A

APPENDIX A

Public Participation Materials

Presentation Outline

- Onterra, LLC
- Why Create a Management Plan?
- Elements of a Lake Management Planning Project
  - Data & Information
  - Planning Process

Onterra LLC Lake Management Planning

Onterra, LLC

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

Onterra LLC Lake Management Planning

Why create a lake management plan?

- To create a better understanding of the lake's positive and negative attributes.
- To discover ways to minimize the negative attributes and maximize the positive attributes.
- To foster realistic expectations and dispel myths.
- To create a snapshot of the lake for future reference and planning.

A goal without a plan is just a wish!

Onterra LLC Lake Management Planning

Elements of an Effective Lake Management Planning Project

Data and Information Gathering

Environmental & Sociological

Planning Process

Brings it all together

Onterra LLC Lake Management Planning

Data and information gathering

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

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Water Quality Analysis

- General water chemistry (current & historical)
  - Collecting at 2 sites
- Nutrient analysis
  - Lake trophic state (Eutrophication)
  - Limiting plant nutrient
- Supporting data for watershed modeling

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Watershed Assessment

- Delineation of drainage basin
- Modeling
  - Land cover
  - Phosphorus loading
  - Scenario development

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Aquatic Plant Surveys

- Concerned with both native and non-native plants
- Multiple surveys used in assessment
  - Point-intercept survey
  - Aquatic plant community mapping

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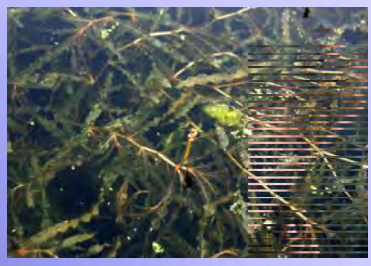
Non-native Aquatic Plants

Curly-leaf Pondweed



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Non-native Aquatic Plants

Eurasian Water Milfoil

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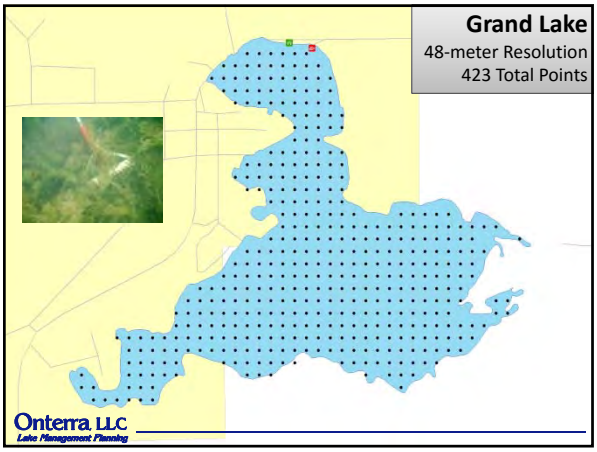

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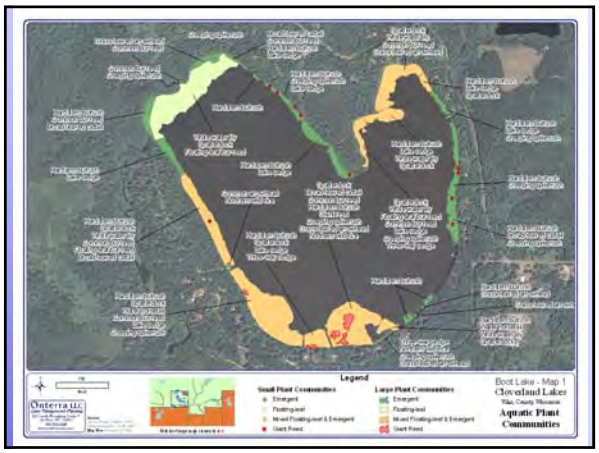

Fisheries Data Integration

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

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Shoreland Assessment

- Shoreland area is important for buffering runoff and provides valuable habitat for aquatic and terrestrial wildlife.
- Assessment ranks shoreland area from shoreline back 35 feet
- Assess shoreland development and habitat
  - Coarse woody habitat

Urbanized **Natural**

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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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Presentation Outline

- Lake Management Planning Project Overview
- Study Results
  - Water Quality
  - Watershed
  - Shoreland
  - Aquatic Plants
  - Fishery

  Stakeholder Survey
- "Big Picture"
- Next Steps

Onterra LLC Lake Management Planning

Management Planning Project Overview

- **Project Objective**: study Grand Lake and utilizing those findings, in conjunction with available historical data, develop a realistic management plan.
- Studies are complete, so the process to create the plan is beginning with this meeting.
  - **Meeting Goal**: Develop a solid understanding of Grand Lake among committee members and Onterra.
  - Second planning meeting will be used to develop framework of Implementation Plan.
- A part of the plan was likely to include the development of a lake association.

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Summary of Project Results

Water Quality
- Two water quality locations sampled during 2016 with very different results
- Phosphorus concentrations near the dam are *poor*, but chlorophyll-*a* & water clarity better than expected
- Dissolved oxygen levels near the dam were very poor during July & August
- It is a very complex story

Watershed & Immediate Shoreline
- Grand Lake has a very large watershed with the bulk of the land being used for agriculture
- Majority of immediate shoreland zone comprised of undeveloped shoreline

Aquatic Plant Community
- Much of the lake supports aquatic plant growth
- Curly-leaf pondweed dominates lake in spring and early summer
- Three native species dominate lake during summer
- Aquatic plant community of Grand Lake greatly impacts the lake's water quality and recreational use
- There are differences in the plant communities around the deep hole and in the rest of the lake

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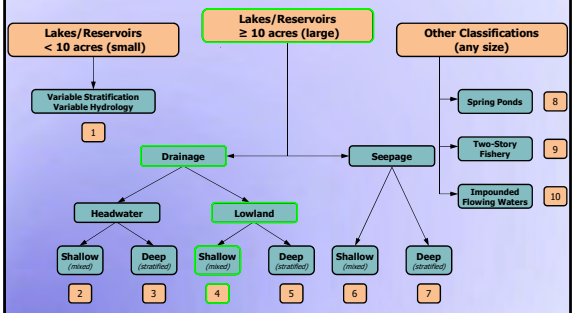
Wisconsin Lakes Natural Community Types



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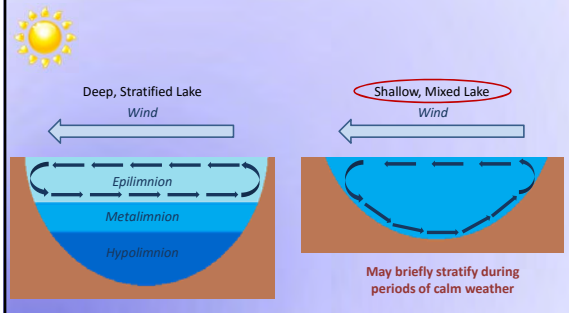
Wisconsin Lakes Classification



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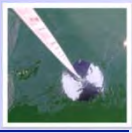
Introduction to Lake Water Quality

Phosphorus
Naturally occurring & essential for all life

Typical relationship between phosphorus & chlorophyll-*a* does not occur in Grand Lake

Pigment used in photosynthesis
Used as surrogate for phytoplankton biomass

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



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Water Quality

Wisconsin Ecoregions

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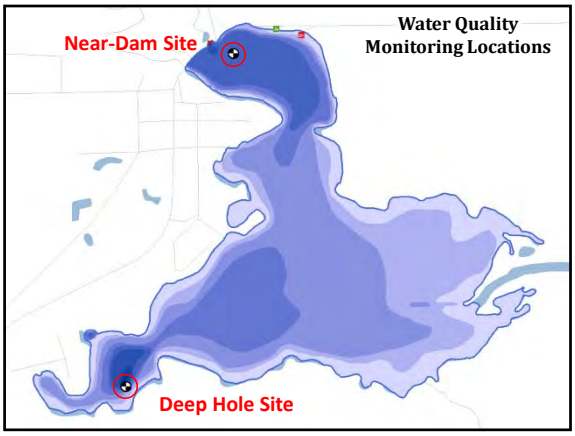
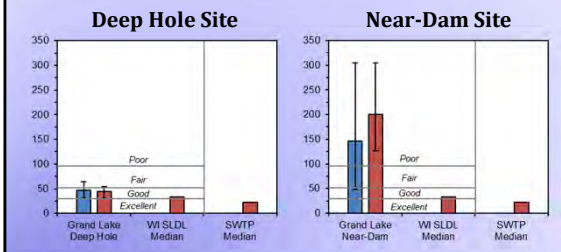


Total Phosphorus



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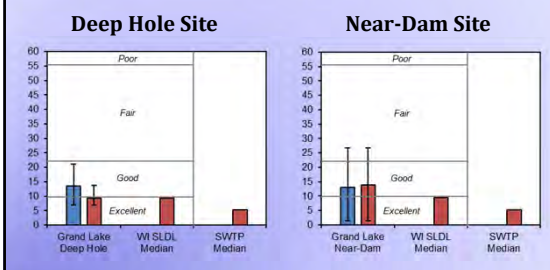
Chlorophyll-*a*



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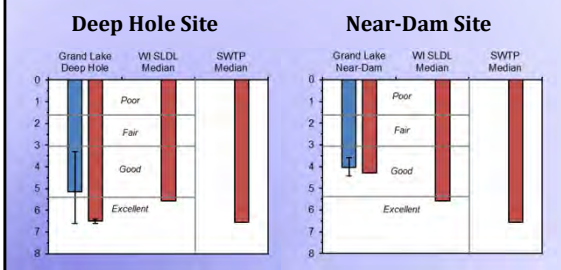
Secchi Disk Transparency



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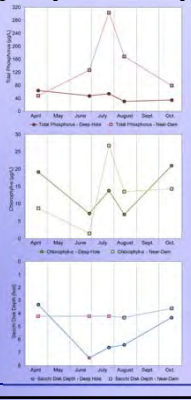
Water Quality Seasonal Dynamics



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Water Quality Seasonal Dynamics

Why do phosphorus concentrations increase in summer at the Near-Dam Site?

- Complicated interaction involving cycling of aquatic plants
  - First the exotic plant, curly-leaf pondweed
  - Second a mixture of native plants
- Curly-leaf pondweed dominates lake during spring and early summer – die off cause large influx of phosphorus spurring excessive growth of native duckweeds, coontail, and common waterweed, which are all native
- The native plants prevent light penetration, only provide oxygen to the very upper portion of the water column, and shade plant growth below.

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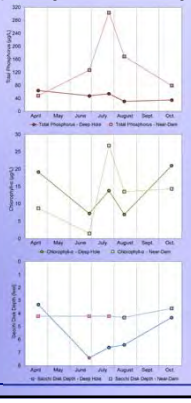
Water Quality Seasonal Dynamics



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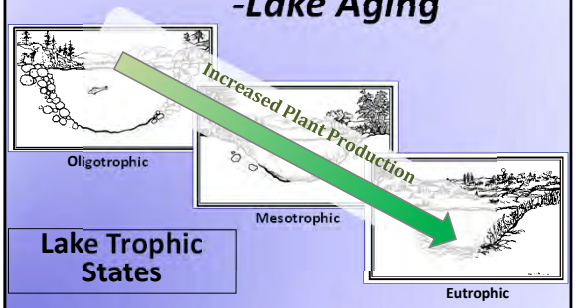
Eutrophication -Lake Aging



Lake Trophic States

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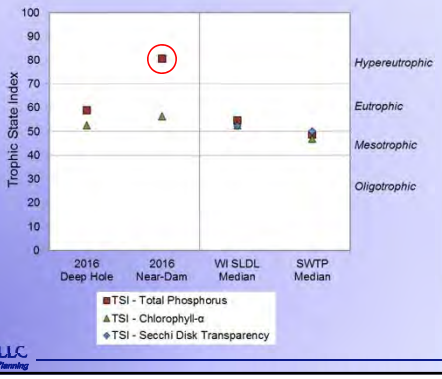
Trophic State Index



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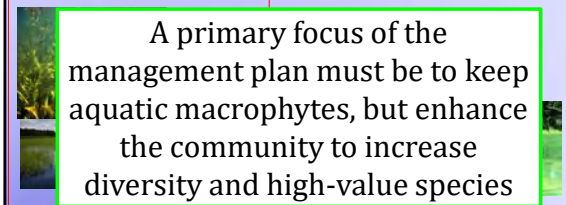
Shallow Lakes are Special

Clear State ***Turbid State***



A primary focus of the management plan must be to keep aquatic macrophytes, but enhance the community to increase diversity and high-value species

Aquatic Plants are Incredibly Important

Grand Lake

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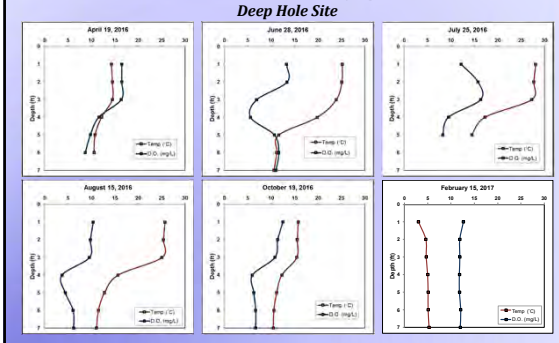
Dissolved Oxygen

Deep Hole Site



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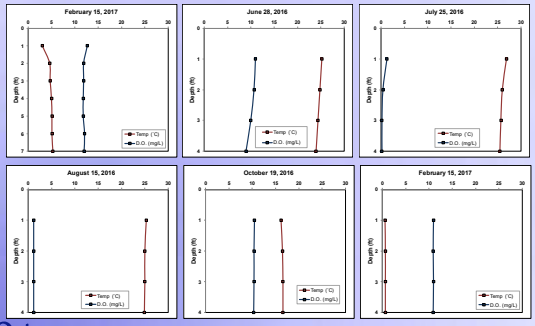
Dissolved Oxygen

Near-Dam Site



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Additional Water Quality Parameters

Alkalinity – capacity to resist fluctuations in pH

- Near-Dam Site 281 as mg/$CaCO_3$ in 2016
- Deep Hole Site 207 as mg/$CaCO_3$ in 2016

Calcium

- Near-Dam Site 63.1 mg/L in 2016
- Deep Hole Site 40.9 mg/L in 2016
- Along with pH (7.9-8.6), indicates water quality is suitable for zebra mussels
- Zebra mussel *veliger* samples were negative in 2016
- No adult zebra mussels observed

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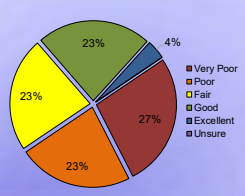
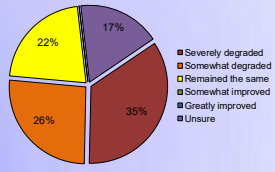
Grand Lake Stakeholder Perceptions of Water Quality

How would you describe the current water quality of Grand Lake?



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



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Watershed Assessment Procedure

Determine Watershed Area and Boundaries

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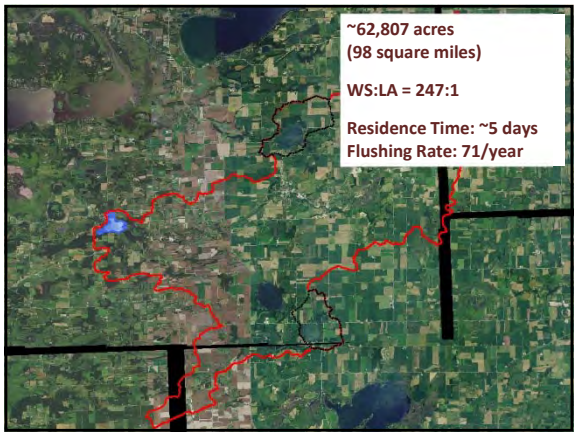

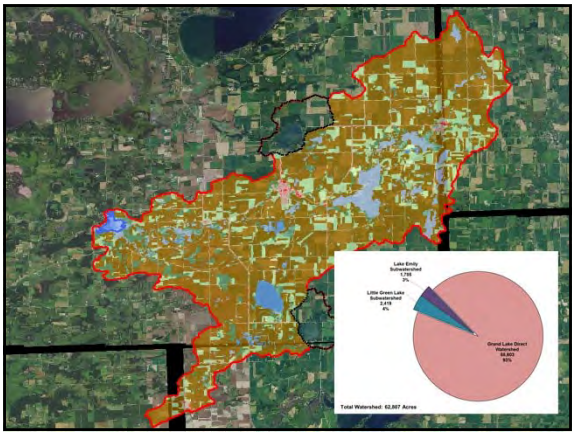

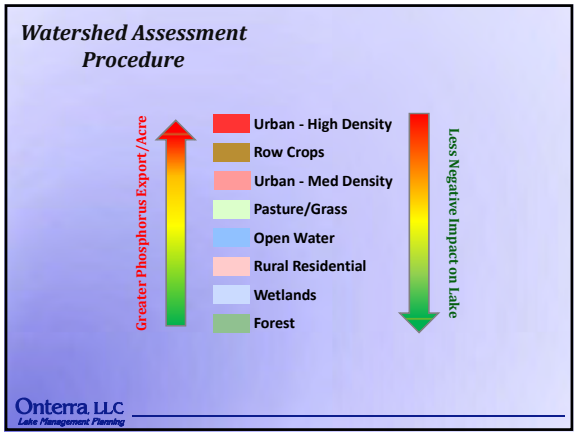
Watershed Assessment Procedure
Urban - High Density
Row Crops
Urban - Med Density
Pasture/Grass
Open Water
Rural Residential
Wetlands
Forest
Greater Phosphorus Export/Acre
Less Negative Impact on Lake
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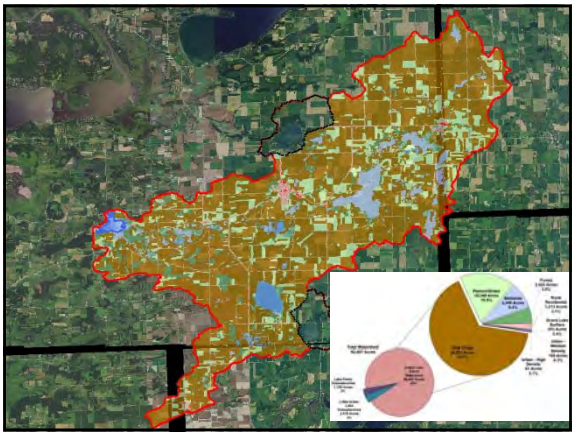

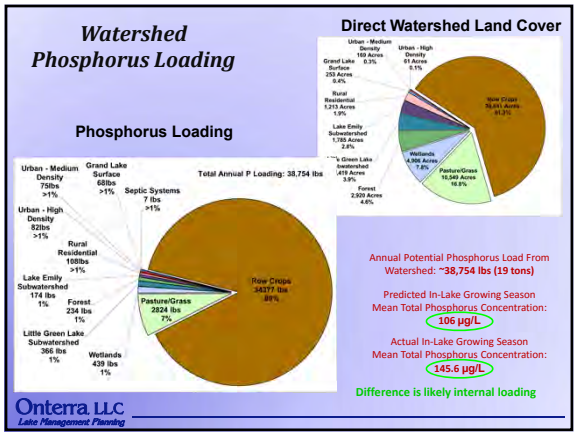
Watershed Phosphorus Loading
Direct Watershed Land Cover
Phosphorus Loading
Total Annual P Loading: 38,754 lbs
Annual Potential Phosphorus Load From Watershed: ~38,754 lbs (19 tons)
Predicted In-Lake Growing Season Mean Total Phosphorus Concentration:
106 µg/L
Actual In-Lake Growing Season Mean Total Phosphorus Concentration:
145.6 µg/L
Difference is likely internal loading
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Shoreland Assessment
Shoreland area is important for buffering runoff and provides valuable habitat for aquatic and terrestrial wildlife.
EPA National Lakes Assessment results indicate shoreland development has greatest negative impact to health of our nation's lakes.
It does not look at lake shoreline on a property-by-property basis.
Assessment ranks shoreland area from shoreline back 35 feet
Urbanized
Natural
Range
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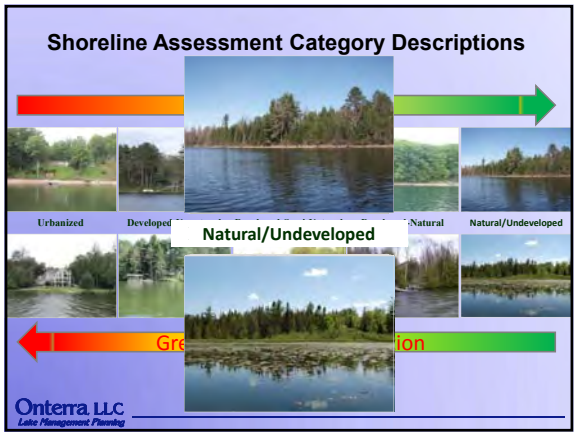
Shoreline Assessment Category Descriptions
Urbanized
Developed
Natural
Natural/Undeveloped
Natural/Undeveloped
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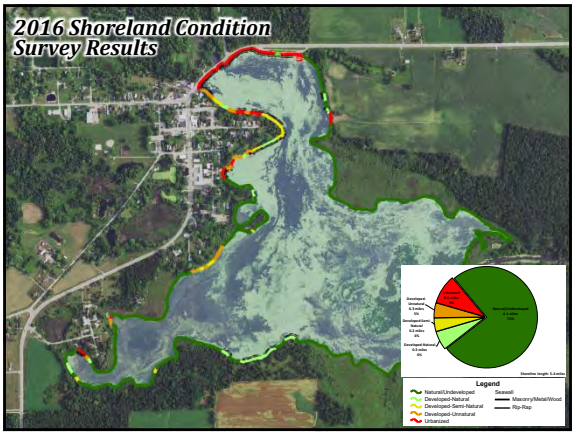
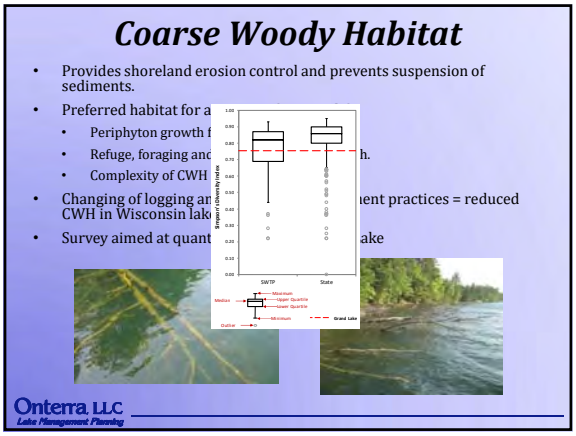

2016 Shoreland Condition Survey Results
Legend
Natural/Undeveloped
Developed-Natural
Developed-Semi-Natural
Developed-Unnatural
Urbanized
Seawall
Masonry/Metal/Wood
Rip-Rap


Coarse Woody Habitat
Provides shoreland erosion control and prevents suspension of sediments.
Preferred habitat for a
Periphyton growth f
Refuge, foraging and
Complexity of CWH
h.
Changing of logging an
ent practices = reduced CWH in Wisconsin lak
Survey aimed at quant
ake
SWTP
State
Grand Lake
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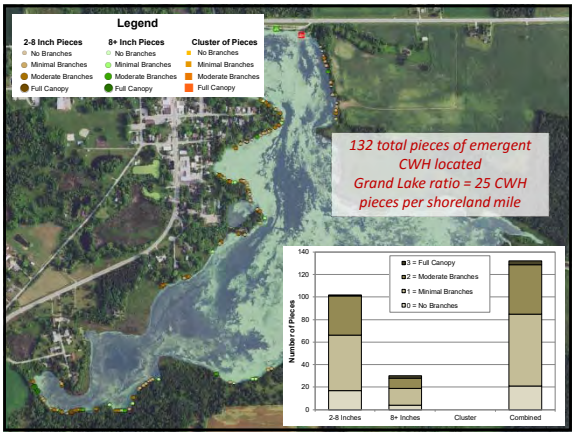
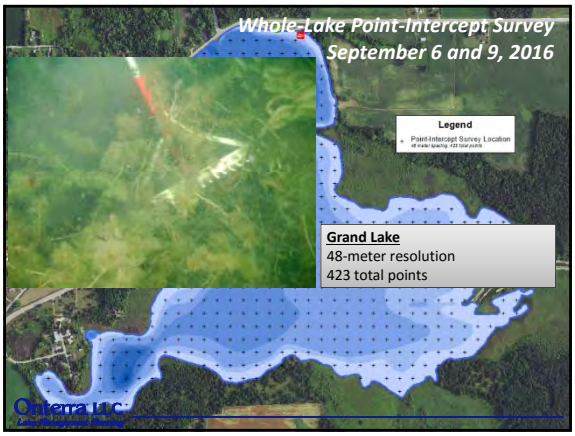

Legend
2-8 Inch Pieces
8+ Inch Pieces
Cluster of Pieces
No Branches
Minimal Branches
Moderate Branches
Full Canopy
132 total pieces of emergent CWH located
Grand Lake ratio = 25 CWH pieces per shoreland mile
3 = Full Canopy
2 = Moderate Branches
1 = Minimal Branches
0 = No Branches
Number of Pieces
2-8 Inches
8+ Inches
Cluster
Combined


