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
  - Four full-time ecologists
  - One part-time ecologist
  - One field technician
  - Four summer interns
- Services
  - Science and planning
- Philosophy
  - Promote realistic planning
  - Assist, not direct

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Why create a lake management plan?

A goal without a plan is just a wish!

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Elements of an Effective Lake Management Planning Project

Data and Information Gathering

Environmental & Sociological

Planning Process

Brings it all together

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Data and information gathering

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

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Water Quality Analysis

- General water chemistry (current & historic)
  - Citizens Lake Monitoring Network
- 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

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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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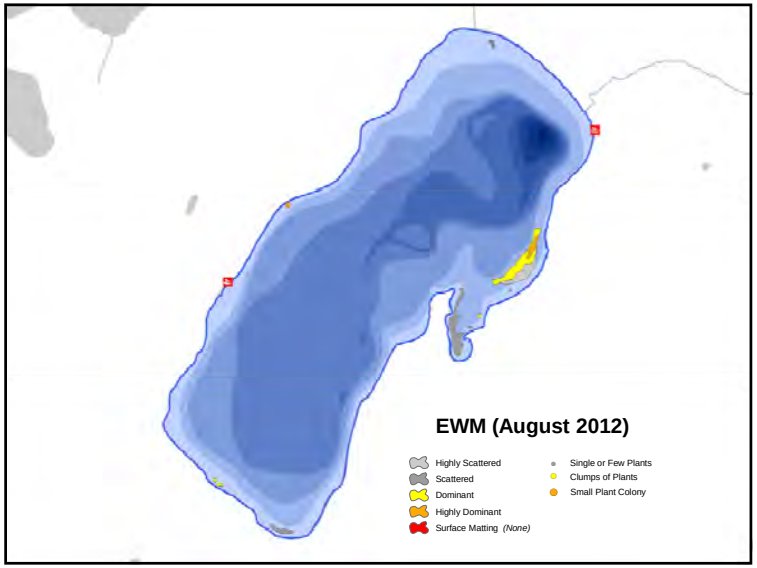
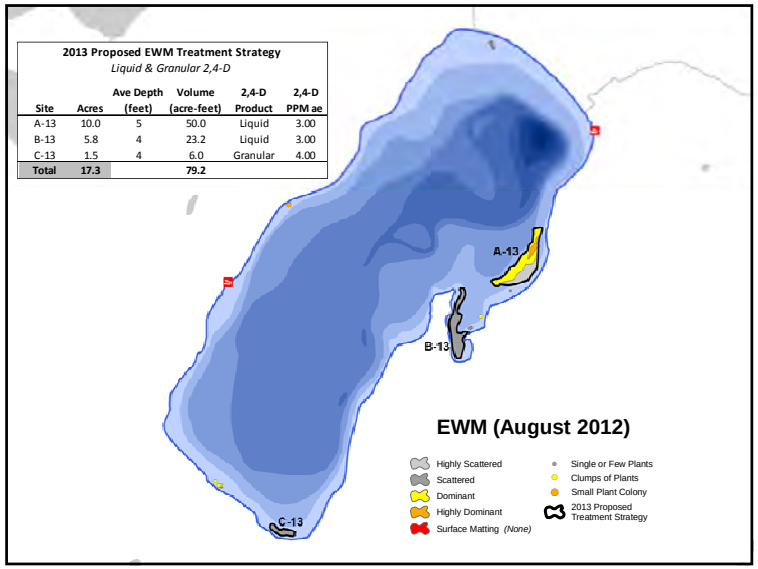
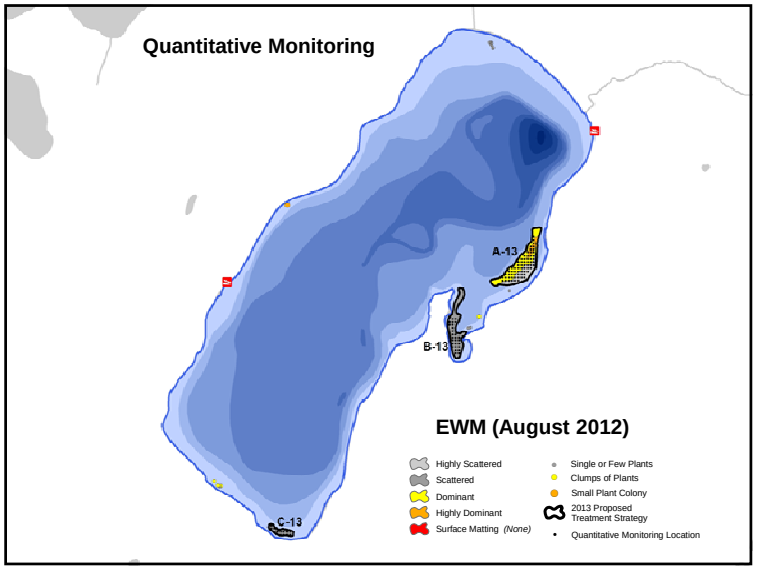
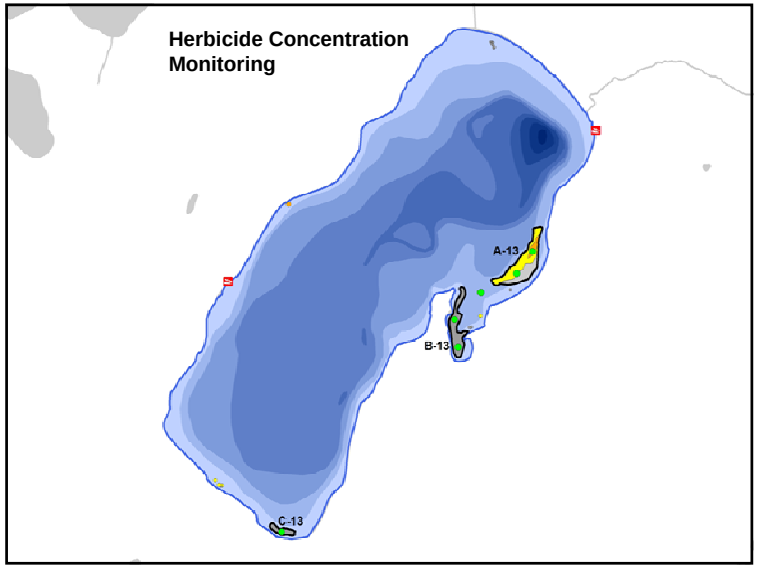


2013 Proposed EWM Treatment Strategy
Liquid & Granular 2,4-D

Site	Acres	Ave Depth (feet)	Volume (acre-feet)	2,4-D Product	2,4-D PPM ae
A-13	10.0	5	50.0	Liquid	3.00
B-13	5.8	4	23.2	Liquid	3.00
C-13	1.5	4	6.0	Granular	4.00
Total	17.3		79.2		







Aquatic Plant Surveys

- Concerned with both native and non-native plants
- Multiple surveys used in assessment
  - Early-season AIS survey
  - Point-intercept survey

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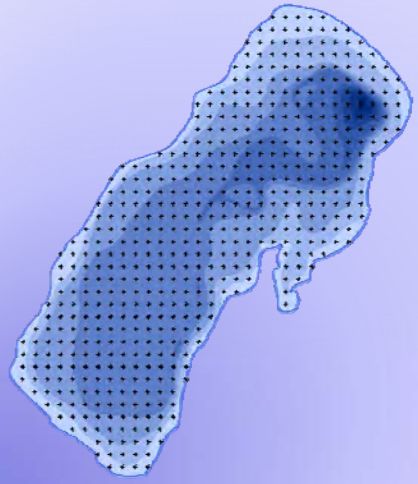
Lake Management Planning



Kentuck Lake
86-meter resolution
543 total points

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Aquatic Plant Surveys

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

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Lake Management Planning

Onterra LLC
Lake Management Planning

Aquatic Plant Surveys

- Concerned with both native and non-native plants
- Multiple surveys used in assessment
  - Early-season AIS Survey
  - Point-intercept survey
  - Aquatic plant community mapping
  - Volunteer survey findings

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Fisheries Data Integration

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

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Stakeholder Survey

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

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Shoreland Assessment

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

Urbanized **Natural**

Range

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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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Lake Management Planning

Thank You

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

Wisconsin Lakes Partnership

UWEX Extension

Wisconsin Dept. of Natural Resources

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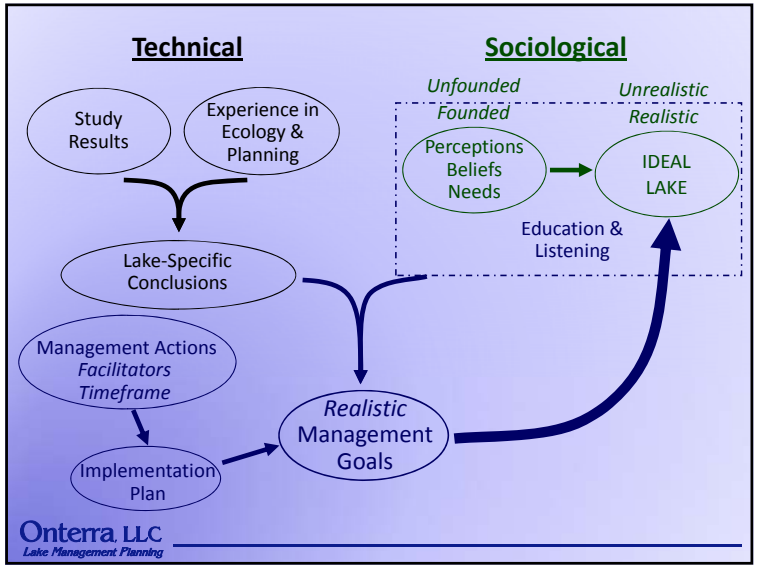
Lake Management Planning

The Planning Process

…it's not as easy as you may think.



Kentuck Lake Protection & Rehabilitation District

Kentuck Lake

Management Planning Project

Planning Meeting I

April 8, 2014

Brenton Butterfield & Tim Hoyman

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Presentation Outline

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

  Stakeholder Survey
  - Fishery (Next Meeting)
- **"Big Picture"**

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Study and Plan Goals

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

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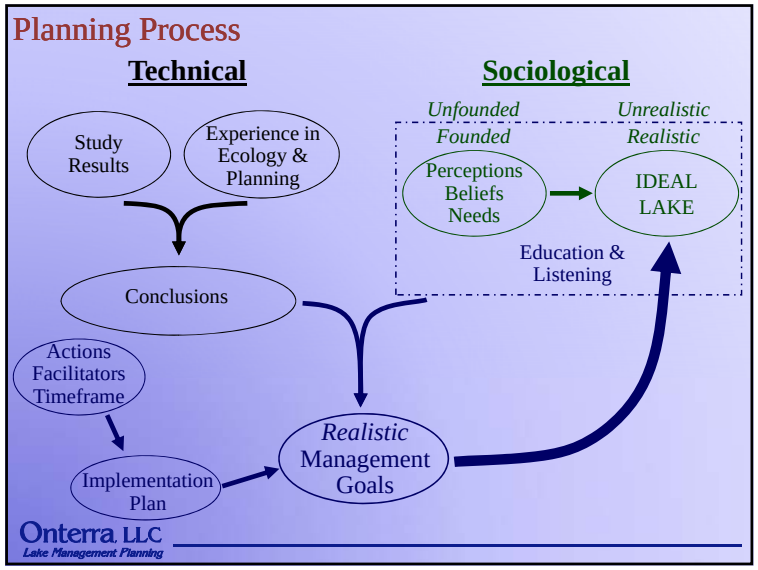
Lake Management Planning

The Planning Process

…it's not as easy as you may think.


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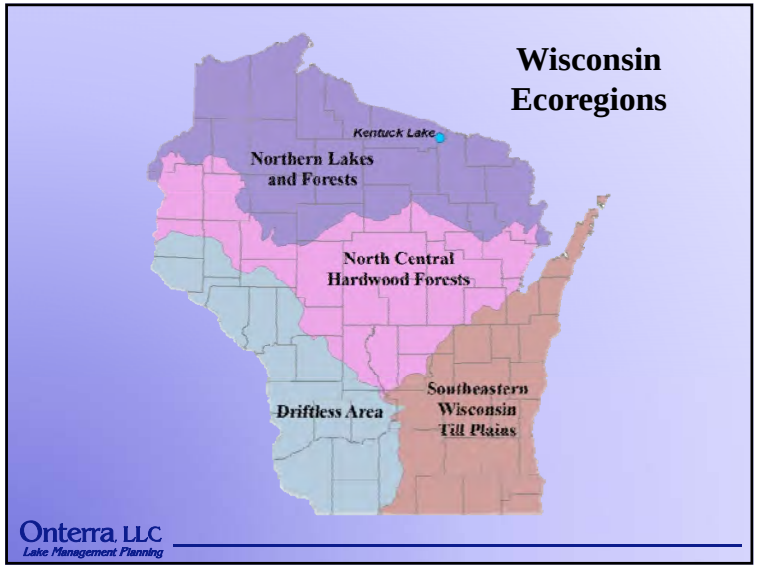
Water Quality


Wisconsin Ecoregions
Kentuck Lake
Northern Lakes and Forests
North Central Hardwood Forests
Driftless Area
Southeastern Wisconsin Till Plains
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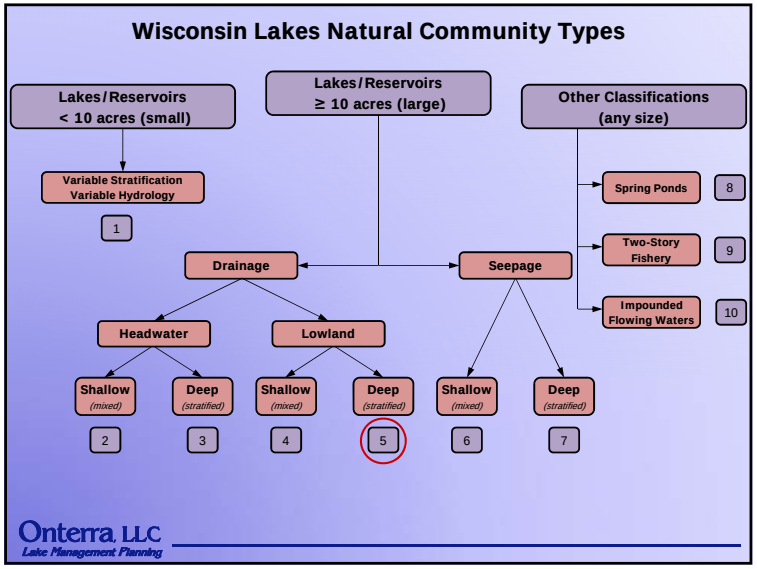
Wisconsin Lakes Natural Community Types
Lakes/Reservoirs < 10 acres (small)
Lakes/Reservoirs ≥ 10 acres (large)
Other Classifications (any size)
Variable Stratification Variable Hydrology
1
Spring Ponds
8
Two-Story Fishery
9
Impounded Flowing Waters
10
Drainage
Seepage
Headwater
Lowland
Shallow (mixed)
Deep (stratified)
Shallow (mixed)
Deep (stratified)
Shallow (mixed)
Deep (stratified)
2
3
4
5
6
7
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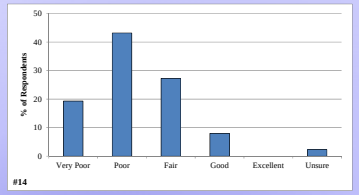
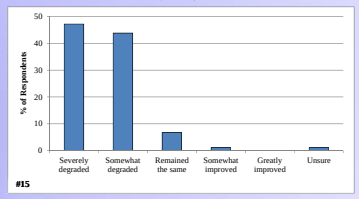
Stakeholder Survey – Water Quality

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



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



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Water Quality

- **Phosphorus (Limiting Plant Nutrient)**
  Mid-Summer Nitrogen:Phosphorus = 22:1
- **Chlorophyll-*a* (Algal Abundance)**
- **Water Clarity (Secchi Disk)**

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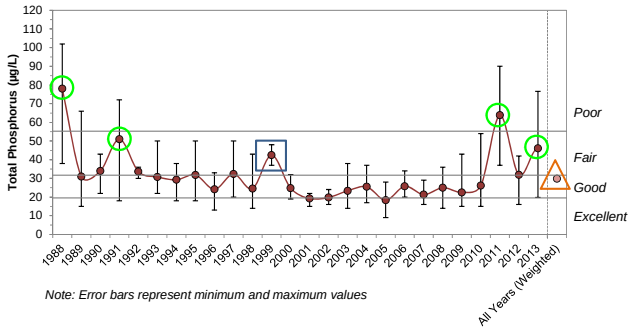
Near-Surface Total Phosphorus

Growing Season (April – October)



Note: Error bars represent minimum and maximum values

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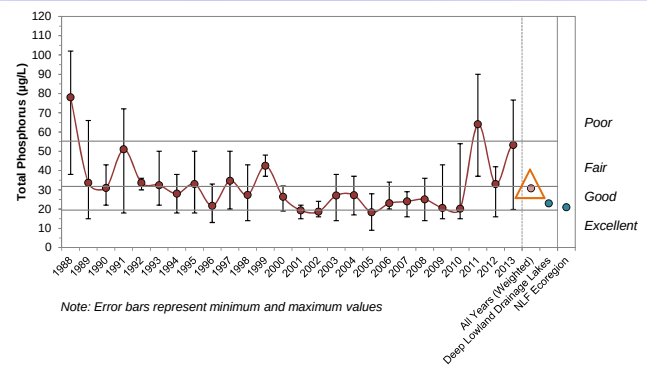
Near-Surface Total Phosphorus

Summer (June – August)



Note: Error bars represent minimum and maximum values

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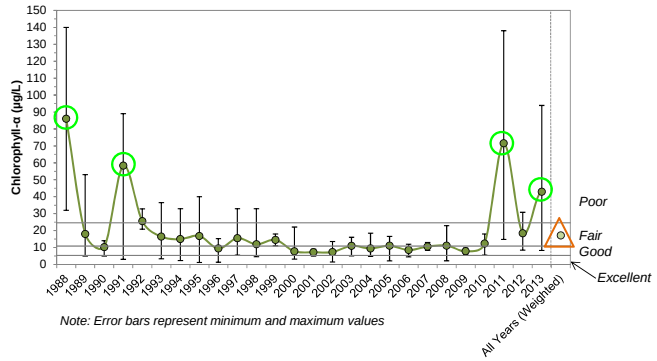
Chlorophyll-a

Growing Season (April – October)



Note: Error bars represent minimum and maximum values

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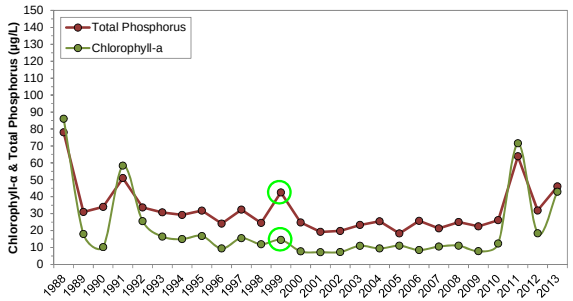
Chlorophyll-a & Total Phosphorus

Growing Season (April – October)



Note: Error bars represent minimum and maximum values

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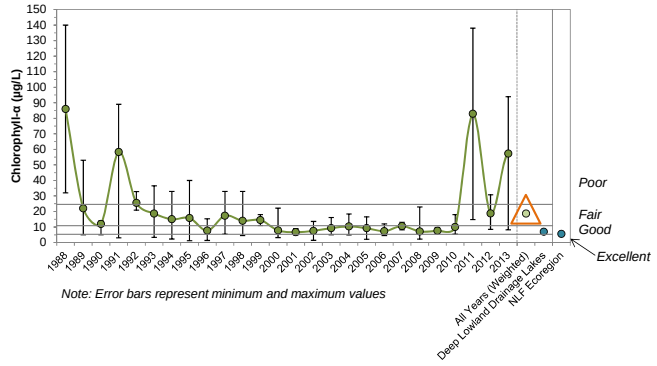
Chlorophyll-a

Summer (June – August)



Note: Error bars represent minimum and maximum values

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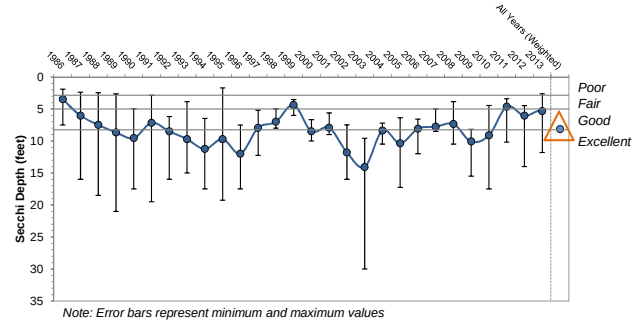
Secchi Disk Transparency

Growing Season (April – October)



Note: Error bars represent minimum and maximum values

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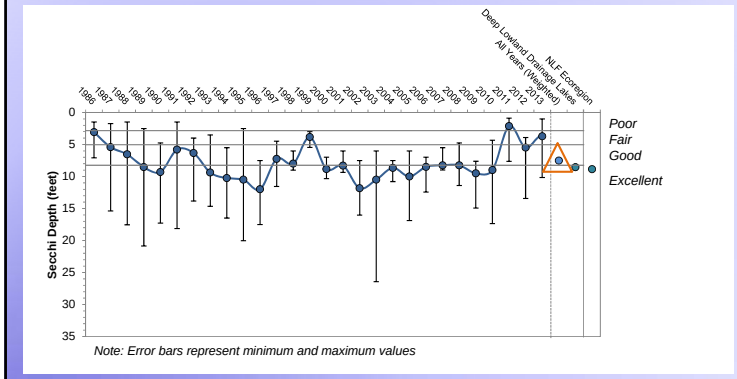
Lake Management Planning

Secchi Disk Transparency

Summer (June – August)



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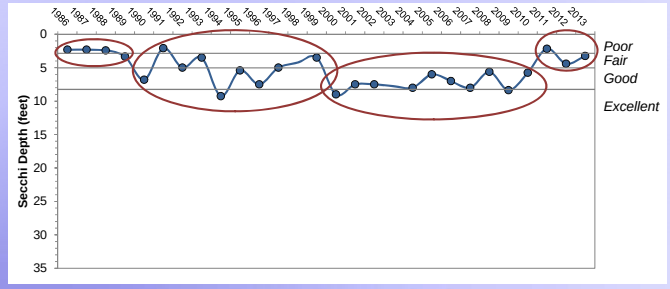
Secchi Disk Transparency

August



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Potential Sources of Intermittent Years with Elevated Phosphorus Concentrations

- ~~Point source input?~~ None that we know of
- ~~Non-point source input?~~ Watershed in good condition
- ~~Curly-leaf pondweed die-off?~~ Population much too small
- Septic system inputs?

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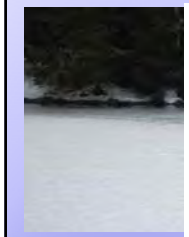
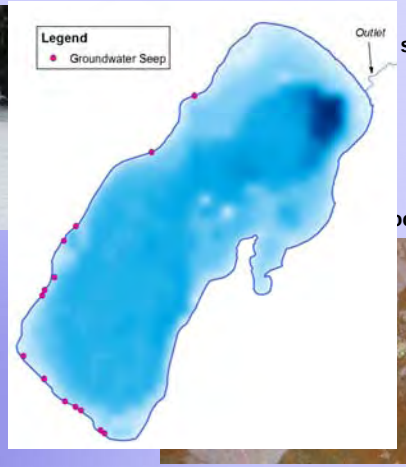
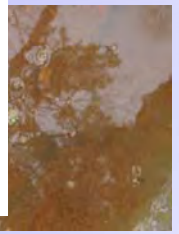
April 3, 2014 Visit





seep

oc



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Potential Sources of Intermittent Years with Elevated Phosphorus Concentrations

- ~~Point (or non-point) source input?~~ Watershed in good condition
- ~~Curly-leaf pondweed die-off?~~ Population too small
- Septic system inputs? Possible, but not likely
- Ground water inputs? Possible, but not likely
- Phosphorus release from bottom sediments (internal nutrient loading)?
  - Data indicate high probability

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Internal Phosphorus Loading – What is it?

- Release of phosphorus from bottom sediments under anoxic (no oxygen) conditions
- Where does phosphorus-laden sediment come from?
  - Can be both anthropogenic (e.g. agriculture, urban areas) or natural
    - Lakes with higher resident times (low water exchange) can accumulate phosphorus

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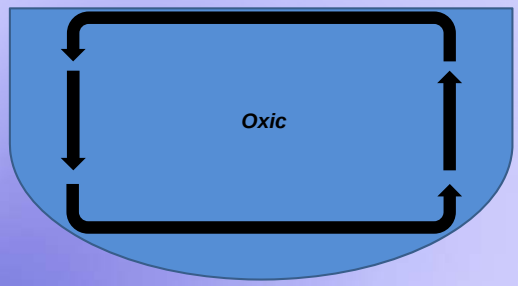
Internal Phosphorus Loading – What is it?

Stratification

Spring



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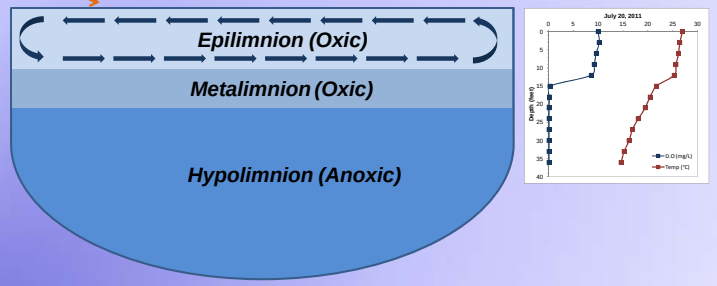
Internal Phosphorus Loading – What is it?

Stratification

Summer



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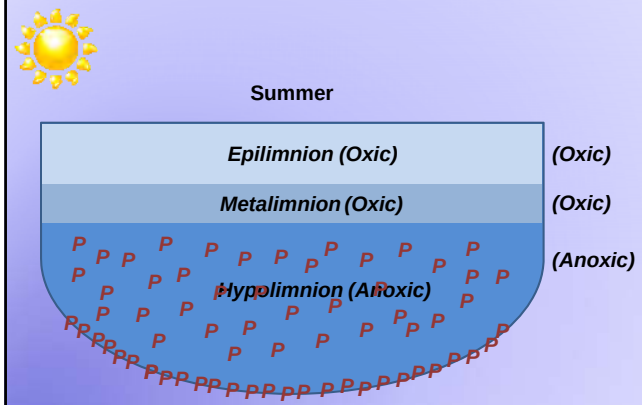
Internal Phosphorus Loading – What is it?

Stratification



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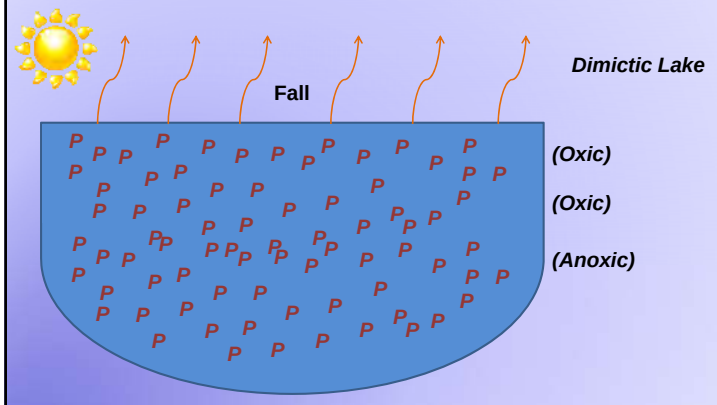
Internal Phosphorus Loading – What is it?

Stratification



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Internal Phosphorus Loading – What is it?

