# A

# APPENDIX A

## Public Participation Materials

# Kelly Lake
# Management Planning Project
## *Kick-Off Meeting*
### *August 13th, 2016 – 9:00 AM*
### *Romy's Holiday Inn at Kelly Lake*
### *9600 County Road G, Suring, WI 54174*


Brenton Butterfield, an Onterra lakes ecologist, speaks to a lake group in Waushara County about a littoral habitat study conducted on their lake. Public participation will be an integral part of the Kelly Lake project.

The Kelly Lake Advancement Association (KLAA) has received a grant totaling over $23,000 from the Wisconsin Department of Natural Resources (WDNR) to partially fund the completion of a comprehensive management plan for Kelly Lake. The design for the planning project has been finalized and approved by the WDNR and includes two primary objectives: 1) the completion of in-depth studies including multiple plant surveys, water quality sampling, watershed and shoreland condition assessments, and 2) the completion of a realistic management plan for Kelly Lake and its watershed. The majority of the studies will be completed during the spring, summer, and fall of 2016. The tasks associated with the analysis of the data will be completed during the fall and winter of 2016/2017.

The project will also incorporate opportunities for stakeholder education and involvement which are both very important components of all lake management planning efforts. The first opportunity for your participation in the process will be at the Project Kick-off Meeting to be held on Saturday, August 13th at 9:00 AM at Romy's Holiday Inn at Kelly Lake (9600 County Rd G). In addition to this meeting as well as others, an additional opportunity for your input will be through a written stakeholder survey that will be distributed during the project.

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



## Presentation Outline

- Lake Management Planning Project
  - Onterra, LLC
  - Why create a lake management plan?
  - Elements of an effective management plan
  - Study components
  - Planning process
- Eurasian water milfoil in Kelly Lake
  - Monitoring methodology
  - 2012-2016 Results

Onterra, LLC
Lake Management Planning

## Onterra, LLC

- Founded in 2005
- Staff
  - Four lead ecologists
  - Three field technicians
  - Five summer interns
- Services
  - Science and planning
- Philosophy
  - Promote realistic planning
  - Assist, not direct

Onterra, LLC
Lake Management Planning

## *Why create a lake management plan?*

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

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## *Why create a lake management plan?*

- WDNR strongly recommends lakes conducting active management update aspects of the plan every 5 years.
- Having a current and approved plan makes the sponsor eligible for WDNR grants that implement an action.
- Conducting large-scale management requires a current and approved plan.

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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 & CWH Assessment
  - Stakeholder Survey

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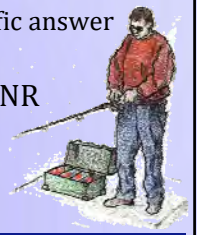
Lake Management Planning

## 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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Lake Management Planning

## 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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## AIS Mapping

### Point-Based Mapping

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

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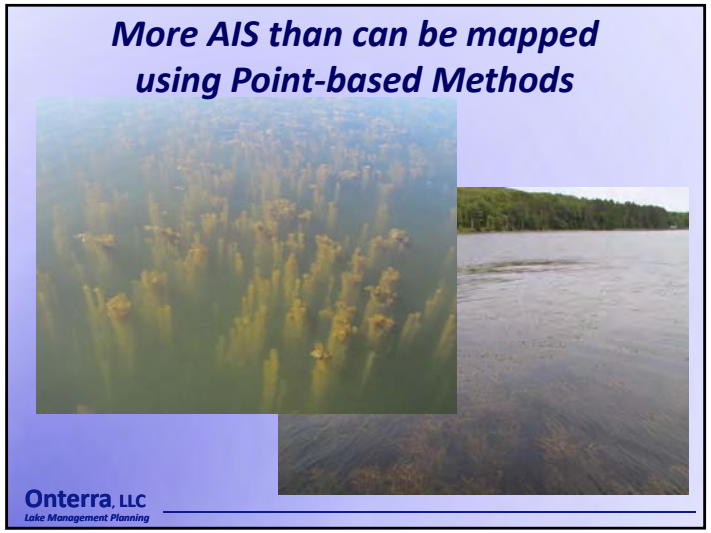
Lake Management Planning


More AIS than can be mapped using Point-based Methods
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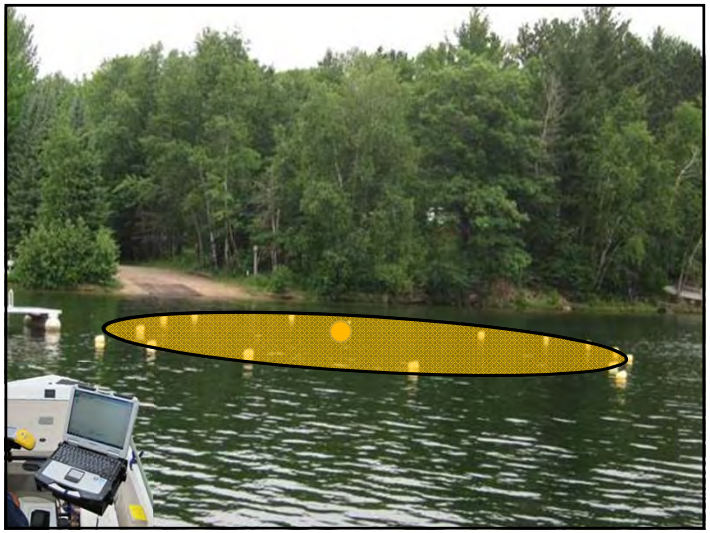
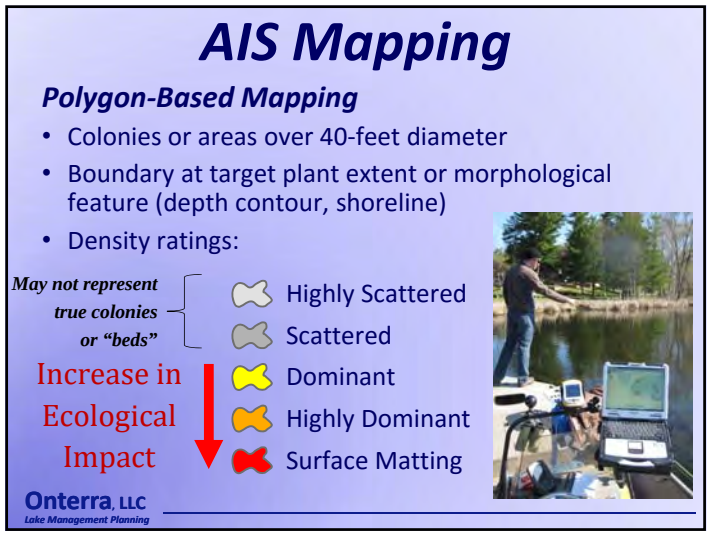
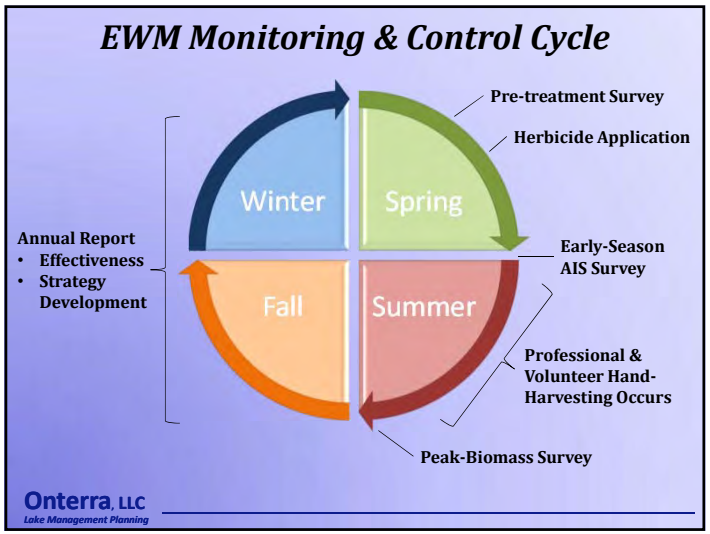
Lake Management Planning




AIS Mapping
Polygon-Based Mapping
• Colonies or areas over 40-feet diameter
• Boundary at target plant extent or morphological feature (depth contour, shoreline)
• Density ratings:
May not represent true colonies or "beds"
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Increase in Ecological Impact
Onterra, LLC
Lake Management Planning


EWM Monitoring & Control Cycle
Winter
Spring
Summer
Fall
Pre-treatment Survey
Herbicide Application
Early-Season AIS Survey
Professional & Volunteer Hand-Harvesting Occurs
Peak-Biomass Survey
Annual Report
• Effectiveness
• Strategy Development
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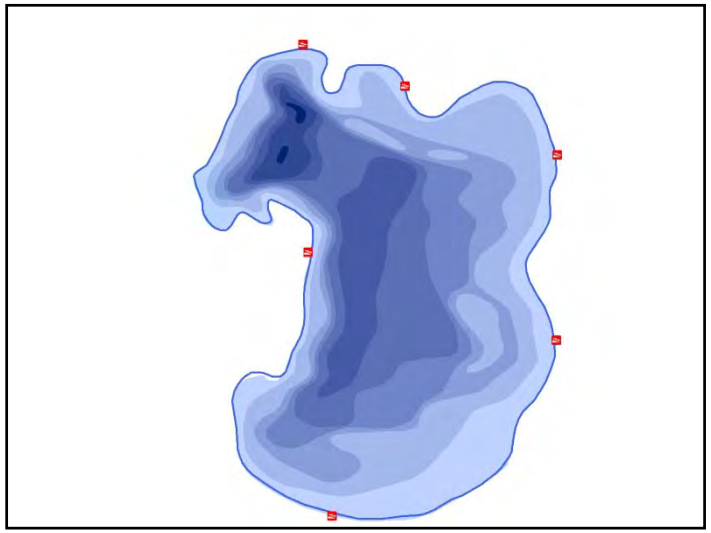
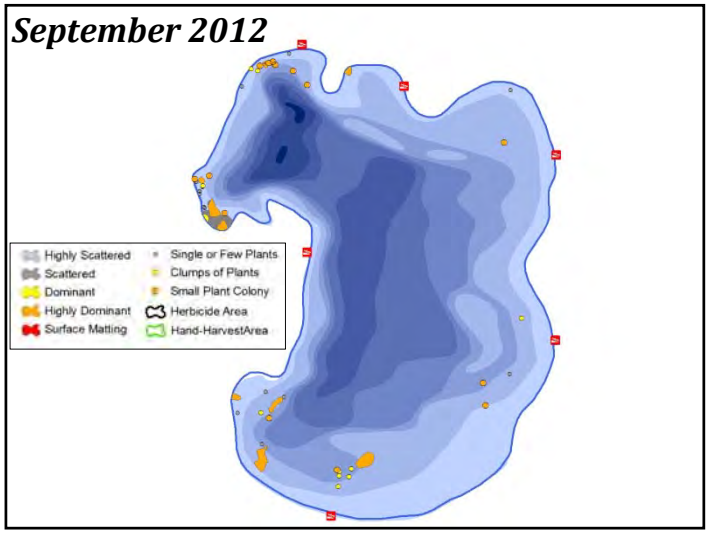
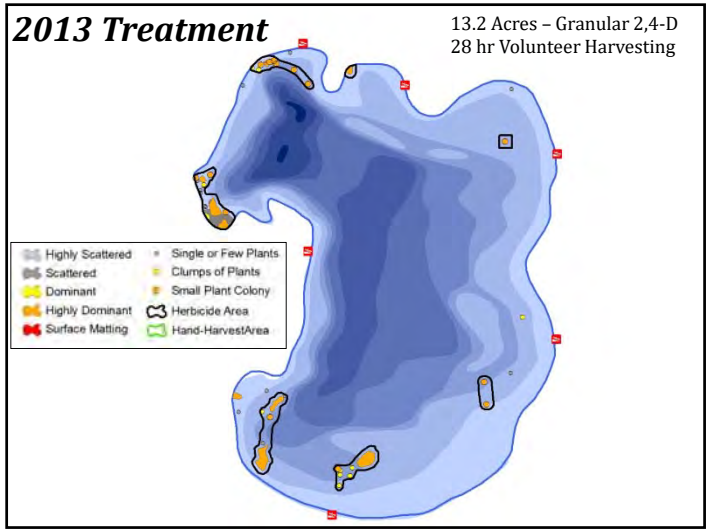
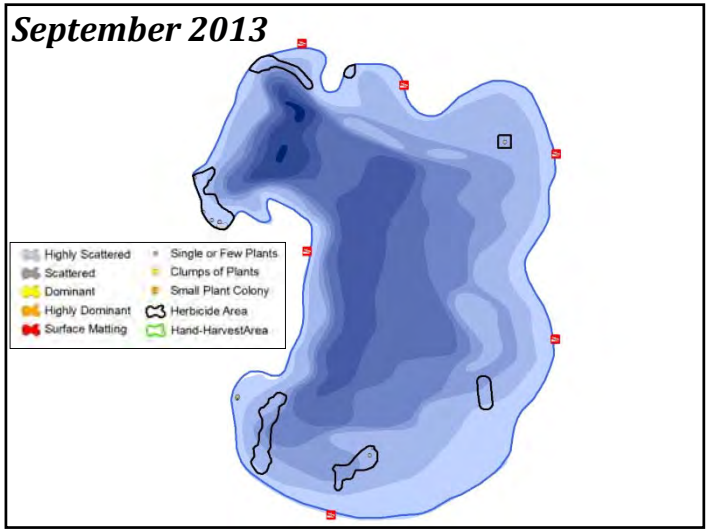
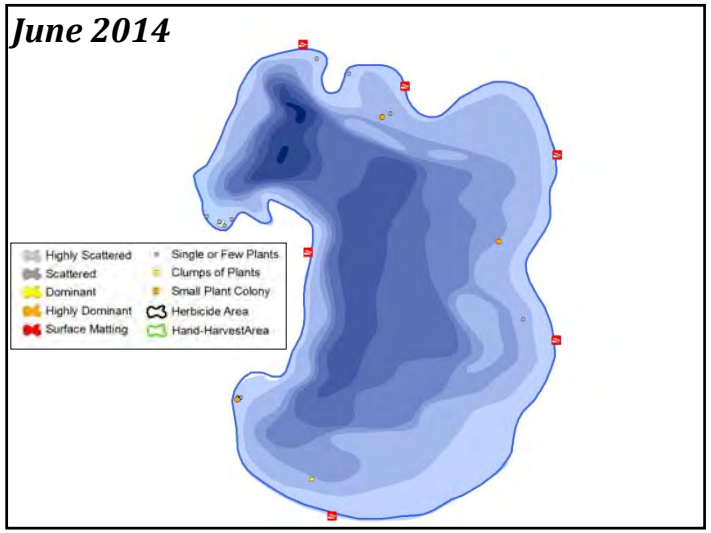
Lake Management Planning

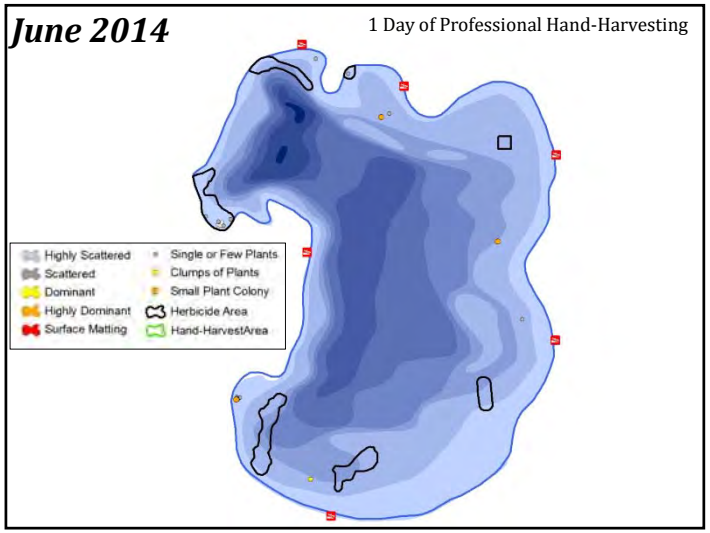


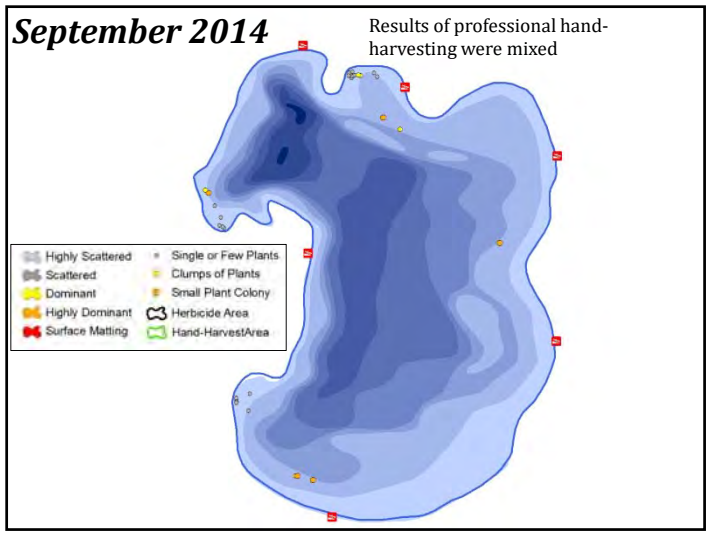

September 2012
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Single or Few Plants
Clumps of Plants
Small Plant Colony
Herbicide Area
Hand-HarvestArea

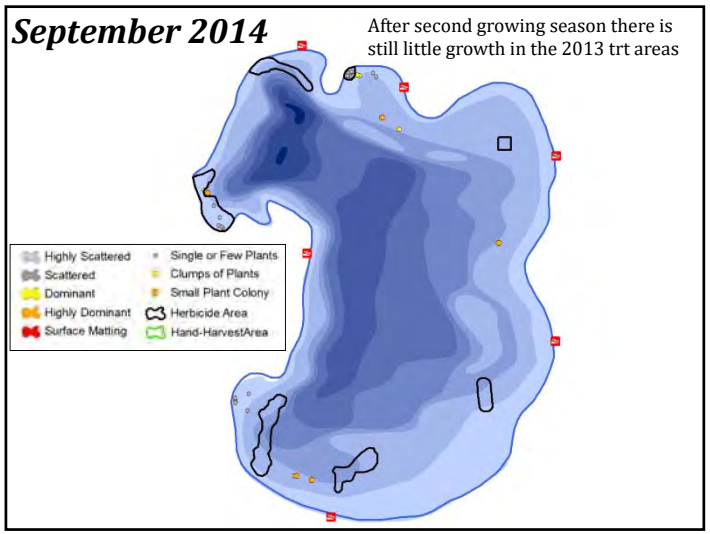

2013 Treatment
13.2 Acres – Granular 2,4-D
28 hr Volunteer Harvesting
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Single or Few Plants
Clumps of Plants
Small Plant Colony
Herbicide Area
Hand-HarvestArea

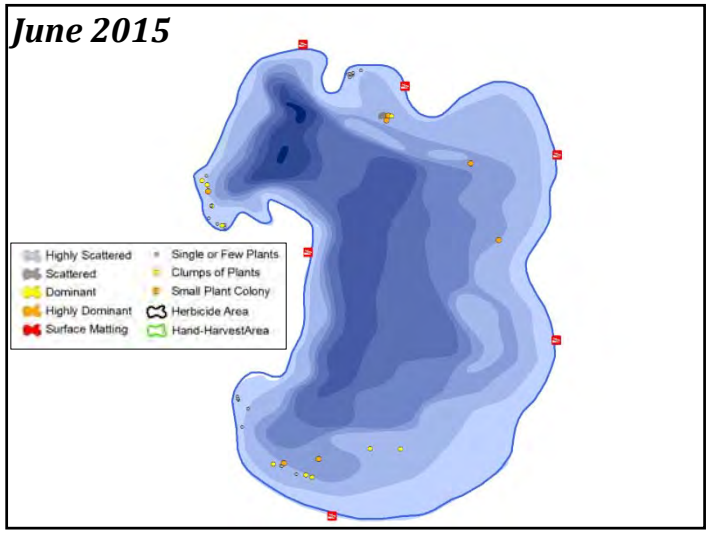

September 2013
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Single or Few Plants
Clumps of Plants
Small Plant Colony
Herbicide Area
Hand-HarvestArea

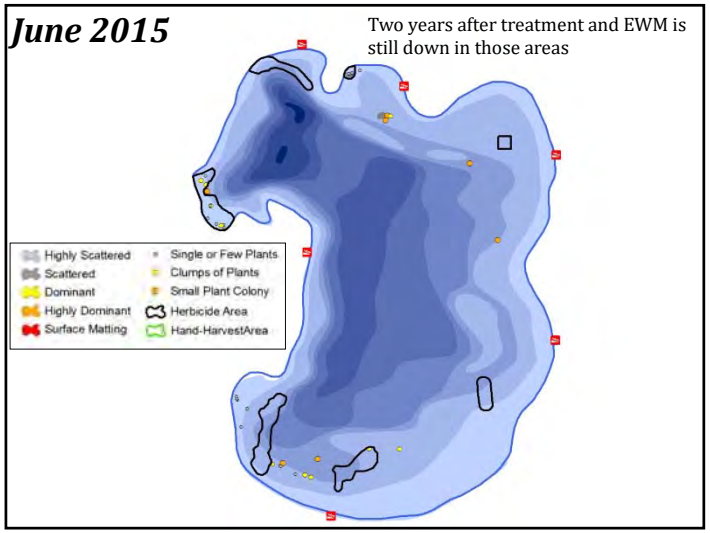

June 2014
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Single or Few Plants
Clumps of Plants
Small Plant Colony
Herbicide Area
Hand-HarvestArea

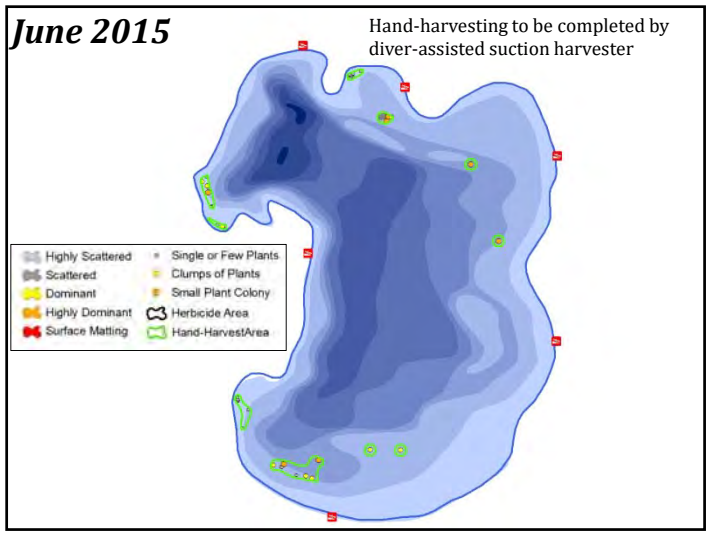

June 2014
1 Day of Professional Hand-Harvesting
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Single or Few Plants
Clumps of Plants
Small Plant Colony
Herbicide Area
Hand-HarvestArea

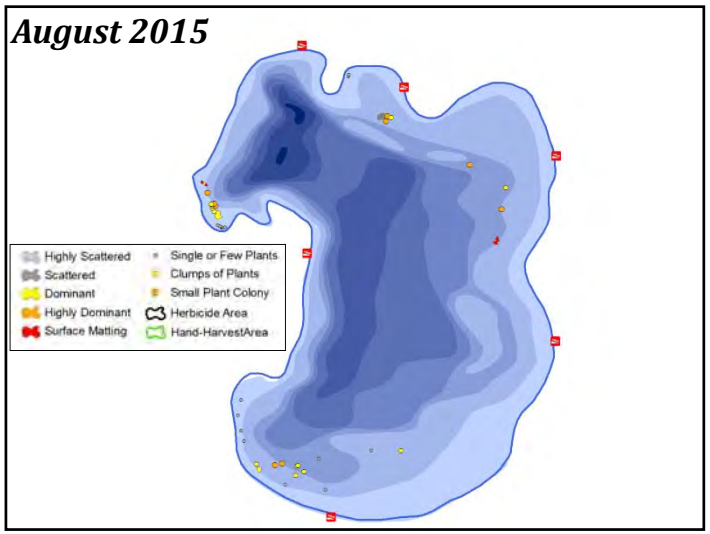

September 2014
Results of professional hand-harvesting were mixed
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Single or Few Plants
Clumps of Plants
Small Plant Colony
Herbicide Area
Hand-HarvestArea

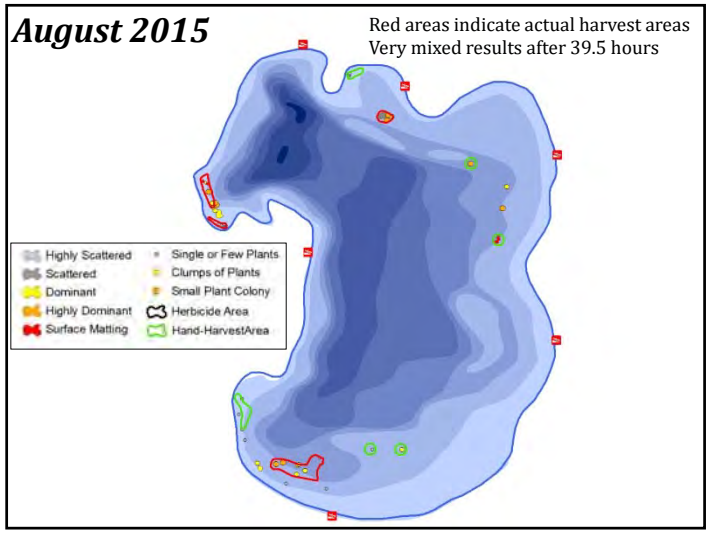

September 2014
After second growing season there is still little growth in the 2013 trt areas
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Single or Few Plants
Clumps of Plants
Small Plant Colony
Herbicide Area
Hand-HarvestArea

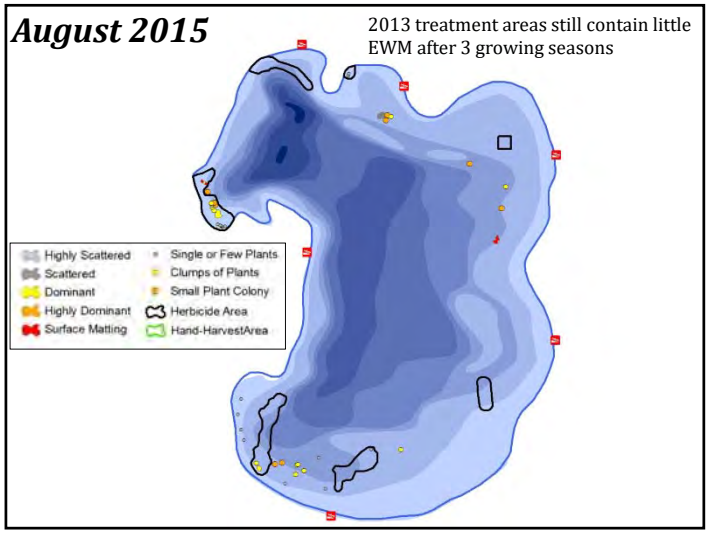

June 2015
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Single or Few Plants
Clumps of Plants
Small Plant Colony
Herbicide Area
Hand-HarvestArea

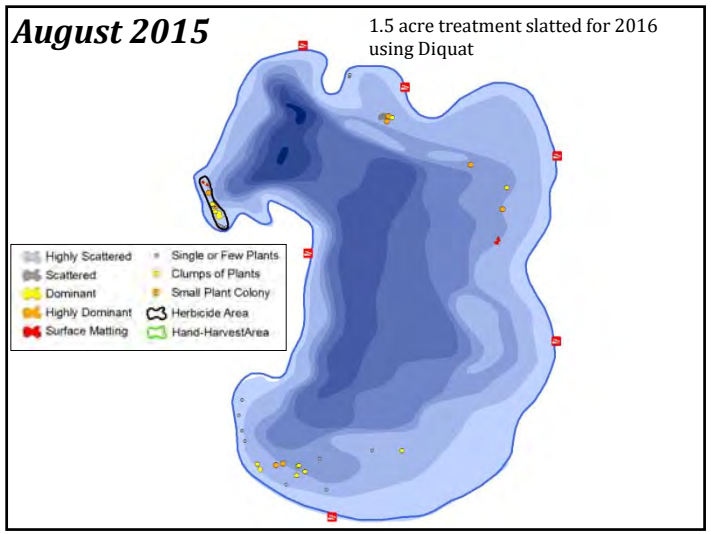

June 2015
Two years after treatment and EWM is still down in those areas
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Single or Few Plants
Clumps of Plants
Small Plant Colony
Herbicide Area
Hand-HarvestArea

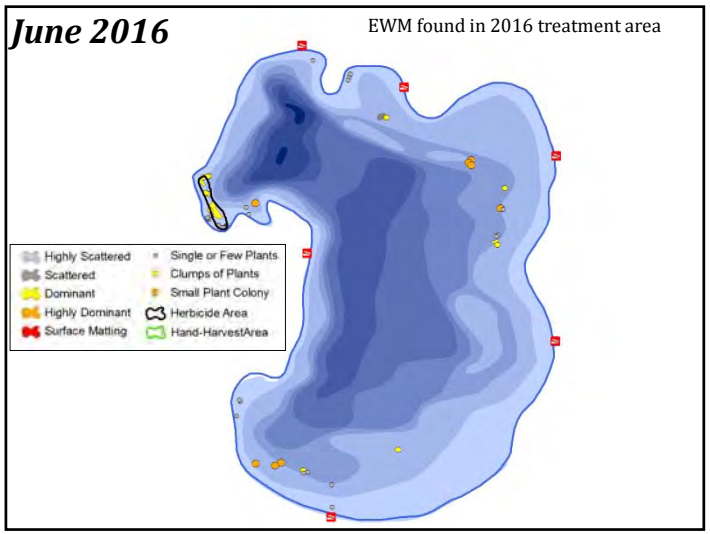

June 2015
Hand-harvesting to be completed by diver-assisted suction harvester
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Single or Few Plants
Clumps of Plants
Small Plant Colony
Herbicide Area
Hand-HarvestArea

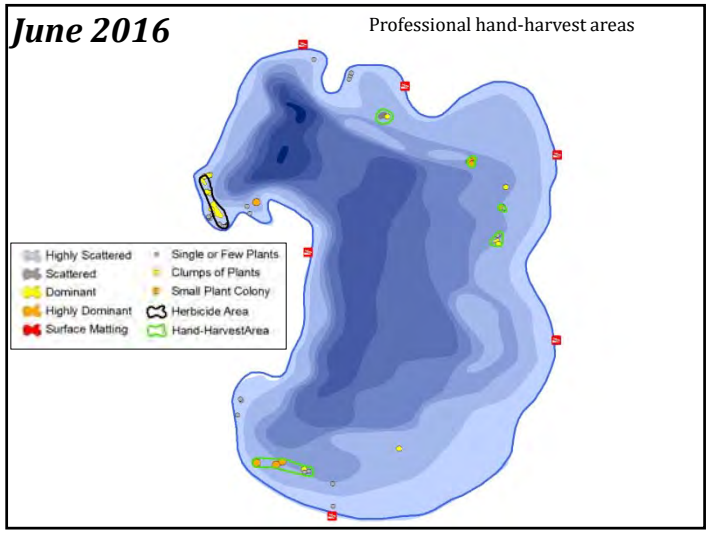

August 2015
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Single or Few Plants
Clumps of Plants
Small Plant Colony
Herbicide Area
Hand-HarvestArea

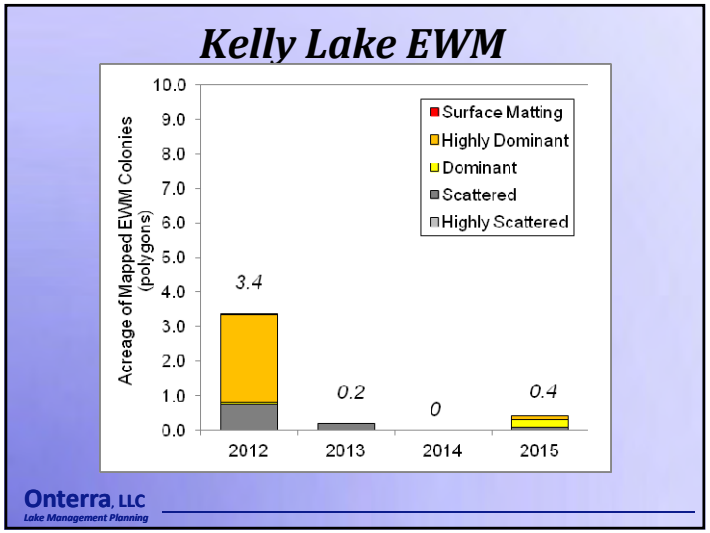

August 2015
Red areas indicate actual harvest areas
Very mixed results after 39.5 hours
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Single or Few Plants
Clumps of Plants
Small Plant Colony
Herbicide Area
Hand-HarvestArea


August 2015
2013 treatment areas still contain little
EWM after 3 growing seasons
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Single or Few Plants
Clumps of Plants
Small Plant Colony
Herbicide Area
Hand-HarvestArea


August 2015
1.5 acre treatment slatted for 2016
using Diquat
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Single or Few Plants
Clumps of Plants
Small Plant Colony
Herbicide Area
Hand-HarvestArea


June 2016
EWM found in 2016 treatment area
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Single or Few Plants
Clumps of Plants
Small Plant Colony
Herbicide Area
Hand-HarvestArea


June 2016
Professional hand-harvest areas
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Single or Few Plants
Clumps of Plants
Small Plant Colony
Herbicide Area
Hand-HarvestArea


Kelly Lake EWM
Acreage of Mapped EWM Colonies (polygons)
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Surface Matting
Highly Dominant
Dominant
Scattered
Highly Scattered
3.4
0.2
0
0.4
2012
2013
2014
2015
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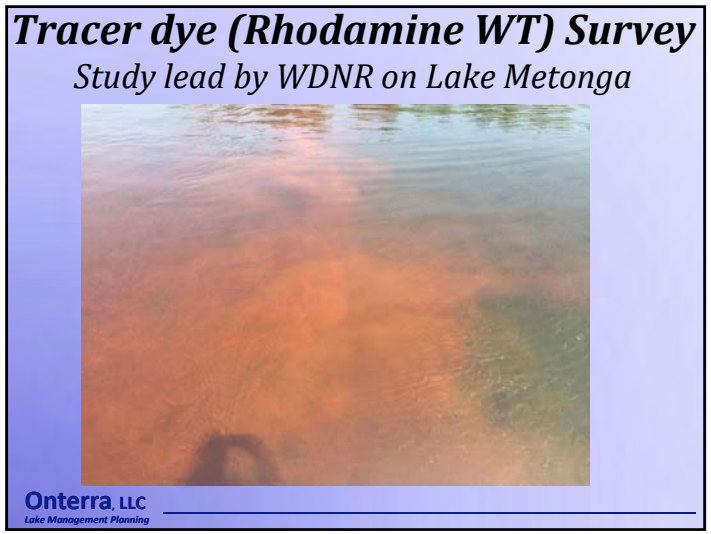
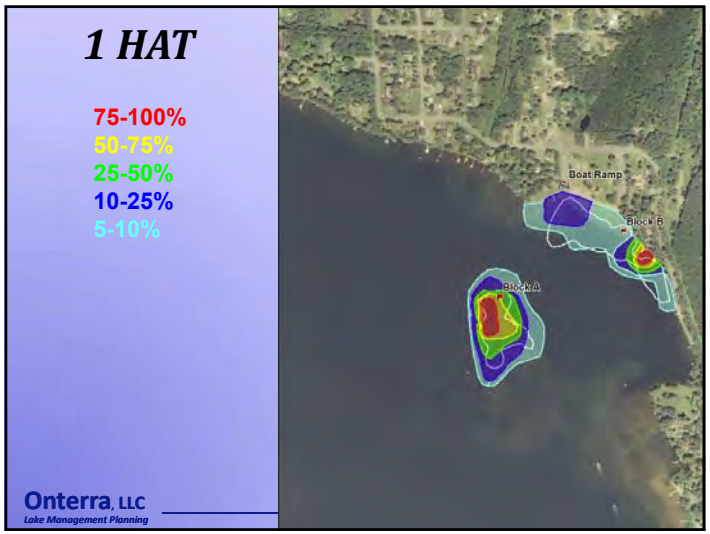
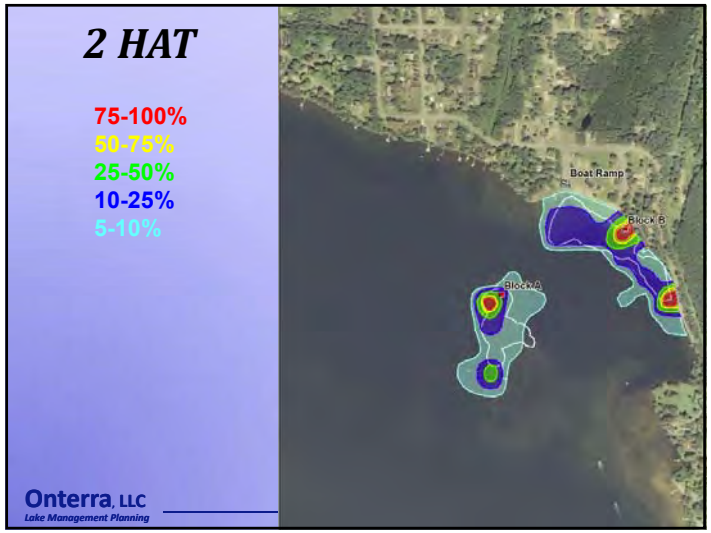
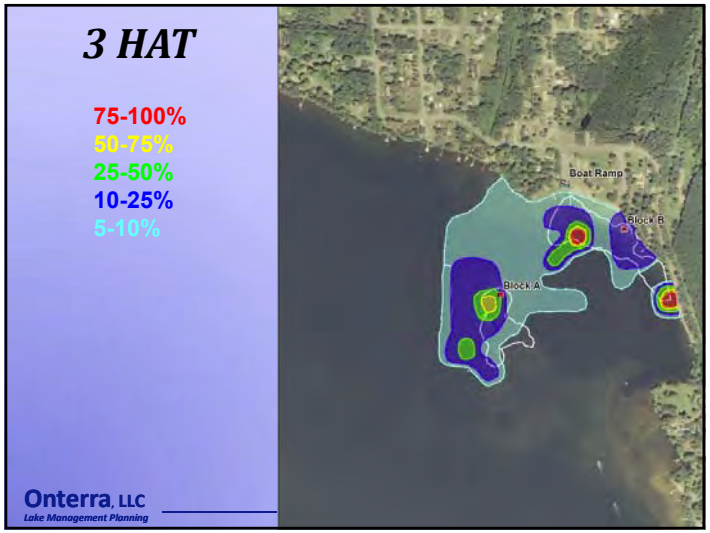
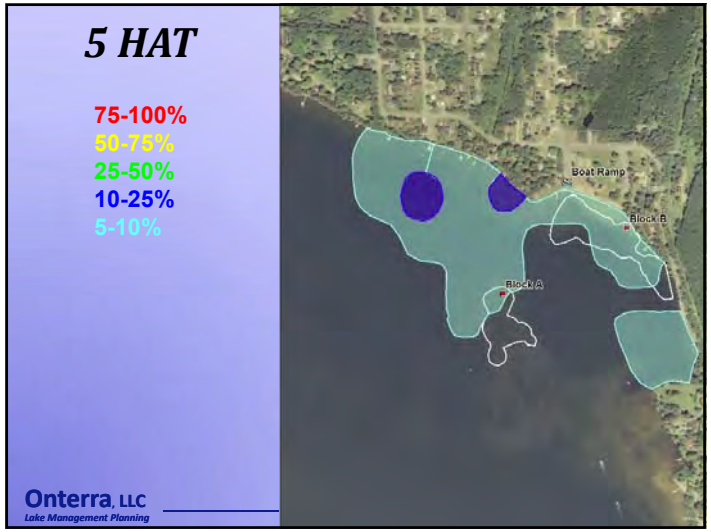

Tracer dye (Rhodamine WT) Survey
Study lead by WDNR on Lake Metonga
Onterra, LLC
Lake Management Planning

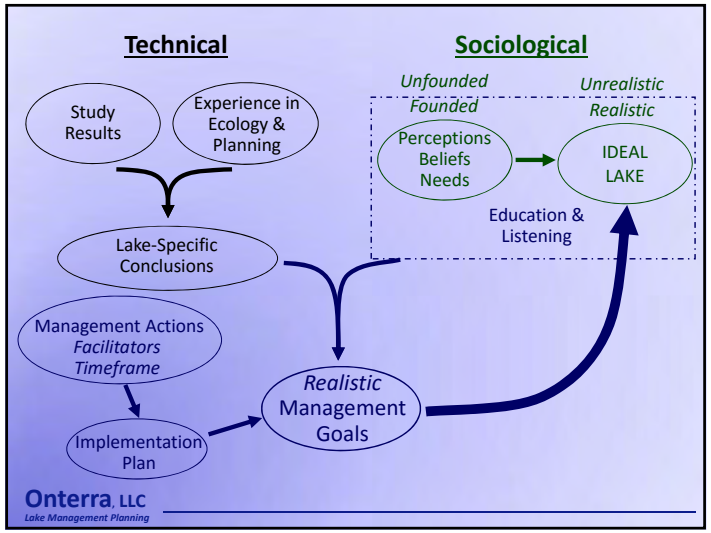

1 HAT
75-100%
50-75%
25-50%
10-25%
5-10%
Boat Ramp
Block B
Block A
Onterra, LLC
Lake Management Planning


2 HAT
75-100%
50-75%
25-50%
10-25%
5-10%
Boat Ramp
Block B
Block A
Onterra, LLC
Lake Management Planning

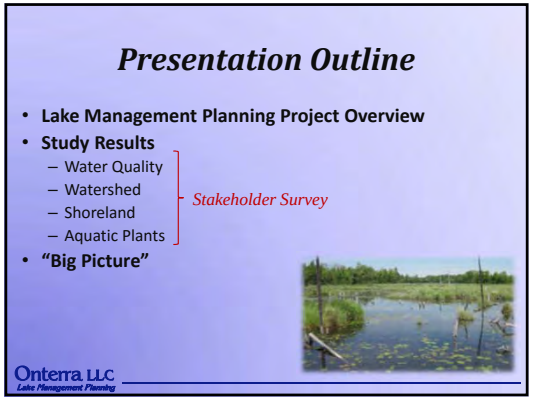

3 HAT
75-100%
50-75%
25-50%
10-25%
5-10%
Boat Ramp
Block B
Block A
Onterra, LLC
Lake Management Planning


5 HAT
75-100%
50-75%
25-50%
10-25%
5-10%
Boat Ramp
Block B
Block A
Onterra, LLC
Lake Management Planning


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


Technical
Sociological
Unfounded
Unrealistic
Founded
Realistic
Study Results
Experience in Ecology & Planning
Perceptions Beliefs Needs
IDEAL LAKE
Education & Listening
Lake-Specific Conclusions
Management Actions
Facilitators
Timeframe
Realistic Management Goals
Implementation Plan
Onterra, LLC
Lake Management Planning


Kelly Lake Advancement Association
Kelly Lake
Management Planning Project
Planning Meeting I
June 30, 2017
Tim Hoyman, CLM
Onterra LLC
Lake Management Planning


Presentation Outline
Lake Management Planning Project Overview
Study Results
Water Quality
Watershed
Shoreland
Aquatic Plants
Stakeholder Survey
"Big Picture"
Onterra LLC
Lake Management Planning


Study and Plan Goals
Collect & Analyze Data
Construct Long-Term & Useable Plan
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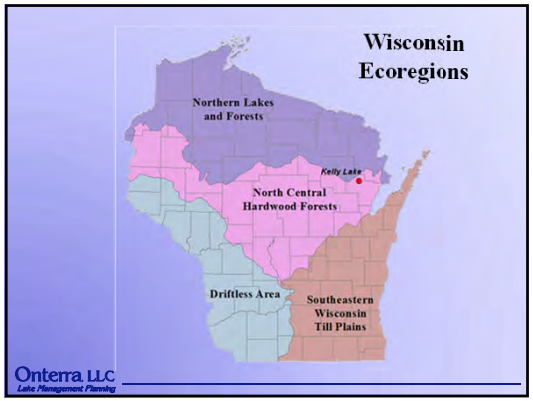
Wisconsin Ecoregions
Northern Lakes and Forests
Kelly Lake
North Central Hardwood Forests
Driftless Area
Southeastern Wisconsin Till Plains
Onterra LLC
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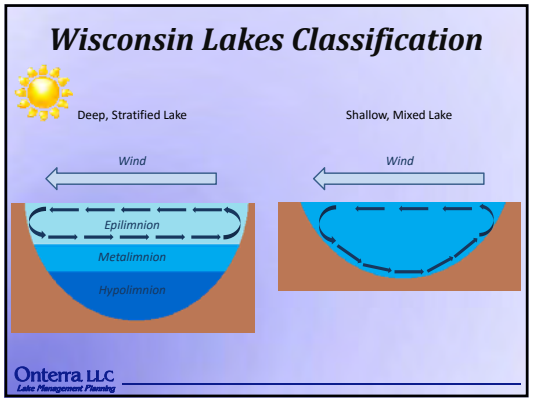
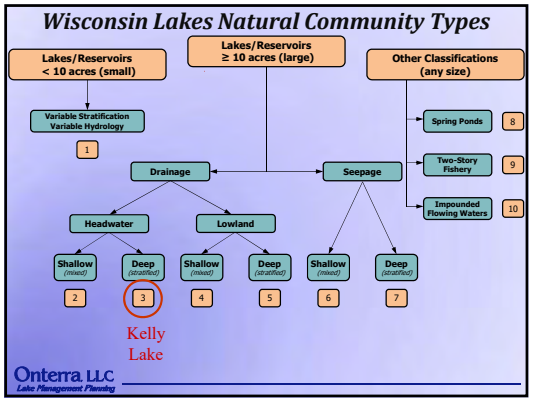