Aquatic Plants


Whole-Lake Point-Intercept Survey
September 6 and 9, 2016
Legend
Point-Intercept Survey Location
Grand Lake
48-meter resolution
423 total points
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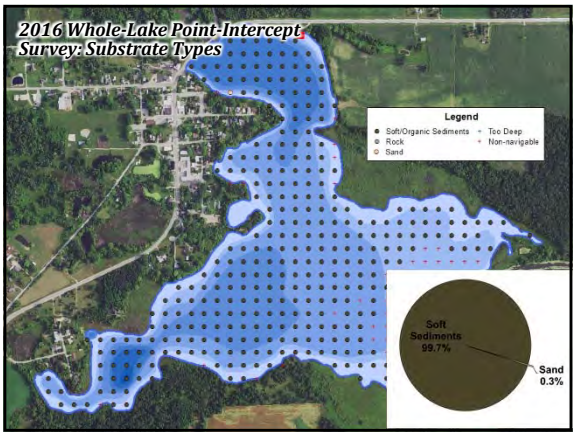
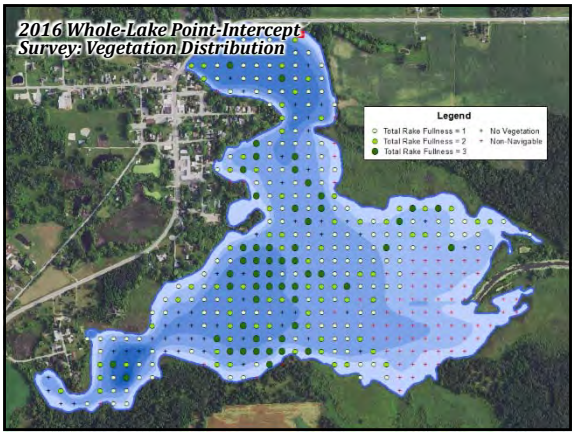

2016 Whole-Lake Point-Intercept Survey: Substrate Types
Legend
Soft/Organic Sediments
Rock
Sand
Too Deep
Non-navigable
Soft Sediments 99.7%
Sand 0.3%



Aquatic Plant Species List

17 Native Species
3 Non-Native Species

Growth Form	Scientific Name	Common Name	Coefficient of Conservatism (C)	2016 (Onterra)
Emergent	*Iris versicolor*	Northern blue flag	5	I
	Iris virginica	Southern blue flag	5	I
	Phragmites australis subsp. australis	Giant reed	Exotic	I
	Sagittaria latifolia	Common arrowhead	3	I
	Schoenoplectus acutus	Hardstem bulrush	5	I
	Schoenoplectus tabernaemontani	Softstem bulrush	4	I
	Zizania aquatica	Southern wild rice	8	X
Submergent	*Ceratophyllum demersum*	Coontail	3	X
	Chara spp.	Muskgrasses	7	X
	Elodea canadensis	Common waterweed	3	X
	Myriophyllum spicatum	Eurasian water milfoil	Exotic	X
	Myriophyllum verticillatum	Whorled water milfoil	8	X
	Potamogeton amplifolius	Large-leaf pondweed	7	I
	Potamogeton crispus	Curly-leaf pondweed	Exotic	X
	Potamogeton friesii	Fries' pondweed	8	X
	Potamogeton friesii X P. zosteriformis	Fries' X flat-stem pondweed	N/A	I
	Potamogeton nodosus	Long-leaf pondweed	5	X
	Ranunculus aquatilis	White water crowfoot	8	X
	Stuckenia pectinata	Sago pondweed	3	X
FF	*Lemna minor*	Lesser duckweed	5	X

FF = Free Floating; X = Located on rake during point-intercept survey; I = Incidental Species

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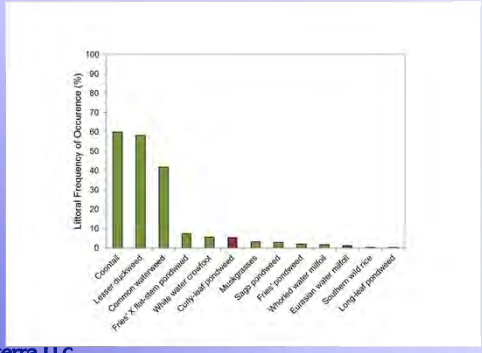
2016 Littoral Frequency of Occurrence



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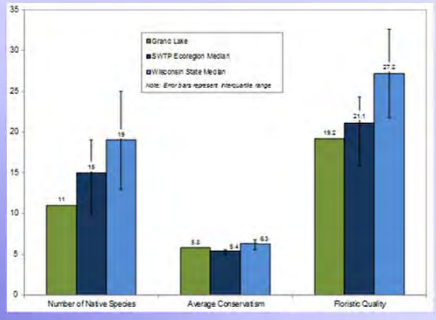
Floristic Quality Analysis



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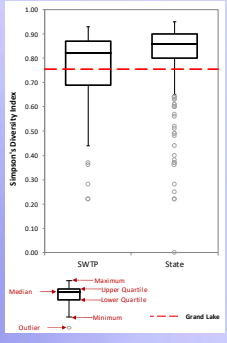
Simpson's Diversity Index



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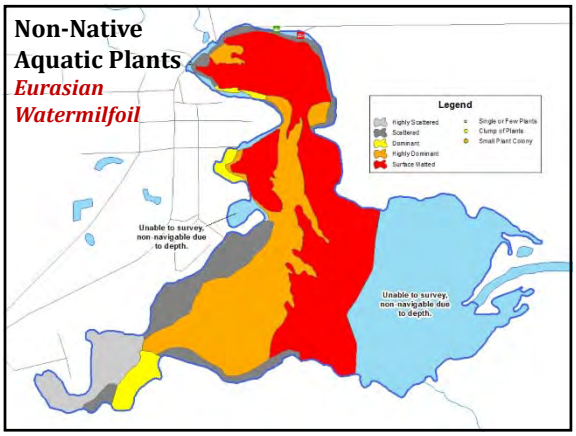
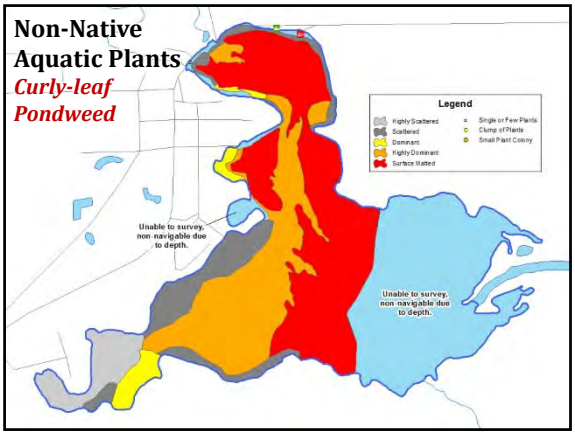
Non-Native Aquatic Plants

Eurasian Watermilfoil



Non-Native Aquatic Plants
Curly-leaf Pondweed



Conclusions

Water Quality
- Water quality is currently determined by watershed and aquatic plant community
- Great differences between Near-Dam Site and Deep Hole Site
- Dissolved oxygen levels at Near-Dam Site, which likely represent much of the lake, are very low and likely impact fishery potential greatly
- Lake has good potential for better water quality

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Conclusions

Watershed
- Grand Lake has a tremendously large watershed so it will always determine water quality in lake.
  - Changing all agriculture to forest would still result in the lake being eutrophic (highly productive)

Aquatic Plants
- Very low number of species and low diversity
- Curly-leaf pondweed population dictates water quality during beginning of growing season
- Population dominated by 3 species that dictate water quality for much of the lake during late growing season

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Next Steps – Planning Meeting II

- Need to schedule this meeting for May
- Develop a list of challenges the lake and association are facing
- Convert challenges to management goals
- Create actions that will allow association and its partners to meet goals

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Lake Management Planning

Thank You

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UW Extension
Wisconsin Dept of Natural Resources

Onterra LLC
Lake Management Planning

Green Lake County LCD & Grand Lake Improvement Assoc. LTD

Grand Lake
Management Planning Project
Planning Meeting II
May 4, 2017

Tim Hoyman
Jessica Wittmann
Onterra LLC
Lake Management Planning

Management Planning Project Overview

- **Project Objective**: study Grand Lake and utilizing those findings, in conjunction with available historical data, develop a realistic management plan.
- Studies are complete, so the process to create the plan has begun.
  - **Meeting Goal**: Develop a framework of management goals and management actions.
  - Onterra will use framework to create full implementation plan for committee's review.

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Conclusions

Water Quality

- Water quality is currently determined by watershed and aquatic plant community
- Great differences between Near-Dam Site and Deep Hole Site
- Dissolved oxygen levels at Near-Dam Site, which likely represent much of the lake, are very low and likely impact fishery potential greatly
- Lake has good potential for better water quality

Watershed

- Grand Lake has a tremendously large watershed so it will always determine water quality in lake.
  - Changing all agriculture to forest would still result in the lake being eutrophic (highly productive)

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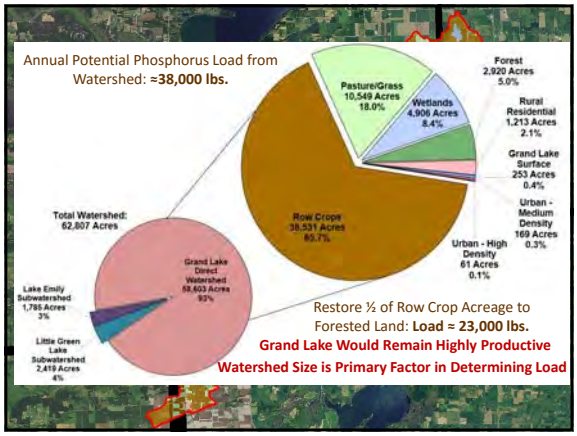

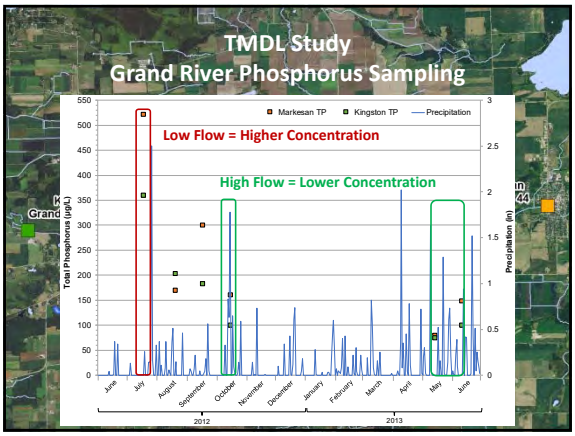

Conclusions

Aquatic Plants

- Very low number of species and low diversity
- Curly-leaf pondweed population dictates water quality during beginning of growing season
- Population dominated by 3 species that dictate water quality for much of the lake during late growing season

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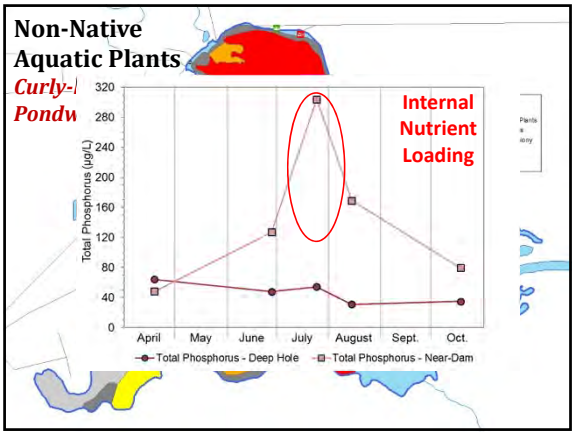
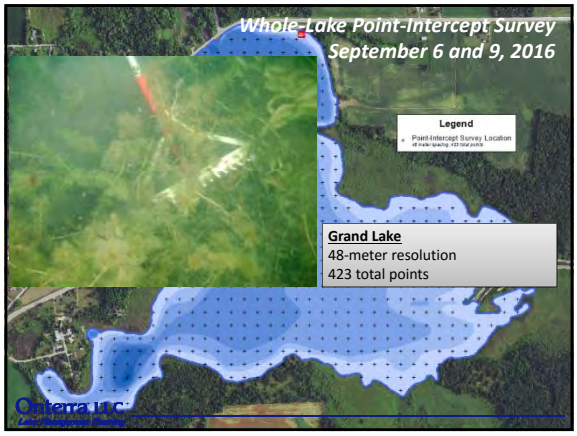
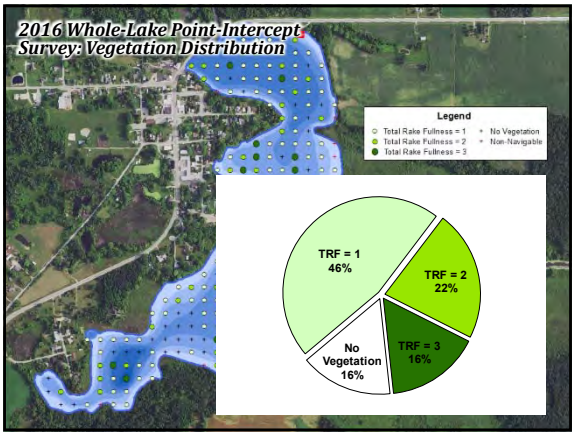
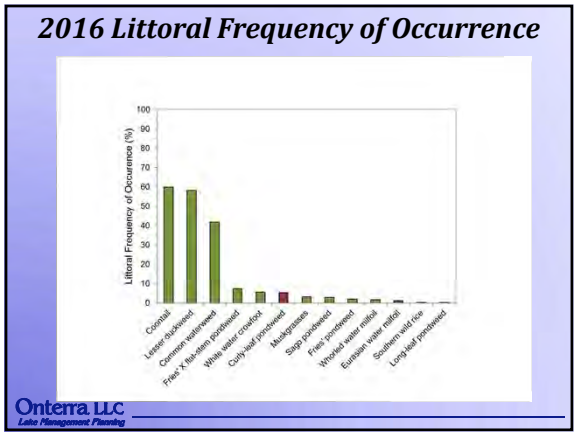

Non-Native
Aquatic Plants
Curly-l
Pondw
Internal
Nutrient
Loading
Total Phosphorus (µg/L)
320
280
240
200
160
120
80
40
0
April
May
June
July
August
Sept.
Oct.
Total Phosphorus - Deep Hole
Total Phosphorus - Near-Dam


Whole-Lake Point-Intercept Survey
September 6 and 9, 2016
Legend
Grand Lake
48-meter resolution
423 total points
Onterra LLC


2016 Whole-Lake Point-Intercept Survey: Vegetation Distribution
Legend
Total Rake Fullness = 1
Total Rake Fullness = 2
Total Rake Fullness = 3
No Vegetation
Non-Navigable
TRF = 1
46%
TRF = 2
22%
TRF = 3
16%
No
Vegetation
16%


2016 Littoral Frequency of Occurrence
Littoral Frequency of Occurence (%)
100
90
80
70
60
50
40
30
20
10
0
Coontail
Lesser duckweed
Common waterweed
Fries' X flat-stem pondweed
White water crowfoot
Curly-leaf pondweed
Muskgrasses
Slough pondweed
Fries pondweed
Whorled water milfoil
Eurasian water milfoil
Southern wild rice
Long-leaf pondweed
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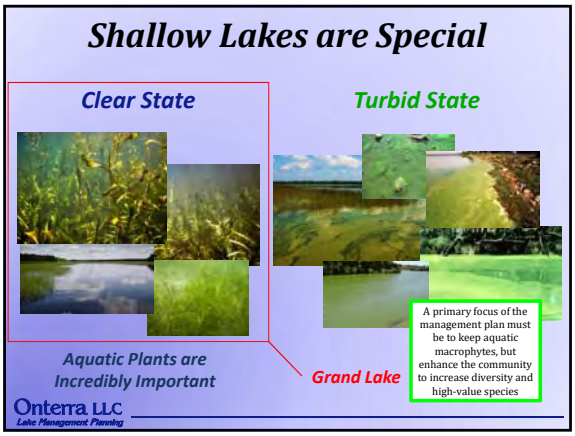
Shallow Lakes are Special
Clear State
Turbid State
Aquatic Plants are
Incredibly Important
Grand Lake
A primary focus of the management plan must be to keep aquatic macrophytes, but enhance the community to increase diversity and high-value species
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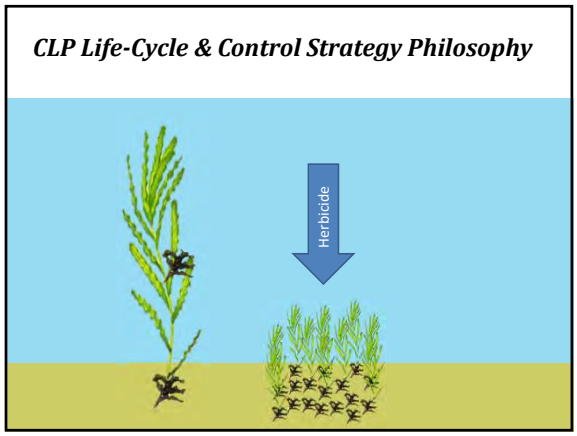
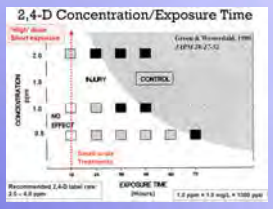

CLP Life-Cycle & Control Strategy Philosophy
Herbicide

Herbicide Spot Treatment

- **Ecological Definition:** Herbicide applied at a scale where dissipation will not result in significant lake wide concentrations; impacts are anticipated to be localized to in/around application area.



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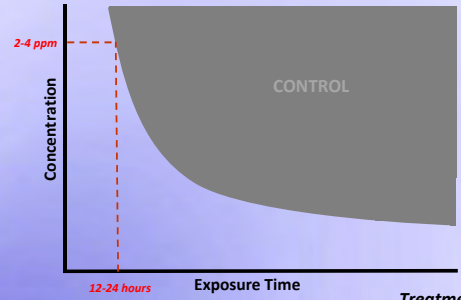
Herbicide Use Patterns



High Concentration ► Short Exposure Time

Treatment Type
Spot

Spot Treatment Specifications

- Treatments size (>5 acres), shape (broad vs narrow), and location (protected vs exposed) are important design components
- Winds within 6hrs of treatment greatly impact outcomes
- Consider using herbicides with short CETs
  - Diquat
  - Diquat + endothall

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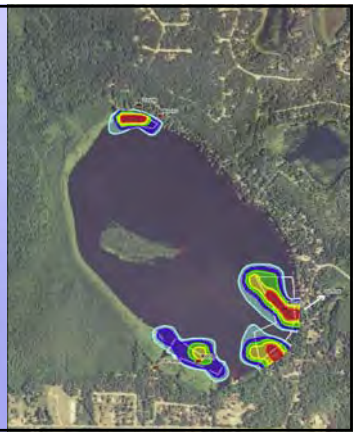
2015 Treatment on Loon Lake

- **Diquat (2 gallons per surface acre of application area)**
- ~24 acres of 305 acre lake (7.8%)
- Tracer Dye (Rhodamine WT) Survey
- Pre (spring) & post (late-summer) point-intercept sub-sampling

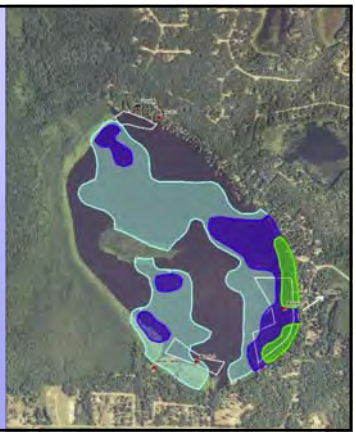
1 HAT

75-100%
50-75%
25-50%
10-25%
5-10%



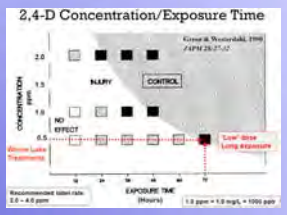
6 HAT

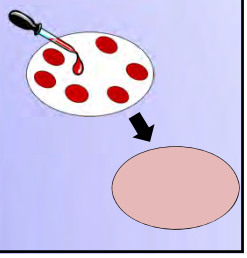
75-100%
50-75%
25-50%
10-25%
5-10%



Large-Scale (Whole-lake) Treatment

- Ecological Definition: *Herbicide applied at a scale where dissipation will result in significant lake wide concentrations; impacts are anticipated to be on a lake wide scale*





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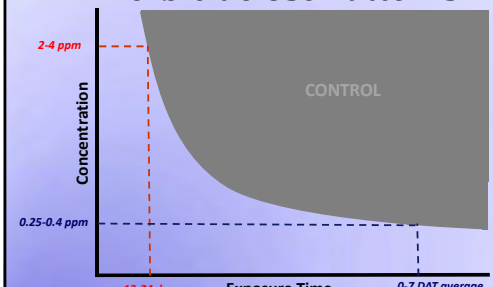

Treatment Type

High Concentration ► Short Exposure Time — *Spot*

Low Concentration ► Long Exposure Time — *Whole-lake*

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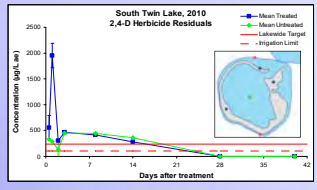
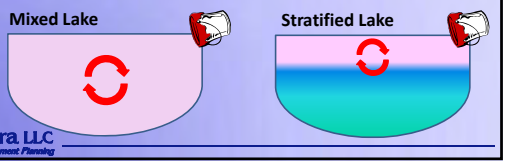
Large-Scale (Whole-lake) Treatment

- Herbicide Mixing
  - Horizontal
  - Vertical





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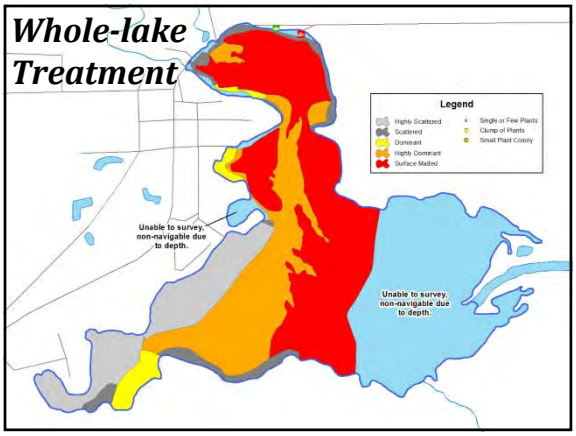
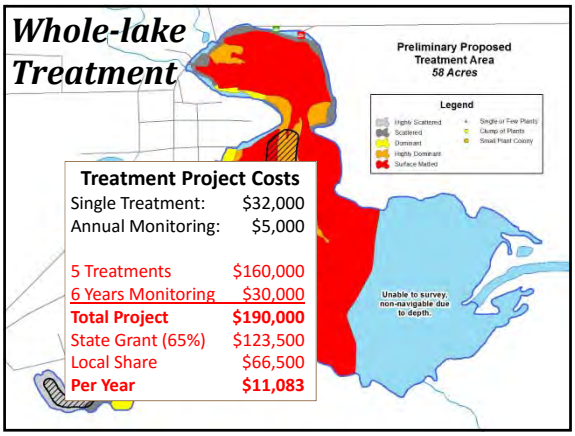
Whole-lake Treatment



Whole-lake Treatment



Treatment Project Costs

Single Treatment:	$32,000
Annual Monitoring:	$5,000
5 Treatments	$160,000
6 Years Monitoring	$30,000
Total Project	**$190,000**
State Grant (65%)	$123,500
Local Share	$66,500
Per Year	**$11,083**

Water Level Management

- Complete water level reduction starting in fall, through winter, through growing season, through following winter
- Water levels brought up to normal in spring of second year
- **Expectations:**
  - Turions dry and freeze rendering in active
  - Reduces curly-leaf pondweed abundance substantially
    - Some lakes this is the case, others no real impact
  - Sediment oxidation and drying
    - Compacts sediments and increases depth (volume)
    - Chemical change in sediments, so they do not re-expand
  - Increased amount & diversity of native emergents
  - Increased amount & diversity of native submergents

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Meeting Outline

- Where did we leave off on May 4, 2017
  - Conclusions and added data
  - Implementation Plan framework
- Draft Implementation Plan
  - Discuss additions and edits
- Water Level Reduction Scenarios
- July 29th Information Meeting
  - Meeting objective
  - Topics of discussion
  - Assessing stakeholder understanding & preference

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Conclusions

Water Quality

- Water quality is currently determined by watershed and aquatic plant community
- Great differences between Near-Dam Site and Deep Hole Site
- Dissolved oxygen levels at Near-Dam Site, which likely represent much of the lake, are very low and likely impact fishery potential greatly
- Lake has good potential for better water quality

Watershed

- Grand Lake has a tremendously large watershed so it will always determine water quality in lake.
  - Changing all agriculture to forest would still result in the lake being eutrophic (highly productive)

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Conclusions

Aquatic Plants

- Very low number of species and low diversity
- Curly-leaf pondweed population dictates water quality during beginning of growing season
- Population dominated by 3 species that dictate water quality for much of the lake during late growing season

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Draft Implementation Plan

Management Goal:

Improve Overall Ecological Condition of Grand Lake

Management Actions

1. **Initiate volunteer-based annual water quality monitoring of Grand Lake through WDNR CLMN**
2. **Reduce Curly-leaf pondweed population in Grand Lake**

Methodology remains to be determined.