- Release of phosphorus from bottom sediments under anoxic (no oxygen) conditions
- Timing matters:
  - In *dimictic* lakes, phosphorus is delivered from hypolimnion to epilimnion during fall turnover when algae are less active
  - In *polymictic* lakes, phosphorus can be delivered from hypolimnion to epilimnion multiple times during summer when algae are active
  - How to determine dimictic vs polymictic:
    - Osgood Index: >9 = dimictic, <4 = polymictic

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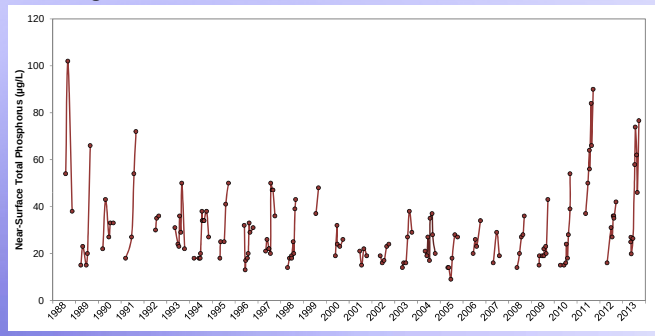
Evidence for Internal Phosphorus Loading In Kentuck Lake

1. Kentuck Lake is polymictic; Osgood Index Value of 1.9.
2. Near-surface total phosphorus concentrations increase throughout the summer.



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Lake Management Planning

Evidence for Internal Phosphorus Loading In Kentuck Lake

1. Kentuck Lake is polymictic; Osgood Index Value of 1.9.
2. Near-surface total phosphorus concentrations increase throughout the summer.
3. Historical near-bottom (hypolimnetic) phosphorus concentrations average 325 µg/L.

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Evidence for Internal Phosphorus Loading In Kentuck Lake

- Internal nutrient loading likely occurring in Kentuck Lake annually
- Why was the magnitude of phosphorus increase so much greater in certain years (e.g. 1988, 1991, 2011, & 2013)?
- May be dependent on differences in lake's initial stratification based on weather

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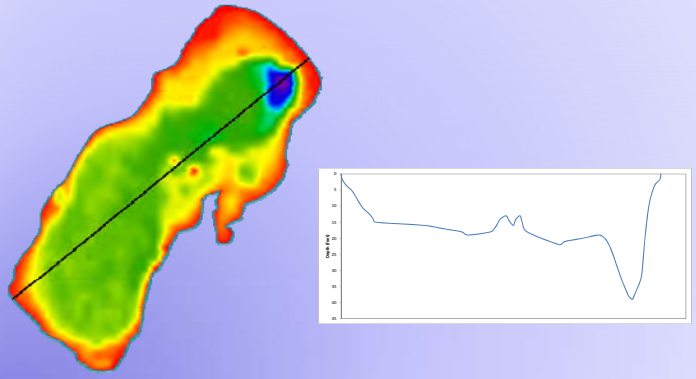
Evidence for Internal Phosphorus Loading In Kentuck Lake



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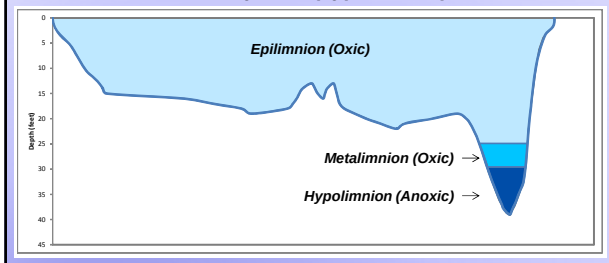
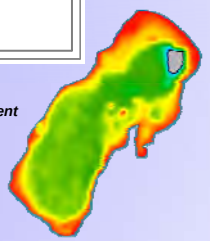
Evidence for Internal Phosphorus Loading In Kentuck Lake

July 2012 (Typical Year)



~ 15 Acres of Anoxic Sediment



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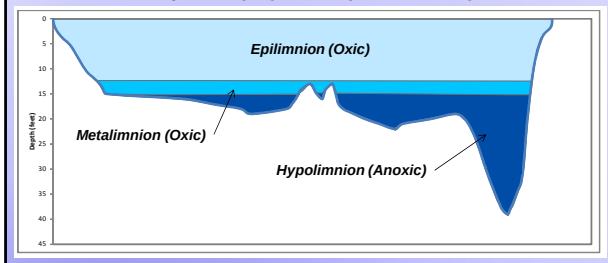
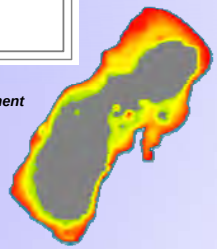
Evidence for Internal Phosphorus Loading In Kentuck Lake

July 2011 (High Phosphorus Year)



~ 500 Acres of Anoxic Sediment



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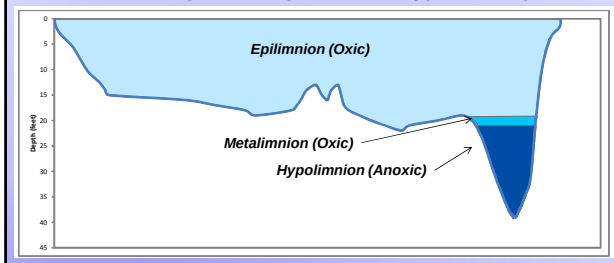
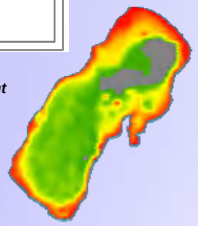
Evidence for Internal Phosphorus Loading In Kentuck Lake

August 2011 (Erosion of Hypolimnion)



~ 104 Acres of Anoxic Sediment



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Lake Management Planning

Evidence for Internal Phosphorus Loading In Kentuck Lake

- Why was the magnitude of phosphorus increase so much greater in certain years (e.g. 2011 & 2013)?
- May be dependent on differences in lake's initial stratification based on weather
  - In most years, epilimnion initially extends to 25 – 30 feet, yielding smaller area of anoxia
  - In some years, like 2011 & 2013, epilimnion is shallower (15-20 feet), and area of anoxia is much larger and more phosphorus is available for release over the summer
    - Likely caused by period of hot, calm weather early in the season
    - Erosion of hypolimnion (or complete mixing in shallower areas) throughout the summer delivers higher levels of phosphorus to epilimnion

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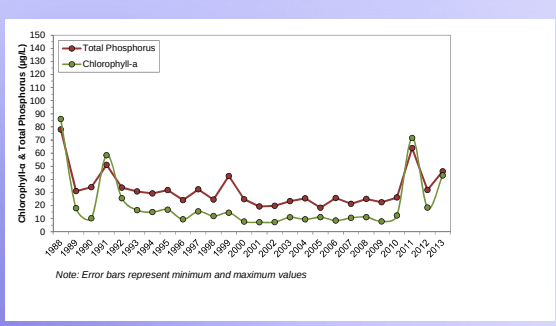
Evidence for Internal Phosphorus Loading In Kentuck Lake

- Poorer water quality in 2011 and 2013 do not necessarily indicate declining trend in lake's water quality; this has happened before (late 1980s & early 1990s)



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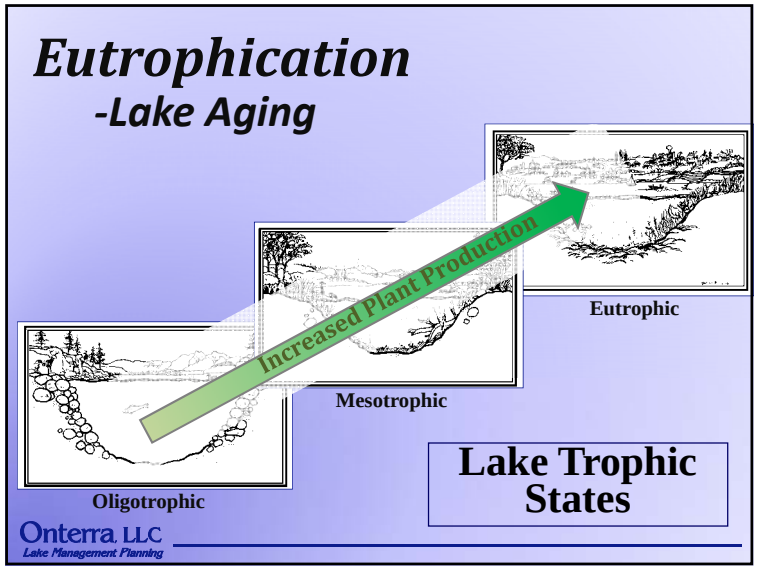

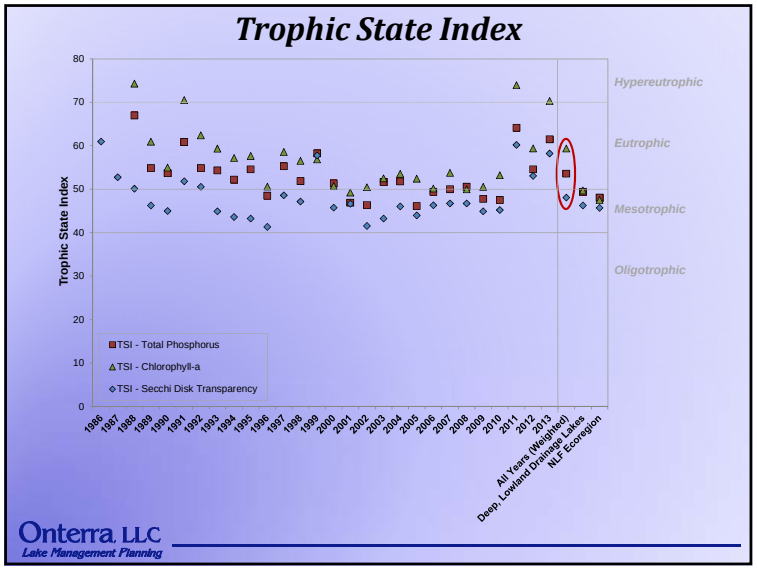

Other Water Quality Results

- Alkalinity = 34.2 mg/L as $CaCO_3$ – indicates very little sensitivity to acid rain
- Low calcium concentrations (6.7 mg/L)
  - Very low susceptibility for zebra mussel establishment

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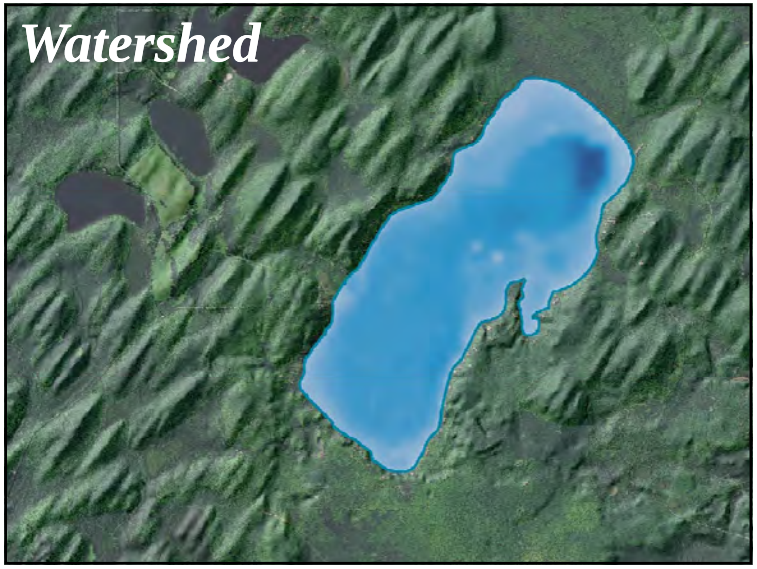

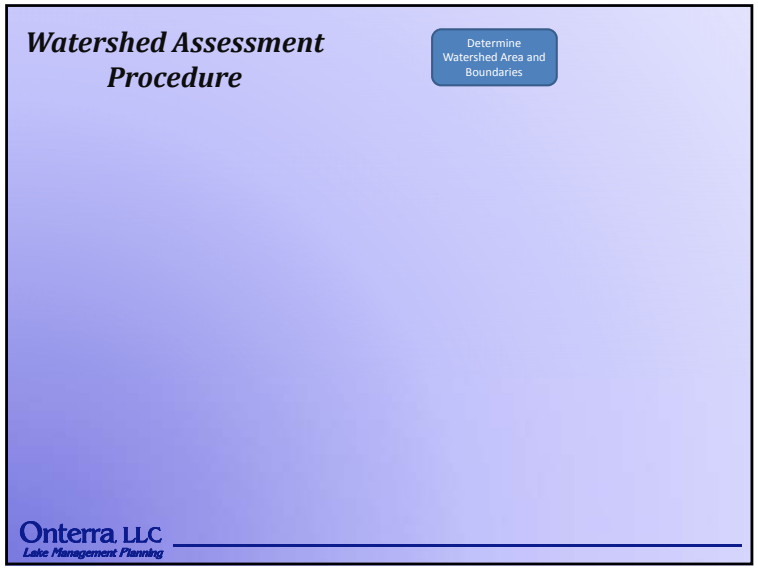
Watershed Assessment Procedure
Determine Watershed Area and Boundaries
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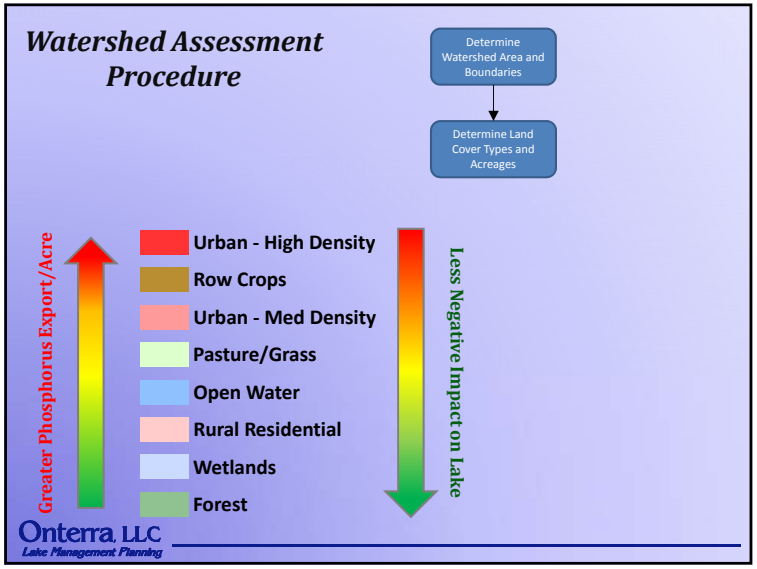
Watershed


Watershed
2,724 acres
WS:LA = 2:1


Watershed Assessment Procedure
Determine Watershed Area and Boundaries
Determine Land Cover Types and Acreages
Greater Phosphorus Export/Acre
Urban - High Density
Row Crops
Urban - Med Density
Pasture/Grass
Open Water
Rural Residential
Wetlands
Forest
Less Negative Impact on Lake
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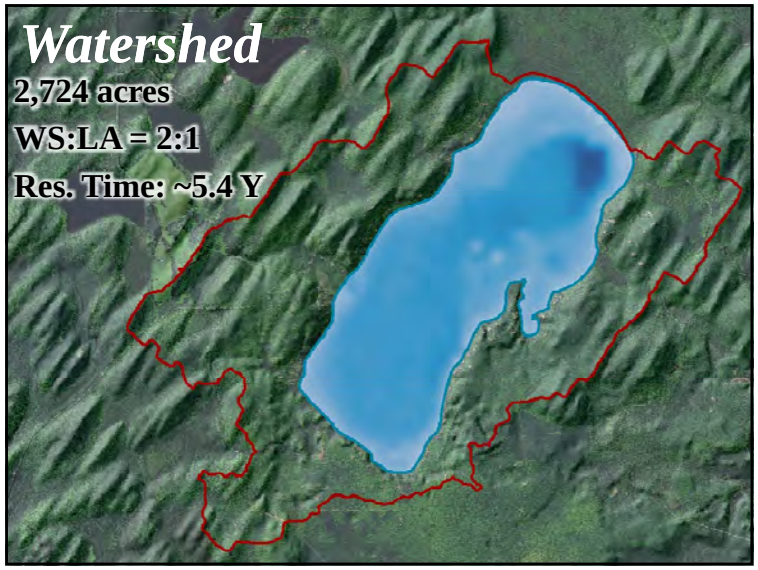
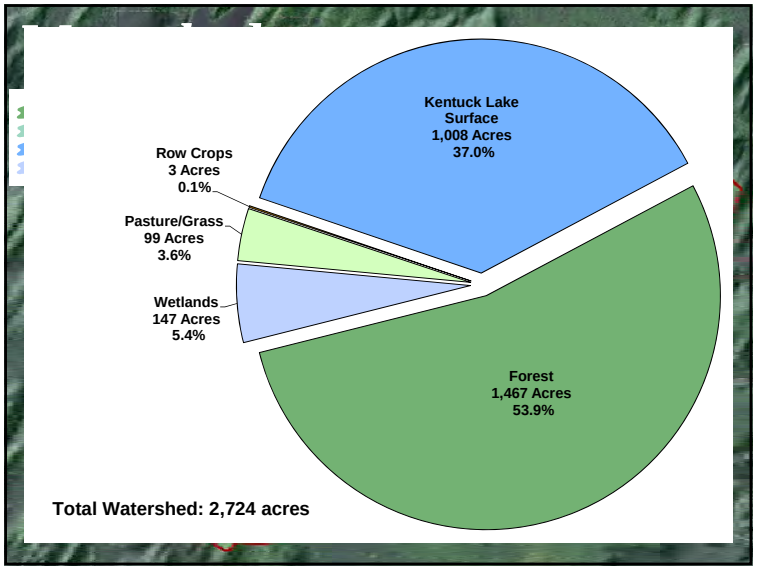
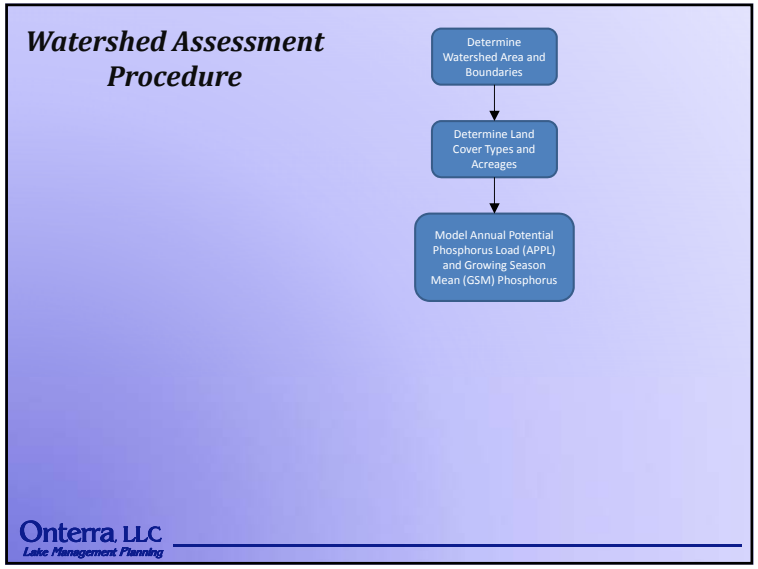

Watershed
2,724 acres
WS:LA = 2:1
Res. Time: ~5.4 Y


Kentuck Lake Surface 1,008 Acres 37.0%
Row Crops 3 Acres 0.1%
Pasture/Grass 99 Acres 3.6%
Wetlands 147 Acres 5.4%
Forest 1,467 Acres 53.9%
Total Watershed: 2,724 acres


Watershed Assessment Procedure
Determine Watershed Area and Boundaries
Determine Land Cover Types and Acreages
Model Annual Potential Phosphorus Load (APPL) and Growing Season Mean (GSM) Phosphorus
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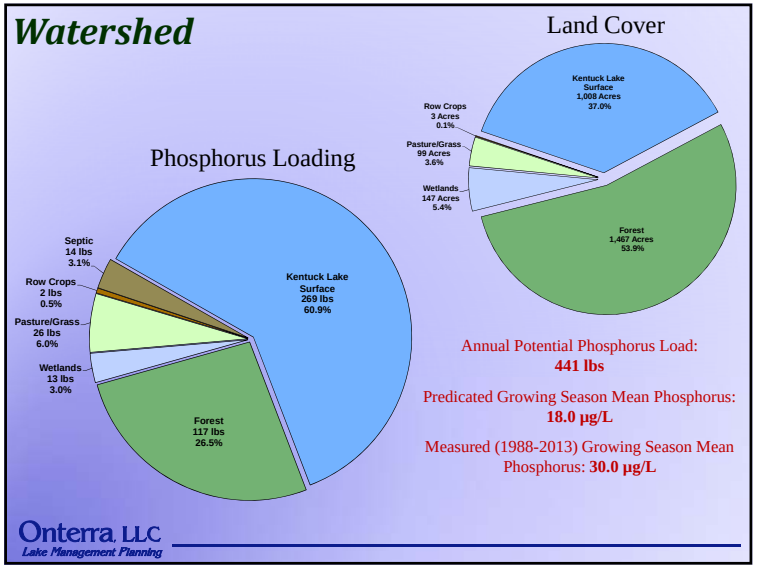
Watershed
Land Cover
Kentuck Lake Surface 1,008 Acres 37.0%
Row Crops 3 Acres 0.1%
Pasture/Grass 99 Acres 3.6%
Wetlands 147 Acres 5.4%
Forest 1,467 Acres 53.9%
Phosphorus Loading
Septic 14 lbs 3.1%
Row Crops 2 lbs 0.5%
Pasture/Grass 26 lbs 6.0%
Wetlands 13 lbs 3.0%
Kentuck Lake Surface 269 lbs 60.9%
Forest 117 lbs 26.5%
Annual Potential Phosphorus Load: 441 lbs
Predicated Growing Season Mean Phosphorus: 18.0 µg/L
Measured (1988-2013) Growing Season Mean Phosphorus: 30.0 µg/L
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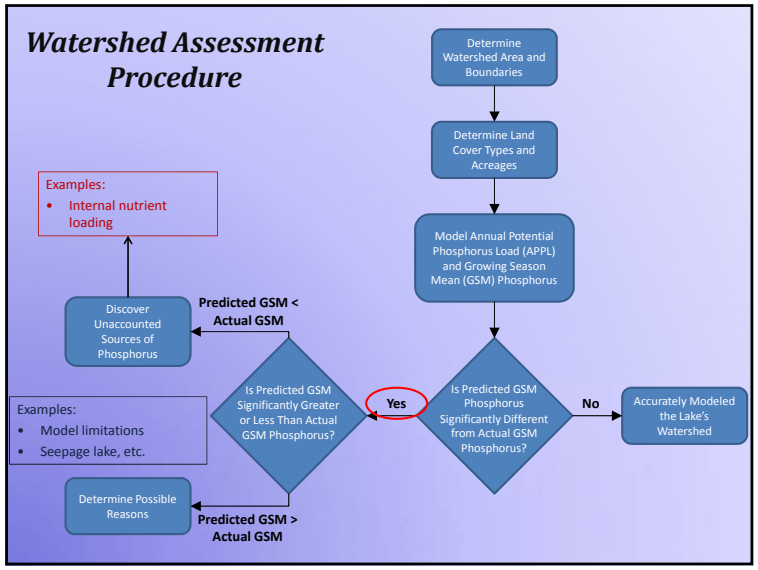
Watershed Assessment Procedure
Determine Watershed Area and Boundaries
Determine Land Cover Types and Acreages
Model Annual Potential Phosphorus Load (APPL) and Growing Season Mean (GSM) Phosphorus
Is Predicted GSM Phosphorus Significantly Different from Actual GSM Phosphorus?
No
Accurately Modeled the Lake's Watershed
Yes
Is Predicted GSM Significantly Greater or Less Than Actual GSM Phosphorus?
Predicted GSM < Actual GSM
Discover Unaccounted Sources of Phosphorus
Examples:
Internal nutrient loading
Predicted GSM > Actual GSM
Determine Possible Reasons
Examples:
Model limitations
Seepage lake, etc.


Shoreland Condition


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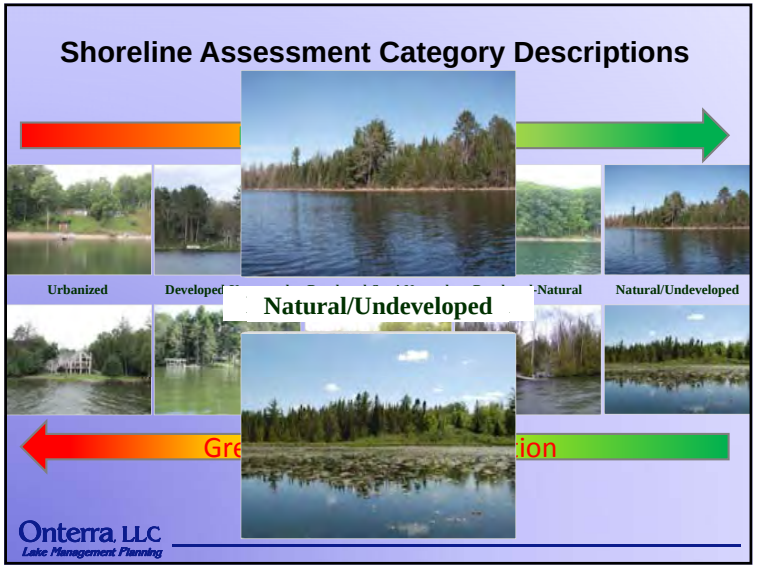
Shoreline Assessment Category Descriptions
Urbanized
Natural/Undeveloped
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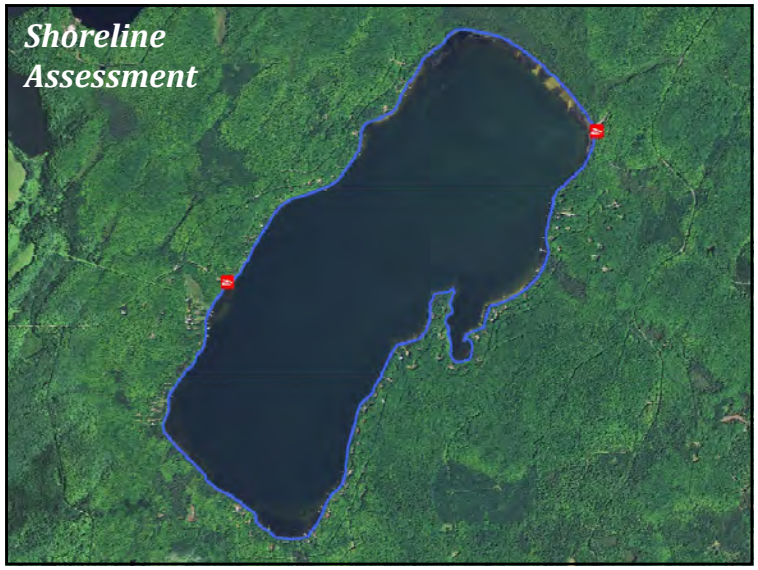

