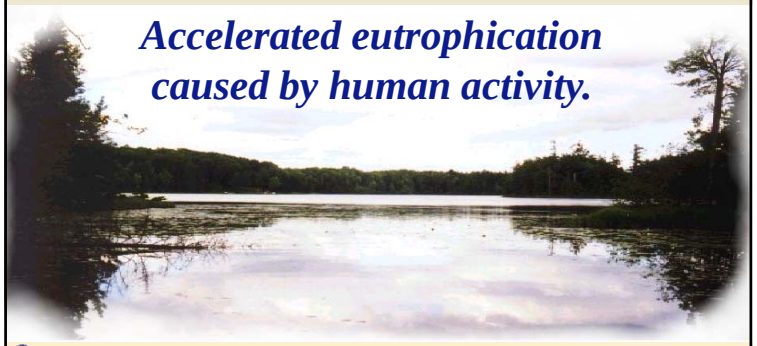
Lake Trophic States

Onterra LLC

General Lake Ecology

Cultural Eutrophication

Accelerated eutrophication caused by human activity.



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General Lake Ecology

Limiting Ingredient (Nutrient)

8 Cups Water, 8 Cups Four, 8 Cups Sugar, 6 Eggs

2 Cups Water
2 Cups Flour
2 Cups Sugar
2 Eggs

2 Cups Water
2 Cups Flour
2 Cups Sugar
2 Eggs

2 Cups Water
2 Cups Flour
2 Cups Sugar
2 Cups Eggs

2 Cups Water
2 Cups Flour
2 Cups Sugar
2 Eggs

General Lake Ecology

Phosphorus

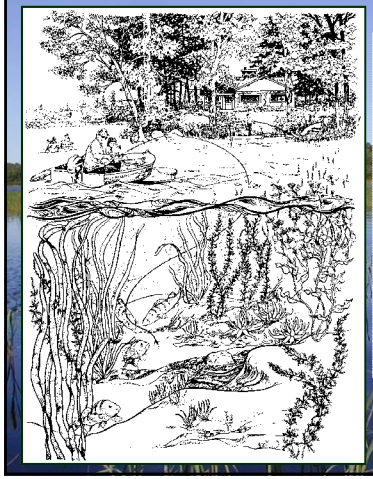
- *Limiting Nutrient*
- *Controls Plant Abundance (Productivity)*
  - *Algae*
  - *Macrophytes*

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

Update:
No CLP Found
on June, 2007

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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

A goal without a plan is nothing more than a wish.

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Current Project

Study Components

- Public Participation
- Watershed Modeling
- Water Quality — *Citizens Lake Monitoring Network*
- Aquatic Vegetation
  - Curly-leaf Survey — *Completed – Results Pending*
  - Comprehensive Survey — *P-I Completed (WDNR)*
  - Eurasian Water Milfoil — *Pretreatment Survey Complete*
- 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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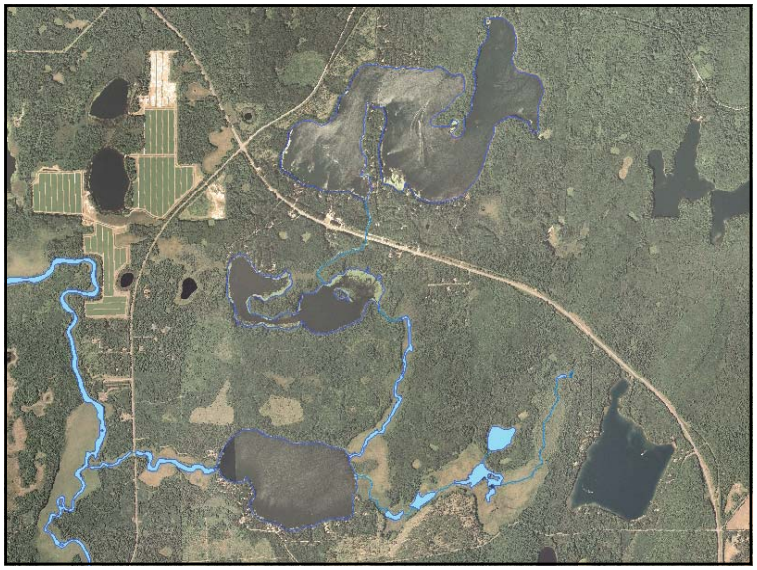
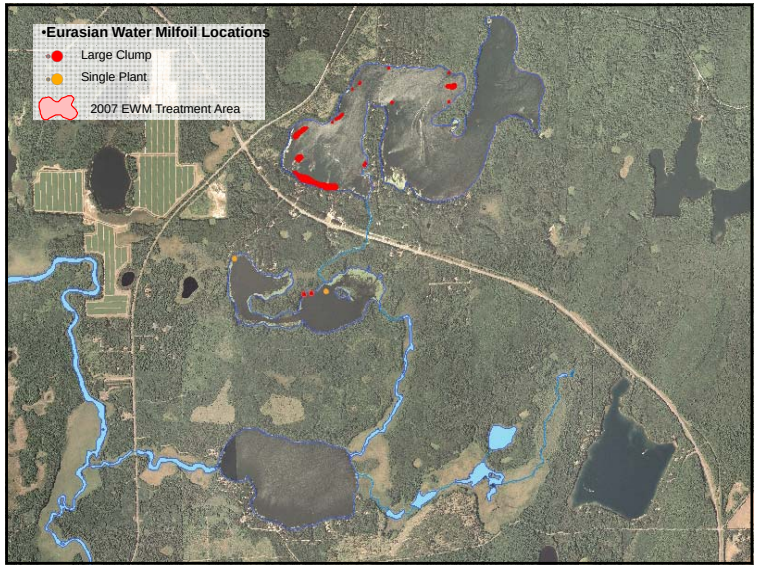
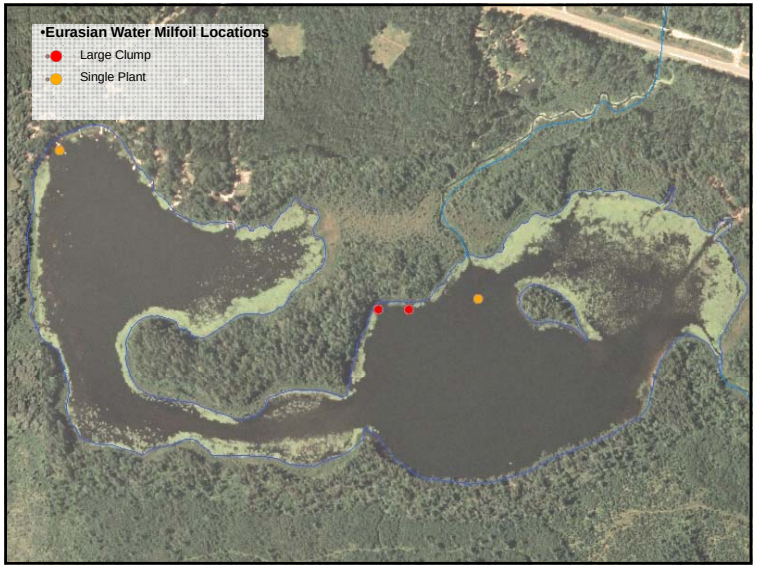
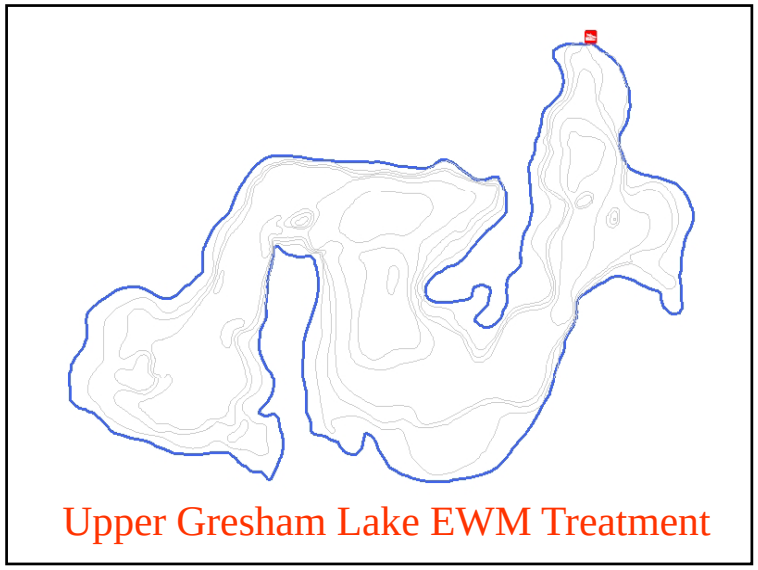
EWM on the Chain

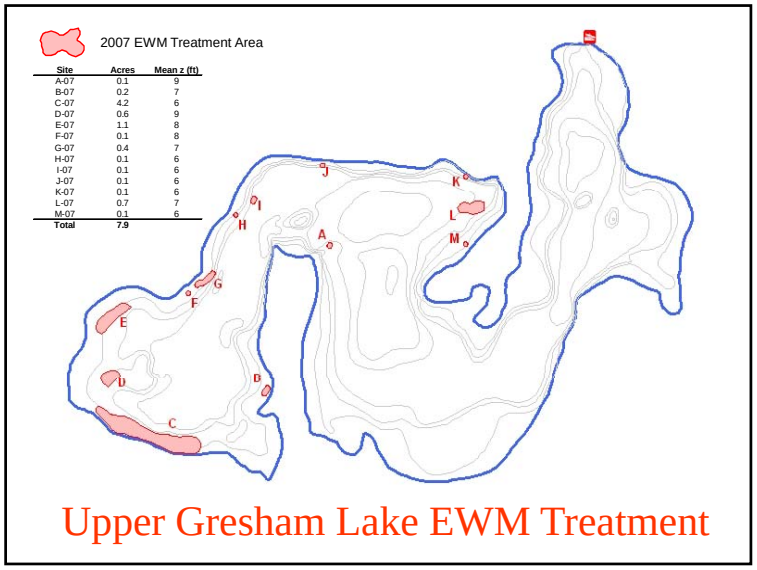



•Eurasian Water Milfoil Locations
Large Clump
Single Plant
2007 EWM Treatment Area

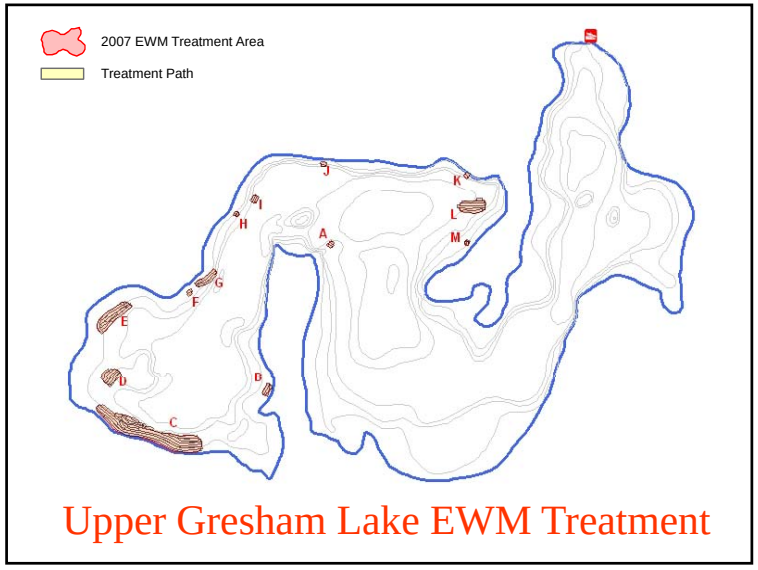

•Eurasian Water Milfoil Locations
Large Clump
Single Plant



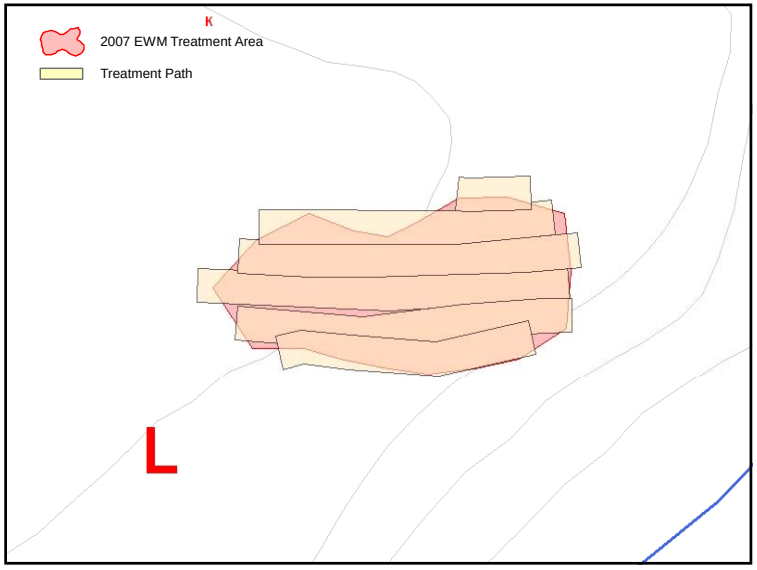
Upper Gresham Lake EWM Treatment



Upper Gresham Lake EWM Treatment



Upper Gresham Lake EWM Treatment



Thank You

Eddie J. Heath **eheath@onterra-eco.com**

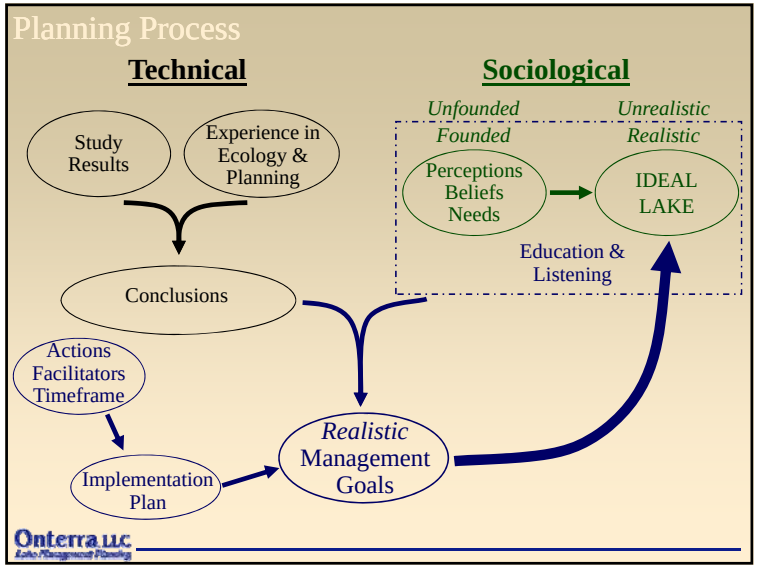
Many of the graphics used in this presentation were supplied by:

Wisconsin Lakes Partnership

UW Extension

Wisconsin Dept. of Natural Resources

Onterra LLC



Presentation Outline

- Current Lake Project Overview
- Planning Process
- Planning Project Study Results
  - Watershed
  - Water Quality
  - Aquatic Plants
  - EWM Treatment
- Preliminary Conclusions
- Discussion
- Management Goals

Onterra LLC Lake Management Planning 2

Current Project

Study and Plan Goals

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

Onterra LLC Lake Management Planning 3

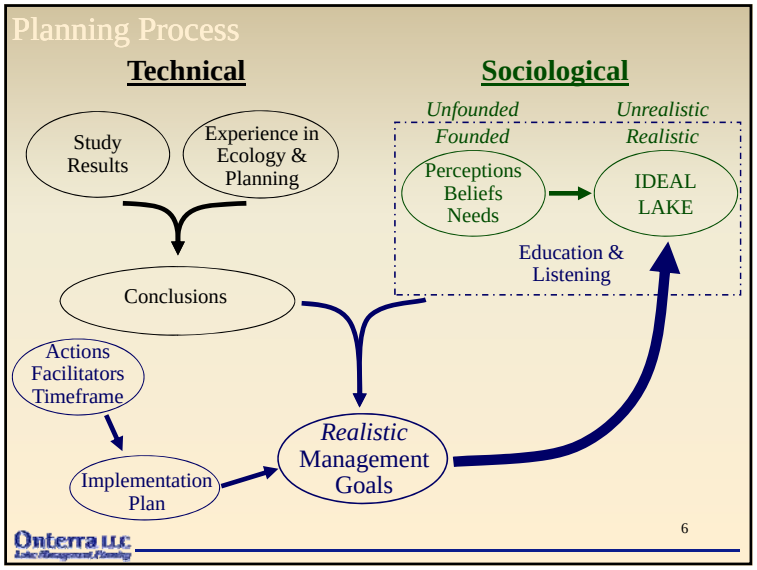
Current Project

Study Components

- Public Participation — *Stakeholder Survey Distributed*
- Watershed Modeling — *Competed - Onterra*
- Water Quality — *Citizens Lake Monitoring Network & Onterra*
- Aquatic Vegetation
  - Curly-leaf Survey — *Completed 2007 - None Found*
  - Comprehensive Survey — *Completed 2007 - Onterra*
  - Treatment Monitoring — *Pre & Post Completed (T2007)*
- Plan Development

Onterra LLC Lake Management Planning 4


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


Planning Process
Technical
Sociological
Study Results
Experience in Ecology & Planning
Unfounded
Founded
Unrealistic
Realistic
Perceptions Beliefs Needs
IDEAL LAKE
Education & Listening
Conclusions
Actions Facilitators Timeframe
Realistic Management Goals
Implementation Plan
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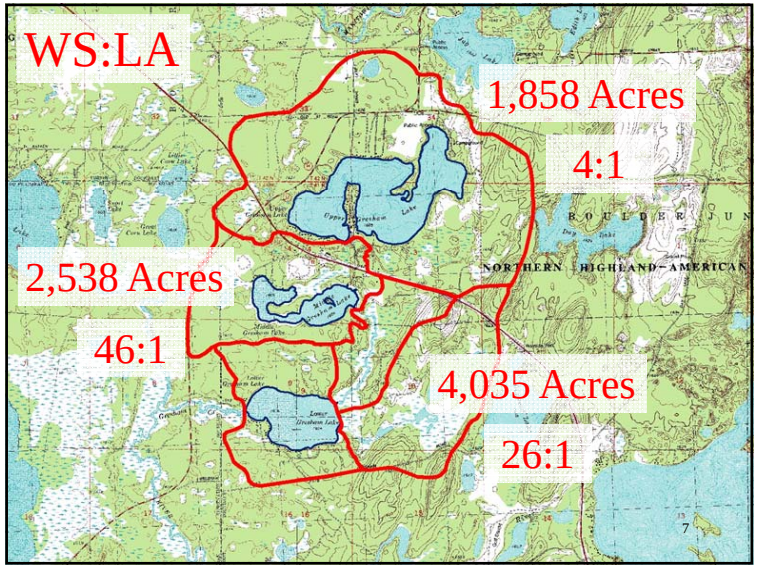
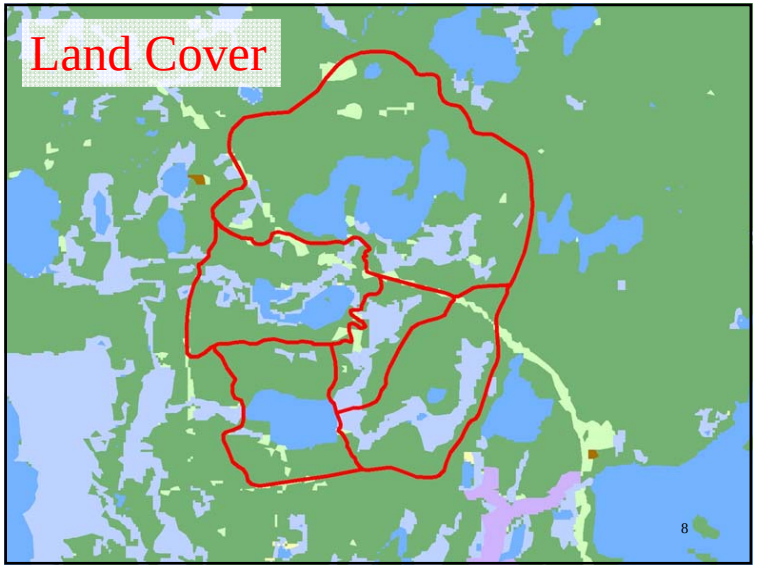
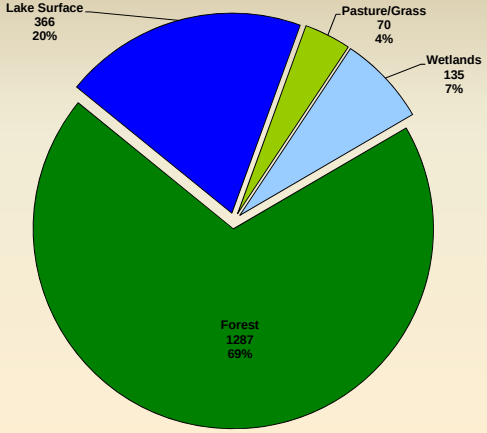
6


WS:LA
1,858 Acres
4:1
2,538 Acres
46:1
4,035 Acres
26:1
7


Land Cover
8

Study Results



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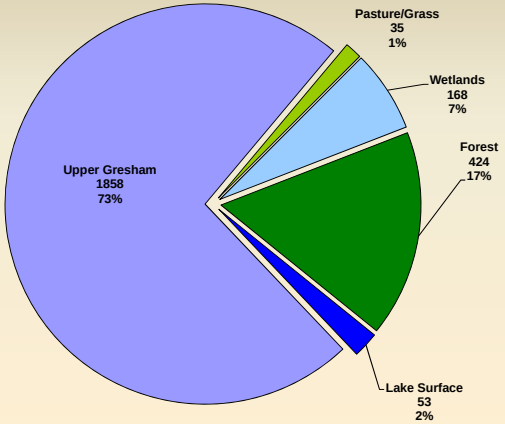
Study Results



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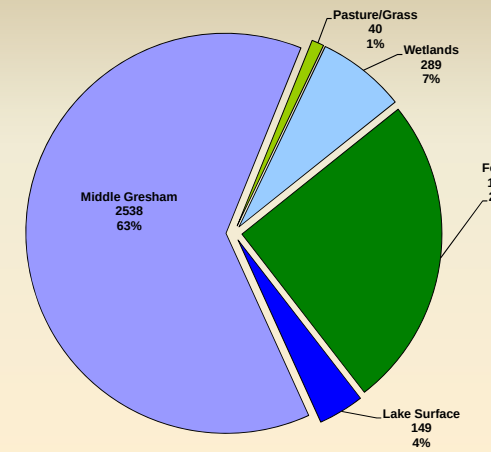
Study Results



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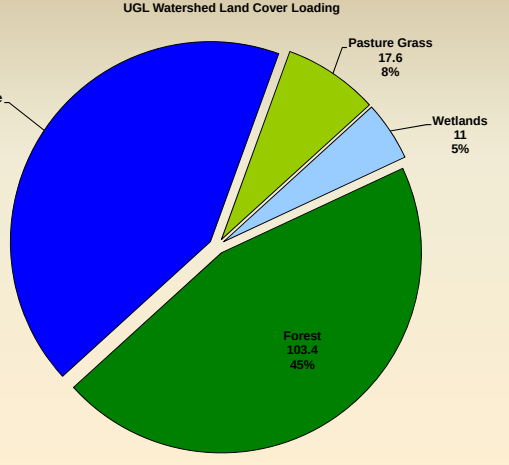
Study Results



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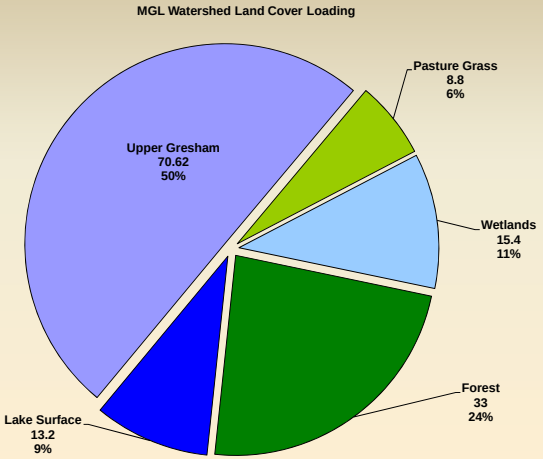
Study Results



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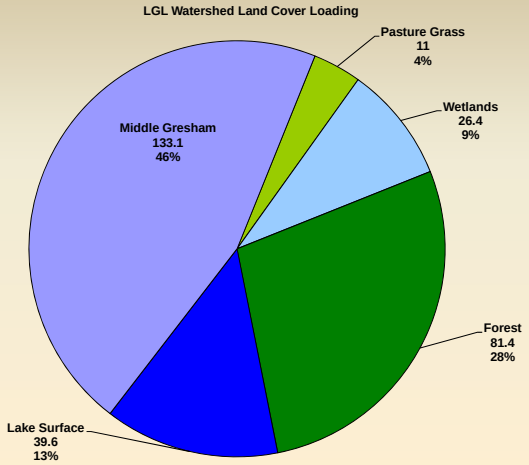
Study Results



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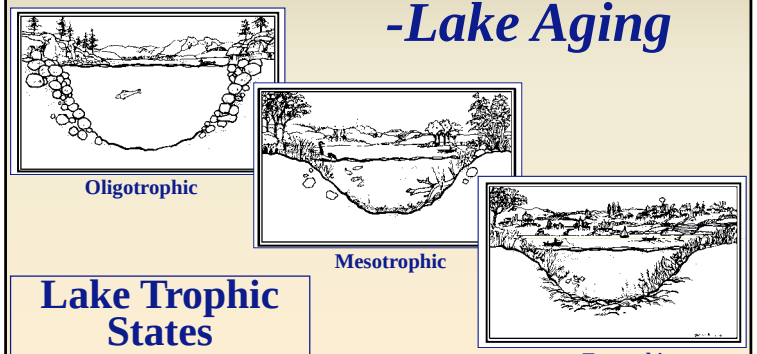
General Lake Ecology

Eutrophication

-Lake Aging



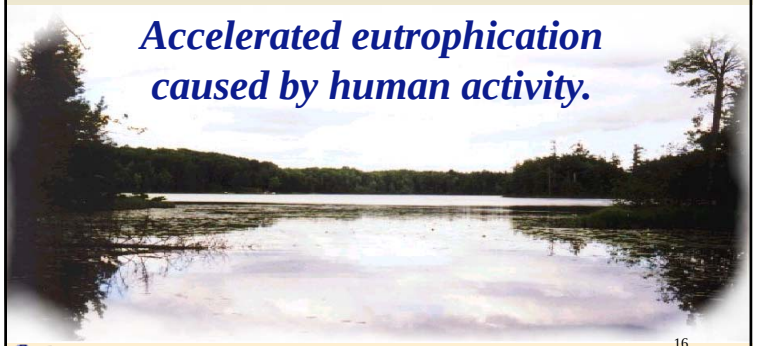
Lake Trophic States

15

General Lake Ecology

Cultural Eutrophication

Accelerated eutrophication caused by human activity.



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Study Results

Water Quality

Lillie & Mason Regions

17

Study Results

Water Quality

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

18

Citizen Lake Monitoring Network Since 1986

Parameter	June	July	August
Total Phosphorus	♦	♦	♦
Dissolved Phosphorus	●	●	
Chlorophyll a	♦	♦	♦
Total Kjeldahl Nitrogen	●	●	●
Nitrate-Nitrite Nitrogen	●	●	●
Ammonia Nitrogen	●	●	●
Laboratory Conductivity	●	●	
Laboratory pH	●	●	
Total Alkalinity	●	●	
Total Suspended Solids	●	●	●
Calcium	●		

♦ indicates samples collected as a part of the Citizen Lake Monitoring Network.
● indicates samples collected under current project funding

- Water quality data
  - Volunteers
    - June, July, August
  - Onterra
    - Winter
- All data is collected
- Only TP has been integrated

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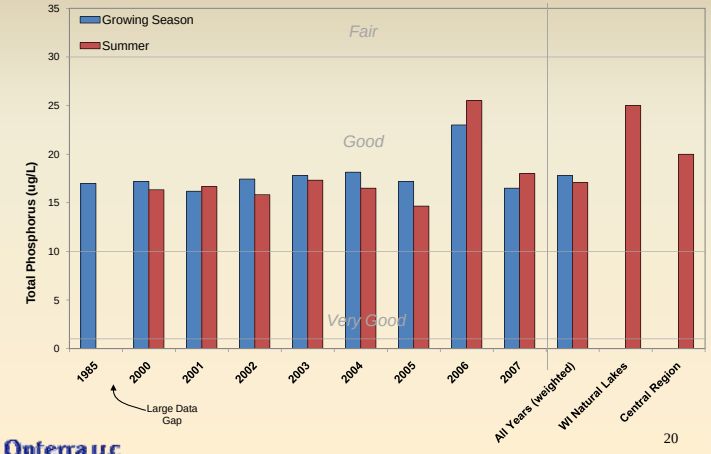
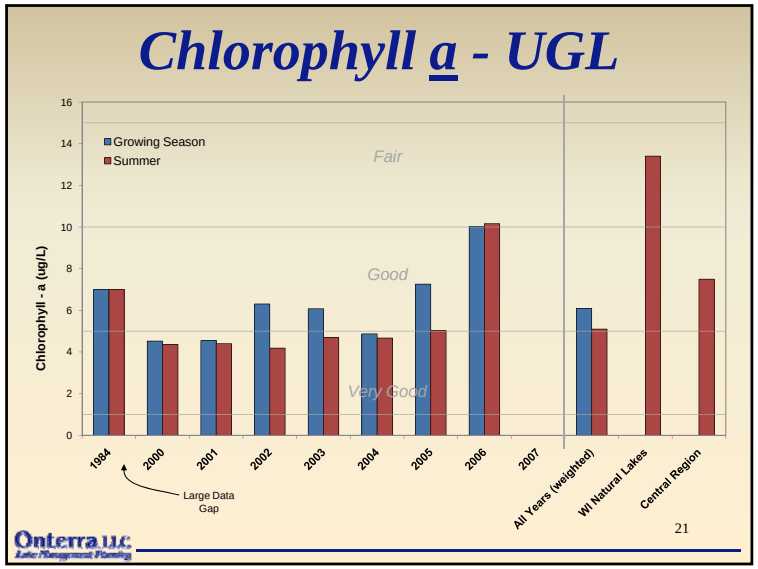
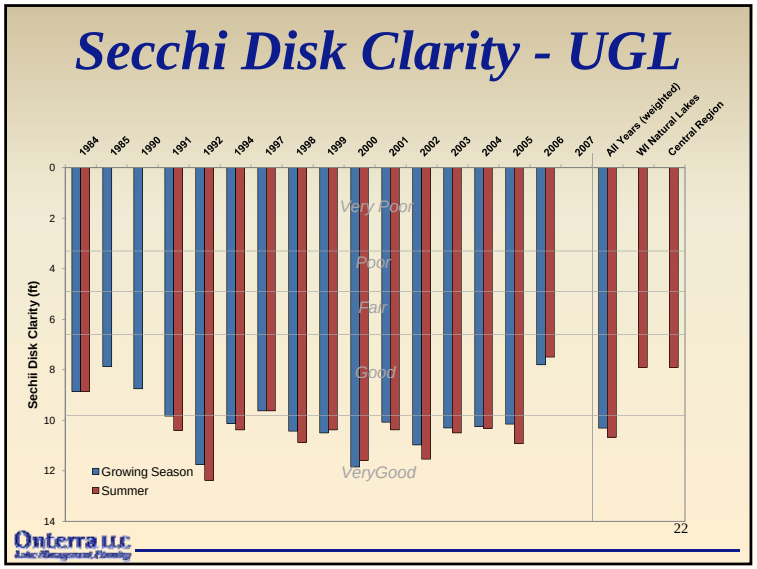
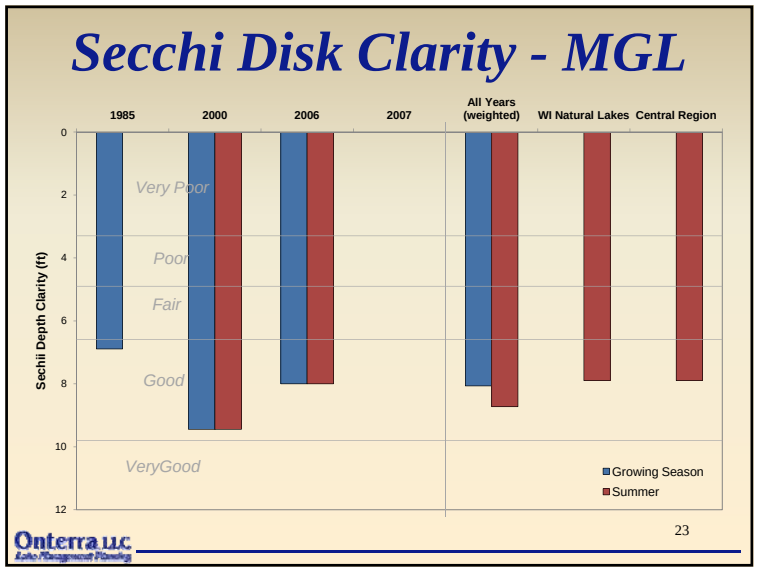
Phosphorus – UGL

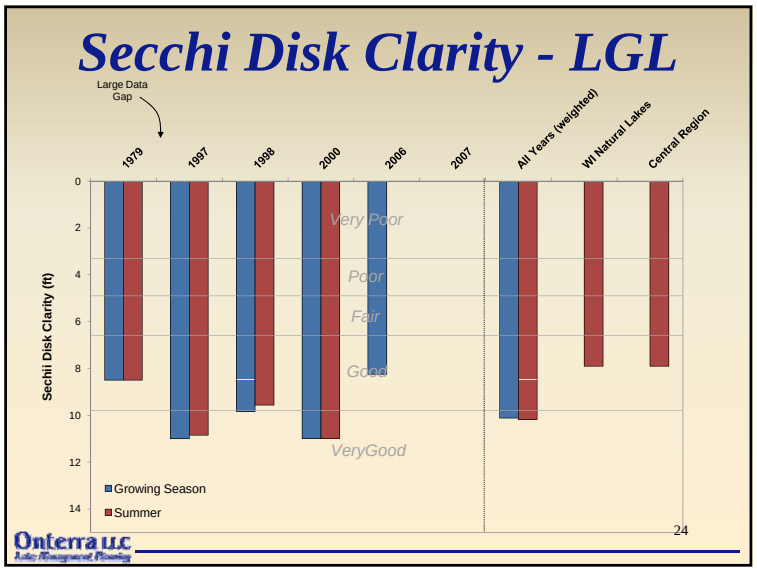


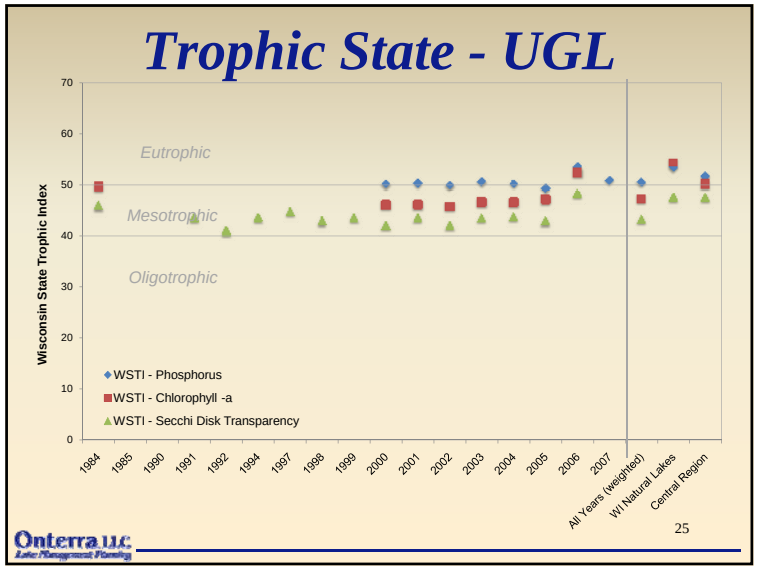
20

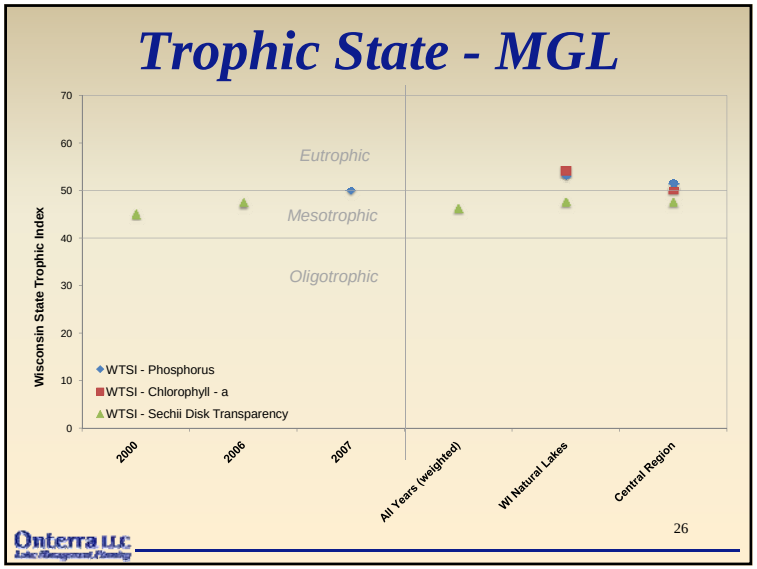

Chlorophyll a - UGL
Chlorophyll - a (ug/L)
Growing Season
Summer
Fair
Good
Very Good
1984
2000
2001
2002
2003
2004
2005
2006
2007
All Years (weighted)
WI Natural Lakes
Central Region
Large Data Gap
21

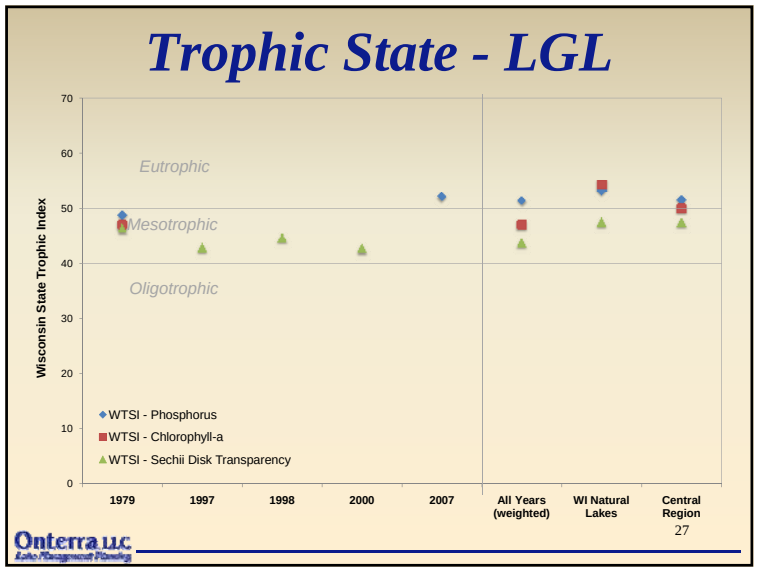

Secchi Disk Clarity - UGL
Secchi Disk Clarity (ft)
Very Poor
Poor
Fair
Good
VeryGood
Growing Season
Summer
All Years (weighted)
WI Natural Lakes
Central Region
22

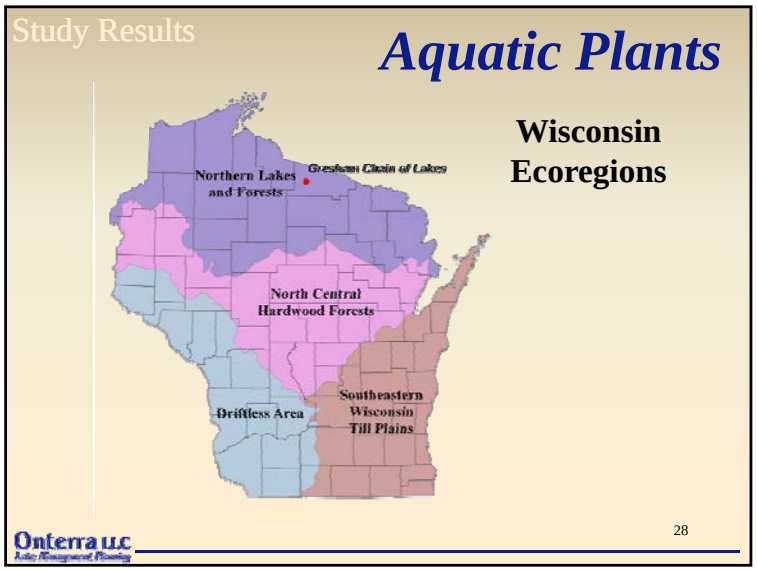

Secchi Disk Clarity - MGL
Sechi Depth Clarity (ft)
1985
2000
2006
2007
All Years (weighted)
WI Natural Lakes
Central Region
Very Poor
Poor
Fair
Good
VeryGood
Growing Season
Summer
23