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Draft Implementation Plan

Management Goal:

Increase the Capacity of the Grand Lake Improvement Association to Manage Grand Lake

Management Actions

1. **Create GLIA Communication & Education Committee**
2. **Enhance GLIA's involvement with other entities that have a hand in managing or otherwise utilizing Grand Lake**
3. **Create Membership & Volunteerism standing committee of GLIA.**
4. **Build GLIA treasury and contingency fund.**

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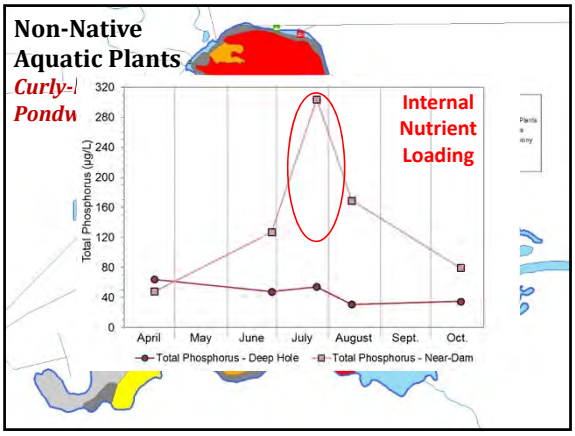

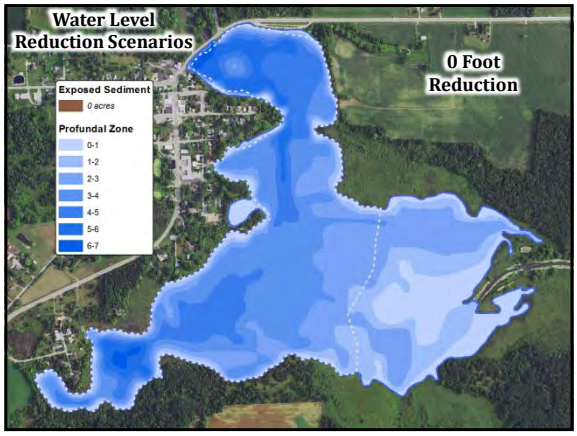

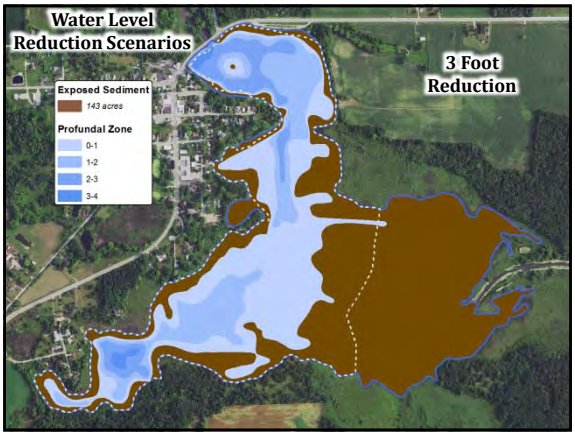

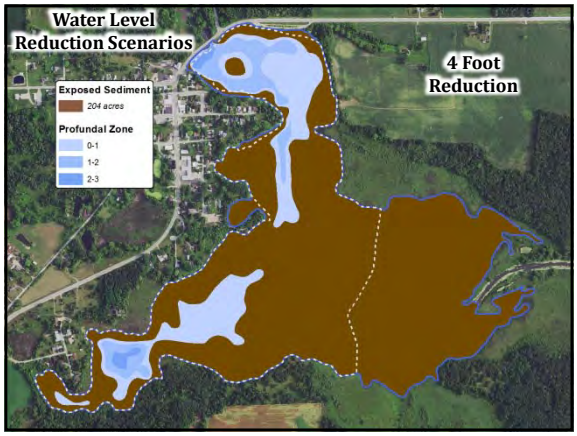

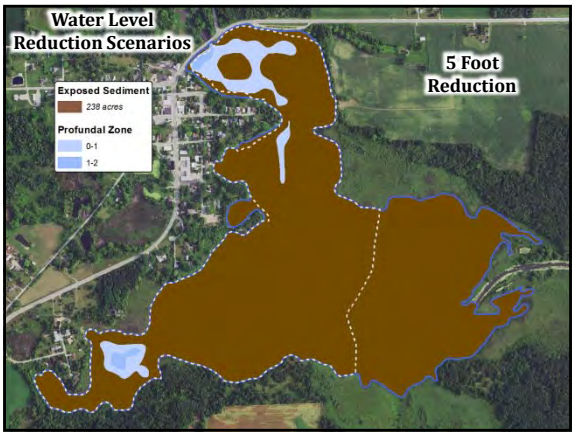

July 29th Information Meeting

Study Results Presentation Approach

- Start with conclusions from studies
- Highlight the most important aspects of conclusions
- Present additional information (explanation) for those conclusions
- Introduce management goals/actions/alternatives for challenge

Meeting Description

- Meeting title*: Grand Lake Planning Project Information Meeting*
- Meeting objective
- Topics of discussion
- Assessing stakeholder understanding & preference

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Meeting Objectives

- Present highlights of 2016 study results from Grand Lake.
  - Focusing on Water Quality & Curly-Leaf Pondweed
- Answer questions (throughout)
- Discuss management options

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Presentation Outline

- Lake Management Planning Project Overview
- Summary of Project Conclusions
- Specific Results Discussion
  - Water Quality
  - Curly-Leaf Pondweed
- Proposed Management Plan

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Management Planning Project Overview

- **Project Objective**: study Grand Lake and utilizing those findings, in conjunction with available historical data, develop a realistic management plan.
- Studies completed in 2016
- Three meetings held with planning committee
- Draft implementation plan is in review by committee

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Conclusions

Water Quality

- Water quality is currently determined by watershed and aquatic plant community
- Great differences between Near-Dam Site and Deep Hole Site
- Dissolved oxygen levels at Near-Dam Site, which likely represent much of the lake, are very low and likely impact fishery potential greatly
- Lake has good potential for better water quality

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Conclusions

Watershed

- Grand Lake has a tremendously large watershed, so it will always determine overall water quality of lake
  - Massive & unrealistic changes to the Grand Lake watershed would not lead to significant changes in water quality

Aquatic Plants

- Very low number of species and low diversity
- Curly-leaf pondweed population dictates water quality during beginning of growing season
- Population dominated by 3 species that dictate water quality for much of the lake during late growing season

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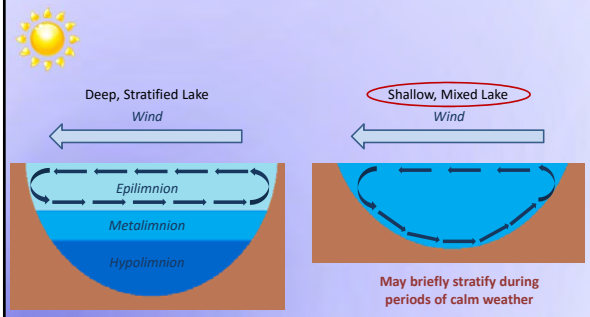
Wisconsin Lakes Classification



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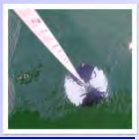
Introduction to Lake Water Quality

Typical relationship between phosphorus & chlorophyll-*a* does not occur in Grand Lake

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

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

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



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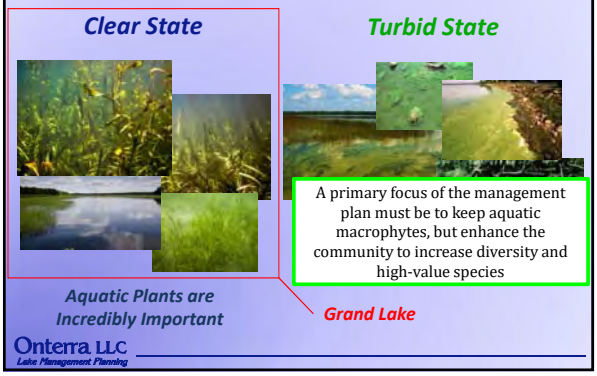
Shallow Lakes are Special



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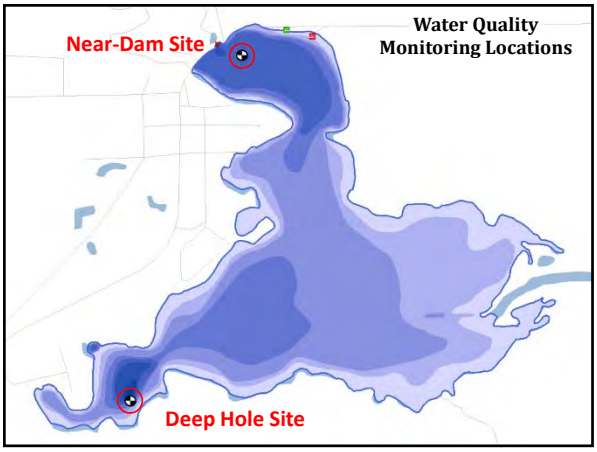
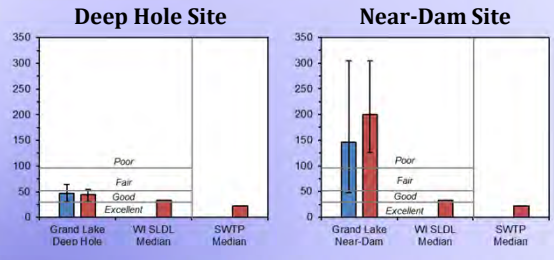
Water Quality Monitoring Locations



Total Phosphorus



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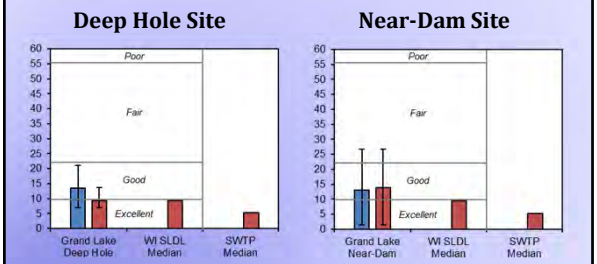
Chlorophyll-*a*



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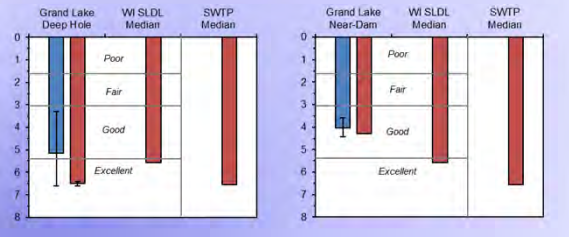
Secchi Disk Transparency



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Water Quality Seasonal Dynamics

Why do phosphorus concentrations increase in summer at the Near-Dam Site?

- Complicated interaction involving cycling of aquatic plants
  - First the exotic plant, curly-leaf pondweed
  - Second a mixture of native plants
- Curly-leaf pondweed dominates lake during spring and early summer – die off causes large influx of phosphorus spurring excessive growth of native duckweeds, coontail, and common waterweed, which are all native
- The native plants prevent light penetration, only provide oxygen to the very upper portion of the water column, and shade plant growth below.

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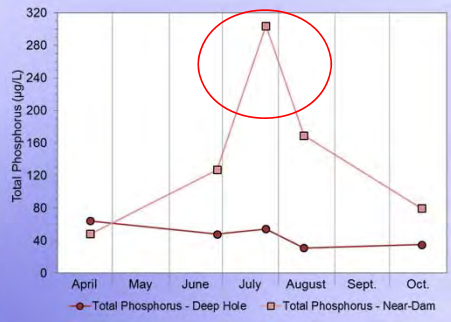
Water Quality Seasonal Dynamics

Internal Nutrient Loading



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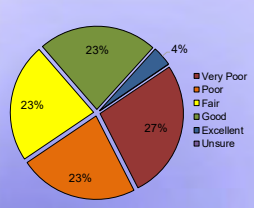
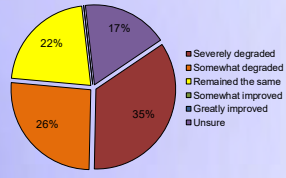
Grand Lake Stakeholder Perceptions of Water Quality

How would you describe the current water quality of Grand Lake?



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



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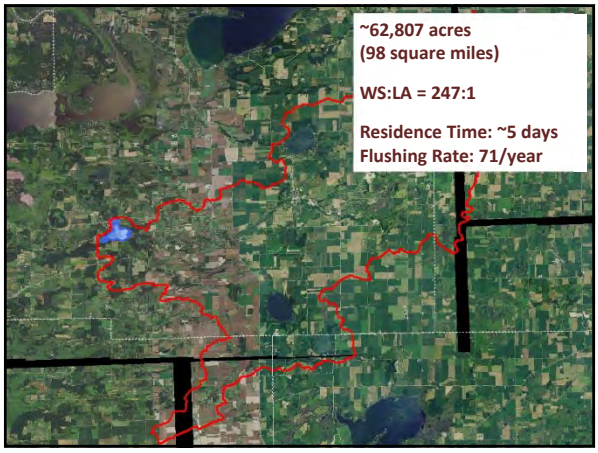
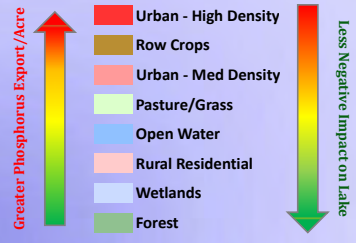


Watershed Land Cover



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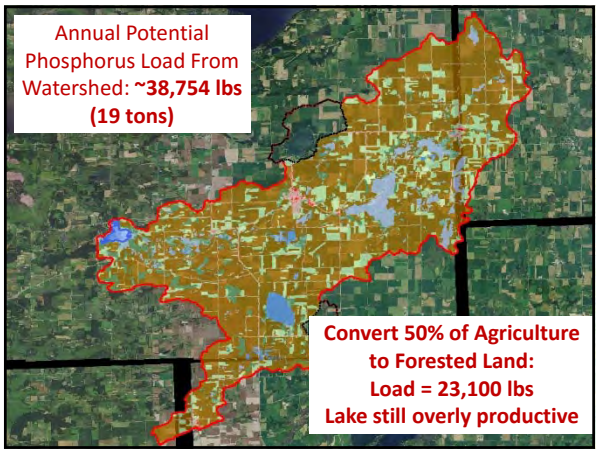
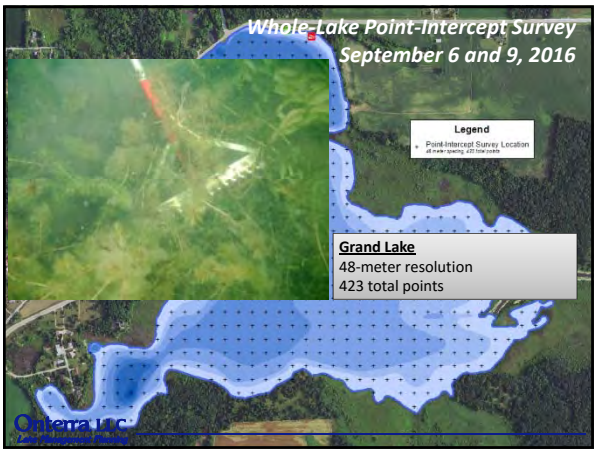

Annual Potential Phosphorus Load From Watershed: ~38,754 lbs (19 tons)
Convert 50% of Agriculture to Forested Land:
Load = 23,100 lbs
Lake still overly productive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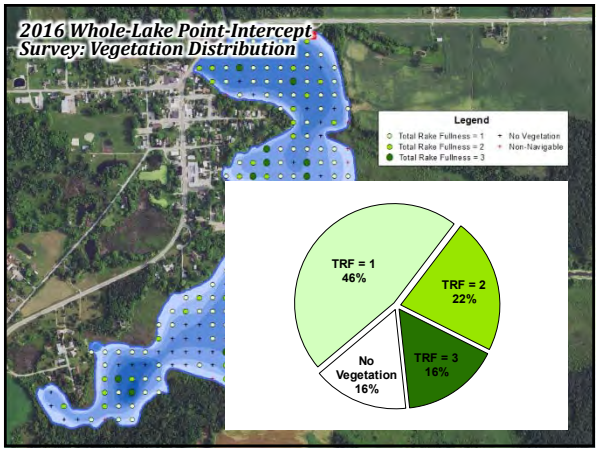
Onterra LLC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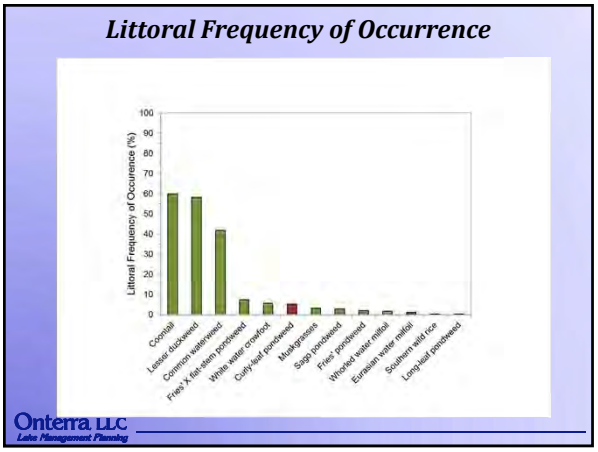
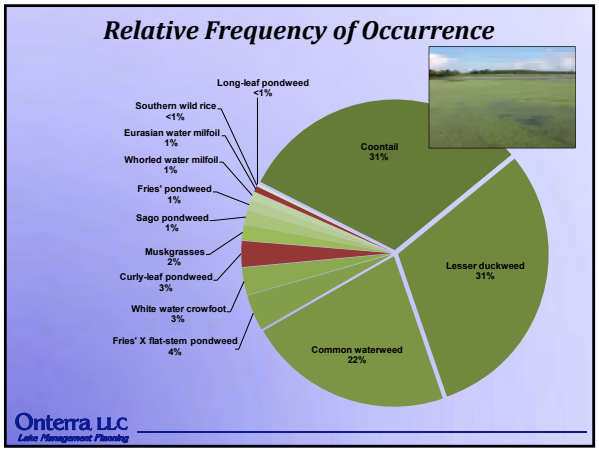
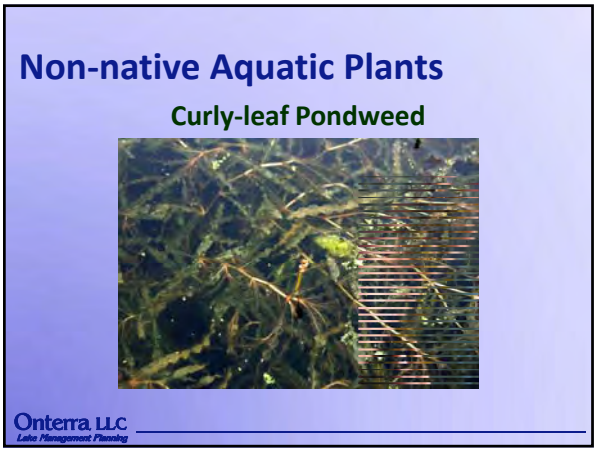
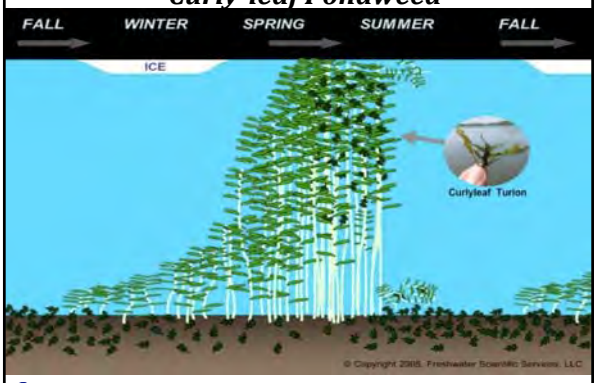
No Vegetation
16%


Littoral Frequency of Occurrence
Littoral Frequency of Occurence (%)
Coontail
Lesser duckweed
Common waterweed
Fries' X flat-stem pondweed
White water crowfoot
Curly-leaf pondweed
Muskgrasses
Sago pondweed
Fries' pondweed
Whorled water milfoil
Eurasian water milfoil
Southern wild rice
Long-leaf pondweed
Onterra LLC


Relative Frequency of Occurrence
Long-leaf pondweed <1%
Southern wild rice <1%
Eurasian water milfoil 1%
Whorled water milfoil 1%
Fries' pondweed 1%
Sago pondweed 1%
Muskgrasses 2%
Curly-leaf pondweed 3%
White water crowfoot 3%
Fries' X flat-stem pondweed 4%
Coontail 31%
Lesser duckweed 31%
Common waterweed 22%
Onterra LLC


Non-native Aquatic Plants
Curly-leaf Pondweed
Onterra LLC

Curly-leaf Pondweed

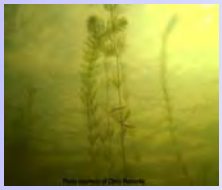


Onterra LLC
Lake Management Planning

AIS Mapping

Point-Based Mapping

- Single plants to colonies or areas less than 40-feet in diameter
- Abundance descriptions:
  - Single or Few Plants
  - Clumps of Plants
  - Small Plant Colony



Onterra LLC
Lake Management Planning

AIS Mapping

Polygon-Based Mapping

- Colonies or areas over 40-feet diameter
- Boundary at target plant extent or morphological feature (depth contour, shoreline)
- Density ratings:

May not represent true colonies or "beds"

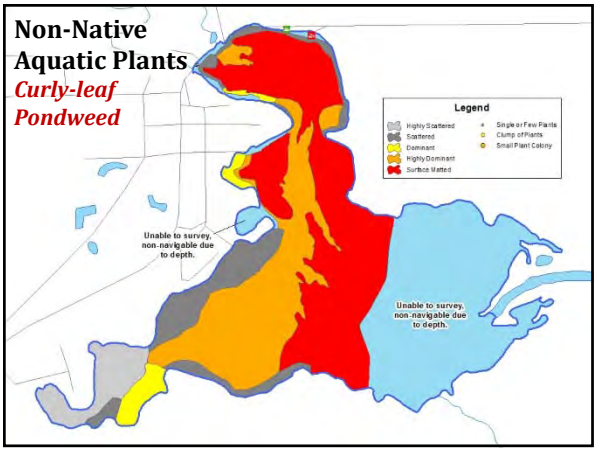
- Highly Scattered
- Scattered
- Dominant
- Highly Dominant
- Surface Matting

Increase in Ecological Impact

Onterra LLC
Lake Management Planning

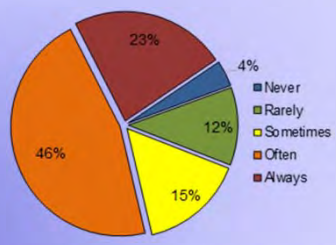
Non-Native Aquatic Plants

Curly-leaf Pondweed



Grand Lake Stakeholder Perceptions of Aquatic Plants

During the open water season, how often does aquatic plant growth, including algae, negatively impact your enjoyment of Grand Lake?



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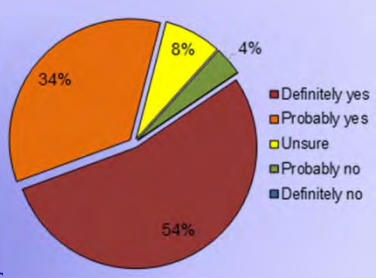
Grand Lake Stakeholder Perceptions of Aquatic Plants

Do you believe aquatic plant control is needed in Grand Lake?



Onterra LLC
Lake Management Planning

Management Goal:
Increase the Capacity of the Grand Lake Improvement Association to Manage Grand Lake

Management Actions

1. **Create Membership & Volunteerism standing committee of GLIA.**
2. **Create Education & Communication standing committee of GLIA**
3. **Build GLIA treasury and contingency fund**
4. **Enhance GLIA's involvement with other entities that have a hand in managing or otherwise utilizing Grand Lake**

Onterra LLC Lake Management Planning

Management Goal:
Improve the Overall Ecological Condition of Grand Lake

Management Actions

1. **Initiate volunteer-based annual water quality monitoring of Grand Lake through WDNR Citizen Lake Monitoring Network**
2. **Reduce and control curly-leaf pondweed population in Grand Lake.**
   - ~~**Option 1: Water level drawdown (2 winters & 1 summer)**~~
   - **Option 2: Herbicide treatments (5-7 years)**

Onterra LLC Lake Management Planning

Common Aquatic Herbicides

- **2,4-D –** absorbed by plant tissue; inhibits plant growth and cell division (auxin hormone mimic)
- **Triclopyr –** absorbed by plant tissue; inhibits plant growth and cell division(auxin hormone mimic)
- **Endothall –** commonly referred to as a contact herbicide, inhibits respiration and protein synthesis, disrupts cell membranes
- **Fluridone –** inhibits plant-specific enzyme (carotene) which protects chlorophyll from UV (sun) damage
- **Diquat –** Inhibits photosynthesis & destroys cell membranes

Onterra LLC Lake Management Planning

Are herbicides "safe?"

- Registration by the EPA does not mean that the use of the herbicide poses no risk to humans or the environment, only that the benefits have been determined to outweigh the risks .
- Because product use is not without risk, the EPA does not define any pesticide as "safe."
- Risk-Risk factors must be considered in determining treatment strategy
- Strategy objective must be to effectively control target species with minimal impact to native habitat
  - For endothall treatments – early spring application

Onterra LLC Lake Management Planning

AIS Control Strategies: Herbicide Use

Spot Treatment

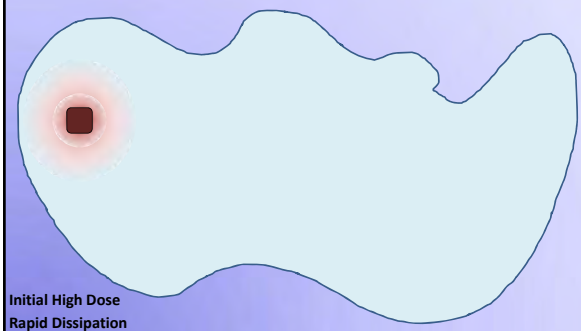
- Herbicide applied to a treatment area, with site-specific considerations.
- Effectiveness hard to reach due to dilution and dissipation.
  - Seasonal vs. long-term effectiveness

Whole Lake Treatment

- Herbicide is applied to treatment areas with whole-lake considerations.
- Dilution and dissipation accounted for in application strategy.

