A

APPENDIX A

Public Participation Materials

Presentation Outline

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

Onterra LLC
Lake Management Planning

Onterra, LLC

- Founded in 2005
- Staff
  - Four full-time ecologists
  - One part-time ecologist
  - One field technician
  - Two 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.

Onterra LLC
Lake Management Planning

Elements of an Effective Lake Management Planning Project

Data and Information Gathering

Environmental & Sociological

Planning Process

Brings it all together

Onterra, LLC
Lake Management Planning

Data and information gathering

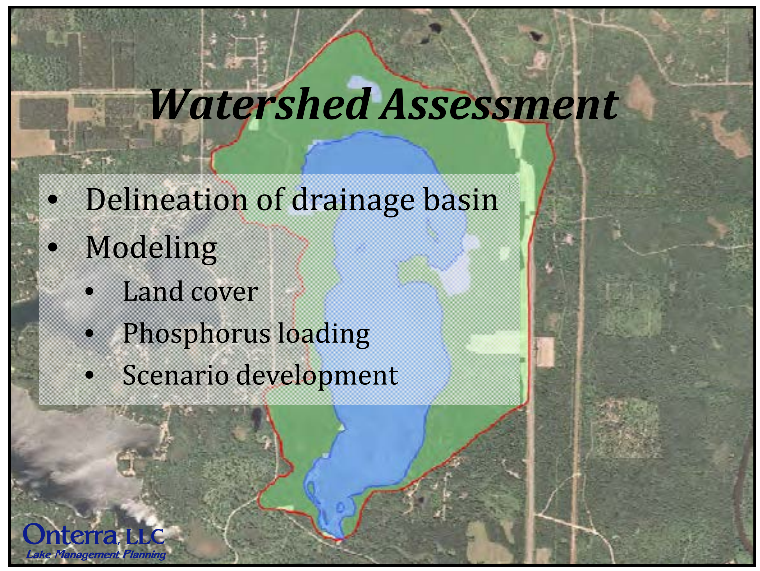
- Study Components
  - Water Quality Analysis
  - Watershed Assessment
  - Aquatic Plant Surveys
  - Fisheries Data Integration
  - Shoreline Assessment
  - Stakeholder Survey

Onterra, LLC
Lake Management Planning

Water Quality Analysis

- General water chemistry (current & historic)
  - Citizens Lake Monitoring Network
- Nutrient analysis
  - Lake trophic state (Eutrophication)
  - Limiting plant nutrient
- Supporting data for watershed modeling

Onterra, LLC
Lake Management Planning



Watershed Assessment

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

Onterra, LLC
Lake Management Planning

Aquatic Plant Surveys

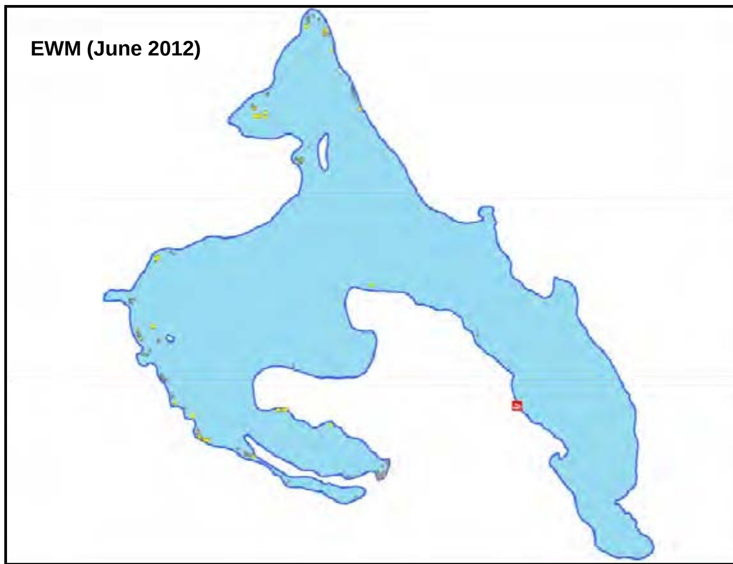
- Concerned with both native and non-native plants
- Multiple surveys used in assessment
  - Early-season AIS Survey
  - Point-intercept survey
  - Aquatic plant community mapping
  - Volunteer survey findings

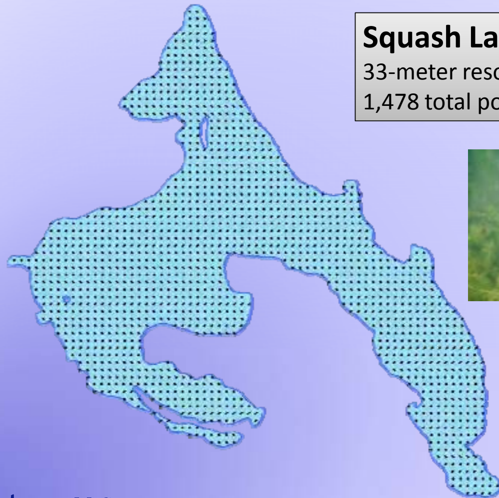
Non-native Aquatic Plants

Curly-leaf Pondweed

Non-native Aquatic Plants

Eurasian Water Milfoil

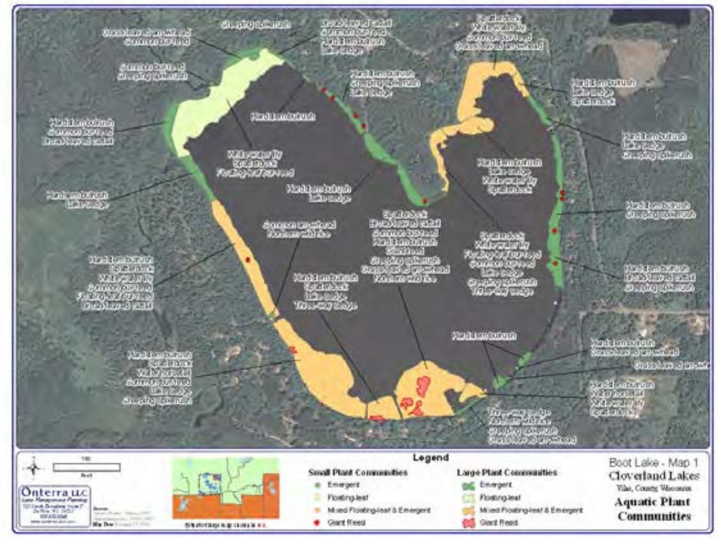




Squash Lake

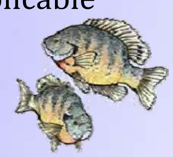
33-meter resolution

1,478 total points



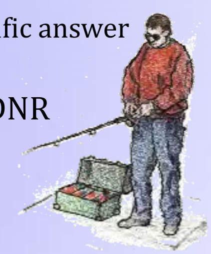
Fisheries Data Integration

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



Stakeholder Survey

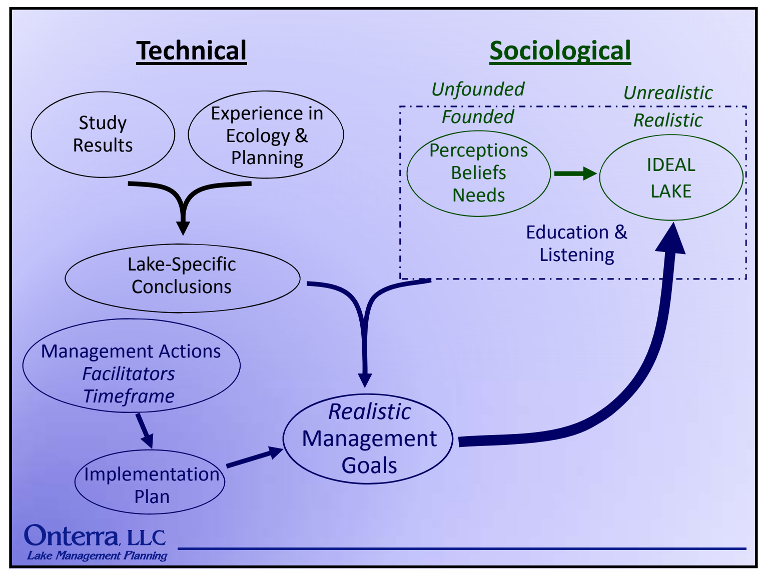
- Standard survey used as base
  - Planning committee potentially develops additional questions and options
  - Must not lead respondent to specific answer through a "loaded" question
- Survey must be approved by WDNR



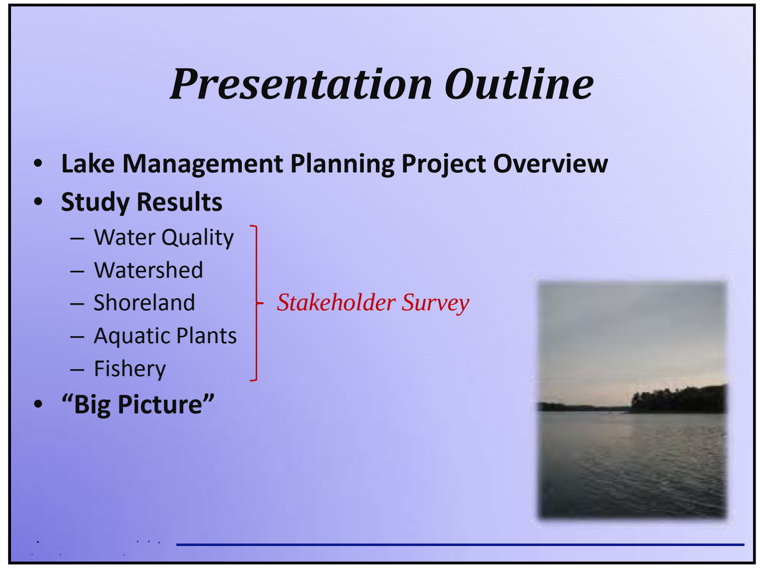

Shoreland Assessment
• Shoreland area is important for buffering runoff and provides valuable habitat for aquatic and terrestrial wildlife.
• It does not look at lake shoreline on a property-by-property basis.
• Assessment ranks shoreland area from shoreline back 35 feet
Urbanized
Range
Natural
Onterra, LLC
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
Onterra, LLC
Lake Management Planning


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

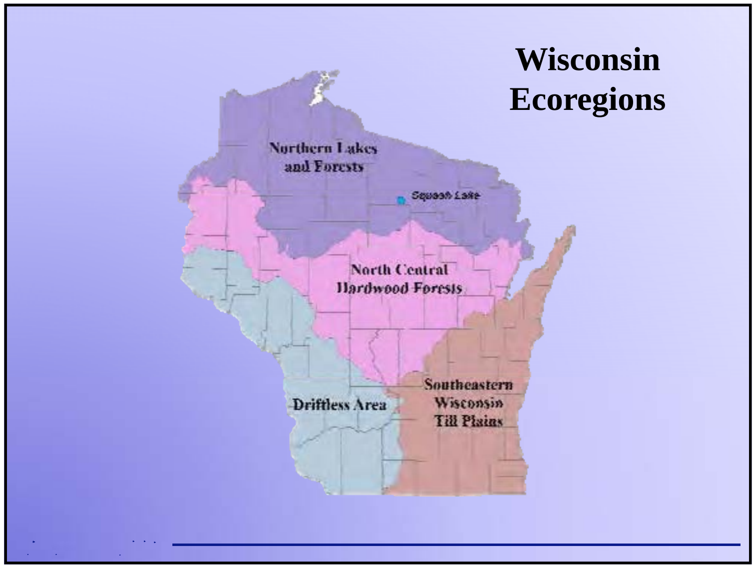

Technical
Sociological
Study Results
Experience in Ecology & Planning
Lake-Specific Conclusions
Management Actions
Facilitators
Timeframe
Implementation Plan
Realistic Management Goals
Unfounded
Founded
Unrealistic
Realistic
Perceptions
Beliefs
Needs
IDEAL LAKE
Education & Listening
Onterra, LLC
Lake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

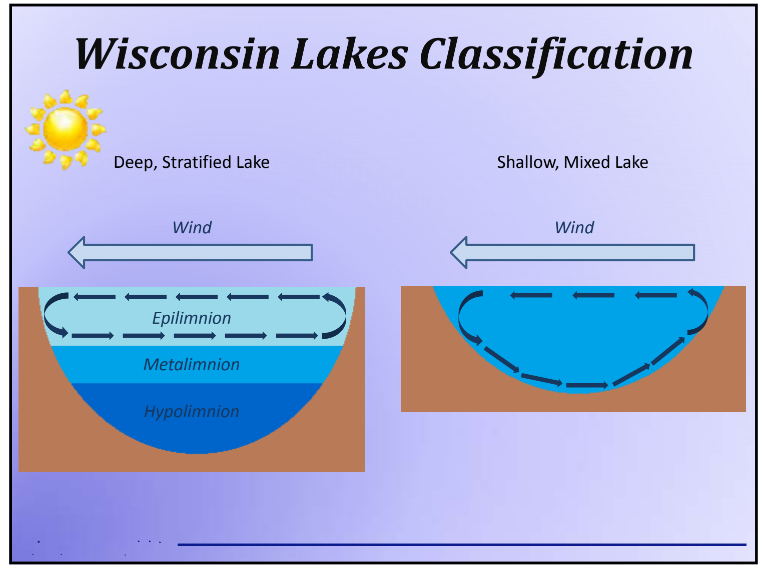

Squash Lake
Association, Inc.
Squash Lake
Management Planning Project
Planning Meeting I
November 6, 2013
Brenton Butterfield
Onterra LLC
Lake Management Planning

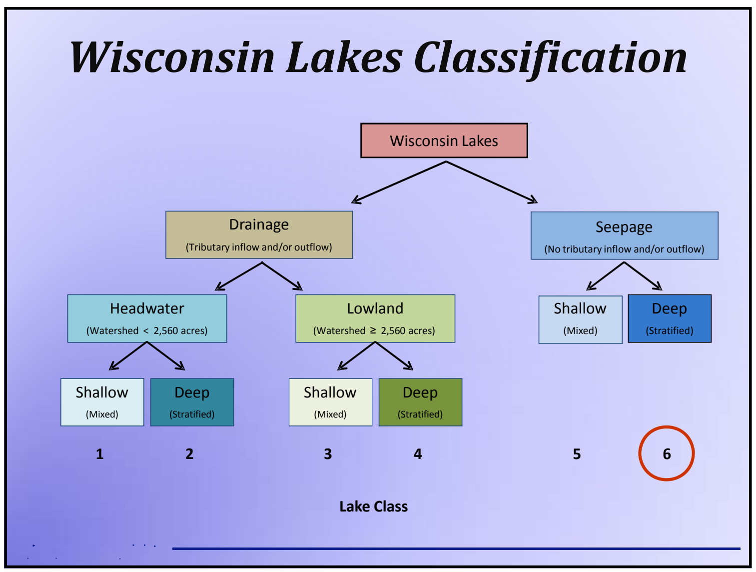

Presentation Outline
• Lake Management Planning Project Overview
• Study Results
– Water Quality
– Watershed
– Shoreland
– Aquatic Plants
– Fishery
Stakeholder Survey
• "Big Picture"


Study and Plan Goals
•Collect & Analyze Data
•Construct Long-Term & Useable Plan

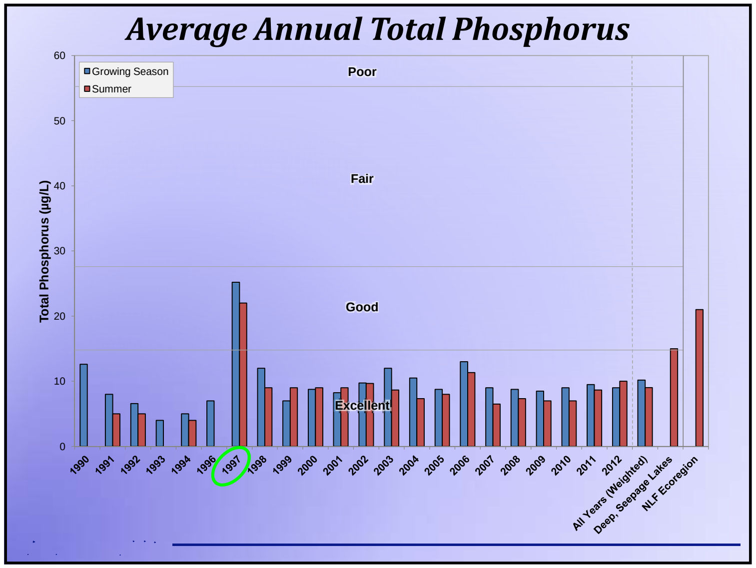

Water Quality

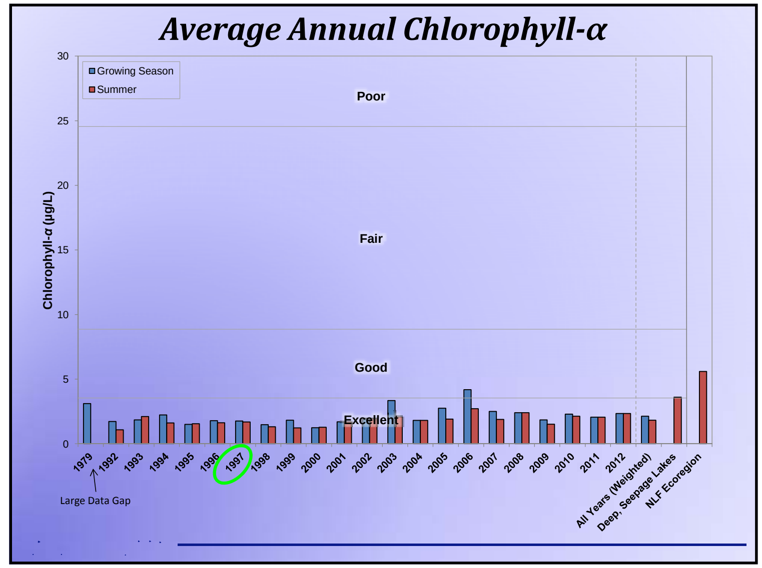

Wisconsin
Ecoregions
Northern Lakes
and Forests
Squash Lake
North Central
Hardwood Forests
Driftless Area
Southeastern
Wisconsin
Till Plains

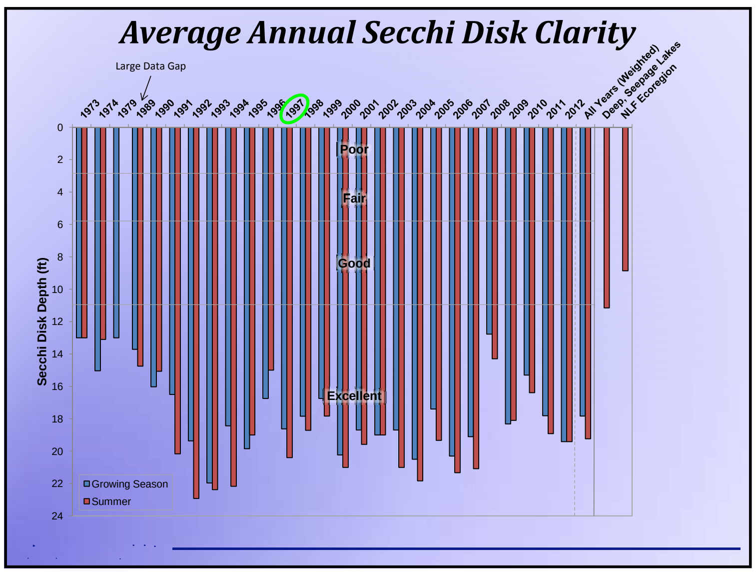

Wisconsin Lakes Classification
Deep, Stratified Lake
Shallow, Mixed Lake
Wind
Wind
Epilimnion
Metalimnion
Hypolimnion

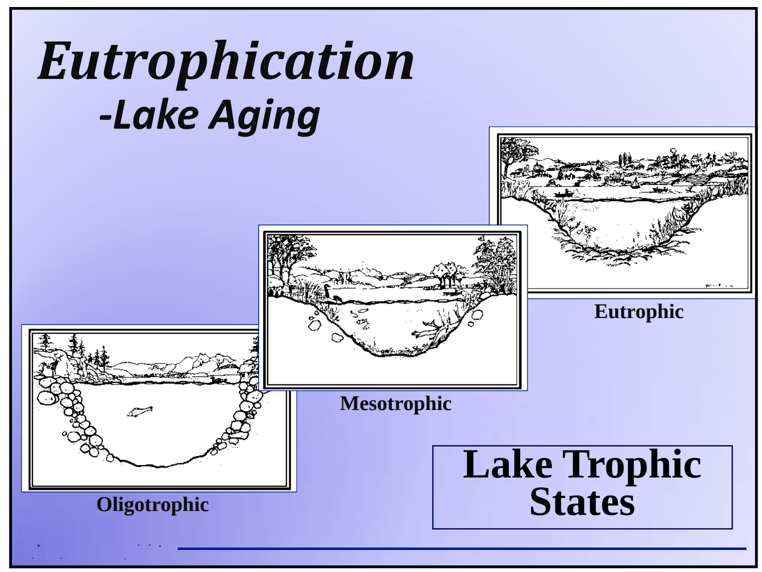

Wisconsin Lakes Classification
Wisconsin Lakes
Drainage
(Tributary inflow and/or outflow)
Seepage
(No tributary inflow and/or outflow)
Headwater
(Watershed < 2,560 acres)
Lowland
(Watershed ≥ 2,560 acres)
Shallow
(Mixed)
Deep
(Stratified)
Shallow
(Mixed)
Deep
(Stratified)
Shallow
(Mixed)
Deep
(Stratified)
1
2
3
4
5
6
Lake Class


Water Quality
Phosphorus (Limiting Plant Nutrient)
Nitrogen:Phosphorus = 32:1
Chlorophyll-a (Algal Abundance)
Low abundance
Water Clarity (Secchi Disk)
High water clarity

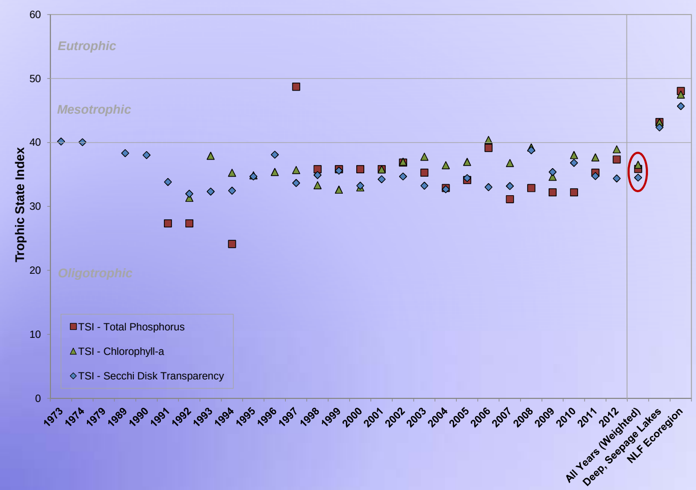

Average Annual Total Phosphorus
Total Phosphorus (µg/L)
Growing Season
Summer
Poor
Fair
Good
Excellent
1990
1991
1992
1993
1994
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
All Years (Weighted)
Deep, Seepage Lakes
NLF Ecoregion


Average Annual Chlorophyll-α
Chlorophyll-α (µg/L)
Growing Season
Summer
Poor
Fair
Good
Excellent
Large Data Gap
1979
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
All Years (Weighted)
Deep, Seepage Lakes
NLF Ecoregion

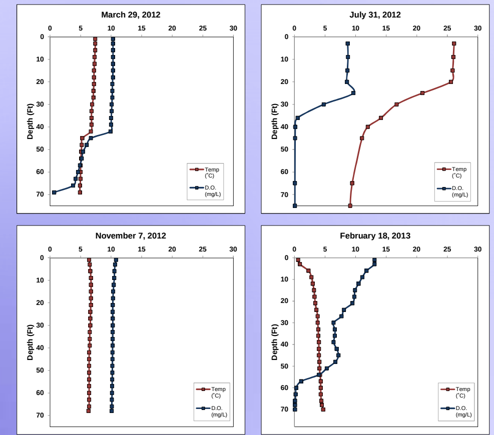

Average Annual Secchi Disk Clarity
Large Data Gap
Secchi Disk Depth (ft)
Poor
Fair
Good
Excellent
Growing Season
Summer
1973
1974
1979
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
All Years (Weighted)
Deep, Seepage Lakes
NLF Ecoregion


Eutrophication
-Lake Aging
Eutrophic
Mesotrophic
Oligotrophic
Lake Trophic States

Trophic State Index



Dissolved Oxygen / Temperature

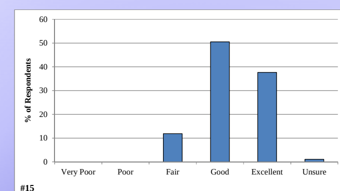


Other Water Quality Results

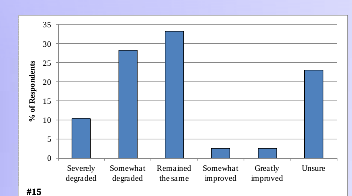
- Alkalinity = 22.6 mg/L as $CaCO_3$ – indicates very little sensitivity to acid rain
- Low calcium concentrations (6.9 mg/L)
  - Very low susceptibility for zebra mussel establishment

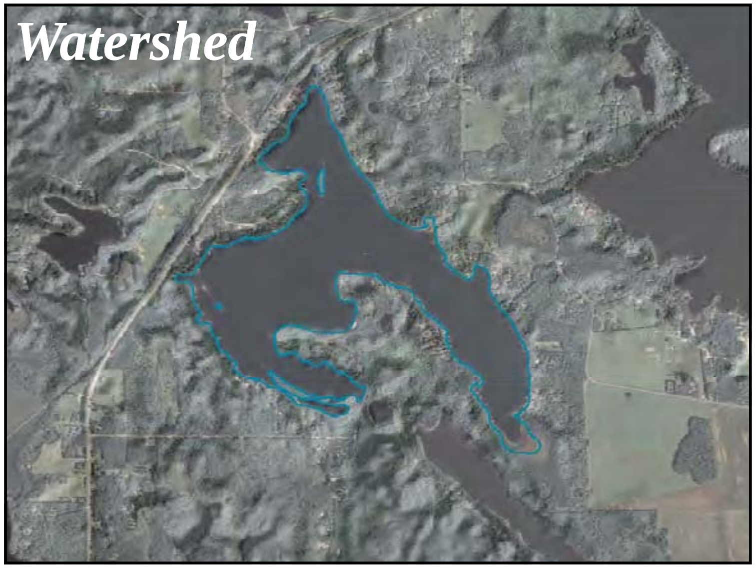
Stakeholder Survey – Water Quality

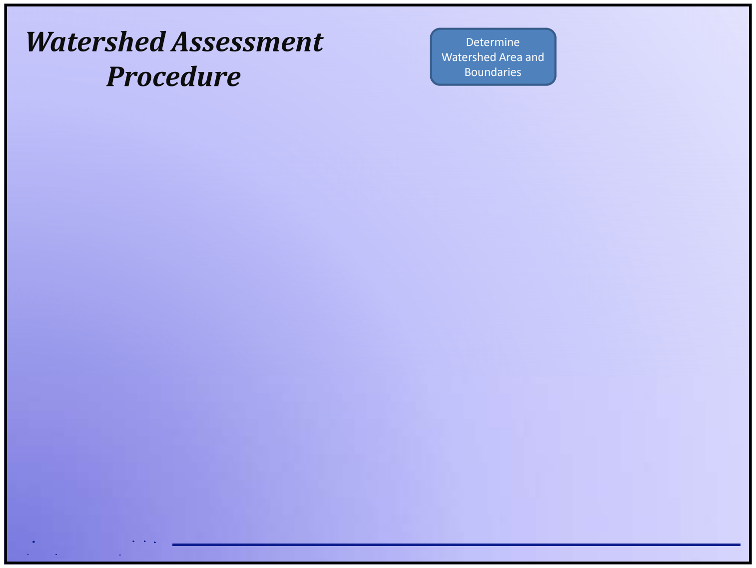
How would you describe the current water quality of Squash Lake?

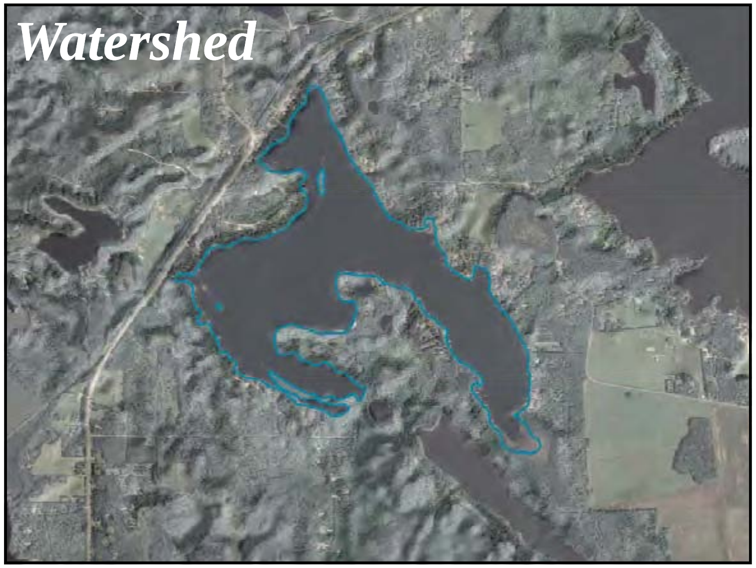


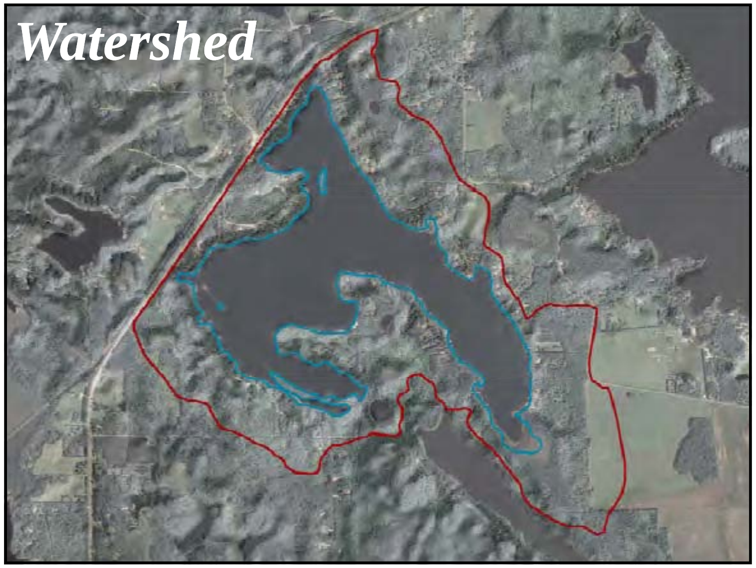
How has the water quality changed in Squash Lake since you first visited the lake?

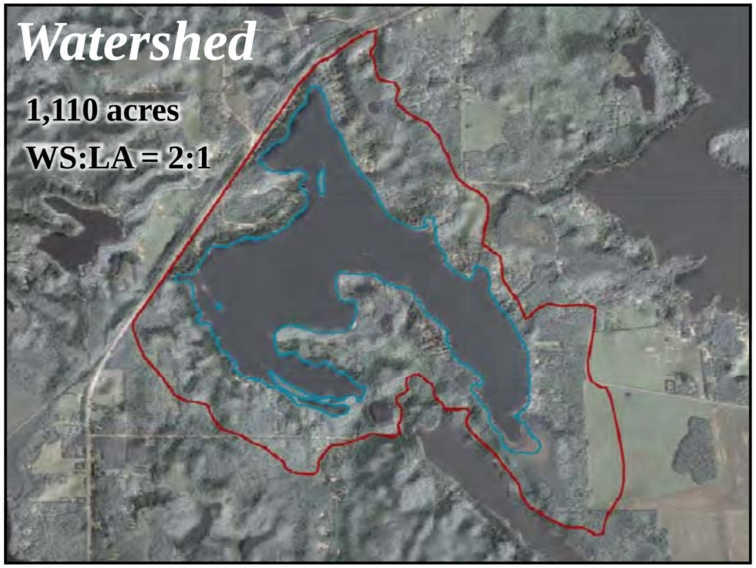


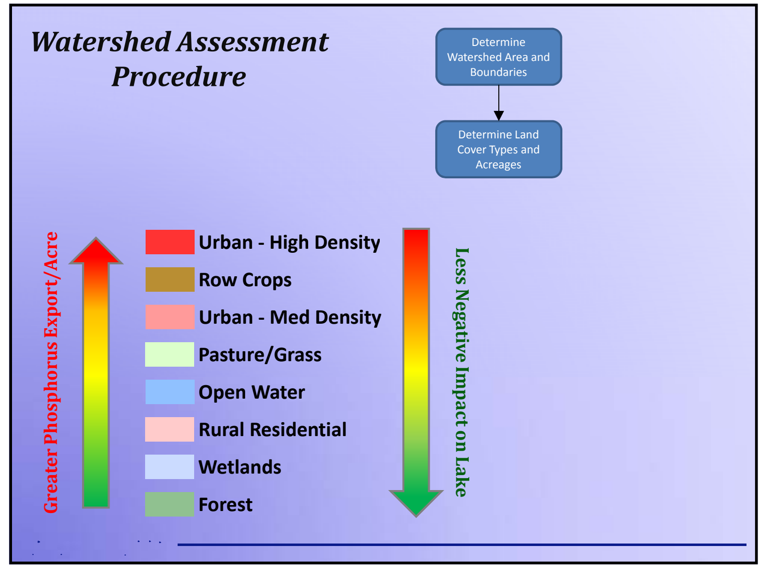

Watershed

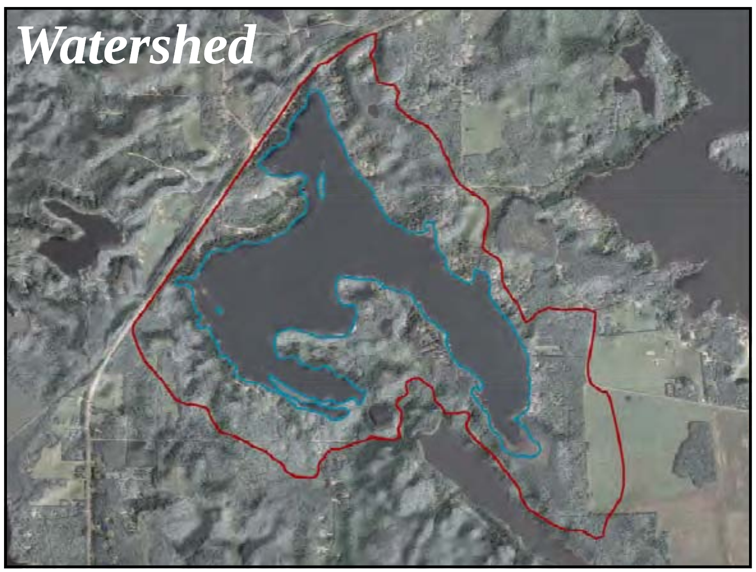

Watershed Assessment
Procedure
Determine
Watershed Area and
Boundaries

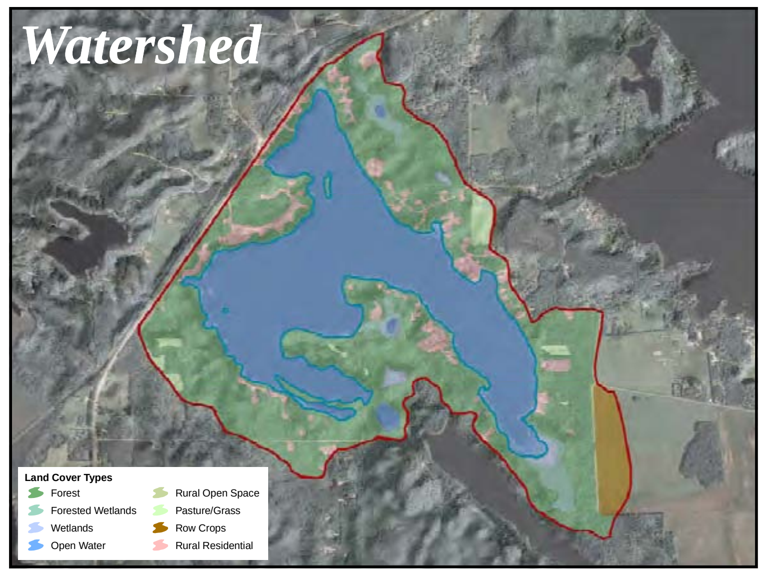

Watershed

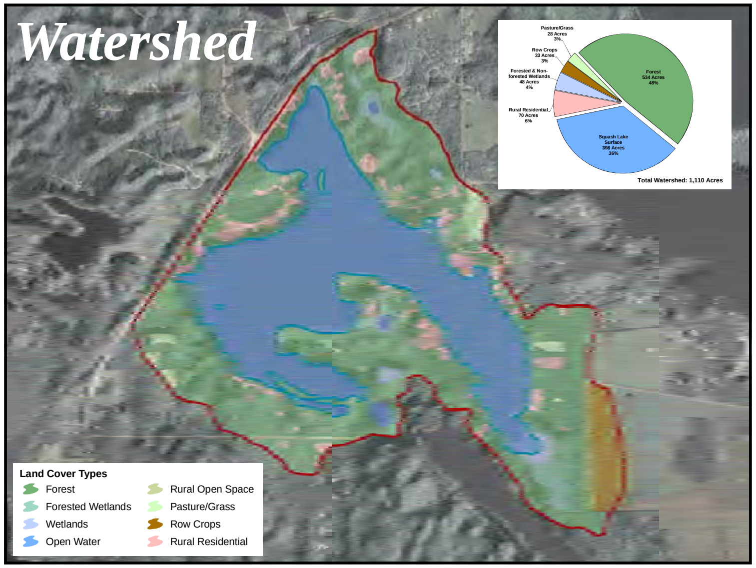

Watershed

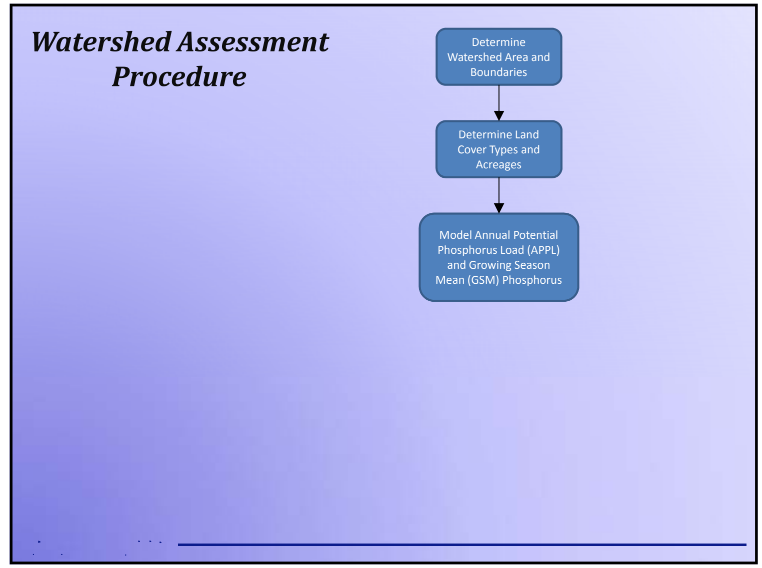

Watershed
1,110 acres
WS:LA = 2:1

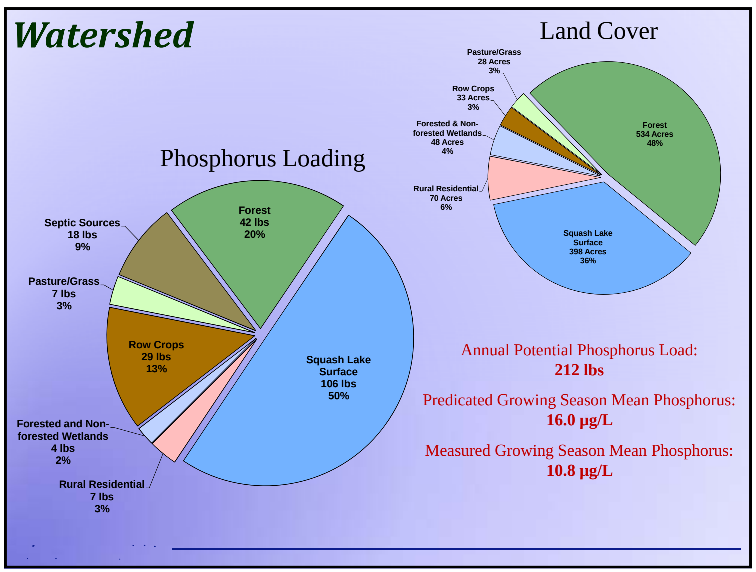

Watershed Assessment Procedure
Determine Watershed Area and Boundaries
Determine Land Cover Types and Acreages
Greater Phosphorus Export/Acre
Urban - High Density
Row Crops
Urban - Med Density
Pasture/Grass
Open Water
Rural Residential
Wetlands
Forest
Less Negative Impact on Lake