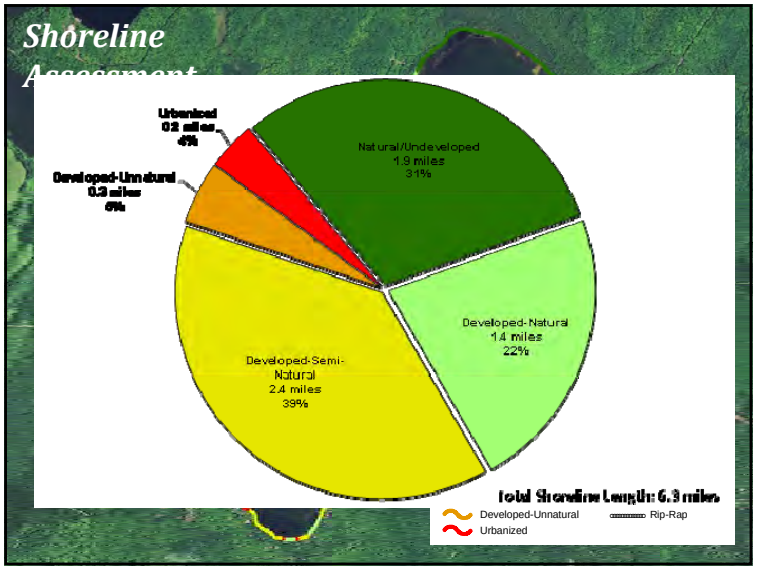

Coarse Woody Habitat

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

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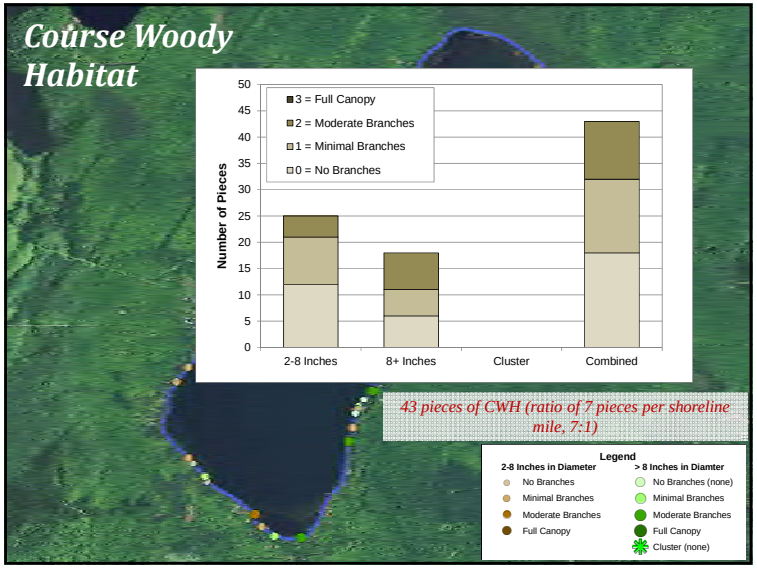
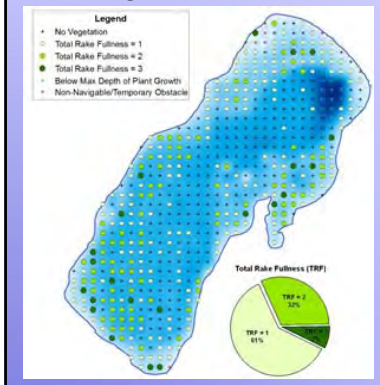
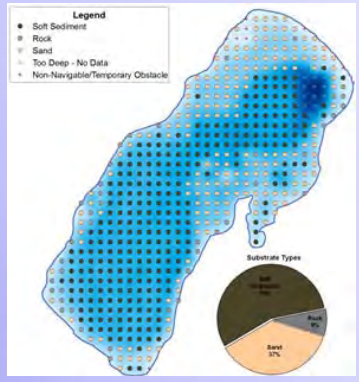


Vegetation Distribution



Sediment Distribution



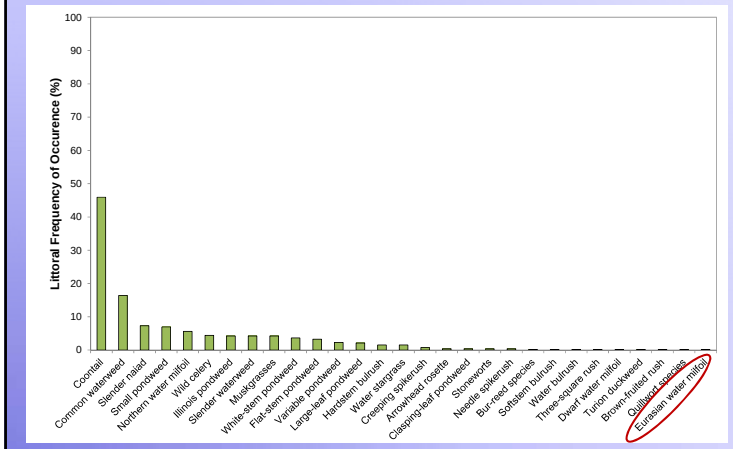
Species List

- 41 Native Species
- 2 Non-Native Species
  - Eurasian water milfoil
  - Curly-leaf pondweed

Growth Form	Scientific Name	Common Name	Coefficient of Conservatism (c)	2011 (WDNR)	2013 (Onterra)
Emergent	*Carex comosa*	Bristly sedge	5		I
	Carex lacustris	Lake sedge	6		I
	Dulichium arundinaceum	Three-way sedge	9		I
	Eleocharis palustris	Creeping spikerush	6	X	I
	Equisetum fluviatile	Water horsetail	7	I	I
	Sagittaria latifolia	Common arrowhead	3		I
	Sagittaria spp. (sterile)	Arrowhead spp. (sterile)	N/A		I
	Schoenoplectus acutus	Hardstem bulrush	5	X	I
	Schoenoplectus pungens	Three-square rush	5	X	
	Schoenoplectus subterminalis	Water bulrush	9	X	
	Schoenoplectus tabernaemontani	Softstem bulrush	4	X	I
	Sparganium spp.	Bur-reed species	N/A	X	
	Typha spp.	Cattail spp.	1	I	I
FL	*Nuphar variegata*	Spatterdock	6	I	
	Nymphaea odorata	White water lily	6	I	I
F/E	*Sparganium angustifolium*	Narrow-leaf bur-reed	9		I
	Sparganium fluctuans	Floating-leaf bur-reed	10		I
Submergent	*Ceratophyllum demersum*	Coontail	3	X	
	Chara spp.	Muskgrasses	7	X	
	Elodea canadensis	Common waterweed	3	X	
	Elodea nuttallii	Slender waterweed	7	X	
	Heteranthera dubia	Water stargrass	6	X	
	Isoetes spp.	Quillwort species	N/A	X	
	Myriophyllum sibiricum	Northern water milfoil	7	X	
	Myriophyllum spicatum	Eurasian water milfoil	Exotic	X	I
	Myriophyllum tenellum	Dwarf water milfoil	10	X	
	Najas flexilis	Slender naiad	6	X	
	Nitella spp.	Stoneworts	7	X	
	Potamogeton amplifolius	Large-leaf pondweed	7	X	
	Potamogeton crispus	Curly-leaf pondweed	Exotic		I
	Potamogeton gramineus	Variable pondweed	7	X	
	Potamogeton illinoensis	Illinois pondweed	6	X	
	Potamogeton praelongus	White-stem pondweed	8	X	
	Potamogeton pusillus	Small pondweed	7	X	
	Potamogeton richardsonii	Clasping-leaf pondweed	5	X	
	Potamogeton robbinsii	Fern pondweed	8	I	
	Potamogeton zosteriformis	Flat-stem pondweed	6	X	
	Sagittaria sp. (rosette)	Arrowhead rosette	N/A	X	
	Vallisneria americana	Wild celery	6	X	
S/E	*Eleocharis acicularis*	Needle spikerush	5	X	
	Juncus pelocarpus	Brown-fruited rush	8	X	
	Sagittaria cuneata	Arum-leaved arrowhead	7	I	
FF	*Lemna turionifera*	Turion duckweed	2	X	

FL = Floating Leaf; FL/E = Floating Leaf and Emergent; S/E = Submergent and Emergent; FF = Free Floating
X = Located on rake during point-intercept survey; I = Incidental Species

2011 Littoral Frequency of Occurrence



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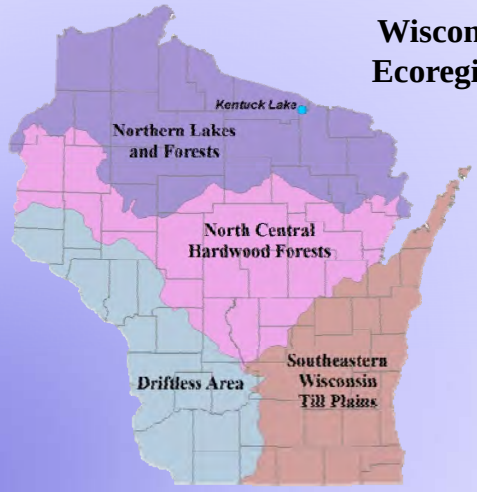
Wisconsin Ecoregions



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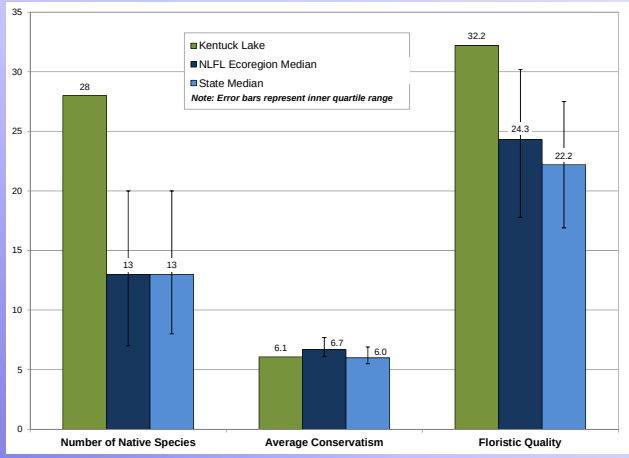
Floristic Quality Analysis



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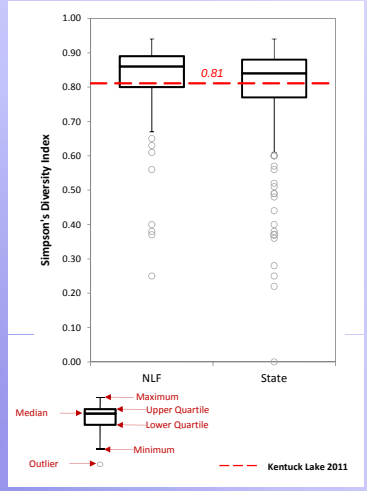
Simpson's Diversity Index



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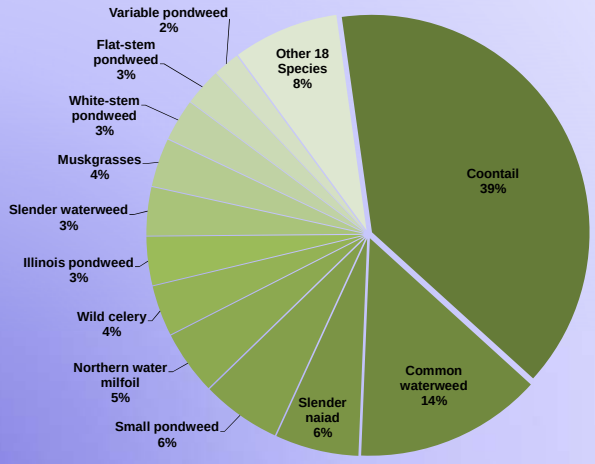
2012 Relative Frequency



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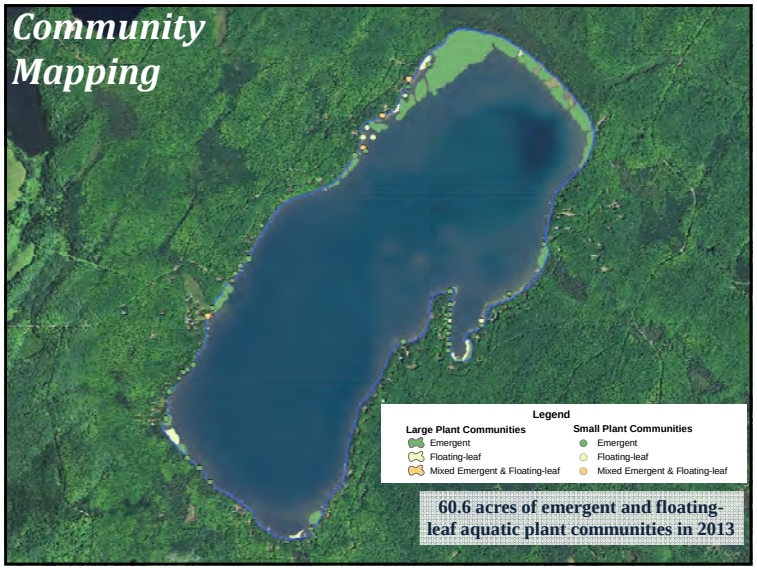
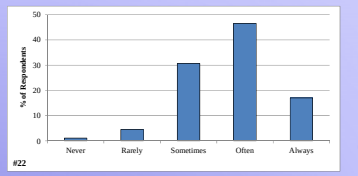
Community Mapping



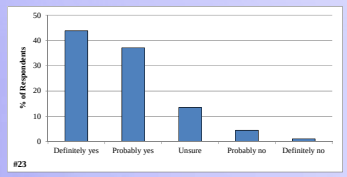
60.6 acres of emergent and floating-leaf aquatic plant communities in 2013

Stakeholder Survey – Aquatic Plants and Algae

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



Considering your answer to Question #22, do you believe aquatic plant control is needed on Kentuck Lake?



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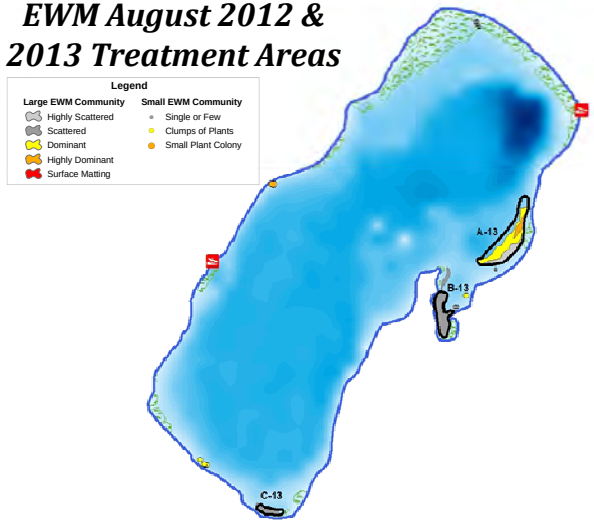
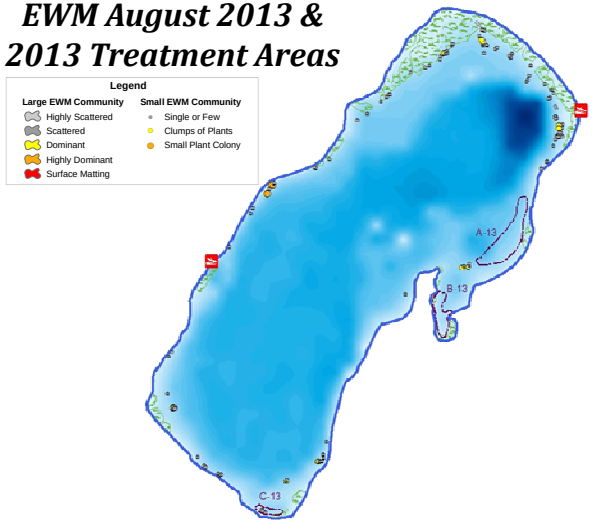
Eurasian water milfoil

- First discovered in 2011
- Summer 2012 survey revealed ~13.4 acres of colonized EWM
- 18.6-acre 2,4-D treatment proposed for 2013 targeting these areas of EWM

EWM August 2012 & 2013 Treatment Areas



EWM August 2013 & 2013 Treatment Areas



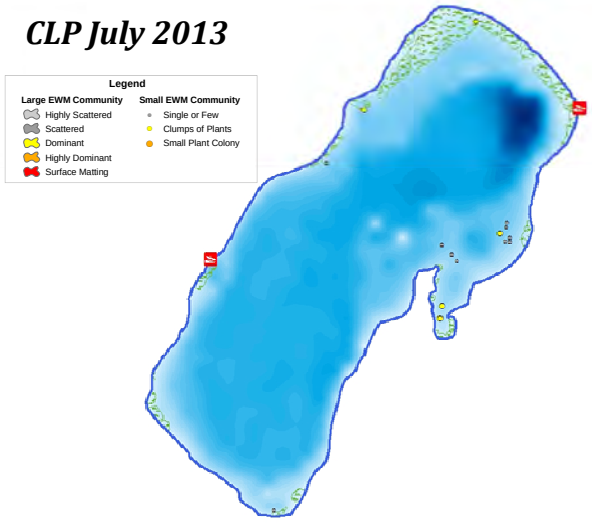
Eurasian water milfoil

- First discovered in 2011
- Summer 2012 survey revealed ~13.4 acres of colonized EWM
- 18.6-acre 2,4-D treatment proposed for 2013 targeting these areas of EWM
- No EWM treatment proposed for 2014
- Late-Summer Peak-Biomass Survey scheduled for 2014

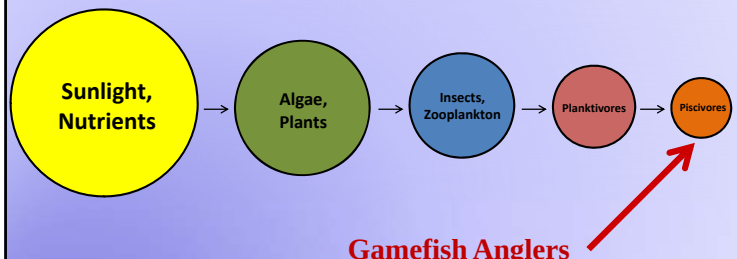
Curly-leaf pondweed (CLP)

- First documented in Kentuck Lake in 1999
- KLPRD members did not observe it again until 2012
- July 2013 Early-Season AIS Survey (ESAIS) located small population comprised mostly of single plants within the lake

CLP July 2013



Kentuck Lake Fishery



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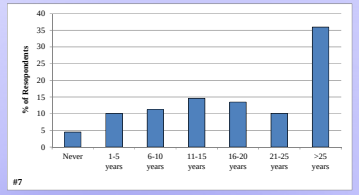
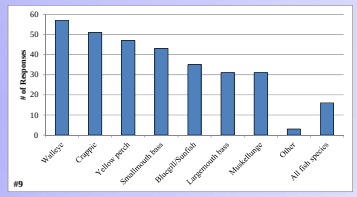
Stakeholder Survey – Kentuck Lake Fishery

For how many years have you fished Kentuck Lake?



What species of fish do you like to catch in Kentuck Lake?



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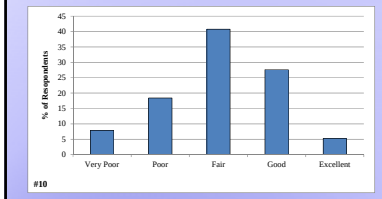
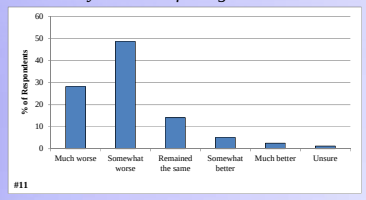
Stakeholder Survey – Kentuck Lake Fishery

How would you describe the current quality of fishing on Kentuck Lake?



How has the quality of fishing changed since you started fishing on the lake?



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Native American Spear Harvest

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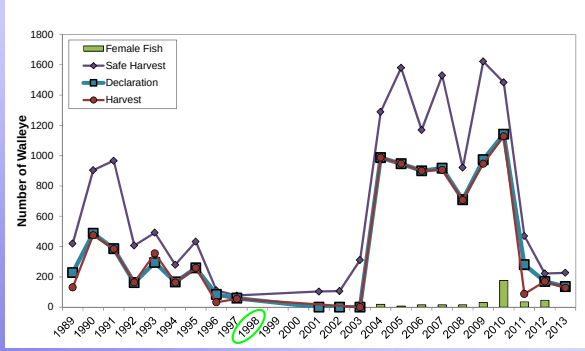
Kentuck Lake Fishery

Walleye Spear Harvest



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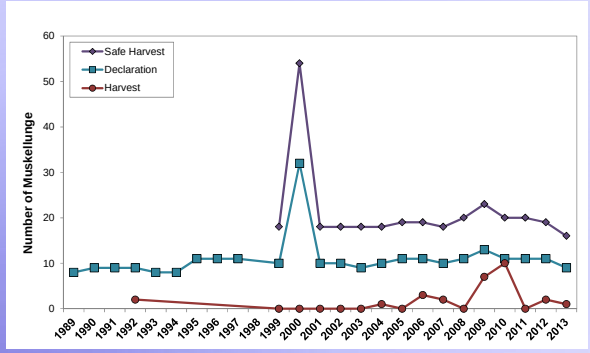
Kentuck Lake Fishery

Muskellunge Spear Harvest



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Kentuck Lake Fishery

- Historically managed by the WDNR for bass and panfish fishery
- Natural recruitment of walleye occurring the 1980s
- Large decline in walleye population in late 1980s/early 1990s
- Walleye stocking began in 1999; 35 fingerlings per acre to be stocked in 2014
- No natural reproduction of walleye is believed to be occurring
- Bass, crappies, and perch are declining
- Bluegill die-off in 2011
- GLIFWC to conduct walleye population estimate and muskellunge tagging in 2014
- WDNR to complete a fall 2014 electrofishing survey and comprehensive survey in 2015

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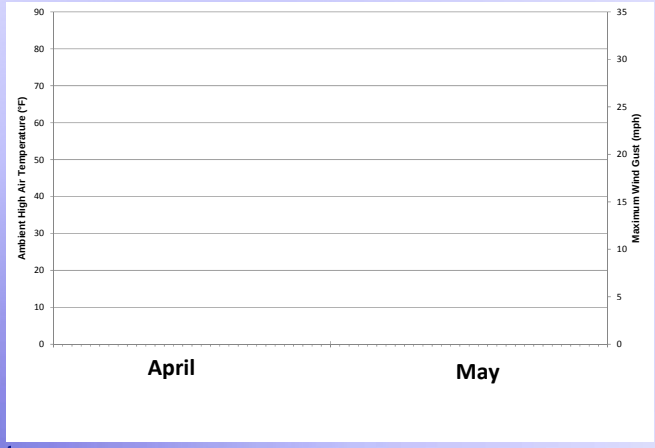
Phelps Weather 2013



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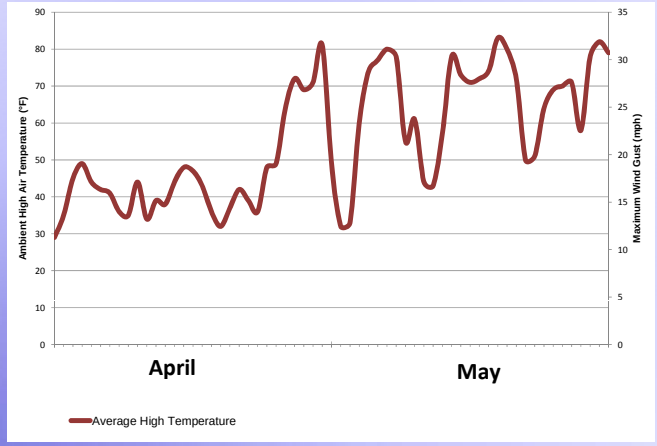
Phelps Weather 2013



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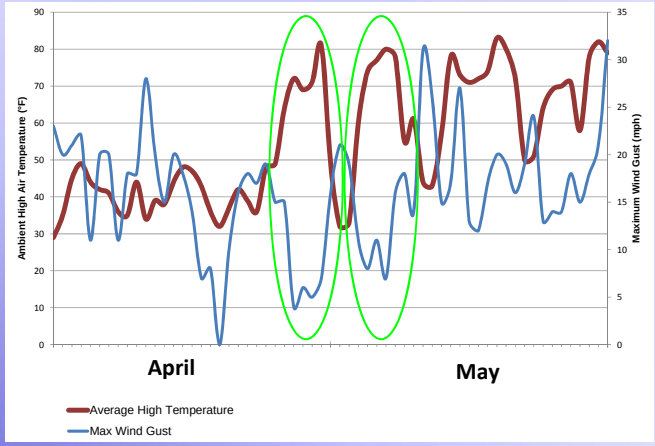
Phelps Weather 2013



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Conclusions

- In most years, water quality for deep lowland drainage lake is good
  - Ample historical data; no apparent trends over time
  - However, the lake experiences intermittent years of poor water quality conditions
    - While internal loading likely occurs annually on Kentuck Lake, weather-driven differences in early-season stratification increase magnitude
- Watershed is in excellent shape; majority is comprised of intact forests and the lake's surface itself
  - Modeling predicted more phosphorus than measured; likely due to internal phosphorus loading

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Conclusions continued

- Overall, immediate shoreland areas are in good condition
- Aquatic plant community
  - Based upon standard analysis, native plant community is of comparable quality to lakes state-wide.
    - High abundance of coontail and common waterweed are indicative of eutrophic conditions
    - Low species diversity; likely driven by eutrophic conditions
  - 2013 EWM treatment was highly successful and population remains low
  - 2013 survey also indicated CLP population is very low
  - No herbicide treatments are proposed for 2014; surveys in 2014 will reveal if treatment strategy needs to be developed for 2015

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Kentuck Lake Proposed Three-Year Water Quality Study

- **<u>2014</u>: Record only temp/dissolved oxygen profiles from 7 locations (pictured) biweekly starting after ice-out through fall turnover and during/immediately after storm events**
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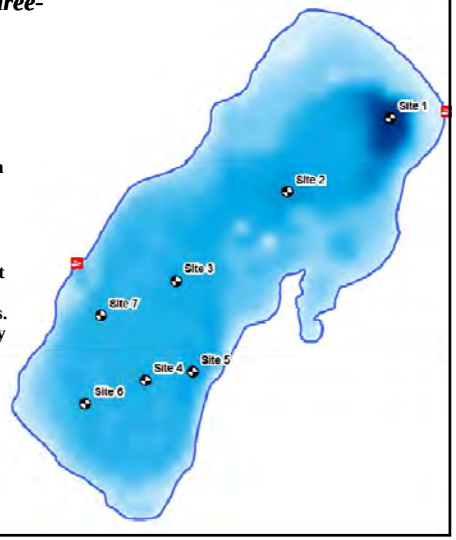

Kentuck Lake Water Quality Study	Cash Costs	Donated Value
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Other Cash Costs		
SLOH Analysis Fees	$10,200.00	
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Total Project	**$40,820.68**	
State Share Requested (75%)	**$30,615.51**	
Local Share (25%)	**$10,205.17**	
KLPRD Actual Cash Costs	**$6,569.49**	

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Kentuck Lake
Protection & Rehabilitation District
Kentuck Lake
Management Planning Project
Planning Meeting II
May 1, 2014
Brenton Butterfield
& Tim Hoyman
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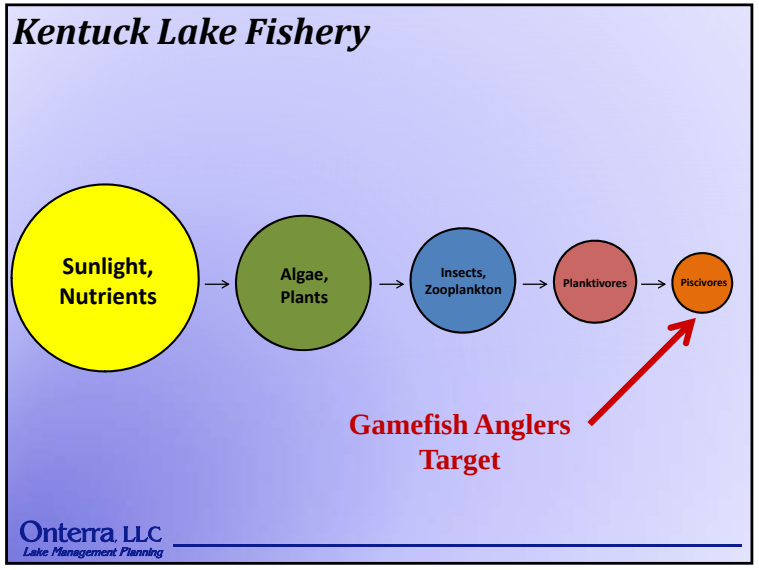
Fisheries


Kentuck Lake Fishery
Sunlight, Nutrients
Algae, Plants
Insects, Zooplankton
Planktivores
Piscivores
Gamefish Anglers Target
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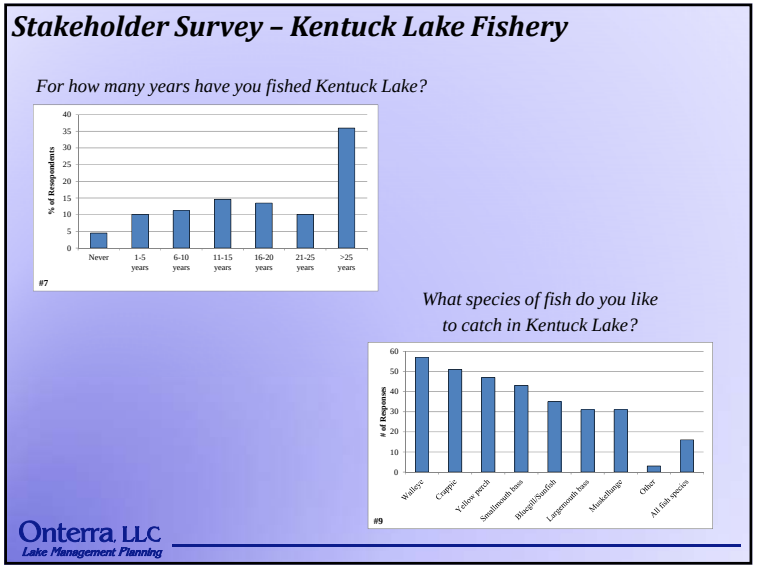
Stakeholder Survey – Kentuck Lake Fishery
For how many years have you fished Kentuck Lake?
% of Respondents
Never
1-5 years
6-10 years
11-15 years
16-20 years
21-25 years
>25 years
#7
What species of fish do you like to catch in Kentuck Lake?
# of Responses
Walleye
Crappie
Yellow perch
Smallmouth bass
Bluegill/Sunfish
Largemouth bass
Muskellunge
Other
All fish species
#9
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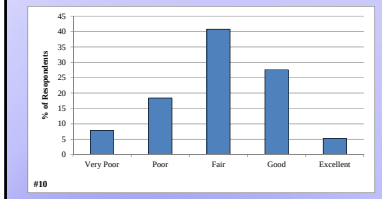
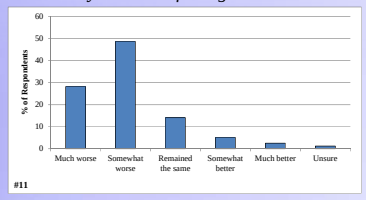
Stakeholder Survey – Kentuck Lake Fishery

How would you describe the current quality of fishing on Kentuck Lake?