Onterra LLC Lake Management Planning

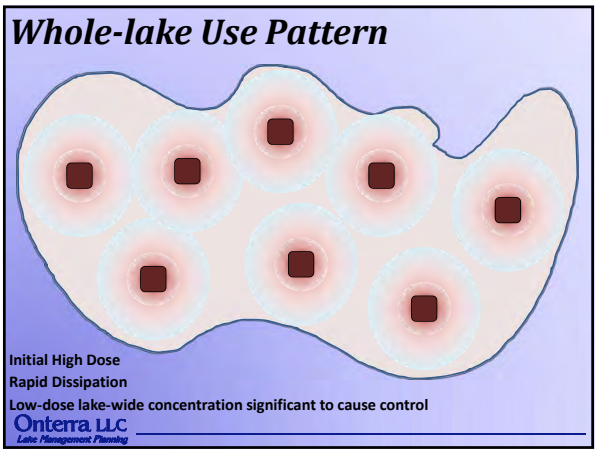
Spot Treatment Use Pattern



Initial High Dose
Rapid Dissipation
Herbicide concentrations too low outside of Treatment Area to cause impact

Onterra LLC Lake Management Planning

Whole-lake Use Pattern



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

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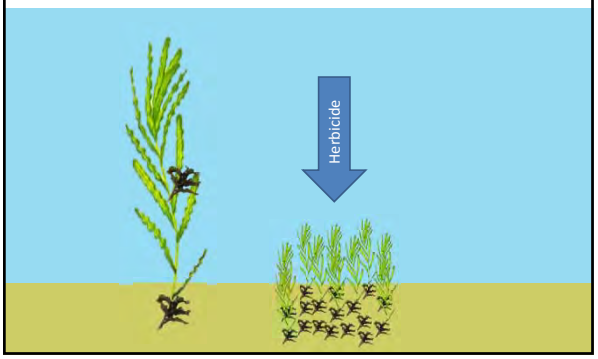
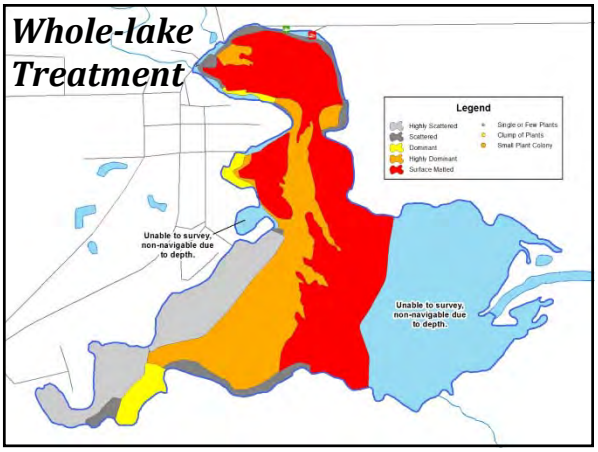
Lake Management Planning

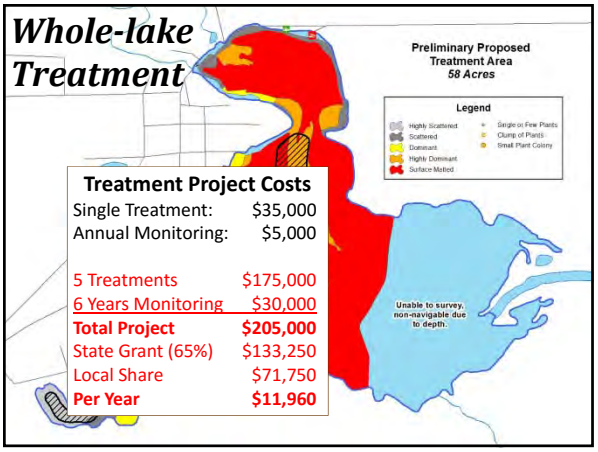
CLP Life-Cycle & Control Strategy Philosophy



Whole-lake Treatment



Whole-lake Treatment



Treatment Project Costs

Single Treatment:	$35,000
Annual Monitoring:	$5,000
5 Treatments	$175,000
6 Years Monitoring	$30,000
Total Project	**$205,000**
State Grant (65%)	$133,250
Local Share	$71,750
Per Year	**$11,960**

B

APPENDIX B

Stakeholder Survey Response Charts and Comments

Grand Lake - Anonymous Stakeholder Survey

Surveys Distributed: 44
Surveys Returned: 26
Response Rate: 58%

Grand Lake Property

1. Do you rent or own your property on or near Grand Lake?

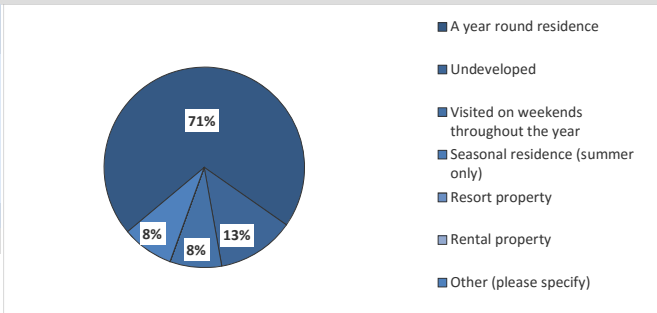
Answer Options	Response Percent	Response Count
Own	100.0%	25
Rent	0.0%	0
answered question		25
skipped question		1

2. Is your property from Question 1 on the lake or off the lake?

Answer Options	Response Percent	Response Count
On the lake	84.0%	21
Off the lake	16.0%	4
answered question		25
skipped question		1

3. How is your property on or near Grand Lake utilized?

Answer Options	Response Percent	Response Count
A year round residence	70.8%	17
Undeveloped	12.5%	3
Visited on weekends throughout the year	8.3%	2
Seasonal residence (summer only)	0.0%	0
Resort property	0.0%	0
Rental property	0.0%	0
Other (please specify)	8.3%	2
answered question		24
skipped question		2

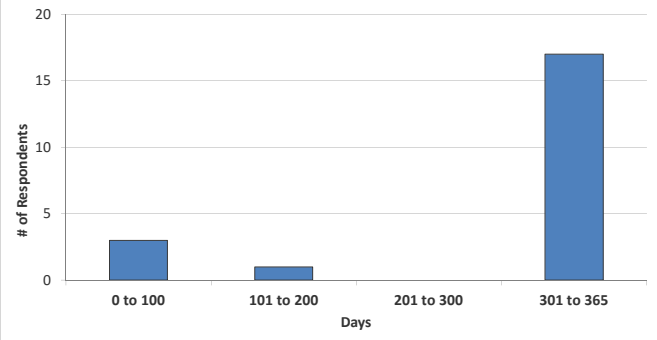


Number	Other (please specify)
1	Business
2	Farm land

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

Answer Options	Response Count
	21
answered question	21
skipped question	5

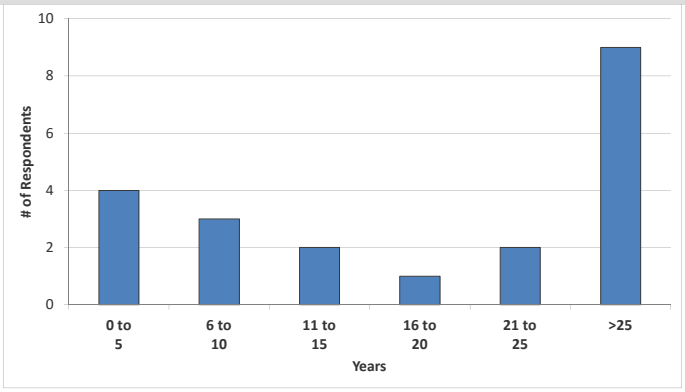
Category (# of days)	Responses	
0 to 100	3	14%
101 to 200	1	5%
201 to 300	0	0%
301 to 365	17	81%



5. How long have you owned or rented your property on Grand Lake?

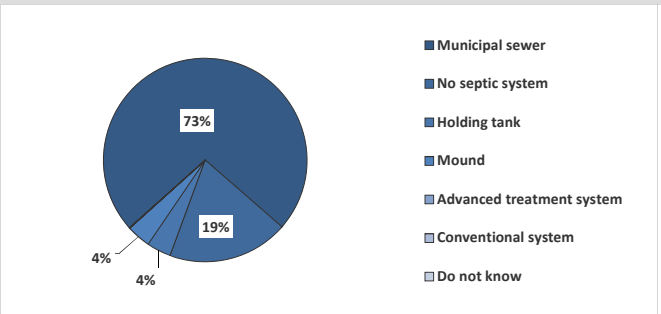
Answer Options	Response Count
	21
answered question	**21**
skipped question	**5**

Category (# of years)	Responses	% Response
0 to 5	**4**	**19%**
6 to 10	**3**	**14%**
11 to 15	**2**	**10%**
16 to 20	**1**	**5%**
21 to 25	**2**	**10%**
>25	**9**	**43%**



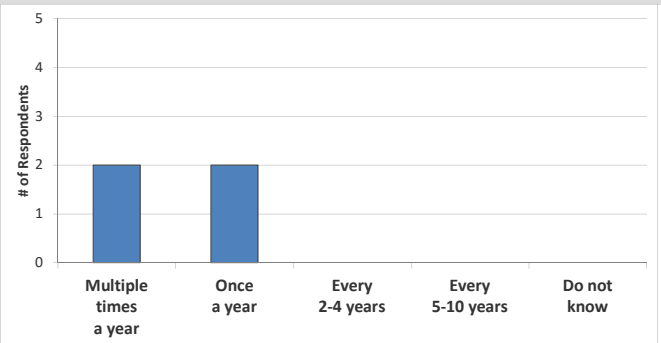
6. What type of septic system does your property utilize?

Answer Options	Response Percent	Response Count
Municipal sewer	73.1%	19
No septic system	19.2%	5
Holding tank	3.8%	1
Mound	3.8%	1
Advanced treatment system	0.0%	0
Conventional system	0.0%	0
Do not know	0.0%	0
answered question		**26**
skipped question		**0**



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

Answer Options	Response Percent	Response Count
Every 2-4 years	50.0%	2
Do not know	50.0%	2
Multiple times a year	0.0%	0
Once a year	0.0%	0
Every 5-10 years	0.0%	0
answered question		**4**
skipped question		**22**

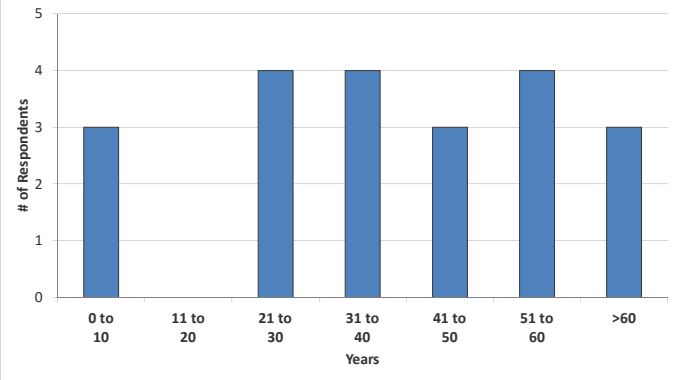


Recreational Activity on Grand Lake

8. How many years ago did you first visit Grand Lake?

Answer Options	Response Count
	21
answered question	21
skipped question	5

Category (# of days)	Responses	% Response
0 to 10	3	14%
11 to 20	0	0%
21 to 30	4	19%
31 to 40	4	19%
41 to 50	3	14%
51 to 60	4	19%
>60	3	14%



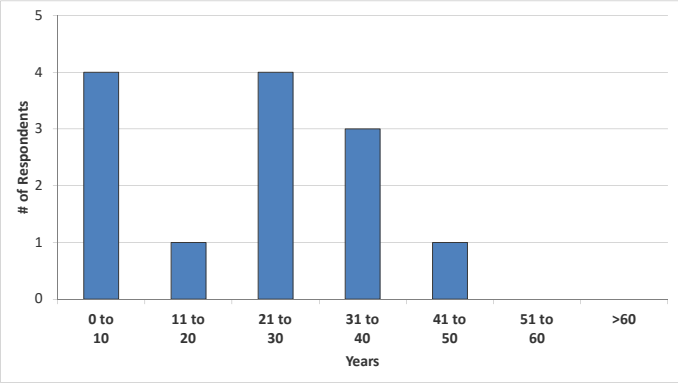
9. Have you personally fished on Grand Lake in the past three years?

Answer Options	Response Percent	Response Count
Yes	43.5%	10
No	56.5%	13
answered question		23
skipped question		3

10. For how many years have you fished Grand Lake?

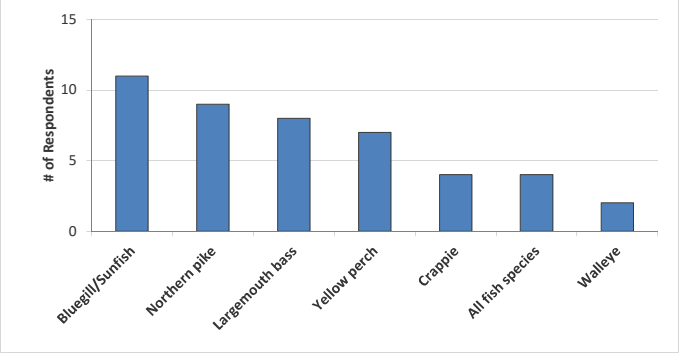
Answer Options	Response Count
	13
answered question	13
skipped question	13

Category (# of years)	Responses	% Response
0 to 10	4	31%
11 to 20	1	8%
21 to 30	4	31%
31 to 40	3	23%
41 to 50	1	8%
51 to 60	0	0%
>60	0	0%



11. What species of fish do you like to catch on Grand Lake?

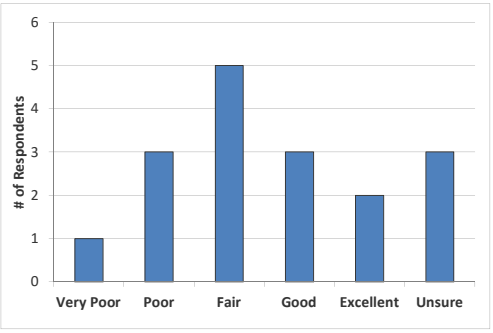
Answer Options	Response Percent	Response Count
Bluegill/Sunfish	84.6%	11
Northern pike	69.2%	9
Largemouth bass	61.5%	8
Yellow perch	53.8%	7
Crappie	30.8%	4
All fish species	30.8%	4
Walleye	15.4%	2
Other (please specify)	23.1%	3
answered question		13
skipped question		13



Number	Other (please specify)
1	I've caught 1 waleye 5yrs ago 23" while ice fishing
2	bullheads
3	maybe walleye

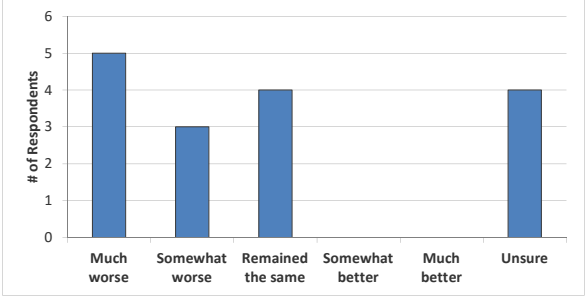
12. How would you describe the current quality of fishing on Grand Lake?

Answer Options	Very Poor	Poor	Fair	Good	Excellent	Unsure	Response Count
	1	3	5	3	2	3	17
answered question							17
skipped question							9



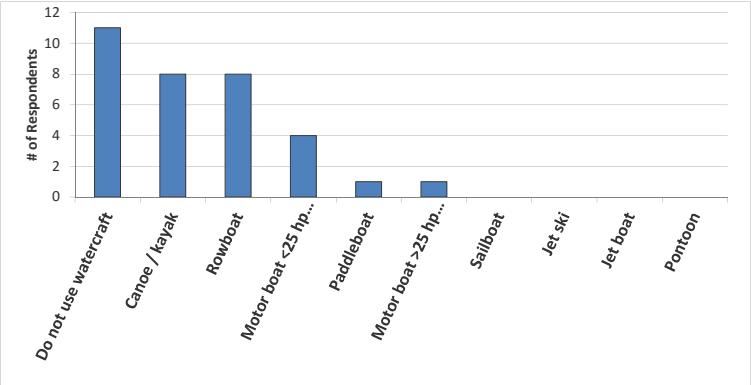
13. How has the quality of fishing changed on Grand Lake since you have started fishing the lake?

Answer Options	Much worse	Somewhat worse	Remained the same	Somewhat better	Much better	Unsure	Response Count
	5	3	4	0	0	4	16
answered question							16
skipped question							10



14. What types of watercraft do you currently use on Grand Lake?

Answer Options	Response Percent	Response Count
Do not use watercraft	45.8%	11
Canoe / kayak	33.3%	8
Rowboat	33.3%	8
Motor boat with 25 hp or less motor	16.7%	4
Paddleboat	4.2%	1
Motor boat with greater than 25 hp motor	4.2%	1
Sailboat	0.0%	0
Jet ski	0.0%	0
Jet boat	0.0%	0
Pontoon	0.0%	0
answered question		24
skipped question		2



15. Do you use your watercraft on waters other than Grand Lake?

Answer Options	Response Percent	Response Count
Yes	40.0%	8
No	60.0%	12
answered question		20
skipped question		6

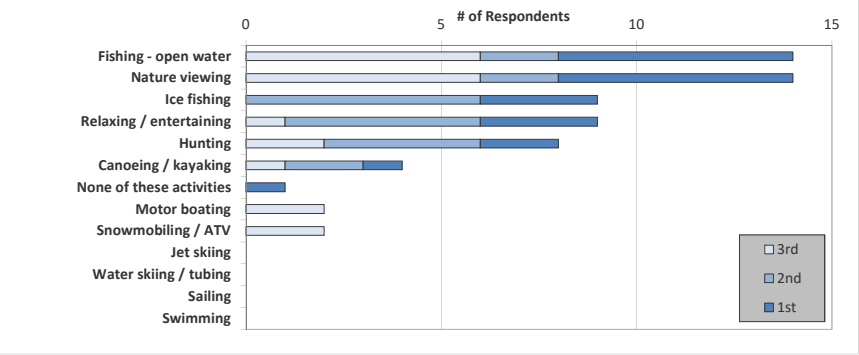
16. What is your typical cleaning routine after using your watercraft on waters other than Grand Lake?

Answer Options	Response Percent	Response Count
Remove aquatic hitch-hikers (ex. - plant material, clams, mussels)	70.0%	7
Rinse boat	40.0%	4
Drain bilge	30.0%	3
Do not clean boat	20.0%	2
Power wash boat	10.0%	1
Apply bleach	10.0%	1
Other (please specify)	0.0%	0
answered question		10
skipped question		16

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

Answer Options	1st	2nd	3rd	Rating Average	Response Count
Fishing - open water	6	2	6	2	14
Nature viewing	6	2	6	2	14
Ice fishing	3	6	0	1.67	9
Relaxing / entertaining	3	5	1	1.78	9
Hunting	2	4	2	2	8
Canoeing / kayaking	1	2	1	2	4
None of these activities are important to me	1	0	0	1	1
Motor boating	0	0	2	3	2
Snowmobiling / ATV	0	0	2	3	2
Jet skiing	0	0	0	0	0
Water skiing / tubing	0	0	0	0	0
Sailing	0	0	0	0	0
Swimming	0	0	0	0	0
Other (please specify below)	1	0	0	1	1
				answered question	**23**
				skipped question	**3**

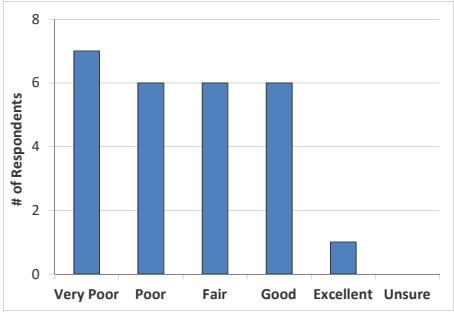
Number	"Other" responses
1	farming



Grand Lake Current and Historic Condition, Health and Management

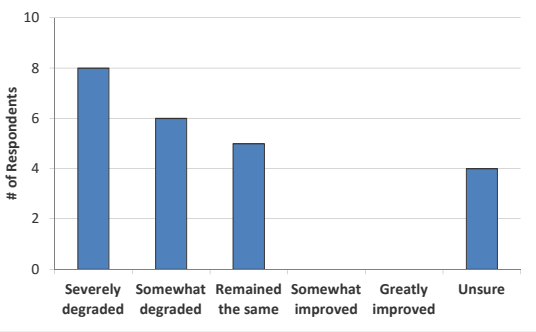
18. How would you describe the current water quality of Grand Lake?

Answer Options	Very Poor	Poor	Fair	Good	Excellent	Unsure	Response Count
	7	6	6	6	1	0	26
						answered question	**26**
						skipped question	**0**



19. How has the current water quality changed in Grand Lake since you first visited the lake?

Answer Options	Severely degraded	Somewhat degraded	Remained the same	Somewhat improved	Greatly improved	Unsure	Response Count
	8	6	5	0	0	4	23
						answered question	23
						skipped question	3



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

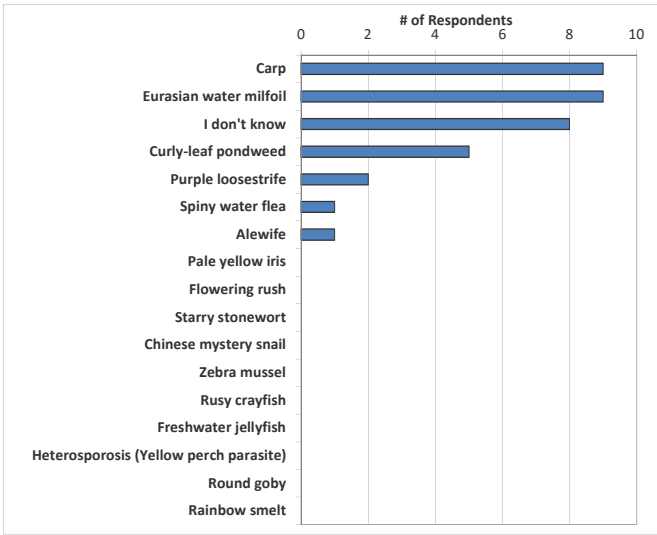
Answer Options	Response Percent	Response Count
Yes	92.3%	24
No	7.7%	2
answered question		26
skipped question		0

21. Do you believe aquatic invasive species are present within Grand Lake?

Answer Options	Response Percent	Response Count
Yes	54.2%	13
I think so but am not certain	33.3%	8
No	12.5%	3
answered question		24
skipped question		2

22. Which aquatic invasive species do you believe are in Grand Lake?

Answer Options	Response Percent	Response Count
Carp	47.4%	9
Eurasian water milfoil	47.4%	9
I don't know but presume AIS to be present	42.1%	8
Curly-leaf pondweed	26.3%	5
Purple loosestrife	10.5%	2
Spiny water flea	5.3%	1
Alewife	5.3%	1
Pale yellow iris	0.0%	0
Flowering rush	0.0%	0
Starry stonewort	0.0%	0
Chinese mystery snail	0.0%	0
Zebra mussel	0.0%	0
Rusy crayfish	0.0%	0
Freshwater jellyfish	0.0%	0
Heterosporosis (Yellow perch parasite)	0.0%	0
Round goby	0.0%	0
Rainbow smelt	0.0%	0
Other (please specify)	10.5%	2
answered question		19
skipped question		7

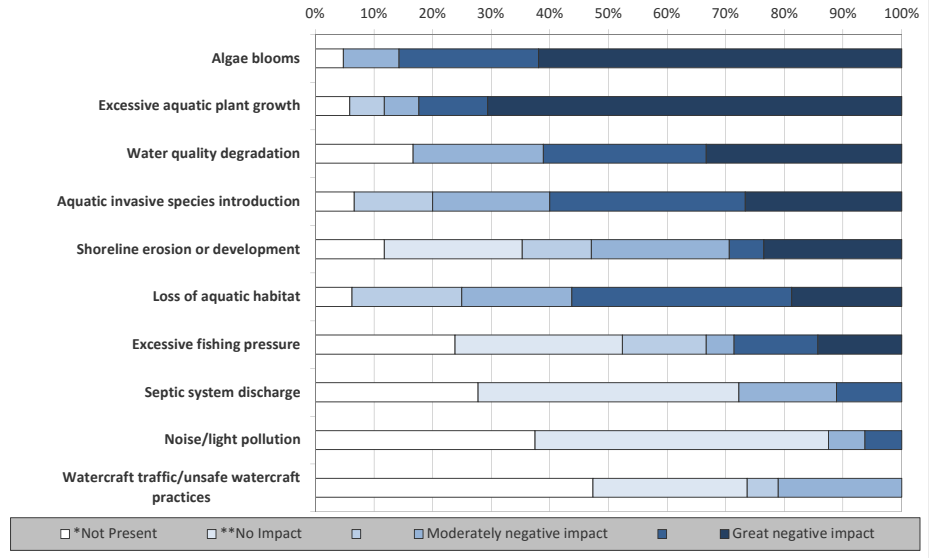


Number	"Other" responses
1	river suckers
2	Duck Weed

23. To what level do you believe each of the following factors may currently be negatively impacting Grand Lake?
*** Not Present means that you believe the issue does not exist on Grand Lake.**
**** No Impact means that the issue may exist on Grand Lake but it is not negatively impacting the lake.**

Answer Options	*Not Present	**No Impact		Moderately negative impact		Great negative impact	Unsure: Need more information	Rating Average	Response Count
Algae blooms	1	0	0	2	5	13	1	4.19	23
Excessive aquatic plant growth	1	0	1	1	2	12	5	3.32	22
Water quality degradation	3	0	0	4	5	6	5	2.82	23
Aquatic invasive species introduction	1	0	2	3	5	4	8	2.27	23
Shoreline erosion or development	2	4	2	4	1	4	6	2	23
Loss of aquatic habitat	1	0	3	3	6	3	7	2.45	23
Excessive fishing pressure	5	6	3	1	3	3	2	1.91	23
Septic system discharge	5	8	0	3	2	0	5	1.14	23
Noise/light pollution	6	8	0	1	1	0	6	0.71	22
Watercraft traffic/unsafe watercraft pı	9	5	1	4	0	0	4	0.86	23
Other (please specify)									3
								answered question	**23**
								skipped question	**3**

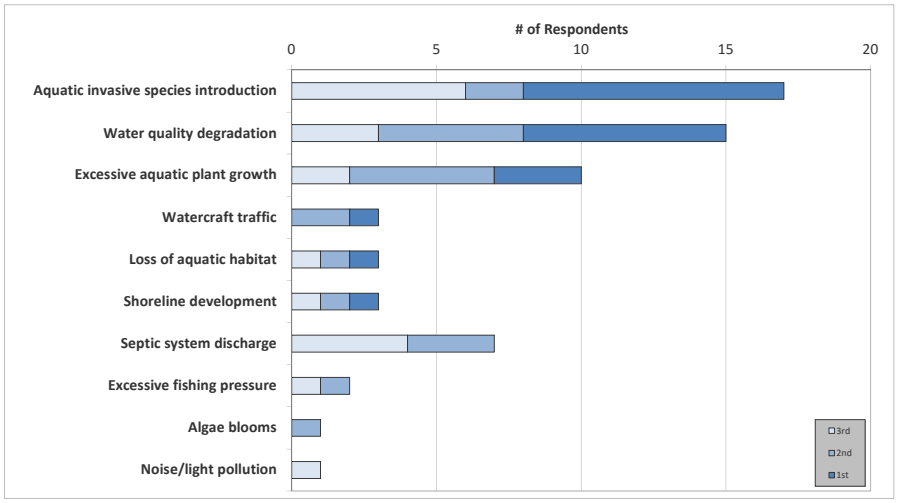
Number	Other (please specify)
1	farm run off
2	Weeds make it not used with motor boats in summer
3	don't know



24. From the list below, please rank your top three concerns regarding Grand Lake, with 1 being your greatest concern.

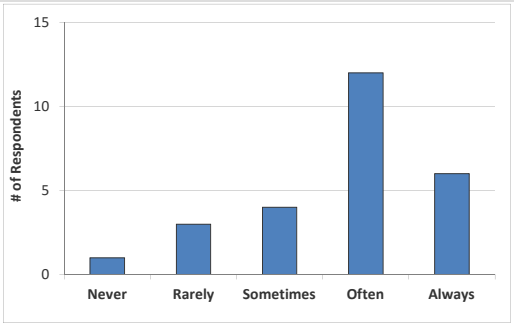
Answer Options	1st	2nd	3rd	Response Count
Excessive aquatic plant growth	9	2	6	17
Water quality degradation	7	5	3	15
Algae blooms	3	5	2	10
Shoreline erosion or development	1	2	0	3
Loss of aquatic habitat	1	1	1	3
Excessive fishing pressure	1	1	1	3
Aquatic invasive species introduction	0	3	4	7
Septic system discharge	0	1	1	2
Noise/light pollution	0	1	0	1
Watercraft traffic/unsafe watercraft practices	0	0	1	1
Other (please specify)	0	0	2	2
			answered question	**22**
			skipped question	**4**

Number	"Other" responses
1	lake not being used much in summer by boats because to many weeds to go threw.