Secchi Disk Clarity - LGL
Large Data Gap
Sechi Disk Clarity (ft)
1979
1997
1998
2000
2006
2007
All Years (weighted)
WI Natural Lakes
Central Region
Very Poor
Poor
Fair
Good
VeryGood
Growing Season
Summer
24


Trophic State - UGL
Wisconsin State Trophic Index
70
60
50
40
30
20
10
0
Eutrophic
Mesotrophic
Oligotrophic
WSTI - Phosphorus
WSTI - Chlorophyll -a
WSTI - Secchi Disk Transparency
1984
1985
1990
1991
1992
1994
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
All Years (weighted)
WI Natural Lakes
Central Region
Onterra LLC
25


Trophic State - MGL
Wisconsin State Trophic Index
70
60
50
40
30
20
10
0
Eutrophic
Mesotrophic
Oligotrophic
WTSI - Phosphorus
WTSI - Chlorophyll - a
WTSI - Sechii Disk Transparency
2000
2006
2007
All Years (weighted)
WI Natural Lakes
Central Region
Onterra LLC
26


Trophic State - LGL
Wisconsin State Trophic Index
70
60
50
40
30
20
10
0
Eutrophic
Mesotrophic
Oligotrophic
WTSI - Phosphorus
WTSI - Chlorophyll-a
WTSI - Sechii Disk Transparency
1979
1997
1998
2000
2007
All Years (weighted)
WI Natural Lakes
Central Region
Onterra LLC
27


Study Results
Aquatic Plants
Wisconsin Ecoregions
Northern Lakes and Forests
Gesham Chain of Lakes
North Central Hardwood Forests
Driftless Area
Southeastern Wisconsin Till Plains
Onterra LLC
28

Chain-wide Species List

- 55 native species
- 2 non-native species
  - Eurasian water milfoil
  - Giant Reed
- UGL & MGL P-I survey
  - WDNR (‘05 & ‘06)
- LGL P-I survey
  - Onterra (‘07)

Common Name	Scientific Name	Upper Gresham	Middle Gresham	Lower Gresham
Watershield	*Brasenia schreberi*	X	X	X
Water arum	*Calla palustris*			I
Lake sedge	*Carex lacustris*	I	I	
Coontail	*Ceratophyllum demersum*	X	X	X
Muskgrasses	*Chara sp.*	X	X	
Three-way sedge	*Dulichium arundinaceum*	I	I	I
Needle spikerush	*Eleocharis acicularis*	X	X	I
Creeping spikerush	*Eleocharis palustris*	I	I	X
Common waterweed	*Elodea canadensis*	X	X	X
Dipsevort	*Eriocaulon aquaticum*	X		
Water stargrass	*Heteranthera dubia*	X	X	I
Quillwort sp.	*Isoetes sp.*	X		
Brown-fruited rush	*Juncus pelocarpus*	X		X
Lesser duckweed	*Lemna minor*			I
Forked duckweed	*Lemna trisulca*		X	X
Water lobelia	*Lobelia dortmanna*	X		
Water marigold	*Megalodonta beckii*	X	X	X
Northern water milfoil	*Myriophyllum sibiricum*	X	X	X
Eurasian water milfoil	*Myriophyllum spicatum*	X		
Dwarf water milfoil	*Myriophyllum tenellum*	X		
Slender naiad	*Najas flexilis*	X	X	I
Stoneworts	*Nitella sp.*	X	X	X
Spatterdock	*Nuphar variegata*	X	X	X
White water lily	*Nymphaea odorata*	X	X	X
Giant reed	*Phragmites australis*	I		
Water smartweed	*Polygonum amphibium*	I		I
Pickerelweed	*Pontederia cordata*	I	X	X
Alpine pondweed	*Potamogeton alpinus*		X	
Large-leaf pondweed	*Potamogeton amplifolius*	X	X	X
Fries' pondweed	*Potamogeton friesii*	X	X	
Variable pondweed	*Potamogeton gramineus*	X	X	
Floating-leaf pondweed	*Potamogeton natans*	X	X	X
White-stem pondweed	*Potamogeton praelongus*	X		X
Small pondweed	*Potamogeton pusillus*	X	X	I
Clasping-leaf pondweed	*Potamogeton richardsonii*	X	X	X
Fern pondweed	*Potamogeton robbinsii*	X	X	X
Stiff pondweed	*Potamogeton strictifolius*	X	X	
Flat-stem pondweed	*Potamogeton zosteriformis*	X	X	X
Creeping spearwort	*Ranunculus flammula*	X		
Sagittaria sp.	*Sagittaria sp. (rosette)*	X	X	X
Grass-leaved arrowhead	*Sagittaria graminea*	I	I	X
Common arrowhead	*Sagittaria latifolia*	I		X
Hardstem bulrush	*Schoenoplectus acutus*	I	I	I
Softstem bulrush	*Schoenoplectus tabernaemontani*	I		X
Eastern bur-reed	*Sparganium americanum*		X	
Narrow-leaf bur-reed	*Sparganium angustifolium*	X		
Short-stemmed bur-reed	*Sparganium emersum*	I	I	X
Common bur-reed	*Sparganium eurycarpum*			I
Floating-leaf bur-reed	*Sparganium fluctuans*		X	
Greater duckweed	*Spirodela polyrhiza*			I
Sago pondweed	*Stuckenia pectinata*	X		
Narrow-leaved cattail	*Typha angustifolia*	I		
Broad-leaved cattail	*Typha latifolia*	I	I	X
Flat-leaf bladderwort	*Utricularia intermedia*		X	
Small bladderwort	*Utricularia minor*		X	
Common bladderwort	*Utricularia vulgaris*	X	X	
Wild celery	*Vallisneria americana*	X	X	X

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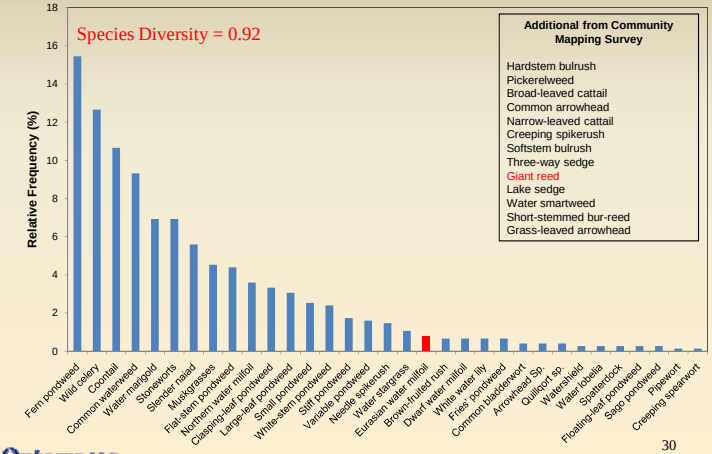
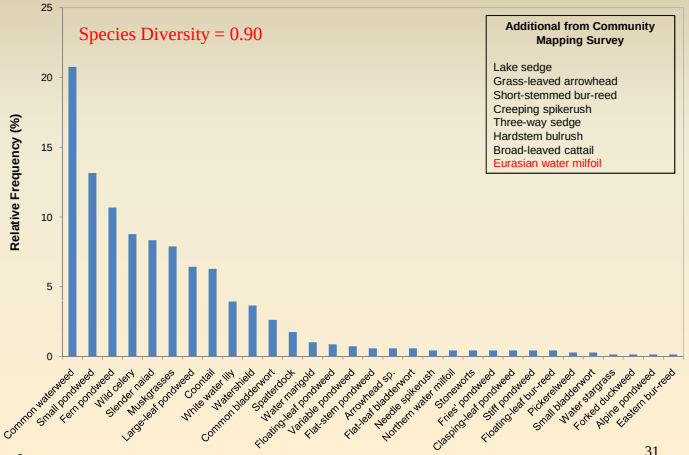
Frequency of Occurrence – UGL



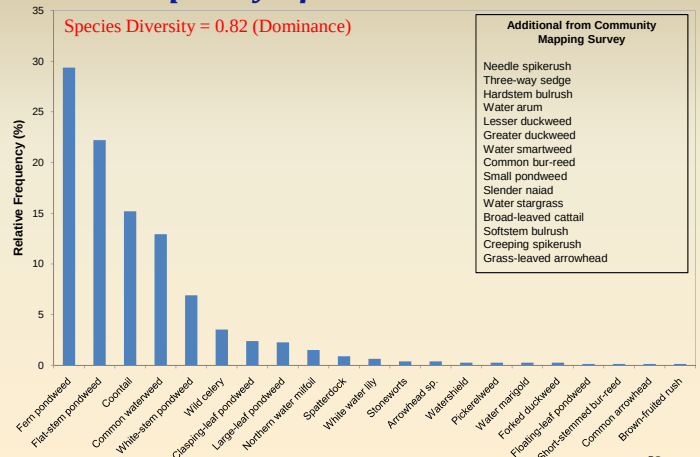
30

Frequency of Occurrence – MGL



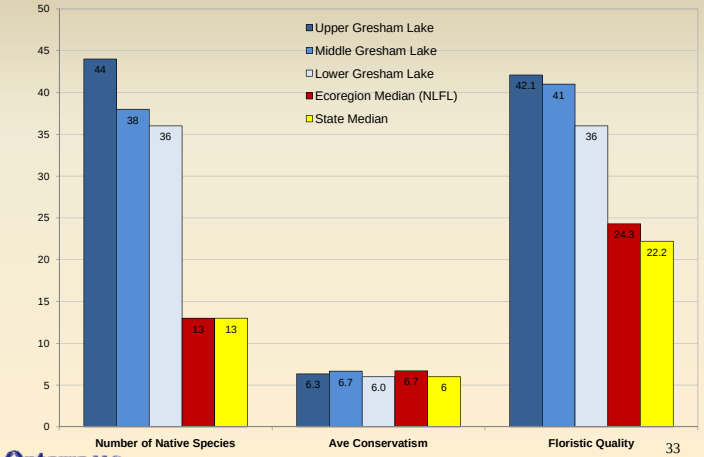
31

Frequency of Occurrence – LGL



32

Floristic Quality Assessment



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Picture of Submergent Species on Middle Gresham

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Project Objectives

- Monitor EWM Treatments
  - Pre-treatment
  - Post treatment
- Use Information in Plan Development
- Provide Information

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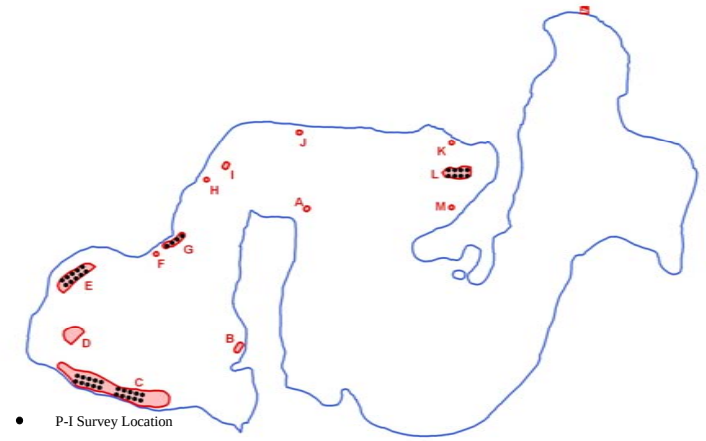
2007 Pretreatment Survey

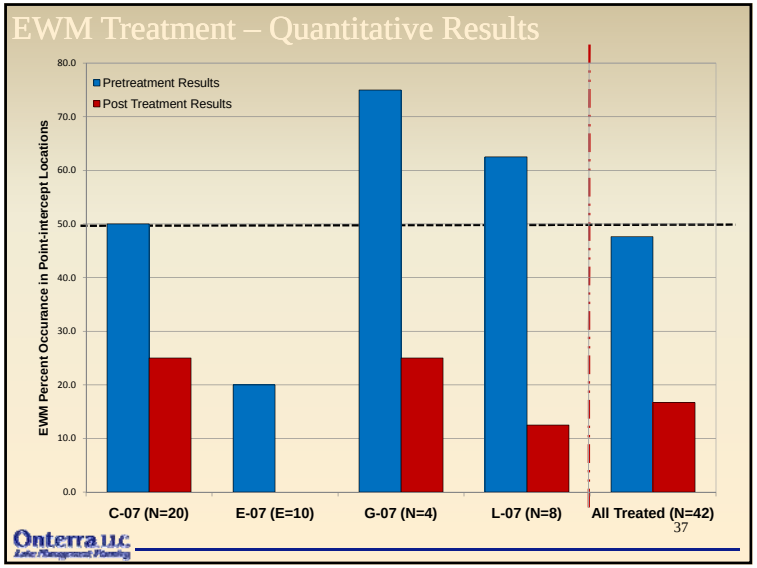


- P-I Survey Location

2007 Treatment Areas
- 100 lbs/acre

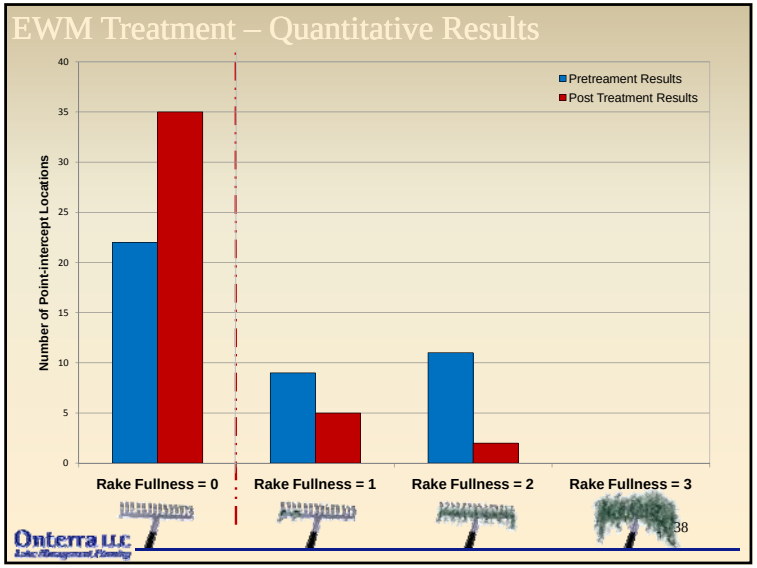
36

EWM Treatment – Quantitative Results



37

EWM Treatment – Quantitative Results



38

EWM – Historic Management

2007 Results

- Point-intercept data showed a decrease in EWM
- EWM Peak biomass survey showed a different story
  - Incomplete treatments
  - Additional locations

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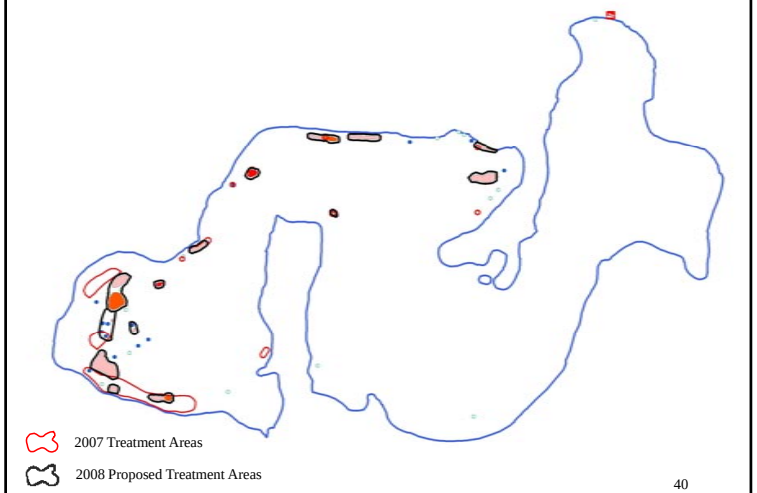
2008 Proposed Treatment Areas



40

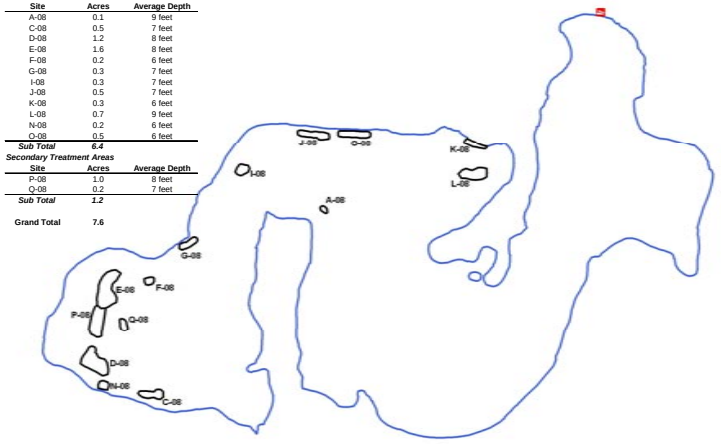
2008 Proposed Treatment Areas

Primary Treatment Areas

Site	Acres	Average Depth
A-08	0.1	9 feet
C-08	0.5	7 feet
D-08	1.2	8 feet
E-08	1.6	8 feet
F-08	0.2	6 feet
G-08	0.3	7 feet
I-08	0.3	7 feet
J-08	0.5	7 feet
K-08	0.3	6 feet
L-08	0.7	9 feet
N-08	0.2	6 feet
O-08	0.5	6 feet
Sub Total	*6.4*	

Secondary Treatment Areas

Site	Acres	Average Depth
P-08	1.0	8 feet
Q-08	0.2	7 feet
Sub Total	*1.2*	
Grand Total	**7.6**	



2008 Proposed Treatment Areas – 150 lbs/acre

Conclusions

- Watershed
  - Land cover within watershed is excellent
    - Minimal loading – best to be expected
  - Makes immediate (shorelands) watershed very important
- Water quality
  - Good because of current watershed condition
  - Lack of historic data makes long-term trend analysis difficult

Conclusions

- Aquatic plant community is exceptional
  - Provides excellent habitat
  - Likely competes heavily against EWM in most areas
- EWM occurrence is of concern
  - Low abundance in UGL
  - Present in MGL
  - No impacts on navigation, but possibly other forms of recreation
  - Impact to native habitat is a concern (Largest)
  - Higher dosage of herbicide is required for success
    - Due to depth of water that EWM is found in and density of these plants

Thank You

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

Wisconsin Lakes Partnership

UWEX Extension

Wisconsin Dept. of Natural Resources

Presentation Outline

- Lake Management Planning Project Overview
- Study Results
  - Watershed
  - Water Quality
  - Aquatic Plants
  - Additional Results
- Conclusions
- Implementation Plan
- 2007 and 2008 EWM Treatments
- AIS Control Project Overview

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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 — *Citizens Lake Monitoring Network & Onterra*
- Aquatic Vegetation
  - Curly-leaf Survey — *Completed 2007 - None Found*
  - Comprehensive Survey
  - Treatment Monitoring
- Plan Development

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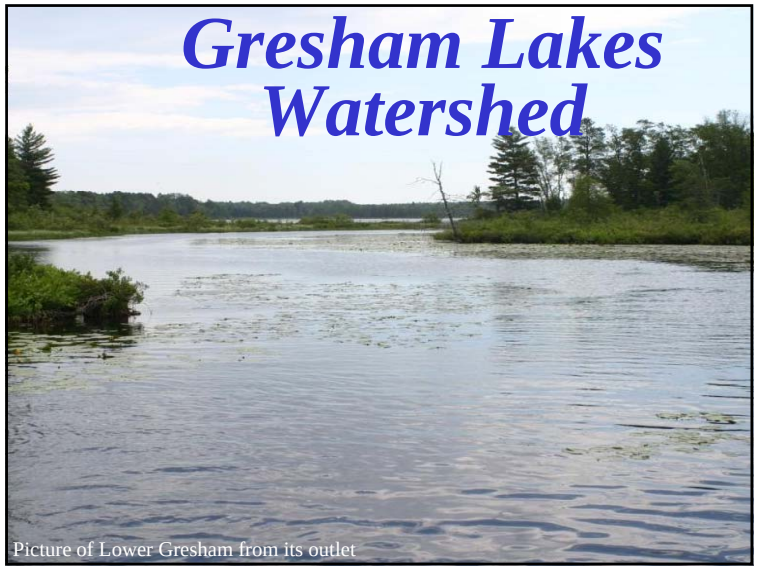
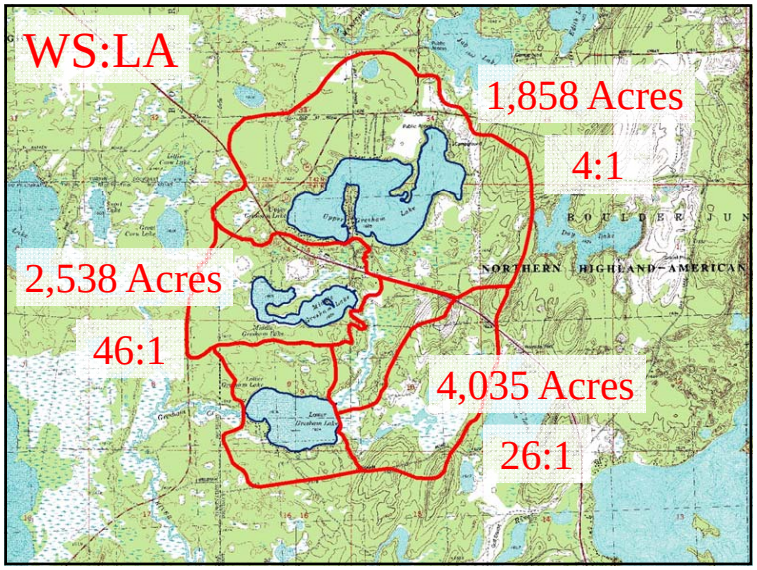
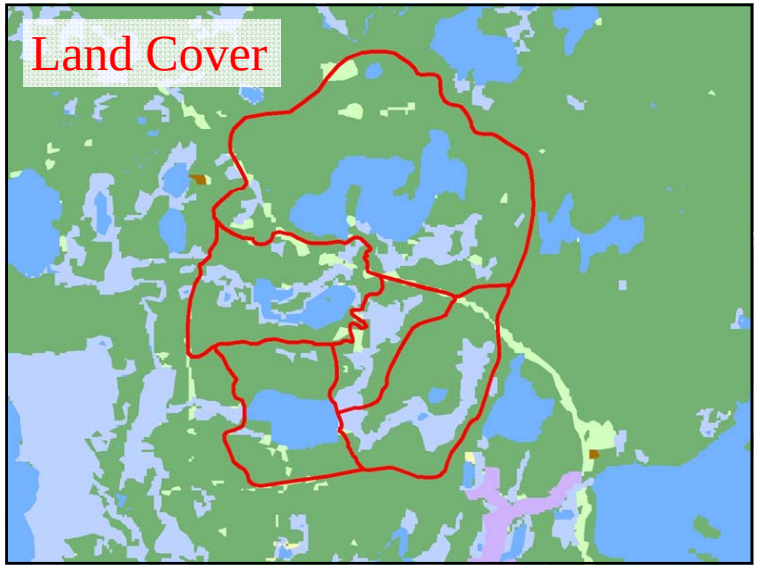
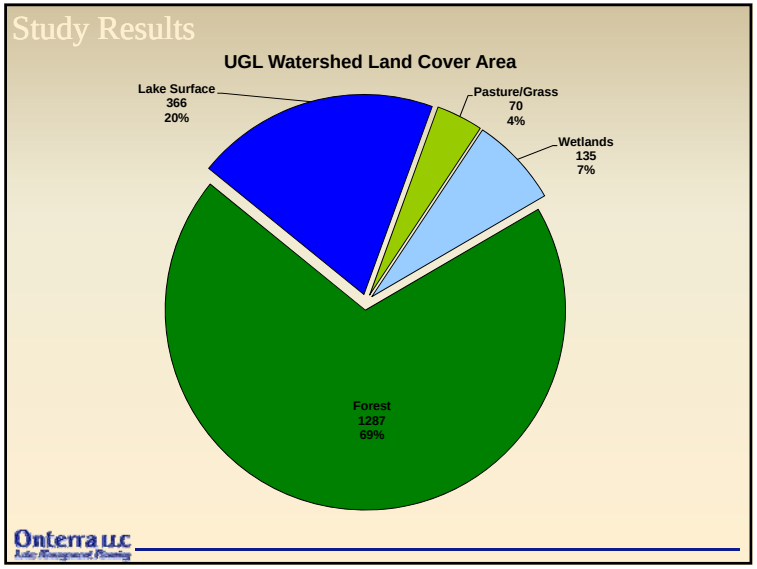

Gresham Lakes Watershed
Picture of Lower Gresham from its outlet


WS:LA
1,858 Acres
4:1
2,538 Acres
46:1
4,035 Acres
26:1


Land Cover


Study Results
UGL Watershed Land Cover Area
Lake Surface
366
20%
Pasture/Grass
70
4%
Wetlands
135
7%
Forest
1287
69%
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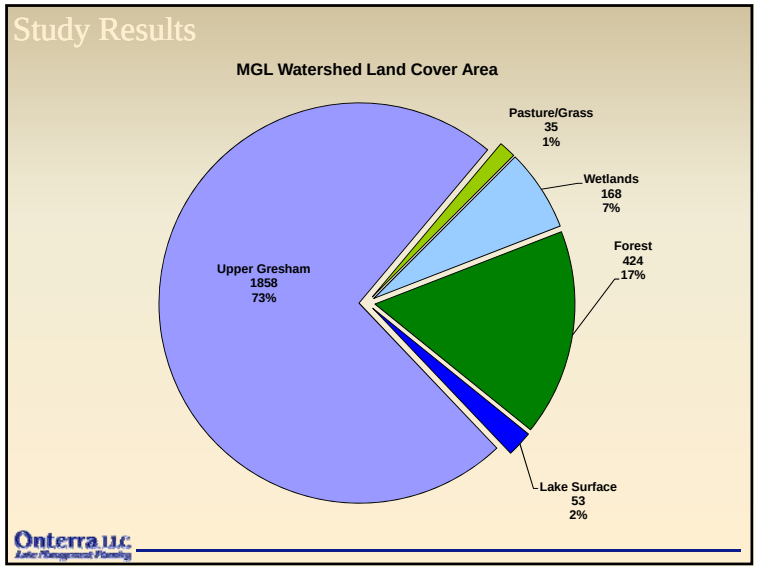
Study Results
MGL Watershed Land Cover Area
Pasture/Grass
35
1%
Wetlands
168
7%
Forest
424
17%
Upper Gresham
1858
73%
Lake Surface
53
2%
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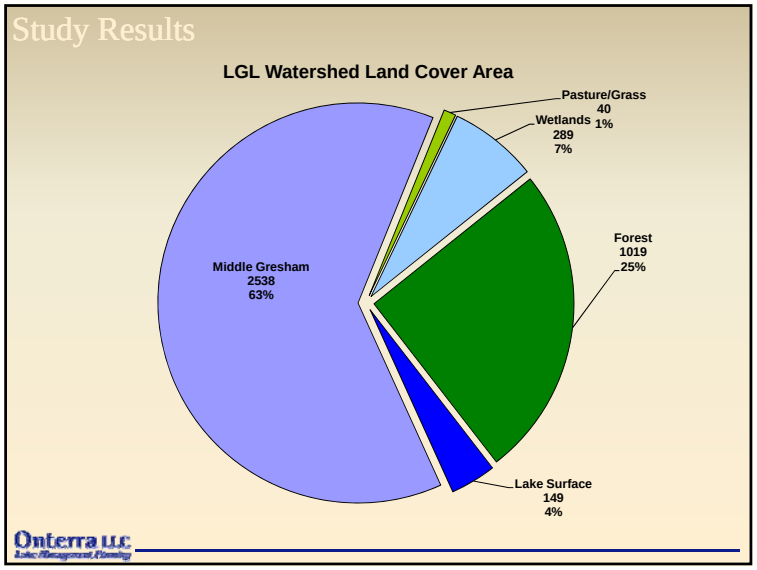
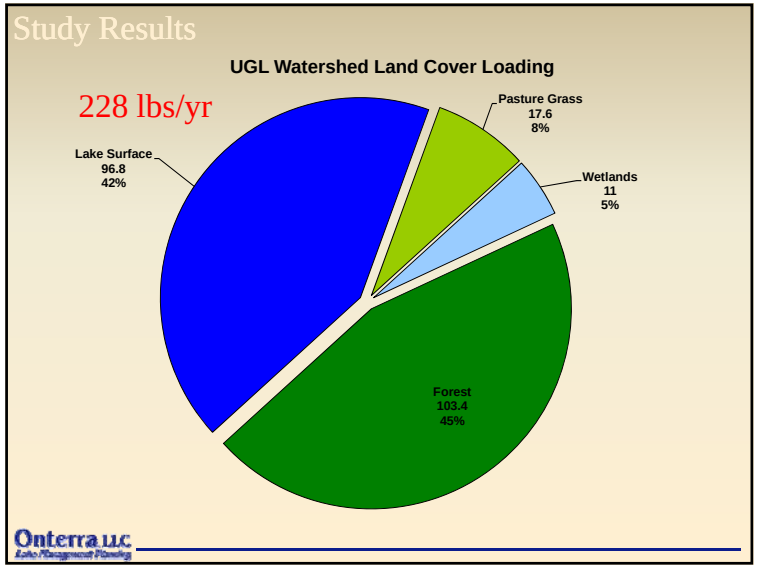
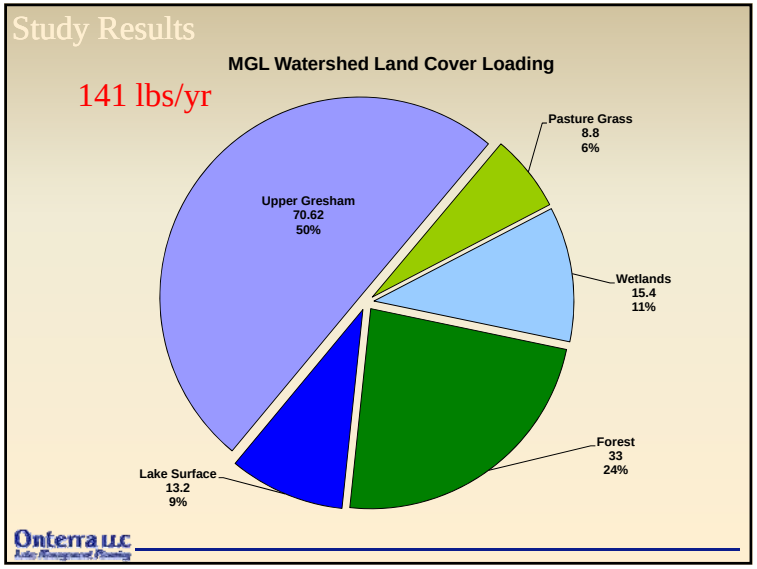

Study Results
LGL Watershed Land Cover Area
Pasture/Grass
40
1%
Wetlands
289
7%
Forest
1019
25%
Middle Gresham
2538
63%
Lake Surface
149
4%
Onterra LLC


Study Results
UGL Watershed Land Cover Loading
228 lbs/yr
Pasture Grass
17.6
8%
Lake Surface
96.8
42%
Wetlands
11
5%
Forest
103.4
45%
Onterra LLC


Study Results
MGL Watershed Land Cover Loading
141 lbs/yr
Pasture Grass
8.8
6%
Upper Gresham
70.62
50%
Wetlands
15.4
11%
Forest
33
24%
Lake Surface
13.2
9%
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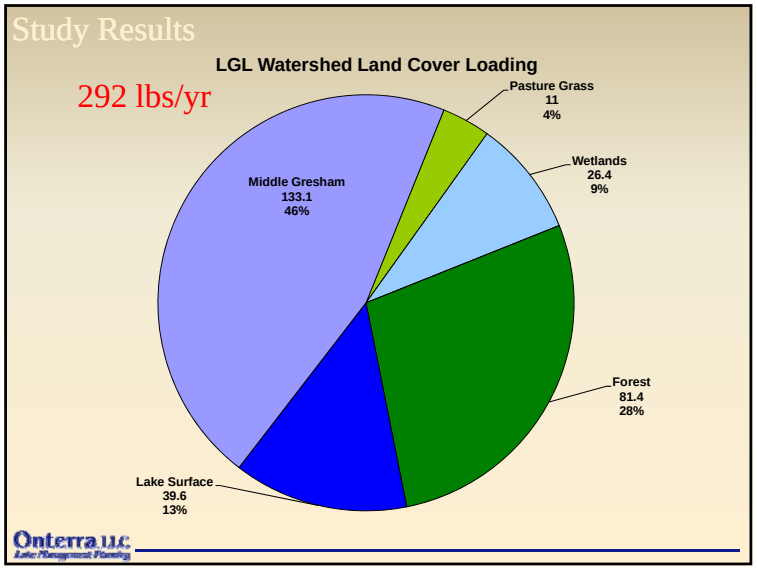
Study Results



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Citizen Lake Monitoring Network

Parameter	June	July	August
Total Phosphorus	♦	♦	♦
Dissolved Phosphorus	●	●	
Chlorophyll a	♦	♦	♦
Total Kjeldahl Nitrogen	●	●	●
Nitrate-Nitrite Nitrogen	●	●	●
Ammonia Nitrogen	●	●	●
Laboratory Conductivity	●	●	
Laboratory pH	●	●	
Total Alkalinity	●	●	
Total Suspended Solids	●	●	●
Calcium	●		

- Water quality data
  - Volunteers
    - June, July, August
  - Onterra
    - Winter
- All data is collected & Integrated

♦ indicates samples collected as a part of the Citizen Lake Monitoring Network.
● indicates samples collected under current project funding

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Study Results

Water Quality

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

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Study Results

Water Quality

Lillie & Mason Regions

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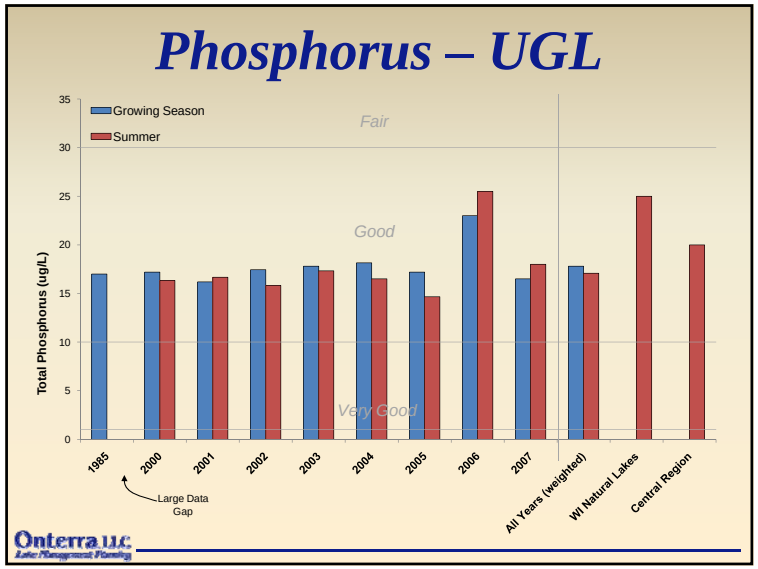
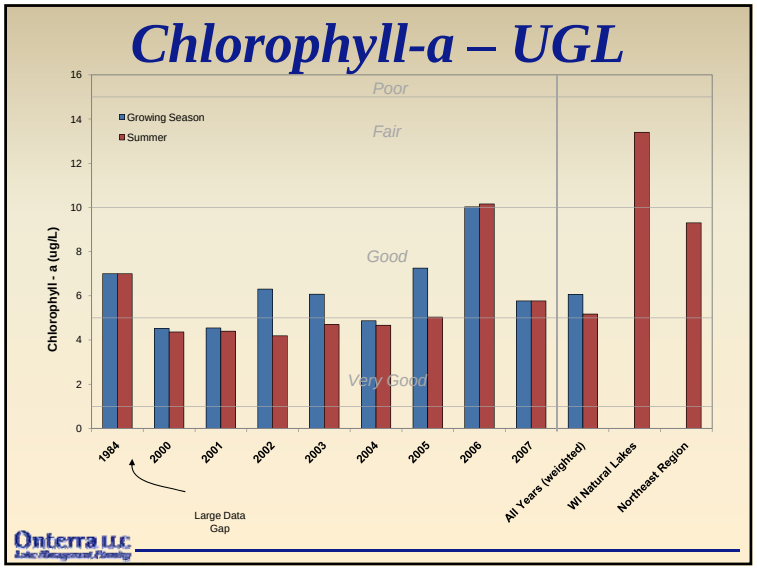

Phosphorus – UGL
Growing Season
Summer
Fair
Good
Very Good
Total Phosphorus (ug/L)
0
5
10
15
20
25
30
35
1985
2000
2001
2002
2003
2004
2005
2006
2007
All Years (weighted)
WI Natural Lakes
Central Region
Large Data Gap
Onterra LLC