Wisconsin Lakes Classification
Deep, Stratified Lake
Shallow, Mixed Lake
Wind
Wind
Epilimnion
Metalimnion
Hypolimnion
Onterra LLC
Lake Management Planning


Wisconsin Lakes Natural Community Types
Lakes/Reservoirs < 10 acres (small)
Lakes/Reservoirs ≥ 10 acres (large)
Other Classifications (any size)
Variable Stratification Variable Hydrology
1
Drainage
Seepage
Spring Ponds
8
Two-Story Fishery
9
Impounded Flowing Waters
10
Headwater
Lowland
Shallow (mixed)
Deep (stratified)
Shallow (mixed)
Deep (stratified)
Shallow (mixed)
Deep (stratified)
2
3
4
5
6
7
Kelly Lake
Onterra LLC
Lake Management Planning

## Introduction to Lake Water Quality

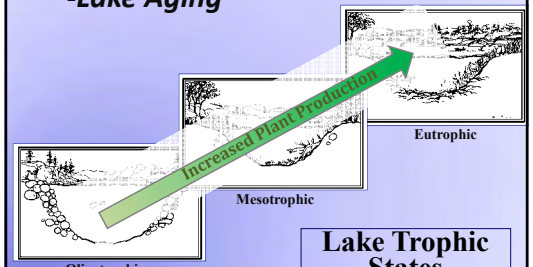
**Phosphorus**
Naturally occurring & essential for all life
Regulates phytoplankton biomass in **most** WI lakes
Most often 'limiting plant nutrient' (shortest supply)
Human activity often increases P delivery to lakes

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

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

Onterra LLC
Lake Management Planning

## Eutrophication
### -Lake Aging




**Lake Trophic States**

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## Average Total Phosphorus


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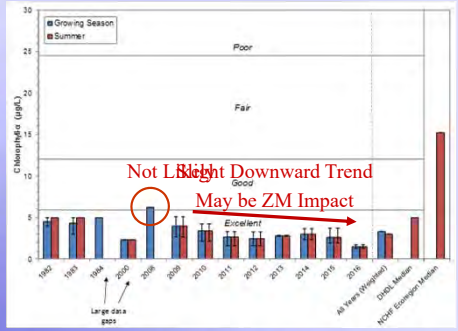
Lake Management Planning

## Average Chlorophyll-a

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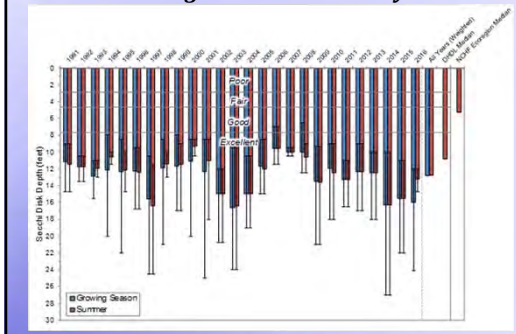
## Average Secchi Disk Clarity

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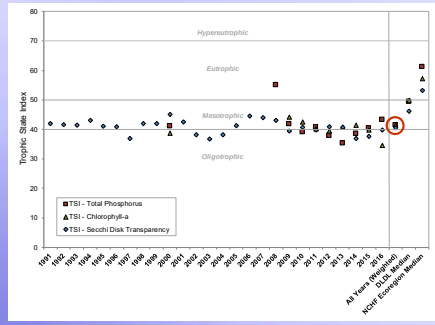
## Trophic State

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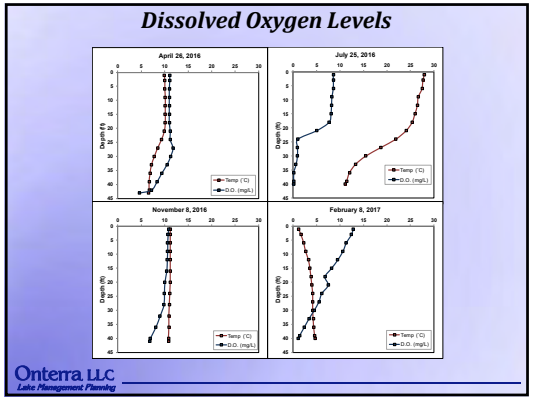
Dissolved Oxygen Levels
April 26, 2016
July 25, 2016
November 8, 2016
February 8, 2017
Temp (°C)
D.O. (mg/L)
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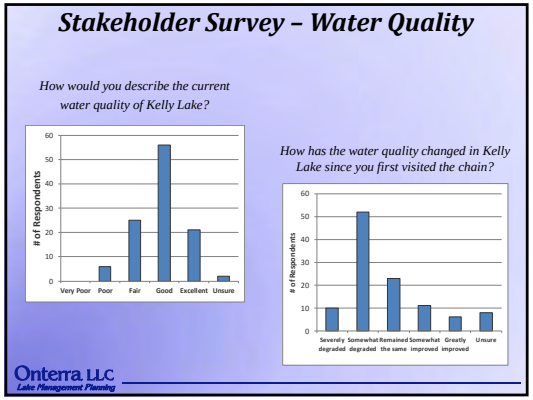
Stakeholder Survey – Water Quality
How would you describe the current water quality of Kelly Lake?
# of Respondents
Very Poor
Poor
Fair
Good
Excellent
Unsure
How has the water quality changed in Kelly Lake since you first visited the chain?
Severely degraded
Somewhat degraded
Remained the same
Somewhat improved
Greatly improved
Unsure
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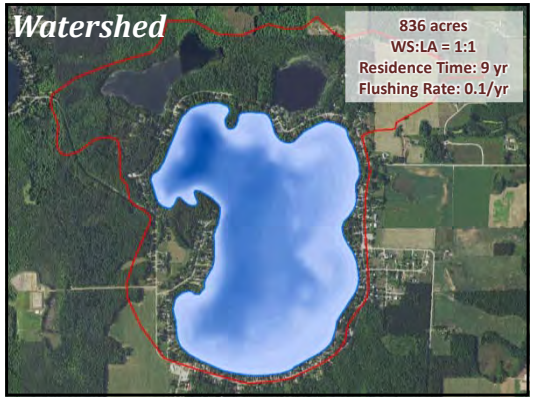
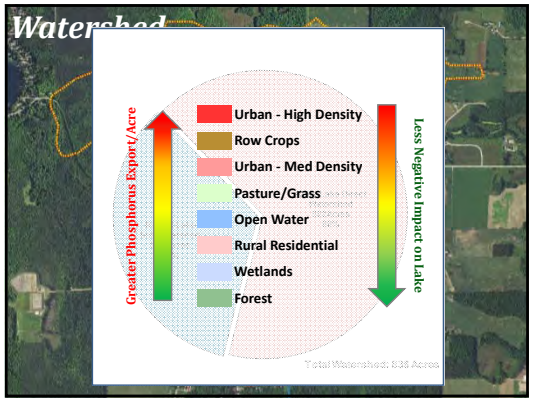
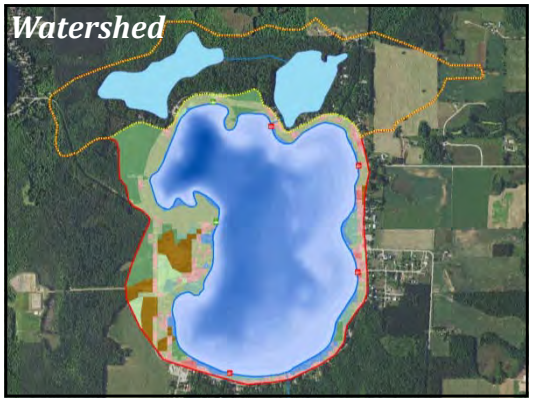
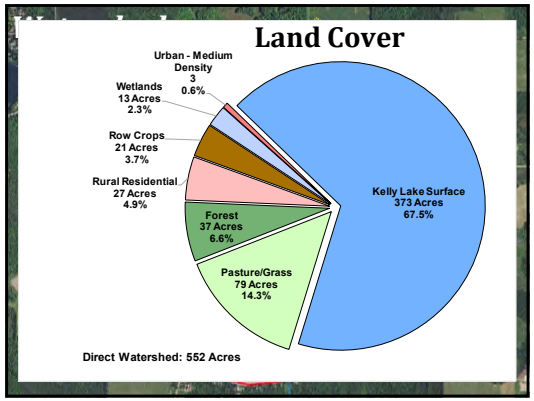
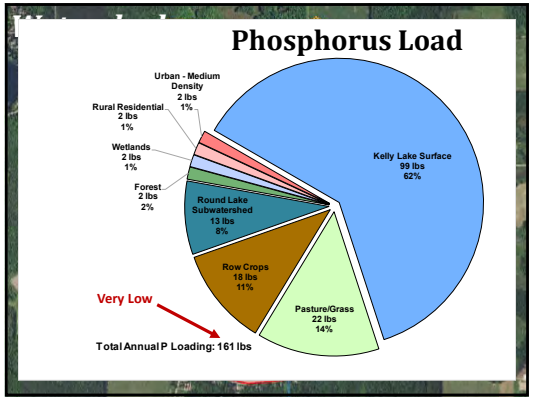

Watershed
836 acres
WS:LA = 1:1
Residence Time: 9 yr
Flushing Rate: 0.1/yr


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


Watershed


Land Cover
Urban - Medium Density
3
0.6%
Wetlands
13 Acres
2.3%
Row Crops
21 Acres
3.7%
Rural Residential
27 Acres
4.9%
Forest
37 Acres
6.6%
Pasture/Grass
79 Acres
14.3%
Kelly Lake Surface
373 Acres
67.5%
Direct Watershed: 552 Acres


Phosphorus Load
Urban - Medium Density
2 lbs
1%
Rural Residential
2 lbs
1%
Wetlands
2 lbs
1%
Forest
2 lbs
2%
Round Lake Subwatershed
13 lbs
8%
Row Crops
18 lbs
11%
Pasture/Grass
22 lbs
14%
Kelly Lake Surface
99 lbs
62%
Very Low
Total Annual P Loading: 161 lbs


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
Range
Natural
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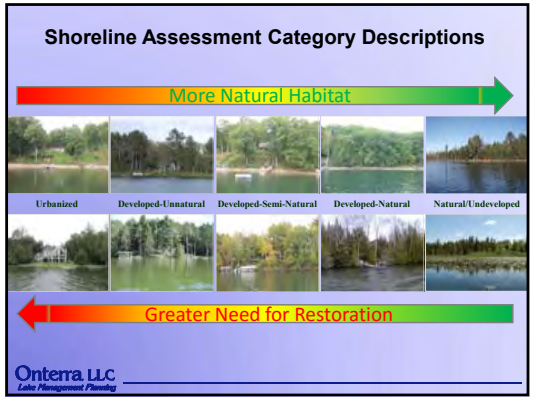
Shoreline Assessment Category Descriptions
More Natural Habitat
Urbanized
Developed-Unnatural
Developed-Semi-Natural
Developed-Natural
Natural/Undeveloped
Greater Need for Restoration
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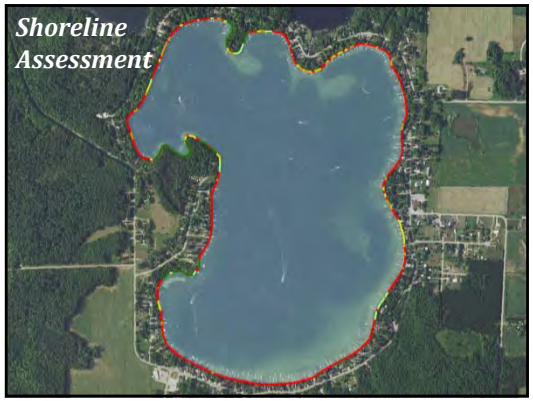
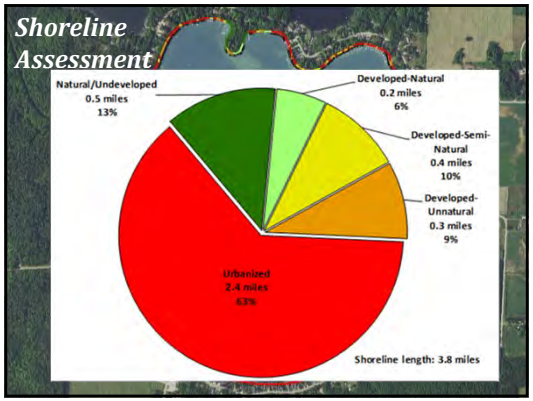
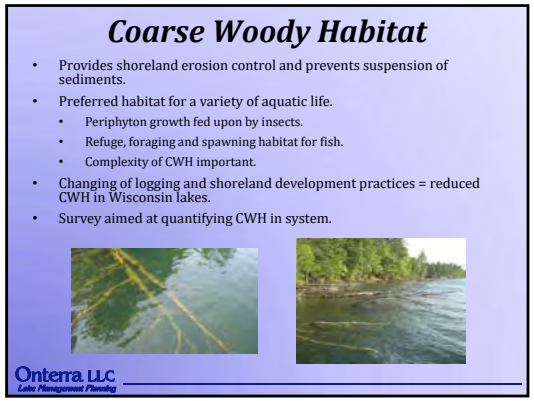

Shoreline Assessment


Shoreline Assessment
Natural/Undeveloped
0.5 miles
13%
Developed-Natural
0.2 miles
6%
Developed-Semi-Natural
0.4 miles
10%
Developed-Unnatural
0.3 miles
9%
Urbanized
2.4 miles
63%
Shoreline length: 3.8 miles


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 system.
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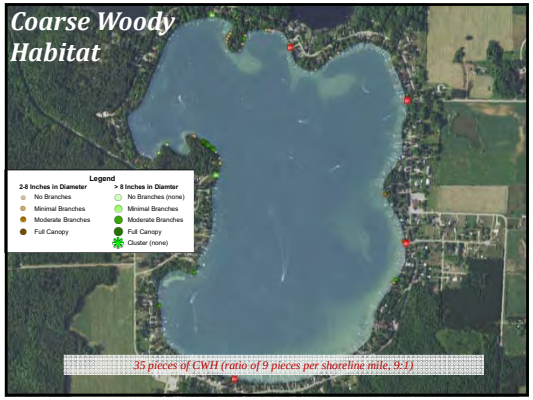


## *Aquatic Plant Surveys*

- Determine changes in plant community from past surveys
- Assess both native and non-native populations
- Numerous surveys completed in 2016
  - Early-Season AIS Survey
  - Whole-Lake Point-Intercept Survey
  - Emergent/Floating-Leaf Community Mapping Survey
  - EWM Peak-Biomass Survey

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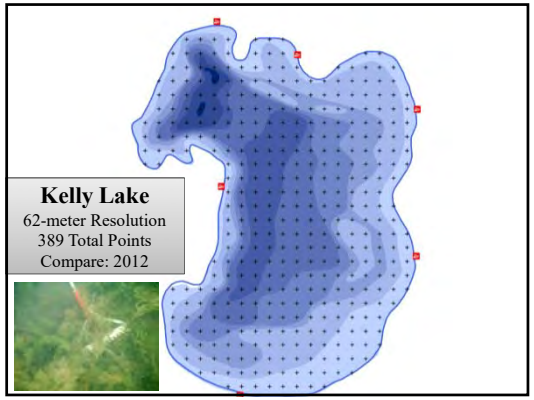


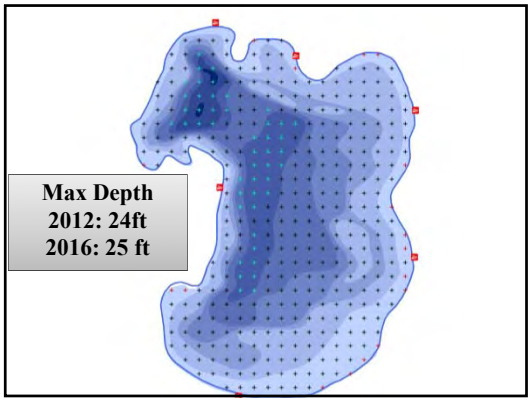


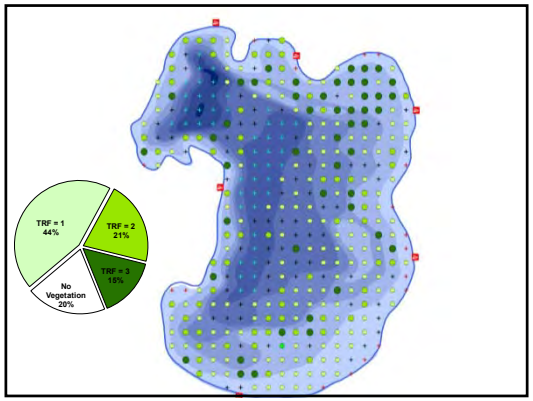


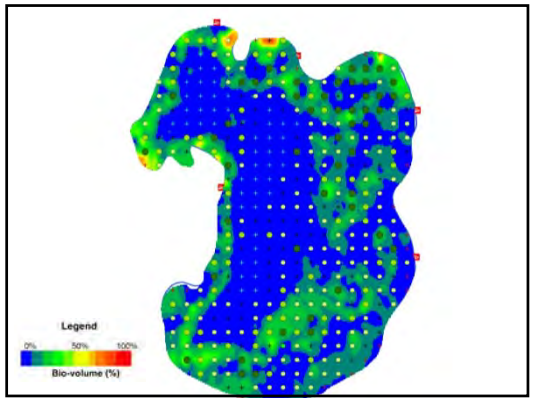

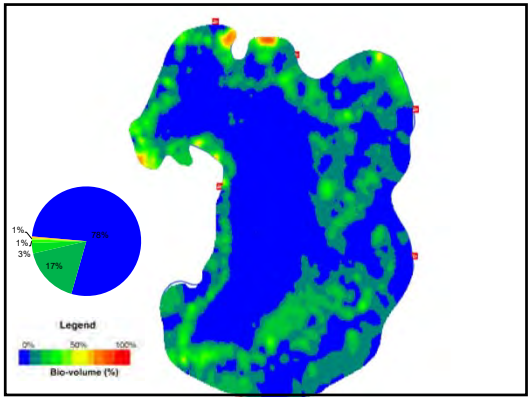


## Aquatic Plant Species List

**~30 Native Species**
**2 Non-Native Species**
Eurasian water milfoil
Reed canary grass

| Growth Form | Scientific Name | Common Name | Coefficient of Conservatism (C) | 2012 WDNR | 2016 Onterra |
|---|---|---|---|---|---|
| Emergent | *Calla palustris* | Water arum | 9 | | I |
| | *Phalaris arundinacea* | Reed canary grass | Exotic | | I |
| | *Pontederia cordata* | Pickerelweed | 9 | | I |
| | *Sagittaria latifolia* | Common arrowhead | 3 | | I |
| | *Schoenoplectus acutus* | Hardstem bulrush | 5 | | I |
| | *Schoenoplectus pungens* | Three-square rush | 5 | | I |
| FL | *Nuphar variegata* | Spatterdock | 6 | | X |
| | *Nymphaea odorata* | White water lily | 6 | X | X |
| | *Persicaria amphibia* | Water smartweed | 5 | | I |
| | *Sparganium fluctuans* | Floating-leaf bur-reed | 10 | | I |
| Submergent | *Bidens beckii* | Water marigold | 8 | X | X |
| | *Ceratophyllum demersum* | Coontail | 3 | X | X |
| | *Chara* spp. | Muskgrasses | 7 | X | X |
| | *Elodea canadensis* | Common waterweed | 3 | X | X |
| | *Myriophyllum sibiricum* | Northern watermilfoil | 7 | X | X |
| | *Myriophyllum spicatum* | Eurasian watermilfoil | Exotic/Invasive | X | X |
| | *Najas flexilis* | Slender naiad | 6 | X | X |
| | *Najas guadalupensis* | Southern naiad | 7 | X | X |
| | *Nitella* spp. | Stoneworts | 7 | X | X |
| | *Potamogeton amplifolius* | Large-leaf pondweed | 7 | X | X |
| | *Potamogeton berchtoldii* | Slender pondweed | 7 | | X |
| | *Potamogeton friesii* | Fries' pondweed | 8 | | X |
| | *Potamogeton gramineus* | Variable-leaf pondweed | 7 | X | X |
| | *Potamogeton illinoensis* | Illinois pondweed | 6 | X | X |
| | *Potamogeton natans* | Floating-leaf pondweed | 5 | | I |
| | *Potamogeton praelongus* | White-stem pondweed | 8 | X | X |
| | *Potamogeton robbinsii* | Fern-leaf pondweed | 8 | X | |
| | *Potamogeton strictifolius* | Stiff pondweed | 8 | X | X |
| | *Potamogeton zosteriformis* | Flat-stem pondweed | 6 | X | X |
| | *Stuckenia pectinata* | Sago pondweed | 3 | X | X |
| | *Vallisneria americana* | Wild celery | 6 | X | X |
| S/E | *Eleocharis acicularis* | Needle spikerush | 5 | 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

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## 2016 Littoral Frequency of Occurrence


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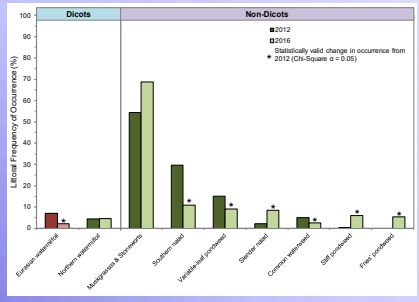
## 2012-2016 LFOO Compare

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## Community Mapping Survey

| Plant Community | Acres |
|---|---|
| Emergent | 0.2 |
| Floating-leaf | 2.9 |
| Mixed Emergent & Floating-leaf | 3.4 |
| **Total** | 6.5 |

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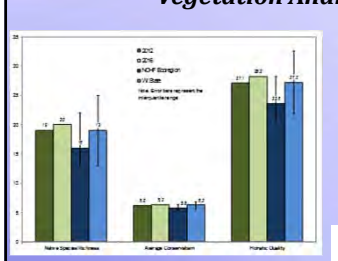
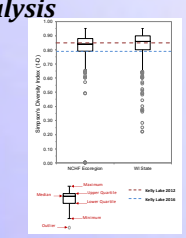
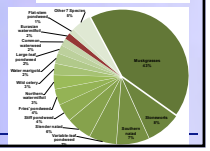
## Vegetation Analysis





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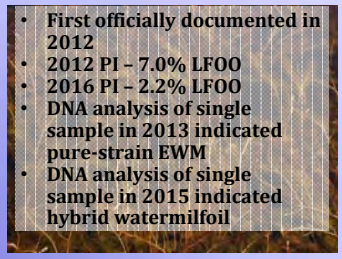
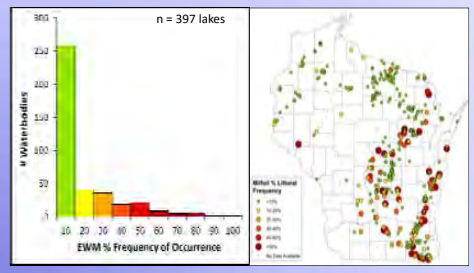
## Non-native Aquatic Plants

### Eurasian Water Milfoil



- First officially documented in 2012
- 2012 PI – 7.0% LFOO
- 2016 PI – 2.2% LFOO
- DNA analysis of single sample in 2013 indicated pure-strain EWM
- DNA analysis of single sample in 2015 indicated hybrid watermilfoil

## *State-wide EWM Population Trends*

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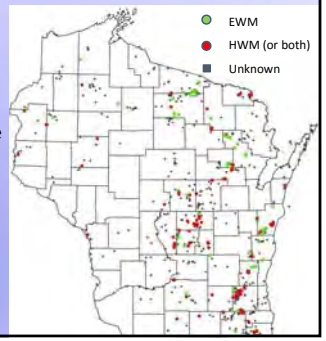
## *Hybrid EWM in Wisconsin*

- ~80 Wisconsin Lakes contain hybrid EWM
- Hybrid strains have different genetic makeups
- Some (perhaps most) hybrid strains are more tolerant to some herbicides



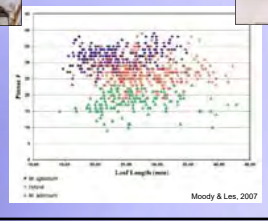

## *Morphological variation*

No turion

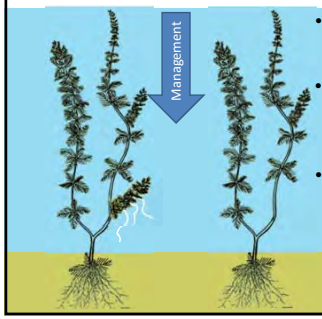
Forms Turions

*EWM*

*NWM*

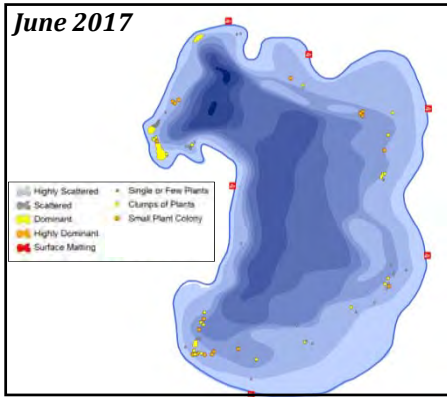



## *EWM Life-Cycle & Control Strategy Philosophy*




- Herbicide needs to translocate to root crown (*hard to kill*)
- Hand-harvesting can be effective (*extremely time intensive*)
- Control strategy is straight-forward

## *June 2017*



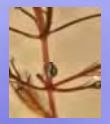
## AIS Active Management Discussion

| Pros | Cons |
|---|---|
| • Keep AIS population low so native ecosystem can function as it did prior to AIS (***ecosystem restoration***) | • Management action itself may be damaging to the lake, so acknowledging potential known/unknown secondary impacts is important |
| • Keep AIS population low so it does not cause recreation, navigation, or aesthetic issues (***improve cultural ecosystem services***) | • Management action may not be fully supported by public |
| • Keep AIS population low so the lake is not a source population for other nearby lakes (***stewardship***) | • ***Unmanaged*** AIS population may be low enough to not cause measurable ecosystem impacts or reduce cultural ecosystem services |

## AIS Control Strategies

- Do nothing (monitor)
- Management
  - ~~Biocontrol (weevils)~~
  - Herbicide treatment
  - Hand removal (includes DASH)
  - ~~Winter drawdown~~
  - ~~Mechanical harvesting~~





## Stakeholder Survey

- What is your level of support for the responsible use of the following techniques on Kelly Lake?

| HH By Divers | | Herbicide | | Do Nothing | |
|---|---|---|---|---|---|
| Support | 72% | Support | 44% | Support | 1% |
| Not Support | 5% | Not Support | 21% | Not Support | 82% |
| Unsure/Neutral | 23% | Unsure/Neutral | 35% | Unsure/Neutral | 17% |

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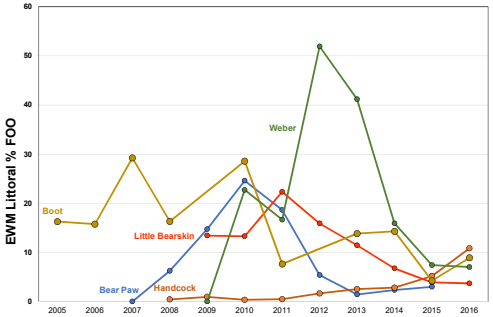
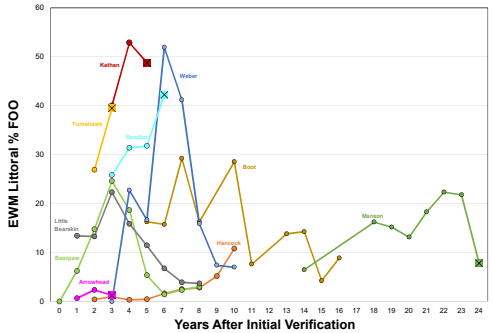
## NLF Ecoregion – Unmanaged




## NLF Ecoregion – Unmanaged




## Stakeholder Survey

- How do you feel about the past use of herbicides to treat EWM in previous years?

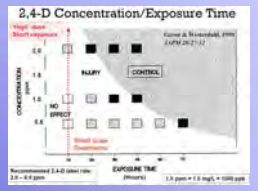
| | |
|---|---|
| Support | 65% |
| Not Support | 13% |
| Unsure/Neutral | 22% |

- What is your level of support or opposition for future aquatic herbicide use to treat EWM?

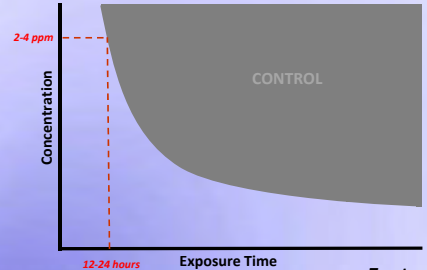
| | |
|---|---|
| Support | 67% |
| Not Support | 9% |
| Unsure/Neutral | 24% |

## Herbicide Spot Treatment

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




## Herbicide Use Patterns




High Concentration ▶ Short Exposure Time

***Treatment Type***
***Spot***

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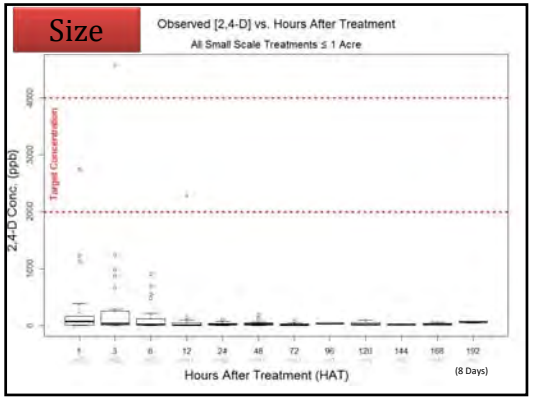
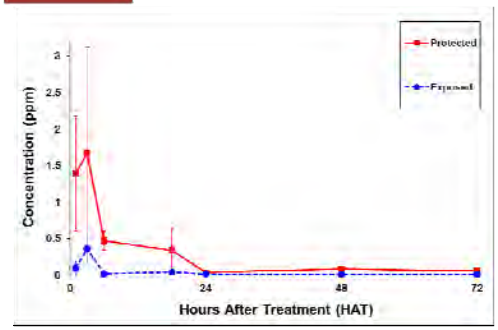
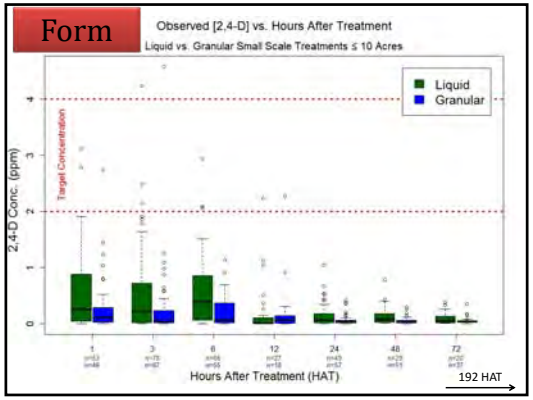
## Size




## Location




## Form



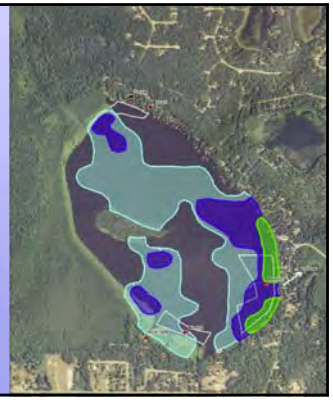

## *2015 Treatment on Loon Lake*

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

## 6 HAT

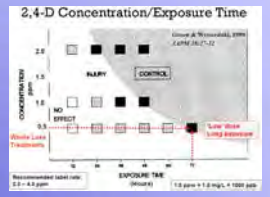
75-100%
50-75%
25-50%
10-25%
5-10%

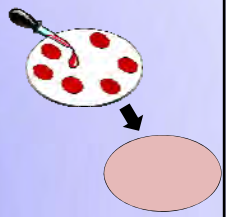
If apply 2,4-D at 4.0 ppm, 5-10% would be 0.2 - 0.4 ppm



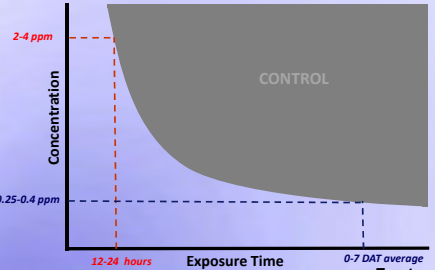
## Large-Scale (Whole-lake) Treatment

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



## Herbicide Use Patterns



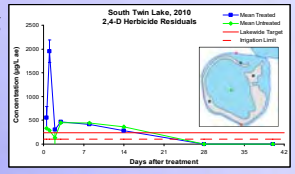

Treatment Type

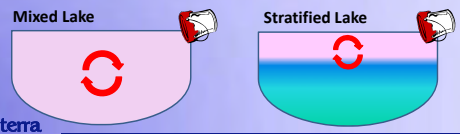
High Concentration ▶ Short Exposure Time — Spot

Low Concentration ▶ Long Exposure Time — Whole-lake

## Large-Scale (Whole-lake) Treatment

- Herbicide Mixing
  - Horizontal
  - Vertical

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## Conclusions

- Water quality for deep, headwater drainage lake is good to excellent.
  - Inconsistent historical data - trends analysis difficult.
  - Kelly Lake may be seeing impacts brought on by zebra mussel infestation.
  - While clearer water with less algae may seem like a good thing, in the long run, it may not be.
- Overall the watershed is in very good condition
  - Land cover exports minimal phosphorus.
  - Actual phosphorus levels lower than predicted levels.
  - Shoreland zone is highly developed with little CWH, which will ultimately impact the lake with time.

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## Conclusions continued

- Aquatic plant community
  - Based upon analysis, Kelly's native plant community is of good quality
    - Moderate species diversity
    - Moderate sensitive species present
  - Little floating-leaf and emergent presence is likely a sign of negative impacts brought on by human disturbance.
  - Conditions are optimal for muskgrasses
    - Limits available space for other species
  - EWM/Hybrid is an issue that must be monitored and managed to keep its occurrence in check

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## Conclusions

- Aquatic plant community
  - Based upon standard analysis, Kelly's native plant community is currently of good quality
    - Moderate species diversity
    - Moderate sensitive species present
  - Little floating-leaf and emergent presence is likely a sign of negative impacts brought on by human disturbance.
  - Conditions are optimal for muskgrasses
    - Limits available space for other species
  - EWM/Hybrid is an issue that must be monitored and managed to keep its occurrence in check

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## Meeting Objective

- Present highlights of study results from Kelly Lake
  - Focusing on primarily on Eurasian/Hybrid Watermilfoil
- Answer questions (throughout)
- Outline management plan goals and actions

## Presentation Outline

- Summary of Project Conclusions
- Specific Results Discussion
- Proposed Management Plan (Mixed In)

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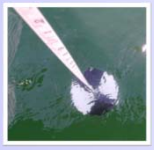
## *Lake Water Quality – Trophic Parameters*

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

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



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

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## Conclusions

- Water quality for deep, headwater drainage lake is good to excellent.
  - Inconsistent historical data - trends analysis difficult.
  - Kelly Lake may be seeing impacts brought on by zebra mussel infestation.
  - While clearer water with less algae may seem like a good thing, in the long run, it may not be.
- Overall the watershed is in very good condition
  - Land cover exports minimal phosphorus.
  - Actual phosphorus levels lower than predicted levels.
  - Shoreland zone is highly developed with little coarse woody habitat, which will ultimately impact the lake with time.

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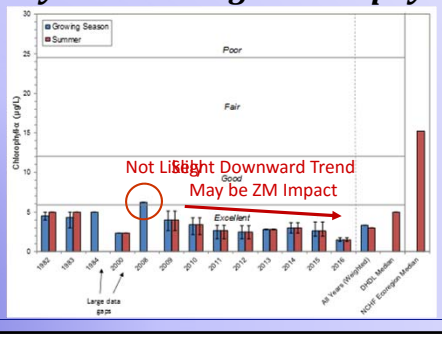
## *Kelly Lake Average Chlorophyll-a*

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**Management Goal:**
**Maintain Current Water Quality Conditions**

***Management Actions***

1. **Monitor water quality through WDNR Citizens Lake Monitoring Network**

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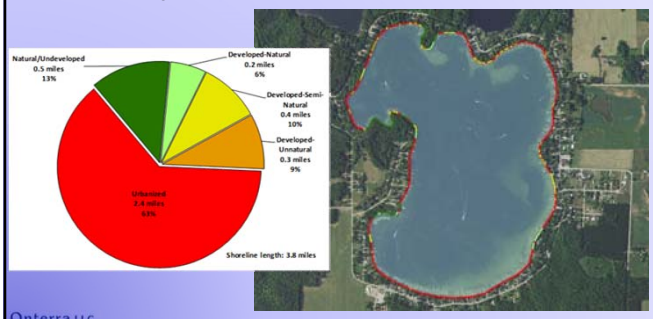
## *Kelly Lake Shoreland Assessment*

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## *Shoreland Assessment*

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

**Urbanized** Range **Natural**

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**Management Goal:**
**Improve Lake and Fishery Resource by Protecting and Restoring Shoreland Condition**

***Management Actions***

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

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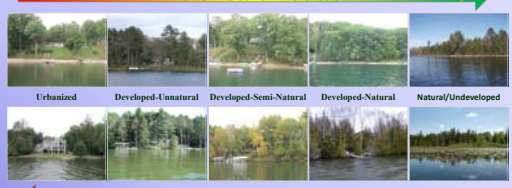
## *Shoreline Assessment Category Descriptions*

More Natural Habitat




Greater Need for Restoration

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## Professional AIS Mapping

**Point-Based Mapping**
- Single or Few Plants
- Clumps of Plants
- Small Plant Colony

**Polygon-Based Mapping**
- Highly Scattered
- Scattered
- Dominant
- Highly Dominant
- Surface Matting

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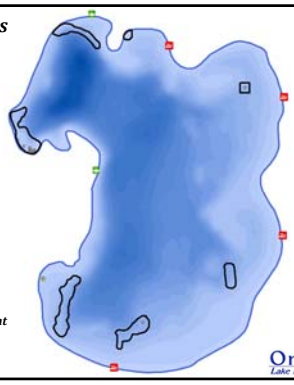
## Late-Season EWM Survey Results 2013

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## Late-Season EWM Survey Results 2012


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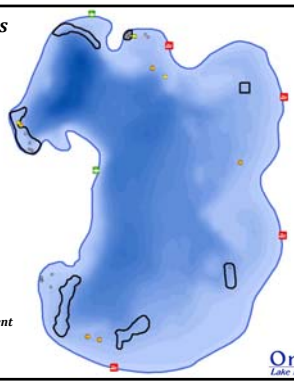
## Late-Season EWM Survey Results 2014

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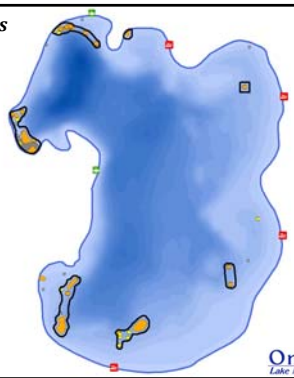
## Late-Season EWM Survey Results 2012

*Spring 2013 Treatment – 13.2 acres*

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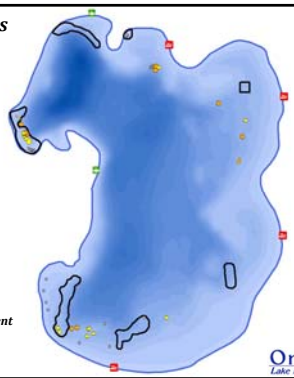
## Late-Season EWM Survey Results 2015

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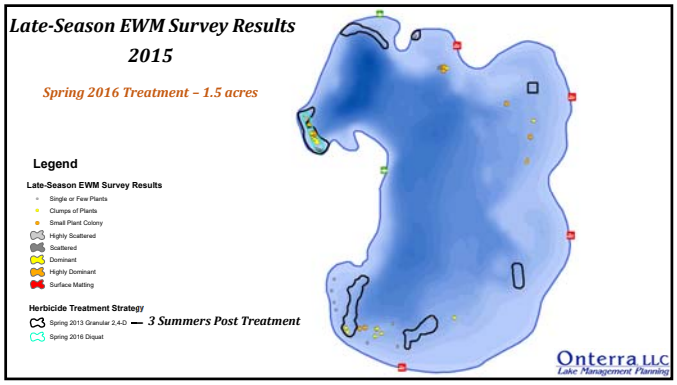
Late-Season EWM Survey Results
2015
Spring 2016 Treatment – 1.5 acres
Legend
Late-Season EWM Survey Results
Single or Few Plants
Clumps of Plants
Small Plant Colony
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Herbicide Treatment Strategy
Spring 2013 Granular 2,4-D — 3 Summers Post Treatment
Spring 2016 Diquat
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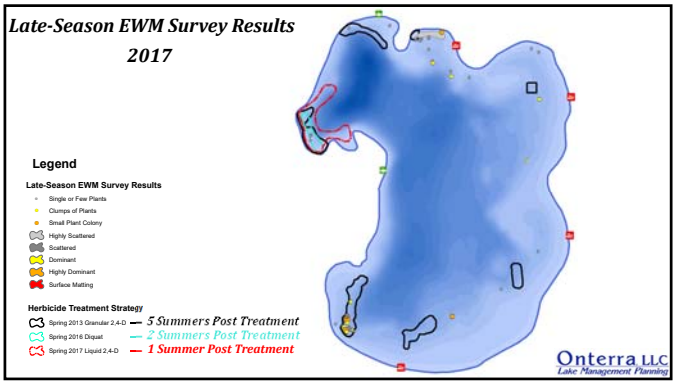
Late-Season EWM Survey Results
2017
Legend
Late-Season EWM Survey Results
Single or Few Plants
Clumps of Plants
Small Plant Colony
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Herbicide Treatment Strategy
Spring 2013 Granular 2,4-D — 5 Summers Post Treatment
Spring 2016 Diquat — 2 Summers Post Treatment
Spring 2017 Liquid 2,4-D — 1 Summer Post Treatment
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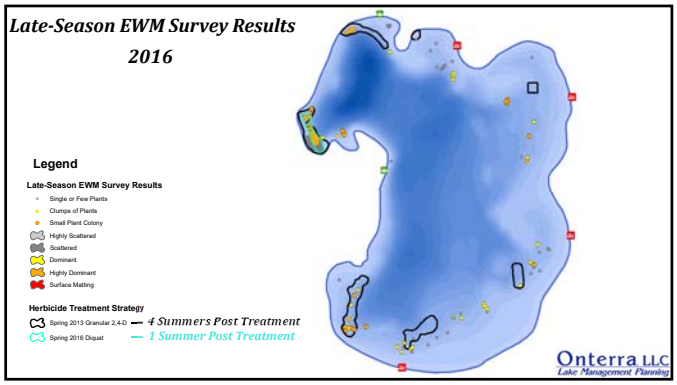
Late-Season EWM Survey Results
2016
Legend
Late-Season EWM Survey Results
Single or Few Plants
Clumps of Plants
Small Plant Colony
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Herbicide Treatment Strategy
Spring 2013 Granular 2,4-D — 4 Summers Post Treatment
Spring 2016 Diquat — 1 Summer Post Treatment
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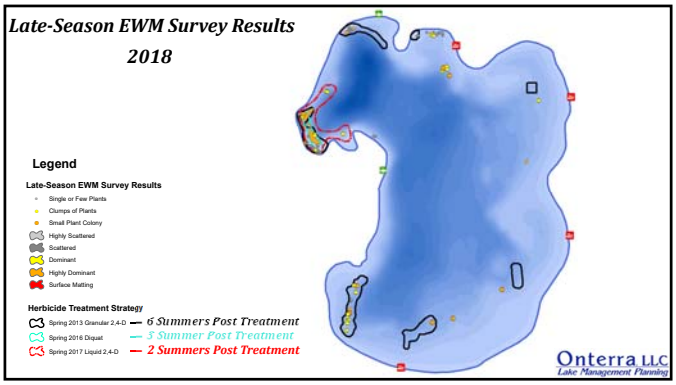
Late-Season EWM Survey Results
2018
Legend
Late-Season EWM Survey Results
Single or Few Plants
Clumps of Plants
Small Plant Colony
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Herbicide Treatment Strategy
Spring 2013 Granular 2,4-D — 6 Summers Post Treatment
Spring 2016 Diquat — 3 Summer Post Treatment
Spring 2017 Liquid 2,4-D — 2 Summers Post Treatment
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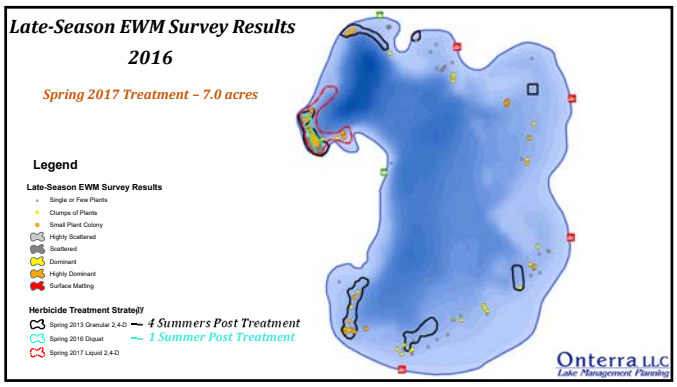
Late-Season EWM Survey Results
2016
Spring 2017 Treatment – 7.0 acres
Legend
Late-Season EWM Survey Results
Single or Few Plants
Clumps of Plants
Small Plant Colony
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Herbicide Treatment Strategy
Spring 2013 Granular 2,4-D — 4 Summers Post Treatment
Spring 2016 Diquat — 1 Summer Post Treatment
Spring 2017 Liquid 2,4-D
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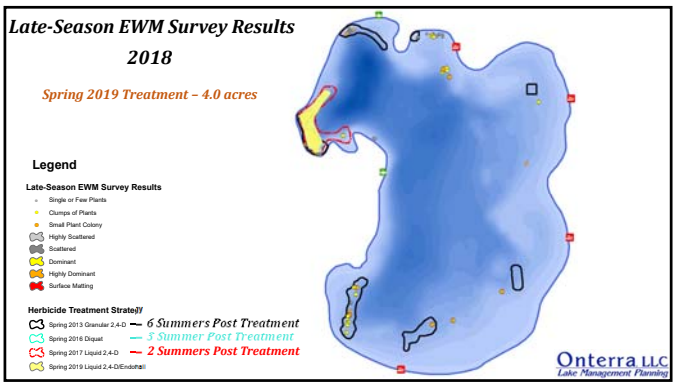
Lake Management Planning