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

Answer Options	Never	Rarely	Sometimes	Often	Always	Response Count
	1	3	4	12	6	26
				answered question		**26**
				skipped question		**0**

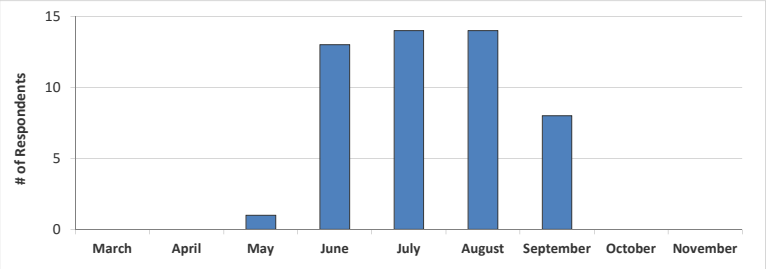


26. During the past three years of open water season, has aquatic plant growth, including algae, ever displacted you from Grand Lake?

Answer Options	Response Percent	Response Count
Yes	58.3%	14
No	41.7%	10
answered question		**24**
skipped question		**2**

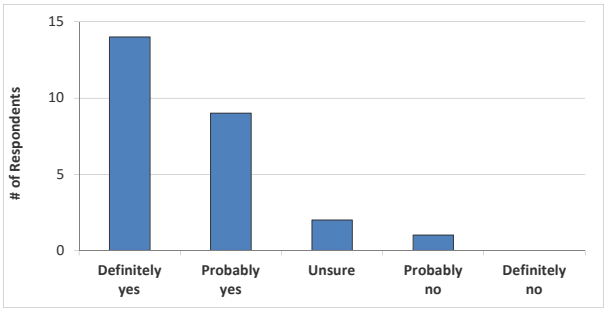
27. During the past three years of open water season, in which months have you been displaced from Grand Lake due to aquatic plant growth?

Answer Options	Response Percent	Response Count
March	0.0%	0
April	0.0%	0
May	7.1%	1
June	92.9%	13
July	100.0%	14
August	100.0%	14
September	57.1%	8
October	0.0%	0
November	0.0%	0
answered question		14
skipped question		12



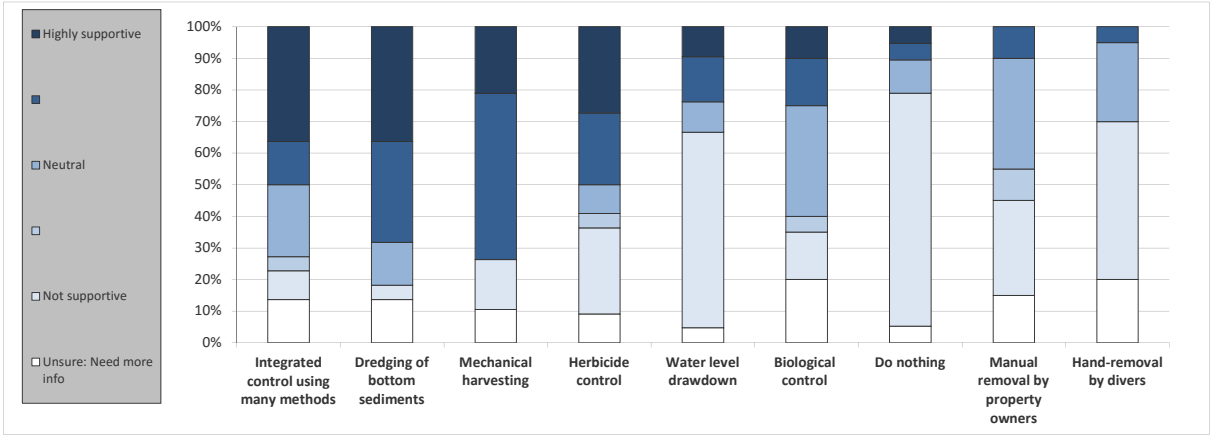
28. Considering your answer to the question above, do you believe aquatic plant control is needed on Grand Lake?

Answer Options	Definitely yes	Probably yes	Unsure	Probably no	Definitely no	Response Count
	14	9	2	1	0	26
answered question						26
skipped question						0



29. Aquatic plants can be managed using many techniques. What is your level of support for the responsible use of the following techniques on Grand Lake?

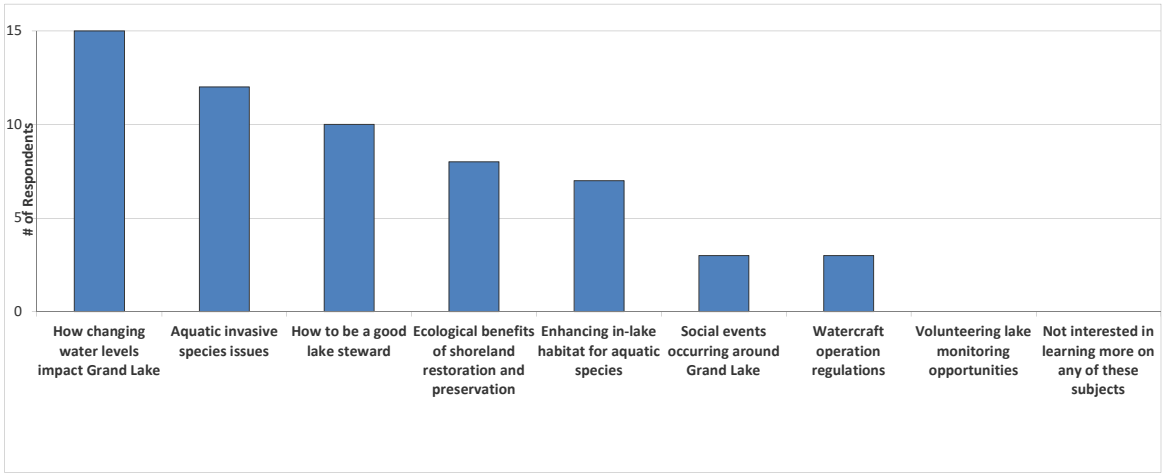
Answer Options	Not supportive		Neutral		Highly supportive	Unsure: Need more info	Rating Average	Response Count
Integrated control using many methods	2	1	5	3	8	3	3.38	22
Dredging of bottom sediments	1	0	3	7	8	3	3.4	22
Mechanical harvesting	3	0	0	10	4	2	3.32	19
Herbicide control	6	1	2	5	6	2	2.7	22
Water level drawdown	13	0	2	3	2	1	2	21
Biological control	3	1	7	3	2	4	2.26	20
Do nothing	14	0	2	1	1	1	1.53	19
Manual removal by property owners	6	2	7	2	0	3	2.05	20
Hand-removal by divers	10	0	5	1	0	4	1.53	20
answered question								23
skipped question								3



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

Answer Options	Response Percent	Response Count
How changing water levels impact Grand Lake	75.0%	15
Aquatic invasive species issues	60.0%	12
How to be a good lake steward	50.0%	10
Ecological benefits of shoreland restoration and preservation	40.0%	8
Enhancing in-lake habitat for aquatic species	35.0%	7
Social events occurring around Grand Lake	15.0%	3
Watercraft operation regulations	15.0%	3
Volunteering lake monitoring opportunities	0.0%	0
Not interested in learning more on any of these subjects	0.0%	0
Some other topic (please specify):	5.0%	1
answered question		**20**
skipped question		**6**

Number	Other (please specify)
1	all of above



31. Please feel free to provide written comments concerning the Grand Lake, its current and/or historic condition and its management.

Answer Options	Response Count
	8
answered question	**8**
skipped question	**18**

Number	Response Text
1	Amish have an impact on the fish. They are out on Grand Lake regularly and they don't abide by the laws. /they keep way over their limits and also under sized fish. What ever they catch they keep.
2	Weed and Carps harvesting did a lot of good in the early years of my family ownership of our home. We were even able to swim in the lake. The shoreline was basically a sand bottom and there were hundreds of spawning beds for pan fish and bass. I doubt if those conditions will ever exist again. I believe in order to get back to those conditions, the lake would need to be dredged in order to remove most of the sediment on the lake bottom. Also the river coming into the lake should be looked at too. The river has a lot to do with the quality of the lake.
3	Lake level is to low
4	*he is on the grand river.* Tom, my name is Dan O'Brien. I do not need my survey to be anonymous. I want to put you and GLIA on notice that I own significant acreage under the grand lake and do not want my rights or input not utilized when "Changing the lake conditions" which may or may not effect my land negatively. I do support improvement of Grand lake and am open to hear your discussions. my email is dobrienconsulting1@gmail.com Phone 847-874-6084 I have owned here for 28 years.
5	Would be nice to have more info about the watershed from the Head waters all the way down stream. How about getting serious about rip rap on the stream, more serious land (soil) management in the watershed, educate home owners around the lake on Best lawn management for weeds etc. that would not negatively affect Grand Lake.
6	It was be great if the lake looked like it does in the spring or fall year round. Summertime its not useable

7	I believe lake is fished the most during the winter months where other lakes are enjoyed all year round. Because of the smells and being covered with a blanket of weeds during the warmer months keeps people from enjoying the lake my self included I fish other lakes and have noticed shallow spots have more weeds at the surface making it hard to travel but spots that are eight feet or more deep are fine to travel weeds and below surface and fish can move more freely. I believe if lake was deeper it would help.
8	Unless it is windy or raining, the lake looks and smells bad.

C

APPENDIX C

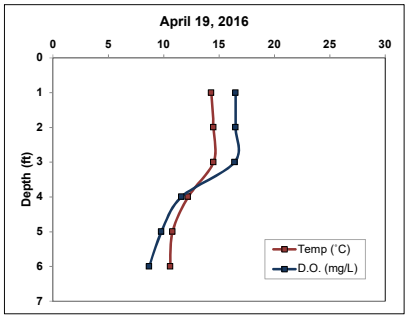
Water Quality Data

Grand Lake - Deep Hole

Date: 4/19/2016
Time: 12:10
Weather: 100% clouds, 50F
Entry: EEH

Max Depth: 6.8
LS Depth (ft): 3.3
LB Depth (ft):
Secchi Depth (ft):

Depth (ft)	Temp (˚C)	D.O. (mg/L)	pH	% Saturation
1	14.3	16.5		162%
2	14.5	16.5	8.9	162%
3	14.5	16.4		161%
4	12.2	11.6		108%
5	10.8	9.8		88%
6	10.6	8.7		78%



Parameter	LS	LB
Total P (µg/L)	64.00	NA
Dissolved P (µg/L)	3.10	NA
Chl-a (µg/L)	19.20	NA
TKN (µg/L)	749.00	NA
$NO_3 + NO_2$-N (µg/L)	4220.00	NA
NH_3-N (µg/L)	ND	NA
Total N (µg/L)	4969.00	NA
Lab Cond. (µS/cm)	523.00	NA
Lab pH	8.62	NA
Alkalinity (mg/L $CaCO_3$)	207.00	NA
Total Susp. Solids (mg/L)	2.40	NA
Calcium (mg/L)	40.90	NA
Magnesium (mg/L)	39.20	NA
Hardness (mg/L)	263.00	NA
Color (SU)	10.00	NA
Turbidity (NTU)	NA	NA

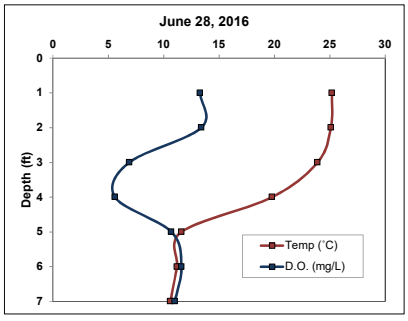
Data collected by TWH (Onterra)

Grand Lake - Deep Hole

Date: 6/28/2016
Time: 12:40
Weather: 10% clouds, breezy, 70F
Entry: JLW

Max Depth: 7.4
LS Depth (ft): 3.0
LB Depth (ft):
Secchi Depth (ft): 7.4

Depth (ft)	Temp (˚C)	D.O. (mg/L)	pH	% Saturation
1	25.2	13.3		162%
2	25.1	13.4		163%
3	23.9	6.9		82%
4	19.8	5.6		62%
5	11.6	10.7		98%
6	11.2	11.6		105%
7	10.6	11.0		99%



Parameter	LS	LB
Total P (µg/L)	47.90	NA
Dissolved P (µg/L)	NA	NA
Chl-a (µg/L)	7.20	NA
TKN (µg/L)	NA	NA
$NO_3 + NO_2$-N (µg/L)	NA	NA
NH_3-N (µg/L)	NA	NA
Total N (µg/L)	NA	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkalinity (mg/L $CaCO_3$)	NA	NA
Total Susp. Solids (mg/L)	NA	NA
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	NA	NA
Turbidity (NTU)	NA	NA

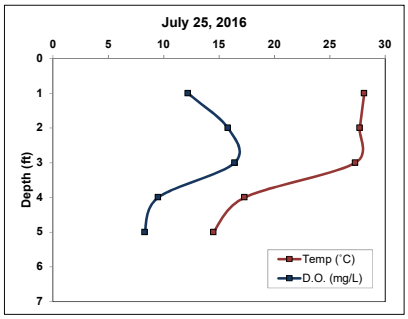
Data collected by TAH (Onterra). SD hit bottom, moved WQ point at this location. DO 108% saturated at 6ft, 100% saturated at 7ft.

Grand Lake - Deep Hole

Date: 7/25/2016
Time: 12:48
Weather: 0% clouds, 82F
Entry: JLW

Max Depth: 7.3
LS Depth (ft): 3.0
LB Depth (ft):
Secchi Depth (ft): 6.6

Depth (ft)	Temp (˚C)	D.O. (mg/L)	pH	% Saturation
1	28.1	12.2	82.6	156%
2	27.7	15.8	81.9	200%
3	27.3	16.4	81.1	208%
4	17.3	9.5	63.1	99%
5	14.5	8.3	58.1	81%



Parameter	LS	LB
Total P (µg/L)	54.40	NA
Dissolved P (µg/L)	NA	NA
Chl-a (µg/L)	13.80	NA
TKN (µg/L)	948.00	NA
$NO_3 + NO_2$-N (µg/L)	254.00	NA
NH_3-N (µg/L)	41.10	NA
Total N (µg/L)	1202.00	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkalinity (mg/L $CaCO_3$)	NA	NA
Total Susp. Solids (mg/L)	NA	NA
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	NA	NA
Turbidity (NTU)	NA	NA

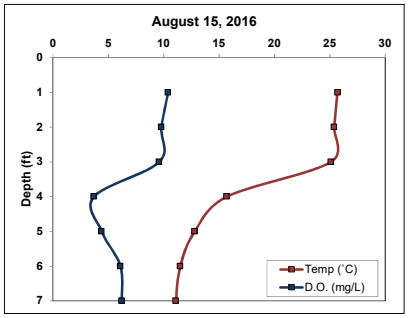
Data collected by BTB & LJS (Onterra).

Grand Lake - Deep Hole

Date: 8/15/2016
Time: 10:25
Weather: 82F, 50% clouds
Entry: JMB

Max Depth: 8.8
LS Depth (ft): 3.0
LB Depth (ft):
Secchi Depth (ft): 6.4

Depth (ft)	Temp (˚C)	D.O. (mg/L)	pH	% Saturation
1	25.7	10.4		127%
2	25.4	9.8		120%
3	25.1	9.6		117%
4	15.7	3.7		37%
5	12.8	4.4		42%
6	11.5	6.1		56%
7	11.1	6.2		56%



Parameter	LS	LB
Total P (µg/L)	30.90	NA
Dissolved P (µg/L)	NA	NA
Chl-a (µg/L)	6.92	NA
TKN (µg/L)	NA	NA
$NO_3 + NO_2$-N (µg/L)	NA	NA
NH_3-N (µg/L)	NA	NA
Total N (µg/L)	NA	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkalinity (mg/L $CaCO_3$)	NA	NA
Total Susp. Solids (mg/L)	NA	NA
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	NA	NA
Turbidity (NTU)	NA	NA

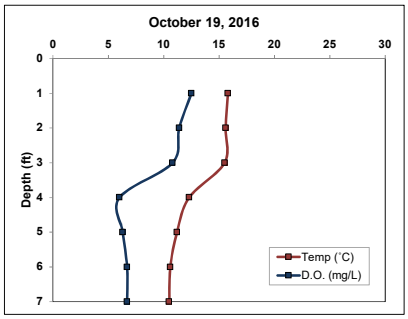
Data collected by TWH and LJS (Onterra).

Grand Lake - Deep Hole

Date: 10/19/2016
Time: 10:10
Weather: 65F, 75% clouds, no wind
Entry: JMB

Max Depth: 7.0
LS Depth (ft): 3.0
LB Depth (ft):
Secchi Depth (ft): 4.3

Depth (ft)	Temp (˚C)	D.O. (mg/L)	pH	% Saturation
1	15.8	12.5		126%
2	15.6	11.4		114%
3	15.5	10.8		108%
4	12.3	6.0		56%
5	11.2	6.3		57%
6	10.6	6.7		60%
7	10.5	6.7		60%



Parameter	LS	LB
Total P (µg/L)	35.00	NA
Dissolved P (µg/L)	NA	NA
Chl-a (µg/L)	21.00	NA
TKN (µg/L)	NA	NA
$NO_3 + NO_2$-N (µg/L)	NA	NA
NH_3-N (µg/L)	NA	NA
Total N (µg/L)	NA	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkalinity (mg/L $CaCO_3$)	NA	NA
Total Susp. Solids (mg/L)	4.00	NA
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	NA	NA
Turbidity (NTU)	NA	NA

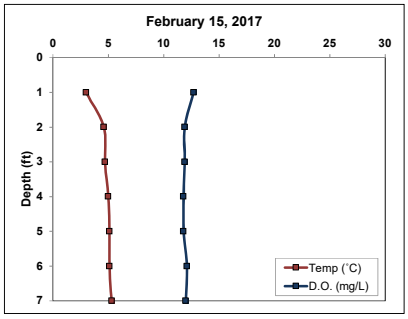
Data collected by JMB and LJS (Onterra).

Grand Lake - Deep Hole

Date: 2/15/2017
Time: 11:00
Weather: 90% Clouds, 26F
Entry: BTB

Max Depth: 7.2
LS Depth (ft): 3.0
LB Depth (ft):
Secchi Depth (ft): 4.6

Depth (ft)	Temp (˚C)	D.O. (mg/L)	pH	% Saturation
1	3.0	12.7	37.4	94%
2	4.6	11.9	40.3	92%
3	4.7	11.9	40.5	92%
4	5.0	11.8	41.0	92%
5	5.1	11.8	41.2	93%
6	5.1	12.1	41.2	95%
7	5.3	12.0	41.5	94%



Parameter	LS	LB
Total P (µg/L)	46.60	NA
Dissolved P (µg/L)	3.70	NA
Chl-a (µg/L)	NA	NA
TKN (µg/L)	526.00	NA
$NO_3 + NO_2$-N (µg/L)	5800.00	NA
NH_3-N (µg/L)	ND	NA
Total N (µg/L)	6326.00	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkalinity (mg/L $CaCO_3$)	NA	NA
Total Susp. Solids (mg/L)	NA	NA
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	NA	NA
Turbidity (NTU)	NA	NA

Data collected by TWH & LJS
Ice depth: 0.9 feet

Water Quality Data

2016-2017	Surface		Bottom	
Parameter	Count	Mean	Count	Mean
Secchi Depth (feet)	5	5.9	NA	NA
Total P (µg/L)	6	46.5	0	NA
Dissolved P (µg/L)	2	3.4	0	NA
Chl a (µg/L)	5	13.6	0	NA
TKN (µg/L	3	741.0	0	NA
NO_3+NO_2-N (µg/L)	3	3424.7	0	NA
NH_3-N (µg/L)	3	41.1	0	NA
Total N (µg/L)	3	4165.7	0	NA
Lab Cond. (µS/cm)	1	523.0	0	NA
Alkal (mg/l $CaCO_3$)	1	207.0	0	NA
Total Susp. Solids (mg/l)	2	3.2	0	NA
Calcium (mg/L)	1	40.9	0	NA
Magnesium (mg/L)	1	39.2	0	NA
Hardness (mg/L)	1	263.0	0	NA
Color (SU)	1	10.0	0	NA
Turbidity (NTU)	0	NA	0	NA

Trophic State Index (TSI)

Year	TP	Chl-a	Secchi
2016	58.8	52.5	50.1
0			
0			
0			
0			
0			
0			
0			
0			
0			
0			
0			
0			
0			
0			
0			
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0			
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0			
0			
0			
0			
0			
0			
0			
0			
All Years (Weighted)	58.8	52.5	50.1
SLDL Median	54.6	52.6	52.4
SWTP Ecoregion Median	48.7	47.0	50.0

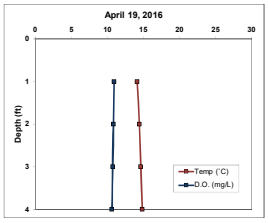
	Secchi (feet)				Chlorophyll-*a* (µg/L)				Total Phosphorus (µg/L)			
	Growing Season		Summer		Growing Season		Summer		Growing Season		Summer	
Year	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean
2016	4	5.2	2	6.5	5	13.6	3	9	5	46.4	3	44
All Years (Weighted)		5.2		6.5		13.6		9.3		46.4		44.4
SLDL Median				5.6				9.4				33.0
SWTP Ecoregion Median				6.6				5.3				22.0

Grand Lake - Near Dam

Date: 4/19/2016
Time: 11:55
Weather: 100% clouds, 50F
Entry: EEH

Max Depth: 4.2
LS Depth (ft): 2.0
LB Depth (ft):
Secchi Depth (ft): hit bottom

Depth (ft)	Temp (˚C)	D.O. (mg/L)	pH	% Saturation
1	14.1	10.9		106%
2	14.4	10.8	8.4	106%
3	14.6	10.7		105%
4	14.8	10.6		105%



Parameter	LS	LB
Total P (µg/L)	48.20	NA
Dissolved P (µg/L)	3.20	NA
Chl-a (µg/L)	8.70	NA
TKN (µg/L)	529.00	NA
$NO_3 + NO_2$-N (µg/L)	5960.00	NA
NH_3-N (µg/L)	30.80	NA
Total N (µg/L)	6489.00	NA
Lab Cond. (µS/cm)	659.00	NA
Lab pH	8.29	NA
Alkalinity (mg/L $CaCO_3$)	254.00	NA
Total Susp. Solids (mg/L	3.00	NA
Calcium (mg/L)	63.10	NA
Magnesium (mg/L)	39.80	NA
Hardness (mg/L)	322.00	NA
Color (SU)	15.00	NA
Turbidity (NTU)	NA	NA

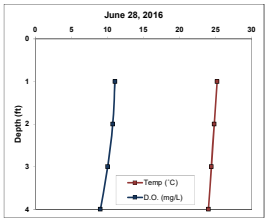
Data collected by TWH (Onterra)

Grand Lake - Near Dam

Date: 6/28/2016
Time: 13:20
Weather: 10% clouds, breezy, 70F
Entry: JLW

Max Depth: 4.2
LS Depth (ft): 3.0
LB Depth (ft):
Secchi Depth (ft): 4.2

Depth (ft)	Temp (˚C)	D.O. (mg/L)	pH	% Saturation
1	25.2	11.0		134%
2	24.8	10.7		129%
3	24.4	10.0		119%
4	24.0	9.0		107%



Parameter	LS	LB
Total P (µg/L)	127.00	NA
Dissolved P (µg/L)	NA	NA
Chl-a (µg/L)	1.48	NA
TKN (µg/L)	NA	NA
$NO_3 + NO_2$-N (µg/L)	NA	NA
NH_3-N (µg/L)	NA	NA
Total N (µg/L)	NA	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkalinity (mg/L $CaCO_3$)	NA	NA
Total Susp. Solids (mg/L	NA	NA
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	NA	NA
Turbidity (NTU)	NA	NA

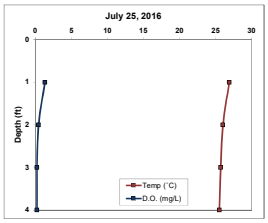
Data collected by TAH (Onterra). SD hit bottom. DO was 109% saturated at 4ft.