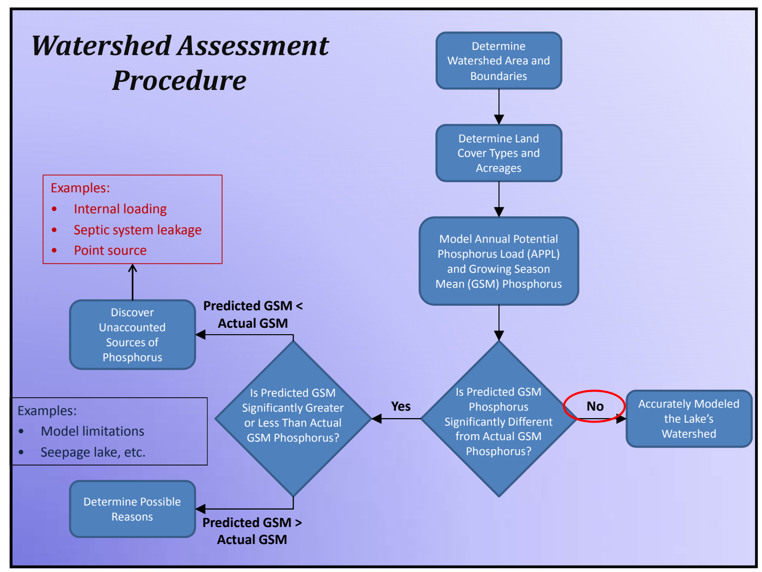

Watershed


Watershed
Land Cover Types
Forest
Forested Wetlands
Wetlands
Open Water
Rural Open Space
Pasture/Grass
Row Crops
Rural Residential

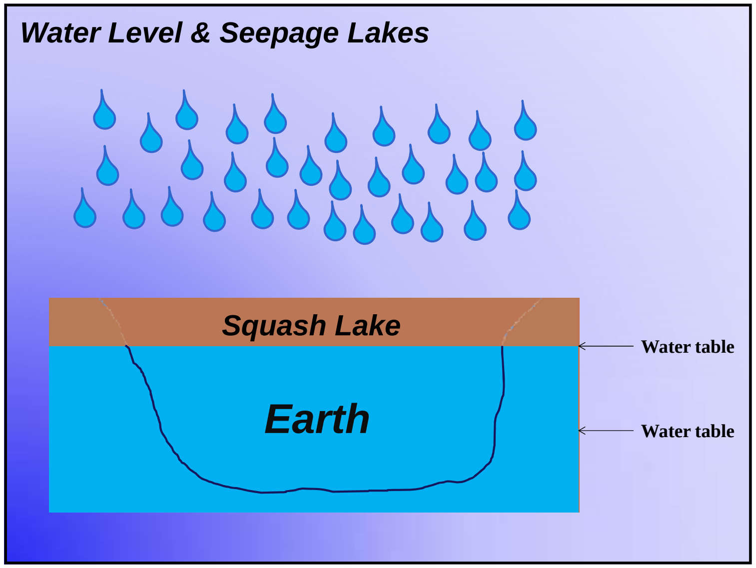

Watershed
Total Watershed: 1,110 Acres
Land Cover Types
Forest
Forested Wetlands
Wetlands
Open Water
Rural Open Space
Pasture/Grass
Row Crops
Rural Residential

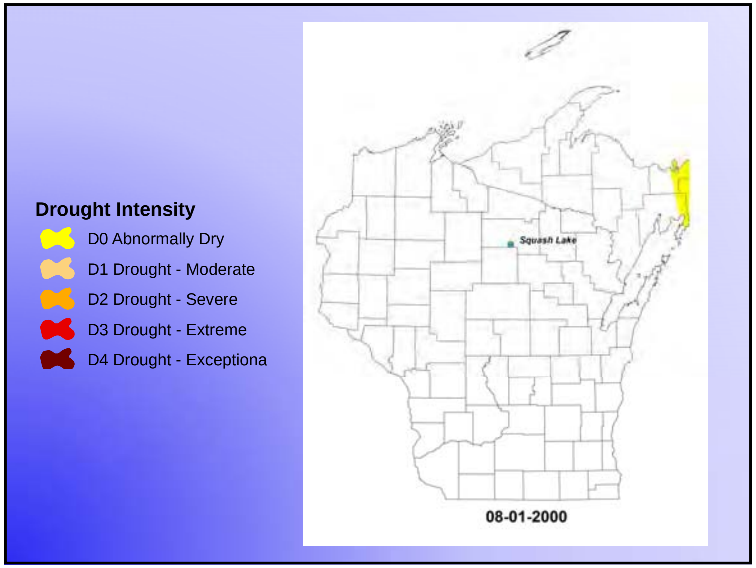

Watershed Assessment Procedure
Determine Watershed Area and Boundaries
Determine Land Cover Types and Acreages
Model Annual Potential Phosphorus Load (APPL) and Growing Season Mean (GSM) Phosphorus

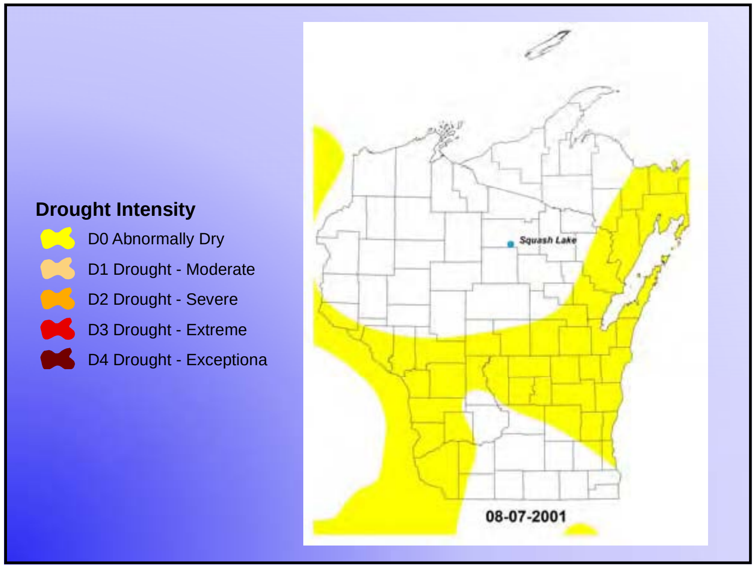

Watershed
Land Cover
Pasture/Grass
28 Acres
3%
Row Crops
33 Acres
3%
Forested & Non-forested Wetlands
48 Acres
4%
Rural Residential
70 Acres
6%
Forest
534 Acres
48%
Squash Lake Surface
398 Acres
36%
Phosphorus Loading
Septic Sources
18 lbs
9%
Forest
42 lbs
20%
Pasture/Grass
7 lbs
3%
Row Crops
29 lbs
13%
Squash Lake Surface
106 lbs
50%
Forested and Non-forested Wetlands
4 lbs
2%
Rural Residential
7 lbs
3%
Annual Potential Phosphorus Load:
212 lbs
Predicated Growing Season Mean Phosphorus:
16.0 µg/L
Measured Growing Season Mean Phosphorus:
10.8 µg/L

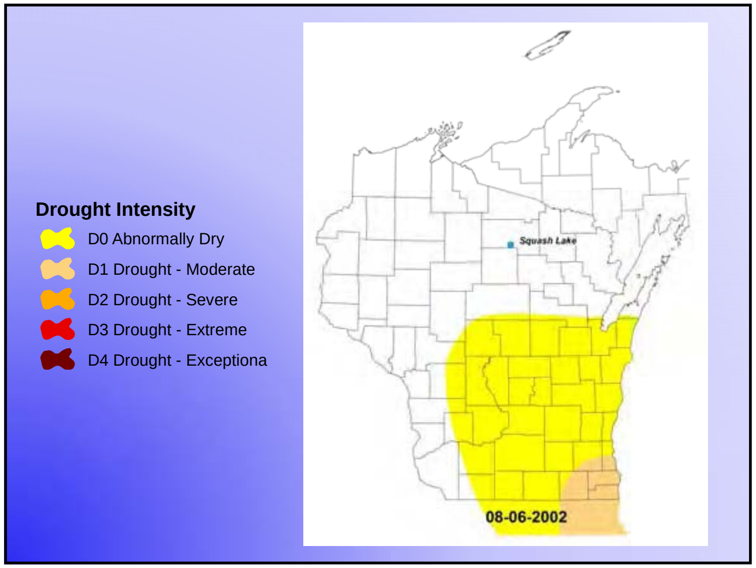

Watershed Assessment Procedure
Determine Watershed Area and Boundaries
Determine Land Cover Types and Acreages
Model Annual Potential Phosphorus Load (APPL) and Growing Season Mean (GSM) Phosphorus
Examples:
• Internal loading
• Septic system leakage
• Point source
Discover Unaccounted Sources of Phosphorus
Predicted GSM < Actual GSM
Examples:
• Model limitations
• Seepage lake, etc.
Is Predicted GSM Significantly Greater or Less Than Actual GSM Phosphorus?
Yes
Is Predicted GSM Phosphorus Significantly Different from Actual GSM Phosphorus?
No
Accurately Modeled the Lake's Watershed
Determine Possible Reasons
Predicted GSM > Actual GSM

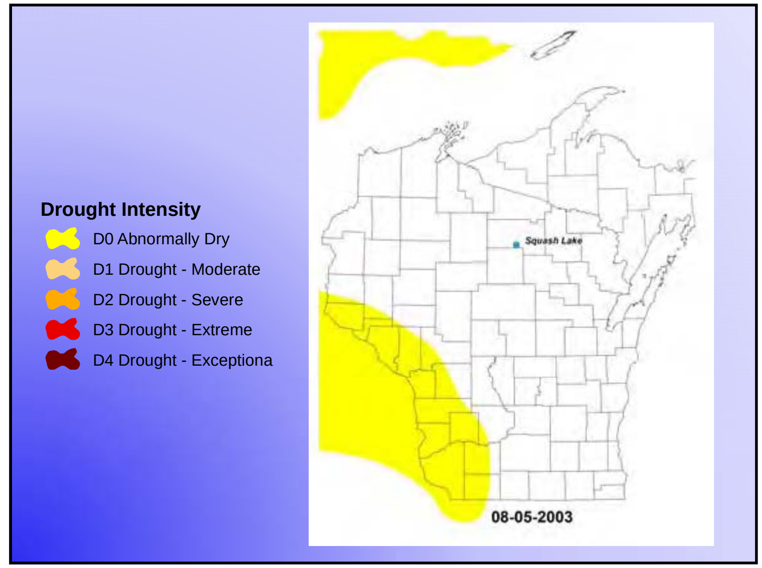

Water Levels

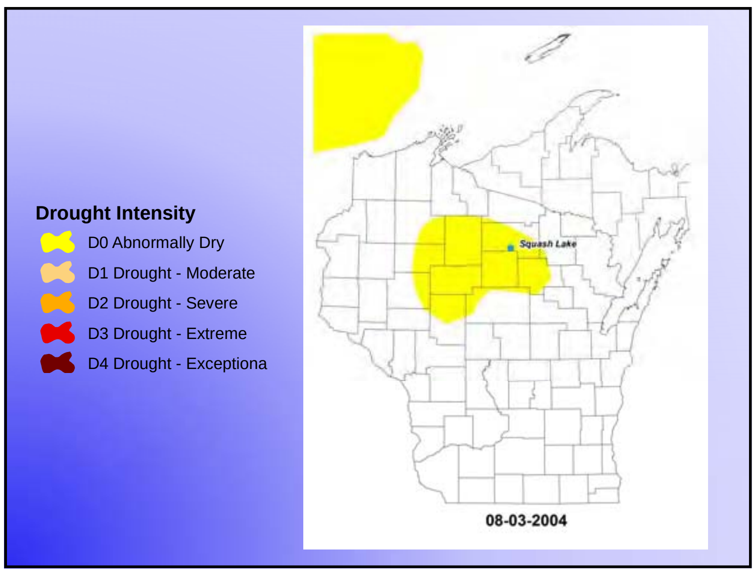

Water Level & Seepage Lakes
Squash Lake
Earth
Water table
Water table

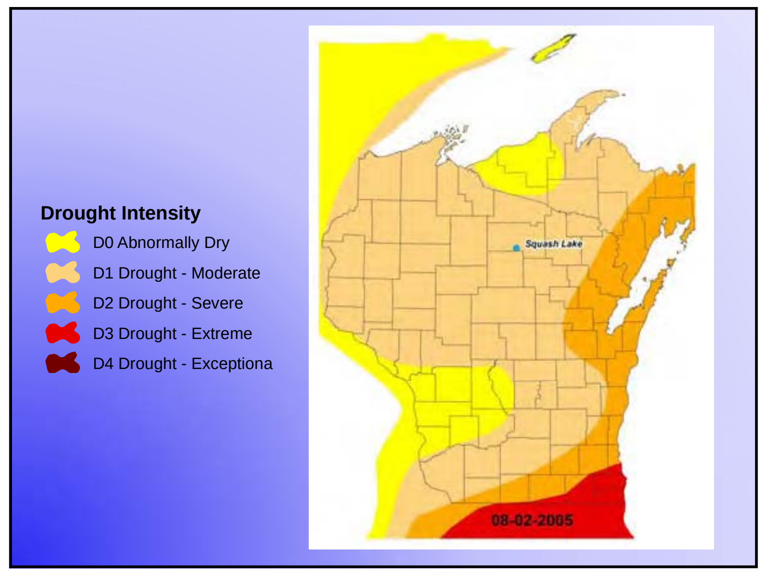

Drought Intensity
D0 Abnormally Dry
D1 Drought - Moderate
D2 Drought - Severe
D3 Drought - Extreme
D4 Drought - Exceptiona
Squash Lake
08-01-2000

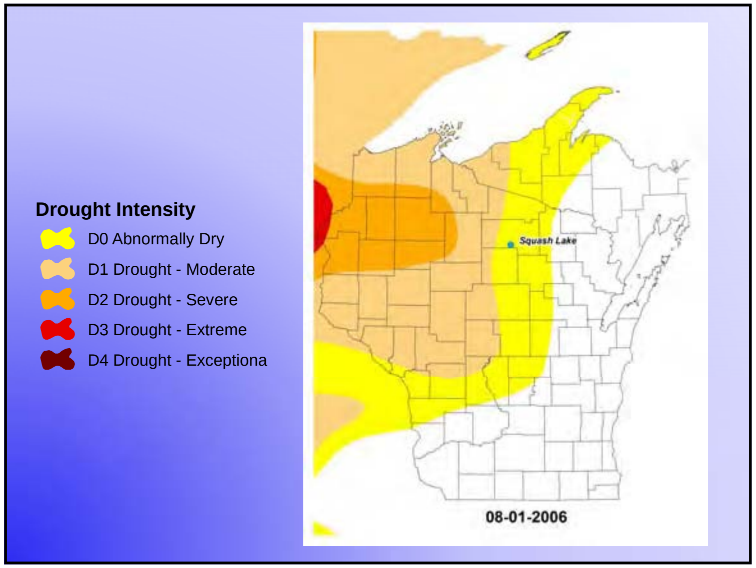

Drought Intensity
D0 Abnormally Dry
D1 Drought - Moderate
D2 Drought - Severe
D3 Drought - Extreme
D4 Drought - Exceptiona
Squash Lake
08-07-2001

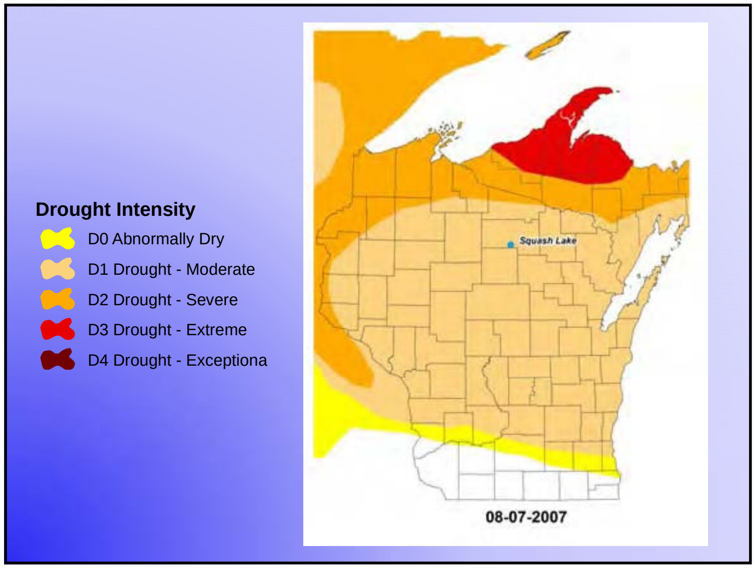

Drought Intensity
D0 Abnormally Dry
D1 Drought - Moderate
D2 Drought - Severe
D3 Drought - Extreme
D4 Drought - Exceptiona
Squash Lake
08-06-2002

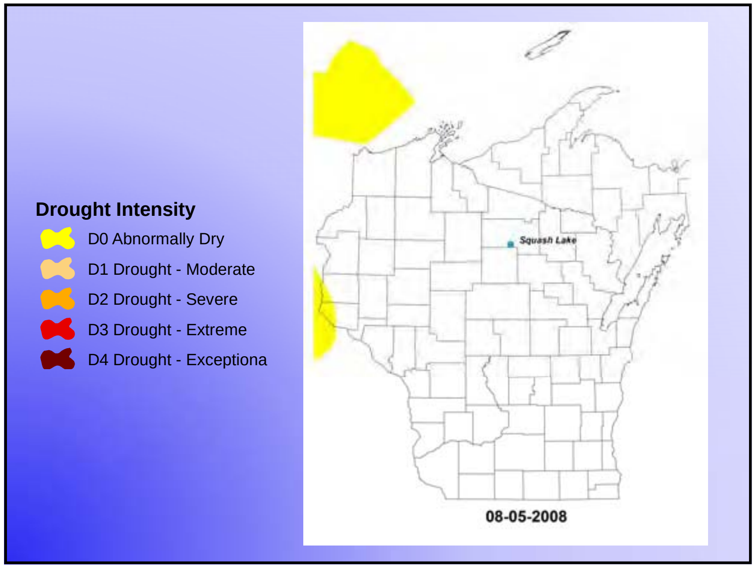

Drought Intensity
D0 Abnormally Dry
D1 Drought - Moderate
D2 Drought - Severe
D3 Drought - Extreme
D4 Drought - Exceptiona
Squash Lake
08-05-2003

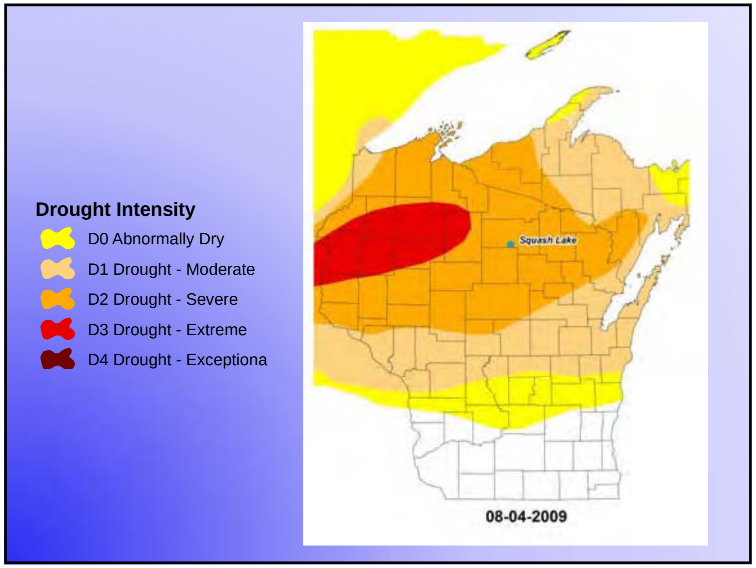

Drought Intensity
D0 Abnormally Dry
D1 Drought - Moderate
D2 Drought - Severe
D3 Drought - Extreme
D4 Drought - Exceptiona
Squash Lake
08-03-2004

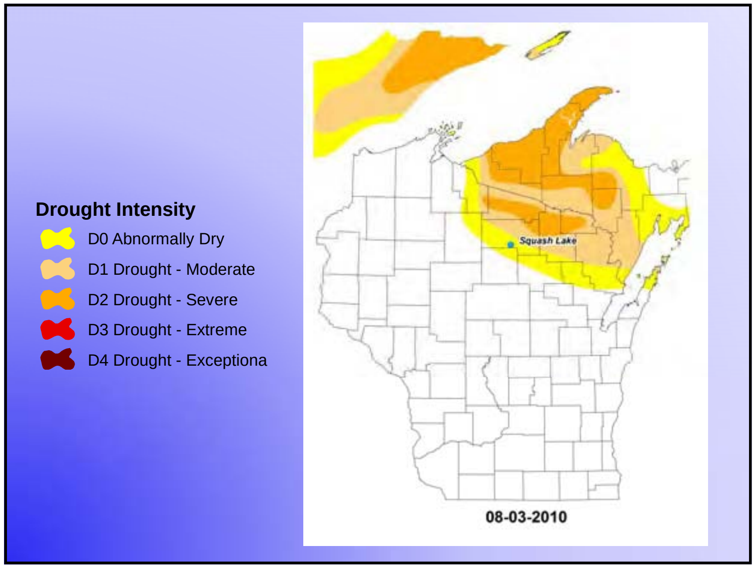

Drought Intensity
D0 Abnormally Dry
D1 Drought - Moderate
D2 Drought - Severe
D3 Drought - Extreme
D4 Drought - Exceptiona
Squash Lake
08-02-2005

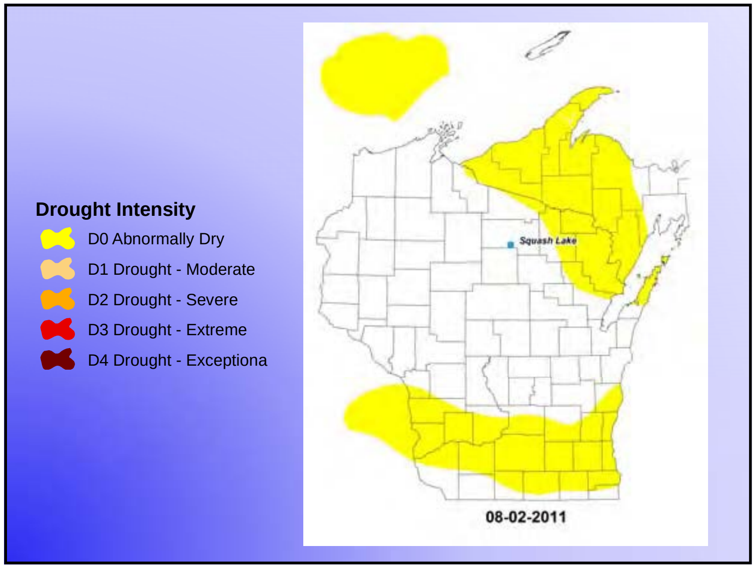

Drought Intensity
D0 Abnormally Dry
D1 Drought - Moderate
D2 Drought - Severe
D3 Drought - Extreme
D4 Drought - Exceptiona
Squash Lake
08-01-2006

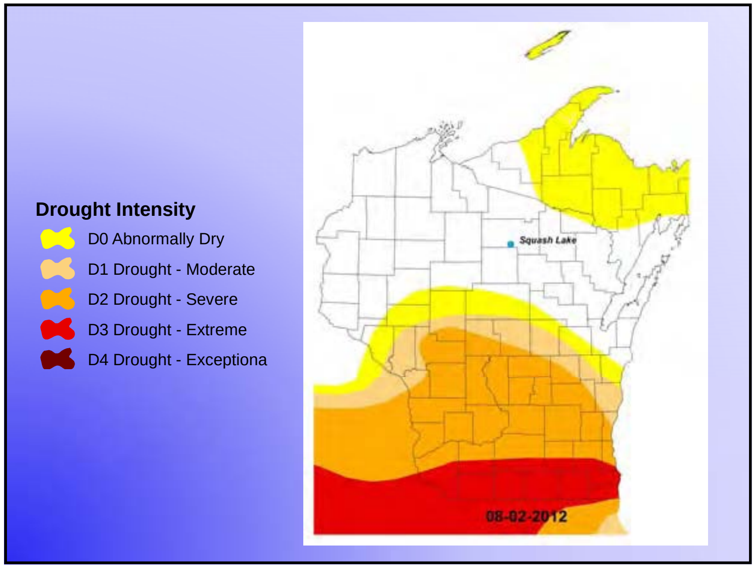

Drought Intensity
D0 Abnormally Dry
D1 Drought - Moderate
D2 Drought - Severe
D3 Drought - Extreme
D4 Drought - Exceptiona
Squash Lake
08-07-2007

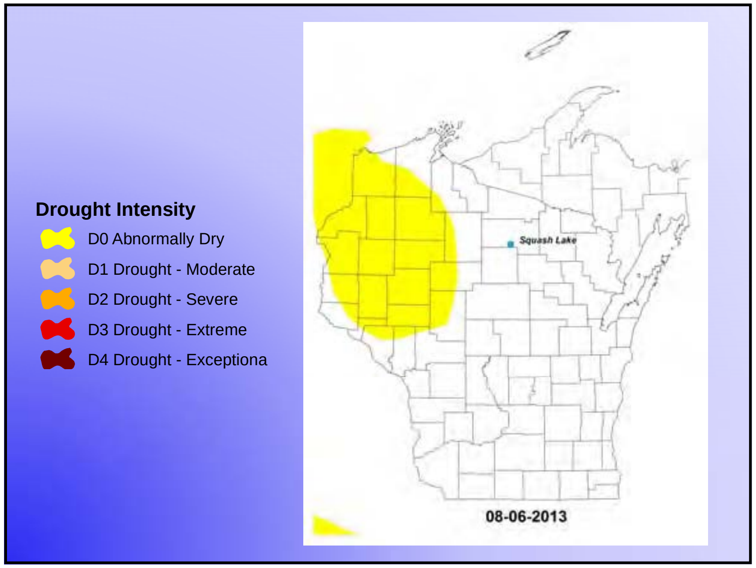

Drought Intensity
D0 Abnormally Dry
D1 Drought - Moderate
D2 Drought - Severe
D3 Drought - Extreme
D4 Drought - Exceptiona
Squash Lake
08-05-2008


Drought Intensity
D0 Abnormally Dry
D1 Drought - Moderate
D2 Drought - Severe
D3 Drought - Extreme
D4 Drought - Exceptiona
Squash Lake
08-04-2009


Drought Intensity
D0 Abnormally Dry
D1 Drought - Moderate
D2 Drought - Severe
D3 Drought - Extreme
D4 Drought - Exceptiona
Squash Lake
08-03-2010


Drought Intensity
D0 Abnormally Dry
D1 Drought - Moderate
D2 Drought - Severe
D3 Drought - Extreme
D4 Drought - Exceptiona
Squash Lake
08-02-2011


Drought Intensity
D0 Abnormally Dry
D1 Drought - Moderate
D2 Drought - Severe
D3 Drought - Extreme
D4 Drought - Exceptiona
Squash Lake
08-02-2012


Drought Intensity
D0 Abnormally Dry
D1 Drought - Moderate
D2 Drought - Severe
D3 Drought - Extreme
D4 Drought - Exceptiona
Squash Lake
08-06-2013

Squash Lake Water Levels

- Abnormally dry conditions 3 of last 10 years.
- Drought conditions 3 of the last 10 years.

Drought Intensity

D0 Abnormally Dry	2004, 2006, 2010
D1 Drought - Moderate	2005, 2007
D2 Drought - Severe	2009
D3 Drought - Extreme	
D4 Drought - Exceptional	

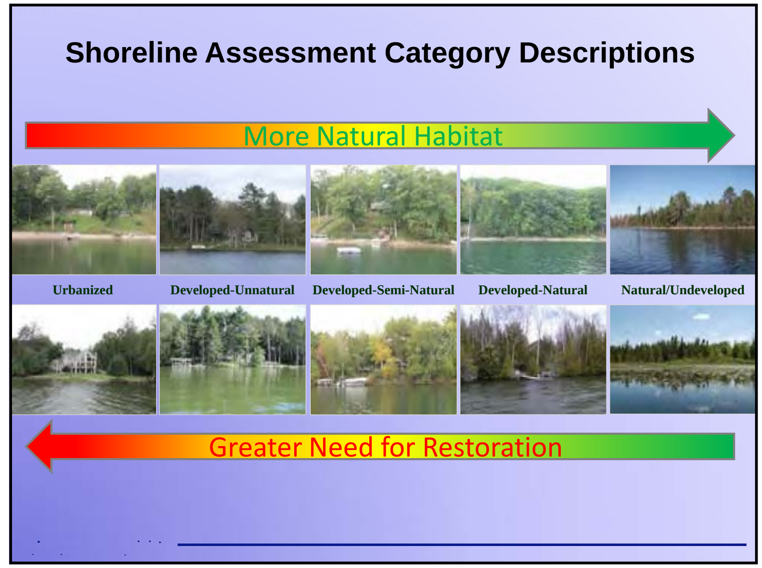
Squash Lake Water Levels

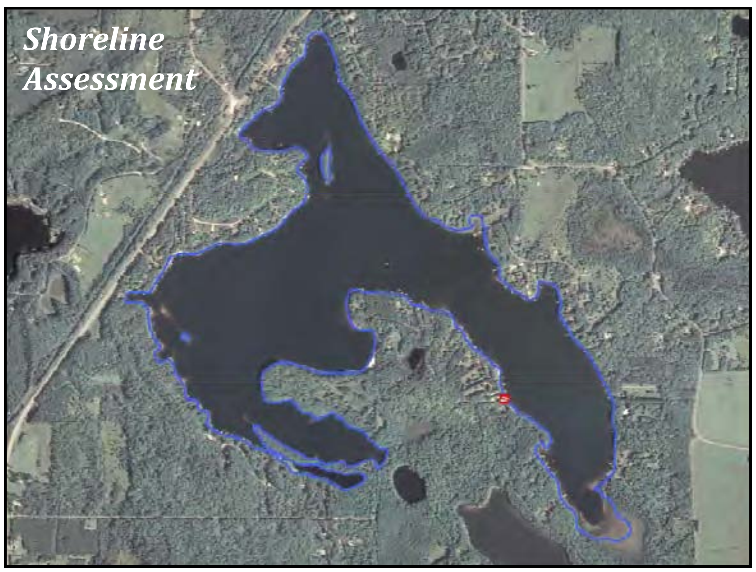
- Stakeholder survey: some believe receding water levels due in part to personal lawn irrigation (sprinkler pumps).
- Example:
  - How long would three 720 gph pumps need to run to reduce Squash Lake's water level by:
  - 1 inch?
    - 720 gph x 3 pumps = 2,160 gph
    - Squash Lake = 398 acres; 1 acre foot = 325,851 gallons; 398 acre-feet = 129,688,869 gallons
    - 129,688,869 gallons/12 = 10,807,405 gallons in 398 acre-inches
    - 10,807,405 gallons/2,160 gph = 5,003 hours = 208 days = 6.8 months **= 0.6 years**
  - 1 foot?
    - 60,041 hours = 2,501 days = 82 months = **6.8 years**
- Conclusion: personal irrigation not likely impacting Squash Lake's water levels.