Chlorophyll-a – UGL
Poor
Fair
Good
Very Good
Growing Season
Summer
Chlorophyll - a (ug/L)
0
2
4
6
8
10
12
14
16
1984
2000
2001
2002
2003
2004
2005
2006
2007
All Years (weighted)
WI Natural Lakes
Northeast Region
Large Data Gap
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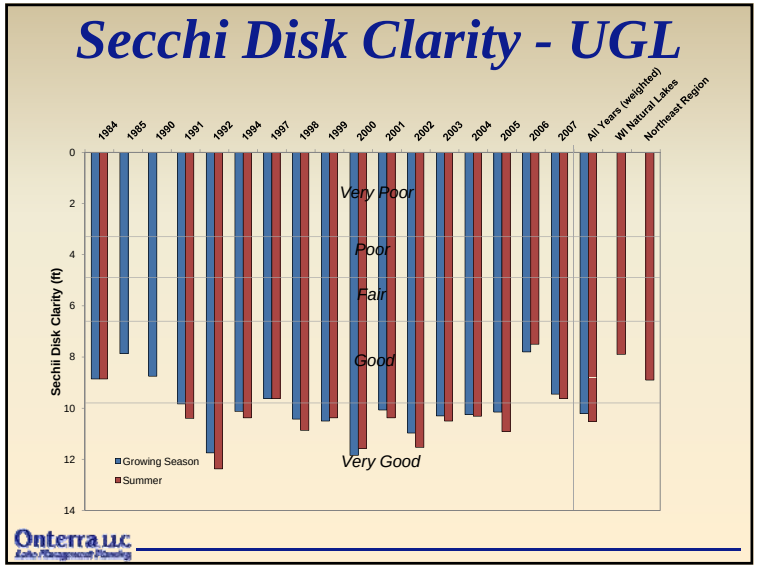
Secchi Disk Clarity - UGL
1984
1985
1990
1991
1992
1994
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
All Years (weighted)
WI Natural Lakes
Northeast Region
Very Poor
Poor
Fair
Good
Very Good
Growing Season
Summer
Secchi Disk Clarity (ft)
0
2
4
6
8
10
12
14
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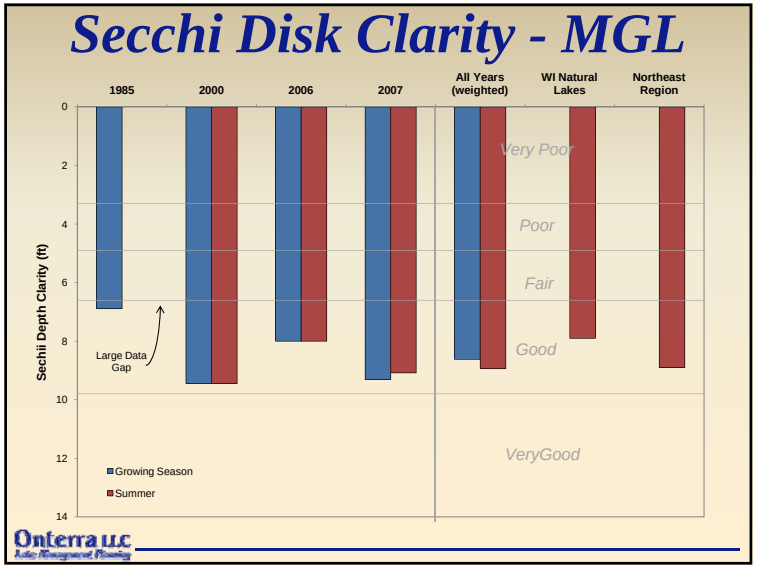
Secchi Disk Clarity - MGL
1985
2000
2006
2007
All Years (weighted)
WI Natural Lakes
Northeast Region
Very Poor
Poor
Fair
Good
VeryGood
Large Data Gap
Growing Season
Summer
Secchi Depth Clarity (ft)
0
2
4
6
8
10
12
14
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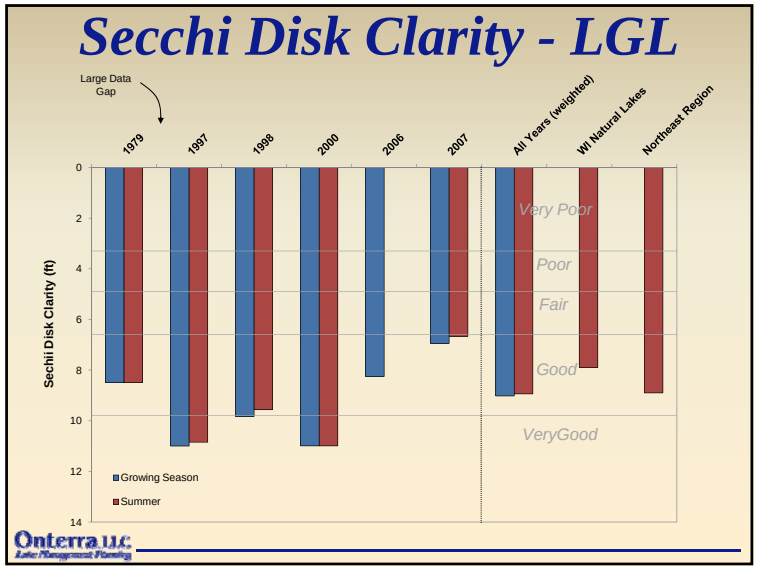
Secchi Disk Clarity - LGL
Large Data Gap
1979
1997
1998
2000
2006
2007
All Years (weighted)
WI Natural Lakes
Northeast Region
Secchi Disk Clarity (ft)
0
2
4
6
8
10
12
14
Very Poor
Poor
Fair
Good
VeryGood
Growing Season
Summer
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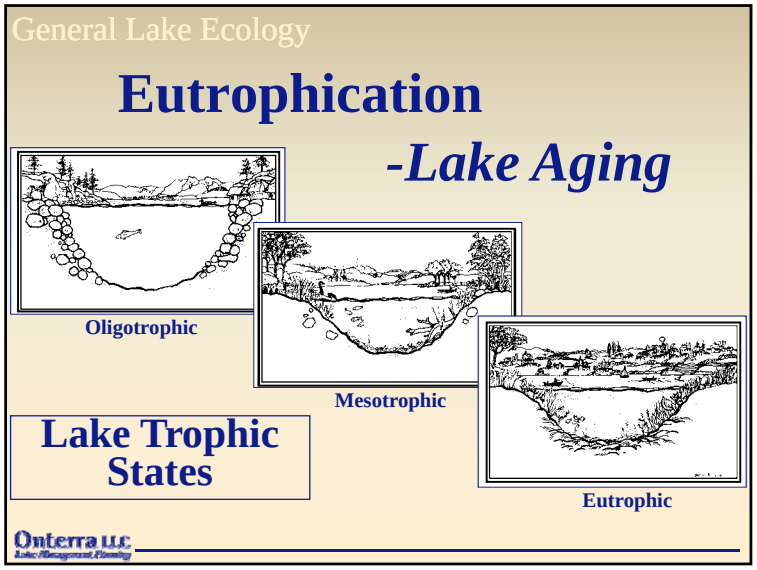
General Lake Ecology
Eutrophication
-Lake Aging
Oligotrophic
Mesotrophic
Eutrophic
Lake Trophic States
Onterra LLC


General Lake Ecology
Cultural Eutrophication
Accelerated eutrophication caused by human activity.
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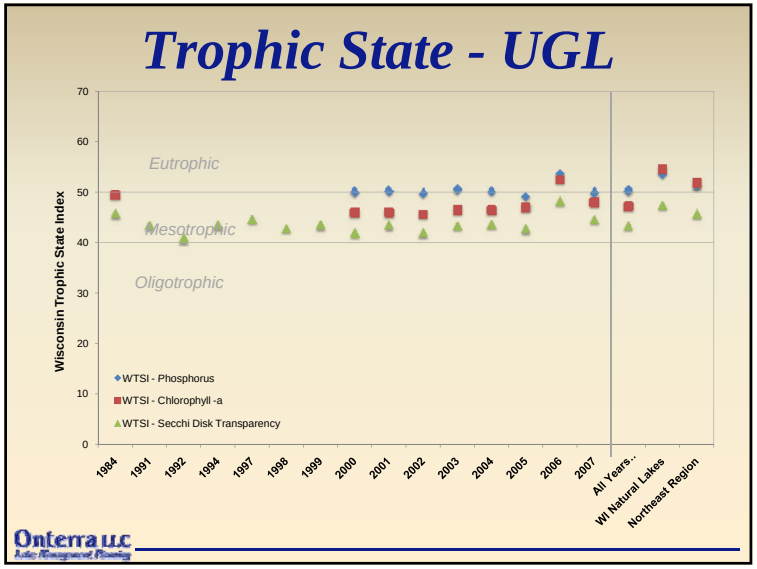
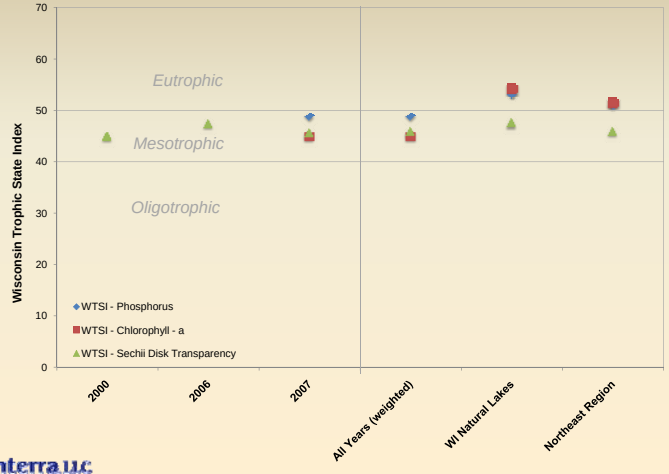

Trophic State - UGL
Wisconsin Trophic State Index
70
60
50
40
30
20
10
0
Eutrophic
Mesotrophic
Oligotrophic
WTSI - Phosphorus
WTSI - Chlorophyll -a
WTSI - Secchi Disk Transparency
1984
1991
1992
1994
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
All Years...
WI Natural Lakes
Northeast Region
Onterra LLC

Trophic State - MGL



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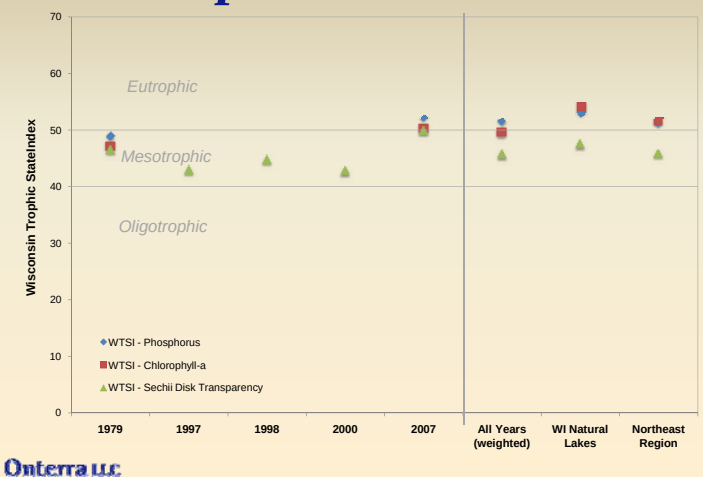
Trophic State - LGL



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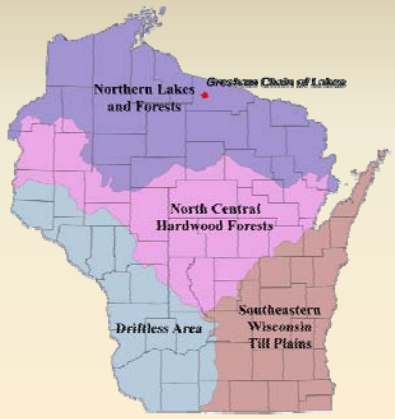
Study Results

Aquatic Plants



Wisconsin Ecoregions

Onterra LLC

Chain-wide Species List

- 55 native species
- 2 non-native species
  - Eurasian water milfoil
  - Giant Reed
- UGL & MGL P-I survey
  - WDNR (‘05 & ‘06)
- LGL P-I survey
  - Onterra (‘07)

Common Name	Scientific Name	Upper Gresham	Middle Gresham	Lower Gresham
Watershield	*Brasenia schreberi*	X	X	X
Water arum	*Calla palustris*			I
Lake sedge	*Carex lacustris*	I	I	
Coontail	*Ceratophyllum demersum*	X	X	X
Muskgrasses	*Chara sp.*	X	X	
Three-way sedge	*Dulichium arundinaceum*	I	I	I
Needle spikerush	*Eleocharis acicularis*	X	X	I
Creeping spikerush	*Eleocharis palustris*	I	I	X
Common waterweed	*Elodea canadensis*	X	X	X
Spikerush	*Eriocaulon aquaticum*	X		
Water stargrass	*Heteranthera dubia*	X	X	I
Quillwort sp.	*Isoetes sp.*	X		
Brown-fruited rush	*Juncus pelocarpus*	X		X
Lesser duckweed	*Lemna minor*			I
Forked duckweed	*Lemna trisulca*		X	X
Water lobelia	*Lobelia dortmanna*	X		
Water marigold	*Megalodonta beckii*	X	X	X
Northern water milfoil	*Myriophyllum sibiricum*	X	X	X
Eurasian water milfoil	*Myriophyllum spicatum*	X		
Dwarf water milfoil	*Myriophyllum tenellum*	X		
Slender naiad	*Najas flexilis*	X	X	I
Stoneworts	*Nitella sp.*	X	X	X
Spatterdock	*Nuphar variegata*	X	X	X
White water lily	*Nymphaea odorata*	X	X	X
Giant reed	*Phragmites australis*	I		
Water smartweed	*Polygonum amphibium*	I		I
Pickerelweed	*Pontederia cordata*	I	X	X
Alpine pondweed	*Potamogeton alpinus*		X	
Large-leaf pondweed	*Potamogeton amplifolius*	X	X	X
Fries' pondweed	*Potamogeton friesii*	X	X	
Variable pondweed	*Potamogeton gramineus*	X	X	
Floating-leaf pondweed	*Potamogeton natans*	X	X	X
White-stem pondweed	*Potamogeton praelongus*	X		X
Small pondweed	*Potamogeton pusillus*	X	X	I
Clasping-leaf pondweed	*Potamogeton richardsonii*	X	X	X
Fern pondweed	*Potamogeton robbinsii*	X	X	X
Stiff pondweed	*Potamogeton strictifolius*	X	X	
Flat-stem pondweed	*Potamogeton zosteriformis*	X	X	X
Creeping spearwort	*Ranunculus flammula*	X		
Sagittaria sp.	*Sagittaria sp. (rosette)*	X	X	X
Grass-leaved arrowhead	*Sagittaria graminea*	I	I	X
Common arrowhead	*Sagittaria latifolia*	I		X
Hardstem bulrush	*Schoenoplectus acutus*	I	I	I
Softstem bulrush	*Schoenoplectus tabernaemontani*	I		X
Eastern bur-reed	*Sparganium americanum*		X	
Narrow-leaf bur-reed	*Sparganium angustifolium*	X		
Short-stemmed bur-reed	*Sparganium emersum*	I	I	X
Common bur-reed	*Sparganium eurycarpum*	I		I
Floating-leaf bur-reed	*Sparganium fluctuans*		X	
Greater duckweed	*Spirodela polyrrhiza*			I
Sago pondweed	*Stuckenia pectinata*	X		
Narrow-leaved cattail	*Typha angustifolia*	I		
Broad-leaved cattail	*Typha latifolia*	I	I	X
Flat-leaf bladderwort	*Utricularia intermedia*		X	
Small bladderwort	*Utricularia minor*		X	
Common bladderwort	*Utricularia vulgaris*	X	X	
Wild celery	*Vallisneria americana*	X	X	X

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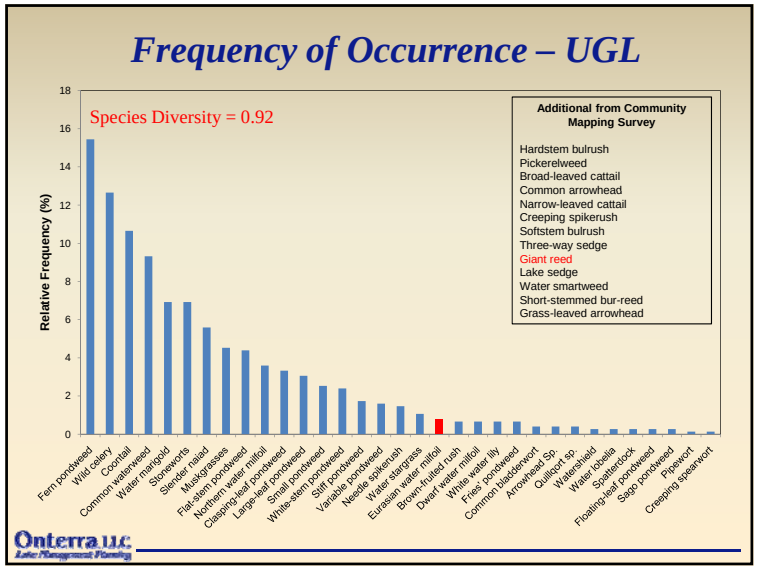
Frequency of Occurrence – UGL
Species Diversity = 0.92
Relative Frequency (%)
Additional from Community Mapping Survey
Hardstem bulrush
Pickerelweed
Broad-leaved cattail
Common arrowhead
Narrow-leaved cattail
Creeping spikerush
Softstem bulrush
Three-way sedge
Giant reed
Lake sedge
Water smartweed
Short-stemmed bur-reed
Grass-leaved arrowhead
Fern pondweed
Wild celery
Coontail
Common waterweed
Water marigold
Stoneworts
Slender naiad
Muskgrasses
Flat-stem pondweed
Northern water milfoil
Clasping-leaf pondweed
Large-leaf pondweed
Small pondweed
White-stem pondweed
Stiff pondweed
Variable pondweed
Needle spikerush
Water stargrass
Eurasian water milfoil
Brown-fruited rush
Dwarf water milfoil
White water lily
Fries' pondweed
Common bladderwort
Arrowhead Sp.
Quillwort sp.
Watershield
Water lobelia
Spatterdock
Floating-leaf pondweed
Sago pondweed
Pipewort
Creeping spearwort
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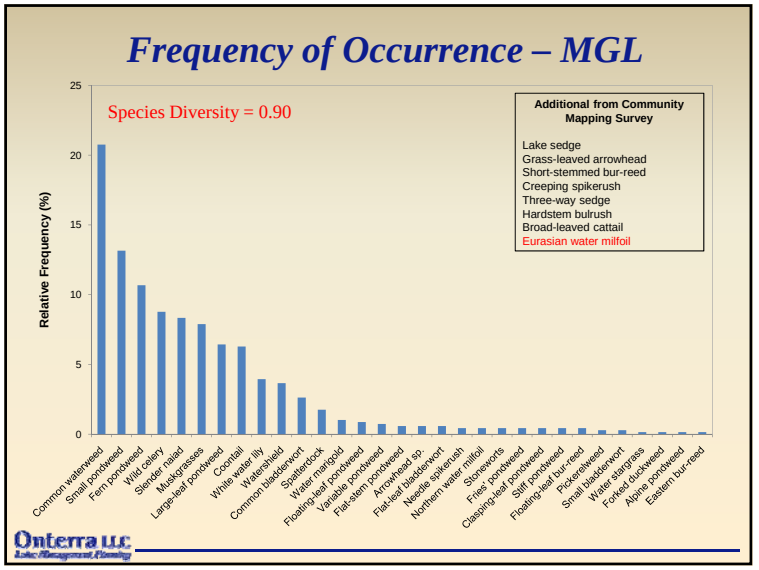
Frequency of Occurrence – MGL
Species Diversity = 0.90
Relative Frequency (%)
Additional from Community Mapping Survey
Lake sedge
Grass-leaved arrowhead
Short-stemmed bur-reed
Creeping spikerush
Three-way sedge
Hardstem bulrush
Broad-leaved cattail
Eurasian water milfoil
Common waterweed
Small pondweed
Fern pondweed
Wild celery
Slender naiad
Muskgrasses
Large-leaf pondweed
Coontail
White water lily
Watershield
Common bladderwort
Spatterdock
Water marigold
Floating-leaf pondweed
Variable pondweed
Flat-stem pondweed
Arrowhead sp.
Flat-leaf bladderwort
Needle spikerush
Northern water milfoil
Stoneworts
Fries' pondweed
Clasping-leaf pondweed
Stiff pondweed
Floating-leaf bur-reed
Pickerelweed
Small bladderwort
Water stargrass
Forked duckweed
Alpine pondweed
Eastern bur-reed
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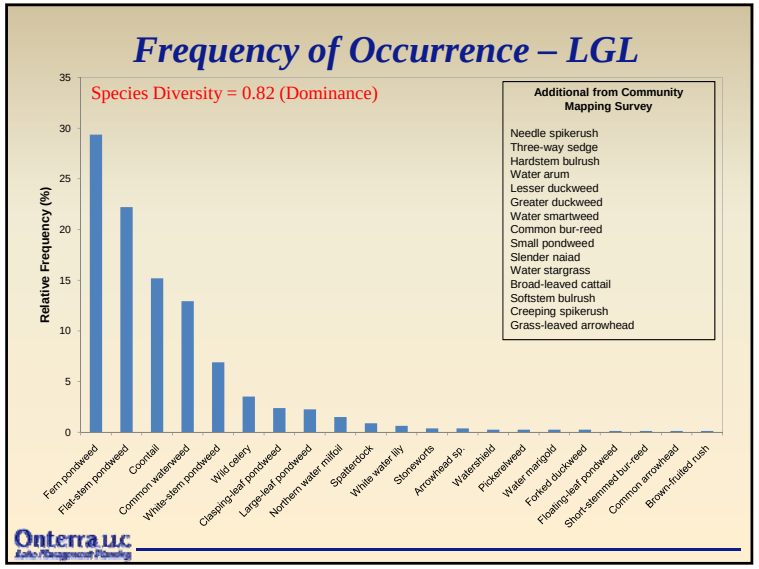
Frequency of Occurrence – LGL
Species Diversity = 0.82 (Dominance)
Relative Frequency (%)
Additional from Community Mapping Survey
Needle spikerush
Three-way sedge
Hardstem bulrush
Water arum
Lesser duckweed
Greater duckweed
Water smartweed
Common bur-reed
Small pondweed
Slender naiad
Water stargrass
Broad-leaved cattail
Softstem bulrush
Creeping spikerush
Grass-leaved arrowhead
Fern pondweed
Flat-stem pondweed
Coontail
Common waterweed
White-stem pondweed
Wild celery
Clasping-leaf pondweed
Large-leaf pondweed
Northern water milfoil
Spatterdock
White water lily
Stoneworts
Arrowhead sp.
Watershield
Pickerelweed
Water marigold
Forked duckweed
Floating-leaf pondweed
Short-stemmed bur-reed
Common arrowhead
Brown-fruited rush
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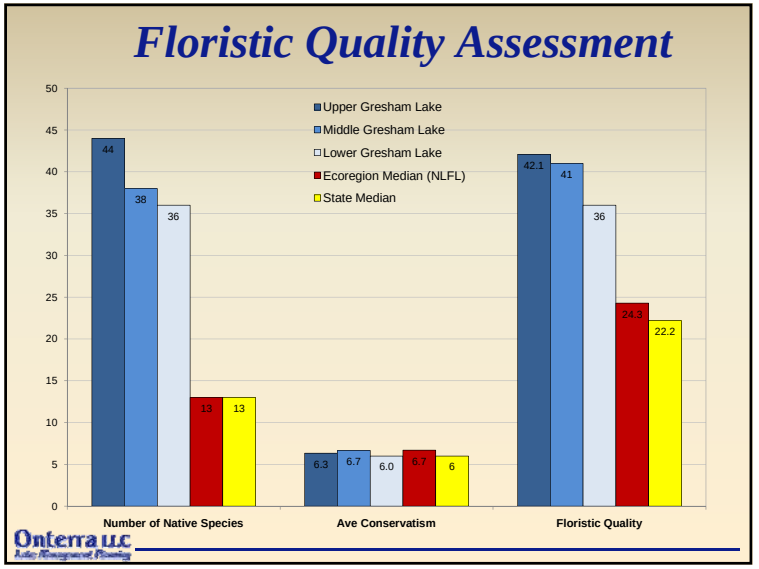
Floristic Quality Assessment
Upper Gresham Lake
Middle Gresham Lake
Lower Gresham Lake
Ecoregion Median (NLFL)
State Median
44
38
36
13
13
6.3
6.7
6.0
6.7
6
42.1
41
36
24.3
22.2
Number of Native Species
Ave Conservatism
Floristic Quality
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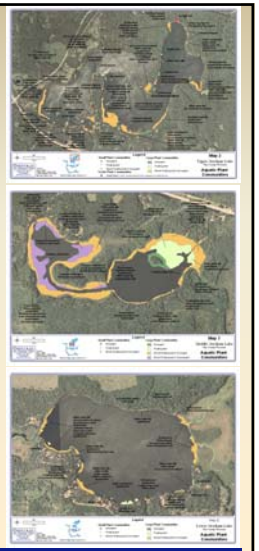
Aquatic Plant Community Mapping

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



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Additional Results

- Fisheries Data Summary & Integration
  - Compilation included within report
- Stakeholder Survey
  - Results discussed within management plan and report as applicable
  - Full results included as appendix
- Zebra Mussel Veliger Samples
  - No veligers discovered

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2008 Treatment EWM Monitoring Project

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Project Objectives

- Monitor EWM Treatments 2007 & 2008
  - Pre-treatment
  - Post treatment
- Use Information in Plan Development
- Provide Information

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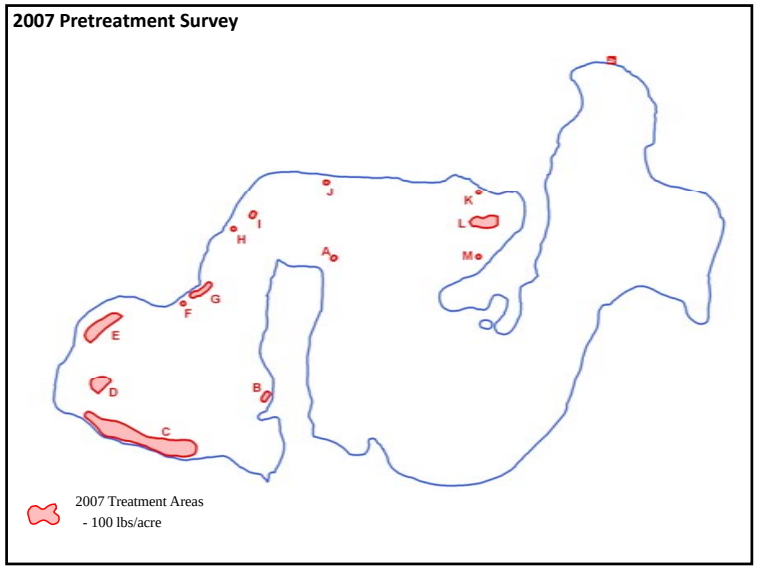
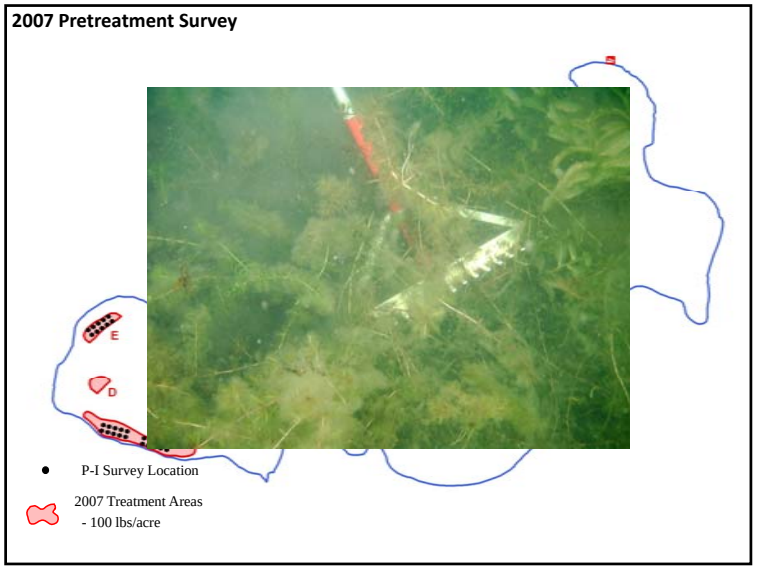
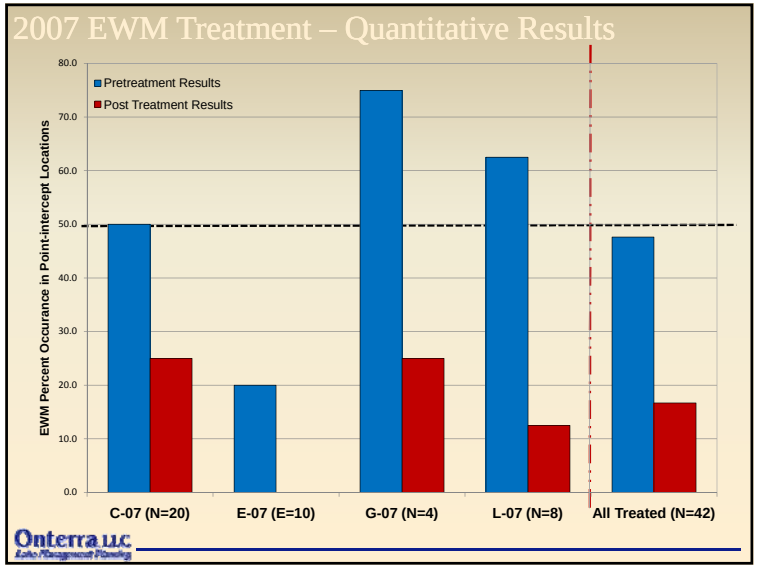

2007 Pretreatment Survey
A
B
C
D
E
F
G
H
I
J
K
L
M
2007 Treatment Areas
- 100 lbs/acre


2007 Pretreatment Survey
E
D
P-I Survey Location
2007 Treatment Areas
- 100 lbs/acre


2007 EWM Treatment – Quantitative Results
Pretreatment Results
Post Treatment Results
EWM Percent Occurance in Point-intercept Locations
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
C-07 (N=20)
E-07 (E=10)
G-07 (N=4)
L-07 (N=8)
All Treated (N=42)
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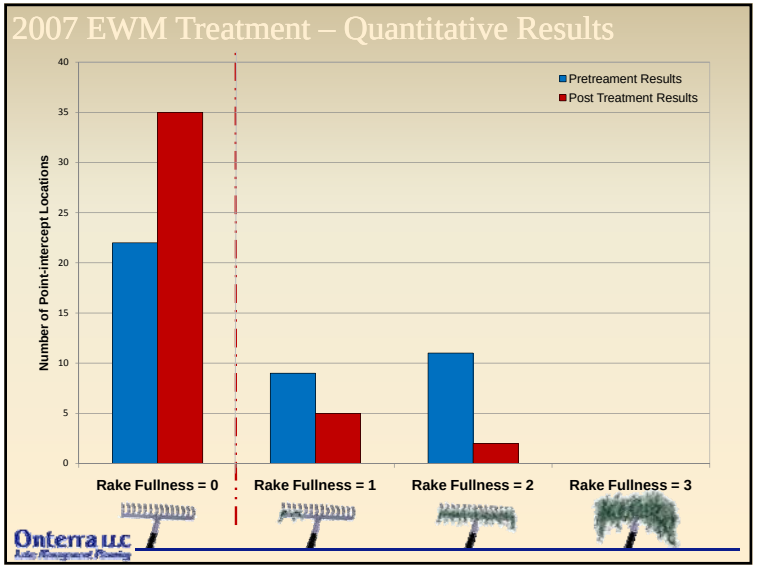
2007 EWM Treatment – Quantitative Results
Pretreament Results
Post Treatment Results
Number of Point-intercept Locations
40
35
30
25
20
15
10
5
0
Rake Fullness = 0
Rake Fullness = 1
Rake Fullness = 2
Rake Fullness = 3
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2007 Results

- Point-intercept data showed a decrease in EWM
- EWM Peak biomass survey showed a different story
  - Incomplete treatments
  - Additional locations

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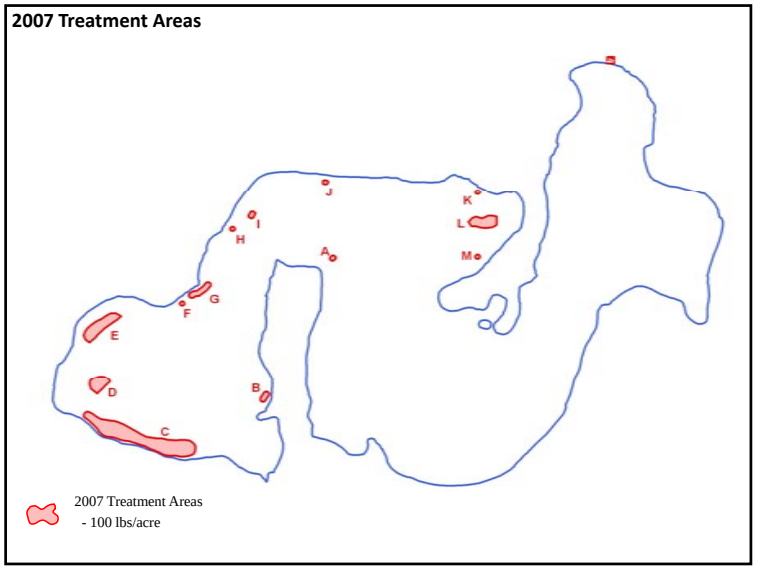
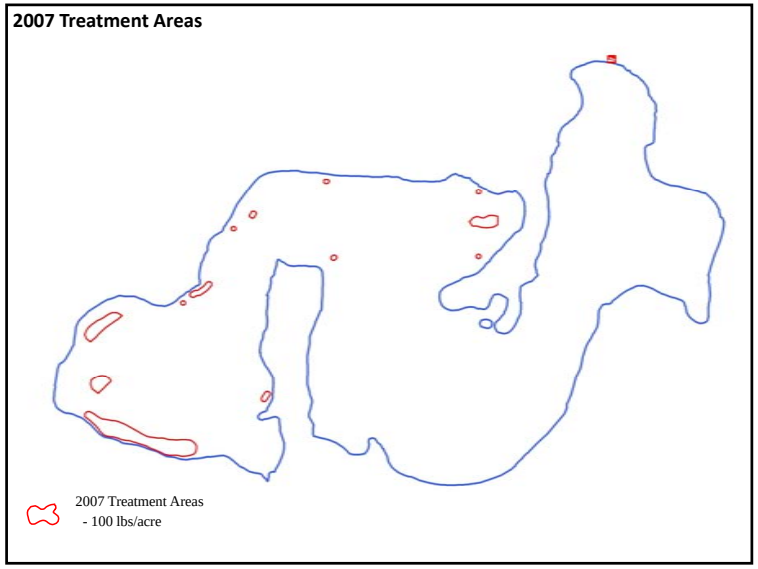
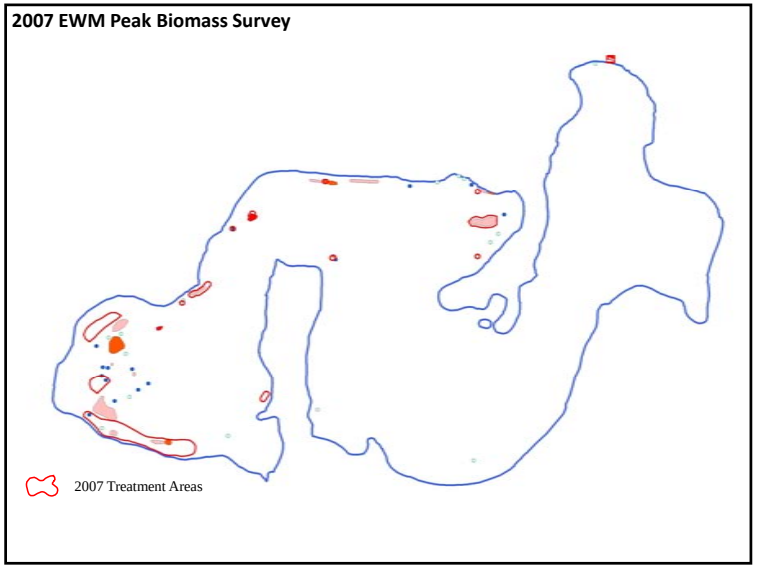
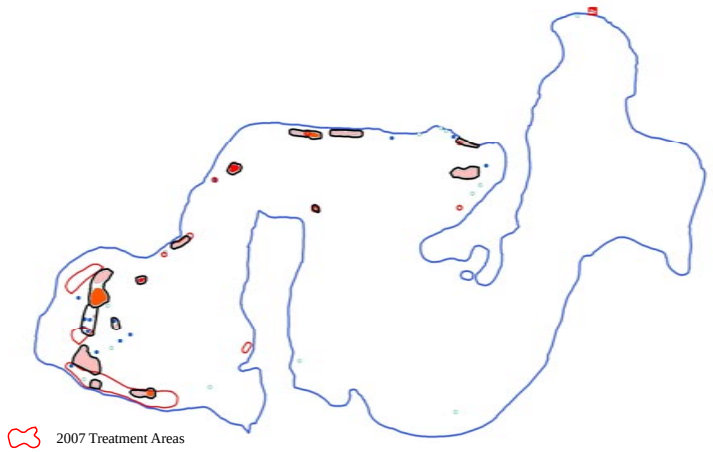






2008 Proposed Treatment Areas



2007 Treatment Areas

2008 Proposed Treatment Areas

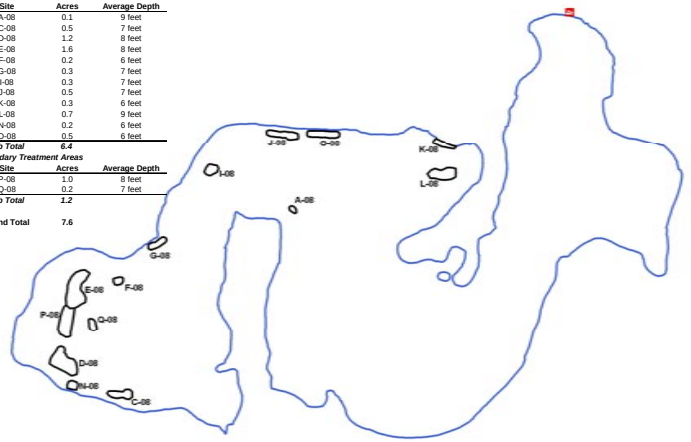
2008 Proposed Treatment Areas

Primary Treatment Areas

Site	Acres	Average Depth
A-08	0.1	9 feet
C-08	0.5	7 feet
D-08	1.2	8 feet
E-08	1.6	8 feet
F-08	0.2	6 feet
G-08	0.3	7 feet
I-08	0.3	7 feet
J-08	0.5	7 feet
K-08	0.3	6 feet
L-08	0.7	9 feet
N-08	0.2	6 feet
O-08	0.5	6 feet
Sub Total	*6.4*	

Secondary Treatment Areas

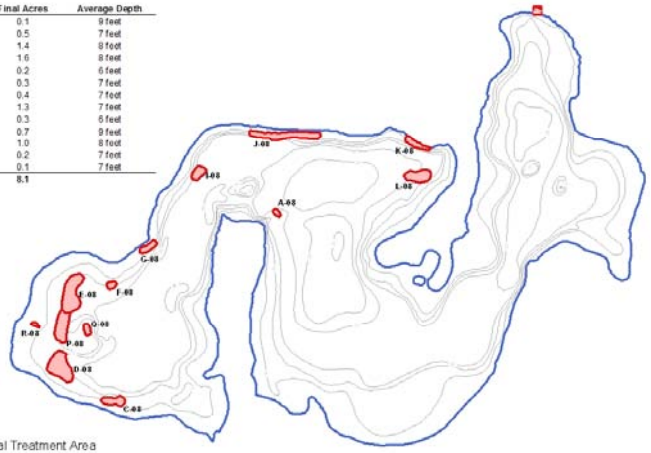
Site	Acres	Average Depth
P-08	1.0	8 feet
Q-08	0.2	7 feet
Sub Total	*1.2*	
Grand Total	7.6	



2008 Proposed Treatment Areas – 150 lbs/acre

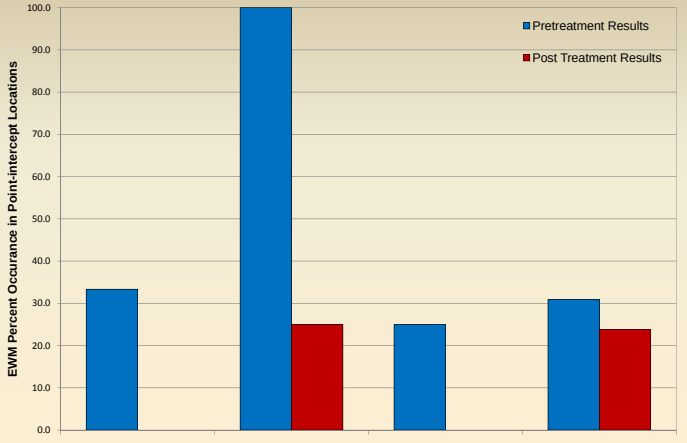
2008 Proposed Treatment Areas

Site	Final Acres	Average Depth
A-08	0.1	9 feet
C-08	0.5	7 feet
D-08	1.4	8 feet
E-08	1.6	8 feet
F-08	0.2	6 feet
G-08	0.3	7 feet
I-08	0.4	7 feet
J-08	1.3	7 feet
K-08	0.3	6 feet
L-08	0.7	9 feet
P-08	1.0	8 feet
Q-08	0.2	7 feet
R-08	0.1	7 feet
Total	8.1	



2008 Final Treatment Area

2008 EWM Treatment – Quantitative Results



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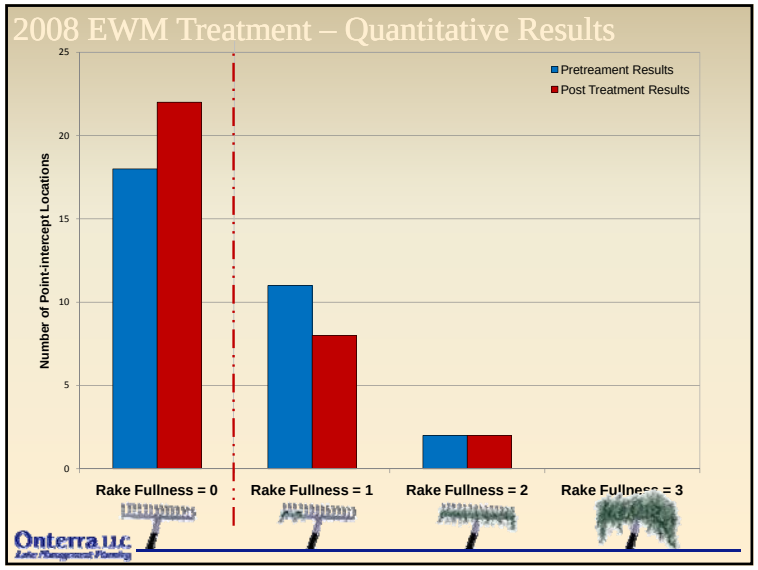

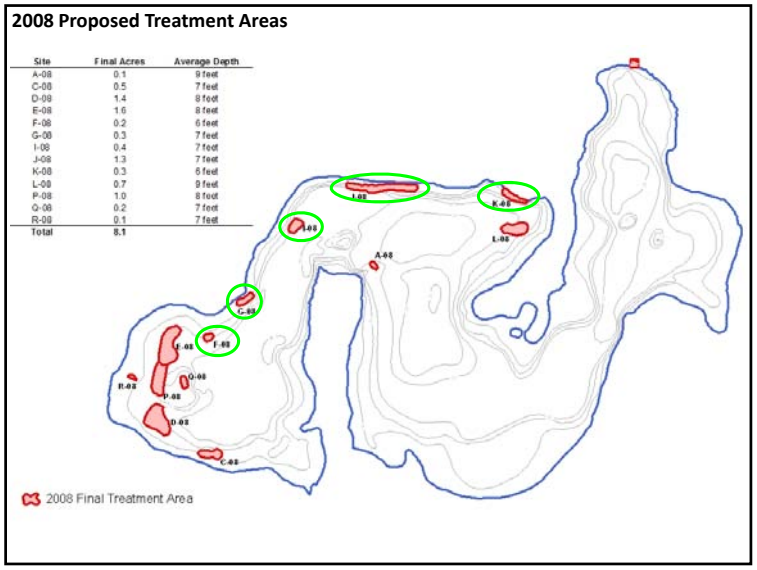

Conclusions

- Watershed
  - Land cover within watershed is excellent
    - Minimal loading – best to be expected
  - Makes immediate (shorelands) watershed very important
- Water quality
  - Good because of current watershed condition
  - Lack of historic data makes long-term trend analysis difficult

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Conclusions

- Aquatic plant community is exceptional
  - Provides excellent habitat
  - Likely competes heavily against EWM in most areas
- EWM occurrence is of concern
  - Low abundance in UGL
  - Present in MGL
  - No impacts on navigation, but possibly other forms of recreation
  - Impact to native habitat is a concern (Largest)
  - Higher dosage of herbicide is required for success
    - Due to depth of water that EWM is found in and density of these plants

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Planning Project

Goal 1: Maintain Current Water Quality Conditions

Management Actions

1. Continue monitoring water quality through WDNR Citizens Lake Monitoring Network.
2. Reduce phosphorus and sediment loads from immediate watershed (shorelands).