Grand Lake - Near Dam

Date: 7/25/2016
Time: 12:25
Weather: 0% clouds, 82F
Entry: JLW

Max Depth: 4.2
LS Depth (ft): 3.0
LB Depth (ft):
Secchi Depth (ft): 4.2

Depth (ft)	Temp (˚C)	D.O. (mg/L)	pH	% Saturation
1	26.9	1.3		16%
2	26.0	0.4	7.8	5%
3	25.7	0.2		2%
4	25.5	0.2		2%



Parameter	LS	LB
Total P (µg/L)	304.00	NA
Dissolved P (µg/L)	127.00	NA
Chl-a (µg/L)	26.80	NA
TKN (µg/L)	1570.00	NA
$NO_3 + NO_2$-N (µg/L)	ND	NA
NH_3-N (µg/L)	147.00	NA
Total N (µg/L)	1570.00	NA
Lab Cond. (µS/cm)	640.00	NA
Lab pH	7.86	NA
Alkalinity (mg/L $CaCO_3$)	281.00	NA
Total Susp. Solids (mg/L)	25.80	NA
Calcium (mg/L)	66.00	NA
Magnesium (mg/L)	42.60	NA
Hardness (mg/L)	340.00	NA
Color (SU)	30.00	NA
Turbidity (NTU)	NA	NA

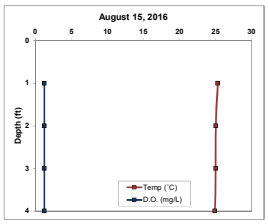
SD hit bottom. Data collected by BTB & LJS (Onterra).

Grand Lake - Near Dam

Date: 8/15/2016
Time: 10:25
Weather: 82F, 50% clouds
Entry: JMB

Max Depth: 5.0
LS Depth (ft): 3.0
LB Depth (ft):
Secchi Depth (ft): 4.3

Depth (ft)	Temp (˚C)	D.O. (mg/L)	pH	% Saturation
1	25.3	1.2		15%
2	25.0	1.2		14%
3	25.0	1.2		14%
4	24.9	1.2		14%



Parameter	LS	LB
Total P (µg/L)	169.00	NA
Dissolved P (µg/L)	NA	NA
Chl-a (µg/L)	13.50	NA
TKN (µg/L)	NA	NA
$NO_3 + NO_2$-N (µg/L)	NA	NA
NH_3-N (µg/L)	NA	NA
Total N (µg/L)	NA	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkalinity (mg/L $CaCO_3$)	NA	NA
Total Susp. Solids (mg/L)	NA	NA
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	NA	NA
Turbidity (NTU)	NA	NA

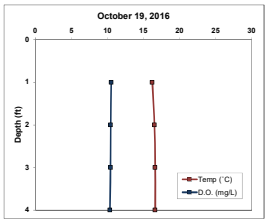
Data collected by TWH and LJS (Onterra).

Grand Lake - Near Dam

Date: 10/19/2016
Time: 10:10
Weather: 65F, 75% clouds, no wind
Entry: JMB

Max Depth: 4.4
LS Depth (ft): 3.0
LB Depth (ft):
Secchi Depth (ft): 3.6

Depth (ft)	Temp (˚C)	D.O. (mg/L)	pH	% Saturation
1	16.2	10.5		107%
2	16.8	10.4		106%
3	16.6	10.4		107%
4	16.6	10.3		106%



Parameter	LS	LB
Total P (µg/L)	79.60	NA
Dissolved P (µg/L)	NA	NA
Chl-a (µg/L)	14.30	NA
TKN (µg/L)	NA	NA
$NO_3 + NO_2$-N (µg/L)	NA	NA
NH_3-N (µg/L)	NA	NA
Total N (µg/L)	NA	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkalinity (mg/L $CaCO_3$)	NA	NA
Total Susp. Solids (mg/L)	15.00	NA
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	NA	NA
Turbidity (NTU)	NA	NA

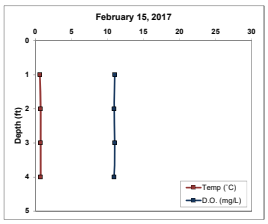
Data collected by JMB and LJS (Onterra).

Grand Lake - Near Dam

Date: 2/15/2017
Time: 10:00
Weather: 75% clouds, 26F
Entry: BTB

Max Depth: 4.2
LS Depth (ft): 3.0
LB Depth (ft):
Secchi Depth (ft): 1.7

Depth (ft)	Temp (˚C)	D.O. (mg/L)	pH	% Saturation
1	0.6	11.0	33.1	76%
2	0.7	10.9	33.3	76%
3	0.7	11.0	33.3	77%
4	0.7	10.9	33.3	76%



Parameter	LS	LB
Total P (µg/L)	229.00	NA
Dissolved P (µg/L)	111.00	NA
Chl-a (µg/L)	NA	NA
TKN (µg/L)	1580.00	NA
$NO_3 + NO_2$-N (µg/L)	4960.00	NA
NH_3-N (µg/L)	334.00	NA
Total N (µg/L)	6540.00	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkalinity (mg/L $CaCO_3$)	NA	NA
Total Susp. Solids (mg/L)	NA	NA
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	NA	NA
Turbidity (NTU)	NA	NA

Collected by TWH & LJS
Ice Depth: 0.8'

Water Quality Data

2016-2017	Surface		Bottom	
Parameter	Count	Mean	Count	Mean
Secchi Depth (feet)	5	3.6	NA	NA
Total P (µg/L)	6	159.5	0	NA
Dissolved P (µg/L)	3	80.4	0	NA
Chl a (µg/L)	5	13.0	0	NA
TKN (µg/L	3	1226.3	0	NA
NO_3+NO_2-N (µg/L)	3	5460.0	0	NA
NH_3-N (µg/L)	3	170.6	0	NA
Total N (µg/L)	3	4866.3	0	NA
Lab Cond. (µS/cm)	2	649.5	0	NA
Alkal (mg/l $CaCO_3$)	2	267.5	0	NA
Total Susp. Solids (mg/l)	3	14.6	0	NA
Calcium (mg/L)	2	64.6	0	NA
Magnesium (mg/L)	2	41.2	0	NA
Hardness (mg/L)	2	331.0	0	NA
Color (SU)	2	22.5	0	NA
Turbidity (NTU)	0	NA	0	NA

Trophic State Index (TSI)

Year	TP	Chl-a	Secchi
2016	80.6	56.4	56.1
0			
0			
0			
0			
0			
0			
0			
0			
0			
0			
0			
0			
0			
0			
0			
0			
0			
0			
0			
0			
0			
0			
0			
0			
0			
0			
0			
All Years (Weighted)	80.6	56.4	56.1
SLDL Median	54.6	52.6	52.4
SWTP Ecoregion Median	48.7	47.0	50.0

	Secchi (feet)				Chlorophyll-a (µg/L)				Total Phosphorus (µg/L)			
	Growing Season		Summer		Growing Season		Summer		Growing Season		Summer	
Year	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean
2016	2	4.0	1	4.3	5	13.0	3	13.9	5	145.6	3.0	200.0
All Years (Weighted)		4.0		4.3		13.0		13.9		145.6		200.0
SLDL Median				5.6				9.4				33.0
SWTP Ecoregion Median				6.6				5.3				22.0

D

APPENDIX D

Watershed Analysis WiLMS Results

Date: 2/22/2017 Scenario: Grand Lake Current

Lake Id: GrandLake_WS_Current_UPDATE

Watershed Id: 0

Hydrologic and Morphometric Data

Tributary Drainage Area: 58349.0 acre
Total Unit Runoff: 9.30 in.
Annual Runoff Volume: 45220.5 acre-ft
Lake Surface Area <As>: 253.0 acre
Lake Volume <V>: 679.0 acre-ft
Lake Mean Depth <z>: 2.7 ft
Precipitation - Evaporation: 3.1 in.
Hydraulic Loading: 47920.7 acre-ft/year
Areal Water Load <qs>: 189.4 ft/year
Lake Flushing Rate <p>: 70.58 1/year
Water Residence Time: 0.01 year
Observed spring overturn total phosphorus (SPO): 48.2 mg/m^3
Observed growing season mean phosphorus (GSM): 145.6 mg/m^3
% NPS Change: 0%
% PS Change: 0%

NON-POINT SOURCE DATA

Land Use	Acre (ac)	Low Loading (kg/ha-year)	Most Likely Loading (kg/ha-year)	High Loading (kg/ha-year)	Loading %	Low Loading (kg/year)	Most Likely Loading (kg/year)	High Loading (kg/year)
Row Crop AG	38531.0	0.50	1.00	3.00	88.7	7797	15593	46780
Mixed AG	0.0	0.30	0.80	1.40	0.0	0	0	0
Pasture/Grass	10549.0	0.10	0.30	0.50	7.3	427	1281	2135
HD Urban (1/8 Ac)	61.0	1.00	1.50	2.00	0.2	25	37	49
MD Urban (1/4 Ac)	169.0	0.30	0.50	0.80	0.2	21	34	55
Rural Res (>1 Ac)	1213.0	0.05	0.10	0.25	0.3	25	49	123
Wetlands	4906.0	0.10	0.10	0.10	1.1	199	199	199
Forest	2920.0	0.05	0.09	0.18	0.6	59	106	213
Lake Surface	253.0	0.10	0.30	1.00	0.2	10	31	102

POINT SOURCE DATA

Point Sources	Water Load (m^3/year)	Low (kg/year)	Most Likely (kg/year)	High (kg/year)	Loading %
Little Green Lake SW	2010000.0	0.0	166.0	0.0	0.9
Lake Emily SW	1240000.0	0.0	79.0	0.0	0.4

SEPTIC TANK DATA

Description		Low	Most Likely	High	Loading %
Septic Tank Output (kg/capita-year)		0.30	0.50	0.80	
# capita-years	67.0				
% Phosphorus Retained by Soil		98.0	90.0	80.0	
Septic Tank Loading (kg/year)		0.40	3.35	10.72	0.0

TOTALS DATA

Description	Low	Most Likely	High	Loading %
Total Loading (lb)	18875.1	38753.6	109494.2	100.0
Total Loading (kg)	8561.7	17578.5	49666.3	100.0
Areal Loading (lb/ac-year)	74.61	153.18	432.78	
Areal Loading (mg/m^2-year)	8362.21	17168.97	48509.09	
Total PS Loading (lb)	0.0	540.1	0.0	1.4
Total PS Loading (kg)	0.0	245.0	0.0	1.4
Total NPS Loading (lb)	18851.6	38138.4	109244.9	98.6
Total NPS Loading (kg)	8551.0	17299.5	49553.1	98.6

Phosphorus Prediction and Uncertainty Analysis Module

Date: 2/22/2017 Scenario: 71
Observed spring overturn total phosphorus (SPO): 48.2 mg/m^3
Observed growing season mean phosphorus (GSM): 145.6 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	103	211	595	65	45
Canfield-Bachmann, 1981 Natural Lake	125	244	621	98	67
Canfield-Bachmann, 1981 Artificial Lake	106	190	411	44	30
Rechow, 1979 General	103	212	600	66	45
Rechow, 1977 Anoxic	128	263	742	117	80
Rechow, 1977 water load<50m/year	N/A	N/A	N/A	N/A	N/A
Rechow, 1977 water load>50m/year	125	257	726	111	76
Walker, 1977 General	129	266	751	218	452
Vollenweider, 1982 Combined OECD	84	151	353	54	56
Dillon-Rigler-Kirchner	97	199	561	151	313
Vollenweider, 1982 Shallow Lake/Res.	74	139	346	42	43
Larsen-Mercier, 1976	129	266	751	218	452
Nurnberg, 1984 Oxic	116	238	674	92	63

Lake Phosphorus Model	Confidence Lower Bound	Confidence Upper Bound	Parameter Fit?	Back Calculation (kg/year)	Model Type
Walker, 1987 Reservoir	123	457	z Tw	0	GSM
Canfield-Bachmann, 1981 Natural Lake	76	703	L	1	GSM
Canfield-Bachmann, 1981 Artificial Lake	59	547	FIT	1	GSM
Rechow, 1979 General	119	464	P	0	GSM
Rechow, 1977 Anoxic	156	567	FIT	0	GSM
Rechow, 1977 water load<50m/year	N/A	N/A	N/A	N/A	N/A
Rechow, 1977 water load>50m/year	176	542	P Pin	0	GSM
Walker, 1977 General	132	600	FIT	0	SPO
Vollenweider, 1982 Combined OECD	74	311	Tw	0	ANN
Dillon-Rigler-Kirchner	117	430	P L p	0	SPO
Vollenweider, 1982 Shallow Lake/Res.	68	294	Tw	0	ANN
Larsen-Mercier, 1976	162	571	P Pin p	0	SPO
Nurnberg, 1984 Oxic	124	531	P L	0	ANN

Water and Nutrient Outflow Module

Date: 2/22/2017 Scenario: 41
Average Annual Surface Total Phosphorus: 145.6mg/m^3
Annual Discharge: 4.79E+004 AF => 5.91E+007 m^3
Annual Outflow Loading: 18135.7 LB => 8226.3 kg

E

APPENDIX E

Aquatic Plant Survey Data

Point Number	ID	Lake Name	County	Date	Field Crew	Point Number	Depth (ft)	Sediment	Pole; Rope	Comments	Notes	Nuisance	Total Rake Fullness	Myriophyllum spicatum	Potamogeton crispus	Ceratophyllum demersum	Chara spp.	Elodea canadensis	Lemna minor	Myriophyllum verticillatum	Potamogeton friesii	Potamogeton nodosus	Ranunculus aquatilis	Stuckenia pectinata	Zizania spp.	Potamogeton hybrid 1
1	2	Grand Lake	Green Lake	9/6/2016	TWH & TAH	1	3	Muck	Pole	SAMPLED			0													
2	1	Grand Lake	Green Lake	9/6/2016	TWH & TAH	2	3	Muck	Pole	SAMPLED			0													
3	3	Grand Lake	Green Lake	9/6/2016	TWH & TAH	3	3	Muck	Pole	SAMPLED			2							2						
4	5	Grand Lake	Green Lake	9/6/2016	TWH & TAH	4	4	Muck	Pole	SAMPLED			0													
5	4	Grand Lake	Green Lake	9/6/2016	TWH & TAH	5	4	Muck	Pole	SAMPLED			0													
6	16	Grand Lake	Green Lake	9/6/2016	TWH & TAH	6	2	Muck	Pole	SAMPLED			1			1			1							
7	6	Grand Lake	Green Lake	9/6/2016	TWH & TAH	7	4	Muck	Pole	SAMPLED			1					1					1			
8	17	Grand Lake	Green Lake	9/6/2016	TWH & TAH	8	4	Muck	Pole	SAMPLED			1			1			1							
9	15	Grand Lake	Green Lake	9/6/2016	TWH & TAH	9	4	Muck	Pole	SAMPLED			1				1		1		1					1
10	14	Grand Lake	Green Lake	9/6/2016	TWH & TAH	10	4	Muck	Pole	SAMPLED			2			1	1				1		1			
11	13	Grand Lake	Green Lake	9/6/2016	TWH & TAH	11	3	Muck	Pole	SAMPLED			2				2									
12	12	Grand Lake	Green Lake	9/6/2016	TWH & TAH	12	3	Muck	Pole	SAMPLED			2			1	1	1		2						
13	7	Grand Lake	Green Lake	9/6/2016	TWH & TAH	13	0			TERRESTRIAL																
14	18	Grand Lake	Green Lake	9/6/2016	TWH & TAH	14	4	Muck	Pole	SAMPLED			1			1										
15	61	Grand Lake	Green Lake	9/6/2016	TWH & TAH	15	6	Muck	Pole	SAMPLED			0													
16	62	Grand Lake	Green Lake	9/6/2016	TWH & TAH	16	6	Muck	Pole	SAMPLED			3			1				3						
17	63	Grand Lake	Green Lake	9/6/2016	TWH & TAH	17	4	Muck	Pole	SAMPLED			1				1	1								
18	11	Grand Lake	Green Lake	9/6/2016	TWH & TAH	18	4	Muck	Pole	SAMPLED			1							1						
19	8	Grand Lake	Green Lake	9/6/2016	TWH & TAH	19	2	Muck	Pole	SAMPLED			1						1				1			
20	19	Grand Lake	Green Lake	9/6/2016	TWH & TAH	20	3	Muck	Pole	SAMPLED			1				1									
21	60	Grand Lake	Green Lake	9/6/2016	TWH & TAH	21	6	Muck	Pole	SAMPLED			0													
22	67	Grand Lake	Green Lake	9/6/2016	TWH & TAH	22	6	Muck	Pole	SAMPLED			2			2				1	1		1			
23	64	Grand Lake	Green Lake	9/6/2016	TWH & TAH	23	5	Muck	Pole	SAMPLED			3			3		1								1
24	10	Grand Lake	Green Lake	9/6/2016	TWH & TAH	24	4	Muck	Pole	SAMPLED			1										1			1
25	9	Grand Lake	Green Lake	9/6/2016	TWH & TAH	25	2	Muck	Pole	SAMPLED			1						1							
26	20	Grand Lake	Green Lake	9/6/2016	TWH & TAH	26	3	Muck	Pole	SAMPLED			1			1	1									
27	59	Grand Lake	Green Lake	9/6/2016	TWH & TAH	27	6	Muck	Pole	SAMPLED			0													
28	66	Grand Lake	Green Lake	9/6/2016	TWH & TAH	28	5	Muck	Pole	SAMPLED			1								1					
29	65	Grand Lake	Green Lake	9/6/2016	TWH & TAH	29	4	Muck	Pole	SAMPLED			1										1	1		
30	107	Grand Lake	Green Lake	9/6/2016	TWH & TAH	30	2	Muck	Pole	SAMPLED			1			1			1		1					
31	70	Grand Lake	Green Lake	9/6/2016	TWH & TAH	31	2	Muck	Pole	SAMPLED			2				2									
32	21	Grand Lake	Green Lake	9/6/2016	TWH & TAH	32	4	Muck	Pole	SAMPLED			0		1											
33	58	Grand Lake	Green Lake	9/6/2016	TWH & TAH	33	3	Muck	Pole	SAMPLED			1			1					1					
34	69	Grand Lake	Green Lake	9/6/2016	TWH & TAH	34	3	Muck	Pole	SAMPLED			1					1								
35	68	Grand Lake	Green Lake	9/6/2016	TWH & TAH	35	2	Muck	Pole	SAMPLED			1						1							
36	149	Grand Lake	Green Lake	9/6/2016	TWH & TAH	36	3	Muck	Pole	SAMPLED			1			1	1		1					1		
37	108	Grand Lake	Green Lake	9/6/2016	TWH & TAH	37	3	Muck	Pole	SAMPLED			1			1	1						1			
38	71	Grand Lake	Green Lake	9/6/2016	TWH & TAH	38	4	Muck	Pole	SAMPLED			0													
39	22	Grand Lake	Green Lake	9/6/2016	TWH & TAH	39	4	Muck	Pole	SAMPLED			0													
40	57	Grand Lake	Green Lake	9/6/2016	TWH & TAH	40	1	Muck	Pole	SAMPLED			0													

Point Number	ID	Lake Name	County	Date	Field Crew	Point Number	Depth (ft)	Sediment	Pole; Rope	Comments	Notes	Nuisance	Total Rake Fullness	Myriophyllum spicatum	Potamogeton crispus	Ceratophyllum demersum	Chara spp.	Elodea canadensis	Lemna minor	Myriophyllum verticillatum	Potamogeton friesii	Potamogeton nodosus	Ranunculus aquatilis	Stuckenia pectinata	Zizania spp.	Potamogeton hybrid 1
41	150	Grand Lake	Green Lake	9/6/2016	TWH & TAH	41	2	Muck	Pole	SAMPLED			1			1										
42	148	Grand Lake	Green Lake	9/6/2016	TWH & TAH	42	4	Muck	Pole	SAMPLED			2			1							1			
43	109	Grand Lake	Green Lake	9/6/2016	TWH & TAH	43	4	Muck	Pole	SAMPLED			0													
44	72	Grand Lake	Green Lake	9/6/2016	TWH & TAH	44	4	Muck	Pole	SAMPLED			0													
45	23	Grand Lake	Green Lake	9/6/2016	TWH & TAH	45	4	Muck	Pole	SAMPLED			0													
46	56	Grand Lake	Green Lake	9/6/2016	TWH & TAH	46	2	Muck	Pole	SAMPLED			0													
47	355	Grand Lake	Green Lake	9/9/2016	TWH & TAH	47	6	Muck	Pole	SAMPLED			2			2			1							
48	151	Grand Lake	Green Lake	9/6/2016	TWH & TAH	48	3	Muck	Pole	SAMPLED			2	1		2										
49	147	Grand Lake	Green Lake	9/6/2016	TWH & TAH	49	3	Muck	Pole	SAMPLED			1			1										
50	110	Grand Lake	Green Lake	9/6/2016	TWH & TAH	50	4	Muck	Pole	SAMPLED			0													
51	73	Grand Lake	Green Lake	9/6/2016	TWH & TAH	51	4	Muck	Pole	SAMPLED			0													
52	24	Grand Lake	Green Lake	9/6/2016	TWH & TAH	52	4	Muck	Pole	SAMPLED			0													
53	55	Grand Lake	Green Lake	9/6/2016	TWH & TAH	53	3	Muck	Pole	SAMPLED			1			1										
54	356	Grand Lake	Green Lake	9/9/2016	TWH & TAH	54	6	Muck	Pole	SAMPLED			1			1		1	1							
55	354	Grand Lake	Green Lake	9/9/2016	TWH & TAH	55	5	Muck	Pole	SAMPLED			2			2			1							
56	335	Grand Lake	Green Lake	9/9/2016	TWH & TAH	56	3	Muck	Pole	SAMPLED			2			2			2							1
57	184	Grand Lake	Green Lake	9/6/2016	TWH & TAH	57	3	Muck	Pole	SAMPLED			1			1										
58	152	Grand Lake	Green Lake	9/6/2016	TWH & TAH	58	3	Muck	Pole	SAMPLED			1			1										
59	146	Grand Lake	Green Lake	9/6/2016	TWH & TAH	59	4	Muck	Pole	SAMPLED			1			1			1				1			
60	111	Grand Lake	Green Lake	9/6/2016	TWH & TAH	60	4	Muck	Pole	SAMPLED			1										1			
61	74	Grand Lake	Green Lake	9/6/2016	TWH & TAH	61	4	Muck	Pole	SAMPLED			1		1	1										
62	25	Grand Lake	Green Lake	9/6/2016	TWH & TAH	62	4	Muck	Pole	SAMPLED			0													
63	54	Grand Lake	Green Lake	9/6/2016	TWH & TAH	63	3	Muck	Pole	SAMPLED			0													
64	106	Grand Lake	Green Lake	9/6/2016	TWH & TAH	64	0			NONNAVIGABLE (PLANTS)																
65	357	Grand Lake	Green Lake	9/9/2016	TWH & TAH	65	5	Muck	Pole	SAMPLED			0													
66	353	Grand Lake	Green Lake	9/9/2016	TWH & TAH	66	5	Muck	Pole	SAMPLED			1			1			1							
67	336	Grand Lake	Green Lake	9/9/2016	TWH & TAH	67	5	Muck	Pole	SAMPLED			1			1										
68	334	Grand Lake	Green Lake	9/9/2016	TWH & TAH	68	0			TERRESTRIAL																
69	293	Grand Lake	Green Lake	9/6/2016	TWH & TAH	69	2	Muck	Pole	SAMPLED			1			1			1							
70	183	Grand Lake	Green Lake	9/6/2016	TWH & TAH	70	3	Muck	Pole	SAMPLED			1			1										
71	185	Grand Lake	Green Lake	9/6/2016	TWH & TAH	71	3	Muck	Pole	SAMPLED			0													
72	153	Grand Lake	Green Lake	9/6/2016	TWH & TAH	72	4	Muck	Pole	SAMPLED			2			2							1			
73	145	Grand Lake	Green Lake	9/6/2016	TWH & TAH	73	4	Muck	Pole	SAMPLED			1			1			1							
74	112	Grand Lake	Green Lake	9/6/2016	TWH & TAH	74	4	Muck	Pole	SAMPLED			1			1										
75	75	Grand Lake	Green Lake	9/6/2016	TWH & TAH	75	4	Muck	Pole	SAMPLED			0		1											
76	26	Grand Lake	Green Lake	9/6/2016	TWH & TAH	76	3	Muck	Pole	SAMPLED			3			3		1	1							
77	53	Grand Lake	Green Lake	9/6/2016	TWH & TAH	77	3	Muck	Pole	SAMPLED			2			1		1		1			1			
78	102	Grand Lake	Green Lake	9/6/2016	TWH & TAH	78	2	Muck	Pole	SAMPLED			2			2			2							
79	370	Grand Lake	Green Lake	9/9/2016	TWH & TAH	79	5	Muck	Pole	SAMPLED			0													
80	358	Grand Lake	Green Lake	9/9/2016	TWH & TAH	80	5	Muck	Pole	SAMPLED			0													