Late-Season EWM Survey Results
2018
Spring 2019 Treatment – 4.0 acres
Legend
Late-Season EWM Survey Results
Single or Few Plants
Clumps of Plants
Small Plant Colony
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Herbicide Treatment Strategy
Spring 2013 Granular 2,4-D — 6 Summers Post Treatment
Spring 2016 Diquat — 3 Summer Post Treatment
Spring 2017 Liquid 2,4-D — 2 Summers Post Treatment
Spring 2019 Liquid 2,4-D/Endothall
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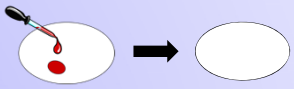
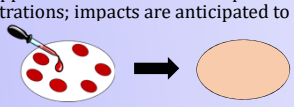
## *Ecological Definitions*

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



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



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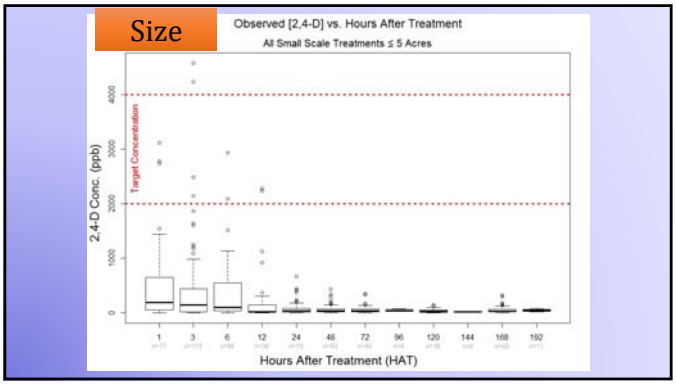
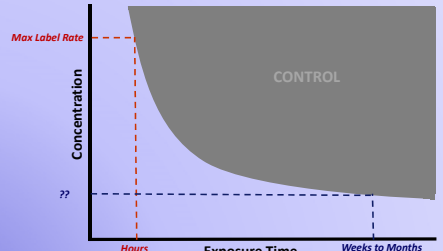



## *Herbicide Use Patterns*




***Treatment Type***

High Concentration ► Short Exposure Time ***Spot***

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

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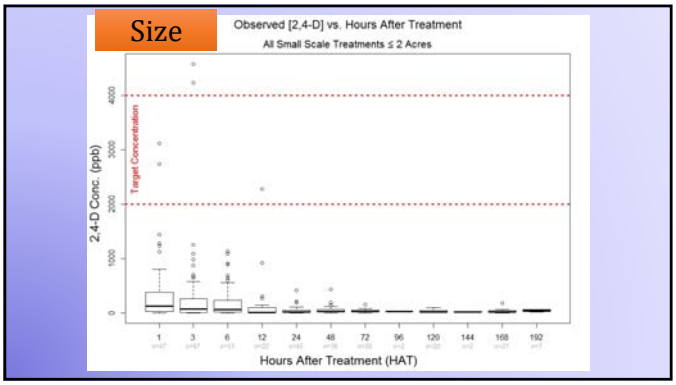
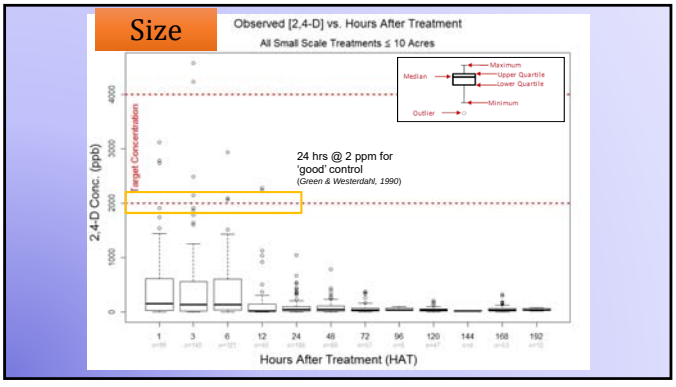
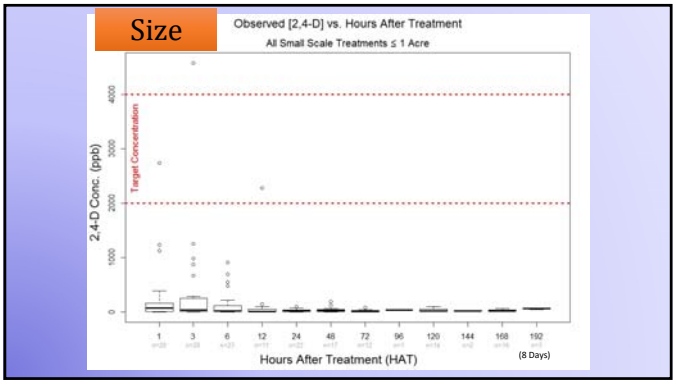
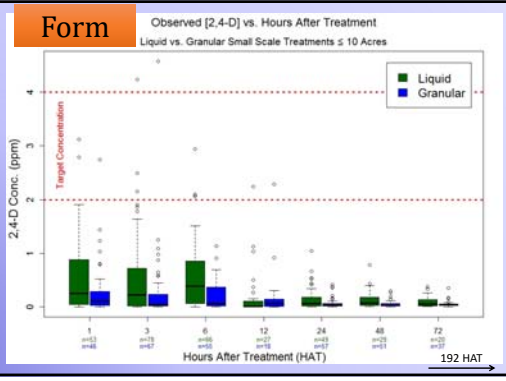


Form




**Management Goal:**

**Control Existing and Prevent Further Aquatic Invasive Species Infestations within Kelly Lake**

***Management Actions***

1. **Continue Clean Boats Clean Waters watercraft inspections at public access locations**
2. **Coordinate annual professional monitoring of EWM/HWM**
3. **Conduct EWM/HWM population control using hand-harvesting (including DASH) and/or herbicide spot treatments**
4. **Investigate feasibility of constructing KLAA-owned and -operated Diver Assisted Suction Harvester (DASH)**
5. **Conduct periodic quantitative vegetation monitoring on Kelly Lake**

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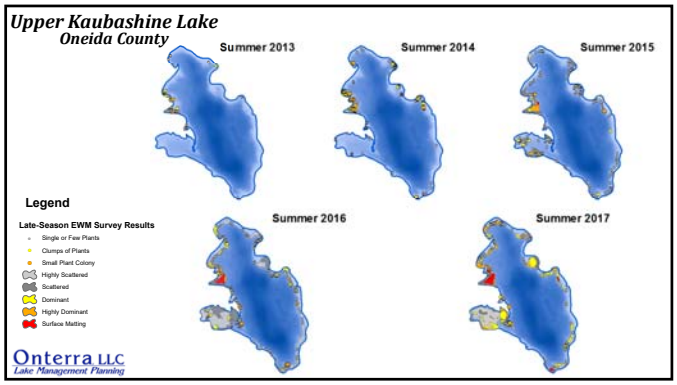


**Management Goal:**

**Increase the KLAA's Capacity to Communicate with Lake Stakeholders and Facilitate Partnerships with Other Management Entities**

***Management Actions***

1. **Use education to promote lake protection and enjoyment through stakeholder education**
2. **Continue KLAA's involvement with other entities that have responsibilities in managing (management units) Kelly Lake**

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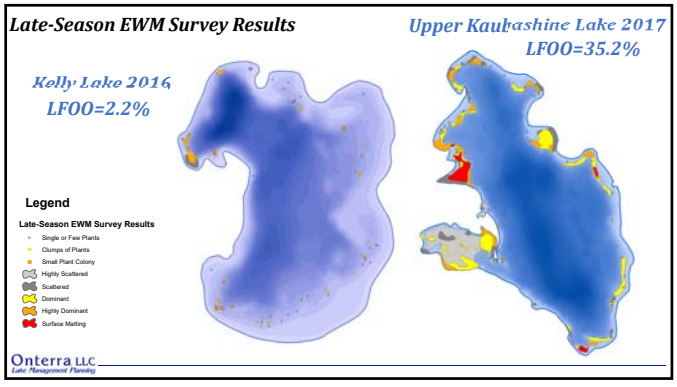


# Thank You

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Lake Management Planning

# B

# APPENDIX B

## Stakeholder Survey Response Charts and Comments

**Kelly Lake - Anonymous Stakeholder Survey**

*Surveys Distributed:* 248
*Surveys Returned:* 112
*Response Rate:* 45%

***Kelly Lake Property***

**1. Do you rent or own your property on or near Kelly Lake? Please select one choice.**

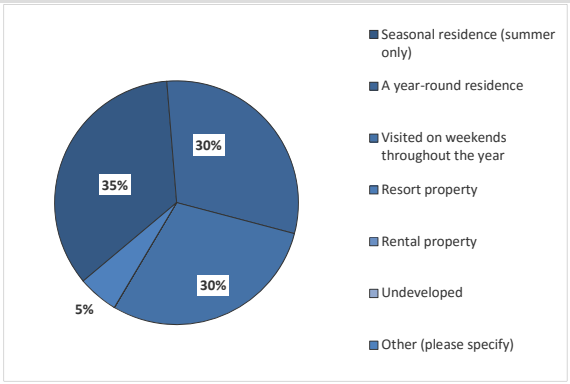
| Answer Options | Response Percent | Response Count |
|---|---|---|
| Own | 100.0% | 112 |
| Rent | 0.0% | 0 |
| *answered question* | | 112 |
| *skipped question* | | 0 |

**2. Is your property from Question 1 on the lake or off the lake? Please select one choice.**

| Answer Options | Response Percent | Response Count |
|---|---|---|
| On the lake | 89.3% | 100 |
| Off the lake | 10.7% | 12 |
| *answered question* | | 112 |
| *skipped question* | | 0 |

**3. How is your property on Kelly Lake utilized?**

| Answer Options | Response Percent | Response Count |
|---|---|---|
| Seasonal residence (summer only) | 34.8% | 39 |
| A year-round residence | 30.4% | 34 |
| Visited on weekends throughout the year | 29.5% | 33 |
| Resort property | 0.0% | 0 |
| Rental property | 0.0% | 0 |
| Undeveloped | 0.0% | 0 |
| Other (please specify) | 5.4% | 6 |
| *answered question* | | 112 |
| *skipped question* | | 0 |

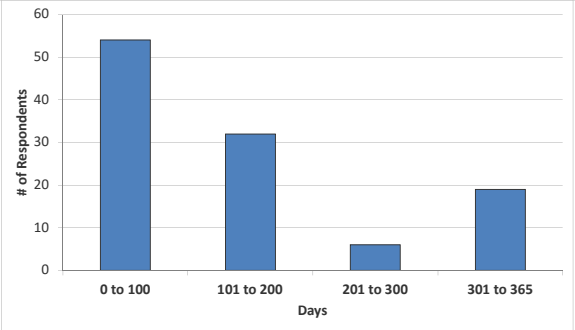



| Number | Other (please specify) |
|---|---|
| 1 | SUMMERS AND WEEKENDS THE REMAINDER OF THE YEAR |
| 2 | Used Year Round, but not primary residence |
| 3 | Summer and weekends throughout the year |
| 4 | seasonal and weekends throughout year |
| 5 | some early spring, all of summer, some autumun |
| 6 | Various weekends and other times during year. |

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

| Answer Options | Response Count |
|---|---|
| | 111 |
| *answered question* | 111 |
| *skipped question* | 1 |

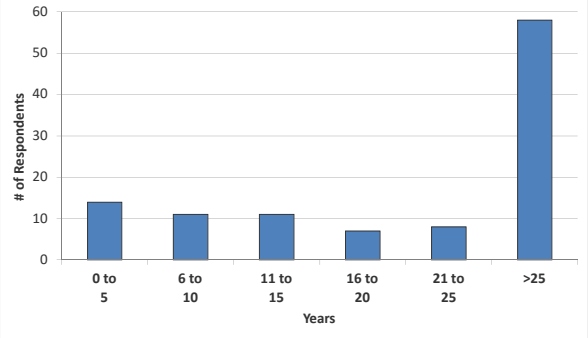
| Category (# of days) | Responses | |
|---|---|---|
| 0 to 100 | 54 | 49% |
| 101 to 200 | 32 | 29% |
| 201 to 300 | 6 | 5% |
| 301 to 365 | 19 | 17% |



**5. How long have you owned your property on Kelly Lake?**

| Answer Options | Response Count |
|---|---|
| | 109 |
| *answered question* | 109 |
| *skipped question* | 3 |

| Category (# of years) | Responses | % Response |
|---|---|---|
| 0 to 5 | 14 | 13% |
| 6 to 10 | 11 | 10% |
| 11 to 15 | 11 | 10% |
| 16 to 20 | 7 | 6% |
| 21 to 25 | 8 | 7% |
| >25 | 58 | 53% |

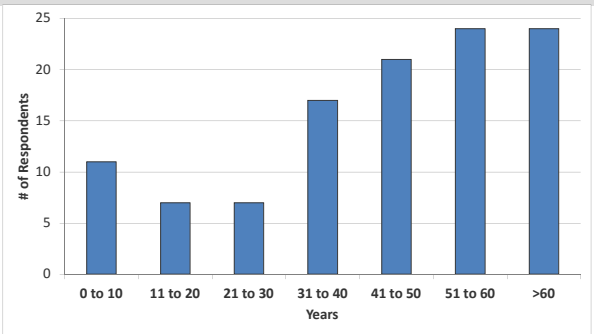



***Recreational Activity on Kelly Lake***

**6. How many years ago did you first visit Kelly Lake?**

| Answer Options | Response Count |
|---|---|
| | 111 |
| *answered question* | 111 |
| *skipped question* | 1 |

| Category (# of years) | Responses | % Response |
|---|---|---|
| 0 to 10 | 11 | 10% |
| 11 to 20 | 7 | 6% |
| 21 to 30 | 7 | 6% |
| 31 to 40 | 17 | 16% |
| 41 to 50 | 21 | 19% |
| 51 to 60 | 24 | 22% |
| >60 | 24 | 22% |



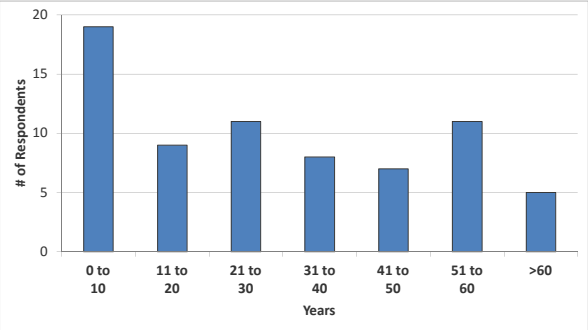

**7. Have you personally fished on Kelly Lake in the past three years?**

| Answer Options | Response Percent | Response Count |
|---|---|---|
| Yes | 66.7% | 74 |
| No | 33.3% | 37 |
| *answered question* | | 111 |
| *skipped question* | | 1 |

**8. For how many years have you fished Kelly Lake?**

| Answer Options | Response Count |
|---|---|
| | 70 |
| *answered question* | 70 |
| *skipped question* | 42 |

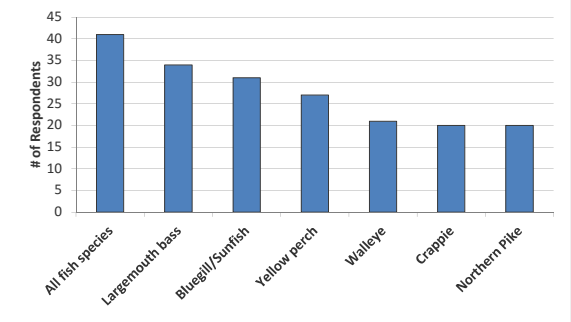
| Category (# of years) | Responses | % Response |
|---|---|---|
| 0 to 10 | 19 | 27% |
| 11 to 20 | 9 | 13% |
| 21 to 30 | 11 | 16% |
| 31 to 40 | 8 | 11% |
| 41 to 50 | 7 | 10% |
| 51 to 60 | 11 | 16% |
| >60 | 5 | 7% |



**9. What species of fish do you like to catch on Kelly Lake?**

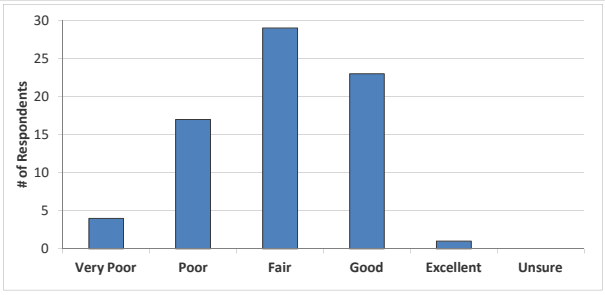
| Answer Options | Response Percent | Response Count |
|---|---|---|
| All fish species | 55.4% | 41 |
| Largemouth bass | 45.9% | 34 |
| Bluegill/Sunfish | 41.9% | 31 |
| Yellow perch | 36.5% | 27 |
| Walleye | 28.4% | 21 |
| Crappie | 27.0% | 20 |
| Northern Pike | 27.0% | 20 |
| Other (please specify) | 4.1% | 3 |
| *answered question* | | 74 |
| *skipped question* | | 38 |

| Number | Other (please specify) |
|---|---|
| 1 | Only ice fish - we give them all away. |
| 2 | bullheads |
| 3 | This past year mostly bullheads...do not like! |



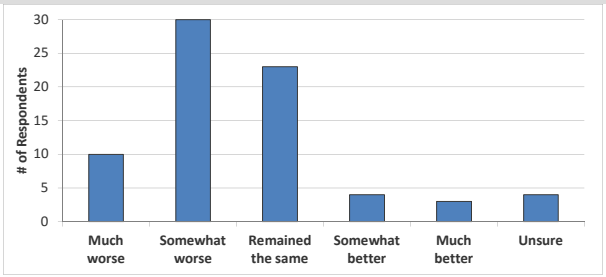

**10. How would you describe the current quality of fishing on Kelly Lake?**

| Answer Options | Very Poor | Poor | Fair | Good | Excellent | Unsure | Response Count |
|---|---|---|---|---|---|---|---|
| | 4 | 17 | 29 | 23 | 1 | 0 | 74 |
| *answered question* | | | | | | | 74 |
| *skipped question* | | | | | | | 38 |



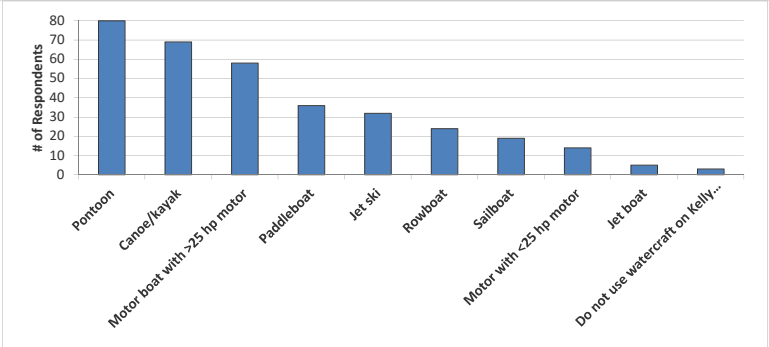

**11. How has the quality of fishing changed on Kelly Lake since you have started fishing the lake?**

| Answer Options | Much worse | Somewhat worse | Remained the same | Somewhat better | Much better | Unsure | Response Count |
|---|---|---|---|---|---|---|---|
| | 10 | 30 | 23 | 4 | 3 | 4 | 74 |
| *answered question* | | | | | | | 74 |
| *skipped question* | | | | | | | 38 |




**12. What types of watercraft do you currently use on Kelly Lake?**

| Answer Options | Response Percent | Response Count |
|---|---|---|
| Pontoon | 72.1% | 80 |
| Canoe/kayak | 62.2% | 69 |
| Motor boat with >25 hp motor | 52.3% | 58 |
| Paddleboat | 32.4% | 36 |
| Jet ski | 28.8% | 32 |
| Rowboat | 21.6% | 24 |
| Sailboat | 17.1% | 19 |
| Motor with <25 hp motor | 12.6% | 14 |
| Jet boat | 4.5% | 5 |
| Do not use watercraft on Kelly Lake | 2.7% | 3 |
| *answered question* | | 111 |
| *skipped question* | | 1 |



**13. Do you use your watercraft on waters other than Kelly Lake?**

| Answer Options | Response Percent | Response Count |
|---|---|---|
| Yes | 10.0% | 11 |
| No | 90.0% | 99 |
| *answered question* | | 110 |
| *skipped question* | | 2 |

**14. What is your typical cleaning routine after using your watercraft on waters other than Kelly Lake?**

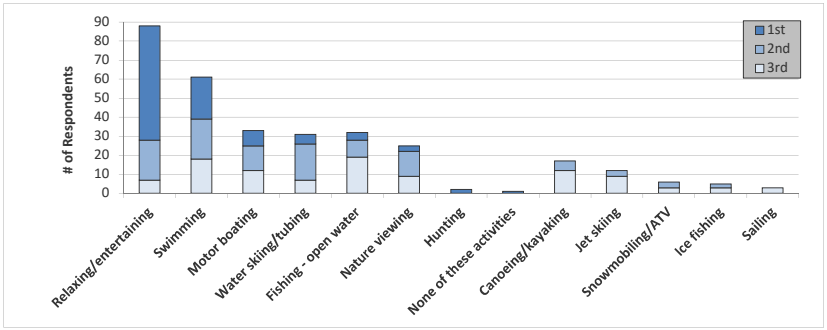
| Answer Options | Response Percent | Response Count |
|---|---|---|
| Remove aquatic hitch-hikers (ex. - plant material, clams, mussels) | 66.7% | 8 |
| Drain bilge | 50.0% | 6 |
| Rinse boat | 25.0% | 3 |
| Power wash boat | 25.0% | 3 |
| Do not clean boat | 16.7% | 2 |
| Apply bleach | 8.3% | 1 |
| Other (please specify) | 25.0% | 3 |
| *answered question* | | 12 |
| *skipped question* | | 100 |

| Number | Other (please specify) |
|---|---|
| 1 | The boat I use to visit other lakes is different boat |
| 2 | Don't know; a different family member does it. |
| 3 | Do not use on other lakes |

**15. For the list below, rank up to three activities that are important reasons for owning your property on Kelly Lake, with 1 being the most important.**

| Answer Options | 1st | 2nd | 3rd | Rating Average | Response Count |
|---|---|---|---|---|---|
| Relaxing/entertaining | 60 | 21 | 7 | 1.40 | 88 |
| Swimming | 22 | 21 | 18 | 1.93 | 61 |
| Motor boating | 8 | 13 | 12 | 2.12 | 33 |
| Water skiing/tubing | 5 | 19 | 7 | 2.06 | 31 |
| Fishing - open water | 4 | 9 | 19 | 2.47 | 32 |
| Nature viewing | 3 | 13 | 9 | 2.24 | 25 |
| Hunting | 2 | 0 | 0 | 1.00 | 2 |
| None of these activities are important to me | 1 | 0 | 0 | 1.00 | 1 |
| Canoeing/kayaking | 0 | 5 | 12 | 2.71 | 17 |
| Jet skiing | 0 | 3 | 9 | 2.75 | 12 |
| Snowmobiling/ATV | 0 | 3 | 3 | 2.50 | 6 |
| Ice fishing | 0 | 2 | 3 | 2.60 | 5 |
| Sailing | 0 | 0 | 3 | 3.00 | 3 |
| Other (please specify below) | 6 | 0 | 4 | 1.80 | 10 |
| Please specify "Other" response here | | | | | 11 |
| *answered question* | | | | | 111 |
| *skipped question* | | | | | 1 |

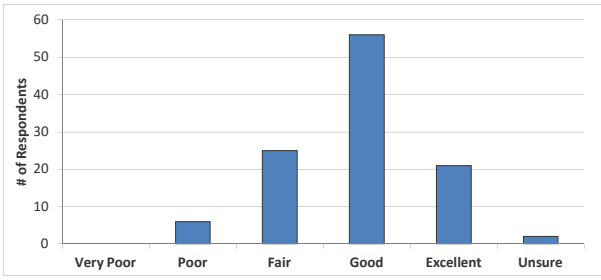
| Number | "Other" responses |
|---|---|
| 1 | Beauty of Kelly Lake |
| 2 | sailing, canoeing, swimming |
| 3 | Near family |
| 4 | No-wake boating |
| 5 | Walking |
| 6 | the entire experience of living on a small body of water |
| 7 | I like to do all above |
| 8 | Family get togethers |
| 9 | Walking through the park and around the lake. |
| 10 | Proximity to family |
| 11 | family |



***Kelly Lake Current and Historic Condition, Health and Management***

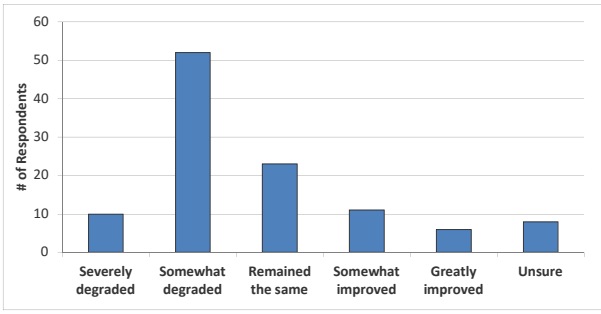
**16. How would you describe the current water quality of Kelly Lake?**

| Answer Options | Very Poor | Poor | Fair | Good | Excellent | Unsure | Response Count |
|---|---|---|---|---|---|---|---|
| | 0 | 6 | 25 | 56 | 21 | 2 | 110 |
| | | | | | | *answered question* | **110** |
| | | | | | | *skipped question* | **2** |




**17. How has the current water quality changed in Kelly Lake since you first visited the lake?**

| Answer Options | Severely degraded | Somewhat degraded | Remained the same | Somewhat improved | Greatly improved | Unsure | Response Count |
|---|---|---|---|---|---|---|---|
| | 10 | 52 | 23 | 11 | 6 | 8 | 110 |
| | | | | | | *answered question* | **110** |
| | | | | | | *skipped question* | **2** |




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

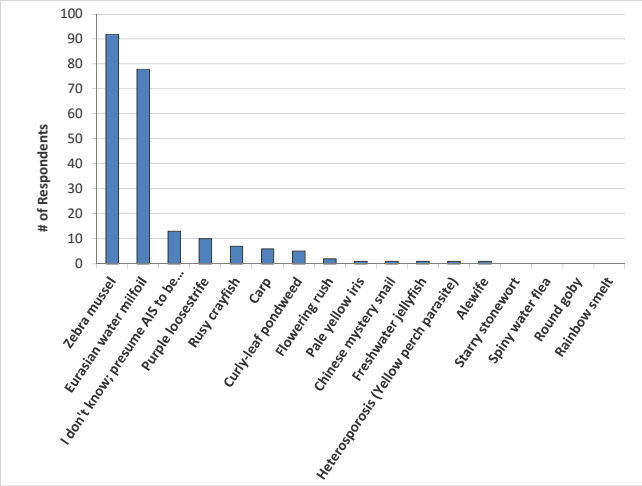
| Answer Options | Response Percent | Response Count |
|---|---|---|
| Yes | 99.1% | 108 |
| No | 0.9% | 1 |
| | *answered question* | **109** |
| | *skipped question* | **3** |

**19. Do you believe aquatic invasive species are present within Kelly Lake?**

| Answer Options | Response Percent | Response Count |
|---|---|---|
| Yes | 87.2% | 95 |
| I think so but am not certain | 10.1% | 11 |
| No | 2.8% | 3 |
| | *answered question* | **109** |
| | *skipped question* | **3** |

**20. Which aquatic invasive species do you believe are in Kelly Lake?**

| Answer Options | Response Percent | Response Count |
|---|---|---|
| Zebra mussel | 86.8% | 92 |
| Eurasian water milfoil | 73.6% | 78 |
| I don't know; presume AIS to be present | 12.3% | 13 |
| Purple loosestrife | 9.4% | 10 |
| Rusy crayfish | 6.6% | 7 |
| Carp | 5.7% | 6 |
| Curly-leaf pondweed | 4.7% | 5 |
| Flowering rush | 1.9% | 2 |
| Pale yellow iris | 0.9% | 1 |
| Chinese mystery snail | 0.9% | 1 |
| Freshwater jellyfish | 0.9% | 1 |
| Heterosporosis (Yellow perch parasite) | 0.9% | 1 |
| Alewife | 0.9% | 1 |
| Starry stonewort | 0.0% | 0 |
| Spiny water flea | 0.0% | 0 |
| Round goby | 0.0% | 0 |
| Rainbow smelt | 0.0% | 0 |
| Other (please specify) | 7.5% | 8 |
| ***answered question*** | | **106** |
| ***skipped question*** | | **6** |

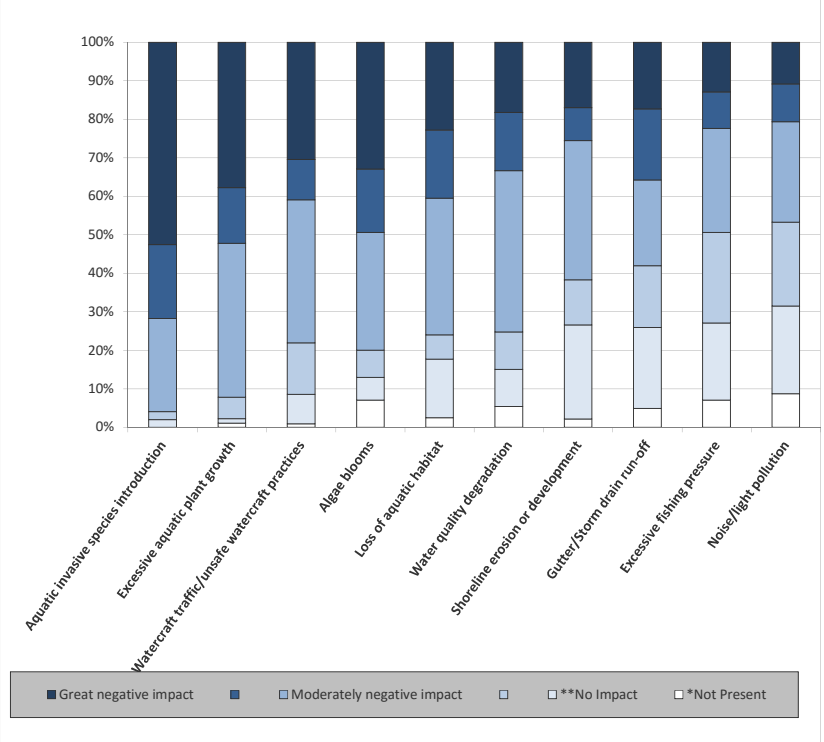



| Number | "Other" responses |
|---|---|
| 1 | Salt from the run off from the curbs on county road and people polluting the lake from grass and weed chemicals |
| 2 | some sort of mussel all over our lift and dock this year |
| 3 | We have zebra mussels on our |
| 4 | really don't know |
| 5 | The plant the lake was being treated for, don't recall the name of |
| 6 | No name, floating green slime clusters |
| 7 | We have tons of zebra mussels in 2015 and 2016 |
| 8 | Not sure what else but expect more than checked |

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

| Answer Options | *Not Present | **No Impact | | Moderately negative impact | | Great negative impact | Unsure: Need more information | Rating Average | Response Count |
|---|---|---|---|---|---|---|---|---|---|
| Aquatic invasive species introduction | 0 | 2 | 2 | 24 | 19 | 52 | 8 | 2.94 | 107 |
| Excessive aquatic plant growth | 1 | 1 | 5 | 36 | 13 | 34 | 11 | 2.5 | 101 |
| Watercraft traffic/unsafe watercraft practices | 1 | 8 | 14 | 39 | 11 | 32 | 1 | 2.39 | 106 |
| Algae blooms | 6 | 5 | 6 | 26 | 14 | 28 | 15 | 2.12 | 100 |
| Loss of aquatic habitat | 2 | 12 | 5 | 28 | 14 | 18 | 21 | 1.75 | 100 |
| Water quality degradation | 5 | 9 | 9 | 39 | 14 | 17 | 12 | 1.88 | 105 |
| Shoreline erosion or development | 2 | 23 | 11 | 34 | 8 | 16 | 9 | 1.62 | 103 |
| Gutter/Storm drain run-off | 4 | 17 | 13 | 18 | 15 | 14 | 21 | 1.47 | 102 |
| Excessive fishing pressure | 6 | 17 | 20 | 23 | 8 | 11 | 16 | 1.33 | 101 |
| Noise/light pollution | 8 | 21 | 20 | 24 | 9 | 10 | 11 | 1.31 | 103 |
| Other (please specify) | | | | | | | | | 9 |
| | | | | | | | | ***answered question*** | **109** |
| | | | | | | | | ***skipped question*** | **3** |

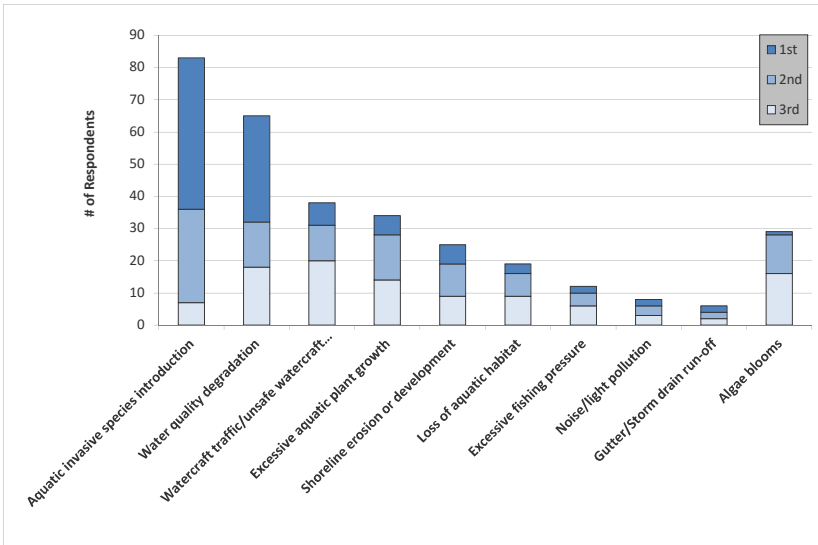
| Number | Other (please specify) |
|---|---|
| 1 | Put limit on size of motor - too large motors |
| 2 | Not aware of problems on Kelly Lake. |
| 3 | Access to lake- too many public landings |
| 4 | Motorcycle noise and speeds: Great Negative Impact. ATVs are okay |
| 5 | With the construction of curbs and and takin away the natural filter of ditches the lake since 1999 has been ruined, then people using weed killer and lawn food that runs into the street into the curb and there is two major runoffs from the road curbs that go into kelly lake, one is on the east side one is near lovers lane that drains into the swamp and that water finds its way back into kelly lake. Also there is run off from the curbs into the outlet. People need to look at the fact how bad the lake has become since the curbs were put installed in 1999. Bad county decisions made our lake bad. No we have to pay to clean it up. |
| 6 | Loud speakers on motorboats |
| 7 | not enforcing no wake times |
| 8 | Lawn fertilizer/weed control runoff |
| 9 | Bass are gone on west side in cove |



**22. From the list below, please rank your top three concerns regarding Kelly Lake, with 1 being your greatest concern.**

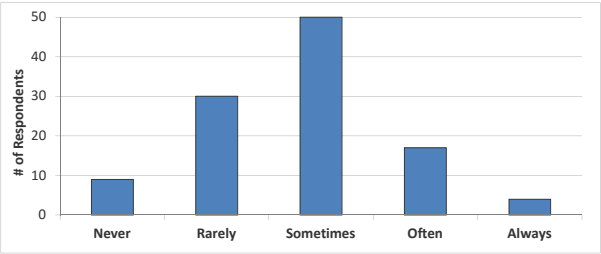
| Answer Options | 1st | 2nd | 3rd | Response Count |
|---|---|---|---|---|
| Aquatic invasive species introduction | 47 | 29 | 7 | 83 |
| Water quality degradation | 33 | 14 | 18 | 65 |
| Watercraft traffic or unsafe watercraft practices | 7 | 11 | 20 | 38 |
| Excessive aquatic plant growth (excluding algae) | 6 | 14 | 14 | 34 |
| Shoreline erosion or development | 6 | 10 | 9 | 25 |
| Loss of aquatic habitat | 3 | 7 | 9 | 19 |
| Excessive fishing pressure | 2 | 4 | 6 | 12 |
| Noise/light pollution | 2 | 3 | 3 | 8 |
| Gutter/Storm drain run-off | 2 | 2 | 2 | 6 |
| Algae blooms | 1 | 12 | 16 | 29 |
| Other (please specify) | 1 | 2 | 2 | 5 |
| Please specify "Other" response here | | | | 7 |
| | | | *answered question* | **110** |
| | | | *skipped question* | **2** |

| Number | "Other" responses |
|---|---|
| 1 | Run-off from lawn fertilizers |
| 2 | Motor Cycle Noise and Speed |
| 3 | Weed killer and lawn food getting into our lake<br>why do we have 5 boat launches? |
| 4 | why don't we charge a fee to launch your boat? Kelly lake is very crowded |
| 5 | tourists |
| 6 | Lawn & Farm Fertilizer & Weed Control Runoff |
| 7 | zebra mussels |



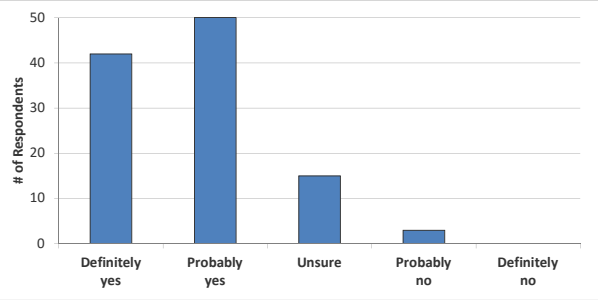

**23. During open water season how often does aquatic plant growth, including algae, negatively impact your enjoyment of Kelly Lake?**

| Answer Options | Never | Rarely | Sometimes | Often | Always | Response Count |
|---|---|---|---|---|---|---|
| | 9 | 30 | 50 | 17 | 4 | 110 |
| | | | | | *answered question* | **110** |
| | | | | | *skipped question* | **2** |



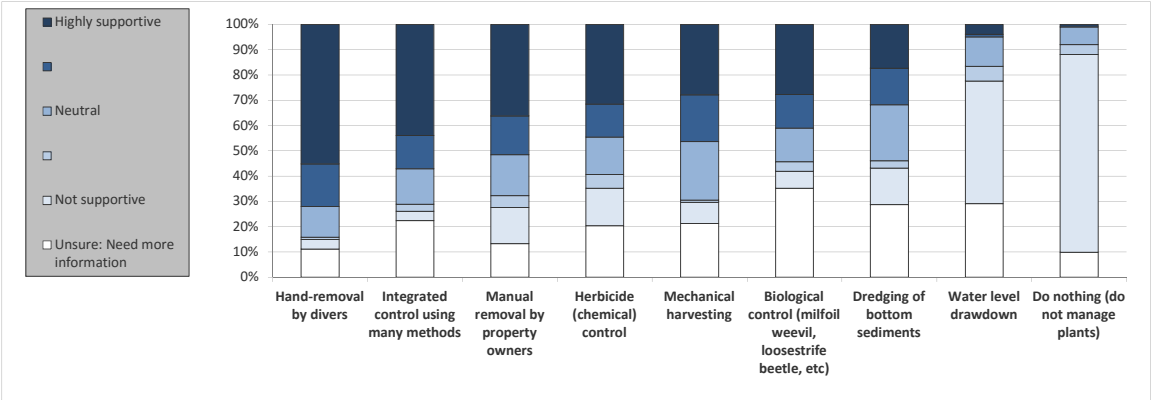
**24. Considering your answer to the question above, do you believe aquatic plant control is needed on Kelly Lake?**

| Answer Options | Definitely yes | Probably yes | Unsure | Probably no | Definitely no | Response Count |
|---|---|---|---|---|---|---|
| | 42 | 50 | 15 | 3 | 0 | 110 |
| | | | | | *answered question* | **110** |
| | | | | | *skipped question* | **2** |




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

| Answer Options | Not supportive | | Neutral | | Highly supportive | Unsure: Need more information | Rating Average | Response Count |
|---|---|---|---|---|---|---|---|---|
| Hand-removal by divers | 4 | 1 | 13 | 18 | 59 | 12 | 2.77 | 107 |
| Integrated control using many methods | 4 | 3 | 15 | 14 | 47 | 24 | 2.24 | 107 |
| Manual removal by property owners | 15 | 5 | 17 | 16 | 38 | 14 | 2.14 | 105 |
| Herbicide (chemical) control | 16 | 6 | 16 | 14 | 34 | 22 | 1.91 | 108 |
| Mechanical harvesting | 9 | 1 | 25 | 20 | 30 | 23 | 1.77 | 108 |
| Biological control (milfoil weevil, loosestrife beetle, etc) | 7 | 4 | 14 | 14 | 29 | 37 | 1.65 | 105 |
| Dredging of bottom sediments | 15 | 3 | 23 | 15 | 18 | 30 | 1.33 | 104 |
| Water level drawdown | 50 | 6 | 12 | 1 | 4 | 30 | 0.79 | 103 |
| Do nothing (do not manage plants) | 79 | 4 | 7 | 0 | 1 | 10 | 0.9 | 101 |
| | | | | | | | *answered question* | **109** |
| | | | | | | | *skipped question* | **3** |




**26. Did you know that aquatic herbicides were being applied in Kelly Lake to help control Eurasian watermilfoil?**

| Answer Options | Response Percet | Response Count |
|---|---|---|
| Yes | 68.8% | 75 |
| I think so but can't say for certain | 10.1% | 11 |
| No | 21.1% | 23 |
| *answered question* | | **109** |
| *skipped question* | | **3** |

**27. How do you feel about the past use of herbicides to treat Eurasian watermilfoil in previous years?**

| Answer Options | Completely support | Moderately support | Unsure | Moderately oppose | Completely oppose | Rating Average | Response Count |
|---|---|---|---|---|---|---|---|
| | 49 | 22 | 24 | 10 | 4 | 1.28 | 109 |
| | | | | | | *answered question* | **109** |
| | | | | | | *skipped question* | **3** |