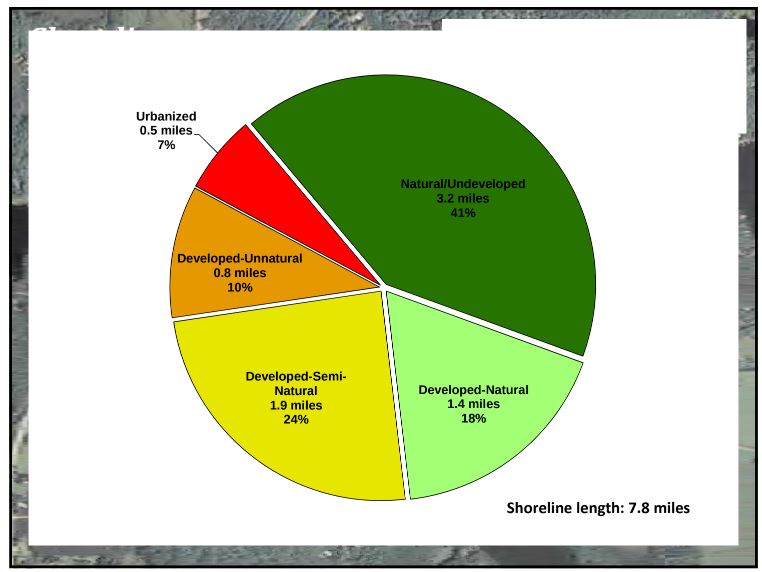
Squash Lake Water Levels

- High Capacity Wells
  - One for agricultural irrigation located near Squash Lake (T36N R08E S20)
  - Studies in central WI indicate areas with large densities of HCW experienced record low water levels compared to areas with low density HCW
  - Not enough discharge information from HCW near Squash Lake
  - Many seepage lakes in northern WI are currently experiencing lower water levels
  - HCW not likely have significant impact on Squash Lake's water levels


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

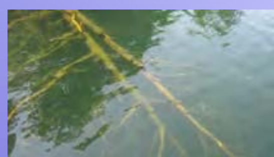

Shoreline Assessment Category Descriptions
More Natural Habitat
Urbanized
Developed-Unnatural
Developed-Semi-Natural
Developed-Natural
Natural/Undeveloped
Greater Need for Restoration

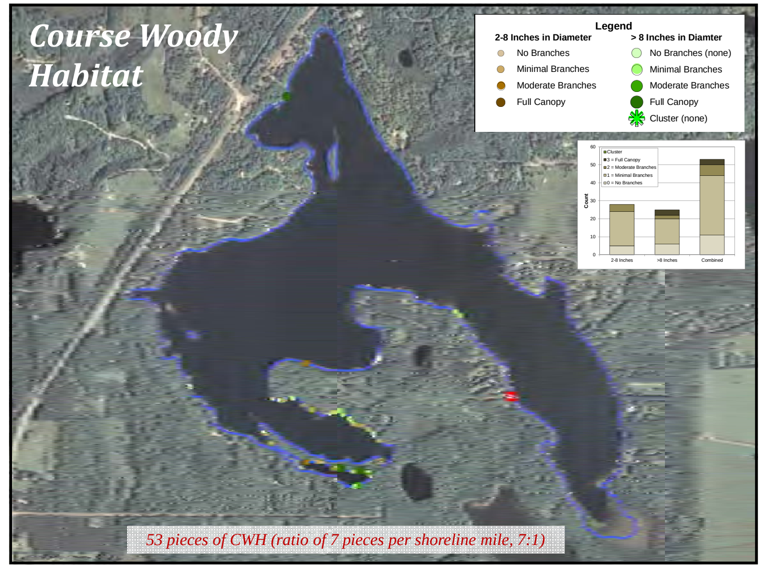

Shoreline Assessment

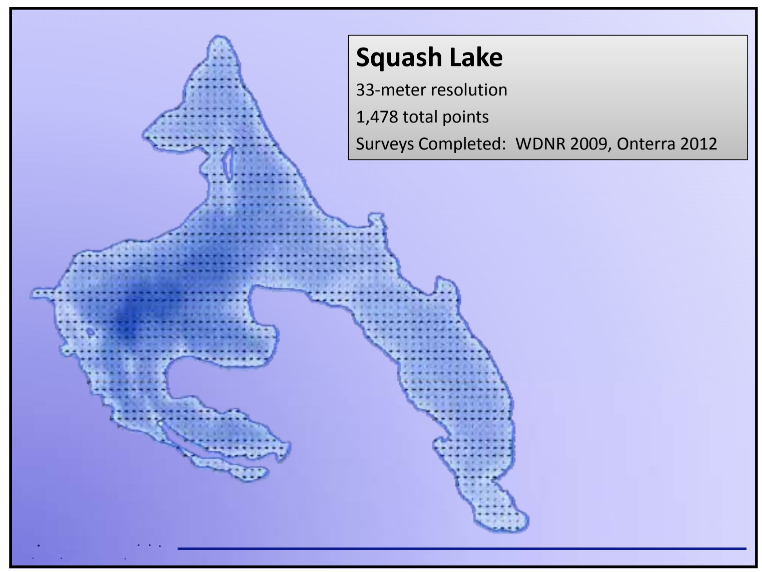

Urbanized 0.5 miles 7%
Natural/Undeveloped 3.2 miles 41%
Developed-Unnatural 0.8 miles 10%
Developed-Semi-Natural 1.9 miles 24%
Developed-Natural 1.4 miles 18%
Shoreline length: 7.8 miles

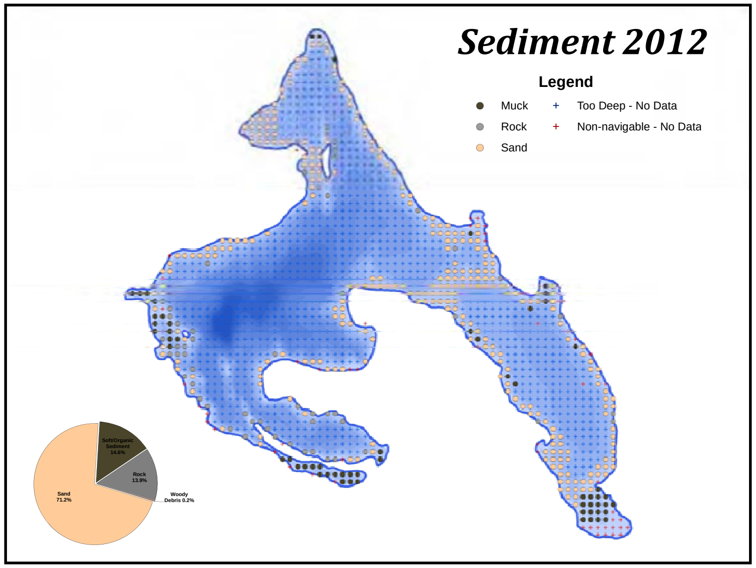
Coarse Woody Habitat

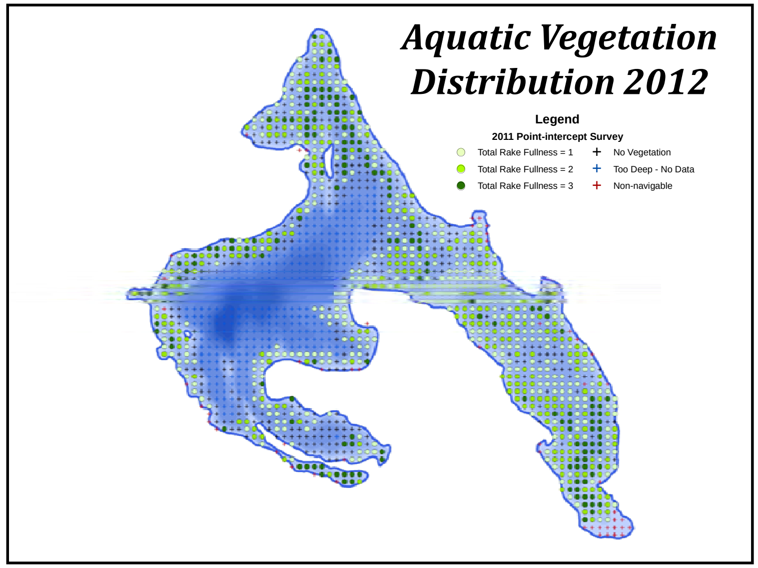
- Provides shoreland erosion control and prevents suspension of sediments.
- Preferred habitat for a variety of aquatic life.
  - Periphyton growth fed upon by insects.
  - Refuge, foraging and spawning habitat for fish.
  - Complexity of CWH important.
- Changing of logging and shoreland development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











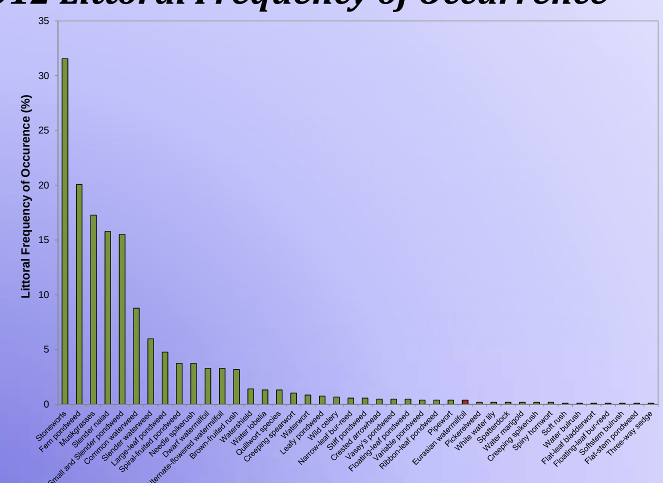
Species List

- 54 Native Species
- 1 non-native Species
  - Eurasian watermilfoil
- 1 native species listed as 'special concern'
  - Vasey's pondweed

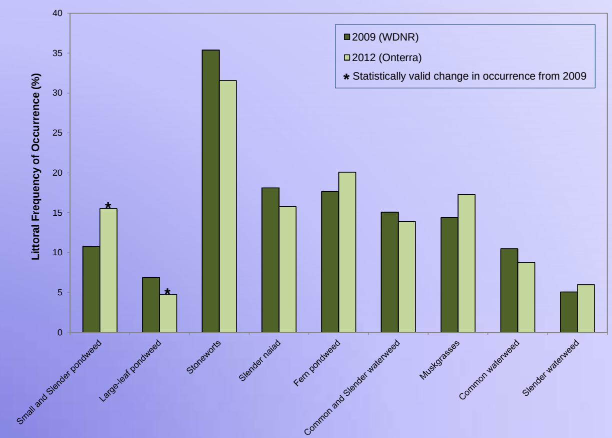
Growth Form	Scientifc Name	Common Name	Coefficient of Conservatism (C)	2009 (WDNR)	2012 (Onterra)
Emergent	*Carex gynandra*	Nodding sedge	6		I
	Carex hystericina	Porcupine sedge	3		I
	Drosera intermedia	Narrow-leaved sundew	8		I
	Dulichium arundinaceum	Three-way sedge	9		X
	Eleocharis palustris	Creeping spikerush	6		X
	Equisetum fluviatile	Water horsetail	7		I
	Iris versicolor	Northern blue flag	5		I
	Juncus effusus	Soft rush	4		X
	Pontederia cordata	Pickerelweed	9		X
	Schoenoplectus acutus	Hardstem bulrush	5		I
	Schoenoplectus pungens	Three-square rush	5		I
	Schoenoplectus tabernaemontani	Softstem bulrush	4		X
	Scirpus cyperinus	Wool grass	4		I
	Typha spp.	Cattail spp.	1		I
FL	*Brasenia schreberi*	Watershield	7	X	X
	Nuphar variegata	Spatterdock	6		X
	Nymphaea odorata	White water lily	6		X
FL/E	*Sparganium americanum*	Eastern bur-reed	8		I
	Sparganium angustifolium	Narrow-leaf bur-reed	9	X	X
	Sparganium fluctuans	Floating-leaf bur-reed	10		X
	Sparganium sp.	Bur-reed species	N/A	X	
Submergent	*Bidens beckii*	Water marigold	8		X
	Ceratophyllum echinatum	Spiny hornwort	10		X
	Chara spp.	Muskgrasses	7	X	X
	Elatine minima	Waterwort	9	X	X
	Elodea canadensis	Common waterweed	3	X	X
	Elodea nuttallii	Slender waterweed	7	X	X
	Eriocaulon aquaticum	Pipewort	9	X	X
	Isoetes spp.	Quillwort species	8	X	X
	Lobelia dortmanna	Water lobelia	10	X	X
	Myriophyllum alterniflorum	Alternate-flowered watermilfoil	10	X	X
	Myriophyllum spicatum	Eurasian watermilfoil	Exotic	I	X
	Myriophyllum tenellum	Dwarf watermilfoil	10	X	X
	Najas flexilis	Slender naiad	6	X	X
	Nitella spp.	Stoneworts	7	X	X
	Potamogeton amplifolius	Large-leaf pondweed	7	X	X
	Potamogeton berchtoldii	Slender pondweed	7		X
	Potamogeton epihydrus	Ribbon-leaf pondweed	8	X	X
	Potamogeton foliosus	Leafy pondweed	6	X	X
	Potamogeton gramineus	Variable pondweed	7	X	X
	Potamogeton natans	Floating-leaf pondweed	5	X	X
	Potamogeton pusillus	Small pondweed	7	X	X
	Potamogeton robbinsii	Fern pondweed	8	X	X
	Potamogeton spirillus	Spiral-fruited pondweed	8	X	X
	Potamogeton strictifolius	Stiff pondweed	8		X
	*Potamogeton vaseyi**	Vasey's pondweed	10	X	X
	Potamogeton zosteriformis	Flat-stem pondweed	6		X
	Ranunculus flammula	Creeping spearwort	9	X	X
	Utricularia cornuta	Horned bladderwort	10		I
	Utricularia intermedia	Flat-leaf bladderwort	9	X	X
	Utricularia vulgaris	Common bladderwort	7	X	
	Vallisneria americana	Wild celery	6	X	X
S/E	*Eleocharis acicularis*	Needle spikerush	5	X	X
	Juncus pelocarpus	Brown-fruited rush	8	X	X
	Sagittaria cristata	Crested arrowhead	9	X	X
	Sagittaria graminea	Grass-leaved arrowhead	9		I
	Schoenoplectus subterminalis	Water bulrush	9		X

FL = Floating Leaf; FL/E = Floating-leaf/Emergent; S/E = Submergent/Emergent
X = Located on rake during point-intercept survey; I = Incidental species
** = Species listed as 'special concern' in Wisconsin*

2012 Littoral Frequency of Occurrence

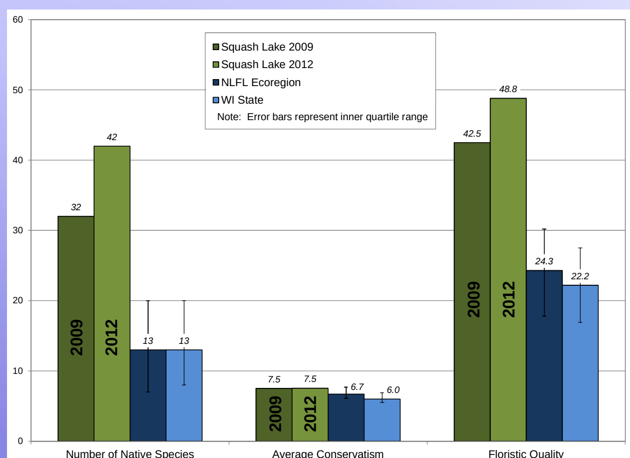


2009- 2012 Littoral Frequency of Occurrence

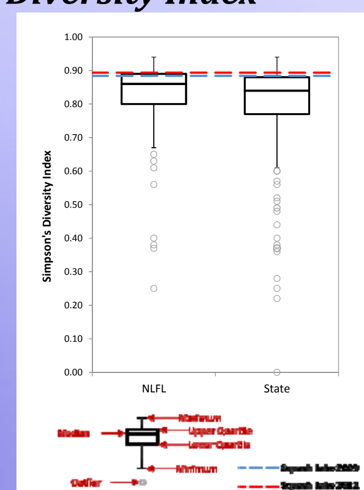


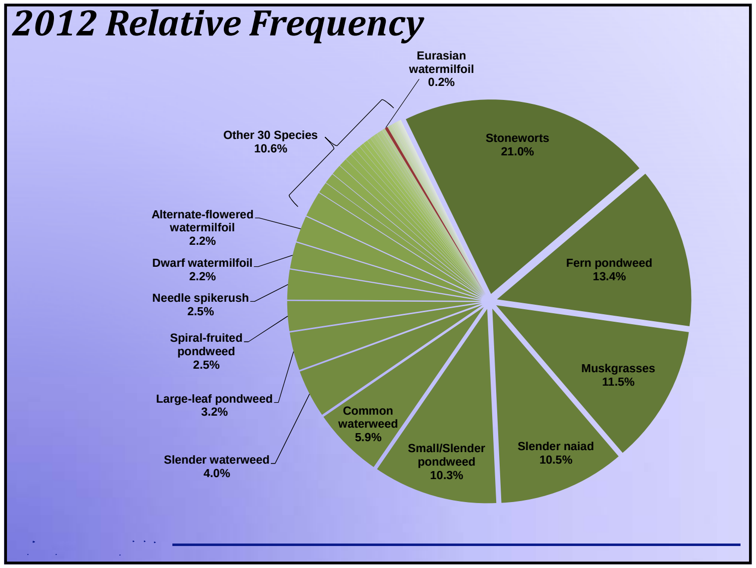
Wisconsin Ecoregions

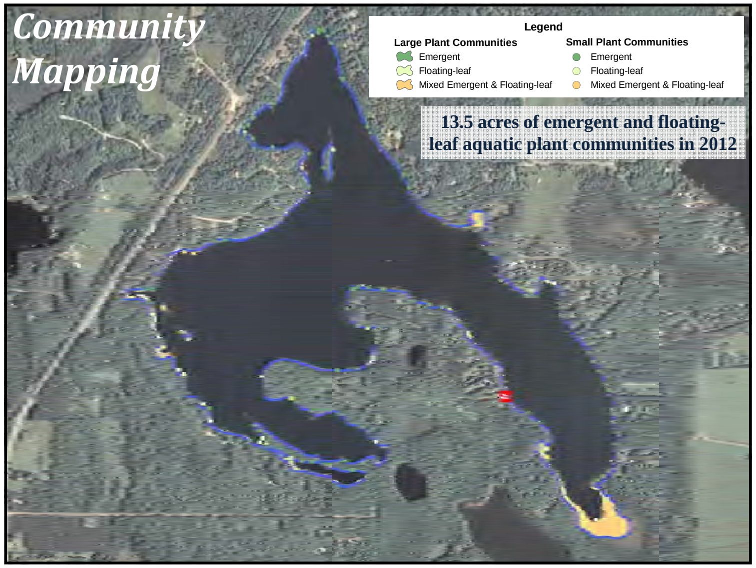
Floristic Quality Analysis

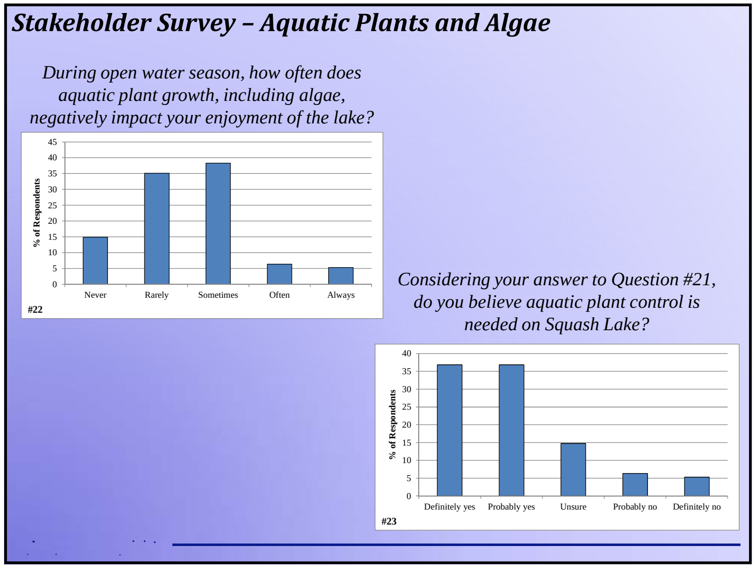


Simpson's Diversity Index



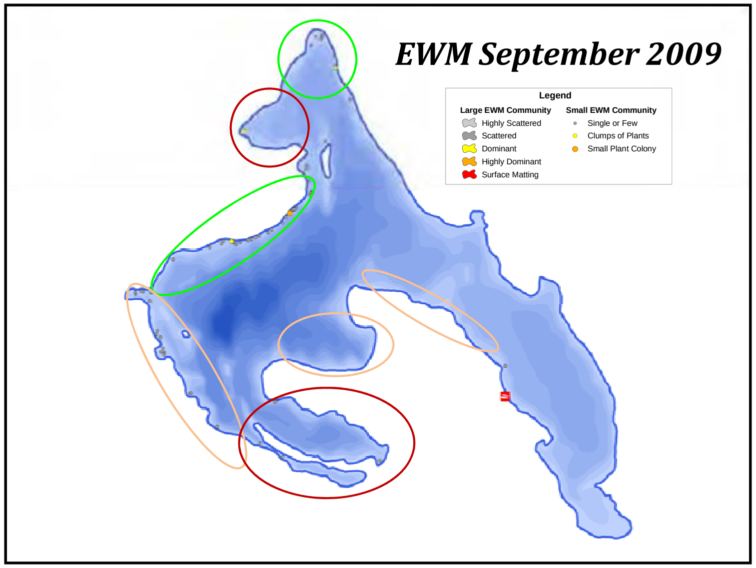


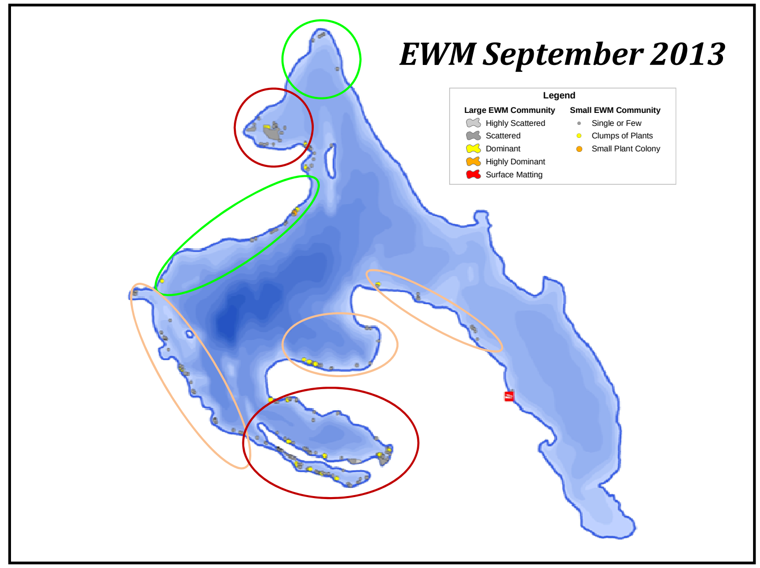




Eurasian water milfoil

- First discovered in 2009
- September 2009 survey revealed small, low-density population
- WDNR 2009 PI survey did not detect EWM on the rake (LFOO = 0.0%)
- SLA annual hand-harvesting began in 2010
- EWM declines and increases in certain areas from 2009-2013
- Overall, EWM still at very low abundance in the lake (2012 LFOO = 0.4%)



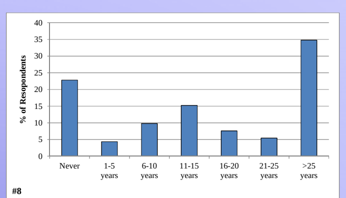


Eurasian water milfoil

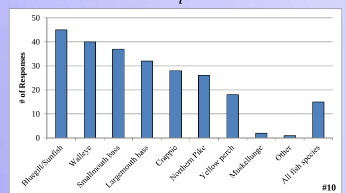
- Where do we go from here?
- 2014 marks 5 years since EWM discovery; need to transition to Established Population Control Program
- To be eligible for WDNR EPC Grant, need to have EWM management action within management plan
  - Outline defined success criteria; was EWM reduced? How long?
  - Currently no model for hand-removal
  - What defines success? Reduction in density? Maintaining same density?
  - Success Criteria Examples:
    - Do not want to see point-based mapping expand to polygon (colony)-based mapping
    - Want to see reduction of colonized areas of at least one density rating
  - Define a trigger for hand-removal
  - Coordinate priority areas for hand-removal
  - Possible modifications to hand-removal methodology (DASH?)

Stakeholder Survey – Squash Lake Fishery

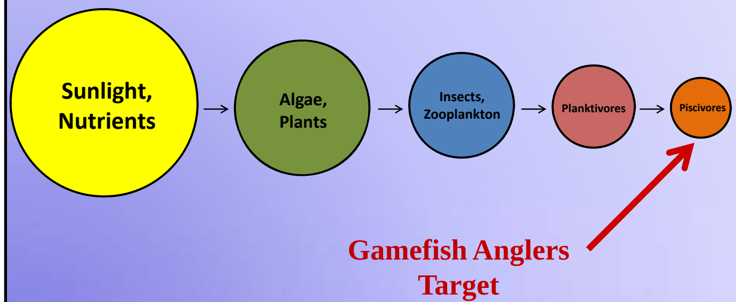
For how many years have you fished Squash Lake?



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



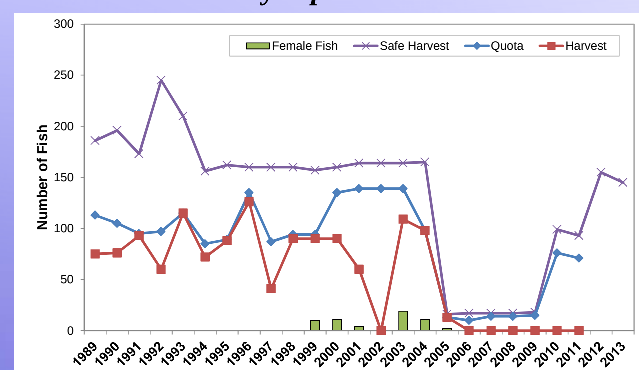
Squash Lake Fishery



Native American Spear Harvest

Squash Lake Fishery

Walleye Spear Harvest



Squash Lake Fishery

2009 Survey

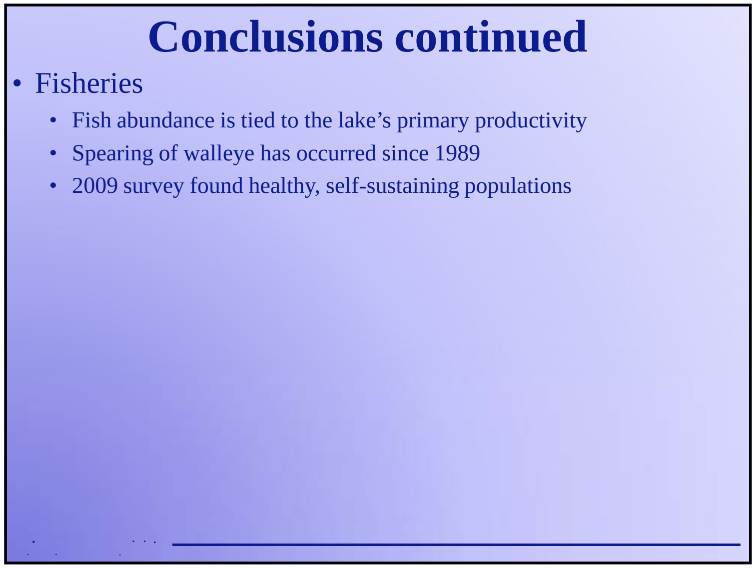
- Walleye and largemouth bass were the dominant gamefish (2.0 adults/acre)
- Moderate numbers of smallmouth bass and northern pike
- Overall, gamefish in very good condition
- Panfish population low, but exceptional bluegill size
- All species are self-sustaining

Conclusions

- Water quality for deep seepage lake is excellent.
  - Ample historic data – no apparent trends (1997 TP outlier)
  - Low phosphorus, low algal abundance, high water clarity
- Watershed is in excellent shape; majority (48%) of watershed is forested, 36% is comprised of the lake's surface.
  - Modeling predicted slightly more phosphorus than measured
  - Limited ability of modeling seepage lakes (little overland flow)
  - Majority of immediate shoreline areas remain in an undeveloped, natural state

Conclusions continued

- Aquatic plant community
  - Based upon standard analysis, native plant community is of exceptional quality.
    - High species richness (habitat types, alkalinity, depth gradient)
    - Sensitive species present (*P. vaseyi*)
    - High species diversity
  - EWM population remains low, but has increased in certain areas and is more widespread than in 2009
    - Realistic and beneficial for the lake
    - Inline with the SLA's lake management goals
    - Based upon the SLA's and other stakeholder's support for various methods
    - Prioritization based upon financial limitations and/or volunteerism
    - Obtain support from additional management entities


Conclusions continued
• Fisheries
• Fish abundance is tied to the lake's primary productivity
• Spearing of walleye has occurred since 1989
• 2009 survey found healthy, self-sustaining populations


Thank You
Many of the graphics used in this presentation were supplied by:
Wisconsin Lakes Partnership
Extension
WISCONSIN DEPT. OF NATURAL RESOURCES

Squash Lake Management Planning Project

November 2012 Update
Submitted by: Brenton Butterfield, Onterra, LLC

With the help of a Lake Management Planning Grant totaling over $24,000 through the Wisconsin Department of Natural Resources (WDNR), a project is underway to create a lake management plan for Squash Lake. The lake management plan will contain historical and current data from the lake as well as provide guidance for its management by integrating stakeholder perceptions and goals with what is ecologically beneficial for the lake.

As described further below, numerous field studies were carried out on Squash Lake during 2012. Because of the wealth of data that was collected just within the past few months, much of the data analysis has yet to be completed. This update intends to bring the Squash Lake Association, Inc. (SLA) up-to-speed on the scientific studies that have occurred, provide some initial observations on the ecology of Squash Lake, and provide a rough timeline for the remaining actions that will be taken as a part of this planning project.

In March of 2012, Onterra staff had their first glimpse of Squash Lake with a water quality sampling visit. The lake is sampled during the spring and fall to analyze water chemistry during the lake's mixing, or *turnover* events. When a lake turns over, many physical and chemical constituents (temperature, dissolved oxygen, nutrients, etc.) are evenly mixed within the water column. This gives ecologists an idea of what the nutrient balance is within the lake, and supports modeling of the lake's watershed. During the summer months, water quality samples were collected by SLA volunteers through the Citizen Lake Monitoring Network (CLMN). These results help ecologists understand how the physical and chemical constituents behave when the lake *stratifies*. Stratification is when a lake develops two separate layers of water – a warmer, upper layer and a cold, lower layer of water. Water samples targeting the larval stage of the invasive zebra mussel were also taken by Onterra staff and sent to the WDNR for analysis as part of efforts to monitor the lake for this invasive species. These results will be available this spring.

All aquatic plant surveys were conducted as scheduled, first by visiting the lake on June 6, 2012 to complete an early-season aquatic invasive species (AIS) survey. This survey's primary purpose is to search the lake for curly-leaf pondweed (CLP), and is scheduled early in the summer to coincide with this species' peak growth. This survey is also useful in finding incidences of Eurasian water milfoil (EWM) as it is further along in growth than most native plants in early summer. While not typically done at this time of year, areas of Eurasian water milfoil were mapped in detail to provide the SLA with locations to target their hand-harvesting efforts. The whole-lake point-intercept and community mapping surveys were conducted by Onterra ecologists on July 10 and 11, 2012. The point-intercept survey is a grid-based survey designed to assess the aquatic plant community of Squash Lake at a lake-wide level. The purpose of the aquatic plant community mapping survey is to map the floating-leaf and emergent species that grow within the lake and are typically under-represented in the point-intercept survey. And finally, a survey aimed at locating and mapping Eurasian water milfoil was conducted again on September 26, 2012.

During the 2012 surveys, Eurasian water milfoil was the only non-native aquatic plant species located in the lake. The point-intercept survey indicates that Squash Lake contains a very high number of native aquatic plant species, including one species that is listed as 'special concern' in Wisconsin due to its rarity and vulnerability to environmental degradation – Vasey's pondweed (*Potamogeton vaseyi*). Aquatic vegetation was found growing to a depth of 30 feet, a testament to Squash Lake's high water clarity; the average Secchi disk depth for the summer of 2012 was 19.4 feet. Stoneworts, fern pondweed, muskgrasses, slender naiad, and small pondweed, all native species, were the most frequently encountered aquatic plants in 2012, while EWM comprised a very small portion (0.2%) of the lake's plant community (Figure 1).

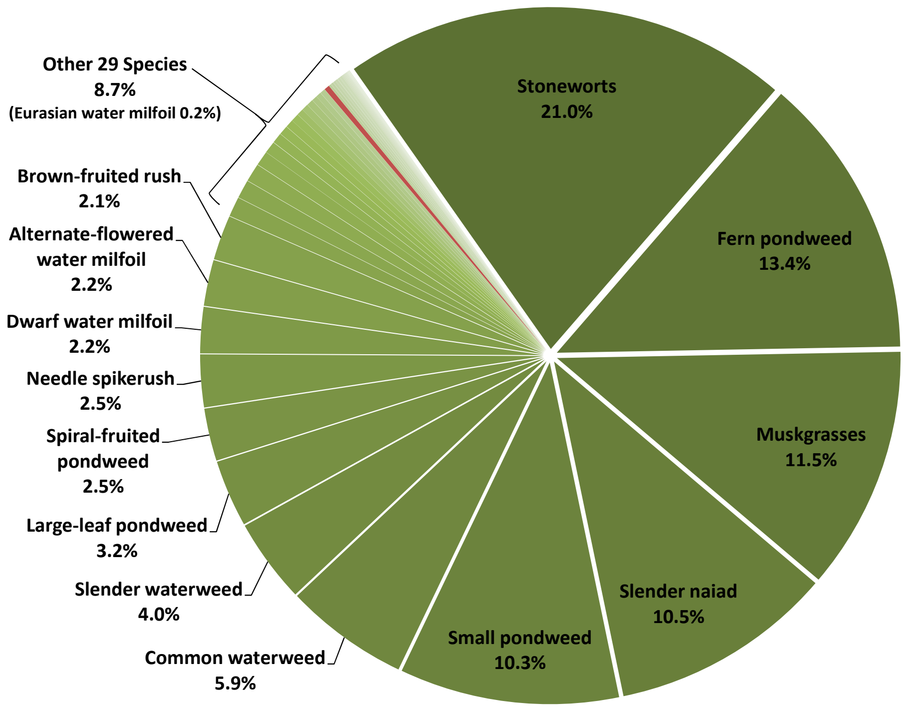


Figure 1. Squash Lake 2012 aquatic plant relative frequency of occurrence. Created using data from 2012 whole-lake point-intercept survey. Non-native species are indicated with red.

On September 26, 2012 a crew visited Squash Lake to conduct a shoreline assessment survey. During this survey, the lake's shoreline is examined and classified into one of five development categories based upon its level of human disturbance. The results of this survey may be used to prioritize areas for restoration if the SLA wishes to pursue this. Course woody habitat around the lake's shoreline was also documented and categorized during this survey.

In addition to collecting ecological data from Squash Lake, sociological data was collected from the people who use and care for the lake. This was approached in the form of a stakeholder survey, which was developed by Onterra staff and a planning committee comprised of SLA volunteers. This survey was distributed in September 2012 to all riparian property owners, both association members and non-members.

In the coming months, Onterra will be sorting through the immense amount of water quality, aquatic plant, shoreline assessment and stakeholder survey data that has been collected.

Additionally, we will be looking at the watershed surrounding the lake and using a modeling program to estimate the amount of nutrients the lake receives on an annual basis. We will also be working with the WDNR to collect data and report upon the management of the fishery.

In summary, all project components are on schedule. Following data analysis and report creation, the Squash Lake Planning Committee and Onterra staff will meet to discuss the project results and begin creation of management goals and actions the SLA will pursue to manage their lake in both a recreationally enjoyable and ecologically sound manner.

Eurasian Water Milfoil: Getting to the Root of the Problem

Stephanie Boismenue, Volunteer Aquatic Invasive Species Coordinator,
Squash Lake Association

Abstract

In 2009, the Aquatic Invasive Species (AIS) Eurasian water milfoil (EWM) was discovered in Squash Lake.

After consulting with Onterra and the WDNR, the Squash Lake Association (SLA) studied all eradication options and voted to hire a team of scuba divers to hand-harvest the EWM.

Since May 2010, the scuba divers have worked diligently at harvesting each plant by its root mass. Their efforts have been successful at significantly reducing the volume of EWM from the lake and it was done without a single chemical!

Objectives

Preserve Squash Lake's ecological integrity from the impact of EWM.

Hand-harvest each plant by its roots via contracted scuba divers and prevent it from spreading throughout the lake.

Monitoring of EWM is performed by Volunteer Milfoil Monitors

Surveying and **mapping,** each fall, is conducted by Onterra, LLC.

Provide SLA with updates of harvesting progress, monitoring activities, and AIS education and prevention measures.

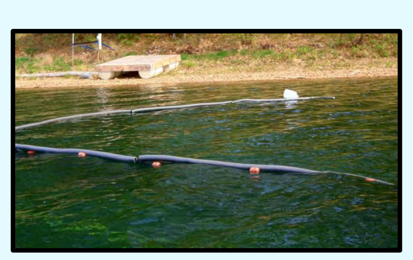
Hand-Harvesting Supplies

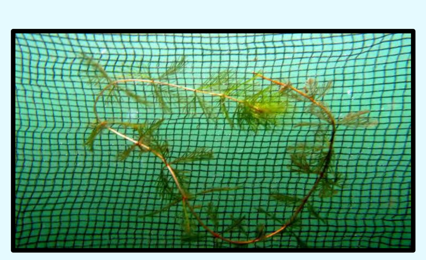
- Aqua-view scopes
- Harvesting boat - such as an old pontoon boat to use as a diving platform
- Harvesting bags - Nylon laundry bags with rigid wire threaded through the hem so the bags stays open under water.
- Fish scale to weigh harvested milfoil
- Frabill Folding Kayak Net with telescoping handle.
- 40′ x 4′ Fragment Barrier

Fragment Barrier

The Fragment Barrier is placed down-wind from the harvesting area to catch escaped EWM fragments.

SLA diver installing the Fragment Barrier





EWM caught on the net

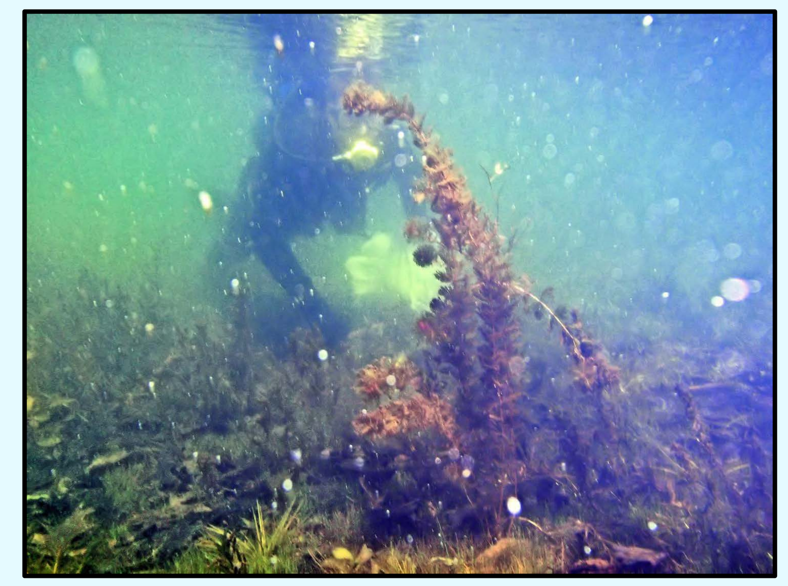
Harvesting Boat "The Milfoil Terminator"

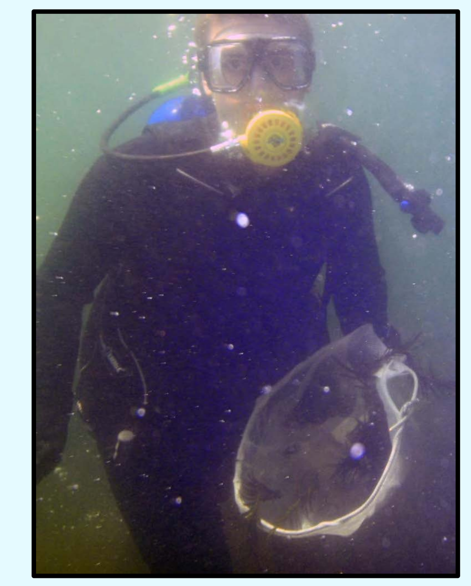
The Terminator transports the divers, diving gear, and harvesting supplies to the work areas; holds each days bags of harvested milfoil; and is an excellent boat to monitor EWM from.

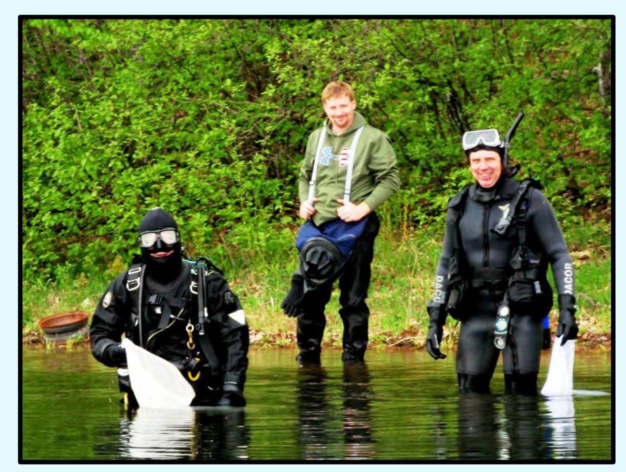
Hand-Harvesting Methods

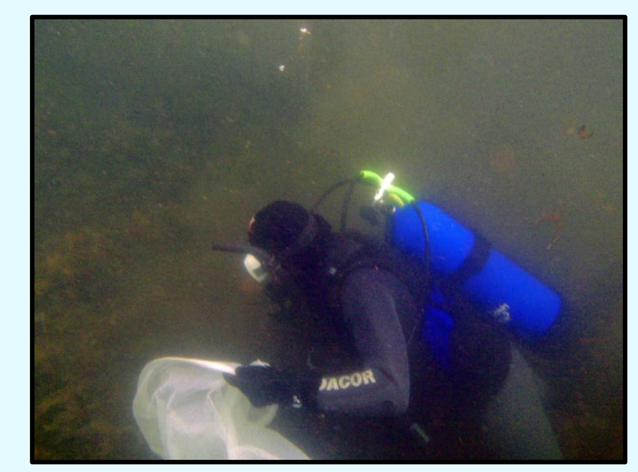
Scuba Divers – Getting to the Root of the Problem

The scuba divers harvest the entire EWM plant, including its root mass and stray roots, and place it in the harvesting bag. When the bag is full, they bring it to the harvesting boat and exchange it for an empty bag. At the end of the day, each bag is weighed and then transported to a compost pile located over 1000 feet away from the lake.