Point Number	ID	Lake Name	County	Date	Field Crew	Point Number	Depth (ft)	Sediment	Pole; Rope	Comments	Notes	Nuisance	Total Rake Fullness	Myriophyllum spicatum	Potamogeton crispus	Ceratophyllum demersum	Chara spp.	Elodea canadensis	Lemna minor	Myriophyllum verticillatum	Potamogeton friesii	Potamogeton nodosus	Ranunculus aquatilis	Stuckenia pectinata	Zizania spp.	Potamogeton hybrid 1
81	352	Grand Lake	Green Lake	9/9/2016	TWH & TAH	81	3	Muck	Pole	SAMPLED			3		1	3		2	1							1
82	337	Grand Lake	Green Lake	9/9/2016	TWH & TAH	82	5	Muck	Pole	SAMPLED			0													
83	333	Grand Lake	Green Lake	9/9/2016	TWH & TAH	83	4	Sand	Pole	SAMPLED			1					1	1							
84	296	Grand Lake	Green Lake	9/6/2016	TWH & TAH	84	3	Muck	Pole	SAMPLED			1						1							
85	292	Grand Lake	Green Lake	9/6/2016	TWH & TAH	85	3	Muck	Pole	SAMPLED			2			2			1					1		1
86	295	Grand Lake	Green Lake	9/6/2016	TWH & TAH	86	0			TERRESTRIAL																
87	211	Grand Lake	Green Lake	9/6/2016	TWH & TAH	87	3	Muck	Pole	SAMPLED			2			2							1			
88	182	Grand Lake	Green Lake	9/6/2016	TWH & TAH	88	3	Muck	Pole	SAMPLED			1		1											
89	186	Grand Lake	Green Lake	9/6/2016	TWH & TAH	89	4	Muck	Pole	SAMPLED			3			3			2							
90	154	Grand Lake	Green Lake	9/6/2016	TWH & TAH	90	4	Muck	Pole	SAMPLED			3	1		3		1								
91	144	Grand Lake	Green Lake	9/6/2016	TWH & TAH	91	4	Muck	Pole	SAMPLED			2			2		1	2							
92	113	Grand Lake	Green Lake	9/6/2016	TWH & TAH	92	4	Muck	Pole	SAMPLED			2			2										
93	76	Grand Lake	Green Lake	9/6/2016	TWH & TAH	93	4	Muck	Pole	SAMPLED			2			1		1								
94	27	Grand Lake	Green Lake	9/6/2016	TWH & TAH	94	4	Muck	Pole	SAMPLED			2			1		2	1							
95	52	Grand Lake	Green Lake	9/6/2016	TWH & TAH	95	3	Muck	Pole	SAMPLED			3			3		1	1				1	1		
96	101	Grand Lake	Green Lake	9/6/2016	TWH & TAH	96	2	Muck	Pole	SAMPLED			2			1		2	1							
97	103	Grand Lake	Green Lake	9/6/2016	TWH & TAH	97	3	Muck	Pole	SAMPLED			1			1		1	1							
98	369	Grand Lake	Green Lake	9/9/2016	TWH & TAH	98	5	Muck	Pole	SAMPLED			1			1										
99	359	Grand Lake	Green Lake	9/9/2016	TWH & TAH	99	5	Muck	Pole	SAMPLED			2			2			1							
100	351	Grand Lake	Green Lake	9/9/2016	TWH & TAH	100	4	Muck	Pole	SAMPLED			1						1							
101	338	Grand Lake	Green Lake	9/9/2016	TWH & TAH	101	5	Muck	Pole	SAMPLED			1			1			1							
102	332	Grand Lake	Green Lake	9/9/2016	TWH & TAH	102	5	Muck	Pole	SAMPLED			0													
103	297	Grand Lake	Green Lake	9/6/2016	TWH & TAH	103	3	Muck	Pole	SAMPLED			2	1		2		1	1							1
104	291	Grand Lake	Green Lake	9/6/2016	TWH & TAH	104	3	Muck	Pole	SAMPLED			3			3			1				1			
105	294	Grand Lake	Green Lake	9/6/2016	TWH & TAH	105	0			TERRESTRIAL																
106	210	Grand Lake	Green Lake	9/6/2016	TWH & TAH	106	3	Muck	Pole	SAMPLED			3		1	3			1							1
107	181	Grand Lake	Green Lake	9/6/2016	TWH & TAH	107	3	Muck	Pole	SAMPLED			3			3		2	1							
108	187	Grand Lake	Green Lake	9/6/2016	TWH & TAH	108	3	Muck	Pole	SAMPLED			0													
109	155	Grand Lake	Green Lake	9/6/2016	TWH & TAH	109	4	Muck	Pole	SAMPLED			2			1								1		
110	143	Grand Lake	Green Lake	9/6/2016	TWH & TAH	110	4	Muck	Pole	SAMPLED			0													
111	114	Grand Lake	Green Lake	9/6/2016	TWH & TAH	111	4	Muck	Pole	SAMPLED			1					1	1							
112	77	Grand Lake	Green Lake	9/6/2016	TWH & TAH	112	3	Muck	Pole	SAMPLED			3			2		2	1							
113	28	Grand Lake	Green Lake	9/6/2016	TWH & TAH	113	4	Muck	Pole	SAMPLED			0													
114	51	Grand Lake	Green Lake	9/6/2016	TWH & TAH	114	3	Muck	Pole	SAMPLED			3			3		1								1
115	100	Grand Lake	Green Lake	9/6/2016	TWH & TAH	115	3	Muck	Pole	SAMPLED			0													
116	104	Grand Lake	Green Lake	9/6/2016	TWH & TAH	116	2	Muck	Pole	SAMPLED			1						1							
117	368	Grand Lake	Green Lake	9/9/2016	TWH & TAH	117	5	Muck	Pole	SAMPLED			1			1										
118	360	Grand Lake	Green Lake	9/9/2016	TWH & TAH	118	5	Muck	Pole	SAMPLED			2			1		2						1		
119	350	Grand Lake	Green Lake	9/9/2016	TWH & TAH	119	5	Muck	Pole	SAMPLED			1						1							
120	339	Grand Lake	Green Lake	9/9/2016	TWH & TAH	120	5	Muck	Pole	SAMPLED			1						1							

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121	331	Grand Lake	Green Lake	9/9/2016	TWH & TAH	121	5	Muck	Pole	SAMPLED			1						1							
122	311	Grand Lake	Green Lake	9/9/2016	TWH & TAH	122	3	Muck	Pole	SAMPLED			3			3		2	1							
123	298	Grand Lake	Green Lake	9/6/2016	TWH & TAH	123	3	Muck	Pole	SAMPLED			3	1		3		1	2							
124	290	Grand Lake	Green Lake	9/6/2016	TWH & TAH	124	3	Muck	Pole	SAMPLED			2			2			1							
125	277	Grand Lake	Green Lake	9/6/2016	TWH & TAH	125	2	Muck	Pole	SAMPLED			1			1			1							
126	276	Grand Lake	Green Lake	9/6/2016	TWH & TAH	126	3	Muck	Pole	SAMPLED			3			3		1	2							
127	212	Grand Lake	Green Lake	9/6/2016	TWH & TAH	127	3	Muck	Pole	SAMPLED			0													
128	209	Grand Lake	Green Lake	9/6/2016	TWH & TAH	128	4	Muck	Pole	SAMPLED			3			3		1	2							
129	180	Grand Lake	Green Lake	9/6/2016	TWH & TAH	129	3	Muck	Pole	SAMPLED			3			2		2	2							
130	188	Grand Lake	Green Lake	9/6/2016	TWH & TAH	130	4	Muck	Pole	SAMPLED			3			3		1	2							
131	156	Grand Lake	Green Lake	9/6/2016	TWH & TAH	131	3	Muck	Pole	SAMPLED			3			2		2	2							
132	142	Grand Lake	Green Lake	9/6/2016	TWH & TAH	132	3	Muck	Pole	SAMPLED			3			3		1	2							
133	115	Grand Lake	Green Lake	9/6/2016	TWH & TAH	133	3	Muck	Pole	SAMPLED			1					1								
134	78	Grand Lake	Green Lake	9/6/2016	TWH & TAH	134	3	Muck	Pole	SAMPLED			2			2		1	1				1			
135	29	Grand Lake	Green Lake	9/6/2016	TWH & TAH	135	3	Muck	Pole	SAMPLED			3			3		1	1							
136	50	Grand Lake	Green Lake	9/6/2016	TWH & TAH	136	3	Muck	Pole	SAMPLED			3			3		2	2				1			
137	99	Grand Lake	Green Lake	9/6/2016	TWH & TAH	137	3	Muck	Pole	SAMPLED			1			1			1							
138	105	Grand Lake	Green Lake	9/6/2016	TWH & TAH	138	0			NONNAVIGABLE (PLANTS)																
139	367	Grand Lake	Green Lake	9/9/2016	TWH & TAH	139	4	Muck	Pole	SAMPLED			1			1										
140	361	Grand Lake	Green Lake	9/9/2016	TWH & TAH	140	5	Muck	Pole	SAMPLED			1			1		1								
141	349	Grand Lake	Green Lake	9/9/2016	TWH & TAH	141	4	Muck	Pole	SAMPLED			1			1		1	1							1
142	340	Grand Lake	Green Lake	9/9/2016	TWH & TAH	142	5	Muck	Pole	SAMPLED			1						1							
143	330	Grand Lake	Green Lake	9/9/2016	TWH & TAH	143	4	Muck	Pole	SAMPLED			1						1							
144	320	Grand Lake	Green Lake	9/9/2016	TWH & TAH	144	2	Muck	Pole	SAMPLED			1			1			1							
145	310	Grand Lake	Green Lake	9/9/2016	TWH & TAH	145	4	Muck	Pole	SAMPLED			1					1	1							
146	299	Grand Lake	Green Lake	9/6/2016	TWH & TAH	146	3	Muck	Pole	SAMPLED			1			1			1							
147	289	Grand Lake	Green Lake	9/6/2016	TWH & TAH	147	3	Muck	Pole	SAMPLED			1			1										
148	278	Grand Lake	Green Lake	9/6/2016	TWH & TAH	148	3	Muck	Pole	SAMPLED			1			1			1							
149	275	Grand Lake	Green Lake	9/6/2016	TWH & TAH	149	3	Muck	Pole	SAMPLED			1						1							
150	263	Grand Lake	Green Lake	9/6/2016	TWH & TAH	150	3	Muck	Pole	SAMPLED			2			1			1							1
151	262	Grand Lake	Green Lake	9/6/2016	TWH & TAH	151	3	Muck	Pole	SAMPLED			1			1			1							
152	213	Grand Lake	Green Lake	9/6/2016	TWH & TAH	152	3	Muck	Pole	SAMPLED			2			2			2							
153	208	Grand Lake	Green Lake	9/6/2016	TWH & TAH	153	3	Muck	Pole	SAMPLED			3			3		1	1							
154	179	Grand Lake	Green Lake	9/6/2016	TWH & TAH	154	3	Muck	Pole	SAMPLED			3			3			2							
155	189	Grand Lake	Green Lake	9/6/2016	TWH & TAH	155	3	Muck	Pole	SAMPLED			3			3		1	2							
156	157	Grand Lake	Green Lake	9/6/2016	TWH & TAH	156	3	Muck	Pole	SAMPLED			3			3		2	2							
157	141	Grand Lake	Green Lake	9/6/2016	TWH & TAH	157	3	Muck	Pole	SAMPLED			2			2		1	2							
158	116	Grand Lake	Green Lake	9/6/2016	TWH & TAH	158	3	Muck	Pole	SAMPLED			1					1								
159	79	Grand Lake	Green Lake	9/6/2016	TWH & TAH	159	3	Muck	Pole	SAMPLED			2			2		1	2							
160	30	Grand Lake	Green Lake	9/6/2016	TWH & TAH	160	3	Muck	Pole	SAMPLED			1					1	1							

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161	49	Grand Lake	Green Lake	9/6/2016	TWH & TAH	161	2	Muck	Pole	SAMPLED			3		V	2		2	2							
162	98	Grand Lake	Green Lake	9/6/2016	TWH & TAH	162	2	Muck	Pole	SAMPLED			3			3		2	1							
163	366	Grand Lake	Green Lake	9/9/2016	TWH & TAH	163	5	Muck	Pole	SAMPLED			1			1		1								
164	362	Grand Lake	Green Lake	9/9/2016	TWH & TAH	164	5	Muck	Pole	SAMPLED			2			2		1	1							
165	348	Grand Lake	Green Lake	9/9/2016	TWH & TAH	165	4	Muck	Pole	SAMPLED			2			2		1	1							1
166	341	Grand Lake	Green Lake	9/9/2016	TWH & TAH	166	4	Muck	Pole	SAMPLED			3					3								
167	329	Grand Lake	Green Lake	9/9/2016	TWH & TAH	167	4	Muck	Pole	SAMPLED			1			1		1								
168	321	Grand Lake	Green Lake	9/9/2016	TWH & TAH	168	5	Muck	Pole	SAMPLED			2		1	1		1	1							1
169	319	Grand Lake	Green Lake	9/9/2016	TWH & TAH	169	2	Muck	Pole	SAMPLED			2			2		1	1							
170	312	Grand Lake	Green Lake	9/9/2016	TWH & TAH	170	5	Muck	Pole	SAMPLED			2			2		1	1							
171	309	Grand Lake	Green Lake	9/9/2016	TWH & TAH	171	5	Muck	Pole	SAMPLED			1			1		1	1							
172	300	Grand Lake	Green Lake	9/6/2016	TWH & TAH	172	5	Muck	Pole	SAMPLED			0													
173	288	Grand Lake	Green Lake	9/6/2016	TWH & TAH	173	5	Muck	Pole	SAMPLED			1						1							
174	279	Grand Lake	Green Lake	9/6/2016	TWH & TAH	174	5	Muck	Pole	SAMPLED			0													
175	274	Grand Lake	Green Lake	9/6/2016	TWH & TAH	175	4	Muck	Pole	SAMPLED			2			2			1							
176	264	Grand Lake	Green Lake	9/6/2016	TWH & TAH	176	4	Muck	Pole	SAMPLED			1			1		1								
177	261	Grand Lake	Green Lake	9/6/2016	TWH & TAH	177	4	Muck	Pole	SAMPLED			1			1										
178	214	Grand Lake	Green Lake	9/6/2016	TWH & TAH	178	3	Muck	Pole	SAMPLED			2			2			2							
179	207	Grand Lake	Green Lake	9/6/2016	TWH & TAH	179	3	Muck	Pole	SAMPLED			2			2		1	2							
180	178	Grand Lake	Green Lake	9/6/2016	TWH & TAH	180	3	Muck	Pole	SAMPLED			3			3		1	2							
181	190	Grand Lake	Green Lake	9/6/2016	TWH & TAH	181	3	Muck	Pole	SAMPLED			1						1							
182	158	Grand Lake	Green Lake	9/6/2016	TWH & TAH	182	3	Muck	Pole	SAMPLED			3			2		1	2							
183	140	Grand Lake	Green Lake	9/6/2016	TWH & TAH	183	3	Muck	Pole	SAMPLED			2			2			2							1
184	117	Grand Lake	Green Lake	9/6/2016	TWH & TAH	184	3	Muck	Pole	SAMPLED			0													
185	80	Grand Lake	Green Lake	9/6/2016	TWH & TAH	185	3	Muck	Pole	SAMPLED			0													
186	31	Grand Lake	Green Lake	9/6/2016	TWH & TAH	186	3	Muck	Pole	SAMPLED			3			3		1	1							
187	48	Grand Lake	Green Lake	9/6/2016	TWH & TAH	187	2	Muck	Pole	SAMPLED			3			3		1	2							1
188	97	Grand Lake	Green Lake	9/6/2016	TWH & TAH	188	0			TERRESTRIAL																
189	365	Grand Lake	Green Lake	9/9/2016	TWH & TAH	189	4	Muck	Pole	SAMPLED			2			2		1								
190	363	Grand Lake	Green Lake	9/9/2016	TWH & TAH	190	5	Muck	Pole	SAMPLED			1			1		1								
191	347	Grand Lake	Green Lake	9/9/2016	TWH & TAH	191	4	Muck	Pole	SAMPLED			1			1		1								
192	342	Grand Lake	Green Lake	9/9/2016	TWH & TAH	192	4	Muck	Pole	SAMPLED			1			1			1							
193	328	Grand Lake	Green Lake	9/9/2016	TWH & TAH	193	4	Muck	Pole	SAMPLED			2			2		1								
194	322	Grand Lake	Green Lake	9/9/2016	TWH & TAH	194	4	Muck	Pole	SAMPLED			0													
195	318	Grand Lake	Green Lake	9/9/2016	TWH & TAH	195	4	Muck	Pole	SAMPLED			1						1							
196	313	Grand Lake	Green Lake	9/9/2016	TWH & TAH	196	4	Muck	Pole	SAMPLED			1						1							
197	308	Grand Lake	Green Lake	9/9/2016	TWH & TAH	197	3	Muck	Pole	SAMPLED			1					1								
198	301	Grand Lake	Green Lake	9/6/2016	TWH & TAH	198	3	Muck	Pole	SAMPLED			3			3		1	1							
199	287	Grand Lake	Green Lake	9/6/2016	TWH & TAH	199	3	Muck	Pole	SAMPLED			3			3		1	2							
200	280	Grand Lake	Green Lake	9/6/2016	TWH & TAH	200	3	Muck	Pole	SAMPLED			1			1		1	1							

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201	273	Grand Lake	Green Lake	9/6/2016	TWH & TAH	201	3	Muck	Pole	SAMPLED			1			1		1								
202	265	Grand Lake	Green Lake	9/6/2016	TWH & TAH	202	4	Muck	Pole	SAMPLED			3			3		1	1							
203	260	Grand Lake	Green Lake	9/6/2016	TWH & TAH	203	4	Muck	Pole	SAMPLED			0													
204	215	Grand Lake	Green Lake	9/6/2016	TWH & TAH	204	3	Muck	Pole	SAMPLED			1			1			1							
205	206	Grand Lake	Green Lake	9/6/2016	TWH & TAH	205	4	Muck	Pole	SAMPLED			3			3		2	2							
206	177	Grand Lake	Green Lake	9/6/2016	TWH & TAH	206	3	Muck	Pole	SAMPLED			3			3		2	2							
207	191	Grand Lake	Green Lake	9/6/2016	TWH & TAH	207	3	Muck	Pole	SAMPLED			1			1		1	1							
208	159	Grand Lake	Green Lake	9/6/2016	TWH & TAH	208	3	Muck	Pole	SAMPLED			3			3		2	3							
209	139	Grand Lake	Green Lake	9/6/2016	TWH & TAH	209	2	Muck	Pole	SAMPLED			3			3		1	3							1
210	118	Grand Lake	Green Lake	9/6/2016	TWH & TAH	210	3	Muck	Pole	SAMPLED			0													
211	81	Grand Lake	Green Lake	9/6/2016	TWH & TAH	211	3	Muck	Pole	SAMPLED			3			2		1	2							1
212	32	Grand Lake	Green Lake	9/6/2016	TWH & TAH	212	3	Muck	Pole	SAMPLED			1					1	1							
213	47	Grand Lake	Green Lake	9/6/2016	TWH & TAH	213	2	Muck	Pole	SAMPLED			2			2			2							1
214	364	Grand Lake	Green Lake	9/9/2016	TWH & TAH	214	4	Muck	Pole	SAMPLED			1			1		1								
215	346	Grand Lake	Green Lake	9/9/2016	TWH & TAH	215	4	Muck	Pole	SAMPLED			0													
216	343	Grand Lake	Green Lake	9/9/2016	TWH & TAH	216	4	Muck	Pole	SAMPLED			2			2			1							
217	327	Grand Lake	Green Lake	9/9/2016	TWH & TAH	217	4	Muck	Pole	SAMPLED			1			1			1							
218	323	Grand Lake	Green Lake	9/9/2016	TWH & TAH	218	4	Muck	Pole	SAMPLED			1			1										
219	317	Grand Lake	Green Lake	9/9/2016	TWH & TAH	219	3	Muck	Pole	SAMPLED			0													
220	314	Grand Lake	Green Lake	9/9/2016	TWH & TAH	220	4	Muck	Pole	SAMPLED			0													
221	307	Grand Lake	Green Lake	9/9/2016	TWH & TAH	221	3	Muck	Pole	SAMPLED			1		1											
222	302	Grand Lake	Green Lake	9/6/2016	TWH & TAH	222	3	Muck	Pole	SAMPLED			1					1						1		
223	286	Grand Lake	Green Lake	9/6/2016	TWH & TAH	223	3	Muck	Pole	SAMPLED			0													
224	281	Grand Lake	Green Lake	9/6/2016	TWH & TAH	224	2	Muck	Pole	SAMPLED			3			3		2	1					1		
225	272	Grand Lake	Green Lake	9/6/2016	TWH & TAH	225	3	Muck	Pole	SAMPLED			1			1		1								
226	266	Grand Lake	Green Lake	9/6/2016	TWH & TAH	226	3	Muck	Pole	SAMPLED			1											1		
227	259	Grand Lake	Green Lake	9/6/2016	TWH & TAH	227	3	Muck	Pole	SAMPLED			3		1	1		2	1							
228	216	Grand Lake	Green Lake	9/6/2016	TWH & TAH	228	3	Muck	Pole	SAMPLED			1		1			1								
229	205	Grand Lake	Green Lake	9/6/2016	TWH & TAH	229	3	Muck	Pole	SAMPLED			1					1								
230	176	Grand Lake	Green Lake	9/6/2016	TWH & TAH	230	3	Muck	Pole	SAMPLED			2					2								
231	192	Grand Lake	Green Lake	9/6/2016	TWH & TAH	231	3	Muck	Pole	SAMPLED			3			3		2	2							
232	160	Grand Lake	Green Lake	9/6/2016	TWH & TAH	232	3	Muck	Pole	SAMPLED			2			2		2	1							
233	138	Grand Lake	Green Lake	9/6/2016	TWH & TAH	233	3	Muck	Pole	SAMPLED			1					1								
234	119	Grand Lake	Green Lake	9/6/2016	TWH & TAH	234	3	Muck	Pole	SAMPLED			2			2			2							
235	82	Grand Lake	Green Lake	9/6/2016	TWH & TAH	235	2	Muck	Pole	SAMPLED			2			2		1	1							
236	33	Grand Lake	Green Lake	9/6/2016	TWH & TAH	236	3	Muck	Pole	SAMPLED			0													
237	46	Grand Lake	Green Lake	9/6/2016	TWH & TAH	237	2	Muck	Pole	SAMPLED			3			1		3	1							
238	345	Grand Lake	Green Lake	9/9/2016	TWH & TAH	238	4	Muck	Pole	SAMPLED			1			1										
239	344	Grand Lake	Green Lake	9/9/2016	TWH & TAH	239	4	Muck	Pole	SAMPLED			1		1	1			1							
240	326	Grand Lake	Green Lake	9/9/2016	TWH & TAH	240	3	Muck	Pole	SAMPLED			1			1										