**28. What is your level of support or opposition for future aquatic herbicide use to treat Eurasian watermilfoil in Kelly Lake?**

| Answer Options | Completely support | Moderately support | Unsure | Moderately oppose | Completely oppose | Rating Average | Response Count |
|---|---|---|---|---|---|---|---|
| | 50 | 23 | 26 | 7 | 3 | 1.18 | 109 |
| | | | | | *answered question* | | 109 |
| | | | | | *skipped question* | | 3 |

**29. What is the reason(s) you oppose the future use of aquatic herbicides to target Eurasian watermilfoil in Kelly Lake?**

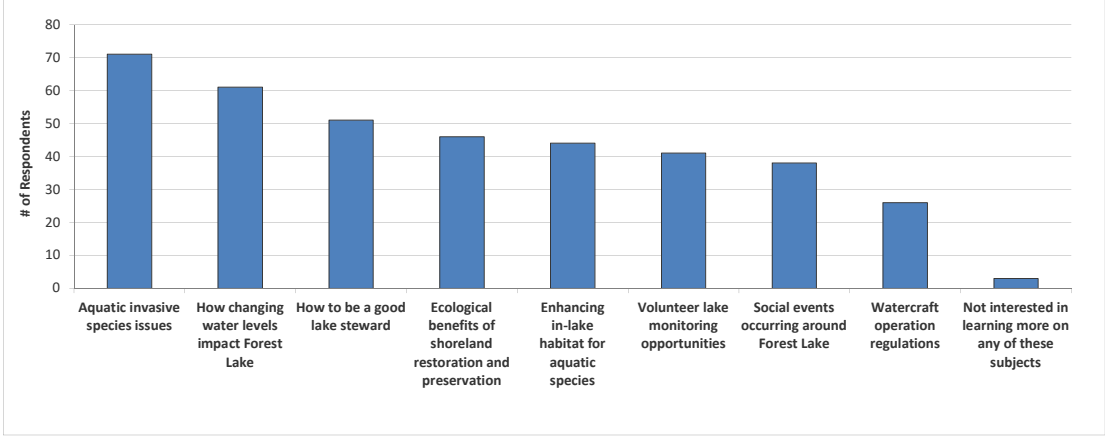
| Answer Options | Response Percet | Response Count |
|---|---|---|
| Potential impacts to human health | 90.0% | 9 |
| Future impacts are unknown | 70.0% | 7 |
| Potential impacts to native (non-plant) species such as fish, insects, etc. | 50.0% | 5 |
| Potential impacts to native aquatic plant species | 40.0% | 4 |
| Potential cost of treatment is too high | 10.0% | 1 |
| Another reason (please specify) | 10.0% | 1 |
| *answered question* | | 10 |
| *skipped question* | | 102 |

| Number | "Other" responses |
|---|---|
| 1 | Need to inform all owners within Kelly Lake area. That was not previously done. |

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

| Answer Options | Response Percent | Response Count |
|---|---|---|
| How changing water levels impact Kelly Lake | 66.4% | 71 |
| Aquatic invasive species impacts, means of transport, identification, control options, etc. | 57.0% | 61 |
| How to be a good lake steward | 47.7% | 51 |
| Enhancing in-lake habitat (not shoreland or adjacent wetlands) for aquatic species | 43.0% | 46 |
| Social events occurring around Kelly Lake | 41.1% | 44 |
| Watercraft operation regulations – lake specific, local and statewide | 38.3% | 41 |
| Ecological benefits of shoreland restoration and preservation | 35.5% | 38 |
| Volunteer lake monitoring opportunities (Clean Boats Clean Waters, Citizens Lake Monitoring Network, Loon Watch, KLAA programs, etc.) | 24.3% | 26 |
| Not interested in learning more on any of these subjects | 2.8% | 3 |
| Some other topic (please specify) | 3.7% | 4 |
| *answered question* | | 107 |
| *skipped question* | | 5 |

| Number | Other (please specify) |
|---|---|
| 1 | Creating habitat in shallow areas along shoreline |
| 2 | How to get rid of the curb and gutter on the roads |
| 3 | I like to be informed and always open to learning new things |
| 4 | Thanks to the Association for its work in this area! |




***Kelly Lake Advancement Association (KLAA)***

**31. Before receiving this mailing, have you ever heard of the KLAA?**

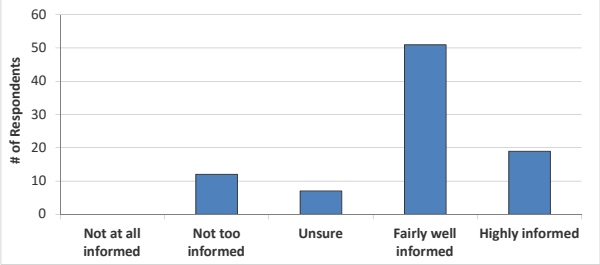
| Answer Options | Response Percent | Response Count |
|---|---|---|
| Yes | 97.2% | 105 |
| No | 2.8% | 3 |
| *answered question* | | 108 |
| *skipped question* | | 4 |

**32. What is your membership status with the KLAA?**

| Answer Options | Response Percent | Response Count |
|---|---|---|
| Current member | 66.7% | 68 |
| Former member | 18.6% | 19 |
| Never been a member | 14.7% | 15 |
| *answered question* | | 102 |
| *skipped question* | | 10 |

**33. How informed has (or had) the KLAA kept you regarding issues with Kelly Lake and its management?**

| Answer Options | Not at all informed | Not too informed | Unsure | Fairly well informed | Highly informed | Response Count |
|---|---|---|---|---|---|---|
| | 0 | 12 | 7 | 51 | 19 | 89 |
| *answered question* | | | | | | 89 |
| *skipped question* | | | | | | 23 |

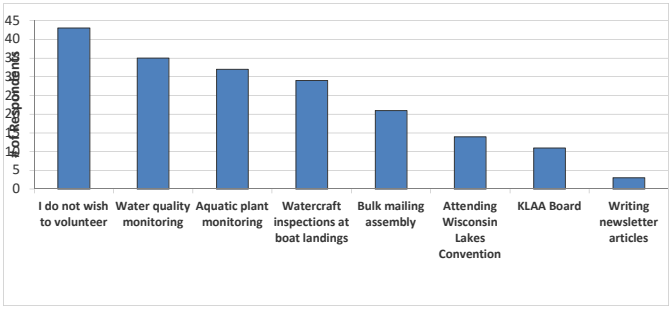



**34. Have you ever visited the Kelly Lake Advancement Association website - KellyLake.org?**

| Answer Options | Response Percent | Response Count |
|---|---|---|
| Yes | 62.7% | 64 |
| No | 37.3% | 38 |
| *answered question* | | 102 |
| *skipped question* | | 10 |

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

| Answer Options | Response Percent | Response Count |
|---|---|---|
| I do not wish to volunteer | 43.0% | 43 |
| Water quality monitoring | 35.0% | 35 |
| Aquatic plant monitoring | 32.0% | 32 |
| Watercraft inspections at boat landings | 29.0% | 29 |
| Bulk mailing assembly | 21.0% | 21 |
| Attending Wisconsin Lakes Convention | 14.0% | 14 |
| KLAA Board | 11.0% | 11 |
| Writing newsletter articles | 3.0% | 3 |
| *answered question* | | 100 |
| *skipped question* | | 12 |




**36. Please feel free to provide written comments concerning Kelly Lake, its current and/or historic condition and its management.**

| Answer Options | Response Count |
|---|---|
| | 47 |
| *answered question* | 47 |
| *skipped question* | 65 |

| Number | Response Text |
|---|---|
| 1 | I do wish to volunteer but too old to do much |
| 2 | Limit the size of motors - a lot of the boats that use the lake are too large for the lake size.<br>Stop the people from shampooing and bathing in the lake - also dogs.<br>Don't let people ride horses in the lake from boat landing to boat landing - one day one of the horses pooped in the lake in front of my neighbors house<br>Let everybody know they should use fertilizer with the middle # on the bag should be 0. Are all these lawn services that people use doing that?<br>Stop people from blowing leaves in the fall into the lake. |
| 3 | I don't think jet skis should be allowed in the shallows along the shoreline in the spring when the fish are spawning. |
| 4 | More information on milfoil an zebra mussels and any other invasive species. I wood like to see only one boat landing on the lake, turn the others into family picnic areas, for the families to enjoy the lake. Finally a great thank you to the Board of the Kelly Lake Advancement Association, Mary Marks and to all of the great people that spend hours and hours of their time to keep Kelly Lake beautiful for years to come. |

| | |
|---|---|
| 5 | Need to keep on top of these problems and need to spray for the weeds from shoreline out. As boats go through weeds they break off and float to shore causing the weeds to replant and grow further away than just what is being treated. |
| 6 | Too many boat landings on a lake this size. it will be hard to monitor all landings to educate and check boaters that come for a day. it is not the cottage and homeowners on kelly we have to worry about, it is the people coming to our lake that do not care about brining invassive species to our lake. our best boat landing is terrible at best. maybe the county could charge to launch boats and use the money to repair the landings and for the upkeep. there are bigger lakes in the county that have only 1 landing and that landing is hard to find, and we have 5, thats crazy. how do we possible monitor all of them? I do believe that the watersports time and fishing times are quite adiquate as they are. the no wake speeds before 10:00a And after 6:00p are appropiate. |
| 7 | Appreciate the efforts of KLAA, expanded awareness is very important to engage the next generation to carry on its mission. Suggest holding events that encourage participation of the generations younger than the baby boomers who will be our future stewards. Want to move them from consumers to stewards! |
| 8 | Thank you for your time that you put into the KLAA! |
| 9 | Lakefront owners need to be active in shoreline restoration. Too many shorelines have riprap (boulders/rocks) as a sea wall and all plants removed for swimming, leaving just sand. It results in no opportunity for habitat for young fish, amphibians, etc. Many long-time Kelly Lakers grew up walking in or along shoreline, catching fish, frogs, turtles and the like. How do we pass this love of KL to current/future children if that opportunity no longer exists? |
| 10 | The KLAA currently has excellent officers, board and volunteers interested in maintaining the quality of the lake. |
| 11 | Need to audit contractors removing mill foil and applying herbicide. |
| 12 | Please, no horses wading and walking in Kelly Lake and leaving droppings behind. Please no fireworks at late hours, after 11:00pm. One tower with red and white flashing lights on the lake or near the lake is enough. |
| 13 | Our favorite place to be and, of course, will do all we can to keep Kelly Lake in excellent condition for nature and for our children and future generations. |
| 14 | Last Summer was the first year we had numerous problems with people getting the "Itch" after swimming in Kelly Lake...very disappointing. |
| 15 | we are very concerned with the soil erosion that is occurring on the lake. we believe that this is due to the size of motors on the boats. the waves are the cause of erosion.also invasive species and fishing pressure that the lake receives especially in the winter..... thank you ! |
| 16 | in 1999 oconto county made the decision at the cost to tax payers to take ditches away and put in curb and gutter, no one at the time except maybe a few people knew the impact that would eventually ruin the lake. But very few people at the time was concerned about it, they were more concerned about making a walking path on the sides of the road for pedestrian traffic, the long term impact of having the salt and road debris and the garbage that collects in the storm sewers was not even considered in 1999. So here we are 18 years later and now everyone is in an uproar about the weeds in the lake. What does the salt, weed killer, lawn food and all the road debris do the the condition of the lake. Check out and do the research on the effect of salt and the like to fresh water lakes. Maybe we should file a law suite against oconto county? There are a few lawyers who have property at kelly lake that should bring an action against oconto county. They have brought action against the town of spruce for way way less important agendas. Now is the time to go to the county and say hey fix your curbs that are ruining our lake. Finger pointers want you to believe it's from boats not be cleaned from other lakes, but that is a small small percentage, the real crime is the curb and gutter and all those people who want green weed free lawns. Where do you think all the chemicals go??? Duh ... Into the lake. Wake up kelly lake people. Point the fingers in the right direction: OCONTO COUNTY HIGHWAY DEPT. |
| 17 | We feel that the lake would be much better controlled if there was only 1or 2 launches on the lake. Also there should be a launch fee that would be used to offset the costs of lake water management.<br>We also feel a survey regarding the no-wake times would be beneficial. Friday and Saturday evenings could be extended to dusk. |
| 18 | Love Kelly Lake!! |
| 19 | When I was a child at KL, the lake had many more weedy areas. Overall, I feel KL is much cleaner now than 60 years ago. Love this lake, a small piece of heaven! |
| 20 | Thank you to all of the members of the KLAA who have worked so hard to control and contain the invasive species on Kelly Lake especially Mary Marks! |
| 21 | Too many boat landings. Should be charging for access to the lake. |
| 22 | why do we have 5 boat launches? why don't we charge a fee to launch your boat? Kelly lake is very crowded with boats because it is so accessible and free |
| 23 | Great that the Kelly Lake group has and will continue to work with the organizations which can assist and provide assistance to better our lake. And the assistance given by the Kelly Lake Sportsmens Club. |
| 24 | 1) noise in summer after dark<br>2) horse poop on road in the summer is not picked up<br>3) local dump needs to open more often<br>4) fireworks all summer terrible - during July 4th fine<br>5) need dock regulations = distance from lot line<br>6) promote members to join the KLAA. That can be completed when you send out notices about chemicals being added to the lake. I'm not a fan of chemicals. TOO many people have fancy lawns and that means they are using chemicals, which is going into the lake |
| 25 | none |
| 26 | Let's go back to Kelly Lake with no jet skis and huge horsepower boats! Pontoons are fine but loud motors are disturbing once peaceful Kelly Lake. You have no safety while swimming! |
| 27 | It's a beautiful lake & we hope it will stay that way for generations to come. |
| 28 | I am older and do not use my property as often as I'd like. If I lived there I would be more involved. It is a beautiful lake and when my children were younger we did many activities on it. |
| 29 | Hi Baba! |
| 30 | More zebra mussel information |
| 31 | My brothers have been coming up since 1976, my 3 daughters / son-in-laws bought our own place on 08/31/2015. We love it up there, and the lake. |
| 32 | It used to be fun lake to enjoy. Now tourists just use it like a trash barrel. Ignoring common sense and abusing the lake for their own benefit. |
| 33 | i am concerned on AIS and the soil ans bank erosion<br>that has and continues to occur. water-crafts have gotten to big and powerful for a lake of this size |
| 34 | Is membership yearly? |
| 35 | On weekends the lake is dangerous. There are too many boats, many not following lake rules. I would like to see a restriction of how many boats may trailer in on a weekend. Also, law enforcement needs to be present on weekends. |
| 36 | 1) Important information should be sent to all property owners,not just KLAA members & all owners should be notified in advance as to when the lake is being treated. 2) During the summer, after-dark noise is becoming a problem. 3) There should be more enforcement of boating rules. 4) Garbage & recycling pick-up should be easily available or possibly additional dump hours during the week. 5) Lawn fertilizer/weed control by the use of chemicals should not be allowed. 6) Regulations as to how close a dock can be placed from property owners adjacent lot lines. 7) There should be consequences for horse owners and dog owners if they do not pick up their animal's droppings off the roadways. |
| 37 | Good job all concerned lake users. Keep up the great work you do.Thank you! |

| | |
|---|---|
| **38** | Zebra mussels have just exploded in the last two years. |
| **39** | i am greatly concerned with the size of boats especially speed boats creating soil and bank erosion. as a kid at the lake this was not an issue. now almost every property owner has rocks on the banks to prevent erosion.<br>thank you ! |
| **40** | KLAA is doing a great job with the fight against invasive species in Kelly Lake. Without their concern and actions the lake would be a mess.<br>I wish more property owners around the lake would become more involved. Hope this survey helps people to realize that they should be involved with the quality of the lake and not just "use" it. |
| **41** | To much regulation and hassle by State and County when doing shoreline restoration. Lake level changes drastically over time. |
| **42** | We love Kelly Lake. Thanks for helping us take care of it for future generations. Everyone should be a member of the KLAA! |
| **43** | In the 83 years since I was first at Kelly Lake I have seen too many different water levels to describe...from severe drought to very high water and everything in between, |
| **44** | Other lakes use boat insertion fees and have significantly restricted lake access compared to Kelly Lake. I would be interested in hearing the KLAA discuss adding/modifying our landings to support these measures. An added fee would also increase your ability to enact change and encourage boat owners to be more mindful at landings. |
| **45** | Dedicated individuals who truly care about the lake are appreciated. Continue your work. Get the website more inclusive of other lake people. |
| **46** | When I purchased my property the water was so clear and now I worry about the condition getting worse each year and look forward to a solution plan. |
| **47** | We bought on Kelly Lake because it was so clean and well maintained, we appreciate your efforts to keep it that way!! But I can tell you that mussels were about 5 times worse this last fall then the previous fall on our pier stands!! Not good!! |

# C

# APPENDIX C

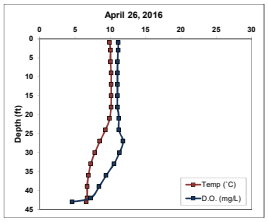
## Water Quality Data

**Kelly Lake**

**Date:** 4/26/2016
**Time:** 13:45
**Weather:** 45F, windy, 97% clouds
**Entry:** EEH

**Max Depth:** 44.1
**LS Depth (ft):** 3.0
**LB Depth (ft):** 42.0
**Secchi Depth (ft):** 24.1

| Depth (ft) | Temp (˚C) | D.O. (mg/L) | pH | Sp. Cond. (µS/cm) |
|---|---|---|---|---|
| 1 | 9.9 | 11.1 | | |
| 3 | 10.0 | 11.1 | | |
| 6 | 10.0 | 11.0 | | |
| 9 | 10.1 | 11.0 | | |
| 12 | 10.1 | 11.0 | | |
| 15 | 10.1 | 11.0 | | |
| 18 | 10.1 | 11.0 | | |
| 21 | 9.9 | 11.2 | | |
| 24 | 9.3 | 11.2 | | |
| 27 | 8.5 | 11.8 | | |
| 30 | 7.8 | 11.3 | | |
| 33 | 7.2 | 10.5 | | |
| 36 | 6.9 | 9.4 | | |
| 39 | 6.7 | 8.4 | | |
| 42 | 6.7 | 7.2 | | |
| 43 | 6.6 | 4.6 | | |




| Parameter | LS | LB |
|---|---|---|
| Total P (µg/L) | 15.90 | 23.20 |
| Dissolved P (µg/L) | ND | 2.50 |
| Chl-a (µg/L) | ND | NA |
| TKN (µg/L) | 596.00 | 775.00 |
| $NO_3 + NO_2$-N (µg/L) | 45.40 | 48.80 |
| $NH_3$-N (µg/L) | 57.70 | 193.00 |
| Total N (µg/L) | 641.40 | 823.80 |
| Lab Cond. (µS/cm) | 249.00 | 255.00 |
| Lab pH | 8.23 | 7.63 |
| Alkalinity (mg/L $CaCO_3$) | 119.00 | 121.00 |
| Total Susp. Solids (mg/L) | ND | ND |
| Calcium (mg/L) | 28.20 | NA |
| Magnesium (mg/L) | 14.20 | NA |
| Hardness (mg/L) | 129.00 | NA |
| Color (SU) | 5.00 | NA |
| Turbidity (NTU) | NA | NA |

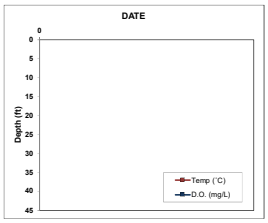
Data collected by JLW and EEH (Onterra).

**Kelly Lake**

**Date:** 6/22/2016
**Time:** 16:00
**Weather:**
**Entry:** EEH

**Max Depth:**
**LS Depth (ft):**
**LB Depth (ft):**
**Secchi Depth (ft):** 12.0

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



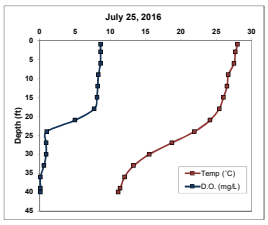

| Parameter | LS | LB |
|---|---|---|
| Total P (µg/L) | 18.20 | NA |
| Dissolved P (µg/L) | NA | NA |
| Chl-a (µg/L) | 1.73 | NA |
| TKN (µg/L) | NA | NA |
| $NO_3 + NO_2$-N (µg/L) | NA | NA |
| $NH_3$-N (µg/L) | NA | NA |
| Total N (µg/L) | 742.00 | NA |
| Lab Cond. (µS/cm) | NA | NA |
| Lab pH | NA | 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 |

**Kelly Lake**

**Date:** 7/25/2016
**Time:** 15:30
**Weather:** 10% clouds, 80F, Breeezy
**Entry:** JMB

**Max Depth:** 41.1
**LS Depth (ft):** 3.0
**LB Depth (ft):** 39.0
**Secchi Depth (ft):** 14.7

| Depth (ft) | Temp (˚C) | D.O. (mg/L) | pH | Sp. Cond. (µS/cm) |
|---|---|---|---|---|
| 1 | 28.0 | 8.6 | | |
| 3 | 27.7 | 8.6 | | |
| 6 | 27.5 | 8.6 | | |
| 9 | 26.7 | 8.3 | | |
| 12 | 26.5 | 8.2 | | |
| 15 | 26.0 | 8.1 | | |
| 18 | 25.4 | 7.7 | | |
| 21 | 24.1 | 5.0 | | |
| 24 | 21.9 | 1.0 | | |
| 27 | 18.7 | 0.9 | | |
| 30 | 15.5 | 0.9 | | |
| 33 | 13.3 | 0.6 | | |
| 36 | 12.0 | 0.1 | | |
| 39 | 11.4 | 0.1 | | |
| 40 | 11.1 | 0.1 | | |




| Parameter | LS | LB |
|---|---|---|
| Total P (µg/L) | 10.60 | 71.20 |
| Dissolved P (µg/L) | NA | NA |
| Chl-a (µg/L) | 1.24 | NA |
| TKN (µg/L) | 416.00 | NA |
| $NO_3 + NO_2$-N (µg/L) | ND | NA |
| $NH_3$-N (µg/L) | ND | NA |
| Total N (µg/L) | 416.00 | NA |
| Lab Cond. (µS/cm) | 230.00 | 274.00 |
| Lab pH | 8.44 | 7.24 |
| Alkalinity (mg/L $CaCO_3$) | 112.00 | 137.00 |
| Total Susp. Solids (mg/L | NA | NA |
| Calcium (mg/L) | NA | NA |
| Magnesium (mg/L) | NA | NA |
| Hardness (mg/L | NA | NA |
| Color (SU) | 5.00 | NA |
| Turbidity (NTU) | NA | NA |

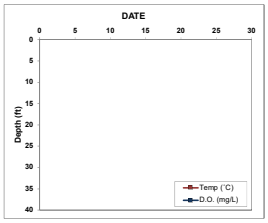
Data collected by TAH (Onterra).

**Kelly Lake**

**Date:** 8/28/2016
**Time:** 11:00
**Weather:**
**Entry:** EEH

**Max Depth:**
**LS Depth (ft):**
**LB Depth (ft):**
**Secchi Depth (ft):** 13.0

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



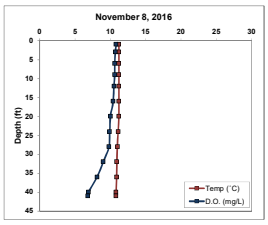

| Parameter | LS | LB |
|---|---|---|
| Total P (µg/L) | 16.60 | NA |
| Dissolved P (µg/L) | NA | NA |
| Chl-a (µg/L) | ND | NA |
| TKN (µg/L) | NA | NA |
| $NO_3 + NO_2$-N (µg/L) | NA | NA |
| $NH_3$-N (µg/L) | NA | NA |
| Total N (µg/L) | 656.00 | NA |
| Lab Cond. (µS/cm) | NA | NA |
| Lab pH | NA | 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 |

**Kelly Lake**

**Date:** 11/8/2016
**Time:** 11:40AM
**Weather:** 100% clouds, 8mph NW wind, 55F
**Entry:** JMB

**Max Depth:** 43.8
**LS Depth (ft):** 3.0
**LB Depth (ft):** 40.0
**Secchi Depth (ft):** 19.9

| Depth (ft) | Temp (˚C) | D.O. (mg/L) | pH | Sp. Cond. (µS/cm) |
|---|---|---|---|---|
| 1 | 11.2 | 10.8 | | |
| 3 | 11.2 | 10.7 | | |
| 6 | 11.2 | 10.6 | | |
| 9 | 11.2 | 10.6 | | |
| 12 | 11.2 | 10.5 | | |
| 16 | 11.2 | 10.4 | | |
| 20 | 11.2 | 10.0 | | |
| 24 | 11.1 | 9.9 | | |
| 28 | 11.0 | 9.8 | | |
| 32 | 10.9 | 9.0 | | |
| 36 | 10.9 | 8.1 | | |
| 40 | 10.8 | 6.9 | | |
| 41 | 10.8 | 6.8 | | |




| Parameter | LS | LB |
|---|---|---|
| Total P (µg/L) | 12.60 | 23.40 |
| Dissolved P (µg/L) | NA | NA |
| Chl-a (µg/L) | 0.52 | 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 | ND | ND |
| Calcium (mg/L) | NA | NA |
| Magnesium (mg/L) | NA | NA |
| Hardness (mg/L | NA | NA |
| Color (SU) | NA | NA |
| Turbidity (NTU) | NA | NA |

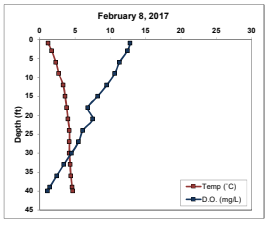
Data collected by JMB (Onterra).

**Kelly Lake**

**Date:** 2/9/2017
**Time:** 11:15
**Weather:** 0% clouds, 5mph wind, 0F
**Entry:** JMB

**Max Depth:** 42.9
**LS Depth (ft):** 3.0
**LB Depth (ft):** 40.0
**Secchi Depth (ft):** 16.7

| Depth (ft) | Temp (˚C) | D.O. (mg/L) | pH | Sp. Cond. (µS/cm) |
|---|---|---|---|---|
| 1 | 1.2 | 12.8 | | |
| 3 | 1.7 | 12.4 | | |
| 6 | 2.3 | 11.3 | | |
| 9 | 2.7 | 10.6 | | |
| 12 | 3.3 | 9.5 | | |
| 15 | 3.6 | 8.2 | | |
| 18 | 3.8 | 6.8 | | |
| 21 | 4.0 | 7.5 | | |
| 24 | 4.2 | 6.1 | | |
| 27 | 4.2 | 5.5 | | |
| 30 | 4.2 | 4.5 | | |
| 33 | 4.3 | 3.4 | | |
| 36 | 4.4 | 2.4 | | |
| 39 | 4.6 | 1.4 | | |
| 40 | 4.7 | 1.1 | | |




| Parameter | LS | LB |
|---|---|---|
| Total P (µg/L) | 8.68 | 22.90 |
| Dissolved P (µg/L) | ND | 7.70 |
| Chl-a (µg/L) | NA | NA |
| TKN (µg/L) | 568.00 | 1060.00 |
| $NO_3 + NO_2$-N (µg/L) | ND | 71.70 |
| $NH_3$-N (µg/L) | 91.70 | 377.00 |
| Total N (µg/L) | 568.00 | 1131.70 |
| Lab Cond. (µS/cm) | NA | NA |
| Lab pH | NA | NA |
| Alkalinity (mg/L $CaCO_3$) | NA | NA |
| Total Susp. Solids (mg/L | NA | NA |
| Calcium (mg/L) | NA | NA |
| Magnesium (mg/L) | NA | NA |
| Hardness (mg/L | NA | NA |
| Color (SU) | NA | NA |
| Turbidity (NTU) | NA | NA |

Data collected by TWH & JMB (Onterra). Ice depth: 1.2ft.

**Water Quality Data**

| 2016-2017 | Surface | | Bottom | |
|---|---|---|---|---|
| Parameter | Count | Mean | Count | Mean |
| Secchi Depth (feet) | 6 | 16.7 | NA | NA |
| Total P (µg/L) | 6 | 13.8 | 4 | 35.2 |
| Dissolved P (µg/L) | 2 | ND | 2 | 5.1 |
| Chl a (µg/L) | 5 | 1.2 | 0 | NA |
| TKN (µg/L | 3 | 526.7 | 2 | 917.5 |
| $NO_3$+$NO_2$-N (µg/L) | 3 | 45.4 | 2 | 60.3 |
| $NH_3$-N (µg/L) | 3 | 74.7 | 2 | 285.0 |
| Total N (µg/L) | 5 | 604.7 | 2 | 977.8 |
| Lab Cond. (µS/cm) | 2 | 239.5 | 2 | 264.5 |
| Alkal (mg/l $CaCO_3$) | 2 | 115.5 | 2 | 129.0 |
| Total Susp. Solids (mg/l) | 2 | ND | 2 | ND |
| Calcium (mg/L) | 1 | 28.2 | 0 | NA |
| Magnesium (mg/L) | 1 | 14.2 | 0 | NA |
| Hardness (mg/L) | 1 | 129.0 | 0 | NA |
| Color (SU) | 2 | 5.0 | 0 | NA |
| Turbidity (NTU) | 0 | NA | 0 | NA |

**Trophic State Index (TSI)**

| Year | TP | Chl-a | Secchi |
|---|---|---|---|
| 1982 | | | |
| 1983 | | | |
| 1984 | | | |
| 1991 | | | 42.0 |
| 1992 | | | 41.6 |
| 1993 | | | 41.4 |
| 1994 | | | 43.1 |
| 1995 | | | 41.1 |
| 1996 | | | 40.8 |
| 1997 | | | 36.8 |
| 1998 | | | 42.1 |
| 1999 | | | 41.9 |
| 2000 | 41.1 | 38.8 | 45.0 |
| 2001 | | | 42.5 |
| 2002 | | | 38.1 |
| 2003 | | | 36.8 |
| 2004 | | | 38.1 |
| 2005 | | | 41.3 |
| 2006 | | | 44.6 |
| 2007 | | | 43.9 |
| 2008 | 55.0 | | 43.0 |
| 2009 | 41.9 | 44.2 | 39.5 |
| 2010 | 39.2 | 42.6 | 40.7 |
| 2011 | 40.8 | 40.2 | 39.9 |
| 2012 | 37.8 | 39.5 | 40.9 |
| 2013 | 35.2 | 40.7 | 40.7 |
| 2014 | 38.6 | 41.4 | 36.9 |
| 2015 | 40.4 | 39.9 | 37.6 |
| 2016 | 43.3 | 34.5 | 39.9 |
| **All Years (Weighted)** | 41.5 | 41.4 | 40.5 |
| **DLDL Median** | 49.4 | 49.7 | 46.2 |
| **NCHF Ecoregion Median** | 61.1 | 57.3 | 53.2 |

| | 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 |
| 1982 | | | | | 2 | 4.5 | 1 | 5.0 | 2 | 20.0 | 1.0 | 20.0 |
| 1983 | | | | | 3 | 4.3 | 1 | 5.0 | 3 | 23.3 | 1.0 | 20.0 |
| 1984 | | | | | 1 | 5.0 | 0 | | 1 | 20.0 | 0.0 | |
| 1991 | 6 | 11.1 | 5 | 11.5 | | | | | | | | |
| 1992 | 4 | 11.8 | 4 | 11.8 | | | | | | | | |
| 1993 | 4 | 12.8 | 3 | 12.0 | | | | | | | | |
| 1994 | 8 | 12.1 | 4 | 10.6 | | | | | | | | |
| 1995 | 16 | 12.3 | 13 | 12.2 | | | | | | | | |
| 1996 | 11 | 12.3 | 9 | 12.4 | | | | | | | | |
| 1997 | 9 | 15.6 | 7 | 16.4 | | | | | | | | |
| 1998 | 8 | 11.9 | 5 | 11.4 | | | | | | | | |
| 1999 | 10 | 11.7 | 7 | 11.5 | | | | | | | | |
| 2000 | 6 | 11.1 | 5 | 9.3 | 1 | 2.3 | 1 | 2.3 | 1 | 13.0 | 1.0 | 13.0 |
| 2001 | 9 | 12.4 | 7 | 11.0 | | | | | | | | |
| 2002 | 9 | 15.0 | 9 | 15.0 | | | | | | | | |
| 2003 | 10 | 16.6 | 8 | 16.5 | | | | | | | | |
| 2004 | 8 | 15.0 | 8 | 15.0 | | | | | | | | |
| 2005 | 9 | 11.7 | 8 | 12.0 | | | | | | | | |
| 2006 | 8 | 9.6 | 8 | 9.6 | | | | | | | | |
| 2007 | 2 | 10.0 | 2 | 10.0 | | | | | | | | |
| 2008 | 9 | 10.0 | 7 | 10.6 | 1 | 6.2 | 0 | | 2 | 24.5 | 1.0 | 34.0 |
| 2009 | 9 | 13.4 | 8 | 13.6 | 3 | 4.0 | 3 | 4.0 | 4 | 13.3 | 3.0 | 13.7 |
| 2010 | 6 | 12.0 | 5 | 12.5 | 3 | 3.4 | 3 | 3.4 | 3 | 11.3 | 3.0 | 11.3 |
| 2011 | 4 | 13.3 | 4 | 13.3 | 3 | 2.7 | 3 | 2.7 | 3 | 12.7 | 3.0 | 12.7 |
| 2012 | 3 | 12.3 | 3 | 12.3 | 3 | 2.5 | 3 | 2.5 | 4 | 10.5 | 3.0 | 10.3 |
| 2013 | 4 | 12.5 | 4 | 12.5 | 2 | 2.8 | 2 | 2.8 | 3 | 8.6 | 3.0 | 8.6 |
| 2014 | 3 | 16.3 | 3 | 16.3 | 2 | 3.0 | 2 | 3.0 | 3 | 10.9 | 3.0 | 10.9 |
| 2015 | 4 | 15.5 | 4 | 15.5 | 3 | 2.6 | 3 | 2.6 | 4 | 13.3 | 3.0 | 12.4 |
| 2016 | 4 | 15.9 | 3 | 13.2 | 2 | 1.5 | 2 | 1.5 | 4 | 15.3 | 3.0 | 15.1 |
| 2017 | | | | | | | | | 0 | | 0.0 | |
| **All Years (Weighted)** | | 12.8 | | 12.7 | | 3.3 | | 3.0 | | 14.4 | | 13.3 |
| **DLDL Median** | | | | 8.5 | | | | 7.0 | | | | 23.0 |
| **NCHF Ecoregion Median** | | | | 5.3 | | | | 15.2 | | | | 52.0 |

# D

# APPENDIX D

## Watershed Analysis WiLMS Results

**Date: 3/22/2017 Scenario: Kelly Lake Current**

Lake Id: Kelly Lake
Watershed Id: 0

**Hydrologic and Morphometric Data**

Tributary Drainage Area: 180.0 acre
Total Unit Runoff: 11.00 in.
Annual Runoff Volume: 165.0 acre-ft
Lake Surface Area <As>: 373.0 acre
Lake Volume <V>: 4932.0 acre-ft
Lake Mean Depth <z>: 13.2 ft
Precipitation - Evaporation: 4.5 in.
Hydraulic Loading: 549.7 acre-ft/year
Areal Water Load <qs>: 1.5 ft/year
Lake Flushing Rate <p>: 0.11 1/year
Water Residence Time: 8.97 year
Observed spring overturn total phosphorus (SPO): 17.5 mg/m^3
Observed growing season mean phosphorus (GSM): 14.4 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 | 21 | 0.50 | 1.00 | 3.00 | 11.7 | 4 | 8 | 25 |
| Mixed AG | 0.0 | 0.30 | 0.80 | 1.40 | 0.0 | 0 | 0 | 0 |
| Pasture/Grass | 79 | 0.10 | 0.30 | 0.50 | 13.1 | 3 | 10 | 16 |
| HD Urban (1/8 Ac) | 0.0 | 1.00 | 1.50 | 2.00 | 0.0 | 0 | 0 | 0 |
| MD Urban (1/4 Ac) | 3.0 | 0.30 | 0.50 | 0.80 | 0.8 | 0 | 1 | 1 |
| Rural Res (>1 Ac) | 27 | 0.05 | 0.10 | 0.25 | 1.5 | 1 | 1 | 3 |
| Wetlands | 13 | 0.10 | 0.10 | 0.10 | 0.7 | 1 | 1 | 1 |
| Forest | 37 | 0.05 | 0.09 | 0.18 | 1.8 | 1 | 1 | 3 |
| Lake Surface | 373.0 | 0.10 | 0.30 | 1.00 | 62.1 | 15 | 45 | 151 |

**POINT SOURCE DATA**

| Point Sources | Water Load | Low | Most Likely | High | Loading % |
|---|---|---|---|---|---|
| | (m^3/year) | (kg/year) | (kg/year) | (kg/year) | |
| Round Lake Subwatershed | 302000 | 0.0 | 6 | 0.0 | 8.2 |

**SEPTIC TANK DATA**

| Description | | Low | Most Likely | High | Loading % |
|---|---|---|---|---|---|
| Septic Tank Output (kg/capita-year) | | 0.30 | 0.50 | 0.80 | |
| # capita-years | 0.0 | | | | |
| % Phosphorus Retained by Soil | | 98.0 | 90.0 | 80.0 | |
| Septic Tank Loading (kg/year) | | 0.00 | 0.00 | 0.00 | 0.0 |

**TOTALS DATA**

| Description | Low | Most Likely | High | Loading % |
|---|---|---|---|---|
| Total Loading (lb) | 54.5 | 160.8 | 439.5 | 100.0 |
| Total Loading (kg) | 24.7 | 72.9 | 199.4 | 100.0 |
| Areal Loading (lb/ac-year) | 0.15 | 0.43 | 1.18 | |
| Areal Loading (mg/m^2-year) | 16.38 | 48.33 | 132.07 | |
| Total PS Loading (lb) | 0.0 | 13.2 | 0.0 | 8.2 |
| Total PS Loading (kg) | 0.0 | 6.0 | 0.0 | 8.2 |
| Total NPS Loading (lb) | 21.2 | 47.8 | 106.7 | 91.8 |
| Total NPS Loading (kg) | 9.6 | 21.7 | 48.4 | 91.8 |

## Phosphorus Prediction and Uncertainty Analysis Module

Date: 3/22/2017  Scenario: 106
Observed spring overturn total phosphorus (SPO): 17.5 mg/m^3
Observed growing season mean phosphorus (GSM): 14.4 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 | 13 | 38 | 102 | 24 | 167 |
| Canfield-Bachmann, 1981 Natural Lake | 10 | 19 | 36 | 5 | 35 |
| Canfield-Bachmann, 1981 Artificial Lake | 11 | 20 | 33 | 6 | 42 |
| Rechow, 1979 General | 1 | 4 | 11 | -10 | -69 |
| Rechow, 1977 Anoxic | 14 | 41 | 111 | 27 | 188 |
| Rechow, 1977 water load<50m/year | 3 | 9 | 23 | -5 | -35 |
| Rechow, 1977 water load>50m/year | N/A | N/A | N/A | N/A | N/A |
| Walker, 1977 General | 11 | 33 | 91 | 16 | 91 |
| Vollenweider, 1982 Combined OECD | 10 | 23 | 53 | 7 | 44 |
| Dillon-Rigler-Kirchner | 8 | 25 | 68 | 8 | 46 |
| Vollenweider, 1982 Shallow Lake/Res. | 7 | 19 | 45 | 3 | 19 |
| Larsen-Mercier, 1976 | 9 | 27 | 74 | 10 | 57 |
| Nurnberg, 1984 Oxic | 7 | 20 | 55 | 6 | 42 |

| Lake Phosphorus Model | Confidence Lower Bound | Confidence Upper Bound | Parameter Fit? | Back Calculation (kg/year) | Model Type |
|---|---|---|---|---|---|
| Walker, 1987 Reservoir | 19 | 79 | Tw | 0 | GSM |
| Canfield-Bachmann, 1981 Natural Lake | 6 | 55 | FIT | 1 | GSM |
| Canfield-Bachmann, 1981 Artificial Lake | 6 | 58 | FIT | 1 | GSM |
| Rechow, 1979 General | 2 | 9 | L qs | 0 | GSM |
| Rechow, 1977 Anoxic | 21 | 86 | 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 | 14 | 73 | FIT | 0 | SPO |
| Vollenweider, 1982 Combined OECD | 10 | 47 | FIT | 0 | ANN |
| Dillon-Rigler-Kirchner | 13 | 53 | P L qs p | 0 | SPO |
| Vollenweider, 1982 Shallow Lake/Res. | 8 | 39 | FIT | 0 | ANN |
| Larsen-Mercier, 1976 | 14 | 57 | P Pin | 0 | SPO |
| Nurnberg, 1984 Oxic | 9 | 44 | FIT | 0 | ANN |

## Water and Nutrient Outflow Module

Date: 3/22/2017  Scenario: 76
Average Annual Surface Total Phosphorus: 14.4mg/m^3
Annual Discharge: 5.50E+002 AF => 6.78E+005 m^3
Annual Outflow Loading:  20.5 LB =>  9.3 kg