How has the quality of fishing changed since you started fishing on the lake?



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Native American Spear Harvest

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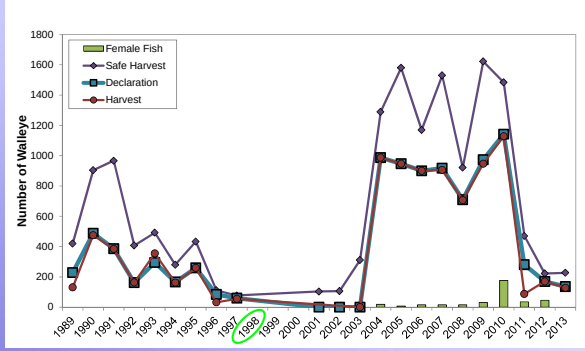
Kentuck Lake Fishery

Walleye Spear Harvest



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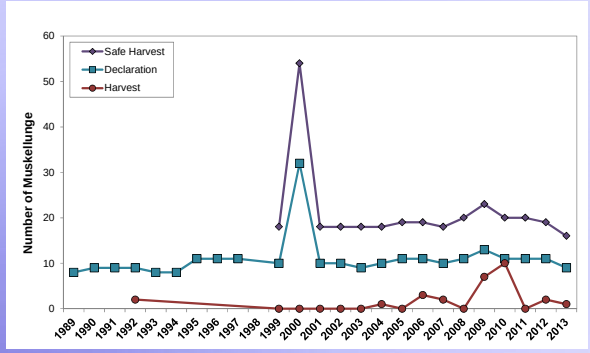
Kentuck Lake Fishery

Muskellunge Spear Harvest



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Kentuck Lake Fishery

- Historically managed by the WDNR for bass and panfish fishery
- Natural recruitment of walleye occurring the 1980s
- Large decline in walleye population in late 1980s/early 1990s
- Walleye stocking began in 1999; 35 fingerlings per acre to be stocked in 2014
- No natural reproduction of walleye is believed to be occurring
- Bass, crappies, and perch are declining
- Bluegill die-off in 2011
- GLIFWC to conduct walleye population estimate and muskellunge tagging in 2014
- WDNR to complete a fall 2014 electrofishing survey and comprehensive survey in 2015

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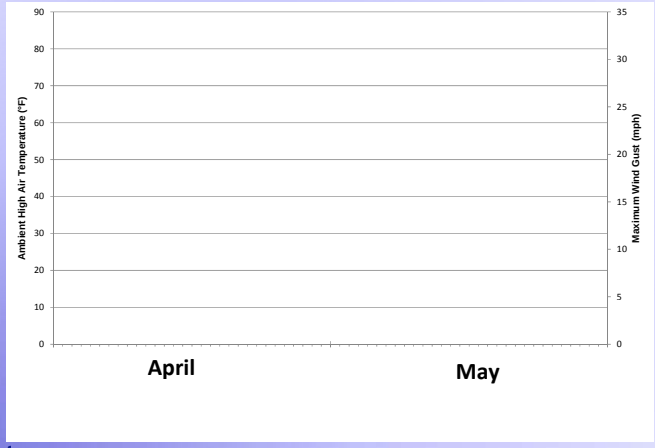
Phelps Weather 2013



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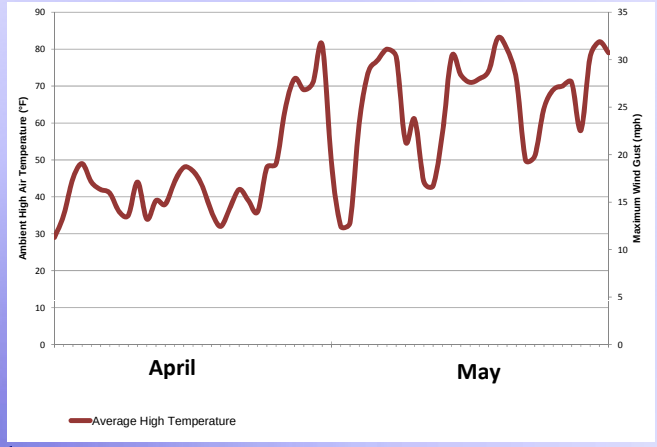

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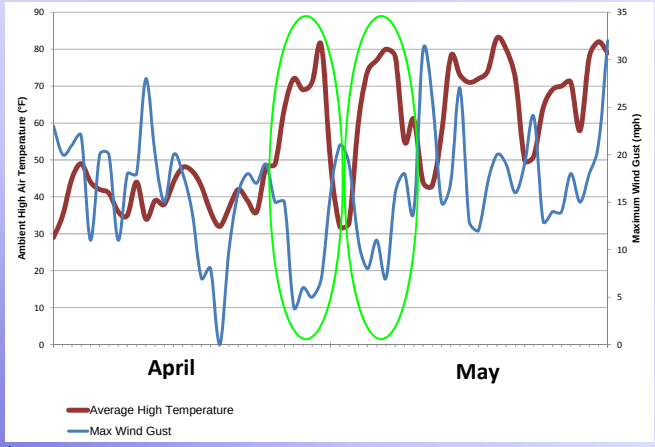

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Conclusions

- In most years, water quality for deep lowland drainage lake is good
  - Ample historical data; no apparent trends over time
  - However, the lake experiences intermittent years of poor water quality conditions
    - While internal loading likely occurs annually on Kentuck Lake, weather-driven differences in early-season stratification increase magnitude
- Watershed is in excellent shape; majority is comprised of intact forests and the lake's surface itself
  - Modeling predicted more phosphorus than measured; likely due to internal phosphorus loading

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Conclusions continued

- Overall, immediate shoreland areas are in good condition
- Aquatic plant community
  - Based upon standard analysis, native plant community is of comparable quality to lakes state-wide.
    - High abundance of coontail and common waterweed are indicative of eutrophic conditions
    - Low species diversity; likely driven by eutrophic conditions
  - 2013 EWM treatment was highly successful and population remains low
  - 2013 survey also indicated CLP population is very low
  - No herbicide treatments are proposed for 2014; surveys in 2014 will reveal if treatment strategy needs to be developed for 2015

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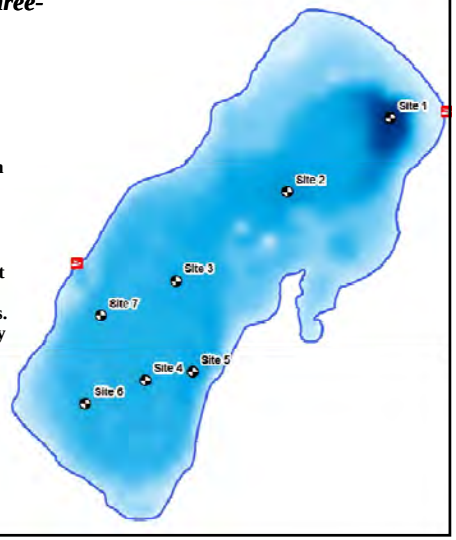

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B

APPENDIX B

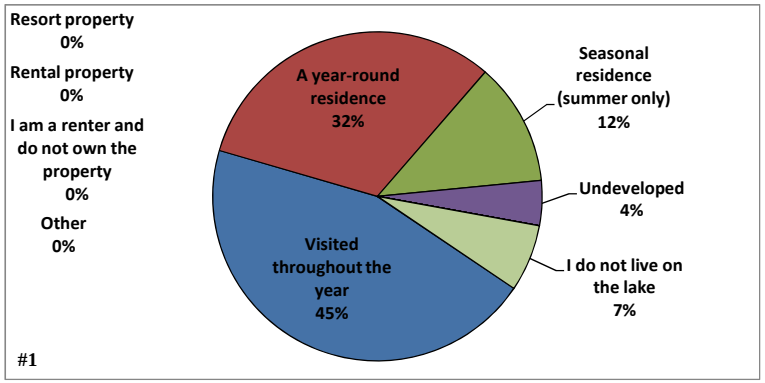
Stakeholder Survey Response Charts and Comments

Returned Surveys	90
Sent Surveys	149
Response Rate (%)	60.4

KENTUCK LAKE PROPERTY

#1 How is your property on Kentuck Lake utilized?

	Total	%
Visited throughout the year	41	*45.1*
A year-round residence	29	*31.9*
Seasonal residence (summer only)	11	*12.1*
Undeveloped	4	*4.4*
Resort property	0	*0.0*
Rental property	0	*0.0*
Other	0	*0.0*
I am a renter and do not own the property	0	*0.0*
I do not live on the lake	6	*6.6*
	91	*100.0*

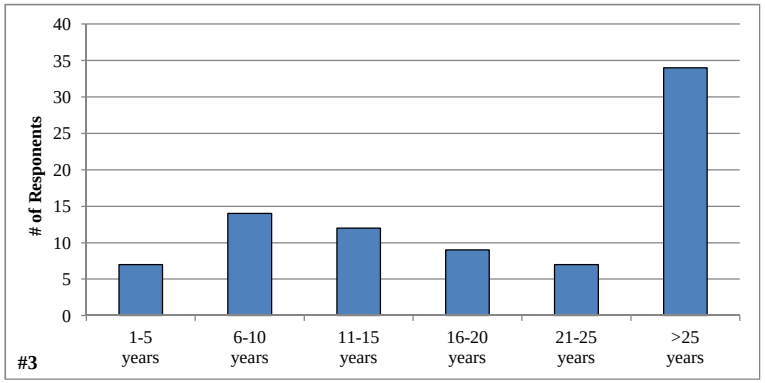


#2 How many days each year is your property used by you or others?

Answered Question	84
Average	158.3
Standard deviation	140.7

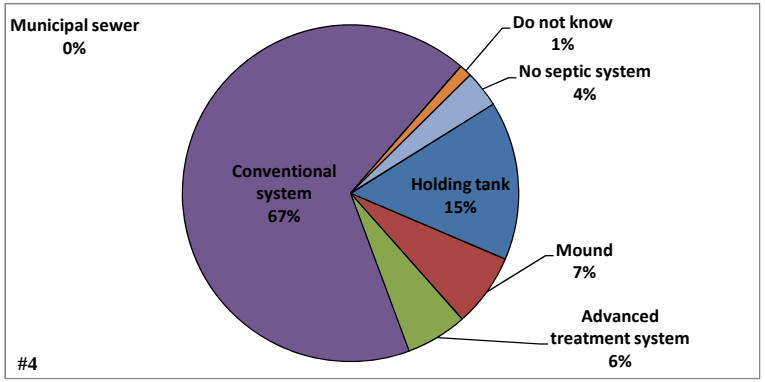
#3 How long have you owned or rented your property on Kentuck Lake?

	Total	%
1-5 years	7	*8.4*
6-10 years	14	*16.9*
11-15 years	12	*14.5*
16-20 years	9	*10.8*
21-25 years	7	*8.4*
>25 years	34	*41.0*
	83	*100.0*



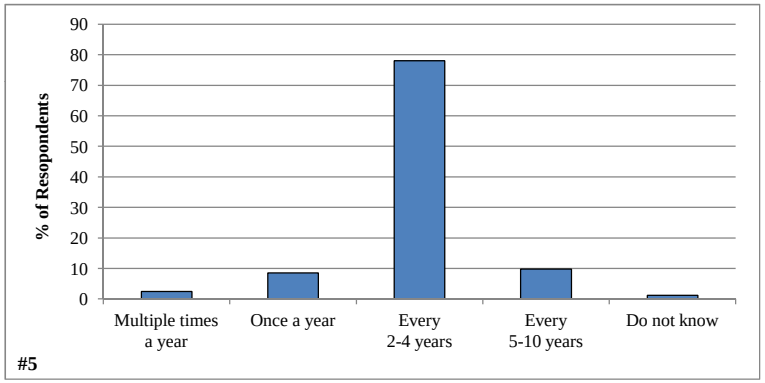
#4 What type of septic system does your property utilize?

	Total	%
Holding tank	13	*15.3*
Mound	6	*7.1*
Advanced treatment system	5	*5.9*
Conventional system	57	*67.1*
Municipal sewer	0	*0.0*
Do not know	1	*1.2*
No septic system	3	*3.5*
	85	*100.0*



#5 How often is the septic tank on your property pumped?

	Total	%
Multiple times a year	2	*2.4*
Once a year	7	*8.5*
Every 2-4 years	64	*78.0*
Every 5-10 years	8	*9.8*
Do not know	1	*1.2*
	82	*100.0*



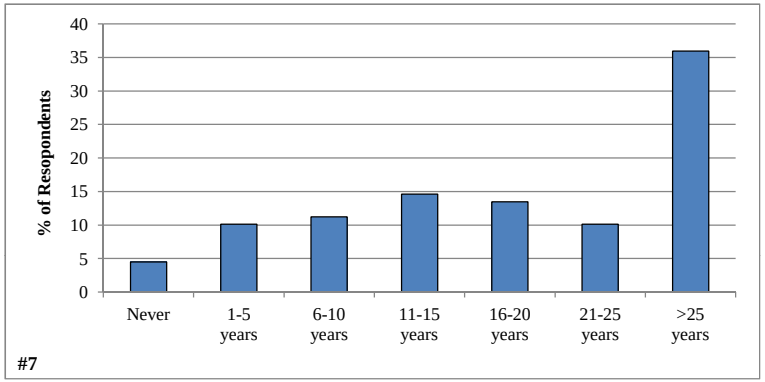
RECREATIONAL ACTIVITY ON KENTUCK LAKE

#6 How many years ago did you first visit Kentuck Lake?

Answered Question	89
Average	26.8
Standard deviation	14.1

#7 For how many years have you fished Kentuck Lake?

	Total	%
Never	4	*4.5*
1-5 years	9	*10.1*
6-10 years	10	*11.2*
11-15 years	13	*14.6*
16-20 years	12	*13.5*
21-25 years	9	*10.1*
>25 years	32	*36.0*
	89	*100.0*

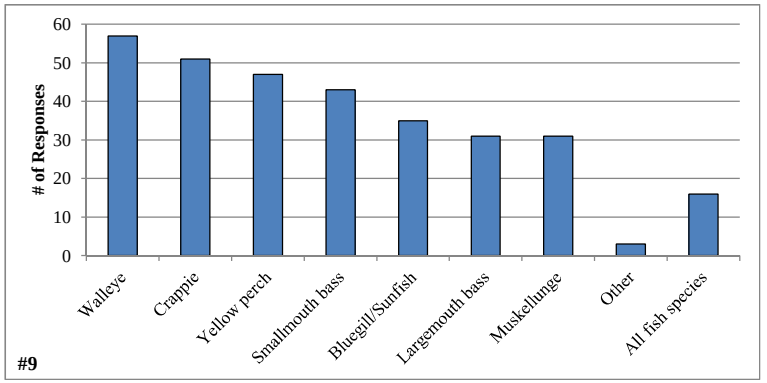


#8 Have you personally fished on Kentuck Lake in the past three years?

	Total	%
Yes	77	*88.5*
No	10	*11.5*
	87	*100.0*

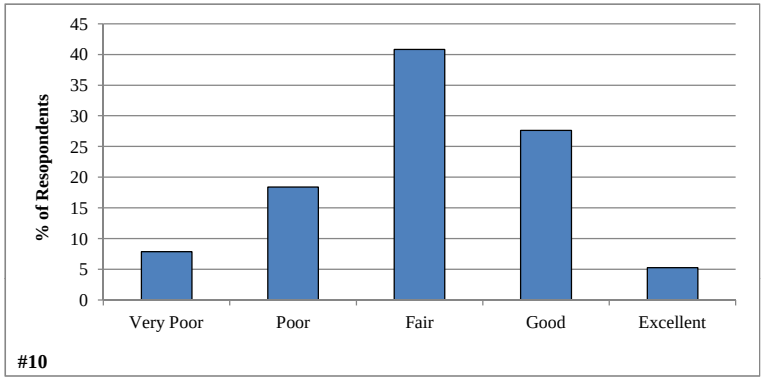
#9 What species of fish do you like to catch on Kentuck Lake?

	Total
Walleye	57
Crappie	51
Yellow perch	47
Smallmouth bass	43
Bluegill/Sunfish	35
Largemouth bass	31
Muskellunge	31
Other	3
All fish species	16



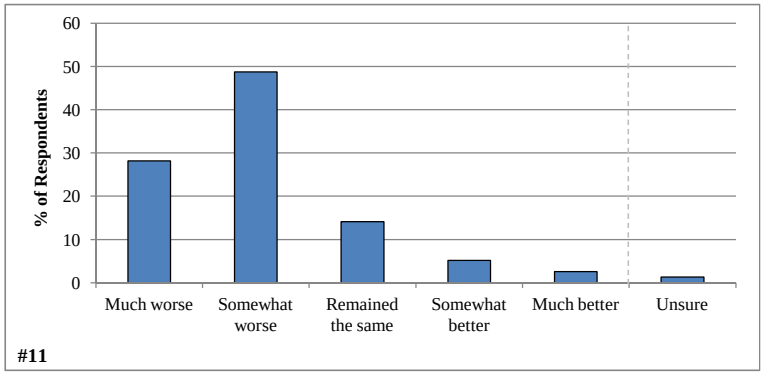
#10 How would you describe the current quality of fishing on Kentuck Lake?

	Total	%
Very Poor	6	*7.9*
Poor	14	*18.4*
Fair	31	*40.8*
Good	21	*27.6*
Excellent	4	*5.3*
Unsure	0	*0.0*
	76	*100.0*



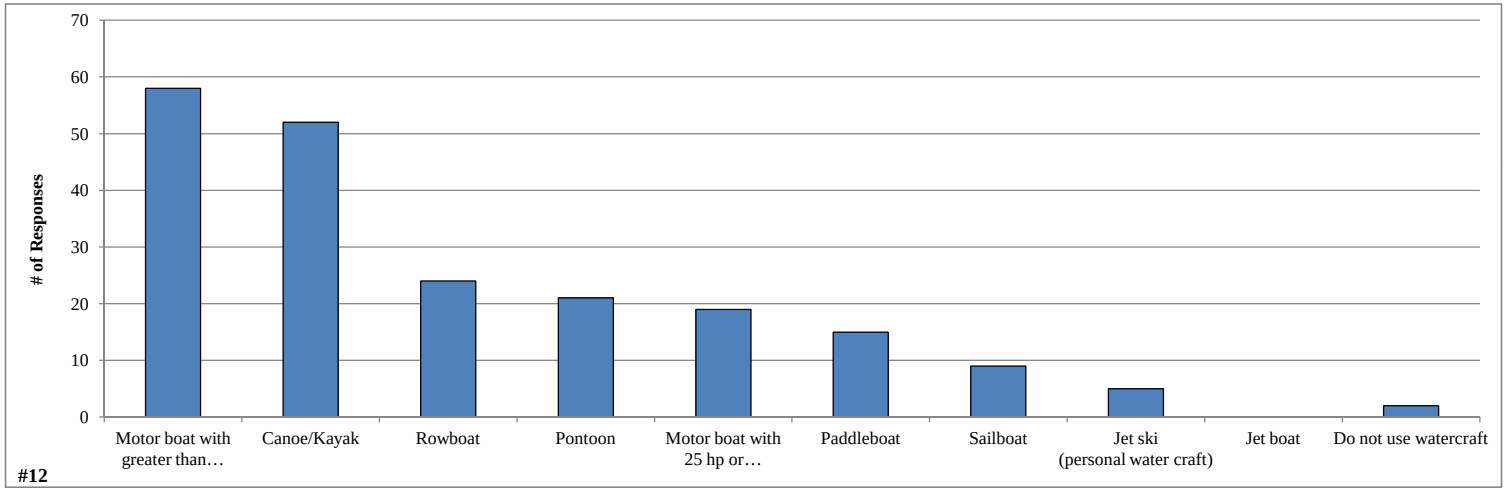
#11 How has the quality of fishing changed since you started fishing on the lake?

	Total	%
Much worse	22	*28.2*
Somewhat worse	38	*48.7*
Remained the Same	11	*14.1*
Somewhat better	4	*5.1*
Much better	2	*2.6*
Unsure	1	*1.3*
	78	*100.0*



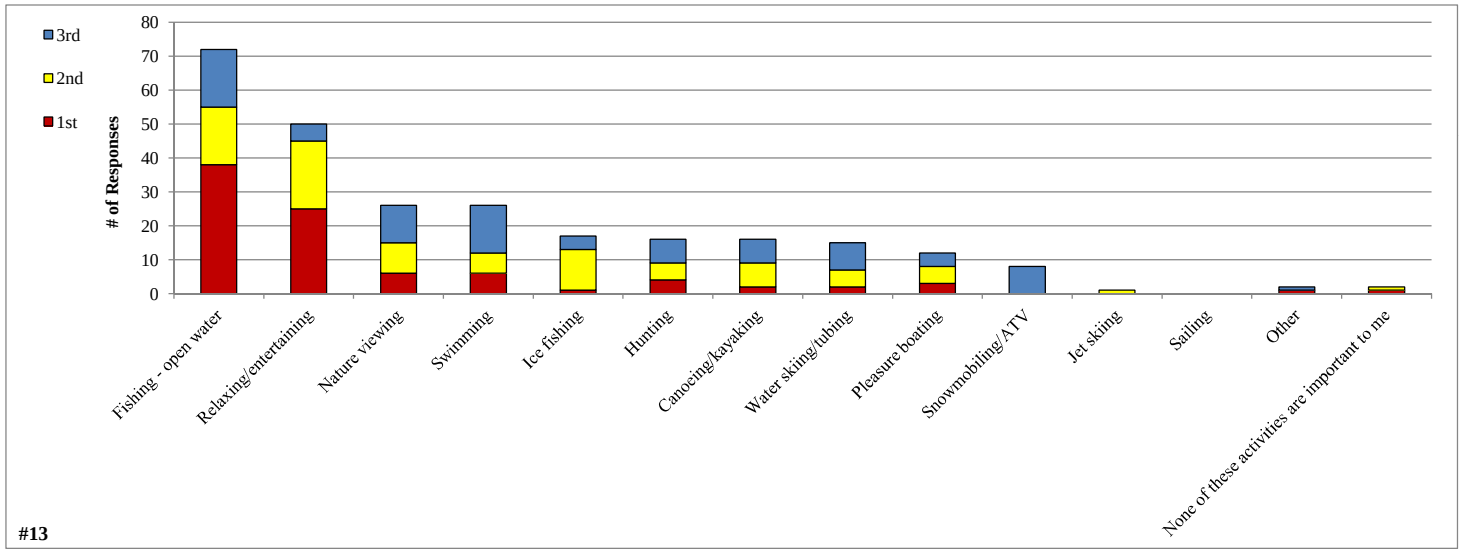
#12 What types of watercraft do you currently use on the lake?

	Total
Motor boat with greater than 25 hp motor	58
Canoe/Kayak	52
Rowboat	24
Pontoon	21
Motor boat with 25 hp or less motor	19
Paddleboat	15
Sailboat	9
Jet ski (personal water craft)	5
Jet boat	0
Do not use watercraft	2



#13 Please rank up to three activities that are important reasons for owning your property on or near the lake.

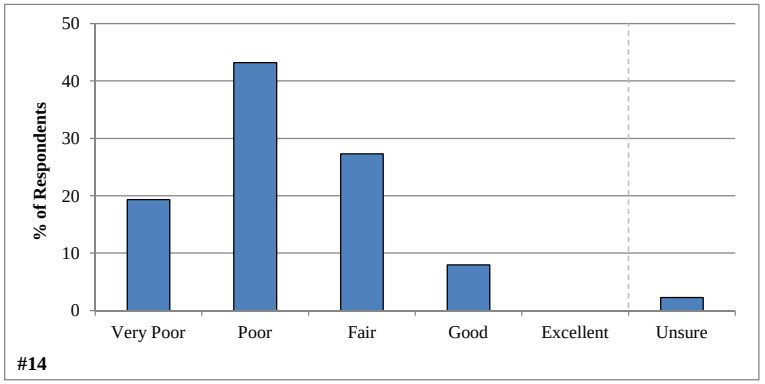
	1st	2nd	3rd	*% ranked*
Fishing - open water	38	17	17	*27.4*
Relaxing/entertaining	25	20	5	*19.0*
Nature viewing	6	9	11	*9.9*
Swimming	6	6	14	*9.9*
Ice fishing	1	12	4	*6.5*
Hunting	4	5	7	*6.1*
Canoeing/kayaking	2	7	7	*6.1*
Water skiing/tubing	2	5	8	*5.7*
Pleasure boating	3	5	4	*4.6*
Snowmobiling/ATV	0	0	8	*3.0*
Jet skiing	0	1	0	*0.4*
Sailing	0	0	0	*0.0*
Other	1	0	1	*0.8*
None of these activities are important to me	1	1	0	*0.8*
	89	88	86	*100.0*



KENTUCK LAKE CURRENT AND HISTORIC CONDITION, HEALTH AND MANAGEMENT

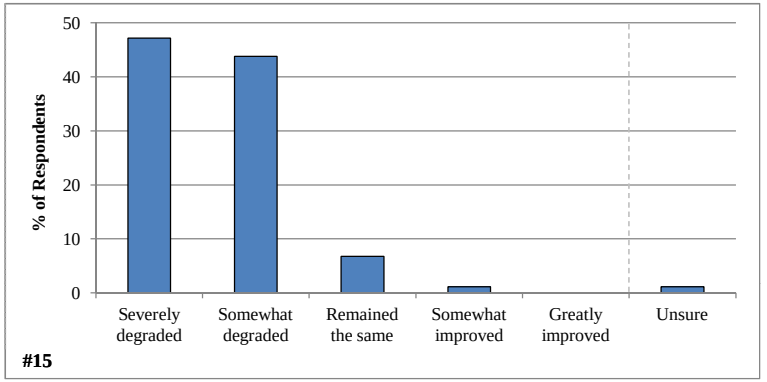
#14 How would you describe the current water quality of Kentuck Lake?

	Total	%
Very Poor	17	*19.3*
Poor	38	*43.2*
Fair	24	*27.3*
Good	7	*8.0*
Excellent	0	*0.0*
Unsure	2	*2.3*
	88	*100.0*



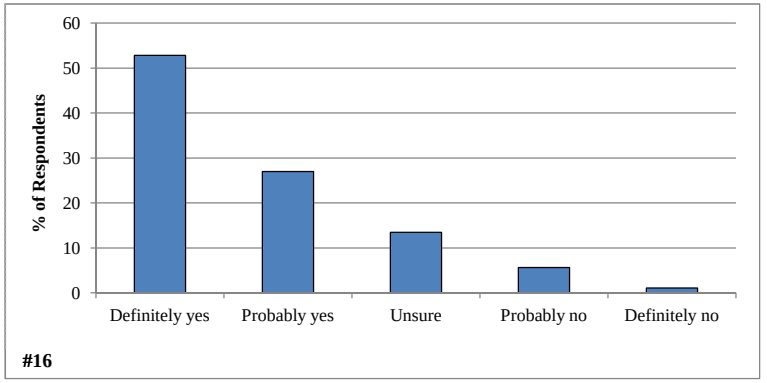
#15 How has the water quality changed in Kentuck Lake since you first visited the lake?