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Planning Project

Goal 2: Control AIS within Gresham Chain of Lakes

Management Actions

1. Continue Clean Boats/Clean Waters watercraft inspections at Upper Gresham Lake public access site.
2. Reduce occurrence of giant reed on Upper Gresham shorelands.
3. Coordinate annual volunteer monitoring of AIS on Gresham Chain of Lakes
4. Control Eurasian water milfoil infestation in Upper Gresham Lake.

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AIS Control Project

AIS Project Overview

- Four-year, $90,000 project
- WDNR AIS Established Infestation Grant
  - Would provide 75% of project costs
- Reduce EWM densities to more easily controlled levels
  - Four years of intense treatments and monitoring
- Prevent further infestations of EWM and other AIS
- Train a core group of volunteers to monitor EWM and set up treatments

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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

Onterra LLC

B

APPENDIX B

Stakeholder Survey Response Charts and Comments

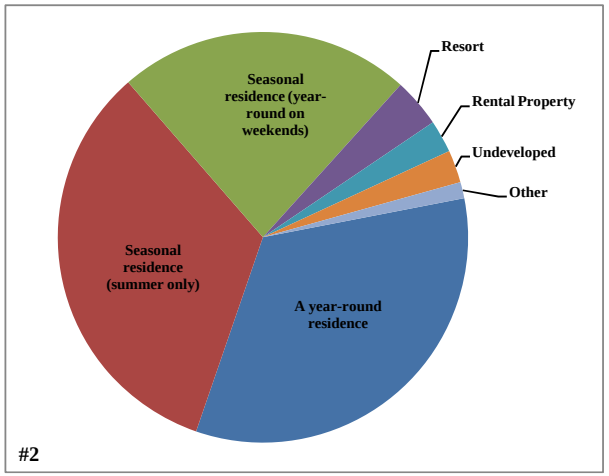
Returned Surveys	74
Sent Surveys	145
Response Rate	51.0

#1 On which lake is your Gresham Lakes proeprty located?

	Total	*%*
Upper Gresham Lake	48	*64.9*
Middle Gresham Lake	8	*10.8*
Lower Gresham Lake	18	*24.3*
	74	

#2 What type of property do you own on the Gresham Lakes?

	Total	*%*
A year-round residence	26	*33.8*
Seasonal residence (summer only)	26	*33.8*
Seasonal residence (year-round on weekends)	18	*23.4*
Resort	3	*3.9*
Rental Property	2	*2.6*
Undeveloped	2	*2.6*
Other	1	*1.3*
	77	

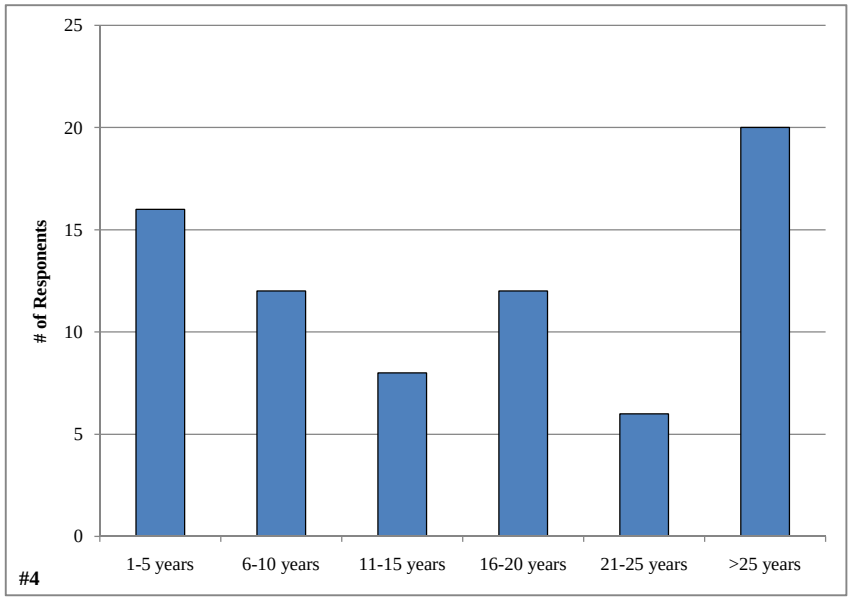


#3 If you are not a year-round resident, how many days each year is your property used by you or others?

Answered Question	44
Average	96.8
Standard deviation	75.3

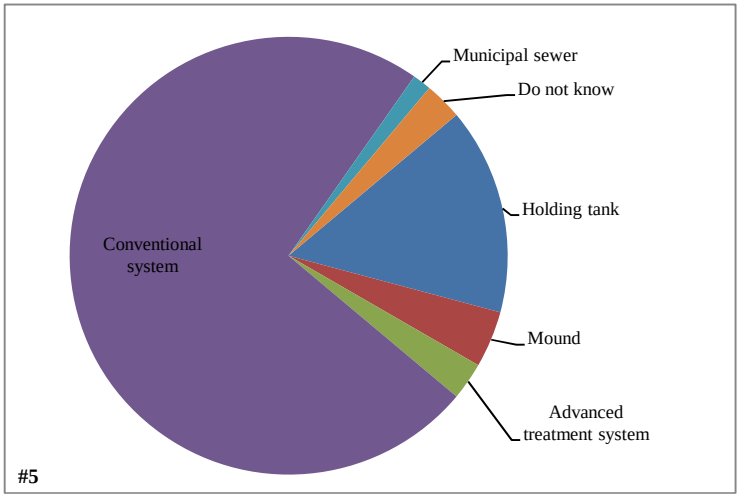
#4 How many years have you owned property on the Gresham Lakes?

Answered Question	74	%
1-5 years	16	*21.6*
6-10 years	12	*16.2*
11-15 years	8	*10.8*
16-20 years	12	*16.2*
21-25 years	6	*8.1*
>25 years	20	*27.0*
	74	*100.0*



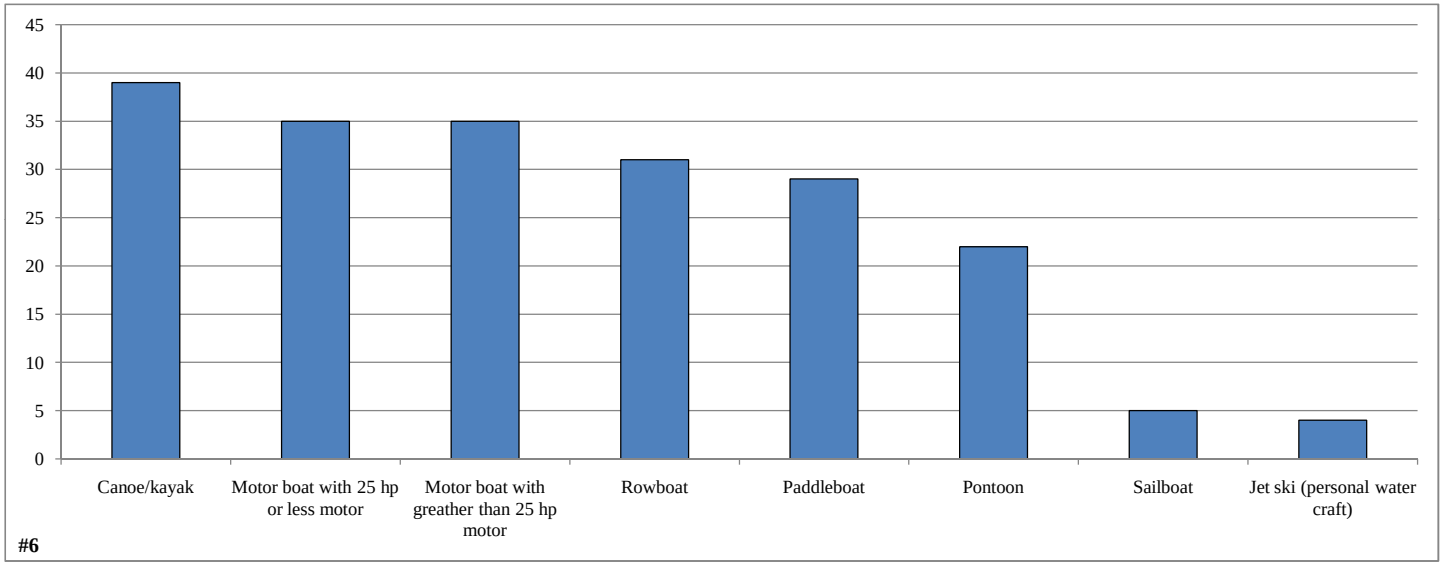
#5 What type of septic system does your property utilize?

	Total	%
Holding tank	11	*15.3*
Mound	3	*4.2*
Advanced treatment system	2	*2.8*
Conventional system	53	*73.6*
Municipal sewer	1	*1.4*
Do not know	2	*2.8*
	72	



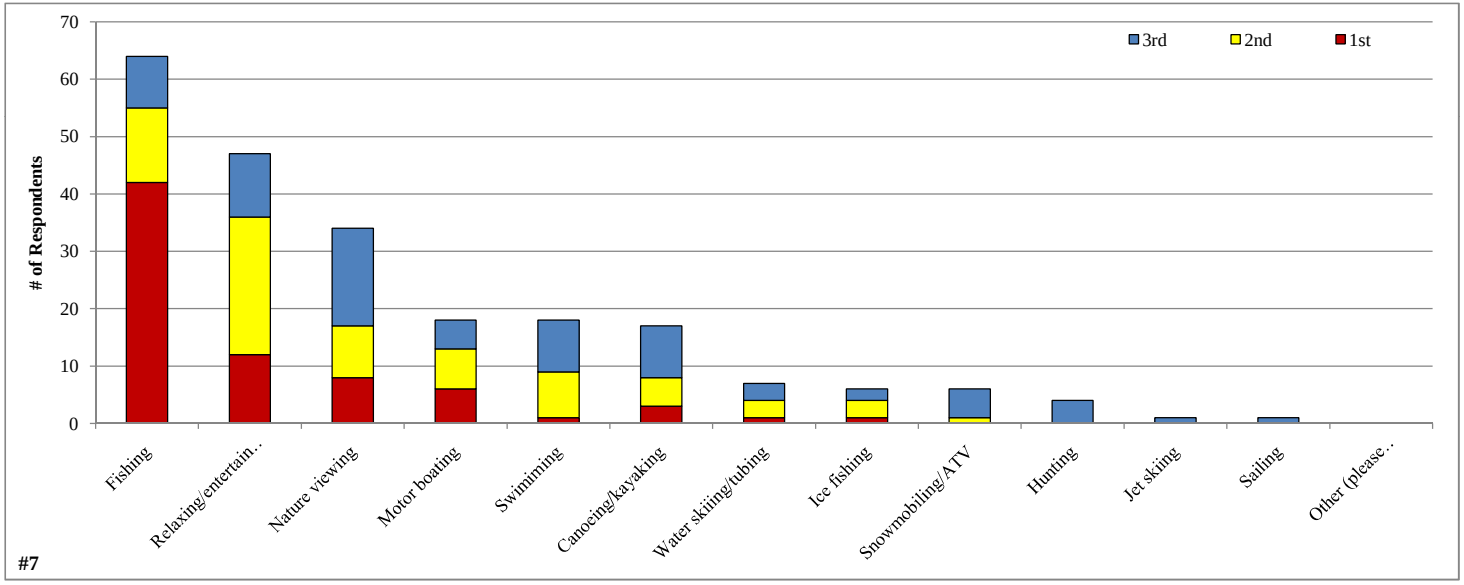
#6 What types of watercraft do you currently use on the Gresham Lakes?

	Total	%
Canoe/kayak	39	*19.5*
Motor boat with 25 hp or less motor	35	*17.5*
Motor boat with greather than 25 hp motor	35	*17.5*
Rowboat	31	*15.5*
Paddleboat	29	*14.5*
Pontoon	22	*11.0*
Sailboat	5	*2.5*
Jet ski (personal water craft)	4	*2.0*
	200	



#7 **Please rank the activities below that are the most important or enjoyable to you on the Gresham Lakes?**

	1st	2nd	3rd	*% ranked*
Fishing	42	13	9	*86.5*
Relaxing/entertaining	12	24	11	*63.5*
Nature viewing	8	9	17	*45.9*
Motor boating	6	7	5	*24.3*
Swimiming	1	8	9	*24.3*
Canoeing/kayaking	3	5	9	*23.0*
Water skiing/tubing	1	3	3	*9.5*
Ice fishing	1	3	2	*8.1*
Snowmobiling/ATV	0	1	5	*8.1*
Hunting	0	0	4	*5.4*
Jet skiing	0	0	1	*1.4*
Sailing	0	0	1	*1.4*
Other (please specify):	0	0	0	*0.0*
	74	73	76	

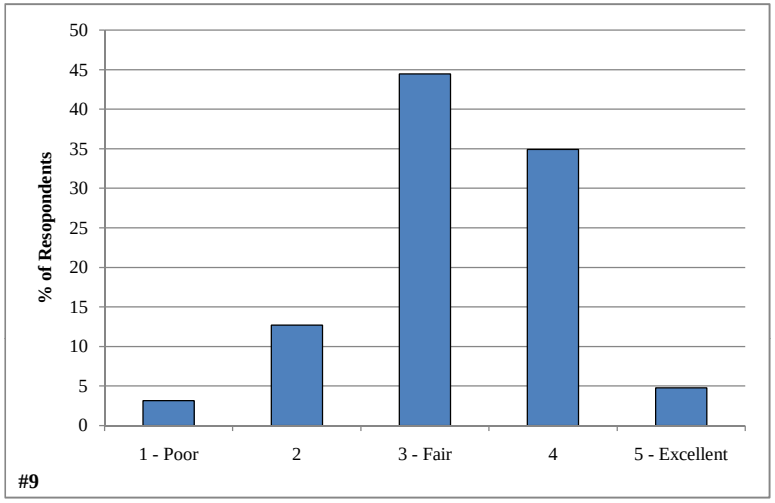


#8 Have you fished on the Gresham Lakes in the past 3 years?

		%
Yes	61	*82.4*
No	13	*17.6*
	74	

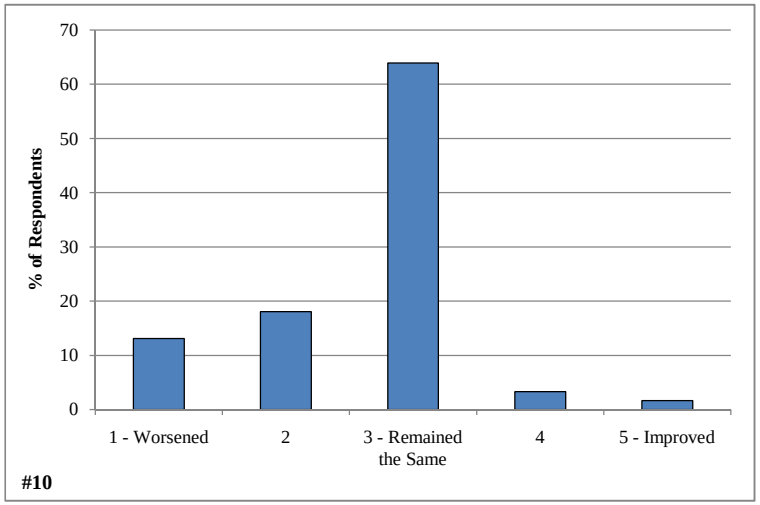
#9 How would you describe the current quality of fishing on the Gresham Lakes?

	Total	*%*
1 - Poor	2	*3.2*
2	8	*12.7*
3 - Fair	28	*44.4*
4	22	*34.9*
5 - Excellent	3	*4.8*
	63	



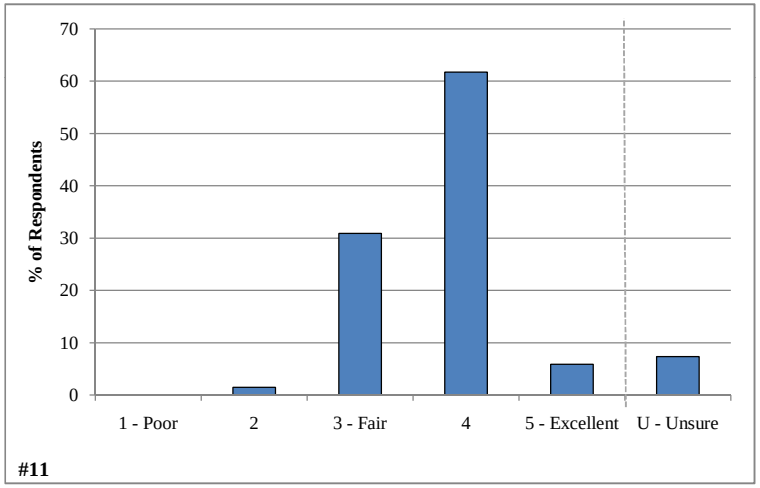
#10 How has the quality of fishing changed on the Gresham Lakes since you obtained your property?

	Total	%
1 - Worsened	8	*13.1*
2	11	*18.0*
3 - Remained the Same	39	*63.9*
4	2	*3.3*
5 - Improved	1	*1.6*
	61	



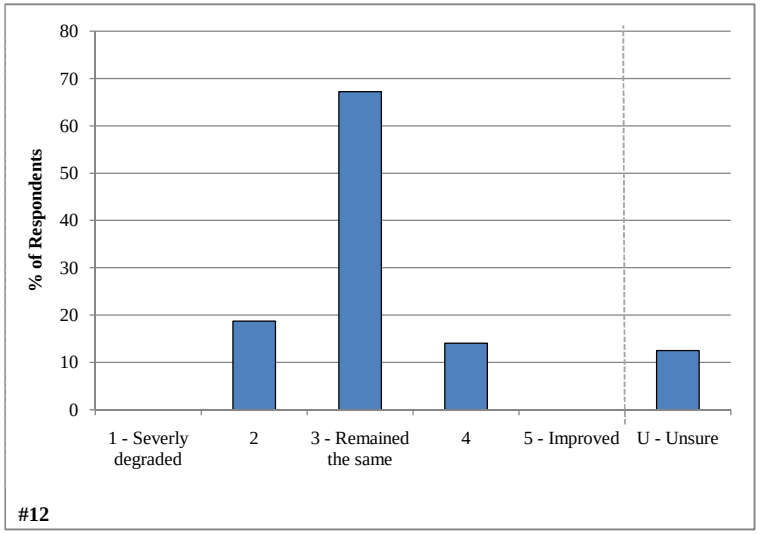
#11 How would you describe the current water quality of the Gresham Lakes?

	Total	%
1 - Poor	0	*0.0*
2	1	*1.5*
3 - Fair	21	*30.9*
4	42	*61.8*
5 - Excellent	4	*5.9*
U - Unsure	5	*7.4*
	68	



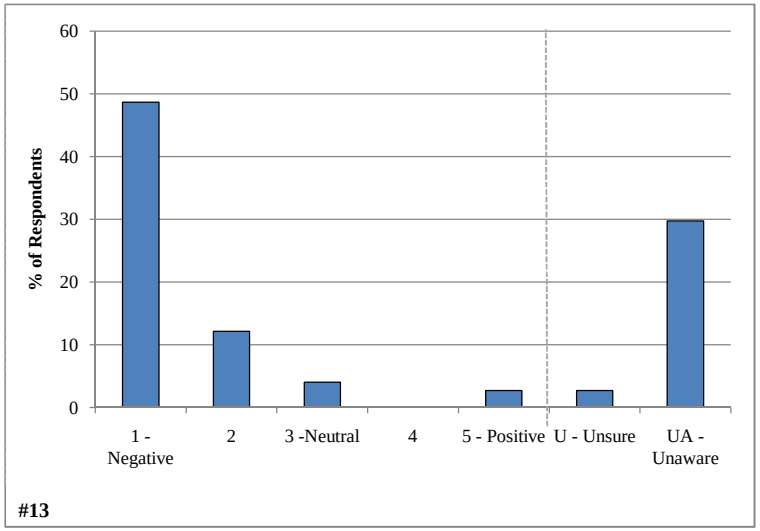
#12 How has the water quality changed in the Gresham Lakes since you obtained your property?

	Total	%
1 - Severly degraded	0	*0.0*
2	12	*18.8*
3 - Remained the same	43	*67.2*
4	9	*14.1*
5 - Improved	0	*0.0*
U - Unsure	8	*12.5*
	64	



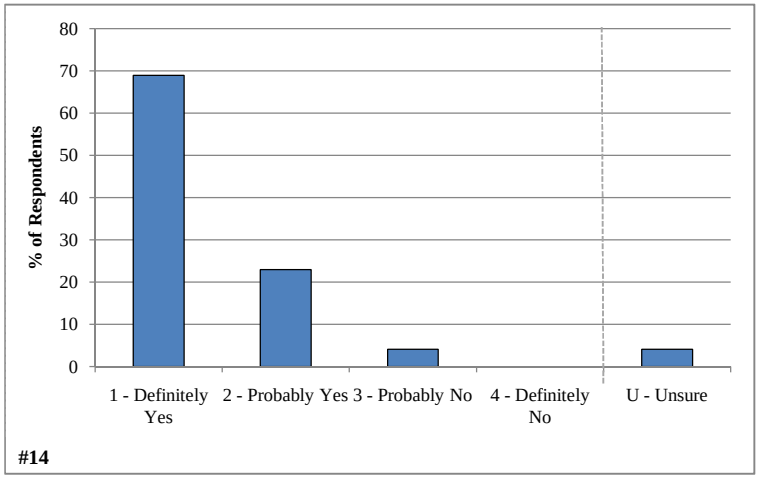
#13 Do you believe the proposed increase in state campground size on Upper Gresham Lake would have a positive or negative impact on the lake?

	Total	%
1 - Negative	36	*48.6*
2	9	*12.2*
3 -Neutral	3	*4.1*
4	0	*0.0*
5 - Positive	2	*2.7*
U - Unsure	2	*2.7*
UA - Unaware	22	*29.7*
	74	



#14 Are you aware of the impacts that the use of phosphorus-containing fertilizer on shoreland properties can have on your lake?

	Total	%
1 - Definitely Yes	51	*68.9*
2 - Probably Yes	17	*23.0*
3 - Probably No	3	*4.1*
4 - Definitely No	0	*0.0*
U - Unsure	3	*4.1*
	74	



#15 Do you support legal consequences for unauthorized destruction of beaver dams in the Gresham Lakes watershed?

	Total	%
Yes	46	*92.0*
No	4	*8.0*
	50	

#16 Have you ever heard of aquatic invasive species?

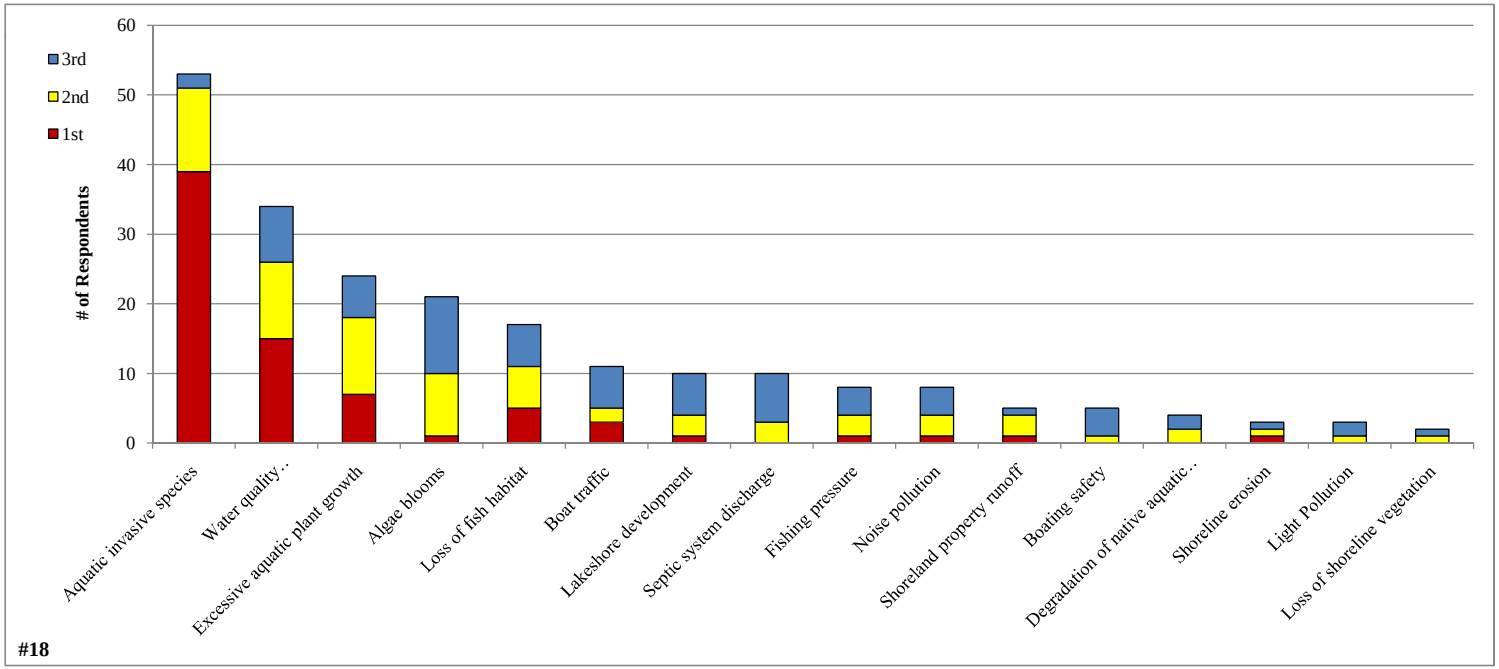
	Total	%
Yes	73	*98.6*
No	1	*1.4*
	74	

#17 Are you aware of aquatic invasive species on the Gresham Lakes?

	Total	%
Yes	53	*72.6*
No	20	*27.4*
	73	

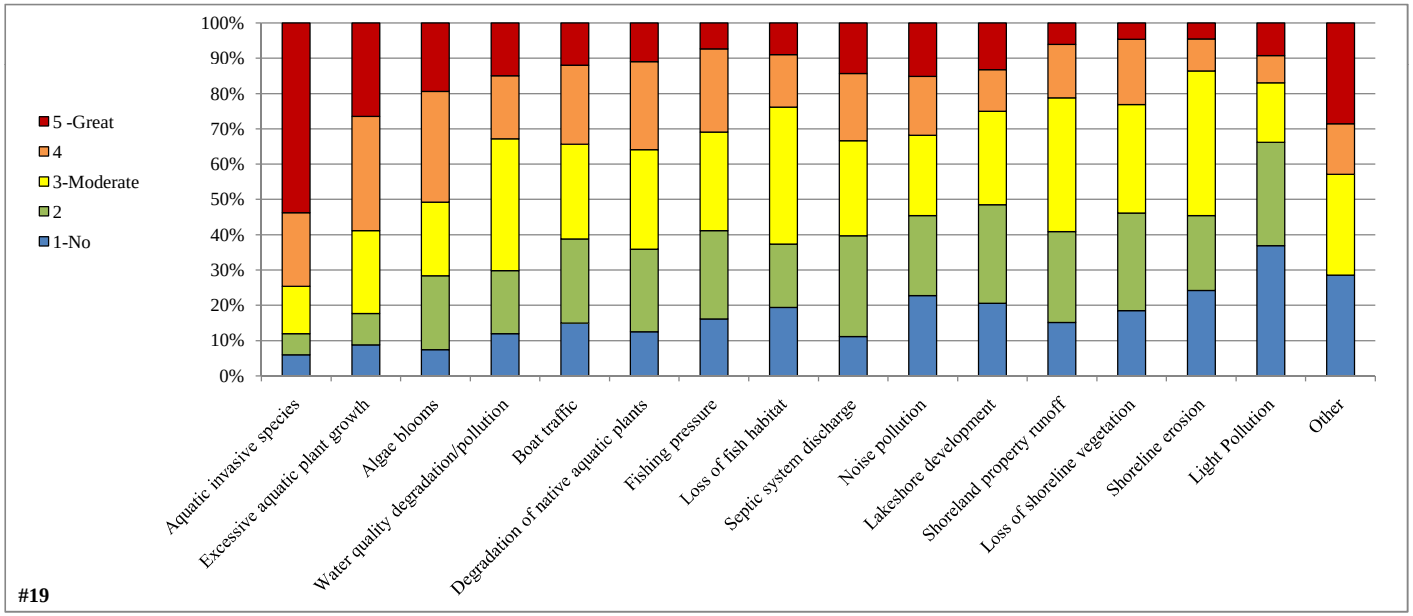
#18 From the list below, please rank your top three concerns regarding the Gresham Lakes?

	1st	2nd	3rd	*% Ranked*
Aquatic invasive species	39	12	2	*24.5*
Water quality degradation/pollution	15	11	8	*15.7*
Excessive aquatic plant growth	7	11	6	*11.1*
Algae blooms	1	9	11	*9.7*
Loss of fish habitat	5	6	6	*7.9*
Boat traffic	3	2	6	*5.1*
Lakeshore development	1	3	6	*4.6*
Septic system discharge	0	3	7	*4.6*
Fishing pressure	1	3	4	*3.7*
Noise pollution	1	3	4	*3.7*
Shoreland property runoff	1	3	1	*2.3*
Boating safety	0	1	4	*2.3*
Degradation of native aquatic plants	0	2	2	*1.9*
Shoreline erosion	1	1	1	*1.4*
Light Pollution	0	1	2	*1.4*
Loss of shoreline vegetation	0	1	1	*0.9*
	75	72	71	*100.9*



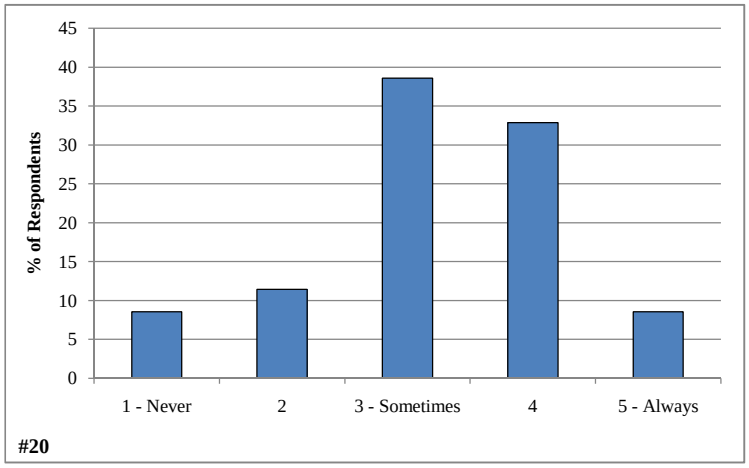
#19 To what level do you believe each the following factors are negatively impacting the Gresham Lakes?

	1-No	2	3-Moderate	4	5 -Great	*Total*	*Average*
Aquatic invasive species	4	4	9	14	36	*67*	*3.7*
Excessive aquatic plant growth	6	6	16	22	18	*68*	*3.3*
Algae blooms	5	14	14	21	13	*67*	*3.0*
Water quality degradation/pollution	8	12	25	12	10	*67*	*2.8*
Boat traffic	10	16	18	15	8	*67*	*2.6*
Degradation of native aquatic plants	8	15	18	16	7	*64*	*2.6*
Fishing pressure	11	17	19	16	5	*68*	*2.6*
Loss of fish habitat	13	12	26	10	6	*67*	*2.5*
Septic system discharge	7	18	17	12	9	*63*	*2.5*
Noise pollution	15	15	15	11	10	*66*	*2.5*
Lakeshore development	14	19	18	8	9	*68*	*2.5*
Shoreland property runoff	10	17	25	10	4	*66*	*2.4*
Loss of shoreline vegetation	12	18	20	12	3	*65*	*2.4*
Shoreline erosion	16	14	27	6	3	*66*	*2.2*
Light Pollution	24	19	11	5	6	*65*	*2.0*
Other	4	0	4	2	4	*14*	*0.6*



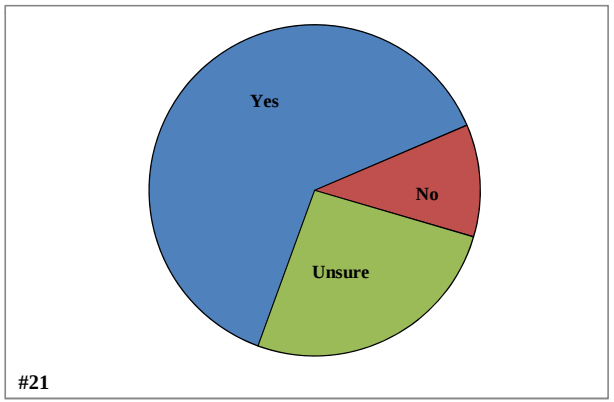
#20 How often does aquatic plant growth impact your recreational use of the Gresham Lakes?

	Total	%
1 - Never	6	*8.6*
2	8	*11.4*
3 - Sometimes	27	*38.6*
4	23	*32.9*
5 - Always	6	*8.6*
	70	



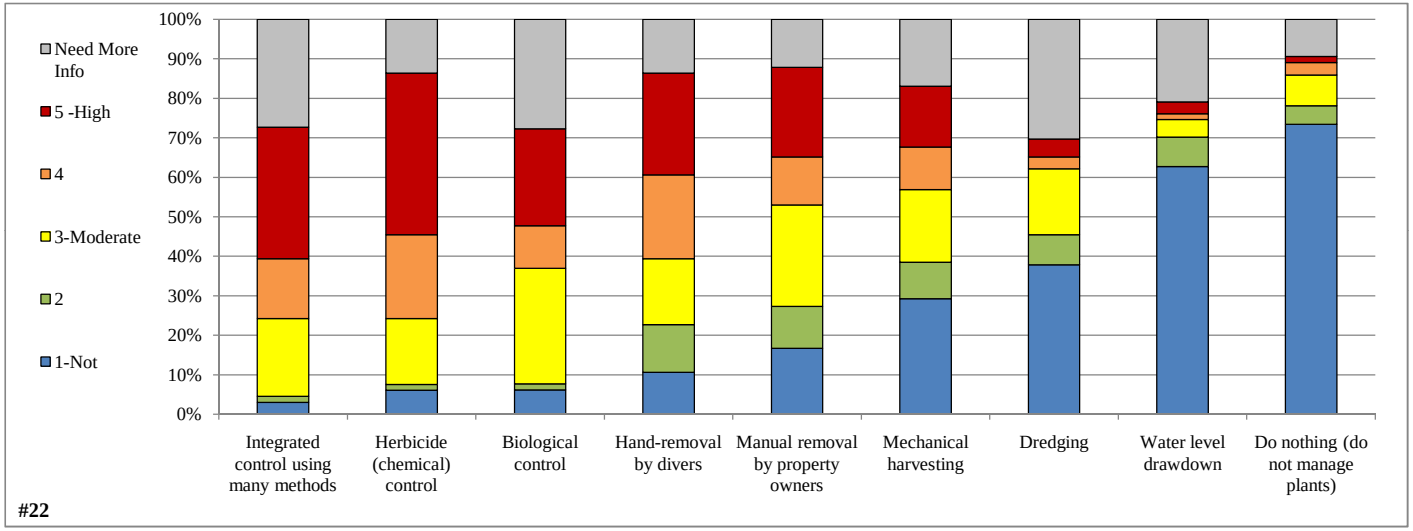
#21 Considering your answer to the question above, do you believe aquatic plant control is needed on the Gresham Lakes?

	Total	%
Yes	46	*63.0*
No	8	*11.0*
Unsure	19	*26.0*
	73	



#22 What is your level of support for the responsible use of the following techniques on the Gresham Lakes?

	1-Not	2	3-Moderate	4	5 -High	Need More Info	*Total*	*Average*
Integrated control using many methods	2	1	13	10	22	18	*66*	*4.1*
Herbicide (chemical) control	4	1	11	14	27	9	*66*	*3.9*
Biological control	4	1	19	7	16	18	*65*	*3.8*
Hand-removal by divers	7	8	11	14	17	9	*66*	*3.4*
Manual removal by property owners	11	7	17	8	15	8	*66*	*3.1*
Mechanical harvesting	19	6	12	7	10	11	*65*	*2.9*
Dredging	25	5	11	2	3	20	*66*	*2.9*
Water level drawdown	42	5	3	1	2	14	*67*	*2.1*
Do nothing (do not manage plants)	47	3	5	2	1	6	*64*	*1.6*



#23 Before receiving this mailing, have you ever heard of the the Gresham LakesAssociation?

	Total	%
Yes	71	*98.6*
No	1	*1.4*
	72	

#24 Are you currently a member of the Gresham Lakes Association?

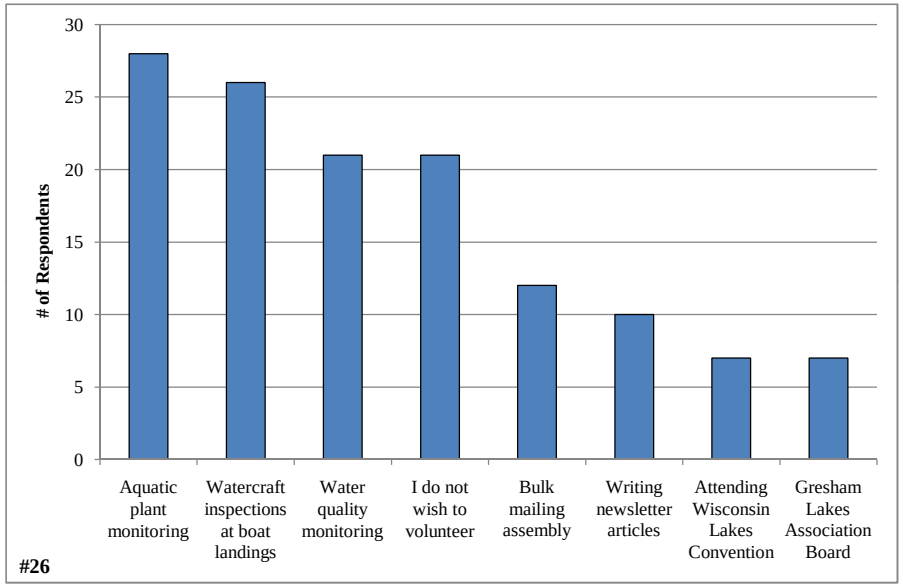
	Total	%
Yes	58	*82.9*
No	12	*17.1*
	70	

#25 Do you believe the Gresham Lakes Association should be responsible for monitoring the beaver dams that affect the chain's water levels?