E

# APPENDIX E

## Aquatic Plant Survey Data

| Point Number | Latitude (Decimal Degrees) | Longitude (Decimal Degrees) | ID | Lake Name | County | Date | Field Crew | Point Number | Depth (ft) | Sediment | Pole;Rope | Comments | Notes | Nuisance | Total Rake Fullness | Myriophyllum spicatum | Bidens beckii | Ceratophyllum demersum | Chara spp. | Elodea canadensis | Myriophyllum sibiricum | Najas flexilis | Najas guadalupensis | Nitella spp. | Nuphar variegata | Nymphaea odorata | Potamogeton amplifolius | Potamogeton berchtoldii | Potamogeton friesii | Potamogeton gramineus | Potamogeton illinoensis | Potamogeton praelongus | Potamogeton strictifolius | Potamogeton zosteriformis | Stuckenia pectinata | Vallisneria americana | Aquatic moss | Filamentous algae |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 45.014576 | -88.230340 | 13 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 1 | 2 | Sand | Pole | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 45.014564 | -88.229553 | 14 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 2 | 4 | Sand | Pole | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 45.014552 | -88.228767 | 27 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 3 | 3 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 4 | 45.014540 | -88.227980 | 28 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 4 | 3 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 5 | 45.014527 | -88.227194 | 41 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 5 | 3 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 6 | 45.014515 | -88.226407 | 42 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 6 | 3 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 7 | 45.014503 | -88.225621 | 55 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 7 | 3 | Muck | Rope | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 8 | 45.014491 | -88.224834 | 56 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 8 | 0 | | | DOCK | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | 45.015158 | -88.231895 | 1 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 9 | 4 | Muck | Pole | SAMPLED | 7/25/2016 | | 2 | | | | 2 | | | 1 | | | | | | | | | | | | | | | |
| 10 | 45.015146 | -88.231109 | 1 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 10 | 5 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | 1 | | | | | | | | | | | | | | | |
| 11 | 45.015134 | -88.230322 | 12 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 11 | 6 | Muck | Pole | SAMPLED | | | 1 | | | | 1 | | | 1 | | | | | | | | | | | | | | | |
| 12 | 45.015122 | -88.229536 | 15 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 12 | 7 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | | | | | | | | | | | | | | | | |
| 13 | 45.015110 | -88.228749 | 26 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 13 | 7 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | 1 | | | | | | | 1 | | | | | | | | |
| 14 | 45.015097 | -88.227963 | 29 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 14 | 5 | Muck | Pole | SAMPLED | | | 2 | | | | 2 | | | | | | | | | | 1 | | | | | | | | |
| 15 | 45.015085 | -88.227176 | 40 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 15 | 4 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 16 | 45.015073 | -88.226390 | 43 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 16 | 4 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 17 | 45.015061 | -88.225603 | 54 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 17 | 3 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 18 | 45.015049 | -88.224817 | 57 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 18 | 3 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 19 | 45.015036 | -88.224031 | 58 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 19 | 3 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 20 | 45.015024 | -88.223244 | 59 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 20 | 0 | | | DOCK | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | 45.015728 | -88.232665 | 5 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 21 | 9 | Muck | Pole | SAMPLED | | | 3 | | | | 1 | | | | 1 | | | | | | 1 | | | 2 | | | | | |
| 22 | 45.015716 | -88.231878 | 2 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 22 | 8 | Muck | Pole | SAMPLED | | | 2 | | | | 1 | | | | | | | | | | | | | 1 | | | 1 | 1 | |
| 23 | 45.015704 | -88.231092 | 2 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 23 | 9 | Muck | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | 1 | | | 1 | | |
| 24 | 45.015692 | -88.230305 | 11 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 24 | 10 | Muck | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 25 | 45.015680 | -88.229519 | 16 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 25 | 8 | Muck | Pole | SAMPLED | | | 3 | 3 | | | | | 1 | | | | | | | | | | | | | | | | 1 |
| 26 | 45.015668 | -88.228732 | 25 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 26 | 11 | Muck | Pole | SAMPLED | | | 1 | V | | | | | | | | | | | | | | | | | 1 | | | | | |
| 27 | 45.015655 | -88.227946 | 30 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 27 | 10 | Muck | Pole | SAMPLED | | | 1 | | 1 | | 1 | | | | | | | | | | | | | | | 1 | | | | |
| 28 | 45.015643 | -88.227159 | 39 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 28 | 8 | Muck | Pole | SAMPLED | | | 1 | | | | | | | | | | | | | | 1 | | | | | | 1 | | | |
| 29 | 45.015631 | -88.226373 | 44 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 29 | 6 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | 1 | | | | | | | | | | | | | | | |
| 30 | 45.015619 | -88.225586 | 53 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 30 | 5 | Muck | Pole | SAMPLED | | | 2 | | | | 2 | | | | | | | | | | | 1 | | | | | | | |
| 31 | 45.015606 | -88.224800 | 63 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 31 | 4 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 32 | 45.015594 | -88.224013 | 62 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 32 | 3 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 33 | 45.015582 | -88.223227 | 61 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 33 | 3 | Rock | Pole | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 34 | 45.015570 | -88.222440 | 60 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 34 | 0 | | | SHALLOW | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35 | 45.016299 | -88.233434 | 15 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 35 | 6 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 36 | 45.016286 | -88.232647 | 6 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 36 | 10 | Muck | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 37 | 45.016274 | -88.231861 | 3 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 37 | 16 | | Rope | SAMPLED | | | 2 | | | | 2 | | | | | | | | | | | | | | | | | | |
| 38 | 45.016262 | -88.231074 | 3 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 38 | 15 | | Rope | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 39 | 45.016250 | -88.230288 | 10 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 39 | 15 | | Rope | SAMPLED | | | 2 | | | | 2 | | | | | | | | | | | | | | | | | | |
| 40 | 45.016238 | -88.229501 | 17 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 40 | 16 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 41 | 45.016225 | -88.228715 | 24 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 41 | 15 | | Rope | SAMPLED | | | 2 | | | | 2 | | | 1 | | 1 | | | | | | | | | 1 | | | | |
| 42 | 45.016213 | -88.227928 | 31 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 42 | 13 | Muck | Pole | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 43 | 45.016201 | -88.227142 | 38 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 43 | 11 | Muck | Pole | SAMPLED | | | 0] | | | | | | | | | | | | | | | | | | | | | | |
| 44 | 45.016189 | -88.226355 | 45 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 44 | 8 | Muck | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 45 | 45.016177 | -88.225569 | 52 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 45 | 9 | Muck | Pole | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 46 | 45.016164 | -88.224783 | 64 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 46 | 6 | Muck | Pole | SAMPLED | | | 1 | | | | 2 | | | 1 | | | | | | | | | | | | | | | |
| 47 | 45.016152 | -88.223996 | 65 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 47 | 4 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 48 | 45.016140 | -88.223210 | 66 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 48 | 3 | Rock | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 49 | 45.016128 | -88.222423 | 67 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 49 | 3 | Sand | Pole | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 50 | 45.016115 | -88.221637 | 68 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 50 | 0 | | | DOCK | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 51 | 45.016856 | -88.233417 | 14 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 51 | 5 | Muck | Pole | SAMPLED | | | 1 | | | | 1 | | | 1 | | | | | | | | | | | | | | | |
| 52 | 45.016844 | -88.232630 | 7 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 52 | 9 | Muck | Pole | SAMPLED | | | 2 | | 1 | | | | 2 | | 1 | | | | 1 | | | | | 1 | 1 | | | | |
| 53 | 45.016832 | -88.231844 | 4 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 53 | 18 | | Rope | SAMPLED | | | 2 | | | | 2 | | | | | | | | | | | | | | | | | | |
| 54 | 45.016820 | -88.231057 | 4 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 54 | 21 | | Rope | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 55 | 45.016808 | -88.230271 | 9 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 55 | 20 | | Rope | SAMPLED | | | 1 | | | | | | | | | 1 | | | | | | | | | | | | | | |
| 56 | 45.016795 | -88.229484 | 18 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 56 | 21 | | Rope | SAMPLED | | | 1 | | | | | | | | | 1 | | | | | | | | | | | | | | |
| 57 | 45.016783 | -88.228698 | 23 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 57 | 17 | | Rope | SAMPLED | | | 2 | | | | | | | | | 2 | | | | | | | | | | | | | | |
| 58 | 45.016771 | -88.227911 | 32 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 58 | 15 | Muck | Pole | SAMPLED | | | 2 | 1 | | 2 | | | | | 1 | | | | | | | | | 1 | 1 | | | | |
| 59 | 45.016759 | -88.227125 | 37 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 59 | 13 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | 1 | | | | | | | | | | | | | | | | |

| Point Number | Latitude (Decimal Degrees) | Longitude (Decimal Degrees) | ID | Lake Name | County | Date | Field Crew | Point Number | Depth (ft) | Sediment | Pole;Rope | Comments | Notes | Nuisance | Total Rake Fullness | Myriophyllum spicatum | Bidens beckii | Ceratophyllum demersum | Chara spp. | Elodea canadensis | Myriophyllum sibiricum | Najas flexilis | Najas guadalupensis | Nitella spp. | Nuphar variegata | Nymphaea odorata | Potamogeton amplifolius | Potamogeton berchtoldii | Potamogeton friesii | Potamogeton gramineus | Potamogeton illinoensis | Potamogeton praelongus | Potamogeton strictifolius | Potamogeton zosteriformis | Stuckenia pectinata | Vallisneria americana | Aquatic moss | Filamentous algae |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 60 | 45.016747 | -88.226338 | 46 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 60 | 12 | Muck | Pole | SAMPLED | | | 2 | | | | 2 | | | | | | | | | | | | | | | | | | | |
| 61 | 45.016734 | -88.225552 | 51 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 61 | 10 | Muck | Pole | SAMPLED | | | 3 | | 1 | | 2 | | 2 | | | | | | 1 | | | | | | 1 | | | | | |
| 62 | 45.016722 | -88.224765 | 73 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 62 | 8 | Muck | Pole | SAMPLED | | | 2 | | 1 | | 1 | | 1 | | 1 | | | | 1 | | 2 | | | | | | 1 | | | |
| 63 | 45.016710 | -88.223979 | 72 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 63 | 5 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | 1 | | | | | | | | |
| 64 | 45.016698 | -88.223192 | 71 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 64 | 4 | Rock | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | | |
| 65 | 45.016685 | -88.222406 | 70 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 65 | 4 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | | |
| 66 | 45.016673 | -88.221619 | 69 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 66 | 2 | Sand | Pole | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 67 | 45.017414 | -88.233400 | 13 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 67 | 5 | Muck | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | | |
| 68 | 45.017402 | -88.232613 | 8 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 68 | 8 | Muck | Pole | SAMPLED | | | 2 | | 1 | | | | | | | | | | | | | | | | 1 | | | 1 | | |
| 69 | 45.017390 | -88.231827 | 16 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 69 | 17 | | Rope | SAMPLED | | | 1 | | | | | | | | | | | | | 1 | | | | | | | | | | |
| 70 | 45.017378 | -88.231040 | 5 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 70 | 21 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 71 | 45.017365 | -88.230254 | 8 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 71 | 23 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 72 | 45.017353 | -88.229467 | 19 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 72 | 22 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 73 | 45.017341 | -88.228681 | 22 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 73 | 18 | | Rope | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | | |
| 74 | 45.017329 | -88.227894 | 33 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 74 | 16 | | Rope | SAMPLED | | | 2 | | | | 2 | | | | | | | | | | | | | | | | | | | |
| 75 | 45.017317 | -88.227108 | 36 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 75 | 16 | | Rope | SAMPLED | | | 2 | | | | 2 | | | | | | | | | | | | | | | | 1 | | | | |
| 76 | 45.017304 | -88.226321 | 47 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 76 | 14 | | Rope | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | | |
| 77 | 45.017292 | -88.225535 | 50 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 77 | 13 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | | | | | | 1 | | | | | | | | | | | |
| 78 | 45.017280 | -88.224748 | 74 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 78 | 8 | Muck | Pole | SAMPLED | | | 2 | | | | 2 | | 1 | | | | | | 1 | | 1 | | | | | | | | | |
| 79 | 45.017268 | -88.223962 | 75 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 79 | 6 | Muck | Pole | SAMPLED | | | 1 | | | | 1 | | | 1 | | | | | | | | | | | | | | | | |
| 80 | 45.017256 | -88.223175 | 76 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 80 | 7 | Muck | Pole | SAMPLED | | | 2 | | | | 2 | | | | | | | | | | 1 | | | | | | | | | |
| 81 | 45.017243 | -88.222388 | 77 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 81 | 4 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | | |
| 82 | 45.017231 | -88.221602 | 78 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 82 | 3 | Sand | Pole | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 83 | 45.017972 | -88.233382 | 12 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 83 | 3 | Muck | Pole | SAMPLED | | | 2 | | | | 1 | | | | | | | | | | | 1 | | | | | | | | |
| 84 | 45.017960 | -88.232596 | 9 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 84 | 5 | Muck | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | | |
| 85 | 45.017948 | -88.231809 | 17 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 85 | 10 | Muck | Pole | SAMPLED | | | 2 | | 1 | | | | | | | | | | | | | | | | | 2 | | 1 | 1 | |
| 86 | 45.017936 | -88.231023 | 6 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 86 | 16 | | Rope | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | | |
| 87 | 45.017923 | -88.230236 | 7 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 87 | 24 | | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | | |
| 88 | 45.017911 | -88.229450 | 20 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 88 | 23 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 89 | 45.017899 | -88.228663 | 21 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 89 | 21 | | Rope | SAMPLED | | | 1 | | | | | | | | | 1 | | | | | | | | | | | | | | |
| 90 | 45.017887 | -88.227877 | 34 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 90 | 18 | | Rope | SAMPLED | | | 1 | | | | 1 | | | | | 1 | | | | | | | | | | | | | | |
| 91 | 45.017875 | -88.227090 | 35 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 91 | 16 | | Rope | SAMPLED | | | 2 | | | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | |
| 92 | 45.017862 | -88.226304 | 48 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 92 | 15 | | Rope | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | 1 | | | | |
| 93 | 45.017850 | -88.225517 | 49 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 93 | 15 | | Rope | SAMPLED | | | 1 | | | | 1 | | | | 1 | | | | | | | | | | | | | | | |
| 94 | 45.017838 | -88.224731 | 84 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 94 | 14 | | Rope | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | | |
| 95 | 45.017826 | -88.223944 | 83 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 95 | 13 | Muck | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | | |
| 96 | 45.017813 | -88.223158 | 82 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 96 | 13 | Muck | Pole | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 97 | 45.017801 | -88.222371 | 81 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 97 | 9 | Muck | Pole | SAMPLED | | | 2 | | | | 2 | | | 1 | | | | | | | | | | | 1 | | | | |
| 98 | 45.017789 | -88.221585 | 80 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 98 | 5 | Sand | Pole | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 99 | 45.017777 | -88.220798 | 79 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 99 | 2 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | | |
| 100 | 45.018530 | -88.233365 | 11 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 100 | 0 | | | NONNAVIGABLE (PLANTS) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 101 | 45.018518 | -88.232579 | 10 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 101 | 0 | | | NONNAVIGABLE (PLANTS) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102 | 45.018506 | -88.231792 | 18 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 102 | 2 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | 1 | | | | | | | 1 | | | | | | | | |
| 103 | 45.018493 | -88.231006 | 19 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 103 | 9 | Muck | Pole | SAMPLED | | | 2 | | | | | | | | | | | | | | | | | | 1 | | | 2 | | |
| 104 | 45.018481 | -88.230219 | 20 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 104 | 23 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 105 | 45.018469 | -88.229433 | 21 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 105 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 106 | 45.018457 | -88.228646 | 23 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 106 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 107 | 45.018445 | -88.227860 | 22 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 107 | 24 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 108 | 45.018432 | -88.227073 | 24 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 108 | 18 | | Rope | SAMPLED | | | 2 | | | | | | | | | 2 | | | | | | | | | | | | | | |
| 109 | 45.018420 | -88.226287 | 25 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 109 | 16 | | Rope | SAMPLED | | | 1 | | | | 1 | | | | 1 | | | | | | | | | | | | | | |
| 110 | 45.018408 | -88.225500 | 85 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 110 | 15 | | Rope | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | | |
| 111 | 45.018396 | -88.224714 | 86 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 111 | 16 | | Rope | SAMPLED | | | 1 | | | | 1 | | | | | 1 | | | | | | | | | | | | | | |
| 112 | 45.018383 | -88.223927 | 87 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 112 | 11 | Muck | Pole | SAMPLED | | | 3 | | 1 | | | 2 | | | | | | | | | | | | 1 | 1 | | | 1 | | |
| 113 | 45.018371 | -88.223140 | 88 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 113 | 15 | Muck | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | | |
| 114 | 45.018359 | -88.222354 | 89 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 114 | 12 | Muck | Pole | SAMPLED | | | 2 | | | | 2 | | | | | | | | | | | | | | | | | | | |
| 115 | 45.018347 | -88.221567 | 90 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 115 | 7 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | | |
| 116 | 45.018335 | -88.220781 | 91 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 116 | 4 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | | |
| 117 | 45.018322 | -88.219994 | 92 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 117 | 0 | | | SHALLOW | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 118 | 45.019051 | -88.230989 | 32 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 118 | 5 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | | | | | | | | | | | | | | | | | |

| Point Number | Latitude (Decimal Degrees) | Longitude (Decimal Degrees) | ID | Lake Name | County | Date | Field Crew | Point Number | Depth (ft) | Sediment | Pole;Rope | Comments | Notes | Nuisance | Total Rake Fullness | Myriophyllum spicatum | Bidens beckii | Ceratophyllum demersum | Chara spp. | Elodea canadensis | Myriophyllum sibiricum | Najas flexilis | Najas guadalupensis | Nitella spp. | Nuphar variegata | Nymphaea odorata | Potamogeton amplifolius | Potamogeton berchtoldii | Potamogeton friesii | Potamogeton gramineus | Potamogeton illinoensis | Potamogeton praelongus | Potamogeton strictifolius | Potamogeton zosteriformis | Stuckenia pectinata | Vallisneria americana | Aquatic moss | Filamentous algae |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 119 | 45.019039 | -88.230202 | 31 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 119 | 22 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 120 | 45.019027 | -88.229415 | 30 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 120 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 121 | 45.019015 | -88.228629 | 29 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 121 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 122 | 45.019002 | -88.227842 | 28 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 122 | 25 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 123 | 45.018990 | -88.227056 | 27 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 123 | 20 | | Rope | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 124 | 45.018978 | -88.226269 | 26 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 124 | 16 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 125 | 45.018966 | -88.225483 | 100 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 125 | 16 | | Rope | SAMPLED | | | 2 | | | | 2 | | | | | | | | | | | | | | | | | | |
| 126 | 45.018954 | -88.224696 | 99 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 126 | 17 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 127 | 45.018941 | -88.223910 | 98 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 127 | 17 | | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 128 | 45.018929 | -88.223123 | 97 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 128 | 15 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 129 | 45.018917 | -88.222337 | 96 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 129 | 12 | Muck | Pole | SAMPLED | | | 1 | | | | | | 1 | 1 | | | | | | | 1 | | | | | | | | |
| 130 | 45.018905 | -88.221550 | 95 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 130 | 6 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 131 | 45.018892 | -88.220764 | 94 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 131 | 7 | Sand | Pole | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 132 | 45.018880 | -88.219977 | 93 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 132 | 0 | | | OTHER | SWIMMING | | | | | | | | | | | | | | | | | | | | | | | | | |
| 133 | 45.019609 | -88.230971 | 33 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 133 | 4 | Muck | Pole | SAMPLED | | | 2 | | | | 2 | | | 1 | | | | | | | | | | | | | | | |
| 134 | 45.019597 | -88.230185 | 34 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 134 | 13 | Muck | Pole | SAMPLED | | | 2 | | | | 2 | | | | | | | | | | | | | | | | | | |
| 135 | 45.019585 | -88.229398 | 35 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 135 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 136 | 45.019573 | -88.228612 | 36 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 136 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 137 | 45.019560 | -88.227825 | 37 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 137 | 25 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 138 | 45.019548 | -88.227039 | 38 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 138 | 21 | | Rope | SAMPLED | | | 1 | | | | | | | | | 1 | | | | | | | | | | | | | |
| 139 | 45.019536 | -88.226252 | 39 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 139 | 18 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 140 | 45.019524 | -88.225466 | 101 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 140 | 19 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 141 | 45.019511 | -88.224679 | 102 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 141 | 18 | | Rope | SAMPLED | | | 1 | | | | 1 | | | | | 1 | | | | | | | | | | | | | |
| 142 | 45.019499 | -88.223893 | 103 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 142 | 18 | | Rope | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 143 | 45.019487 | -88.223106 | 104 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 143 | 15 | | Rope | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 144 | 45.019475 | -88.222319 | 105 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 144 | 6 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 145 | 45.019462 | -88.221533 | 106 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 145 | 8 | Muck | Pole | SAMPLED | | | 2 | | | | 2 | | | | | | | | | | | | | | | | | | |
| 146 | 45.019450 | -88.220746 | 107 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 146 | 7 | Muck | Pole | SAMPLED | | | 2 | | | | 2 | | | 1 | | | | | | | | | | | | | | |
| 147 | 45.019438 | -88.219960 | 108 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 147 | 4 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 148 | 45.020155 | -88.230168 | 45 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 148 | 10 | Muck | Pole | SAMPLED | | | 1 | | | | 1 | | | | 1 | | | | | | 1 | | | | 1 | | | | |
| 149 | 45.020143 | -88.229381 | 44 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 149 | 25 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 150 | 45.020130 | -88.228595 | 43 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 150 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 151 | 45.020118 | -88.227808 | 42 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 151 | 25 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 152 | 45.020106 | -88.227021 | 41 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 152 | 22 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 153 | 45.020094 | -88.226235 | 40 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 153 | 20 | | Rope | SAMPLED | | | 3 | | | | 3 | | | | | | | | | | | | | | | | | | |
| 154 | 45.020081 | -88.225448 | 116 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 154 | 18 | | Rope | SAMPLED | | | 1 | | | | | | | | | 1 | | | | | | | | | | | | | |
| 155 | 45.020069 | -88.224662 | 115 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 155 | 18 | | Rope | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 156 | 45.020057 | -88.223875 | 114 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 156 | 16 | | Rope | SAMPLED | | | 1 | | | | 1 | | 1 | | | | | | | | | | | | | | | | |
| 157 | 45.020045 | -88.223089 | 113 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 157 | 6 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | 1 | | | | | | | | | | | | | | |
| 158 | 45.020033 | -88.222302 | 112 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 158 | 5 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 159 | 45.020020 | -88.221516 | 111 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 159 | 9 | Muck | Pole | SAMPLED | | | 1 | | 1 | | | | | | | | | | | | 1 | | | | | | 1 | | |
| 160 | 45.020008 | -88.220729 | 110 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 160 | 7 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | | | | | | | | | 1 | | | | | | | |
| 161 | 45.019996 | -88.219943 | 109 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 161 | 0 | | | DOCK | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 162 | 45.020713 | -88.230150 | 46 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 162 | 13 | Muck | Pole | SAMPLED | | | 2 | | | | 2 | | | | | | | | | | | | | | | | | | |
| 163 | 45.020700 | -88.229364 | 47 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 163 | 24 | | Rope | SAMPLED | | | 2 | | | | | | | | | 2 | | | | | | | | | | | | | |
| 164 | 45.020688 | -88.228577 | 48 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 164 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 165 | 45.020676 | -88.227791 | 49 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 165 | 24 | | Rope | SAMPLED | | | 2 | | | | | | | | | 2 | | | | | | | | | | | | | |
| 166 | 45.020664 | -88.227004 | 50 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 166 | 21 | | Rope | SAMPLED | | | 1 | | | | | | | | | 1 | | | | | | | | | | | | | |
| 167 | 45.020652 | -88.226218 | 51 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 167 | 19 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 168 | 45.020639 | -88.225431 | 117 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 168 | 18 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 169 | 45.020627 | -88.224645 | 118 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 169 | 17 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 170 | 45.020615 | -88.223858 | 119 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 170 | 6 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 171 | 45.020603 | -88.223071 | 120 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 171 | 6 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 172 | 45.020590 | -88.222285 | 121 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 172 | 6 | Muck | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | 1 | | | | | | | |
| 173 | 45.020578 | -88.221498 | 122 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 173 | 9 | Muck | Pole | SAMPLED | | | 3 | | 2 | | | | 2 | | | | | | | | | | 1 | | | | | | |
| 174 | 45.020566 | -88.220712 | 123 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 174 | 5 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 175 | 45.020554 | -88.219925 | 124 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 175 | 0 | | | DOCK | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 176 | 45.021270 | -88.230133 | 57 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 176 | 13 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | | | | | | | | | 1 | | | | | | | |
| 177 | 45.021258 | -88.229347 | 56 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 177 | 24 | | Rope | SAMPLED | | | 1 | | | | | | | | | 1 | | | | | | | | | | | | | |

| Point Number | Latitude (Decimal Degrees) | Longitude (Decimal Degrees) | ID | Lake Name | County | Date | Field Crew | Point Number | Depth (ft) | Sediment | Pole;Rope | Comments | Notes | Nuisance | Total Rake Fullness | Myriophyllum spicatum | Bidens beckii | Ceratophyllum demersum | Chara spp. | Elodea canadensis | Myriophyllum sibiricum | Najas flexilis | Najas guadalupensis | Nitella spp. | Nuphar variegata | Nymphaea odorata | Potamogeton amplifolius | Potamogeton berchtoldii | Potamogeton friesii | Potamogeton gramineus | Potamogeton illinoensis | Potamogeton praelongus | Potamogeton strictifolius | Potamogeton zosteriformis | Stuckenia pectinata | Vallisneria americana | Aquatic moss | Filamentous algae |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 178 | 45.021246 | -88.228560 | 55 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 178 | 26 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 179 | 45.021234 | -88.227774 | 54 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 179 | 24 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 180 | 45.021222 | -88.226987 | 53 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 180 | 22 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 181 | 45.021209 | -88.226200 | 52 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 181 | 0 | 21 | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 182 | 45.021197 | -88.225414 | 131 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 182 | 18 | | Rope | SAMPLED | | | 1 | | | | | | | | | 1 | | | | | | | | | | | | | |
| 183 | 45.021185 | -88.224627 | 130 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 183 | 15 | | Rope | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 184 | 45.021173 | -88.223841 | 129 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 184 | 14 | Muck | Pole | SAMPLED | | | 2 | | | | 1 | | | | | | | | | | | | | 2 | 1 | | | | |
| 185 | 45.021160 | -88.223054 | 128 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 185 | 6 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | 1 | | | | | | | 1 | | | | | | | |
| 186 | 45.021148 | -88.222268 | 127 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 186 | 6 | Sand | Pole | SAMPLED | | | 2 | | | | 2 | | | | | | | | | | 1 | | | | | | | |
| 187 | 45.021136 | -88.221481 | 126 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 187 | 6 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | |
| 188 | 45.021124 | -88.220695 | 125 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 188 | 3 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | |
| 189 | 45.021828 | -88.230116 | 58 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 189 | 16 | Muck | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | 1 | | | | | | | |
| 190 | 45.021816 | -88.229329 | 59 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 190 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | |
| 191 | 45.021804 | -88.228543 | 60 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 191 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | |
| 192 | 45.021792 | -88.227756 | 61 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 192 | 26 | | Rope | SAMPLED | | | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 193 | 45.021779 | -88.226970 | 62 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 193 | 22 | | Rope | SAMPLED | | | 1 | | | | | | | | | 1 | | | | | | | | | | | | | |
| 194 | 45.021767 | -88.226183 | 63 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 194 | 21 | | Rope | SAMPLED | | | 1 | | | | | | | | | 1 | | | | | | | | | | | | | |
| 195 | 45.021755 | -88.225397 | 132 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 195 | 18 | | Rope | SAMPLED | | | 1 | | | | | | | | | 1 | | | | | | | | | | | | | |
| 196 | 45.021743 | -88.224610 | 133 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 196 | 16 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 197 | 45.021731 | -88.223823 | 134 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 197 | 15 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 198 | 45.021718 | -88.223037 | 135 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 198 | 10 | Muck | Pole | SAMPLED | | | 3 | | | | 2 | | | | | | | | | | 2 | | | | | | | |
| 199 | 45.021706 | -88.222250 | 136 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 199 | 6 | Sand | Pole | SAMPLED | | | 2 | | | | 2 | | | 1 | | | | | | | | | | | | | |
| 200 | 45.021694 | -88.221464 | 137 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 200 | 4 | Rock | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | |
| 201 | 45.021682 | -88.220677 | 138 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 201 | 0 | | | SHALLOW | | | | | | | | | | | | | | | | | | | | | | | | | |
| 202 | 45.022386 | -88.230099 | 69 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 202 | 13 | Muck | Pole | SAMPLED | | | 2 | | | | 2 | | | | 1 | | | | | | | | | | 1 | | | |
| 203 | 45.022374 | -88.229312 | 68 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 203 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | |
| 204 | 45.022362 | -88.228526 | 67 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 204 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | |
| 205 | 45.022350 | -88.227739 | 66 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 205 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | |
| 206 | 45.022337 | -88.226953 | 65 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 206 | 24 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 207 | 45.022325 | -88.226166 | 64 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 207 | 21 | | Rope | SAMPLED | | | 1 | | | | | | 1 | | | 1 | | | | | | | | | | | | | |
| 208 | 45.022313 | -88.225379 | 144 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 208 | 18 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 209 | 45.022301 | -88.224593 | 143 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 209 | 13 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | | | | | | | | | | | | | | | | |
| 210 | 45.022288 | -88.223806 | 142 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 210 | 15 | | Rope | SAMPLED | | | 1 | | | | | | | | | | | | | | 1 | | | | | | | | |
| 211 | 45.022276 | -88.223020 | 141 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 211 | 14 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | | | | | | | | | | | | | | | | |
| 212 | 45.022264 | -88.222233 | 140 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 212 | 8 | Muck | Pole | SAMPLED | | | 2 | | | | 2 | | | | | | | | | | | | | | | | | | |
| 213 | 45.02225169 | -88.22144651 | 139 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 213 | 5 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | 1 | | | | | | | |
| 214 | 45.022944 | -88.23008166 | 70 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 214 | 2 | Rock | Pole | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 215 | 45.0229318 | -88.22929508 | 71 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 215 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | |
| 216 | 45.0229196 | -88.22850849 | 72 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 216 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | |
| 217 | 45.02290739 | -88.2277219 | 73 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 217 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | |
| 218 | 45.02289518 | -88.22693532 | 74 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 218 | 25 | | Rope | SAMPLED | | | 1 | | | | | | | | | 1 | | | | | | | | | | | | | |
| 219 | 45.02288296 | -88.22614873 | 75 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 219 | 21 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 220 | 45.02287074 | -88.22536215 | 145 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 220 | 18 | | Rope | SAMPLED | | | 1 | | | | | | | | | 1 | | | | | | | | | | | | | |
| 221 | 45.02285851 | -88.22457556 | 146 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 221 | 16 | | Rope | SAMPLED | | | 2 | | | | 2 | | 1 | | 1 | | | | | | | | | | | | | |
| 222 | 45.02284627 | -88.22378898 | 147 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 222 | 15 | Muck | Pole | SAMPLED | | | 2 | | | | 2 | | | | | | | | | | 1 | | | | | | | |
| 223 | 45.02283403 | -88.2230024 | 148 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 223 | 15 | Muck | Pole | SAMPLED | | | 2 | | | | 2 | | | | | | | | | | | 1 | | | | | | |
| 224 | 45.02282179 | -88.22221581 | 149 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 224 | 11 | Muck | Pole | SAMPLED | | | 1 | | | | | | 1 | 1 | | | | | | | | | | | | | | |
| 225 | 45.02280954 | -88.22142923 | 150 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 225 | 7 | Muck | Pole | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 226 | 45.02279728 | -88.22064265 | 151 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 226 | 3 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | |
| 227 | 45.02357492 | -88.23478405 | 103 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 227 | 0 | | | DOCK | | | | | | | | | | | | | | | | | | | | | | | | | |
| 228 | 45.02356275 | -88.23399745 | 102 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 228 | 1 | Muck | Pole | SAMPLED | | | 1 | 1 | | | | | | | | | | 1 | | | | | | | | | | |
| 229 | 45.02350185 | -88.23006447 | 79 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 229 | 8 | Muck | Pole | SAMPLED | | | 3 | | | | 2 | | | | 1 | | | | | | | | | 1 | | | 2 | |
| 230 | 45.02348965 | -88.22927787 | 78 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 230 | 24 | | Rope | SAMPLED | | | 1 | | | | | | | | | 1 | | | | | | | | | | | | | |
| 231 | 45.02347745 | -88.22849128 | 83 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 231 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | |
| 232 | 45.02346524 | -88.22770469 | 0 | Kelly Lake | Oconto | 7/25/2016 | | 232 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | |
| 233 | 45.02345303 | -88.22691809 | 77 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 233 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | |
| 234 | 45.02344081 | -88.2261315 | 76 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 234 | 21 | | Rope | SAMPLED | | | 1 | | | | | | | | | 1 | | | | | | | | | | | | | |
| 235 | 45.02342859 | -88.22534491 | 159 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 235 | 19 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 236 | 45.02341636 | -88.22455832 | 158 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 236 | 16 | | Rope | SAMPLED | | | 1 | | | | 1 | | | | 1 | | | | | | | | | | | | | |

| Point Number | Latitude (Decimal Degrees) | Longitude (Decimal Degrees) | ID | Lake Name | County | Date | Field Crew | Point Number | Depth (ft) | Sediment | Pole;Rope | Comments | Notes | Nuisance | Total Rake Fullness | Myriophyllum spicatum | Bidens beckii | Ceratophyllum demersum | Chara spp. | Elodea canadensis | Myriophyllum sibiricum | Najas flexilis | Najas guadalupensis | Nitella spp. | Nuphar variegata | Nymphaea odorata | Potamogeton amplifolius | Potamogeton berchtoldii | Potamogeton friesii | Potamogeton gramineus | Potamogeton illinoensis | Potamogeton praelongus | Potamogeton strictifolius | Potamogeton zosteriformis | Stuckenia pectinata | Vallisneria americana | Aquatic moss | Filamentous algae |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 237 | 45.02340412 | -88.22377172 | 157 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 237 | 15 | | Rope | SAMPLED | | | 3 | | | | 3 | | | | | | | | | | 1 | | | | | | | | | |
| 238 | 45.02339188 | -88.22298513 | 156 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 238 | 14 | Muck | Pole | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 239 | 45.02337963 | -88.22219854 | 155 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 239 | 12 | Muck | Pole | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 240 | 45.02336738 | -88.22141195 | 154 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 240 | 10 | Muck | Pole | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 241 | 45.02335513 | -88.22062536 | 152 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 241 | 5 | Sand | Pole | SAMPLED | | | 2 | | | | 2 | | | | | | | | | | | | | | | | | | |
| 242 | 45.02334287 | -88.21983878 | 153 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 242 | 0 | | | SHALLOW | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 243 | 45.02413277 | -88.2347669 | 98 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 243 | 8 | Muck | Pole | SAMPLED | | | 3 | 2 | 1 | | | 1 | | | 1 | | | | | | | | | | | | | | |
| 244 | 45.0241206 | -88.23398029 | 99 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 244 | 15 | Muck | Pole | SAMPLED | | | 2 | | | 1 | | 1 | | | 1 | | | | | | | | | | | | | | |
| 245 | 45.02410843 | -88.23319369 | 100 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 245 | 6 | Muck | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | 1 | |
| 246 | 45.02409626 | -88.23240708 | 101 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 246 | 2 | Sand | Pole | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 247 | 45.02407189 | -88.23083388 | 80 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 247 | 6 | Muck | Pole | SAMPLED | | | 2 | | | | 1 | | | | 1 | | | | | | | 1 | | | | | | | |
| 248 | 45.0240597 | -88.23004727 | 81 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 248 | 19 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 249 | 45.0240475 | -88.22926067 | 82 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 249 | 24 | | Rope | SAMPLED | | | 2 | | | | | | | | | 2 | | | | | | | | | | | | | | |
| 250 | 45.0240353 | -88.22847407 | 84 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 250 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 251 | 45.02402309 | -88.22768747 | 0 | Kelly Lake | Oconto | 7/25/2016 | | 251 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 252 | 45.02401088 | -88.22690087 | 86 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 252 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 253 | 45.02399866 | -88.22611427 | 85 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 253 | 24 | | Rope | SAMPLED | | | 3 | | | | | | | | | 3 | | | | | | | | | | | | | | |
| 254 | 45.02398643 | -88.22532767 | 160 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 254 | 19 | | Rope | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 255 | 45.0239742 | -88.22454107 | 161 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 255 | 15 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | 1 | | | | | | | | | | | | | | | |
| 256 | 45.02396197 | -88.22375447 | 162 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 256 | 14 | | Rope | SAMPLED | | | 1 | | | | | | | | 1 | | | | | 1 | | | | | | | | | |
| 257 | 45.02394973 | -88.22296787 | 163 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 257 | 13 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | | | | | | | | | | | | | | | | |
| 258 | 45.02393748 | -88.22218127 | 164 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 258 | 12 | Muck | Pole | SAMPLED | | | 1 | | | | | | | | 1 | | | | | | | | | | | | | | |
| 259 | 45.02392523 | -88.22139468 | 165 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 259 | 9 | Muck | Pole | SAMPLED | | | 1 | | | | | | | | 1 | | | | | | 1 | | | | | | | | |
| 260 | 45.02391297 | -88.22060808 | 166 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 260 | 6 | Muck | Pole | SAMPLED | | | 2 | | | | 2 | | | 1 | | | | | | | | 1 | 1 | | | | | | |
| 261 | 45.02390071 | -88.21982148 | 167 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 261 | 3 | Sand | Pole | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 262 | 45.02469062 | -88.23474975 | 97 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 262 | 15 | Muck | Pole | SAMPLED | | | 2 | | | | | | | | 1 | | | | | | | 1 | | | | | | | |
| 263 | 45.02467845 | -88.23396314 | 96 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 263 | 22 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 264 | 45.02466628 | -88.23317652 | 95 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 264 | 24 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 265 | 45.02465411 | -88.23238991 | 94 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 265 | 19 | | Rope | SAMPLED | | | 2 | | | | 1 | | | | | 2 | | | | | | | | | | | | | |
| 266 | 45.02464193 | -88.2316033 | 93 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 266 | 14 | Muck | Pole | SAMPLED | | | 2 | | | | 2 | | 1 | | | | | | | | | | | | | | | | |
| 267 | 45.02462974 | -88.23081669 | 92 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 267 | 19 | | Rope | SAMPLED | | | 3 | | | | 3 | | | | | | | | | | | | | | | | | | |
| 268 | 45.02461755 | -88.23003008 | 91 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 268 | 22 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 269 | 45.02460535 | -88.22924347 | 90 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 269 | 25 | | Rope | SAMPLED | | | 2 | | | 1 | | | | | | 2 | | | | | | | | | | | | | |
| 270 | 45.02459315 | -88.22845686 | 89 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 270 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 271 | 45.02458094 | -88.22767025 | 0 | Kelly Lake | Oconto | 7/25/2016 | | 271 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 272 | 45.02456873 | -88.22688364 | 88 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 272 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 273 | 45.02455651 | -88.22609703 | 87 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 273 | 26 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 274 | 45.02454428 | -88.22531043 | 175 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 274 | 16 | | Rope | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 275 | 45.02453205 | -88.22452382 | 174 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 275 | 15 | | Rope | SAMPLED | | | 1 | | | | | 1 | | | 1 | | | | | | | | | | | | | | |
| 276 | 45.02451982 | -88.22373721 | 173 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 276 | 16 | | Rope | SAMPLED | | | 3 | | | | 3 | | | | 1 | | | | | | 1 | | | | | | | | |
| 277 | 45.02450758 | -88.22295061 | 172 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 277 | 14 | Muck | Pole | SAMPLED | | | 1 | | | | | | 1 | | 1 | | | | | | | | | | | | | | |
| 278 | 45.02449533 | -88.222164 | 171 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 278 | 12 | Muck | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | 1 | | | | | | | |
| 279 | 45.02448308 | -88.2213774 | 170 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 279 | 10 | Muck | Pole | SAMPLED | | | 1 | | | | | | | 1 | | | | | | | | | | | | | | | |
| 280 | 45.02447082 | -88.22059079 | 169 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 280 | 6 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | 1 | | | | | | | | | | | | | | | |
| 281 | 45.02445856 | -88.21980419 | 168 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 281 | 3 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 282 | 45.02524847 | -88.2347326 | 104 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 282 | 10 | Muck | Pole | SAMPLED | | | 1 | | | | | | | | 1 | | | | | | | | | | | | 1 | 1 | |
| 283 | 45.02523631 | -88.23394598 | 105 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 283 | 22 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 284 | 45.02522414 | -88.23315936 | 106 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 284 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 285 | 45.02521196 | -88.23237274 | 136 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 285 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 286 | 45.02519978 | -88.23158612 | 135 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 286 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 287 | 45.02518759 | -88.2307995 | 134 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 287 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 288 | 45.0251754 | -88.23001288 | 133 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 288 | 24 | | Rope | SAMPLED | | | 3 | | | | | | | | | 3 | | | | | | | | | | | | | | |
| 289 | 45.0251632 | -88.22922627 | 137 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 289 | 26 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 290 | 45.025151 | -88.22843965 | 148 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 290 | 24 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 291 | 45.02513879 | -88.22765303 | 149 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 291 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 292 | 45.02512658 | -88.22686642 | 162 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 292 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 293 | 45.02511436 | -88.2260798 | 163 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 293 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 294 | 45.02510213 | -88.22529318 | 176 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 294 | 18 | | Rope | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 295 | 45.0250899 | -88.22450657 | 177 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 295 | 19 | | Rope | SAMPLED | | | 1 | | | | | | | | | 1 | | | | | | | | | | | | | | |

| Point Number | Latitude (Decimal Degrees) | Longitude (Decimal Degrees) | ID | Lake Name | County | Date | Field Crew | Point Number | Depth (ft) | Sediment | Pole;Rope | Comments | Notes | Nuisance | Total Rake Fullness | Myriophyllum spicatum | Bidens beckii | Ceratophyllum demersum | Chara spp. | Elodea canadensis | Myriophyllum sibiricum | Najas flexilis | Najas guadalupensis | Nitella spp. | Nuphar variegata | Nymphaea odorata | Potamogeton amplifolius | Potamogeton berchtoldii | Potamogeton friesii | Potamogeton gramineus | Potamogeton illinoensis | Potamogeton praelongus | Potamogeton strictifolius | Potamogeton zosteriformis | Stuckenia pectinata | Vallisneria americana | Aquatic moss | Filamentous algae |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 296 | 45.02507767 | -88.22371996 | 178 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 296 | 16 | | Rope | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | | |
| 297 | 45.02506543 | -88.22293334 | 179 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 297 | 13 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | | | | | | 1 | | | | | | | | | | | |
| 298 | 45.02505318 | -88.22214673 | 180 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 298 | 11 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | | | | | | | | | | | | | | | | | |
| 299 | 45.02504093 | -88.22136012 | 181 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 299 | 10 | Muck | Pole | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 300 | 45.02502867 | -88.2205735 | 182 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 300 | 7 | Muck | Pole | SAMPLED | | | 1 | | | | | | | 1 | | | | | | | | | | | | | | | | |
| 301 | 45.02501641 | -88.21978689 | 183 | Kelly Lake | Oconto | 7/25/2016 | JLW & CMB | 301 | 4 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | | |
| 302 | 45.02579416 | -88.23392882 | 109 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 302 | 15 | Muck | Pole | SAMPLED | | | 1 | | | | 1 | | | | 1 | | | | | 1 | | | | | | | | | | |
| 303 | 45.02578199 | -88.23314219 | 107 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 303 | 25 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 304 | 45.02576981 | -88.23235557 | 108 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 304 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 305 | 45.02575763 | -88.23156894 | 0 | Kelly Lake | Oconto | 7/25/2016 | | 305 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 306 | 45.02574544 | -88.23078231 | 0 | Kelly Lake | Oconto | 7/25/2016 | | 306 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 307 | 45.02573325 | -88.22999569 | 132 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 307 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 308 | 45.02572105 | -88.22920906 | 138 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 308 | 25 | | Rope | SAMPLED | | | 2 | | | | | | | | | 2 | | | | | | | | | | | | | | |
| 309 | 45.02570885 | -88.22842244 | 147 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 309 | 25 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 310 | 45.02569664 | -88.22763581 | 150 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 310 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 311 | 45.02568443 | -88.22684919 | 161 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 311 | 24 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 312 | 45.02567221 | -88.22606257 | 164 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 312 | 22 | | Rope | SAMPLED | | | 1 | | | | | | | | | 1 | | | | | | | | | | | | | | |
| 313 | 45.02565998 | -88.22527594 | 190 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 313 | 15 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | 1 | | 1 | | | | | | | | | | | | | | |
| 314 | 45.02564775 | -88.22448932 | 191 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 314 | 8 | Muck | Pole | SAMPLED | | | 2 | | | | | | | 2 | | | | | | | | | | | | | | | |
| 315 | 45.02563551 | -88.2237027 | 192 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 315 | 7 | Sand | Pole | SAMPLED | | | 3 | | | | 3 | | | 1 | 1 | | | | | | | 1 | | | | | | | |
| 316 | 45.02562327 | -88.22291608 | 193 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 316 | 9 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | | | | | | | | | 1 | | | | | | | |
| 317 | 45.02561103 | -88.22212946 | 194 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 317 | 10 | Muck | Pole | SAMPLED | | | 3 | | | | 2 | | | | 2 | | | | | | | | | | | | | | |
| 318 | 45.02559877 | -88.22134284 | 195 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 318 | 10 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | | | | | | | | | | | | 1 | | | | |
| 319 | 45.02558652 | -88.22055622 | 196 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 319 | 8 | Muck | Pole | SAMPLED | | | 1 | | | | | | | 1 | 1 | | | | | | | | | | | | | | |
| 320 | 45.02557425 | -88.2197696 | 197 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 320 | 4 | Rock | Pole | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 321 | 45.02635201 | -88.23391166 | 110 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 321 | 7 | Muck | Pole | SAMPLED | | | 1 | | | | | | | | | | | | | | | 1 | | | | | | | |
| 322 | 45.02633984 | -88.23312503 | 111 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 322 | 12 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | | | | | | | | | | | | | | | | |
| 323 | 45.02632766 | -88.23233839 | 112 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 323 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 324 | 45.02631548 | -88.23155176 | 0 | Kelly Lake | Oconto | 7/25/2016 | | 324 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 325 | 45.02630329 | -88.23076512 | 0 | Kelly Lake | Oconto | 7/25/2016 | | 325 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 326 | 45.0262911 | -88.22997849 | 131 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 326 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 327 | 45.0262789 | -88.22919186 | 139 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 327 | 24 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 328 | 45.0262667 | -88.22840523 | 146 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 328 | 22 | | Rope | SAMPLED | | | 1 | | | | | | | | | 1 | | | | | | | | | | | | | | |
| 329 | 45.02625449 | -88.22761859 | 151 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 329 | 23 | | Rope | SAMPLED | | | 1 | | | | | | | | | 1 | | | | | | | | | | | | | | |
| 330 | 45.02624227 | -88.22683196 | 160 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 330 | 21 | | Rope | SAMPLED | | | 1 | | | | | | | | | 1 | | | | | | | | | | | | | | |
| 331 | 45.02623005 | -88.22604533 | 165 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 331 | 8 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | | | | | | | | | | | | | | | | |
| 332 | 45.02621783 | -88.2252587 | 189 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 332 | 11 | Muck | Pole | SAMPLED | | | 2 | | | | 2 | | | | | | | | 1 | | | | | | 1 | | | | |
| 333 | 45.0262056 | -88.22447207 | 188 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 333 | 6 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | | | | | | | | | | | | | | | | |
| 334 | 45.02619336 | -88.22368544 | 187 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 334 | 4 | Rock | Pole | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 335 | 45.02618112 | -88.22289881 | 186 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 335 | 5 | Rock | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | 1 | | | | | | | |
| 336 | 45.02616887 | -88.22211218 | 185 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 336 | 6 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | | 1 | | | | | | | 1 | | | | | | | |
| 337 | 45.02615662 | -88.22132556 | 184 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 337 | 8 | Muck | Pole | SAMPLED | | | 3 | | | | 1 | | | | | | | | | | | | | | 3 | | | | |
| 338 | 45.02614436 | -88.22053893 | 182 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 338 | 7 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | | | | | | | | | 1 | | | | | | | |
| 339 | 45.0261321 | -88.2197523 | 183 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 339 | 2 | Sand | Pole | SAMPLED | | | 2 | | | | 2 | | | | | | | | | | | | | | | | | | |
| 340 | 45.02690986 | -88.2338945 | 115 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 340 | 3 | Muck | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | 1 | | | | | | | |
| 341 | 45.02689769 | -88.23310786 | 114 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 341 | 13 | Muck | Pole | SAMPLED | | | 2 | | 1 | | | 1 | | | | | | | | | | | | | | 1 | | | |
| 342 | 45.02688551 | -88.23232122 | 113 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 342 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 343 | 45.02687333 | -88.23153458 | 0 | Kelly Lake | Oconto | 7/25/2016 | | 343 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 344 | 45.02686114 | -88.23074793 | 0 | Kelly Lake | Oconto | 7/25/2016 | | 344 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 345 | 45.02684895 | -88.22996129 | 130 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 345 | 24 | | Rope | SAMPLED | | | 1 | | | | | | | | | 1 | | | | | | | | | | | | | | |
| 346 | 45.02683675 | -88.22917465 | 140 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 346 | 10 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | | 1 | | | | | | 1 | | | | 1 | | | | |
| 347 | 45.02682455 | -88.22838801 | 145 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 347 | 7 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | | | | | | | | | 1 | | | | | | | |
| 348 | 45.02681234 | -88.22760137 | 152 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 348 | 11 | Muck | Pole | SAMPLED | | | 2 | | | | 2 | | | | 1 | | | | 1 | | | | | | | | | | |
| 349 | 45.02680012 | -88.22681473 | 159 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 349 | 16 | Muck | Pole | SAMPLED | | | 1 | 1 | | | | | | | | | | | | | | | | | | | | | |
| 350 | 45.0267879 | -88.2260281 | 166 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 350 | 5 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | | | | | | | | | | | | | | | | |
| 351 | 45.02677568 | -88.22524146 | 176 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 351 | 3 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 352 | 45.02676345 | -88.22445482 | 175 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 352 | 3 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 353 | 45.02675121 | -88.22366818 | 177 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 353 | 7 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | | | | | | | | | | | | | | | | |
| 354 | 45.02673897 | -88.22288155 | 178 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 354 | 5 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | | | | | | | | | | | | | | | | |

| Point Number | Latitude (Decimal Degrees) | Longitude (Decimal Degrees) | ID | Lake Name | County | Date | Field Crew | Point Number | Depth (ft) | Sediment | Pole;Rope | Comments | Notes | Nuisance | Total Rake Fullness | Myriophyllum spicatum | Bidens beckii | Ceratophyllum demersum | Chara spp. | Elodea canadensis | Myriophyllum sibiricum | Najas flexilis | Najas guadalupensis | Nitella spp. | Nuphar variegata | Nymphaea odorata | Potamogeton amplifolius | Potamogeton berchtoldii | Potamogeton friesii | Potamogeton gramineus | Potamogeton illinoensis | Potamogeton praelongus | Potamogeton strictifolius | Potamogeton zosteriformis | Stuckenia pectinata | Vallisneria americana | Aquatic moss | Filamentous algae |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 355 | 45.02672672 | -88.22209491 | 179 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 355 | 7 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | | | | | | | | 1 | | | | | | | | |
| 356 | 45.02671447 | -88.22130827 | 180 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 356 | 8 | Muck | Pole | SAMPLED | | | 1 | | | | | | | 1 | | | | | | | | | | | | | | |
| 357 | 45.02670221 | -88.22052164 | 181 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 357 | 5 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | | | | | | | | 1 | | | | | | | | |
| 358 | 45.02745554 | -88.23309069 | 116 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 358 | 8 | Muck | Pole | SAMPLED | | | 2 | | | | 2 | | | | | | | | | | | | | | | | | | |
| 359 | 45.02744336 | -88.23230404 | 120 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 359 | 25 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 360 | 45.02743118 | -88.23151739 | 123 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 360 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 361 | 45.02741899 | -88.23073074 | 126 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 361 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 362 | 45.0274068 | -88.2299441 | 127 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 362 | 15 | Muck | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 363 | 45.0273946 | -88.22915745 | 141 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 363 | 3 | Rock | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 364 | 45.0273824 | -88.2283708 | 142 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 364 | 3 | Sand | Pole | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 365 | 45.02737019 | -88.22758415 | 153 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 365 | 8 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | | | | | | | | | | | | | | | | |
| 366 | 45.02735797 | -88.22679751 | 158 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 366 | 8 | Muck | Pole | SAMPLED | | | 2 | | | | 2 | | | | | | | | | | | | | | | | | | |
| 367 | 45.02734575 | -88.22601086 | 167 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 367 | 0 | | | TEMPORARY OBSTACLE | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 368 | 45.02730906 | -88.22365092 | 174 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 368 | 2 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 369 | 45.02729682 | -88.22286428 | 173 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 369 | 6 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | | | | | | | | | | | | | | | | |
| 370 | 45.02728457 | -88.22207764 | 172 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 370 | 7 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | | 1 | | | | | | | | | | 1 | | | | |
| 371 | 45.02727232 | -88.22129099 | 171 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 371 | 7 | Muck | Pole | SAMPLED | | | 3 | | | | 3 | | | | | | | | 1 | | | 1 | | | | | | | |
| 372 | 45.02726006 | -88.22050435 | 170 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 372 | 3 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 373 | 45.02801339 | -88.23307353 | 117 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 373 | 4 | Muck | Pole | SAMPLED | | | 2 | | | 1 | 2 | | | | 1 | | | | | | | | | | | | | | |
| 374 | 45.02800121 | -88.23228687 | 119 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 374 | 20 | | Rope | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 375 | 45.02798903 | -88.23150021 | 122 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 375 | 0 | | | DEEP | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 376 | 45.02797684 | -88.23071355 | 125 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 376 | 22 | | Pole | SAMPLED | | | 2 | | | | | | | | | 2 | | | | | | | | | | | | | | |
| 377 | 45.02796465 | -88.2299269 | 128 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 377 | 3 | Sand | Pole | SAMPLED | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | |
| 378 | 45.02794025 | -88.22835359 | 143 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 378 | 5 | Muck | Pole | SAMPLED | | | 2 | | | | 1 | | | | | | | | | | 2 | | | | | | | 1 | |
| 379 | 45.02792804 | -88.22756693 | 154 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 379 | 7 | Muck | Pole | SAMPLED | | | 2 | | | | 1 | | | | | | | | | | 2 | | 1 | | | | | | |
| 380 | 45.02791582 | -88.22678028 | 157 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 380 | 6 | Muck | Pole | SAMPLED | | | 2 | | | | 2 | | | | | | | | | | | | | | | | | | |
| 381 | 45.02784242 | -88.22206036 | 168 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 381 | 0 | | | DOCK | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 382 | 45.02783016 | -88.22127371 | 169 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 382 | 0 | | | DOCK | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 383 | 45.02855906 | -88.23226969 | 118 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 383 | 13 | Muck | Pole | SAMPLED | | | 2 | 1 | | 2 | | 1 | | | | | | | | | | | | | | | | | |
| 384 | 45.02854688 | -88.23148303 | 121 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 384 | 15 | Muck | Pole | SAMPLED | | | 2 | 1 | | | | 1 | | | 1 | | | | | | | | | | | | | | |
| 385 | 45.02853469 | -88.23069636 | 124 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 385 | 6 | Muck | Pole | SAMPLED | | | 2 | | | | 2 | | | | 1 | | | | | | | | | | | | | | |
| 386 | 45.0285225 | -88.2299097 | 129 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 386 | 2 | Muck | Pole | SAMPLED | | | 1 | | | 1 | 1 | | | | | | 1 | 1 | | | | | | | | | | | |
| 387 | 45.0284981 | -88.22833637 | 144 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 387 | 0 | | | NONNAVIGABLE (PLANTS) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 388 | 45.02848589 | -88.22754971 | 155 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 388 | 2 | Sand | Pole | SAMPLED | | | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 389 | 45.02847367 | -88.22676305 | 156 | Kelly Lake | Oconto | 7/25/2016 | TWH & CJF | 389 | 1 | Sand | Pole | SAMPLED | | | 2 | | | | 2 | | | | | | | | | | | | | | | | | | |

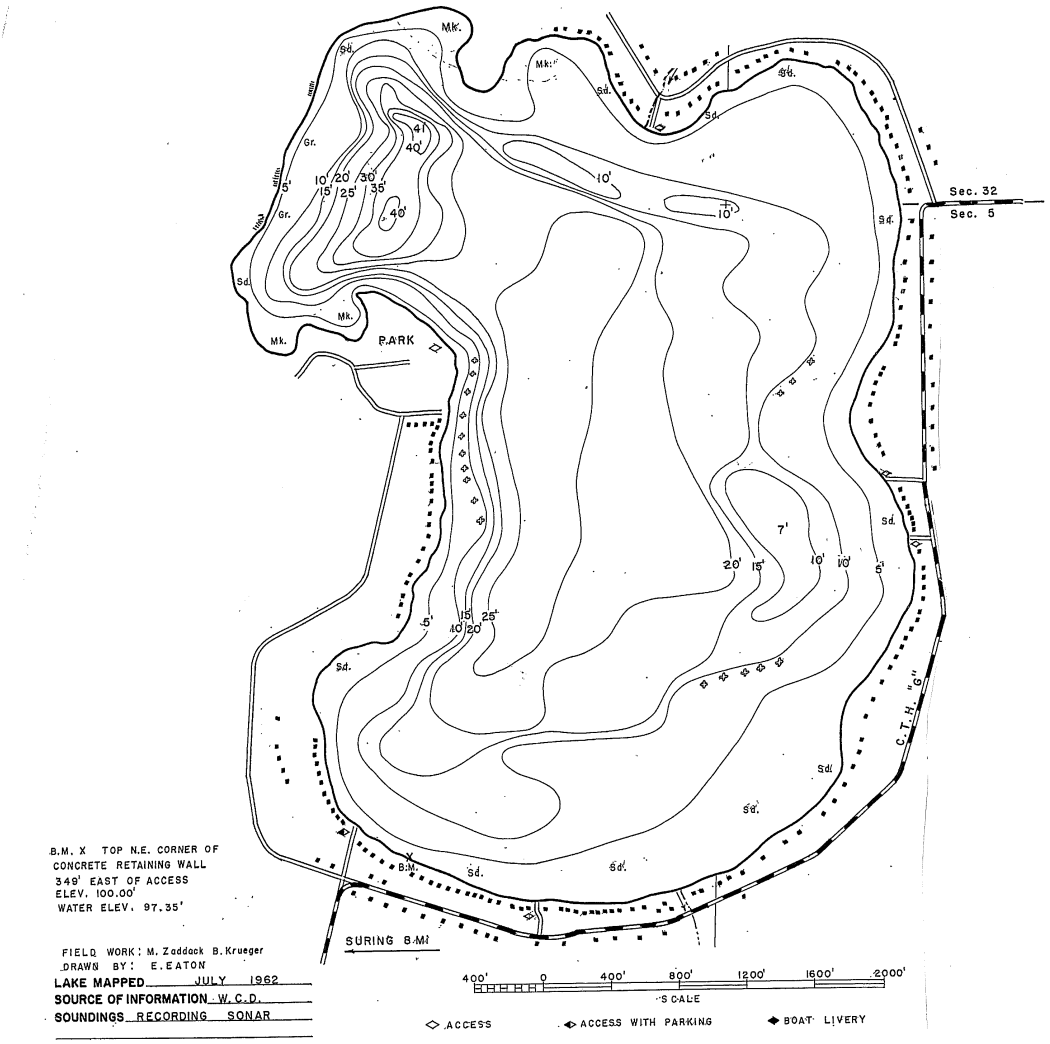
F

# APPENDIX F

## 2014 Kelly Lake Fisheries Report

# Kelly Lake, Oconto County Wisconsin
# Fisheries Survey Report, 2014

Waterbody Identification Code: 446600





Tammie Paoli
Fisheries Biologist
Wisconsin Department of Natural Resources
Peshtigo, Wisconsin
February 2015

# Kelly Lake, Oconto County Wisconsin
# Fisheries Survey Report, 2014

Tammie Paoli
Fisheries Biologist
February 2015

SUMMARY

Lake and location
Kelly Lake, Oconto County, T30N R19E Sections 31 and 32; T29N R19E Sections 5 and 6. Located in the town of Brazeau and Spruce.

Physical / chemical attributes
**Surface acres:** 366
**Maximum depth:** 41 feet
**Lake type:** drainage
**Water chemistry:** Hard water, slightly alkaline, clear
**Littoral substrate:** primarily sand with limited muck, gravel, and rubble
**Shoreline:** 3.7 miles. Primarily developed upland (mixed hardwoods/conifers)
**Aquatic vegetation:** sparse; limited
**Aquatic invasives**: Eurasian water-milfoil

Purpose of surveys
Baseline lake survey Tier 1 assessment

Dates of fieldwork
**Spring Fyke netting survey:** April 29 through May 5, 2014
**Summer Fyke netting survey:** June 16 – 17, 2014
**Electrofishing surveys:** May 6, May 27, and September 24, 2014

Fishery
Largemouth bass, bluegill, rock bass, walleye, northern pike, yellow perch, warmouth, pumpkinseed, black crappie, white sucker, and bullhead (yellow and brown) are present.

Acknowledgements
Data collection for the 2014 survey was completed by WDNR fisheries staff Ronald Rhode, Brad Ryan, Tammie Paoli, Rod Lange, Kevin King, Steve Surendonk, and Steve Hogler. Fish aging and data entry was completed by Ronald Rhode.

## SUMMARY

- Kelly Lake is a hard water drainage lake with an area of 366 acres and a maximum depth of 41 feet. The last comprehensive fyke netting survey was completed in 2001.

- Walleye small and large fingerlings have been stocked sporadically by the Wisconsin Department of Natural Resources and/or Kelly Lake Sportsman's Club since the 1970's.

- Yellow perch yearlings have been stocked regularly since 2003 by Kelly Lake Sportsman's Club.

- Overall, 1,176 fish representing 13 species were collected during the 2014 survey. The five most abundant species collected by number were largemouth bass (20% of total), bluegill (16%), rock bass (12%), bullhead spp. (11%), and walleye (10%).

- A total of 191 bluegill were collected. Bluegill ranged in length from 3.2 to 10.3 inches and averaged 6.1 inches. The number caught was considerably less than the 2001 survey, when 963 bluegill were captured.

- A total of 40 black crappie were sampled. The average length was 8.6 inches with a range from 5.2 to 11.7 inches. Growth rates in Kelly Lake are slightly better than other northeast Wisconsin lakes.

- A total of 81 yellow perch were sampled. The average length was 7.3 inches with a range from 5.3 to 11.3 inches.

- There were a total of 230 largemouth bass sampled, with an additional 5 fish that were recaptured. The population estimate was 1,818 fish, or 5/acre. Size structure is poor, with only 16% being of a legal size (14 inches or greater). Growth rates are slower than the 2001 survey and the northeast Wisconsin averages.

- The population estimate of northern pike was 145 fish (0.4/acre). A total of 75 northern pike were sampled, with an additional 12 recaptured fish. Average length was 18.7 inches with a range from 12.3 to 39.6 inches. The size structure was poor with only 17% of the fish greater than 21 inches.

- A total of 68 walleye were captured, plus an additional 45 fish were recaptured. The 2014 population estimate was 65 adult walleye, or 0.2/acre, and similar to the 2001 density of 0.3/acre. Average length was 19.7 inches with a range from 12 to 26 inches. Size structure was excellent, with 90% over 15 inches (legal size).

## BACKGROUND

Kelly Lake is a hard water drainage lake with an area of 366 acres and a maximum depth of 41 feet. The littoral area is primarily sand with only limited muck, gravel, and rubble. There are five public boat landings (Figure 1). These access locations are owned and maintained by the Towns of Spruce and Brazeau. The majority of the 3.7 miles of shoreline is developed as homes and seasonal cottages. A total of 185 piers were counted on a recent aerial photo, averaging one dock every 105 feet of shoreline. On the west side of the lake, Holt Park (maintained by the Town of Spruce) has a campground and picnic area. The Kelly Lake Sportsmen's Club is a non-governmental group that is active in the lake community.

Aquatic invasive species present in Kelly Lake include Eurasian watermilfoil which was first documented in the lake in 2012. The Kelly Lake Advancement Association has received a state grant to implement control measures during 2014-2016. Habitat projects on the lake include the addition of brush shelters in the early 1960's. Additional fish cribs were installed between 1989 and the early 2000's. A walleye spawning reef was constructed in 1984 on the west shore, adjacent to Holt Park.

Current fishing regulations are listed in Table 1 and follow the general inland regulations. State and private fish stocking history for all species from 1972 to 2014 for Kelly Lake is summarized in Table 2.

Small and large fingerling walleye have been stocked sporadically by the Wisconsin Department of Natural Resources (WDNR) and the Kelly Lake Sportsmen's Club (KLSC) since the early 1970's. In anticipation of the 2014 comprehensive survey, walleye stocked in 2012 (large fingerlings; 2012 year class) and 2013 (yearlings; 2012 year class) were given a unique fin clip by WDNR and KLSC at the time of stocking (Table 2). The KLSC has stocked adult yellow perch in most years since 2003. As part of the Wisconsin Walleye Initiative, Kelly Lake was selected to receive 20 large fingerling walleye per acre (7,337 fish) beginning in 2014 and continuing for several years as funding allows.

Fisheries surveys conducted from 1984 to 2014 are shown in Table 3. The most recent comprehensive (netting and electrofishing) survey was conducted in 2001.

## METHODS

Data collection

Eight standard 3' x 6' hoop fyke nets with ¾" bar, 1 ½" stretch mesh were set at ice-out on April 28, 2014. Nets were lifted daily from April 29 through May 5, 2014, for a total effort of 56 net nights (Figure 1). All fish captured were identified to species and measured to the nearest 0.1 inch. All gamefish were given a top caudal fin clip (for mark recapture population estimate), and a scale (northern pike) or dorsal spine (walleye, bass) was collected from 5 gamefish per 0.5 inch group per sex. Scales were collected from 5 panfish per 0.5 inch group per species with a length to the nearest 0.1 inch. An additional 250 lengths per species measured to the nearest 0.1 inch were collected as time allowed and all additional fish were counted.

Due to low numbers of panfish captured in the spring netting survey, an additional five fyke nets were set on June 16, 2014 and removed on June 17, 2014 (Figure 1). The primary purpose of the June survey was to collect aging structures and additional lengths on panfish during spawning.

A WDNR standard direct current double anode electrofishing boat was used to sample the entire shoreline on the evenings of May 6, May 27, and September 24, 2014. All panfish and gamefish were collected for the entire shoreline on May 6. On May 27, all panfish and gamefish were collected for two staggered 0.5 mile transects, and only gamefish were collected for the remaining shoreline per protocol (Spring Electrofishing II). Only walleye were collected on October 9 (Fall Electrofishing). Fish collected were measured to the nearest 0.1 inch and inspected for a top caudal fin clip. In the spring of 2013, an electrofishing survey targeting gamefish was completed.

Data analysis

Total catch and catch per gear type was calculated for all species (Tables 6 and 7). Ages were assigned to fish after scales and spines were aged using standard WDNR procedures. An age-length key was created to assign ages to un-aged fish based on proportional representation of the known age fish subsample, within the 0.5 inch length bins. The modified Schnabel population estimation technique was used for gamefish and was calculated using fish captured in fyke nets and the Spring Electrofishing I and II surveys in 2014.

Age and length frequency distributions and mean length at age analyses were performed for gamefish and panfish. Proportional stock density (PSD) and relative stock density of preferred length fish (RSD-preferred) were calculated (Anderson and Neumann 1996; Bister et al. 2000). Proportional stock density (PSD) is the ratio of 'quality-length' fish to 'stock-length' fish multiplied by 100. Relative stock density (RSD-preferred) is the ratio of 'preferred-length' fish to 'stock length fish' multiplied by 100. Both indices are commonly used as a measure of population size structure (Table 4). PSD and RSD data was combined for all gear types from all samples from 2014. Age-frequency distribution was calculated after ages were allocated to all fish in the sample, excluding recaptured fish. Mean length at age was calculated as mean length at time of capture. Mean lengths of aged fish were plotted against northeast Wisconsin averages and the 2001 survey, if aging data was available. Total mortality was estimated using a catch curve analysis (Ricker 1975) for populations where the assumptions of constant recruitment and mortality appeared valid.

## RESULTS AND DISCUSSION

A total of 1,176 fish (including recaptures) of 13 different species were collected (Table 5). Catch per gear type are shown for each species sampled (Tables 6 and 7). Largemouth bass, bluegill, rock bass, walleye, northern pike, yellow perch, warmouth, pumpkinseed, black crappie, white sucker, and yellow and brown bullhead were common. Other species captured include bluegill hybrids and green sunfish.

Water temperature during the spring netting survey ranged from 40-46F. This was an unusually late spring, and northern pike, walleye, and yellow perch were spawning at the same time. In contrast, fyke nets in 2001 were lifted from April 15-23 and water temperature was 45F or greater during that survey.

Black Crappie

A total of 40 black crappie were sampled. The catch rate was 0.6 per net night during spring fyke netting and 1.6 per mile electrofishing (Tables 6 and 7). The average length was 8.6 inches with a range from 5.2 to 11.7 inches. Growth rates in Kelly Lake are slightly better than other northeast Wisconsin lakes. The length frequency distribution indicated a wide variety of lengths

(Figure 2), which corresponds with several year classes in the age distribution (Figure 3). 63% of fish were greater than 8 inches (PSD), which is close to the acceptable range of 30-60%, and 23% of the fish were greater than 10 inches (RSD-preferred). The mean length at age shows that these fish are growing slightly faster compared to other populations in northeast Wisconsin (Figure 4), and may be a result of low density of black crappie.

Bluegill

Bluegill were the most abundant panfish species captured, with a total of 191 sampled. The catch rate was 0.6/net night in the spring, 22.4/net night in June, and 27/mile for electrofishing (Tables 6 and 7). Catch rates for bluegill in 2014 were notably lower than the previous survey for all gear types (Tables 6 and 7). Average length was 6.1 inches with a range from 3.2 to 10.3 inches. 58% of the fish were greater than 6 inches (PSD), which is within the acceptable range of 20-60%. Also, 7% were greater than the "preferred" size of 8 inches (RSD-preferred), which is within the desirable range of 5-20% (see Table 4; Figure 5). There was good representation of ages 3 through 6 (Figure 6). The oldest bluegill, estimated at 8 years old, was 10.3 inches. Total annual mortality for ages 4-8 was estimated at 42%. The growth rate of bluegills is slightly above the northeast Wisconsin average (Figure 7).

Pumpkinseed Sunfish

There were a total of 44 pumpkinseed sampled. The catch rate was 7.4/net night and 6/mile electrofishing (Tables 6 and 7). Average length was 5.9 inches with a range from 3.6 to 8.7 inches. The size structure was fairly evenly distributed, with 55% of the fish 6 inches or greater (PSD) (Figure 8). Ages 3 and 4 dominated the catch (Figure 9). Growth rates are faster than Oconto County averages (Figure 10).

Rock Bass

A total of 141 rock bass were sampled, for a catch rate of 2.1/net night in the spring (Table 6). Average length was 6.8 inches with a range from 4.4 to 9.5 inches. The size structure was good, with 45% of the fish greater than 7 inches (PSD), which is within the acceptable range of 20-60% (Table 4; Figure 11). Age 4 and 5 dominated the catch (Figure 12). Because aging structures are not regularly collected on rock bass, length at age data for northeast Wisconsin is not readily available. However, growth rates in Kelly Lake are similar to Anderson Lake and faster than Chute Pond in Oconto County (Figure 13).

Yellow Perch

A total of 81 yellow perch were sampled. Average length was 7.3 inches with a range of 5.3 to 11.3 inches (Figure 14). Several year classes were represented (Figure 15). The size structure was skewed toward smaller fish, with only 20% of the fish greater than 8 inches (PSD). Growth rates are slightly below northeast Wisconsin averages for ages 4 through 6 (Figure 16). The Kelly Lake Sportsmen's Club has been stocking between 1,000 to 5,000 yellow perch in most years since 2003 (Table 2).

Largemouth Bass

Largemouth bass were the most abundant of all fish species captured, with a total of 235 sampled including 5 recaptured individuals. The catch rate for summer fyke netting was 2.0/net night (Table 6). Catch rates (14.6/mile and 42.2/mile) for spring electrofishing surveys were high

(Table 7). The population estimate for largemouth bass was 1,818 fish (5 per acre), with a 95% confidence range between 861 and 4,158. This is a fairly high population density compared to other area lakes. Average length of largemouth bass was 11.9 inches with a range from 6.5 to 18.4 inches. The size structure was poor, with only 16% being 14 inches or greater (legal size) (Figure 17). There appears to be steady recruitment of largemouth bass, with several ages being represented (Figure 18). The total annual mortality for ages 7-11 is estimated at 36%, which is quite low and may reflect that some of those fish are not yet of a legal size to be harvested. Growth rates for largemouth bass are considerably slower compared to both the 2001 survey and northeast Wisconsin averages (Figure 19) and likely related to higher density of largemouth bass. It takes approximately 8 years for a largemouth bass to reach 14 inches in Kelly Lake.

Northern Pike

There were a total of 87 northern pike sampled, including 12 recaptured individuals. The catch rate during spring fyke netting was 1.4/net night (Table 6) compared to 1.0/net night in 2001. The population estimate for northern pike was 145 adults (0.4 per acre), with a 95% confidence range between 86 and 262. This is considered a fairly low density for northern pike. Average length was 18.7 inches with a range from 12.3 to 39.6 inches. The size structure was poor with only 17% of the fish greater than 21 inches (PSD), which is below the acceptable range of 30-60% (Figure 20; Table 4). However, this may be a result of the sex ratio in the sample which was dominated by males 10:1. This ratio is a common pattern and may suggest either an angler preference to harvest faster growing females or a gear bias towards netting males. The three largest fish in the sample were females. The age frequency distribution was dominated by age 3 fish (2011 year class) (Figure 21). The total annual mortality for ages 3-10 is estimated at 59%. Growth rates are slightly below the northeast Wisconsin averages (Figure 22).

Walleye

A total of 113 walleye were sampled, including 44 recaptured individuals. The catch rate during spring fyke netting was 1.9/net night (Table 6) compared to 1.8/net night in 2001. The population estimate for walleye was 65 adults (0.2 per acre), with a 95% confidence range between 49 and 89. This is considered a low population density for walleye, and is similar to the estimate obtained in the 2001 survey. At that time, 86 walleye were captured, for a population estimate of 111 or 0.3/acre (95 – 135, 95% confidence interval). Average length in 2014 was 19.7 inches with a range from 12 to 26 inches. The size structure was excellent with 90% of the fish being greater than 15 inches (PSD) (Figure 20; Table 4). The age frequency distribution was dominated by age 7 fish (2007 year class) (Figure 21). Growth rates are similar to northeast Wisconsin averages (Figure 22). Similar to the 2001 netting survey, the majority of the walleye in 2014 were caught in the net located on the spawning reef adjacent to Holt Park. Fall electroshocking surveys targeting small walleye only resulted in 3 fish, all in the 12-inch range with an RV clip indicating they were stocked in 2013. No unclipped small walleye were captured, suggesting that natural reproduction is negligible in Kelly Lake.

## CONCLUSIONS AND RECOMMENDATIONS

Littoral fish habitat on Kelly Lake is limited. The shoreline is highly developed, with only a small amount of natural shoreline. The sand substrate dominating the littoral zone is not favorable for aquatic vegetation that would provide refuge for panfish. There is very little coarse

woody debris along the shoreline to provide fish habitat. The physical and chemical characteristics (clear, hard water) of the lake influence the overall fishery in the lake.

Spawning habitat for northern pike (shallow, vegetated, protected shorelines) is minimal, which may explain why the density of pike is low (0.4 adults/acre). Continuing to protect the limited areas where pike can reproduce is important. These areas include the bay adjacent to Holt Park, the small reach of natural shoreline on the southwest portion of the lake, and the bays on the northwest portion of the lake. Discouraging riparian property owners from mowing to the water's edge will allow native grasses and sedges to grow. Allowing a buffer of vegetation along the shoreline will filter runoff and fertilizer from lawns as well as provide habitat for frogs and aquatic insects which are important components of a healthy aquatic ecosystem.

Walleye in Kelly Lake exhibit average growth rates and good size structure. However, the current population density of 0.2/acre is very low. A minor recreational walleye fishery is provided through stocking. The rock reef that was constructed in 1984 provides marginal spawning habitat for walleye. During the spring netting survey, 60% of all walleye were captured in the net placed over the rock reef. It was apparent that walleye are attracted to this area. Upon further inspection, we noted that the reef consists of highly variable sized rocks, including some rocks that were too large (10 inches diameter or greater) to be utilized by walleye. In addition, there were several bare areas throughout the reef which had no rock. Improving the existing walleye reef may help to improve the walleye fishery in the future. Although Kelly Lake's physical and chemical characteristics will likely never support a self-sustaining walleye population, enhancing the existing walleye reef may result in some natural reproduction that could supplement stocking. The Kelly Lake Sportsmen's Club committed funds to add rock over the existing reef and that project was completed in February 2015.

Additional fish habitat could be gained by the placement of large woody debris ("fish sticks") along shorelines. In this highly developed lake, the addition of coarse woody debris in the near-shore zone may serve to increase growth rates of largemouth bass and increase recruitment of yellow perch (Sass et al. 2006) that require woody or vegetated structure to drape their egg skeins upon.

Population density of largemouth bass is high at 5.0/acre. Size structure is poor with only 16% of the largemouth bass sampled being 14 inches or greater. Management of Kelly Lake should focus on reducing the density and improving size structure of largemouth bass. I suggest a regulation change for largemouth bass from the existing regulation of 5/day, 14 inch minimum size to 5/day, no minimum size. The management goals are to reduce over-abundant smaller bass, improve bass growth, and increase bass average length. Increased harvest of small bass will hopefully thin the population and increase growth rates of bass.

The next comprehensive survey for Kelly Lake is scheduled for 2024.

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Sass, G. G., J. F. Kitchell, S. R. Carpenter, T. R. Hrabik, A. E. Marburg, and M. G. Turner. 2006. Fish community and food web responses to a whole-lake removal of coarse woody habitat. Fisheries 31(7):321-330.

## TABLES AND FIGURES

TABLE 1.— Current (2014) fishing regulations for Kelly Lake.

| Species | Open Season | Daily limit | Minimum length |
|---|---|---|---|
| Largemouth and Smallmouth Bass | first Saturday in May – first Sunday in March | 5 | 14 inches |
| Walleye | first Saturday in May – first Sunday in March | 5 | 15 inches |
| Muskellunge | Saturday nearest Memorial Day to November 30th. | 1 | 40 inches |
| Northern Pike | first Saturday in May – first Sunday in March | 5 | none |
| Panfish (bluegill, pumpkinseed, yellow perch, black crappie) | Open all year | 25 in total | none |

TABLE 2.— Stocking history of Kelly Lake from 1972 to 2014 (continued on next page).

| YEAR | SPECIES | STRAIN | AGE CLASS | NUMBER STOCKED | AVG LENGTH | CLIP | SOURCE |
|---|---|---|---|---|---|---|---|
| 1972 | WALLEYE | UNSPECIFIED | FINGERLING | 6,620 | 3 | | DNR COOP PONDS |
| 1974 | WALLEYE | UNSPECIFIED | FINGERLING | 30,000 | 3 | | DNR COOP PONDS |
| 1978 | WALLEYE | UNSPECIFIED | FINGERLING | 7,000 | 4 | | DNR COOP PONDS |
| 1989 | WALLEYE | UNSPECIFIED | FINGERLING | 1,800 | 6 | | FIELD TRANSFER |
| 1991 | WALLEYE | UNSPECIFIED | FINGERLING | 2,000 | 7 | | PRIVATE HATCHERY |
| 1992 | WALLEYE | UNSPECIFIED | FINGERLING | 8,323 | 3 | | DNR COOP PONDS |
| 1994 | WALLEYE | UNSPECIFIED | FINGERLING | 16,303 | 4 | | DNR COOP PONDS |
| 1995 | WALLEYE | UNSPECIFIED | YEARLING | 500 | 10 | | PRIVATE HATCHERY |
| 1996 | WALLEYE | UNSPECIFIED | FINGERLING | 14,954 | 2 | | DNR HATCHERY |
| 1996 | WALLEYE | UNSPECIFIED | FINGERLING | 515 | 8 | | PRIVATE HATCHERY |
| 1997 | WALLEYE | UNSPECIFIED | FINGERLING | 16,000 | 3 | | DNR PONDS |
| 1998 | WALLEYE | UNSPECIFIED | SMALL FINGERLING | 13,314 | 1 | | DNR HATCHERY |
| 2000 | WALLEYE | UNSPECIFIED | SMALL FINGERLING | 16,000 | 2 | | DNR HATCHERY |
| 2003 | YELLOW PERCH | UNSPECIFIED | ADULT (BROODSTOCK) | 2,745 | 8 | | PRIVATE HATCHERY |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2004 | WALLEYE | LAKE MICHIGAN | SMALL FINGERLING | 15,983 | 1 | | DNR HATCHERY |
| 2004 | WALLEYE | UNSPECIFIED | UNKNOWN | 1,300 | 6 | | PRIVATE HATCHERY |
| 2004 | YELLOW PERCH | UNSPECIFIED | UNKNOWN | 1,458 | 6 | | PRIVATE HATCHERY |
| 2005 | WALLEYE | UNSPECIFIED | LARGE FINGERLING | 893 | | | PRIVATE HATCHERY |
| 2005 | YELLOW PERCH | UNSPECIFIED | ADULT | 1,069 | 6 | | PRIVATE HATCHERY |
| 2006 | WALLEYE | LAKE MICHIGAN | SMALL FINGERLING | 12,625 | 1 | | DNR HATCHERY |
| 2006 | WALLEYE | UNSPECIFIED | LARGE FINGERLING | 1,786 | 6 | | PRIVATE HATCHERY |
| 2006 | YELLOW PERCH | UNSPECIFIED | ADULT | 2,137 | 5 | | PRIVATE HATCHERY |
| 2007 | WALLEYE | UNSPECIFIED | LARGE FINGERLING | 3,150 | 8 | | PRIVATE HATCHERY |
| 2007 | YELLOW PERCH | UNSPECIFIED | ADULT | 3,450 | 7 | | PRIVATE HATCHERY |
| 2008 | WALLEYE | MISSISSIPPI HEADWATERS | SMALL FINGERLING | 11,404 | 1 | | DNR HATCHERY |
| 2008 | WALLEYE | UNSPECIFIED | LARGE FINGERLING | 2,300 | 7 | | PRIVATE HATCHERY |
| 2009 | WALLEYE | UNSPECIFIED | LARGE FINGERLING | 3,650 | 7 | | PRIVATE HATCHERY |
| 2011 | WALLEYE | UNSPECIFIED | LARGE FINGERLING | 1,027 | 7 | | PRIVATE HATCHERY |
| 2011 | YELLOW PERCH | UNSPECIFIED | LARGE FINGERLING | 2,030 | 7 | | PRIVATE HATCHERY |
| 2012 | WALLEYE | UNSPECIFIED | LARGE FINGERLING | 950 | 8 | LV | PRIVATE HATCHERY |
| 2012 | YELLOW PERCH | UNSPECIFIED | LARGE FINGERLING | 2,742 | 7 | | PRIVATE HATCHERY |
| 2013 | WALLEYE | UNSPECIFIED | YEARLING | 1,450 | 9 | RV | PRIVATE HATCHERY |
| 2013 | YELLOW PERCH | UNSPECIFIED | YEARLING | 3,475 | 7 | | PRIVATE HATCHERY |
| 2014 | WALLEYE | LAKE MICHIGAN | LARGE FINGERLING | 7,334 | 7 | | DNR HATCHERY |
| 2014 | YELLOW PERCH | UNSPECIFIED | YEARLING | 5,000 | 7 | | PRIVATE HATCHERY |

TABLE 3.— WDNR fisheries surveys completed on Kelly Lake from 1980 to 2014.

| Date | Survey Type | Effort | Primary survey purpose |
|---|---|---|---|
| April 29-May 5, 2014 | Fyke net | 56 net nights | Gamefish population estimate & panfish assessment |
| May 6, 2014 | Electrofishing | 3.7 miles | Gamefish/panfish assessment (SEI) |
| May 27, 2014 | Electrofishing | 3.7 miles | Gamefish/panfish assessment (SEII) |
| June 16-17, 2014 | Fyke net | 5 net nights | Summer panfish assessment |
| September 24, 2014 | Electrofishing | 3.7 miles | Fall walleye index |
| May 13, 2013 | Electrofishing | 3.7 miles | Gamefish assessment (SEI) |
| April 15-23, 2001 | Fyke net | 80 net nights | Gamefish population estimate & panfish assessment |
| June 21-22, 2001 | Fyke net | 10 net nights | Summer panfish assessment |
| October 23, 2001 | Electrofishing | 3.7 miles | Gamefish/panfish assessment |
| April 10-16, 1987 | Fyke net | 57 net nights | Gamefish population estimate & panfish assessment |
| October 13, 1987 | Electrofishing | 3.7 miles | Gamefish assessment |
| October 1, 1985 | Electrofishing | 3.7 miles | Gamefish assessment |
| October 11, 1984 | Electrofishing | 3.7 miles | Gamefish/panfish assessment |

TABLE 4.— Proposed length categories used to calculate Proportional stock density (PSD) and Relative stock density (RSD) for various fish species. Measurements are total lengths for each category in inches. Updated from Anderson and Neumann (1996) and Bister et al. (2000).

| Species | PSD | RSD-P | Stock | Quality | Preferred | Memorable | Trophy |
|---|---|---|---|---|---|---|---|
| Black crappie | | | 5 | 8 | 10 | 12 | 15 |
| Bluegill | 20 - 60 | 5 - 20* | 3 | 6 | 8 | 10 | 12 |
| Brown bullhead | | | 5 | 8 | 11 | 14 | 17 |
| Largemouth bass | 40 - 70 | 10 - 40* | 8 | 12 | 15 | 20 | 25 |
| Muskellunge | | | 20 | 30 | 38 | 42 | 50 |
| Northern pike | 30 - 60 | | 14 | 21 | 28 | 34 | 44 |
| Pumpkinseed | | | 3 | 6 | 8 | 10 | 12 |
| Rock bass | 20 - 60 | | 4 | 7 | 9 | 11 | 13 |
| Walleye | 30 - 60 | | 10 | 15 | 20 | 25 | 30 |
| Yellow perch | | | 5 | 8 | 10 | 12 | 15 |
| Yellow bullhead | | | 4 | 7 | 9 | 11 | 14 |

*Range based on management strategy for balanced populations.

TABLE 5.— Total number, percent of total, average length, and length range of fish by species captured with all gear types in 2001 and 2014 in Kelly Lake. Numbers include recaptured individuals.

| | 2001 | | | | 2014 | | | |
|---|---|---|---|---|---|---|---|---|
| *COMMON NAME OF FISH | NUMBER | PERCENT | AVERAGE LENGTH | LENGTH RANGE (inches) | NUMBER | PERCENT | AVERAGE LENGTH | LENGTH RANGE (inches) |
| Black Crappie | 22 | 1.1% | 9.0 | 7.3 - 11.6 | 40 | 3.4% | 8.6 | 5.2 - 11.7 |
| Bluegill | 963 | 49.4% | 6.8 | 3.4 - 9.9 | 191 | 16.2% | 6.1 | 3.2 - 10.3 |
| Largemouth Bass | 107 | 5.5% | 11.1 | 5.4 - 21.3 | 235 | 20.0% | 11.9 | 6.5 - 18.4 |
| Northern Pike | 107 | 5.5% | 17.6 | 10.5 - 31.7 | 87 | 7.4% | 18.7 | 12.3 - 39.6 |
| Pumpkinseed | 39 | 2.0% | 6.0 | 3.8 - 8.1 | 44 | 3.7% | 5.9 | 3.6 - 8.7 |
| Rock Bass | 92 | 4.7% | 6.6 | 3.0 - 9.3 | 141 | 12.0% | 6.8 | 4.4 - 9.5 |
| Walleye | 145 | 7.4% | 21.6 | 15.3 - 31.5 | 113 | 9.6% | 19.7 | 12.0 - 26.0 |
| Yellow Perch | 50 | 2.6% | 7.8 | 4.6 - 10.3 | 81 | 6.9% | 7.3 | 5.3 - 11.3 |
| Warmouth | 33 | 1.7% | 4.9 | 4.0 - 6.6 | 49 | 4.2% | 5.6 | 4.2 - 7.9 |
| Bullhead Sp. | 226 | 11.6% | | | 129 | 11.0% | | |
| White Sucker | 166 | 8.5% | | | 63 | 5.4% | | |
| Smallmouth Bass | 1 | 0.1% | 16.1 | 16.1 | 0 | 0.0% | | |
| Bluegill Hybrid | 0 | 0.0% | | | 2 | 0.2% | 5.8 | 4.3 - 7.2 |
| Green Sunfish | 0 | 0.0% | | | 1 | 0.1% | 6.3 | |
| **Total** | **1,951** | **100.0%** | | | **1,176** | **100.0%** | | |

TABLE 6.— Catch summary for spring and summer fyke netting in Kelly Lake in 2001 and 2014. Totals include recaptured individuals. See Methods for additional sampling details.

| | 2001 Spring Fyke Netting (80 net nights) | | 2014 Spring Fyke Netting (56 net nights) | | 2001 Summer Fyke Netting (10 net nights) | | 2014 Summer Fyke Netting (5 net nights) | |
|---|---|---|---|---|---|---|---|---|
| | Total Catch | Catch per net night | Total Catch | Catch per net night | Total Catch | Catch per net night | Total Catch | Catch per net night |
| Black Crappie | 20 | 0.3 | 34 | 0.6 | 2 | 0.2 | 0 | 0.0 |
| Bluegill | 182 | 2.3 | 35 | 0.6 | 707 | 70.7 | 112 | 22.4 |
| Largemouth Bass | 29 | 0.4 | 15 | 0.3 | 30 | 3.0 | 10 | 2.0 |
| Smallmouth Bass | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| Northern Pike | 83 | 1.0 | 79 | 1.4 | 2 | 0.2 | 0 | 0.0 |
| Pumpkinseed | 1 | 0.0 | 0 | 0.0 | 38 | 3.8 | 37 | 7.4 |
| Rock Bass | 61 | 0.8 | 118 | 2.1 | 25 | 2.5 | 4 | 0.8 |
| Walleye | 145 | 1.8 | 104 | 1.9 | 0 | 0.0 | 0 | 0.0 |
| Yellow Perch | 45 | 0.6 | 71 | 1.3 | 0 | 0.0 | 0 | 0.0 |
| Warmouth | 0 | 0.0 | 4 | 0.1 | 33 | 3.3 | 40 | 8.0 |
| Bullhead Sp. | 93 | 1.2 | 96 | 1.7 | 132 | 13.2 | 33 | 6.6 |
| White Sucker | 166 | 2.1 | 63 | 1.1 | 0 | 0.0 | 0 | 0.0 |

TABLE 7.— Catch summary for electrofishing surveys in Kelly Lake in 2001, 2013, and 2014. Totals include recaptured individuals. See Methods for additional sampling details.

| | 2001 Fall Electrofishing[a] 23-Oct-2001 | | 2014 Fall Electrofishing[b] 24-Sep-2014 | | 2013 Spring Electrofishing[c] 13-May-2013 | | 2014 Spring Electrofishing[d] 6-May-2014 | | 2014 Spring Electrofishing[e] 27-May-2014 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Total Catch | Catch per mile | Total Catch | Catch per mile | Total Catch | Catch per mile | Total Catch | Catch per mile | Total Catch | Catch per mile |
| Black Crappie | | | | | | | 6 | 1.6 | | |
| Bluegill | 74 | 148.0 | | | | | 17 | 4.6 | 27 | 27.0 |
| Largemouth Bass | 48 | 13.0 | | | 95 | 25.7 | 54 | 14.6 | 156 | 42.2 |
| Smallmouth Bass | 1 | 0.3 | | | | | | | | |
| Northern Pike | 22 | 5.9 | | | 3 | 0.8 | 6 | 1.6 | 2 | 0.5 |
| Pumpkinseed | | | | | | | 1 | 0.3 | 6 | 6.0 |
| Rock Bass | 6 | 12.0 | | | | | 13 | 3.5 | 6 | 6.0 |
| Walleye | | | 3 | 0.8 | 2 | 0.5 | 5 | 1.4 | 1 | 0.3 |
| Yellow Perch | 5 | 10.0 | | | | | 9 | 2.4 | 1 | 1.0 |
| Warmouth | | | | | | | 2 | 0.5 | 3 | 3.0 |

[a]Gamefish collected for entire 3.7 mile shoreline. Panfish also collected for one 1/2 mile station

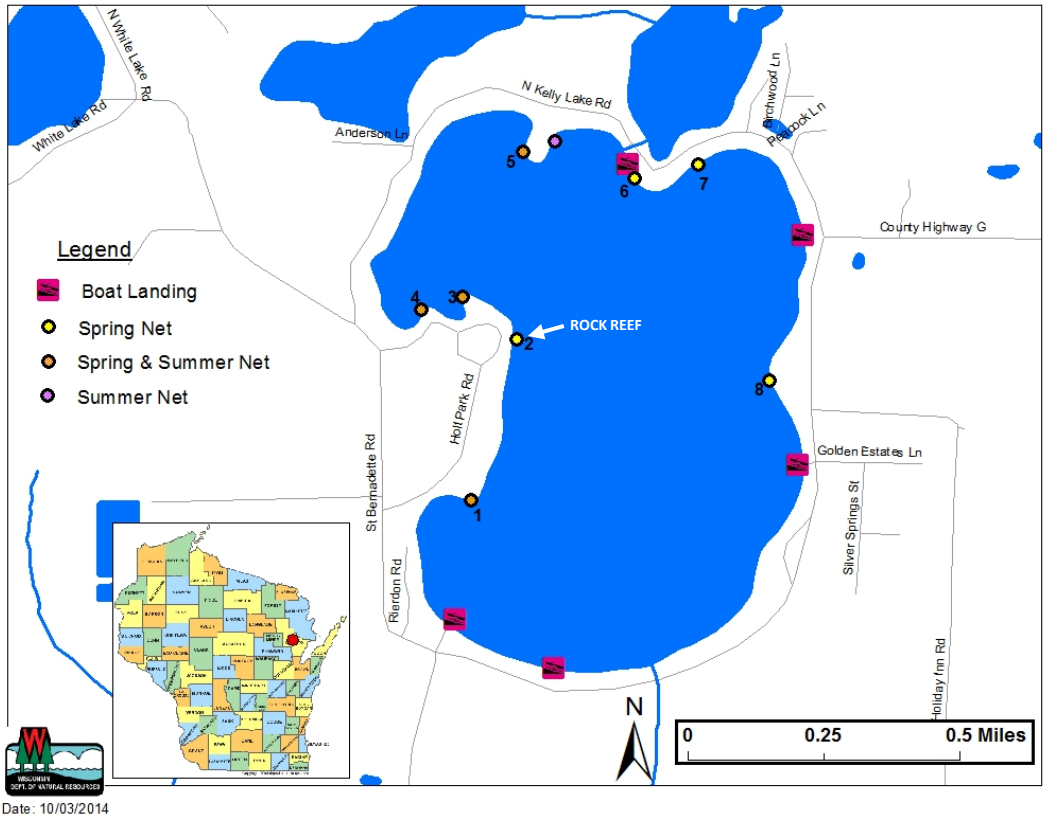
[b]Only walleye collected

[c]Only gamefish collected for entire 3.7 mile shoreline

[d]All panfish and gamefish collected for entire shoreline

[e]Gamefish collected for entire 3.7 mile shoreline. Panfish also collected for two 1/2 mile stations

FIGURE 1.— Locations of 8 fyke nets set on April 28 and removed on May 5, 2014 on Kelly Lake, Oconto County (effort = 56 net nights). Also, locations of summer fyke nets (June 16-17, 2014) are shown (effort = 5 net nights).