Scuba Diver Hours

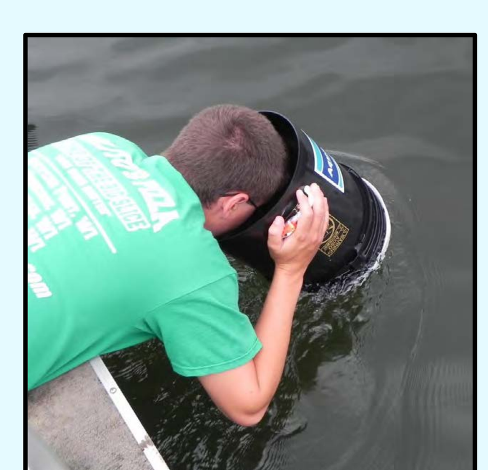
2010	=	716.50
2011	=	788.25
TOTAL	=	1,504.75 hours

Pounds of EWM Harvested From Squash Lake (drained lbs)

2010	=	808 lbs
2011	=	965 lbs
TOTAL	=	1,773 lbs

Volunteer Milfoil Monitors – Searching for EWM

- 13 Volunteer Milfoil Monitors provide lake wide EWM monitoring.
- Monitor their designated areas twice a month from ice-out to ice-in.
- Search the littoral zone for new EWM locations and reoccurrences in previously harvested areas.
- Remove EWM fragments and record and report their monitoring efforts and findings.
- Educate neighbors and recruit additional volunteers.
- Attend training and/or a yearly refresher course provided by the SLA.
- Monitoring hours to date = **291 hours**

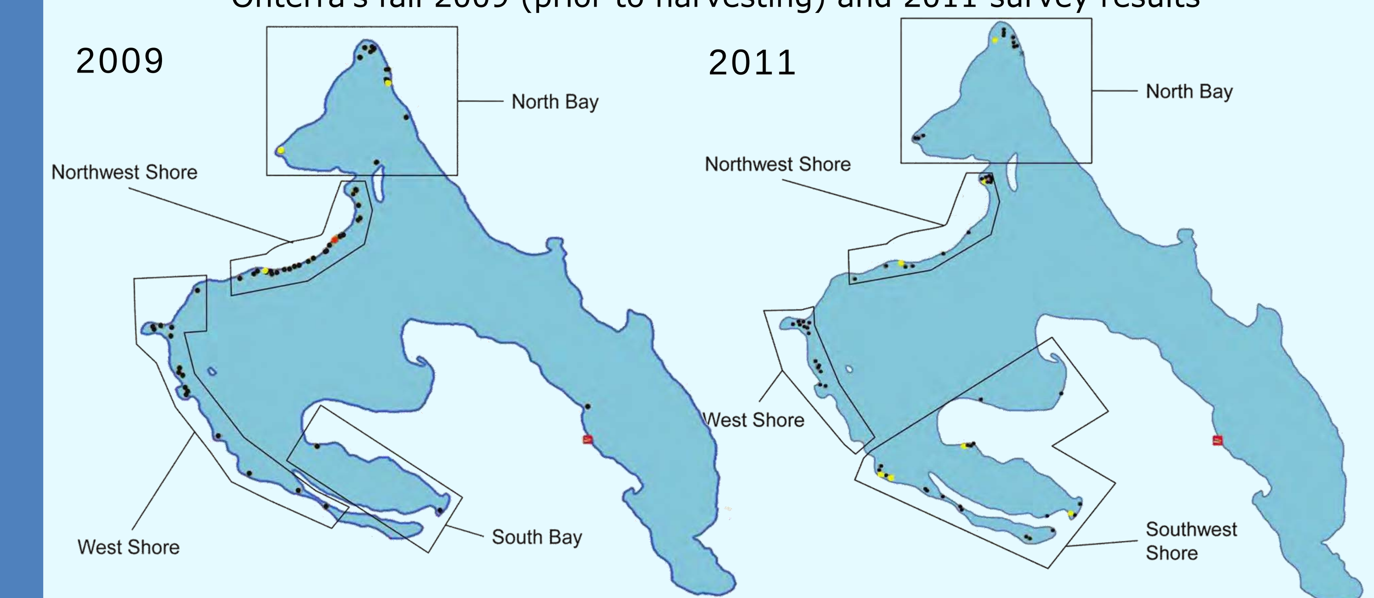


Squash Lake Association = **Volunteers Pulling Together to Remain at the Root of the Problem**

Results

- Hand-Harvesting has been successful at significantly reducing the volume of EWM.
- Zero use of the herbicide 2,4-D.
- Onterra's 2011 fall survey states "hand-removal efforts have been very successful at keeping the EWM population at low densities - compromised of single plants and clumps of plants".
- EWM is located in the north and west end of the lake rather than the typical location of being in the proximity of a boat landing.
- EWM was found growing in as little as a ¼ inch of water and as deep as 20 feet.

Onterra's fall 2009 (prior to harvesting) and 2011 survey results



Map Key: Black Dots = Single or Few Plant
Yellow Dots = Clumps of Plant
Orange Dots = Small Plant Colony

Conclusion

- Scuba diving is the ultimate way to selectively hand-harvest EWM, allowing the non-targeted native plant community to remain intact.
- Zero use of the chemical 2, 4-D.
- EWM starts growing early in the spring - before native plants emerge. Therefore, starting the harvesting process in early spring provides the ultimate species-selective technique and minimizes the impact to the native species within the vicinity of the work area.
- Volunteer Milfoil Monitors are the key ingredient to helping the divers locate EWM, which keeps divers EWM monitoring time to a minimum and focusing on harvesting – saving SLA money.

EWM rooted in 1 inch of water

Credits

Nick Boismenue, Squash Lake Association

Tim Hoyman of Onterra, LLC for maps, support, and printing

Kevin Gauthier Sr., Lakes Management Coordinator, WDNR

Photo Credits: Volunteer Milfoil Monitoring Training courtesy Sandra Wickman, WDNR. All other photos by Stephanie Boismenue

Squash Lake Association

Onterra LLC
Lake Management Planning

B

APPENDIX B

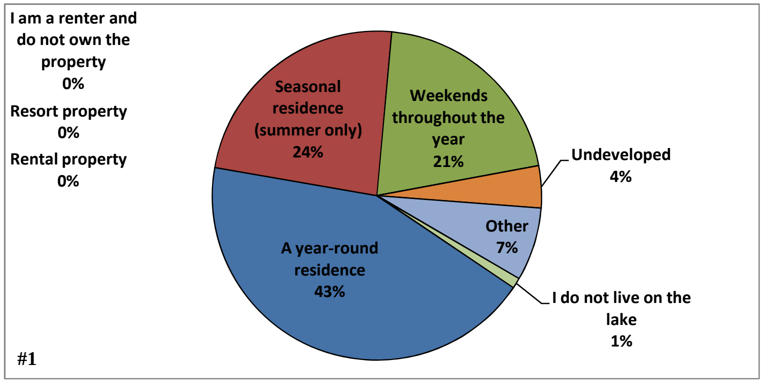
Stakeholder Survey Response Charts and Comments

Returned Surveys	96
Sent Surveys	159
Response Rate (%)	60.4

SQUASH LAKE PROPERTY

#1 How is your property on Squash Lake utilized?

	Total	%
A year-round residence	42	*43.3*
Seasonal residence (summer only)	23	*23.7*
Weekends throughout the year	20	*20.6*
Resort property	0	*0.0*
Rental property	0	*0.0*
Undeveloped	4	*4.1*
Other	7	*7.2*
I am a renter and do not own the property	0	*0.0*
I do not live on the lake	1	*1.0*
	97	100.0

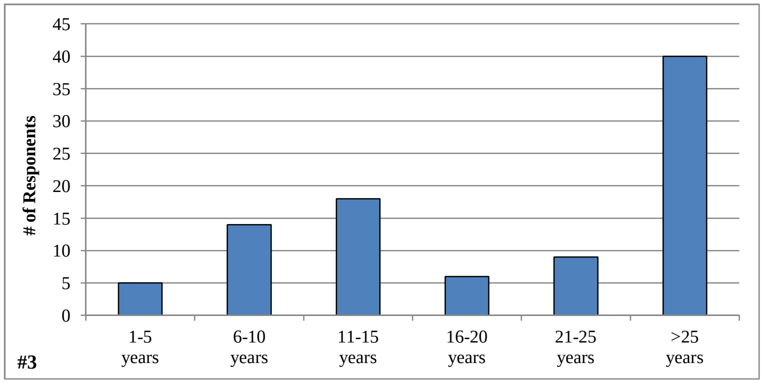


#2 How many days each year is your property used by you or others?

Answered Question	92
Average	204.0
Standard deviation	141.6

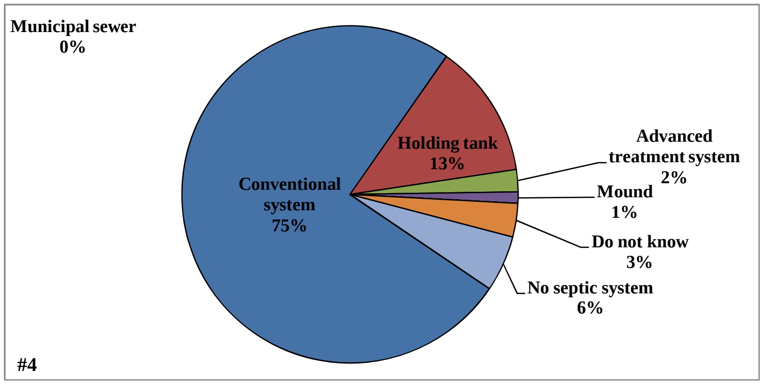
#3 How long have you owned or rented your property on Squash Lake?

	Total	%
1-5 years	5	*5.4*
6-10 years	14	*15.2*
11-15 years	18	*19.6*
16-20 years	6	*6.5*
21-25 years	9	*9.8*
>25 years	40	*43.5*
	92	*100.0*



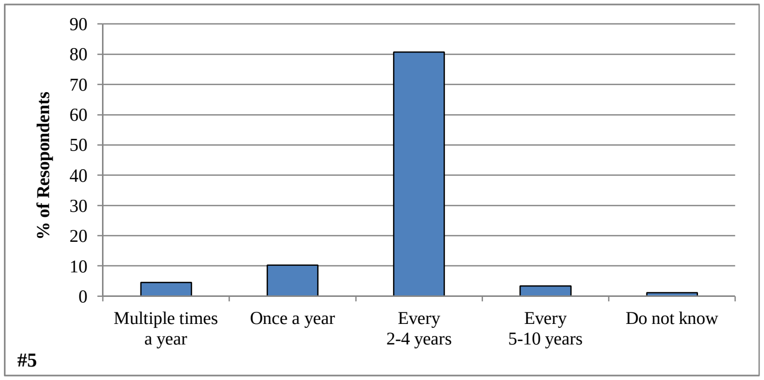
#4 What type of septic system does your property utilize?

	Total	%
Conventional system	70	*75.3*
Holding tank	12	*12.9*
Advanced treatment system	2	*2.2*
Mound	1	*1.1*
Municipal sewer	0	*0.0*
Do not know	3	*3.2*
No septic system	5	*5.4*
	93	*100.0*



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

	Total	%
Multiple times a year	4	*4.5*
Once a year	9	*10.2*
Every 2-4 years	71	*80.7*
Every 5-10 years	3	*3.4*
Do not know	1	*1.1*
	88	*100.0*



#6 Was your septic system installed before July 1, 1980?

	Total	%
Yes	12	*15.0*
No	68	*85.0*
Unsure	9	*11.3*
	80	*100.0*

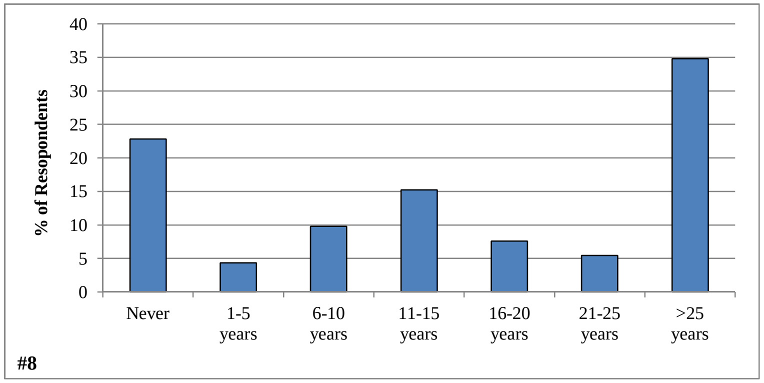
RECREATIONAL ACTIVITY ON SQUASH LAKE

#7 How many years ago did you first visit Squash Lake?

Answered Question	95
Average	31.3
Standard deviation	18.5

#8 For how many years have you fished Squash Lake?

	Total	%
Never	21	*22.8*
1-5 years	4	*4.3*
6-10 years	9	*9.8*
11-15 years	14	*15.2*
16-20 years	7	*7.6*
21-25 years	5	*5.4*
>25 years	32	*34.8*
	92	*100.0*

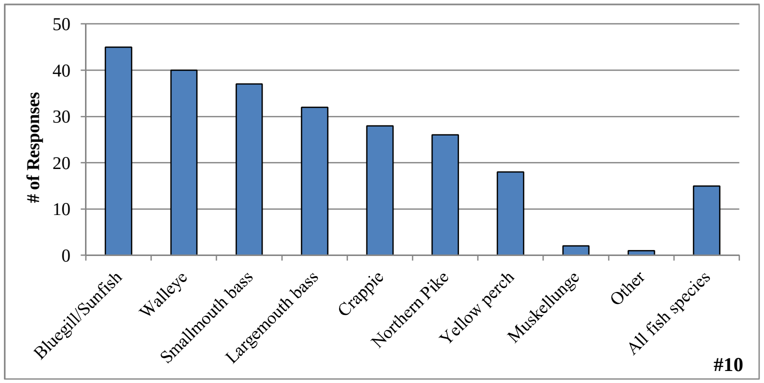


#9 Have you personally fished on Squash Lake in the past three years?

	Total	%
Yes	58	*74.4*
No	20	*25.6*
	78	*100.0*

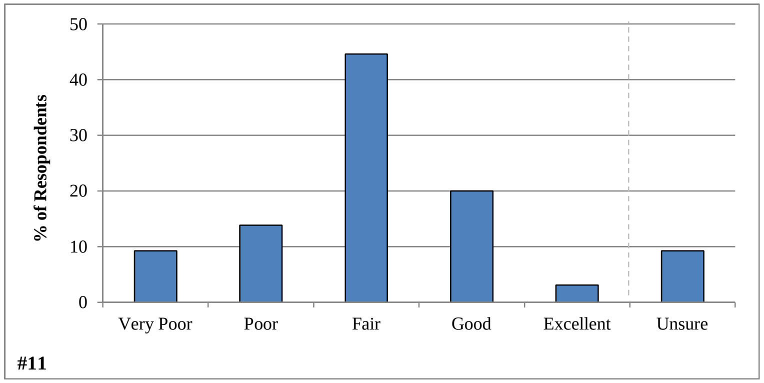
#10 What species of fish do you like to catch on Squash Lake?

	Total
Bluegill/Sunfish	45
Walleye	40
Smallmouth bass	37
Largemouth bass	32
Crappie	28
Northern Pike	26
Yellow perch	18
Muskellunge	2
Other	1
All fish species	15



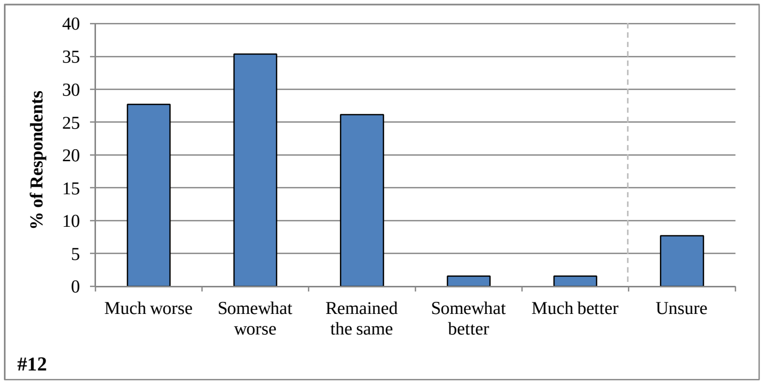
#11 How would you describe the current quality of fishing on Squash Lake?

	Total	%
Very Poor	6	*9.2*
Poor	9	*13.8*
Fair	29	*44.6*
Good	13	*20.0*
Excellent	2	*3.1*
Unsure	6	*9.2*
	65	*100.0*



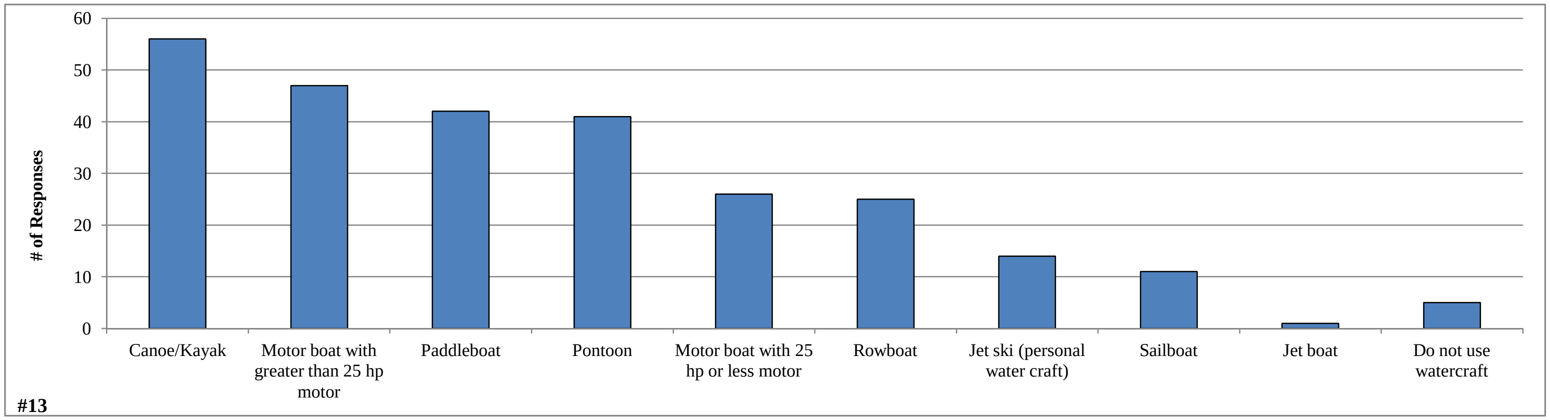
#12 How has the quality of fishing changed since you started fishing on the lake?

	Total	%
Much worse	18	*27.7*
Somewhat worse	23	*35.4*
Remained the Same	17	*26.2*
Somewhat better	1	*1.5*
Much better	1	*1.5*
Unsure	5	*7.7*
	65	*100.0*



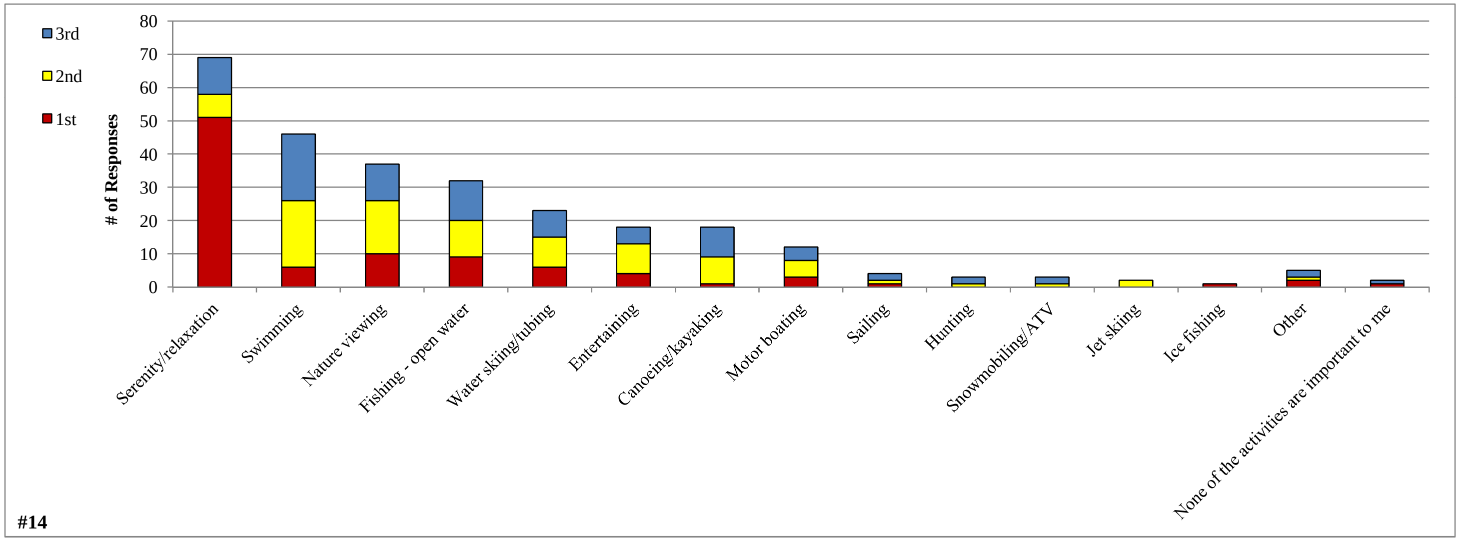
#13 What types of watercraft do you currently use on Squash Lake?

	Total
Canoe/Kayak	56
Motor boat with greater than 25 hp motor	47
Paddleboat	42
Pontoon	41
Motor boat with 25 hp or less motor	26
Rowboat	25
Jet ski (personal water craft)	14
Sailboat	11
Jet boat	1
Do not use watercraft	5



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

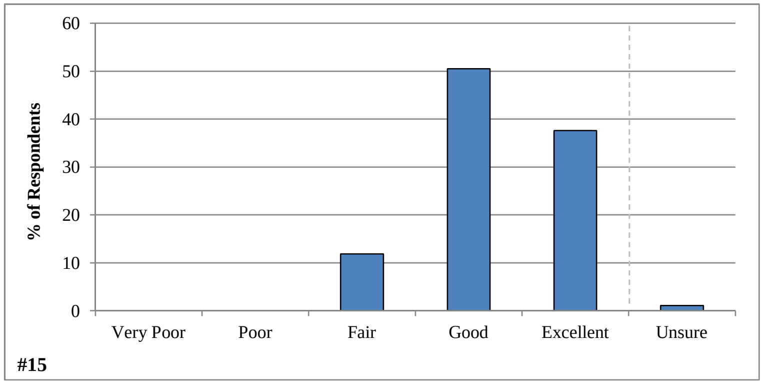
	1st	2nd	3rd	*% ranked*
Serenity/relaxation	51	7	11	*25.1*
Swimming	6	20	20	*16.7*
Nature viewing	10	16	11	*13.5*
Fishing - open water	9	11	12	*11.6*
Water skiing/tubing	6	9	8	*8.4*
Entertaining	4	9	5	*6.5*
Canoeing/kayaking	1	8	9	*6.5*
Motor boating	3	5	4	*4.4*
Sailing	1	1	2	*1.5*
Hunting	0	1	2	*1.1*
Snowmobiling/ATV	0	1	2	*1.1*
Jet skiing	0	2	0	*0.7*
Ice fishing	1	0	0	*0.4*
Other	2	1	2	*1.8*
None of the activities are important to me	1	0	1	*0.7*
	95	91	89	*100.0*



SQUASH LAKE CURRENT AND HISTORIC CONDITION, HEALTH AND MANAGEMENT

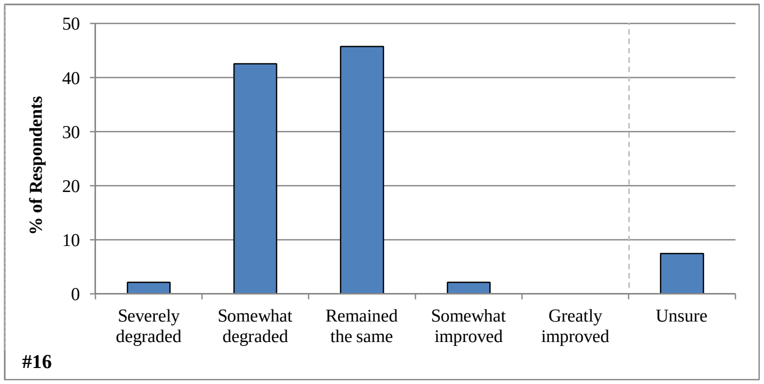
#15 How would you describe the current water quality of Squash Lake?

	Total	%
Very Poor	0	*0.0*
Poor	0	*0.0*
Fair	11	*11.8*
Good	47	*50.5*
Excellent	35	*37.6*
Unsure	1	*1.1*
	93	*100.0*



#16 How has the water quality changed in Squash Lake since you first visited the lake?

	Total	%
Severely degraded	2	*2.1*
Somewhat degraded	40	*42.6*
Remained the same	43	*45.7*
Somewhat improved	2	*2.1*
Greatly improved	0	*0.0*
Unsure	7	*7.4*
	94	*100.0*



#17 Have you ever heard of aquatic invasive species?

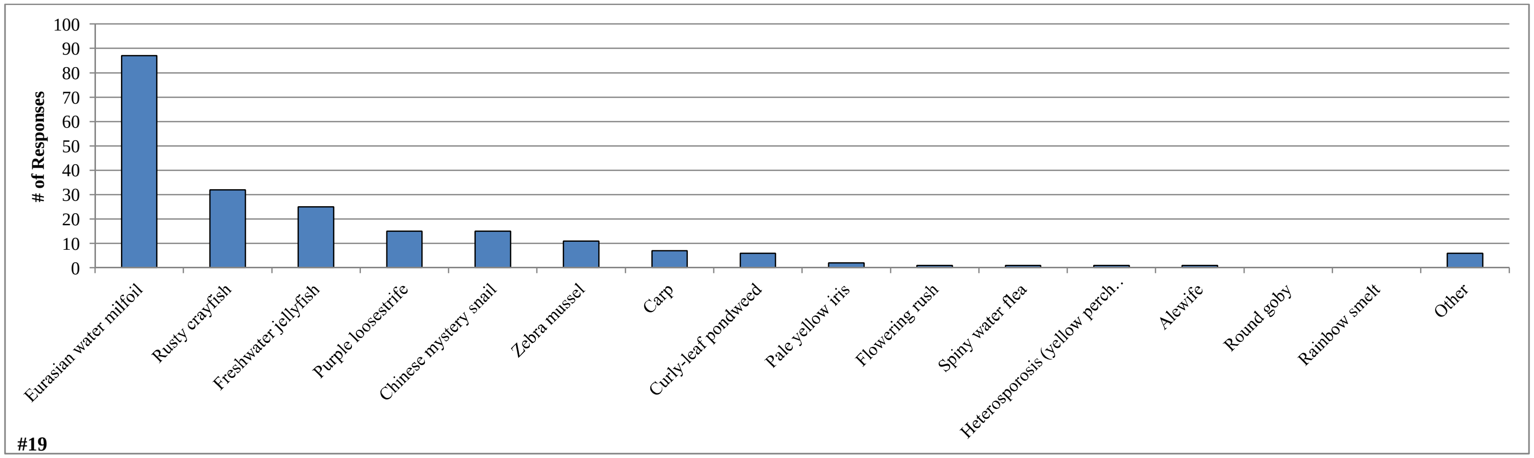
	Total	**%**
Yes	91	*95.8*
No	4	*4.2*
	95	*100.0*

#18 Are you aware of aquatic invasive species in the lake?

	Total	**%**
Yes	90	*96.8*
No	3	*3.2*
	93	*100.0*

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

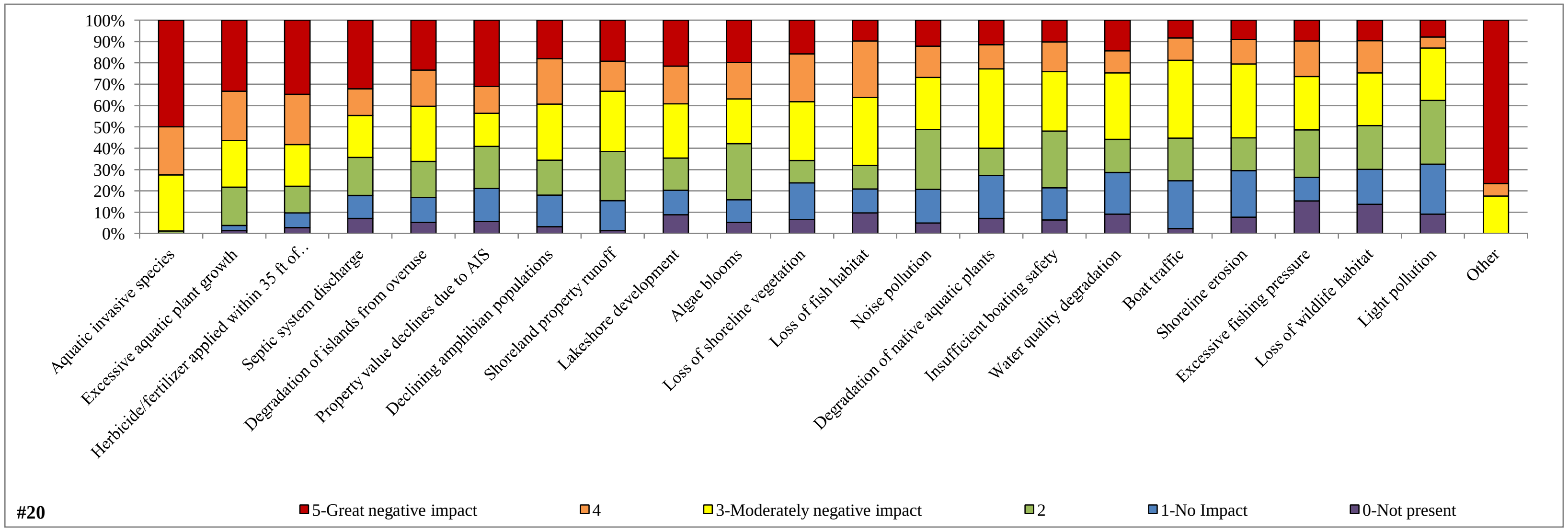
	Total
Eurasian water milfoil	87
Rusty crayfish	32
Freshwater jellyfish	25
Purple loosestrife	15
Chinese mystery snail	15
Zebra mussel	11
Carp	7
Curly-leaf pondweed	6
Pale yellow iris	2
Flowering rush	1
Spiny water flea	1
Heterosporosis (yellow perch parasite)	1
Alewife	1
Round goby	0
Rainbow smelt	0
Other	6



#19

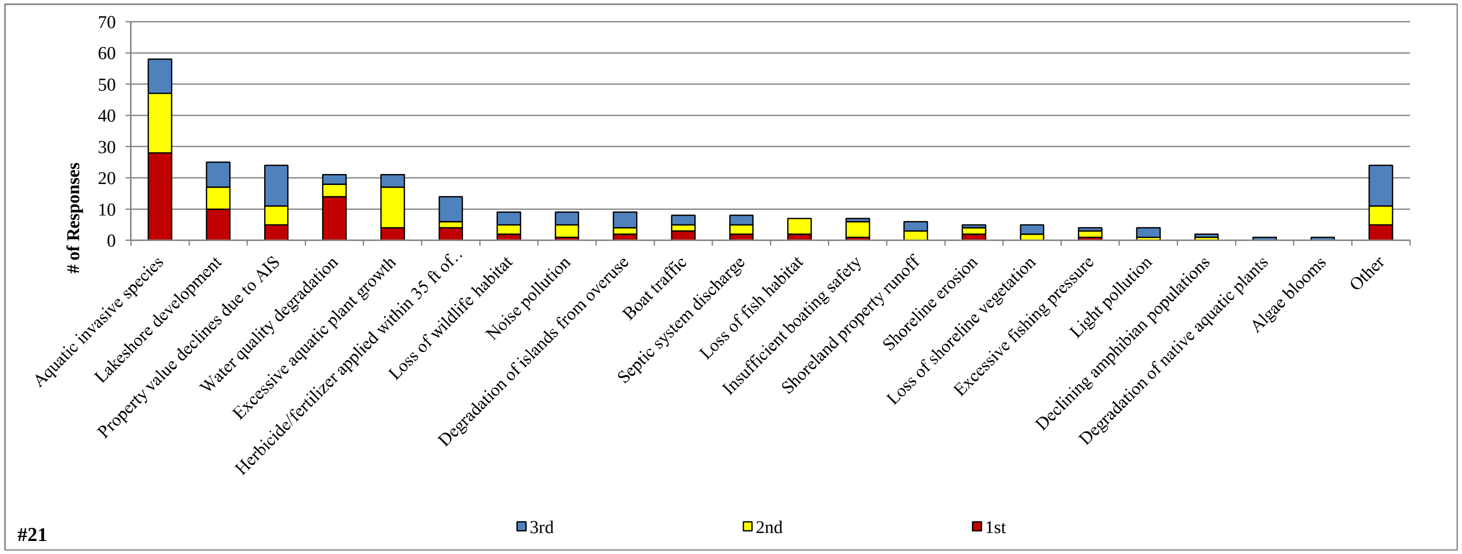
#20 To what level do you believe each of the following factors may be negatively impacting Squash Lake?

	0-Not present	1-No Impact	2	3-Moderately negative impact	4	5-Great negative impact	Unsure	*Total*	*Average*
Aquatic invasive species	0	0	1	21	18	40	4	*80*	*4.2*
Excessive aquatic plant growth	1	2	14	17	18	26	7	*77*	*3.6*
Herbicide/fertilizer applied within 35 ft of shoreline	2	5	9	14	17	25	14	*70*	*3.6*
Septic system discharge	4	6	10	11	7	18	28	*52*	*3.2*
Degradation of islands from overuse	4	9	13	20	13	18	10	*73*	*3.1*
Property value declines due to AIS	4	11	14	11	9	22	14	*67*	*3.1*
Declining amphibian populations	2	9	10	16	13	11	22	*59*	*3.0*
Shoreland property runoff	1	11	18	22	11	15	8	*77*	*3.0*
Lakeshore development	7	9	12	20	14	17	6	*72*	*3.0*
Algae blooms	4	8	20	16	13	15	7	*72*	*2.9*
Loss of shoreline vegetation	5	13	8	21	17	12	8	*71*	*2.9*
Loss of fish habitat	7	8	8	23	19	7	14	*65*	*2.8*
Noise pollution	4	13	23	20	12	10	2	*78*	*2.6*
Degradation of native aquatic plants	5	14	9	26	8	8	15	*65*	*2.6*
Insufficient boating safety	5	12	21	22	11	8	7	*74*	*2.6*
Water quality degradation	7	15	12	24	8	11	8	*70*	*2.6*
Boat traffic	2	19	17	31	9	7	2	*83*	*2.6*
Shoreline erosion	6	17	12	27	9	7	8	*72*	*2.5*
Excessive fishing pressure	11	8	16	18	12	7	12	*61*	*2.5*
Loss of wildlife habitat	10	12	15	18	11	7	12	*63*	*2.4*
Light pollution	7	18	23	19	4	6	8	*70*	*2.2*
Other	0	0	0	3	1	13	5	*17*	*4.6*



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

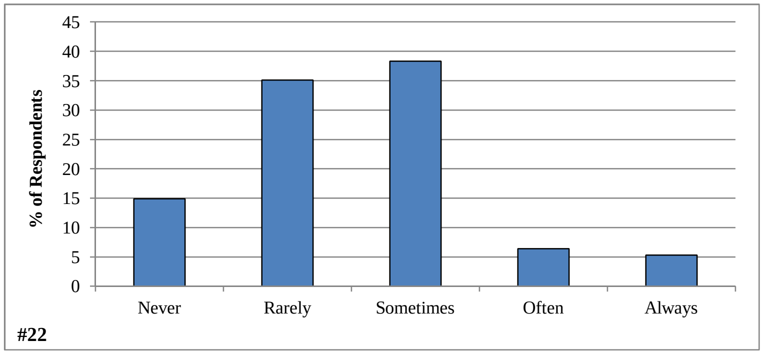
	1st	2nd	3rd	*% Ranked*
Aquatic invasive species	28	19	11	*21.3*
Lakeshore development	10	7	8	*9.2*
Property value declines due to AIS	5	6	13	*8.8*
Water quality degradation	14	4	3	*7.7*
Excessive aquatic plant growth	4	13	4	*7.7*
Herbicide/fertilizer applied within 35 ft of shoreline	4	2	8	*5.1*
Loss of wildlife habitat	2	3	4	*3.3*
Noise pollution	1	4	4	*3.3*
Degradation of islands from overuse	2	2	5	*3.3*
Boat traffic	3	2	3	*2.9*
Septic system discharge	2	3	3	*2.9*
Loss of fish habitat	2	5	0	*2.6*
Insufficient boating safety	1	5	1	*2.6*
Shoreland property runoff	0	3	3	*2.2*
Shoreline erosion	2	2	1	*1.8*
Loss of shoreline vegetation	0	2	3	*1.8*
Excessive fishing pressure	1	2	1	*1.5*
Light pollution	0	1	3	*1.5*
Declining amphibian populations	0	1	1	*0.7*
Degradation of native aquatic plants	0	0	1	*0.4*
Algae blooms	0	0	1	*0.4*
Other	5	6	13	*8.8*
	86	92	94	*100.0*



#21

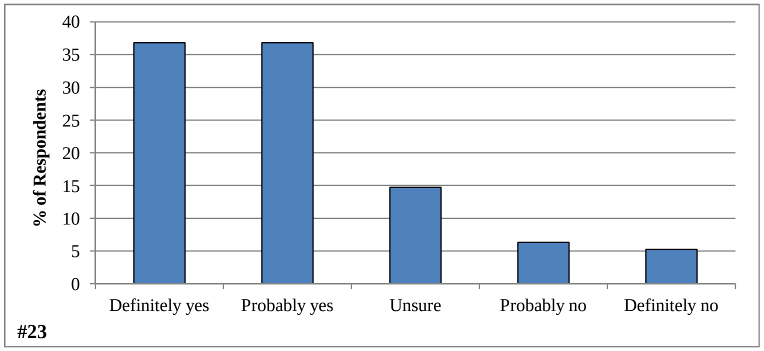
#22 During open water season how often does aquatic plant growth, including algae, negatively impact your enjoyment of the lake?

	Total	%
Never	14	*14.9*
Rarely	33	*35.1*
Sometimes	36	*38.3*
Often	6	*6.4*
Always	5	*5.3*
	94	*100.0*



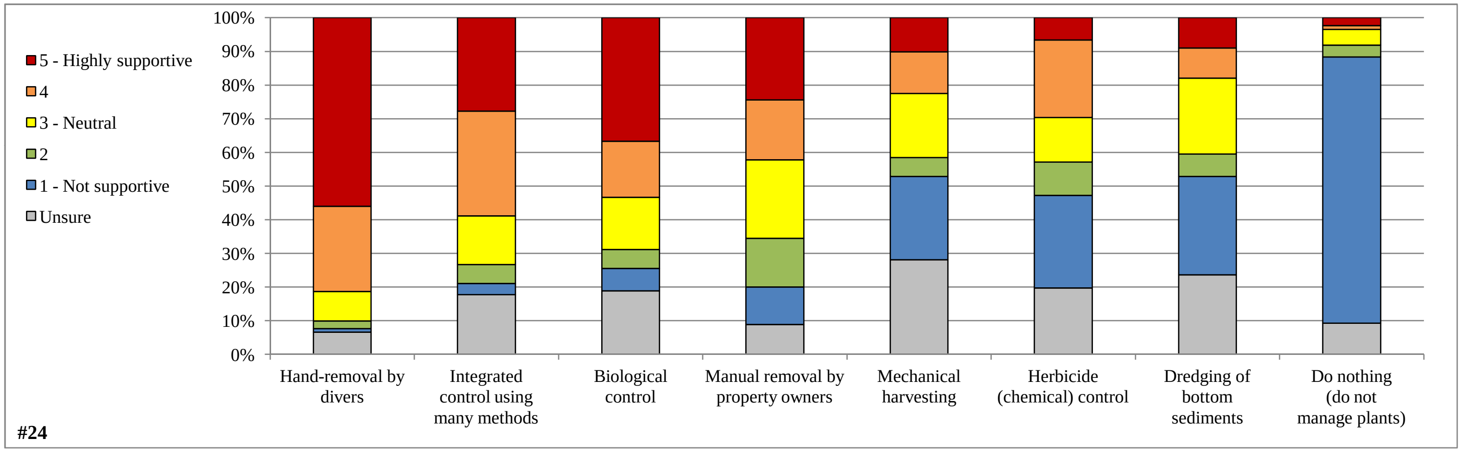
#23 Considering your answer to the question #22, do you believe aquatic plant control is needed on Squash Lake?