	Total	%
Severely degraded	42	*47.2*
Somewhat degraded	39	*43.8*
Remained the same	6	*6.7*
Somewhat improved	1	*1.1*
Greatly improved	0	*0.0*
Unsure	1	*1.1*
	89	*100.0*



#16 Do you believe that management actions specific to water quality are needed?

	Total	%
Definitely yes	47	*52.8*
Probably yes	24	*27.0*
Unsure	12	*13.5*
Probably no	5	*5.6*
Definitely no	1	*1.1*
	89	*100.0*



#17 Have you ever heard of aquatic invasive species?

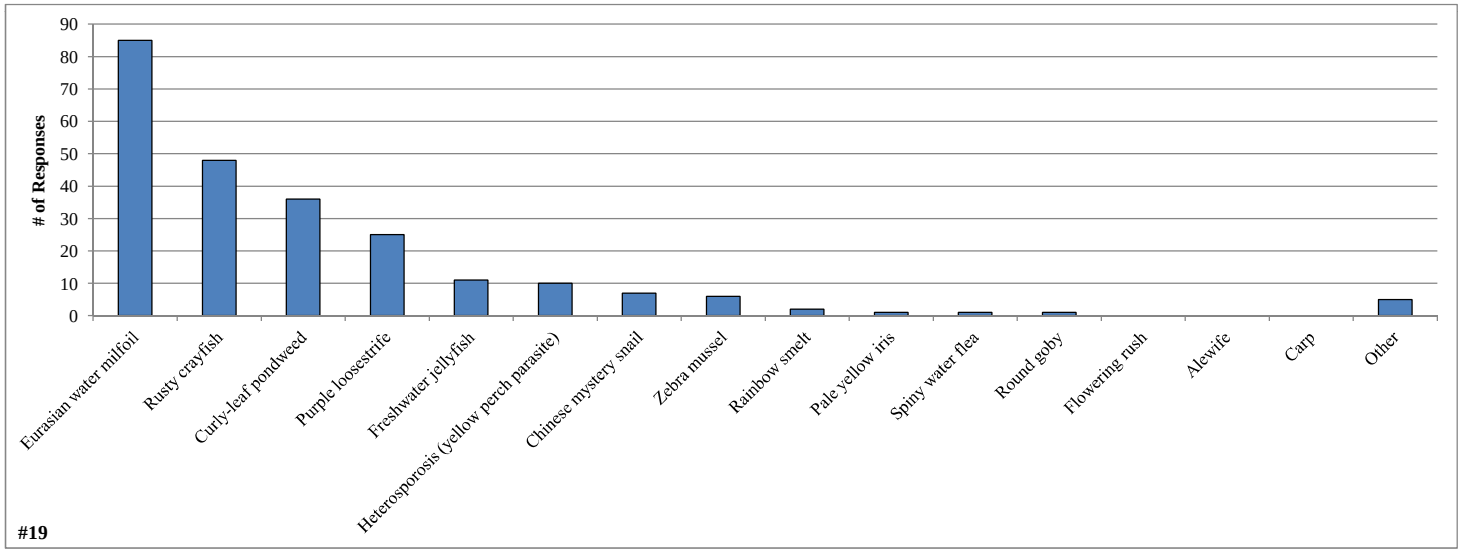
	Total	%
Yes	88	*98.9*
No	1	*1.1*
	89	*100.0*

#18 Do you believe aquatic invasive species are present within Kentuck Lake?

	Total	%
Yes	88	*100.0*
No	0	*0.0*
	88	*100.0*

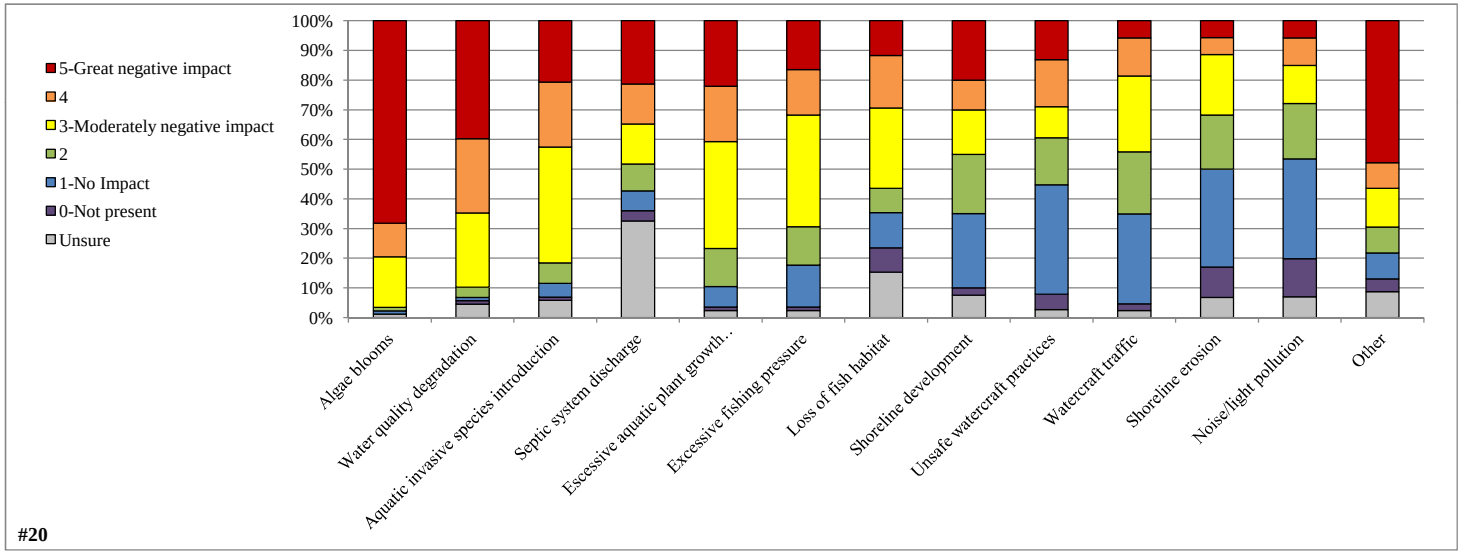
#19 Which aquatic invasive species are you aware of in the lake?

	Total
Eurasian water milfoil	85
Rusty crayfish	48
Curly-leaf pondweed	36
Purple loosestrife	25
Freshwater jellyfish	11
Heterosporosis (yellow perch parasite)	10
Chinese mystery snail	7
Zebra mussel	6
Rainbow smelt	2
Pale yellow iris	1
Spiny water flea	1
Round goby	1
Flowering rush	0
Alewife	0
Carp	0
Other	5



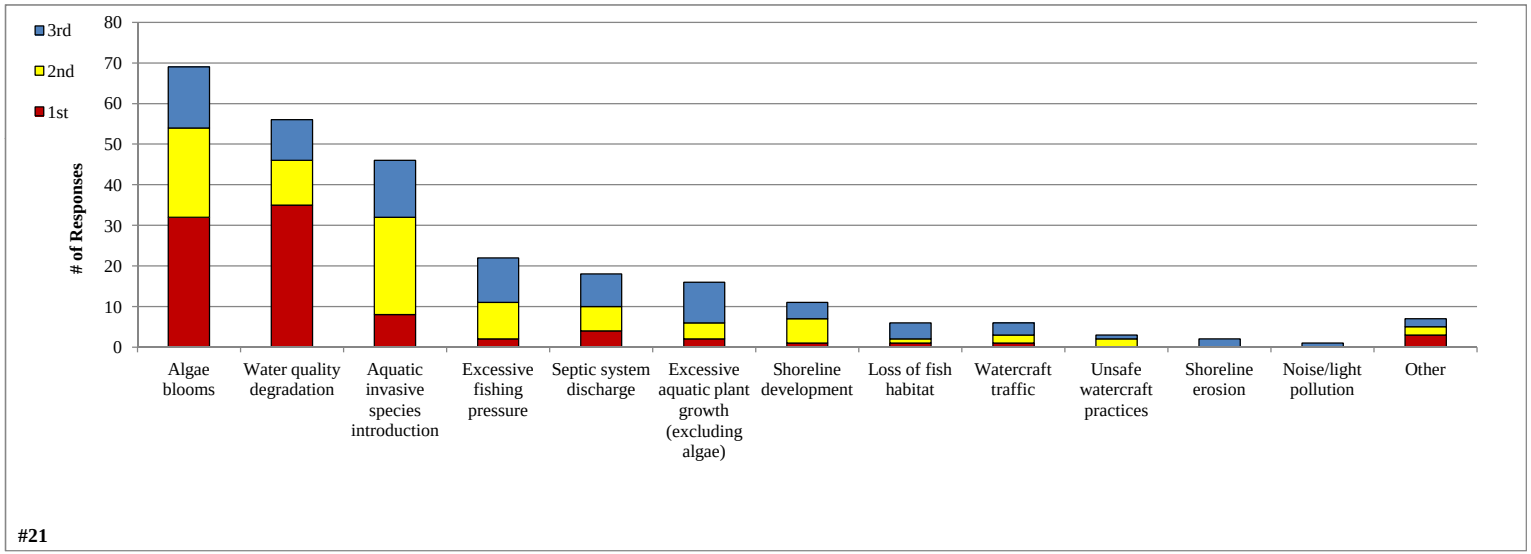
#20 To what level do you believe each of the following factors may currently be negatively impacting Kentuck Lake?

	0-Not present	1-No Impact	2	3-Moderately negative impact	4	5-Great negative impact	Unsure	*Total*	*Average*
Algae blooms	0	1	1	15	10	60	1	*87*	*4.5*
Water quality degradation	1	1	3	22	22	35	4	*83*	*4.0*
Aquatic invasive species introduction	1	4	6	34	19	18	5	*81*	*3.5*
Septic system discharge	3	6	8	12	12	19	29	*57*	*3.4*
Escessive aquatic plant growth (excluding algae)	1	6	11	31	16	19	2	*83*	*3.3*
Excessive fishing pressure	1	12	11	32	13	14	2	*82*	*3.0*
Loss of fish habitat	7	10	7	23	15	10	13	*65*	*2.8*
Shoreline development	1	10	8	6	4	8	3	*36*	*2.7*
Unsafe watercraft practices	2	14	6	4	6	5	1	*35*	*2.4*
Watercraft traffic	2	26	18	22	11	5	2	*82*	*2.3*
Shoreline erosion	9	29	16	18	5	5	6	*73*	*2.0*
Noise/light pollution	11	29	16	11	8	5	6	*69*	*1.9*
Other	1	2	2	3	2	11	2	*20*	*3.7*



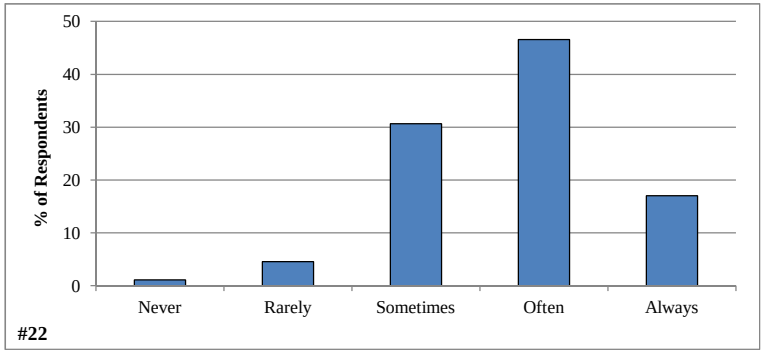
#21 From the list below, please rank your top three concerns regarding Kentuck Lake.

	1st	2nd	3rd	*% Ranked*
Algae blooms	32	22	15	*26.2*
Water quality degradation	35	11	10	*21.3*
Aquatic invasive species introduction	8	24	14	*17.5*
Excessive fishing pressure	2	9	11	*8.4*
Septic system discharge	4	6	8	*6.8*
Excessive aquatic plant growth	2	4	10	*6.1*
Shoreline development	1	6	4	*4.2*
Loss of fish habitat	1	1	4	*2.3*
Watercraft traffic	1	2	3	*2.3*
Unsafe watercraft practices	0	2	1	*1.1*
Shoreline erosion	0	0	2	*0.8*
Noise/light pollution	0	0	1	*0.4*
Other	3	2	2	*2.7*
	89	89	85	*100.0*



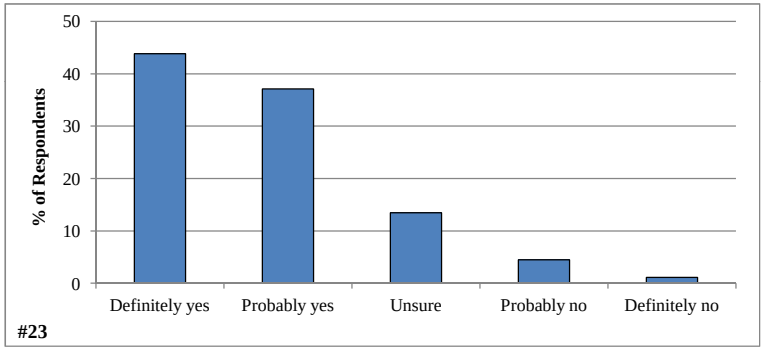
#22 During open water season how often does aquatic plant growth, including algae, negatively impact your enjoyment of Kentuck Lake?

	Total	%
Never	1	*1.1*
Rarely	4	*4.5*
Sometimes	27	*30.7*
Often	41	*46.6*
Always	15	*17.0*
	88	*100.0*



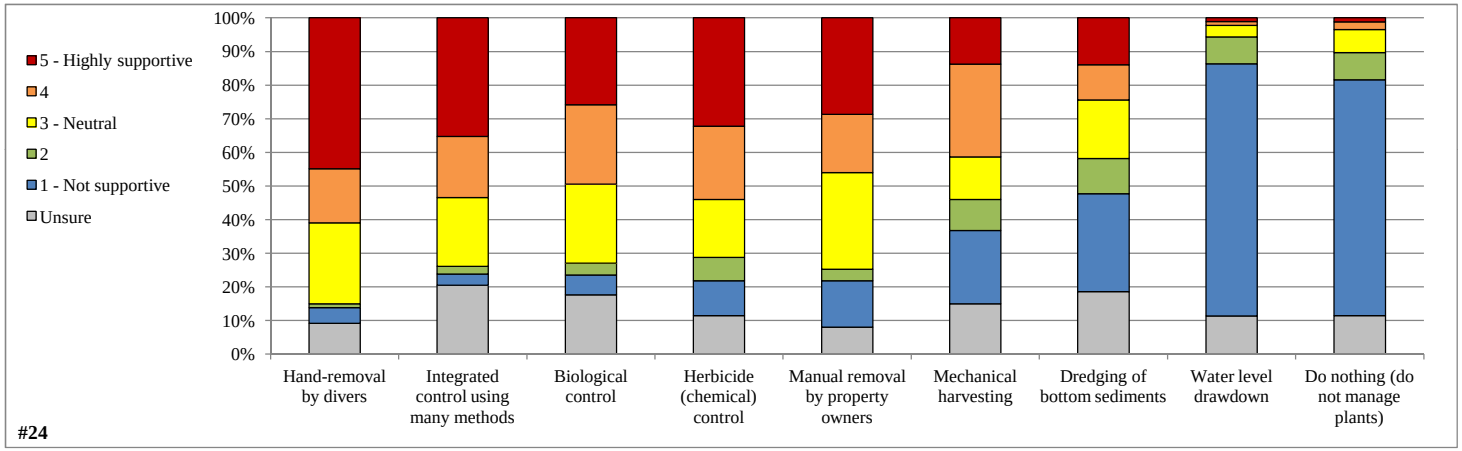
#23 Considering your answer to the question #22, do you believe aquatic plant control is needed on Kentuck Lake?

	Total	%
Definitely yes	39	*43.8*
Probably yes	33	*37.1*
Unsure	12	*13.5*
Probably no	4	*4.5*
Definitely no	1	*1.1*
	89	*100.0*



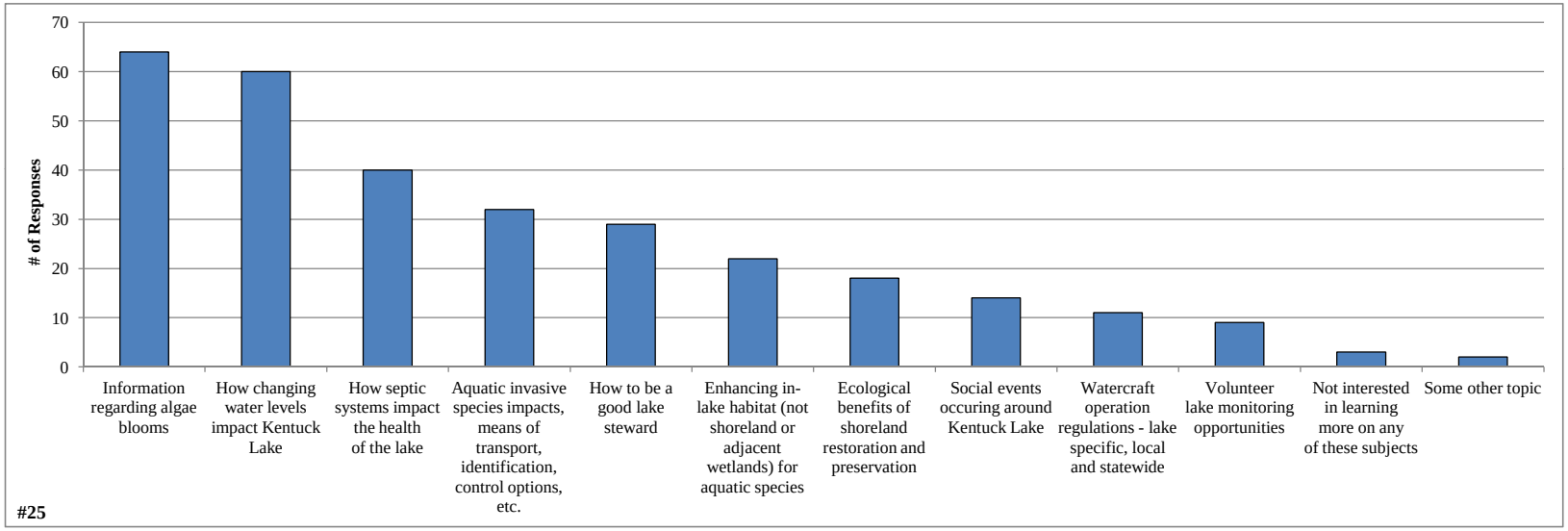
#24 Aquatic plants can be professionally managed using many techniques. What is your level of support for the responsible use of the following techniques on Kentuck Lake?

	1 - Not supportive	2	3 - Neutral	4	5 - Highly supportive	Unsure	Total	Average
Hand-removal by divers	4	1	21	14	39	8	*79*	*4.1*
Integrated control using many methods	3	2	18	16	31	18	*70*	*4.0*
Biological control	5	3	20	20	22	15	*70*	*3.7*
Herbicide (chemical) control	9	6	15	19	28	10	*77*	*3.7*
Manual removal by property owners	12	3	25	15	25	7	*80*	*3.5*
Mechanical harvesting	19	8	11	24	12	13	*74*	*3.0*
Dredging of bottom sediments	25	9	15	9	12	16	*70*	*2.6*
Water level drawdown	66	7	3	1	1	10	*78*	*1.3*
Do nothing (do not manage plants)	61	7	6	2	1	10	*77*	*1.4*



#25 Which of these subjects would you like to learn more about?

	Total
Information regarding algae blooms	64
How changing water levels impact Kentuck Lake	60
How septic systems impact the health of the lake	40
Aquatic invasive species impacts, means of transport, identification, control options, etc.	32
How to be a good lake steward	29
Enhancing in-lake habitat (not shoreland or adjacent wetlands) for aquatic species	22
Ecological benefits of shoreland restoration and preservation	18
Social events occuring around Kentuck Lake	14
Watercraft operation regulations - lake specific, local and statewide	11
Volunteer lake monitoring opportunities	9
Not interested in learning more on any of these subjects	3
Some other topic	2



KENTUCK LAKE PROTECTION & REHABILITATION DISTRICT (KLPRD)

#26 Before receiving this mailing, have you ever heard of the Kentuck Lake Protection and Rehabilitation District?

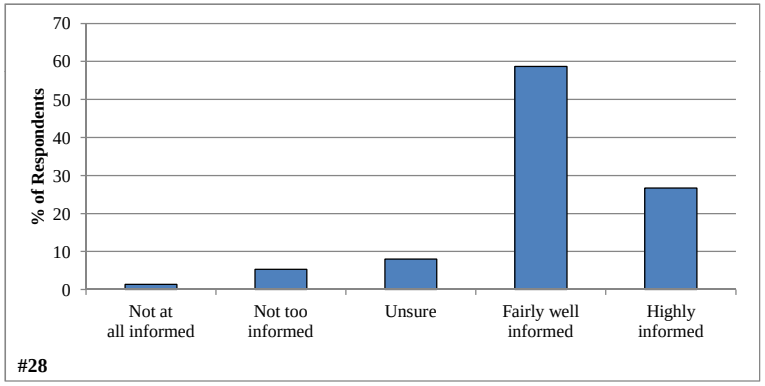
	Total	%
Yes	80	*92.0*
No	7	*8.0*
	87	*100.0*

#27 What is your membership status with the Kentuck Lake Protection and Rehabilitation District?

	Total	%
Current member	64	*83.1*
Former member	0	*0.0*
Never been a member	13	*16.9*
	77	*100.0*

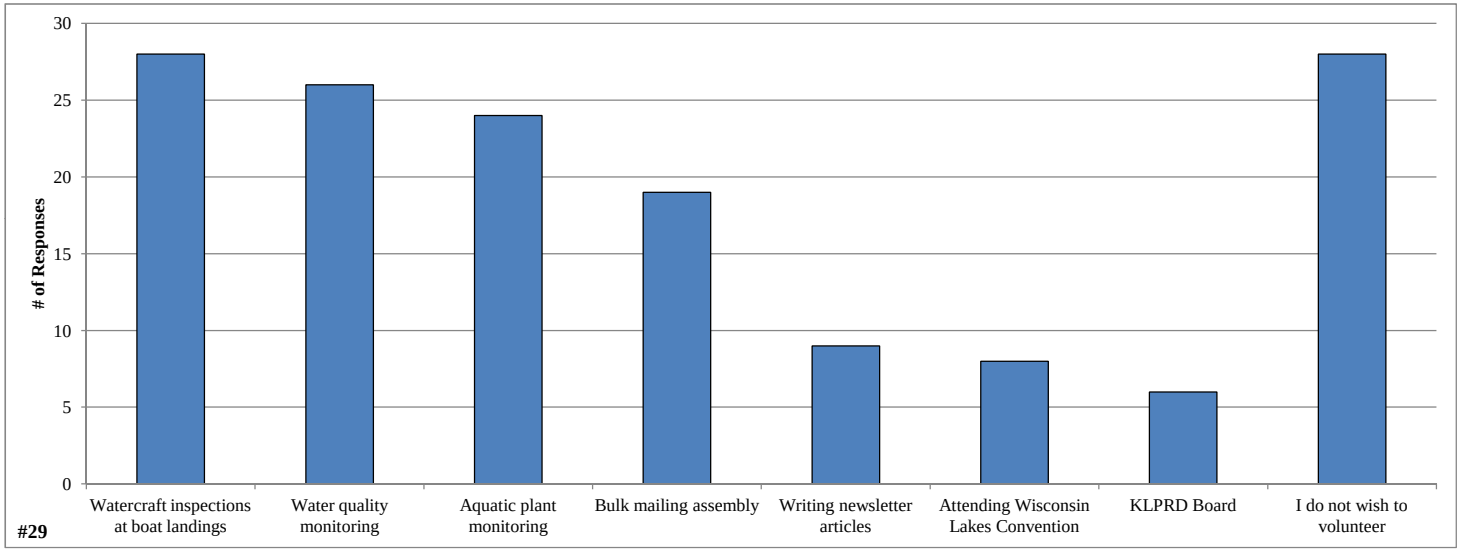
#28 How informed has the Kentuck Lake Protection and Rehabilitation District kept you regarding issues with the lake and its management?

	Total	%
Not at all informed	1	*1.3*
Not too informed	4	*5.3*
Unsure	6	*8.0*
Fairly well informed	44	*58.7*
Highly informed	20	*26.7*
	75	*100.0*



#29 Please circle the activities you would be willing to participate in if the Kentuck Lake Protection and Rehabilitation District requires additional assistance.

	Total
Watercraft inspections at boat landings	28
Water quality monitoring	26
Aquatic plant monitoring	24
Bulk mailing assembly	19
Writing newsletter articles	9
Attending Wisconsin Lakes Convention	8
KLPRD Board	6
I do not wish to volunteer	28



KENTUCK LAKE STAKEHOLDER SURVEY

Individual Question Comments

QUESTION 5

How often is the septic system on your property pumped?

#58 – My septic is taken care of every 2 years. Vilas county does not need to keep track of me.

QUESTION 9

What species of fish do you like to catch on Kentuck Lake?

#10 – Added after muskellunge – Do I Wish!

#20 – Lake Trout added.

#21 – Rock Bass added.

QUESTION 10

How would you describe current quality of fishing?

#42 – Very poor for walleye, balance good for other added.

#72 – Except walleye which is much worse.

QUESTION 13

Rank 3 activities that are important for owning your property.

#20 – Living there added.

#24 – Scuba added.

#41 – Too much algae listed as a problem for swimming.

QUESTION 19

What aquatic invasive species do you believe are in Kentuck Lake?

#18 – Rock Bass added.

#31 – Cyanobacteria added.

#49 – Probably others added.

#64 – Algae added.

QUESTION 20

What level do you believe listed factors negatively impact Kentuck Lake?

#2 – Indian Spearing was added and rated as great negative impact.

#6 – Lower water level was added and rated as 4, between moderate and great.

#13 – Fireworks at late hours added.

#20 – Spear fishing by native Americans added.

#21 – Campground on lake added.

#30 – Spearing added.

#33 – Low water level added.

#34 – Spearing added.

#41 – Check every septic system on Kentuck added.

#50 – Fishing tournaments on our lake and duck hunting added.

#52 – Too much walleye spearing by the native Americans added.

#58 – Over-managed added.

#60 – Spear fishing by native Americans added.

#64 – Way over-fished added.

#65 – Spearing and shocking/netting by Indians.

#78 – Low water level added.

#79 – Lawn fertilizer, fish kills in spring added.

#88 – Excessive fishing pressure by the Indians when they are allowed to spear.

QUESTION 21

Rank top 3 concerns regarding Kentuck Lake.

#2 – Indian spearing and Fertilizer added.

#6 – Low water level added.

#30 – Spearing added.

#33 – Low water level added.

#34 – Spear fishing added.

#76 – Low water level added.

#79 – Lawn fertilizer, fish kills in spring added.

QUESTION 22

During open water season, how often does aquatic plant growth impact your enjoyment of Kentuck Lake?

#60 – Have not felt safe swimming last few years added.

QUESTION 23

Do you believe aquatic plant control is needed on Kentuck Lake?

#1 – Unsure, with the exception of Eurasian Milfoil.

QUESTION 24

What is your level of support for responsible use of techniques to control problems on Kentuck Lake?

#8 – We have gone from normal plant growth, to no plants (rusty crayfish), to normal plant growth. Plants are cover for fry. Invasive species is not normal plant growth.

#58 – Water level already too low due to natural dam being destroyed by forest service.

#88 – It seems like the water level is going down each year – why is that?

QUESTION 25

Education is important. Which subjects would you like to learn more about?

#49 – It's not that I'm not interested, I am, but people hurt lakes.

#64 – Adding more fish cribs.

QUESTION 29

Activities you would be willing to participate in if help is needed.

#30 – I do not have time to volunteer added as choice.