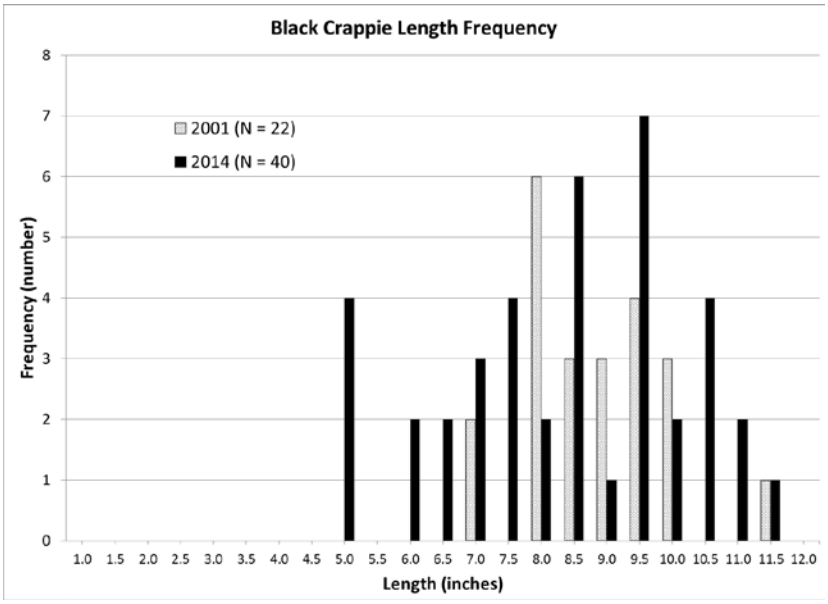



FIGURE 2. – Black crappie length frequency distribution from Kelly Lake, 2001 and 2014.

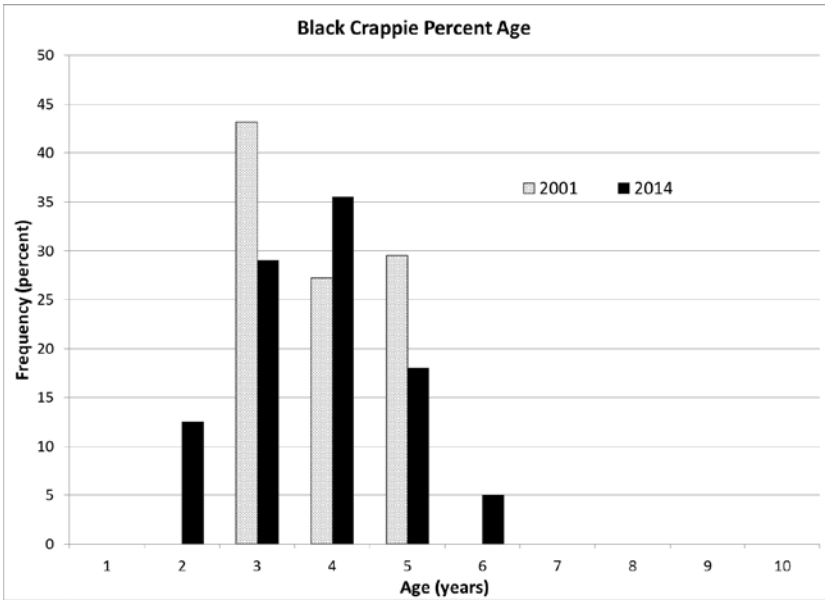



FIGURE 3. – Black crappie age frequency distribution from Kelly Lake, 2001 and 2014.

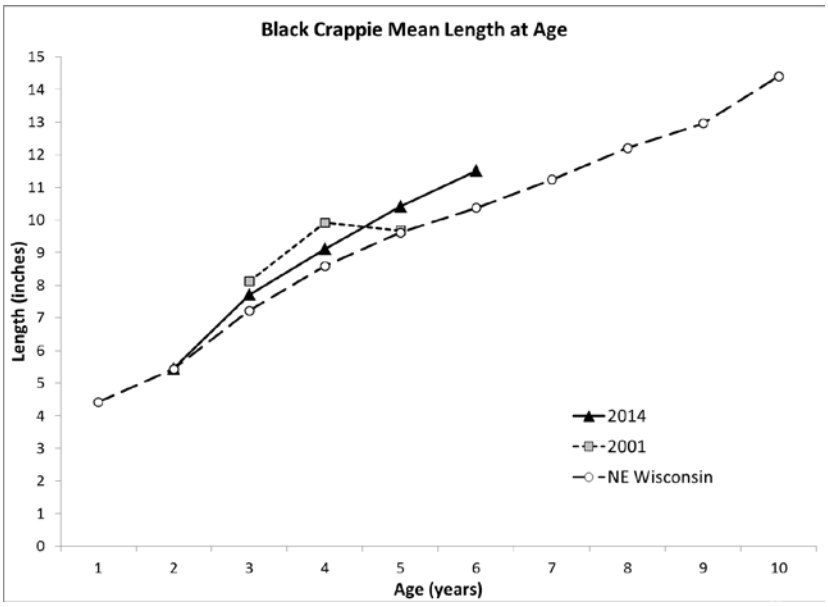



FIGURE 4. – Black crappie mean length at age, Kelly Lake, 2001 and 2014, compared to northeast Wisconsin averages.

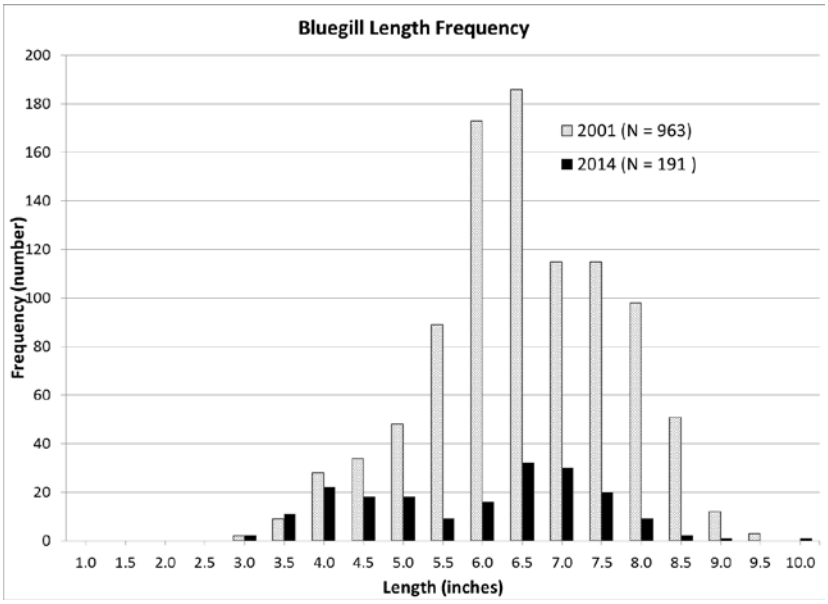



FIGURE 5. – Bluegill length frequency distribution from Kelly Lake, 2001 and 2014.

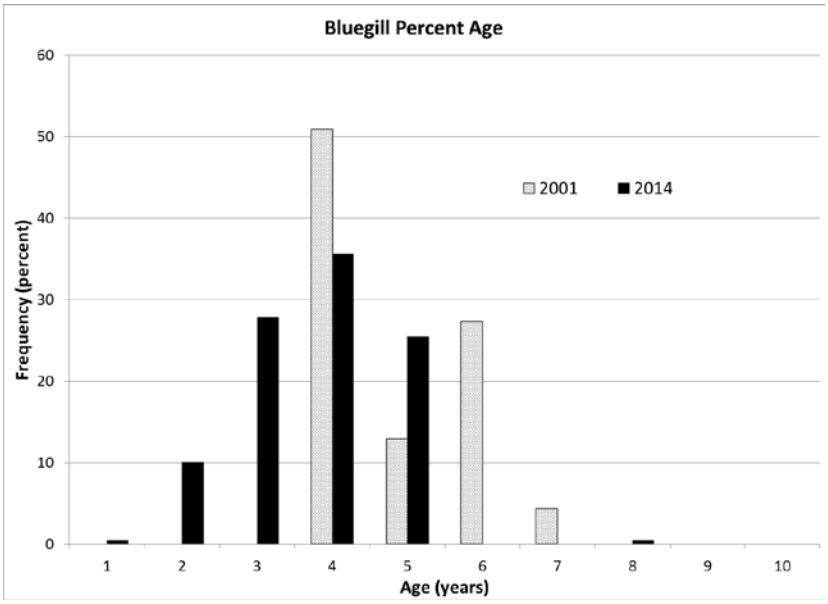



FIGURE 6. – Bluegill age frequency distribution from Kelly Lake, 2001 and 2014.

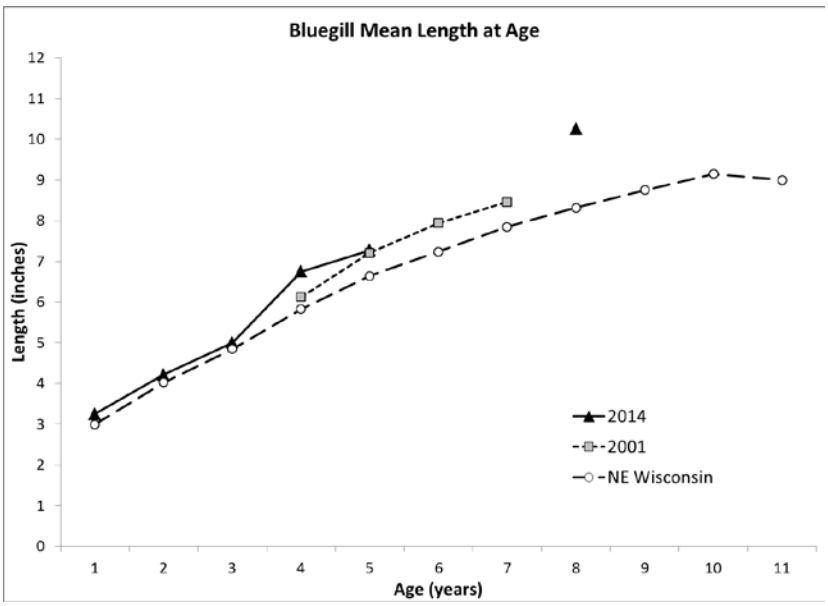



FIGURE 7. – Bluegill mean length at age, Kelly Lake, 2001 and 2014, compared to northeast Wisconsin averages.

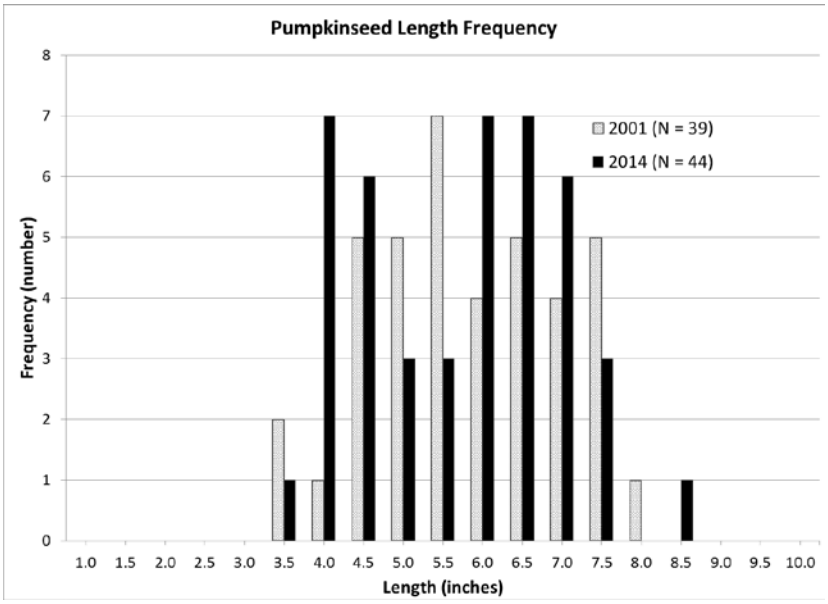



FIGURE 8. – Pumpkinseed length frequency distribution from Kelly Lake, 2001 and 2014.

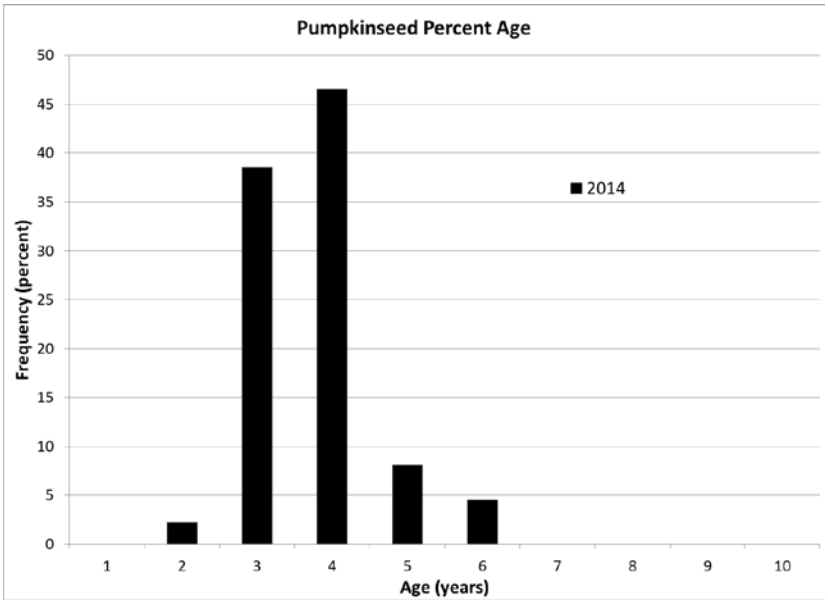



FIGURE 9. – Pumpkinseed age frequency distribution from Kelly Lake, 2014.

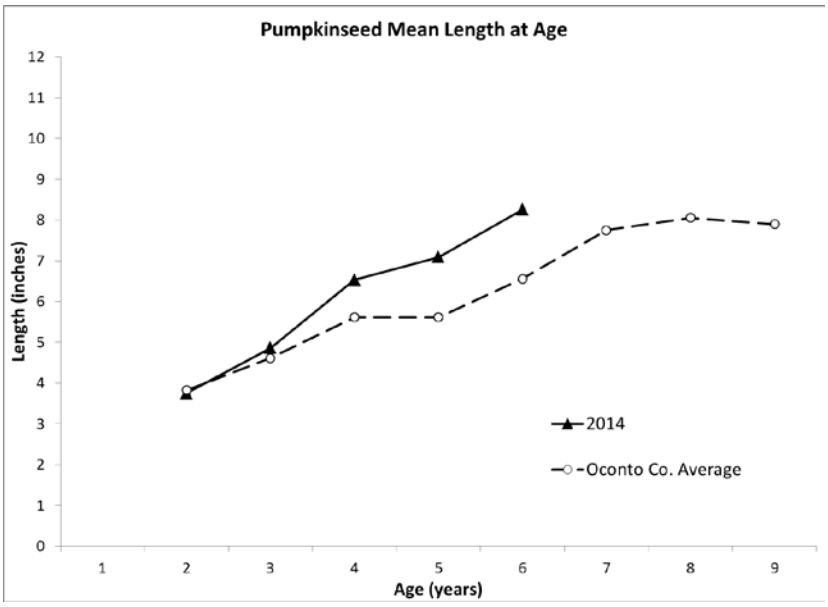



FIGURE 10. – Pumpkinseed mean length at age, Kelly Lake, 2014, compared to Oconto County averages.

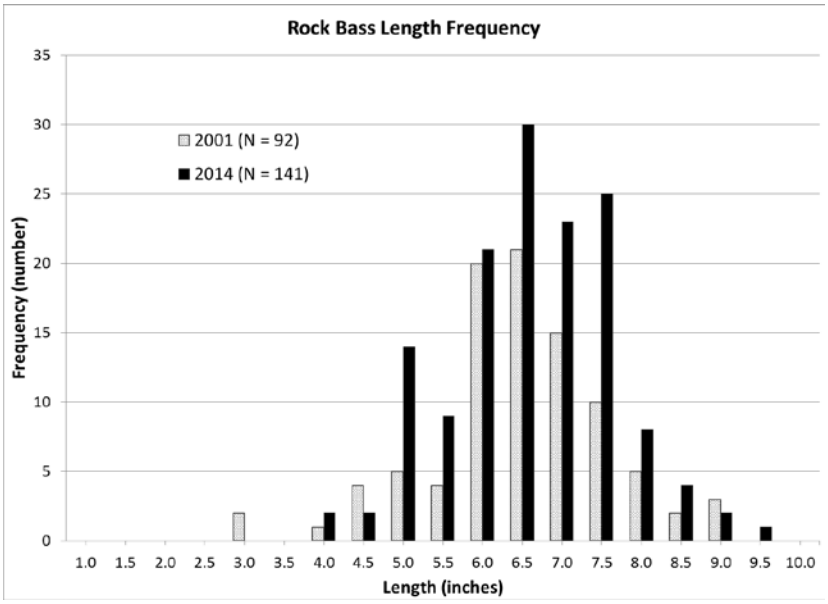



FIGURE 11. – Rock bass length frequency distribution from Kelly Lake, 2001 and 2014.

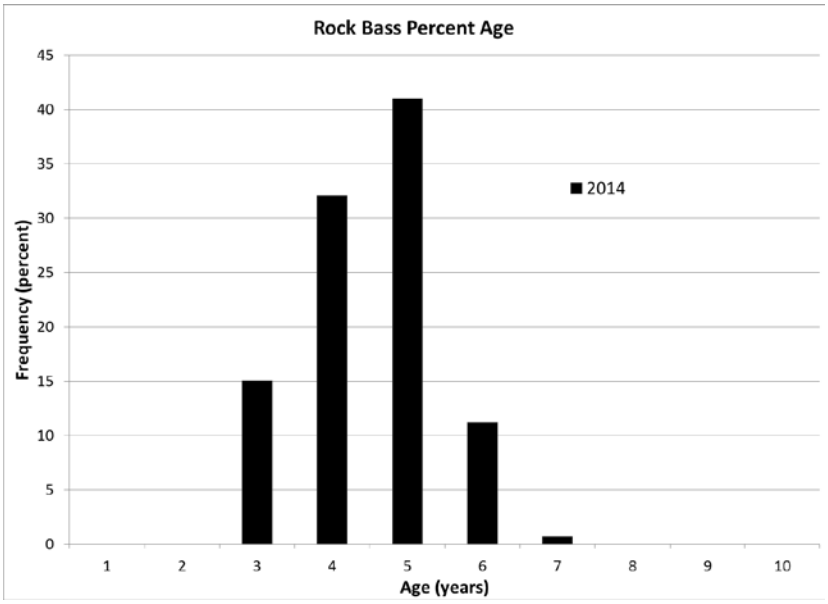



FIGURE 12. – Rock bass age frequency distribution from Kelly Lake, 2014.

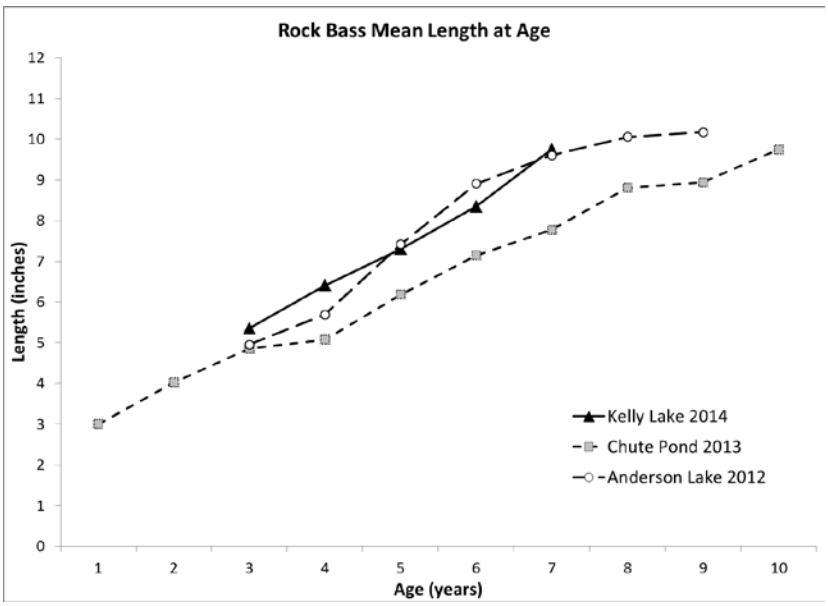



FIGURE 13. –Rock bass mean length at age, Kelly Lake, 2014, compared to 2012 Anderson Lake and 2013 Chute Pond (Oconto County) surveys.

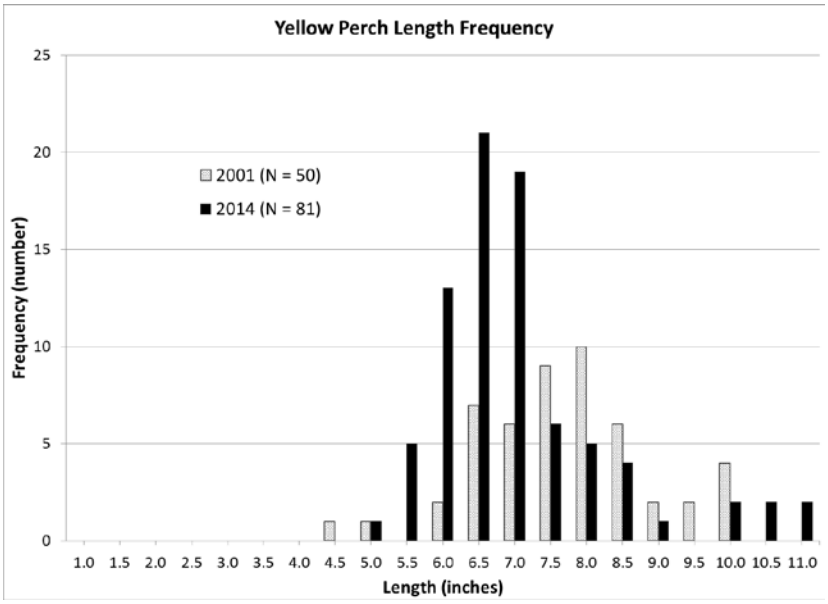



FIGURE 14. – Yellow perch length frequency distribution from Kelly Lake, 2001 and 2014.

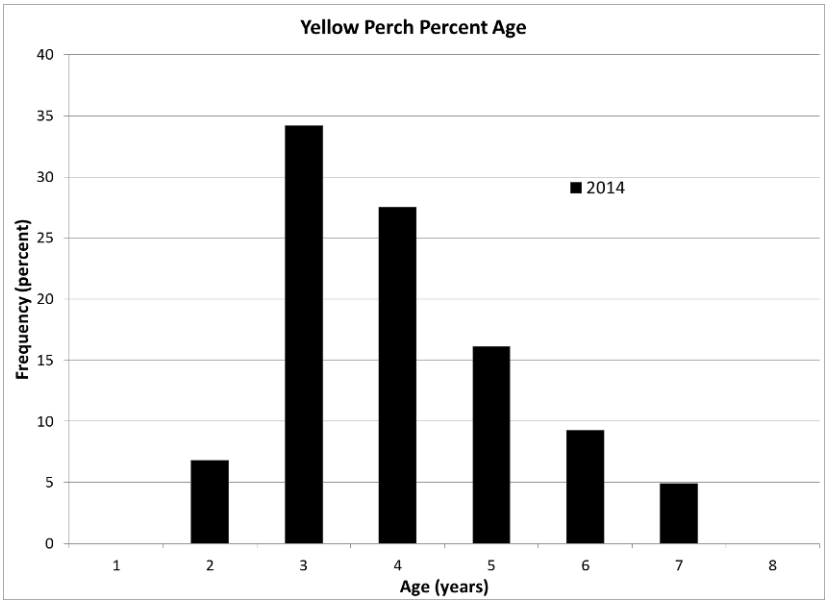



FIGURE 15. – Yellow perch age frequency distribution from Kelly Lake, 2014.

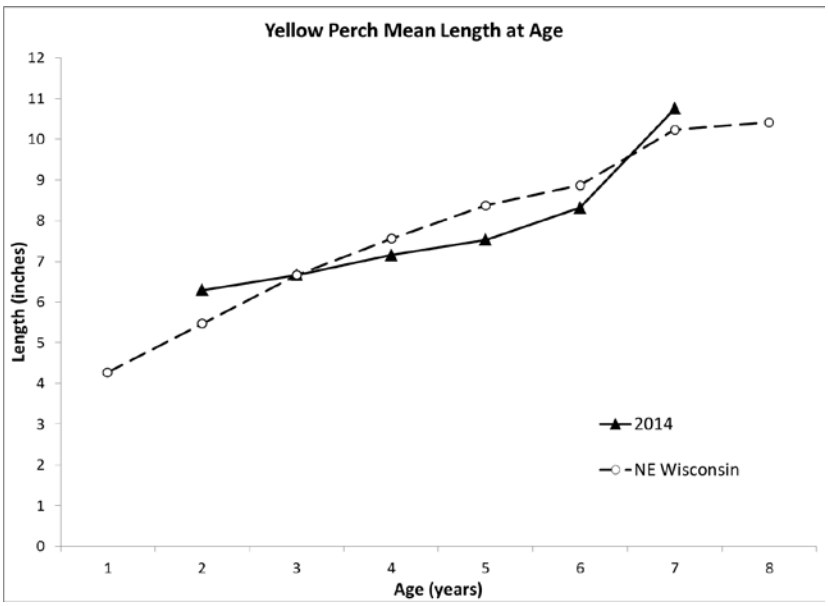



FIGURE 16. – Yellow perch mean length at age, Kelly Lake, 2014, compared to northeast Wisconsin averages.

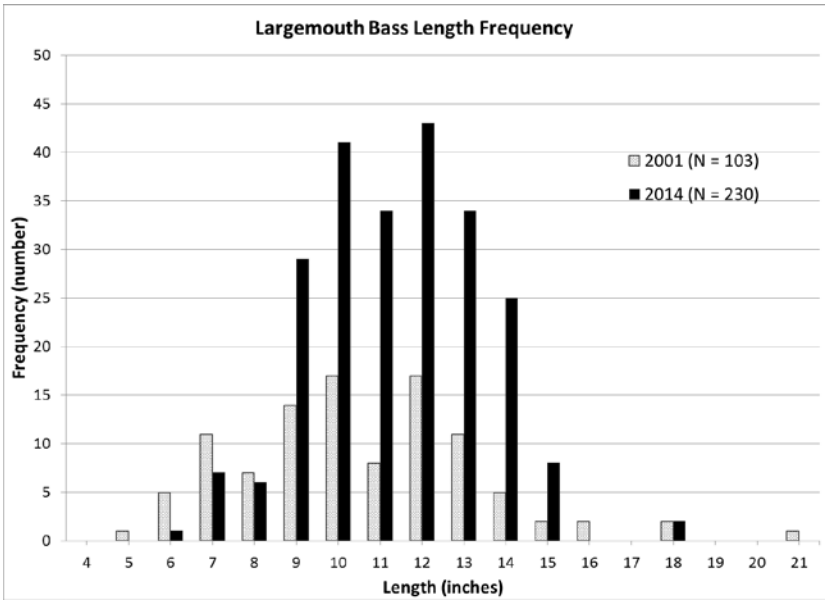



FIGURE 17. – Largemouth bass length frequency distribution from Kelly Lake, 2001 and 2014.

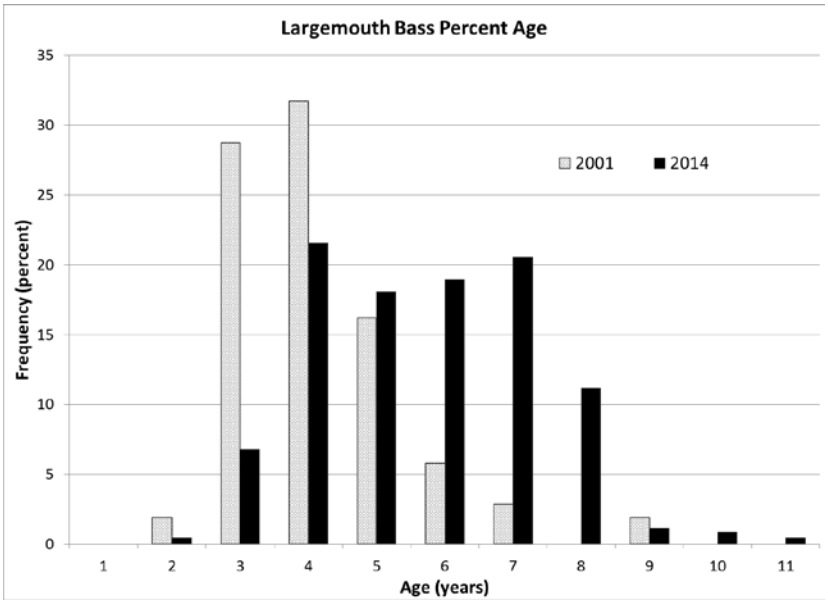



FIGURE 18. – Largemouth bass age frequency distribution from Kelly Lake, 2001 and 2014.

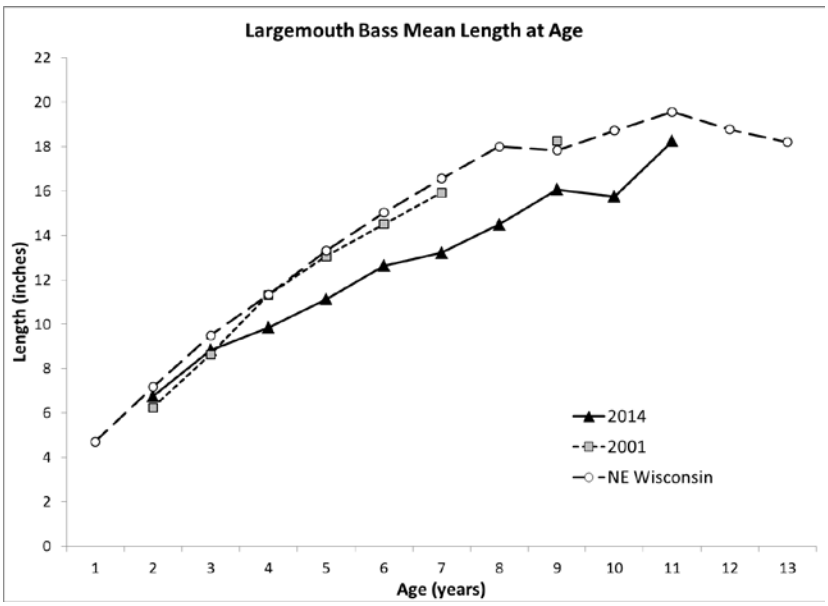



FIGURE 19. – Largemouth bass mean length at age, Kelly Lake, 2001 and 2014, compared to northeast Wisconsin averages.

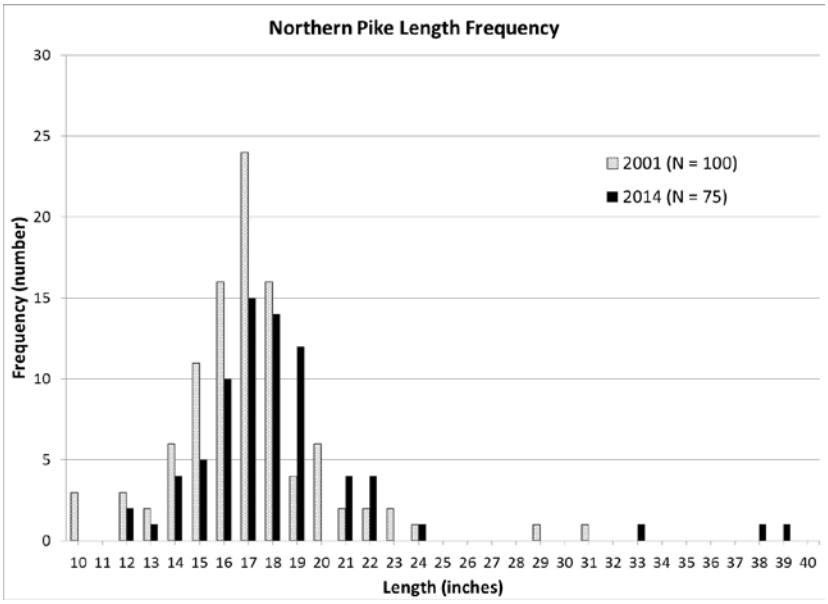



FIGURE 20. – Northern pike length frequency distribution from Kelly Lake, 2001 and 2014.

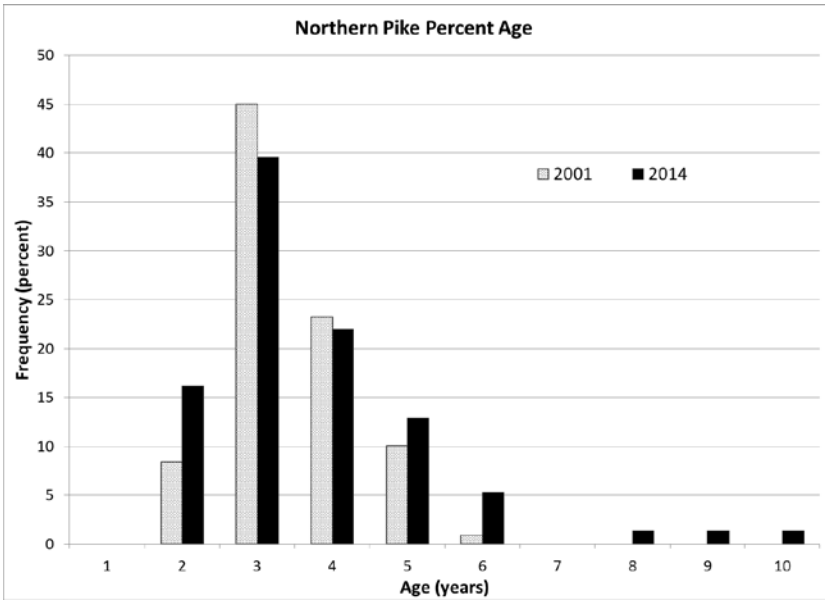



FIGURE 21. – Northern pike age frequency distribution from Kelly Lake, 2001 and 2014.

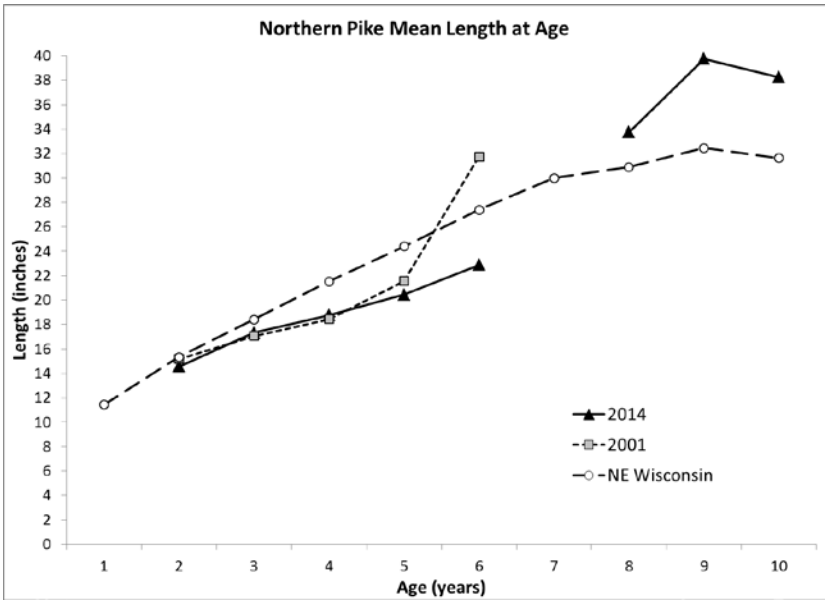



FIGURE 22. – Northern pike mean length at age, Kelly Lake, 2001 and 2014, compared to northeast Wisconsin averages.

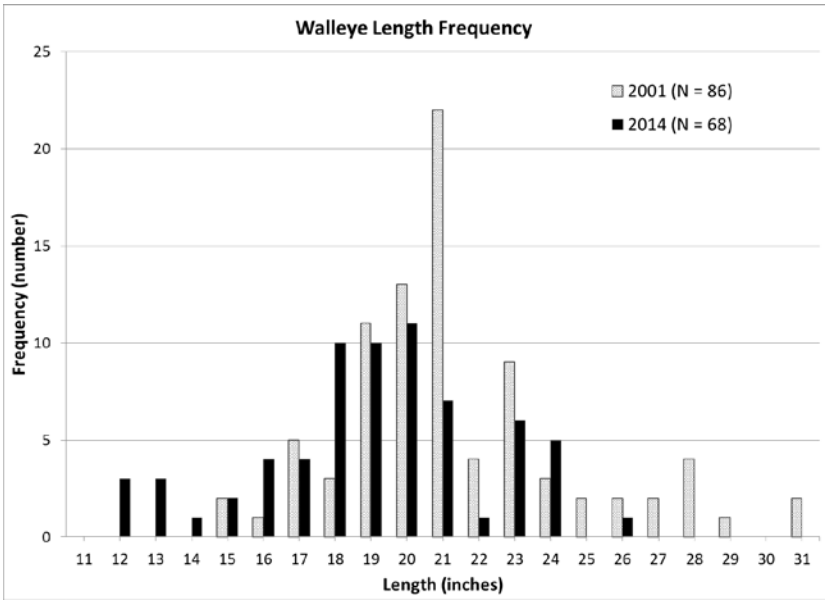



FIGURE 23. – Walleye length frequency distribution from Kelly Lake, 2001 and 2014.

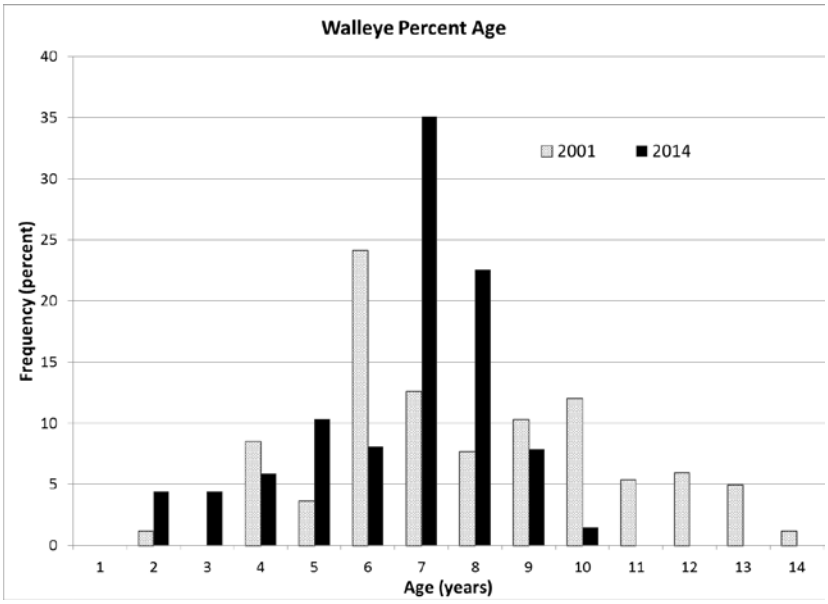



FIGURE 24. – Walleye age frequency distribution from Kelly Lake, 2001 and 2014.

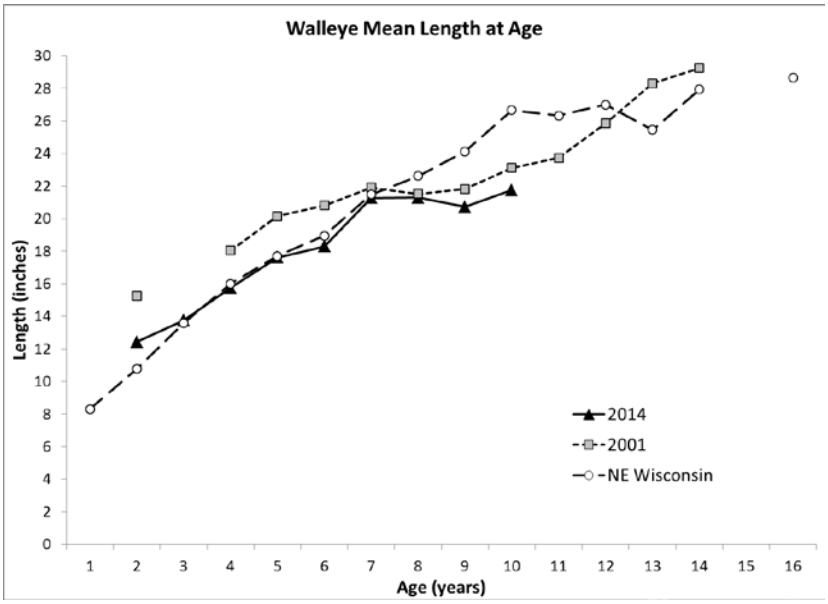



FIGURE 25. – Walleye mean length at age, Kelly Lake, 2001 and 2014, compared to northeast Wisconsin averages.

APPENDIX - PHOTOS

Buoy of net #3. Holt Park, Town of Brazeau, owns the shoreline in the background. This is one of a few areas of natural shoreline along Kelly Lake.

Net #7 set along a developed shoreline with no vegetated buffer on Kelly Lake.

Bottom substrate of the existing rock reef. Note that there are few smaller rocks, and a large area of no rock.

APPENDIX - PHOTOS

WDNR fish biologist Tammie Paoli holds a 39.6 inch female northern pike captured on April 29, 2014.

WDNR fish technicians Brad Ryan (left) and Ron Rhode (right) process fish on a cold spring day with snow flurries in the air on April 29, 2014.

A 13.5 inch walleye collected during a fall electroshocking survey on Kelly Lake. The fish has a left ventral (LV) clip, indicating that it was stocked in 2012 by the Kelly Lake Sportsmen's Club.