	Total	%
Definitely yes	35	*36.8*
Probably yes	35	*36.8*
Unsure	14	*14.7*
Probably no	6	*6.3*
Definitely no	5	*5.3*
	95	*100.0*



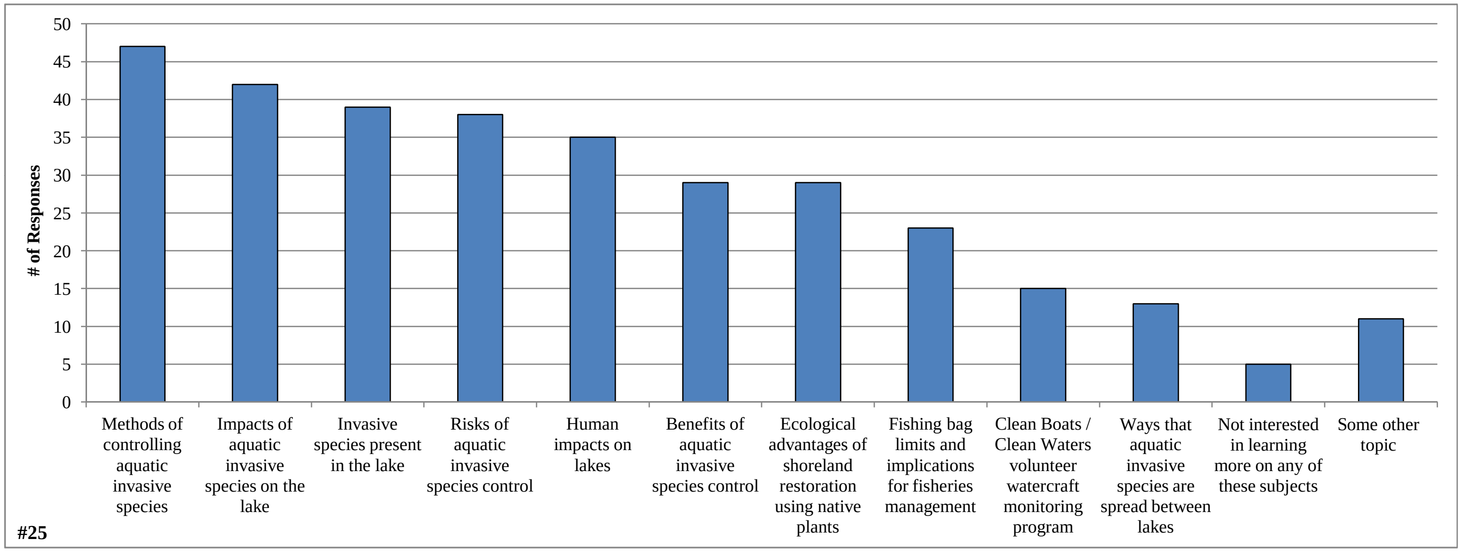
#24 Aquatic plants can be professionally managed using many techniques. What is your level of support for the responsible use of the following techniques on Squash Lake?

	1 - Not supportive	2	3 - Neutral	4	5 - Highly supportive	Unsure	Total	Average
Hand-removal by divers	1	2	8	23	51	6	*85*	*4.4*
Integrated control using many methods	3	5	13	28	25	16	*74*	*3.9*
Biological control	6	5	14	15	33	17	*73*	*3.9*
Manual removal by property owners	10	13	21	16	22	8	*82*	*3.3*
Mechanical harvesting	22	5	17	11	9	25	*64*	*2.7*
Herbicide (chemical) control	25	9	12	21	6	18	*73*	*2.6*
Dredging of bottom sediments	26	6	20	8	8	21	*68*	*2.5*
Do nothing (do not manage plants)	68	3	4	1	2	8	*78*	*1.3*



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

	Total
Methods of controlling aquatic invasive species	47
Impacts of aquatic invasive species on the lake	42
Invasive species present in the lake	39
Risks of aquatic invasive species control	38
Human impacts on lakes	35
Benefits of aquatic invasive species control	29
Ecological advantages of shoreland restoration using native plants	29
Fishing bag limits and implications for fisheries management	23
Clean Boats / Clean Waters volunteer watercraft monitoring program	15
Ways that aquatic invasive species are spread between lakes	13
Not interested in learning more on any of these subjects	5
Some other topic	11



SQUASH LAKE ASSOCIAION, INC.

#26 Before receiving this mailing, have you ever heard of the Squash Lake Lake Association?

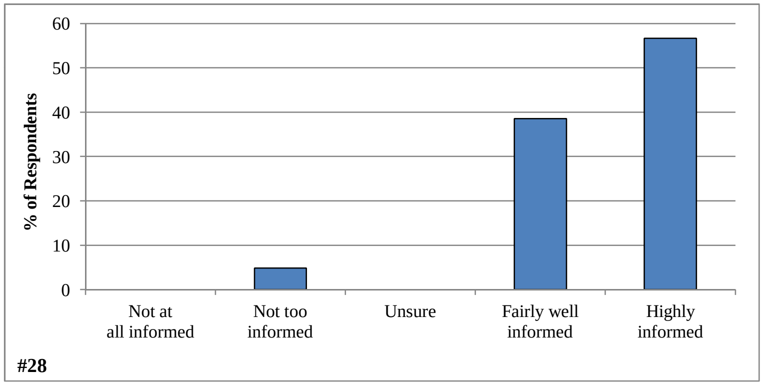
	Total	%
Yes	91	*98.9*
No	1	*1.1*
	92	*100.0*

#27 What is your membership status with the Squash Lake Lake Association?

	Total	%
Current member	81	*91.0*
Former member	3	*3.4*
Never been a member	5	*5.6*
	89	*100.0*

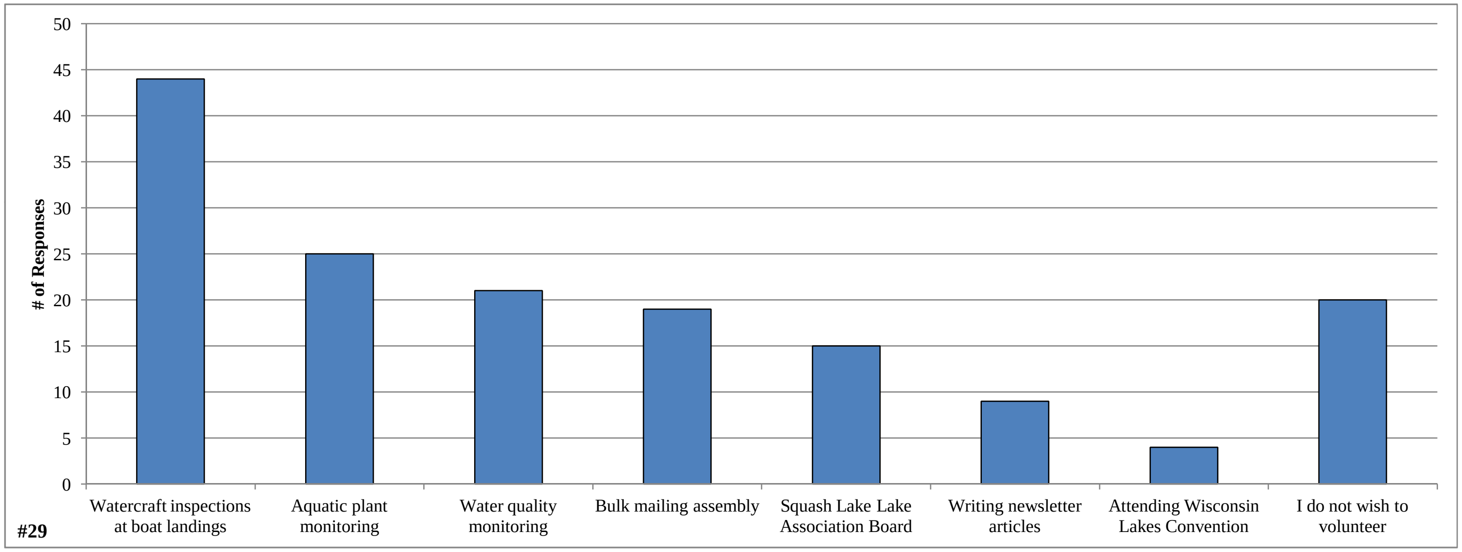
#28 How informed has the Squash Lake Lake Association kept you regarding issues with the lake and its management?

	Total	%
Not at all informed	0	*0.0*
Not too informed	4	*4.8*
Unsure	0	*0.0*
Fairly well informed	32	*38.6*
Highly informed	47	*56.6*
	83	*100.0*



#29 Please circle the activities you would be willing to participate in if the Squash Lake Lake Association requires additional assistance.

	Total
Watercraft inspections at boat landings	44
Aquatic plant monitoring	25
Water quality monitoring	21
Bulk mailing assembly	19
Squash Lake Lake Association Board	15
Writing newsletter articles	9
Attending Wisconsin Lakes Convention	4
I do not wish to volunteer	20



C

APPENDIX C

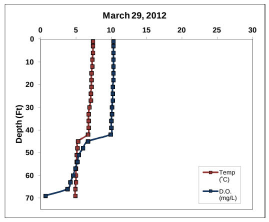
Water Quality Data

Squash Lake

Date: 3/29/2012
Time:
Weather: 100% clouds
Entry: TWH

Max Depth: 72.1
SQLS Depth (ft): 3.0
SQLB Depth (ft): 69.0
Secchi Depth (ft): 17.1

Depth (ft)	Temp (˚C)	D.O. (mg/L)	pH	Sp. Cond. (µS/cm)
1	7.4	10.3	8.6	82.0
3	7.4	10.3	8.5	82.0
6	7.4	10.3	8.4	82.0
9	7.3	10.3	8.4	82.0
12	7.3	10.3	8.3	82.0
15	7.2	10.3	8.3	82.0
18	7.2	10.3	8.3	82.0
21	7.2	10.2	8.3	82.0
24	7.1	10.2	8.2	82.0
27	7.1	10.2	8.2	82.0
30	6.9	10.1	8.2	82.0
33	6.8	10.1	8.1	82.0
36	6.8	10.0	8.1	82.0
39	6.8	10.0	8.1	82.0
42	6.7	9.9	8.1	82.0
45	5.3	6.7	7.9	86.0
48	5.2	6.0	7.8	87.0
51	5.1	5.4	7.8	88.0
54	5.1	5.2	7.7	88.0
57	5.0	4.9	7.7	89.0
60	5.0	4.6	7.6	89.0
63	5.0	4.2	7.6	90.0
66	4.9	3.8	7.5	91.0
69	4.9	0.7	7.3	137.0



Parameter	SQLS	SQLB
Total P (µg/L)	9.00	197.00
Dissolved P (µg/L)	ND	ND
Chl-*a* (µg/L)	1.88	N/A
TKN (µg/L)	160.00	3760.00
NO_3 + NO_2-N (µg/L)	67.00	ND
NH_3-N (µg/L)	ND	3060.00
Total N (µg/L)	227.00	3760.00
Lab Cond. (µS/cm)	87.00	125.00
Lab pH	7.25	6.50
Alkalinity (mg/L $CaCO_3$)	22.60	40.80
Total Susp. Solids (mg/L)	ND	49.00
Calcium (mg/L)	6.90	N/A
Magnesium (mg/L)	2.70	N/A
Hardness (mg/L)	28.20	N/A
Color (SU)	>5	N/A
Turbidity (NTU)	N/A	N/A

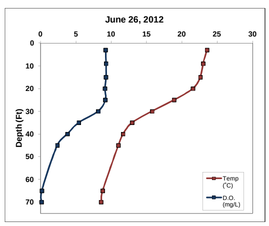
Data collected by TWH and EEC (Onterra)

Squash Lake

Date: 6/26/2012
Time: 12:00
Weather:
Entry: EEC

Max Depth:
SQLS Depth (ft): 6.0
SQLB Depth (ft):
Secchi Depth (ft): 22.0

Depth (ft)	Temp (˚C)	D.O. (mg/L)	pH	Sp. Cond. (µS/cm)
3	23.6	9.2		
9	23.0	9.3		
15	22.6	9.2		
20	21.6	9.1		
25	18.9	9.1		
30	15.8	8.1		
35	12.9	5.4		
40	11.7	3.8		
45	11.0	2.4		
65	8.8	0.2		
70	8.6	0.1		



Parameter	SQLS	SQLB
Total P (µg/L)	10.00	N/A
Dissolved P (µg/L)	N/A	N/A
Chl-*a* (µg/L)	2.31	N/A
TKN (µg/L)	390.00	N/A
NO_3 + NO_2-N (µg/L)	ND	N/A
NH_3-N (µg/L)	ND	N/A
Total N (µg/L)	390.00	N/A
Lab Cond. (µS/cm)	N/A	N/A
Lab pH	N/A	N/A
Alkalinity (mg/L $CaCO_3$)	N/A	N/A
Total Susp. Solids (mg/L)	N/A	N/A
Calcium (mg/L)	N/A	N/A
Magnesium (mg/L)	NA	N/A
Hardness (mg/L)	NA	N/A
Color (SU)	N/A	N/A
Turbidity (NTU)	NA	N/A

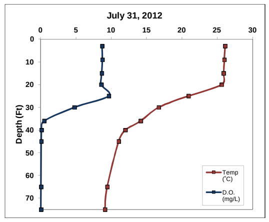
Data collected by Marj Mehring (Citizen Lake Monitoring, Squash Lake)

Squash Lake

Date: 7/31/2012
Time: 11:00
Weather:
Entry: EEC

Max Depth:
SQLS Depth (ft): 6.0
SQLB Depth (ft):
Secchi Depth (ft): 16.5

Depth (ft)	Temp (˚C)	D.O. (mg/L)	pH	Sp. Cond. (µS/cm)
3	26.1	8.7		
9	26.0	8.8		
15	25.9	8.7		
20	25.6	8.6		
25	20.9	9.7		
30	16.7	4.8		
36	14.2	0.5		
40	12.0	0.1		
45	11.1	0.1		
65	9.4	0.1		
75	9.1	0.1		



Parameter	SQLS	SQLB
Total P (µg/L)	9.00	N/A
Dissolved P (µg/L)	N/A	N/A
Chl-*a* (µg/L)	2.01	N/A
TKN (µg/L)	290.00	N/A
NO_3 + NO_2-N (µg/L)	ND	N/A
NH_3-N (µg/L)	ND	N/A
Total N (µg/L)	290.00	N/A
Lab Cond. (µS/cm)	N/A	N/A
Lab pH	N/A	N/A
Alkalinity (mg/L $CaCO_3$)	N/A	N/A
Total Susp. Solids (mg/L)	N/A	N/A
Calcium (mg/L)	N/A	N/A
Magnesium (mg/L)	N/A	N/A
Hardness (mg/L)	N/A	N/A
Color (SU)	N/A	N/A
Turbidity (NTU)	N/A	N/A

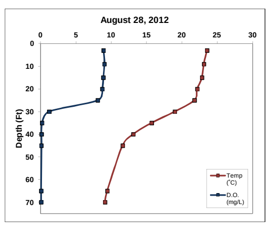
Data collected by Marj Mehring (Citizens Lake Monitoring, Squah Lake)

Squash Lake

Date: 8/28/2012
Time: 11:00
Weather:
Entry: EEC

Max Depth:
SQLS Depth (ft): 6
SQLB Depth (ft):
Secchi Depth (ft): 19.7

Depth (ft)	Temp (˚C)	D.O. (mg/L)	pH	Sp. Cond. (µS/cm)
3	23.6	8.9		
9	23.1	9.02		
15	22.8	8.86		
20	22.2	8.72		
25	21.8	8.08		
30	19.0	1.21		
35	15.7	0.2		
40	13.1	0.12		
45	11.6	0.1		
65	9.4	0.07		
70	9.1	0.07		



Parameter	SQLS	SQLB
Total P (µg/L)	11.00	N/A
Dissolved P (µg/L)	N/A	N/A
Chl-*a* (µg/L)	2.66	N/A
TKN (µg/L)	260.00	N/A
NO_3 + NO_2-N (µg/L)	ND	N/A
NH_3-N (µg/L)	ND	N/A
Total N (µg/L)	260.00	N/A
Lab Cond. (µS/cm)	N/A	N/A
Lab pH	N/A	N/A
Alkalinity (mg/L $CaCO_3$)	N/A	N/A
Total Susp. Solids (mg/L)	N/A	N/A
Calcium (mg/L)	N/A	N/A
Magnesium (mg/L)	N/A	N/A
Hardness (mg/L)	N/A	N/A
Color (SU)	N/A	N/A
Turbidity (NTU)	N/A	N/A

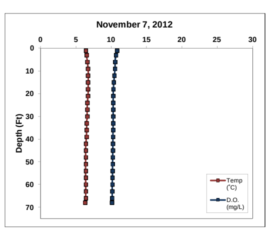
Data collected by Marj Mehring (Citizens Lake Monitoring, Squah Lake)

Squash Lake

Date: 11/7/2012
Time: 13:20
Weather: 100% clouds, 37F, light breeze
Entry: EEC

Max Depth: 71.2
SQLS Depth (ft): 3
SQLB Depth (ft): 68
Secchi Depth (ft): 10.4

Depth (ft)	Temp (˚C)	D.O. (mg/L)	pH	Sp. Cond. (µS/cm)
1	6.4	10.81	6.58	
3	6.5	10.66	6.63	
6	6.6	10.54	6.66	
9	6.7	10.53	6.7	
12	6.7	10.44	6.71	
15	6.7	10.34	6.88	
18	6.7	10.3	6.88	
21	6.7	10.27	6.91	
24	6.6	10.26	9.96	
27	6.6	10.27	6.95	
30	6.6	10.27	7.05	
33	6.5	10.26	7.04	
36	6.5	10.26	7.04	
39	6.5	10.24	7.09	
42	6.4	10.23	7.12	
45	6.4	10.23	7.07	
48	6.4	10.21	7.15	
51	6.4	10.2	7.15	
54	6.4	10.18	7.18	
57	6.4	10.16	7.15	
60	6.4	10.15	7.19	
63	6.4	10.13	7.2	
66	6.4	10.12	7.22	
68	6.3	10.09	7.17	



Parameter	SQLS	SQLB
Total P (µg/L)	13.00	12.00
Dissolved P (µg/L)	NA	NA
Chl-*a* (µg/L)	9.64	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	2.00
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	NA	NA
Turbidity (NTU)	NA	NA

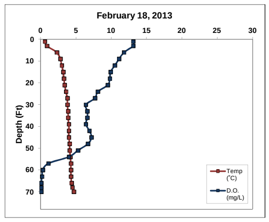
Data collected by EJG (Onterra)

Squash Lake

Date: 2/18/2013
Time: 15:21
Weather: 100% clouds, slight breeze, 28°F
Entry: TWH

Max Depth: 71
SQLS **Depth (ft):** 3
SQLB **Depth (ft):** 68
Secchi Depth (ft): 9.2

Depth (ft)	Temp (˚C)	D.O. (mg/L)	pH	Sp. Cond. (µS/cm)
1	0.6	13.1		
3	0.9	13.1		
6	2.3	11.8		
9	2.8	11.1		
12	3	10.5		
15	3.2	9.9		
18	3.3	9.8		
21	3.4	9.5		
24	3.6	8.1		
27	3.8	7.7		
30	3.8	6.4		
33	3.9	6.6		
36	3.9	6.6		
39	4	6.4		
42	4	6.9		
45	4	7.2		
48	4.1	6.7		
51	4.1	5.3		
54	4.2	4		
57	4.3	1.1		
60	4.3	0.3		
63	4.3	0.2		
66	4.4	0.1		
68	4.5	0.1		
70	4.7	0.1		



Parameter	SQLS	SQLB
Total P (µg/L)	12.00	59.00
Dissolved P (µg/L)	ND	2.00
Chl-*a* (µg/L)	NA	NA
TKN (µg/L)	320.00	2460.00
NO_3 + NO_2-N (µg/L)	ND	24.00
NH_3-N (µg/L)	19.00	1680.00
Total N (µg/L)	NA	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkalinity (mg/L $CaCO_3$)	NA	NA
Total Susp. Solids (mg/L)	NA	NA
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	NA	NA
Turbidity (NTU)	NA	NA

Data collected by TWH and EJG (Onterra) Ice thickness = 1.3'

Water Quality Data

2012/2013	Surface		Bottom	
Parameter	Count	Mean	Count	Mean
Secchi Depth (feet)	6	15.8	NA	NA
Total P (µg/L)	6	10.7	3	89.3
Dissolved P (µg/L)	2	ND	2	2.0
Chl a (µg/L)	5	3.7	0	NA
TKN (µg/L	5	284.0	2	3110.0
NO3+NO2-N (µg/L)	5	67.0	2	24.0
NH3-N (µg/L)	5	19.0	2	2370.0
Total N (µg/L)	4	291.8	1	3760.0
Lab Cond. (µS/cm)	1	87.0	1	125.0
Lab pH	1	7.3	1	6.5
Alkal (mg/l CaCO3)	1	22.6	1	40.8
Total Susp. Solids (mg/l)	2	ND	2	25.5
Calcium (µg/L)	1	6.9	0	NA
Magnesium (mg/L)	1	2.7	0	NA
Hardness (mg/L)	1	28.2	0	NA
Color (SU)	0	NA	0	NA
Turbidity (NTU)	0	NA	0	NA

Morphological / Geographical Data

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

Watershed Data

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

Trophic State Index (TSI)

Year	TP	Chl-a	Secchi
1973			40.2
1974			40.0
1979			
1989			38.3
1990			38.0
1991	27.4		33.8
1992	27.4	31.4	32.0
1993		37.9	32.3
1994	24.1	35.3	32.5
1995		34.9	34.7
1996		35.4	38.1
1997	48.7	35.7	33.7
1998	35.8	33.3	34.9
1999	35.8	32.6	35.6
2000	35.8	33.0	33.2
2001	35.8	35.8	34.3
2002	36.9	37.0	34.7
2003	35.3	37.8	33.2
2004	32.9	36.5	32.7
2005	34.1	37.0	34.4
2006	39.2	40.4	33.0
2007	31.1	36.8	33.2
2008	32.9	39.2	38.8
2009	32.2	34.6	35.4
2010	32.2	38.0	36.8
2011	35.3	37.7	34.8
2012	37.4	38.9	34.4
All Years (Weighted)	35.9	36.5	34.5
Deep, Seepage Lakes	43.2	43.2	42.4
NLF Ecoregion	48.1	47.5	45.7

	Secchi (feet)				Chlorophyll-*a* (µg/L)				Total Phosphorus (µg/L)			
	Growing Season		Summer		Growing Season		Summer		Growing Season		Summer	
Year	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean
1973	1	13.0	1	13.0								
1974	3	15.0	1	13.1								
1979	1	13.0	0		1	3.1	0					
1989	6	13.7	3	14.8								
1990	10	16.0	4	15.1					5	12.6	0.0	
1991	7	16.5	3	20.2					4	8.0	1.0	5.0
1992	9	19.4	6	22.9	3	1.7	2	1.1	7	6.6	4.0	5.0
1993	9	22.0	6	22.4	5	1.9	3	2.1	1	4.0	0.0	
1994	8	18.4	3	22.2	4	2.2	2	1.6	3	5.0	1.0	4.0
1995	5	19.9	4	19.0	4	1.5	3	1.5				
1996	5	16.8	2	15.0	3	1.8	1	1.6	1	7.0	0.0	
1997	8	18.6	5	20.4	4	1.8	3	1.7	5	25.2	3.0	22.0
1998	11	17.8	6	18.7	4	1.5	3	1.3	3	12.0	1.0	9.0
1999	5	16.8	3	17.8	3	1.8	2	1.2	2	7.0	1.0	9.0
2000	12	20.2	8	21.0	5	1.2	4	1.3	4	8.8	2.0	9.0
2001	4	18.7	3	19.6	3	1.7	3	1.7	4	8.3	3.0	9.0
2002	1	19.0	1	19.0	3	1.9	3	1.9	4	9.8	3.0	9.7
2003	4	18.7	3	21.0	4	3.4	3	2.1	4	12.0	3.0	8.7
2004	4	20.5	3	21.8	3	1.8	3	1.8	4	10.5	3.0	7.3
2005	5	17.4	3	19.3	4	2.8	3	1.9	4	8.8	2.0	8.0
2006	5	20.3	3	21.3	4	4.2	3	2.7	5	13.0	3.0	11.3
2007	15	19.1	9	21.1	2	2.5	1	1.9	4	9.0	2.0	6.5
2008	10	12.8	5	14.3	3	2.4	3	2.4	4	8.8	3.0	7.3
2009	8	18.3	5	18.1	4	1.8	2	1.5	4	8.5	1.0	7.0
2010	10	15.3	7	16.4	3	2.3	2	2.1	4	9.0	2.0	7.0
2011	4	17.8	3	18.9	3	2.1	3	2.1	4	9.5	3.0	8.7
2012	3	19.4	3	19.4	3	2.3	3	2.3	4	9.0	3.0	10.0
All Years (Weighted)		17.8		19.2		2.1		1.8		10.2		9.0
Deep, Seepage Lakes				11.2				3.6				15.0
NLF Ecoregion				8.9				5.6				21.0

July YEAR N: 290.0
July YEAR P: 9.0

Summer 2012 N:P 32 :1

D

APPENDIX D

Watershed Analysis WiLMS Results

Date: 8/21/2013 Scenario: Squash Lake Current

Lake Id: Squash_WS_Current
Watershed Id: 0

Hydrologic and Morphometric Data

Tributary Drainage Area: 713.0 acre
Total Unit Runoff: 12.2 in.
Annual Runoff Volume: 724.9 acre-ft
Lake Surface Area <As>: 398 acre
Lake Volume <V>: 8835 acre-ft
Lake Mean Depth <z>: 22.2 ft
Precipitation - Evaporation: 5.8 in.
Hydraulic Loading: 917.3 acre-ft/year
Areal Water Load <qs>: 2.3 ft/year
Lake Flushing Rate <p>: 0.10 1/year
Water Residence Time: 9.63 year
Observed spring overturn total phosphorus (SPO): 10.7 mg/m^3
Observed growing season mean phosphorus (GSM): 10.8 mg/m^3
% NPS Change: 0%
% PS Change: 0%

NON-POINT SOURCE DATA

Land Use	Acre (ac)	Low	Most Likely	High	Loading %	Low	Most Likely	High
		Loading (kg/ha-year)				Loading (kg/year)		
Row Crop AG	33	0.50	1.00	3.00	13.7	7	13	40
Mixed AG	0.0	0.30	0.80	1.40	0.0	0	0	0
Pasture/Grass	28	0.10	0.30	0.50	3.5	1	3	6
HD Urban (1/8 Ac)	0.0	1.00	1.50	2.00	0.0	0	0	0
MD Urban (1/4 Ac)	0.0	0.30	0.50	0.80	0.0	0	0	0
Rural Res (>1 Ac)	70	0.05	0.10	0.25	2.9	1	3	7
Wetlands	48	0.10	0.10	0.10	2.0	2	2	2
Forest	534	0.05	0.09	0.18	20.0	11	19	39
Lake Surface	398.0	0.10	0.30	1.00	49.6	16	48	161

POINT SOURCE DATA

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

SEPTIC TANK DATA

Description		Low	Most Likely	High	Loading %
Septic Tank Output (kg/capita-year)		0.3	0.5	0.8	
# capita-years	163				
% Phosphorus Retained by Soil		98	90	80	
Septic Tank Loading (kg/year)		0.98	8.15	26.08	8.4

TOTALS DATA

Description	Low	Most Likely	High	Loading %
Total Loading (lb)	86.1	214.8	619.1	100.0
Total Loading (kg)	39.1	97.5	280.8	100.0
Areal Loading (lb/ac-year)	0.22	0.54	1.56	0.0
Areal Loading (mg/m^2-year)	24.25	60.50	174.34	0.0
Total PS Loading (lb)	0.0	0.0	0.0	0.0
Total PS Loading (kg)	0.0	0.0	0.0	0.0
Total NPS Loading (lb)	48.4	90.3	206.5	91.6
Total NPS Loading (kg)	22.0	41.0	93.7	91.6

Phosphorus Prediction and Uncertainty Analysis Module

Date: 8/21/2013   Scenario: Squash Lake Current
Observed spring overturn total phosphorus (SPO): 10.7 mg/m^3
Observed growing season mean phosphorus (GSM): 10.8 mg/m^3
Back calculation for SPO total phosphorus: 0.0 mg/m^3
Back calculation GSM phosphorus: 0.0 mg/m^3
% Confidence Range: 70%
Nurenberg Model Input - Est. Gross Int. Loading: 0 kg

Lake Phosphorus Model	**Low** Total P (mg/m^3)	**Most Likely** Total P (mg/m^3)	**High** Total P (mg/m^3)	**Predicted** -Observed (mg/m^3)	**% Dif.**
Walker, 1987 Reservoir	11	27	77	16	148
Canfield-Bachmann, 1981 Natural Lake	9	16	31	5	46
Canfield-Bachmann, 1981 Artificial Lake	10	17	29	6	56
Rechow, 1979 General	2	5	14	-6	-56
Rechow, 1977 Anoxic	12	31	90	20	185
Rechow, 1977 water load<50m/year	3	8	22	-3	-28
Rechow, 1977 water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977 General	10	26	75	15	140
Vollenweider, 1982 Combined OECD	9	19	45	8	74
Dillon-Rigler-Kirchner	8	20	58	9	84
Vollenweider, 1982 Shallow Lake/Res.	7	15	38	4	37
Larsen-Mercier, 1976	8	21	60	10	93
Nurnberg, 1984 Oxic	7	17	49	6	56

Lake Phosphorus Model	Confidence Lower Bound	Confidence Upper Bound	Parameter Fit?	Back Calculation (kg/year)	Model Type
Walker, 1987 Reservoir	15	59	Tw	0	GSM
Canfield-Bachmann, 1981 Natural Lake	5	46	FIT	1	GSM
Canfield-Bachmann, 1981 Artificial Lake	5	49	FIT	1	GSM
Rechow, 1979 General	3	11	L qs	0	GSM
Rechow, 1977 Anoxic	17	68	FIT	0	GSM
Rechow, 1977 water load<50m/year	4	17	FIT	0	GSM
Rechow, 1977 water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977 General	12	60	FIT	0	SPO
Vollenweider, 1982 Combined OECD	9	39	FIT	0	ANN
Dillon-Rigler-Kirchner	11	44	P L qs p	0	SPO
Vollenweider, 1982 Shallow Lake/Res.	7	32	FIT	0	ANN
Larsen-Mercier, 1976	12	46	P Pin	0	SPO
Nurnberg, 1984 Oxic	8	38	FIT	0	ANN

Date: 8/23/2013   Scenario: Squash Lake – Row Crops to Forest

Lake Id: Squash_WS_Scenario_1
Watershed Id: 0

Hydrologic and Morphometric Data

Tributary Drainage Area: 713.0 acre
Total Unit Runoff: 12.20 in.
Annual Runoff Volume: 724.9 acre-ft
Lake Surface Area <As>: 398.0 acre
Lake Volume <V>: 8835.0 acre-ft
Lake Mean Depth <z>: 22.2 ft
Precipitation - Evaporation: 5.8 in.
Hydraulic Loading: 917.3 acre-ft/year
Areal Water Load <qs>: 2.3 ft/year
Lake Flushing Rate <p>: 0.10 1/year
Water Residence Time: 9.63 year
Observed spring overturn total phosphorus (SPO): 10.7 mg/m^3
Observed growing season mean phosphorus (GSM): 10.8 mg/m^3
% NPS Change: 0%
% PS Change: 0%

NON-POINT SOURCE DATA

Land Use	Acre (ac)	Low	Most Likely	High	Loading %	Low	Most Likely	High
		|---- Loading (kg/ha-year) ----|				|----- Loading (kg/year) ----|		
Row Crop AG	0	0.50	1.00	3.00	0.0	0	0	0
Mixed AG	0.0	0.30	0.80	1.40	0.0	0	0	0
Pasture/Grass	28.0	0.10	0.30	0.50	4.0	1	3	6
HD Urban (1/8 Ac)	0.0	1.00	1.50	2.00	0.0	0	0	0
MD Urban (1/4 Ac)	0.0	0.30	0.50	0.80	0.0	0	0	0
Rural Res (>1 Ac)	70.0	0.05	0.10	0.25	3.3	1	3	7
Wetlands	48.0	0.10	0.10	0.10	2.3	2	2	2
Forest	567	0.05	0.09	0.18	24.2	11	21	41
Lake Surface	398.0	0.10	0.30	1.00	56.6	16	48	161

POINT SOURCE DATA

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

SEPTIC TANK DATA

Description		Low	Most Likely	High	Loading %
Septic Tank Output (kg/capita-year)		0.30	0.50	0.80	
# capita-years	163.0				
% Phosphorus Retained by Soil		98.0	90.0	80.0	
Septic Tank Loading (kg/year)		0.98	8.15	26.08	9.6

TOTALS DATA

Description	Low	Most Likely	High	Loading %
Total Loading (lb)	72.9	188.0	536.0	100.0
Total Loading (kg)	33.1	85.3	243.1	100.0
Areal Loading (lb/ac-year)	0.18	0.47	1.35	
Areal Loading (mg/m^2-year)	20.52	52.96	150.96	
Total PS Loading (lb)	0.0	0.0	0.0	0.0
Total PS Loading (kg)	0.0	0.0	0.0	0.0
Total NPS Loading (lb)	35.2	63.6	123.4	90.4
Total NPS Loading (kg)	16.0	28.8	56.0	90.4

Phosphorus Prediction and Uncertainty Analysis Module

Date: 8/23/2013 Scenario: Squash Lake – Row Crops to Forest
Observed spring overturn total phosphorus (SPO): 10.7 mg/m^3
Observed growing season mean phosphorus (GSM): 10.8 mg/m^3
Back calculation for SPO total phosphorus: 0.0 mg/m^3
Back calculation GSM phosphorus: 0.0 mg/m^3
% Confidence Range: 70%
Nurenberg Model Input - Est. Gross Int. Loading: 0 kg

Lake Phosphorus Model	**Low** Total P (mg/m^3)	**Most Likely** Total P (mg/m^3)	**High** Total P (mg/m^3)	**Predicted** -Observed (mg/m^3)	**% Dif.**
Walker, 1987 Reservoir	10	25	71	14	130
Canfield-Bachmann, 1981 Natural Lake	8	15	29	4	37
Canfield-Bachmann, 1981 Artificial Lake	9	16	27	5	46
Rechow, 1979 General	2	4	12	-7	-65
Rechow, 1977 Anoxic	11	27	78	16	148
Rechow, 1977 water load<50m/year	3	7	19	-4	-37
Rechow, 1977 water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977 General	9	23	65	12	112
Vollenweider, 1982 Combined OECD	8	17	40	6	56
Dillon-Rigler-Kirchner	7	18	50	7	65
Vollenweider, 1982 Shallow Lake/Res.	6	13	33	2	19
Larsen-Mercier, 1976	7	18	52	7	65
Nurnberg, 1984 Oxic	6	15	43	4	37

Lake Phosphorus Model	Confidence Lower Bound	Confidence Upper Bound	Parameter Fit?	Back Calculation (kg/year)	Model Type
Walker, 1987 Reservoir	14	54	Tw	0	GSM
Canfield-Bachmann, 1981 Natural Lake	5	43	FIT	1	GSM
Canfield-Bachmann, 1981 Artificial Lake	5	46	FIT	1	GSM
Rechow, 1979 General	2	9	L qs	0	GSM
Rechow, 1977 Anoxic	15	59	FIT	0	GSM
Rechow, 1977 water load<50m/year	4	15	FIT	0	GSM
Rechow, 1977 water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977 General	11	52	FIT	0	SPO
Vollenweider, 1982 Combined OECD	8	35	FIT	0	ANN
Dillon-Rigler-Kirchner	10	38	P L qs p	0	SPO
Vollenweider, 1982 Shallow Lake/Res.	6	28	FIT	0	ANN
Larsen-Mercier, 1976	10	39	P Pin	0	SPO
Nurnberg, 1984 Oxic	7	34	FIT	0	ANN

Date: 8/23/2013 Scenario: Squash Lake – 25% Forest Converted to Row Crops

Lake Id: Squash_WS_Scenario_2
Watershed Id: 0

Hydrologic and Morphometric Data

Tributary Drainage Area: 713.0 acre
Total Unit Runoff: 12.20 in.
Annual Runoff Volume: 724.9 acre-ft
Lake Surface Area <As>: 398.0 acre
Lake Volume <V>: 8835.0 acre-ft
Lake Mean Depth <z>: 22.2 ft
Precipitation - Evaporation: 5.8 in.
Hydraulic Loading: 917.3 acre-ft/year
Areal Water Load <qs>: 2.3 ft/year
Lake Flushing Rate <p>: 0.10 1/year
Water Residence Time: 9.63 year
Observed spring overturn total phosphorus (SPO): 10.7 mg/m^3
Observed growing season mean phosphorus (GSM): 10.8 mg/m^3
% NPS Change: 0%
% PS Change: 0%

NON-POINT SOURCE DATA

Land Use	Acre (ac)	Low	Most Likely	High	Loading %	Low	Most Likely	High
		|---- Loading (kg/ha-year) ----|				|----- Loading (kg/year) ----|		
Row Crop AG	166.5	0.50	1.00	3.00	46.0	34	67	202
Mixed AG	0.0	0.30	0.80	1.40	0.0	0	0	0
Pasture/Grass	28.0	0.10	0.30	0.50	2.3	1	3	6
HD Urban (1/8 Ac)	0.0	1.00	1.50	2.00	0.0	0	0	0
MD Urban (1/4 Ac)	0.0	0.30	0.50	0.80	0.0	0	0	0
Rural Res (>1 Ac)	70.0	0.05	0.10	0.25	1.9	1	3	7
Wetlands	48.0	0.10	0.10	0.10	1.3	2	2	2
Forest	400.5	0.05	0.09	0.18	9.9	8	15	29
Lake Surface	398.0	0.10	0.30	1.00	33.0	16	48	161