	Total	%
Yes	55	*87.3*
No	8	*12.7*
	63	

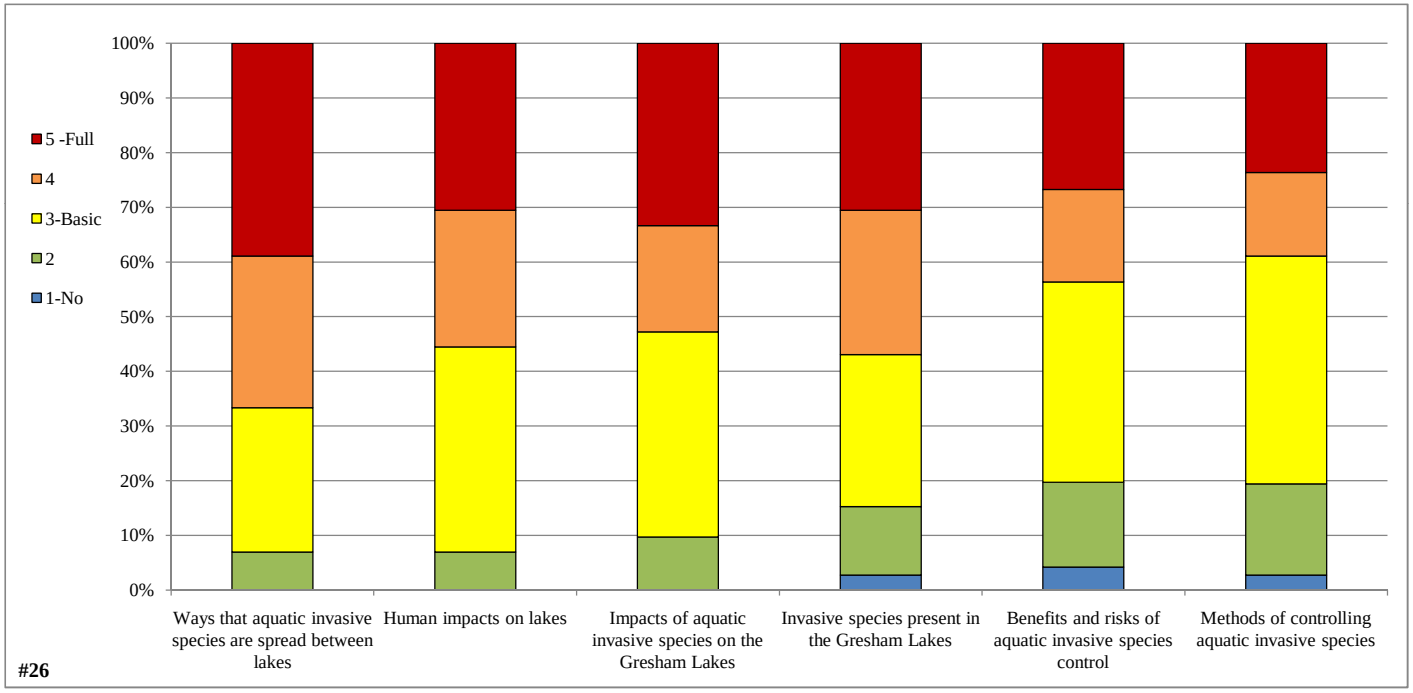
#26 Please circle the activities you would be willing to participate in if the opportunity arose.

	Total
Aquatic plant monitoring	28
Watercraft inspections at boat landings	26
Water quality monitoring	21
I do not wish to volunteer	21
Bulk mailing assembly	12
Writing newsletter articles	10
Attending Wisconsin Lakes Convention	7
Gresham Lakes Association Board	7
	125



#27 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	0	5	19	20	28	*72*	*3.9*
Human impacts on lakes	0	5	27	18	22	*72*	*3.7*
Impacts of aquatic invasive species on the Gresham Lakes	0	7	27	14	24	*72*	*3.7*
Invasive species present in the Gresham Lakes	2	9	20	19	22	*72*	*3.6*
Benefits and risks of aquatic invasive species control	3	11	26	12	19	*71*	*3.3*
Methods of controlling aquatic invasive species	2	12	30	11	17	*72*	*3.3*



#26

Returned Surveys	74
Sent Surveys	
Response Rate	#DIV/0!

#1 On which lake is your Gresham Lakes proeprty located?

	Total	*%*
Upper Gresham Lake	48	*64.9*
Middle Gresham Lake	8	*10.8*
Lower Gresham Lake	18	*24.3*
	74	

#2 What type of property do you own on the Gresham Lakes?

	UGL	*%*	**MGL**	*%*	**LGL**	*%*
A year-round residence	16	*31.4*	2	*25.0*	8	*44.4*
Seasonal residence (summer only)	18	*35.3*	3	*5.9*	5	*27.8*
Seasonal residence (year-round on weekends)	13	*25.5*	2	*3.9*	3	*16.7*
Resort	1	*2.0*	1	*2.0*	1	*5.6*
Rental Property	2	*3.9*	0	*0.0*	0	*0.0*
Undeveloped	1	*2.0*	0	*0.0*	1	*5.6*
Other	1	*2.0*	0	*0.0*	0	*0.0*
	51		8		18	

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

	UGL	**MGL**	**LGL**
Answered Question	31	6	7
Average	85.2	139.5	111.4
Standard deviation	56.4	124.8	94.9

#4 How many years have you owned property on the Gresham Lakes?

	UGL	*%*	**MGL**	*%*	**LGL**	*%*
Answered Question	48		8		18	
1-5 years	9	*18.8*	2	*25.0*	5	*27.8*
6-10 years	8	*16.7*	1	*12.5*	3	*16.7*
11-15 years	7	*14.6*	0	*0.0*	1	*5.6*
16-20 years	9	*18.8*	1	*12.5*	2	*11.1*
21-25 years	2	*4.2*	1	*12.5*	3	*16.7*
>25 years	13	*27.1*	3	*37.5*	4	*22.2*
	48		8		18	

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

	UGL	*%*	**MGL**	*%*	**LGL**	*%*
Holding tank	7	*14.9*	1	*12.5*	3	*17.6*
Mound	2	*4.3*	0	*0.0*	1	*5.9*
Advanced treatment system	2	*4.3*	0	*0.0*	0	*0.0*
Conventional system	34	*72.3*	7	*87.5*	12	*70.6*
Municipal sewer	1	*2.1*	0	*0.0*	0	*0.0*
Do not know	1	*2.1*	0	*0.0*	1	*5.9*
	47		8		17	

#6 What types of watercraft do you currently use on the Gresham Lakes?

	UGL	*%*	**MGL**	*%*	**LGL**	*%*
Paddleboat	19	*14.2*	4	*14.8*	6	*15.4*
Sailboat	3	*2.2*	0	*0.0*	2	*5.1*
Canoe/kayak	28	*20.9*	5	*18.5*	6	*15.4*
Rowboat	17	*12.7*	6	*22.2*	8	*20.5*
Jet ski (personal water craft)	3	*2.2*	1	*3.7*	0	*0.0*
Motor boat with 25 hp or less motor	22	*16.4*	4	*14.8*	9	*23.1*
Motor boat with greather than 25 hp motor	27	*20.1*	4	*14.8*	4	*10.3*
Pontoon	15	*11.2*	3	*11.1*	4	*10.3*
	134		27		39	

#7 Please rank the activities below that are the most important or enjoyable to you on the Gresham Lakes?

	UGL			MGL			LGL		
	1st	**2nd**	**3rd**	**1st**	**2nd**	**3rd**	**1st**	**2nd**	**3rd**
Fishing	24	8	7	7	1	0	11	4	2
Ice fishing	1	1	0	0	1	0	0	1	2
Motor boating	5	5	3	0	0	1	1	2	1
Jet skiing	0	0	1	0	0	0	0	0	0
Relaxing/entertaining	9	15	7	1	4	1	2	5	3
Nature viewing	6	5	10	0	1	3	2	3	4
Hunting	0	0	2	0	0	1	0	0	1
Water skiiing/tubing	1	2	3	0	0	0	0	1	0
Sailing	0	0	0	0	0	0	0	0	1
Canoeing/kayaking	2	4	6	0	0	1	1	1	2
Swimiming	1	7	8	0	1	0	0	0	1
Snowmobiling/ATV	0	1	3	0	0	1	0	0	1
Other (please specify):	0	0	0	0	0	0	0	0	0
	49	48	50	8	8	8	17	17	18

#8 Have you fished on the Gresham Lakes in the past 3 years?

	UGL	***%***	**MGL**	***%***	**LGL**	***%***
Yes	40	*83.3*	8	*100.0*	13	*72.2*
No	8	*16.7*	0	*0.0*	5	*27.8*
	48		8		18	

#9 How would you describe the current quality of fishing on the Gresham Lakes?

	UGL	***%***	**MGL**	***%***	**LGL**	***%***
1 - Poor	2	*4.9*	0	*0.0*	0	*0.0*
2	7	*17.1*	0	*0.0*	1	*7.1*
3 - Fair	17	*41.5*	3	*37.5*	8	*57.1*
4	14	*34.1*	4	*50.0*	4	*28.6*
5 - Excellent	1	*2.4*	1	*12.5*	1	*7.1*
	41		8		14	

#10 How has the quality of fishing changed on the Gresham Lakes since you obtained your property?

	UGL	***%***	**MGL**	***%***	**LGL**	***%***
1 - Worsened	6	*15.4*	2	*25.0*	0	*0.0*
2	9	*23.1*	0	*0.0*	2	*14.3*
3 - Remained the Same	24	*61.5*	6	*75.0*	9	*64.3*
4	0	*0.0*	0	*0.0*	2	*14.3*
5 - Improved	0	*0.0*	0	*0.0*	1	*7.1*
	39		8		14	

#11 How would you describe the current water quality of the Gresham Lakes?

	UGL	***%***	**MGL**	***%***	**LGL**	***%***
1 - Poor	0	*0.0*	0	*0.0*	0	*0.0*
2	1	*2.1*	0	*0.0*	0	*0.0*
3 - Fair	10	*21.3*	4	*50.0*	7	*38.9*
4	32	*68.1*	4	*50.0*	6	*33.3*
5 - Excellent	3	*6.4*	0	*0.0*	1	*5.6*
U - Unsure	1	*2.1*	0	*0.0*	4	*22.2*
	47		8		18	

#12 How has the water quality changed in the Gresham Lakes since you obtained your property?

	UGL	***%***	**MGL**	***%***	**LGL**	***%***
1 - Severly degraded	0	*0.0*	0	*0.0*	0	*0.0*
2	8	*17.4*	2	*25.0*	2	*11.1*
3 - Remained the same	29	*63.0*	6	*75.0*	8	*44.4*
4	6	*13.0*	0	*0.0*	3	*16.7*
5 - Improved	0	*0.0*	0	*0.0*	0	*0.0*
U - Unsure	3	*6.5*	0	*0.0*	5	*27.8*
	46		8		18	

#13 Do you believe the proposed increase in state campground size on Upper Gresham Lake would have a positive or negative impact on the lake?

	UGL	***%***	**MGL**	***%***	**LGL**	***%***
1 - Negative	30	*62.5*	3	*37.5*	3	*16.7*
2	6	*12.5*	0	*0.0*	3	*16.7*
3 -Neutral	1	*2.1*	0	*0.0*	2	*11.1*
4	0	*0.0*	0	*0.0*	0	*0.0*
5 - Positive	2	*4.2*	0	*0.0*	0	*0.0*
U - Unsure	0	*0.0*	0	*0.0*	2	*11.1*
UA - Unaware	9	*18.8*	5	*62.5*	8	*44.4*
	48		8		18	

#14 Are you aware of the impacts that the use of phosphorus-containing fertilizer on shoreland properties can have on your lake?

	UGL	%	MGL	%	LGL	%
1 - Definitely Yes	33	*68.8*	7	*87.5*	11	*61.1*
2 - Probably Yes	12	*25.0*	1	*12.5*	4	*22.2*
3 - Probably No	2	*4.2*	0	*0.0*	1	*5.6*
4 - Definitely No	0	*0.0*	0	*0.0*	0	*0.0*
U - Unsure	1	*2.1*	0	*0.0*	2	*11.1*
	48		8		18	

#15 Do you support legal consequences for unauthorized destruction of beaver dams in the Gresham Lakes watershed?

	UGL	%	MGL	%	LGL	%
Yes	33	*91.7*	7	*100.0*	6	*85.7*
No	3	*8.3*	0	*0.0*	1	*14.3*
	36		7		7	

#16 Have you ever heard of aquatic invasive species?

	UGL	%	MGL	%	LGL	%
Yes	47	*97.9*	8	*100.0*	18	*100.0*
No	1	*2.1*	0	*0.0*	0	*0.0*
	48		8		18	

#17 Are you aware of aquatic invasive species on the Gresham Lakes?

	UGL	%	MGL	%	LGL	%
Yes	42	*87.5*	7	*100.0*	4	*22.2*
No	6	*12.5*	0	*0.0*	14	*77.8*
	48		7		18	

#18 From the list below, please rank your top three concerns regarding the Gresham Lakes?

	UGL			MGL			LGL		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
Water quality degradation/pollution	10	8	4	2	0	2	3	3	2
Loss of fish habitat	3	3	4	0	1	0	2	2	2
Shoreline erosion	0	1	1	0	0	0	1	0	0
Loss of shoreline vegetation	0	1	0	0	0	1	0	0	0
Aquatic invasive species	31	8	1	3	3	0	5	1	1
Boat traffic	2	2	5	0	0	1	1	0	0
Shoreland property runoff	0	1	0	0	1	0	1	1	1
Degradation of native aquatic plants	0	1	1	0	1	0	0	0	1
Fishing pressure	0	3	4	0	0	0	1	0	0
Lakeshore development	1	3	4	0	0	0	0	0	2
Excessive aquatic plant growth	2	5	5	3	1	1	2	5	0
Algae blooms	0	7	3	0	1	2	1	1	6
Septic system discharge	0	1	6	0	0	0	0	2	1
Noise pollution	1	2	4	0	0	0	0	1	0
Light Pollution	0	0	1	0	0	1	0	1	0
Boating safety	0	1	4	0	0	0	0	0	0
	50	47	47	8	8	8	17	17	16

#19 To what level do you believe each the following factors are negatively impacting the Gresham Lakes?

UGL

	1-No	2	3-Moderate	4	5 -Great	*Total*	*Average*
Water quality degradation/pollution	5	7	16	8	9	*45*	*3.0*
Loss of fish habitat	7	8	19	7	5	*46*	*2.8*
Shoreline erosion	10	11	19	3	2	*45*	*2.3*
Loss of shoreline vegetation	6	14	14	8	2	*44*	*2.5*
Aquatic invasive species	1	2	4	11	27	*45*	*4.1*
Boat traffic	4	9	13	12	6	*44*	*2.9*
Shoreland property runoff	4	10	21	8	1	*44*	*2.6*
Degradation of native aquatic plants	6	7	14	13	3	*43*	*2.7*
Fishing pressure	3	10	15	13	4	*45*	*2.9*
Lakeshore development	6	13	12	6	8	*45*	*2.8*
Excessive aquatic plant growth	6	4	9	16	10	*45*	*3.2*
Algae blooms	3	11	9	16	6	*45*	*3.0*
Septic system discharge	3	12	13	9	7	*44*	*2.9*
Noise pollution	6	9	10	10	9	*44*	*2.9*
Light Pollution	13	14	7	5	3	*42*	*2.0*
Other	3	0	2	2	2	*9*	*0.6*

MGL

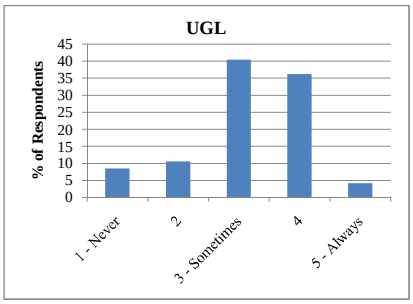
	1-No	2	3-Moderate	4	5 -Great	*Total*	*Average*
Water quality degradation/pollution	0	2	3	2	0	*7*	*2.6*
Loss of fish habitat	1	1	3	2	0	*7*	*2.5*
Shoreline erosion	3	2	1	1	0	*7*	*1.8*
Loss of shoreline vegetation	3	1	1	2	0	*7*	*2.0*
Aquatic invasive species	0	0	1	2	5	*8*	*4.5*
Boat traffic	0	2	4	1	1	*8*	*3.1*
Shoreland property runoff	3	1	2	0	1	*7*	*2.0*
Degradation of native aquatic plants	0	1	2	2	2	*7*	*3.3*
Fishing pressure	2	2	2	2	0	*8*	*2.5*
Lakeshore development	3	2	2	1	0	*8*	*2.1*
Excessive aquatic plant growth	0	0	2	1	5	*8*	*4.4*
Algae blooms	0	1	2	1	3	*7*	*3.4*
Septic system discharge	1	3	2	1	0	*7*	*2.1*
Noise pollution	4	0	3	1	0	*8*	*2.1*
Light Pollution	6	0	1	0	1	*8*	*1.8*
Other	0	0	1	0	1	*2*	*1.0*

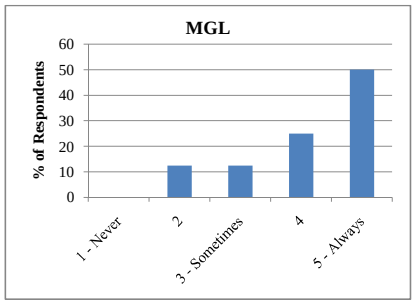
LGL

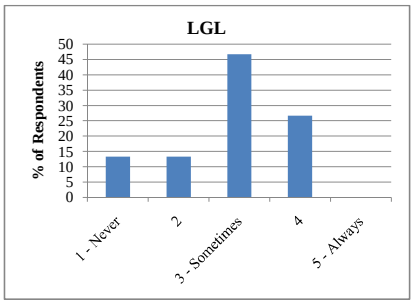
	1-No	2	3-Moderate	4	5 -Great	*Total*	*Average*
Water quality degradation/pollution	3	3	6	2	1	*15*	*2.2*
Loss of fish habitat	5	3	4	1	1	*14*	*1.9*
Shoreline erosion	3	1	7	2	1	*14*	*2.3*
Loss of shoreline vegetation	3	3	5	2	1	*14*	*2.2*
Aquatic invasive species	3	2	4	1	4	*14*	*2.4*
Boat traffic	6	5	1	2	1	*15*	*1.8*
Shoreland property runoff	3	6	2	2	2	*15*	*2.2*
Degradation of native aquatic plants	2	7	2	1	2	*14*	*2.0*
Fishing pressure	6	5	2	1	1	*15*	*1.7*
Lakeshore development	5	4	4	1	1	*15*	*1.9*
Excessive aquatic plant growth	0	2	5	5	3	*15*	*3.0*
Algae blooms	2	2	3	4	4	*15*	*2.8*
Septic system discharge	3	3	2	2	2	*12*	*1.8*
Noise pollution	5	6	2	0	1	*14*	*1.6*
Light Pollution	5	5	3	0	2	*15*	*1.9*
Other	1	0	1	0	1	*3*	*0.6*

#20 How often does aquatic plant growth impact your recreational use of the Gresham Lakes?

	UGL	%	MGL	%	LGL	%
1 - Never	4	*8.5*	0	*0.0*	2	*13.3*
2	5	*10.6*	1	*12.5*	2	*13.3*
3 - Sometimes	19	*40.4*	1	*12.5*	7	*46.7*
4	17	*36.2*	2	*25.0*	4	*26.7*
5 - Always	2	*4.3*	4	*50.0*	0	*0.0*
	47		8		15	







#21 Considering your answer to the question above, do you believe aquatic plant control is needed on the Gresham Lakes?

	UGL	%	MGL	%	LGL	%
Yes	37	*77.1*	5	*62.5*	4	*23.5*
No	4	*8.3*	0	*0.0*	4	*23.5*
Unsure	7	*14.6*	3	*37.5*	9	*52.9*
	48		8		17	

#22 What is your level of support for the responsible use of the following techniques on the Gresham Lakes?

UGL

	1-Not	2	3-Moderate	4	5 -High	Need More Info	*Total*	*Average*
Herbicide (chemical) control	1	1	9	7	18	6	*42*	*3.9*
Dredging	15	4	9	1	1	12	*42*	*2.7*
Hand-removal by divers	5	6	9	7	9	6	*42*	*3.2*
Manual removal by property owners	8	4	13	6	6	5	*42*	*2.9*
Biological control	2	0	15	6	10	9	*42*	*3.6*
Mechanical harvesting	11	4	10	5	4	7	*41*	*2.8*
Water level drawdown	28	4	2	1	2	6	*43*	*1.9*
Integrated control using many methods	1	1	9	7	15	10	*43*	*4.0*
Do nothing (do not manage plants)	36	1	2	0	0	3	*42*	*1.3*

MGL

	1-Not	2	3-Moderate	4	5 -High	Need More Info	*Total*	*Average*
Herbicide (chemical) control	0	0	1	1	6	0	*8*	*4.6*
Dredging	2	1	1	1	1	2	*8*	*3.5*
Hand-removal by divers	1	1	0	2	3	1	*8*	*4.0*
Manual removal by property owners	2	1	2	0	2	1	*8*	*3.3*
Biological control	0	0	1	1	3	3	*8*	*5.0*
Mechanical harvesting	1	1	1	0	4	1	*8*	*4.0*
Water level drawdown	6	0	0	0	0	2	*8*	*2.3*
Integrated control using many methods	0	0	2	1	2	2	*7*	*4.0*
Do nothing (do not manage plants)	6	1	0	0	0	1	*8*	*1.8*

LGL

	1-Not	2	3-Moderate	4	5 -High	Need More Info	*Total*	*Average*
Herbicide (chemical) control	3	0	1	6	3	3	*16*	*3.5*
Dredging	8	0	1	0	1	6	*16*	*2.9*
Hand-removal by divers	1	1	2	5	5	2	*16*	*3.7*
Manual removal by property owners	1	2	2	2	7	2	*16*	*3.7*
Biological control	2	1	3	0	3	6	*15*	*3.6*
Mechanical harvesting	7	1	1	2	2	3	*16*	*2.7*
Water level drawdown	8	1	1	0	0	6	*16*	*2.7*
Integrated control using many methods	1	0	2	2	5	6	*16*	*4.2*
Do nothing (do not manage plants)	5	1	3	2	1	2	*14*	*2.3*

#23 Before receiving this mailing, have you ever heard of the the Gresham LakesAssociation?

	UGL	%	MGL	%	LGL	%
Yes	47	*100.0*	8	*100.0*	16	*94.1*
No	0	*0.0*	0	*0.0*	1	*5.9*
	47		8		17	

#24 Are you currently a member of the Gresham Lakes Association?

	UGL	%	MGL	%	LGL	%
Yes	42	*91.3*	6	*75.0*	10	*62.5*
No	4	*8.7*	2	*25.0*	6	*37.5*
	46		8		16	

#25 Do you believe the Gresham Lakes Association should be responsible for monitoring the beaver dams that affect the chain's water levels?

	UGL	%	MGL	%	LGL	%
Yes	38	*90.5*	5	*71.4*	12	*85.7*
No	4	*9.5*	2	*28.6*	2	*14.3*
	42		7		14	

#26 Please circle the activities you would be willing to participate in if the opportunity arose.

	UGL	MGL	LGL
Watercraft inspections at boat landings	22	1	3
Aquatic plant monitoring	18	5	5
Writing newsletter articles	8	1	1
Attending Wisconsin Lakes Convention	4	0	3
Bulk mailing assembly	11	0	1
Water quality monitoring	11	4	6
Gresham Lakes Association Board	6	0	1
I do not wish to volunteer	12	1	8
	80	11	20

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

UGL

	1-No	2	3-Basic	4	5 -Full	*Total*	*Average*
Impacts of aquatic invasive species on the Gresham Lakes	0	5	14	10	18	*47*	*3.8*
Ways that aquatic invasive species are spread between lakes	0	3	12	11	21	*47*	*4.0*
Human impacts on lakes	0	4	17	11	15	*47*	*3.7*
Invasive species present in the Gresham Lakes	1	6	10	13	17	*47*	*3.8*
Methods of controlling aquatic invasive species	1	7	20	6	13	*47*	*3.4*
Benefits and risks of aquatic invasive species control	1	6	18	6	15	*46*	*3.5*

MGL

	1-No	2	3-Basic	4	5 -Full	*Total*	*Average*
Impacts of aquatic invasive species on the Gresham Lakes	0	0	2	1	5	*8*	*4.4*
Ways that aquatic invasive species are spread between lakes	0	0	1	1	6	*8*	*4.6*
Human impacts on lakes	0	0	2	1	5	*8*	*4.4*
Invasive species present in the Gresham Lakes	1	0	2	1	4	*8*	*3.9*
Methods of controlling aquatic invasive species	0	1	2	2	3	*8*	*3.9*
Benefits and risks of aquatic invasive species control	0	2	1	2	3	*8*	*3.8*

LGL

	1-No	2	3-Basic	4	5 -Full	*Total*	*Average*
Impacts of aquatic invasive species on the Gresham Lakes	0	2	11	3	1	*17*	*3.0*
Ways that aquatic invasive species are spread between lakes	0	2	6	8	1	*17*	*3.3*
Human impacts on lakes	0	1	8	6	2	*17*	*3.3*
Invasive species present in the Gresham Lakes	0	3	8	5	1	*17*	*3.1*
Methods of controlling aquatic invasive species	1	4	8	3	1	*17*	*2.8*
Benefits and risks of aquatic invasive species control	2	3	7	4	1	*17*	*2.8*

Survey Number	19 Comment	28 Comment	Other comments
1		Define oppose mechanical harvest weed growth	
2			
3			
4			
6	jet skis	We are grateful for the dedication of our present association officers and committee members-thank you for your time and efforts to preserve our lakes!	13--Very negative--Proposed increase on our small lake would be tragic for all--residents, fish, fowl, and milfoil spread 26--shoreline and shallow water litter cleanup (cans, etc.)
7		We need to continue to treat for eurasian milfoil and try to keep it under control. Beave dams need to be monitored and controlled by the board of directors. John and Rich are doing an excellent job!!	
8		control of lakes weather has a lot to do with it	
9		The lake levels did not vary as much prior to Beaver dams and the cranberry marsh. Current beaver dams keep water in Lower Gresham as we are the first lake that feeds into the Trout River after the cranberry marsh. We appreciate the beaver dams during the years drought. In rainy years, they may hold too much water.	4--Parents purchased in 1954. I was born in 1957. Lived here my entire life except 4 years in college & 7 years teaching in Washburn. Siblings and I now own since parents are deceased. 6h--Pontoon--have but do not use"7--Also marked f, m, and added paddleboat , ice skating, and rowing a boat. "7--Also marked f, m, and added paddleboat , ice skating, and rowing a boat.
11	water too low resorts allowing too many boats not inspected very old cottages and septic systems Indian spearing habits--I don't understand if they can or cannot	It would be nice to consider using some of the grant to pay the DNR fee of $50 to have a DNR person visit property owners and tell them how to manage their lots better.	10--only been on lake for 0.5 years 12--only been on lake for 0.5 years 13--but negative 24--How do we join 920-882-6184
12		All lake property owners are responsible for the "health" of our lakes and the "wealth" of their property--everyone should be required to pay their fair share towards the presentation of the Gresham chain. Actually the state campground should contribute also. I don't know what the answer is to "enforce" home owners to participate in funding the future our our beautiful and cherished lakes & homes. Thank you for including stamps.	9--don't know 10--don't know
13			
14			
15		If you want $100 & $20, you need to hold another informative meeting.	26--I work full time
16			
17			26--Please note in question 3 we only spend 30 days or less on the lake. Spending time working on other things besides my property doesn't make sense.
18			18--I think they are all concerns. 21--AIS yes; Natura no
19	beaver dam removal during drought years.	Since day 1 the association has been involved with managing beaver activity! During drought years! The beaver dams help keep the water levels up. During wet years the beavers were trapped to prevent flooding! The association should determine dam removal!	
20		I've only owned my property for 1.5 years. I know the lake was low last summer but I think I burned out my boat motor going through the weeds so much was there an over abundance of weeks or was the lake just so slow? Neighbors told me the beaver dam was keeping water from coming down to Lower Gresham. I'm for letting nature being left undisturbed, but can a couple of beavers affect a lake that it ruins the conditiion of the lake. I don't know, I'm not an expert. If an expert says it's ok, then I accept that. What's going on with Eurasion milfoil is it now in Middle Gresham? Is it close to or in Lower Gresham?	

Survey Number	19 Comment	28 Comment	Other comments
21			15--not sure 25--not sure 26--do not have time, possibly in future
22			
23		I'm enthusiastic about the current homeowners assoc., and its impact on managing the lakes, as well as educating property owners. The current association leadership seems to recognize that there are a number of usage patterns for the lake, with ??? owners enjoying the lakes in a number of different ways. This is a favoragle contrast to the old olds of the "gresham manifesto" which had more of a "one size fits all" flavor.	18f--concern relates to potential w/campground expansion; current traffic levels ok 18j--relates to both campground expansion and condo projects 25a--While a perfect world scenario would involve DNR executing this responsibility, I have no faith in that happening w/o a push from local property owners 26--As a part time user, it would be difficult for me to participate in the above
24	19f--boat traffic bringing milfoil to our lake		
25		We appreciate and thank all on the board for your time and effort.	10--can't answer--not enough time spent
26		When and if we were to become full time residents, we might then be more likely to volunteer on the assn.	
27			
28		We have a seasonal cabin on the east portion of middle gresham lake. We have owned the property since May 1971. Over the years, and especially iin the last ten years, there has been a tremendous proliferation of large native plants which are essentially taking over a good portion of the lake including the shoreline where our cabin is located. We are very interested in doing anything possilbe to control these native plants. We would like to work with you to help solve this problem.	
29	jet ski/water ski/tubing traffic on holiday weekends especially reduces enjoyment of sailing, kayaking, canoeing	I didn't see an opportunity regarding the negative effects of snowmobiling. In our area some years this activity tends to be distructive to the shoreline and steeper bands. One year my cabin was broken into. We're on the main trail that connects the DNR CG and Hwy 51 so we get lots of snowmobile traffic.	19d resort community--19 units 24--as Deer Path Condo Asso. 25--don't know enough regarding responsibilities of landowners vs. DNR
30			
31			
32			
33		There should be greater control of the operation of personal watercraft and water skiing. Hours of operation should be shortened. Size of motors should be limited based upon acreage of the lake.	
34		I believe that the beaver dams should be open for good flow of water to keep the creek clean of pollution free for all to travel to the 3 lake chain	11 needs more flow of water
35		Noise pollution--there is a need to control fireworks on this lake. It goes on almost all summer instead of only the 4th of July.	
36	jet skis--great impact	Jet ski use to great! Ski boat regs not monitored (no observer). Boats not registered. Too close to docks and swimmers. Need regs. To reduce ski and jet ski use hours (like Presque Isle area).	
37			
38		Past 5-8 years have seen rather dramatic increase in weeds. Don't feel we can sustain any substantial increase in activity on lake.	
39			
40		In addition to invasive species, I'm also concerned about the impacts of deforestation and the drought is having on all the area lakes and communities.	

Survey Number	19 Comment	28 Comment	Other comments
41		We applaud the initiative of the current board, and will do everything we can to support the efforts of the Gresham Lakes Association. Thanks	17b--but have been told of fish that come out of water and crawl on lake "21--We were a part of the group (4 families) that organized weeding ins 2005 and 2006. We would have continued but the owners of the boat ramp refused to allow the use of the ramp because he felt weeding the lake would kill all the fish. Our plan for weeding was develope3dand approved by the DNR." 25--We have not supported the Association in the past due to their negative response when we asked for help with the weeding program on lower gresham
42		I do not live on the lake shosre, but use upper and middle for recreation.	
43		1--Noise pollution--Disturbing fireworks noise all summer okay around the 4th of July week, but not appreciated June, July, August each year 2 Management (manual correction of height of beaver dams) of water levels in 3 lakes to accommodate safe water levels for submerged obstructions and boat house water levels/dock usage, etc. 3 Existing campground on U Gresham only ever full on Memorial Day, 4th of July weekends. Usage does not justify enlargement.	18n--noise pollution fireworks, June, July, August 21a--only on invasive aquatic plants
44			
45		We feel that as long as there is a campground, managemen is virtually impossible.	18f--boat traffic--fast speed
46			
47			
48			
49			
50		I have owned my home for 31 years and I have seen members get involved to only benefit themselves as resort owners to tell me what I can and can't do by calling the DNR. Instead of coming to me to talk about their concerns. I am sick of it. That is why I will not joy the association.	
51		In regard to Beaver dams and Lake levels; all 3 lakes should be taken into account when maintaining or destroying beaver dams.	
52	Haven't been resident long enough to have an opinion		24--we emailed several months to join but did not receive a response 25--we need more info. 26--Due to our limited presence onsite, any of these options would be difficult
53	Lily pads and large root like growth near shoreline	Middle Gresham--Our main concern are the water lilies. They have gotten so thick, one can hardly get out to the deeper part of the lake, with a row boat to fish. The water level is also very low. Beaver and muskrats are also damagin trees and shoreline.	
54			
55		50 years on Lower Gresham leeches were common. We caught an occasional walleye. We see neither of these species today	
56			
57			
58			21a--for Eurasian milfoil
59		Do not wish to have state campground extended.	
60			
61			
62			
63			
64		Everyone should contribute the $140 toward the aquatic invasive species. No free lunch Was not aware of increasing the size of campground on Upper Gresham lake. Why Upper Gresham? More campers mean more evasive species. Do they pay taxes?	

Survey Number	19 Comment	28 Comment	Other comments
65	Boat safety	Thanks so much for taking the time to care to this level for our lakes. You show great concern and care for our lakes	
66			
67			
68			
69		Noise pollution due to excessive fireworks usuage needs to be controlled phosphorus fertilizers should be banned	
70	g--fertilizer j--campground extension n--jet skis and fireworks		10--overfished 20--invasive species only 21--invasive species only 22a--invasive species only
71			
72			
73		Although my wife and I are seasonal users, we would be happy to help support the aquatic plant monitoring while at home	

C

APPENDIX C

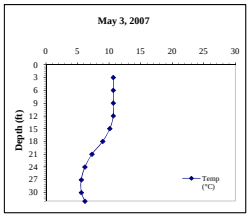
Water Quality Data

Upper Gresham

Date: 05-03-07
Time: NA
Weather: NA
Ent: BTB **Verf:**

Max Depth (ft): 32.0
UGLS Depth (ft): 3.0
UGLB Depth (ft): 30.0
Secchi Depth (ft): 10.0

Depth (ft)	Temp (°C)	Temp (°F)
3.0	10.7	49.1
6.0	10.7	49.1
9.0	10.7	49.1
12.0	10.7	49.1
15.0	10.1	48.2
18.0	9.0	46.4
21.0	7.3	43.7
24.0	6.2	41.9
27.0	5.6	41.0
30.0	5.6	41.0
32.0	6.2	41.9



Parameter	UGLS	UGLB
Total P (µg/L)	12.000	NA
Dissolved P (µg/L)	NA	NA
Chl a (µg/L)	NA	NA
TKN (µg/L	NA	NA
NO3+NO2-N (µg/L)	NA	NA
NH3-N (µg/L)	NA	NA
Total N (µg/L)	NA	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkal (mg/l CaCO3)	NA	NA
Total Susp Sol (mg/l)	NA	NA
Calcium (mg/l)	NA	NA

Data collected by Don Osborn (Upper Gresham CLMN)

Upper Gresham

Date: 06-10-07
Time: NA
Weather: NA
Ent: BTB **Verf:**

Max Depth (ft): NA
UGLS Depth (ft): NA
UGLB Depth (ft): NA
Secchi Depth (ft): 8.0

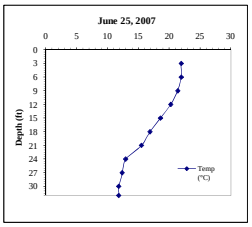
Data collected by Don Osborn (Upper Gresham CLMN)

Upper Gresham

Date: 06-25-07
Time: NA
Weather: NA
Ent: BTB **Verf:**

Max Depth (ft): 32.0
UGLS Depth (ft): 3.0
UGLB Depth (ft): 32.0
Secchi Depth (ft): 12.0

Depth (ft)	Temp (°C)	Temp (°F)
3.0	21.9	67.1
6.0	21.9	67.1
9.0	21.4	66.2
12.0	20.3	64.4
15.0	18.6	61.7
18.0	16.9	59.0
21.0	15.5	56.8
24.0	12.9	52.7
27.0	12.4	51.8
30.0	11.8	50.9
32.0	11.8	50.9



Parameter	UGLS	UGLB
Total P (µg/L)	11.00	NA
Dissolved P (µg/L)	ND	NA
Chl a (µg/L)	4.01	NA
TKN (µg/L	250.00	NA
NO3+NO2-N (µg/L)	ND	NA
NH3-N (µg/L)	ND	NA
Total N (µg/L)	250.00	NA
Lab Cond. (µS/cm)	125	NA
Lab pH	8.01	NA
Alkal (mg/l CaCO3)	45	NA
Total Susp Sol (mg/l)	ND	NA
Calcium (mg/l)	14.0	NA

Data collected by Don Osborn & Robert Ehmke (UG CLMN)

Upper Gresham

Date: 07-14-07
Time: NA
Weather: NA
Ent: BTB **Verf:**

Max Depth (ft): NA
UGLS Depth (ft): NA
UGLB Depth (ft): NA
Secchi Depth (ft): 11.0

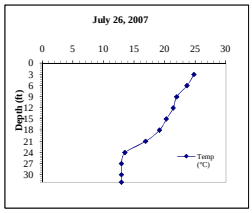
Data collected by Don Osborn (Upper Gresham CLMN)

Upper Gresham

Date: 07-26-07
Time: NA
Weather: NA
Ent: BTB **Verf:**

Max Depth (ft): 32.0
UGLS Depth (ft): 3.0
UGLB Depth (ft): 32.0
Secchi Depth (ft): 10.5

Depth (ft)	Temp (°C)	Temp (°F)
3.0	24.8	71.6
6.0	23.6	69.8
9.0	21.9	67.1
12.0	21.4	66.2
15.0	20.3	64.4
18.0	19.1	62.6
21.0	16.9	59.0
24.0	13.5	53.6
27.0	12.9	52.7
30.0	12.9	52.7
32.0	12.9	52.7



Parameter	UGLS	UGLB
Total P (µg/L)	15.000	NA
Dissolved P (µg/L)	10.000	NA
Chl a (µg/L)	3.10	NA
TKN (µg/L	350.00	NA
NO3+NO2-N (µg/L)	ND	NA
NH3-N (µg/L)	ND	NA
Total N (µg/L)	350.00	NA
Lab Cond. (µS/cm)	126	NA
Lab pH	8.11	NA
Alkal (mg/l CaCO3)	45	NA
Total Susp Sol (mg/l)	ND	NA
Calcium (mg/l)	NA	NA

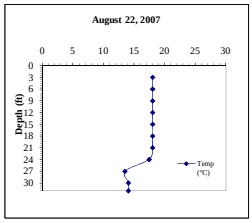
Data collected by Don Osborn (Upper Gresham CLMN)

Upper Gresham

Date: 08-22-07
Time: NA
Weather: NA
Ent: BTB **Verf:**

Max Depth (ft): 32.0
UGLS Depth (ft): 3.0
UGLB Depth (ft): 32.0
Secchi Depth (ft): 6.5

Depth (ft)	Temp (°C)	Temp (°F)
3.0	18.0	60.8
6.0	18.0	60.8
9.0	18.0	60.8
12.0	18.0	60.8
15.0	18.0	60.8
18.0	18.0	60.8
21.0	18.0	60.8
24.0	17.4	59.9
27.0	13.5	53.6
30.0	14.1	54.5
32.0	14.1	54.5



Parameter	UGLS	UGLB
Total P (µg/L)	28.000	NA
Dissolved P (µg/L)	NA	NA
Chl a (µg/L)	10.20	NA
TKN (µg/L	530.00	NA
NO3+NO2-N (µg/L)	ND	NA
NH3-N (µg/L)	55.000	NA
Total N (µg/L)	530.00	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkal (mg/l CaCO3)	NA	NA
Total Susp Sol (mg/l)	3	NA
Calcium (mg/l)	NA	NA

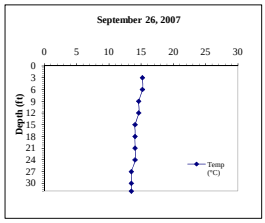
Data collected by Don Osborn (Upper Gresham CLMN)

Upper Gresham

Date: 09-26-07
Time: NA
Weather: NA
Ent: BTB **Verf:**

Max Depth (ft): 32.0
UGLS Depth (ft): 3.0
UGLB Depth (ft): 32.0
Secchi Depth (ft): 7.5

Depth (ft)	Temp (°C)	Temp (°F)
3.0	15.2	56.3
6.0	15.2	56.3
9.0	14.6	55.4
12.0	14.6	55.4
15.0	14.1	54.5
18.0	14.1	54.5
21.0	14.1	54.5
24.0	14.1	54.5
27.0	13.5	53.6
30.0	13.5	53.6
32.0	13.5	53.6



Parameter	UGLS	UGLB
Total P (µg/L)	NA	NA
Dissolved P (µg/L)	NA	NA
Chl a (µg/L)	NA	NA
TKN (µg/L	NA	NA
NO3+NO2-N (µg/L)	NA	NA
NH3-N (µg/L)	NA	NA
Total N (µg/L)	NA	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkal (mg/l CaCO3)	NA	NA
Total Susp Sol (mg/l)	NA	NA
Calcium (mg/l)	NA	NA

Data collected by Don Osborn (Upper Gresham CLMN)

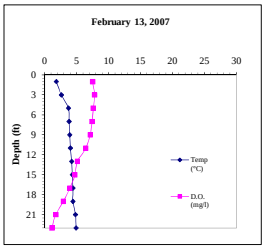
Upper Gresham

Date: 02-13-08
Time:
Weather: 100% clouds, -10 °F
Ent: BTB **Verf:**

Max Depth (ft): 23.5
UGLS Depth (ft): 3.0
UGLB Depth (ft):
Secchi Depth (ft): 11.2

NOTE: DO may be higher than indicated

Depth (ft)	Temp (°C)	D.O. (mg/l)	pH	Sp. Cond (µS/cm)
1.0	1.8	7.5		
3.0	2.6	7.8		
5.0	3.7	7.6		
7.0	3.8	7.4		
9.0	3.9	7.1		
11.0	4.0	6.4		
13.0	4.2	5.1		
15.0	4.3	4.7		
17.0	4.4	3.9		
19.0	4.4	2.9		
21.0	4.8	1.7		
23.0	4.9	1.1		



Parameter	UGLS	UGLB
Total P (µg/L)	20.000	NA
Dissolved P (µg/L)	6.000	NA
Chl a (µg/L)	NA	NA
TKN (µg/L	ND	NA
NO3+NO2-N (µg/L)	142.000	NA
NH3-N (µg/L)	ND	NA
Total N (µg/L)	142.00	NA
Lab Cond. (µS/cm)	135	NA
Lab pH	6.60	NA
Alkal (mg/l CaCO3)	NA	NA
Total Susp Sol (mg/l)	ND	NA
Calcium (mg/l)	NA	NA

Data collected by TAH and EJH. Ice - 1.5 ft. NOTE - Hydrolab was malfunctioning, DO may be incorrect.