Question #30 – General Comments Concerning Kentuck Lake

#1 – Since the day users of the lake are likely responsible for the introduction of invasive species (including Eurasian water milfoil), I believe it is reasonable to have them share in the costs of controlling these species now that they have been introduced into the lake. The boat ramp on the west side of the lake is always busy on weekends and currently does not charge a launch fee. I understand it may be difficult to get approval to add a fee that can be used to offset the cost currently covered by property owners (and DNR), but I believe it's worth the effort. Prior to the road being paved on that side of the lake, I believe there were less day users on the lake and most used the ramp at the public camp ground that does charge a daily user fee. Day users have a right to use the lake, but have no incentive to protect the quality and value of our lake. At a minimum, we should try to find a way that they share in the cost of maintaining its quality. The damage likely caused by these day users has not only lead to increased annual fees for property owners, but is also having a significant impact on our ability to enjoy the substantial investment we have in our property as well as the value of their investment.

#3 – Since owning in 1994, we have watched the lake water quality deteriorate greatly over the past 4 – 5 years with algae blooms. I can only speculate that one or more lake property septic systems are to blame, and new owners clear cutting to the water instead of keeping a natural barrier.

I also have witnessed the rise, fall and rise again of pan fishing due to walleye stocking. A few years ago bluegill /perch fishing was destroyed by the walleye and excessive over fishing during the ice fishing season. Very happy the pan fishing is on the rise again. Keep walleye stocking out of Kentuck Lake.

#4 – Other than management of invasive species, leave the lake alone. Many of the issues are cyclical and will correct themselves. It's a terrific, healthy lake.

#6 – Several years ago the DNR removed a dam that had been in place for decades. They stated that it was to restore outlet to a trout stream. That outlet has since I have come here been completely dry in mid June to very early July. I have never seen more than a few inches of water going down that outlet. It is in no way a navigable waterway. I also believe that the lower water level has affected he water quality, weed growth, and algae bloom as well as number of waterfowl.

#7 – Kentuck Lake has changed dramatically since we first came to the lake. A spillway at the entrance to Kentuck Creek would help to maintain a specific lake level. A committee should be started to address this possibility with the corp of engineers.

#8 – Bought on Kentuck 1974. Lots of healthy perch, bass, and walleye – no musky. Many years pass, one summer a plane flew over Kentuck, dropped water into lake (seen by wife and kids). Not long after (years) we have musky and less perch, bass, and walleye. DNR and

Indians say they never stocked lake with musky. Indians have stocked males and/or females and left them (walleyes). Somebody removed "small fish" for feeding elsewhere – DNR? If the Indians spear, they should stock walleye fry. I would donate money to stock walleye. I do not believe the musky presence has done anything to enhance my life at Kentuck. Best thing DNR ever did, one of the best actually was dynamite the dam by the stream source at the north end – which had caused shoreline erosion be raising the water level. Thanks for the opportunity.

#10 – My husband and I have made Kentuck Lake our permanent home since June, 2006. I have owned my property here since 1983 but have spent most summer vacations here since 1973. When I spent my first vacation here at my Uncle's cabin (built in 1971) I fell in love with the peaceful surroundings, serenity, wildlife, crystal clear water and star-filled skies. We built our retirement home here for those reasons and it is so sad to see that many of the reasons we love it here are all too quickly disappearing. For the past 3 summers our beautiful lake has been a stinky, bubbling mass of green sludge not fit for swimming, fishing or kayaking. Fishing has declined the loons left this year because they can't see below the surface to fish. The increase in jet skis and the noise and carelessness that accompany most of them should be banned or restricted. On most summer nights it is almost impossible to see the stars due to all the bright lights lining the shore. One of my bigger concerns is the drastic changes to our water quality! Are septics outdated/ failing/ leaking? Are people using phosphorous containing products which can leach into the lake? Can we do some shore land restoration to prevent run-off? Thanks!

Also, there is a home in the South End who party's almost every summer weekend, much drinking, very loud music and talking, fireworks and when repeatedly asked to stop (after 10PM) only escalates. People need to be considerate of their neighbors and friends as a few are ruining the peace for many. The lack of willingness of many people to volunteer for Clean Boats Clean Waters leaves much of the protection of the lake from invasive species up to few people!

#11 – Better of method of warnings on lake conditions than posting at boat launches.

#12 – As an infrequent visitor, I am unable to volunteer.

#13 – Kentuck Lake as we experienced summer of 2013 is/was a mess when we cannot use the lake due to algae bloom. There is a problem. Will we be able to locate/determine the problem and deal with it? Thanks for your efforts.

#16 – My property is a vacation home. Unfortunately my ability to be enjoying this cabin has been curtailed due to gas prices and more commitment with a side business. If not for those two major factors, I would volunteer. I am wondering why we are not using more e-mail transport in newsletters and other mailings to communicate with members. Most lake owners have one published in the directory.

#18 – Water level being very low because of outlet and lack of moisture to replenish lake. Walleye numbers are way down and muskie numbers too high.

#19 – Probably the most significant health issue for the lake and any users (people or domestic animals) is the highly toxic algae bloom. To find the source of the problem would be highly beneficial and would probably impact answers to prior questions. I feel our board is doing an excellent job. Given the high spearing volume it does not make sense to me to expend funds (ours or others) to restock walleyes. Kentuck was at one time the highest walleye density (per acre) fishery in the state. After years of native American harvesting and extreme angling pressure, Kentuck is in sad shape as a walleye destination. The walleyes are not naturally reproducing. Let nature take its course in terms of the fishery development.

#20 – After a little reading about the lake history, it seems that is has always been a rather "dirty" lake; but I believe the present share owners have an individual and collective responsibility to keep it as healthy as possible under the current high pressure it receives by many landowners. I have grass, but DO NOT fertilize it but I must say I leave the clippings in place. I have a steep lakeshore under

many hemlocks; the runoff I try to deviate and minimize. We have not paved a square foot of land beyond the buildings. I worry about the potential of back-land development and its future impact on the lake. When we came here many years ago there was not "management" but "management" is necessary where there is a crowd – "fish-on". We thank you for your services.

#22 – We need to stock walleye in the lake and limit fishing numbers from the camp ground. I would like to see the lake level increased by several inches.

#24 – Many lake members are active and dedicated to monitoring and enhancing the lake. Unfortunately, too many show little or no interest. As an example, irrespective of all the info available regarding EWM, our infestations took root in front of members' properties and piers. Boats passed through well developed infestations of EWM and either did not care or were too intent on other activities to take notice and report. Kentuck is too big for a few to do the heavy lifting. Having frequented Kentuck for many years (60+) the current frequency of algae blooms and weed growth is troublesome and points out a trajectory none of us will be happy with. We cannot depend on continued grant monies from the DNR to fund remedial efforts. I believe the current conditions are controllable, but if allowed to gain a foothold could exceed our financial and technical abilities to deal with them.

#25 – I would like to see 2 specific things occur: 1. Inspection of all septic systems to see that there is no seepage from any systems into the lake. 2. Additional effort to set a higher lake level and keep it at that level. Look at the water marks on boulders or stones around the lake – their marks show what the level used to be. The DNR has mismanaged the law as to the lake level.

#27 – I am very disturbed about the changes in the water quality of Kentuck Lake. The blue/green algae growth makes it impossible to enjoy the water. The green cast to the water "turns off" my visitors. I am very glad that you are conducting this survey. Hopefully, we will see some positive changes in Kentuck Lake in the future.

#31 – I have been a property owner on the lake since 1999. At the time of purchase the water was clear and visibility far better than it is at the present time. While I realize that AIS is a serious problem, it has not prevented us from using the lake and we are dealing with Milfoil at this time.

A far greater concern for the health of residents and visitors is the problem of Algae blooms and specifically Cyanobacteria. Over the last three years we have had blooms every summer and they have gotten more severe each year and lasted longer each year. This past summer we were only able to swim for about 2 weeks in June due to the algae scum. Visibility in the lake went from 15 ft down to 2 ft and stayed that way for most of the summer. The green color of the water lasted from June through September. Historically, we first noticed this problem shortly after the DNR and Forest Service made the opening from the lake larger than it has ever been, around 2008. The lake level fell dramatically and has never recovered. A professor at UW has stated that when the water level drops, algae can become more concentrated. The blooms have occurred in both a very warm summer and a cooler one. It has lasted through 80 degree water temperature down to 60 degree water temp, so I am not convinced this is a natural occurrence caused by weather, water temperature or turnover. In the spring of 2013 we experienced an unusual pan fish kill, loons left our lake in July and fishing has been poor, probably due to lack of visibility. Our once flourishing weeds are gone and it seems to us that our lake is in serious trouble.

I feel a number of steps need to be taken. We need to know if there are too many nutrients in the lake feeding the algae and where they are coming from. We need to test septic systems (especially the older ones) beyond the mandatory testing which does not test for leakage. The absence of plant life indicates an imbalance in the lake. Why is this happening so fast since 2008, and what can we do about it? I would suggest that the lake study be expanded to deal with the algae problem and stakeholders be informed of what can be done to correct the problem.

#32 – Algae concerns in summer. Fishing seems to have become softer for musky and walleye. Overabundance of small pan fish. Mandatory septic system inspection required. Support 48” musky length limit.

#33 – We understand that the water levels have been very low in the north, but even with the rain we have received our quality of use has not improved.

#36 – The algae blooms seem to be more frequent and longer in duration most recently. This is a major health concern for residents and animals. Water level stability is also an important issue.

#37 – If we lived on Kentuck Lake full time, we would be greatly involved. But we are there 100 days or so each year. I really love Kentuck Lake, but feel I really can’t do much because of my part time residence.

#38 – I did the water quality monitoring for 12 years, but I would be willing to help out if needed.

#44 – Used to catch crappies of good size. Lake is over fished. People seem to keep every "little fish" – SAD! One lady and husband had pails full of small fish in front of me: Ice fishing they were taking home to freeze and use as fertilizer for spring garden. Very sad! Don't know if that is typical, but how do you change that. Wife and I still working full time. Would help when can.

#45 – Reporting a septic problem on lake @ residence Robert Sheder, 16860 Shady Lane. Chain O Lakes Septic pumped out in August and condemned metal tank completely full of holes and leaking sewage into lake. Please check out for myself and neighbors are very concerned. Thank you.

#47 – Blue-green algae is a major problem.

#48 – We would like to see personal watercraft (jet skis) hours limited: 10:00AM to 4:00PM is plenty of time for them to disturb the fishermen and those of us that don't enjoy the sensory assault. This should also include water skiing, tubing, etc.

#49 – I live near the lake. I like fishing and the loons. I avoid high summer months because the water skis and the jet skis are OBNOXIOUS! I think they should be limited to a very few lakes. I think there should be a lot of regulation regarding shoreline properties as to vegetation and septic systems and fertilizer. There should be a speed limit. Those fast boats are dangerous to other boats and wildlife and make waves that damage the shore. It's a lake in a forest. If people want noise and fast boats go somewhere else. There should be significant fines or something for people violating rules. That would help pay for enforcement like speeding tickets, unsafe boating, unsafe shoreline practices, etc. wildlife harassment etc.

#50 – My family has had a presence on Kentuck Lake since the 1950's. We love the lake and want it to remain the asset it has become for us. We have grave concerns about fishing tournaments that use our lake and don't contribute to its restocking and protection. We heard from a local guide how a group from Southern Wisconsin took many muskies and how inexperienced fishers left undersize muskies to die while waiting for official measurements. If this is true, the lake association needs to address this with the DNR and Eagle River Chamber of Commerce. Fishermen also need to be more courteous to others enjoying the lakefront. Numerous times a boat has come right up to our dock while we were sitting, and when asked politely to provide distance, the fishermen have been very rude. Hunting along the shore needs to be better regulated. Numerous hunters and fishermen trespass on our property throughout the year. Ice fishermen are particularly pesty and their fresh cud etc. is found on our property.

#52 – In the last 25 years fishing quality has greatly decreased and our water level is far too low!

#53 – We do enjoy the lake with the grandchildren.

#56 – We are concerned about personal health issues because of blue-green algae in the lake. We would like to be informed through e-mail about all concerns regarding lake usage/safety when they occur. Postings at the boat launches do not inform the majority of lake residents throughout the year. We would also like information about what types of vegetation would be best for shore land protection. Could e-mail be used when possible to send information to lake property owners rather than having to mail items?

#57 – It will take many to help Kentuck to revive its past glory. Blue-green algae very concerning. Need more information and better communication of danger to children and pets. Please monitor old septic systems. Leaking systems are a danger to all.

#58 – This lake has been studied, surveyed and managed by multiple groups at multiple times since 1991 when I purchased land. When will the "study" stop and concerns be arrived at that are actionable and relatable to us all? Maybe the problem is too much studying. As a landowner, I only want to know what is good and what is harmful to the lake so I (we) can do what we need to do to protect our asset, our property on our lake. Nobody on the lake bought property to ruin anything. I don't appreciate being told I may be the source of evil because I and others do not. Get over it!

#59 – Walleye population almost non-existant. Boat numbers too high for August musky fishing tournament. Algae bloom is a big concern, preventing lake use this year. I support catch and release only for musky fishing. Stop spear fishing from desimating our fish populations. These are my major concerns. Thank you for all your hard work!

#60 – Until a few years ago, Kentuck Lake was a beautiful, pristine lake. Great for swimming, boating, fishing, etc. Our enjoyment of our home on Kentuck Lake has been greatly reduced. We no longer can have family and friends here to swim or boat as it is no longer safe for them to do. I can't imagine what could have happened to create such a change so suddenly to our beautiful lake. I find it very frustrating that no one can pinpoint how this happened and where the source of the blue-green algae is in Kentuck.

#63 – It's not enjoyable when there are fishing tournaments and you wake up to 40+ boats pounding the lake on a weekend. Algae blooms seem more prevalent in 2012 and 2013. It's no fun when 3 – 4 weeks of the short summer the lake turns to pea soup.

#64 – Way over fished for muskies. Large algae bloom. Southern half is all weeds. Would be nice to clean it up and/or add more cribs to give fish structure.

#65 – Keep DNR management and Indian fisheries away from Kentuck. It was much better they started fooling around. We used to have brook trout and cisco in the lake. Where are they now?

#69 – Converting the north woods into residential Appleton, Milwaukee, Chicago, or any other metropolitan area is not desirable. Our first contact with Kentuck Lake was in the summer of

1986. Between 1986 and 1996 we had periodic annual time on Kentuck on fishing trips and vacations. We bought our property in fall of 1996 and moved up full time in February 2000. During this time, there were sporadic algae blooms. Beginning in 2011, the algae bloom has been occurring annually and with increasing duration. Something has happened in the last 3 to 5 years to change this. I know of no major watershed change that would cause this. We believe it is probably the result of new and upgraded cottages and homes using grandfathered septic systems that are not designed for the greater load. Reed bed destruction by new owners to open up their waterfront. This has been substantial on the west and northwest shore. I think that anyone engaging in catch and release fishing should be using barbless hooks. Otherwise, there is too much damage done to the released fish, especially bass. There are a few boats on the lake that are obnoxiously loud. Between these and the personal watercraft (jet skis), the character of the lake is being changed from a peaceful, northwoods retreat to a place where intrusion into the general tranquility of the lake in the pursuit of personal pleasure is acceptable. One of the pleasures of the northwoods is the spectacular night sky uninhibited by artificial lighting. Dock lights, decorative lights and security lights have greatly impacted this.

#71 – Kentuck is an awesome lake. It would be nice to find out and fix its' problem.

#72 – We have lived on this lake for 7 years. The first 4 years were wonderful with regards to water quality. The next 3 years the water quality has gone down. This year our dogs, grandchildren, guests, and we were NOT able to go swimming or play in the water. I miss having a lake we can use on a daily basis. Please help us figure this out.

#74 – Do not publish Lakes (Kentuck) after Musky Tournaments – just invites more pressure and boat traffic. Use zones or lake families instead of names.

#74 – Find something to do about blue-green algae ASAP. Never ever EVER use chemical herbicides!!!! If you do, you will hear from me and you won't stop hearing from me until you vow to NEVER use chemicals in our beautiful lake! The intention of their use is understandable; along with their effectiveness. But I don't want chemicals in my lake and I am speaking on behalf of my family and friends who enjoy the serenity of this lake. A lake is a living thing not to be poisoned by humans for ANY reason. What is the purpose of the dam? Do we really need to control lake levels because we are greedy fishermen and property owners? Is our greed really worth the disruption of a stream – Kentuck Creek is like an artery? The water is like blood. Clog the artery and the system is unhealthy.

#76 – I'm concerned that the lake level is low and water still flows out by campgrounds. Used to be that once the lake hits a certain level water wouldn't flow out any more, but that doesn't seem the case any more.

#79 – We have owned our property since 2000. The water quality was wonderful for the first several years and the depth was fairly consistent from year to year. Ever since the dam washed away that now allows the lake to empty into the marsh and the water quality and depth have

deteriorated. It seems like the shallower water allows the algae to grow quickly and easily. It is surprising that the DNR is content to have everyone deal with the poor water quality when it would be very simple to re-build the dam and see if that improves the quality in a couple years. It could always be removed again if that does not appear to have an impact. Also, we have not been able to put our boat on/off of our lift for about 3 years unless we get in the water and push/pull it on/off because the water is so shallow. This was not a problem in the past.

#80 – Diversion of runoff should be investigated at both boat landings. All septic systems at Kentuck Lake should be tested NOW! Water level has been an issue for many years on Kentuck (i.e. outlet dams). This issue should be revisited, an increased height may be beneficial.

#84 – Discourage the planting of walleye and musky by DNR. They desimated the native fish population. Prohibit power launching/retrieving of boats at the west shore boat ramp. They have created a crater in the lake bottom that's over my head. The aluminum dock provided there is tipping sideways into it.

#88 – We love Kentuck Lake and are very concerned about the water levels over the last few years. What can be done to bring up the levels?

C

APPENDIX C

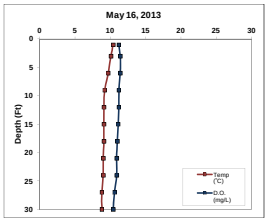
Water Quality Data

Kentuck Lake

Date: 5/16/2013
Time: 13:10
Weather: Clear, 68F, Breezy
Entry: EEC

Max Depth: 33.0
KLS Depth (ft): 3.0
KLB Depth (ft): 30.0
Secchi Depth (ft): 6.6

Depth (ft)	Temp (˚C)	D.O. (mg/L)	pH	Sp. Cond. (µS/cm)
1	10.4	11.2	7.6	68.0
3	10.1	11.4	7.7	68.0
6	9.7	11.4	7.7	69.0
9	9.2	11.2	7.7	69.0
12	9.1	11.2	7.6	68.0
15	9.1	11.1	7.6	68.0
18	9.1	11.0	7.6	68.0
21	9.0	10.9	7.5	68.0
24	9.0	10.9	7.5	68.0
27	8.8	10.6	7.4	69.0
30	8.8	10.4	7.4	68.0



Parameter	KLS	KLB
Total P (µg/L)	29.00	26.90
Dissolved P (µg/L)	ND	ND
Chl-a (µg/L)	8.21	NA
TKN (µg/L)	667.00	534.00
NO_3 + NO_2-N (µg/L)	30.40	41.10
NH_3-N (µg/L)	ND	18.30
Total N (µg/L)	697.40	593.40
Lab Cond. (µS/cm)	72.40	72.40
Lab pH	7.58	7.49
Alkalinity (mg/L CaCO3)	34.20	33.90
Total Susp. Solids (mg/L	2.40	2.20
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	NA	NA
Turbidity (NTU)	NA	NA

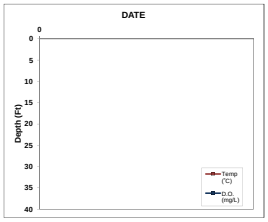
Data collected by TAH (Onterra)

Kentuck Lake

Date: 6/17/2013
Time:
Weather:
Entry: EEH

Max Depth:
KLS Depth (ft):
KLB Depth (ft):
Secchi Depth (ft): 8.5

Depth (ft)	Temp (˚C)	D.O. (mg/L)	pH	Sp. Cond. (µS/cm)



Parameter	KLS	KLB
Total P (µg/L)	NA	NA
Dissolved P (µg/L)	NA	NA
Chl-a (µg/L)	9.65	NA
TKN (µg/L)	652.00	NA
NO_3 + NO_2-N (µg/L)	ND	NA
NH_3-N (µg/L)	ND	NA
Total N (µg/L)	652.00	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkalinity (mg/L CaCO3)	NA	NA
Total Susp. Solids (mg/L	NA	NA
Calcium (mg/L)	6.65	NA
Magnesium (mg/L)	3.46	NA
Hardness (mg/L)	NA	NA
Color (SU)	NA	NA
Turbidity (NTU)	NA	NA

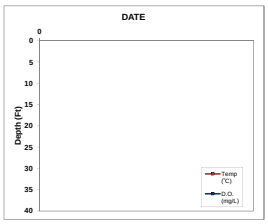
Sample collected by Candy Purdy

Kentuck Lake

Date: 7/25/2013
Time:
Weather:
Entry: EEH

Max Depth:
KLS Depth (ft):
KLB Depth (ft):
Secchi Depth (ft):

Depth (ft)	Temp (˚C)	D.O. (mg/L)	pH	Sp. Cond. (µS/cm)



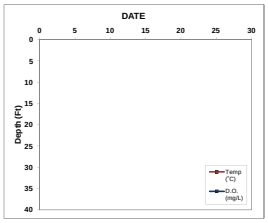
Parameter	KLS	KLB
Total P (µg/L)	73.90	NA
Dissolved P (µg/L)	NA	NA
Chl-a (µg/L)	56.10	NA
TKN (µg/L)	1420.00	NA
$NO_2 + NO_3$-N (µg/L)	ND	NA
NH_3-N (µg/L)	181.00	NA
Total N (µg/L)	1601.00	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkalinity (mg/L $CaCO_3$)	NA	NA
Total Susp. Solids (mg/L)	NA	NA
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	NA	NA
Turbidity (NTU)	NA	NA

Kentuck Lake

Date: 8/26/2013
Time:
Weather:
Entry: EEH

Max Depth:
KLS Depth (ft):
KLB Depth (ft):
Secchi Depth (ft):

Depth (ft)	Temp (˚C)	D.O. (mg/L)	pH	Sp. Cond. (µS/cm)



Parameter	KLS	KLB
Total P (µg/L)	NA	NA
Dissolved P (µg/L)	NA	NA
Chl-a (µg/L)	NA	NA
TKN (µg/L)	1000.00	NA
$NO_2 + NO_3$-N (µg/L)	ND	NA
NH_3-N (µg/L)	42.90	NA
Total N (µg/L)	1042.90	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

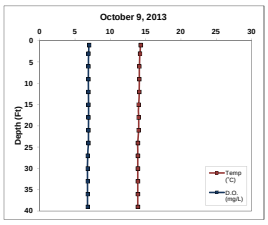
Sample collected by Candy Purdy

Kentuck Lake

Date: 10/9/2013
Time: 9:30
Weather: Clear, 25% clouds, windy, 62F
Entry: EEH

Max Depth: 40.8
KLS Depth (ft): 3.0
KLB Depth (ft): 38.0
Secchi Depth (ft): 9.8

Depth (ft)	Temp (˚C)	D.O. (mg/L)	pH	Sp. Cond. (µS/cm)
1	14.3	7.0		
3	14.2	6.9		
6	14.1	6.9		
9	14.1	6.9		
12	14.1	6.9		
15	14.0	6.9		
18	14.0	6.9		
21	14.0	6.9		
24	13.9	6.9		
27	13.9	6.8		
30	13.9	6.8		
33	13.9	6.8		
36	13.9	6.8		
39	13.9	6.8		



Parameter	KLS	KLB
Total P (µg/L)	36.80	34.00
Dissolved P (µg/L)	NA	NA
Chl-a (µg/L)	10.40	NA
TKN (µg/L)	669.00	NA
NO_3 + NO_2-N (µg/L)	104.00	NA
NH_3-N (µg/L)	21.50	NA
Total N (µg/L)	700.90	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkalinity (mg/L $CaCO_3$)	NA	NA
Total Susp. Solids (mg/L)	2.40	2.40
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	NA	NA
Turbidity (NTU)	NA	NA

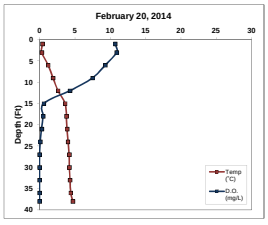
Data collected by TWH and TAH (Onterra)

Kentuck Lake

Date: 2/20/2014
Time: 9:00
Weather: 20F, 100% clouds, light breeze
Entry: EEH

Max Depth: 39.6
KLS Depth (ft): 3.0
KLB Depth (ft): 37.0
Secchi Depth (ft): 11.9

Depth (ft)	Temp (˚C)	D.O. (mg/L)	pH	Sp. Cond. (µS/cm)
1	0.4	10.7		
3	0.3	10.9		
6	1.2	9.3		
9	1.9	7.5		
12	2.6	4.3		
15	3.6	0.6		
18	3.8	0.5		
21	3.9	0.3		
24	4.0	0.1		
27	4.2	0.0		
30	4.2	0.0		
33	4.3	0.0		
36	4.4	0.0		
38	4.7	0.0		



Parameter	KLS	KLB
Total P (µg/L)	NA	NA
Dissolved P (µg/L)	NA	NA
Chl-a (µg/L)	NA	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 DAC and TWH (Onterra). Ice thickness: 1.9 feet

Water Quality Data

2013	Surface		Bottom	
Parameter	Count	Mean	Count	Mean
Secchi Depth (feet)	4	9.2	NA	NA
Total P (µg/L)	3	46.2	2	30.5
Dissolved P (µg/L)	1	ND	1	ND
Chl a (µg/L)	4	21.1	0	NA
TKN (µg/L	5	881.6	1	534.0
NO3+NO2-N (µg/L)	5	67.2	1	41.1
NH3-N (µg/L)	5	81.8	1	18.3
Total N (µg/L)	5	938.8	1	593.4
Lab Cond. (µS/cm)	1	72.4	1	72.4
Lab pH	1	7.6	1	7.5
Alkal (mg/l CaCO3)	1	34.2	1	33.9
Total Susp. Solids (mg/l)	2	2.4	2	2.3
Calcium (µg/L)	1	6.7	0	NA
Magnesium (mg/L)	1	3.5	0	NA
Hardness (mg/L)	0	NA	0	NA
Color (SU)	0	NA	0	NA
Turbidity (NTU)	0	NA	0	NA

Morphological / Geographical Data

Parameter	Value
Acreage	
Volume (acre-feet)	
Perimeter (miles)	
Shoreland Developmetnt Factor	
Maximum Depth (feet)	
County	
WBIC	
Lillie Mason Region (1983)	NLF Ecoregion Median
Nichols Ecoregion (1999)	NLFL

Watershed Data

WiLMS Class	Acreage	kg/yr	lbs/yr
Forest			0.0
Open Water			0.0
Pasture/Grass			0.0
Row Crops			0.0
Urban - Rural Residential			0.0
Wetland			0.0
Watershed to Lake Area			

Trophic State Index (TSI)

Year	TP	Chl-a	Secchi
1986			61.0
1987			52.8
1988	67.0	74.3	50.1
1989	54.9	60.9	46.2
1990	53.7	55.0	45.0
1991	60.8	70.5	51.8
1992	54.9	62.4	50.5
1993	54.3	59.3	44.9
1994	52.2	57.2	43.6
1995	54.6	57.6	43.2
1996	48.5	50.6	41.3
1997	55.3	58.6	48.6
1998	51.9	56.5	47.2
1999	58.2	56.8	57.8
2000	51.3	50.8	45.7
2001	46.9	49.2	46.6
2002	46.4	50.4	41.5
2003	51.7	52.5	43.2
2004	51.8	53.5	46.0
2005	46.1	52.4	43.9
2006	49.4	50.2	46.3
2007	50.0	53.7	46.7
2008	50.6	49.9	46.7
2009	47.8	50.5	44.9
2010	47.5	53.2	45.2
2011	64.1	73.9	60.2
2012	54.6	59.4	53.0
2013	61.5	70.3	58.2
2014	53.8	58.0	47.5
All Years (Weighted)	53.6	59.3	48.1
Deep, Lowland Drainage Lakes Median	49.4	49.7	46.2
NLF Ecoregion Median	48.1	47.5	45.7