POINT SOURCE DATA

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

SEPTIC TANK DATA

Description		Low	Most Likely	High	Loading %
Septic Tank Output (kg/capita-year)		0.30	0.50	0.80	
# capita-years	163.0				
% Phosphorus Retained by Soil		98.0	90.0	80.0	
Septic Tank Loading (kg/year)		0.98	8.15	26.08	5.6

TOTALS DATA

Description	Low	Most Likely	High	Loading %
Total Loading (lb)	139.7	323.2	955.0	100.0
Total Loading (kg)	63.4	146.6	433.2	100.0
Areal Loading (lb/ac-year)	0.35	0.81	2.40	
Areal Loading (mg/m^2-year)	39.35	91.03	268.94	
Total PS Loading (lb)	0.0	0.0	0.0	0.0
Total PS Loading (kg)	0.0	0.0	0.0	0.0
Total NPS Loading (lb)	102.0	198.7	542.4	94.4
Total NPS Loading (kg)	46.3	90.1	246.0	94.4

Phosphorus Prediction and Uncertainty Analysis Module

Date: 8/23/2013   Scenario: Squash Lake – 25% Forest Converted to Row Crops
Observed spring overturn total phosphorus (SPO): 10.7 mg/m^3
Observed growing season mean phosphorus (GSM): 10.8 mg/m^3
Back calculation for SPO total phosphorus: 0.0 mg/m^3
Back calculation GSM phosphorus: 0.0 mg/m^3
% Confidence Range: 70%
Nurenberg Model Input - Est. Gross Int. Loading: 0 kg

Lake Phosphorus Model	**Low** Total P (mg/m^3)	**Most Likely** Total P (mg/m^3)	**High** Total P (mg/m^3)	**Predicted** -Observed (mg/m^3)	**% Dif.**
Walker, 1987 Reservoir	15	34	101	23	213
Canfield-Bachmann, 1981 Natural Lake	12	21	41	10	93
Canfield-Bachmann, 1981 Artificial Lake	14	21	36	10	93
Rechow, 1979 General	3	7	22	-4	-37
Rechow, 1977 Anoxic	20	47	138	36	333
Rechow, 1977 water load<50m/year	5	11	34	0	0
Rechow, 1977 water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977 General	17	39	116	28	262
Vollenweider, 1982 Combined OECD	13	26	64	15	140
Dillon-Rigler-Kirchner	13	30	90	19	178
Vollenweider, 1982 Shallow Lake/Res.	10	21	55	10	93
Larsen-Mercier, 1976	14	32	93	21	196
Nurnberg, 1984 Oxic	11	26	76	15	139

Lake Phosphorus Model	**Confidence** Lower Bound	**Confidence** Upper Bound	**Parameter** Fit?	**Back** Calculation (kg/year)	**Model** Type
Walker, 1987 Reservoir	19	77	Tw	0	GSM
Canfield-Bachmann, 1981 Natural Lake	7	60	FIT	1	GSM
Canfield-Bachmann, 1981 Artificial Lake	7	60	FIT	1	GSM
Rechow, 1979 General	4	17	qs	0	GSM
Rechow, 1977 Anoxic	26	105	FIT	0	GSM
Rechow, 1977 water load<50m/year	6	26	FIT	0	GSM
Rechow, 1977 water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977 General	19	91	FIT	0	SPO
Vollenweider, 1982 Combined OECD	12	55	FIT	0	ANN
Dillon-Rigler-Kirchner	17	68	P L qs p	0	SPO
Vollenweider, 1982 Shallow Lake/Res.	10	46	FIT	0	ANN
Larsen-Mercier, 1976	19	70	P Pin	0	SPO
Nurnberg, 1984 Oxic	13	59	FIT	0	ANN

E

APPENDIX E

Aquatic Plant Survey Data

Sampling Point	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Pole (P); Rake (R)	Comments	Total Rake Fullness	EWM	BRASC	CEREC	CHARA	DULAR	ELAMI	ELEAC	ELEPA	ELOCA	ELONU	ERIAQ	ISO_SP	JUNPE	LOBDO	BIDBE	MYRAL	MYRTE	NAJFL	NITELLA	NUPVA	NYMOD	PONCO	POTAM	POTEP	POTFO	POTGR	POTNA	POTPU&POTBE	POTRO	POTSP	POTST	POTVA	POTZO	RANFM	SAGCR	SCHTA	SPAANG	SPAFL	UTRIN	VALAM	F_AGLAE	SCHSU	JUNEF
1	45.5971737	-89.56214933	4	Muck	Pole		2																													2														
2	45.597172	-89.56172622	6	Muck	Pole		3																													3														
3	45.5971704	-89.56130312	8	Muck	Pole		3										1													1						2														
4	45.5968734	-89.56130543	3	Sand	Pole		1	V			1												1																											
5	45.5974658	-89.56087769	2	Rock	Pole		1						1							1																														
6	45.5971688	-89.56088001	6	Sand	Pole		1				1																																							
7	45.5968718	-89.56088233	8	Muck	Pole		2									1														1						1														
8	45.5965747	-89.56088464	2	Sand	Pole		1				1									1																														
9	45.5962777	-89.56088696	5	Muck	Pole		2				2														1																									
10	45.5959807	-89.56088928	6	Muck	Pole		3		1		3																								1															
11	45.5956837	-89.56089159	6	Muck	Pole		3	1	1																										1	3														
12	45.5980582	-89.56044995	2	Sand	Pole		1						1	1				1					1																											
13	45.5977612	-89.56045227				TEMPORARY OBSTACLE																																												
14	45.5974642	-89.56045458	12	Sand	Pole		3				2														1																									
15	45.5971672	-89.5604569	9	Sand	Pole		2				2														1																									
16	45.5968701	-89.56045922	5	Rock	Pole																																													
17	45.5965731	-89.56046154				TERRESTRIAL																																												
18	45.5962761	-89.56046386	10	Muck	Pole		2				2														1											1														
19	45.5959791	-89.56046618	14		Rope		2									1										1									1	1														
20	45.595682	-89.5604685	15		Rope		1										1																																	
21	45.595385	-89.56047082	2	Rock	Pole		1																		1																									
22	45.595088	-89.56047314	3	Sand	Pole		1																1																											
23	45.594791	-89.56047545	4	Sand	Pole		2		1					1																						2														
24	45.5986507	-89.56002219				TERRESTRIAL																																												
25	45.5983536	-89.56002451	3	Sand	Pole		1				1												1																											
26	45.5980566	-89.56002683	10	Sand	Pole		2									1										1										2														
27	45.5977596	-89.56002916	14		Pole		1																			1																								
28	45.5974626	-89.56003148	20		Pole		2				2																																							
29	45.5971655	-89.5600338	22		Rope																																													
30	45.5968685	-89.56003612	16		Rope																																													
31	45.5965715	-89.56003844	6	Rock	Pole																																													
32	45.5962745	-89.56004076	5	Rock	Pole																																													
33	45.5959774	-89.56004308	14	Muck	Pole		2										1									1										2														
34	45.5956804	-89.5600454	13	Muck	Pole		2																													2														
35	45.5953834	-89.56004772	10	Muck	Pole		3				3																									1														
36	45.5950864	-89.56005005	8	Muck	Pole		3				1					1														1						3														
37	45.5947893	-89.56005237	3	Rock	Pole		1		1																												1													
38	45.598649	-89.55959907	9	Sand	Pole		1																		1										1	1														
39	45.598352	-89.5596014	14		Rope		3				1															2																								
40	45.598055	-89.55960372	18		Rope		1																			1																								
41	45.597758	-89.55960604	20		Rope		3																			3																								
42	45.5974609	-89.55960837	19		Pole		2																			2										1														
43	45.5971639	-89.55961069	27		Rope		2																			2																								
44	45.5968669	-89.55961301	30		Rope																																													
45	45.5965699	-89.55961534	28		Rope																																													
46	45.5962728	-89.55961766	15		Rope																																													
47	45.5959758	-89.55961999	5	Rock	Pole																																													
48	45.5956788	-89.55962231	6	Sand	Pole		2				2														1												1													
49	45.5953818	-89.55962463	11	Muck	Pole		2				2																																							
50	45.5950847	-89.55962695	9	Rock	Pole		2				2														1																									
51	45.5947877	-89.55962928	9	Rock	Pole																																													
52	45.5944907	-89.5596316	9	Sand	Pole		1									1																			1		1													
53	45.5941937	-89.55963392	1	Sand	Pole		1		1																																									
54	45.5986474	-89.55917596	9	Sand	Pole		2				1												1		1							1				1														
55	45.5983504	-89.55917828	19		Rope		2																			2										1														
56	45.5980533	-89.55918061	21		Rope		3																			3																								
57	45.5977563	-89.55918293	19		Rope																																													
58	45.5974593	-89.55918526	17		Rope		1				1																									1														
59	45.5971623	-89.55918759	30		Rope																																													
60	45.5968653	-89.55918991				DEEP																																												
61	45.5965682	-89.55919224	34			DEEP																																												
62	45.5962712	-89.55919456	32			DEEP																																												
63	45.5959742	-89.55919689	18		Rope		1																												1															
64	45.5953801	-89.55920154	4	Sand	Pole		2				1									1			1		1																									
65	45.5950831	-89.55920386	9	Rock	Pole		1																			1																								
66	45.5947861	-89.55920619	11	Rock	Pole		1				1														1												1													
67	45.5944891	-89.55920852	18		Rope		1																												1															
68	45.594192	-89.55921084	15		Rope																																													
69	45.593895	-89.55921317	2	Rock	Pole		1																														1													
70	45.593598	-89.55921549				TERRESTRIAL																																												
71	45.5986458	-89.55875284	9	Sand	Pole		3																													3														
72	45.5983487	-89.55875517	18		Rope		3																			3									1															
73	45.5980517	-89.5587575	20		Rope		2																			2																								
74	45.5977547	-89.55875982	16		Rope																																													
75	45.5974577	-89.55876215	26		Rope																																													
76	45.5971606	-89.55876448				DEEP																																												
77	45.5968636	-89.55876681				DEEP																																												
78	45.5965666	-89.55876914				DEEP																																												
79	45.5962696	-89.55877146				DEEP																																												
80	45.5959725	-89.55877379	36			DEEP																																												

Sampling Point	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Pole (P); Rake (R)	Comments	Total Rake Fullness	EWM	BRASC	CEREC	CHARA	DULAR	ELAMI	ELEAC	ELEPA	ELOCA	ELONU	ERIAQ	ISO_SP	JUNPE	LOBDO	BIDBE	MYRAL	MYRTE	NAJFL	NITELLA	NUPVA	NYMOD	PONCO	POTAM	POTEP	POTFO	POTGR	POTNA	POTPU&POTBE	POTRO	POTSP	POTST	POTVA	POTZO	RANFM	SAGCR	SCHTA	SPAANG	SPAFL	UTRIN	VALAM	F_AGLAE	SCHSU	JUNEF
81	45.5956755	-89.55877612	9	Rock	Pole																																													
82	45.5953785	-89.55877845	5	Rock	Pole																																													
83	45.5950815	-89.55878077	16		Rope																																													
84	45.5947845	-89.5587831	22		Rope																																													
85	45.5944874	-89.55878543	25		Rope		1																			1																								
86	45.5941904	-89.55878776	15	Rock	Pole																																													
87	45.5938934	-89.55879008	7	Sand	Pole		2				2																																							
88	45.5935964	-89.55879241	8	Rock	Pole		1				1																								1															
89	45.5932993	-89.55879474	11	Sand	Pole		1									1																																		
90	45.5986441	-89.55832972	6	Sand	Pole		2				1			1											1																									
91	45.5983471	-89.55833205	14		Rope		2																			2						1																		
92	45.5980501	-89.55833438	23		Rope																																													
93	45.5977531	-89.55833671				DEEP																																												
94	45.597456	-89.55833904				DEEP																																												
95	45.597159	-89.55834137				DEEP																																												
96	45.596862	-89.5583437				DEEP																																												
97	45.596565	-89.55834603				DEEP																																												
98	45.5962679	-89.55834836				DEEP																																												
99	45.5959709	-89.55835069	42			DEEP																																												
100	45.5956739	-89.55835302	45			DEEP																																												
101	45.5953769	-89.55835535	31			DEEP																																												
102	45.5950798	-89.55835768	34			DEEP																																												
103	45.5947828	-89.55836001	34			DEEP																																												
104	45.5944858	-89.55836234	34			DEEP																																												
105	45.5941888	-89.55836467	21		Rope																																													
106	45.5938917	-89.558367	29		Rope																																													
107	45.5935947	-89.55836933	23		Rope																																													
108	45.5932977	-89.55837166	13		Pole																																													
109	45.5930007	-89.55837399	7	Rock	Pole		1	1																																										
110	45.5927037	-89.55837632				TERRESTRIAL																																												
111	45.5989395	-89.55790427	4	Sand	Pole		3				1			1					1				2												1															
112	45.5986425	-89.5579066	10	Sand	Pole		2				2														1										1		1													
113	45.5983455	-89.55790894	11	Rock	Pole																																													
114	45.5980484	-89.55791127	28		Rope																																													
115	45.5977514	-89.5579136				DEEP																																												
116	45.5974544	-89.55791593				DEEP																																												
117	45.5971574	-89.55791827				DEEP																																												
118	45.5968603	-89.5579206				DEEP																																												
119	45.5965633	-89.55792293				DEEP																																												
120	45.5962663	-89.55792526				DEEP																																												
121	45.5959693	-89.5579276				DEEP																																												
122	45.5956723	-89.55792993				DEEP																																												
123	45.5953752	-89.55793226				DEEP																																												
124	45.5950782	-89.55793459				DEEP																																												
125	45.5947812	-89.55793693	37			DEEP																																												
126	45.5944842	-89.55793926	35			DEEP																																												
127	45.5941871	-89.55794159	35			DEEP																																												
128	45.5938901	-89.55794392	35			DEEP																																												
129	45.5935931	-89.55794625				DEEP																																												
130	45.5932961	-89.55794859	30		Rope																																													
131	45.592999	-89.55795092	21		Rope																																													
132	45.592702	-89.55795325	4	Rock	Pole		1	V								1																			1	1	1													
133	45.592405	-89.55795558				TERRESTRIAL																																												
134	45.592108	-89.55795791				TERRESTRIAL																																												
135	45.5989379	-89.55748115	7	Sand	Pole		3				3																																							
136	45.5986409	-89.55748349	11	Sand	Pole		3				3																																							
137	45.5983438	-89.55748582	12		Rope		1				1																																							
138	45.5980468	-89.55748816	24		Rope																																													
139	45.5977498	-89.55749049				DEEP																																												
140	45.5974528	-89.55749283				DEEP																																												
141	45.5971557	-89.55749516				DEEP																																												
142	45.5968587	-89.5574975				DEEP																																												
143	45.5965617	-89.55749983				DEEP																																												
144	45.5962647	-89.55750217				DEEP																																												
145	45.5959676	-89.5575045				DEEP																																												
146	45.5956706	-89.55750683				DEEP																																												
147	45.5953736	-89.55750917				DEEP																																												
148	45.5950766	-89.5575115				DEEP																																												
149	45.5947795	-89.55751384	41			DEEP																																												
150	45.5944825	-89.55751617	33			DEEP																																												
151	45.5941855	-89.55751851	34			DEEP																																												
152	45.5938885	-89.55752084	34			DEEP																																												
153	45.5935915	-89.55752317				DEEP																																												
154	45.5932944	-89.55752551				DEEP																																												
155	45.5929974	-89.55752784				DEEP																																												
156	45.5927004	-89.55753018	23		Rope																																													
157	45.5924034	-89.55753251	19		Rope																																													
158	45.5921063	-89.55753484	15		Rope																																													
159	45.5918093	-89.55753718				TERRESTRIAL																																												
160	45.5992333	-89.5570557	4	Sand	Pole																																													

Sampling Point	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Pole (P); Rake (R)	Comments	Total Rake Fullness	EWM	BRASC	CEREC	CHARA	DULAR	ELAMI	ELEAC	ELEPA	ELOCA	ELONU	ERIAQ	ISO_SP	JUNPE	LOBDO	BIDBE	MYRAL	MYRTE	NAJFL	NITELLA	NUPVA	NYMOD	PONCO	POTAM	POTEP	POTFO	POTGR	POTNA	POTPU&POTBE	POTRO	POTSP	POTST	POTVA	POTZO	RANFM	SAGCR	SCHTA	SPAANG	SPAFL	UTRIN	VALAM	F_AGLAE	SCHSU	JUNEF
161	45.5989362	-89.55705803	9	Sand	Pole		2				2														1														1											
162	45.5986392	-89.55706037	13		Rope																																													
163	45.5983422	-89.55706271	17		Rope																																													
164	45.5980452	-89.55706504				DEEP																																												
165	45.5977481	-89.55706738				DEEP																																												
166	45.5974511	-89.55706972				DEEP																																												
167	45.5971541	-89.55707206				DEEP																																												
168	45.5968571	-89.55707439				DEEP																																												
169	45.59656	-89.55707673				DEEP																																												
170	45.596263	-89.55707907				DEEP																																												
171	45.595966	-89.5570814				DEEP																																												
172	45.595669	-89.55708374				DEEP																																												
173	45.595372	-89.55708608				DEEP																																												
174	45.5950749	-89.55708841				DEEP																																												
175	45.5947779	-89.55709075	40			DEEP																																												
176	45.5944809	-89.55709309	14		Rope																																													
177	45.5941839	-89.55709542	24		Rope																																													
178	45.5938868	-89.55709776	26		Rope																																													
179	45.5935898	-89.5571001				DEEP																																												
180	45.5932928	-89.55710243				DEEP																																												
181	45.5929958	-89.55710477				DEEP																																												
182	45.5926987	-89.5571071				DEEP																																												
183	45.5924017	-89.55710944				DEEP																																												
184	45.5921047	-89.55711178	19		Rope																																													
185	45.5918077	-89.55711411	4	Sand	Pole		3									1																				1														
186	45.5992316	-89.55663257	5	Sand	Pole		3				1					1							1		1					1					1	1														
187	45.5989346	-89.55663491	9	Sand	Pole		3				3																																							
188	45.5986376	-89.55663725	15		Rope		2				2																																							
189	45.5983405	-89.55663959	23		Rope																																													
190	45.5980435	-89.55664193				DEEP																																												
191	45.5977465	-89.55664427				DEEP																																												
192	45.5974495	-89.55664661				DEEP																																												
193	45.5971525	-89.55664895				DEEP																																												
194	45.5968554	-89.55665129				DEEP																																												
195	45.5965584	-89.55665363				DEEP																																												
196	45.5962614	-89.55665597				DEEP																																												
197	45.5959644	-89.55665831				DEEP																																												
198	45.5956673	-89.55666064				DEEP																																												
199	45.5953703	-89.55666298				DEEP																																												
200	45.5950733	-89.55666532				DEEP																																												
201	45.5947763	-89.55666766	35			DEEP																																												
202	45.5944792	-89.55667	28		Rope																																													
203	45.5941822	-89.55667234	24		Rope																																													
204	45.5938852	-89.55667468	32			DEEP																																												
205	45.5935882	-89.55667702				DEEP																																												
206	45.5932911	-89.55667935	20		Rope																																													
207	45.5929941	-89.55668169				DEEP																																												
208	45.5926971	-89.55668403				DEEP																																												
209	45.5924001	-89.55668637				DEEP																																												
210	45.5921031	-89.55668871	30		Rope																																													
211	45.591806	-89.55669105	7	Rock	Pole																																													
212	45.59923	-89.55620945	3	Sand	Pole		1						1	1					1				1																											
213	45.598933	-89.5562118	14		Rope		2				2																																							
214	45.5986359	-89.55621414	22		Rope		2																			2																								
215	45.5983389	-89.55621648	28		Rope																																													
216	45.5980419	-89.55621882				DEEP																																												
217	45.5977449	-89.55622116				DEEP																																												
218	45.5974478	-89.5562235				DEEP																																												
219	45.5971508	-89.55622584				DEEP																																												
220	45.5968538	-89.55622818				DEEP																																												
221	45.5965568	-89.55623053				DEEP																																												
222	45.5962597	-89.55623287				DEEP																																												
223	45.5959627	-89.55623521				DEEP																																												
224	45.5956657	-89.55623755				DEEP																																												
225	45.5953687	-89.55623989				DEEP																																												
226	45.5950716	-89.55624223				DEEP																																												
227	45.5947746	-89.55624457	33			DEEP																																												
228	45.5944776	-89.55624691	33			DEEP																																												
229	45.5941806	-89.55624926	33			DEEP																																												
230	45.5938836	-89.5562516	33			DEEP																																												
231	45.5935865	-89.55625394				DEEP																																												
232	45.5932895	-89.55625628				DEEP																																												
233	45.5929925	-89.55625862	13		Rope																																													
234	45.5926955	-89.55626096	20		Rope																																													
235	45.5923984	-89.5562633	29		Rope																																													
236	45.5921014	-89.55626564	27		Rope		2																			2																								
237	45.5918044	-89.55626798	21		Rope																																													
238	45.6036837	-89.55575117	6	Sand	Pole		2	V			1			1									1							1																				
239	45.6033867	-89.55575352				TERRESTRIAL																																												
240	45.5992283	-89.55578633	5	Sand	Pole		2				2												1	1																										

Sampling Point	Latitiude (Decimal Degrees)	Longitude (Decimal Degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Pole (P); Rake (R)	Comments	Total Rake Fullness	EWM	BRASC	CEREC	CHARA	DULAR	ELAMI	ELEAC	ELEPA	ELOCA	ELONU	ERIAQ	ISO_SP	JUNPE	LOBDO	BIDBE	MYRAL	MYRTE	NAJFL	NITELLA	NUPVA	NYMOD	PONCO	POTAM	POTEP	POTFO	POTGR	POTNA	POTPU&POTBE	POTRO	POTSP	POTST	POTVA	POTZO	RANFM	SAGCR	SCHTA	SPAANG	SPAFL	UTRIN	VALAM	F_AGLAE	SCHSU	JUNEF
241	45.5989313	-89.55578868	17		Rope		3																				3																								
242	45.5986343	-89.55579102	24		Rope		3																				3																								
243	45.5983373	-89.55579336				DEEP																																											
244	45.5980402	-89.55579571				DEEP																																											
245	45.5977432	-89.55579805				DEEP																																											
246	45.5974462	-89.55580039				DEEP																																											
247	45.5971492	-89.55580274				DEEP																																											
248	45.5968521	-89.55580508				DEEP																																											
249	45.5965551	-89.55580742				DEEP																																											
250	45.5962581	-89.55580977				DEEP																																											
251	45.5959611	-89.55581211				DEEP																																											
252	45.595664	-89.55581446				DEEP																																											
253	45.595367	-89.5558168				DEEP																																											
254	45.59507	-89.55581914				DEEP																																											
255	45.594773	-89.55582149				DEEP																																											
256	45.594476	-89.55582383				DEEP																																											
257	45.5941789	-89.55582617				DEEP																																											
258	45.5938819	-89.55582851				DEEP																																											
259	45.5935849	-89.55583086				DEEP																																											
260	45.5932879	-89.5558332				DEEP																																											
261	45.5929908	-89.55583554				DEEP																																											
262	45.5926938	-89.55583789	22		Rope																																												
263	45.5923968	-89.55584023	8	Rock	Pole																																												
264	45.5920998	-89.55584257	19		Rope		2																				2																								
265	45.5918027	-89.55584492	20		Rope		1																				1																								
266	45.5915057	-89.55584726	3	Rock	Pole																																												
267	45.6039791	-89.55532567	2	Sand	Pole		1														1																														
268	45.603682	-89.55532802	9	Sand	Pole		1																	1																											
269	45.603385	-89.55533036	2	Sand	Pole																																												
270	45.603088	-89.55533271	1	Sand	Pole																																												
271	45.5992267	-89.55536321	11	Sand	Pole		3				3						1																		1															
272	45.5989297	-89.55536556	21		Rope		2																				2																								
273	45.5986326	-89.5553679	26		Rope		2																				2																								
274	45.5983356	-89.55537025				DEEP																																											
275	45.5980386	-89.55537259				DEEP																																											
276	45.5977416	-89.55537494				DEEP																																											
277	45.5974445	-89.55537729				DEEP																																											
278	45.5971475	-89.55537963				DEEP																																											
279	45.5968505	-89.55538198				DEEP																																											
280	45.5965535	-89.55538432				DEEP																																											
281	45.5962564	-89.55538667				DEEP																																											
282	45.5959594	-89.55538901				DEEP																																											
283	45.5956624	-89.55539136				DEEP																																											
284	45.5953654	-89.55539371				DEEP																																											
285	45.5950684	-89.55539605				DEEP																																											
286	45.5947713	-89.5553984				DEEP																																											
287	45.5944743	-89.55540074	27		Rope		1																				1																								
288	45.5941773	-89.55540309	26				1																				1																								
289	45.5938803	-89.55540543	25		Rope		1																				1																								
290	45.5935832	-89.55540778	28		Rope		1																				1																								
291	45.5932862	-89.55541012	28		Rope																																												
292	45.5929892	-89.55541247	30		Rope		1																				1																								
293	45.5926922	-89.55541481	29		Rope																																												
294	45.5923951	-89.55541716	25		Rope																																												
295	45.5920981	-89.55541951	2	Rock	Pole																																												
296	45.5918011	-89.55542185	14		Rope		2																				1										2															
297	45.5915041	-89.5554242	13		Rope		2																				1											1														
298	45.6042744	-89.55490016	5	Woody	Pole																																												
299	45.6039774	-89.55490251	11	Sand	Pole		1																														1														
300	45.6036804	-89.55490486	12	Sand	Pole																																												
301	45.6033834	-89.55490721	12	Sand	Pole		1	1																												1														
302	45.6030863	-89.55490956	7	Sand	Pole																																												
303	45.599225	-89.55494009	15		Rope		2				1															2																									
304	45.598928	-89.55494244	23		Rope		1																				1																								
305	45.598631	-89.55494479	28		Rope		3																				3																								
306	45.598334	-89.55494713				DEEP																																											
307	45.5980369	-89.55494948				DEEP																																											
308	45.5977399	-89.55495183				DEEP																																											
309	45.5974429	-89.55495418				DEEP																																											
310	45.5971459	-89.55495653				DEEP																																											
311	45.5968488	-89.55495887				DEEP																																											
312	45.5965518	-89.55496122				DEEP																																											
313	45.5962548	-89.55496357				DEEP																																											
314	45.5959578	-89.55496592				DEEP																																											
315	45.5956608	-89.55496827				DEEP																																											
316	45.5953637	-89.55497061				DEEP																																											
317	45.5950667	-89.55497296				DEEP																																											
318	45.5947697	-89.55497531	28		Rope		2																				2																								
319	45.5944727	-89.55497766	19		Rope		1				1															1	1																								
320	45.5941756	-89.55498	6	Sand	Pole		1				1			1																																				

Sampling Point	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Pole (P); Rake (R)	Comments	Total Rake Fullness	EWM	BRASC	CEREC	CHARA	DULAR	ELAMI	ELEAC	ELEPA	ELOCA	ELONU	ERIAQ	ISO_SP	JUNPE	LOBDO	BIDBE	MYRAL	MYRTE	NAJFL	NITELLA	NUPVA	NYMOD	PONCO	POTAM	POTEP	POTFO	POTGR	POTNA	POTPU&POTBE	POTRO	POTSP	POTST	POTVA	POTZO	RANFM	SAGCR	SCHTA	SPAANG	SPAFL	UTRIN	VALAM	F_AGLAE	SCHSU	JUNEF
321	45.5938786	-89.55498235	7	Sand	Pole		1																		1					1																				
322	45.5935816	-89.5549847	10	Sand	Pole		3									1									1										2															
323	45.5932846	-89.55498705	12		Rope		1				1														1	1																								
324	45.5929875	-89.5549894	18		Rope		2																			2																								
325	45.5926905	-89.55499174	27		Rope		1																			1																								
326	45.5923935	-89.55499409	28		Rope																																													
327	45.5920965	-89.55499644	10	Rock	Pole																																													
328	45.5915024	-89.55500113	7	Sand	Pole		2				1			1		1							1		1	1										1														
329	45.5912054	-89.55500348	4	Sand	Pole		1									1							1		1											1														
330	45.6042728	-89.554477	11	Sand	Pole		1	V																												1														
331	45.6039758	-89.55447936	13	Sand	Pole		3										1									1				2																				
332	45.6036787	-89.55448171	12	Sand	Pole		2																													2														
333	45.6033817	-89.55448406	13	Sand	Pole		2																													2														
334	45.6030847	-89.55448641	9	Sand	Pole																																													
335	45.5995204	-89.55451462	10	Sand	Pole		2				2														1																									
336	45.5992234	-89.55451697	19		Rope		2																			2																								
337	45.5989264	-89.55451932	27		Rope		2																			2																								
338	45.5986293	-89.55452167				DEEP																																														
339	45.5983323	-89.55452402				DEEP																																														
340	45.5980353	-89.55452637				DEEP																																														
341	45.5977383	-89.55452872				DEEP																																														
342	45.5974412	-89.55453107				DEEP																																														
343	45.5971442	-89.55453342				DEEP																																														
344	45.5968472	-89.55453577				DEEP																																														
345	45.5965502	-89.55453812				DEEP																																														
346	45.5962532	-89.55454047				DEEP																																														
347	45.5959561	-89.55454282				DEEP																																														
348	45.5956591	-89.55454517				DEEP																																														
349	45.5953621	-89.55454752				DEEP																																														
350	45.5950651	-89.55454987				DEEP																																														
351	45.594768	-89.55455222	21		Rope		1				1																																									
352	45.594471	-89.55455457	5	Sand	Pole		2							2											1										1															
353	45.5926889	-89.55456867	23		Rope		1																			1																								
354	45.5923918	-89.55457102	28		Rope		1																			1																								
355	45.5920948	-89.55457337	26		Rope																																													
356	45.5917978	-89.55457572	6	Rock	Pole																																													
357	45.6045682	-89.55405149	7	Sand	Pole		1							1						1			1												1		1													
358	45.6042711	-89.55405384	12	Sand	Pole																																													
359	45.6039741	-89.5540562	14	Sand	Pole		2				1						2																						1											
360	45.6036771	-89.55405855	13	Sand	Pole																																													
361	45.6033801	-89.5540609	13	Sand	Pole		2										2									1									1															
362	45.603083	-89.55406326	9	Sand	Pole																																													
363	45.5995188	-89.55409149	15		Rope																																													
364	45.5992217	-89.55409385	23		Rope		3																			3																								
365	45.5989247	-89.5540962	29		Rope																																													
366	45.5986277	-89.55409855				DEEP																																														
367	45.5983307	-89.5541009				DEEP																																														
368	45.5980336	-89.55410326				DEEP																																														
369	45.5977366	-89.55410561				DEEP																																														
370	45.5974396	-89.55410796				DEEP																																														
371	45.5971426	-89.55411031				DEEP																																														
372	45.5968455	-89.55411267				DEEP																																														
373	45.5965485	-89.55411502				DEEP																																														
374	45.5962515	-89.55411737				DEEP																																														
375	45.5959545	-89.55411972				DEEP																																														
376	45.5956575	-89.55412208				DEEP																																														
377	45.5953604	-89.55412443				DEEP																																														
378	45.5950634	-89.55412678	28		Rope		1																			1																								
379	45.5947664	-89.55412913	13	Rock	Pole		1																		1												1													
380	45.5926872	-89.5541456	21		Rope		2																			2																								
381	45.5923902	-89.55414795	28		Rope		1																			1																								
382	45.5920932	-89.5541503	28		Rope		1																			1																								
383	45.5917961	-89.55415265	25		Rope		1																			1																								
384	45.5914991	-89.55415501		Rock	Pole																																													
385	45.5909051	-89.55415971				TERRESTRIAL																																														
386	45.6051605	-89.55362362	4	Sand	Pole		1							1					1	1																					1									
387	45.6048635	-89.55362597	2	Sand	Pole		1						1	1						1																														
388	45.6045665	-89.55362833	14		Rope																																													
389	45.6042695	-89.55363069	14		Rope																																													
390	45.6039725	-89.55363304	14		Rope		3										3									1									1	1														
391	45.6036754	-89.5536354	13		Rope		2				1					1	1																		1	1														
392	45.6033784	-89.55363775	13		Rope		2										1															1				1														
393	45.6030814	-89.55364011	10	Sand	Pole																																													
394	45.5998141	-89.55366602	16		Rope																																													
395	45.5995171	-89.55366837	21		Rope		2																			2																								
396	45.5992201	-89.55367073	26		Rope																																													
397	45.5989231	-89.55367308	30		Rope																																													
398	45.598626	-89.55367544				DEEP																																														
399	45.598329	-89.55367779				DEEP																																														
400	45.598032	-89.55368015				DEEP																																														

Sampling Point	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Pole (P); Rake (R)	Comments	Total Rake Fullness	EWM	BRASC	CEREC	CHARA	DULAR	ELAMI	ELEAC	ELEPA	ELOCA	ELONU	ERIAQ	ISO_SP	JUNPE	LOBDO	BIDBE	MYRAL	MYRTE	NAJFL	NITELLA	NUPVA	NYMOD	PONCO	POTAM	POTEP	POTFO	POTGR	POTNA	POTPU&POTBE	POTRO	POTSP	POTST	POTVA	POTZO	RANFM	SAGCR	SCHTA	SPAANG	SPAFL	UTRIN	VALAM	F_AGLAE	SCHSU	JUNEF
401	45.597735	-89.5536825				DEEP																																												
402	45.5974379	-89.55368485				DEEP																																												
403	45.5971409	-89.55368721				DEEP																																												
404	45.5968439	-89.55368956				DEEP																																												
405	45.5965469	-89.55369192				DEEP																																												
406	45.5962498	-89.55369427				DEEP																																												
407	45.5959528	-89.55369663				DEEP																																												
408	45.5956558	-89.55369898				DEEP																																												
409	45.5953588	-89.55370134				DEEP																																												
410	45.5950618	-89.55370369				DEEP																																												
411	45.5947647	-89.55370605	7	Sand	Pole		1				1														1																											
412	45.5926856	-89.55372253	20		Rope		2																			2																										
413	45.5923885	-89.55372488	27		Rope																																															
414	45.5920915	-89.55372723	27		Rope		1																			1																										
415	45.5917945	-89.55372959	27		Rope		1																			1																										
416	45.5914975	-89.55373194	18		Rope																																															
417	45.5912004	-89.5537343				TERRESTRIAL																																												
418	45.5906064	-89.553739		Muck	Pole		2	1	1														1															1														
419	45.6057529	-89.55319574	9	Sand	Pole		1				1														1													1														
420	45.6054559	-89.55319809	13	Sand	Pole		1																			1										1																
421	45.6051589	-89.55320045	15		Rope																																															
422	45.6048619	-89.55320281	15		Pole		1				1																																									
423	45.6045648	-89.55320517	16		Rope		1																													1	1															
424	45.6042678	-89.55320753	15		Rope		1				1					1																																				
425	45.6039708	-89.55320988	15		Rope		3										3									1										1																
426	45.6036738	-89.55321224	14		Pole		1				1						1									1														1												
427	45.6033768	-89.5532146	14		Rope																																															
428	45.6030797	-89.55321696	4	Sand	Pole		1													1																																
429	45.6001095	-89.55324053	14		Rope																																															
430	45.5998125	-89.55324289	22		Rope		1																			1																										
431	45.5995155	-89.55324525	25		Rope		2																			2																										
432	45.5992184	-89.5532476	29		Rope																																															
433	45.5989214	-89.55324996				DEEP																																												
434	45.5986244	-89.55325232				DEEP																																												
435	45.5983274	-89.55325468				DEEP																																												
436	45.5980303	-89.55325703				DEEP																																												
437	45.5977333	-89.55325939				DEEP																																												
438	45.5974363	-89.55326175				DEEP																																												
439	45.5971393	-89.5532641				DEEP																																												
440	45.5968422	-89.55326646				DEEP																																												
441	45.5965452	-89.55326882				DEEP																																												
442	45.5962482	-89.55327117				DEEP																																												
443	45.5959512	-89.55327353				DEEP																																												
444	45.5956541	-89.55327589				DEEP																																												
445	45.5953571	-89.55327824				DEEP																																												
446	45.5950601	-89.5532806				DEEP																																												
447	45.5947631	-89.55328296	18		Rope		1																			1																										
448	45.5929809	-89.5532971	6	Sand	Pole		3										1													1						2																
449	45.5926839	-89.55329945	18		Rope																																															
450	45.5923869	-89.55330181	26		Rope		1																			1																										
451	45.5920899	-89.55330417	27		Rope		3																			3																										
452	45.5917928	-89.55330652	27		Rope																																															
453	45.5914958	-89.55330888	26		Rope																																															
454	45.5911988	-89.55331124	4	Rock	Pole		1							1																																						
455	45.5906047	-89.55331595	2	Muck	Pole		1		1																											1	1															
456	45.5903077	-89.5533183				TERRESTRIAL																																												
457	45.6063453	-89.55276785	3	Sand	Pole		1				1												1	1																												
458	45.6060483	-89.55277021	11	Sand	Pole		1																													1	1															
459	45.6057513	-89.55277257	15		Rope																																															
460	45.6054543	-89.55277493	17		Rope		2										2																																			
461	45.6051572	-89.55277729	18		Rope		1																														1															
462	45.6048602	-89.55277965	18		Rope																																															
463	45.6045632	-89.55278201	19		Rope																																															
464	45.6042662	-89.55278437	17		Rope		2				2					1										1																										
465	45.6039691	-89.55278673	16		Rope		2										2									1																										
466	45.6036721	-89.55278909	15		Rope		2									1										1											1															
467	45.6033751	-89.55279145	15		Rope		1																														1															
468	45.6030781	-89.55279381	3	Rock	Pole		1							1					1						1																											
469	45.6027811	-89.55279617				TERRESTRIAL																																												
470	45.6004049	-89.55281504	14		Rope		2				2														1																											
471	45.6001078	-89.5528174	24		Rope		3																			3																										
472	45.5998108	-89.55281976	29		Rope																																															
473	45.5995138	-89.55282212				DEEP																																												
474	45.5992168	-89.55282448				DEEP																																												
475	45.5989198	-89.55282684				DEEP																																												
476	45.5986227	-89.5528292				DEEP																																												
477	45.5983257	-89.55283156				DEEP																																												
478	45.5980287	-89.55283392				DEEP																																												
479	45.5977317	-89.55283628				DEEP																																												
480	45.5974346	-89.55283864				DEEP																																												