Water Quality Data

2007	Surface		Bottom	
Parameter	Count	Mean	Count	Mean
Secchi Depth (feet)	7	9.4	NA	NA
Total P (µg/L)	5	17.200	NA	NA
Dissolved P (µg/L)	2	8.000	NA	NA
Chl a (µg/L)	3	5.770	NA	NA
TKN (µg/L	3	376.667	NA	NA
NO3+NO2-N (µg/L)	1	142.000	NA	NA
NH3-N (µg/L)	1	55.000	NA	NA
Total N (µg/L)	4	318.000	NA	NA
Lab Cond. (µS/cm)	3	128.667	NA	NA
Lab pH	3	7.573	NA	NA
Alkal (mg/l CaCO3)	2	45.100	NA	NA
Total Susp Sol (mg/l)	1	3.000	NA	NA
Calcium (µg/L)	1	14.000	NA	NA

Wisconsin Trophic State Index (WTSI)

Year	TP	Chla	SD
1984		49.36	45.68
1985			
1990			
1991			43.37
1992			40.86
1994			43.40
1997			44.48
1998			42.72
1999			43.40
2000	49.88	45.82	41.82
2001	50.03	45.88	43.40
2002	49.63	45.51	41.87
2003	50.34	46.37	43.23
2004	49.96	46.33	43.49
2005	49.04	46.89	42.67
2006	53.34	52.15	48.08
2007	49.72	47.91	44.48
All Years Weighted	50.11	47.10	43.20
WI Natural Lakes	53.19	54.23	47.33
Northeast Region	51.05	51.49	45.61

Morphological / Geographical Data

Parameter	Value
Acreage	366
Volume (acre-feet)	4870
Perimeter (miles)	5.79
Shoreland Development	
Maximum Depth (feet)	32
County	Vilas County
WBIC	2330800
Lillie Mason Region(1983)	Northeast Region
Nichols Ecoregion(1999)	NLFL

Watershed Data

WiLMS Class	Acreage	kg/yr	lbs/yr
Forest	1287.0	47.0	21.4
Open Water	366.0	44.0	20.0
Pasture/Grass	70.0	3.0	1.4
Row Crops	0.0	0.0	0.0
Urban - Rural Residential	0.0	0.0	0.0
Wetland	135.0	5.0	2.3

Watershed to Lake Area 4:1

	Secchi (feet)				Chlorophyll a (µg/L)				Phosphorus (µg/L)				Phosphorus (µg/L)				Nitrogen (µg/L)			
	Growing Season		Summer		Growing Season		Summer		Growing Season		Summer		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
1984	1.00	8.86	1.00	8.86	1	7	1	7												
1985	1.00	7.87							1		17									
1990	2.00	8.75																		
1991	6.00	9.83	5.00	10.40																
1992	3.00	11.75	2.00	12.38																
1994	4.00	10.13	2.00	10.38																
1997	2.00	9.63	2.00	9.63																
1998	7.00	10.43	4.00	10.88																
1999	5.00	10.50	4.00	10.38																
2000	10.00	11.85	6.00	11.58	4.00	4.53	3.00	4.37	5.00	17.20	3.00	16.33								
2001	7.00	10.07	4.00	10.38	4.00	4.55	3.00	4.40	5.00	16.20	3.00	16.67								
2002	9.00	10.97	7.00	11.54	6.00	6.31	5.00	4.19	9.00	17.44	6.00	15.83								
2003	5.00	10.30	3.00	10.50	4.00	6.08	3.00	4.70	5.00	17.80	3.00	17.33								
2004	7.00	10.25	4.00	10.31	5.00	4.87	4.00	4.67	7.00	18.14	4.00	16.50								
2005	5.00	10.15	3.00	10.92	4.00	7.26	3.00	5.04	5.00	17.20	3.00	14.67								
2006	5.00	7.80	2.00	7.50	3.00	10.03	2.00	10.16	4.00	23.00	2.00	25.50								
2007	10.00	9.45	8.00	9.63	3.00	5.77	3.00	5.77	5.00	15.20	4.00	16.00	1	12	0	NA	0	NA	0	NA
All Years (weighted)		10.2		10.5		6.1		5.2		17.6		16.8								
WI Natural Lakes				7.9				13.4				25								
Northeast Region				8.9				9.3				19.0								

Middle Gresham

Date: 04-23-07
Time: NA
Weather: NA
Ent: BTB **Verf:**

Max Depth (ft): NA
MGLS Depth (ft): 6.0
MGLB Depth (ft): NA
Secchi Depth (ft): NA

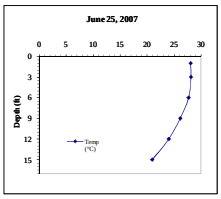
Parameter	MGLS	MGLB
Total P (µg/L)	21.000	NA
Dissolved P (µg/L)	NA	NA
Chl a (µg/L)	5.31	NA
TKN (µg/L	NA	NA
NO3+NO2-N (µg/L)	NA	NA
NH3-N (µg/L)	NA	NA
Total N (µg/L)	NA	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkal (mg/l CaCO3)	NA	NA
Total Susp Sol (mg/l)	NA	NA
Calcium (mg/l)	NA	NA

Data collected by Charlie Spencer (Middle Gresham CLMN)

Date: 06-25-07
Time: NA
Weather: NA
Ent: BTB **Verf:**

Max Depth (ft): 15.0
MGLS Depth (ft): 3.0
MGLB Depth (ft): 15.0
Secchi Depth (ft): 8.8

Depth (ft)	Temp (°C)	Temp (°F)
1.0	28.1	77
3.0	28.2	77.1
6.0	27.8	76.4
9.0	26.2	73.9
12.0	24.1	70.5
15.0	21.0	65.6



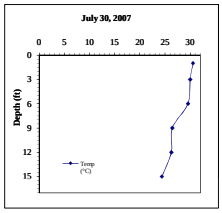
Parameter	MGLS	MGLB
Total P (µg/L)	14.000	NA
Dissolved P (µg/L)	ND	NA
Chl a (µg/L)	5.05	NA
TKN (µg/L	400.00	NA
NO3+NO2-N (µg/L)	**	NA
NH3-N (µg/L)	ND	NA
Total N (µg/L)	400.00	NA
Lab Cond. (µS/cm)	110	NA
Lab pH	8.07	NA
Alkal (mg/l CaCO3)	39	NA
Total Susp Sol (mg/l)	ND	NA
Calcium (mg/l)	12.1	NA

Data collected by Charlie Spencer & Robert Ehmke (MGL CLMN)

Date: 07-30-07
Time: NA
Weather: NA
Ent: BTB **Verf:**

Max Depth (ft): 15.0
MGLS Depth (ft): 3.0
MGLB Depth (ft): 15.0
Secchi Depth (ft): 9.3

Depth (ft)	Temp (°C)	Temp (°F)
1.0	30.6	80.9
3.0	30.0	80
6.0	29.6	79.3
9.0	26.4	74.3
12.0	26.3	74.0
15.0	24.4	71.0



Parameter	MGLS	MGLB
Total P (µg/L)	13.00	NA
Dissolved P (µg/L)	ND	NA
Chl a (µg/L)	2.40	NA
TKN (µg/L	610.00	NA
NO3+NO2-N (µg/L)	ND	NA
NH3-N (µg/L)	ND	NA
Total N (µg/L)	610.00	NA
Lab Cond. (µS/cm)	114	NA
Lab pH	7.97	NA
Alkal (mg/l CaCO3)	40	NA
Total Susp Sol (mg/l)	2	NA
Calcium (mg/l)	NA	NA

Data collected by Charlie Spencer & Robert Ehmke (MGL CLMN)

Date: 10-26-06
Time: 9/4/2007
Weather: NA
Ent: BTB **Verf:**

Max Depth (ft): NA
MGLS Depth (ft): NA
MGLB Depth (ft): NA
Secchi Depth (ft): 10.0

Parameter	MGLS	MGLB
Total P (µg/L)	22.000	NA
Dissolved P (µg/L)	NA	NA
Chl a (µg/L)	4.88	NA
TKN (µg/L	720.00	NA
NO3+NO2-N (µg/L)	ND	NA
NH3-N (µg/L)	ND	NA
Total N (µg/L)	720.00	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkal (mg/l CaCO3)	NA	NA
Total Susp Sol (mg/l)	ND	NA
Calcium (mg/l)	NA	NA

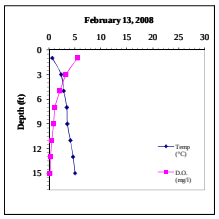
Data collectors unkown

Middle Gresham Lake

Date: 02-13-08
Time:
Weather: 30 % Sun, -10 °F
Ent: BTB **Verf:**

Max Depth (ft): 17.4
MGLS Depth (ft): 3.0
MGLB Depth (ft): 15.0
Secchi Depth (ft): 6.0

Depth (ft)	Temp (°C)	D.O. (mg/l)	pH	Sp. Cond (µS/cm)
1.0	0.6	5.5	7.0	144
3.0	2.3	3.3	6.6	138
5.0	2.8	2.1	6.4	137
7.0	3.4	1.1	6.3	136
9.0	3.5	0.9	6.3	136
11.0	4.1	0.5	6.3	147
13.0	4.6	0.3	6.4	156
15.0	5.0	0.2	6.6	216



Parameter	MGLS	MGLB
Total P (µg/L)	16.000	NA
Dissolved P (µg/L)	4.000	NA
Chl a (µg/L)	NA	NA
TKN (µg/L	380.00	NA
NO3+NO2-N (µg/L)	ND	NA
NH3-N (µg/L)	289.000	NA
Total N (µg/L)	380.00	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkal (mg/l CaCO3)	NA	NA
Total Susp Sol (mg/l)	ND	NA
Calcium (mg/l)	NA	NA

Data collected by TAH and EJH.
Ice - 1.4 ft.
Hydrolab malfunctioning, DO is suspect.

Water Quality Data

2007	Surface		Bottom	
Parameter	Count	Mean	Count	Mean
Secchi Depth (feet)	4	8.5	NA	NA
Total P (µg/L)	5	17.2	NA	NA
Dissolved P (µg/L)	1	4.0	NA	NA
Chl a (µg/L)	4	4.4	NA	NA
TKN (µg/L	4	527.5	NA	NA
NO3+NO2-N (µg/L)	4	ND	NA	NA
NH3-N (µg/L)	4	289.0	NA	NA
Total N (µg/L)	4	527.5	NA	NA
Lab Cond. (µS/cm)	2	112.0	NA	NA
Lab pH	2	8.0	NA	NA
Alkal (mg/l CaCO3)	2	39.6	NA	NA
Total Susp Sol (mg/l)	1	2.0	NA	NA
Calcium (µg/L)	1	12.1	NA	NA

Wisconsin Trophic State Index (WTSI)

Year	TP	Chla	SD
1985			
2000			44.75
2006			47.15
2007	48.39	44.63	45.45
All Years (weighted)	48.39	44.63	45.67
WI Natural Lakes	53.19	54.23	47.33
Northeast Region	51.05	51.49	45.61

Morphological / Geographical Data

Parameter	Value
Acreage	53
Volume (acre-feet)	450.5
Perimeter (miles)	
Shoreland Development	
Maximum Depth (feet)	17
County	Vilas County
WBIC	2330700
Lillie Mason Region(1983)	Northeast Region
Nichols Ecoregion(1999)	NLFL

Watershed Data

WiLMS Class	Acreage	kg/yr	lbs/yr
Forest	424.0	15	6.8
Open Water	53.0	6	2.7
Upstream Lakes	366.0	32.1	14.6
Pasture/Grass	35.0	4	1.8
Row Crops	0.0	0	0.0
Urban - Rural Residential	0.0	0	0.0
Wetland	168.0	7	3.2

Watershed to Lake Area 48 :1

	Secchi (feet)				Chlorophyll a (µg/L)				phorus (µg/L)				Phosphorus (µg/L)				Nitrogen (µg/L)			
	Growing Season		Summer		Growing Season		Summer		Growing Season		Summer		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
1985	1	6.89							1	28										
2000	1	9.45	1	9.45																
2006	3	8.00	1	8.00																
2007	4	9.50	2	9.00	4	4.41	2	3.73	4	17.5	3	13.50	1	21.0	1	22.0	0	NA	1	720.0
All Years (weighted)		8.7		8.9				3.7		19.6		13.5								
WI Natural Lakes				7.9				13.4				25								
Northeast Region				8.9				9.3				19								

Summer 2007 N: 505
Summmer 2007 P: 13.5

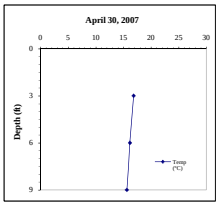
Summer 2007 N:P 37 :1

Lower Gresham

Date: 04-30-07
Time: NA
Weather: NA
Ent: BTB **Verf:**

Max Depth (ft): 9.0
LGLS Depth (ft): 3.0
LGLB Depth (ft): 9.0
Secchi Depth (ft): 6.5

Depth (ft)	Temp (°C)	Temp (°F)
3.0	16.9	59.0
6.0	16.2	57.9
9.0	15.6	57.0



Parameter	LGLS	LGLB
Total P (µg/L)	NA	NA
Dissolved P (µg/L)	NA	NA
Chl a (µg/L)	NA	NA
TKN (µg/L	NA	NA
NO3+NO2-N (µg/L)	NA	NA
NH3-N (µg/L)	NA	NA
Total N (µg/L)	NA	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkal (mg/l CaCO3)	NA	NA
Total Susp Sol (mg/l)	NA	NA
Calcium (mg/l)	NA	NA

Data collected by Robert Ehmke (Lower Gresham CLMN)

Lower Gresham

Date: 05-01-07
Time: NA
Weather: NA
Ent: BTB **Verf:**

Max Depth (ft): NA
LGLS Depth (ft): NA
LGLB Depth (ft): NA
Secchi Depth (ft): NA

Parameter	LGLS	LGLB
Total P (µg/L)	19.000	NA
Dissolved P (µg/L)	NA	NA
Chl a (µg/L)	**	NA
TKN (µg/L	NA	NA
NO3+NO2-N (µg/L)	NA	NA
NH3-N (µg/L)	NA	NA
Total N (µg/L)	NA	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkal (mg/l CaCO3)	NA	NA
Total Susp Sol (mg/l)	NA	NA
Calcium (mg/l)	NA	NA

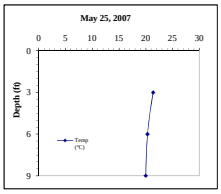
Data collected by Robert Ehmke (Lower Gresham CLMN)

Lower Gresham

Date: 05-25-07
Time: NA
Weather: NA
Ent: BTB **Verf:**

Max Depth (ft): 9.0
LGLS Depth (ft): 3.0
LGLB Depth (ft): 9.0
Secchi Depth (ft): 8.0

Depth (ft)	Temp (°C)	Temp (°F)
3.0	21.4	66.2
6.0	20.3	64.5
9.0	20.0	64.0



Parameter	LGLS	LGLB
Total P (µg/L)	NA	NA
Dissolved P (µg/L)	NA	NA
Chl a (µg/L)	NA	NA
TKN (µg/L	NA	NA
NO3+NO2-N (µg/L)	NA	NA
NH3-N (µg/L)	NA	NA
Total N (µg/L)	NA	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkal (mg/l CaCO3)	NA	NA
Total Susp Sol (mg/l)	NA	NA
Calcium (mg/l)	NA	NA

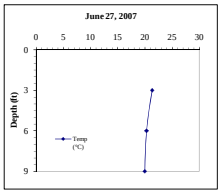
Data collected by Robert Ehmke (Lower Gresham CLMN)

Lower Gresham

Date: 06-27-07
Time: NA
Weather: NA
Ent: BTB **Verf:**

Max Depth (ft): 9.0
LGLS Depth (ft): 3.0
LGLB Depth (ft): 9.0
Secchi Depth (ft): 6.0

Depth (ft)	Temp (°C)	Temp (°F)
3.0	21.4	66.2
6.0	20.3	64.5
9.0	20.0	64.0



Parameter	LGLS	LGLB
Total P (µg/L)	17.000	NA
Dissolved P (µg/L)	ND	NA
Chl a (µg/L)	5.73	NA
TKN (µg/L	590.00	NA
NO3+NO2-N (µg/L)	ND	NA
NH3-N (µg/L)	ND	NA
Total N (µg/L)	590.00	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkal (mg/l CaCO3)	NA	NA
Total Susp Sol (mg/l)	2	NA
Calcium (mg/l)	NA	NA

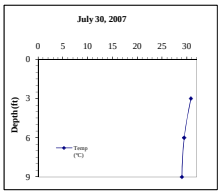
Data collected by Robert Ehmke (Lower Gresham CLMN)

Lower Gresham

Date: 07-30-07
Time: NA
Weather: NA
Ent: BTB **Verf:**

Max Depth (ft): 9.0
LGLS Depth (ft): 3.0
LGLB Depth (ft): 9.0
Secchi Depth (ft): 6.5

Depth (ft)	Temp (°C)	Temp (°F)
3.0	30.8	81.3
6.0	29.4	79.1
9.0	29.0	78.4



Parameter	LGLS	LGLB
Total P (µg/L)	23.000	NA
Dissolved P (µg/L)	3.000	NA
Chl a (µg/L)	8.05	NA
TKN (µg/L	670.00	NA
NO3+NO2-N (µg/L)	ND	NA
NH3-N (µg/L)	ND	NA
Total N (µg/L)	670.00	NA
Lab Cond. (µS/cm)	96	NA
Lab pH	8.83	NA
Alkal (mg/l CaCO3)	35	NA
Total Susp Sol (mg/l)	3	NA
Calcium (mg/l)	NA	NA

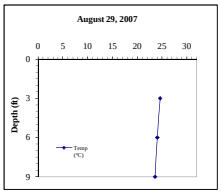
Data collected by Robert Ehmke (Lower Gresham CLMN)

Lower Gresham

Date: 08-29-07
Time: NA
Weather: NA
Ent: BTB **Verf:**

Max Depth (ft): 9.0
LGLS Depth (ft): 3.0
LGLB Depth (ft): 9.0
Secchi Depth (ft): 7.5

Depth (ft)	Temp (°C)	Temp (°F)
3.0	24.6	71.4
6.0	24.1	70.5
9.0	23.6	69.8



Parameter	LGLS	LGLB
Total P (µg/L)	25.000	NA
Dissolved P (µg/L)	**	NA
Chl a (µg/L)	9.310	NA
TKN (µg/L	690.000	NA
NO3+NO2-N (µg/L)	ND	NA
NH3-N (µg/L)	ND	NA
Total N (µg/L)	690.000	NA
Lab Cond. (µS/cm)	100.000	NA
Lab pH	8.060	NA
Alkal (mg/l CaCO3)	36.000	NA
Total Susp Sol (mg/l)	ND	NA
Calcium (mg/l)	NA	NA

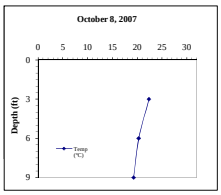
Data collected by Robert Ehmke (Lower Gresham CLMN)

Lower Gresham

Date: 10-08-07
Time: NA
Weather: NA
Ent: BTB **Verf:**

Max Depth (ft): 9.0
LGLS Depth (ft): 3.0
LGLB Depth (ft): 9.0
Secchi Depth (ft): 8.0

Depth (ft)	Temp (°C)	Temp (°F)
3.0	22.4	67.8
6.0	20.3	64.5
9.0	19.3	62.9



Parameter	LGLS	LGLB
Total P (µg/L)	NA	NA
Dissolved P (µg/L)	NA	NA
Chl a (µg/L)	NA	NA
TKN (µg/L	NA	NA
NO3+NO2-N (µg/L)	NA	NA
NH3-N (µg/L)	NA	NA
Total N (µg/L)	NA	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkal (mg/l CaCO3)	NA	NA
Total Susp Sol (mg/l)	NA	NA
Calcium (mg/l)	NA	NA

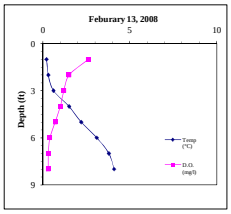
Data collected by Robert Ehmke (Lower Gresham CLMN)

Lower Gresham Lake

Date: 02-13-08
Time:
Weather: Full sun, -10°F
Ent: BTB **Verf:**

Max Depth (ft): 9.0
LGLS Depth (ft): 3.0
LGLB Depth (ft): 8.0
Secchi Depth (ft): 5.5

Depth (ft)	Temp (°C)	D.O. (mg/l)	pH	Sp. Cond (µS/cm)
1.0	0.2	2.6	7.0	145
2.0	0.3	1.5	6.7	144
3.0	0.6	1.2	6.6	143
4.0	1.5	1.0	6.5	140
5.0	2.2	0.7	6.5	137
6.0	3.1	0.4	6.4	136
7.0	3.8	0.3	6.4	139
8.0	4.1	0.3	6.5	143



Parameter	LGLS	LGLB
Total P (µg/L)	17.000	NA
Dissolved P (µg/L)	5.000	NA
Chl a (µg/L)	NA	NA
TKN (µg/L	300.00	NA
NO3+NO2-N (µg/L)	ND	NA
NH3-N (µg/L)	226.000	NA
Total N (µg/L)	300.00	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkal (mg/l CaCO3)	NA	NA
Total Susp Sol (mg/l)	ND	NA
Calcium (mg/l)	NA	NA

Data collected by TAH and EJH (Onterra)
NOTE: DO may be higher than indicated

Water Quality Data

2007/2008	Surface		Bottom	
Parameter	Count	Mean	Count	Mean
Secchi Depth (feet)	7	6.9	NA	NA
Total P (µg/L)	5	20.2	NA	NA
Dissolved P (µg/L)	2	4.0	NA	NA
Chl a (µg/L)	3	7.7	NA	NA
TKN (µg/L	4	562.5	NA	NA
NO3+NO2-N (µg/L)	4	ND	NA	NA
NH3-N (µg/L)	4	226.0	NA	NA
Total N (µg/L)	4	562.5	NA	NA
Lab Cond. (µS/cm)	2	98.0	NA	NA
Lab pH	2	8.4	NA	NA
Alkal (mg/l CaCO3)	2	35.4	NA	NA
Total Susp Sol (mg/l)	2	2.5	NA	NA
Calcium (µg/L)	NA	MA	NA	NA

Wisconsin Trophic State Index (WTSI)

Year	TP	Chla	SD
1979	48.68	46.92	46.27
1997			42.75
1998			44.58
2000			42.57
2006			
2007	53.34	50.07	49.77
All Years (weighted)	52.08	49.40	44.78
WI Natural Lakes	53.19	54.23	47.33
Northeast Region	51.05	51.49	45.61

Morphological / Geographical Data

Parameter	Value
Acreage	149
Volume (acre-feet)	894
Perimeter (miles)	
Shoreland Development	
Maximum Depth (feet)	12
County	Vilas County
WBIC	2330300
Lillie Mason Region(1983)	Northeast Region
Nichols Ecoregion(1999)	NLFL

Watershed Data

WiLMS Class	Acreage	kg/yr	lbs/yr
Forest	1019.0	37	16.8
Open Water	149.0	18	8.2
Upstream Lakes	95.0	60.5	27.5
Pasture/Grass	40.0	5	2.3
Row Crops	0.0	0	0.0
Urban - Rural Residential	0.0	0	0.0
Wetland	289.0	12	5.5

Watershed to Lake Area	27	:1

	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
1979	1	8.50	1	8.50	1	5.06	1	5.06	1	14.00	1	14.00								
1997	7	11.00	5	10.85																
1998	6	9.83	4	9.56																
2000	1	10.99	1	10.99																
2006	2	8.25	0																	
2007	6	7.08	3	6.67	3	7.70	3	7.70	4	27.75	2	25.50	1	37.0	0	NA	0	NA	0	NA
All Years (weighted)		9.3		9.4		7.0		7.0		25.00		21.7								
WI Natural Lakes				7.9				13.4				25.0								
Northeast Region				8.9				9.3				19.0								

D

APPENDIX D

Watershed Analysis WiLMS Results

Date: 4/4/2008 Scenario: Upper Gresham Lake Current

Lake Id: Upper Gresham
Watershed Id: UGL

Hydrologic and Morphometric Data

Tributary Drainage Area: 1492.0 acre
Total Unit Runoff: 14.00 in.
Annual Runoff Volume: 1740.7 acre-ft
Lake Surface Area <As>: 366.0 acre
Lake Volume <V>: 4870.0 acre-ft
Lake Mean Depth <z>: 13.3 ft
Precipitation - Evaporation: 5.5 in.
Hydraulic Loading: 1908.4 acre-ft/year
Areal Water Load <qs>: 5.2 ft/year
Lake Flushing Rate <p>: 0.39 1/year
Water Residence Time: 2.55 year
Observed spring overturn total phosphorus (SPO): 12.0 mg/m^3
Observed growing season mean phosphorus (GSM): 16.5 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	70.0	0.10	0.30	0.50	8.1	3	8	14
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	135.0	0.10	0.10	0.10	5.2	5	5	5
Forest	1287.0	0.05	0.09	0.18	44.5	26	47	94
Lake Surface	366.0	0.10	0.30	1.00	42.2	15	44	148

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)	0.30	0.50	0.80	
# capita-years	0.0			
% Phosphorus Retained by Soil	98.0	90.0	80.0	
Septic Tank Loading (kg/year)	0.00	0.00	0.00	0.0

TOTALS DATA

Description	Low	Most Likely	High	Loading %
Total Loading (lb)	108.4	232.1	576.5	100.0
Total Loading (kg)	49.2	105.3	261.5	100.0
Areal Loading (lb/ac-year)	0.30	0.63	1.58	
Areal Loading (mg/m^2-year)	33.18	71.08	176.55	
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)	75.7	134.1	250.0	100.0
Total NPS Loading (kg)	34.3	60.8	113.4	100.0

Phosphorus Prediction and Uncertainty Analysis Module

Date: 4/4/2008 Scenario: 1
Observed spring overturn total phosphorus (SPO): 12.0 mg/m^3
Observed growing season mean phosphorus (GSM): 16.5 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	10	22	55	6	36
Canfield-Bachmann, 1981 Natural Lake	10	18	33	2	12
Canfield-Bachmann, 1981 Artificial Lake	10	17	30	1	6
Rechow, 1979 General	2	5	13	-12	-73
Rechow, 1977 Anoxic	13	29	71	13	79
Rechow, 1977 water load<50m/year	5	10	26	-7	-42
Rechow, 1977 water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977 General	9	20	49	8	67
Vollenweider, 1982 Combined OECD	9	16	34	2	14
Dillon-Rigler-Kirchner	5	11	27	-1	-8
Vollenweider, 1982 Shallow Lake/Res.	6	12	28	-2	-14
Larsen-Mercier, 1976	8	17	43	5	42
Nurnberg, 1984 Oxic	5	10	26	-7	-42

Lake Phosphorus Model	Confidence Lower	Confidence Upper	Parameter Fit?	Back Model

Calculation	Type	Bound (kg/year)	Bound (kg/year)	
Walker, 1987	Reservoir	12	44	Tw
0	GSM			
Canfield-Bachmann, 1981	Natural Lake	6	52	FIT
1	GSM			
Canfield-Bachmann, 1981	Artificial Lake	5	49	FIT
1	GSM			
Rechow, 1979	General	3	10	FIT
0	GSM			
Rechow, 1977	Anoxic	17	56	FIT
0	GSM			
Rechow, 1977	water load<50m/year	6	21	FIT
0	GSM			
Rechow, 1977	water load>50m/year	N/A	N/A	N/A
N/A	N/A			
Walker, 1977	General	10	41	FIT
0	SPO			
Vollenweider, 1982	Combined OECD	8	31	FIT
0	ANN			
Dillon-Rigler-Kirchner		6	21	L
0	SPO			
Vollenweider, 1982	Shallow Lake/Res.	6	24	FIT
0	ANN			
Larsen-Mercier, 1976		10	34	P Pin
0	SPO			
Nurnberg, 1984	Oxic	5	21	FIT
0	ANN			

Water and Nutrient Outflow Module

Date: 4/4/2008 Scenario: 1
Average Annual Surface Total Phosphorus: 14.3mg/m^3
Annual Discharge: 1.91E+003 AF => 2.35E+006 m^3
Annual Outflow Loading: 70.8 LB => 32.1 kg

Date: 4/4/2008 Scenario: Middle Gresham Lake Current

Lake Id: Middle Gresham
Watershed Id: MGL

Hydrologic and Morphometric Data

Tributary Drainage Area: 627.0 acre
Total Unit Runoff: 14.00 in.
Annual Runoff Volume: 731.5 acre-ft
Lake Surface Area <As>: 53.0 acre
Lake Volume <V>: 424.0 acre-ft
Lake Mean Depth <z>: 8.0 ft
Precipitation - Evaporation: 5.5 in.
Hydraulic Loading: 2661.0 acre-ft/year
Areal Water Load <qs>: 50.2 ft/year
Lake Flushing Rate <p>: 6.28 1/year
Water Residence Time: 0.16 year
Observed spring overturn total phosphorus (SPO): 21 mg/m^3
Observed growing season mean phosphorus (GSM): 17.5 mg/m^3
% NPS Change: 0%
% PS Change: 0%

NON-POINT SOURCE DATA

Land Use	Acre (ac)	Low	Most Likely	High	Loading %	Low	Most Likely	High
		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	35.0	0.10	0.30	0.50	6.5	1	4	7
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	168.0	0.10	0.10	0.10	10.5	7	7	7
Forest	424.0	0.05	0.09	0.18	23.7	9	15	31
Lake Surface	53.0	0.10	0.30	1.00	9.9	2	6	21

POINT SOURCE DATA

Point Sources	Water Load (m^3/year)	Low (kg/year)	Most Likely (kg/year)	High (kg/year)	Loading %
UGL_Outlet	2350000	0.0	32.1	0.0	49.4

SEPTIC TANK DATA

Description	Low	Most Likely	High
Septic Tank Output (kg/capita-year)	0.30	0.50	0.80
# capita-years	0.0		
% Phosphorus Retained by Soil	98.0	90.0	80.0

Septic Tank Loading (kg/year) 0.00 0.00 0.00
0.0

TOTALS DATA

Description	Low	Most Likely	High	Loading %
Total Loading (lb)	41.8	143.4	146.0	100.0
Total Loading (kg)	18.9	65.0	66.2	100.0
Areal Loading (lb/ac-year)	0.79	2.70	2.75	
Areal Loading (mg/m^2-year)	88.31	303.18	308.73	
Total PS Loading (lb)	0.0	70.8	0.0	49.4
Total PS Loading (kg)	0.0	32.1	0.0	49.4
Total NPS Loading (lb)	37.0	58.4	98.7	50.6
Total NPS Loading (kg)	16.8	26.5	44.8	50.6

Phosphorus Prediction and Uncertainty Analysis Module

Date: 4/4/2008 Scenario: 2
Observed spring overturn total phosphorus (SPO): 21.0 mg/m^3
Observed growing season mean phosphorus (GSM): 17.5 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	5	16	16	-2	-11
Canfield-Bachmann, 1981 Natural Lake	5	16	16	-2	-11
Canfield-Bachmann, 1981 Artificial Lake	5	15	15	-3	-17
Rechow, 1979 General	3	10	10	-8	-46
Rechow, 1977 Anoxic	5	17	17	-1	-6
Rechow, 1977 water load<50m/year	4	13	14	-5	-29
Rechow, 1977 water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977 General	4	15	15	-6	-29
Vollenweider, 1982 Combined OECD	5	14	14	-5	-26
Dillon-Rigler-Kirchner	3	10	10	-11	-52
Vollenweider, 1982 Shallow Lake/Res.	4	11	11	-8	-42
Larsen-Mercier, 1976	4	14	14	-7	-33
Nurnberg, 1984 Oxic	3	11	11	-7	-40

Lake Phosphorus Model	Confidence Lower Bound	Confidence Upper Bound	Parameter Fit?	Back Calculation	Model Type
(kg/year)					
Walker, 1987 Reservoir	8	22	FIT	0	GSM
Canfield-Bachmann, 1981 Natural Lake	5	46	FIT	1	GSM
Canfield-Bachmann, 1981 Artificial Lake	5	43	FIT	1	GSM
Rechow, 1979 General	5	14	FIT	0	GSM
Rechow, 1977 Anoxic	8	23	Pin	0	GSM
Rechow, 1977 water load<50m/year	6	18	FIT	0	GSM
Rechow, 1977 water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977 General	6	24	FIT	0	SPO
Vollenweider, 1982 Combined OECD	6	23	FIT	0	ANN
Dillon-Rigler-Kirchner	5	13	FIT	0	SPO
Vollenweider, 1982 Shallow Lake/Res.	5	18	FIT	0	ANN
Larsen-Mercier, 1976	7	18	Pin	0	SPO
Nurnberg, 1984 Oxic	5	17	FIT	0	ANN

Water and Nutrient Outflow Module

Date: 4/4/2008 Scenario: 2
Average Annual Surface Total Phosphorus: 19.3mg/m^3
Annual Discharge: 2.66E+003 AF => 3.28E+006 m^3
Annual Outflow Loading: 133.4 LB => 60.5 kg

Date: 4/4/2008 Scenario: Lower Gresham Current

Lake Id: Lower Gresham
Watershed Id: LGL

Hydrologic and Morphometric Data

Tributary Drainage Area: 1348.0 acre
Total Unit Runoff: 14.00 in.
Annual Runoff Volume: 1572.7 acre-ft
Lake Surface Area <As>: 149.0 acre
Lake Volume <V>: 894.0 acre-ft
Lake Mean Depth <z>: 6.0 ft
Precipitation - Evaporation: 5.5 in.
Hydraulic Loading: 4300.1 acre-ft/year
Areal Water Load <qs>: 28.9 ft/year
Lake Flushing Rate <p>: 4.81 1/year
Water Residence Time: 0.21 year
Observed spring overturn total phosphorus (SPO): 19 mg/m^3
Observed growing season mean phosphorus (GSM): 21.0 mg/m^3
% NPS Change: 0%
% PS Change: 0%

NON-POINT SOURCE DATA

Land Use	Acre (ac)	Low	Most Likely	High	Loading %	Low	Most Likely	High
		Loading (kg/ha-year)				Loading (kg/year)		
Row Crop AG	0.0	0.50	1.00	3.00		0.0	0	0
Mixed AG	0.0	0.30	0.80	1.40		0.0	0	0
Pasture/Grass	40.0	0.10	0.30	0.50		3.7	2	5
HD Urban (1/8 Ac)	0.0	1.00	1.50	2.00		0.0	0	0
MD Urban (1/4 Ac)	0.0	0.30	0.50	0.80		0.0	0	0
Rural Res (>1 Ac)	0.0	0.05	0.10	0.25		0.0	0	0
Wetlands	289.0	0.10	0.10	0.10		8.8	12	12
Forest	1019.0	0.05	0.09	0.18		28.1	21	37
Lake Surface	149.0	0.10	0.30	1.00		13.7	6	18
								60

POINT SOURCE DATA

Point Sources	Water Load (m^3/year)	Low (kg/year)	Most Likely (kg/year)	High (kg/year)	Loading %
MGL_Outlet	3280000	0.0	60.5	0.0	45.7

SEPTIC TANK DATA

Description	Low	Most Likely	High
Septic Tank Output (kg/capita-year)	0.30	0.50	0.80
# capita-years	0.0		
% Phosphorus Retained by Soil	98.0	90.0	80.0

Septic Tank Loading (kg/year) 0.00 0.00 0.00
0.0

TOTALS DATA

Description	Low	Most Likely	High	Loading %
Total Loading (lb)	88.1	291.6	340.2	100.0
Total Loading (kg)	40.0	132.3	154.3	100.0
Areal Loading (lb/ac-year)	0.59	1.96	2.28	
Areal Loading (mg/m^2-year)	66.28	219.34	255.93	
Total PS Loading (lb)	0.0	133.4	0.0	45.7
Total PS Loading (kg)	0.0	60.5	0.0	45.7
Total NPS Loading (lb)	74.8	118.3	207.3	54.3
Total NPS Loading (kg)	33.9	53.7	94.0	54.3