Point Number	ID	Lake Name	County	Date	Field Crew	Point Number	Depth (ft)	Sediment	Pole; Rope	Comments	Notes	Nuisance	Total Rake Fullness	Myriophyllum spicatum	Potamogeton crispus	Ceratophyllum demersum	Chara spp.	Elodea canadensis	Lemna minor	Myriophyllum verticillatum	Potamogeton friesii	Potamogeton nodosus	Ranunculus aquatilis	Stuckenia pectinata	Zizania spp.	Potamogeton hybrid 1
241	324	Grand Lake	Green Lake	9/9/2016	TWH & TAH	241	3	Muck	Pole	SAMPLED			0													
242	316	Grand Lake	Green Lake	9/9/2016	TWH & TAH	242	3	Muck	Pole	SAMPLED			2			2		1	1		1					
243	306	Grand Lake	Green Lake	9/6/2016	TWH & TAH	243	3	Muck	Pole	SAMPLED			1						1							
244	303	Grand Lake	Green Lake	9/6/2016	TWH & TAH	244	3	Muck	Pole	SAMPLED			1						1							
245	285	Grand Lake	Green Lake	9/6/2016	TWH & TAH	245	2	Muck	Pole	SAMPLED			1					1								
246	282	Grand Lake	Green Lake	9/6/2016	TWH & TAH	246	2	Muck	Pole	SAMPLED			1			1		1	1							
247	271	Grand Lake	Green Lake	9/6/2016	TWH & TAH	247	3	Muck	Pole	SAMPLED			3		1	1		3	1							
248	267	Grand Lake	Green Lake	9/6/2016	TWH & TAH	248	2	Muck	Pole	SAMPLED			3			3		1	2							
249	258	Grand Lake	Green Lake	9/6/2016	TWH & TAH	249	3	Muck	Pole	SAMPLED			0													
250	217	Grand Lake	Green Lake	9/6/2016	TWH & TAH	250	3	Muck	Pole	SAMPLED			0													
251	204	Grand Lake	Green Lake	9/6/2016	TWH & TAH	251	3	Muck	Pole	SAMPLED			2			2		2	2							
252	175	Grand Lake	Green Lake	9/6/2016	TWH & TAH	252	2	Muck	Pole	SAMPLED			1					1								
253	193	Grand Lake	Green Lake	9/6/2016	TWH & TAH	253	3	Muck	Pole	SAMPLED			3			3		1	2							
254	161	Grand Lake	Green Lake	9/6/2016	TWH & TAH	254	3	Muck	Pole	SAMPLED			2					2	2							
255	137	Grand Lake	Green Lake	9/6/2016	TWH & TAH	255	3	Muck	Pole	SAMPLED			2			2		1	2							
256	120	Grand Lake	Green Lake	9/6/2016	TWH & TAH	256	2	Muck	Pole	SAMPLED			1			1			1							
257	83	Grand Lake	Green Lake	9/6/2016	TWH & TAH	257	2	Muck	Pole	SAMPLED			1					1	1							
258	34	Grand Lake	Green Lake	9/6/2016	TWH & TAH	258	2	Muck	Pole	SAMPLED			2			1		1	1							
259	45	Grand Lake	Green Lake	9/6/2016	TWH & TAH	259	2	Muck	Pole	SAMPLED			2			2			1							
260	325	Grand Lake	Green Lake	9/9/2016	TWH & TAH	260	2	Muck	Pole	SAMPLED			1			1			1							
261	315	Grand Lake	Green Lake	9/9/2016	TWH & TAH	261	0			NONNAVIGABLE (PLANTS)																
262	305	Grand Lake	Green Lake	9/6/2016	TWH & TAH	262	0			NONNAVIGABLE (PLANTS)																
263	304	Grand Lake	Green Lake	9/6/2016	TWH & TAH	263	0			NONNAVIGABLE (PLANTS)																
264	284	Grand Lake	Green Lake	9/6/2016	TWH & TAH	264	2	Muck	Pole	SAMPLED			1			1										
265	283	Grand Lake	Green Lake	9/6/2016	TWH & TAH	265	0			NONNAVIGABLE (PLANTS)																
266	270	Grand Lake	Green Lake	9/6/2016	TWH & TAH	266	2	Muck	Pole	SAMPLED			2			2			2							1
267	268	Grand Lake	Green Lake	9/6/2016	TWH & TAH	267	2	Muck	Pole	SAMPLED			1			1			1							
268	257	Grand Lake	Green Lake	9/6/2016	TWH & TAH	268	3	Muck	Pole	SAMPLED			2		1	1		1	1							
269	218	Grand Lake	Green Lake	9/6/2016	TWH & TAH	269	2	Muck	Pole	SAMPLED			1		1											
270	203	Grand Lake	Green Lake	9/6/2016	TWH & TAH	270	2	Muck	Pole	SAMPLED			1					1								
271	174	Grand Lake	Green Lake	9/6/2016	TWH & TAH	271	2	Muck	Pole	SAMPLED			1					1								
272	194	Grand Lake	Green Lake	9/6/2016	TWH & TAH	272	2	Muck	Pole	SAMPLED			1					1								
273	162	Grand Lake	Green Lake	9/6/2016	TWH & TAH	273	2	Muck	Pole	SAMPLED			2		1			2	2							
274	136	Grand Lake	Green Lake	9/6/2016	TWH & TAH	274	3	Muck	Pole	SAMPLED			1						1							
275	121	Grand Lake	Green Lake	9/6/2016	TWH & TAH	275	0			NONNAVIGABLE (PLANTS)																
276	84	Grand Lake	Green Lake	9/6/2016	TWH & TAH	276	2	Muck	Pole	SAMPLED			1					1					1			
277	35	Grand Lake	Green Lake	9/6/2016	TWH & TAH	277	2	Muck	Pole	SAMPLED			1			1		1								
278	44	Grand Lake	Green Lake	9/6/2016	TWH & TAH	278	2	Muck	Pole	SAMPLED			1			1		1	1				1			
279	87	Grand Lake	Green Lake	9/6/2016	TWH & TAH	279	1	Muck	Pole	SAMPLED			2			2		2	1							
280	269	Grand Lake	Green Lake	9/6/2016	TWH & TAH	280	2	Muck	Pole	SAMPLED			1			1			1							

Point Number	ID	Lake Name	County	Date	Field Crew	Point Number	Depth (ft)	Sediment	Pole; Rope	Comments	Notes	Nuisance	Total Rake Fullness	Myriophyllum spicatum	Potamogeton crispus	Ceratophyllum demersum	Chara spp.	Elodea canadensis	Lemna minor	Myriophyllum verticillatum	Potamogeton friesii	Potamogeton nodosus	Ranunculus aquatilis	Stuckenia pectinata	Zizania spp.	Potamogeton hybrid 1
281	256	Grand Lake	Green Lake	9/6/2016	TWH & TAH	281	3	Muck	Pole	SAMPLED			0													
282	219	Grand Lake	Green Lake	9/6/2016	TWH & TAH	282	2	Muck	Pole	SAMPLED			1					1								
283	202	Grand Lake	Green Lake	9/6/2016	TWH & TAH	283	3	Muck	Pole	SAMPLED			1			1	1	1								
284	173	Grand Lake	Green Lake	9/6/2016	TWH & TAH	284	2	Muck	Pole	SAMPLED			1		1			1								
285	163	Grand Lake	Green Lake	9/6/2016	TWH & TAH	285	2	Muck	Pole	SAMPLED			1					1								
286	134	Grand Lake	Green Lake	9/6/2016	TWH & TAH	286	2	Muck	Pole	SAMPLED			3			1		3	1							
287	135	Grand Lake	Green Lake	9/6/2016	TWH & TAH	287	2	Muck	Pole	SAMPLED			2			2		1	1							
288	122	Grand Lake	Green Lake	9/6/2016	TWH & TAH	288	2	Muck	Pole	SAMPLED			0													
289	85	Grand Lake	Green Lake	9/6/2016	TWH & TAH	289	2	Muck	Pole	SAMPLED			1					1	1							
290	36	Grand Lake	Green Lake	9/6/2016	TWH & TAH	290	1	Muck	Pole	SAMPLED			1													1
291	43	Grand Lake	Green Lake	9/6/2016	TWH & TAH	291	2	Muck	Pole	SAMPLED			1			1		1	1							
292	88	Grand Lake	Green Lake	9/6/2016	TWH & TAH	292	2	Muck	Pole	SAMPLED			2			1		1	2							
293	255	Grand Lake	Green Lake	9/6/2016	TWH & TAH	293	3	Muck	Pole	SAMPLED			2			1		2	1							
294	220	Grand Lake	Green Lake	9/6/2016	TWH & TAH	294	2	Muck	Pole	SAMPLED			0													
295	201	Grand Lake	Green Lake	9/6/2016	TWH & TAH	295	3	Muck	Pole	SAMPLED			1						1							
296	172	Grand Lake	Green Lake	9/6/2016	TWH & TAH	296	2	Muck	Pole	SAMPLED			1			1			1							
297	164	Grand Lake	Green Lake	9/6/2016	TWH & TAH	297	2	Muck	Pole	SAMPLED			2			2		1	2							
298	132	Grand Lake	Green Lake	9/6/2016	TWH & TAH	298	2	Muck	Pole	SAMPLED			1						1							1
299	133	Grand Lake	Green Lake	9/6/2016	TWH & TAH	299	0			NONNAVIGABLE (PLANTS)																
300	123	Grand Lake	Green Lake	9/6/2016	TWH & TAH	300	2	Muck	Pole	SAMPLED			1					1	1							
301	86	Grand Lake	Green Lake	9/6/2016	TWH & TAH	301	2	Muck	Pole	SAMPLED			1					1	1							
302	37	Grand Lake	Green Lake	9/6/2016	TWH & TAH	302	1	Muck	Pole	SAMPLED			2			1			1							1
303	42	Grand Lake	Green Lake	9/6/2016	TWH & TAH	303	1	Muck	Pole	SAMPLED			0													
304	89	Grand Lake	Green Lake	9/6/2016	TWH & TAH	304	1	Muck	Pole	SAMPLED			1						1							
305	96	Grand Lake	Green Lake	9/6/2016	TWH & TAH	305	1	Muck	Pole	SAMPLED			1			1			1							
306	254	Grand Lake	Green Lake	9/6/2016	TWH & TAH	306	3	Muck	Pole	SAMPLED			1			1			1							
307	221	Grand Lake	Green Lake	9/6/2016	TWH & TAH	307	2	Muck	Pole	SAMPLED			1						1							
308	200	Grand Lake	Green Lake	9/6/2016	TWH & TAH	308	3	Muck	Pole	SAMPLED			1		1											
309	171	Grand Lake	Green Lake	9/6/2016	TWH & TAH	309	2	Muck	Pole	SAMPLED			1			1			1							
310	165	Grand Lake	Green Lake	9/6/2016	TWH & TAH	310	2	Muck	Pole	SAMPLED			2			1			1							1
311	131	Grand Lake	Green Lake	9/6/2016	TWH & TAH	311	2	Muck	Pole	SAMPLED			1					1	1							
312	127	Grand Lake	Green Lake	9/6/2016	TWH & TAH	312	1	Muck	Pole	SAMPLED			2			2			2							
313	124	Grand Lake	Green Lake	9/6/2016	TWH & TAH	313	1	Muck	Pole	SAMPLED			1		1											
314	125	Grand Lake	Green Lake	9/6/2016	TWH & TAH	314	0			NONNAVIGABLE (PLANTS)																
315	38	Grand Lake	Green Lake	9/6/2016	TWH & TAH	315	0			NONNAVIGABLE (PLANTS)																
316	39	Grand Lake	Green Lake	9/6/2016	TWH & TAH	316	2	Muck	Pole	SAMPLED			2			2			1						1	
317	90	Grand Lake	Green Lake	9/6/2016	TWH & TAH	317	1	Muck	Pole	SAMPLED			1			1		1	1							
318	253	Grand Lake	Green Lake	9/6/2016	TWH & TAH	318	3	Muck	Pole	SAMPLED			2			2		1	1							
319	222	Grand Lake	Green Lake	9/6/2016	TWH & TAH	319	2	Muck	Pole	SAMPLED			1						1							
320	199	Grand Lake	Green Lake	9/6/2016	TWH & TAH	320	2	Muck	Pole	SAMPLED			3			1		2	3							

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321	170	Grand Lake	Green Lake	9/6/2016	TWH & TAH	321	2	Muck	Pole	SAMPLED			1					1	1							
322	166	Grand Lake	Green Lake	9/6/2016	TWH & TAH	322	0			NONNAVIGABLE (PLANTS)																
323	129	Grand Lake	Green Lake	9/6/2016	TWH & TAH	323	1	Muck	Pole	SAMPLED			1						1							
324	128	Grand Lake	Green Lake	9/6/2016	TWH & TAH	324	0			NONNAVIGABLE (PLANTS)																
325	126	Grand Lake	Green Lake	9/6/2016	TWH & TAH	325	0			NONNAVIGABLE (PLANTS)																
326	0	Grand Lake	Green Lake			326	0			NONNAVIGABLE (PLANTS)																
327	0	Grand Lake	Green Lake			327	0			NONNAVIGABLE (PLANTS)																
328	40	Grand Lake	Green Lake	9/6/2016	TWH & TAH	328	0			NONNAVIGABLE (PLANTS)																
329	91	Grand Lake	Green Lake	9/6/2016	TWH & TAH	329	2	Muck	Pole	SAMPLED			2			2			1							
330	94	Grand Lake	Green Lake	9/6/2016	TWH & TAH	330	2	Muck	Pole	SAMPLED			1			1			1			1				
331	249	Grand Lake	Green Lake	9/6/2016	TWH & TAH	331	2	Muck	Pole	SAMPLED			2			2			2							
332	252	Grand Lake	Green Lake	9/6/2016	TWH & TAH	332	2	Muck	Pole	SAMPLED			3			3		1	3							1
333	223	Grand Lake	Green Lake	9/6/2016	TWH & TAH	333	2	Muck	Pole	SAMPLED			1			1			1							
334	198	Grand Lake	Green Lake	9/6/2016	TWH & TAH	334	2	Muck	Pole	SAMPLED			1					1	1							
335	169	Grand Lake	Green Lake	9/6/2016	TWH & TAH	335	1	Muck	Pole	SAMPLED			1						1							
336	167	Grand Lake	Green Lake	9/6/2016	TWH & TAH	336	1	Muck	Pole	SAMPLED			1			1			1							
337	130	Grand Lake	Green Lake	9/6/2016	TWH & TAH	337	1	Muck	Pole	SAMPLED			1			1			1							
338	372	Grand Lake	Green Lake	9/9/2016	TWH & TAH	338	0			NONNAVIGABLE (PLANTS)																
339	0	Grand Lake	Green Lake			339	0			NONNAVIGABLE (PLANTS)																
340	0	Grand Lake	Green Lake			340	0			NONNAVIGABLE (PLANTS)																
341	0	Grand Lake	Green Lake			341	0			NONNAVIGABLE (PLANTS)																
342	41	Grand Lake	Green Lake	9/6/2016	TWH & TAH	342	0			NONNAVIGABLE (PLANTS)																
343	92	Grand Lake	Green Lake	9/6/2016	TWH & TAH	343	0			NONNAVIGABLE (PLANTS)																
344	93	Grand Lake	Green Lake	9/6/2016	TWH & TAH	344	0			NONNAVIGABLE (PLANTS)																
345	95	Grand Lake	Green Lake	9/6/2016	TWH & TAH	345	0			NONNAVIGABLE (PLANTS)																
346	248	Grand Lake	Green Lake	9/6/2016	TWH & TAH	346	2	Muck	Pole	SAMPLED			3			3		2	2							1
347	251	Grand Lake	Green Lake	9/6/2016	TWH & TAH	347	3	Muck	Pole	SAMPLED			1					1								
348	224	Grand Lake	Green Lake	9/6/2016	TWH & TAH	348	2	Muck	Pole	SAMPLED			2			2		1	1							
349	197	Grand Lake	Green Lake	9/6/2016	TWH & TAH	349	2	Muck	Pole	SAMPLED			1						1							
350	195	Grand Lake	Green Lake	9/6/2016	TWH & TAH	350	0			NONNAVIGABLE (PLANTS)																
351	168	Grand Lake	Green Lake	9/6/2016	TWH & TAH	351	0			NONNAVIGABLE (PLANTS)																
352	371	Grand Lake	Green Lake	9/9/2016	TWH & TAH	352	0			NONNAVIGABLE (PLANTS)																
353	0	Grand Lake	Green Lake			353	0			NONNAVIGABLE (PLANTS)																
354	0	Grand Lake	Green Lake			354	0			NONNAVIGABLE (PLANTS)																
355	0	Grand Lake	Green Lake			355	0			NONNAVIGABLE (PLANTS)																
356	0	Grand Lake	Green Lake			356	0			NONNAVIGABLE (PLANTS)																
357	0	Grand Lake	Green Lake			357	0			NONNAVIGABLE (PLANTS)																
358	0	Grand Lake	Green Lake			358	0			NONNAVIGABLE (PLANTS)																
359	0	Grand Lake	Green Lake			359	0			NONNAVIGABLE (PLANTS)																
360	247	Grand Lake	Green Lake	9/6/2016	TWH & TAH	360	2	Muck	Pole	SAMPLED			2			2		2	1							

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361	250	Grand Lake	Green Lake	9/6/2016	TWH & TAH	361	2	Muck	Pole	SAMPLED			0													
362	225	Grand Lake	Green Lake	9/6/2016	TWH & TAH	362	2	Muck	Pole	SAMPLED			2			2		1	2							
363	196	Grand Lake	Green Lake	9/6/2016	TWH & TAH	363	0			NONNAVIGABLE (PLANTS)																
364	0	Grand Lake	Green Lake			364	0			NONNAVIGABLE (PLANTS)																
365	0	Grand Lake	Green Lake			365	0			NONNAVIGABLE (PLANTS)																
366	0	Grand Lake	Green Lake			366	0			NONNAVIGABLE (PLANTS)																
367	0	Grand Lake	Green Lake			367	0			NONNAVIGABLE (PLANTS)																
368	0	Grand Lake	Green Lake			368	0			NONNAVIGABLE (PLANTS)																
369	0	Grand Lake	Green Lake			369	0			NONNAVIGABLE (PLANTS)																
370	0	Grand Lake	Green Lake			370	0			NONNAVIGABLE (PLANTS)																
371	0	Grand Lake	Green Lake			371	0			NONNAVIGABLE (PLANTS)																
372	0	Grand Lake	Green Lake			372	0			NONNAVIGABLE (PLANTS)																
373	246	Grand Lake	Green Lake	9/6/2016	TWH & TAH	373	2	Muck	Pole	SAMPLED			3			3		1	1					1		
374	238	Grand Lake	Green Lake	9/6/2016	TWH & TAH	374	2	Muck	Pole	SAMPLED			1			1			1							
375	226	Grand Lake	Green Lake	9/6/2016	TWH & TAH	375	2	Muck	Pole	SAMPLED			1						1							
376	236	Grand Lake	Green Lake	9/6/2016	TWH & TAH	376	0			NONNAVIGABLE (PLANTS)																
377	0	Grand Lake	Green Lake			377	0			NONNAVIGABLE (PLANTS)																
378	0	Grand Lake	Green Lake			378	0			NONNAVIGABLE (PLANTS)																
379	0	Grand Lake	Green Lake			379	0			NONNAVIGABLE (PLANTS)																
380	0	Grand Lake	Green Lake			380	0			NONNAVIGABLE (PLANTS)																
381	0	Grand Lake	Green Lake			381	0			NONNAVIGABLE (PLANTS)																
382	0	Grand Lake	Green Lake			382	0			NONNAVIGABLE (PLANTS)																
383	0	Grand Lake	Green Lake			383	0			NONNAVIGABLE (PLANTS)																
384	0	Grand Lake	Green Lake			384	0			NONNAVIGABLE (PLANTS)																
385	0	Grand Lake	Green Lake			385	0			NONNAVIGABLE (PLANTS)																
386	245	Grand Lake	Green Lake	9/6/2016	TWH & TAH	386	2	Muck	Pole	SAMPLED			2			2		1	1							
387	239	Grand Lake	Green Lake	9/6/2016	TWH & TAH	387	2	Muck	Pole	SAMPLED			1					1	1							
388	227	Grand Lake	Green Lake	9/6/2016	TWH & TAH	388	2	Muck	Pole	SAMPLED			1			1			1							
389	235	Grand Lake	Green Lake	9/6/2016	TWH & TAH	389	2	Muck	Pole	SAMPLED			3			2		2	2							
390	237	Grand Lake	Green Lake	9/6/2016	TWH & TAH	390	0			NONNAVIGABLE (PLANTS)																
391	0	Grand Lake	Green Lake			391	0			NONNAVIGABLE (PLANTS)																
392	0	Grand Lake	Green Lake			392	0			NONNAVIGABLE (PLANTS)																
393	0	Grand Lake	Green Lake			393	0			NONNAVIGABLE (PLANTS)																
394	0	Grand Lake	Green Lake			394	0			NONNAVIGABLE (PLANTS)																
395	0	Grand Lake	Green Lake			395	0			NONNAVIGABLE (PLANTS)																
396	0	Grand Lake	Green Lake			396	0			NONNAVIGABLE (PLANTS)																
397	0	Grand Lake	Green Lake			397	0			NONNAVIGABLE (PLANTS)																
398	240	Grand Lake	Green Lake	9/6/2016	TWH & TAH	398	2	Muck	Pole	SAMPLED			1			1			1							
399	228	Grand Lake	Green Lake	9/6/2016	TWH & TAH	399	2	Muck	Pole	SAMPLED			1			1			1							
400	233	Grand Lake	Green Lake	9/6/2016	TWH & TAH	400	2	Muck	Pole	SAMPLED			0													

Point Number	ID	Lake Name	County	Date	Field Crew	Point Number	Depth (ft)	Sediment	Pole; Rope	Comments	Notes	Nuisance	Total Rake Fullness	Myriophyllum spicatum	Potamogeton crispus	Ceratophyllum demersum	Chara spp.	Elodea canadensis	Lemna minor	Myriophyllum verticillatum	Potamogeton friesii	Potamogeton nodosus	Ranunculus aquatilis	Stuckenia pectinata	Zizania spp.	Potamogeton hybrid 1
401	234	Grand Lake	Green Lake	9/6/2016	TWH & TAH	401	0			NONNAVIGABLE (PLANTS)																
402	0	Grand Lake	Green Lake			402	0			NONNAVIGABLE (PLANTS)																
403	0	Grand Lake	Green Lake			403	0			NONNAVIGABLE (PLANTS)																
404	0	Grand Lake	Green Lake			404	0			NONNAVIGABLE (PLANTS)																
405	0	Grand Lake	Green Lake			405	0			NONNAVIGABLE (PLANTS)																
406	0	Grand Lake	Green Lake			406	0			NONNAVIGABLE (PLANTS)																
407	0	Grand Lake	Green Lake			407	0			NONNAVIGABLE (PLANTS)																
408	241	Grand Lake	Green Lake	9/6/2016	TWH & TAH	408	2	Muck	Pole	SAMPLED			2			2			2							
409	229	Grand Lake	Green Lake	9/6/2016	TWH & TAH	409	2	Muck	Pole	SAMPLED			1			1			1							
410	231	Grand Lake	Green Lake	9/6/2016	TWH & TAH	410	2	Muck	Pole	SAMPLED			1			1			1							
411	232	Grand Lake	Green Lake	9/6/2016	TWH & TAH	411	0			NONNAVIGABLE (PLANTS)																
412	0	Grand Lake	Green Lake			412	0			NONNAVIGABLE (PLANTS)																
413	0	Grand Lake	Green Lake			413	0			NONNAVIGABLE (PLANTS)																
414	0	Grand Lake	Green Lake			414	0			NONNAVIGABLE (PLANTS)																
415	242	Grand Lake	Green Lake	9/6/2016	TWH & TAH	415	2	Muck	Pole	SAMPLED			2			2			2							
416	230	Grand Lake	Green Lake	9/6/2016	TWH & TAH	416	1	Muck	Pole	SAMPLED			1						1							
417	0	Grand Lake	Green Lake			417	0			NONNAVIGABLE (PLANTS)																
418	243	Grand Lake	Green Lake	9/6/2016	TWH & TAH	418	2	Muck	Pole	SAMPLED			1			1			1							
419	0	Grand Lake	Green Lake			419	0			NONNAVIGABLE (PLANTS)																
420	0	Grand Lake	Green Lake			420	0			NONNAVIGABLE (PLANTS)																
421	0	Grand Lake	Green Lake			421	0			NONNAVIGABLE (PLANTS)																
422	0	Grand Lake	Green Lake			422	0			NONNAVIGABLE (PLANTS)																
423	244	Grand Lake	Green Lake	9/6/2016	TWH & TAH	423	2	Muck	Pole	SAMPLED			1			1			1							

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APPENDIX F

Example Funding Plan for 3-year AIS-Established Population Control Grant Project

Grand Lake
Three-Year Project Example

Grand Lake
Improvement Association, Inc.

Annual Costs During Treatment Years					
Herbicide Treatments	$35,000.00	Single billing each year			
Onterra Monitoring/Reporting	$6,000.00	Two billings each year ($3,000/ea.)		**Total Project Cost**	**$130,200.00**
	Expense	**Grant Reimbursement**	**Bridge Loan Disbursal**	**Cash on Hand**	**Bridge Loan Repayment**
2018				$14,350.00	
			$26,650.00	$41,000.00	
Herbicide Treatment	-$35,000.00			$6,000.00	
Reimbursement Request		*$22,750.00*		$6,000.00	-$22,750.00
Onterra First Billing	-$3,000.00			$3,000.00	
Onterra Second Billing	-$3,000.00			$0.00	
Reimbursement Request		*$3,900.00*		$3,900.00	
				$0.00	-$3,900.00
2019				$14,350.00	
			$26,650.00	$41,000.00	
Herbicide Treatment	-$35,000.00			$6,000.00	
Reimbursement Request		*$22,750.00*		$6,000.00	-$22,750.00
Onterra First Billing	-$3,000.00			$3,000.00	
Onterra Second Billing	-$3,000.00			$0.00	
Reimbursement Request		*$3,900.00*		$3,900.00	
				$0.00	-$3,900.00
2020				$14,350.00	
			$26,650.00	$41,000.00	
Herbicide Treatment	-$35,000.00			$6,000.00	
Reimbursement Request		*$22,750.00*		$6,000.00	-$22,750.00
Onterra First Billing	-$3,000.00			$3,000.00	
Onterra Second Billing	-$3,000.00			$0.00	
Reimbursement Request		*$3,900.00*		$3,900.00	
				$0.00	-$3,900.00
2021				$7,200.00	
				$7,200.00	
Herbicide Treatment	$0.00			$7,200.00	
Reimbursement Request		*$0.00*		$7,200.00	$0.00
Onterra First Billing	-$3,000.00			$4,200.00	
Onterra Second Billing	-$4,200.00			$0.00	
Reimbursement Request		*$4,680.00*		$4,680.00	
				$4,680.00	$0.00