Sampling Point	Latitiude (Decimal Degrees)	Longitude (Decimal Degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Pole (P); Rake (R)	Comments	Total Rake Fullness	EWM	BRASC	CEREC	CHARA	DULAR	ELAMI	ELEAC	ELEPA	ELOCA	ELONU	ERIAQ	ISO_SP	JUNPE	LOBDO	BIDBE	MYRAL	MYRTE	NAJFL	NITELLA	NUPVA	NYMOD	PONCO	POTAM	POTEP	POTFO	POTGR	POTNA	POTPU&POTBE	POTRO	POTSP	POTST	POTVA	POTZO	RANFM	SAGCR	SCHTA	SPAANG	SPAFL	UTRIN	VALAM	F_AGLAE	SCHSU	JUNEF
481	45.5971376	-89.552841				DEEP																																												
482	45.5968406	-89.55284336				DEEP																																												
483	45.5965436	-89.55284572				DEEP																																												
484	45.5962465	-89.55284808				DEEP																																												
485	45.5959495	-89.55285043				DEEP																																												
486	45.5956525	-89.55285279				DEEP																																												
487	45.5953555	-89.55285515				DEEP																																												
488	45.5950584	-89.55285751				DEEP																																												
489	45.5947614	-89.55285987	22		Rope		1																			1																								
490	45.5944644	-89.55286223				TERRESTRIAL																																												
491	45.5926823	-89.55287638	8	Rock	Pole						1																									1																
492	45.5923852	-89.55287874	18		Rope																																															
493	45.5920882	-89.5528811	25		Rope		2																			2																								
494	45.5917912	-89.55288346	27		Rope																																															
495	45.5914942	-89.55288582	27		Rope																																															
496	45.5911971	-89.55288817	23		Rope																																															
497	45.5903061	-89.55289525	4	Muck	Pole		3		1								1													1						2														
498	45.6063437	-89.55234467	12	Sand	Pole																																															
499	45.6060466	-89.55234703	16		Rope																																															
500	45.6057496	-89.5523494	17		Rope		2										2																		1															
501	45.6054526	-89.55235176	18		Rope		2				2																								1															
502	45.6051556	-89.55235412	19		Rope		3				1						1									3									1															
503	45.6048586	-89.55235648	20		Rope		3																			3																								
504	45.6045615	-89.55235885	20		Rope		3																			3																								
505	45.6042645	-89.55236121	19		Rope		1				1																								1															
506	45.6039675	-89.55236357	15		Rope		3				1					1										3									1															
507	45.6036705	-89.55236593	15		Rope		3				1					1										3									1															
508	45.6033734	-89.55236829	16		Rope		3									1										3																								
509	45.6030764	-89.55237066	11	Sand	Pole		2																		1												2													
510	45.6027794	-89.55237302				TERRESTRIAL																																												
511	45.6024824	-89.55237538	1	Sand	Pole		1													1					1												1													
512	45.6021853	-89.55237774	7	Sand	Pole		3									1	1													1						3														
513	45.6018883	-89.55238011	1	Rock	Pole																																															
514	45.6007002	-89.55238955	13	Sand	Pole		1																		1										1															
515	45.6004032	-89.55239191	20		Rope		1																			1																								
516	45.6001062	-89.55239428				DEEP																																												
517	45.5998092	-89.55239664				DEEP																																												
518	45.5995121	-89.552399				DEEP																																												
519	45.5992151	-89.55240136				DEEP																																												
520	45.5989181	-89.55240372				DEEP																																												
521	45.5986211	-89.55240609				DEEP																																												
522	45.598324	-89.55240845				DEEP																																												
523	45.598027	-89.55241081				DEEP																																												
524	45.59773	-89.55241317				DEEP																																												
525	45.597433	-89.55241553				DEEP																																												
526	45.597136	-89.55241789				DEEP																																												
527	45.5968389	-89.55242025				DEEP																																												
528	45.5965419	-89.55242262	35			DEEP																																												
529	45.5962449	-89.55242498				DEEP																																												
530	45.5959479	-89.55242734				DEEP																																												
531	45.5956508	-89.5524297				DEEP																																												
532	45.5953538	-89.55243206				DEEP																																												
533	45.5950568	-89.55243442	33			DEEP																																												
534	45.5947598	-89.55243678	21		Rope		1																			1																								
535	45.5944627	-89.55243914	4	Sand	Pole		2																1		1					1																			1		
536	45.5923836	-89.55245567	9	Sand	Pole		1				1																			1					1															
537	45.5920866	-89.55245803	17		Rope																																															
538	45.5917895	-89.55246039	26		Rope		1																			1																								
539	45.5914925	-89.55246275	27		Rope																																															
540	45.5911955	-89.55246511	25		Rope																																															
541	45.5908985	-89.55246747	11	Rock	Pole																																															
542	45.5903044	-89.5524722	9	Muck	Pole		3																													3														
543	45.6072331	-89.5519144	4	Muck	Pole		3																													3														
544	45.6069361	-89.55191677	11	Sand	Pole		2																		1										1	2														
545	45.606639	-89.55191913	9		Rope		1				1														1											1														
546	45.606342	-89.5519215	15		Rope		1																													1														
547	45.606045	-89.55192386	16		Rope		2										2									1																								
548	45.605748	-89.55192623	18		Rope																																															
549	45.6054509	-89.55192859	20		Rope		1																												1	1														
550	45.6051539	-89.55193096	21		Rope		3																			3																								
551	45.6048569	-89.55193332	21		Rope		1																			1																								
552	45.6045599	-89.55193568	21		Rope		2																			2									1															
553	45.6042629	-89.55193805	18		Rope		3									1										3									1	1														
554	45.6039658	-89.55194041	16		Rope		3									1	1									3									1															
555	45.6036688	-89.55194278	14		Rope		2									1																				2														
556	45.6033718	-89.55194514	17		Rope		3																			1									3															
557	45.6030748	-89.55194751	14		Rope		1																												1															
558	45.6027777	-89.55194987	12	Sand	Pole		1				1																										1													
559	45.6024807	-89.55195224	9	Sand	Pole		2				1												1		2												1													
560	45.6021837	-89.5519546	11	Sand	Pole		2																													2														

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561	45.6018867	-89.55195696	7	Sand	Pole		2				2														1												1													
562	45.6015896	-89.55195933	9	Sand	Pole		1																		1												1													
563	45.6012926	-89.55196169	9	Sand	Pole																																													
564	45.6009956	-89.55196406	13	Sand	Pole		1				1																																							
565	45.6006986	-89.55196642	23		Rope		1																			1																								
566	45.6004016	-89.55196878				DEEP																																												
567	45.6001045	-89.55197115				DEEP																																												
568	45.5998075	-89.55197351				DEEP																																												
569	45.5995105	-89.55197588				DEEP																																												
570	45.5992135	-89.55197824				DEEP																																												
571	45.5989164	-89.5519806				DEEP																																												
572	45.5986194	-89.55198297				DEEP																																												
573	45.5983224	-89.55198533				DEEP																																												
574	45.5980254	-89.5519877				DEEP																																												
575	45.5977283	-89.55199006				DEEP																																												
576	45.5974313	-89.55199242				DEEP																																												
577	45.5971343	-89.55199479				DEEP																																												
578	45.5968373	-89.55199715				DEEP																																												
579	45.5965402	-89.55199951	29		Rope		1																			1																								
580	45.5962432	-89.55200188				DEEP																																												
581	45.5959462	-89.55200424				DEEP																																												
582	45.5956492	-89.5520066				DEEP																																												
583	45.5953522	-89.55200897				DEEP																																												
584	45.5950551	-89.55201133				DEEP																																												
585	45.5947581	-89.5520137	24		Rope		1																			1																								
586	45.5944611	-89.55201606	7	Sand	Pole		3				1												2		1										1	1	1													
587	45.5923819	-89.5520326	2	Rock	Pole															1																	1													
588	45.5920849	-89.55203496	8	Rock	Pole		1				1																											1												
589	45.5917879	-89.55203733	22		Rope																																													
590	45.5914908	-89.55203969	28		Rope																																													
591	45.5911938	-89.55204205	28		Rope																																													
592	45.5908968	-89.55204442	9	Rock	Pole																																													
593	45.5903028	-89.55204914	10	Muck	Pole		3									1																				3														
594	45.5900057	-89.5520515				TERRESTRIAL																																												
595	45.6072314	-89.55149122	5	Muck	Pole		2									1																				2														
596	45.6069344	-89.55149359	12	Sand	Pole		2																													2														
597	45.6066374	-89.55149595	13		Rope		1																													1														
598	45.6063403	-89.55149832	14		Rope		3										2									2																								
599	45.6060433	-89.55150069	15		Rope		2																													2														
600	45.6057463	-89.55150306	17		Rope		2									1	1									1									1	1														
601	45.6054493	-89.55150542	20		Rope		2																			2									1															
602	45.6051523	-89.55150779	21		Rope		3																			3																								
603	45.6048552	-89.55151016	21		Rope		3																			3																								
604	45.6045582	-89.55151252	21		Rope		3																			3																								
605	45.6042612	-89.55151489	15		Rope																																													
606	45.6039642	-89.55151726	15		Rope																																													
607	45.6036671	-89.55151962	17		Rope		2																			2																								
608	45.6033701	-89.55152199	15		Rope		1																			1						1																		
609	45.6030731	-89.55152436	14		Rope		2				1																									2														
610	45.6027761	-89.55152672	7	Sand	Pole		1				1														1												1													
611	45.6024791	-89.55152909	4	Sand	Pole																																													
612	45.602182	-89.55153146	5	Sand	Pole		2				1			1									1																											
613	45.601885	-89.55153382	9	Sand	Pole		3				3														1																									
614	45.601588	-89.55153619	12	Sand	Pole		1				1																								1															
615	45.601291	-89.55153856	10	Rock	Pole		1				1																																							
616	45.6009939	-89.55154092	18		Rope																																													
617	45.6006969	-89.55154329	26		Rope																																													
618	45.6003999	-89.55154565				DEEP																																												
619	45.6001029	-89.55154802				DEEP																																												
620	45.5998058	-89.55155039				DEEP																																												
621	45.5995088	-89.55155275				DEEP																																												
622	45.5992118	-89.55155512				DEEP																																												
623	45.5989148	-89.55155749				DEEP																																												
624	45.5986178	-89.55155985				DEEP																																												
625	45.5983207	-89.55156222				DEEP																																												
626	45.5980237	-89.55156458				DEEP																																												
627	45.5977267	-89.55156695				DEEP																																												
628	45.5974297	-89.55156932				DEEP																																												
629	45.5971326	-89.55157168				DEEP																																												
630	45.5968356	-89.55157405	34			DEEP																																												
631	45.5965386	-89.55157641	22		Rope		1																			1																								
632	45.5962416	-89.55157878	26		Rope		1																			1																								
633	45.5959445	-89.55158114	32			DEEP																																												
634	45.5956475	-89.55158351				DEEP																																												
635	45.5953505	-89.55158588				DEEP																																												
636	45.5950535	-89.55158824				DEEP																																												
637	45.5947564	-89.55159061	22		Rope		1																			1																								
638	45.5944594	-89.55159297	13	Sand	Pole		1																		1																									
639	45.5941624	-89.55159534				TERRESTRIAL																																												
640	45.5920832	-89.5516119	24		Rope																																													

Sampling Point	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Pole (P); Rake (R)	Comments	Total Rake Fullness	EWM	BRASC	CEREC	CHARA	DULAR	ELAMI	ELEAC	ELEPA	ELOCA	ELONU	ERIAQ	ISO_SP	JUNPE	LOBDO	BIDBE	MYRAL	MYRTE	NAJFL	NITELLA	NUPVA	NYMOD	PONCO	POTAM	POTEP	POTFO	POTGR	POTNA	POTPU&POTBE	POTRO	POTSP	POTST	POTVA	POTZO	RANFM	SAGCR	SCHTA	SPAANG	SPAFL	UTRIN	VALAM	F_AGLAE	SCHSU	JUNEF
641	45.5917862	-89.55161426	28		Rope																																													
642	45.5914892	-89.55161663	29		Rope																																													
643	45.5911922	-89.55161899	28		Rope																																													
644	45.5908951	-89.55162136	16		Rope																																													
645	45.5903011	-89.55162609	10	Muck	Pole		3									1																				3														1		
646	45.5900041	-89.55162845	4	Muck	Pole		3									1																				2																
647	45.6069327	-89.55107041	4	Sand	Pole		2																2							1						1					1											
648	45.6066357	-89.55107278	11	Sand	Pole		3			1	1																			1									1													
649	45.6063387	-89.55107515	13		Rope		2										1																			2																
650	45.6060417	-89.55107752	15		Rope		1																			1																										
651	45.6057446	-89.55107989	16		Rope		1																			1																										
652	45.6054476	-89.55108225	19		Rope		1																			1																										
653	45.6051506	-89.55108462	21		Rope		3									1										3																										
654	45.6048536	-89.55108699	21		Rope		3																			3																										
655	45.6045566	-89.55108936	21		Rope		1																			1																										
656	45.6042595	-89.55109173	21		Rope		3				1															3																										
657	45.6039625	-89.5510941	20		Rope																																													
658	45.6036655	-89.55109647	6	Rock	Pole		2				2																																									
659	45.6033685	-89.55109884	4	Rock	Pole																																													
660	45.6030714	-89.55110121	6	Sand	Pole		2				1			1									1																													
661	45.6015863	-89.55111305	1	Rock	Pole																																													
662	45.6012893	-89.55111542	14		Rope																																													
663	45.6009923	-89.55111779	8	Rock	Pole																																													
664	45.6006953	-89.55112016	14		Rope																																													
665	45.6003982	-89.55112252				DEEP																																												
666	45.6001012	-89.55112489				DEEP																																												
667	45.5998042	-89.55112726				DEEP																																												
668	45.5995072	-89.55112963				DEEP																																												
669	45.5992101	-89.551132				DEEP																																												
670	45.5989131	-89.55113437				DEEP																																												
671	45.5986161	-89.55113674				DEEP																																												
672	45.5983191	-89.5511391				DEEP																																												
673	45.598022	-89.55114147				DEEP																																												
674	45.597725	-89.55114384				DEEP																																												
675	45.597428	-89.55114621				DEEP																																												
676	45.597131	-89.55114858				DEEP																																												
677	45.596834	-89.55115094				DEEP																																												
678	45.5965369	-89.55115331	15		Rope																																													
679	45.5962399	-89.55115568	15		Rope		1																			1																										
680	45.5959429	-89.55115805	26		Rope		1																			1																										
681	45.5956459	-89.55116042				DEEP																																												
682	45.5953488	-89.55116278	34			DEEP																																												
683	45.5950518	-89.55116515				DEEP																																												
684	45.5947548	-89.55116752	28		Rope		1																			1																										
685	45.5944578	-89.55116989	19		Rope		1																		1							1																				
686	45.5941607	-89.55117226		Sand																																														
687	45.5923786	-89.55118646	6	Rock	Pole		1																																	1												
688	45.5920816	-89.55118883	24		Rope																																													
689	45.5917846	-89.5511912	29		Rope																																													
690	45.5914875	-89.55119356	30		Rope																																													
691	45.5911905	-89.55119593	29		Rope																																													
692	45.5908935	-89.5511983	21		Rope																																													
693	45.5905965	-89.55120067		Rock	Pole																																													
694	45.5900024	-89.5512054	4	Muck	Pole		2		1																			1								1																
695	45.606337	-89.55065197	6	Muck	Pole		3																													3																
696	45.60604	-89.55065434	9	Sand	Pole		2				1					1														1	1					1	1															
697	45.605743	-89.55065672	10	Sand	Pole																																													
698	45.605446	-89.55065909	16		Rope		1																													1																
699	45.6051489	-89.55066146	19		Rope		1																			1																										
700	45.6048519	-89.55066383	20		Rope		3																			3																										
701	45.6045549	-89.5506662	22		Rope		3																			3																										
702	45.6042579	-89.55066857	22		Rope		3																			3																										
703	45.6039608	-89.55067094	22		Rope		3																			3																										
704	45.6036638	-89.55067331	20		Rope																																													
705	45.6033668	-89.55067569	18		Rope																																													
706	45.6030698	-89.55067806	9	Rock	Pole		1				1														1										1																	
707	45.6027727	-89.55068043	14	Rock	Pole																																													
708	45.6024757	-89.5506828	13	Rock	Pole		1																		1																											
709	45.6021787	-89.55068517	20		Rope																																													
710	45.6018817	-89.55068754	13	Sand	Pole																																													
711	45.6015847	-89.55068991	17		Rope																																													
712	45.6012876	-89.55069228	24		Rope		3																			3																										
713	45.6009906	-89.55069465	19		Rope																																													
714	45.6006936	-89.55069702	26		Rope																																													
715	45.6003966	-89.55069939				DEEP																																												
716	45.6000995	-89.55070177				DEEP																																												
717	45.5998025	-89.55070414				DEEP																																												
718	45.5995055	-89.55070651				DEEP																																												
719	45.5992085	-89.55070888				DEEP																																												
720	45.5989114	-89.55071125				DEEP																																												

Sampling Point	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Pole (P); Rake (R)	Comments	Total Rake Fullness	EWM	BRASC	CEREC	CHARA	DULAR	ELAMI	ELEAC	ELEPA	ELOCA	ELONU	ERIAQ	ISO_SP	JUNPE	LOBDO	BIDBE	MYRAL	MYRTE	NAJFL	NITELLA	NUPVA	NYMOD	PONCO	POTAM	POTEP	POTFO	POTGR	POTNA	POTPU&POTBE	POTRO	POTSP	POTST	POTVA	POTZO	RANFM	SAGCR	SCHTA	SPAANG	SPAFL	UTRIN	VALAM	F_AGLAE	SCHSU	JUNEF
721	45.5986144	-89.55071362				DEEP																																												
722	45.5983174	-89.55071599				DEEP																																												
723	45.5980204	-89.55071836				DEEP																																												
724	45.5977234	-89.55072073				DEEP																																												
725	45.5974263	-89.5507231				DEEP																																												
726	45.5971293	-89.55072547	23		Rope		1				1															1																								
727	45.5968323	-89.55072784	16		Rope		1																		1										1															
728	45.5965353	-89.55073021	9	Sand	Pole		1																		1																									
729	45.5962382	-89.55073258	10	Sand	Pole		1				1																																							
730	45.5959412	-89.55073495	18		Rope																																													
731	45.5956442	-89.55073732	26		Rope																																													
732	45.5953472	-89.55073969	30		Rope																																													
733	45.5950501	-89.55074206	33			DEEP																																												
734	45.5947531	-89.55074443	32			DEEP																																												
735	45.5944561	-89.5507468	20		Rope																																													
736	45.5941591	-89.55074917	1	Sand	Pole						1												1											1				1												
737	45.5923769	-89.55076339	1	Rock	Pole																																													
738	45.5920799	-89.55076576	20		Rope																																													
739	45.5917829	-89.55076813	29		Rope																																													
740	45.5914859	-89.5507705	31			DEEP																																												
741	45.5911888	-89.55077287	30		Rope																																													
742	45.5908918	-89.55077524	17		Rope																																													
743	45.5905948	-89.55077761	3	Rock	Pole																																													
744	45.5900007	-89.55078235	10	Muck	Pole		3																													3														
745	45.5897037	-89.55078472				TERRESTRIAL																																												
746	45.6054443	-89.55023592	1	Sand	Pole		1							1						1	1																													
747	45.6051473	-89.55023829	9	Sand	Pole		2				2																										1													
748	45.6048502	-89.55024067	18		Rope																																													
749	45.6045532	-89.55024304	20		Rope																																													
750	45.6042562	-89.55024541	21		Rope		3																			3																								
751	45.6039592	-89.55024779	22		Rope		2																			2																								
752	45.6036622	-89.55025016	23		Rope		3																			3																								
753	45.6033651	-89.55025253	23		Rope		1																			1																								
754	45.6030681	-89.55025491	22		Rope		3																			3																								
755	45.6027711	-89.55025728	22		Rope		3																			3																								
756	45.6024741	-89.55025965	22		Rope		3																			3																								
757	45.602177	-89.55026203	24		Rope		3																			3																								
758	45.60188	-89.5502644	25		Rope		3																			3																								
759	45.601583	-89.55026677	25		Rope		1																			1																								
760	45.601286	-89.55026915	28		Rope																																													
761	45.6009889	-89.55027152	30		Rope																																													
762	45.6006919	-89.55027389				DEEP																																												
763	45.6003949	-89.55027627				DEEP																																												
764	45.6000979	-89.55027864				DEEP																																												
765	45.5998009	-89.55028101				DEEP																																												
766	45.5995038	-89.55028338				DEEP																																												
767	45.5992068	-89.55028576				DEEP																																												
768	45.5989098	-89.55028813				DEEP																																												
769	45.5986128	-89.5502905				DEEP																																												
770	45.5983157	-89.55029288				DEEP																																												
771	45.5980187	-89.55029525	32			DEEP																																												
772	45.5977217	-89.55029762	30		Rope																																													
773	45.5974247	-89.55029999	16		Rope																																													
774	45.5971276	-89.55030237	9	Rock	Pole		1																		1																									
775	45.5968306	-89.55030474	5	Sand	Pole		1				1															1																								
776	45.5965336	-89.55030711	5	Sand	Pole		1				1										1																													
777	45.5962366	-89.55030948	4	Sand	Pole		1				1																			1																				
778	45.5959396	-89.55031186	8	Sand	Pole		1																		1																									
779	45.5956425	-89.55031423	19		Rope																																													
780	45.5953455	-89.5503166	28		Rope		1																			1																								
781	45.5950485	-89.55031897	32			DEEP																																												
782	45.5947515	-89.55032135	29		Rope																																													
783	45.5944544	-89.55032372	16		Rope		1																		1																									
784	45.5941574	-89.55032609		Sand																																														
785	45.5920782	-89.55034269	10	Rock	Pole																																													
786	45.5917812	-89.55034507	25		Rope																																													
787	45.5914842	-89.55034744	27		Rope																																													
788	45.5911872	-89.55034981	25		Rope		3																			3																								
789	45.5908902	-89.55035218	15		Rope																																													
790	45.5905931	-89.55035455				TERRESTRIAL																																												
791	45.5899991	-89.5503593	10	Muck	Pole		3																							1						3														
792	45.5897021	-89.55036167	7	Muck	Pole		3																							1						2														
793	45.6048486	-89.5498175	6	Sand	Pole		3									1							1							1						2														
794	45.6045516	-89.54981988	11	Sand	Pole		1									1																																		
795	45.6042545	-89.54982225	14		Rope		2																		1	2																								
796	45.6039575	-89.54982463	21		Rope		1																			1																								
797	45.6036605	-89.54982701	22		Rope		3																			3																								
798	45.6033635	-89.54982938	24		Rope		3																			3																								
799	45.6030664	-89.54983176	25		Rope		3																			3																								
800	45.6027694	-89.54983413	26		Rope		2																			2										1														

Sampling Point	Latitiude (Decimal Degrees)	Longitude (Decimal Degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Pole (P); Rake (R)	Comments	Total Rake Fullness	EWM	BRASC	CEREC	CHARA	DULAR	ELAMI	ELEAC	ELEPA	ELOCA	ELONU	ERIAQ	ISO_SP	JUNPE	LOBDO	BIDBE	MYRAL	MYRTE	NAJFL	NITELLA	NUPVA	NYMOD	PONCO	POTAM	POTEP	POTFO	POTGR	POTNA	POTPU&POTBE	POTRO	POTSP	POTST	POTVA	POTZO	RANFM	SAGCR	SCHTA	SPAANG	SPAFL	UTRIN	VALAM	F_AGLAE	SCHSU	JUNEF
801	45.6024724	-89.54983651	26		Rope		1																									1																																	
802	45.6021754	-89.54983888	26		Rope																																													
803	45.6018783	-89.54984126	27		Rope		1																			1																								
804	45.6015813	-89.54984363	27		Rope																																													
805	45.6012843	-89.54984601	29		Rope																																													
806	45.6009873	-89.54984838				DEEP																																														
807	45.6006903	-89.54985076				DEEP																																														
808	45.6003932	-89.54985314				DEEP																																														
809	45.6000962	-89.54985551				DEEP																																														
810	45.5997992	-89.54985789				DEEP																																														
811	45.5995022	-89.54986026				DEEP																																														
812	45.5992051	-89.54986264				DEEP																																														
813	45.5989081	-89.54986501				DEEP																																														
814	45.5986111	-89.54986739	32			DEEP																																														
815	45.5983141	-89.54986976	34			DEEP																																														
816	45.598017	-89.54987214	24		Rope		1																			1																								
817	45.59772	-89.54987451	21		Rope		1																			1																								
818	45.597423	-89.54987689	6	Sand	Pole		1				1														1					1																				
819	45.5959379	-89.54988876	4	Sand	Pole		1							1						1	1									1					1															
820	45.5956409	-89.54989113	14		Rope																																													
821	45.5953438	-89.54989351	23		Rope		2																			2																								
822	45.5950468	-89.54989588	30		Rope																																													
823	45.5947498	-89.54989826	28		Rope		1																			1																								
824	45.5944528	-89.54990063	16		Rope		2				1														1											1														
825	45.5941557	-89.54990301				TERRESTRIAL																																														
826	45.5917796	-89.549922	19		Rope																																													
827	45.5914825	-89.54992437	26		Rope		3																			3																								
828	45.5911855	-89.54992675	25		Rope		3																			1																								
829	45.5908885	-89.54992912	16		Pole																																													
830	45.5905915	-89.5499315	9	Sand	Pole		1																		1											1														
831	45.5899974	-89.54993625	10	Muck	Pole		3																													3														
832	45.5897004	-89.54993862	9	Muck	Pole		3									1																				3														
833	45.6042529	-89.5493991	5	Sand	Pole		3																							1						2														
834	45.6039558	-89.54940147	11	Sand	Pole		2																													2														
835	45.6036588	-89.54940385	20		Rope		1																			1																								
836	45.6033618	-89.54940623	22		Rope		1																			1																								
837	45.6030648	-89.54940861	24		Rope		3																			3																								
838	45.6027677	-89.54941098	25		Rope		3																			3																								
839	45.6024707	-89.54941336	26		Rope																																													
840	45.6021737	-89.54941574	26		Rope																																													
841	45.6018767	-89.54941812	27		Rope																																													
842	45.6015797	-89.5494205	28		Rope																																													
843	45.6012826	-89.54942287	29		Rope																																													
844	45.6009856	-89.54942525				DEEP																																														
845	45.6006886	-89.54942763				DEEP																																														
846	45.6003916	-89.54943001				DEEP																																														
847	45.6000945	-89.54943238				DEEP																																														
848	45.5997975	-89.54943476				DEEP																																														
849	45.5995005	-89.54943714				DEEP																																														
850	45.5992035	-89.54943951				DEEP																																														
851	45.5989065	-89.54944189				DEEP																																														
852	45.5986094	-89.54944427	33			DEEP																																														
853	45.5983124	-89.54944665	28		Rope																																													
854	45.5980154	-89.54944902	23		Rope		1																			1																								
855	45.5977184	-89.5494514	15		Rope		1																												1															
856	45.5974213	-89.54945378		Sand	Pole		1				1																																							1
857	45.5956392	-89.54946804	15		Rope		2									1																				2														
858	45.5953422	-89.54947042	20		Rope		1																			1																								
859	45.5950451	-89.54947279	29		Rope		1																			1																								
860	45.5947481	-89.54947517	29		Rope		1																			1																								
861	45.5944511	-89.54947755	15		Rope		1																												1															
862	45.5941541	-89.54947992				TERRESTRIAL																																														
863	45.5917779	-89.54949894	15		Rope																																													
864	45.5914809	-89.54950131	21		Rope		1																			1																								
865	45.5911838	-89.54950369	22		Rope		2																			2																								
866	45.5908868	-89.54950606	18		Rope		1									1									1																									
867	45.5905898	-89.54950844	8	Sand	Pole		1				1														1										1															
868	45.5899957	-89.54951319	10	Muck	Pole		3																													3														
869	45.5896987	-89.54951557	5	Muck	Pole		2	V								1														1						1														
870	45.6036571	-89.5489807	2	Sand	Pole		1				1									1	1		1	1																										
871	45.6033601	-89.54898308	6	Sand	Pole		2				2									1										1																				
872	45.6030631	-89.54898546	15		Rope																																													
873	45.6027661	-89.54898784	21		Rope		1																			1																								
874	45.6024691	-89.54899022	23		Rope		3																			3																								
875	45.602172	-89.5489926	25		Rope		3																			3																								
876	45.601875	-89.54899498	27		Rope																																													
877	45.601578	-89.54899736	29		Rope																																													
878	45.601281	-89.54899974	31		Rope																																													
879	45.6009839	-89.54900212				DEEP																																														
880	45.6006869	-89.5490045				DEEP																																														

Sampling Point	Latitiude (Decimal Degrees)	Longitude (Decimal Degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Pole (P); Rake (R)	Comments	Total Rake Fullness	EWM	BRASC	CEREC	CHARA	DULAR	ELAMI	ELEAC	ELEPA	ELOCA	ELONU	ERIAQ	ISO_SP	JUNPE	LOBDO	BIDBE	MYRAL	MYRTE	NAJFL	NITELLA	NUPVA	NYMOD	PONCO	POTAM	POTEP	POTFO	POTGR	POTNA	POTPU&POTBE	POTRO	POTSP	POTST	POTVA	POTZO	RANFM	SAGCR	SCHTA	SPAANG	SPAFL	UTRIN	VALAM	F_AGLAE	SCHSU	JUNEF
881	45.6003899	-89.54900688				DEEP																																												
882	45.6000929	-89.54900926				DEEP																																												
883	45.5997958	-89.54901163				DEEP																																												
884	45.5994988	-89.54901401	32			DEEP																																												
885	45.5992018	-89.54901639				DEEP																																												
886	45.5989048	-89.54901877				DEEP																																												
887	45.5986078	-89.54902115	31			DEEP																																												
888	45.5983107	-89.54902353	27		Rope		1				1																																							
889	45.5980137	-89.54902591	17		Rope																																													
890	45.5977167	-89.54902829	13		Rope		1																		1	1													1												
891	45.5974197	-89.54903067	2	Sand	Pole		2				1					1							1							1									1									1			
892	45.5959345	-89.54904257				TERRESTRIAL																																												
893	45.5956375	-89.54904495	9	Sand	Pole		2				1						1													1						1															
894	45.5953405	-89.54904732	13		Rope		1				1														1																										
895	45.5950435	-89.5490497	19		Rope		1				1															1																									
896	45.5947465	-89.54905208	20		Rope																					1													1												
897	45.5944494	-89.54905446	8	Sand	Pole		3									2														1						2															
898	45.5914792	-89.54907825	13		Rope																																														
899	45.5911822	-89.54908063	19		Rope																																														
900	45.5908852	-89.54908301	9	Rock	Pole		1																		1												1														
901	45.6030614	-89.54856231	2	Sand	Pole		1													1	1			1																											
902	45.6027644	-89.54856469	11	Sand	Pole		1																	1											1																
903	45.6024674	-89.54856707	18		Rope		1																			1																									
904	45.6021704	-89.54856945	20		Rope		1																			1																									
905	45.6018733	-89.54857184	26		Rope		3																			3																									
906	45.6015763	-89.54857422	28		Rope																																														
907	45.6012793	-89.5485766	31			DEEP																																												
908	45.6009823	-89.54857898				DEEP																																												
909	45.6006852	-89.54858136				DEEP																																												
910	45.6003882	-89.54858375				DEEP																																												
911	45.6000912	-89.54858613				DEEP																																												
912	45.5997942	-89.54858851	30		Rope																																														
913	45.5994972	-89.54859089				DEEP																																												
914	45.5992001	-89.54859327	30		Rope																																														
915	45.5989031	-89.54859566	28		Rope		o																																												
916	45.5986061	-89.54859804	25		Rope		1																			1																									
917	45.5983091	-89.54860042	13		Rope																																														
918	45.598012	-89.5486028	13		Rope																																														
919	45.597715	-89.54860518	12	Sand	Pole		1																		1	1																									
920	45.597418	-89.54860756	5	Sand	Pole		2																																		2										
921	45.5953388	-89.54862423	4	Sand	Pole		1				1			1						1					1																										
922	45.5911805	-89.54865757	8	Sand	Pole		1				1																																								
923	45.5908835	-89.54865995	8	Sand	Pole		1				1														1																										
924	45.6027627	-89.54814154	2	Sand	Pole		1						1						1		1			1																		1									
925	45.6024657	-89.54814393	12	Sand	Pole																																														
926	45.6021687	-89.54814631	17		Rope																																														
927	45.6018717	-89.5481487	23		Rope		3																			3																									
928	45.6015746	-89.54815108	26		Rope		1																			1																									
929	45.6012776	-89.54815346	29		Rope																																														
930	45.6009806	-89.54815585	29		Rope																																														
931	45.6006836	-89.54815823	29		Rope																																														
932	45.6003866	-89.54816062	29		Rope																																														
933	45.6000895	-89.548163	30		Rope																																														
934	45.5997925	-89.54816538	30		Rope																																														
935	45.5994955	-89.54816777	29		Rope																																														
936	45.5991985	-89.54817015	27		Rope																																														
937	45.5989014	-89.54817254	22		Rope																																											1		
938	45.5986044	-89.54817492	22		Rope		1																			1																									
939	45.5983074	-89.5481773	18		Pole																																														
940	45.5980104	-89.54817969	16		Rope																																														
941	45.5977133	-89.54818207	12	Sand	Pole		2				1														2												1														
942	45.5974163	-89.54818446	4	Sand	Pole		2				1												2																												
943	45.5908818	-89.54823689	6	Muck	Pole		3				1					2														1					1	1															
944	45.5905848	-89.54823927	5	Muck	Pole		3				1			1		2															1				1																
945	45.602167	-89.54772317	8	Sand	Pole		1				1									1																															
946	45.60187	-89.54772555	20		Rope		2																			2																									
947	45.601573	-89.54772794	22		Rope		3																			3																									
948	45.6012759	-89.54773033	22		Rope		3																			3																									
949	45.6009789	-89.54773271	24		Rope		3																			3																									
950	45.6006819	-89.5477351	24		Rope		1																			1																									
951	45.6003849	-89.54773749	27		Rope		2																			2																									
952	45.6000879	-89.54773987	28		Rope																																														
953	45.5997908	-89.54774226	29		Rope		1																			1																									
954	45.5994938	-89.54774465	28		Rope		1																			1																									
955	45.5991968	-89.54774703	25		Rope		3																			3																									
956	45.5988998	-89.54774942	24		Rope		1																			1																									
957	45.5986027	-89.5477518	19		Rope		2																			2																									
958	45.5983057	-89.54775419	22		Rope		2																			2																									
959	45.5980087	-89.54775658	20		Rope		1																			1																									
960	45.5977117	-89.54775896	16		Rope																																														

Sampling Point	Latitiude (Decimal Degrees)	Longitude (Decimal Degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Pole (P); Rake (R)	Comments	Total Rake Fullness	EWM	BRASC	CEREC	CHARA	DULAR	ELAMI	ELEAC	ELEPA	ELOCA	ELONU	ERIAQ	ISO_SP	JUNPE	LOBDO	BIDBE	MYRAL	MYRTE	NAJFL	NITELLA	NUPVA	NYMOD	PONCO	POTAM	POTEP	POTFO	POTGR	POTNA	POTPU&POTBE	POTRO	POTSP	POTST	POTVA	POTZO	RANFM	SAGCR	SCHTA	SPAANG	SPAFL	UTRIN	VALAM	F_AGLAE	SCHSU	JUNEF
961	45.5974146	-89.54776135	5	Sand	Pole		1				1			1											1										1															
962	45.6018683	-89.54730241	11	Sand	Pole		1																		1										1	1														
963	45.6015713	-89.5473048	14		Rope																																													
964	45.6012743	-89.54730719	17		Rope																																													
965	45.6009772	-89.54730958	16		Rope		1				1																																							
966	45.6006802	-89.54731197	23		Rope		1																			1																								
967	45.6003832	-89.54731436	26		Rope		1																			1																								
968	45.6000862	-89.54731675	28		Rope																																													
969	45.5997892	-89.54731913	28		Rope		1																			1																								
970	45.5994921	-89.54732152	27		Rope		1																			1																								
971	45.5991951	-89.54732391	25		Rope		3																			3																								
972	45.5988981	-89.5473263	24		Rope		2																			2																								
973	45.5986011	-89.54732869	23		Rope		2																			2																								
974	45.598304	-89.54733108	22		Rope		2																			2																								
975	45.598007	-89.54733346	20		Rope		2																			2																								
976	45.59771	-89.54733585	15		Rope		1																												1															
977	45.597413	-89.54733824	7	Sand	Pole		2																		1					1					1															
978	45.6012726	-89.54688405	8	Sand	Pole		1				1			1																							1													
979	45.6009756	-89.54688645	10	Sand	Pole		2				2																																							
980	45.6006785	-89.54688884	19		Rope																																													
981	45.6003815	-89.54689123	26		Rope		2																			2																								
982	45.6000845	-89.54689362	28		Rope		1																			1									1															
983	45.5997875	-89.54689601	28		Rope																																													
984	45.5994905	-89.5468984	27		Rope																																													
985	45.5991934	-89.54690079	26		Rope		1																			1																								
986	45.5988964	-89.54690318	24		Rope		1																			1																								
987	45.5985994	-89.54690557	24		Rope		2																			2																								
988	45.5983024	-89.54690796	22		Rope		2																			2																								
989	45.5980053	-89.54691035	20		Rope		2																			2																								
990	45.5977083	-89.54691274	18		Rope																																													
991	45.5974113	-89.54691513	9	Sand	Pole		1																		1																									
992	45.6009739	-89.54646331	4	Sand	Pole		2				1		1						1	1	1			1																		1									
993	45.6006769	-89.5464657	11	Sand	Pole																																													
994	45.6003798	-89.5464681	15		Rope		1																		1																									
995	45.6000828	-89.54647049	24		Rope		2																			2																								
996	45.5997858	-89.54647288	25		Rope		3																			3																								
997	45.5994888	-89.54647528	25		Rope																																													
998	45.5991918	-89.54647767	25		Rope		3																			3																								
999	45.5988947	-89.54648006	20		Rope		1																			1																								
1000	45.5985977	-89.54648246	23		Rope		1																			1																								
1001	45.5983007	-89.54648485	22		Rope		2									1										2																								
1002	45.5980037	-89.54648724	21		Rope		2																			2									1															
1003	45.5977066	-89.54648963	20		Rope		1									1										1									1															
1004	45.5974096	-89.54649203	15		Rope		1																													1														
1005	45.5971126	-89.54649442	5	Sand	Pole		1				1												1		1																									
1006	45.6003782	-89.54604497	7	Rock	Pole		1							1																																				
1007	45.6000811	-89.54604736	15		Rope																																													
1008	45.5997841	-89.54604976	22		Rope		1																			1									1															
1009	45.5994871	-89.54605215	22		Rope		3																			3																								
1010	45.5991901	-89.54605455	22		Rope		3																			3																								
1011	45.598893	-89.54605694	22		Rope		3																			3																								
1012	45.598596	-89.54605934	24		Rope		2																			2																								
1013	45.598299	-89.54606173	21		Rope		1																			1																								
1014	45.598002	-89.54606413	21		Rope		2																			2																								
1015	45.597705	-89.54606652	19		Rope		3																			3																								
1016	45.5974079	-89.54606892	17		Rope		1																			1																								
1017	45.5971109	-89.54607131	12	Sand	Pole		1																		1																									
1018	45.5968139	-89.54607371	1	Sand	Pole		1														1		1	1																										
1019	45.6000795	-89.54562424	9	Sand	Pole																																													
1020	45.5997824	-89.54562663	16		Rope		1																		1																									
1021	45.5994854	-89.54562903	18		Rope																																													
1022	45.5991884	-89.54563143	18		Rope																																													
1023	45.5988914	-89.54563383	20		Rope		1																			1																								
1024	45.5985943	-89.54563622	20		Rope		2																			2																								
1025	45.5982973	-89.54563862	20		Rope		3																			3																								
1026	45.5980003	-89.54564102	20		Rope		3																			3																								
1027	45.5977033	-89.54564342	18		Rope		1																			1																								
1028	45.5974063	-89.54564581	16		Rope		1																		1																									
1029	45.5971092	-89.54564821	10	Sand	Pole		2																		1										1		1													
1030	45.5968122	-89.54565061	4	Sand	Pole		1				1													1						1																				
1031	45.6000778	-89.54520111	3	Sand	Pole																																													
1032	45.5997808	-89.54520351	10	Sand	Pole																																													
1033	45.5994837	-89.54520591	14	Sand	Pole		1																		1																									
1034	45.5991867	-89.54520831	16		Rope																																													
1035	45.5988897	-89.54521071	18		Rope																																													
1036	45.5985927	-89.54521311	19		Rope		2																			2																								
1037	45.5982956	-89.54521551	19		Rope		1																			1																								
1038	45.5979986	-89.54521791	18		Rope																																													
1039	45.5977016	-89.54522031	15		Rope																																													
1040	45.5974046	-89.54522271	12	Sand	Pole		1																		1																									