Phosphorus Prediction and Uncertainty Analysis Module

Date: 4/4/2008 Scenario: 3
Observed spring overturn total phosphorus (SPO): 19.0 mg/m^3
Observed growing season mean phosphorus (GSM): 21.0 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	6	20	23	-1	-5
Canfield-Bachmann, 1981 Natural Lake	6	19	22	-2	-10
Canfield-Bachmann, 1981 Artificial Lake	6	18	20	-3	-14
Rechow, 1979 General	3	10	12	-11	-52
Rechow, 1977 Anoxic	6	21	25	0	0
Rechow, 1977 water load<50m/year	5	17	20	-4	-19
Rechow, 1977 water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977 General	5	18	21	-1	-5
Vollenweider, 1982 Combined OECD	6	16	18	-4	-20
Dillon-Rigler-Kirchner	3	8	10	-11	-58
Vollenweider, 1982 Shallow Lake/Res.	4	12	14	-8	-40
Larsen-Mercier, 1976	5	17	20	-2	-11
Nurnberg, 1984 Oxic	3	11	13	-10	-48

Lake Phosphorus Model		Confidence Lower Bound	Confidence Upper Bound	Parameter Fit?	Back Calculation	Model Type
					(kg/year)	
Walker, 1987	Reservoir	10	27	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	14	FIT	0	GSM
Rechow, 1977	Anoxic	10	28	FIT	0	GSM
Rechow, 1977	water load<50m/year	8	24	FIT	0	GSM
Rechow, 1977	water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977	General	7	29	FIT	0	SPO
Vollenweider, 1982	Combined OECD	7	27	FIT	0	ANN
Dillon-Rigler-Kirchner		4	11	FIT	0	SPO
Vollenweider, 1982	Shallow Lake/Res.	5	20	FIT	0	ANN
Larsen-Mercier, 1976		9	22	P Pin	0	SPO
Nurnberg, 1984	Oxic	5	17	FIT	0	ANN

E

APPENDIX E

2005-2007 Aquatic Plant Survey Data

Sampling point	Lattitude (Decimal degrees)	Longitude (Decimal degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Comments	Myriophyllum spicatum,Eurasian water-milfoil Record 1,2,3 or leave blank	Brasenia schreberi,Watershield	Ceratophyllum demersum,Coontail	Chara ,Muskgrasses	Eleocharis acicularis,needle spikerush	Elodea canadensis,Common waterweed	Eriocaulon aquaticum,Pipewort	Heteranthera dubia,Water star-grass	Juncus paleocarpus f. submersus,Brown-fruited rush	Lobelia dortmanna,Water lobelia	Megalodonta beckii,Water marigold	Myriophyllum sibericum,Northern water milfoil	Myriophyllum tenellum,Dwarf water milfoil	Najas flexilis,Bushy pondweed	Nitella sp.,Nitella	Nuphar variegata,Spatterdock	Nymphaea odorata,White water lily	Potamogeton amplifolius,Large-leaf pondweed	Potamogeton friesii,Frie's pondweed	Potamogeton gramineus,Variable pondweed	Potamogeton natans,Floating-leaf pondweed	Potamogeton praelongis,White-stem pondweed	Potamogeton pusillus,Small pondweed	Potamogeton richardsonii,Clasping-leaf pondweed	Potamogeton robbinsii,Robbins pondweed	Potamogeton strictifolius,Stiff pondweed	Potamogeton zosteriformis,Flat-stem pondweed	Ranunculus flammula,Creeping spearwort	Sparganium angustifolium ,Narrow-leaved bur-reed	Stuckenia pectinata,Sago pondweed	Utricularia vulgaris,Common	Vallisneria americana,Wild celery	Sagittaria sp.	Isoetes sp.
1			1	S	P							1										V	1					1											
2			3	M	P			V														V																	
3			5	M	P							1																											
4			6	M	P							1					1																						
5			2	S	P							1										V																	
6			5	M	P							1																											
7			4	M	P				1			1																											
8			5.5	M	P																			1															
9			7	M	P					1																													
10			8	M	P							1																											
11			9	M	P							1																											
12			7	M	P																																	
13			4	S	P				1															V					1									
14			10	M	P				1			1																											
15			9	M	P												1											1										
16			9	M	P							1																											
17			11	M	P				1			1																											
18			7	M	P												1							1				1									1		
19			10	M	P				1								1	1																	1				
20			11	M	P							1																											
21			7	S	P		1		1																													
22			10	M	P				1								1																					
23			13	M	P				1									1																				
24			13	M	P				1			1						1																				
25			11.5	M	P							1					1																					
26			11	M	P																																	
27			7	M	P																																	
28			10	M	P		1					1																											
29			14	M	P																																	
30			13	M	P		1							1																							1		
31			13	M	P				1																										1				
32			14	M	P							1																											
33			15	M	P																																	
34			15	M	P							1																											
35			8	M	P												1																				1		
36			3	S	P																							1										
37			15	M	P																																	
38			15	M	P																																	
39			15	M	P																																	
40			6	M	P				1			1																											
41			4	S	P												1																				1		
42			15	M	P							1									1																		
43						DEEP																																	
44						DEEP																																	
45						DEEP																																	
46			13.5	S	P																																	
47						DEEP																																	
48			16	M	R																																	
49			16	M	P																																	
50			6	M	P												1																		1		1		
51			2.5	S	P																																	
52			8	M	P					1																											1		
53			16	M	P																																	
54			15.2	M	R																																	
55			15.7	M	R																																	
56						DEEP																																	
57						DEEP																																	
58						DEEP																																	
59			15.5	M	P																																	
60			12.5	S	P				1																													
61			2.5	S	P		1										1							1										1		1		
62			2	S	P																																	
63			9	M	P													1												1	1					1		
64			10.5	S	P				1																											1		
65						DEEP																																	
66			15.7	M	R																																	
67						DEEP																																	
68						DEEP																																	
69						DEEP																																	
70			15.2	M	R																																	
71			16	M	P																																	
72			4	S	P							1					1							1	1				1	1						1		
73			3.5	M	P				1															V					1	1						1		
74			16	M	P																																	
75			15.5	M	R																																	
76			16.5	M	R																																	
77			16.2	M	R																																	
78			16.3	M	R																																	
79			15.9	M	R																																	
80			15.8	M	R																																	
81			15	M	R																																	
82			14.7	M	R					1																												
83			16	M	P																																	
84			10	M	P				1								1													1							V	
85			1.5	S	P				1	1	1				1																					1	V	
86			6.5	S	P															1					1				1								1		
87			15.6	M	R																																	
88			17.8	M	R																																	
89						DEEP																																	
90			18.1	M	R																																	
91			17.7	M	R																																	
92			16.5	M	R																																	
93			16.1	M	R																																	
94			17	M	R							1																											
95			17	M	R																																	
96			16.5	M	R																																	
97			16	M	R																																	
98			15	M	P																																	
99			9	M	P												1																			1		

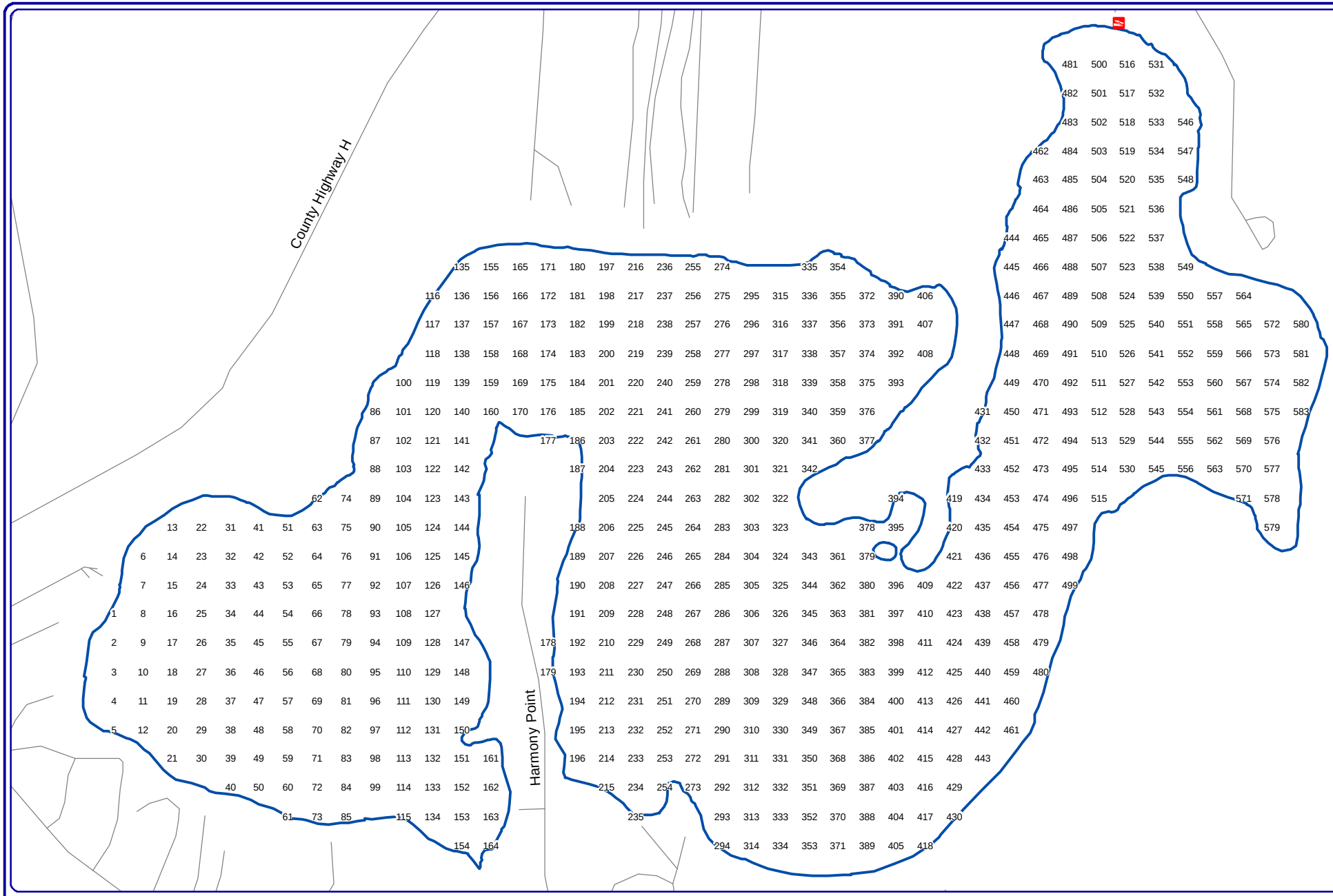
Sampling point	Lattitude (Decimal degrees)	Longitude (Decimal degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Comments	*Myriophyllum spicatum,Eurasian water-milfoil Record 1,2,3 or leave blank*	*Brasenia schreberi,Watershield*	*Ceratophyllum demersum,Coontail*	*Chara ,Muskgrasses*	*Eleocharis acicularis,needle spikerush*	*Elodea canadensis,Common waterweed*	*Eriocaulon aquaticum,Pipewort*	*Heteranthera dubia,Water star-grass*	*Juncus paleocarpus f. submersus,Brown-fruited rush*	Lobelia dortmanna,Water lobelia	*Megalodonta beckii,Water marigold*	*Myriophyllum sibericum,Northern water milfoil*	*Myriophyllum tenellum,Dwarf water milfoil*	*Najas flexilis,Bushy pondweed*	*Nitella sp.,Nitella*	*Nuphar variegata,Spatterdock*	*Nymphaea odorata,White water lily*	Potamogeton amplifolius,Large-leaf pondweed	Potamogeton friesii,Frie's pondweed	Potamogeton gramineus,Variable pondweed	Potamogeton natans,Floating-leaf pondweed	Potamogeton praelongis,White-stem pondweed	Potamogeton pusillus,Small pondweed	Potamogeton richardsonii,Clasping-leaf pondweed	Potamogeton robbinsii,Robbins pondweed	Potamogeton strictifolius,Stiff pondweed	Potamogeton zosteriformis,Flat-stem pondweed	Ranunculus flammula,Creeping spearwort	Sparganium angustifolium ,Narrow-leaved bur-reed	Stuckenia pectinata,Sago pondweed	Utricularia vulgaris,Common	Vallisneria americana,Wild celery	Sagittaria sp.	Isoetes sp.
100			15	M	P															1	1																			
101			15.9	M	R																																			
102			16.3	M	R																																			
103			16.9	M	R																																			
104			17.4	M	R																																			
105			19	M	R																																			
106						DEEP																																		
107			17.2	M	R																																			
108			15.6	M	R																																			
109			15.1	M	R				1			1																												
110			15.1	M	R																																			
111			15.1	M	R																																			
112			5	M	P												1							1				1		1	1		1				1			
113			3	S	P																																			
114			11	M	P																																			
115			0.5	S	P																																			
116			1	S	P					1	1				1				1								1					1					1			
117			3	R	P					1																	1												
118			12	S	P				1											1	1																1			
119			16.2	M	R				1												1																		
120			16.9	M	R																																			
121			17.2	M	R		1					1									1																			
122			16.7	M	R																																			
123			17.4	M	R				1																															
124			18.1	M	R																																			
125			17.6	M	R				1																															
126			5	M	P												1				1																1			
127			10.5	M	P				1								1																				1			
128			14.3	M	R																1																			
129			16	M	P																																			
130			14	M	P																																			
131			2.5	S	P					1																	1												
132			3	S	P					1		1					1								1						1		1				1			
133			6	M	P																				V							1							
134			5.5	M	P							1																				1					1			
135			3	S	P					1										1																1			
136			14.5	S	P															1											1								
137			13	M	P		1													1																			
138			17		R				1																														
139			18.1	M	R																																			
140			18.1	M	R																																			
141			17.3	M	R																																			
142			16.5	M	R																																			
143			12.5	S	P																1																			
144			9	M	P																																			
145			8	M	P							1									1																1			
146			2	R	P						1	1				1											1												
147			7	M	P							1					1																				1			
148			15	M	P																																			
149			16	M	P																																			
150						TOO SHALLOW																																			
151			5	M	P							1								1											1	1	1							
152			6	M	P																												1							
153			5	M	P																												1							
154			1	S	P					1	1	1			1																1				1				1
155			16.2	M	R																									1									
156			15.8	M	R																																			
157			16.6	M	R							1																										1			
158			17.3	M	R																																			
159			15.6	M	R																																			
160			17.2	S	R																																			
161			3.5	M	P			V													1			V				V								1			
162			4	M	P																												1							
163			4.5	M	P																																			
164			2	S	P			1											1					V							1					1			
165			16.9	M	R																																			
166			16.9	M	R																																			
167			16.2	M	R				1																															
168			15.5	M	R				1																															
169			14	S	P																																1			
170			8	M	P				1								1																				1			
171			9	M	P				1								1	1			1										1									
172			18.5	M	R																																			
173			17.7	M	R																																			
174			9	M	P				1																						1					1			
175			16	S	P				1												1	1								1									
176			16.7	M	R																																			
177						ON LAND																																		
178			1.5	S	P						1											V	V																
179						DOCK																																		
180			8.5	S	P				1	1		1			1																						1			
181			19.1	M	R																																			
182			18.9	M	R																																			
183			8.1	M	R																																			
184			18.4	M	R																																			
185			17.9	M	R																																			
186			3.5	S	P																1		V	1												1			
187						ON LAND																																		
188						ON LAND																																		
189			3	S	P																			V							1	1					1			
190			12.5	M	P				1			1								1	1																1			
191			5.5	M	P																												1					1			
192			8	M	P																												1							
193			5	M	P												1																1							
194			3	M	P			V		1													V													1	1		
195			5	M	P			V		1		1								1													1				1			
196			2.5	M	P			1		1							1			1			1		1											1	1		
197						DOGS SWIMMING																																			
198						DEEP																																		

Sampling point	Lattitude (Decimal degrees)	Longitude (Decimal degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Comments	Myriophyllum spicatum,Eurasian water-milfoil Record 1,2,3 or leave blank	Brasenia schreberi,Watershield	Ceratophyllum demersum,Coontail	Chara ,Muskgrasses	Eleocharis acicularis,needle spikerush	Elodea canadensis,Common waterweed	Eriocaulon aquaticum,Pipewort	Heteranthera dubia,Water star-grass	Juncus paleocarpus f. submersus,Brown-fruited rush	Lobelia dortmanna,Water lobelia	Megalodonta beckii,Water marigold	Myriophyllum sibericum,Northern water milfoil	Myriophyllum tenellum,Dwarf water milfoil	Najas flexilis,Bushy pondweed	Nitella sp.,Nitella	Nuphar variegata,Spatterdock	Nymphaea odorata,White water lily	Potamogeton amplifolius,Large-leaf pondweed	Potamogeton friesii,Frie's pondweed	Potamogeton gramineus,Variable pondweed	Potamogeton natans,Floating-leaf pondweed	Potamogeton praelongis,White-stem pondweed	Potamogeton pusillus,Small pondweed	Potamogeton richardsonii,Clasping-leaf pondweed	Potamogeton robbinsii,Robbins pondweed	Potamogeton strictifolius,Stiff pondweed	Potamogeton zosteriformis,Flat-stem pondweed	Ranunculus flammula,Creeping spearwort	Sparganium angustifolium ,Narrow-leaved bur-reed	Stuckenia pectinata,Sago pondweed	Utricularia vulgaris,Common	Vallisneria americana,Wild celery	Sagittaria sp.	Isoetes sp.
199						DEEP																																		
200						DEEP																																		
201						DEEP																																		
202			15	S	P												1			1	1									1								
203			17.6	M	P																1																	
204			16.5	M	P																																	
205			4.5	M	P				1			1					1												1			1				1		
206			9	M	P												1														1						
207			17.2	M	R																																	
208			16	M	R																																	
209			13	S	P																											1					
210			13	M	P													1															1				
211			13	M	P																															1		
212			8	M	P				1			1									1										1						
213			4	M	P							1						1		1	1		1														
214			4	M	P			V										1		1		V	V				1								1		
215						TOO SHALLOW																																	
216			6	S	P				1			1			1														1				1			1		
217						DEEP																																
218						DEEP																																
219						DEEP																																
220						DEEP																																
221			19.5	M	R																																
222			19	M	R																																
223			18.2	M	R																											1					
224			12	S	P				V																							1		1			V		
225			18.8	M	R																																
226						DEEP																																
227			17.5	M	R																																
228			15.8	M	R																																
229			15	M	P																	1															
230			11	M	P				1			1																				1					
231			5.5	M	P							1					1							1													
232						NOT NAVIG																																
233						NOT NAVIG																																
234						NOT NAVIG																																
235						NOT NAVIG																																
236			6	S	P					1		1					1	1		1											1	1		1			1		
237						DEEP																																
238						DEEP																																
239						DEEP																																
240						DEEP																																
241						DEEP																																
242						DEEP																																
243						DEEP																																
244						DEEP																																
245						DEEP																																
246						DEEP																																
247						DEEP																																
248			19.4	M	R																																
249			11	M	P				1																						1		1				
250			4	R	P												1																		1		
251			6	M	P																			1						1							
252			4	M	P							1					1														1					1		
253						NOT NAVIG																																
254						NOT NAVIG																																
255			5	S	P					1										1															1		
256						DEEP																																
257						DEEP																																
258						DEEP																																
259						DEEP																																
260						DEEP																																
261						DEEP																																
262						DEEP																																
263						DEEP																																
264						DEEP																																
265						DEEP																																
266						DEEP																																
267						DEEP																																
268			17.6	S	R				1											1											1					1		
269			12	R	P																																
270			13	M	P																1																
271			14	M	P																1															1		
272			8	M	P				1								1														1					1		
273			2	S	P					1									1																		
274			8.5	M	P																										1						
275						DEEP																																
276						DEEP																																
277						DEEP																																
278						DEEP																																
279						DEEP																																
280						DEEP																																
281						DEEP																																
282						DEEP																																
283						DEEP																																
284						DEEP																																
285						DEEP																																
286						DEEP																																
287			18.8	M	R																																
288			17.5		R																																
289			16.5	S	R				1												1									1							
290			13.3	M	P																1									1							
291			15	M	P																1																
292			3.5	R	P																																
293			4	M	P																		1									1					
294			1.5	S	P			V		1	1									1		V	V											1			1	
295						DEEP																																
296						DEEP																																
297						DEEP																																

Sampling point	Lattitude (Decimal degrees)	Longitude (Decimal degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Comments	*Myriophyllum spicatum,Eurasian water-milfoil Record 1,2,3 or leave blank*	*Brasenia schreberi,Watershield*	*Ceratophyllum demersum,Coontail*	*Chara ,Muskgrasses*	*Eleocharis acicularis,needle spikerush*	*Elodea canadensis,Common waterweed*	*Eriocaulon aquaticum,Pipewort*	*Heteranthera dubia,Water star-grass*	*Juncus paleocarpus f. submersus,Brown-fruited rush*	*Lobelia dortmanna,Water lobelia*	*Megalodonta beckii,Water marigold*	*Myriophyllum sibericum,Northern water milfoil*	*Myriophyllum tenellum,Dwarf water milfoil*	*Najas flexilis,Bushy pondweed*	*Nitella sp.,Nitella*	*Nuphar variegata,Spatterdock*	*Nymphaea odorata,White water lily*	*Potamogeton amplifolius,Large-leaf pondweed*	*Potamogeton friesii,Frie's pondweed*	*Potamogeton gramineus,Variable pondweed*	*Potamogeton natans,Floating-leaf pondweed*	*Potamogeton praelongis,White-stem pondweed*	*Potamogeton pusillus,Small pondweed*	*Potamogeton richardsonii,Clasping-leaf pondweed*	*Potamogeton robbinsii,Robbins pondweed*	*Potamogeton strictifolius,Stiff pondweed*	*Potamogeton zosteriformis,Flat-stem pondweed*	*Ranunculus flammula,Creeping spearwort*	*Sparganium angustifolium ,Narrow-leaved bur-reed*	*Stuckenia pectinata,Sago pondweed*	*Utricularia vulgaris,Common*	*Vallisneria americana,Wild celery*	*Sagittaria sp.*	*Isoetes sp.*
298						DEEP																																		
299						DEEP																																		
300						DEEP																																		
301						DEEP																																		
302						DEEP																																		
303						DEEP																																		
304						DEEP																																		
305						DEEP																																		
306						DEEP																																		
307			18.8	M	R																																	
308			16.8	M	R																																		
309			16.3	M	R																																		
310			7	R	P				1								1							1				1			1		1				1		
311			13	M	P																1									1								
312			5.5	M	P												1											1								1		
313			3	R	P																															1		
314			2	R	P								1																									
315						DEEP																																		
316						DEEP																																		
317						DEEP																																		
318						DEEP																																		
319						DEEP																																		
320						DEEP																																		
321						DEEP																																		
322			11.5	S	P																															1		
323			12	S	P																1	1				1				1						1		
324						DEEP																																		
325						DEEP																																		
326						DEEP																																		
327			18.6	M	R																																	
328						BOAT																																		
329			15.9	M	P																	1																
330			16.5	M	P																																		
331			10	M	P												1											1								1		
332			7	M	P																			1							1							
333			6	M	P																										1							
334			5	M	P																															1		
335			10	S	P							1																										
336						DEEP																																		
337						DEEP																																		
338						DEEP																																		
339			19.6	M	R																																	
340			20.6	M	R																																		
341						DEEP																																		
342			7.5	S	P				1			1						1		1										1	1				1			
343			9	S	P												1							1							1					1		
344			15.4	M	R																																		
345			19.2	M	R																																		
346			18.1	M	R																																		
347			16.9	M	R																																		
348			15.7	M	R																																		
349			15	M	R																	1																
350			14.5	M	P																	1																
351			8.5	M	P				1			1					1	1											1			1				1		
352			7	M	P																											1		1				
353			5	M	P												1															1				1		
354			16.5	M	P							1																										
355			17.8	M	R																																		
356						DEEP																																		
357			19.3	M	R																																		
358			16.5	M	R																																		
359			9.5	R	P				1								1															1				1		
360			10.5		P							1								1												1						
361						FISHERMAN																																		
362			17.4	M	R																																		
363			17.4	M	R																																		
364			17.6	M	R				1																													
365			17.4	M	R																																		
366			16.1	M	R																	1																
367			15.7	M	R																	1																
368			13.6	M	R							1										1																
369			15	M	P																																		
370			12	M	P														1													1		1				
371			5	M	P																				V							1						
372			16.6	M	P																																		
373			17.7	M	P																																		
374			14	R	P				1												1					1						1		1				
375			16.5	M	P				1													1																
376						FISHERMAN																																		
377						FISHERMAN																																		
378			3	M	P																				V							1	1	1				
379			1.5	R	P																																		
380			14.5	M	P																	1																
381			17	M	R																																		
382			18.6	M	R																	1																
383			17.6	M	R																																		
384			14	M	R																																		
385			16	M	R																																		
386			13.6	M	R																																		
387			13.6	M	R																	1																
388			11.5	M	P																											1						
389			5.5	M	P												1								1									1		1		
390			12.5	S	P				1																									1				
391			16.5	M	R				1								1																					
392			7	R	P							1																			1					1		
393			8.5	M	P												1														1		1			1		
394						NOT NAVIG																																		
395						NOT NAVIG																																		
396			2.5	S	P					1	1																												

Sampling point	Lattitude (Decimal degrees)	Longitude (Decimal degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Comments	*Myriophyllum spicatum,Eurasian water-milfoil Record 1,2,3 or leave blank*	*Brasenia schreberi,Watershield*	*Ceratophyllum demersum,Coontail*	*Chara ,Muskgrasses*	*Eleocharis acicularis,needle spikerush*	*Elodea canadensis,Common waterweed*	*Eriocaulon aquaticum,Pipewort*	*Heteranthera dubia,Water star-grass*	*Juncus paleocarpus f. submersus,Brown-fruited rush*	Lobelia dortmanna,Water lobelia	*Megalodonta beckii,Water marigold*	*Myriophyllum sibericum,Northern water milfoil*	*Myriophyllum tenellum,Dwarf water milfoil*	*Najas flexilis,Bushy pondweed*	*Nitella sp.,Nitella*	*Nuphar variegata,Spatterdock*	*Nymphaea odorata,White water lily*	Potamogeton amplifolius,Large-leaf pondweed	Potamogeton friesii,Frie's pondweed	Potamogeton gramineus,Variable pondweed	Potamogeton natans,Floating-leaf pondweed	Potamogeton praelongis,White-stem pondweed	Potamogeton pusillus,Small pondweed	Potamogeton richardsonii,Clasping-leaf pondweed	Potamogeton robbinsii,Robbins pondweed	Potamogeton strictifolius,Stiff pondweed	Potamogeton zosteriformis,Flat-stem pondweed	Ranunculus flammula,Creeping spearwort	Sparganium angustifolium ,Narrow-leaved bur-reed	Stuckenia pectinata,Sago pondweed	Utricularia vulgaris,Common	Vallisneria americana,Wild celery	Sagittaria sp.	Isoetes sp.
397			6	M	P				1			1						1																			1		
398			9	M	P				1									1																			1		
399			17	M	R																1																		
400			17	M	R				1																														
401			16	M	R																1																		
402			8	M	P				1																				1		1		1						
403			8.5	M	P				1																				1			1		1					
404			4.5	R	P					1											1																		
405			3	S	P							1																			1								
406			5	M	P				1			1																		1	1				1				
407			11	S	P																										1					1			
408			4	R	P							1					1																						
409			10	M	P				1																						1		1			1			
410			16.5	M	P																	1								1								
411			16.5	M	R																	1																
412			16.6	M	R																	1								1								
413			16	M	R																	1								1								
414			15	M	R																																		
415			15	M	R				1									1													1	1						
416			6	M	P							1													1				1					1					
417			4	S	P					1											1						1											
418			1	S	P					1	1				1																							
419			1	S	P																																	V
420			2	S	P					1	1				1											1												
421						FISHERMAN																																		
422						FISHERMAN																																		
423			15.5	M	R																																		
424			15.5	M	R																																		
425			16.1	M	R																																		
426			15.7	M	R																	1																
427			16.5	M	P																																		
428			10.5	M	P												1																1			1			
429			4	R	P					1																													
430						ON LAND																																		
431			2	R	P																		1															
432			4	S	P					1											1	1					1									1			
433			5	M	P							1													1				V			1				1			
434			5	M	P																										1	1				1			
435			16	M	R																																		
436			16.5	M	R																																		
437			15	M	R																	1																
438			15.9	M	R																	1																
439			15.7	M	R							1										1																
440			15.4	M	R							1										1																
441			15.3	M	R																	1																
442			12.5	S	P				1																													
443			5	M	P																				1				1				1					
444			4	S	P																																		
445			8	S	P																												1		1				
446			8.5	S	P				1									1												1			1	1		1			
447			5	M	P																1			V									1			1			
448			5	S	P				1																		1				1	1						1
449			7	M	P				1								1								1						1				1			
450			7	M	P												1													1	1		1			1			
451			10	M	P																1															1			
452			8	M	P				1			1					1														1		1						
453			3	S	P					1																													
454			8.5	S	P				1									1																					
455			16.4	M	R																																		
456			16.6	M	R																																		
457			16.2	M	R																																		
458			16	M	R																																		
459			15	S	P																		1															
460			9	S	P				1										1																			
461			3.5	M	P																																	1	
462			4	S	P										1				1																				
463			14	S	P																																		
464			15.5	M	R																																		
465			17.5	M	R				1																														
466			18	M	R																																		
467			15.7	M	R																																		
468			10	M	P																				1				1			1		1				
469			14	R	P																		1															
470			16.6	M	R																																		
471			17.3	M	R																																		
472			16.8	M	R																																		
473			16.3	S	R																																		
474			13	S	P																																	1	
475			17.8	M	R																																		
476			17.6	M	R																																		
477			16.9	M	R																																		
478			15.7	M	R				1																														
479			11	S	P				V																						1					1			
480			2.5	R	P																																		
481			5.5	M	P			V				1												V														
482			6.5	S	P			V	1			1									1												1						
483			14.5	S	P				1			1																			1								
484			16.4	S	R																																		
485			19	S	R																																		
486						DEEP																																		
487						DEEP																																		
488						DEEP																																		
489						DEEP																																		
490			18.7	M	R																1																		
491			18.7	M	R																																		
492						DEEP																																		
493						DEEP																																		
494						DEEP																																		
495						DEEP																																		

Sampling point	Lattitude (Decimal degrees)	Longitude (Decimal degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Comments	*Myriophyllum spicatum,Eurasian water-milfoil Record 1,2,3 or leave blank*	*Brasenia schreberi,Watershield*	*Ceratophyllum demersum,Coontail*	*Chara ,Muskgrasses*	*Eleocharis acicularis,needle spikerush*	*Elodea canadensis,Common waterweed*	*Eriocaulon aquaticum,Pipewort*	*Heteranthera dubia,Water star-grass*	*Juncus paleocarpus f. submersus,Brown-fruited rush*	Lobelia dortmanna,Water lobelia	*Megalodonta beckii,Water marigold*	*Myriophyllum sibericum,Northern water milfoil*	*Myriophyllum tenellum,Dwarf water milfoil*	*Najas flexilis,Bushy pondweed*	*Nitella sp.,Nitella*	*Nuphar variegata,Spatterdock*	*Nymphaea odorata,White water lily*	Potamogeton amplifolius,Large-leaf pondweed	Potamogeton friesii,Frie's pondweed	Potamogeton gramineus,Variable pondweed	Potamogeton natans,Floating-leaf pondweed	Potamogeton praelongis,White-stem pondweed	Potamogeton pusillus,Small pondweed	Potamogeton richardsonii,Clasping-leaf pondweed	Potamogeton robbinsii,Robbins pondweed	Potamogeton strictifolius,Stiff pondweed	Potamogeton zosteriformis,Flat-stem pondweed	Ranunculus flammula,Creeping spearwort	Sparganium angustifolium ,Narrow-leaved bur-reed	Stuckenia pectinata,Sago pondweed	Utricularia vulgaris,Common	Vallisneria americana,Wild celery	Sagittaria sp.	Isoetes sp.
496						DEEP																																	
497			17.9	M	R																																		
498			12	S	P																											1							
499			4	S	P					1	1									1				1		1													
500			13	M	P				1																					1									
501			15	M	P																																		
502			15.7	M	R																																		
503			16.1	M	R																																		
504						DEEP																																	
505						DEEP																																	
506						DEEP																																	
507						DEEP																																	
508						DEEP																																	
509						DEEP																																	
510						DEEP																																	
511						DEEP																																	
512						DEEP																																	
513						DEEP																																	
514						DEEP																																	
515			17.7	S	R																																	
516			13	M	P				1																					1								
517			15	M	P																																	
518			13	M	P																														1			
519			13	S	P				1																					1		1					
520			17	M	R																																	
521						DEEP																																	
522						DEEP																																	
523						DEEP																																	
524						DEEP																																	
525			17	M	R																	1																
526			5	R	P					1							1	1																				
527						DEEP																																	
528			17.2	M	R																																	
529			17.7	M	R																																	
530			17	S	P							1																										
531			3.5	S	P					1	1								1																		
532			11.5	M	P																																	
533			13	M	P				1									1																				
534			9	M	P				1																1				1									
535			10.5	M	P				1									1																				
536			20	M	R																																	
537			20.6		R																																	
538			21		R																																	
539			20	M	R																																	
540			17.6		R																	1																
541			8	M	P																				1				1		1	1		1				
542			17	M	P																	1																
543			16.5	M	P																	1																
544			16	M	R																																	
545			5	M	P													1	1		1									1								
546			4	S	P																																	
547			3	R	P																																	
548			2.5	R	P												1			1																		
549			2	S	P						1									1	1						1											1
550			4.5	S	P						1						1																					
551			14	S	P																																	
552			15	M	P				1			1																										
553			15	M	R																																	
554			15.3	M	R																																	
555			16	M	R																																	
556			2.5	R	P																																	
557			11	S	P																														1			
558			14.5	M	P				1												1									1								
559			15	M	P				1												1																	
560			15.5	M	P												1					1																
561			15.5	M	P				1																													
562			12	M	P										1				1																			
563			6	M	P							1													1						1							
564			8.5	M	P							1					1																			1		
565			14	M	P				1																													
566			15	M	P																	1																
567			15	M	P																																	
568			15	M	P				1																													
569			14	M	P																	1																
570			8.5	S	P							1							1																			
571			2	S	P			V								1										1											1	
572			11	M	P																				1													
573			13.5	M	P																																1	
574			14	M	P														1																		1	
575			14	M	P																1										1						1	
576			13	M	P																1									1							1	
577			5.5	M	P							1													V							1						
578			5	M	P				1								1								1							1				1		
579			3	M	P					1		1			1		1						V										1				
580			3	M	P							1			1																	1				1	1
581			4	S	P							1													1							1				1		
582			5.5	M	P							1																			1				1			
583			3.5	M	P					1																1												



N
W E
S

750
Feet

Onterra LLC
Lake Management Planning
135 South Broadway Suite C
De Pere, WI 54115
920.338.8860
www.onterra-eco.com

Sources:
Roads & Hydro: WDNR
Point-Intercept Locations: WDNR ISS
Map date: May 27, 2008

Extent of large map shown in red.