	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
1986	16	3.5	11	3.1								
1987	17	6.0	10	5.4								
1988	15	7.5	9	6.5	2	86.0	2	86.0	2	78.0	2.0	78.0
1989	14	8.7	9	8.5	5	18.0	3	22.0	4	31.0	3.0	33.7
1990	14	9.5	9	9.3	4	10.3	3	12.0	4	34.0	3.0	31.0
1991	14	7.2	10	5.8	3	58.3	3	58.3	3	51.0	3.0	51.0
1992	16	8.5	9	6.3	3	25.5	3	25.5	3	33.7	3.0	33.7
1993	8	9.7	6	9.4	7	16.4	5	18.7	7	30.7	5.0	32.4
1994	11	11.3	7	10.3	8	15.0	7	15.0	8	29.3	7.0	28.0
1995	14	9.7	7	10.5	5	16.8	2	15.7	5	31.8	2.0	33.0
1996	3	12.0	3	12.0	8	9.4	6	7.7	8	24.1	6.0	21.7
1997	5	8.0	3	7.3	8	15.5	6	17.3	9	32.3	6.0	34.7
1998	2	7.0	1	8.0	12	11.9	8	14.0	8	24.5	6.0	27.3
1999	4	4.4	3	3.8	2	14.5	2	14.5	2	42.5	2.0	42.5
2000	7	8.5	3	8.8	12	7.8	10	7.8	5	24.8	3.0	26.3
2001	7	7.9	5	8.3	4	7.3	3	6.7	4	19.3	3.0	19.3
2002	5	11.8	3	11.8	3	7.4	2	7.5	5	19.8	3.0	18.7
2003	6	14.1	2	10.5	4	11.0	3	9.3	6	23.3	3.0	27.0
2004	8	8.4	6	8.7	6	9.4	5	10.4	8	25.5	6.0	27.2
2005	6	10.4	3	10.0	4	11.1	3	9.2	6	18.3	3.0	18.3
2006	6	8.1	4	8.5	4	8.5	3	7.3	4	25.8	3.0	23.0
2007	6	7.8	2	8.3	2	10.6	2	10.6	3	21.3	2.0	24.0
2008	7	7.4	5	8.3	4	11.1	3	7.2	5	25.0	3.0	25.0
2009	10	10.1	6	9.4	5	7.8	4	7.6	8	22.5	5.0	20.6
2010	10	9.1	6	9.2	6	12.4	4	10.0	8	26.1	5.0	20.2
2011	10	4.6	7	3.2	6	71.6	5	82.9	7	63.9	5.0	64.0
2012	**9**	**6.1**	**6**	**5.3**	**6**	**18.4**	**5**	**18.8**	**7**	**31.9**	**5.0**	**33.0**
2013	11	5.3	5	3.7	8	43.0	5	57.3	9	46.0	5.0	53.2
2014	8	7.3	4	7.8	5	18.8	4	16.3	7	29.5	4.0	31.2
All Years (Weighted)		8.1		7.5		17.2		18.7		29.8		30.8
Drainage Lakes Median				8.5				7.0				23.0
NLF Ecoregion Median				8.9				5.6				21.0

TP	
Weighted (1999-2009)	23.4
Weighted (2010-2013)	39.5
Chl-a	
Weighted (1999-2009)	9.1
Weighted (2010-2013)	33.9

July 2013 N:	1601.0
July 2013 P:	73.9

Summer 2012 N:P 22 :1

11.240641

D

APPENDIX D

Watershed Analysis WiLMS Results

Date: 10/15/2015 Scenario: Kentuck Lake Watershed Current

Lake Id: Kentuck_WS_Current

Watershed Id: 0

Hydrologic and Morphometric Data

Tributary Drainage Area: 1756.0 acre
Total Unit Runoff: 14 in.
Annual Runoff Volume: 2048.7 acre-ft
Lake Surface Area <As>: 1008 acre
Lake Volume <V>: 13359 acre-ft
Lake Mean Depth <z>: 13.3 ft
Precipitation - Evaporation: 5.5 in.
Hydraulic Loading: 2510.7 acre-ft/year
Areal Water Load <qs>: 2.5 ft/year
Lake Flushing Rate <p>: 0.19 1/year
Water Residence Time: 5.32 year
Observed spring overturn total phosphorus (SPO): 21.0 mg/m^3
Observed growing season mean phosphorus (GSM): 31.9 mg/m^3
% NPS Change: 0%
% PS Change: 0%

NON-POINT SOURCE DATA

Land Use	Acre	Low	Most Likely	High	Loading %	Low	Most Likely	High
	(ac)	Loading (kg/ha-year)				Loading (kg/year)		
Row Crop AG	0.0	0.50	1.00	3.00	0.0	0	0	0
Mixed AG	0.0	0.30	0.80	1.40	0.0	0	0	0
Pasture/Grass	10	0.10	0.30	0.50	0.6	0	1	2
HD Urban (1/8 Ac)	0.0	1.00	1.50	2.00	0.0	0	0	0
MD Urban (1/4 Ac)	0.0	0.30	0.50	0.80	0.0	0	0	0
Rural Res (>1 Ac)	0.0	0.05	0.10	0.25	0.0	0	0	0
Wetlands	139	0.10	0.10	0.10	2.9	6	6	6
Forest	1607	0.05	0.09	0.18	30.2	33	59	117
Lake Surface	1008.0	0.10	0.30	1.00	63.1	41	122	408

POINT SOURCE DATA

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

SEPTIC TANK DATA

Description		Low	Most Likely	High	Loading %
Septic Tank Output (kg/capita-year)		0.3	0.5	0.8	
# capita-years	125				
% Phosphorus Retained by Soil		98	90	80	
Septic Tank Loading (kg/year)		0.75	6.25	20.00	3.2

TOTALS DATA

Description	Low	Most Likely	High	Loading %
Total Loading (lb)	176.6	427.7	1218.4	100.0
Total Loading (kg)	80.1	194.0	552.6	100.0
Areal Loading (lb/ac-year)	0.18	0.42	1.21	0.0
Areal Loading (mg/m^2-year)	19.63	47.56	135.48	0.0
Total PS Loading (lb)	0.0	0.0	0.0	0.0
Total PS Loading (kg)	0.0	0.0	0.0	0.0
Total NPS Loading (lb)	85.0	144.1	274.9	96.8
Total NPS Loading (kg)	38.5	65.4	124.7	96.8

Phosphorus Prediction and Uncertainty Analysis Module

Date: 10/15/2015 Scenario: Kentuck Lake Watershed Current
Observed spring overturn total phosphorus (SPO): 21.0 mg/m^3
Observed growing season mean phosphorus (GSM): 31.9 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	11	27	77	-5	-16
Canfield-Bachmann, 1981 Natural Lake	9	17	34	-15	-47
Canfield-Bachmann, 1981 Artificial Lake	10	17	31	-15	-47
Rechow, 1979 General	2	4	11	-28	-88
Rechow, 1977 Anoxic	13	31	88	-1	-3
Rechow, 1977 water load<50m/year	3	8	23	-24	-75
Rechow, 1977 water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977 General	9	23	65	2	10
Vollenweider, 1982 Combined OECD	8	17	41	-9	-34
Dillon-Rigler-Kirchner	6	15	42	-6	-29
Vollenweider, 1982 Shallow Lake/Res.	6	14	34	-12	-45
Larsen-Mercier, 1976	8	19	54	-2	-10
Nurnberg, 1984 Oxic	5	13	36	-19	-60

Lake Phosphorus Model	Confidence Lower Bound	Confidence Upper Bound	Parameter Fit?	Back Calculation (kg/year)	Model Type
Walker, 1987 Reservoir	15	59	Tw	0	GSM
Canfield-Bachmann, 1981 Natural Lake	5	49	FIT	1	GSM
Canfield-Bachmann, 1981 Artificial Lake	5	49	FIT	1	GSM
Rechow, 1979 General	2	9	L	0	GSM
Rechow, 1977 Anoxic	17	67	FIT	0	GSM
Rechow, 1977 water load<50m/year	4	18	FIT	0	GSM
Rechow, 1977 water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977 General	11	52	FIT	0	SPO
Vollenweider, 1982 Combined OECD	8	36	FIT	0	ANN
Dillon-Rigler-Kirchner	8	32	L qs p	0	SPO
Vollenweider, 1982 Shallow Lake/Res.	6	29	FIT	0	ANN
Larsen-Mercier, 1976	11	41	P Pin	0	SPO
Nurnberg, 1984 Oxic	6	29	FIT	0	ANN

E

APPENDIX E

Aquatic Plant Survey Data

PointNumber	LATITUDE (Decimal Degrees)	LONGITUDE (Decimal Degrees)	DEPTH	SEDIMENT	POLE_ROPE	COMMENTS	NOTES	NUISANCE	Total Rake Fullness	Myriophyllum spicatum	Ceratophyllum demersum	Elodea canadensis	Najas flexilis	Potamogeton pusillus	Myriophyllum sibiricum	Vallisneria americana	Chara spp.	Elodea nuttallii	Potamogeton illinoensis	Potamogeton praelongus	Potamogeton zosteriformis	Potamogeton gramineus	Potamogeton amplifolius	Heteranthera dubia	Schoenoplectus acutus	Eleocharis palustris	Eleocharis acicularis	Nitella spp.	Potamogeton richardsonii	Sagittaria sp. (rosette)	Isoetes spp.	Juncus pelocarpus	Lemna turionifera	Myriophyllum tenellum	Schoenoplectus pungens	Schoenoplectus subterminalis	Schoenoplectus tabernaemontani	Sparganium sp.
1	45.97841	-89.0164503	2.5	Sand	Pole																																	
2	45.977636	-89.016464	3.5	Rock	Pole				1		1																											
3	45.976862	-89.0164777	3.5	Rock	Pole				1		1		1																									
4	45.976088	-89.0164914	4	Sand	Pole				1				1	1		1													1								
5	45.979174	-89.0153265	6	Rock	Pole				2		2	1		1	1													1								
6	45.978401	-89.0153403	8	Rock	Pole				1			1		1	1																					
7	45.977627	-89.015354	10	Muck	Pole				2		2	1											1														
8	45.976853	-89.0153677	8	Rock	Pole				3		1	1		1	2																					
9	45.976079	-89.0153814	5.5	Rock	Pole				1		1		1																								
10	45.975305	-89.0153951	4	Rock	Pole				1				1																								
11	45.980713	-89.014189	5	Rock	Pole				1		1	1	1																								
12	45.979939	-89.0142027	11.5	Muck	Pole				3		2	1								1																	
13	45.979165	-89.0142165	12	Muck	Pole				3		3									1																	
14	45.978391	-89.0142302	12	Muck	Pole				2		2	1			1																					
15	45.977617	-89.0142439	12	Muck	Pole				2		2			1	1																					
16	45.976843	-89.0142577	12	Muck	Pole				2		2																									
17	45.976069	-89.0142714	12	Muck	Pole				3		3				1					1																	
18	45.975295	-89.0142851	8	Rock	Pole				3		3	1		1	1								1													
19	45.974521	-89.0142989	4	Sand	Pole				1							1																				
20	45.983799	-89.0130239	1.5	Rock	Pole				1																		V									
21	45.983025	-89.0130376	3	Sand	Pole				1																									1		
22	45.982251	-89.0130514	6	Sand	Pole				2		2	1	1				1				1															
23	45.981477	-89.0130651	12.5	Sand	Pole				2		2				1																					
24	45.980703	-89.0130789	14.5	Sand	Pole				2		2																									
25	45.979929	-89.0130927	15.5	Muck	Pole				2		2								1																	
26	45.979155	-89.0131064	14	Muck	Pole				2		2								1																	
27	45.978381	-89.0131202	17	Muck	Pole																															
28	45.977607	-89.0131339	15.5	Muck	Pole				1		1																									
29	45.976834	-89.0131477	14.5	Muck	Pole																															
30	45.97606	-89.0131614	14	Muck	Pole				2		2								1																	
31	45.975286	-89.0131751	12.5	Muck	Pole																															
32	45.974512	-89.0131889	11	Muck	Pole				2		2				1					1	1															
33	45.973738	-89.0132026	6	Rock	Pole				1			1																								
34	45.984563	-89.0119	12	Sand	Pole				1		1																1									
35	45.983789	-89.0119137	13	Sand	Pole																															
36	45.983015	-89.0119275	6	Rock	Pole				1				1																							
37	45.982241	-89.0119413	12	Rock	Pole				1		1	1	1																							
38	45.981467	-89.011955	16	Muck	Pole																															
39	45.980694	-89.0119688	16.5	Muck	Pole				2		2																									
40	45.97992	-89.0119826	17	Muck	Pole																															
41	45.979146	-89.0119963	16	Muck	Pole				2		2																									
42	45.978372	-89.0120101	16.5	Muck	Pole				2		2																									
43	45.977598	-89.0120239	17.5	Muck	Pole				3		3																									
44	45.976824	-89.0120376	17.5	Muck	Pole				2		2																									
45	45.97605	-89.0120514	17.5	Muck	Pole				2		2																									
46	45.975276	-89.0120652	16	Muck	Pole				2		2																									
47	45.974502	-89.0120789	14.5	Muck	Pole				2		2																									
48	45.973728	-89.0120927	12.8	Muck	Pole				2		2																									
49	45.972954	-89.0121064	7	Sand	Pole				3		3	2		1	1					1																
50	45.985327	-89.010776	6	Rock	Pole																															
51	45.984554	-89.0107898	7	Rock	Pole				1		1		1	1																						
52	45.98378	-89.0108036	9	Rock	Pole				1		1	1	1		1																					
53	45.983006	-89.0108174	16	Sand	Pole				3		3																									
54	45.982232	-89.0108311	17.5	Muck	Pole				1		1																									
55	45.981458	-89.0108449	17.5	Muck	Pole				2		2																									
56	45.980684	-89.0108587	17.5	Muck	Pole				2		2																									
57	45.97991	-89.0108725	17.5	Muck	Pole				1		1																									
58	45.979136	-89.0108863	16	Muck	Rope																															
59	45.978362	-89.0109001	15	Muck	Rope				2		2																									
60	45.977588	-89.0109138	16	Muck	Rope																															
61	45.976814	-89.0109276	17.5	Muck	Pole																															

PointNumber	LATITUDE (Decimal Degrees)	LONGITUDE (Decimal Degrees)	DEPTH	SEDIMENT	POLE_ROPE	COMMENTS	NOTES	NUISANCE	Total Rake Fullness	Myriophyllum spicatum	Ceratophyllum demersum	Elodea canadensis	Najas flexilis	Potamogeton pusillus	Myriophyllum sibiricum	Vallisneria americana	Chara spp.	Elodea nuttallii	Potamogeton illinoensis	Potamogeton praelongus	Potamogeton zosteriformis	Potamogeton gramineus	Potamogeton amplifolius	Heteranthera dubia	Schoenoplectus acutus	Eleocharis palustris	Eleocharis acicularis	Nitella spp.	Potamogeton richardsonii	Sagittaria sp. (rosette)	Isoetes spp.	Juncus pelocarpus	Lemna turionifera	Myriophyllum tenellum	Schoenoplectus pungens	Schoenoplectus subterminalis	Schoenoplectus tabernaemontani	Sparganium sp.
62	45.97604	-89.0109414	17.5	Muck	Pole				1		1																											
63	45.975267	-89.0109552	16.5	Muck	Pole				2		2																											
64	45.974493	-89.010969	17.5	Muck	Pole				2		2																											
65	45.973719	-89.0109827	14	Muck	Pole				2		2																											
66	45.972945	-89.0109965	10.5	Sand	Pole				2		2									2																		
67	45.986866	-89.0096382	6.5	Rock	Pole				1			1																										
68	45.986092	-89.009652	12	Sand	Pole				1		1	1																										
69	45.985318	-89.0096658	15	Muck	Pole																																	
70	45.984544	-89.0096796	16	Muck	Pole				1		1																											
71	45.98377	-89.0096934	17.5	Muck	Pole				1		1																											
72	45.982996	-89.0097072	17.5	Muck	Pole				1		1																											
73	45.982222	-89.009721	17.5	Muck	Pole				1		1																											
74	45.981448	-89.0097348	17.5	Muck	Pole																																	
75	45.980674	-89.0097486	16	Muck	Rope				1		1																											
76	45.9799	-89.0097624	16.5	Muck	Rope				1		1																											
77	45.979127	-89.0097762	16	Muck	Rope				2		2																											
78	45.978353	-89.00979	17	Muck	Rope				2		2																											
79	45.977579	-89.0098038	16.5	Muck	Rope				1		1																											
80	45.976805	-89.0098176	16.5	Muck	Rope				2		2																											
81	45.976031	-89.0098314	15.5	Muck	Rope				3		3																											
82	45.975257	-89.0098452	15.5	Muck	Rope				2		2																											
83	45.974483	-89.009859	15	Muck	Rope				2		2																											
84	45.973709	-89.0098728	16.5	Muck	Pole				2		2																											
85	45.972935	-89.0098866	14	Muck	Pole				1		1			1																								
86	45.972161	-89.0099004	6	Rock	Pole				1		1	1			1																							
87	45.971387	-89.0099142	2.5	Rock	Pole				1			1																										
88	45.988404	-89.0085004	1	Rock	Pole																																	
89	45.98763	-89.0085142	10.5	Sand	Pole				1		1	1			1																							
90	45.986856	-89.008528	15	Muck	Pole				2		2																											
91	45.986082	-89.0085418	15	Muck	Pole				3		3																											
92	45.985308	-89.0085556	16	Muck	Pole				1		1			1																								
93	45.984534	-89.0085694	17	Muck	Pole				2		2																											
94	45.98376	-89.0085833	15.5	Muck	Rope																																	
95	45.982986	-89.0085971	15	Muck	Rope				2		2																											
96	45.982213	-89.0086109	17	Muck	Rope				1		1																											
97	45.981439	-89.0086247	17	Muck	Rope				2																													
98	45.980665	-89.0086385	17	Muck	Rope				2		2																											
99	45.979891	-89.0086523	17	Muck	Rope				1		1																											
100	45.979117	-89.0086661	17.5	Muck	Rope				1		1																											
101	45.978343	-89.00868	16	Muck	Rope				1		1																											
102	45.977569	-89.0086938	17.5	Muck	Rope				2		2																											
103	45.976795	-89.0087076	17.5	Muck	Rope																																	
104	45.976021	-89.0087214	15.5	Muck	Rope				1		1																											
105	45.975247	-89.0087352	17.5	Muck	Pole																																	
106	45.974473	-89.008749	17.5	Muck	Pole				2		2																											
107	45.973699	-89.0087628	16.5	Muck	Pole				1		1																											
108	45.972926	-89.0087766	15	Muck	Pole																																	
109	45.972152	-89.0087904	9	Sand	Pole				2		2	1		1																							
110	45.971378	-89.0088042	7	Sand	Pole				1		1	1			V		1				1		2														
111	45.970604	-89.008818	3.5	Sand	Pole				1				1																								
112	45.989168	-89.0073763	2	Rock	Pole				1		1																											
113	45.988394	-89.0073901	11	Sand	Pole				1		1			1	1																							
114	45.98762	-89.0074039	14	Muck	Pole				2		2																											
115	45.986846	-89.0074178	15	Muck	Pole																																	
116	45.986072	-89.0074316	17.5	Muck	Pole																																	
117	45.985299	-89.0074454	17.5	Muck	Pole				2		2																											
118	45.984525	-89.0074593	15	Muck	Rope				2		2																											
119	45.983751	-89.0074731	16	Muck	Rope																																	
120	45.982977	-89.0074869	16	Muck	Rope				1		1																											
121	45.982203	-89.0075008	16	Muck	Rope																																	
122	45.981429	-89.0075146	17	Muck	Rope																																	

PointNumber	LATITUDE (Decimal Degrees)	LONGITUDE (Decimal Degrees)	DEPTH	SEDIMENT	POLE_ROPE	COMMENTS	NOTES	NUISANCE	Total Rake Fullness	Myriophyllum spicatum	Ceratophyllum demersum	Elodea canadensis	Najas flexilis	Potamogeton pusillus	Myriophyllum sibiricum	Vallisneria americana	Chara spp.	Elodea nuttallii	Potamogeton illinoensis	Potamogeton praelongus	Potamogeton zosteriformis	Potamogeton gramineus	Potamogeton amplifolius	Heteranthera dubia	Schoenoplectus acutus	Eleocharis palustris	Eleocharis acicularis	Nitella spp.	Potamogeton richardsonii	Sagittaria sp. (rosette)	Isoetes spp.	Juncus pelocarpus	Lemna turionifera	Myriophyllum tenellum	Schoenoplectus pungens	Schoenoplectus subterminalis	Schoenoplectus tabernaemontani	Sparganium sp.
123	45.980655	-89.0075284	17	Muck	Rope				1		1																											
124	45.979881	-89.0075423	17	Muck	Rope																																	
125	45.979107	-89.0075561	17	Muck	Rope																																	
126	45.978333	-89.0075699	17	Muck	Rope				1		1																											
127	45.977559	-89.0075837	18.5	Muck	Rope				1		1																											
128	45.976785	-89.0075976	17.5	Muck	Rope																																	
129	45.976012	-89.0076114	16.5	Muck	Rope				2		2																											
130	45.975238	-89.0076252	16	Muck	Rope																																	
131	45.974464	-89.007639	15	Muck	Rope																																	
132	45.97369	-89.0076529	15	Muck	Rope																																	
133	45.972916	-89.0076667	15	Muck	Pole				1		1																											
134	45.972142	-89.0076805	14	Sand	Pole																																	
135	45.971368	-89.0076943	3	Sand	Pole				1				1																									
136	45.970594	-89.0077082	7	Muck	Pole				3		3									1																		
137	45.989158	-89.006266	8	Sand	Pole				2		2																											
138	45.988385	-89.0062799	13	Muck	Pole				1		1																											
139	45.987611	-89.0062937	15	Muck	Pole				1		1																											
140	45.986837	-89.0063076	16	Muck	Rope				2		2							1																				
141	45.986063	-89.0063214	15	Muck	Rope																																	
142	45.985289	-89.0063353	16	Muck	Rope				2		2																											
143	45.984515	-89.0063491	15	Muck	Rope																																	
144	45.983741	-89.0063629	16	Muck	Rope																																	
145	45.982967	-89.0063768	17	Muck	Rope																																	
146	45.982193	-89.0063906	18	Muck	Rope																																	
147	45.981419	-89.0064045	18	Muck	Rope																																	
148	45.980645	-89.0064183	18	Muck	Rope																																	
149	45.979872	-89.0064322	18	Muck	Rope				1		1																											
150	45.979098	-89.006446	18	Muck	Rope																																	
151	45.978324	-89.0064599	19	Muck	Rope																																	
152	45.97755	-89.0064737	18	Muck	Rope																																	
153	45.976776	-89.0064875	17	Muck	Rope																																	
154	45.976002	-89.0065014	18	Muck	Rope																																	
155	45.975228	-89.0065152	17	Muck	Rope				3		3																											
156	45.974454	-89.0065291	15	Muck	Rope																																	
157	45.97368	-89.0065429	17	Muck	Rope																																	
158	45.972906	-89.0065567	15	Muck	Pole				1		1																											
159	45.972132	-89.0065706	8	Muck	Pole				1		1								1																			
160	45.971358	-89.0065844	4	Sand	Pole				1		1		1																									
161	45.970585	-89.0065983	7	Muck	Pole				3		2	V							1	1																	
162	45.989149	-89.0051557	10	Sand	Pole				2		2				1																							
163	45.988375	-89.0051696	13	Muck	Pole				2		2																											
164	45.987601	-89.0051835	15	Muck	Pole				2		2																											
165	45.986827	-89.0051973	15	Muck	Rope				1			1																										
166	45.986053	-89.0052112	14.5	Muck	Rope				1		1																											
167	45.985279	-89.0052251	17	Muck	Rope																																	
168	45.984505	-89.0052389	17	Muck	Rope																																	
169	45.983731	-89.0052528	16	Muck	Rope				1		1																											
170	45.982958	-89.0052667	19	Muck	Rope																																	
171	45.982184	-89.0052805	18	Muck	Rope																																	
172	45.98141	-89.0052944	17	Muck	Rope				1		1																											
173	45.980636	-89.0053082	17	Muck	Rope				1		1																											
174	45.979862	-89.0053221	17	Muck	Rope																																	
175	45.979088	-89.005336	17	Muck	Rope																																	
176	45.978314	-89.0053498	18	Muck	Rope																																	
177	45.97754	-89.0053637	17	Muck	Rope																																	
178	45.976766	-89.0053775	15	Muck	Rope																																	
179	45.975992	-89.0053914	15	Muck	Rope																																	
180	45.975218	-89.0054052	16	Muck	Rope																																	
181	45.974444	-89.0054191	15	Muck	Rope				1		1																											
182	45.973671	-89.005433	15.5	Muck	Rope				1		1																											
183	45.972897	-89.0054468	15	Muck	Pole																																	

PointNumber	LATITUDE (Decimal Degrees)	LONGITUDE (Decimal Degrees)	DEPTH	SEDIMENT	POLE_ROPE	COMMENTS	NOTES	NUISANCE	Total Rake Fullness	Myriophyllum spicatum	Ceratophyllum demersum	Elodea canadensis	Najas flexilis	Potamogeton pusillus	Myriophyllum sibiricum	Vallisneria americana	Chara spp.	Elodea nuttallii	Potamogeton illinoensis	Potamogeton praelongus	Potamogeton zosteriformis	Potamogeton gramineus	Potamogeton amplifolius	Heteranthera dubia	Schoenoplectus acutus	Eleocharis palustris	Eleocharis acicularis	Nitella spp.	Potamogeton richardsonii	Sagittaria sp. (rosette)	Isoetes spp.	Juncus pelocarpus	Lemna turionifera	Myriophyllum tenellum	Schoenoplectus pungens	Schoenoplectus subterminalis	Schoenoplectus tabernaemontani	Sparganium sp.
184	45.972123	-89.0054607	6	Sand	Pole				1		1										1																	
185	45.971349	-89.0054745	3	Sand	Pole				1				1																									
186	45.970575	-89.0054884				NON NAVIGABLE																																
187	45.989913	-89.0040316	5	Rock	Pole																																	
188	45.989139	-89.0040455	11	Muck	Pole				2		2	1																										
189	45.988365	-89.0040594	14	Muck	Pole				2		2							1																				
190	45.987591	-89.0040732	16	Muck	Pole				2		2																											
191	45.986817	-89.0040871	19	Muck	Rope				1		1																											
192	45.986044	-89.004101	17	Muck	Rope				1		1																											
193	45.98527	-89.0041149	17	Muck	Rope																																	
194	45.984496	-89.0041288	19	Muck	Rope																																	
195	45.983722	-89.0041426	20	Muck	Rope																																	
196	45.982948	-89.0041565	18	Muck	Rope																																	
197	45.982174	-89.0041704	18	Muck	Rope																																	
198	45.9814	-89.0041843	17	Muck	Rope				1		1																											
199	45.980626	-89.0041981	18	Muck	Rope																																	
200	45.979852	-89.004212	17	Muck	Rope				1		1																											
201	45.979078	-89.0042259	17	Muck	Rope																																	
202	45.978304	-89.0042398	18	Muck	Rope				1		1																											
203	45.97753	-89.0042536	18	Muck	Rope				1		1																											
204	45.976757	-89.0042675	17	Muck	Rope																																	
205	45.975983	-89.0042814	17	Muck	Rope																																	
206	45.975209	-89.0042953	16	Muck	Rope																																	
207	45.974435	-89.0043091	16.5	Muck	Rope																																	
208	45.973661	-89.004323	16	Muck	Pole																																	
209	45.972887	-89.0043369	6	Muck	Pole				2		2								1																			
210	45.972113	-89.0043507	3	Sand	Pole				1																						1							
211	45.989903	-89.0029213	8	Sand	Pole																																	
212	45.989129	-89.0029352	11	Sand	Pole				1		1							1																			
213	45.988356	-89.0029491	15	Muck	Pole																																	
214	45.987582	-89.002963	16	Muck	Rope				2		2						1																					
215	45.986808	-89.0029769	18	Muck	Rope																																	
216	45.986034	-89.0029908	20	Muck	Rope																																	
217	45.98526	-89.0030047	17	Muck	Rope																																	
218	45.984486	-89.0030186	18	Muck	Rope																																	
219	45.983712	-89.0030325	18	Muck	Rope																																	
220	45.982938	-89.0030464	21	Muck	Rope																																	
221	45.982164	-89.0030603	18	Muck	Rope																																	
222	45.98139	-89.0030742	17	Muck	Rope				1		1							1																			
223	45.980616	-89.0030881	18	Muck	Rope																																	
224	45.979843	-89.0031019	19	Muck	Rope																																	
225	45.979069	-89.0031158	19	Muck	Rope																																	
226	45.978295	-89.0031297	20	Muck	Rope																																	
227	45.977521	-89.0031436	20	Muck	Rope																																	
228	45.976747	-89.0031575	20	Muck	Rope				1		1																											
229	45.975973	-89.0031714	16	Sand	Rope				1		1																											
230	45.975199	-89.0031853	14	Rock	Pole				2		2	1						1																				
231	45.974425	-89.0031992	12	Sand	Pole				1		1	1						1																				
232	45.973651	-89.003213	5	Sand	Pole				1			1	1					1																				
233	45.990668	-89.0017971	7	Sand	Pole																																	
234	45.989894	-89.001811	11	Sand	Pole																																	
235	45.98912	-89.001825	11	Muck	Pole				2		2																											
236	45.988346	-89.0018389	17	Muck	Rope																																	
237	45.987572	-89.0018528	19	Muck	Rope																																	
238	45.986798	-89.0018667	19	Muck	Rope																																	
239	45.986024	-89.0018806	19	Muck	Rope																																	
240	45.98525	-89.0018945	19	Muck	Rope																																	
241	45.984476	-89.0019084	19	Muck	Rope																																	
242	45.983702	-89.0019223	19	Muck	Rope																																	
243	45.982928	-89.0019362	18	Muck	Rope																																	
244	45.982155	-89.0019502	19	Muck	Rope																																	