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1041	45.5971075	-89.5452251	8	Sand	Pole		1																		1																									
1042	45.5968105	-89.5452275	4	Sand	Pole		1				1			1																1																				
1043	45.5997791	-89.54478038	6	Sand	Pole		1													1																														
1044	45.599482	-89.54478279	11	Sand	Pole		1																																								1			
1045	45.599185	-89.54478519	14		Rope		1																		1																									
1046	45.598888	-89.54478759	18		Rope																																															
1047	45.598591	-89.54478999	18		Rope																																															
1048	45.598294	-89.54479239	16		Rope																																															
1049	45.5979969	-89.54479479	15		Rope																																															
1050	45.5976999	-89.5447972	11	Sand	Pole		1				1														1																									
1051	45.5974029	-89.5447996	10	Sand	Pole		1																		1																									
1052	45.5971059	-89.544802	6	Sand	Pole		1							1											1																									
1053	45.5968088	-89.5448044	3	Sand	Pole		1																	1																										
1054	45.5997774	-89.54435726	1	Sand	Pole																			1																										
1055	45.5994804	-89.54435966	8	Sand	Pole																																															
1056	45.5991833	-89.54436207	8	Sand	Pole																																															
1057	45.5988863	-89.54436447	14	Sand	Pole		2				2														1																									
1058	45.5985893	-89.54436688	16		Rope																																															
1059	45.5982923	-89.54436928	15		Rope																																															
1060	45.5979952	-89.54437168	13	Sand	Pole		1																			1																								
1061	45.5976982	-89.54437409	10	Sand	Pole		1				1														1										1															
1062	45.5974012	-89.54437649	8	Sand	Pole		1																		1																									
1063	45.5971042	-89.54437889	5	Sand	Pole		1																		1																									
1064	45.5968072	-89.5443813	4	Sand	Pole		1				1													1																										
1065	45.5965101	-89.5443837	1	Sand	Pole		1														1			1																										
1066	45.5994787	-89.54393654	8	Sand	Pole																																															
1067	45.5991816	-89.54393895	9	Sand	Pole		2				1														2					1							1													
1068	45.5988846	-89.54394135	9	Rock	Pole																																															
1069	45.5985876	-89.54394376	11		Rope		1																		1	1																								
1070	45.5982906	-89.54394617	14	Sand	Pole		1				1														1	1																								
1071	45.5979936	-89.54394857	13	Sand	Pole		1				1														1																									
1072	45.5976965	-89.54395098	9	Sand	Pole		1				1																																							
1073	45.5973995	-89.54395338	9	Sand	Pole		1																		1																									
1074	45.5971025	-89.54395579	9	Sand	Pole		1																		1																									
1075	45.5968055	-89.5439582	12	Sand	Pole		1																		1											1														
1076	45.5965084	-89.5439606	9	Sand	Pole		2																		2	1										1	1													
1077	45.5962114	-89.54396301	3	Rock	Pole		2							1		1			1	1					1						1						1					1								
1078	45.599477	-89.54351342	7	Sand	Pole		1									1									1																									
1079	45.59918	-89.54351583	10	Sand	Pole		1				1																																							
1080	45.5988829	-89.54351824	14		Rope																																															
1081	45.5985859	-89.54352064	14		Rope		2				2																																							
1082	45.5982889	-89.54352305	13		Rope		1																		1																									
1083	45.5979919	-89.54352546	11	Sand	Pole		1																		1	1																								
1084	45.5976948	-89.54352787	9	Sand	Pole		1				1														1																									
1085	45.5973978	-89.54353028	11	Sand	Pole		1																		1																									
1086	45.5971008	-89.54353269	14		Rope		2																		1	1									1	1														
1087	45.5968038	-89.54353509	14		Rope		2																												1	1														
1088	45.5965067	-89.5435375	13		Rope		2																													2														
1089	45.5962097	-89.54353991	8	Sand	Pole		2																		1	1				1	1				1	1														
1090	45.5959127	-89.54354232	3	Sand	Pole		2																2	1																										
1091	45.6000693	-89.54308547				TERRESTRIAL																																														
1092	45.5997723	-89.54308788				TERRESTRIAL																																														
1093	45.5994753	-89.5430903	7	Muck	Pole		2															1														2														
1094	45.5991783	-89.54309271	14	Sand	Pole		2																		2	1																								
1095	45.5988812	-89.54309512	15		Rope																																															
1096	45.5985842	-89.54309753	14		Rope		1				1																																							
1097	45.5982872	-89.54309994	14		Rope		2				2																																							
1098	45.5979902	-89.54310235	10	Sand	Pole		1				1														1																									
1099	45.5976932	-89.54310476	8	Sand	Pole		1							1												1											1	1												
1100	45.5973961	-89.54310717	14	Sand	Pole		1				1														1																									
1101	45.5970991	-89.54310958	16		Rope		2																			1									1															
1102	45.5968021	-89.54311199	15		Rope		3									1										3									1															
1103	45.5965051	-89.5431144	15		Rope		1																			1																								
1104	45.596208	-89.54311681	14		Rope		2				2					1										1																								
1105	45.595911	-89.54311922	11	Sand	Pole		2																		2										1	1														
1106	45.595614	-89.54312163	4	Muck	Pole		1																																						1						
1107	45.595317	-89.54312404	1	Sand	Pole		1																1		1												1													
1108	45.6000676	-89.54266235				TERRESTRIAL																																														
1109	45.5997706	-89.54266476	1	Sand	Pole		1																		1																				1						
1110	45.5994736	-89.54266717	4	Sand	Pole		1																	1						1																				
1111	45.5991766	-89.54266959	9	Sand	Pole		2																		1											1														
1112	45.5988795	-89.542672	13	Sand	Pole		1				1														1																									
1113	45.5985825	-89.54267441	15		Rope																																															
1114	45.5982855	-89.54267682	15		Rope		2				2																																							
1115	45.5979885	-89.54267924	14	Sand	Pole																																															
1116	45.5976915	-89.54268165	13	Sand	Pole		1																			1																								
1117	45.5973944	-89.54268406	13	Sand	Pole		1																		1	1																								
1118	45.5970974	-89.54268648	16		Rope																																															
1119	45.5968004	-89.54268889	16		Rope		1																													1														
1120	45.5965034	-89.5426913	17		Rope		2																													2														

Sampling Point	Latitiude (Decimal Degrees)	Longitude (Decimal Degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Pole (P); Rake (R)	Comments	Total Rake Fullness	EWM	BRASC	CEREC	CHARA	DULAR	ELAMI	ELEAC	ELEPA	ELOCA	ELONU	ERIAQ	ISO_SP	JUNPE	LOBDO	BIDBE	MYRAL	MYRTE	NAJFL	NITELLA	NUPVA	NYMOD	PONCO	POTAM	POTEP	POTFO	POTGR	POTNA	POTPU&POTBE	POTRO	POTSP	POTST	POTVA	POTZO	RANFM	SAGCR	SCHTA	SPAANG	SPAFL	UTRIN	VALAM	F_AGLAE	SCHSU	JUNEF
1121	45.5962063	-89.54269371	15		Rope		3				3															1																								
1122	45.5959093	-89.54269613	14		Rope		2				1					1										2									1															
1123	45.5956123	-89.54269854	12	Sand	Pole		1																		1											1														
1124	45.5953153	-89.54270095	7	Muck	Pole		1																													1														
1125	45.5950183	-89.54270336				TERRESTRIAL																																												
1126	45.5997689	-89.54224164				TERRESTRIAL																																												
1127	45.5994719	-89.54224405				TERRESTRIAL																																												
1128	45.5991749	-89.54224647				TERRESTRIAL																																												
1129	45.5988779	-89.54224888	2	Sand	Pole		2						1	1																											1									
1130	45.5985808	-89.5422513	8	Sand	Pole		2																		1											1														
1131	45.5982838	-89.54225371	13	Sand	Pole		2				1														1										1															
1132	45.5979868	-89.54225613	11	Sand	Pole		1																		1	1																								
1133	45.5976898	-89.54225854	11	Sand	Pole		1																		1												1													
1134	45.5973927	-89.54226096	12	Sand	Pole		1																		1										1															
1135	45.5970957	-89.54226337	15		Rope		2				1																								1															
1136	45.5967987	-89.54226579	17		Rope		1																			1										1														
1137	45.5965017	-89.5422682	17		Rope		2																			2																								
1138	45.5962046	-89.54227062	16		Rope																																													
1139	45.5959076	-89.54227303	15		Rope		2				2																																							
1140	45.5956106	-89.54227545	14		Rope		1				1																																							
1141	45.5953136	-89.54227786	13	Sand	Pole		2																													2														
1142	45.5950166	-89.54228028	10	Sand	Pole		2																		2										1															
1143	45.5985791	-89.54182818	1	Sand	Pole		1				1										1			1																	1									
1144	45.5982821	-89.5418306	6	Sand	Pole		2							1																					1	2											1			
1145	45.5979851	-89.54183302	4	Sand	Pole		1																	1																										
1146	45.5976881	-89.54183543	8	Sand	Pole		1																		1												1										1			
1147	45.597391	-89.54183785	14	Sand	Pole		1																													1														
1148	45.597094	-89.54184027	15		Rope		1																			1									1															
1149	45.596797	-89.54184268	16		Rope		1				1																																							
1150	45.5965	-89.5418451	17		Rope		1																			1									1															
1151	45.596203	-89.54184752	17		Rope		1																			1																								
1152	45.5959059	-89.54184994	15		Rope		3									1										3									1															
1153	45.5956089	-89.54185235	15		Rope		2																													2														
1154	45.5953119	-89.54185477	14		Rope		1																													1														
1155	45.5950149	-89.54185719	11	Sand	Pole		2																		2					1																				
1156	45.5947178	-89.5418596	3	Sand	Pole		1				1												1																		1									
1157	45.5976864	-89.54141232	1	Rock	Pole																																													
1158	45.5973893	-89.54141474	9	Sand	Pole		2																		2											1	1													
1159	45.5970923	-89.54141716	14		Rope		2																			2									1															
1160	45.5967953	-89.54141958	15		Rope		1																													1														
1161	45.5964983	-89.541422	16		Rope																																													
1162	45.5962013	-89.54142442	16		Rope		1									1										1																								
1163	45.5959042	-89.54142684	17		Rope		2																													2														
1164	45.5956072	-89.54142926	15		Rope		1																													1														
1165	45.5953102	-89.54143168	15		Rope		2										2									1																								
1166	45.5950132	-89.5414341	14		Rope		1				1					1										1									1															
1167	45.5947161	-89.54143652	12	Sand	Pole		1																		1										1															
1168	45.5944191	-89.54143894	5	Sand	Pole		1				1													1																										
1169	45.5938251	-89.54144377	1	Sand	Pole		2													1			2	1																	1									
1170	45.5973876	-89.54099164	6	Sand	Pole																																													
1171	45.5970906	-89.54099406	12	Sand	Pole		1																		1											1														
1172	45.5967936	-89.54099648	15		Rope		1									1										1										1														
1173	45.5964966	-89.5409989	16		Rope		1									1										1										1												1		
1174	45.5961996	-89.54100132	17		Rope		2									2										1									1															
1175	45.5959025	-89.54100374	17		Rope		2				1					1										2																								
1176	45.5956055	-89.54100617	17		Rope		1																													1														
1177	45.5953085	-89.54100859	16		Rope		2									2																			1															
1178	45.5950115	-89.54101101	15		Rope		1																													1														
1179	45.5947144	-89.54101343	14		Rope																															1														
1180	45.5944174	-89.54101585	14		Rope		1																													1														
1181	45.5941204	-89.54101827	9	Sand	Pole		1																		1											1														
1182	45.5938234	-89.54102069	9	Muck	Pole		2																													2											1			
1183	45.5935263	-89.54102312	8	Sand	Pole		2																													2														
1184	45.5932293	-89.54102554	7	Sand	Pole		2																													2														
1185	45.5970889	-89.54057095	10	Sand	Pole		1																		1										1															
1186	45.5967919	-89.54057338	16		Rope		1																			1																								
1187	45.5964949	-89.5405758	16		Rope		2										2									1									1															
1188	45.5961979	-89.54057822	17		Rope		1																			1									1															
1189	45.5959008	-89.54058065	18		Rope		1									1																			1															
1190	45.5956038	-89.54058307			Rope		2										1									1									1	1														
1191	45.5953068	-89.5405855	17		Rope		1																													1														
1192	45.5950098	-89.54058792	16		Rope		1									1										1										1														
1193	45.5947127	-89.54059034	15		Rope		2									1										1									1	1														
1194	45.5944157	-89.54059277	15		Rope																																													
1195	45.5941187	-89.54059519	14		Rope		1																													1														
1196	45.5938217	-89.54059761	13		Rope		2																													2														
1197	45.5935246	-89.54060004	13	Muck	Pole		2																													2														
1198	45.5932276	-89.54060246	13		Rope		2																													2														
1199	45.5929306	-89.54060488	11	Sand	Pole		2				1											1			1	1										1														
1200	45.5970872	-89.54014785				TERRESTRIAL																																												

Sampling Point	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Pole (P); Rake (R)	Comments	Total Rake Fullness	EWM	BRASC	CEREC	CHARA	DULAR	ELAMI	ELEAC	ELEPA	ELOCA	ELONU	ERIAQ	ISO_SP	JUNPE	LOBDO	BIDBE	MYRAL	MYRTE	NAJFL	NITELLA	NUPVA	NYMOD	PONCO	POTAM	POTEP	POTFO	POTGR	POTNA	POTPU&POTBE	POTRO	POTSP	POTST	POTVA	POTZO	RANFM	SAGCR	SCHTA	SPAANG	SPAFL	UTRIN	VALAM	F_AGLAE	SCHSU	JUNEF
1201	45.5967902	-89.54015028	10	Sand	Pole		2																	1										1	1														
1202	45.5964932	-89.5401527	16		Rope		1										1									1										1														
1203	45.5961962	-89.54015513	18		Rope		1																												1															
1204	45.5958991	-89.54015755	18		Rope		2										1																		1															
1205	45.5956021	-89.54015998	18		Rope		1																												1															
1206	45.5953051	-89.54016241	18		Rope		1																			1																									
1207	45.5950081	-89.54016483	18		Rope											1																																			
1208	45.594711	-89.54016726	17		Rope																																														
1209	45.594414	-89.54016968	17		Pole	1										1										1									1															
1210	45.594117	-89.54017211	15		Rope		2				1					1										1										1														
1211	45.59382	-89.54017453	14		Rope																																														
1212	45.5935229	-89.54017696	14		Rope		2																													2														
1213	45.5932259	-89.54017939	14		Rope		2																													2														
1214	45.5929289	-89.54018181	13		Rope		3																													3														
1215	45.5926319	-89.54018424	8	Sand	Pole		2																		2					1		1				1														
1216	45.5967885	-89.53972717	8	Sand	Pole		1																													1														
1217	45.5964915	-89.5397296	14	Muck	Pole		3										2										2				1					1															
1218	45.5961944	-89.53973203	18		Rope		1																												1															
1219	45.5958974	-89.53973446	20		Rope		1																			1																									
1220	45.5956004	-89.53973689	20		Rope		1																			1																									
1221	45.5953034	-89.53973931	21		Rope		1										1									1																									
1222	45.5950064	-89.53974174	20		Rope																																														
1223	45.5947093	-89.53974417	18		Rope		2																			2																									
1224	45.5944123	-89.5397466	19		Rope		1																			1									1															
1225	45.5941153	-89.53974903	17		Rope		1										1										1									1															
1226	45.5938183	-89.53975145	16		Rope		2				2																									1															
1227	45.5935212	-89.53975388	16		Rope		2																													2														
1228	45.5932242	-89.53975631	15		Rope		1										1																																		
1229	45.5929272	-89.53975874	15		Rope		2																													2														
1230	45.5926302	-89.53976117	13	Sand	Pole		2																		2											1														
1231	45.5923331	-89.53976359	2	Sand	Pole		1				1		1						1	1				1																	1									
1232	45.5970838	-89.53930164	2	Sand	Pole		1				1			1																1																					
1233	45.5967868	-89.53930407	9	Sand	Pole		2									1																				2														
1234	45.5964898	-89.5393065	15		Rope		3										2									1									1	1														
1235	45.5961927	-89.53930893	18		Rope		2																			2																									
1236	45.5958957	-89.53931136				TEMPORARY OBSTACLE																																											
1237	45.5955987	-89.53931379	21		Rope		1																			1																									
1238	45.5953017	-89.53931622	22		Rope		1																			1																									
1239	45.5950047	-89.53931865	21		Rope																																														
1240	45.5947076	-89.53932108	21		Rope																																														
1241	45.5944106	-89.53932351	20		Rope																						1																									
1242	45.5941136	-89.53932594	18		Rope		1																			1									1															
1243	45.5938166	-89.53932837	17		Rope		1										1									1																									
1244	45.5935195	-89.5393308	17		Rope		1																													1														
1245	45.5932225	-89.53933323	16		Rope		1																													1														
1246	45.5929255	-89.53933566	15		Pole		2				1					2										1									1		1													
1247	45.5926285	-89.53933809	14		Rope																																														
1248	45.5923314	-89.53934052	10	Sand	Pole		2																		2										1															
1249	45.5920344	-89.53934295	1	Rock	Pole																																														
1250	45.5911434	-89.53935024				NONNAVIGABLE (PLANTS)																																											
1251	45.5908463	-89.53935267				TERRESTRIAL																																											
1252	45.5973791	-89.5388761	3	Muck	Pole		1			1				1		1																				1														
1253	45.5970821	-89.53887854	8	Muck	Pole		3																													3														
1254	45.5967851	-89.53888097	12	Muck	Pole		3																													3														
1255	45.5964881	-89.5388834	15		Rope		1																													1														
1256	45.596191	-89.53888583	18		Rope		3																			3																						1		
1257	45.595894	-89.53888827	18		Rope		1										1																		1															
1258	45.595597	-89.5388907	21		Rope		2																			1									2															
1259	45.5953	-89.53889313	22		Rope		1																			1																									
1260	45.5950029	-89.53889556	22		Rope		1																			1																									
1261	45.5947059	-89.538898			Rope																																														
1262	45.5944089	-89.53890043	21		Rope		1																			1																									
1263	45.5941119	-89.53890286	19		Rope		1																			1																									
1264	45.5938149	-89.53890529	18		Rope		1																			1																									
1265	45.5935178	-89.53890773	18		Rope		1										1																		1															
1266	45.5932208	-89.53891016	17		Pole																																														
1267	45.5929238	-89.53891259	16		Rope		2																													2														
1268	45.5926268	-89.53891502	16		Rope		2										1								1	1									1	1														
1269	45.5923297	-89.53891746	16		Rope		2										2																		1	1														
1270	45.5920327	-89.53891989	8	Sand	Pole		2																		1					1			2																	
1271	45.5908446	-89.53892962	3	Sand	Pole		1				1													1																											
1272	45.5905476	-89.53893205	2	Sand	Pole		1		1		1							1						1																											
1273	45.5973774	-89.538453	3	Sand	Pole		1																		1										1	1														
1274	45.5970804	-89.53845543	6	Sand	Pole		2									1								1											2												1		
1275	45.5967834	-89.53845787	5	Sand	Pole		1				1																			1						1														
1276	45.5964863	-89.5384603	10	Sand	Pole		1																		1																										
1277	45.5961893	-89.53846274	14		Rope		1																		1																										
1278	45.5958923	-89.53846517	17		Rope		2										1									1																									
1279	45.5955953	-89.53846761	18		Rope		2										1									2																									
1280	45.5952983	-89.53847004	19		Pole		2																												2															

Sampling Point	Latitiude (Decimal Degrees)	Longitude (Decimal Degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Pole (P); Rake (R)	Comments	Total Rake Fullness	EWM	BRASC	CEREC	CHARA	DULAR	ELAMI	ELEAC	ELEPA	ELOCA	ELONU	ERIAQ	ISO_SP	JUNPE	LOBDO	BIDBE	MYRAL	MYRTE	NAJFL	NITELLA	NUPVA	NYMOD	PONCO	POTAM	POTEP	POTFO	POTGR	POTNA	POTPU&POTBE	POTRO	POTSP	POTST	POTVA	POTZO	RANFM	SAGCR	SCHTA	SPAANG	SPAFL	UTRIN	VALAM	F_AGLAE	SCHSU	JUNEF
1281	45.5950012	-89.53847248	22		Rope																																												
1282	45.5947042	-89.53847491	23		Rope																																												
1283	45.5944072	-89.53847735	22		Rope		1																			1																									
1284	45.5941102	-89.53847978	21		Rope																																												
1285	45.5938131	-89.53848222	19		Rope		1									1											1										1																
1286	45.5935161	-89.53848465	19		Rope		1									1											1											1															
1287	45.5932191	-89.53848708	18		Rope		1																			1										1																
1288	45.5929221	-89.53848952	18		Rope		2										2									1										1																
1289	45.5926251	-89.53849195	17		Rope		2																			1											2															
1290	45.592328	-89.53849439	15		Rope		3										3																			1	1															
1291	45.592031	-89.53849682	15		Rope		1				1															1												1	1															
1292	45.591734	-89.53849926	13	Sand	Pole		2																		2												1																
1293	45.591437	-89.53850169	2	Sand	Pole		1																1																													
1294	45.5911399	-89.53850413	5	Sand	Pole		1				1								1					1											1										1										
1295	45.5908429	-89.53850656	6	Sand	Pole		2							1						2					1																									
1296	45.5905459	-89.53850899	9	Sand	Pole		2																															2															
1297	45.5902489	-89.53851143	3	Sand	Pole		1																			1									1																			
1298	45.5967817	-89.53803476			TERRESTRIAL																																											
1299	45.5961876	-89.53803964	1	Rock	Pole		1													1	1			1																									
1300	45.5958906	-89.53804208	10	Sand	Pole		1																		1												1														
1301	45.5955936	-89.53804451	15		Rope		3																															3															
1302	45.5952965	-89.53804695	17		Rope		2										1									1																									
1303	45.5949995	-89.53804939	19		Rope		1																												1																
1304	45.5947025	-89.53805182	23		Rope																																												
1305	45.5944055	-89.53805426	22		Rope																																												
1306	45.5941085	-89.5380567	21		Pole																																												
1307	45.5938114	-89.53805914	21		Rope		1																												1																
1308	45.5935144	-89.53806157	19		Rope		1									1											1																									
1309	45.5932174	-89.53806401	19		Rope		1																			1										1																
1310	45.5929204	-89.53806645	16		Rope		1										1									1										1																
1311	45.5926233	-89.53806888	16		Rope		2									1											1										2																
1312	45.5923263	-89.53807132	15		Pole		2									1										1											1																
1313	45.5920293	-89.53807376	17		Rope		3				1						1									1										1	2															
1314	45.5917323	-89.53807619	17		Rope		2									1	1																			1	1															
1315	45.5914353	-89.53807863	14	Sand	Pole		2				1															2												1																
1316	45.5911382	-89.53808107	14	Sand	Rope																																												
1317	45.5908412	-89.5380835	12	Sand	Pole		2				1																												2															
1318	45.5905442	-89.53808594	12	Sand	Pole		2																															2															
1319	45.5902472	-89.53808838	10	Sand	Pole		2																															2	1														
1320	45.5899501	-89.53809081	5	Sand	Pole		2							1					1						1					1																							
1321	45.5896531	-89.53809325	1	Sand	Pole		1														1							1																		1	1						
1322	45.5893561	-89.53809568	2	Sand	Pole		2		1													1																													
1323	45.5955919	-89.53762142			TEMPORARY OBSTACLE																																											
1324	45.5952948	-89.53762386	9	Sand	Pole		2																															2															
1325	45.5949978	-89.5376263	17		Rope		1									1																					1															
1326	45.5947008	-89.53762874	18		Rope		2																			2										1																
1327	45.5944038	-89.53763118	19		Rope		1																												1																
1328	45.5941067	-89.53763362	20		Rope																																												
1329	45.5938097	-89.53763606	22		Rope																																												
1330	45.5935127	-89.53763849	21		Rope		1																			1																									
1331	45.5932157	-89.53764093	21		Rope		1																			1																									
1332	45.5929187	-89.53764337	19		Rope		1										1									1										1																
1333	45.5926216	-89.53764581	18		Rope		2									1											2																									
1334	45.5923246	-89.53764825	19		Rope		3																			3																									
1335	45.5920276	-89.53765069	16		Rope		3										1									3										1																
1336	45.5917306	-89.53765313	17		Rope		3									1											3																									
1337	45.5914335	-89.53765557	14		Rope		1										1									1											1															
1338	45.5911365	-89.53765801	16		Rope		2																												1	2															
1339	45.5908395	-89.53766044	12	Sand	Pole		2				2															1																										
1340	45.5905425	-89.53766288	13	Sand	Pole		2									1																					1															
1341	45.5902454	-89.53766532	13		Rope		3																															3															
1342	45.5899484	-89.53766776	13	Sand	Pole		1																		1												1	1															
1343	45.5896514	-89.5376702	8	Sand	Pole		2				2															1					1																							
1344	45.5893544	-89.53767264	8	Sand	Pole		3									1																					3															
1345	45.5890574	-89.53767508	2	Sand	Pole		1				1				1			1						1																									
1346	45.5952931	-89.53720077			TERRESTRIAL																																											
1347	45.5949961	-89.53720321	9	Muck	Pole		2				2															1					1					1																
1348	45.5946991	-89.53720565	16		Rope		2																															2															
1349	45.5944021	-89.53720809	16		Rope		2										1									1										1																
1350	45.594105	-89.53721053	18		Rope		2										1									2																									
1351	45.593808	-89.53721298	19		Rope		1										1																			1																
1352	45.593511	-89.53721542	22		Rope		1																			1																									
1353	45.593214	-89.53721786	22		Rope																																												
1354	45.5929169	-89.5372203	20		Rope		1																			1																									
1355	45.5926199	-89.53722274	20		Rope		1									1																					1																
1356	45.5923229	-89.53722518	20		Rope		1									1																																				
1357	45.5920259	-89.53722762	20		Rope		1																			1																									
1358	45.5917288	-89.53723006	20		Rope		1																			1																									
1359	45.5914318	-89.53723251	19		Rope		2																			2																									
1360	45.5911348	-89.53723495	16		Rope		3										1									2										1																

Sampling Point	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Pole (P); Rake (R)	Comments	Total Rake Fullness	EWM	BRASC	CEREC	CHARA	DULAR	ELAMI	ELEAC	ELEPA	ELOCA	ELONU	ERIAQ	ISO_SP	JUNPE	LOBDO	BIDBE	MYRAL	MYRTE	NAJFL	NITELLA	NUPVA	NYMOD	PONCO	POTAM	POTEP	POTFO	POTGR	POTNA	POTPU&POTBE	POTRO	POTSP	POTST	POTVA	POTZO	RANFM	SAGCR	SCHTA	SPAANG	SPAFL	UTRIN	VALAM	F_AGLAE	SCHSU	JUNEF
1361	45.5908378	-89.53723739	16		Rope		2				2														1	1																								
1362	45.5905408	-89.53723983	14		Rope		3																													3														
1363	45.5902437	-89.53724227	14		Rope		3																													3														
1364	45.5899467	-89.53724471	14		Rope		2																													2														
1365	45.5896497	-89.53724715	12	Sand	Pole		3																													3														
1366	45.5893527	-89.53724959	12	Sand	Pole		3																													3														
1367	45.5890556	-89.53725203	8	Sand	Pole		3																													3														
1368	45.5887586	-89.53725447	3	Sand	Pole		1				1													1										1																
1369	45.5949944	-89.53678012	3	Sand	Pole		1				1								1					1												1														
1370	45.5946974	-89.53678257	10	Sand	Pole		2																		2										1															
1371	45.5944003	-89.53678501	15		Rope		1																													1														
1372	45.5941033	-89.53678745	16		Rope		1									1										1									1															
1373	45.5938063	-89.5367899	15		Rope																																													
1374	45.5935093	-89.53679234				TEMPORARY OBSTACLE																																												
1375	45.5932122	-89.53679478	18		Rope		2										1									2									1															
1376	45.5929152	-89.53679723	19		Rope		1																			1									1															
1377	45.5926182	-89.53679967	19		Rope		1																			1																								
1378	45.5923212	-89.53680211	20		Rope		2									1										2																								
1379	45.5920242	-89.53680456	20		Rope		1																			1																								
1380	45.5917271	-89.536807	20		Rope		2																			2																								
1381	45.5914301	-89.53680944	20		Rope		1																			1																								
1382	45.5911331	-89.53681189	17		Rope		3																			3																								
1383	45.5908361	-89.53681433	16		Rope		3										1																		3															
1384	45.590539	-89.53681677	15		Rope		3																									1			1	3														
1385	45.590242	-89.53681922	14		Rope		3																													3														
1386	45.589945	-89.53682166	14		Rope		2																													2														
1387	45.589648	-89.5368241	8	Sand	Pole		3				2						1													1						1											1			
1388	45.5893509	-89.53682655	5	Sand	Pole		2				2									1																														
1389	45.5890539	-89.53682899	9	Muck	Pole		3																													3														
1390	45.5887569	-89.53683143	7	Muck	Pole		3																													3														
1391	45.5884599	-89.53683387	4	Muck	Pole		2		1																									2																
1392	45.5881629	-89.53683632	2	Muck	Pole		3																	3																						1			1	
1393	45.5878658	-89.53683876				SHALLOW																																												
1394	45.5946956	-89.53635948				TERRESTRIAL																																												
1395	45.5943986	-89.53636193	6	Sand	Pole		1							1											1										1	1														
1396	45.5941016	-89.53636437	14	Sand	Pole		1																													1														
1397	45.5938046	-89.53636682	14		Rope																																													
1398	45.5935076	-89.53636926	15		Rope		1																			1									1															
1399	45.5932105	-89.53637171	16		Rope		1				1																								1															
1400	45.5929135	-89.53637415	16		Rope		3				3					1										1									1															
1401	45.5926165	-89.5363766	16		Rope		3				1					1										3																								
1402	45.5923195	-89.53637905	16		Rope		3									1	1									3																								
1403	45.5920224	-89.53638149	16		Rope		3																			3									1															
1404	45.5917254	-89.53638394	17		Rope		3																			3																								
1405	45.5914284	-89.53638638	18		Rope																																													
1406	45.5911314	-89.53638883	17		Rope		3				3															1																								
1407	45.5908343	-89.53639127	14		Rope		3										3									1									1															
1408	45.5905373	-89.53639372	15		Rope		2																													2														
1409	45.5902403	-89.53639616	14		Rope		2																												1	2														
1410	45.5899433	-89.53639861	7	Sand	Pole		3				2																			1			2														1			
1411	45.5896463	-89.53640105	2	Sand	Pole		1														1			1																										
1412	45.5893492	-89.5364035	5	Sand	Pole		2									1									2										1		1													
1413	45.5890522	-89.53640595	6	Muck	Pole		3																													3														
1414	45.5887552	-89.53640839	7	Muck	Pole		3																		1											3														
1415	45.5884582	-89.53641084	5	Muck	Pole		3																		1					1						3														
1416	45.5881611	-89.53641328	4	Muck	Pole		2																													2														
1417	45.5878641	-89.53641573				SHALLOW																																												
1418	45.5940999	-89.53594129	1	Sand	Pole															1				1																										
1419	45.5938029	-89.53594374	5	Sand	Pole		2				2			1						1					1																									
1420	45.5935058	-89.53594619	7	Sand	Pole		2				1														2					1																				
1421	45.5932088	-89.53594863	15		Rope		1																												1															
1422	45.5929118	-89.53595108	15		Rope		2																													2														
1423	45.5926148	-89.53595353	13		Rope		3				3																																							
1424	45.5923177	-89.53595598	16		Rope		3									1	1									1									3	1														
1425	45.5920207	-89.53595843	16		Rope		3				1					1																			1	3														
1426	45.5917237	-89.53596087	16		Rope		3				1					1	2																		2															
1427	45.5914267	-89.53596332	17		Rope		3				3																								1	1														
1428	45.5911297	-89.53596577	16		Rope		3									1	2									1									2															
1429	45.5908326	-89.53596822	16		Rope		3										2																		2	1														
1430	45.5905356	-89.53597066	14		Rope		1																													1														
1431	45.5902386	-89.53597311	9	Sand	Pole		3				1														2										2	1														
1432	45.5899416	-89.53597556	4	Sand	Pole		2				2													1	1																									
1433	45.5896445	-89.53597801				TERRESTRIAL																																												
1434	45.5893475	-89.53598045	3	Muck	Pole		2									1									1			1															2			1						
1435	45.5890505	-89.5359829	5	Muck	Pole		2																													2														
1436	45.5887535	-89.53598535	5	Muck	Pole		3									1														1						3														
1437	45.5884564	-89.5359878	4	Muck	Pole		2													1																1														
1438	45.5881594	-89.53599024	3	Muck	Pole		1																		1																									
1439	45.5878624	-89.53599269				SHALLOW																																												
1440	45.5875654	-89.53599514				TERRESTRIAL																																												

Sampling Point	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Pole (P); Rake (R)	Comments	Total Rake Fullness	EWM	BRASC	CEREC	CHARA	DULAR	ELAMI	ELEAC	ELEPA	ELOCA	ELONU	ERIAQ	ISO_SP	JUNPE	LOBDO	BIDBE	MYRAL	MYRTE	NAJFL	NITELLA	NUPVA	NYMOD	PONCO	POTAM	POTEP	POTFO	POTGR	POTNA	POTPU&POTBE	POTRO	POTSP	POTST	POTVA	POTZO	RANFM	SAGCR	SCHTA	SPAANG	SPAFL	UTRIN	VALAM	F_AGLAE	SCHSU	JUNEF
1441	45.5935041	-89.53552311				TERRESTRIAL																																												
1442	45.5932071	-89.53552556	6	Sand	Pole		1							1											1										1															
1443	45.5929101	-89.53552801	11	Sand	Pole		3																													3														
1444	45.592613	-89.53553046	13	Sand	Pole		1																													1														
1445	45.592316	-89.53553291	10	Sand	Pole		2				1														2										1															
1446	45.592019	-89.53553536	12		Rope																																													
1447	45.591722	-89.53553781	15		Rope		1																													1														
1448	45.591425	-89.53554026	16		Rope		1																									1																		
1449	45.5911279	-89.53554271	16		Rope		1																		1											1														
1450	45.5908309	-89.53554516	13		Rope		1										1																		1	1														
1451	45.5905339	-89.53554761	9	Sand	Pole		2																		2					1					1	1														
1452	45.5902369	-89.53555006	6	Sand	Pole		2				2									1																														
1453	45.5899398	-89.53555251	1	Sand	Pole		1																		1																									
1454	45.5890488	-89.53555986	3	Muck	Pole		2																		1												1\					1		1						
1455	45.5887518	-89.53556231	3	Muck	Pole		2		1											1					1																									
1456	45.5884547	-89.53556476	2	Muck	Pole		2		1																									1										2						
1457	45.5881577	-89.53556721	3	Muck	Pole		1																		1				1															1						
1458	45.5878607	-89.53556966				SHALLOW																																												
1459	45.5875637	-89.53557211				TERRESTRIAL																																												
1460	45.5929084	-89.53510494	1	Sand	Pole		1							1				1	1	1	1		1	1	1												1					1								
1461	45.5926113	-89.53510739	2	Sand	Pole		1						1	1					1	1				1																										
1462	45.5923143	-89.53510984	1	Rock	Pole		1																		1																									
1463	45.5920173	-89.53511229		Rock	Pole																																													
1464	45.5917203	-89.53511475	5	Sand	Pole		2				1					1																			1	2														
1465	45.5914232	-89.5351172	6	Sand	Pole		2				1					1									1					1					1	1	1				1									
1466	45.5911262	-89.53511965	3	Sand	Pole		2				1			1		1			1					1																										
1467	45.5908292	-89.5351221	3	Sand	Pole		1				1																			1																				
1468	45.5905322	-89.53512455	2	Sand	Pole																																													
1469	45.5902351	-89.53512701	1	Sand	Pole		1																		1																									
1470	45.58875	-89.53513927	1	Muck	Pole		1		1			1		1	1												1		1					1								1								
1471	45.588453	-89.53514172				SHALLOW																																												
1472	45.588156	-89.53514417				SHALLOW																																												
1473	45.587859	-89.53514662				SHALLOW																																												
1474	45.5875619	-89.53514907				TERRESTRIAL																																												
1475	45.5881543	-89.53472113				SHALLOW																																												
1476	45.5878572	-89.53472359				SHALLOW																																												
1477	45.5875602	-89.53472604				TERRESTRIAL																																												
1478	45.5878555	-89.53430055				SHALLOW																																												