APPENDIX - PHOTOS

Bluegill collected during the June 2014 fyke netting survey on Kelly Lake.

Warmouth collected during the June 2014 fyke netting survey on Kelly Lake.

# G

# APPENDIX G

## 2018 AIS Monitoring Report

# INTRODUCTION

Kelly Lake is a 373-acre lake in Oconto County with a maximum depth of 44 feet (Photo 1). Eurasian water milfoil (*Myriophyllum spicatum*; EWM) was first discovered in Kelly Lake in 2012 by the Oconto County Aquatic Invasive Species Coordinator. Its presence was also confirmed during a 2012 point-intercept survey conducted by the Wisconsin Department of Natural Resources (WDNR). Onterra, LLC was subsequently contacted in the late summer of 2012 to conduct an EWM peak-biomass survey, which documented much more EWM than was previously thought to exist in Kelly Lake.

**Photo 1. Kelly Lake, Oconto County**

In the fall of 2012, the Kelly Lake Advancement Association (KLAA) successfully applied for a WDNR AIS Early Detection and Response Grant to conduct comprehensive studies and create a plan to control the EWM population on Kelly Lake. An herbicide treatment strategy targeting 13.2 acres of EWM was implemented in the spring of 2013. Post treatment surveys conducted in 2013 showed the treatment met success criteria.

Professional and volunteer-based hand harvesting efforts were conducted in 2014 and 2015 in an effort to maintain the lowered EWM population within the lake. These efforts provided some limited control in the targeted areas but did not keep pace with the expanding EWM population in some parts of the lake. The 2016 strategy included a continued hand-harvesting program as well as one area of the lake to be targeted with an herbicide treatment using diquat. The 2016 hand-harvesting program was effective in the targeted areas whereas the herbicide treatment failed to meet control expectations. It is likely that the concentrations and exposure times surrounding the 2016 treatment of Kelly Lake were insufficient to cause EWM mortality. This may be partly due to the increased winds following the treatment causing increased dissipation, but perhaps mainly because of the small size of the treatment site was unable to hold CETs. Diquat also has a high affinity for binding with organic particles. In shallow waters where the application equipment creates disturbance of the lake bottom, the diquat being applied will quickly bind to the suspended particles and be instantly unavailable to cause impacts to the target plants.

The KLAA continued an active management regiment in 2017 including a spot herbicide treatment using liquid 2,4-D as well as professional hand-harvesting. A seven-acre spot treatment conducted in the northwest part of the lake provided effective control during 2017 with minimal EWM present in the site during the late-summer survey. Herbicide concentration monitoring collected in association with the treatment showed 2,4-D remained present in the application area for at least six hours after the treatment was completed and minimal herbicide was detected outside of the application area. Professional hand-harvesting efforts in 2017 totaled 15.4 cubic feet of EWM and provided some level of control in the targeted areas.

Based on the EWM population that was mapped in September 2017, professional hand-harvesting was recommended for 2018 as no areas were deemed appropriate for herbicide control. This report discusses the monitoring and control activities that were completed in 2018 on Kelly Lake.

## MONITORING METHODOLOGIES

A set of EWM mapping surveys were used within this project to coordinate and qualitatively monitor the hand-harvesting efforts (Figure 1). The first monitoring event on Kelly Lake in 2018 was the Early Season Aquatic Invasive Species Survey (ESAIS). This late-spring/early-summer survey provides an early look at the lake to help guide the hand-harvesting management to occur on the system. Following the hand-harvesting, Onterra ecologists completed the Late-Summer HWM Peak-Biomass Survey, the results of which serve as a post-treatment assessment of the hand-harvesting. The hand-removal program would be considered successful if the density of EWM within the hand-removal areas was found to have decreased from the ESAIS Survey to the Late-Summer Peak-Biomass Survey.

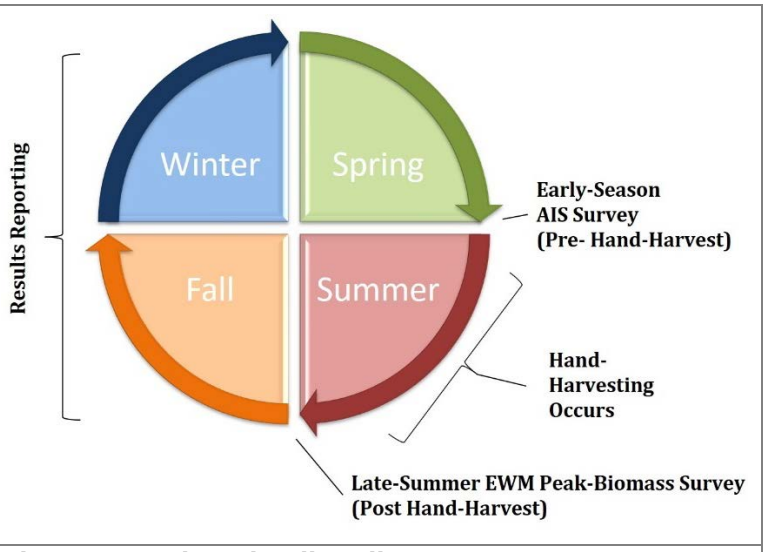



**Figure 1. Project timeline diagram.**

## EARLY SEASON AIS SURVEY RESULTS (PRE- HAND-HARVESTING)

On May 31, 2018, Onterra ecologists conducted the ESAIS Survey on Kelly Lake. During the survey, the EWM population was mapped using sub-meter GPS technology by using either 1) point-based or area-based methodologies. Large colonies >40 feet in diameter are mapped using polygons (areas) and were qualitatively attributed a density rating based upon a five-tiered scale from *highly scattered* to s*urface matting*. Point-based techniques were applied to EWM locations that were considered as *small plant colonies* (<40 feet in diameter), *clumps of plants*, or *single or few plants*.

The crews noted favorable conditions during the survey with overcast skies and light winds. A Secchi disk measurement of 15.4 feet was recorded during the survey indicating high water clarity. Most of the EWM population was visible from the bow of the survey boat however a submersible camera was used in select areas to supplement the visual survey. Following the survey, the largest concentrations of EWM were included in the final professional hand-harvesting control strategy. Six sites totaling 2.0 acres were included in the final hand-harvesting strategy (Map 1). Sites A-18, C-18, and D-18 were given first priority for hand removal efforts as these sites contained the largest concentration of EWM in the lake. Onterra provided the spatial data from this survey to the KLAA and the professional hand-harvesting firm to aid the control efforts and reporting.

## HAND-HARVESTING MANAGEMENT ACTIONS

The KLAA contracted with Aquatic Plant Management, LLC (APM) to conduct professional hand-harvesting of EWM for four days in 2018. Aquatic Plant Management LLC conducted hand-harvesting activities on July 9-10 and August 23-24, 2018. Divers removed approximately 395.5 cubic feet of EWM from the lake from sites A-18, B-18, and C-18. DASH was deployed in sites A-18 and C-18,

while traditional removal with divers was implemented in site B-18. Details of the hand removal efforts as reported by APM are attached to this report as an appendix.

**Table 1. Kelly Lake, 2018 professional hand-harvesting activities.** Site locations displayed on Map 1. Table created from APM, LLC dive summary report (Appendix).

| *2018 EWM Control Strategy Diver Assisted Suction Harvest (DASH)* | | | | *Aquatic Plant Management, LLC 2018 Harvest Summary* | |
|---|---|---|---|---|---|
| **Site** | **Final Acres** | **Ave Depth (feet)** | **Priority** | **Time Underwater (hours)** | **Harvest (cubic feet)** |
| A-18 | 0.91 | 7.00 | First | 9.59 | 126 |
| B-18 | 0.06 | 7.00 | Second | 5.83 | 30 |
| C-18 | 0.60 | 8.0 | First | 14.51 | 239.5 |
| D-18 | 0.25 | 8.0 | First | - | - |
| E-18 | 0.11 | 9.00 | Second | - | - |
| F-18 | 0.07 | 7.00 | Second | - | - |
| **Total** | **2.00** | | | **29.93** | **395.50** |

**Site B-18 utilized traditional hand-harvesting methods without the use of DASH. No efforts took place in D-18, E-18 or F-18.*

## LATE-SUMMER EWM PEAK-BIOMASS SURVEY RESULTS (POST HAND-HARVESTING)

The Late-Summer EWM Peak Bio-mass Survey was conducted on August 31, 2018 to qualitatively assess the professional hand-harvesting efforts as well as to understand the peak growth (peak-biomass) of the EWM population. Conditions for the survey were favorable with partly sunny skies and moderate winds. The field crews surveyed the littoral areas of the entire lake and mapped all occurrences of EWM with the same methodology as was done in the ESAIS survey.

The results of the late-summer EWM survey are displayed on Map 2. For the most part, the EWM population was found to be in similar locations as in past surveys. The largest concentration of EWM was located within the northwestern bay of the lake where an area of *highly dominant* EWM was delineated. A few other EWM colonies in the lake required mapping with area-based methods (polygons) and include a *scattered* to *highly dominant* colony on the northwest shore, a *dominant* and *highly dominant* colony in the southwest part of the lake and a small *highly dominant* colony on the east side of the lake (Map 2). Additionally, several EWM occurrences consisting of *single or few plants*, *clumps of plants* or *small plant colonies* were mapped in various locations around the lake.

The sites that were included in the 2018 professional hand-harvesting control strategy were evaluated during the late-summer survey. Figure 2 displays the EWM population from surveys conducted before (ESAIS) and after (EWM Peak Biomass) the hand harvesting actions.

Professional DASH harvesting efforts in site A-18 resulted in the removal of approximately 126 cubic feet of EWM during APM's visits to the lake. The late-summer mapping surveyed found a reduction in EWM particularly in the southern end of site A-18 where numerous *clumps of plants* had been present

before the hand-harvesting took place. A relatively small but dense *dominant* colony was mapped on the northern end of site A-18 as well as a few additional *clumps of plants* in the vicinity (Figure 2).

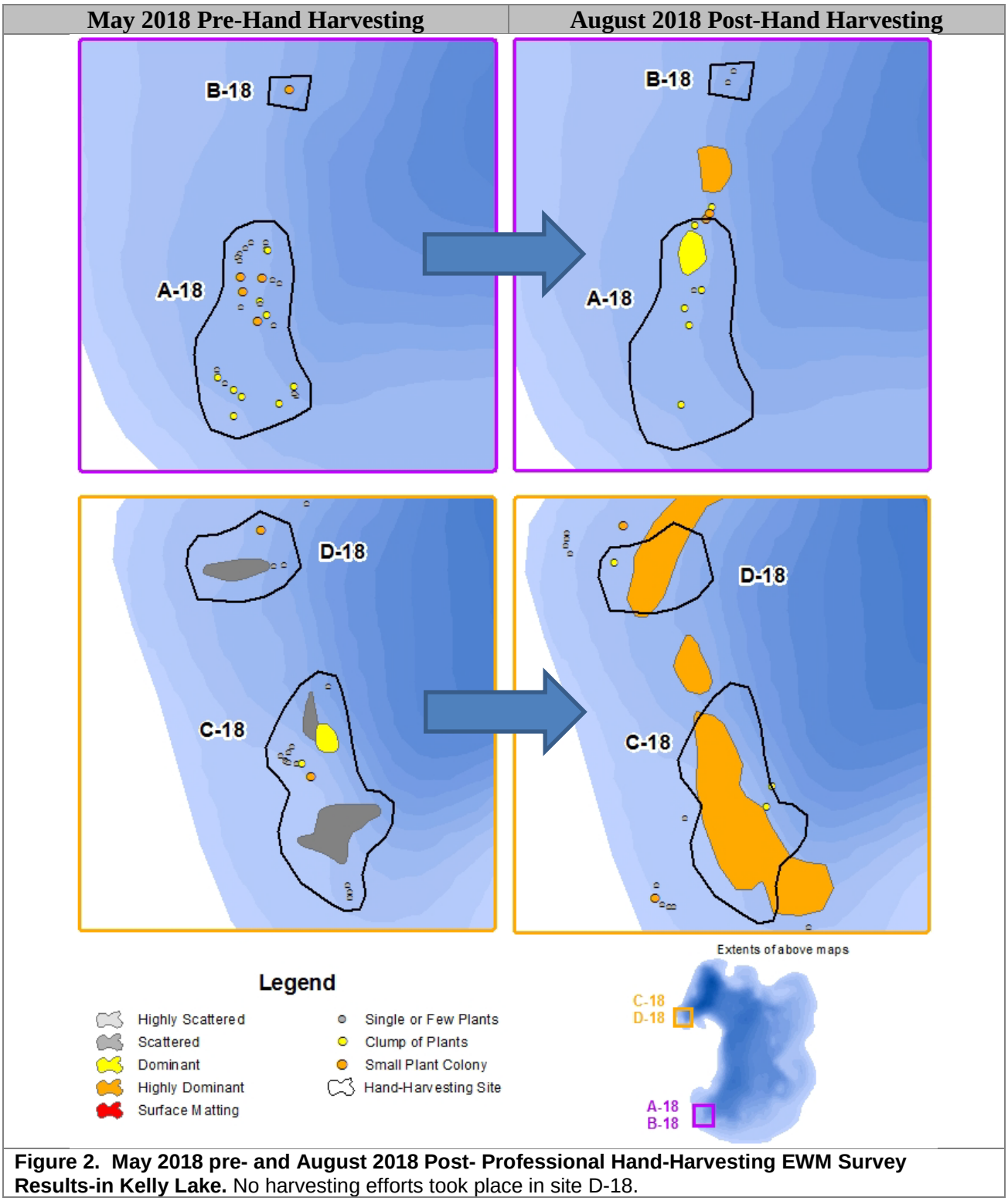



**Figure 2. May 2018 pre- and August 2018 Post- Professional Hand-Harvesting EWM Survey Results-in Kelly Lake.** No harvesting efforts took place in site D-18.

Divers from APM conducted traditional hand-harvesting (no DASH) in site B-18 and reported harvesting 30 cubic feet of EWM from the site. The post-harvesting survey found the EWM population had been reduced from a *small plant colony* before harvesting to two *single or few plant* occurrences after harvesting (Figure 2).

Professional DASH harvesting efforts in site C-18 resulted in the removal of approximately 239.5 cubic feet of EWM from the site during APM's work. The late-summer mapping survey showed the EWM population in the site expanded since the ESAIS survey and had formed large *highly dominant* colonies. The field notes indicated that these colonies were "patchy", likely as a result of harvesting efforts. Divers from APM indicated that the population in this site had likely expanded in the time between Onterra's ESAIS survey and when the diving efforts began in July (Appendix).

No harvesting efforts were undertaken in sites D-18, E-18, or F-18 during 2018 likely due to limited available time by the harvesting firm as they focused on the other higher priority sites.

## CONCLUSIONS AND DISCUSSION

Monitoring surveys completed in 2018 showed the professional hand-harvesting actions provided a limited level of control in the targeted areas. A decrease in the EWM population was evident between the pre- and post-harvesting surveys in sites A-18 and B-18, whereas the EWM population increased in site C-18. Divers from the professional harvesting firm noted that many EWM plants were weighted down by large numbers of zebra mussels in 2018, resulting in tangled mats of plants on the lakebed. Additional challenges during the hand-harvesting activities included heavy native aquatic plant biomass and algae that obscured the target EWM plants in some locations (Appendix A). The harvesting firm also acknowledged that the EWM population in sites C-18 & D-18 had increased to such a level that herbicide control methods be considered for the site rather than hand-harvesting (Appendix A).

Overall, the lake-wide EWM population expanded somewhat between the early and late-summer surveys in 2018, however the overall footprint of the EWM population has remained relatively consistent over the past several years (Map 3). The proactive EWM management strategy that has occurred in Kelly Lake since its detection has kept the EWM population at relatively low levels. At these low levels, the majority of the EWM population is likely not causing measurable negative ecological impacts to the system nor diminishing the navigability, recreation, or aesthetics for the lake. The KLAA would like to continue a proactive management approach to EWM to keep the population low within the lake, preferably through an integrated pest management (IPM) approach.

The KLAA are in the final stages of completing a comprehensive management plan. Within the planning process, the KLAA has developed a goal to "*Control Existing and Prevent Further Aquatic Invasive Species Infestations within Kelly Lake*". In order to meet this goal, several management actions have been devised. One action outlined within the implementation plan of the management plan is to "*conduct EWM population control using hand-harvesting including DASH and/or herbicide spot treatments*".

## *2019 EWM Control Strategy – Herbicide Control*

Based on the management planning process, if the following trigger is met, the KLAA would consider conducting herbicide spot treatments:

> *colonized (polygons) areas of EWM where a sufficiently large treatment area can be constructed to hold concentration and exposure times sufficient to result in greater than seasonal control*

The EWM population in the northwest bay of the lake currently meets the threshold for considering an herbicide spot treatment. This area was targeted with diquat in 2016 and failed to reach control goals. This area was targeted with liquid 2,4-D amine at its maximum application rate (4.0 ppm ae) in the spring of 2017, resulting in seasonal EWM suppression during the summer of 2017 but complete rebound by the summer of 2018. Striving for greater than seasonal control, the KLAA is considering alternative spot treatment strategies for the spring of 2019.

Based upon the treatment history and small size of this area (Map 4), Onterra explored a few treatment options for applicability.

**Diquat/Endothall – Aquastrike ™ (UPI)**

Aquastrike is a commercially available combination of diquat and endothall. As a contact herbicide, diquat does not move (translocate) through plant tissue. Therefore, only the exposed plant material is impacted by the herbicide. Concern exists whether this herbicide has the capacity to kill the entire plant, or simply impacts the above ground biomass and the plant rebounds from unaffected root crowns. The addition of the endothall component is theorized to have increased systemic activity on EWM to result in complete control. This herbicide use-pattern has shown promise controlling HWM in a few Wisconsin treatments. The long-term control of EWM targeted with diquat/endothall continue to be evaluated on many lakes across Wisconsin. Given the treatment history in Kelly Lake that showed poor control with diquat alone, there is uncertainty that this option would be successful.

**Florpyrauxifen-Benzyl – ProcellaCOR™ (SePRO)**

This new herbicide is specifically designed to control invasive milfoil in short exposure time scenarios. ProcellaCOR™ is in a new class of synthetic auxin mimic herbicides (arylpicolinates) with short concentration and exposure time (CET) requirements compared to other systemic herbicides. Netherland and Richardson (2016) and Richardson et al. (2016) indicated control of select non-native plant species with the active ingredient in ProcellaCOR™, including invasive watermilfoils (EWM and HWM) at low application rates compared with other registered spot treatment herbicides. The majority of native plants tested to date also suggest greater tolerance to the is mode of action. Because this is a new herbicide, data available from field trials is relatively limited. To date, only one ProcellaCOR™ spot treatment has occurred in a public water of Wisconsin.

While this option may have a place in future invasive watermilfoil management on Kelly Lake, there is insufficient data at the current time to consider this strategy. If this new herbicide is to be considered, it would be important to ensure sufficient monitoring steps are in place to allow for the gathering of good scientific knowledge from the application. This would include collecting native plant information the summer prior to the treatment in the form of a focused point-intercept sub-sample

survey. If the KLAA wants to consider a ProcellaCOR™ treatment in the future, the decision to collect the pretreatment data would need to be made during the summer prior to the treatment.

**2,4-D/Endothall – Chinook®**

Both of these herbicides have been used extensively across Wisconsin for invasive watermilfoil (2,4-D) and curly-leaf pondweed (endothall) management. It is theorized, but not proven, that a combination of 2,4-D/endothall may not require as long of an exposure time as either herbicide alone due to increased systematic impacts to the target plants particularly at cold water temperatures. The simultaneous exposure to endothall and 2,4-D has been shown to provide increased control of invasive milfoil in outdoor growth chamber studies (Madsen et. al 2010). A handful of whole-lake EWM and hybrid EWM (HWM) treatments in Wisconsin utilizing this strategy have been conducted to date with promising results of control and selectivity towards native plants. Numerous spot treatment field trials of 2,4-D/endothall are occurring in Wisconsin. There are two different ratios of these chemicals that were considered: 1) one dosing option partners a modest dose of endothall (1.5 ppm ai) with 2,4-D at its maximum application rate (4.0 ppm ae), and 2) a second dosing option adopts a ratio of 2,4-D/endothall used by UPL within Chinook®.

Spot-treatments that use the first ratio discussed above have shown variable results to date with some treatments achieving seasonal impacts to the EWM while others have resulted in control that extends beyond the year of treatment.

Onterra has been in contact with the scientific technology advisor (Dr. Cody Gray) from UPL on the applicability of this strategy. The recommended rate of Chinook is 8.0 gallons/acre-feet, which equates to approximately 1.5 ppm ae 2,4-D and 3.6 ppm ai endothall. It may be more economical to apply both herbicides separately, but it is imperative that they are applied simultaneously. Because 2,4-D and endothall cannot be tank mixed together, the applicator would need two separate tanks applying herbicide simultaneously. This may not be an option for all applicators depending on their operating equipment, so the Chinook® product may be the most straight-forward solution. Onterra believes that a treatment strategy that utilizes a higher ratio of endothall to 2,4-D may be the most likely choice to result in greater than seasonal EWM control on Kelly Lake. Map 4 outlines this herbicide treatment strategy for consideration in 2019 in Kelly Lake.

## *2019 EWM Control Strategy – Coordinated Hand-Harvesting Control*

If the ESAIS Survey reveal areas of EWM that are comprised of *single plants* or *clumps of plants* and are not 'colonized', the KLAA will organize efforts to hand-remove the plants. Depending on the level of volunteerism and size of the EWM occurrences, the KLAA will determine if volunteer- or professional-based methods would be solicited.

The hand-harvesting would occur following the June ESAIS Survey in roughly mid-June to mid-September. Conducting hand-harvesting earlier or later in the year can reduce the effectiveness of the strategy, as plants are more brittle and extraction of the roots more difficult. If a professional-based hand-harvesting method is chosen and WDNR funds are being used to offset the costs, a Late-Summer EWM Peak-Biomass Mapping Survey would take place following the hand-harvesting. If a Diver Assisted Suction Harvest (DASH) component is utilized, the KLAA and contracted firm would be responsible for the WDNR permit procedures. The contracted firm would be guided with GPS data from

the consultant following the ESAIS Survey and would track their efforts (when, where, time spent, quantity removed) for post assessments.

Contracted DASH harvesting services currently averages about $2,500/day and as a result, many lake groups are considering constructing or are already utilizing their own DASH units. AIS-Established Population Control Grant funds can be used to purchase a portion of the equipment needed to construct a DASH unit; however, the grant funds cannot be used to purchase a boat, motor, or trailer. Grant funds can be used to purchase pumps, miscellaneous supplies, and scuba gear. If any piece of equipment costs $5,000 or more, that equipment's cost must be depreciated over the extent of the grant period. While grant funds are available to aid in the building of the DASH unit, there are still large-ticket items that need to be obtained and specific training is required to operate the unit on the surface and especially below the surface. Further, a substantial and dedicated volunteer force must be assembled.

Considering the current level of infestation and the areas and densities of those occurrences, the use of DASH harvesting would be the most effective method of controlling EWM in Kelly Lake; therefore, the KLAA will investigate the feasibility of constructing and utilizing their own DASH unit on Kelly Lake. This investigation will include the following elements:

- Estimating construction costs including grant-funded and out-of-pocket expenses.
- Determining if the KLAA membership has the expertise and skills to construct the DASH unit.
- Investigating the skillsets and certifications required to operate the DASH unit (surface and sub-surface personnel).
- Investigating liability and insurance needs.
- Determining if the KLAA can supply sufficient volunteer time to operate the unit throughout the growing season.

If the KLAA discovers that it is feasible to construct and operate an association-owned DASH unit, the association will apply for AIS-EPC funds to aid in the unit's construction costs and conduct a 3-year operation and monitoring program on Kelly Lake. The project would include professional monitoring and reporting in an effort to assist the KLAA in operating the unit effectively and efficiently.

With the exception of the site proposed for herbicide control in 2019, the rest of the EWM population in Kelly Lake may be appropriate for considering hand-harvesting control actions. It is unlikely that the KLAA could reasonably target the entire EWM population in the lake in 2019 with hand-harvesting as the amount of time/effort that would be required is too high. Therefore, the KLAA should prioritize EWM locations in the lake for hand removal methods based on characteristics such as size, density, depth, location, etc.

Map 5 displays nine preliminary sites that contain some of the larger and denser EWM occurrences in Kelly Lake outside of the proposed herbicide site. These sites, totaling 1.99 acres, are recommended for management in 2019 with DASH methodology. All other EWM occurrences in the lake may be considered for hand-harvesting as time, funds and level of volunteerism allow. An early season AIS survey is scheduled for 2019 during which Onterra field crews will map the EWM population and from which the final 2019 hand-harvesting strategy will be determined. A late-summer mapping survey will serve to evaluate the control actions that occur in 2019 and will be used to develop a preliminary control strategy for 2020.


D-18

C-18

B-18

A-18

E-18

F-18

| 2018 EWM Control Strategy<br>Diver Assisted Suction Harvest (DASH) | | | |
|---|---|---|---|
| Site | Final Acres | Ave Depth (feet) | Priority |
| A-18 | 0.91 | 7.00 | First |
| B-18 | 0.06 | 7.00 | Second |
| C-18 | 0.60 | 8.0 | First |
| D-18 | 0.25 | 8.0 | First |
| E-18 | 0.11 | 9.00 | Second |
| F-18 | 0.07 | 7.00 | Second |
| **Total** | **2.00** | | |

750

Feet

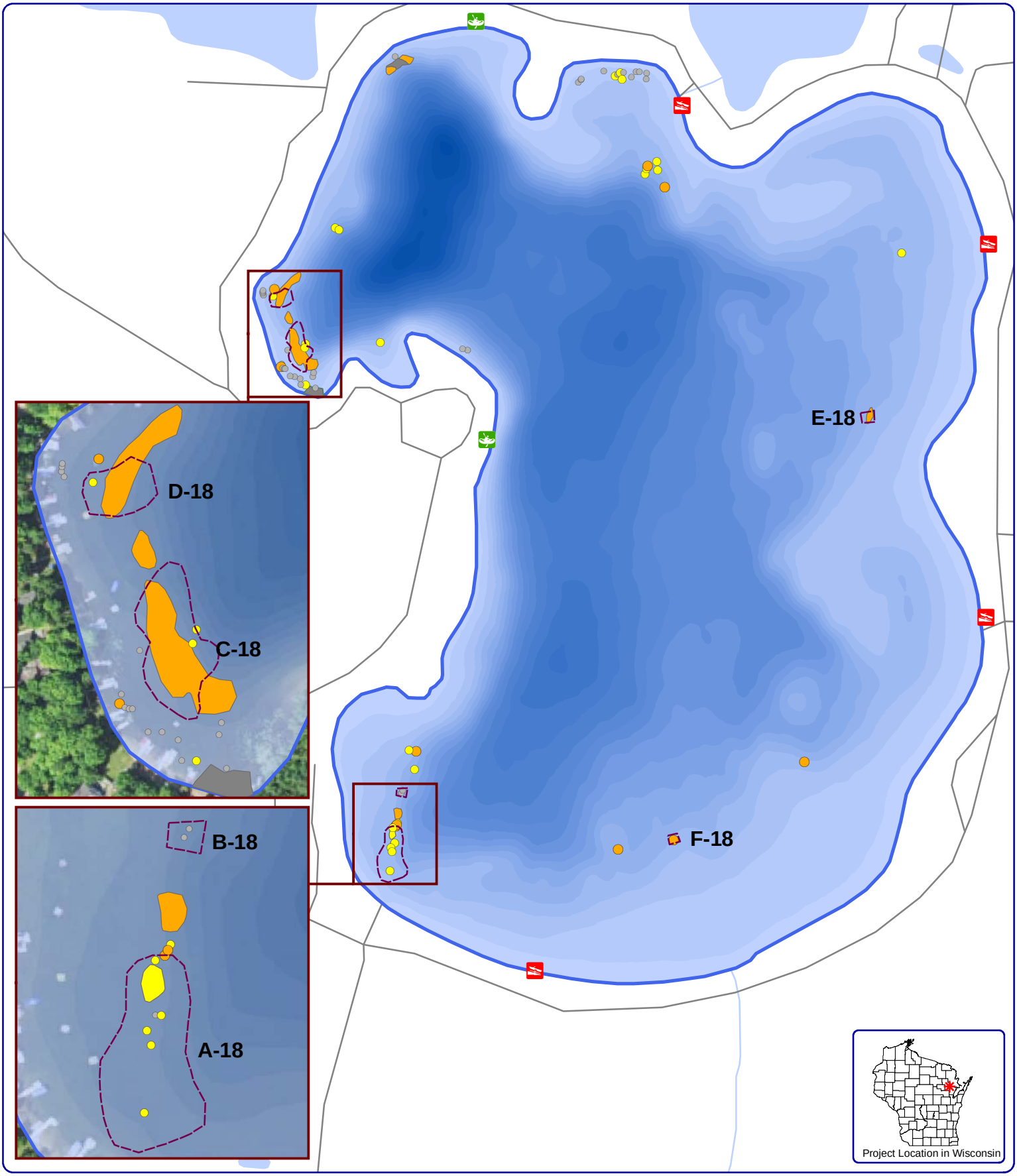
**Legend**

- Highly Scattered *(None)*
- Scattered
- Dominant
- Highly Dominant *(None)*
- Surface Matting *(None)*
- Single or Few Plants
- Clumps of Plants
- Small Plant Colony
- 2018 Hand-Harvest Site

Onterra LLC
Lake Management Planning
815 Prosper Rd
De Pere, WI 54115
920.338.8860
www.onterra-eco.com

**Sources**
Roads and Hydro: WDNR
Bathymetry: Onterra, 2016;
Processed by C-Map USA
Aquatic Plants: Onterra, 2018
**Map Date:** June15, 2018 TWH
**Filename:** *KellyOconto_EWM_May18.mxd*

Map 1
Kelly Lake
Oconto, Wisconsin
**June 2018 EWM Survey Results & Hand-Harvesting Strategy**




N
W E
S

700
Feet

**Legend**

- Highly Scattered *(None)*
- Scattered
- Dominant
- Highly Dominant
- Surface Matting *(None)*
- Single or Few Plants
- Clumps of Plants
- Small Plant Colony
- 2018 Hand Harvest Site

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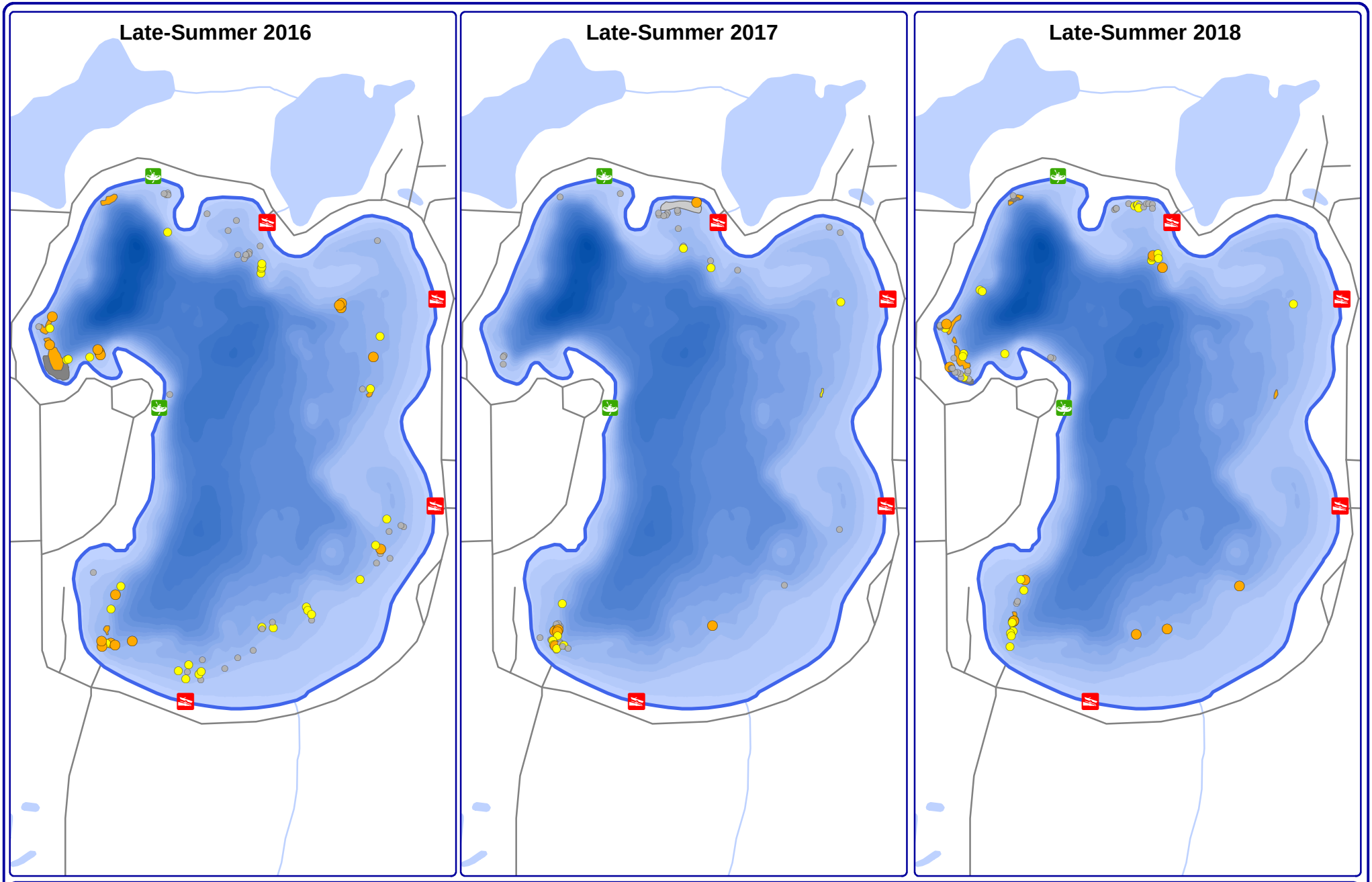
**Sources**
Roads and Hydro: WDNR
Bathymetry: Onterra, 2016;
Processed by C-Map USA
Aquatic Plants: Onterra, 2018
**Map Date:** October 25, 2018 TWH
**Filename:** *KellyOconto_EWMPB_Aug18.mxd*

Map 2
# Kelly Lake
Oconto, Wisconsin
## August 2018 EWM Survey Results




N
W E
S

1,300
Feet

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www.onterra-eco.com

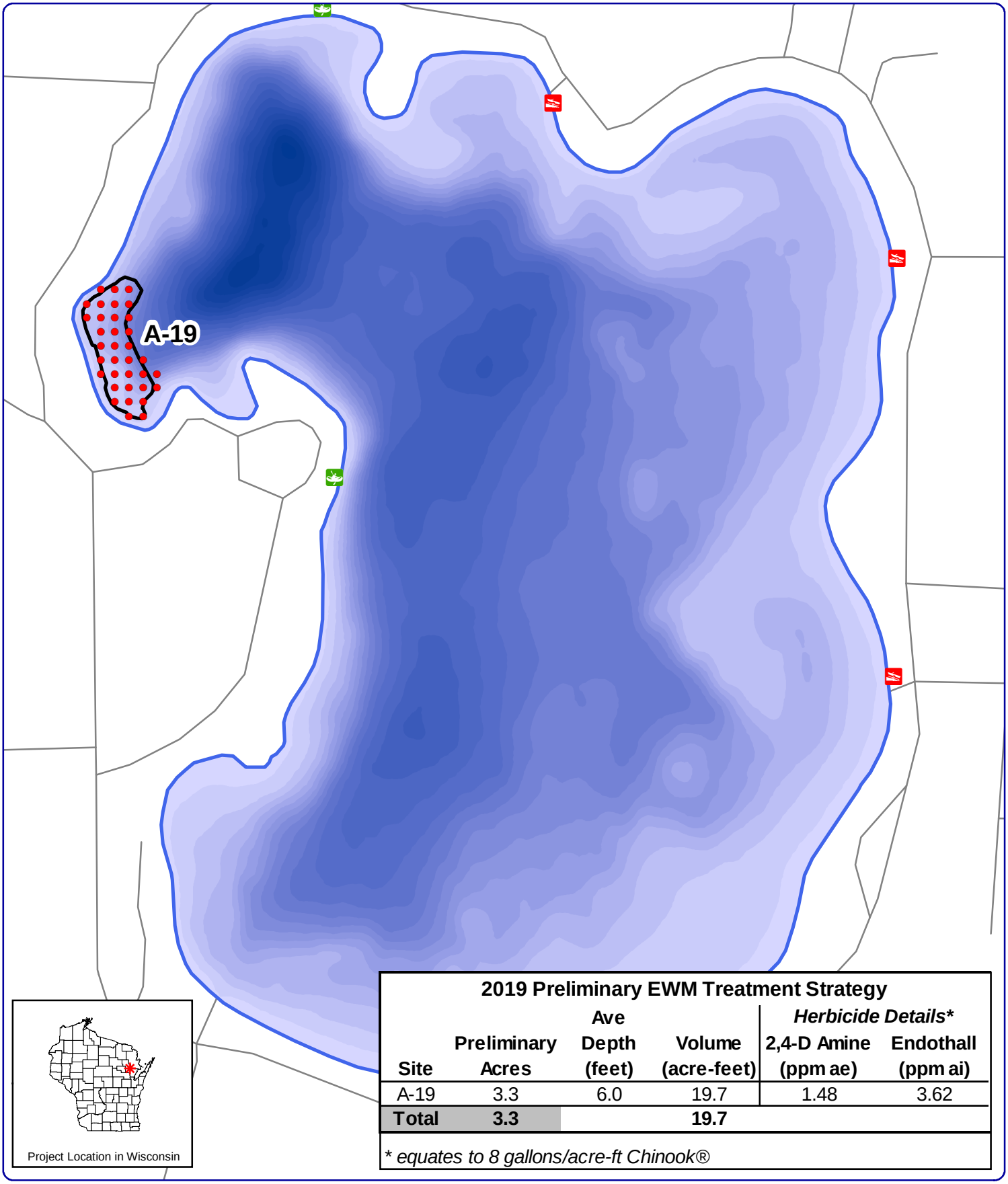
**Sources:**
Roads Hydro: WDNR
Bathymetry: Onterra, 2014; processed by Navico
Plant Survey: Onterra, 2012-16
**Map Date:** November 23, 2016
***Filename:*** *Map6_Anvil_EWM_Progression_2012-16.mxd*


## Legend

- Highly Scattered
- Scattered
- Dominant
- Highly Dominant
- Surface Matting
- Single or Few Plants
- Clumps of Plants
- Small Plant Colony

Map 3
Kelly Lake
Oconto County, Wisconsin

# 2016-2018 EWM Progression




## 2019 Preliminary EWM Treatment Strategy

| Site | Preliminary Acres | Ave Depth (feet) | Volume (acre-feet) | *Herbicide Details** 2,4-D Amine (ppm ae) | Endothall (ppm ai) |
|---|---|---|---|---|---|
| A-19 | 3.3 | 6.0 | 19.7 | 1.48 | 3.62 |
| **Total** | **3.3** | | **19.7** | | |

** equates to 8 gallons/acre-ft Chinook®*



Project Location in Wisconsin

N W E S

700

Feet

Onterra LLC
Lake Management Planning
815 Prosper Road
De Pere, WI 54115
920.338.8860
www.onterra-eco.com

**Sources:**
Roads and Hyrdo: WDNR
Bathymetry: Onterra, 2016
Plant Survey: Onterra, 2018

**Map Date:** April 1, 2019 TWH
***Filename:*** *KellyOctonto_EWM_T2019Prelim1.mxd*

### Legend

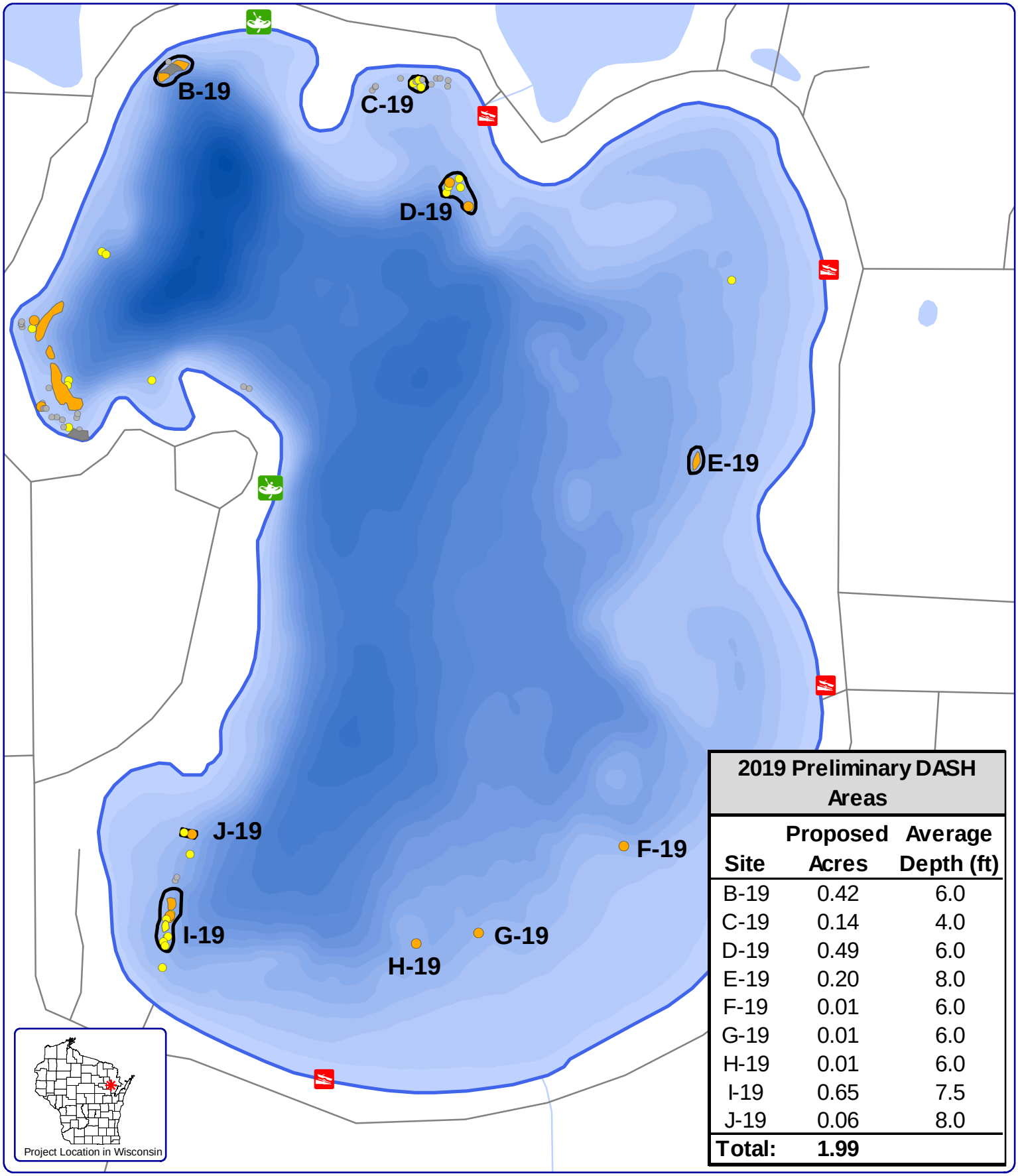
- 2019 Preliminary Herbicide Treatment Area
- Sub Point-Intercept Survey Sampling Location (n=35)

Map 4

Kelly Lake

Oconto County, Wisconsin

# 2019 Preliminary Herbicide Treatment Strategy




| 2019 Preliminary DASH Areas | | |
|---|---|---|
| Site | Proposed Acres | Average Depth (ft) |
| B-19 | 0.42 | 6.0 |
| C-19 | 0.14 | 4.0 |
| D-19 | 0.49 | 6.0 |
| E-19 | 0.20 | 8.0 |
| F-19 | 0.01 | 6.0 |
| G-19 | 0.01 | 6.0 |
| H-19 | 0.01 | 6.0 |
| I-19 | 0.65 | 7.5 |
| J-19 | 0.06 | 8.0 |
| **Total:** | **1.99** | |




N
W E
S

650
Feet

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**Sources**
Roads and Hydro: WDNR
Bathymetry: Onterra, 2016;
Processed by C-Map USA
Aquatic Plants: Onterra, 2018
**Map Date:** April 1, 2019 TWH
**Filename:** *Kelly_EWM_HH_2019_Prelim1.mxd*

**Legend**

- Highly Scattered *(None)*
- Scattered
- Dominant
- Highly Dominant
- Surface Matting *(None)*
- Single or Few Plants
- Clumps of Plants
- Small Plant Colony
- 2019 Proposed Hand-Harvest Site

Map 5

Kelly Lake
Oconto, Wisconsin

**2019 Preliminary EWM Hand-Harvesting Sites**