PointNumber	LATITUDE (Decimal Degrees)	LONGITUDE (Decimal Degrees)	DEPTH	SEDIMENT	POLE_ROPE	COMMENTS	NOTES	NUISANCE	Total Rake Fullness	Myriophyllum spicatum	Ceratophyllum demersum	Elodea canadensis	Najas flexilis	Potamogeton pusillus	Myriophyllum sibiricum	Vallisneria americana	Chara spp.	Elodea nuttallii	Potamogeton illinoensis	Potamogeton praelongus	Potamogeton zosteriformis	Potamogeton gramineus	Potamogeton amplifolius	Heteranthera dubia	Schoenoplectus acutus	Eleocharis palustris	Eleocharis acicularis	Nitella spp.	Potamogeton richardsonii	Sagittaria sp. (rosette)	Isoetes spp.	Juncus pelocarpus	Lemna turionifera	Myriophyllum tenellum	Schoenoplectus pungens	Schoenoplectus subterminalis	Schoenoplectus tabernaemontani	Sparganium sp.
245	45.981381	-89.0019641	19	Muck	Rope																																	
246	45.980607	-89.001978	17	Muck	Rope																																	
247	45.979833	-89.0019919	18	Muck	Rope																																	
248	45.979059	-89.0020058	19	Muck	Rope																																	
249	45.978285	-89.0020197	20	Muck	Rope																																	
250	45.977511	-89.0020336	12	Sand	Pole				2		2																											
251	45.976737	-89.0020475	5	Sand	Pole				2		2						1		1																			
252	45.975963	-89.0020614	3	Rock	Pole				1																													
253	45.99298	-89.0006451	2	Sand	Pole				1																			1										
254	45.992206	-89.000659	3	Sand	Pole				1				1																									
255	45.991432	-89.0006729	8	Sand	Pole				1		1	1		1			1																					
256	45.990658	-89.0006868	10	Sand	Pole				1		1																											
257	45.989884	-89.0007008	11	Sand	Pole				1		1																											
258	45.98911	-89.0007147	17	Sand	Rope				1		1																											
259	45.988336	-89.0007286	18	Muck	Rope																																	
260	45.987562	-89.0007426	19	Muck	Rope																																	
261	45.986788	-89.0007565	20	Muck	Rope																																	
262	45.986014	-89.0007704	20	Muck	Rope																																	
263	45.985241	-89.0007843	18	Sand	Rope																																	
264	45.984467	-89.0007983	18	Sand	Rope																																	
265	45.983693	-89.0008122	18	Muck	Rope																																	
266	45.982919	-89.0008261	18	Muck	Rope																																	
267	45.982145	-89.00084	19	Muck	Rope																																	
268	45.981371	-89.000854	20	Muck	Rope																																	
269	45.980597	-89.0008679	20	Muck	Rope																																	
270	45.979823	-89.0008818	19	Muck	Rope																																	
271	45.979049	-89.0008957	18	Sand	Rope																																	
272	45.978275	-89.0009096	2	Rock	Pole				1																													
273	45.993744	-88.9995208	6	Sand	Pole				1				1																									
274	45.99297	-88.9995347	9	Sand	Pole				1			1																											
275	45.992196	-88.9995487	9	Muck	Pole				1		1	1								1																		
276	45.991422	-88.9995626	10	Sand	Pole																																	
277	45.990648	-88.9995766	16	Sand	Rope																																	
278	45.989874	-88.9995905	20	Muck	Rope																																	
279	45.9891	-88.9996044	20	Muck	Rope																																	
280	45.988326	-88.9996184	20	Muck	Rope																																	
281	45.987553	-88.9996323	20	Muck	Rope																																	
282	45.986779	-88.9996463	18	Muck	Rope				1		1																											
283	45.986005	-88.9996602	14	Sand	Rope																																	
284	45.985231	-88.9996741	12	Sand	Pole				2	1	2																											
285	45.984457	-88.9996881	15	Sand	Pole																																	
286	45.983683	-88.999702	16	Sand	Rope																																	
287	45.982909	-88.999716	13	Sand	Pole				2		2																											
288	45.982135	-88.9997299	12	Sand	Pole				2		2							1			1																	
289	45.981361	-88.9997438	11	Sand	Pole																																	
290	45.980587	-88.9997578	8	Rock	Pole				1		1	1																										
291	45.979813	-88.9997717	2	Rock	Pole				1			1																V				V						
292	45.993734	-88.9984104	5	Sand	Pole				1			1	1																									
293	45.99296	-88.9984244	9	Sand	Pole				1		1	1		1	1		1	1																			
294	45.992186	-88.9984383	10	Sand	Pole				1		1		1																									
295	45.991412	-88.9984523	10	Sand	Pole				1					1																								
296	45.990638	-88.9984663	15	Sand	Pole																																	
297	45.989865	-88.9984802	19	Muck	Rope																																	
298	45.989091	-88.9984942	20	Muck	Rope																																	
299	45.988317	-88.9985081	20	Muck	Rope																																	
300	45.987543	-88.9985221	20	Muck	Rope																																	
301	45.986769	-88.9985361	5	Sand	Pole				2		1	1									1				1												
302	45.985995	-88.99855	19	Muck	Rope																																	
303	45.985221	-88.998564	11	Sand	Pole				1					1																								
304	45.984447	-88.9985779	11	Sand	Pole				1		1	1																										
305	45.983673	-88.9985919	11	Sand	Pole																																	

PointNumber	LATITUDE (Decimal Degrees)	LONGITUDE (Decimal Degrees)	DEPTH	SEDIMENT	POLE_ROPE	COMMENTS	NOTES	NUISANCE	Total Rake Fullness	Myriophyllum spicatum	Ceratophyllum demersum	Elodea canadensis	Najas flexilis	Potamogeton pusillus	Myriophyllum sibiricum	Vallisneria americana	Chara spp.	Elodea nuttallii	Potamogeton illinoensis	Potamogeton praelongus	Potamogeton zosteriformis	Potamogeton gramineus	Potamogeton amplifolius	Heteranthera dubia	Schoenoplectus acutus	Eleocharis palustris	Eleocharis acicularis	Nitella spp.	Potamogeton richardsonii	Sagittaria sp. (rosette)	Isoetes spp.	Juncus pelocarpus	Lemna turionifera	Myriophyllum tenellum	Schoenoplectus pungens	Schoenoplectus subterminalis	Schoenoplectus tabernaemontani	Sparganium sp.
306	45.982899	-88.9986058	11	Sand	Pole				1		1																										
307	45.982125	-88.9986198	11	Sand	Pole				1		1																										
308	45.981352	-88.9986337	4.5	Sand	Pole				1				1																								
309	45.995272	-88.9972721	2	Sand	Pole				1					1										1		1	1					1					V
310	45.994498	-88.9972861	4	Sand	Pole				1			1	1												1												
311	45.993724	-88.9973001	8.5	Sand	Pole				2		2	1		1			1																			
312	45.99295	-88.997314	9	Sand	Pole				1		1	1		1	1		1																			
313	45.992177	-88.997328	9.5	Sand	Pole				2		2	1											1														
314	45.991403	-88.997342	9.5	Sand	Pole																																
315	45.990629	-88.997356	18	Sand	Rope																																
316	45.989855	-88.9973699	19.5	Muck	Rope																																
317	45.989081	-88.9973839	21	Muck	Rope																																
318	45.988307	-88.9973979	20.5	Muck	Rope																																
319	45.987533	-88.9974119	19	Sand	Rope																																
320	45.986759	-88.9974258	19	Sand	Rope																																
321	45.985985	-88.9974398	16	Sand	Rope				1		1																										
322	45.985211	-88.9974538	11	Sand	Pole																																
323	45.984437	-88.9974678	16.5	Sand	Pole																																
324	45.983664	-88.9974817	12	Sand	Pole																																
325	45.98289	-88.9974957	11	Sand	Pole				1		1			1																							
326	45.982116	-88.9975097	9	Sand	Pole				2		2	1																									
327	45.981342	-88.9975236	2	Rock	Pole				1				1																								
328	45.99681	-88.9961337				TERRESTRIAL																															
329	45.996036	-88.9961477	2.5	Sand	Pole				1																1												1
330	45.995262	-88.9961617	5	Rock	Pole				1			1											1														
331	45.994489	-88.9961757	8	Sand	Pole				1		1								1																		
332	45.993715	-88.9961897	8.5	Sand	Pole				2		1	1			1								2														
333	45.992941	-88.9962037	9	Sand	Pole				1					1			1																				
334	45.992167	-88.9962177	9.5	Sand	Pole				1		1	1																									
335	45.991393	-88.9962317	9.5	Sand	Pole				1					1																							
336	45.990619	-88.9962457	18.5	Sand	Rope																																
337	45.989845	-88.9962597	20.5	Muck	Rope																																
338	45.989071	-88.9962737	21	Muck	Rope																																
339	45.988297	-88.9962877	21	Muck	Rope																																
340	45.987523	-88.9963016	20	Sand	Rope																																
341	45.986749	-88.9963156	19	Sand	Rope																																
342	45.985976	-88.9963296		Sand	Pole																																
343	45.985202	-88.9963436	11	Sand	Pole				1					1																							
344	45.984428	-88.9963576	12	Sand	Pole																																
345	45.983654	-88.9963716	10.5	Sand	Pole				2		2	1																									
346	45.98288	-88.9963856	8	Sand	Pole				3		3	1		1	1																						
347	45.982106	-88.9963995	4	Rock	Pole				1										1																		
348	45.997574	-88.9950093	1	Sand	Pole				3		1				1	1									3	1							1				V
349	45.996801	-88.9950233				NONNAVIGABLE (PLANTS)																															
350	45.996027	-88.9950373	3.5	Sand	Pole				1		1	1													V											
351	45.995253	-88.9950513	6	Sand	Pole				1							1																				
352	45.994479	-88.9950654	8	Sand	Pole				1			1				1	1																				
353	45.993705	-88.9950794	9	Sand	Pole				1		1	1		1			1						1														
354	45.992931	-88.9950934	10	Sand	Pole				1		1	1																									
355	45.992157	-88.9951074	13	Sand	Pole																																
356	45.991383	-88.9951214	16.5	Sand	Pole																																
357	45.990609	-88.9951354	20.5	Sand	Rope																																
358	45.989835	-88.9951494	21	Muck	Rope																																
359	45.989061	-88.9951634	22	Muck	Rope																																
360	45.988287	-88.9951774	22	Muck	Rope																																
361	45.987514	-88.9951914	20.5	Muck	Rope																																
362	45.98674	-88.9952054	19	Muck	Rope																																
363	45.985966	-88.9952194	13.5	Sand	Pole																																
364	45.985192	-88.9952334	14	Sand	Pole				1		1																										
365	45.984418	-88.9952474	11.5	Sand	Pole																																
366	45.998339	-88.9938849				NONNAVIGABLE (PLANTS)																															

Point Number	LATITUDE (Decimal Degrees)	LONGITUDE (Decimal Degrees)	DEPTH	SEDIMENT	POLE_ROPE	COMMENTS	NOTES	NUISANCE	Total Rake Fullness	Myriophyllum spicatum	Ceratophyllum demersum	Elodea canadensis	Najas flexilis	Potamogeton pusillus	Myriophyllum sibiricum	Vallisneria americana	Chara spp.	Elodea nuttallii	Potamogeton illinoensis	Potamogeton praelongus	Potamogeton zosteriformis	Potamogeton gramineus	Potamogeton amplifolius	Heteranthera dubia	Schoenoplectus acutus	Eleocharis palustris	Eleocharis acicularis	Nitella spp.	Potamogeton richardsonii	Sagittaria sp. (rosette)	Isoetes spp.	Juncus pelocarpus	Lemna turionifera	Myriophyllum tenellum	Schoenoplectus pungens	Schoenoplectus subterminalis	Schoenoplectus tabernaemontani	Sparganium sp.
367	45.997565	-88.9938989				NONNAVIGABLE (PLANTS)																																
368	45.996791	-88.9939129				NONNAVIGABLE (PLANTS)																																
369	45.996017	-88.9939269	5	Sand	Pole																				V													
370	45.995243	-88.993941	8	Sand	Pole				1				1	1								1																
371	45.994469	-88.993955	9.5	Sand	Pole				1			1	1				1																				
372	45.993695	-88.993969	10	Sand	Pole				1		1	1	1																								
373	45.992921	-88.993983	16	Sand	Rope																																
374	45.992147	-88.9939971	19	Muck	Rope																																
375	45.991373	-88.9940111	19	Muck	Rope																																
376	45.990599	-88.9940251	20	Muck	Rope																																
377	45.989826	-88.9940391	21	Muck	Rope																																
378	45.989052	-88.9940531	22	Muck	Rope																																
379	45.988278	-88.9940672	23	Muck	Rope																																
380	45.987504	-88.9940812	10	Sand	Pole				1		1	1																									
381	45.98673	-88.9940952	15	Sand	Pole																																
382	45.985956	-88.9941092	11	Sand	Pole																																
383	45.985182	-88.9941232	12	Sand	Pole																																
384	45.984408	-88.9941373	6.5	Sand	Pole				1		1	1			1	1																					
385	45.998329	-88.9927744	2	Sand	Pole				2		2	1			1					1					1	1											
386	45.997555	-88.9927885	3	Sand	Pole																				V												
387	45.996781	-88.9928025	5	Sand	Pole				1		1														V												
388	45.996007	-88.9928165	8	Sand	Pole				1				1			1												1							1		
389	45.995233	-88.9928306	9	Sand	Pole				1		1	1		1		1							1														
390	45.994459	-88.9928446	9.5	Sand	Pole				1		1	1		1								1														
391	45.993685	-88.9928587	16.5	Muck	Rope				1		1																										
392	45.992911	-88.9928727	18.5	Muck	Rope				1		1																										
393	45.992138	-88.9928867	19	Muck	Rope				1		1																										
394	45.991364	-88.9929008	19	Muck	Rope																																
395	45.99059	-88.9929148	20	Muck	Rope																																
396	45.989816	-88.9929289	20	Muck	Rope																																
397	45.989042	-88.9929429	21	Muck	Rope																																
398	45.988268	-88.9929569	21	Muck	Rope																																
399	45.987494	-88.992971	11	Rock	Pole																																
400	45.98672	-88.992985	10	Sand	Pole				1		1																										
401	45.985946	-88.992999	10	Sand	Pole																																
402	45.985172	-88.9930131	8.5	Rock	Pole				2		2	1						1																			
403	45.984398	-88.9930271	4.5	Sand	Pole				1		1	1	1			1	1					1															
404	45.983624	-88.9930411	6.5	Sand	Pole				3		3				1			1			V		3														
405	45.982851	-88.9930552	6.5	Sand	Pole				2		1	1		1	1					2	1																
406	45.982077	-88.9930692	6.5	Muck	Pole				1		1				V																						
407	45.981303	-88.9930832	5.5	Muck	Pole				1		1	1			1						1																
408	45.980529	-88.9930973	3	Muck	Pole				1		1				V															1							
409	45.998319	-88.991664	2.5	Sand	Pole																				V												
410	45.997545	-88.991678	4	Sand	Pole				1			1			1	1				1					V					1							
411	45.996771	-88.9916921	7	Sand	Pole				1		1	1				1						1													1		
412	45.995997	-88.9917061	8.5	Sand	Pole				2		2						1						1														
413	45.995223	-88.9917202	9	Sand	Pole				1		1	1		1																							
414	45.994449	-88.9917343	10	Sand	Pole				2		1	2		1	1																						
415	45.993676	-88.9917483	20	Muck	Rope																																
416	45.992902	-88.9917624	19	Muck	Rope																																
417	45.992128	-88.9917764	19	Muck	Rope																																
418	45.991354	-88.9917905	19	Muck	Rope																																
419	45.99058	-88.9918045	20	Muck	Rope																																
420	45.989806	-88.9918186	20	Muck	Rope				1		1	1																									
421	45.989032	-88.9918326	20	Muck	Rope																																
422	45.988258	-88.9918467	20	Muck	Rope																																
423	45.987484	-88.9918607	17	Sand	Pole				1		1																										
424	45.98671	-88.9918748	9	Sand	Pole				1		1																										
425	45.985936	-88.9918888	9	Sand	Pole				2		2	1						1																			
426	45.985163	-88.9919029	8	Sand	Pole				2		2							1																			
427	45.984389	-88.9919169	7	Sand	Pole				3		3	1																									

PointNumber	LATITUDE (Decimal Degrees)	LONGITUDE (Decimal Degrees)	DEPTH	SEDIMENT	POLE_ROPE	COMMENTS	NOTES	NUISANCE	Total Rake Fullness	Myriophyllum spicatum	Ceratophyllum demersum	Elodea canadensis	Najas flexilis	Potamogeton pusillus	Myriophyllum sibiricum	Vallisneria americana	Chara spp.	Elodea nuttallii	Potamogeton illinoensis	Potamogeton praelongus	Potamogeton zosteriformis	Potamogeton gramineus	Potamogeton amplifolius	Heteranthera dubia	Schoenoplectus acutus	Eleocharis palustris	Eleocharis acicularis	Nitella spp.	Potamogeton richardsonii	Sagittaria sp. (rosette)	Isoetes spp.	Juncus pelocarpus	Lemna turionifera	Myriophyllum tenellum	Schoenoplectus pungens	Schoenoplectus subterminalis	Schoenoplectus tabernaemontani	Sparganium sp.
428	45.983615	-88.991931	9.5	Muck	Pole				2		1			1									1															
429	45.982841	-88.991945	8.5	Muck	Pole				2		2								1				V															
430	45.982067	-88.9919591	3.5	Sand	Pole				2		1					1						1															
431	45.998309	-88.9905535	3.5	Sand	Pole																				V												
432	45.997535	-88.9905676	5	Sand	Pole																																
433	45.996761	-88.9905817	8	Sand	Pole				2		2	1							1		1	1		1													
434	45.995987	-88.9905957	9	Sand	Pole				3		3	1						1	1		1																
435	45.995214	-88.9906098	4	Sand	Pole				2		1	1						1	1																		
436	45.99444	-88.9906239	19	Sand	Rope																																
437	45.993666	-88.990638	20	Muck	Rope																																
438	45.992892	-88.990652	20	Muck	Rope																																
439	45.992118	-88.9906661	20	Muck	Rope																																
440	45.991344	-88.9906802	19	Muck	Rope																																
441	45.99057	-88.9906942	20	Muck	Rope																																
442	45.989796	-88.9907083	20	Muck	Rope																																
443	45.989022	-88.9907224	20	Muck	Rope																																
444	45.988248	-88.9907364	20	Muck	Rope				2		2								1	1																	
445	45.987474	-88.9907505	16	Sand	Rope																																
446	45.986701	-88.9907646	11	Sand	Pole				3		3							1	1																		
447	45.985927	-88.9907786	17	Muck	Pole																																
448	45.985153	-88.9907927	13.5	Muck	Pole				1																												
449	45.984379	-88.9908068	6.5	Sand	Pole				2		2	2					2		1			1		1													
450	45.983605	-88.9908208	5.5	Sand	Pole				2		2	2					1				1																
451	45.982831	-88.9908349	2	Sand	Pole																																
452	45.998299	-88.9894431	1.5	Sand	Pole				1		1	V			V	1		V	V			V															
453	45.997525	-88.9894572	5	Sand	Pole																																
454	45.996752	-88.9894713	7	Sand	Pole				1															1													
455	45.995978	-88.9894854	8.5	Sand	Pole				2		2	1									1																
456	45.995204	-88.9894994	9	Sand	Pole				1		1										1																
457	45.99443	-88.9895135	22	Sand	Rope				2		2																										
458	45.993656	-88.9895276	22	Muck	Rope																																
459	45.992882	-88.9895417	22	Muck	Rope				1		1																										
460	45.992108	-88.9895558	20	Muck	Rope																																
461	45.991334	-88.9895699	20	Muck	Rope																																
462	45.99056	-88.989584	20	Muck	Rope																																
463	45.989786	-88.989598	20	Muck	Rope																																
464	45.989012	-88.9896121	21	Muck	Rope																																
465	45.988239	-88.9896262	20	Muck	Rope																																
466	45.987465	-88.9896403	11.5	Sand	Pole				1		1																										
467	45.986691	-88.9896544	12	Muck	Pole																																
468	45.985917	-88.9896684	15	Muck	Pole				1									1																			
469	45.985143	-88.9896825	15	Muck	Pole																																
470	45.984369	-88.9896966	6	Sand	Pole				2		2	1	1		1								1														
471	45.983595	-88.9897107	2	Sand	Pole				1				1																								
472	45.997516	-88.9883468	3.5	Sand	Pole				1		1	V											V			V											
473	45.996742	-88.9883609	6	Rock	Pole				1			1	1	1									1		1												
474	45.995968	-88.988375	8	Sand	Pole				3		2					1		1		1																
475	45.995194	-88.9883891	9	Sand	Pole				1											1																
476	45.99442	-88.9884032	24	Sand	Rope				1		1																										
477	45.993646	-88.9884173	25	Muck	Rope																																
478	45.992872	-88.9884314	24	Muck	Rope																																
479	45.992098	-88.9884455	23	Muck	Rope																																
480	45.991324	-88.9884596	22	Muck	Rope				1			1																									
481	45.99055	-88.9884737	22	Muck	Rope																																
482	45.989777	-88.9884878	23	Muck	Rope																																
483	45.989003	-88.9885019	23	Muck	Rope																																
484	45.988229	-88.988516	18	Muck	Rope																																
485	45.987455	-88.9885301	11	Sand	Pole				2		2										1																
486	45.986681	-88.9885442	10.5	Muck	Pole				3		3								1																		
487	45.985907	-88.9885583	9.5	Sand	Pole	2					2								1																		
488	45.985133	-88.9885724	7	Sand	Pole				2		2	1							1																		

Point Number	LATITUDE (Decimal Degrees)	LONGITUDE (Decimal Degrees)	DEPTH	SEDIMENT	POLE_ROPE	COMMENTS	NOTES	NUISANCE	Total Rake Fullness	Myriophyllum spicatum	Ceratophyllum demersum	Elodea canadensis	Najas flexilis	Potamogeton pusillus	Myriophyllum sibiricum	Vallisneria americana	Chara spp.	Elodea nuttallii	Potamogeton illinoensis	Potamogeton praelongus	Potamogeton zosteriformis	Potamogeton gramineus	Potamogeton amplifolius	Heteranthera dubia	Schoenoplectus acutus	Eleocharis palustris	Eleocharis acicularis	Nitella spp.	Potamogeton richardsonii	Sagittaria sp. (rosette)	Isoetes spp.	Juncus pelocarpus	Lemna turionifera	Myriophyllum tenellum	Schoenoplectus pungens	Schoenoplectus subterminalis	Schoenoplectus tabernaemontani	Sparganium sp.
489	45.984359	-88.9885864	5	Sand	Pole				1		1		1									1																
490	45.997506	-88.9872363				TEMPORARY OBSTACLE																																	
491	45.996732	-88.9872504	4.5	Sand	Pole				1												1																1	
492	45.995958	-88.9872646	7	Sand	Pole				1		1					1																					
493	45.995184	-88.9872787	9	Sand	Pole				1		1	1	1						1																		
494	45.99441	-88.9872928				DEEP																															
495	45.993636	-88.9873069				DEEP																															
496	45.992862	-88.987321				DEEP																															
497	45.992088	-88.9873352				DEEP																															
498	45.991315	-88.9873493				DEEP																															
499	45.990541	-88.9873634	25	Muck	Rope																																
500	45.989767	-88.9873775	25	Muck	Rope																																
501	45.988993	-88.9873916	21	Muck	Rope																																
502	45.988219	-88.9874057	11	Sand	Pole				2		2										1																
503	45.987445	-88.9874198	10	Rock	Pole				2		2			1																							
504	45.986671	-88.987434	9	Muck	Pole				2		2						1		1	1	1																
505	45.985897	-88.9874481	7	Sand	Pole				2		1	2						1												1							
506	45.985123	-88.9874622	5	Sand	Pole				1		1	1										1															
507	45.984349	-88.9874763	2	Rock	Pole																																
508	45.996722	-88.98614	1	Sand	Pole				1				1		V	1																				V	V
509	45.995948	-88.9861542	4	Sand	Pole				1				1			1		1																			
510	45.995174	-88.9861683	7	Sand	Pole				1		1					1																					
511	45.9944	-88.9861824	10	Sand	Pole				1		1	1					1																				
512	45.993626	-88.9861966				DEEP																															
513	45.992853	-88.9862107				DEEP																															
514	45.992079	-88.9862248				DEEP																															
515	45.991305	-88.986239				DEEP																															
516	45.990531	-88.9862531				DEEP																															
517	45.989757	-88.9862672	15	Sand	Rope																																
518	45.988983	-88.9862814	9	Sand	Pole				3		3	1					1	1																			
519	45.988209	-88.9862955	8	Sand	Pole																																
520	45.987435	-88.9863096	6.5	Sand	Pole				1		1							1			1																
521	45.986661	-88.9863237	5	Sand	Pole				1			1	1			1	1							1													
522	45.985887	-88.9863379	3	Sand	Pole				1		1				1		1								1												
523	45.995938	-88.9850438	1	Sand	Pole																																
524	45.995164	-88.9850579	5	Sand	Pole				1		1				V	1																					
525	45.99439	-88.9850721	7	Muck	Pole				1			V				1	1			V																	
526	45.993617	-88.9850862				DEEP																															
527	45.992843	-88.9851004				DEEP																															
528	45.992069	-88.9851145				DEEP																															
529	45.991295	-88.9851287	23	Muck	Rope				1		1																										
530	45.990521	-88.9851428	10	Muck	Pole				1		1																										
531	45.989747	-88.985157	2	Rock	Pole				1			1																									
532	45.995155	-88.9839476	1	Sand	Pole						V																										
533	45.994381	-88.9839617	4	Sand	Pole				1				1		V	1																					
534	45.993607	-88.9839759	7.5	Sand	Pole				1		1		1			1								1													
535	45.992833	-88.98399	9	Sand	Pole																																
536	45.992059	-88.9840042	9	Rock	Pole				1		1	1		1																							
537	45.991285	-88.9840184	8	Sand	Pole				1													1															
538	45.990511	-88.9840325	5	Rock	Pole																																
539	45.994371	-88.9828514				NONNAVIGABLE (PLANTS)																																	
540	45.993597	-88.9828655	2.5	Muck	Pole				1		1	1	1	1					1	1				1	1												
541	45.992823	-88.9828797	1	Rock	Pole																																
542	45.992049	-88.9828939	3.5	Rock	Pole																																
543	45.991275	-88.9829081	2.5	Rock	Pole				1		1										1				1												