Legend

\# Point-intercept Sample Location

Appendix E

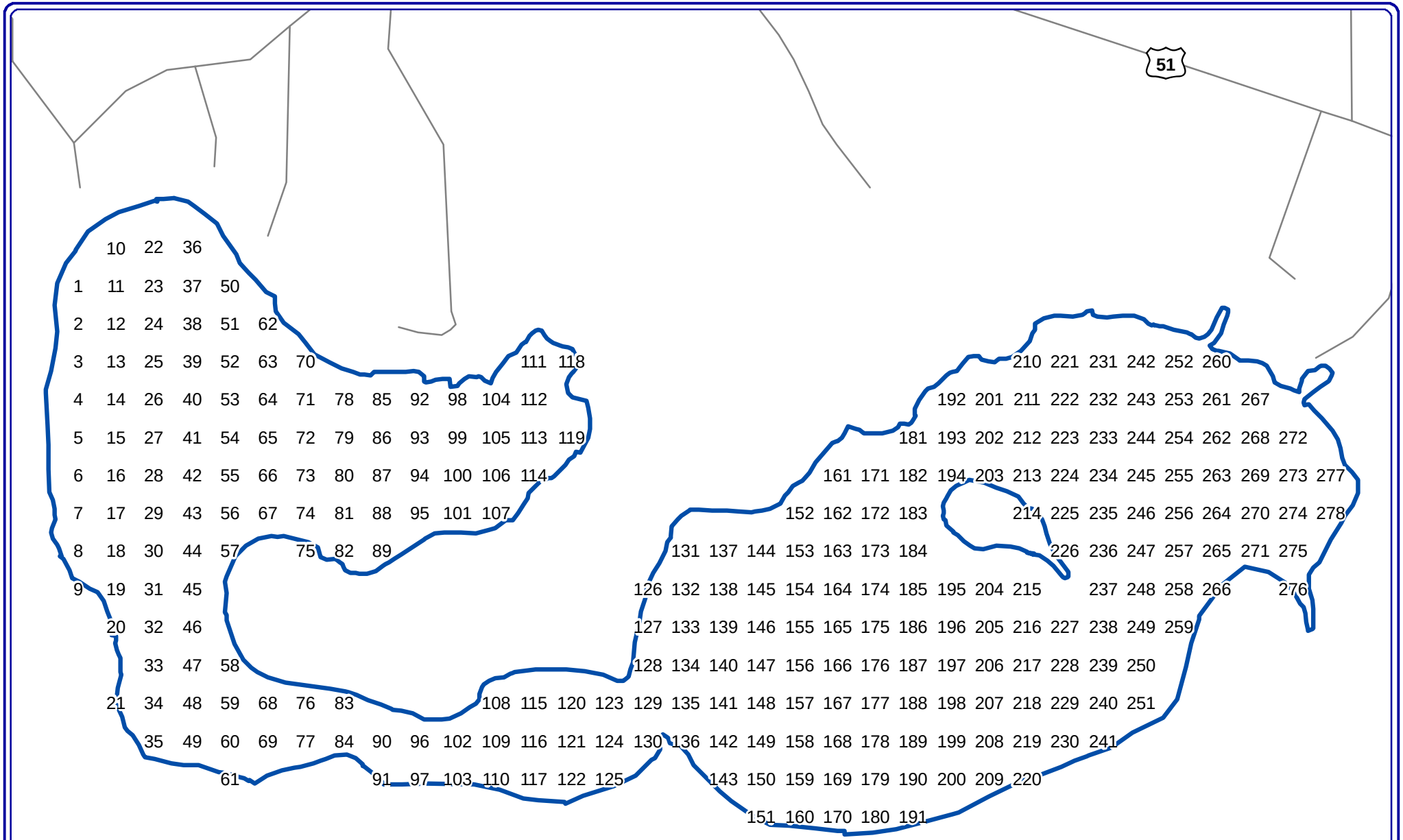
Upper Gresham Lake
Vilas County, Wisconsin

Point-intercept Sample Locations

Sampling point	Lattitude (Decimal degrees)	Longitude (Decimal degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Comments	*Brasenia schreberi,Watershield*	*Ceratophyllum demersum,Coontail*	*Chara ,Muskgrasses*	*Eleocharis acicularis,needle spikerush*	*Elodea canadensis,Common waterweed*	*Heteranthera dubia,Water star-grass*	*Lemna trisulca,Forked duckweed*	*Megalodonta beckii,Water marigold*	*moss*	*Myriophyllum sibiricum,Northern water milfoil*	*Najas flexilis,Bushy pondweed*	*Nitella sp.,Nitella*	*Nuphar variegata,Spatterdock*	*Nymphaea odorata,White water lily*	*Pontederia cordata,Pickerelweed*	*Potamogeton alpinus,Alpine pondweed*	*Potamogeton amplifolius,Large-leaf pondweed*	*Potamogeton friesii,Frie's pondweed*	*Potamogeton gramineus,Variable pondweed*	*Potamogeton natans,Floating-leaf pondweed*	*Potamogeton pusillus,Small pondweed*	*Potamogeton richardsonii,Clasping-leaf pondweed*	*Potamogeton robbinsii,Robbins pondweed*	*Potamogeton strictifolius,Stiff pondweed*	*Potamogeton zosteriformis,Flat-stem pondweed*	*Sagittaria sp.*	*Sparganium americanum,American bur-reed*	*Sparganium fluctuans ,Floating-leaved bur-reed*	*Sparganium sp.*	*Utricularia intermedia,Flat-leaf bladderwort*	*Utricularia minor,Small bladderwort*	*Utricularia vulgaris,Common*	*Vallisneria americana,Wild celery*	*sp1 - freshwater sponge*
1			3	M	P						2		V						3		V							1												
2			4	M	P						3																	1		1										
3			5	M	P						2						1											3												
4			5.5	M	P						3								V									1		1										
5			4.5	M	P						3						1											1		2										
6			5	M	P						2						3		V																				
7			3	M	P		V				1									3								1		2										
8			4	M	P						1									V										1										
9						NONNAVIGABLE (PLANTS)													V	V																					
10			4	M	P						1																			3										
11			5	M	P						1													3				1												
12			6	M	P						2																													
13			6	M	P														V	V							1	1										2	
14			5.5	M	P						1													1				1		2										
15			5.5	M	P			1			2																			1										
16			5.5	M	P						3																			1									3	
17			4	M	P				1		3						1		V					2				1											
18			5.5	M	P						3																			1										
19			5	M	P						3													V														3	
20			1.5	M	P						1								V	V	V														3				
21			1	M	P										1					3																			
22			4.5	M	P			2			1								V					1						3										
23			6.5	M	P						1																	1										1		
24			8.5	M	P				1																													1		
25			8	M	P																							1										1		
26			7.5	M	P						1																	1												
27			5	M	P						1					V								1														1		
28			4.5	M	P			1			1													1						2										
29			5	M	P			1			1													1																
30			5.5	M	P						2								V					V				1												
31			6.5	M	P						1																	1		2										
32			4.5	M	P			1			3																	1		1									1	
33			4.5	M	P						2						1																						
34			4.5	M	P		V				1									1																			
35			3.5	M	P		V				1						2			V									1										
36			4.5	M	P			1			2																	1											
37			8.5	M	P																							1									1	3	
38			10	M	P																																		
39						TEMPORARY OBSTACLE																																			
40			10.5	M	P																			1															
41			6	M	P			1			1								V											1									
42			4.5	M	P			1			3													1														1		
43			6	M	P			1			1																												
44			6	M	P				1		2													V						1									
45			5.5	M	P						1																			1										
46			6	M	P						1																												
47			5	M	P						2																	1		1										
48			2.5	M	P						2						1			3								1												
49			4	M	P		V				1									V				V															
50			4	M	P																			2						1									
51			7	M	P											1												2												
52			9.5	M	P																																		
53			10.5	M	P																																		
54			8	M	P														V									1											
55			6	M	P						1																	1		2										
56			6.5	M	P						1													1				1		2										
57			3	M	P			1			1									1	1							1											1	
58			3	M	P						1						3	1		V																			
59			5	M	P						1										1			1						2										
60			4	M	P		V				2										3							1												
61			1	M	P		V		1		1						1		V	V						3		1		2				V						
62			4.5	M	P																									2										
63			7	M	P						1																												2	
64			10	M	P																							1											
65			10.5	M	P																																		
66			7	M	P						1						1							1				1												
67			6	M	P				1		1									V								1		1									
68			5	M	P						1																			1										
69			5	M	P						3						1																						3	
70			5	M	P						2																	1												
71			7.5	M	P			1			1													1	1			2												
72			9	M	P			1																															
73			8	M	P																							1			1								
74			6	M	P						1									V								1		2									
75			0.5	M	P						1											1						1		1						1	1	1		
76			4.5	M	P						3																			1										
77			4.5	M	P						1						3							V														V		
78			7	M	P						1								V									2									1	1	
79			7.5	M	P																							1										1	
80			7.5	M	P																							1											
81			6	M	P				1		2								V	V				V															
82			3.5	M	P		V	1			3									1								1		1										
83			3	M	P												3				3								1										1	
84			5	M	P						1						1																							
85			5.5	M	P			1			2									V				V				1			1								
86			7.5	M	P																																		
87			8	M	P						1																	1											
88			5	M	P		1				1							1	3					1				1										1	
89			3	M	P		V		1		2								V	2										1							1		
90			5.5	M	P			1																						1									
91			1	M	P				2												3									1					1		1		1	
92			5.5	M	P		V				3								V					1						1									
93			6	M	P						1								V					1				1		1									
94			6.5	M	P						1						1							V															
95			3.5	M	P		V	1			1									3								1		1								1	
96			5.5	M	P						1						2													1									
97			2	M	P												2			V	V			1									V						
98			3	M	P		1				1						1		1	1								1		1							1		
99			5.5	M	P						1								V											1									
100			5	M	P		V		2		3								V									1		1									

Sampling point	Lattitude (Decimal degrees)	Longitude (Decimal degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Comments	Brasenia schreberi,Watershield	Ceratophyllum demersum,Coontail	Chara ,Muskgrasses	Eleocharis acicularis,needle spikerush	Elodea canadensis,Common waterweed	Heteranthera dubia,Water star-grass	Lemna trisulca,Forked duckweed	Megalodonta beckii,Water marigold	moss	Myriophyllum sibiricum,Northern water milfoil	Najas flexilis,Bushy pondweed	Nitella sp.,Nitella	Nuphar variegata,Spatterdock	Nymphaea odorata,White water lily	Pontederia cordata,Pickerelweed	Potamogeton alpinus,Alpine pondweed	Potamogeton amplifolius,Large-leaf pondweed	Potamogeton friesii,Frie's pondweed	Potamogeton gramineus,Variable pondweed	Potamogeton natans,Floating-leaf pondweed	Potamogeton pusillus,Small pondweed	Potamogeton richardsonii,Clasping-leaf pondweed	Potamogeton robbinsii,Robbins pondweed	Potamogeton strictifolius,Stiff pondweed	Potamogeton zosteriformis,Flat-stem pondweed	Sagittaria sp.	Sparganium americanum,American bur-reed	Sparganium fluctuans ,Floating-leaved bur-reed	Sparganium sp.	Utricularia intermedia,Flat-leaf bladderwort	Utricularia minor,Small bladderwort	Utricularia vulgaris,Common	Vallisneria americana,Wild celery	sp1 - freshwater sponge
101			2	M	P		1	1			1									1	V								1										
102			5	M	P						1																												
103			2	M	P			V			1								3	3						V												
104			5	M	P				1		1								V				V			V	1										
105			5	M	P						2												1				1		1									
106			4.5	M	P				1		2								V								1		1									
107						NONNAVIGABLE (PLANTS)													V	V																			
108			4	M	P				2								2												2								2	
109			6	M	P																																	
110			3	M	P				1		2						3		V	V							1		3									
111			2	M	P			1											V	V	V					V	2		2								
112			5	M	P		1		2		3								V	V						1	1		1							1		
113			5	M	P		V				3									V			V			V	1		1								
114			4	M	P		V		1		1		1		1				V	V			1			V	1									1		
115			4.5	M	P						2						2									V			2								
116			5.5	M	P						1																											
117			5.5	M	P		V										1				1								1									
118						NONNAVIGABLE (PLANTS)													V	V																			
119						NONNAVIGABLE (PLANTS)													V	V																			
120			5	M	P		V		1		1										1		2														
121			5.5	M	P												1						1						1									
122			4.5	M	P						2									V			3						1									
123			6	M	P						2						1												1									
124			5.5	M	P				1		1									V						V												
125						NONNAVIGABLE (PLANTS)														V																			
126			0.5	M	P														1		3																	
127			2.5	M	P												1		2																			
128			4	M	P						1						3																				2	
129			5.5	M	P						1												V						1									
130			3	M	P				1		2						1		3								1											
131						TEMPORARY OBSTACLE																																	
132			7.5	M	P						1												1						1									
133			7	M	P						1						1						1				1										3	
134			6	M	P						1												3														3	
135			9	M	P						1																										3	
136			4.5	M	P				2										V	V																		
137						TEMPORARY OBSTACLE																																	
138			10.5	M	P			1																					3								2	
139			11.5	M	P			1	1								1																					
140			11.5	M	P			1																													2	
141			9.5	M	P																		1				1		2								
142			9	M	P																		1						1								
143			7.5	M	P						2																											
144			8.5	M	P																								3								
145			11.5	M	P			1																			1										
146			13	M	P																																
147			13.5	M	P																																
148			13	M	P																																
149			13	M	P																																
150			9	M	P																								2								
151			3	R	P														V														1				
152			5	M	P			1	1								1						1				1									1	
153			9	M	P		V	1								1																					
154			11	M	P			1																			1										
155			13	M	P																																
156			14.5	M	P																																
157			14	M	P																																
158			15	M	P																																
159			13	M	P																						1										
160			6.5	M	P			1			1																										
161			3.5	M	P												3						V			V	1										
162			4.5	M	P						1												2				3										3	
163			8.5	M	P			1																													1	
164						TEMPORARY OBSTACLE																																	
165			12	M	P																																
166			14	M	P																																
167			14	M	P																																
168			15	M	P																																
169			13.5	M	P																																
170			5	R	P						1																1										
171			3	M	P			1	1		3																										
172			4.5	M	P						2												V				1										1	
173			7	M	P																								2								
174			10	M	P																						1										
175			12	M	P				1																												
176			14	M	P																																
177						DEEP																															
178			15.5	M	P																																
179			13	M	P																						1										
180			7	M	P			2	1		1																										
181						NONNAVIGABLE (PLANTS)													V	V																			
182			4.5	M	P						1						2						V														
183			5.5	M	P						1																1										2	
184			7	M	P				1		1																										
185			7	M	P			1																					1		1						2	
186			13	M	P																																
187						DEEP																															
188						DEEP																															
189						DEEP																															
190			12	M	P																						1										
191			5	R	P																						1							V			
192						NONNAVIGABLE (PLANTS)																																	
193			4.5	M	P		V				1						1			V							2										3	
194			3	M	P		1	1	1										1	1							1						1			1	2	
195						TEMPORARY OBSTACLE																																	
196			12	M	P																																
197						DEEP																															
198						DEEP																															
199						DEEP																															
200			11	M	P																															1	

Sampling point	Lattitude (Decimal degrees)	Longitude (Decimal degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Comments	Brasenia schreberi,Watershield	Ceratophyllum demersum,Coontail	Chara ,Muskgrasses	Eleocharis acicularis,needle spikerush	Elodea canadensis,Common waterweed	Heteranthera dubia,Water star-grass	Lemna trisulca,Forked duckweed	Megalodonta beckii,Water marigold	moss	Myriophyllum sibiricum,Northern water milfoil	Najas flexilis,Bushy pondweed	Nitella sp.,Nitella	Nuphar variegata,Spatterdock	Nymphaea odorata,White water lily	Pontederia cordata,Pickerelweed	Potamogeton alpinus,Alpine pondweed	Potamogeton amplifolius,Large-leaf pondweed	Potamogeton friesii,Frie's pondweed	Potamogeton gramineus,Variable pondweed	Potamogeton natans,Floating-leaf pondweed	Potamogeton pusillus,Small pondweed	Potamogeton richardsonii,Clasping-leaf pondweed	Potamogeton robbinsii,Robbins pondweed	Potamogeton strictifolius,Stiff pondweed	Potamogeton zosteriformis,Flat-stem pondweed	Sagittaria sp.	Sparganium americanum,American bur-reed	Sparganium fluctuans ,Floating-leaved bur-reed	Sparganium sp.	Utricularia intermedia,Flat-leaf bladderwort	Utricularia minor,Small bladderwort	Utricularia vulgaris,Common	Vallisneria americana,Wild celery	sp1 - freshwater sponge
201			3	M	P		2	1			1						1			1			1			1	2		1									1	
202			5	M	P				1		1												2				1		1									1	1
203			3	M	P		1		1		1						1			1	V		1				2						1				1	
204						TEMPORARY OBSTACLE																																	
205			12.5	M	P																																	
206						DEEP																																
207						DEEP																																
208						DEEP																																
209			8	M	P																																2	
210			3	M	P		1	1			1						1			3					1									2		2		
211			4.5	M	P						1									V																	
212			3.5	M	P		1		2		1			3									1				1									1	
213			3	M	P		2		1		1			1			2		1	V			1						1							1	
214						NONNAVIGABLE (PLANTS)																																	
215			8	M	P																								1							1	
216			10	M	P																																
217			10	M	P																										1						
218			12	M	P			2																			1				1						
219			12	M	P																																
220			1	S	P			1			1								V														3				
221			2	M	P		3				2								V								2		1								
222			4	M	P		3										1			V			1				1										
223			3.5	M	P		1		1								2			3			1													1	
224			3.5	M	P				3		3						2								1		1		1								
225			3	M	P				3		1						1	1		3			2			1			1							1	1
226			2	R	P			2	1		1	1		1			2					1		1	1		1					1	1		1	1	1	1
227			5.5	M	P				1		2			1									V													1	
228			5.5	M	P						1												1								2					1	
229			8	M	P																								1								
230			7	M	P						2																									1	
231						NONNAVIGABLE (PLANTS)													V	V																		
232			3	M	P		2		3		1									1							1									1	
233			4	M	P		1		3								1			V							1									1	
234			4	M	P		1										3			V							1									1	
235			4.5	M	P		1		1		1												1														
236			4	M	P		2		2		2						2			3																	
237			3	S	P			1	1	1															1												
238			4.5	M	P			2			3																										
239			5	M	P			1																					1							1	
240			6	M	P																						3									3	
241			2	S	P																						1					V					
242						NONNAVIGABLE (PLANTS)																																	
243			2.5	M	P		2		1											3			1														
244			4.5	M	P		V		2		1																1									1	
245			4.5	M	P		V		2											V																	
246			5	M	P		2										1			V							1									1	
247			5	M	P		2																														
248			5	M	P						3																									1	
249			5	M	P						2						1																			3	
250						NONNAVIGABLE (PLANTS)																																	
251						NONNAVIGABLE (PLANTS)																																	
252						NONNAVIGABLE (PLANTS)																																	
253			2.5	M	P			1	1		1						1			3						1									2		2		
254			3	M	P		V		1		1						3			V																2	
255			4	M	P		V										2																			3	
256			4.5	M	P		2		1								1														3					2	
257			5	M	P			1	1		3			1			1						1														
258			3	R	P				1	1	1																										
259			1.5	R	P																				2							1					
260						NONNAVIGABLE (PLANTS)																																	
261						NONNAVIGABLE (PLANTS)																																	
262			3	M	P				2		1						2			3			1			3	2									2	
263			4	M	P		V	1			2			1			1		V																		
264			4	M	P												1						3													1	
265			4.5	M	P			2			2												3						2								
266						NONNAVIGABLE (PLANTS)																																	
267						NONNAVIGABLE (PLANTS)																																	
268			3	M	P		3		1		1									V																
269			3	M	P		1		1		1						2			V																
270			2	M	P		V		1		1			1			3		V	V																
271			3	M	P			2	2	1	2																		2								1
272						NONNAVIGABLE (PLANTS)																																	
273			2	M	P				1		1					1				2			2			1			1						1	1	
274						NONNAVIGABLE (PLANTS)																																	
275						NONNAVIGABLE (PLANTS)																																	
276						NONNAVIGABLE (PLANTS)																																	
277						NONNAVIGABLE (PLANTS)																																	
278						NONNAVIGABLE (PLANTS)																																	



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Lake Management Planning
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Sources:
Roads & Hydro: WDNR
Point-Intercept Locations: WDNR ISS
Map date: May 27, 2008

Extent of large map shown in red.

Legend

\# Point-intercept Sample Location

Appendix E

Middle Gresham Lake
Vilas County, Wisconsin

Point-intercept Sample Locations

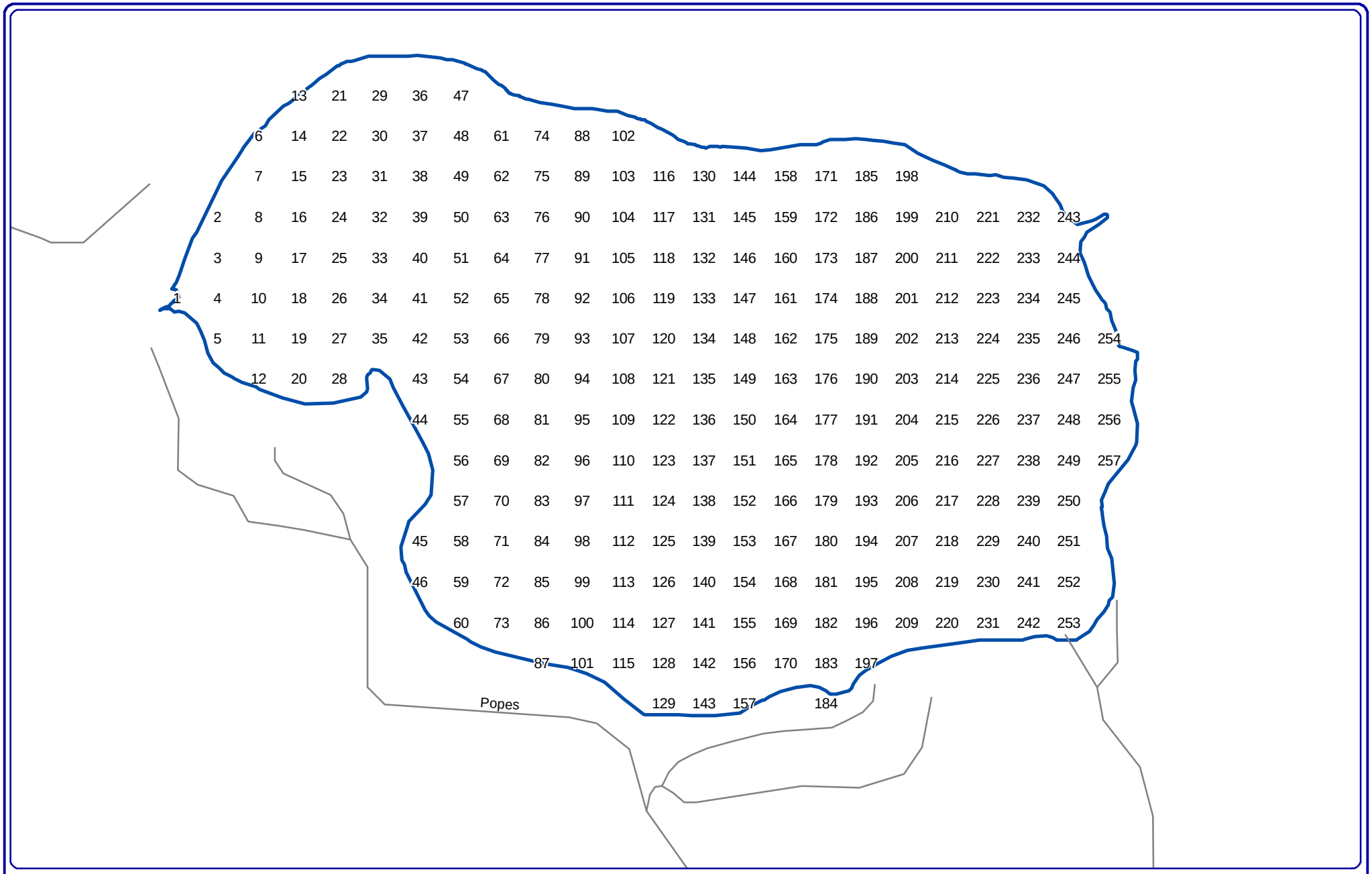
Sampling point	Lattitude (Decimal degrees)	Longitude (Decimal degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Comments	*Nymphaea odorata*	*Nuphar variegata*	*Brasenia schreberi*	*Vallisneria americana*	*Elodea canadensis*	*Ceratophyllum demersum*	*Nitella sp.*	*Potamogeton zosteriformis*	*Potamogeton praelongus*	*Potamogeton amplifolius*	*Potamogeton richardsonii*	*Potamogeton gramineus*	*Potamogeton robbinsii*	*Potamogeton natans*	*Myriophyllum sibiricum*	*Sparganium emersum (chlorocarpum)*	*Sagittaria latifolia*	*Sagitaria sp. (rosette)*	*Pontederia cordata*	*Megalodonta beckii*	*Juncus pelocarpus*	*Lemna trisulca*
1			2	M	P					2	1		1															
2			3	M	P		1	1		1		1		1					1									
3			5	M	P						1	1	1				1											
4			3	M	P														3									
5			4	M	P						2																	
6			2	S	P					1				1					1					1				
7			5	M	P						1			1					1									
8			6	M	P						1								3									
9			6	M	P									1					3									
10			6	M	P						1								3									
11			5	M	P						1	1					2		2									
12			3	M	P			2		1	1																	
13			1	S	P					1						1								1			1	
14			6	M	P						1	1							1									
15			6	M	P										1				2									
16			8	M	P							1		1					1									
17			7	M	P							1		1	2		1											
18			7	M	P									1					2		1							
19			6	M	P						1			1					3									
20			5	M	P						2			1					1									
21			6	M	P														3									
22			7	M	P									1		1			1									
23			8	M	P									1					2									
24			9	M	P									1					1									
25			8	M	P									1					2									
26			8	M	P						1	1		1					2									
27			6	M	P														2									
28			4	M	P					1	1																	
29			7	M	P														2									
30			10	M	P														3									
31			10	M	P						1	1		2					1									
32			10	M	P									1					2									
33			10	M	P									1					3									
34			9	M	P						1	1		1					2									
35			7	M	P														2									
36			8	M	P						1	1		1														
37			10	M	P							1		1					1									
38			10	M	P							1		1					1									
39			10	M	P						1			1					2									
40			10	M	P						1								2									
41			9	M	P							1		1					1									
42			8	M	P							1		2			1		1									
43			6	M	P						1	1		1					1									
44			1	M	P			1		1				1					1		1	1			1			
45			4	M	P					1				1		1	1		1									
46			3	M	P		1		1	2	1	1		1					1					1				
47			8	M	P									1					3									
48			10	M	P									1					3									
49			13	-	R									1					1									
50			14	-	R						1								1									
51			13	-	R									1					1									
52			10	M	P							1		1	2				1									
53			8	M	P							1		1					1									
54			8	M	P						1								2									
55			6	M	P						1								1									
56			5	M	P					1	1																	
57			6	M	P						1			1					1									
58			6	M	P							1							3									
59			6	M	P						2	1		1					1									
60			3	M	P		1		1	1	1	1		1		1			1									
61			9	M	P														2									
62			13	-	R																							
63			14	-	R																							

Sampling point	Lattitude (Decimal degrees)	Longitude (Decimal degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Comments	*Nymphaea odorata*	*Nuphar variegata*	*Brasenia schreberi*	*Vallisneria americana*	*Elodea canadensis*	*Ceratophyllum demersum*	*Nitella sp.*	*Potamogeton zosteriformis*	*Potamogeton praelongus*	*Potamogeton amplifolius*	*Potamogeton richardsonii*	*Potamogeton gramineus*	*Potamogeton robbinsii*	*Potamogeton natans*	*Myriophyllum sibiricum*	*Sparganium emersum (chlorocarpum)*	*Sagittaria latifolia*	*Sagitaria sp. (rosette)*	*Pontederia cordata*	*Megalodonta beckii*	Juncus pelocarpus	Lemna trisulca
64			14	-	R																							
65			12	-	R									1					1									
66			10	M	P									1					1									
67			9	M	P									1					2									
68			8	M	P						1	1		1	1				2									
69			8	M	P						1	1		1					2									
70			8	M	P							1			1		1		1									
71			8	M	P							1		1					1									
72			6	M	P						1	1		1					2									
73			5	M	P						2	1							1									
74			8	M	P									3					1									
75			12	-	R														3									
76			14	-	R						1	1		1	1													
77			13	-	R						1	1		1														
78			10	M	P									1					1									
79			10	M	P									1					1									
80			10	M	P									2					1									
81			9	M	P									1					1									
82			8	M	P						1								3									
83			8	M	P						1	1		1	2				1									
84			7	M	P									1					3									
85			6	M	P						1				1				2									
86			4	M	P						1								2									
87			2	S	V					1				1					1		1							
88			8	M	P									3					1									
89			10	M	P														1									
90			14	-	R							1																
91			12	-	R														2									
92			10	M	P							1							1									
93			10	M	P									1					1									
94			10	M	P							1		1					2									
95			10	M	P									1					1									
96			8	M	P									1	2				1									
97			8	M	P							1		1	1				1									
98			8	M	P							1			1				1									
99			8	M	P							1		1					1									
100			6	M	P					1	1			1					2									
101			4	S	P					1				1					2									
102			8	M	P							1		1					3									
103			10	M	P							1		2					1									
104			14	-	R						1	1		1					1									
105			10	M	P														1									
106			10	M	P						1	1		1					1									
107			10	M	P						1	1		1	1				1									
108			10	M	P	NV					1			2					1									
109			10	M	P	NV						1		1					2									
110			8	M	P	NV						1							2									
111			8	M	P						1	1		1					2									
112			8	M	P							1			1				1									
113			8	M	P						1								3									
114			6	M	P					1	1			1	1	1			1									
115			6	M	P																							
116			9	M	P						1	1		1					1									
117			11	M	P														1									
118			13	-	R							1		1					2									
119			11	-	R							1							3									
120			10	M	P									1					1									
121			10	M	P									2					1									
122			9	M	P										1				1									
123			9	M	P									1	1				3									
124			10	M	P							1		1					1									
125			9	M	P							1		1					1									
126			8	M	P							1		1					2									

Sampling point	Lattitude (Decimal degrees)	Longitude (Decimal degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Comments	*Nymphaea odorata*	*Nuphar variegata*	*Brasenia schreberi*	*Vallisneria americana*	*Elodea canadensis*	*Ceratophyllum demersum*	*Nitella sp.*	*Potamogeton zosteriformis*	*Potamogeton praelongus*	*Potamogeton amplifolius*	*Potamogeton richardsonii*	*Potamogeton gramineus*	*Potamogeton robbinsii*	*Potamogeton natans*	*Myriophyllum sibiricum*	*Sparganium emersum (chlorocarpum)*	*Sagittaria latifolia*	*Sagitaria sp. (rosette)*	*Pontederia cordata*	*Megalodonta beckii*	Juncus pelocarpus	Lemna trisulca
127			8	M	P									1	1				3									
128			6	M	P						1								2									
129			3	M	P					1									1									
130			8	M	P							1		1					1		1							
131			10	M	P						1								1									
132			12	-	R									1					2									
133			10	M	P							1		1	1				1									
134			10	M	P									1					1									
135			9	M	P						1	1		1	1				1									
136			8	M	P						1	1		1	1				2									
137			10	M	P						1	1		2					1									
138			10	M	P									1														
139			9	M	P									1					3									
140			8	M	P						1	1		1					2									
141			8	M	P										1				2									
142			5	M	P						1				1				3									
143			4	M	P					2									1									
144			7	M	P							1				1			1									
145			10	M	P									1					1									
146			10	M	P							1		1					1									
147			10	M	P							1							1									
148			10	M	P							1		2					1									
149			9	M	P							3							1									
150			8	M	P							1		1	1		1		1									
151			9	M	P							1		1					1									
152			9	M	P									1					2									
153			9	M	P						1			2	1				1									
154			8	M	P							1							1									
155			6	M	P							1			1				1									
156			6	M	P									1					3									
157			1	M	P		1				1	1		1			1		1									
158			6	M	P							1		1					2									
159			8	M	P							1							2									
160			10	M	P						1	1			2				1									
161			10	M	P									1					1									
162			8	M	P							1		1	1				1									
163			9	M	P									2					1									
164			8	M	P							1		3			1		1									
165			8	M	P							1		2					1									
166			8	M	P									2	2				1									
167			8	M	P									3	1				1									
168			8	M	P									1	1				2									
169			6	M	P										1		2		1									
170			6	M	P								1															
171			6	M	P						1	1		1		2			1									
172			6	M	P							1			2				1									
173			9	M	P							1		1					1									
174			9	M	P							1		1					1									
175			8	M	P							1		1					1									
176			10	M	P									1	1				1									
177			10	M	P									1					1									
178			9	M	P							1		1	1				1									
179			8	M	P									1					1									
180			8	M	P														1									
181			7	M	P									1					1									
182			6	M	P						1			1					3									
183			6	M	P					2	1			1		1			1									1
184						on shore																						
185			4	M	P						1			1					2									
186			6	M	P							1			2				2									
187			7	M	P							1		1					1									
188			8	M	P						1			1					2									
189			6	M	P							1		1	1		3		1									

Sampling point	Lattitude (Decimal degrees)	Longitude (Decimal degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Comments	*Nymphaea odorata*	*Nuphar variegata*	*Brasenia schreberi*	*Vallisneria americana*	*Elodea canadensis*	*Ceratophyllum demersum*	*Nitella sp.*	*Potamogeton zosteriformis*	*Potamogeton praelongus*	*Potamogeton amplifolius*	*Potamogeton richardsonii*	*Potamogeton gramineus*	*Potamogeton robbinsii*	*Potamogeton natans*	*Myriophyllum sibiricum*	*Sparganium emersum (chlorocarpum)*	*Sagittaria latifolia*	*Sagitaria sp. (rosette)*	*Pontederia cordata*	*Megalodonta beckii*	*Juncus pelocarpus*	*Lemna trisulca*
190			8	M	P									1					2									
191			8	M	P									2	2				1									
192			8	M	P									2	1				1									
193			8	M	P							1		1					1									
194			8	M	P						1	1							2									
195			6	M	P														2									
196			5	M	P						1	3		1					1									
197			3	M	P					1				1		1	1		1		1							
198			4	M	P						1	1		1					3									
199			6	M	P						1	3							1									
200			6	M	P							1		1					2									
201			6	M	P							1		1	1				1									
202			7	M	P									1					2									
203			6	M	P									1	2				1									
204			6	M	P									1	2				2									
205			8	M	P						1	1		1					1									
206			8	M	P							1		2	1				1									
207			8	M	P										1				1									
208			6	M	P						1			1					3									
209			6	M	P					1	1	1					1		1									
210			5	M	P						2	1		1					1									
211			5	M	P						1	1		1					2									
212			6	M	P						1	1		1	2				1									
213			7	M	P							1		1	1													
214			8	M	P							1		1					1									
215			6	M	P						1	1		1	2				1									
216			6	M	P					3					1				1									
217			8	M	P							1		1					2									
218			6	M	P						1	1		1	1				2									
219			6	M	P									1					2									
220			5	M	P									1					3									
221			5	M	P						1			1					2									
222			4	M	P						2			1					1									
223			5	M	P						1								2									
224			4	M	P							1		1		1			1									
225			7	M	P						1	1		1					1									
226			6	M	P									2					1									
227			5	M	P						1	1		1	2		1		2									
228			7	M	P						1								2									
229			4	M	P					3	1	1							1									
230			5	M	P					2	1	1			1				1									
231			3	M	P					1	1			1			1		1									
232			3	M	P						1	1		1		1			1		1							
233			5	M	P						1	1		1					1									
234			5	M	P						2								2									
235			5	M	P						1	1		1					2									
236			5	M	P						1	1		2					1									
237			5	M	P						1			1	1													
238			4	M	P							1		1	1				2									
239			5	M	P						1			1		1			2									
240			4	M	P									1	1				3									
241			5	M	P						1	1							2		1							
242			3	M	P					1		1					2		1									
243			2	M	V		1	1			1	1								1	1		1		1	2		1
244			2	M	V						1	1		1	1	1	1		1							1		
245			2	M	V						1	1		1	1	1	1		1									
246			5	M	P						1			1		1			1									
247			5	M	P						3			1					1									
248			4	M	P						2	1		1					2									
249			5	M	P					1	1	1		1					2		1							
250			5	M	P					1	1			1		1			1		1							
251			6	M	P						1			1			2											
252			4	M	P						1	1		1					3									

Sampling point	Lattitude (Decimal degrees)	Longitude (Decimal degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Comments	*Nymphaea odorata*	*Nuphar variegata*	*Brasenia schreberi*	*Vallisneria americana*	*Elodea canadensis*	*Ceratophyllum demersum*	*Nitella sp.*	*Potamogeton zosteriformis*	*Potamogeton praelongus*	*Potamogeton amplifolius*	*Potamogeton richardsonii*	*Potamogeton gramineus*	*Potamogeton robbinsii*	*Potamogeton natans*	*Myriophyllum sibiricum*	*Sparganium emersum (chlorocarpum)*	*Sagittaria latifolia*	*Sagitaria sp. (rosette)*	*Pontederia cordata*	*Megalodonta beckii*	Juncus pelocarpus	Lemna trisulca
253			3	M	P														2		1							
254			2	M	V			1			1	1		1					1									
255			2	M	V			1			1	1		1		1			1									
256			2	M	V									1		1			1		1							
257			3	M	P			1		1	1	1		1					1									



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500
Feet

Onterra LLC
Lake Management Planning
135 South Broadway Suite C
De Pere, WI 54115
920.338.8860
www.onterra-eco.com

Sources:
Roads & Hydro: WDNR
Point-Intercept Locations: WDNR ISS

Map date: May 27, 2008

Extent of large map shown in red.

Legend

\# Point-intercept Sample Location

Appendix E

Lower Gresham Lake
Vilas County, Wisconsin

Point-intercept Sample Locations

F

APPENDIX F

2007 Upper Gresham Lake Treatment Monitoring Data

Number	Longitude (Decimal Degrees)	Latitude (Decimal Degrees)	Depth (ft)	Sediment type	Rope (R); Pole (P); Visual (V)	*Myriophyllum spicatum*	Potamogeton robbinsii	Ceratophyllum demersum	Elodea canadensis	Potamogeton amplifolius	Myriophyllum sibericum	Potamogeton praelongis	Potamogeton zosteriformis	Eleocharis acicularis
1	-89.73306672	46.07059915	9	M	P	2						1		
2	-89.73332533	46.07059976	8	M	P	1		1			1			
3	-89.73358395	46.07060036	14	M	R									
4	-89.73384257	46.07060096	9	M	P	2		1						
5	-89.73306758	46.07041915	9	M	P		1	1			1		1	
6	-89.7333262	46.07041975	8	M	P	2		1						
7	-89.73358482	46.07042036	11	M	P	2		1						
8	-89.73384343	46.07042096	11	M	P		2	1						
9	-89.74490019	46.06857617	10	S	P	1								
10	-89.74510993	46.06847086	8	S	P	2		1						
11	-89.74531966	46.06836556	7	S	P	2		1						
12	-89.7455294	46.06826025	10	S	P									
13	-89.74903427	46.06762192	8	M	P		1	1	1		1			
14	-89.749244	46.0675166	9	M	P		3							
15	-89.74945372	46.06741129	9	M	P		3		1					
16	-89.74966344	46.06730597	6	M	P		3							
17	-89.74987316	46.06720066	6	M	P	1	2							
18	-89.74888297	46.06747594	10	M	P		2	1	1					
19	-89.7490927	46.06737062	10	M	P	1	1							

Number	Longitude (Decimal Degrees)	Latitude (Decimal Degrees)	Depth (ft)	Sediment type	Rope (R); Pole (P); Visual (V)	*Myriophyllum spicatum*	Potamogeton robbinsii	Ceratophyllum demersum	Elodea canadensis	Potamogeton amplifolius	Myriophyllum sibericum	Potamogeton praelongis	Potamogeton zosteriformis	Eleocharis acicularis
20	-89.74930242	46.06726531	9	M	P		3		1					
21	-89.74951214	46.06715999	9	M	P		1							
22	-89.74972186	46.06705468	5	M	P		3			1				
23	-89.74926686	46.06420383	9	M	P		3							
24	-89.74901746	46.06415627	11	M	P	2								
25	-89.74876806	46.06410872	10	M	P	1								
26	-89.74851866	46.06406116	14	M	R			1						
27	-89.74826926	46.0640136	14	M	R									
28	-89.74933517	46.06403022	6	M	P	1	2			1				
29	-89.74908577	46.06398267	9	M	P	2	1							
30	-89.74883638	46.06393511	9	M	P	2								
31	-89.74858698	46.06388755	12	M	R	1	1							
32	-89.74833758	46.06383999	13	M	R	1	1							
33	-89.74756794	46.06379539	8	M	P		1	1						
34	-89.74731854	46.06374782	6	M	P	2		1						
35	-89.74706914	46.06370026	10	M	P	2								
36	-89.74681975	46.0636527	9	M	P		1							
37	-89.74657035	46.06360514	5	M	P	1	1		1	1		1		
38	-89.74763626	46.06362178	4	M	P		2			1				

Number	Longitude (Decimal Degrees)	Latitude (Decimal Degrees)	Depth (ft)	Sediment type	Rope (R); Pole (P); Visual (V)	*Myriophyllum spicatum*	Potamogeton robbinsii	Ceratophyllum demersum	Elodea canadensis	Potamogeton amplifolius	Myriophyllum sibericum	Potamogeton praelongis	Potamogeton zosteriformis	Eleocharis acicularis
39	-89.74738686	46.06357422	2	S	P									1
40	-89.74713747	46.06352666	2	M	P		1							
41	-89.74688807	46.0634791	4	M	P		2							
42	-89.74663868	46.06343153	7	M	P		3							

Number	Longitude (Decimal Degrees)	Latitude (Decimal Degrees)	Depth (ft)	Sediment type	Rope (R); Pole (P); Visual (V)	*Myriophyllum spicatum*	*Potamogeton robbinsii*	*Ceratophyllum demersum*	*Elodea canadensis*	*Vallisneria americana*	*Potamogeton praelongis*	*Potamogeton richardsonii*	*Myriophyllum sibericum*	*Potamogeton zosteriformis*	*Chara sp.*	*Potamogeton amplifolius*	*Potamogeton pusillus*	*Megalodonta beckii*	*Eleocharis acicularis*
1	-89.73306672	46.07059915	7	M	P		1		1		1	1							
2	-89.73332533	46.07059976	8	M	P		1	1	1		1	1							
3	-89.73358395	46.07060036	8	M	P			1			1		2						
4	-89.73384257	46.07060096	9	R	P	1							1						
5	-89.73306758	46.07041915	8	M	P		1										1		
6	-89.7333262	46.07041975	8	R	P		1	1	1		1			1					
7	-89.73358482	46.07042036	9	M	P			1	1		1								
8	-89.73384343	46.07042096	10	M	P		2	1				1							
9	-89.74490019	46.06857617	12		R														
10	-89.74510993	46.06847086	6	S	P														
11	-89.74531966	46.06836556	7	S	P			3											
12	-89.7455294	46.06826025	8	S	P	2		1					1						
13	-89.74903427	46.06762192	8	M	P		1	1	1				1						
14	-89.749244	46.0675166	8	M	P		2		1										
15	-89.74945372	46.06741129	8	M	P		3												
16	-89.74966344	46.06730597	7	M	P		2		1										
17	-89.74987316	46.06720066	5	M	P		1												
18	-89.74888297	46.06747594	9	M	P		1	1			1								
19	-89.7490927	46.06737062	9	M	P		1												
20	-89.74930242	46.06726531	9	M	P		2							1					
21	-89.74951214	46.06715999	8	M	P		3												
22	-89.74972186	46.06705468	6	M	P		2												
23	-89.74926686	46.06420383	10	M	P		3		1										
24	-89.74901746	46.06415627	10	M	P		3												
25	-89.74876806	46.06410872	11	M	P			1											

Number	Longitude (Decimal Degrees)	Latitude (Decimal Degrees)	Depth (ft)	Sediment type	Rope (R); Pole (P); Visual (V)	*Myriophyllum spicatum*	*Potamogeton robbinsii*	*Ceratophyllum demersum*	*Elodea canadensis*	*Vallisneria americana*	*Potamogeton praelongis*	*Potamogeton richardsonii*	*Myriophyllum sibericum*	*Potamogeton zosteriformis*	*Chara sp.*	*Potamogeton amplifolius*	*Potamogeton pusillus*	*Megalodonta beckii*	*Eleocharis acicularis*
26	-89.74851866	46.06406116	13	M	P														
27	-89.74826926	46.0640136	13	M	P														
28	-89.74933517	46.06403022	5	M	P	1	1					1				1		1	
29	-89.74908577	46.06398267	8	M	P		1			1									
30	-89.74883638	46.06393511	10	M	P	1													
31	-89.74858698	46.06388755	11	M	P														
32	-89.74833758	46.06383999	12	M	P		1							1			1		
33	-89.74756794	46.06379539	8	M	P		1	1		1		1							
34	-89.74731854	46.06374782	9	M	P	1		2											
35	-89.74706914	46.06370026	9	M	P	1		1		1									
36	-89.74681975	46.0636527	9	M	P		1			1									
37	-89.74657035	46.06360514	5	M	P	2									1				
38	-89.74763626	46.06362178	3	M	P										1	1			
39	-89.74738686	46.06357422	3	M	P														1
40	-89.74713747	46.06352666	3	M	P		2			1									
41	-89.74688807	46.0634791	4	M	P		2			1									
42	-89.74663868	46.06343153	6	M	P		1			1									